

## EXECUTIVE SUMMARY

### INTRODUCTION

M/s Jai Mata Di Minerals has been granted Quarry lease over an extent of 9.10 ha in village Gathora, District Jabalpur, Madhya Pradesh for a period of 10 years with effect from 28.07.2003 to 27.07.2013 for mining marble blocks.

The lease area has been sanctioned under quarry lease for a period of 10 years upto 27.07.2013. Vide State government order No.4-64/2003/12/2, dated-16.06.2003.

### Location

The mine lease area is located within the jurisdiction of Gathora village, Tehsil-Sihora, District Jabalpur (M.P). Geographically the ML area falls under following co-ordinates:

Latitude	:	N 23 <sup>0</sup> 26' 59" to 23 <sup>0</sup> 27' 14"
Longitude	:	E 79 <sup>0</sup> 51' 42" to 79 <sup>0</sup> 52' 04"

### PROJECT DESCRIPTION

#### Topography & Drainage

The lease area is hilly having gentle slope towards North West and South direction. The highest elevation is about 116 m RL towards SW portion of the lease area trending SW-NE and the lowest elevation is about 100 m RL towards north direction.

#### Salient Features of Mining

- Mining is proposed by opencast mechanized method.
- Estimated Mineable Reserves: 3,20,000 m<sup>3</sup>.
- Maximum rate of production will be around 4,000 m<sup>3</sup>/year.
- Anticipated life of mine is 32 years.
- A maximum bench height of 4 m in over burden and 6 m in ore body would be maintained. The width of the bench varies from 10m.
- Blasting will be done only in the harder pitches which cannot be directly excavated by excavator.
- Tippers will be used for loading and dumping of waste material and ore.
- Quantum of waste is expected to be around 23,120 m<sup>3</sup> per year
- At present total man power of Gathora Marble mine is around 30

## DESCRIPTION OF THE ENVIRONMENT

Meteorology (Pre Monsoon 2008)

Sl.No	Parameters	Data
1	Hourly Maximum Temperature (°C)	43.2
2	Hourly Minimum Temperature (°C)	16.0
3	Hourly Maximum Relative Humidity (%)	91.0
4	Hourly Minimum Relative Humidity (%)	3.0
5	Predominant Wind Direction from	West

### Ambient Air Quality

The ambient air quality with respect to the study zone of 10 km radius around the mine site forms the baseline information. The various sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning and vehicular traffic.

Pre-calibrated R.D. Samplers have been used for monitoring the existing AAQ status. The summary of Ambient Air Quality test results are given below.

Name of Sampling Location	98 th Percentile Test Results (Units: µg / m <sup>3</sup> )			
	SPM	RPM	SO <sub>2</sub>	NO <sub>X</sub>
Mine Lease Area	166	60.2	10.0	14.7
Gathora	166.5	60.0	10.1	16.6
Chhitapal	167.1	100.2	16.2	18.7
Bagaswahi	167.6	100.6	16.2	22.1
Bisi	167.6	60.3	10.2	14.5
Pipariya	165.5	61.8	10.5	15.0
*NAAQ Standard for industrial area Annual Average / 24 Hrs	360/500	120/150	80/120	80/120
**NAAQ Standard for residential area Annual Average / 24 Hrs	140/200	60/100	60/80	60/80

### Noise Level

A preliminary survey was undertaken at 6 locations i.e. 1 location in mine lease area and 5 locations in buffer zone during study period, to identify the major noise generating sources in the area. Summary of noise level data of different locations are given below.

**Noise Levels during Study Period [Units:dB(A)]**

	<b>N-1</b>	<b>N-2</b>	<b>N-3</b>	<b>N-4</b>	<b>N-5</b>	<b>N-6</b>
L <sub>min</sub>	46.9	46.4	45.7	45.9	45.4	45.4
L <sub>Max</sub>	64.5	65.0	60.8	61.3	61.0	61.0
L <sub>d</sub>	58.6	58.9	56.7	57.4	57.0	56.8
Standard	75	75	55	55	55	55
L <sub>n</sub>	48.0	48.2	46.8	48.0	48.2	48.2
Standard	70	70	45	45	45	45
L <sub>min</sub>	Minimum Noise Level Recorded					
L <sub>Max</sub>	Maximum Noise Level Recorded					
L <sub>d</sub>	Day Equivalent					
L <sub>n</sub>	Night Equivalent					
L <sub>dn</sub>	Day-Night Equivalent					

The major noise generating sources are mining related activities, commercial activities, traffic and blasting. The ambient noise level in and around the existing mine area is well within the statutory limits.

**Traffic Density**

The characteristics and volume of traffic in the buffer zone was studied during the monitoring period, on Gathora – Suhjani road. Summary of the traffic study is given below.

<b>Type of Vehicle</b>	<b>Total traffic on Gathora – Suhjani road (in 24 hrs)</b>
HMV	6
LMV	10
2 & 3 Wheelers	21
Total	37

Perusal of the above monitored data shows that the traffic density on Gathora – Suhjani road in a working day is 37.

**WATER ENVIRONMENT**

**Surface Water**

There is no river, nalla or any surface water source within ML area. Besides a network of many seasonal nalla in the study area Hiran River passes along N-S as perennial water body. The existing seasonal nallahs of the study area only help to drain out rain water during monsoons.

## Ground Water

The study area essentially comprises of weathered marble at shallow depth and hard marble comparatively at lower depth. In the study area ground water is available both under confined and un-confined conditions. The ground water table in the lease area varies from 12m to 15m bgl. In the study area, the general water table in the hilly region ranges between 120m – 150m bgl. The water table on the hill tops is at quite a great depth, where as in plain area it varies between 6m to 16m bgl. The water table fluctuation is between 15 m during summer and rises upto 8m during rainy season. Ground water potential of the study area is ranges between 1 to 5 l/s.

## Water Quality

One Surface water and three ground water samples were collected and tested to know the water quality of the study area. Summary of the water quality results are given below.

<b>S.No</b>	<b>Parameter</b>	<b>Surface Water</b>	<b>Ground Water</b>	<b>Desirable limits as per IS:10500</b>
1.	pH	6.7	7.4-7.9	6.5 – 8.5
2.	Total Dissolved Solids	145	233-265	500
3.	Total Hardness as CaCO <sub>3</sub>	72	215-257	300
4.	Chloride as Cl	25	17-22	250
5.	Flouride as F	0.1	0.2-0.55	1.0
6.	Turbidity	55	2-12	5

Persual of the above table shows that physico-chemical characteristic of the samples analyzed were well within the desirable limits of the prescribed drinking water standards IS: 10500.

## LAND ENVIRONMENT

### Land Use

The entire lease area 9.10 ha is under possession of Jai Mata Di Minerals. Land use of mining lease area and study area are given below.

**Present Land use of ML area**

<b>S.NO.</b>	<b>Category</b>	<b>Land Use (In Ha.)</b>
1	Excavation	0.25
2	Over burden dumps	--
3	Road	--
4	Green belt / Plantation	--
5	Others (Site services)	--
6	Undisturbed area	8.85
	<b>Total</b>	<b>9.10</b>

**Land use in the Study area**

<b>Land use</b>	<b>Percentage (%)</b>
Forest land	32
Irrigated land	12
Un irrigated land	32
Cultivable waste land	9
Area N/A for cultivation	15
Total	<b>100%</b>

**SOIL ENVIRONMENT**

**Soil Quality**

Soil samples were collected from three locations from the core and buffer zone to evaluate the soil quality in the study area. All the samples are showing moderately fertile nature.

The sampling locations have been finalized with the following objectives:-

- To determine the baseline soil characteristics of the study area.
- To determine the impact of industrialization on soil characteristics.

**BIOLOGICAL ENVIRONMENT**

**Floral**

Flora of the study area includes (neem) Azadirachta indica Sal (Shorea robusta), Gambhar (Gmelina arborea), Mahua (Madhuca indica), etc. Herbs are found sporadically all over the forest areas, some of them are, etc. Main shrubs species of this forest area are Lantana camara, Cassia tora, Dicanthium annulatum, etc.

## Fauna

The presence of fauna depends on topography and vegetation in the area. The animals like Neel Gai (*Boselaphus tragocamelus*), Fox (*Vulpes bengalensis*), Hare (*Lepus ruficaudatus*), Jackel (*Cannis aureus*) etc, are found in the study area. The reptiles like snake, lizard are also found in the area. Among the birds mainly Crow (*Crovis splendens*), Sparrow (*Athene brome*), Dove, Pigeon (*Columba livia*) are found in the area.

## ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### Impact on Ambient Air Quality

From the proposed mining activity removal, handling, transportation of ore and storage of wastes will cause an additional increase in the concentration of SPM in the atmosphere. Marginal emissions of Sulphur dioxide (SO<sub>2</sub>) and oxides of Nitrogen (NO<sub>X</sub>) can be anticipated by diesel operated equipments and vehicles plying on haul roads. Based on ISC-AERMOD model the maximum predicted concentrations of SPM during pick operation of mining will be < 170.7 µg/m<sup>3</sup> within ML area and <169.5 µg/m<sup>3</sup> within study area.

### Control Measures of Air Pollution

S.No.	Dust Source	Control measure
1	Haul Road	-Compaction, gradation and drainage on both sides. -Proper maintenance. -Regular water spraying.
2	Truck Movement	-No overloading of trucks. -Trucks to be covered with tarpaulin while transporting ore. -Enforcing speed limit.
4	Mine pit	-Regular water sprinkling in working areas.
5.	Plantation	-Native species of the area proposed for the plantation. -Fast growing tree species are proposed for plantation on dumps and road sides.

### **Impact on Noise Level**

Increase in vehicles for transportation and haulage due to increase in production will add some noise level in the present monitoring level of noise specially within the active working area. The anticipated noise level at ML boundary from nearest pit boundary will be less than 55 dB(A), which is less than the prescribed limits for industrial area. No additional noise can be anticipated due to proposed mining activities at nearest habitat (about 500m from ML boundary) of Gathora village.

### **Control Measure of Noise Pollution**

Noise levels will be kept within acceptable limits by:

- Limiting of speed of haulage vehicles/tippers
- Restriction of blast hole drilling to only day time hours and usage of sharp drilling bits and delivery of compressed air at optimal pressure during drilling
- Controlled blasting techniques with sequential blasting to reduce noise level and blast induced ground vibrations.
- Use of low density explosives to have a heaving effect than an explosion
- Provision of earmuffs/ear plugs to workers in noise prone zones in the mine.

### **Impact on Water Environment**

- Total water requirement is 12m<sup>3</sup>/day
- There is no waste water generation from the mine, hence contamination of surface and ground water quality is not possible.
- Excavation for Marble mining will be upto a maximum of 36 m and it will encounter with the ground water table as it is at 10 – 15 m.
- Excavated pit will work as water harvesting pit

### **Water Conservation Measure**

To conserve the water following measures are adopted:

- After 3 years of mining the excavated pit will be available for rain water infiltration
- Water sprinkler will be used for dust suppression
- Dry washing of mine machinery will reduce the water consumption

### **Impact on Land**

The present land use of the core-zone i.e. mining lease area is mostly broken waste land. There is no agriculture or forest cover. Afforestation has been done near the mine office outside pit limit. Hence every impact on land use will be positive in future by way of afforestation or water reservoir. Backfilling will be done in exhausted portion of the quarry.

In buffer zone no adverse impact is envisaged due to all mining activities being restricted to the core zone only. The intensity of mining is less, most of the area already broken, backfilling proposed & garland drain & bund prepared towards the sloping southern side denies any adverse impact in the buffer zone if any.

### **Impact on Flora & Fauna**

The area is thinly vegetated and with no thick vegetation on the plateau top. There is no tree growth on the top of the plateau area, but grass shrub and bushes grow sparsely. No wildlife is found in this area. The mining activity of the proposed project does not change the community structure of the vegetation.

### **Impact on Socio-Economy**

Since there is no village or human settlement within the core zone, therefore there would be no displacement of the human population.

The mining operations will substantially increase gross economic production and infrastructure facilities. Therefore, Socio economic prospects are likely to improve to some extent. Also increase in mining operations will result in some increase in direct and indirect employment and consequently the population in near by villages.

## **ENVIRONMENTAL MANAGEMENT PLAN**

### **Air Quality Management**

- Drilling & blasting operations which generate maximum quantity of dust are intermittently operated and are restricted to only hard rock portions exposed.
- Water tankers with spraying arrangement will be used for regular water sprinkling on the haul roads to ensure effective dust suppression.
- Dust masks will be provided to the workers especially for the drillers and for the workers working in the loading operations.

### **Waste Management**

Generation of waste will be around 23,120 m<sup>3</sup> per annum. There is no generation of sub-grade ore.

The Overburden will be removed in two sages. The soil at the top will be removed first and transported by 10 T tippers for Stacking and later this soil stack shall be reused for spreading over the back filled portions with the overburden and mine wastes. External dumping will be done in future in 2 ha. area.

The sides have been sloped to 28<sup>0</sup> and inactive sides have been vegetated. The average height of the dump will be 20m, suitably terraced of 10m height.

### **Afforestation**

The mined out areas will be backfilled and reclaimed with dense poly-culture plantation of the local species. Water reservoirs will be created in the abandoned mine pit that shall increase the water availability on the plateau for longer periods of time. During the plan period an area of 0.13 ha land has been proposed for phased green belt plantation/afforestation and till the post mining stage a total area of 5.05 ha land shall be afforested. The species to be grown in the areas should be dust tolerant, fast growing and fruit yielding species so that a permanent green belt is created.

### **Socio-Economic Benefits**

The lessee provides social welfare activities in and around the lease area. The social welfare activities are planned in the following areas:-

- Medical assistance
- Primary Education
- Agriculture improvement
- Vocational Training and
- Assistance in utilizing government programs

### **ENVIRONMENTAL MONITORING PROGRAMME**

Routine monitoring of all the environmental parameters viz. air, water, noise and soil as per the formulated program based on CPCB and MOEF guidelines every year in order to detect any changes from the baseline status. Monitoring program will be followed till the mining operations continue. For implementation of Environment Management Plan a small unit called Environment Management Division will be formed under the control of the Mines Manager. The job of this division will be regular environmental monitoring, preparation and submission of environmental report, green belt development, etc.

### **CONCLUSION**

Based on the EIA study it is observed that there will be an increase in the dust pollution, which will be controlled by sprinkling of water and transportation of ore in closed trucks. There will be an insignificant impact on ambient environment and ecology due to the mining activities moreover the mining operation will lead to direct and indirect employment generation in the area. Monitoring program will be followed till the mining operations continue. Around Rs. 8.0 lakhs as capital and Rs10.5 lakhs as recurring annual budget for environmental protection have been formulated to achieve the environmental quality as desired. Hence, it can be summarized that the development of the mine will have a positive impact on the socio-economic of the area and lead to sustainable development of the region.