



Map showing Mine site & surrounding Features

Prepared by

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## SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**Production Capacity Enhancement of  
Pathariya - I Limestone Mines from**

**0.6 MTPA to 0.84 MTPA**

**Mining Lease Area 36.001 ha (No increase in ML Area)**

at

**Village - Pathariya, Tehsil - Dhamda**

**District : Durg, (CHHATTISGARH)**

by

**ACC LIMITED**

**SEPTEMBER 2014**

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## 1.0 Project Description

ACC Limited, established in 1936, is the pioneer in cement manufacturing industry of India . Since then many iconic and mega structures in India has been built with ACC cement. ACC operates three captive mining leases in Durg district, namely Jamul Cement Works Limestone Mine (Lease area 269.95 Ha), Pathariya Limestone Mine Lease-I (36.001 Ha) and Pathariya Limestone Mine Lease-II (37.85 Ha). The fourth mining lease, namely Nandini Khundini Limestone Mine (Lease area 53.57 Ha) is yet to start operation.

The Jamul Cement Works (JCW) of ACC Limited had started cement production in 1965 with an installed capacity of 0.25 million tons per annum (MTPA). The existing production capacity of clinker is 0.76 MTPA and Portland Slag Cement is 1.58 MTPA. Slag is a waste from steel plant and used in cement making. JCW has obtained environmental clearance from MoEF vide letter no. J-11011/251/2008-IA-II (I) dated 11<sup>th</sup> January, 2013 to produce 3.0 MTPA Clinker and 1.5 MTPA Portland Slag Cement and Portland Pozallana Cement (PSC & PPC)

Additional limestone required for producing 3.0 MTPA Clinker at Jamul Cement Works will be met from ACC's captive limestone mines, namely Jamul Limestone Mine, Patheriya Lease-I & Patheriya Lease -II and Nandini Khundini Limestone mine.

In view of this, ACC Limited has proposed to increase the limestone production in Patheriya limestone mine Lease-I from 0.60 MTPA to 0.84 MTPA. Pathariya Limestone Mine (Lease-I) having lease area of 36.001 ha is located at Village-Pathariya, and Tehsil Dhamdha in the district of Durg of Chhattisgarh State. Mining lease area of 36.001 ha in village Pathariya was granted by the State Government in the year 1971. The Patheriya Lease-I is under operation. The lease has been extended for next 20 years on 14-5-11.

The limestone from Pathariya Limestone Mine (Lease – I) is of high Grade. It will be blended with marginal grade limestone of Jamul Cement Works Limestone Mine. (located 3 km North of Jamul Cement Works). The blended limestone will be crushed in the proposed 1500 TPH Crusher at Jamul Mines. The crushed limestone will be transported to the stacking site, through a closed pipe conveyor belt.

The project activities fall under Category 'B' of EIA Notification 14-9-2006. Terms of Reference (TOR) for EIA have been approved by State Level Expert Appraisal Committee (SEAC) vide letter No. 1632/SEAC-CG/EC/Mining/Durg/785 dated 18<sup>th</sup> March 2014. This draft EIA report has been prepared as per the Terms of Reference (TOR) issued by the SEAC for Public Hearing. The Final EIA report will be prepared after considering the comments and views obtained during the Public Hearing.

**Location:** The Mining Lease area comprises total area of 36.001 ha falling in Pathariya villages, of Dhamda Tehsil, District Durg of Chhattisgarh. Terrain of the area is flat. Cement Plant (Jamul Cement Works) of ACC is located about 17 (aerial) km in south direction of mine and well connected with Jamul-Dhamda state highway. Pathariya Lease-I is about 23 km, NE of Durg railway station (situated on Nagpur-Howrah Broad Gauge of SE railway) and well connected to National and State Highways. NH-6 from Mumbai to Kolkata passes through nearest Bhilai town which is approx 22 km away from the mining site. Nearest airport is at Raipur which is about 70 km from mine site.

There are no ecologically sensitive area and archaeologically important places within 10 km radius of the mine site. There is no protected or reserve forest present within the 10 km radius of the mine site. Sheonath river and Amner river are the main surface water bodies present in the study area. Sheonath river is located about 1 km north of the mine site. Amner river is located about 6.7 km in south west direction. Tandula canal is the other source of surface water in the study area. Tandula canal is located about 6.3 km southeast of the mine site.

**Project Cost:** The estimated cost of the expansion of Pathariya Limestone Mine (Lease-I & II) is approx. Rs.15 crores.

**Employment:** Project will create the direct employment for 21 people in Pathariya Limestone Mine – Lease I & II. It would also generate indirect employment for approx. 100 tipper operators for transporting limestone from mine to crusher site, which will be installed at Jamul Mines.

**Water Requirement:** 12 kl/day water will be required for the project. This water requirement would be met from rainwater harvesting in old pits within the lease area.

Ground water will not be utilized for the mine operation. The wastewater will be treated and reused. No wastewater will be discharged outside the mine boundary.

**Power Requirement:** 2 lakh unit per year power will be required for the proposed Pathariya-I & II mine expansion. This will be sourced from State Electricity Board.

**Mining Process:** Mechanized opencast mining method comprising shovel - tipper combination will be adopted. Drills, hydraulic rock breaker, hydraulic excavator and dumper trucks will be deployed. Non electric delay detonators type blasting will be applied. The boreholes will be 115 mm dia and 9-10 m depth. Spacing between two holes will be 3.0-5.5 m. Blasting will be done once a week. The height of bench will be kept 2-4 m for OB and 7m for Limestone. The width of the bench will be kept more than bench height and the ultimate depth of mine will be kept 30 m from ground level. The ultimate pit slope will be 45° to 60°. Overburden shall be stacked along the lease boundary. The height of the dump shall be 3 m. Total measured mineral reserve is 30.49 million tons. Overburden shall be stacked and re-handled back in the voids. Technically the mining methodology is based on 'Zero Waste' concept.

## **2.0 Description of Environment**

Baseline data was generated during the period 1<sup>st</sup> March 2014 to 31<sup>st</sup> May 2014. 10 km area around the mines boundary (all three mines of ACC) was considered as study area to study cumulative impacts. Data was generated as per the standard procedures of the Ministry of Environment & Forests and the Central Pollution Control Board.

Meteorological data on wind speed, wind direction, relative humidity and temperature was generated site. Baseline ambient air quality was measured at 8 locations within the core and buffer zone. Noise levels were measured at 8 locations. Surface water quality of 4 locations, groundwater quality of 8 locations and soil quality of 8 locations was collected and analyzed. Data on plants and animals present in the core and buffer zone was collected from the published literatures and checked during field survey. Data on landuse, demography, occupation pattern, cropping pattern, infrastructure facilities were collected from District Statistics Handbook and village profile records.

The study area falls under Seismic Zone II. The limestone of this area is of lower Vindhyan age occurring as flat terrain. No forest, national park, wildlife sanctuary, tiger reserve, biosphere reserve, wetland, heritage site, archaeological monument, etc are present within 10 km radius of mines.

The predominant wind direction is from southwest and west direction. The average wind speed ranges from 0.5 to 8.8 m/s. Daily mean temperature varied from 19.8°C to 44.6°C. The relative humidity varied from 20-54%. The annual rainfall is 1288 mm.

**Air Quality:** PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, benzene, ozone, ammonia, carbon monoxide as well as Benzo(a)pyrene, As, Ni and Pb in PM<sub>10</sub> were monitored at eight locations in the study area. The locations were selected as per CPCB guidelines. Monitoring was done at upwind direction and various downwind directions of the project. The baseline air quality levels of all parameters are found to be within the National Ambient Air Quality Standards prescribed for residential and industrial area. Benzo (a) pyrene, As, Ni and Pb in PM<sub>10</sub> are found to be within the National Ambient Air Quality Standards prescribed for residential and industrial area.

**Noise Quality:** Ambient noise levels were monitored at 8 locations in the study area. The baseline noise levels are well within the National Standards for residential area (Standards are 55 dBA-day time and 45 dBA-night time).

**Water Quality:** 4 surface water samples and 8 groundwater samples were collected from the study area for chemical and biological analysis. Surface water samples were collected from upstream and downstream point of Sheonath river, Amner river and Dhamda dam. The surface water quality of river and dam meets the designated use criteria. The surface water is fit for irrigation and industrial use. The surface water quality is fit for drinking only after conventional treatment. Groundwater samples were collected from hand pumps and tube wells of villages around the project site. The groundwater quality meets the standards prescribed by Bureau of Indian Standards (BIS 10500).

**Soil Quality:** 8 soil samples were collected from the study area and analyzed. The texture of soil is sandy loam. The organic matter, nitrogen, potassium and phosphorus

content of the soil are moderate. The pH and conductivity of all the soil samples are within the acceptable range.

**Sensitive Ecosystem:** Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park, wildlife sanctuary and Forest are present within 10 km distance of the project site.

**Socioeconomic Data:** The proposed mine site is located in Dhamda Tehsil of District Durg in Chhattisgarh State. The 10 km area of the mine site falls in Dhamda and Durg tehsil, district Durg. There are 59 villages and Two Nagar Palika falls within the 10 km area of the mine site. According to 2011 census the total population of the study area is 114455 comprising 57257 male and 57198 female. Male female ratio of the study area is 999 female / 1000 male, which is much higher than the State and National average. Out of the total population about 18.7% is SC population and only 6.1% is ST population.

### **3.0 Environmental Impact and Mitigation Measures**

**Water Environment:** Rainwater accumulated in abandoned pits inside mine area will be used for dust suppression and irrigation for green belt development.

**Mitigation Measures:** The surface runoff generated during rainfall event will be diverted to mined out pits inside the mines premises. This will act as rainwater harvesting structure. Garland drains with sedimentation pits at appropriate intervals will be made around the overburden dump. Runoff from dump slopes will be passed through befall plates filters to arrest the silt before letting it to the pits. Gully along the slopes will be provided with (Befell plates) to arrest the silt. The slopes will be compacted routinely, soil will be spread over it and stabilized by planting hers and shrubs. This will prevent soil and silt erosion. Domestic wastewater will be treated in septic tanks and disposed in soak pits. Water available in the mined out pit and active pits will be tested. The spent oil and lubricants from workshop, vehicles, etc will be given to authorized re-processors. There will be no discharge of wastewater outside the mine premises.

**Air Environment:** Dust is the main pollutant generated during various mining operations, including blasting, haul roads, loading and vehicular movement.

**Mitigation Measures:** Stable roads will be made inside the mining premises for movement of vehicles. Water sprinkling system (truck mounted) will be applied for dust suppression on haul roads. Regular maintenance of vehicles and equipment will be carried out. Wet drilling and controlled blasting (using latest NONEL technology) will be adopted. Stacks as per CPCB norms will be provided for DG sets. 30 m wide greenbelt will be developed on west side of the mine premises (towards Patheriya village). Small herbs and shrubs like Bougainvillea, Kaner, Lantana, Adhusa, Ber, Custard apple, Casurina, Vitex negundo, etc. will be planted in the first 15 m. Thereafter trees like Shisham, Siris Gulmohar, Amaltas, Munga, Peepal, Jamun, Neem, Kadamb, Aam will be planted in next 15 m.

**Noise Environment:** Material handlings, movement of vehicle, blasting, loading and unloading activities are the main noise generating sources in the mine site.

**Mitigation Measures:** Material handling operations and movement of vehicles will be properly scheduled to minimize noise. Maintenance program for heavy vehicles will be routinely followed. Non-electric delay detonator will be used to minimize the ground vibrations. Workers working inside crusher house will be given ear plugs and ear muffs. Mining will be done only during day time. In this manner the noise level at the mine boundary will be below the national standard of 55 dBA during day time and 45 dBA during night time.

**Land Environment:** Overburden will be stacked at the periphery of mining lease boundary along the south side to form bunds of 3 m height (7.5 m inside the mine boundary). The slope will be maintained at less than 60°, with adequate number and size of steps / trenches made. The slopes will be compacted and spread with 8-10 cm thick soil cover and grass, legumes and small shrubs will be planted along the slopes. Befell plates shall be fixed at several places along the garland drain and gully of dump to arrest the erosion and de-silting. Recyclable materials will be sorted out and sold to local recyclers. Inert material will be reused as landfill. Organic and other green waste will be taken to compost pit. Use of plastic inside mine area will be strictly prohibited. Mined out area will be suitably reclaimed after extracting the limestone. Reclamation will be done



by backfilling the overburden. Voids will be converted to water body and can be used based on local regulatory authorities at the end of mining.

For reducing adverse environmental impacts from other sources, following mitigation measures are recommended in the EIA report:

- Wet drilling will be practiced. The drilling machine will have inbuilt water sprinkling arrangement and dust extraction system.
- Controlled blasting technique will be followed. The site will be wetted before blasting. Blasting will be done around noon.
- Non-electric shock tube initiating system and Noiseless Trunkline Delay detonators and IKON (Digital Electronic System) will be used to keep the air blast levels to the lowest possible limits and minimize noise and vibration.
- Ground vibrations to be continuously monitored during blasting using Minimate Seismograph, through study of the peak particle velocity at different distances.
- Hydraulic rock breaker will be used to eliminate the use of secondary blasting.
- Combination of primary rock breaker and backhoe will be used for efficient collection and loading.
- Compaction, gradation and proper drainage will be provided for haul roads.
- Haul roads in mines will be stabilized. Vehicular speed in mines area will be restricted to 20 kmph.
- Depression area within the worked out site will be converted to water body. The water body will act as water reservoir.
- Plantation shall be done on both side of Jamul Dhamda road from Patheriya to Jamul cement Works.

Air quality dispersion modeling study was conducted and it proved that the ambient air and noise quality of the area will remain well within the national ambient air quality and noise standards. No wastewater will be generated during mining. No toxic chemicals or wastes will be handled in the mines. Diesel and Explosives will be stored as per approval obtained from Chief Controller of Explosives.

Exposure to dust for long period may lead to respiratory disorders, noise induced hearing loss, mechanical injury to body parts are the identified occupational hazards. The workers will be checked during employment and then shall be checked for any

clinical complaints and abnormal symptoms by the medical team of Jamul Cement Works. Workers will be given personal protective equipment like nose mask, ear plugs, safety boots, gloves, goggles. Clean drinking water and toilet facility for workers is exists. Rest room facility, with toilet, bathroom and recreation facilities for Drivers and their attendants exists in Pathariya-I mine. Canteen facility for all workers and drivers is exists in Patheriya-I. Regular training and awareness programs will be conducted for the workers so that they are aware of the work hazards, vector borne diseases, HIV, etc and will develop the behavior of using protective equipment.

The proposed mining activity will have certain negative impact on the environment. With implementation of recommended mitigation measures and safeguards, the adverse effects will get reduced to acceptable level. The groundwater level at Patheriya village (near mining site) is 6.2 m during pre-monsoon. Since mining will be done upto 30 m, groundwater table will be intercepted. Blasting and mining will lead to opening up of fractures and fissures thereby improving groundwater flow. Development of secondary porosity by cracks and joints will also enhance the transmissivity and specific yield of aquifer. Seepage water will accumulate in the mining pits. The accumulated water will be pumped to the existing old mined out small pits in view to use it for dust suppression system and irrigation. During rainy season the surplus accumulated water will be discharged into nearby nalla.

The mining activity will have beneficial impacts in terms of direct and indirect employment opportunities. Jamul Cement Works will introduce a number of community development measures, which would improve the quality of life of the people living in the area.

#### **4.0 Environmental Monitoring Plan**

Pathariya Lease-I & Patheriya Lease-II limestone mines is an operational mine. The mines are administratively operated from a single point located at Patheriya- Lease I. The infrastructure like administrative buildings, workshop, magazine, lubricant and diesel storage already exists inside the Patheriya-I mine, which are common for Patheriya Lease –I & II and proposed Nandini Khundini Mine. Environment Management Department already exists and is located at Jamul Cement Works plant, take care of

plant and all the integrated limestone mines Environment Management System. Existing EMD is adequate to perform the responsibilities of the proposed mines.

EMD will be responsible for the following functions:

I. Regular monitoring of –

1. Ambient air quality at upwind & downwind direction inside mine and at two nearest villages (Nandini Khundini and Patheriya) throughout the year.
2. Fugitive dust emission monitoring at 200 m upwind and 200 m downwind direction of the fugitive dust generation source.
3. Collect and analyse the ground water quality of mine site (seepage water), and all the surrounding villages. The depth of the groundwater in surrounding villages shall be checked every year during June and October.
4. Collect and analyse the water quality of Amner and Sheonath river, surrounding nalas and village ponds, once during June and October.

II. Development and maintenance of greenbelt and greenery inside the mining lease area and between mines boundary, Patheriya and Nandini Khundini villages.

## 5.0 Additional Studies

**Risk Mitigation Measures:** Explosion / fire in explosive storage (magazine house) and diesel storage tank are the risks and accident hazards. The diesel tank has been designed as approved by Chief Controller of Explosives. The location of explosive storage area is approved by IBM. All safety measures recommended by the IBM and DGMS are being implemented. Mobile vehicles and arrangement for the first aid is available at Patheriya Limestone mine Lease -I site. An effective communication system comprising landline and mobile phones facilities is already available at the mine site. Local Police station is being informed before blasting. Ground vibration measurements will be carried out and blasting will be done as per recommendation. The ground vibration (peak particle velocity) will be maintained within the DGMS limit, so as to ensure safety of surrounding buildings and houses of villagers. Blasting technology selected for this operation will ensure that flyrocks are kept to the minimum and blast waves are of lower magnitude. The water pits will be properly fenced and warning signals and signboards put at various places stating the depth of the ponds at end of mine life.

## **6.0 Project Benefits**

Limestone mining will generate substantial revenue for the state of Chhattisgarh, through optimal utilization of natural resource and royalty. The project will boost the infrastructure development of the area.

21 direct + 100 indirect (under contractor) persons will get employment in this project. Local people will be preferred for jobs, depending upon their skill and experience. Transport business, vehicle drivers and attendants, repairing workshops, grocery and retail stores, school, coaching centers, restaurants, self employed persons like tailors, carpenters, plumbers, electricians, etc will get indirect employment / livelihood opportunity from this project.

ACC will contribute in the field of social development. Rs.5 lakhs/year has been earmarked as annual recurring expenses for undertaking various community development measures. The CSR budget will be common for Patheriya - I & II Limestone Mine. This money will be spent towards social development activities which include construction of community centers and schools, maintaining roads, rain shelters, providing drinking water facility to the nearby villages, making toilets in schools and for community, providing free medical camps, providing scholarships to bright students and sportsperson, etc. Income generating schemes will be implemented for upliftment of women and poor sections of the society includes vocational training in the field of mushroom cultivation, Pattal making, Masala making and packaging, Growing fruits and vegetables, Development of fodder farms, etc.

## **7.0 Environmental Management Plan (EMP)**

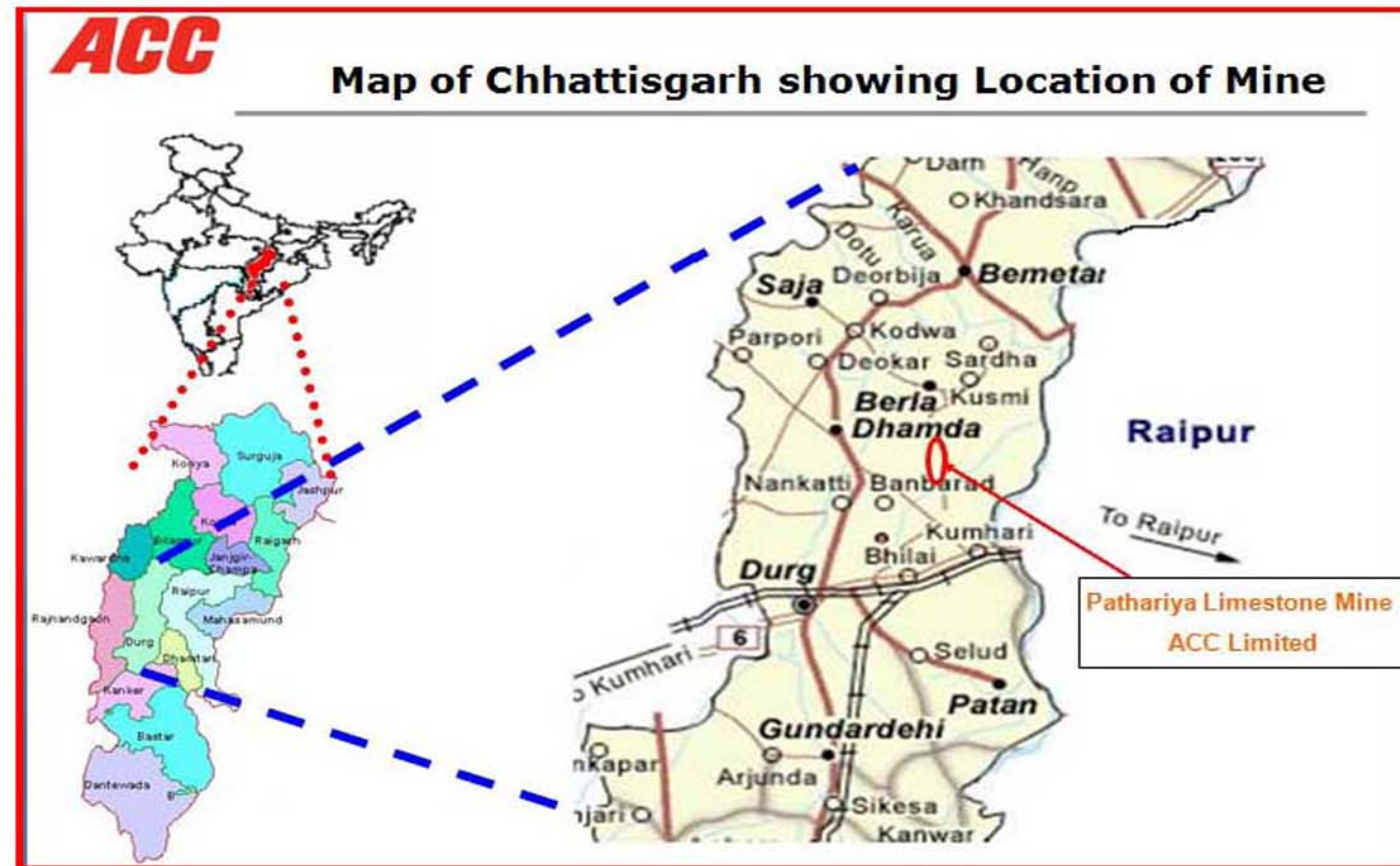
EMP for effective management of environmental impacts due to the mining activity and ensuring overall protection of the surrounding environment through appropriate management procedures has been prepared.

The capital cost for environmental management of the Patheriya-I & II mining project is estimated to be Rs 30 lakhs. This amount shall be used for procurement of Fugitive Dust Suppression systems like road side water sprinkling system and water tanker with rain

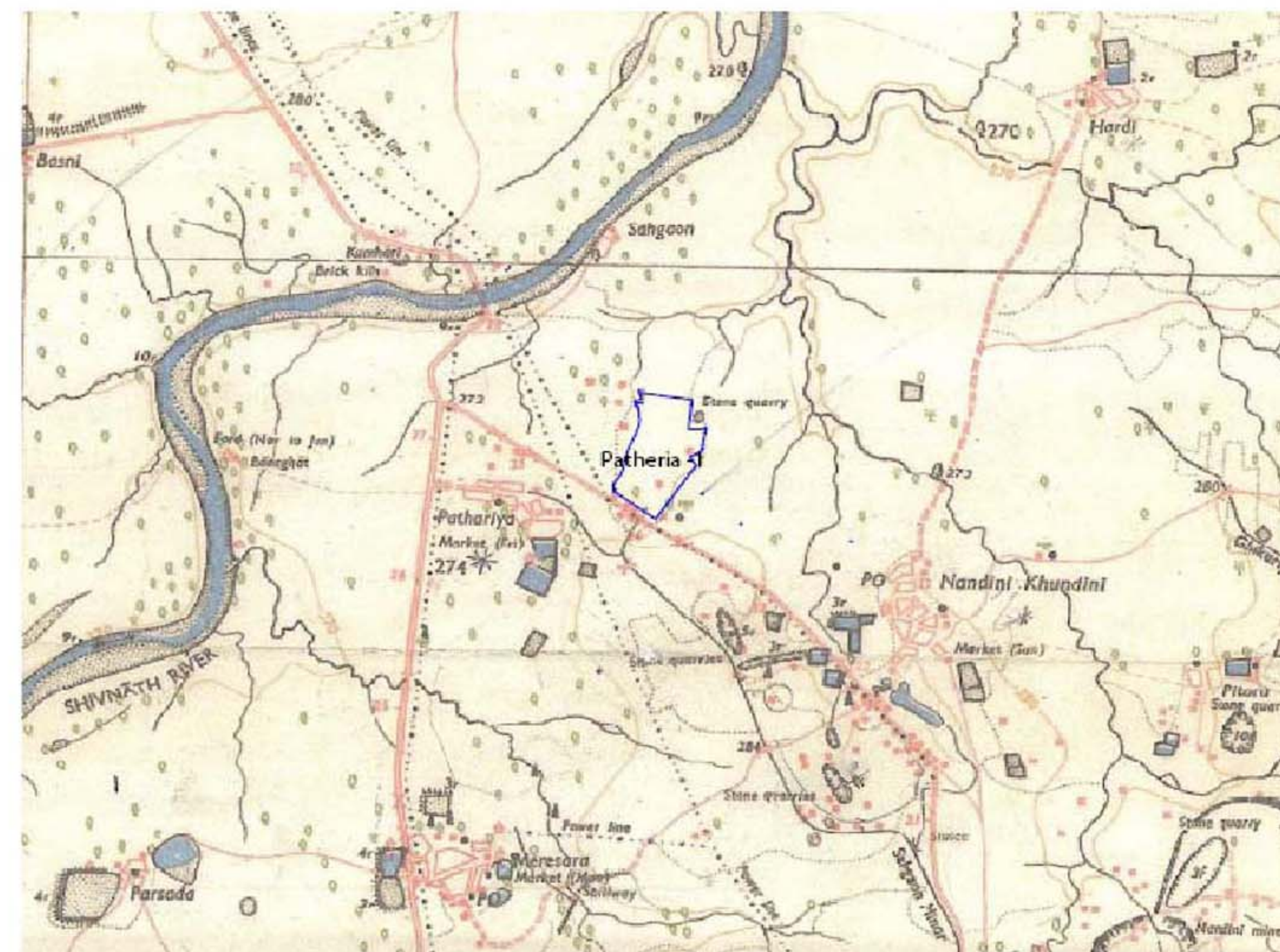
gun and other facilities for suppressing the dust. Monitoring devices for ambient air, noise monitoring, and environment cell already exists. Occupational health and safety, energy development is an ongoing process and shall continue in future also. About Rs.10 Lakhs would be required as annual recurring expenses.

Environment Management Dell will ensure that all pollution control devices function effectively. EMD will supervise disposal of spent oil and lubricants and used batteries to the authorized vendors. Plantation will be started from day one and continue throughout the life of the project. Schemes for resource conservation, rainwater harvesting and social forestry development will be taken up. Regular environment, safety and health awareness programs for the workers will be conducted by the EMD.

EMD will also interact with the regulatory authorities, submit the monitoring reports and consent applications. The implementation of EMP would ensure that all elements of project comply with relevant environmental legislation throughout the mine life.



Location Map



Boundary of Mine Lease Area and Vicinity Features



Mine Photographs