EXECUTIVE SUMMARY

FOR OBTAINING ENVIRONMENTAL CLEARANCE

(Category - B1, under item 1 (a), as per EIA Notification 14th September' 2006 and its subsequent amendments till date)

FOR

"WAHRIANG LIMESTONE MINE"

Location:- At Wahriang, Khliehshnong, Elaka Rymbai, District East Jaintia Hills (Meghalaya)

Production Capacity: - 1,33,750 TPA of ROM (Limestone:- 1,20,375 TPA and Waste:- 13,375 TPA)

Area: - 1.33 Ha; LOI issued dated 30.09.2021

Lease Validity: - 15 Years (From the date of Registration)

Details of ToR	**:**	**Issued from SEIAA, Meghalaya**
Baseline data Generation	**:**	**March' 2022 to May, 2022 (Pre Monsoon Season)**
Project Cost	**:**	**Rs. 20.00 Lacs**

PROMOTER

Shri Bigen Rupsi

R/o.- Umlong Village, District- East Jaintia Hills, Meghalaya

ENVIRONMENTAL CONSULTANT

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NABET Accreditation: NABET/EIA/2023/ RA0192

September, 2022

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The proposed project "Wahriang Limestone Mine" is situated at Wahriang, Khliehshnong, Elaka Rymbai, District East Jaintia Hills (Meghalaya). The total lease area of the project is 1.33 Ha. The mining activity will be carried out by open cast semi-mechanized method.

The Letter of Intent has been sanctioned in favour of Bigen Rupsi from the Office of Govt. of Meghalaya, Divisional Forest Officer, Jaintia Hills Territorial Division, Jowai. vide letter no. JH/BR/ML/2021-22/LS/B/1053 dated 30.09.2021, which was valid upto 30.03.2022. The proposed mine is spread over an area of 1.33 ha. with mineable reserves of about 5,27,000 Tonnes to produce 1,33,750 TPA of ROM (Limestone:- 1,20,375 TPA and Waste:- 13,375 TPA).

1.1 LOCATION OF LEASE AREA

The proposed project "Wahriang Limestone Mine" is situated at Wahriang, Khliehshnong, Elaka Rymbai, District East Jaintia Hills (Meghalaya).

1.2 DETAIL OF MINING LEASE

S. No.	Particulars	Details
1.	Name of Project	Wahriang Limestone Mine
2.	Location	Wahriang, Khliehshnong, Elaka Rymbai, District East Jaintia Hills (Meghalaya).
3.	Lease Area	1.33 Ha.
4.	Land Type	Khatedari Land (Private)
5.	Latitude & Longitude	25°10'31.06" N to 25°10'36.08" N and 92°20'09.02" E to 92°20' 13.06"E
6.	Seismic Zone	Zone – V

1.3 PROJECT DESCRIPTION

The Letter of Intent has been sanctioned in favour of Shri Bigen Rupsi vide letter no. JH/BR/ML/2021-22/LS/B/1053 dated 30.09.2021 which was valid upto 30.03.2022. The proposed mine is spread over an area of 1.33 ha. with mineable reserves of about

5,27,000 Tonnes to produce 1,33,750 TPA of ROM (Limestone:- 1,20,375 TPA and Waste:- 13,375 TPA).

The proposed mining operations will be carried out by open cast semi - mechanized method.

1.4 GEOLOGY

1.4.1 LOCAL GEOLOGY

The limestone is exposed in the whole lease area. No other rocks exposed in the lease area. The lime stone has strike almost north- south and dip seems vertical in absence of workings. No fault, fold and geological disturbances are observed in the area. The succession of rocks in the lease area is as given below:-

Table 1.1: Local Geology

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
----------UNCONFIRMITY----------			
Eocene	Jaintia Group	Shella Formation	Lime Stone

1.4.2 PHYSIOGRAPHY

The topography of the lease area is undulated. Highest elevation is 621 MSL and lowest is 597 MSL. The drainage of the lease area is west to south direction.

1.4.3 GEOLOGICAL AND MINEABLE RESERVES

Geological Reserve : 17,92,800 MT

Mineable Reserve : 5,27,000 MT

Production : 1,33,750 TPA of ROM

Life of Mine : 05 Years

1.4.4 MINING

The mining will be done by open cast semi-mechanized method of mining. The salient features of mode of working as per approved Mining Plan with PMCP are:-

- The mining will be carried out by open – cast semi-mechanized method.
- The bench hseven will be kept 6m and width of the bench will not be less than the hseven of the bench.

- Total six bench will be developed i.e. from Bench levels 619MSL (Top bench), 613MSL, 607MSL, 601MSL, 595MSL, 589MSL, 583MSL, 577MSL and 571MSL (lowest bench).
- Blasting will be done by short or long holes with the permission of DGMS.
- The bench slope will be providing 85°.
- The loading will be from pits or from stocks.

1.4.5 PRODUCTION DETAILS

The year wise development of mines for five year will progress as per the table below:-

Table 1.2: Production Details

Year	ROM (T)	Waste/sub-grade (T)	Mineral Limestone (T)
1st Year	1,33,750	13,375	1,20,375
2nd Year	1,33,500	13,350	1,20,150
3rd Year	1,11,150	11,125	1,00,025
4th Year	1,11,150	11,100	1,00,050
5th Year	89,850	8,975	80,875
Total	**5,79,400**	**57,925**	**5,21,475**

1.4.6 LAND USE PATTERN

Land use plan of the mine lease area to encompass pre-operational, operational and post–operational phases is given below:-

Table 1.3: Land Use Pattern

Sr. No.	Land Use Category	Pre-Operational (Ha.)	Operational (Ha.)	Post-Operational (Ha.)
1	Top Soil Dump	00	0.01	00
2	Overburden Dump	00	0.08	0.08 (Reclaimed by Plantation)
3	Excavation (Voids Only)	00	1.09	0.40
4	Road	00	0.02	0.02 (Public Use)
5	Built Up Area	00	0.01	0.01 (Public Use)
6	Township Area	00	00	00
7	Afforestation	00	0.10	0.12

8	Reclamation (Backfilled)	00	00	0.69 (Plantation)
9	Mineral Storage	00	00	00
10	Sub – grade stack yard	00	00	00
11	Undisturbed Area	00	0.02	0.01(Plantation)
Total		**1.33**	**1.33**	**1.33**

1.5 DESCRIPTION OF THE ENVIRONMENT

For monitoring the environmental parameters like meteorology, air, water, soil and noise quality, the monitoring stations have been established at seven locations in the study area. The baseline data has been collected in the pre monsoon season (March' 2022 to May' 2022). The detail of the sampling locations is given in below:-

Table 1.4: Sampling Location

Sampling Location	Distance (Km)	Direction	Components
Mine Site (Shri Bigen Rupsi)	--	--	Air, Water, Noise, Soil
Near Dalmia Cement Bharat Limited	2.0	NE	Air, Water, Noise, Soil
Lumsnang	4.1	ENE	Air, Water, Noise, Soil
25° 9'52.57"N 92°20'56.18"E (Location-4)	1.7	SE	Air, Water, Noise, Soil
Umlong	0.4	S	Air, Water, Noise, Soil
25°10'32.71"N 92°19'15.16"E (Location-6)	1.4	W	Air, Water, Noise, Soil
25°11'30.97"N 92°19'51.21"E (Location-7)	1.9	NNW	Air, Water, Noise, Soil

1.5.1 LAND ENVIRONMENT

1.5.1.1 Soil Quality

Soil samples were collected at seven representative sampling locations. The soil analysis results are given below:-

pH	:	7.41 – 8.05
Total Organic Matter	:	0.41 – 0.94 (% by mass)
Nitrogen as N	:	0.021–0.036(mg/100gm)

Phosphorus as P	:	10.80–12.76 (meq/100gm)
Potassium as K	:	74.60 – 297.75 (mg/kg)

1.5.1.2 Water Environment

Seven ground water samples have been considered in the study area. The analysis results are presented below:-

Table 1.6: Water Quality Status

Sr. No.	Parameter	Requirement (Desirable Limits).	Permissible Limits in the Absence of Alternate Source.	Units	Mine Site (Shri Bigen Rupsi)	Near Dalmia Cement Bharat Limited	Lumsnang	25° 9'52.57"N 92°20'56.18"E (Location-4)	Umlong	25°10'32.71"N 92°19'15.16"E (Location-6)	25°11'30.97"N 92°19'51.21"E (Location-7)
1.	Colour	5	25	Hazen	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2.	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	Agreeable	-	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	5	10	NTU	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5.	pH value	6.5-8.5	-	-	7.51	7.25	7.38	7.68	7.21	7.36	7.48
6.	Total Dissolve Solid (TDS)	500	2000	mg/l	318	326	320	336	322	250	280
7.	Aluminum (as Al)	0.03	0.2	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
8.	Anionic surface Detergents (as MBAS)	0.2	1.0	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
9.	Boron (as B)	0.5	2.4	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
10.	Calcium (as Ca)	75	200	mg/l	51.0	54.2	51.4	58.8	60.5	54.0	51.3
11.	Chloride (as Cl)	250	1000	mg/l	16.8	15.2	12.5	17.6	15.1	15.0	12.6
12.	Copper (as	0.05	1.5	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

	Cu)										
13.	Fluoride (as F)	1	1.5	mg/l	0.25	0.36	0.28	0.35	0.26	0.18	0.25
14.	Iron (as Fe)	1.0	No Relaxation	mg/l	0.130	0.123	0.127	0.140	0.119	0.121	0.118
15.	Magnesium (as Mg)	30	100	mg/l	6.89	4.71	17.0	7.96	2.60	15.4	17.2
16.	Manganese (as Mn)	0.1	0.3	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17.	Mineral Oil	0.5	No Relaxation	mg/l	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
18.	Nitrate (as NO_3)	45	No Relaxation	mg/l	2.55	2.21	4.16	4.08	3.40	2.16	2.54
19.	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20.	Sulphate (as SO_4)	200	400	mg/l	26.0	32.4	34.6	28.4	32.1	32.0	27.8
21.	Alkalinity (as Ca CO3)	200	600	mg/l	178	164	180	165	170	189	192
22.	Total Hardness (as $CaCO_3$)	200	600	mg/l	156	155	160	180	162	161	175
23.	Zinc (as Zn)	5	15	mg/l	0.136	0.118	0.122	0.127	0.140	0.128	0.131

24.	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
25.	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26.	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27.	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28.	Arsenic (as As)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
29.	Total Chromium (as Cr)	0.05	No Relaxation	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
30.	Conductivity µmhos/cm	-	-	µmhos/cm	496	508	498	521	502	389	421

1.5.3 AIR ENVIRONMENT

To assess the baseline status of the air quality in the study area systematic ambient air quality monitoring has been carried out for criteria pollutants (PM_{10}, $PM_{2.5}$, NO_X, SO_2 and CO) at seven representative ambient air quality monitoring stations.

1.5.3.1 Air Quality

Ambient air quality monitoring has been carried out with a frequency of two days a week at seven locations covering one complete season i.e. March' 2022 to May' 2022. The summary of these results for all the locations is given below. These are compared with the standards prescribed by Central Pollution Control Board (CPCB) for rural and residential zone.

Table 1.7: Ambient Air Quality Status

S. No.	Sampling Location		Parameters				
			PM_{10} ($\mu g/m^3$)	**$PM_{2.5}$ ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**NO_x ($\mu g/m^3$)**	**CO (mg/m^3)**
1.	Mine Site (Shri Bigen Rupsi)	**Min**	46.3	22.61	4.24	8.43	0.25
		Max	58.7	27.54	8.14	10.46	0.91
		Avg.	50.09	24.44	6.00	9.43	0.65
		98^{th}% ile	56.13	27.17	7.72	10.46	0.91
2.	Near Dalmia Cement Bharat Limited	**Min**	35.41	14.32	5.35	8.54	0.47
		Max	45.02	21.38	7.89	10.98	0.85
		Avg.	40.98	16.62	6.89	9.95	0.62
		98^{th}% ile	44.61	21.22	7.89	10.98	0.82
3.	Lumsnang	**Min**	40.92	16.72	5.03	8.84	0.48
		Max	53.4	23.84	7.54	10.9	0.92
		Avg.	44.97	18.79	6.18	9.80	0.70
		98^{th}% ile	51.48	23.38	7.51	10.89	0.89
4.	25° 9'52.57"N 92°20'56.18"E (Location-4)	**Min**	40.02	20.96	5.78	8.6	0.25
		Max	52.97	32.97	8.2	13.2	0.48
		Avg.	48.08	27.97	6.88	10.41	0.37
		98^{th}% ile	52.94	32.09	8.19	12.89	0.48
5.	Umlong	**Min**	36.02	14.78	4.33	7.09	0.46
		Max	55.3	24.2	8.44	12.64	0.79
		Avg.	47.25	20.29	7.22	9.58	0.62

		98th% ile	53.83	24.05	8.43	12.64	0.78
6.	25°10'32.71"N 92°19'15.16"E (Location-6)	**Min**	32.58	13.79	4.8	6.14	0.45
		Max	49.5	22.4	6.5	8.86	0.55
		Avg.	40.69	17.29	5.63	7.45	0.51
		98th% ile	48.13	22.37	6.41	8.69	0.55
7.	25°11'30.97"N 92°19'51.21"E (Location-7)	**Min**	34.25	15.43	5.37	6.55	0.32
		Max	49.39	22.43	7.67	8.69	0.92
		Avg.	42.20	17.76	6.10	7.45	0.57
		98th% ile	48.99	22.06	7.64	8.64	0.90
NAAQ STANDARDS			**100**	**60**	**80**	**80**	**02**

1.5.4 NOISE ENVIRONMENT

The noise monitoring has been conducted for determination of noise levels at seven locations in the study area. The noise levels at each location were recorded for 24 hrs. The results obtained were compared with the national standards and were found to be within the standards. The collected data are:-

Table 1.8: Ambient Noise Level Status

Location	**Date of Sampling**	**Day Time (6.0 AM to 10.0 PM)**	**Night Time (10.0 PM to 6.0AM)**
Mine Site	**01/03/2022**	58.2	43.5
Near Dalmia Cement Bharat Limited	03/03/2022	62.4	50.2
Lumsnang	05/03/2022	54.2	42.6
25° 9'52.57"N 92°20'56.18"E (Location-4)	06/03/2022	52.5	43.0
Umlong	08/03/2022	53.6	41.5
25°10'32.71"N 92°19'15.16"E (Location-6)	10/03/2022	52.8	36.0
25°11'30.97"N 92°19'51.21"E (Location-7)	12/03/2022	51.6	40.0
Standards			
Category of Area/ Zone		**Day Time**	**Night Time**
Industrial Area		75	70
Commercial Area		65	55
Residential Area		55	45
Silence Zone		50	40

1.5.5 SOCIO-ECONOMIC ENVIRONMENT

The study area includes the 26 Villages at Wahriang, Khliehshnong, Elaka Rymbai, District East Jaintia Hills (Meghalaya) within 10 km of area from mine periphery.

Table 1.9: Demography Profile of the Study Area

S. No.	Particulars		Details
1.	No. of Villages		26
2.	Total Population		9007
	a.	Male	4592
	b.	Female	4415
3.	No. of Households		1640
4.	No. of Literates		4360
	a.	Male	2191
	b.	Female	2169
5.	Main Workers		2841
	a.	Male	1893
	b.	Female	948
6.	Marginal Workers		446
	a.	Male	207
	b.	Female	239
7.	Non-workers		5720
	a.	Male	2492
	b.	Female	3228

(Source: Census, 2011)

1.5.6 BIOLOGICAL ENVIRONMENT

Core Zone	Buffer Zone
Flora	
Grass - 3 Species	Grass - 10 Species
Climber – 6 Specie	Climber – 19 Specie
Herb – 7 Species	Herb – 40 Species
Shrubs - 8 Species	Shrubs - 70 Species
Tree - 9 Species	Tree - 74Species

Fauna	
Amphibian - 6 Species	Amphibian – 17 Species
Reptiles - 4 Species	Reptiles - 16 Species
Avifauna - 31 Species	Avifauna – 93 Species
Butterflies – 4 Species	Butterflies – 28 Species
Mammals – 2 Species	Mammals – 28 Species

1.6 RISK ASSESSMENT & MANAGEMENT

Risk analysis is the systematic study of uncertainties and risks encountered in various areas. Risk analysts seek to identify the risks involved in mining operations, to understand how and when they arise, and estimate the impact (financial or otherwise) of adverse outcomes. It also defines and analyzes the dangers to individuals, businesses and government agencies posed by potential natural and human-caused adverse events.

However, there are various factors, which can create unsafe working conditions/ hazards in mining of Limestone (major minerals). The following types of hazards are identified during the limestone mining operations:-

1. Accident during mineral loading, transportation and dumping
2. Accident due to vehicular movement
3. Inundation/ Flooding

Following procedure will be followed for effective management of any disaster in the mine.

Step 1: Identification of Disaster risk.

Step 2: Identification of persons at risk

Step 3: Removal of Hazard

Step 4: Evaluation of the risk

Step 5: Control measures to be taken

Step 6: Maintain Assessment records

Step 7: Review

1.7 ENVIRONMENTAL MANAGEMENT PLAN

Impact	Mitigation Measures
Land Environment	
Land will be degraded due to mining and dumping of waste	➢ The total excavated pit will be 1.09 ha., out of which 0.40 ha. will be used as a water reservoir (0.40 ha.) and remaining 0.69 ha. Will be backfilled and reclaimed & rehabilitated by plantation.
Water Environment	
Discharge of effluents water from the mine. Intersection of ground water table during mining operations.	There will be no discharge of effluent from the mine. Mine pit (0.40ha.) will act as a water reservoir. As per the approved Mining Plan along with PMCP, ultimate pit level (571 MSL) will be above the ground water table and hence it will not be intersected.
Air Environment	
➢ Dust will be generated mainly during excavation, loading & unloading activities. ➢ Gaseous pollutants will by generated mostly by the traffic.	➢ It will be ensured that all the vehicles plying in the working zone are properly tuned and maintained to keep emissions within the permissible limits. ➢ At loading & unloading points and transportation routes, arrangement for water sprinkling will be made to minimize dust generation. ➢ In order to predict changes in the air quality, AERMOD version 8.8.0 model was used. The maximum ground level concentrations of particulate matter PM10, PM2.5, NOx & CO from the different mining activities for the study period (pre monsoon) were observed to be 2.7678 µg/m3, 1.8227 µg/m3, 0.055 µg/m3 & 0.00012 mg/m3 respectively. ➢ The resultant will remain within the National Ambient Air Quality Standards for industrial/ residential areas.
Noise Environment	
➢ Noise due to mining activities. ➢ Noise due to vehicular movement.	➢ The noise levels from all these sources are periodical and restricted to particular operation. ➢ The noise measurement data indicated that present noise levels in the study area is within the permissible limits of National Ambient Noise Quality Standards. ➢ Thus, due to natural attenuation effects by proper green belt/ maintenance of machines etc., the impact of noise levels will be minimal.
Socio-Economic Environment	
➢ Employment generation ➢ Health impacts	➢ The mining activity puts negligible change in the socio economic profile. ➢ No displacement (0) is proposed due to proposed mine.

➢ Education Facilities	➢ Approx. 35 local workers will get employment opportunities along with periodical training to generate local skills. ➢ New patterns of indirect employment/ income will generate. ➢ Regular health Check up camp. ➢ Assistance to schools and scholarship to children will be provided.
Biological Environment	
➢ Impact on biodiversity ➢ Impact on threatened species	➢ The mining activity will have insignificant effect on the existing flora and fauna. The purpose of the project itself is to save the flora around the project area. ➢ The existing vegetation within the mining area includes trees and shrubs vegetation. They will not be disturbed due to the mining activity. So, the impact on the vegetation is very less. ➢ The growth of vegetation in and around the complexes. Noise and vibrations due to blasting and operation of the machines drive away the wild animals and birds from the nearby nests. ➢ The cluster area and its buffer zone are devoid of any eco sensitive area. So the impact on the biodiversity and wild life is minimal. ➢ Green belt will be developed along the individual lease boundary which will act as a pollution barrier for the biological environment. ➢ There is the proposal for plantation along the haul road of individual lease and also along the connecting road. ➢ The blasting, drilling and transportation will be carried out during the day time only minimizing the impact on the wild fauna movement. ➢ All the necessary pollution control measures will be undertaken by the lessee to minimize the impact on the surrounding environment.

1.8 ENVIRONMENTAL ACTION PROGRAMME

The breakup of the proposed cost for Environment Management Programme is given as under:-

Table 1.10: Provision for Environmental Protection Measures

S. No.	Description	Capital Cost (Rs. In Lacs)	Recurring Cost (Rs. In Lacs)

1.	Environmental Monitoring (Air, Water, Noise and Soil)	--	2.00
2.	Occupational Health and Safety (Initial & Periodical Medical Check-ups)	1.00	0.50
3.	Green Belt (phase wise greenbelt development during plantation plan period)	3.00	0.30
4.	Construction & Maintenance of Settling Tank, Garland Drains etc.	1.00	0.40
5.	Provision of fencing around mine pit	1.00	0.20
6.	Environmental Awareness Program	--	0.75
7.	Rain Water Harvesting	1.00	0.25
8.	Socio EMP	0.40	--
Total		**7.40**	**4.40**

1.9 CONCLUSION

EIA study was performed as per the approved ToR. Various environmental attributes were studied relating with aspects of mining activities. The related impacts were identified and evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and accordingly fund was allocated. The EMP has been dynamic, flexible and subject to periodic review.

The project will increase the revenue of the State Govt. as well as it will help in the social upliftment of the local people. The greenbelt development programme will help in increasing the green cover in the nearby areas. Thus, the existing project is not likely to affect the environment or adjacent ecosystem adversely. The Senior Management will be responsible for the project review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.

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