

***EXECUTIVE SUMMARY  
OF  
ENVIRONMENTAL IMPACT ASSESSMENT  
AND  
ENVIRONMENTAL MANAGEMENT PLAN***

**For**

**WAH PYNKON LIMESTONE DEPOSIT  
OVER 13.58 HA. OF AREA IN LUMSHNONG VILLAGE,  
EAST JAINTIA HILLS DISTRICT  
MEGHALAYA**

**Prepared For**

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## EXECUTIVE SUMMARY

### 1. PROJECT DESCRIPTION

Mining Lease for the Lumshnong limestone project area over 13.58 ha. Was-issued Initial Approval Accorded by Meghalaya state Govt. vide letter number MG-96/2007/82(LOI) dated Shillong, the 22<sup>nd</sup> July 2010 to M/s Cement Manufacturing Company Limited which is a public limited company. The project area is of private land category. No forest area is involved. The mining operation will be carried out as per Mining Plan and Progressive Mine Closure plan approved by Indian Bureau of Mines . Mining plan for the period 2013-14 to 2017-18 was submitted to IBM, Govt. of India on 09/08/2013. TOR has been issued by SEIAA, Meghalaya for production capacity upto 12,00,000 MT as per the pre-feasibility report. This is a new mining proposal. The Limestone from the mine shall be utilised in the cement plant of the company. Cement Manufacturing Company Ltd (CMCL) an ISO9001:2000 certified company and was incorporated as a Public Limited Company on 2<sup>nd</sup> November 2001 with Registered office and works at Lumshnong, East Jaintia Hills district, Meghalaya. CMCL was given approval for setting up a 900 TPD cement plant at Lumshnong village, East Jaintia Hills district Meghalaya by the Govt. of Meghalaya in the year 2002 and subsequently was given approval for expanding the capacity to 3000 TPD in the year 2003. The present capacity of the plant is 2400 tpd clinker/ cement.

#### Geographical Location (Fig. 1)

State	Meghalaya
District	East Jaintia hills
Tehesil	Khliehriat
Village	Lumshnong
Lease Area	13.58 ha
Toposheet No.	83C/W
Latitude	25°10'16" N
Longitude	92°22'52"E
Altitude	273 m AMSL to 387m AMSL

There is no public road or railway line within the M.L area. The lease area is situated at a distance 40m-200 m east of NH-44 connecting Shillong to Silchar. The nearest railway station at a distance of 80km from Lumshnong is Badarpur on Guwahati-Lumding-Silchar meter gauge section of N.E.F. Railway. (**Fig. 2**). The lease area map is given in **Fig. 3** Topography of the ML area and its surroundings are rugged and mountainous. Maximum and minimum contours passing through the area are 387m and 273m respectively. North-Western part of the area is at a higher elevation with respect to south-eastern part.

A seasonal nala flows from the southern part of the mining lease area. This nala joins a perennial nala running SW at a distance of 300m towards south of the area. Another nala flows from north east direction.

The reserves of the area are as follows.

	Geological Reserve (Tonne)			Mineable reserve (Tonne)		
	Proved	Probable	Total	Proved	Probable	Total
Lime Stone	10174837.5	6924937.5	17099775	4973175	3172950	8146125

Based on the bore holes drilled in the limestone zone the grade wise resources have been computed below by taking borehole log analysis data into account.

Opencast fully mechanised method of mining will be adopted on one shift basis. Machineries/vehicles like crawler drill, air compressor, hydraulic excavators, dumpers, etc. will be used. The limestone shall be dislodged by crawler drill and blasting. Limestone will be handled by dumpers/ tipper trucks and Excavators. Height and width of the mine benches would be 6 meters and 18 meters respectively. Slope of the benches will be  $22^{\circ}$  where as overall slope of the pit will be  $45^{\circ}$ . Production will be upto 12,00,000 TPA of limestone. Keeping the above production, the life of the mine will be 7.12 years, including 5 years of plan period. The capital cost of the project is 4.43 crores. Ultimate working depth of the mine will be 60m at 265m AMSL whereas ground water table is at 195m AMSL (in summer) and 200m AMSL (in rainy season). Hence mining will not touch ground water table. About 12 Cum of water will be required per day & will be supplied from CMCL Plant site.

## 2. DESCRIPTION OF THE ENVIRONMENT

Different environmental parameters required to evaluate the prevailing scenario have been generated / collected and compiled for the period from March, 2013 to May,2013 which is 1712 mm. The annual normal rainfall at Lumshnong is 7200.25 mm. The temperature ranged from  $14.0^{\circ}\text{C}$  to  $29.5^{\circ}\text{C}$  while the relative humidity varied from 66.0% to 96.0% during the season. The predominant wind direction is from Southern side. The wind rose diagram is shown in **Fig. 4**. The sample location map is indicated in **Fig. 5**.

The CPCB value for rural and residential areas for  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ ,  $\text{SO}_2$ ,  $\text{NO}_x$  and CO (24 hourly) are 100, 60, 80, 80 and 2000  $\mu\text{g}/\text{cum}$  respectively. We had taken various ambient air quality datas from eight stations for minimum one season. The analysis results are presented as follows. We had tested all the parameters as prescribed by CPCB but all the parameters found below the permissible limit in the study area, so we had not given them in tabular form.

Zone	Station Code	Station	Value of	$\text{PM}_{2.5}$	$\text{PM}_{10}$	$\text{SO}_2$	$\text{NO}_x$
Core zone	A1	Lease area	MAX	25.9	38.8	15.9	17.4
			MIN	23.8	35.7	13.6	15.1
			AVERAGE	24.78	37.14	14.69	16.21
			95 PERCENTILE	25.75	38.63	15.75	17.25
	A2	Lease area	MAX	24.9	37.3	15.0	17.5
			MIN	22.9	34.3	13.0	15.0
			AVERAGE	23.83	35.73	13.84	15.93
			95	24.65	36.95	14.50	17.00

Zone	Station Code	Station	Value of	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>
Buffer zone			PERCENTILE				
	A3	Tongseng	MAX	25.5	37.5	15.5	17.7
			MIN	23.5	35.0	13.6	15.3
			AVERAGE	24.42	36.30	14.61	16.50
			95 PERCENTILE	25.28	37.48	15.48	17.58
	A4	Umlaper	MAX	25.0	37.6	15.2	17.4
			MIN	23.1	34.6	13.2	15.2
			AVERAGE	24.03	36.04	14.05	16.10
			95 PERCENTILE	24.80	37.48	14.70	17.20
	A5	Umlong	MAX	24.6	36.9	14.5	17.0
			MIN	22.6	33.9	12.5	14.0
			AVERAGE	23.56	35.35	13.55	15.60
			95 PERCENTILE	24.38	36.58	14.35	16.58
	A6	Lumshnong	MAX	25.8	38.7	15.8	17.9
			MIN	23.7	35.5	13.8	15.5
			AVERAGE	24.67	36.97	14.76	16.64
			95 PERCENTILE	25.65	38.43	15.65	17.65
	A7	CMCL Plant Site	MAX	24.5	36.7	14.1	16.5
			MIN	22.5	33.7	12.3	14.2
			AVERAGE	23.45	35.16	13.22	15.27
			95 PERCENTILE	24.28	36.38	14.05	16.18
	A8	Hill Area	MAX	24.8	37.2	15.0	17.5
			MIN	22.8	34.2	13.0	15.0
			AVERAGE	23.76	35.67	13.84	15.93
			95 PERCENTILE	24.58	36.88	14.50	17.00

The vehicular movements are the main noise source during the study period. The noise level data are varying from 39.8 to 53.5 dBA in the day time and in the night it varies from 32.6 to 39.6 dBA. The noise level of the area is within the prescribed limit.

The annual ground water recharge is 3.26 Ham. The depth to water level in summer ranges from 78 to 92m below ground level. The quality of surface and ground water is within the prescribed limit of Inland Surface Water, class-A, IS 3025 and IS 10500 respectively.

### Result of Surface Water Samples Analysis

Parameter	Unit	Permissible Limit*	Surface Water Samples					
			SW <sub>1</sub>	SW <sub>2</sub>	SW <sub>3</sub>	SW <sub>4</sub>	SW <sub>5</sub>	SW <sub>6</sub>
pH	---	8.5	7.3	7.3	7.2	7.1	7.2	7.3
Colour	Hazen	10	7	5	5	4	5	7
Odour	----	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solid	mg/l	500	285	234	252	250	255	270
Oil and Grease	µg/l	----	0.3	0.4	0.1	0.2	0.2	0.3
Dissolved oxygen	mg/l	6.0	6.8	6.9	6.7	6.5	6.4	6.2
Free ammonia as NH <sub>3</sub>	mg/l	----	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BOD	mg/l	2	0.3	0.1	0.4	0.3	0.4	0.3
Arsenic as As	mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury as Hg	mg/l	0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead as Pb	mg/l	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium as Cr	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper as Cu	mg/l	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cadmium as Cd	mg/l	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc as Zn	mg/l	15.0	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium as Se	mg/l	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel as Ni	mg/l	3.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide as CN	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloride as Cl	mg/l	250	22	22	15	20	15	20
Nitrate as NO <sub>3</sub>	mg/l	20	0.63	0.63	0.58	0.55	0.60	0.55
Fluoride as F	mg/l	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulphate as SO <sub>4</sub>	mg/l	400	06	07	11	08	0.7	0.8
Iron as Fe	mg/l	0.3	0.05	0.07	0.09	0.08	0.06	0.05
Sodium Percentage (max)	mg/l	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Calcium as Ca	mg/l	80.10	3.1	3.3	3.5	3.9	3.2	3.5
Magnesium as Mg	mg/l	24.28	4.8	3.3	5.7	3.6	4.0	3.5
Coliform cells/100ml	MPN	50	2	2	1	2	2	1

**Date of Surface water sampling - 15.03.2013**

**Standard : Class - A, Inland Surface Water Quality Standard (IS 2296)**

**Surface water sampling stations:-**

SW<sub>1</sub> : Lubha River Up-stream

SW<sub>3</sub> : Umlunar River

SW<sub>5</sub> : Nala near Lumshnong

SW<sub>2</sub> : Lubha River Down-stream

SW<sub>4</sub> : Umlong River

SW<sub>6</sub> : Water near CMCL Plant site

### Result of Ground Water Samples Analysis

Sl. No.	Parameters	Units	Desirable Limit*	Ground Water Samples			
				GW <sub>1</sub>	GW <sub>2</sub>	GW <sub>3</sub>	GW <sub>4</sub>
1	Colour	Hazen	5	2	3	2	1
2	Odour	----	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	----	6.5-8.5	7.3	7.1	7.2	7.4
5	T.D.S	mg/l	500	215	220	185	200
7	Chloride as Cl	mg/l	250	13.5	12.9	11.4	13.1
8	Sulphate as SO <sub>4</sub>	mg/l	200	10.9	9.2	9.9	8.5
9	Cyanide as CN	mg/l	0.05	<0.01	<0.01	<0.01	<0.01
10	Fluoride as F	mg/l	1.0	0.65	0.60	0.55	0.65
13	Boron as B	mg/l	0.3	<0.5	<0.5	<0.5	<0.5
14	Calcium as Ca	mg/l	75	15.8	16.5	15.1	17.4
15	Magnesium as Mg	mg/l	30	7.5	7.3	6.4	7.0
16	Arsenic as As	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
17	Barium as Ba	mg/l	0.7	<0.5	<0.5	<0.5	<0.5
18	Cadmium as Cd	mg/l	0.003	<0.001	<0.001	<0.001	<0.001
20	Hexavalent Chromium	mg/l	0.05	<0.005	<0.005	<0.005	<0.005
21	Copper as Cu	mg/l	0.05	<0.02	<0.02	<0.02	<0.02
22	Iron as Fe	mg/l	0.3	0.19	0.20	0.14	0.12
23	Selenium as Se	mg/l	0.01	<0.005	<0.005	<0.005	<0.005
25	Zinc as Zn	mg/l	5.0	<0.02	<0.02	<0.02	<0.02
26	Phenolic compound	mg/l	0.001	<0.0001	<0.0001	<0.0001	<0.0001
27	Pesticides	mg/l	Absent	Absent	Absent	Absent	Absent
<b>Date of ground water sampling- 14.03.2013</b> <b>Standard : IS 10500</b> <b>Ground water sampling stations:-</b> GW <sub>1</sub> : Spring water near lease area                      GW <sub>3</sub> : Spring water Tongseng Village GW <sub>2</sub> : Spring water Umbadoh Village                      GW <sub>4</sub> : Spring water Wahiajer Village							

The area exposes hilly ever green and dry deciduous forests. The recorded fauna species are common reptiles, birds, amphibians, insects and few mammals such as Bamboo Rat, Squirrel, Otter, House rat, Monkey. No rare or endangered flora and fauna species are found.

### **3. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Mining activities and related operations can cause several beneficial and adverse impacts on the environment. The adverse impacts proposed to mitigate the impact on the environment has been assessed by using 'Matrix method'.

The expected beneficial impacts on the society are Health, Population/Migration, Employment, Literacy, Services and Aesthetic sense. The proposed mining operation will generate direct employment for 41 nos. of employees and indirectly for 200 people. Communication, education, medical, power and employment facilities will be improved.

Various phases of mining operations will generate dust and gaseous pollutants. With a view to the scale of mining and existing environmental back ground condition it is anticipated that increment impact due to the mining operation will be within the prescribed limit. Further mitigation measures like wet drilling, water sprinkling and plantation will reduce the pollution level in the area.

Contamination/siltation of surface water might occur due to mixing of run off during rainy season with high-suspended particles, likely to be caused. As it is proposed to construct settling tank and garland drain around the mining area the level of concentration of suspended particles in the surface water shall be well within the prescribed limit.

The contamination of surface water may cause diseases in the area. Treatment of water will be done. Medical treatment will be provided as per the requirement. The impact on ground water will be marginal since proposed mining activities will be much above the ground water table.

Due to the opencast mining project, the noise level of the area due to drilling, blasting, transportation and running of heavy machineries will increase. Controlled blasting, proper maintenance of machineries and soundproof cabins and plantation will minimise noise level .

Greenbelt development will neutralize the impact on flora. The present and so also proposed land use pattern of the mine will be as follows. **(Fig. 3)**

#### **Existing Core Zone Land use Pattern**

<b>Classification of land</b>	<b>Village/District</b>	<b>Total area in Hects.</b>
Total Private Land (non-forest)	Lumshnong/ East Jaintia hills	13.58 Waste land



<b>Proposed Land Use Pattern (Area in Ha.)</b>				
<b>Sl. No.</b>	<b>Features</b>	<b>Planned period</b>	<b>Beyond planned period</b>	<b>Total</b>
1	Mining	6.66	1.84	8.50
2	Over Burden Dump	---	----	--
3	Infrastructure (workshop, admn. Building etc.)	0.01	---	0.01
4	Roads	0.20	---	0.20
5	Magazine	---	---	---
6	Green Belt	4.87	--	4.87
	<b>Total</b>	<b>11.74</b>	<b>1.84</b>	<b>13.58</b>

<b>Post-operational Land use</b>					
<b>Area in Ha.</b>					
<b>Land use</b>	<b>Plantation</b>	<b>Water Body</b>	<b>Public Use</b>	<b>Undisturbed</b>	<b>Total</b>
Mining	8.50	--	--	--	8.50
Road and Infrastructure	0.21	--	--	--	0.21
Green Belt	4.87	--	--	--	4.87
<b>Total</b>	<b>13.58</b>	--	--	--	<b>13.58</b>

The stage wise cumulative plantation is as follows.

#### Stage Wise Cumulative Plantation

REQUIREMENT OF PLANTS FOR AFFORESTATION / RECLAMATION										
Year	Un-worked Area (Greenbelt)		Out Side Dump		Dump Area		Top Soil Dump		Total	
	Area (Ha)	Trees	Area (Ha)	Trees	Area (Ha)	Trees	Area (Ha)	Trees	Area (Ha)	Tree
1st	0.1	250			--	--	--	--	0.1	250
2nd	0.2	500			--	--	--	--	0.2	500
3rd	0.3	750			--	--	--	--	0.3	750
4th	0.4	1000			--	--	--	--	0.4	1000
5th	4.87	12175			--	--	--	--	4.87	12175
Ultimate	4.87	12175	8.71	21775	--	--	--	--	13.58	33950

The post mining land use is represented in **Fig. 6**.

There will be less chance of improvement in agriculture. By using these land in mining there will be generation of employment and revenue.

#### **4. ENVIRONMENT MONITORING PROGRAMME**

An environmental monitoring cell will be formed for regular environmental assessment on air, water, noise and soil qualities at nearby habitational area. Four permanent Air quality stations will be fixed as per the SPCB guidance to monitor the AAQ in quarterly basis. Quarterly water samples of ground water and surface water shall be collected and analysed. Noise level monitoring at Noise generating points and AAQ locations shall be done in quarterly basis.

#### **5. ADDITIONAL STUDIES**

Additional studies like soil erosion and nutrient quality at river bed soil will be taken up.

#### **6. PROJECT BENEFITS**

The limestone to be produce from the mine shall be utilised in the plant of the Lessee. The mining project along with the cement plant shall uplift the socio-economic, educational and cultural status of the local inhabitants. The project will in addition generate revenue to the state and central governments in the way of Royalty and cesses.

#### **7. ENVIRONMENT MANAGEMENT PLAN**

The mining activities will have certain adverse effects on the existing environment like air, water, land and noise. The following protection measures will be adopted to minimize pollution.

- Provision of planting emission and noise absorbing species (with dense/thick type canopy), soil erosion control and nutrient enhancing species
- To suppress fugitive dust, provision of water sprinkler, dust extractor etc at the dust generation source
- Adoption of control blasting techniques (using advance non-electric detonator)
- Construction of garland drains around the quarry area with proper gradients
- The settling tank will have adequate dimension
- Surface runoff through drain and channel shall be channelized into sedimentation pond before discharging into natural drainage
- Proper maintenance of plant and machinery
- Providing sound proof cabins with proper ventilation
- Provision of personal protective equipments according to the pollution.
- Stone pitched walls in garland drains will be prepared to arrest flow of loose sediments.
- Provision of speed breaker (stone pitching) at regular intervals on garland drains
- Reclamation through plantation