

## EXECUTIVE SUMMARY

### 1.0 INTRODUCTION

M/s. Veerabhadrappe Sangappa & Company, Sandur, possess a mining lease bearing No. 2160 in Ramanadurga Range, Dharmapura Village, Sandur Taluka, Ballari District, Karnataka State, over an area of 18.62 Ha. as per lease deed and 18.46 Ha. as per Joint Team/CEC sketch.

The mining lease was granted on 19.10.1992, over an area of 18.62 Ha. for a period of 20 years and valid upto 18.10.2012. However, as per the Mines & Minerals (Development and Regulation) Amendment Act 2015, the lease is valid upto 18.10.2042.

Environmental clearance was obtained from MOEF (Now MOEF&CC) for expansion of production of 1.40 MTPA, under EIA Notification 1994 vide letter no. J-11015/32/2006-IA II(M) dated 15.09.2006

Consent for operation under Water and Air Act has been obtained from KSPCB, regularly and latest Consent for operation obtained vide order dated 19.04.2017, which is valid upto 30.06.2021.

It is proposed to produce 0.46 MTPA of Iron Ore from the mining lease by adopting open cast fully mechanized method with drilling and blasting. The estimated project cost will be about Rs. Rs.488.69 lakhs.

An application along with FORM-I, Pre-feasibility study report was submitted to the SEIAA, Karnataka vide proposal no. SIA/KA/MIN/29061/2018 on 14.09.2018 for obtaining the Environmental Clearance for reduced production from 1.40 mtpa to 0.46 MTPA of Iron ore as per EIA Notification 14 September, 2006.

Based on the documents submitted and presentation, the committee prescribed the Terms of Reference (ToR) for preparing EIA/EMP report, by considering the project under the category 'B' 1 (a) of the Schedule of EIA Notification 2006, vide letter no. SEIAA 55 MIN (VOIL) 2018 dated: 10.05.2019.

## 1.1 DESCRIPTION OF THE ENVIRONMENT

### 1.1.1 AIR QUALITY

The study area covers 10 km radius around the proposed Iron Ore mine located in Ramanadurga Range. As part of Environmental Impact Assessment study, baseline environmental monitoring was carried out covering the months of March 2019 to May 2019.

Ambient air quality of the study area has been assessed through a network of ten ambient air quality locations. Results of the ambient air quality at all the above locations were found to be well within the limits of National Ambient Air Quality (NAAQ) Standards specified for Rural, Residential and Industrial areas. Concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are mainly contributed due to vehicular traffic and local activities. The summary of ambient air quality in the study area is given in **Table**.

**SUMMARY OF AMBIENT AIR QUALITY ( $\mu\text{g}/\text{m}^3$ )**

Station Code	Locations	98 <sup>th</sup> Percentile Values ( $\mu\text{g}/\text{m}^3$ )				
		PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO
AAQ1	Loading Area	79.7	21.7	16.6	20.5	0.4
AAQ2	Dump Area	78.9	20.2	18.4	21.0	0.4
AAQ3	Haulage	81.2	21.3	14.4	18.3	0.3
AAQ4	Sandur Village	60.3	23.2	17.5	21.2	0.4
AAQ5	Yeshwanthnagar	61.8	21.4	15.5	19.8	0.4
AAQ6	Dharmapur Village	64.3	21.2	18.7	23.1	0.4
AAQ7	Sushilnagar Village	58.7	20.5	17.8	22.2	0.4
AAQ8	Somalapur Village	53.1	23.8	17.7	21.9	0.4
AAQ9	Lakshmipur Village	56.6	20.9	16.6	20.5	0.3
AAQ10	Subbarayanhalli	55.5	20.5	16.2	20.1	0.3
<b>NAAQ standards for Industrial, Residential, Rural and other areas (24 Hours) (<math>\mu\text{g}/\text{m}^3</math>)</b>		<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>2 (mg/m<sup>3</sup>)</b>

*Note: CO values are observed less than 1ppm during study period.*

*Free silica was found to be nil in Particulate Matter (PM<sub>10</sub>).*

### 1.1.2 NOISE QUALITY

The values of noise observed in some of the areas are primarily owing to vehicular traffic and other anthropogenic activities. Assessment of night time Leq (Ln) varies from 44.5 to 49.3 dB (A) and the daytime Leq (Ld) varies from 56.4 to 70.5 dB (A) within the study area.

### 1.1.3 WATER QUALITY

- It is observed that the pH of the ground water samples is in the range of 7.05 to 7.85, which shows that all samples are within the acceptable limits.
- Total dissolved solids were in the range between 500 -805 mg/l, which shows that one sample is within acceptable limit and remaining 5 samples are above acceptable limits but within the permissible limits.
- Total hardness of the ground water samples was in the range of 270 - 460 mg/l, all samples are above the acceptable limits but within the permissible limits.
- Chlorides concentration was found to vary between 56.88 -155.71 mg/l, all samples are within the acceptable limits.
- Fluorides concentration was found to vary between 0.02 -0.22 mg/l, which shows that all samples are within the acceptable limits.

### 1.1.4 SOIL QUALITY

Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be neutral (7.05 to 7.62). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 275 to 465  $\mu\text{s}/\text{cm}$ .

## 1.2 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 1.2.1 AIR ENVIRONMENT

The air borne particulate matter is the main air pollutant contributed by opencast mining. Predictions have been carried out for the worst-case scenario considering all the operations of the mine will be under simultaneous continuous operation of 24-hours for the proposed emissions. Overall scenario is given in **Table**.

**OVERALL SCENARIO ( $\mu\text{g}/\text{m}^3$ )**

S. No.	Pollutant	Maximum Baseline Concentration ( $\mu\text{g}/\text{m}^3$ )	Incremental GLCs ( $\mu\text{g}/\text{m}^3$ )	Resultant Concentration ( $\mu\text{g}/\text{m}^3$ )	Limit (Industrial, Residential, Rural and other area) ( $\mu\text{g}/\text{m}^3$ )
1	PM <sub>10</sub>	81.2	5.79	86.99	100
2	PM <sub>2.5</sub>	23.8	3.03	26.83	60

### **1.2.1.1 AIR POLLUTION CONTROL MEASURES**

The following air pollution control measures will be implemented in the mine to control the impact of air pollution.

- Sharp drill bits will be used for drilling to reduce generation of dust and noise level.
- Drilling will be carried-out by conventional wet drilling method to prevent dust to get air borne.
- Rock breaker will be used for breaking over size boulders in order to reduce dust and noise generation, which otherwise generates due to secondary blasting.
- Controlled blasting and optimization of use of explosive energy will be done which helps in reducing the above emissions.
- All the vehicles that will be used for transportation i.e. trucks, tippers, and dumpers will be maintained regularly and checked for Pollution under Control.
- Water spraying will be done on mine haul roads and approach roads upto SH40.
- Greenbelt/thick plantation will be developed all along the haul roads and other places to arrest dust.
- Personal Protective Equipment's like dust mask, ear plugs will be provided to all employees working in the likely dusty and noise generating areas.
- Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
- Proper maintenance of vehicles and machinery will be done, which minimizes the generation of emissions.

### **1.2.2 NOISE ENVIRONMENT**

Noise levels in the proposed mine will be produced due to movement of vehicles for transportation of Iron Ore and Mining operations like Blasting and Drilling. But the pronounced effect of noise is felt only near the active working area. Since the proposed mine will adopt opencast fully mechanized method for mining, there will not be much impact on the surrounding villages due to the mining operations.

#### **1.2.2.1 NOISE POLLUTION CONTROL MEASURES**

The following are the noise pollution control measures proposed in the mine.

- Drilling will be carried out with the help of sharp drill bits which will help in reducing noise.
- Controlled blasting will be done to minimize noise, ground vibration, fly rock and air overpressure.

- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.
- Confining the noise generating sources.
- In order to reduce the effect of noise pollution, ear plugs/earmuffs will be provided to all employees.
- Greenbelt development along the safety barrier would minimize the adverse impacts likely to arise out of mining operations. In the proposed scheduled afforestation programme, adequate plantation will be done along the periphery of the mines area to attenuate noise.
- Periodical noise level monitoring will be done.

### **1.2.3 IMPACT DUE TO GROUND VIBRATIONS**

The proposed mine will adopt opencast fully mechanized method for mining with drilling and blasting. Hence, the impact on ground vibrations due to mining will be negligible.

### **1.2.4 WATER ENVIRONMENT**

The total water requirement for the above operations will be 16 m<sup>3</sup>/day and will be met from bore well located adjacent to the mine.

Wastewater generation is mainly from domestic consumption and vehicle washing. Domestic Wastewater generated from the toilets will be treated in septic tank and sent to soak pit. There are no natural drainage channels within the site, except natural drainage pattern of mining lease area. The ground water table is available at a depth of 100m from the ground level. No seepage water is envisaged in the mine as no other mine pits exist above the present working level of subject mine. Hence there will not be much impact on the ground water table due to mining activities.

It is proposed to construct garland drains with sedimentation pits all along the mine pits to avoid erosion and sedimentation due to storm water. The de-silted water will be used for greenbelt development and dust suppression within the mine.

### **1.2.5 LAND ENVIRONMENT**

The lease area is already broken up area so there is no requirement of removal and storage of top soil. Out of the total Iron Ore produced 29% of Intercalated waste (5,53,808 tons) will be generated during the plan period.

The total mining area is 18.46 Ha out of which, area under mining is 12.65 Ha, safety zone/greenbelt is 1.05 Ha. Land use pattern of present, at the end of the plan period and conceptual stage is given in **Table**.

#### **LAND USE PATTERN AT THE MINE**

<b>Sl. No</b>	<b>Details</b>	<b>Present land use (Ha)</b>	<b>At the end of the plan period (Ha)</b>	<b>Conceptual Land use Area (Ha)</b>
1	Area for mining	12.30	12.55	12.65
2	Area for dumping	4.43	4.43	4.56
3	Engineering Measures	0.20	0.20	0.20
4	Safety zone/Greenbelt (Plantation)	1.05	1.05	1.05
5	Float worked out area	0.25	--	--
6	Virgin area / area untouched	0.23	0.23	--
<b>Total Area</b>		<b>18.46</b>	<b>18.46</b>	<b>18.46</b>

#### **1.2.6 AFFORESTATION**

The mining lease area is in a Reserve Forest and Stage I Forest Clearance was obtained. Mining is proposed in already broken up area. Hence, no further loss to natural vegetation.

So far 29,000 agave and 920 other species were planted in an area of 1.36 Ha inside the lease area. 1,00,000 agave and 4,469 other species (Nerali, Honne, Kamara, Kagina, Bevu, Hatti, Gobbara, Semethangadi, Hala, Badami, etc.) were planted in an area of 1.30 Ha.(95 kgs seeds) outside the lease area. Survival rate is about 60%. Geo-Coir-matting of 1.192 Ha was done on inactive dump and maintained.

#### **1.2.7 SOCIO ECONOMIC ENVIRONMENT**

The mine area does not cover any habitation. Hence, the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc. exist within the lease area or in the vicinity. The mining operations will not disturb/relocate any village or need resettlement. Thus, no adverse impact is anticipated.

The mining activity can improve the economic status of the people around the mine area. Local people will get employment with the continued mining activities and infra-structural facilities will be developed. Hence there is possibility of positive impact on socio-economics of people living in the nearby villages.

### 1.3 ENVIRONMENTAL MONITORING PROGRAMME

To evaluate the effectiveness of environmental management programme, regular monitoring of the important environment parameters will be taken up. The schedule, duration and parameters to be monitored are given in **Table**.

#### MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
<b>A. Air Environment</b>				
Pollutants PM10 PM2.5	10 locations (3 locations within the mine site and 7 locations in the project impact area - considering upwind/downwind side / impact zone)	Alternate weeks in a month during operation	Gravimetric method	-
			Gravimetric method	-
SO <sub>2</sub>			EPA Modified West & Geake method	Absorption in Potassium Tetra Chloromercurate Followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO <sub>2</sub>			Arsenite modified Jacob &Hochheiser	Absorption in dil. NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nephthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
<b>B. Water Environment</b>				
pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic Compounds	6 Ground water samples and 2 surface water samples within the study area	Once in a month	As per IS 10500-2012 and IS 2296:1998	Samples for water quality should be collected and analyzed as per IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health Association.

<b>C. Noise</b>				
Noise levels at Day & night time - Leq dB (A)	7 locations (1 locations within the mine site and 6 locations in the impact zone/study area)	Quarterly / Half Yearly	As per CPCB norms	As per CPCB norms
<b>D. Soil</b>				
pH, Bulk Density, Soil texture, Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical Conductivity, Organic Matter, Chloride	7 locations in the project impact area/study area	Yearly/half yearly	As per USDA Method	As per USDA Method

### 1.3.1 LOCATIONS OF MONITORING STATIONS

The location of the monitoring stations are selected on the basis of prevailing micro - meteorological conditions of the area like Wind direction & wind speed, Relative Humidity, Temperature. Seven AAQM stations are selected (including minimum 2 locations in upwind side, more sites in downwind side / impact zone) to assess ambient air quality of the area.

Noise level monitoring will be carried out on lease boundary & in high noise generating area within the lease. Water & soil monitoring locations will be decided on the basis of general slope of the area & drainage pattern. Locations for the post project monitoring are given in **Table**.

#### POST PROJECT MONITORING LOCATIONS

<b>S. No</b>	<b>Description</b>	<b>Location</b>
1	Ambient Air Quality	Mine site, Villages in downwind direction from the mine site
2	Meteorological data	Mine site
3	Noise Level Monitoring	Mine Boundary, High noise generating areas within the Mine boundary
4	Water Level & Quality	Nearby Surface & Ground water sources
5	Soil Quality	Nearby villages



## **1.4 ADDITIONAL STUDIES**

### **1.4.1 RISK ASSESSMENT**

The proposed mining is limited to a depth of 997 m RL to 916 m RL from the present pit level. The anticipated risks are mentioned below:

- Slope failures
- Falls from the edge of a bench
- Drilling operations
- Handling of explosives in future
- Dozer operation
- Excavator, loading equipment operation
- Hauling equipment
- Crusher and screening unit operation

Maintenance of proper bench geometry, observing safety precautions for transport, proper storage, safe handling and use of explosives and fuel etc., good maintenance of roads and transport units, fire prevention measures, good dump management, shall go a long way in preventing accidents / disasters.

No chemicals are used in mining operations or beneficiation process. Hence, there is no risk involved due to chemical spills.

## **1.5 PROJECT BENEFITS**

It is proposed to employ about 67 persons for carrying out mining operations and the lessee proposed to give preference to the local people in employment. In addition there will be indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. this will enhance the economic status of the local people.

The impact of mining activity in the area will be positive on the socio- economic environment of the region. The employment directly and indirectly will be increased and better infrastructure and communication facilities will be provided.

M/s Veerabhadrappe Sangappa & Company would be required to initiate the following measures to minimize the possible negative impacts, as a consequence of proposed Iron Ore mining project Dharmapura Village, Sandur Taluk, Ballari District, on the surrounding socio-economic environment:

- Implemetation of adequate dust control measures to check air pollution.
- Organize monthly health camps in the area to check the incidence of any respiratory and other related disorders.
- Conduct Entrepreneurship Development Camps to nurture entrepreneurial talents among the local youth.

## **1.6 ENVIRONMENTAL MANAGEMENT PLAN**

In order to implement an effective environmental management plan for mitigating the adverse impacts on the environment, regular monitoring of various environmental components is necessary. Mines Manager with the support of foreman and other workers will monitor the environment management plan of this area. Budget allocated this project Capital Cost is Rs. 62.00 lakhs and Recurring Cost is Rs.10.00 lakhs.

## **1.7 CONCLUSION**

Based on the EIA study it is observed that there will be a marginal increase in the dust pollution, which will be controlled by sprinkling of water and transportation of Iron Ore in closed trucks by covering the material.

There will be negligible impact on ambient environment & ecology due to mining activities, more over the mining operations will lead to direct and indirect employment generation in the area.

Hence, it can be summarized that the mining of minerals from the proposed mine of M/s Veerabhadrappe Sangappa & Company will have a positive impact on the socio-economic environment of the area.

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