MONNET
Steel | Power | Mining

# MONNET ISPAT & ENERGY LTD.

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# EXECUTIVE SUMMARY

**OF**

## DRAFT
## ENVIRONMENTAL IMPACT ASSESSMENT

**AND**

## ENVIRONMENTAL MANAGEMENT PLAN

**FOR**

## GAITRA LIMESTONE MINE
## (OPEN CAST)

**IN**

**VILLAGE: GAITRA, PAUSARI, BHARSELA & BHARSELI,**
**TEHSIL BALODA BAZAR,**
**DISTRICT: BALODA BAZAR,**
**CHHATTISGARH**
**(EXTENT: 278.144 Ha, PRODUCTION : 1.3 MTPA)**

**JUNE, 2016**
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***Consultants:***

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Estb. 1983

An ISO 9001:2008 approved company

# EXECUTIVE SUMMARY

## 1.0 INTRODUCTION

### 1.1 General background

Proposed Gaitra Limestone Mine will have 1.3 MTPA production. The mine lease area is 278.144 Hectares. The project proponent is Monnet Ispat & Energy Ltd. The lease occurs in parts of Gaitra, Pausari, Bharsela & Bharseli villages, District Baloda Bazar, Chattisgarh. A total of 79.09 million tonnes of total geological limestone reserves and 61.08 million tonnes of mineable reserves have been estimated. Mining is proposed by opencast method. The average stripping ratio will be 1:0.11 for first 5 years of mining scheme.

### 1.2 Location and communication

The mine lease falls within the Survey of India Toposheet No.64-K/2. The mine lease is bound by Latitudes 21° 40' 22'' to 21° 41' 30'' North and Longitudes 82° 06' 10'' to 82° 07' 44'' East. SH-10 (Bhatapara to Baloda Bazar) is passing at a distance of 0.6 km in south west. SH-9 (Baloda Bazar to Raipur) is passing at 5.0 km in south east. SH-14 (Baloda Bazar to Kasdol) is passing at 4.9 km in south east. MG Road (Baloda Bazar to Hathbandh) is passing at 4.3 km in south south east. Nearest Railway Station is at Bhatapara at 16.5 km (by road) in west north west. Nearest airport is Raipur at a distance of 100 km (by road) from the area. The location of the project can be seen in Fig 1.

## 2.0 PROJECT DESCRIPTION

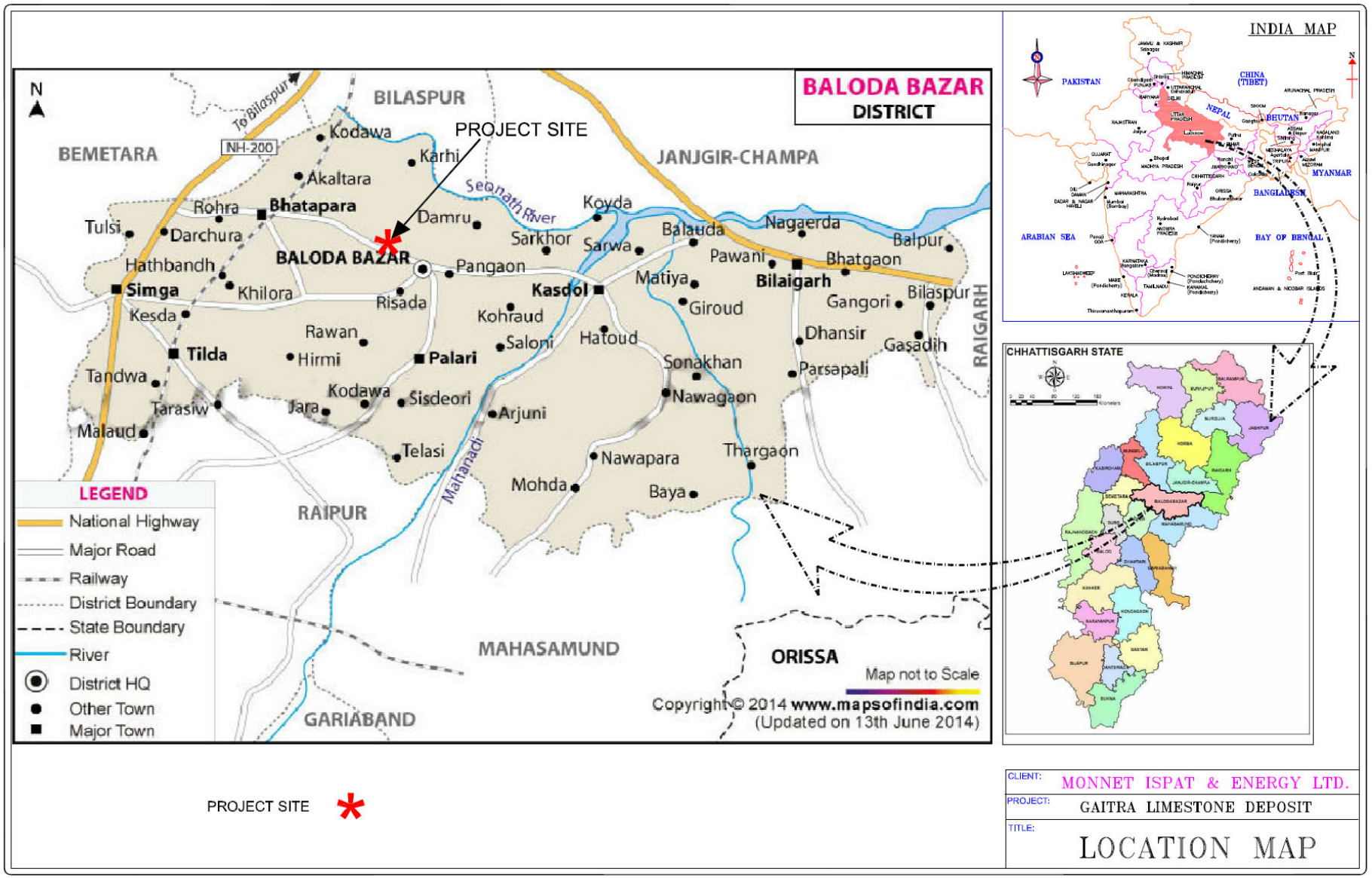
### 2.1 Geology

The lease area is a small part of the Proterozoic Chhattisgarh basin spanning around 36,000 sq.km. It comprises limestone and buff grey shale of Chandi Formation of the Raipur Group. The general trend of the outcrops is in north east- south west direction and almost horizontal in disposition.

### 2.2 Reserve and grades

Reserves have been calculated borehole wise by influence method. It is based on the prospecting report of Directorate of Geology and Mining. Estimated mineable reserves from the block are 61.08 MT. At the production rate of 1.3 million tonnes per year, anticipated life of mine is 47 years. The average quality of limestone will have 45.05% of CaO, 12.55% of $Al_2O_3$ and less than 3% of MgO. This makes it suitable for cement manufacture.

## FIG 1: LOCATION MAP



## 2.3 Mining

The targeted production of limestone will be 1.3 million tonnes per annum. This will meet the requirement of raw material for cement plant.

Mining will be mechanized open-cast method. It will adopt a system of benches. Bench height will be 9 m. Hydraulic excavators will be deployed for progressing benches and for handling ore/ waste material. Drilling and blasting will be done in hard formations. Dumpers will be used for loading and dumping of waste material/ ore. Limestone will be blasted, handled and loaded by excavators into dumpers of 25 tonnes capacity.

Run of Mine (ROM) will be crushed up to 75 mm in a semi mobile crushing plant. It will then be transported to the proposed cement plant of the company by road or conveyor.

Ultimate pit limit is fixed and final pit slope angle will be 45°. Mine pit area will be 173.78 ha. Ultimate pit depth will be 30 m below ground level.

## 2.4 Blasting

High explosives of slurry cartridge of 83 mm shall be used as prime charge. Powder factor will be around 8 t/kg of explosives in the entire strata to be blasted. Optimization on powder factor will be achieved after gaining sufficient field experience. Explosives shall be stored in permanent magazine of 10 tonnes capacity.

## 2.5 Site services

The services such as office, stores, first aid centre, canteen, etc. are proposed at the site. A work-shop with machine shop facility will also be provided. Power shall be supplied from Chhattisgarh State Electricity Board from their nearest sub-station. Total water requirement for the mines will be 132 cum/day. Ground water will be used for drinking purpose and mine sump water for the industrial use. The mining operation (production) will be 300 days in a year with two shifts per day.

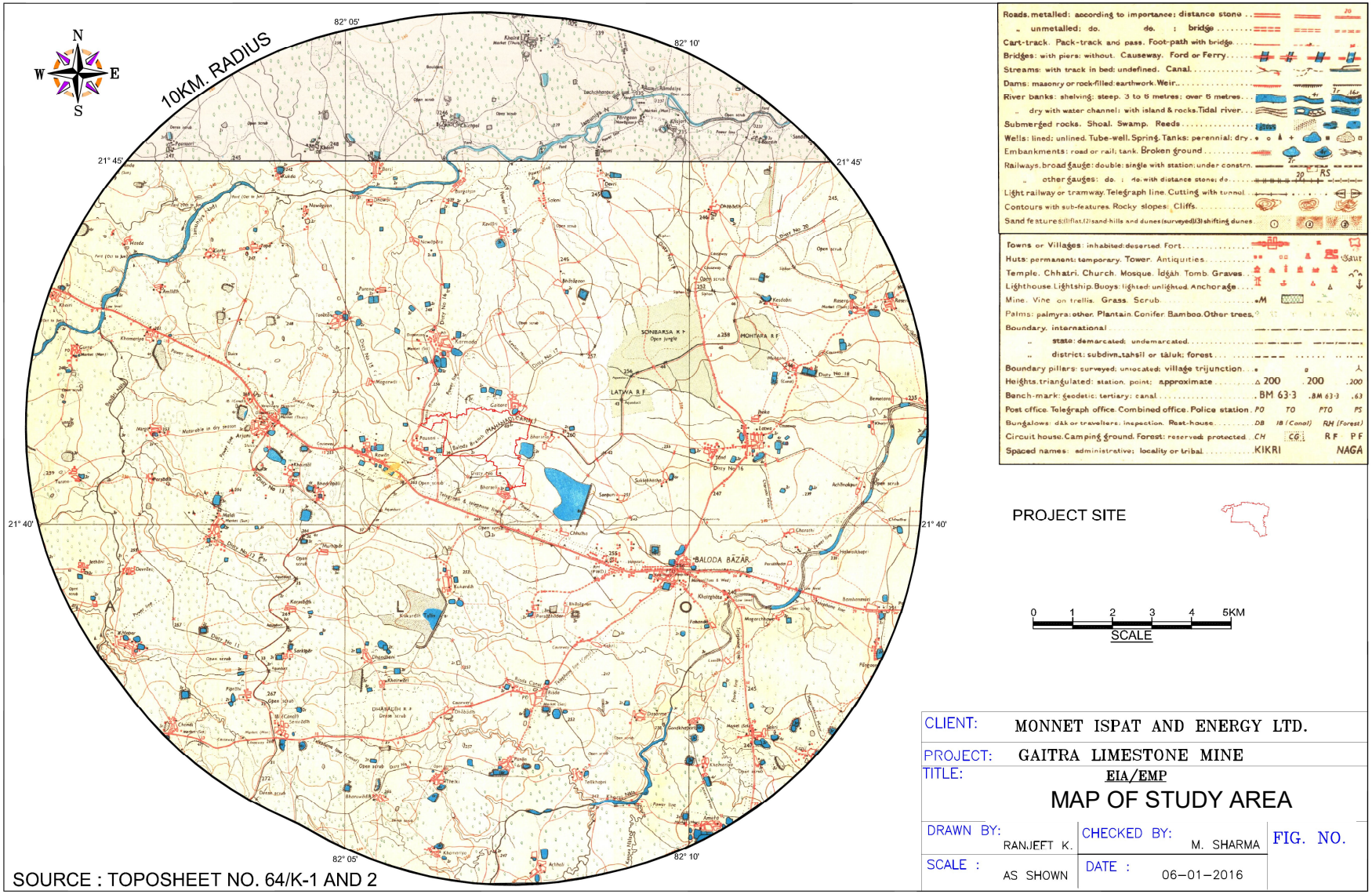
## 2.6 Manpower

Total employment including management and workers will be 89. Persons required will be of both technical and non-technical background.

# 3.0 PRESENT ENVIRONMENTAL SCENARIO

The mine lease area is the project area. It is referred to as “core zone”. The 10 km radius around the mine lease has been called “buffer zone”. Both core and buffer zone are called “study area”. The map of the study area can be seen in Fig 2.

## FIG 2 : MAP OF STUDY AREA




SOURCE : TOPOSHEET NO. 64/K-1 AND 2

### 3.1 Topography & drainage

**Core zone:** The area represents plain land gently sloping towards south – east. The average elevation of land varies between 258 to 261 m above mean sea level. Baloda branch of Mahanadi Canal cuts across the mine lease area. One second order nala passes through the lease. One first order nala originates in the lease area.

**Buffer zone:** The buffer zone represents mostly flat to gently undulating topography with regional slope towards Jamuniya Nadi in the north and towards Khorsi nala in the south and east. The land elevation varies from 235 m in eastern portions of study area to 278 m in south-south west. The study area forms a part of Mahanadi River basin. It is drained by Banjari Nala and its tributaries in the western parts. Banjari nala, flowing northwards, joins Jamuniya Nadi. Jamuniya Nadi and Khorsi Nala both meet Seonath river outside study area, which eventually meets Mahanadi river.

### 3.2 Climate & micro-meteorology

The climate of the study area is tropical wet and dry. The nearest meteorological station of IMD from where data was available is at Raipur.The annual average rainfall during years 1993-2005 in the area was 1170.4 mm. The monsoon season spread over the months of June to September. The average maximum and minimum recorded temperatures were 41.8°C and 13.5°C, respectively. The average relative humidity was found to be 67% at 8:30 hrs and 51% at 17:30 hrs.

The micro-meteorology was monitored at project site from March to May 2016. Temperature was recorded between 21°C to 43°C and relative humidity between 6% to 86%. The wind speed varied between calm to 37 km/hr and the predominant wind direction was observed from SW with 26.77% of occurrences.

### 3.3 Ambient air quality

Ambient air quality was monitored at eight locations, one in the core and seven in the buffer zone. These are at villlages Dhabadih (6.9 km, north east), Murhipar (3.9 km, south west), Karmada (1.8 km, north), Latwa (5.2 km, east), Chhuiha (1.3 km, south east), Bhatagaon (3.3 km, south east) and Rawan (1.3 km, west-south west). Twenty four hour average $PM_{10}$ was found between 59.2 to 85.0 µg/m$^3$, $PM_{2.5}$ was found between 32.9 to 51.8 µg/m$^3$, $SO_2$ from below detectable limits (BDL) to 24.8 µg/m$^3$ and NOx from 8.1 to 27.7 µg/m$^3$. All the values were within the permissible standards at all the locations.

### 3.4 Water resources

Seonath as well as Mahanadi rivers flow outside the 10 km radius of the study area. The entire study area is divided into two watersheds namely Jamuniya Nadi and Khorsi Nala watershed. Water from both eventually

meets Mahanadi via Seonath river. The groundwater in the area occurs in unconfined conditions within the secondary porosity of limestone which is highly fractured down to a depth of about 20m below the ground. Ground Water Development in Raipur district is only 36.70%, while in Baloda Bazar Block it is 45.06% and it falls under safe category.

Water samples were collected from nine surface water sources, namely, Mahanadi Canal near Pausari and Bharsela Village, Ponds in villages Gaitra, Bharseli, Bharsela, Karmada, Kukardih and Arjuni, and Tank near Chhuiha Village. Eight ground water samples were also collected from villages Gaitra, Bharseli, Bharsela, Pausari, Murhipar, Koliyari, Latwa and Baloda Bazar. Water is generally found to be potable with few parameters in some samples sporadically exceeding limits.

## 3.5 Noise and traffic density

Ambient noise level were studied at ten locations and was found to be between 50.40 and 64.40 dB(A) during day and 41.00 and 52.80 dB(A) during night. The higher levels were near areas of high activity and road traffic.

A traffic density survey was conducted at Baloda Bazar to Bhatapara road near Rawan village. The total number of vehicles on the road during the monitoring period were found to be 4014 of which 3799 were motorised. Traffic was more during day than night.

## 3.6 Ecology

There is no forest area in core zone. There are four reserved forests in study area. The study area is a part of the Raipur Division and forest falls under Thorny Scrub Forest. Vegetation predominantly comprises of *Acacia nilotica, Acacia leucophloea, Butea monosperma, Ziziphus mauritiana, Madhuca indica, Syzygium cumini,* etc.

Due to scanty vegetation in the study area, the diversity of fauna is poor. There is only one Schedule-I animal, namely, *Python molurus* found in buffer zone. Fauna found in the buffer zone includes Jackal, fox, wild pig, mongoose, bat, hare, krait, cobra, owl, etc.

## 3.7 Soil quality and Land use pattern

Soil samples were collected from five locations i.e. one in core and 4 in buffer zone. The pH value varied from 6.5 to 7.9 while the electrical conductivity varies from 126 to 336 µmhos /cm. The organic content of all the soil samples was low, except Gaitra village. Gaitra had optimum content of organic matter. All the soil samples were deficient in potassium.

Total Mine lease area is 278.144 Ha. Out of this, 267.975 Ha is private agricultural land and 10.169 is government land.

The study area comprises 105 villages and towns in Baloda Bazar district. Land use pattern based on 2011 Census data shows that the agricultural land (net sown + current fallows + other fallows) account for a major portion i.e. 75.33% of land. This is followed by areas under Permanent Pastures and Other Grazing Land (9.46%), non agricultural uses (9.38%), culturable waste land (3.64%), forest land (1.32%), barren and uncultivable land (0.85%),and Land under miscellaneous tree, crops (0.02%).

## 3.8 Socio-economic condition

There are no human settlements within mine lease area. The total population within the 10 km radius study area is 1,70,970. There are 85,302 females and 85,668 males. Scheduled castes constitute 21.11% and Scheduled Tribes constitute 18.62% of the total population.

The overall literacy level is moderate (60.66%). Of this 35.10% are males and 25.56% are females. 31.08% of total population is main workers. 12.62% of population is marginal workers in rural area. 56.30% are non workers.

## 3.9 Industries and Places of tourism/ religious/ historical interest

There is no National Park/ Sanctuary and places of tourism/ religious/ historical interest in 10 km radius. Three cement plants and eight limestone mines are present or proposed within 10 km radius.

# 4.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION

## 4.1 Topography and drainage

***Impact:*** Mining, waste handling, infrastructure and transportation will affect the existing land surface over mine lease area. Physiography of the mine will change due to removal of top soil, overburden and excavation for mineral removal. Voids will be created after completion of mining at the end of life of mine. The upper benches where the limestone will get exhausted can be reclaimed by plantation and deeper pits will be used as water reservoirs. A short length of the first order stream will be dug up in the north side. The second order stream in south-east side will be realigned along the mine pit. Due to excavation of pits, a part of the total rain water run off into the season streams will reduce.

***Mitigation:*** There is Baloda branch of Mahanadi canal is passing through the middle of mine lease. It will not be disturbed. A canal on northwest corner will also not be disturbed. Safety barriers of 45 m will be left along them on both sides. There is no other perennial surface course of water or surface water body within the leasehold area. The seasonal nala will be managed through realignment to ensure free flow of water to the reservoir near village Chhuiha. Rain water will get collected in mine pits and recharge ground water.

## 4.2 Climate

***Impact:*** The climatic conditions including temperature variations, wind direction and speed, rainfall and humidity are governed by regional factors and the monsoons. As such the mining and other allied activities will not influence the climate.

***Mitigation:*** The operations are to be carried out in a limited area, vertically below the ground surface; as a result no climatological impacts are anticipated. Implementation of plantation in green belt, around mine workings and in virgin area will contribute in positive manner.

## 4.3 Air environment

***Impact:*** The opencast mining operations are generally prone to generation of high levels of Suspended Particulate matter (SPM). Sulphur dioxide, Nitrogen oxide and Carbon monoxide generation is limited due to explosives based blasting and fuel oil consumption by diesel based equipment. SPM will be generated due to excavation, movement of dumpers and crushing activities. Control measures will be required to ensure air pollutants are within permissible limits.

***Mitigation:*** The emission of dust will be restricted by the sprinkling of water. Water spraying system will be carried out at mine face, haul roads, near office, benches and wherever required. Vehicles will be maintained periodically for emission control. Tree plantation along the mine boundary, along the roads, canals and in unutilised virgin land will be carried out. Drills will be equipped with dust collectors. Suitable burden, spacing of blast hole, charge per delay and controlled blasting using short delay detonators shall be implemented. Speed limit of various types of vehicles will be specified and displayed at various locations.

## 4.4 Water environment

***Impact:*** There will not be any discharge of industrial or domestic effluent from the proposed mine. Thus, no impact envisaged on the surface and ground water quality due to effluent. The canals passing through central part as well as north west part of the mine lease will remain undisturbed. The village ponds are all outside the lease area and a buffer of plantation will be created to ensure that the mining activities do not impact them. Two seasonal nalas will be disturbed. Mine workings will intersect ground water table. The seepage water will get accumulated in the mine pit. It will be of same quality as the ground water in that area. Therefore evacuation of mine pit water during mining will not be harmful if used for irrigation use. Some amount of oil/ grease is likely to be released from the maintenance workshop for equipment and vehicles washing which will be treated and reused.

***Mitigation:*** A garland drain will be provided all along the pit periphery in order to protect the mine working from inflow of storm water. A surface

water reservoir is proposed to store the run off water as well as water pumped out from the mine. Settlement of suspended solids shall take place in the surface reservoir. The accumulated water would be consumed in mine operations. Water would be available for plantation and irrigation in surrounding areas, for recharge of ponds and use of villagers. Excess water will be released into natural streams. To prevent surface and ground water contamination by oil & grease, leak proof containers will be used for storage and transportation. Rain water harvesting structures shall be provided for the office building and similar structures wherefrom the roof top rain water can be directly recharged to the ground water through recharge well.

## 4.5 Noise, traffic density and ground vibration

***Impact:*** During the proposed mining operation, noise pollution will take place due to machines, vehicles and blasting. Vibration due to blasting can cause damage to nearby structure if safeguards are ignored. There will be increased traffic on public roads due to the movement of the manpower and limestone bearing trucks.

***Mitigation:*** To minimise noise levels, extensive plantation will be done. Periodic maintenance of machinery and vehicles will be carried out. Silencers will be installed on machines. Imposition of speed limit will be there on HEMM near residential areas. The exposure time of workers will be reduced and ear muffs will be provided to them.

## 4.6 Ecology

***Impact:*** Ecological impacts from open cast mining are generally due to generation of air and water pollutants and deforestation. There is no forest land in the mine lease area. Ecological impacts from open cast mining result in loss of vegetation by excavation and dumping. This will affect the species for which such vegetation was the host. Migration of animals to neighboring areas due to noise, vibrations, lights and habitat loss will occur. However, due to low faunal density and variety, the impact will not be significant.

***Mitigation:*** The precautionary measures taken for control and management of ecology will include construction of boundary or fence along the mine perimeter. The roads leading to and from the mine shall be having boards with caution warning. Drivers shall be sensitized not to hit stray animals on the road. Emissions from the mines shall always be kept within the norms. Care shall be taken that no food or degradable waste is openly disposed. The total proposed area for afforestation will be around 105 ha. It has been proposed to create and maintain a green belt around the mine. To fulfill the requirements of plants for afforestation, a nursery of native plants shall be established at the site.

## 4.7 Land Environment

***Impact:*** Land degradation is inevitable during mining, particularly, in open cast mines. The original soil ecosystem and structure are affected within the

core zone. In the mine lease, land is nearly flat. Out of 278.144 ha lease area, 113.28 ha area will be excavated for limestone by end of life of mine. 30.25 ha would be used for soil storage and 10 ha for waste dump/ sub grade stacking. Mineral storage would be over 2.42 ha.

***Mitigation:*** The maximum depth of the proposed mine pit will be 30 m at end of life of mine and will be used as water reservoir. It will serve as a rain water harvesting structure. Neighbouring villages can also use the water through a safe access point. Plantation is proposed over 105.224 ha area, which will act as a buffer between the mine and surroundings.

## 4.8 Solid waste

***Impact:*** Five types of solid waste are likely to be generated through mining activities which are overburden (both topsoil and waste), oil & sludge from oil-water separator, sludge created by mine water in settling pond, sludge from domestic waste water treatment facilities and municipal solid waste. 2.44 million cum overburden will be generated from the mine during its entire life.

***Mitigation:*** Topsoil generated during mining will be temporarily stored and utilized in plantation purpose. The OB surface dumps will occupy an area of 10 Ha. The backfill dump will be effectively stabilised by carrying out afforestation. The oil from oil-water separator will be sold to authorised recyclers while sludge will be disposed in impervious pit. Sludge from domestic waste water treatment facilities will be used as manure. Municipal solid waste will be segregated. The organic component will be composted and used for plantation manure, recyclable sold and balance disposed in designated area.

## 4.9 Socio-economics

***Impact:*** There is no habitation within mine lease, hence, there is no displacement or resettlement of population. There will be requirement of 267.975 hectare agricultural land for mining. There will be land losers, who will have to be rehabilitated as per the Model R&R policy of Govt. Of Chhattisgarh. There will be creation of 89 jobs in the mine. Activities under Corporate Social Responsibility will aid in improvement of surrounding areas.

***Mitigation:*** As part of CSR various activities will be carried out such as strengthening of approach roads, improvement of common structures like schools, health centre, community centre, panchayat bhawan, temples, ponds, etc. This will benefit the local population. There will be overall positive effect on social life of the local people as they will get direct and indirect job opportunities in mine and related activities. Employment will be provided to land losers according to qualification and capability. Adequate training facilities shall be created to create an industry ready workforce from the eligible local population. Capacity building activities will be carried out. The Model R&R policy of Govt. of Chhattisgarh will be followed.

## 4.10 Occupational health

The medical facilities shall be provided for all the manpower of the mine. All workers shall be sent for regular health check up for occupational diseases like Silicosis, Pneumoconiosis, etc., which are prevalent in mining industry. Tests like optometric, blood tests, chest X-rays, sputum test, audiometric test, lung test, cardio-vascular, etc. will be carried out periodically as per the DGMS norms.

## 5.0 ANALYSIS OF ALTERNATIVE

Mining industry is a site specific. Mineral has to be mined at the place where it exists in economically feasible quantity and quality. The mine is captive for the proposed cement plant of the company since it is having cement grade limestone. Opencast mining method is selected in view of workable thickness and favourable overburden to limestone ratio. Conventional mining technology of drilling, blasting, loading and transportation will be followed.

## 6.0 ENVIRONMENTAL CONTROL AND MONITORING ORGANIZATION

The management of the company will form an environmental cell for the proposed mines and the cement plant. The responsibility of environmental compliance of mines shall rest with the Project manager (Mines) duly supported by various engineers such as environmental, occupational health & safety, horticulturists, etc.

The total investment on environmental improvement works is envisaged as Rs. 2.2 crores while the recurring expenditure during the stage of production is envisaged as Rs. 1 crore per year. Total investment in the project is Rs. 140 Crores approximately.

## 7.0 DISASTER MANAGEMENT PLAN

Natural/ industrial disasters likely to be encountered during the mining operation are:

i. Inundation i.e. filling of the mine pit due to excessive rains.

ii. Disaster due to failure of mine pit slope

iii. Disaster due to failure of waste dump

iv. Possible dangers due to storage of explosives in the magazine

No high risk accidents like landslides, subsidence, flood, etc. have been anticipated. All statutory precautions shall be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955, Rule of MMR- 1961 and the Rules of MCDR-1988. A team for dealing with emergency shall be in place with defined roles and responsibilities.

## 8.0 PROJECT BENEFITS

The mine will create direct employment for skilled as well as semi-skilled staff directly or indirectly. There exists an opportunity for a good number of indirect employment once mining operations begin in the area. The general social development of the area shall be due to the improvements in infrastructure and communication system. The company shall undertake various activities under Corporate Social responsibility (CSR) to improve the physical infrastructure (drinking water supply, sanitation, roads, deepening ponds, making new ponds, etc.) and social infrastructure (schools, health care, communication, etc.). The company will undertake social welfare activities such as supporting Youth Groups, sports, womens self-help groups, training on income generation activities, capacity building work, apprentice raining, exposure visit, financial assistance for social welfare, etc. The CSR budget will be as per the Companies Act 2013 wherein the company shall ensure that it spends, in every financial year, at least two percent of the average net profits of the company made during the three immediately preceding financial years in this project.

## 9.0 DISCLOSURE OF CONSULTANTS ENGAGED

The consultants engaged for the preparation of the EIA/EMP of the project are Min Mec Consultancy Pvt. Ltd. Company. It was registered in July 1983 with the Registrar of Companies, Delhi & Haryana, India. In 1994, Min Mec established a modern R&D Laboratory. Min Mec is ISO 9001: 2008 certified under ANZ-JAS. In June 2006, the laboratory received accreditation from NABL (certificate no. T-1157), which has been renewed as per procedure since. In 2012, lab has been accredited under Environment Protection Act (EPA) by Ministry of Environment & Forests, Government of India (Sl. No. 97). Min Mec has prepared the EIA/EMP based on the permission granted from Delhi High Court vide LPA 110/2014 and CM No. 2175/2014 (stay).