EXECUTIVE SUMMARY

INTRODUCTION

Environmental Impact Assessment (EIA) is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision making tool, which guides the decision makers in taking appropriate decisions for proposed projects. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are taken into account during the project designing.

The mining lease of limestone mine over an area of 1.62 Ha in village Badanji, Tehsil-Lohandiguda (Jagdalpur), District Bastar was granted on 02.07.2003 vide order no. Khanij/M.L.1/99/289/2003 Jagdalpur for 20 years. The Execution of mining lease was done in 29.04.2003 for 20 years (29.04.2003 to 28.04.2023). Further 1st Scheme of Mining was approved by IBM, Nagpur vide letter no:-BST/LST/MPLN-810/NGP, dated 11.08.2011 for a period of 2008-09 to 2012-13. Subsequent 2nd Scheme of Mining was approved by IBM, Nagpur vide letter no:-BST/LST/MPLN-810/NGP, dated 02.02.2016 for a period of 2013-14 to 2017-18. Thereafter the lease period will be extended up to 50 years with effect from first execution date 29.04.2003 (i.e 29.04.2003 to 28.04.2053).

Location

The mining lease is located in village of Baranji, Tehsil – Jagdalpur, District-Bastar, Chhattisgarh. Geo-graphically the ML area extends from East Longitude 81°48'23.7" to 81°48'29.8" East and North Latitude 19°09'54.2" to 19°09'54.6" North. The area falls in Survey of India toposheet No. 65E/16.

Connectivity

The area can be approached from District Headquarter Jagdalpur by good tar road, via Karanji; Potannar village at a distance of 28Kms. nearest railway station is at Jagdalpur. The Jagdalpur town is well connected by road, rail from Raipur.

Mailing/ Correspondence Address of Project Proponent:

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Size of the Project

The total Mine Lease area is 1.62ha. The proposed production is 4620 tons per year.

Anticipated Life of Project and Cost of the Project

The life of the mine is anticipated at 12 years based on the level of exploration and reserve established as per UNFC classification and expecting the market demand will remain at 4620 Tonnes per Annum. The cost of mining, mining machinery, Environmental protection, Socio-economic development for the present ML area is about Rs. 20Lakhs.

MINING

Opencast manual method of mining has been adopted in the lease area using hand tools like crowbars, Chisels and hammer. All operation of mining such as development, winning of ore, loading and transport has been carried out by manual means. Drilling and blasting is carried out by safety fuse & gun powder at some times whenever necessary.

Table: Year wise Production details –

Plan period/Year	Proposed Production	Upto RL (m)
2013-2014	4620 Tonnes	Bottom Pit RL-551m & Top Pit RL-56.5 m.
2014-2015	4620 Tonnes	
2015-2016	4620 Tonnes	
2016-2017	4620 Tonnes	
2017-2018	4620 Tonnes	
Total	**23100 Tonnes**	

Table: -Summary of Land use at different stage will be as follows (inHa):

Articles	Govt. Land			
	Area put on use at present	Forest Land	Agrl. Land	Barren Land
A. Lease Area	**1.62 Hect.**	**Nil**	**Nil**	**1.62 Hect.**
B. Mining & allied				
1. Area under pits	0.302	Nil	Nil	0.302
2. Area for dumping (OB/soil)	0.015	Nil	Nil	0.015
3. Area for pit road	0.020	Nil	Nil	0.020
4. Area for Infrastructure	0.005	Nil	Nil	0.005
5. Plantation	0.010	Nil	Nil	0.010
6. Storage of Mineral	0.005	Nil	Nil	Nil
7. Waste Dump Area	0.010	Nil	Nil	0.010
8. Crushing Plant	0.110	Nil	Nil	0.110
9. Magazine house	Nil	Nil	Nil	Nil
10. Township Area	Nil	Nil	Nil	Nil
11. Virgin Land Area	1.143	Nil	Nil	1.143

Systematic working will be done by formation of benches as per M.M.R. 1961. All applicable rules of MMR 1961, Mines Act-1952, MCR-2016 and MCDR-1988 will be followed for safe, scientific & systematic working to follow the principles of safety & conservation of human health & mineral.

Disposal of Waste

Nature of waste, its rate of yearly generation and proposals for disposal of waste: The mine waste is in the form of following:-

(1) Top soil: - No top soil is present at the proposed site for mining.

(2) OB and Mine waste: - This is in the form of lateritic soil and weathered sandstone pebbles. The quantity to be generated is given below.

Table No: Year Wise Waste Generation

Year	Reuse/Spreading	Top soil (Tonnes)	Backfilling	Rejects (Tonnes)
2018-19	Nil	1065.31	Nil	1000
2019-20	Nil	251.87	Nil	1000
2020-21	Nil	-	Nil	1000
2021-22	Nil	-	Nil	1000
2022-23	Nil	-	Nil	1000
Total		**1317.18**		**5000**

Method and manner of disposal of waste rock: Generated OB during the five year will be stacked along the lease boundary in the mining limit and use for the plantation purpose. The height of soil/OB/waste dump will not cross the limit of 3.0 meter in the statutory boundary in the mine area.

Use of Mineral

The Limestone is proposed to be sold to cement and Aluminium plants.

GENERAL FEATURES

i) Surface Drainage Pattern

The entire drainage of the area is controlled by the only perennial river named Indravati River which is passing 1 Kms away from the lease area in the direction of east.

ii) Vehicular Traffic Density

The Mine Lease area is 25 km by road from District Head quarter Jagdalpur which can be approached by road, by own conveyance or by bus on Jagdalpur-ChitrakotRoad upto Badanji village.

The mode of transport of mineral and waste will be tractors or trucks within the ML area. The mineral transportation to the destination industry outside the mining lease area will be by road.

Table:Existing Traffic Scenario & LOS

Road	V (Volume in PCU/hr)	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
(Jagdalpur-Chitrakoot Road)	35	1100	0.03	B

Note: V= Volume in PCU's/hr& C= Capacity in PCU's/ hr.
The existing Level of Service near Village is "A" i.e. excellent and at PWD road and NH is "A"i.e. excellent.

During Mine Operation

Total Capacity of mine	: 4620 TPA
No. of working days	: 280
Extraction & Transportation of mineral	: 16.5 T/day
Working hours per day	: 8 hour
Tractor Capacity	: 3Tonnes
Frequency of tractors deployed/day	: 16.5/3 = 5.5 (say6)
No. of tractors deployed/day to and fro	: 6 * 2 trucks = 12 trucks
No of tractors deployed/hour	: 12/8=1.5=2

Table: Modified Traffic Scenario & LOS

Road	Increased PCU'S-PWD	V	C	Modified V/C Ratio	LOS
(Jagdalpur-Chitrakoot Road)	35+10	45	1100	0.040	A

6 tractors/day will be required for transport of mineral from mine. The LOS value from the proposed mine may be "Excellent". So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse affect.

iii)Water demand
No processing of mineral will be done in the mine. Only simple sizing and sorting will be done.

Manpower Requirement
About 29 persons will be getting direct and 20 indirect employment in this mine. The man power will be mostly skilled.

DESCRIPTION OF BASELINE-ENVIRONMENT

This section contains the description of baseline studies of the 10 km radius of the area. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to propose mining for:-

(a) Land
(b) Water
(c) Air
(d) Noise
(e) Biological
(f) Socio-economic

(a) Land Use: The land-use is divided into agriculture land, settlement, river and forest area as shown in the map. The area is fertile and dominated by the proportion of agriculture land.

Table:Land Use Pattern of the Study Area (within 10 km Buffer)

Landuse Type	Area (Ha)
Open Land	1797.03
River	1041.90
Settlement	338.95
Agriculture	28742.33
TOTAL	**31920.21**

There is no National Park, Biosphere reserve, Migratory routes of fauna and National Monument within 10km periphery of the lease area as per secondary data available. There is no habitation within lease area.

Analysis Results of Baseline Environment

(a)Results of Soil Analysis

The analysis results show that soil is basic in nature as pH value ranges from 7.30 to 7.62 showing the saline property of soil. High electrical conductivity (64.2 to 116.2 mS/cm) is observed in the analysis report, showing the electrical behavior of soil. The presence of Nitrogen content varies from 0.042 to 0.082 % by mass. The concentration of Nitrogen, Phosphorus & Potassium are found low value in the soil samples. PH and EC values vary greatly and are affected by several environmental factors including, climate, local biota

(plants and animals), bedrock and surficial geology, as well as human impacts are shown in the analysis report.

Low values of EC reflect relatively dilute waters, such as distilled water or glacial melt water.

(b) Water Environment

The results of Ground water samples are collected at Six locations in the post-monsoon season as discussed above for organoleptic & physical parameters, general parameters, toxic and biological parameters. The analysis results at the six ground water locations and two surface water locations are given below:

The analysis results indicate that pH of the groundwater is in range of 6.10 – 6.58. The TDS were found to be in the range of 375– 415 mg/l. Total Hardness is in range of 186.1 – 198.5 mg/l.

The analysis results indicate that pH of the surface water to be in range of 7.15– 7.25. The TDS is found to be in the range of 235– 275 mg/l. Total Hardness is in range of 122.2 – 130.6 mg/l. Other parameters like chloride and sulphate are observed within the prescribed limits. The physico – chemical analysis for some of the parameters is exceeding the standards as per IS: 10500. The necessary treatment required to minimize the impact is mentioned in Environment Management Plan and cost is born by the Project Proponent.

(c) Ambient Air Quality

The Ambient Air Quality Monitoring reveals that of six monitoring stations the minimum concentrations of $PM_{2.5}$ are 26.28 $\mu g/m^3$ at AQ4 and maximum 43.58 $\mu g/m^3$ at AQ1 (Core Zone).The results of PM_{10} reveals that the minimum concentration of 47.2 $\mu g/m^3$ at AQ3 while maximum concentration of 66.50$\mu g/m^3$ is found at AQ4. These values for PM10 and PM2.5 are within prescribed CPCB limit of 100 $\mu g/m^3$ and 60 $\mu g/m^3$ respectively for residential and rural areas at all stations.

The gaseous pollutants SO_2 and NO_2 are within the prescribed CPCB limit of 80 $\mu g/m^3$ for residential and rural areas at all stations. The minimum & maximum concentrations of SO_2 were found to be 9.28$\mu g/m^3$ at AQ4 & 13.63$\mu g/m^3$ at AQ2 respectively. The minimum & maximum concentrations of $NO_2$are found to be 11.33 $\mu g/m^3$ at AQ2 & 20.24 $\mu g/m^3$ at AQ7 respectively.

(d) Noise Environment

The values of noise observed in some of the areas are primarily owing to vehicular traffic and other anthropogenic activities. Noise monitoring results reveal that the maximum & minimum noise levels at day time were recorded in the range of 58.0 dB(A) at NQ6 and 48.0 dB(A) at NQ3 in downwind direction and maximum & minimum noise levels at night time were recorded in the range of 53.3 dB(A) at NQ6 and 33.24 dB(A) at NQ3 in downwind direction respectively.

(e) Biological Environment

The lease area as well as buffer zone area reveals no endangered and endemic species of flora and fauna in the area.

(f) Socio- economic

Population Composition

According to 2011 Population Census the study area has a total population of 70061. Of this 52.0 percent are male and the remaining 48.0 percent are female. Further 15.2 percent of the total population belongs to 0-6 age group. About 53.7 percent of them are male and the remaining 46.3 percent are female.

Sex Ratio

The overall sex ratio in the study area has been worked out to 923 females per 1000 males, which is less than the national average of 940 females per 1000 males. The highest sex ratio recorded in the study area is 2000 females per thousand of males, Hence, no sex ratio could be compiled for this village. The sex ratio of Children belonging to 0-6 age group has been worked out to 863 females per 1000 males.

Density of Population

The overall density of population in the study area has been worked out to 216 persons per sq. Kilometre. This is less than the density of population for the state of Chhattisgarh, which stands at 236 persons per sq. Kilometre, according to census 2011.

Households

There are 15857 households in the study area and the average household size is four

Social Structure

In the study area the total number of persons belonging to Scheduled Caste community is 12789, which is 18.3 percent of the total population. The gender wise distribution of schedule caste population indicates male 51.7 percent and female 48.3 percent, registering a sex ratio of 934 females per one thousand males.

Further analysis of data reveals that in the study area, the total number of persons belonging to Scheduled Tribe community is 11932, which is 17.0 percent of the total population. This is nearly same as the total number of persons belonging to Scheduled caste community residing in the study area.

About 64.7 percent of the total population belongs to General category, which includes people belonging to 'Other Backward Castes'. In absolute number the population belongs to this category are 45340 with 52 percent male and 48 percent female. The sex ratio of General category population has been worked out to 922 females per 1000 males.

The socio-economic development of poor and downtrodden scheduled caste and scheduled tribe people is a continuous process and the governments, both at the centre and the states are constantly making efforts to improve the destiny of these people. Distribution of surplus land to the members of the above categories of people is an important step taken by the government for their economic empowerment. The State Governments have drawn

up its own list of socially and educationally backward classes and implementing various developmental schemes for them. These schemes are mainly in the field of education and income generation. All the ongoing schemes are critically examined and modified periodically to cater to the needs of different groups amongst the above communities. The government has also started various schemes to improve the quality of life of the rural poor, especially for the scheduled castes and scheduled tribes by making special provisions for them. 'Sampornma Grameen Rozgar Yojana' (SGRY) is one such programme, which was launched to safeguard the interest of the weaker sections and women by providing them wage employment. The 'Swarnjayanti Gram Swarozgar Yojana' (SGSY), another rural development scheme aims at bringing poor families above the poverty line by providing them with income generating assets through a mixture of credit and subsidy. The SGSY has also made an explicit provision that 50 per cent of the Swarozgaris assisted should be from Scheduled caste and Scheduled Tribe communities.

Over the decades the Scheduled caste and scheduled tribe people are making rapid progress both in economic and social sphere. Today they are no more untouchables. The literate Schedule Caste and Scheduled tribe people are engaged in trade, commerce & industry, private & government services including police and armed forces.

Literates and Literacy Rate

All persons aged seven years and above, who can both read and write with understanding in any language including Braille are considered as literate. The total numbers of literate persons in the study area are 41183, which is 58.8 percent of the total population. Of the total number of literate persons 58.8 percent are male and the remaining 41.2 percent are female.

The overall literacy rate in the study area has been worked out to 69.3 percent. The gender wise distribution of literacy rate reveals that 78.8 percent of the literate persons are male and 59. 2 percent are female. This creates a gender gap of 19.6 percent.

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Impact on Ambient Air Quality

The mining is proposed to be carried out by opencast other than fully mechanized method. The air borne particulate matter generated by ore and handling operations as well as transportation is the main air pollutant. The emissions of Sulphur dioxide (SO_2), Oxides of Nitrogen (NO_x) contributed by vehicles plying on haul roads are marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

Mitigation Measures

1. Water sprinkling will be done on the haul roads twice in a day.
2. The dust generated during the process will be minimized by water spray at the working faces before and after the activity.
3. Plantation will be carried out on approach roads and in Lease boundary.
4. Planning transportation routes of mined material so as to reach the nearest paved roads by shortest route. (minimize transportation over unpaved road);

5. Personal Protection Equipments (PPE) like dust masks, ear plugs etc. will be provided to mine workers.
6. Rock breaker will be used for breaking over size boulders in order to reduce dust and noise generation, which otherwise would be generated due to secondary blasting.
7. Speed limit will be enforced to reduce airborne fugitive dust from vehicular traffic.
8. Deploying PUC certified vehicles to reduce their noise emission.
9. Haul road shall be covered with gravels
10. Spillage from the trucks will be prevented by covering tarpaulin over the trucks.
11. Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.
12. Proper maintenance of machines improves combustion process & makes reduction in the pollution.
13. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.

Noise Environment

Noise generated at the mine is due to mechanized mining operations and truck transportation activities. The noise generated by the mining activity dissipates within the mine. There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area.

The impact of noise on the villages is negligible as the villages are far located from the mine workings. Since there is no involvement of major machinery, the impact of noise levels will be minimal.

S.No	Impact Prediction	Mitigation Measures
1	Noise Impact due to mining activities.	The noise levels from all the sources are periodical and restricted to particular operation.
2	Noise impact due to vehicular movement.	a) Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce the generation of noise. b) Plantation along the sides of approach roads, around office building and mine area will be done to minimize the propagation of noise. c) Personal Protective Equipments (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone. d) Periodical noise level monitoring will be done

Biological Environment

S.No	Impact Predicted	Suggestive measure
1	Disturbance of free movement/living of wild fauna	• Care will be taken that noise produced during vehicles movement for carrying OB and ore materials are within the permissible noise level. • Care will be taken that no hunting of animals (birds) carried out by labours • If wild animals are noticed crossing the core zone, it will not be disturbed at all Labours will not be allowed to discards food, plastic etc., which can attract animals near the core site. • Only low polluting vehicle will be allowed for carrying ore materials. All vehicles allowed in the project site area will have to provide pollution under control certificate at the end of three months • Noise level will be within permissible limit (silent zone-50dB during day time) as per noise pollution (regulation and control), rules, 2000, CPCB norms
2	Harvesting of flora	• No tree cutting, chopping, lumbering, uprooting of shrubs and herbs should be allowed • Collections of economically important plants will be fully restricted

Land Environment

S.No	Impact Prediction	Mitigation Measures
1	Change in the Topography of the Land / Land Degradation	The proposed mining activity is carried out in hilly region and waste land After removal of ore body, a undulating portion will be created. All the broken area will be reclaimed by systematic backfilling and rehabilitated by afforestation so that landscape of the area is improved.
2	Solid waste generation	The OB/mine waste will be in form of soil and sand stone etc. No dumping has been proposed. The OB/waste will backfilled in the mined out areas on which plantation will be raised.
3	Change in Drainage Pattern	Water flow / course will not be obstructed and natural drains or nallahs will not be disturbed. Run-off from mine and mineral stack will be prevented to avoid being discharged to surroundings, particularly to agricultural land.Garland drains and, catchpits has been constructed to prevent run off affecting the surrounding agricultural land. Green belt has been developed in boundary.
4	Impact on the Agricultural Practice at	Agriculture activities are practiced nearby areas may impacted because of dust generation but mitigative

	nearby area due to dust generation	measures such as regular water sprinkling on active areas for example haul roads, excavation sites will be strictly followed so that impact is minimized.

Water Environment

S.No	Impact Prediction	Mitigation Measures
1	Effect on the Ground Water Table	Max Elevation of the ML area is 572 m AMSL The mining activity will not intersect with the ground water table.
2	Wash off from the dumps	No dumping has been proposed.
3	Soil Erosion	Reclamation of the mined out area will be done with plantation to avoid the soil erosion
4	Waste Water generation/ Discharge	Portable Bio-toilets will be used; hence no sewage / liquid effluent will be generated and contamination is also not expected due to percolation.
5	Siltation in nearby agriculture field	Garland drains have been constructed on the sloping side barrier of the ML area. The garland drain has been routed through settling tank to remove suspended solids from flowing into storm water.

10.5 ADDITIONAL STUDIES

DISASTER MANAGEMENT PLAN

In order to avoid any danger in the mine site at the end of life of mine a disaster management cell headed by local authority District Collector will be constituted. Police department health authorities, including doctor, ambulances and so on will have a vital part to play following a disaster along with the mine management, and they will be an integral part of the disaster management plan.

The disaster management plan is aimed to ensure safety of human life and property and protection of environment Following are the objective of the disaster management plan.

(i) First Aid to injure.
(ii) Rescue operation and provision of adequate medical facilities to the injured.
(iii) Safety of the human life in the buffer zone if needed.
(iv) Protecting and minimizing damage to property and the environment.
(v) Initially restrict and ultimately bring the incident under control.
(vi) Identify any dead.
(vii) Inform to the administration, DGMS and statutory persons as per Rules.

10.6 PROJECT BENEFITS AND COSTS EVALUATION

The project will improve the physical infrastructure, social infrastructure like improvement of road conditions water supply during dry season, drainage, educational institutions and improved environmental conditions, etc. The project also provides direct employment and indirect employment to persons. It increases economic activities, better living standard, educational facility, health facility and infrastructural development. The project will contribute to district mineral fund which will directly provide aid to the local

authority to fund the development projects. The management will provide free saplings of fruit bearing and other trees, etc. to local during monsoon season plantation. This will increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

The CSR activities are increasingly being taken up by the project proponent not only as fulfilling of mandatory provisions but also for the formation or enhancement of brand image. Besides the above, CSR is seen more as a responsibility towards society rather than a business promotion activity.

All the activities listed are for community development as a whole and not for individual person or a family. Each development initiative will be implemented in close collaboration with the village Panchayat. The Project proponent may avail the services of a NGO for the implementation of the above programme, if felt needed.

Table: Budget for Environmental Management Plan

Particulars	Capital Cost	Recurring Cost/ year in Rs.
Environmental Protection		
Dust Suppression & Pollution Control	1,00,000	1,00,000
Tarpaulin and cover for stack of ore	50,000	50,000
Environmental Monitoring	60,000	75,000
Green Belt	65,000	80,000
Total	**2,75,000**	**3,05,000**

Table: Budget for Occupational Health

Particulars	Capital Cost (Rs.)	Recurring Cost (Rs.)
Before hiring man power	1,00,000	-
For routine checkup	--	1,00,000
Infrastructure &PPE's	50,000	50,000
Total	1,50,000	1,50,000

Table: Budget for Water, Shelter and Sanitation for Mine Worker

Scheme	Capital Cost (In Rs)	Recurring Cost (In Rs)/year
Drinking water facility	75,000	50,000
Rest shelter	25,000	15,000
Sanitation (Urinal and Toilet)	1,00,000	35,000
Total	**2,00,000**	**1,00,000**