

EXECUTIVE SUMMARY
OF
ENVIRONMENTAL IMPACT
ASSESSMENT

For
WAKRUGRE STONE MINE

Village- Wakrugre, Post- Zikabari,
District: West Garo Hills, Meghalaya
Area – 7.13 Ha

Proposed capacity: - 66432 Cu.m/annum or 186010 TPA

Applicant:

M/s A.S. STONE MINING
(Prop. Shri Jengna Marak)

Address: AT-2, Wakrugre, Village- Wakrugre,
Post- Zikabari,
District- West Garo Hills
State- Meghalaya



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INTRODUCTION OF PROJECT & PROPONENT

The proposed project is an opencast mechanized mining project, where mining of Boulder Stone mine will be done. The estimated project cost of the mine is Rs 21.0Lakhs with average production of 66432 Cu.m/annum or 186010 TPA. The lease area lies near Village: Wakrugre, Post: Zikabari, District: West Garo Hills, State: Meghalaya. The project falls in Category B1 as per EIA notification 2006 and its subsequent amendment thereof. (Total lease area 7.13 ha which is more than 5 ha hence proposed projects falls in category B1).

The Gift deed of land was executed in favor of Project Proponent by the District Registrar, Tura, Meghalaya. Vide regd. deed No. 8298, Dated 27-08-2020.

LOI was granted in favour of Project proponent vide letter No. MFG.39/42/LOI/MMMCR/2016/7652, Dated 30th September 2021.

TOR letter has been granted on 18-01-2024. Via letter no ML/SEIAA/MIN/WGH/P-365/2023/914.

LOCATION

The mine area is located near Village: Wakrugre, Post: Zikabari, District: West Garo Hills, State: Meghalaya. The mining lease / proposed project area falls in Survey of India Toposheet No. G46M2. The co-ordinates of the mine lease area are:

	Point	Latitude	Longitude
Coordinates	1	25°38'11.70"N	89°59'03.20"E
	2	25°38'13.30"N	89°59'00.70"E
	3	25°38'16.80"N	89°59'00.40"E
	4	25°38'19.10"N	89°59'58.56"E
	5	25°38'20.10"N	89°59'55.60"E
	6	25°38'22.30"N	89°59'01.50"E
	7	25°38'25.70"N	89°59'02.30"E
	8	25°38'21.90"N	89°59'06.80"E
	9	25°38'18.70"N	89°59'08.40"E
	10	25°38'17.00"N	89°59'08.20"E
	11	25°38'14.20"N	89°59'05.20"E
Nearest Railway Station	Dhubri Railway station, approx. 42.30 km toward North		

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	direction.
Nearest Airport	Shillong Airport, Approx. 200.0 km towards East direction.
Nearest Highway	SH-2, Approx, 0.25 km towards WSW Direction.

RESERVES

Total Geological Reserves	1600000 cum	4320000 Tonnes
Total Mineable Reserves	1354880 cum	3658176 Tonnes
Proposed Production	66432Cu.m/annum	186010 TPA

• MINING PROCESS

Mining operation has been proposed to be mechanized open cast mining, Shovel Dumper combination with deep hole drilling & blasting. It is proposed to out Sourced the blasting operation to the license vender. The waste material generated will be utilized haul road dressing and leveling in mining operation.

Blasting Parameters –

Depth of hole – 6m

Dia. of hole – 100mm

Spacing – 2.5m

Burden – 2m.

• EQUIPMENT REQUIREMENT

No.	Type	Nos.	Size/Capacity	Mode of Operation
1.	Wagon Drill	01	100mm dia	Compressed/air
2.	Compressor	01	100 L/s	Diesel
3.	Excavator 1.2Cum	01	1.2m ³	Diesel
4.	Tippers 25 tons	08	25/10 tones	Diesel
5.	Dozer (Optional)	01	65 H.P	Diesel
6.	Water Tanker	01	12000 liters	Diesel
7.	Diesel Pump	01	5/10 HP	Diesel
8.	D.G. Set	01	60 KVA	Diesel

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- **WATER DEMAND**

Water consumption will be there mainly for dust suppression, green belt development, drinking and other domestic purpose during mining operations. The total requirement of water will be **12.56~12.6 KLD**.

- **EMPLOYMENT**

As per the proposed production the total manpower requirement will be limited to a specific number of miners. However, the number of unskilled labour may increase/decrease depending on the quantum of overburden removal. The lessee will employ around **31** skilled and unskilled workers for removal of overburden, quarry cleaning and road repairing, etc. which includes the following:

Serial No.	Designation	Working forces per day
1.	Manager mines/Geologist Part time	1
2.	Mining Mate/Blaster	1
3.	Mechanic	1
4.	Electrician	1
5.	Services vehicle Operator/ water tanker	2
6.	Excavator/JCB Operator	2
7.	Dozer operator	1
8.	Grader Operator	0
9.	Dumper Operator	8
10.	Drill Operator	1
11.	Drill Helper	1
12.	Compounder	1
13.	Clerk	1
14.	Trip Man	0
15.	Semi Skilled Worker	0
16.	Unskilled workers	10
	Total	31

BASE LINE DATA

This section contains the description of baseline studies of the 10 km radius of the area surrounding. The data collected has been used to understand the existing environment scenario

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around the proposed mining project against which the potential impacts of the project can be assessed. Environmental data has been collected in relation to proposed mining for:-

- (a) Air
- (b) Noise
- (c) Water
- (d) Soil
- (e) Ecology and Biodiversity
- (f) Socio-economy

BASELINE ENVIRONMENTAL STATUS

Attribute	Baseline status
Ambient Air Quality	<p>Oct, 2023 to Dec, 2023</p> <p>Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM_{2.5} for all the 8 AQ monitoring stations were found to be 16.83µg/m³ and 48.65µg/m³ respectively. The minimum & maximum concentrations of PM₁₀ for all the 8 AQ monitoring stations were found to be 28.44µg/m³ and 72.45µg/m³, respectively.</p> <p>As far as the gaseous pollutants SO₂ and NO_x are concerned, the prescribed CPCB limit of 80 µg/m³ and 100 µg/m³ for residential and rural areas has never surpassed at any station. The minimum & maximum concentrations of SO₂ were found to be 3.92µg/m³ to 20.1µg/m³ respectively. The minimum & maximum concentrations of NO_x were found to be 6.0µg/m³ to 20.65µg/m³ respectively.</p>
Noise Levels	Noise monitoring was carried out at 08 locations. The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS.

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Water Quality	<p>5 Groundwater samples and 2 surface water samples were analyzed and concluded that:</p> <p>The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500.</p> <p>From the surface water analysis it is evident that most of the parameters of the samples comply with 'Category C' standards of CPCB Drinking water source with con-ventional treatment followed by disinfection.</p>
Soil Quality	<p>Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.27 to 7.84, which shows that the soil is alkaline in nature. The water holding capacity is found in between 25.0 % to 28.8 %.</p>
Ecology and Biodiversity	<p>There are no Ecologically Sensitive Areas present in the study area.</p>

ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

• BIOLOGICAL ENVIRONMENT

Impacts on Biodiversity

As the mining activity is restricted to core zone, no significant impact on the flora of the buffer zone due to the proposed mining is anticipated. The incremental dust generations due to the mining operations, at the boundary of the mine lease are insignificant and it is also expected that with the adoption of mitigatory measures as suggested in EMP, the impact due to operation of the mine will be minimal on the terrestrial ecosystem and also on the adjacent forest area.

The proposed progressive plantation over a period of time will reduce the impact, if any, on the fauna.

Impacts on agriculture

No agriculture activity is going on in mine lease area. Therefore no significant impact on the agriculture around the project site is expected.

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Mitigation Measures

There is a requirement to establish a stable ecosystem with both ecological and economic returns. Minimization of soil erosion and dust pollution enhances the aesthetic value of the core and the buffer zone. To achieve this, it is planned to increase the area of green cover of plantation and green belts activities. The basic objectives of plantations are as follows:

- Improvement of Soil quality,
- Quick vegetative cover to check soil erosion,
- Improvement in mining site stability,
- Conservation of biological diversity of plants, birds and animals,
- As dust receptor and dust filter, this is likely to be produced during mining.
- If birds are noticed crossing the core zone, they will not be disturbed at all;
- Labors will not be allowed to discards food, plastic etc., which can attract animals/birds near the core site;
- Only low polluting vehicles having PUC will be allowed for carrying mining materials.
- Noise level will be maintained within permissible limit (silent zone-50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms.

• LAND ENVIRONMENT

Various components of land environment have been identified for study of impact of the mine operations. Details of the same are given below:

Solid waste generation and management

The land will be affected by excavation of mineral and dumping of waste. The waste material generated will be utilized haul road dressing and leveling in mining operation. Land use planning is suggested for minimizing the adverse impact of mining activities on environment and also helps in economy of the project as well as effective restoration and enhancement of land surface with the help of plantation through proper and planned green belt development in 7.5 m barrier zone.

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Impact on land use & reclamation of mined out areas

The area likely to be degraded due to quarrying, pitting. The total mined out area at the ultimate stage shall be left as water reservoir and the water which shall be utilized by local people for agriculture & domestic use. Plantation along the safety zone has been proposed as a part of rehabilitation of the area. The impact on land use will also be limited.

The various modifications due to mining allied & activities during next five years are given below.

LANDUSE PATTERN OF THE MINE AREA (HECTARES)

Sl. No	Pattern of Utilization	Present/Existing Land use pattern in (ha.)	Proposed Land use for Current plan period (ha.)	Land used at the conceptual stage i.e. end of mine life (ha.)
1)	Mining Activities	0.00	4.87	5.98 (water body)
2)	Offices/Store/Magazine etc.	0.00	0.00	0.00
3)	Dumping	0.00	0.26	0.26 (water body)
4)	Mining Road	0.00	0.02	0.02
5)	Garland drains	0.00	0.10	0.10
6)	Settling Pond	0.00	0.05	0.05
7)	Green belt/ Safety Zone	0.00	0.72 (Plantation)	0.72 (Plantation)
8)	Stone Stock yards	0.00	0.00	0.00
9)	Unutilized	7.13	1.11	0.00
	Total	7.13	7.13	7.13

As the mineral is non-replenishable, the excavated area at the end of mine life will be converted into water body.

- **AIR ENVIRONMENT**

Anticipated impacts and evaluation

Information on air quality was studied and various modelling techniques predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, transportation and unloading operations may cause deterioration in air quality due to

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handling dry materials. In the present case, from the Air modelling results it is anticipated that the incremental pollution will remain within the limit and becomes insignificant outside the mine lease area. Also, the blasting is not prescribed and will be only done in the utmost requirement and that too for a very short duration of mere significance.

Mitigation measures

The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. Utmost care will be taken to prevent spillage from the trucks. Overloading will be prevented. Plantation activities along the roads will also reduce the impact of dust in the nearby villages.

• WATER ENVIRONMENT

To find out the effect on ground water an extensive hydro-geological study has been conducted and from the study it can be safely concluded that there is no noticeable effect on surrounding ground water resource due to mining.

Mining of stone does not have any significant impact on the water quality and parameters as the mining does not intercept with the ground water level.

In this project, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water from the river. There will not be any adverse impact on surface hydrology and ground water regime due to this project. The contractor will adhere to all guidelines and rules for proper and scientific method of mining during the period of extracting the stone. Thus, the project activities shall not have any adverse affect on the physical components of the environment and therefore may not have any effect on the recharge of ground waters or affect the water quality.

• NOISE ENVIRONMENT

Anticipated impacts and evaluation

Noise generated at the mine is due to mechanized mining operations and truck transportation activities. The noise generated by the mining activity dissipates within the mine. There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area.

Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings, but when it is abnormally high- it incurs some maleficent effects.

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In this case the impact of noise on the nearby settlements is negligible as they are far located from the mine workings.

Mitigation measures

On-site

- a) **Blasting** only if required will be done by a licensed blaster.
- b) **Maintenance of Machinery:** Regular maintenance of machinery will keep the generated noise level below the minimum prescribed limit i.e. not exceeding 90 dB (A) at a distance of 2 m from the machine. All machines will be as per stipulated standards and will be used at their optimum capacity.
- c) **Trained Operators:** Only trained operators will be allowed to operate machines during mining to reduce any chance of safety failures.
- d) **Vegetation:** Plantation will be carried in the 7.5m safety zone of the lease area.
- e) **Hearing Protection:** All the miners will be provided with Personal Protective equipments such as ear-muffs.

Off-site

The off-site receptors are not significantly affected as they are located far away from the mine site. But some disturbances due to vehicle movement cannot be avoided. Plantation will be done along the roadsides, civic amenities, etc. which will more or less dampen the off-site noise level.

SOCIO-ECONOMIC ENVIRONMENT

The implementation of Wakrugre Stone Mining project will throw opportunities to local people for both direct and indirect employment. Since the quarries will be leased out to successful allottees, stone mining operation in the state will get legalized and it will fetch income to the state exchequer. The project will also provide impetus to industrialization of the area. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agriculture to mining and industry. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

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- **ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

Proper environmental management plan is proposed for Wakrugre Stone Mining project to mitigate the impact during the mining operation.

- No overburden or loose sediments will be kept in the working benches particularly during monsoon months.
- The possibility of the project activity contributing to the pollution of watercourses of the region or to the ground water regime is so less that this does not significantly constitute an area of concern.
- Construction of well-compacted roads.
- Regular water spraying on haul roads and waste dumps by tankers.
- Provision of dust collectors for the drilling machines.
- Controlled blasting (if any).
- Supply of personal protective equipments like dust masks, earplugs, helmets, safety boots etc. for the miners.
- Plantation of wide leaf trees, creepers, tall grasses around quarry sites, waste dumps, road and other surrounding barren zones.
- Proper and regular maintenance of vehicles, compressors and jack hammers.
- Provision of supplying earplugs for jackhammer drillers and crusher operators.
- Care should be taken that noise produced during vehicles movement for carrying stone is within the permissible noise level.
- Carrying of blasting (if any) only during daytime (not during cloudy weather and when strong wind is blowing towards residential areas). Blasting will be carried out with limited explosives at a time so that the noise generation can be well maintained with the prescribed limits.
- Provision of Green Belt (thick foliage) along the lease boundary and road.
- Strict observance of the provisions of Acts, Rules and Regulations in respect of safety both by management and the workers.
- Proper planning and designing of work in order to reduce the risk of hazards.
- Specific instructions and supervisions of working where danger due to fall of side (overhanging, undercutting of bench, fall of objects from higher benches/places is apprehended).

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- Training of work persons and the officials.
- Since the haul road will be of considerable length, due importance will be given in the construction of road. The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- A code of practices for tipping in stock piles/dumping of overburden at dump yard and loading point will be implemented.
- In respect of contract work, safety code for contractors and workers will be implemented.
- They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipments will be supplied to them.
- A code of practice for fighting fire will be implemented.
- Competent persons like fitters, mechanics will imparted with special attention to project impact.
- The safe handling of materials while attending to repairs, maintenance of HEMM.
- Provision of pit safety committee meeting every month (20th day) to discuss the safety of the mines and the persons employed.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness amongst employees.
- Pre joining medical check up shall be done and regular health check up in 6 monthly interval is planned for the employees.
- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- If some causality or injury to animal occurs, it should be informed to forest department and proper treatment should be given.
- Corridor movement of wild mammals (If exists) should be avoided.
- **ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION**

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implanted and monitored. Thus, an implementation and monitoring programme has to be prepared.

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The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas:

- a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b) Collection of soil samples at strategic locations once in every year and analysis thereof with regard to deleterious constituents, if any.
- c) The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.
- d) Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.
- e) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.
- f) Plantation/afforestation as should be done as per program. Regular watering of plant and fencing to protect them from cattle/goats has to be provided. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

Greenery development: The project will not lead to any tree cutting. However, a social responsibility, greenery will be developed in 7.5m barrier zone of lease area. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.

During the plan period, **1800** plants will be planted in 7.5m barrier zone of lease area.

Mine management will be in regular touch with local surrounding villages to update the various developmental schemes made by them. They will also consider any immediate requirement, which could be taken care of in near future.

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Mine management will be in regular touch with State Pollution Control Board and Indian Bureau of Mines and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of.

BUDGET ALLOCATION FOR EMP IMPLEMENTATION

COST OF EMP

Sl. No	Description	Capital Cost (Rs.)	Recurring Cost (Rs.)
1	Pollution Control & Dust Suppression	--	2,00,000
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil Pollution iv) Noise Pollution	--	14,000 (4 samples) 8,000 (2 GW & 2 SW) 8,000 (2 samples) 7,000 (2 samples)
3	Plantation	3,60,000	1,00,000
4	Construction and maintenance of haul road	1,62,500	90,000
TOTAL		5,22,500	4,27,000

*Note: *1800 plants * 200 Rs (for each plants including hedges and fences) = 3.60 lakh*

*Salary of Labor for haul road maintenance 1 labor*300 =300 per day*

300 300 = 90000/-*

** 2.5 lakh per kilometer (250000 * 0.650 km haul road = 1,62,500/-)*

MONITORING SCHEDULE AND PARAMETERS

Monitoring Schedule and Parameters

S.No.	Description of Parameters	Schedule and Duration of Monitoring
1	Air Quality a)In the vicinity of the mine b)In the vicinity of the transportation network	24 hourly samples twice a week for one month in each season except monsoon season.
2	Water Quality a)Water quality of groundwater around the site b)Drinking water must conform to drinking	Once in a season for 4 season in a year.

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	water standards	
3	Ambient Noise Level	Twice in a year for couple of years & then once in a year.
4	Soil Quality	Once in two years on project monitoring area.
5	Inventory of Flora(tree plantation, survival etc)	Once in two years on project monitoring area.
6	Socio-economic condition of local, population, physical survey	Once in 3 or 4 years.

BENEFIT OF MINING

PHYSICAL BENIFITS

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

- a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.
- b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.
- c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.
- a. **Creation of community assets** (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health centre, community centre, market place etc, as a part of corporate social responsibility.

SOCIAL BENEFITS

- a) **Increase in Employment** Potential due to the project activity. Employment opportunities will increase both directly as well indirectly.
- b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.

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c) **Strengthening of existing community** facilities through the Community Development Programme.

CORPORATE ENVIRONMENTAL RESPONSIBILITY

CER 2% of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018. The following has been proposed considering the needs & demand of the people

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during Public Hearing. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme.

CER Budget

Activity	Capital Cost (in Rs.)
Fund for distribution of medicine in nearby village	42,000
Fund for health check up camp in nearby village	58,000
Total	1,00,000

CONCLUSION

Based on the EIA study it is observed that there will be an increase in the dust pollution, which will be controlled by wet drilling, sprinkling of water and plantation. There will be an insignificant impact on ambient environment and ecology due to the mining activities moreover the mining operation will lead to direct and indirect employment generation in the area. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the stone mine. Monitoring program will be followed till the mining operations continue. Hence, it can be summarized that the development of the mine will have a positive impact on the socio-economic of the area and lead to sustainable development of the region. The per capita income of villages is much below the national average. It will increase the profitability of the company and will have

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positive impact in the socio-economic status of the people in the region & will increase opportunities for employment

The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities. Proposed activities and expenses on Corporate Environmental Responsibility will be as per Mandate of the Government.
