EXECUTIVE SUMMARY

OF

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

&

ENVIRONMENTAL MANAGEMENT PLAN

FOR

PUBLIC HEARING

of

Expansion in Limestone Production Capacity from 2.0 Million TPA to 3.5 Million TPA in Maratha Limestone Mine - II (ML Area – 880.31 ha)

At

Villages- Bakhardi, Upparwahi, Chandur, Pimpalgaon, Lakhmapur and Thutra (Tehsil: Korpana) and Sonapur (Tehsil: Rajura), District- Chandrapur, State: Maharashtra

PROJECT PROPONENT

M/s Ambuja Cements Ltd.

(Unit: Maratha Cements Works)

Village & PO : Upparwahi, Tehsil : Korpana,
District : Chandrapur, Maharashtra - 442908
Telephone No. 07173240015

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Executive Summary

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION OF PROJECT PROPONENT

- Ambuja Cements Limited (ACL) , formerly known as Gujarat Ambuja Cements Limited, is a major cement producing company in India. The Group's principal activity is to manufacture and market cement and clinker for both domestic and export markets.
- Ambuja Cements Limited (ACL) is having six integrated cement manufacturing plants, eight cement grinding units; and the first in the industry with a captive port and four bulk cement terminals along the west coast of India. Established in 1986, ACL is among country's 'Most Sustainable Companies' and is recognized for its best practices in environment management and corporate citizenship.
- Ambuja cements Limited does lot of work on water management and being certified over Eight times Water Positive, Ambuja cements limited is also plastic negative, by co-processing plastic waste in its kilns, equivalent to around 2.5 times of total plastic used.
- The company also generates 7.9% of its power needs from renewable resources. It has been ranked #4 in the globally recognized Dow Jones Sustainability Index (DJSI); All Ambuja Cement plants are ISO 14001 certified.

1.2 STATUS OF PROJECT

M/s. Ambuja Cement Limited (Unit: Maratha Cement Works) is proposing Expansion in Limestone Production Capacity from 2.0 Million TPA to 3.5 Million TPA, Top Soil 0.25 million TPA, Waste (OB/IB) 2.40 million TPA, Sub grade 0.50 Million TPA (Total Excavation 6.65 Million TPA) along with existing crusher of 1200 TPH in Maratha Limestone Mine - II (ML Area – 880.31 ha) in Villages- Bakhardi, Upparwahi, Chandur, Pimpalgaon, Lakhmapur and Thutra (Tehsil: Korpana) and Sonapur (Tehsil: Rajura), District- Chandrapur, State: Maharashtra..

As per EIA Notification dated 14th September, 2006, as amended from time to time; the project falls under Category "A" S. No. '1' (Mining of Minerals), Project or Activity '1(a) - (3).

Application (Form-1 and Pre-Feasibility Report) has been uploaded on MoEFCC web Portal, New Delhi on 19.02.2021. Essential Details were sought by MoEF&CC web portal, New Delhi on 10.03.2021. EDS reply was submitted to MoEF&CC web portal, New Delhi on 06.05.2022. and grant of Standard ToR by Ministry of Environment, Forest and Climate Change, Govt of India, New Delhi vide letter no. J-11015/400/2006 – IA.II (M) dated 12.05.2022 in accordance to the EIA Notification – 2006 and amended as on date.

1.3 NEED FOR THE PROJECT

- M/s. Ambuja Cements Limited (Unit –Maratha Cement Works) has "Proposed Expansion of Integrated Cement Project (Clinker - 2.85 to 6.15 MTPA, Cement - 4.75 to 10 MTPA and WHRS - 45 MW) by Installation of new Line-II at Village: Bhendvi / Upparwahi, Tehsil: Korpana, District: Chandrapur (Maharashtra) by M/s. Ambuja Cements Limited (Unit: Maratha Cement Works)".

Standard ToR for the same has been issued by MoEFCC vide J-11011/292/2006-IA.II (I) dated 04th March, 2021. Amendment in ToR letter was issued by MoEFCC on 26.05.2022 and (EC granted wide letter no: IA-J-11011/292/2006-IA-II(IND-I), Dated 20.02.2024).

- In order to meet the raw material requirement (limestone) M/s. Ambuja Cements Limited (Unit – Maratha Cement works) is proposing Expansion in Limestone Production Capacity from 2.0 Million TPA to 3.5 Million TPA, Top Soil 0.25 Million TPA, Waste (OB/IB) 2.40 Million TPA, Sub grade 0.50 Million TPA (Total Excavation 6.65 Million TPA) along with existing crusher of 1200 TPH in Maratha Limestone Mine - II (ML Area – 880.31 ha) in Villages- Bakhardi, Upparwahi, Chandur, Pimpalgaon, Lakhmapur and Thutra (Tehsil: Korpana) and Sonapur (Tehsil: Rajura), District- Chandrapur, State: Maharashtra.

1.4 BRIEF DESCRIPTION OF THE PROJECT

Table – 1

Brief Description of the Project

S. No.	Particulars	Details
A.	**Nature of the Project**	Expansion in Limestone Mining Project
B.	**Size of the Project**	
1.	Mining Lease Area	880.31 Ha (Govt. Land: 62.92 ha and Pvt. Land: 817.39 ha)
2.	Production capacity	➢ Expansion in Limestone Production Capacity from 2.0 Million TPA to 3.5 Million TPA ➢ Top Soil: 0.25 Million TPA ➢ OB: 2.40 Million TPA ➢ Sub Grade: 0.50 Million TPA ➢ Total Excavation: 6.65 million TPA ➢ Existing crusher of 1200 TPH ➢ With proposed ultimate pit depth upto 178 mRL
C.	**Location Details**	
1.	Near Villages	Bakhardi, Upparwahi, Chandur, Pimpalgaon, Lakhmapur, Thutra and Sonapur
2.	Tehsil	Korpana and Rajura
3.	District	Chandrapur
4.	State	Maharashtra
5.	Latitude & Longitude	Latitude: 19°41'16.13" to 19° 46' 33.51 "N Longitude:79° 10'26.27" to 79° 13' 07.18" E
6.	SOI Toposheet No.	Core Zone -56 M/2(E44B2) Buffer Zone –56M M/1 (E44B1), 56M M/5 (E44B5), 56M M/6 (E44B6)
D.	**Environmental Settings**	
1.	Habitation	➢ Habitation of Saleguda Within lease area ➢ Habitation of Upparwahi Adjacent in NE direction

S. No.	Particulars	Details	
		➢ Habitation of Pimpalgaon ~150 m in NNW direction ➢ Habitation of Sonapur ~300 m in SSW direction	
2.	Nearest State/National Highway	SH 6 (~18 Km in North) ➢ NH 264 (~14 km in East)	
3.	Nearest Railway Station	Balharshah Junction (~18 km in NE direction)	
4.	Airport	➢ Nagpur Airport (~142 Km in North Direction)	
5.	Nearest Town / City	Chandrapur City (~20 Km in NE direction)	
6.	Wild Life Sanctuaries, National parks, biosphere reserves, Reserved / Protected Forest within 10km radius study area	None	
7.	Water bodies	**Name**	**Distance and Direction**
		Lohandi Nala	Within Lease Area
		Tutra Nala	0.5 Km in NNE
		Lohandi Nala	~1.0 km in NNW
		Nalla Vagu	~1.5 Km in West
		Chandanvayi Nala	~ 2.0 km in NW
		Mangi Nala	~1.5 km in East
		Amal Nala Dam	~3.5 km in West
		Injapur Nala	~5.0 km in West
		PeddaVagu	~7.0 Km in ENE
		Sonda Nala	~5.5 km in ESE
		ChikliVagu	~7.5 km in SSE
		Bop Nala	~7.5 km in NNW
		Khadak Nala	~8.5 km in SSE
8.	Seismic Zone	Zone-II as per IS:1893 (Part-I):2002	
E.	**Cost Details (In crore)**		
1.	Cost of Project	Rs. 56 Crore	
2.	Capital Cost of EMP	Rs. 10.47 Crore	
3.	Recurring cost of EMP	Rs. 1.12 Crore	

Source: *Site Visit & Pre-feasibility Report*

1.5 Location map

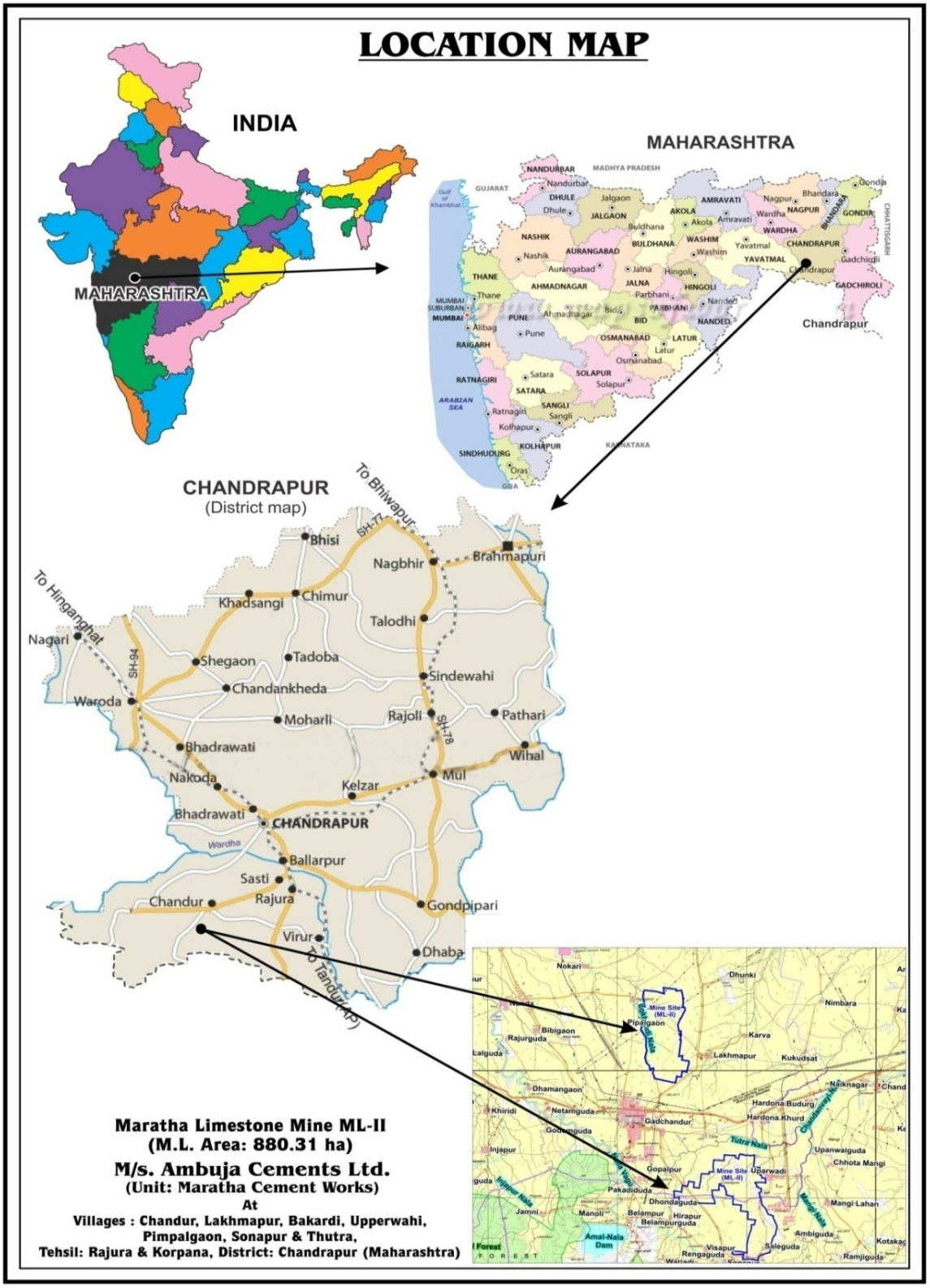


Figure-1: Location map (Showing general as well as specific location of the ML area)

1.6 MINE DESCRIPTION

1.6.1 MINING LEASE STATUS

- The mining lease was granted in favor of M/s. Maratha cements Limited on 04.03.1999 for 872.37 Ha and its corrigendum was made on 23.07.1999 for the area change from 872.37 Ha to 880.31 Ha.
- The lease was executed on 14.12.2000 and registered on 19.03.2001 in favor of Gujarat Ambuja Cements Limited.
- As per Section 8A (5) of MMDR Act 2015, The Department of Mining has extended the validity of the mining lease upto 13.12.2050 vide their letter no.MNG 0415/C.R.34/Ind-19 dated 17.07.2015.
- The supplementary deed was executed for extension of lease validity upto 13.12.2050 dated 17.04.2017 in favor of M/s. Ambuja Cements Limited.

1.6.2 MINING DETAILS

Table – 2

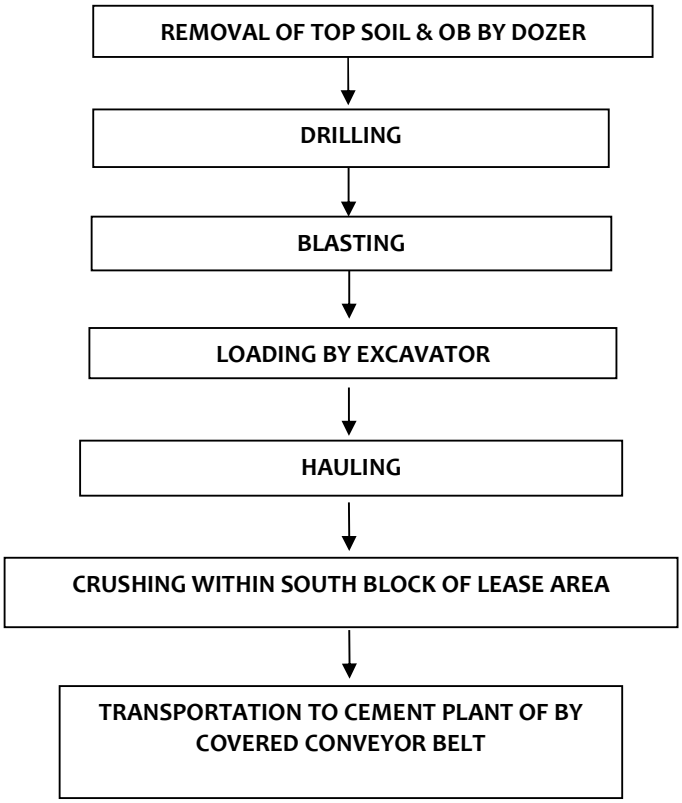
Mining Details

S. No.	Particulars	Details
1.	Method of mining	Opencast Fully Mechanized Mining
2.	Total Geological Reserves	124.66 Million Tonne (As on 01.04.2023)
3.	Total Mineable reserves	52.43 Million Tonne (As on 01.04.2023) upto 210 m AMSL
4.	Proposed Life of the Mine	15 Years (As on 01.04.2023)
5.	Bench Height	8.0 m (Maximum)
6.	Bench Width:	8.0 m (Minimum)
7.	Ultimate Pit Slope	45°
8.	Elevation Range	210 – 270m AMSL
9.	General Ground Level	258 m AMSL
10.	Water Table	Pre-Monsoon: 7.62 m bgl Post Monsoon: 4.90 m bgl
11.	Present working Depth	210 m AMSL (48 m bgl)
12.	Ultimate Working Depth	178 m AMSL (80 m bgl)
13.	Stripping Ratio: Tonnes :Tonnes Tonnes: Cum	 1:0.69 1:0.34
14.	Number of Working Days	305 days/year
15.	Number of shifts per day	2 shifts of 6 hours each

Source: *Approved Modified Mining Plan with Progressive Mine Closure Plan.*

1.6.3 METHOD OF MINING

- Mining operation is being/will be carried out by opencast mining method with formation of benches by fully mechanized means.
- Bench height and bench width are being/will be maintained at 8 m and 8 m respectively.
- Drilling is being/will be carried out crawler mounted 115 mm fast drills.
- Controlled blasting method is being/will be practiced.
- The blasting is being/will be done using ANFO/SME & Boosters.
- In blasting, NONEL & hole to hole delay pattern is being/will be used.
- Loading is being/will be done by Hydraulic Excavators and transportation of limestone and waste, being/will be done by means of dumpers (55/35 T) to the crushers (for limestone) and waste dumps (for waste)
- Size of Blasted limestone is reduced by crushing to meet size requirement of cement plant i.e. crushed to meet <70 mm size.
- Crushed Limestone is being/ will be transported from crusher to the Cement Plant via. Covered Conveyor Belt. Cement Plant is adjacent to existing Mine site.



2.0 DESCRIPTION OF THE ENVIRONMENT

2.1 PRESENTATION OF RESULTS (AIR, NOISE, WATER & SOIL)

Table – 3

Summary of Air, Noise, Water and Soil Parameters (March to May, 2021)

Parameters	Number of locations	Description	Standards
Ambient Air Quality Monitoring	12 Locations	PM10 –50.6 to 91.5 µg/m^3	100 µg/m^3 (24 hours)
		PM2.5 – 25.7 to 53.8 µg/m^3	60 µg/m^3 (24 hours)
		SO2 – 5.89 to 13.58 µg/m^3	80 µg/m^3 (24 hours)
		NO2 – 12.59 to 30.78 µg/m^3	80 µg/m^3 (24 hours)
		All other parameters were also found within the permissible limit as per the NAAQS 2009.	
Noise Level Monitoring	12 Locations	Noise Level During Day Time – 49.6 to 64.9 Leq dB (A)	75 Leq dB (A)
		Noise Level During Night Time – 40.9 to 60.2 Leq dB (A)	70 Leq dB (A)
Surface Water	01 Locations	pH- 7.67	
		Total Hardness – 111.29 mg/l	
		Total Dissolved Solids -- 168 mg/l	
Ground Water Sampling	12 Locations	pH – 6.61 to 7.17	6.5 to 8.5
		Total Hardness – 394.21 to 576.16 mg/l	600 mg/l
		Fluoride - 0.51 mg/l to 0.88 mg/l	1 to 1.5
		TDS – 527 mg/l to 956 mg/l	2000 mg/l
Soil Sampling	12 Locations	Soil nature – neutral to moderately alkaline pH – 7.02 to 7.98 Organic Matter – 0.75 % to 1.11 % Available Nitrogen –192.5 to 286.7 kg/ha Phosphorous – 35.8 to 71.2 kg/ha Potassium – 166.69 to 409.52	-

Table – 4

Summary of Air, Noise, Water and Soil Parameters (March to May, 2024)

Parameters	Number of locations	Description	Standards
Ambient Air Quality Monitoring	12 Locations	PM10 –49.8 to 90.2 µg/m^3	100 µg/m^3 (24 hours)
		PM2.5 – 25.2 to 53.1 µg/m^3	60 µg/m^3 (24 hours)
		SO2 – 5.8 to 13.4 µg/m^3	80 µg/m^3 (24 hours)
		NO2 – 12.30 to 29.8 µg/m^3	80 µg/m^3 (24 hours)
		All other parameters were also found within the permissible limit as per the NAAQS 2009.	
Noise Level Monitoring	12 Locations	Noise Level During Day Time – 49.5 to 65.1 Leq dB (A)	75 Leq dB (A)
		Noise Level During Night Time – 41.2 to 60.3 Leq dB (A)	70 Leq dB (A)
Surface Water	01 Locations	pH- 7.8	
		Total Hardness – 114.5 mg/l	
		Total Dissolved Solids -- 172 mg/l	
Ground Water Sampling	12 Locations	pH – 6.53 to 7.21	6.5 to 8.5
		Total Hardness – 400.1 to 579.8 mg/l	600 mg/l
		Fluoride - 0.52 mg/l to 0.89 mg/l	1 to 1.5
		TDS – 570 mg/l to 987 mg/l	2000 mg/l
Soil Sampling	12 Locations	Soil nature – neutral to moderately alkaline pH – 7.13 to 7.91 Organic Matter – 0.77% to 1.10% Available Nitrogen –189.5 to 290.7 kg/ha Phosphorous – 37.8 to 70.1 kg/ha Potassium – 170.69 to 420.52	-

2.2 BIOLOGICAL ENVIRONMENT

Flora: In the Study area, 185 plant species from 90 families were identified. Among them 109 trees, 32 shrubs, 24 herbs, 14 grasses, as well as 6 climber species have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. The dominant family in the project area is Fabaceae, which has 24 species, followed by Poaceae and Mimosaceae which each have 16and 12 species respectively.

During field survey, there is no Rare, Endangered and Threatened (RET) species of flora were found in the study area.

Among fauna, total 82 species of faunal species which includes 23 species of mammals, 31 species of reptiles and amphibians and 28 species of Butterfly and Arthropods were recorded from the study area. Among avifauna, 100 species were recorded in the study area.

2.3 SOCIO-ECONOMIC ENVIRONMENT

The total area for the buffer zone is 33534 Ha & total population as per 2011 Census records is 100604 (for 10 km radius buffer zone of mine). Scheduled Caste population of the study area (10 km) is 12.3 %, Scheduled Tribe is 23.2 % and others are 64.5 %. Total no. of household in the area is 24016.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

- **Impact on Air Environment**

Due to Mining

The key air emissions from the mining activities (drilling, blasting, loading, haulage and transportation) are Particulate Matter (PM), Oxides of Nitrogen (NOx) and Sulphur dioxide (SO_2). Gaseous emissions will be generated from HEMMs & transportation of vehicles. Use of proper mitigation measures is being taken like water sprinkling during transport activities & development of green area to control fugitive emissions. Better maintenance of equipments also helps to reduce such emissions. The maximum predicted incremental values of various pollutants are given in table 5:

Table – 5

Cumulative Predicted Incremental & Ground Level Concentration (GLC) due to Mine and Integrated Cement Plant

S. No.	Pollutants	Concentration (µg/m^3)			NAAQS Standards
		Baseline Value	Incremental Value	Resultant	
1.	PM10	80.1	3.75	83.84	100
2.	PM2.5	52.4	1.50	53.9	60
3.	SO2	13.58	3.50	17.08	80
4.	NO2	27.98	4.38	32.36	80

- **Impact on Water Environment –**

Surface Water:

There are two seasonal nalla passing through north Eastern part of the lease area (North Block). In addition to this, there are many seasonal nala`s, and vagu present with in the study area, which will not be adversely impacted as these are distantly located.

No waste water will be discharged outside ML Area which may contaminate any surface water body.

Ground Water

- Ground water pollution can take place only if the mining rejects contain toxic substances, which get leached by the precipitation of water and percolate to the ground water table thus polluting it. Any nearby wells or other sources of water can be

rendered unfit for drinking and even for industrial use. The mineral limestone and associated rocks do not contain any toxic substance. Therefore, there is no significant impact of mining activities on quality of any source of water.

- Existing water requirement for the project is 100 KLD. Additional water requirement for the proposed expansion project will be 85 KLD; therefore, the total water requirement after expansion will be 185 KLD which will be sourced from Mine sump and Pakadiguddam reservoir.
- General ground level of the lease area is 258 m AMSL. Water table during Pre-Monsoon is 4.90 m bgl and during Post Monsoon is 7.62 m bgl. The present working depth of the mining operation is 8 m bgl (250 m AMSL) and Ultimate working depth of the mining operation will be 80 m bgl (178 m AMSL). The water table has been intersected.

➢ **Impact of Noise & Vibration –**

Due to Mining Activities

Major noise generating sources of the mining activity are drilling, blasting and HEMMs movement used for transportation of limestone. The plantation and the green belt around the mining lease boundary help in reducing noise level and proper mitigation measures is being carried out.

DGMS guidelines are being followed to reduce the impact of blasting on the nearest habitation. Controlled blasting techniques through proper blast design and explosive selection is being/ used to reduce the vibrations to a greater extent.

➢ **Impact on Land Environment** –

The soil within the applied area is earthy brown, sandy loam in nature. From inception of mine to till life of mine, 1.36 million m3 of soil will be generated which will be utilized for plantation/greenbelt. By adopting efficient dust suppression measures, the contamination of dust with soil will be avoided. Following measures are/will be taken to reduce the impact of mining on adjacent land with reference to run off, soil erosion and loss of top soil:

Run Off

- ➢ Garland drain having siltation pits have been provided at the toe of the dumps, to channelize the runoff water from dumps into the water reservoir (i.e. mined out pits).
- ➢ To control the surface run-offs, Retaining Wall around waste dump has been constructed.
- ➢ To arrest the silt and sediment flow, the retaining wall and Garland Drain is proposed

Soil Erosion

- ➢ The increased green cover will substantially prevent soil erosion.
- ➢ At the end of lease period, 100.55 Ha area will be covered under greenbelt/plantation.

4.0 POST PROJECT ENVIRONMENTAL MONITORING PROGRAMME

Table 3

Post Project Monitoring

S. No.	Description	Frequency of Monitoring
1.	Micro-Meteorological Data	Hourly
2.	Ambient Air Quality Monitoring	Monthly
3.	Ground Water Quality & Level Monitoring	Half Yearly as per CGWA guidelines
4.	Surface Water Quality Monitoring	Half Yearly
5.	Noise Level Monitoring	Monthly
6.	Ground Vibration Monitoring	On every blast
7.	Crusher Stack Monitoring	Monthly
8.	Medical Checkup of employees	3 to 5 Year Interval ➢ Age of workers <45 years: After every 5 years ➢ Age of workers >45 years: After every 3 years

5.0 ADDITIONAL STUDIES

Additional Studies i.e. Hydro–Geological Study, Risk Assessment & Disaster Management Plan, Land use and land cover study, Ecology and Biodiversity, are covered in Draft EIA/EMP Report as per the Terms of reference granted by MoEFCC, New Delhi vide letter no. J-11015/400/2006 – IA.II (M) dated 12.05.2022 in favor of M/s. Ambuja Cements Limited.

6.0 RESETTLEMENT & REHABILITATION

The total mining lease area is 880.31 ha which spreads in seven villages Bakhardi, Upparwahi, Chandur, Pimpalgaon, Lakhmapur, Thutra and Sonapur. Out of Total Area 62.92 Ha Govt Land and 817.39 Ha Pvt Agriculture Land.

As on date, 575.01 Ha Pvt land has been acquired and 242.38 Ha land will be acquired if required near future will be acquired on the one-to-one basis as per the LARR Act, 2013.

7.0 PROJECT BENEFITS

The proposed expansion project has generated a fair amount of direct and indirect employment in the study region. The local economy has received a boost due to employees spending and services generated by the company.

The overall effect has improved the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing etc. This is envisaged as a major positive benefit, which will ultimately lead to the sustainable development of the region.

8.0 ENVIRONMENT MANAGEMENT PLAN

8.1 AIR QUALITY MANAGEMENT

During Drilling Operation

- Drilling machines (40Mt/Hr) is being/will be equipped with both Wet drilling and dust collection system to suppress dust generation at source.Personal protective equipment's will be provided to drill operators and his helpers.
- Dust masks are being provided to the workers.

During Blasting Operation

- Controlled Blasting is being/will be adopted with the optimum use of explosive energy which helps in reducing air pollution.
- Use of Rock Breaker (PC-200, 129 HP capacity) for breaking oversize boulders in place of secondary blasting.

During loading operation

- Overloading of material is being avoided.
- Fugitive dust emissions from all sources shall be controlled regularly, Water spraying on haul roads, loading, unloading and transfer points shall be provided and maintained.

During Transport operation

- Fugitive dust emissions from all sources shall be controlled regularly. Water sprinkling on haulage road regularly through water tanker with Dust Sol Mist Gun arrangement and Downward Road Fogging System which have been installed by the modification of BEML dumper.
- Permanent Water sprinklers have been provided on the haul roads.
- Periodic air quality survey is being carried and the records are being maintained properly.
- Personal protective equipment's is being provided to workers/employees working in the area and adequate training is being provided on safety and health aspect.
- Maintenance of vehicles is being carried out regularly for minimization of generation of gaseous pollutants.
- The crusher hopper is fitted with an atomized water mist sprayer to control the dust due to unloading of raw material in the hopper.
- In the conveying circuit, bag filters have been provided to control the dust due to unloading of raw material in the hopper.
- In order to reduce air pollution in the surrounding, Green Belt around 7.5 m lease periphery has been done covering an area of 1.45 ha and Total 14.11 Ha area will be covered till end of lease period.
- Vehicular emissions will be kept under norms. Proper maintenance of vehicles will be done to limit gaseous emissions
- Ambient Air Quality Monitoring Stations is being established at Mine Site.
- The emissions levels will be monitored regularly.

8.2 NOISE & VIBRATION QUALITY MANAGEMENT

- **NOISE QUALITY MANAGEMENT**

- Drilling will be carried out with the help of sharp drill bits which will help in reducing noise.
- Secondary blasting will be totally avoided and Rock breaker will be used for breaking boulders.
- Controlled blasting will be adopted.
- Proper maintenance, oiling and greasing of machines at regular intervals is being done to reduce generation of noise.
- Adequate silencers with AC cabins will be provided in Heavy Earth Moving Machines.
- All Mine employees are being provided with necessary PPE's.
- In order to reduce noise pollution in the surrounding, Green Belt around 7.5 m lease periphery has been done covering an area of 1.46 ha and Total 14.11 Ha area will be covered till end of lease period.
- Ambient Noise Monitoring is being done monthly.

- **VIBRATION QUALITY MANAGEMENT**

- Ground vibrations does not affect the structures in the vicinity of ML area as blasting is being done within the standards prescribed by DGMS for controlled blasting.
- The recommendations of CIMFR followed by approvals from DGMS regarding charge per hole & delay/blasting sequences are implemented.
- Explosives charge per hole and per delay is being maintained as per DGMS guidelines.
- NONEL is being used to control ground vibrations, noise & fly rocks.
- Blasting is carried out only during day time only.
- Blasting time is fixed and displayed. People are cautioned 30 minutes before the blasting so that they can go into the blasting shelter or far away from the blasting zone/danger zone.
- Regular monitoring of blast induced vibration is being conducted at mine site by seismograph instrument which records all details of vibration caused by blasting. With the regular monitoring of blast induced vibration, blast parameters have been optimized and vibration level is in as per prescribed limit.

8.3 WATER MANAGEMENT

- Garland drain (L*W*D = 4714 m x 1 m x 1 m) and having settling pond 1871 sq.mhave been provided at the toe of the waste dumps, to channelize the runoff water from dumps.
- To control the surface run-offs, Retaining Wall around waste dump (L*W*H = 150 m x 1.5 m x 1.0 m) has been provided till date & Retaining Wall of (L*W*H = 550 m x 1.5 m x 1.5 m) will be constructed all around the dump area.
- The garland drains and settling pits are being cleaned before the onset of monsoon for efficient and better management of surface run off in the lease area.
- Toe wall along with garland drain having cross section of 1.5m x 1.5m will be constructed all around dump area.
- Seepage in the mine pit will be collected in a sump formed at bottom most bench.

- Suitable drainage system will be provided to prevent surface water from entering into the mine so as to reduce soil wash off.
- The rainwater falling directly into the mine pits will be stored and used for plantation & dust suppression.
- Mining sump shall contribute to augment the ground water resources and shall be considered as recharging pit which shall create overall positive impact on ground water regime both on qualitative and quantitative aspects of ground water environment.

8.4 TOP SOIL AND SOLID WASTE GENERATION & MANAGEMENT

Top Soil Generation & Management

- As on date top soil of 0.36 million m^3 has been generated since inception of the mines. Till end of lease period, 1.00 million m^3 additional soil will be generated which will be utilized for plantation/greenbelt.
- Top soil generated will be used for plantation and green belt development concurrently.

By adopting efficient dust suppression measures, the contamination of dust with soil will be avoided. Following measures are/will be taken to reduce the impact of mining on adjacent land with reference to run off, soil erosion and loss of top soil:

Run Off

- Garland drain (L*W*D = 4714 m x 1 m x 1 m) and having settling pond 1871sq.mhave been provided at the toe of the waste dumps, to channelize the runoff water from dumps.
- To control the surface run-offs, Retaining Wall around waste dump (L*W*H = 550 m x 1.5 m x 1.5 m) will be constructed all around the dump area.

Soil Erosion

- The increased green cover will substantially prevent soil erosion.
- Total area which will be covered under greenbelt 14.11 ha in which at present an area of 1.45 ha has been covered under greenbelt along 7.5m lease periphery and remaining will be covered within proposal period.
- Total area which will be covered under greenbelt and plantation is 100.55 ha other than OB dump area. At present an area of 56.71 ha has been covered and remaining will be covered till the mine life.
- Plantation will be done @2000 trees/ha

8.5 LAND USE PATTERN

- The land use of the lease area is being/will be altered due to mining activities such as formation of pits, temporary dumps, greenbelt, water reservoir etc.
- At the conceptual stage, out of the total lease area (880.31 ha), mined out area will be 261.25 ha, out of which, 23.42 ha area will be backfilled, 52.20 ha to water reservoir and 185.63 remain under mining. 191.99 Ha area will be under waste dump stabilized with plantation and 26.59 ha sub grade stack. Total undisturbed area will be 279.21 Ha
- Local and Indigenous plant species will be planted in consultation with forest department.

8.6 GREENBELT DEVELOPMENT AND PLANTATION PROGRAM

- Total area which will be covered under greenbelt 14.11 ha in which at present an area of 1.45 ha has been covered under greenbelt along 7.5m lease periphery and remaining will be covered within proposal period.
- Total area which will be covered under plantation 86.44 ha in which at present an area of 55.26 ha has been covered and remaining will be covered till the end of lease period.
- Total area covered under greenbelt/plantation at the conceptual period will be 100.55 Ha.
- Plantation will be done @2000 trees/ha with survival rate of 85%.
- The plants and saplings suitable for the existing soil and site conditions will be considered. Preference is being/will be given for fast growing local plant species, which can adapt to the local climate.
- Native plant species have been/will be planted in consultation with local forest officer such as *Azadirachta indica* (Neem), *Bauhinia recemosa (Zinza)*, *Pongania pinnata* (Karanj), *Albizia lebeck (Kala siris)*, *Saraca indica* (Ashoka), *Bauhinia purpuriai (Papeli)*, Ponqamia glabra (Ganuga), Peltophorum ferrusinium (Copper Pod), Mangifera indica (Aam) etc