

**EXECUTIVE SUMMARY  
OF  
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT &  
ENVIRONMENTAL MANAGEMENT PLAN REPORT**

(Submitted for Public Hearing as per the provisions of  
EIA Notification 2006 & amendments thereof)

**For**

# **NaNdi agate miNe**

**(Lease Area: 14.04 Ha, Non Forest Private Land)**

**Located at**

**Nandi Village, Ambad Tehsil, Jalna District, Maharashtra**

**Project Proponent:**

**Lessee: Shri. Sunil R. Bilawar  
21, Nandadeep Co-Operative Housing Society,  
Govind Nagar, Station Road,  
Aurangabad, Maharashtra-431005**

**Environmental Consultant**



**Anacon Laboratories Pvt. Ltd., Nagpur**

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## EXECUTIVE SUMMARY

### 1.1 INTRODUCTION

It is a proposed Agate mineral mine for which lease was granted by Govt. of Maharashtra, Department of Industries, Energy and Labour, Mumbai vide letter no. MMN-1101/196/Ind-9 dated 9<sup>th</sup> February 2005.

The lease was executed on 10.10.2006 in the name of Shri. Sunil Ramsingh Bilawar for a period of 20 years i.e. from 10.10.2006 to 9.10.2026 over an area of 14.04 Ha located Near Nandi Village, Tehsil Ambad, District Jalna, Maharashtra State.

Application for environmental Clearance was submitted to SEAC, Maharashtra under 'B' category as the mine lease area is more than 5 Ha but less than 50 Ha. for obtaining Environmental Clearance as per EIA Notification 2006. The case was presented to State Expert Appraisal Committee, Maharashtra during its 92<sup>nd</sup> meeting held in December, 22<sup>nd</sup> and 23<sup>rd</sup>, 2014. The committee considered and granted TOR to the project proponent vide minutes of 92<sup>nd</sup> Meeting.

#### 1.1.1 Identification of Project

It is a proposed Agate Mine and mining will be carried out by open cast manual method, which includes removal of top soil/overburden, excavation by drilling & blasting, loading & transportation by excavator-truck combination, manual crushing and screening, stacking and final dispatch by trucks.

The target production capacity of the mine is produce a maximum 12,000 TPA ROM (1,200 TPA of graded agate) from the mine. The mine lease area is consists of 14.04 Ha private land. Since the applied mine lease area is less than 50 Ha, it falls under "Category B" based on the Schedule Clause no 1(a) of EIA notification 2006 and subsequent amendments.

#### 1.1.2 Location of the Project

Proposed Nandi Agate Mine is located in Nandi Village, Ambad Taluka, Jalna District, Maharashtra. The nearest railway station is Jalna (23.8 km NE). The nearest National Highway is NH- 211 (11.4 KM, WSW) and State Highway is SH – 177 (22 km NNE). Location map of the proposed Nandi Agate Mine is given in **Figure 1**.

Latitude	N 19°39'51.30" to N 19°40'05.2"
Longitude	E 75°43'36.22" to E 75°43'51.7"

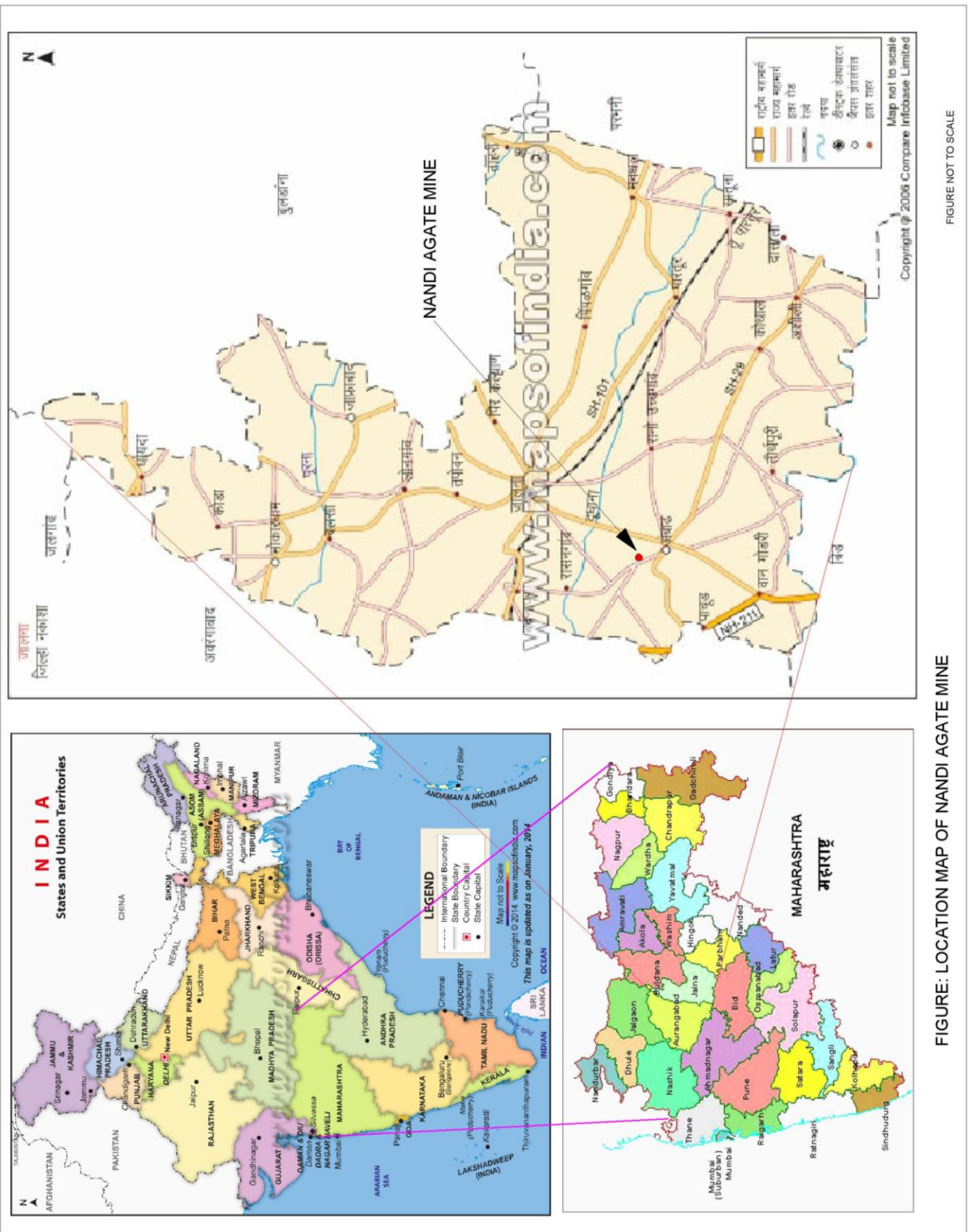


FIGURE NOT TO SCALE

FIGURE: LOCATION MAP OF NANDI AGATE MINE

**TABLE 1.1  
 SALIENT FEATURES OF THE PROJECT SITE**

<b>Particulars</b>	<b>Details</b>
Project Location	Plot/ Survey/ Khasara No. : Survey No.: 74, 75, 76 and 77 Village : Nandi, Tehsil : Ambad, District : Jalna, State : Maharashtra Mine Lease area 14.04 Ha
Site elevation above MSL	100 to 109m RL (528 to 538m above MSL)
Land use of project site	Non forest private land including agriculture land and mosque
Site topography	Almost flat having plain surface sloping towards north
Nearest roadway	NH 211 – 11.4 KM, WSW SH 177 (Nagpur Aurangabad Road) ~22.0 Km NNE
Nearest Railway Station	Jalna ~ 23.8 Km, NE
Nearest village/major town	Nearest Village: Nandi ~ 0.1 km (W), Nearest Town : Ambad (8.5 km, SE)
Hills/valleys	BhawaniaichaDongar (Hill) ~ 0.5 km, SE SalaichaDongar (Hill)~ 1.5 km, SW JambuwantDongar (Hill) ~ 5.0 km, W TukaichaDongar (Hill) ~ 6.7 km, WNW
Ecologically sensitive zone	None within 10 km study area
Reserved/ Protected forests	Reserve Forest (Near Nandi) ~ 0.3 KM, E SalaichaDongor R.F. ~1.3 KM, SW Reserve Forest (Near Hastpokhri) ~ 4.7 KM, NE Reserve Forest (Near Sirner) ~ 5.8 KM, S TukaichaDongor R.F. ~ 6.7 KM, W MahadevachaDongor R.F. ~ 8.0 KM, SE
Historical/tourist places	None within 10 km radius area
Nearest Industries	None within 10 km radius area
Nearest water bodies	Sukna River ~ 8.7 km, NE Dudhana River ~ 9.3 km, NNE Water Reservoir near Dhangarpimpri ~ 7.0 km, ENE KajriNala ~ 5.5 km, NE LendiNala ~ 7.9 km, SW Par Nala ~ 9.0 km, ENE
Seismic zone	Seismically, this area is categorized under Zone-II as per IS-1893 (Part-1)-2002. Hence, seismically the site is a stable zone

## 1.2 PROJECT DESCRIPTION

### 1.2.1 Method of Mining

The mining would be carried out by manual open cast method. The proposal is to produce 12000 TPA ROM (1200 TPA graded ore) by manual opencast mining with drilling & blasting. Mined out ROM will be broken and sorted before getting dispatched to user industries. Top soil will be separately scrapped and stacked for utilization in plantation. OB & waste rock generated during mining will be dumped in surface dumps located within the mine lease area.

#### Mine Design Parameters as per approved Mining Plan are as:

- Bench Height-5m,
- Bench Width-5m
- Pit Slope- 45°
- Bench Slope-75°
- Ultimate Pit Slope-45°

### SALIENT FEATURES OF THE MINE

Particulars	Details
Method of mining	Manual Open Cast Mining
Area	14.04 ha
Proposed Production	12000 TPA ROM (1200 TPA graded Agate)
Mineable Reserves	9,36,565tonnes
Life of the Mine	78 years
Bench Height and Width	5 M Height &5 M Width
Drilling & Blasting	34 mm dia jack hammer drill holes & controlled blasting using delay detonators.
Maximum Depth of Mining	15 m BGL
Topsoil thickness	0.5 m (average)
Ultimate Pit Slope angle	45°
Elevation Range	100 to 109m RL (528 to 538m above MSL)
Water requirement	5 KLD
Source of Water	Well water and Mine pit water, when available
Water table	12 - 15 m bgl from 100 mRL Ground water may be intersected during 4 <sup>th</sup> year of mine working.

#### 1.2.2 Anticipated life of the mine

The mineable reserve under Proved category are calculated to be about 9,36,565 tonnes and production of ROM @12000 TPA in next five years will be 60,000 Tonnes. The balance mineable reserve will be 8,76,565 tonnes, which will be mined out during subsequent years of mining. Life of mine on the basis of proved reserve and proposed production capacity of agate mineral is estimated to be about 78 years.

#### 1.2.3 Waste Generation & Disposal

During mining plan period of 5 years, about 5067 cu.m.soil and 15703 cu.m. overburden will be generated. The top soil and waste generated would be dumped and stacked near mining pit.

Topsoil generated during mining will be separately scrapped and stored in 0.16 Ha area within the mine lease in soil stack. The soil will be later used for spreading on backfilled area for plantation. The OB dumps produced are proposed to be dumped in 0.53 Ha area earmarked for the purpose within the mine lease area. Dumping site has been selected on non-mineralized zone, having adequate space for long term storage. In later stage, if the non-mineralization is proved below ultimate pit depth, it is proposed to vacate the surface dumps and will be backfilled in the vacated pits.

#### 1.2.4 Water Requirement & Source

Total water requirement for the project will be 5KLD, which will be met from dug well in the mine lease area and from mine pit water, when available.

#### 1.2.5 Manpower Requirement

Total manpower requirement for the project will be about 15 persons.

#### 1.2.6 Site Infrastructure

This is a small scale mining project. Preference in employment will be given to local people. Hence, there is no need for provision of township. For efficient mine operation, infrastructure facilities like



office, store, rest shelter, drinking water facilities, urinals, latrines, first aid centre, etc. will be provided within the mine lease area.

### 1.3 EXISTING ENVIRONMENTAL SCENARIO

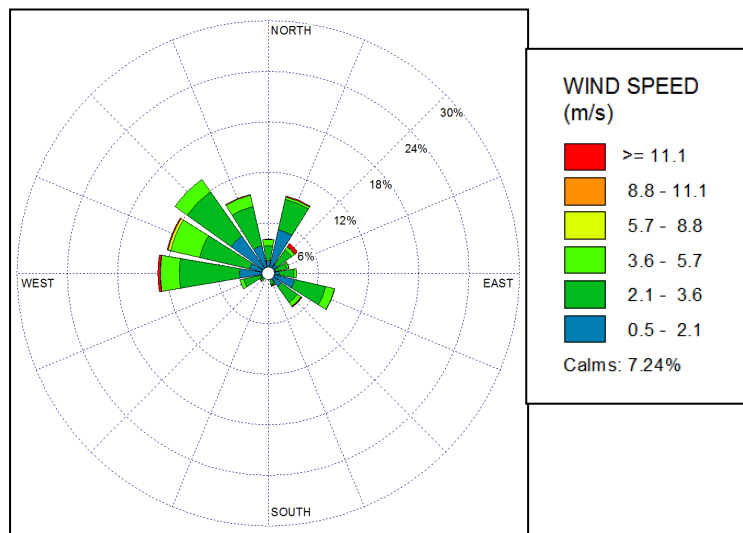
#### 1.3.1 Baseline Environmental Studies

Baseline environmental studies were carried out within 10 km radius of the Nandi Agate Mine area to assess the existing environmental scenario in the area. For the purpose of EIA studies, Mine lease area of Nandi Agate Mine was considered as the core zone and area outside the mine upto 10 km radius was considered as buffer zone. The baseline environmental monitoring for various components of environment, viz. Air, Noise, Water, Land was carried out during summer season i.e. **March to May 2015** in the study area covering 10 km radial Distance from the mine.

#### 1.3.2 Meteorology & Ambient Air Quality

##### Summary of Meteorological data generated at site (March to May 2015)

Temperature (°C)      18°C to 43°C  
 Relative Humidity (%)    5% to 96%  
 Wind Direction          NW (13.6%)  
 Calm wind %            7.24%



#### Ambient Air Quality Status

Ambient air monitoring was carried out at 9 locations. The locations were identified keeping in view predominant wind directions prevailing during study period, sensitive receptors and human settlements. The levels of PM10, PM2.5, Sulphur Dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>) were monitored for establishing the baseline status. The minimum and maximum values of monitoring results are summarized in **Table 1.2**.

**TABLE 1.2**  
**SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS**

Station code	Location	Description	PM10, (µg/m <sup>3</sup> )	PM2.5, (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )
AAQ1	Project Site	Minimum	35.8	11.1	6.2	9.7
		Maximum	42.2	14.8	8.7	14.0
AAQ2	Nandi	Minimum	39.1	11.6	8.0	10.5
		Maximum	48.2	15.3	10.9	16.9
AAQ 3	Kingaon	Minimum	47.7	12.4	9.9	13.5
		Maximum	59.0	16.4	14.1	20.9
AAQ 4	DhangarPimplagaon	Minimum	32.1	8.7	7.1	9.6
		Maximum	45.7	14.5	11.5	17.0
AAQ 5	Siradhan	Minimum	35.8	10.2	6.0	8.1
		Maximum	56.4	14.4	10.4	17.1
AAQ 6	BhiwandiBodkha	Minimum	22.5	6.5	5.0	8.0
		Maximum	56.1	15.5	11.1	17.4

Station code	Location	Description	PM10, (µg/m <sup>3</sup> )	PM2.5, (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NOx (µg/m <sup>3</sup> )
AAQ 7	Kingaonwadi	Minimum	42.7	11.7	6.8	9.4
		Maximum	52.5	16.7	10.4	16.7
AAQ 8	Mardi	Minimum	30.3	9.0	5.8	8.7
		Maximum	43.5	14.3	9.0	14.6
AAQ 9	LamaniTanda	Minimum	27.0	7.0	5.2	8.9
		Maximum	40.6	13.6	8.5	12.8
<b>CPCB Standard</b>			<b>100 (24 hrs)</b>	<b>60 (24 hrs)</b>	<b>80 (24 hrs)</b>	<b>80 (24 hrs)</b>

From the above results, it is observed that the ambient air quality with respect to PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NOx at all the monitoring locations was within the permissible limits specified by NAAQS.

### 1.3.3 Ambient Noise Levels

Ambient noise level monitoring was carried out at the 9 monitoring locations, those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 1.3**.

**TABLE 1.3**  
**SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS [Leq in dB(A)]**

Time	N1, Project Site	N2, Nandi village	N3, Kingaon village	N4, DhangarPimplagaon village	N5, Siradhan village	N6, BhiwandiBodkha village	N7, Kingaonwadi village	N8, Mardi village	N9, LamaniTanda village
<b>Min</b>	38.1	30.5	38.6	38.3	39.4	38.5	38.8	38.5	37.8
<b>Max</b>	52.8	54.7	53.5	51.7	54.4	49.6	54.7	52.0	50.9
<b>Ld</b>	49.1	51.3	49.7	48.8	50.7	46.7	51.0	48.8	46.7
<b>Ln</b>	39.0	41.0	40.2	39.3	40.9	39.1	40.4	40.0	38.6

### 1.3.4 Surface and Ground Water Resources & Quality

#### Water Resources

There is no seasonal or perennial surface water body in the mine lease area. The drainage of the study area is carried through a number of first order and second order streams and rivers, which are mostly seasonal. Major surface water bodies are observed within the 10 km radius of the proposed Nandi Agate Mine are Sukna River (~ 8.7 km, NE), Dudhana River (~ 9.3 km, NNE), Water Reservoir near Dhangarpimpri (~ 7.0 km, ENE), KajriNala (~ 5.5 km, NE), LendiNala (~ 7.9 km, SW) and Par Nala (~ 9.0 km, ENE).

The pre monsoon water level observed in the region is 14-15m below ground level while post monsoon water level observed in the area comes to 12 - 14m below ground level. Water level fluctuation observed to 2 - 4m meter. The entire AmbadTaluka of Jalna district falls in safe category of groundwater development with 41.06 % of groundwater development.

#### Water Quality

The existing status of groundwater and surface water quality was assessed by collecting 7 ground water (Bore wells/dug wells) samples in different villages and 1 surface water sample.

#### Groundwater Quality

The physico-chemical characteristics of groundwater are compared with the IS10500:2012 standards. The pH of the water samples collected ranged from 7.53 - 8.19 and within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found in the range of 306 - 652 mg/l. The total hardness varied between 161 - 345.3 mg/l. In all samples, Iron content observed to be <0.001 mg/l, Nitrate observed

to be <0.01 mg/l, the fluoride varied between <0.1 - 0.19 mg/l, chloride in between 23.65 – 43.36 mg/l, Sulphate in between < 2 to 29.85 mg/l, alkalinity in between 189 – 315 mg/l. In groundwater samples, the coliform organisms were absent in all the samples. It was observed that the ground water quality is good and can be used for domestic use except for TDS in Kingaonwadi and Parner villages observed to marginally exceed the desirable limits but were observed within the permissible limits.

### Surface water quality

The results of the surface water samples are compared with the IS10500:2012 standards. The pH of the surface water sample collected was 8.04 and within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found to be 168 mg/l. The total hardness was observed 135.8 mg/l. Dissolved oxygen was observed as 6.6 mg/l. The fluoride concentration was found to be <0.1 mg/l and chloride concentration was found 9.78 mg/l. The sulphate content was 16.28 mg/l. Total and faecal coliform in surface water samples were found to be 54. It was observed from the analysis that, the surface water quality is within the acceptable limit of drinking water but needs primary treatment and disinfection before using for domestic purposes.

### 1.3.5 Land use Land Cover classification

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-1 (IRS-P6), sensor- LISS-3 having 23.5 m spatial resolution and date of pass Feb 2014 satellite image. These were later verified by using SOI toposheet and Google Earth imagery. Polygon layers for each class were digitized and the respective areas were calculated. The Land Cover classes and their coverage are summarized in **Table 1.4**.

**TABLE 1.4**  
**LU/LC CLASSES AND THEIR COVERAGE WITHIN 10 KM RADIUS**

Sr. No.	LU/LC Class	Area (Sq.Km)	Percentage (%)
1	Built up Land Rural/Urban)		
	Settlement	30.56	9.73
	Road Infrastructure	4.36	1.39
2	Agriculture Land		
	Cropland/Current Fallow Land	181.2	57.71
3	Water bodies		
	River/Nala/Stream	15.63	4.98
	Pond/Tank	4.23	1.35
4	Scrub/Waste Land		
	Land with scrub/Open Scrub	63.79	20.32
	Forest Plantation	10.15	3.23
5	Dense Forest	2.45	0.78
6	Mining/Stone Quarry	1.63	0.52
	<b>Total</b>	<b>314</b>	<b>100.00</b>

### 1.3.6 Soil Quality

For studying soil profile of the region, sampling locations were selected to assess the existing soil conditions in and around the proposed project site representing various land use conditions. The physical, chemical properties and heavy metals concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 15-20 cm. Total 6 samples within the study area were collected and analyzed.



From the analysis results of the soil samples, it was observed that the soil was low to medium fertile and having low productivity. The soil in the study area needs additional fertilizers for improving the fertility status and increase in crop productivity. The concentration of heavy metals in the water extract of soil was found to be low with a negligible concentration level of cadmium, chromium, lead, cobalt and selenium. This also indicates the poor level of micro-nutrient. The organic matter and organic carbon was found in the range of 0.81 to 1.20 % respectively indicating moderate organic content in the soil. Overall the soil quality in the area was found as poor to medium fertile with moderate productivity.

### 1.3.7 Biological Environment

#### Flora in the core & Buffer Zone

Mine Lease area of proposed agate is 14.04 Ha land. It is non forest, agriculture land with private ownership. Trees were observed within the mine lease area along the hedges of agriculture land. *Azadirachta Indica* (Neem), *Acacia Catechu* (Khair), *Acacia nilotica* (Babul), *Acacia leucophloea* (Hiwar), *Moringaoleifera* (Shevga) and *Zizyphus sp.* (Bor). One mosque is also observed within the mine lease area. The proposed ML area is surrounded with few agriculture land. The major crop grown in within ML area as well as its immediate vicinity is *Sorghum vulgare*(Jowar) and *Gossypiumherbaceum* (Cotton). The major horticulture crop is *Citrus limetta*(Mosambi) and *Punicagranatum*(Pomegranet). Nearest habitation is Nandi which is around 0.1 km in west direction. The nearest forest from the project site is AichaDongar RF which is 0.3 km in E direction from the project site. The forest area is observed to be degraded with scanty of tree rejuvenated species like *Acacia nilotica*, *Lucinaleucociphala* and *Acacia catechu*. No major wildlife was observed in this forest.

#### Fauna in the core & Buffer zone

There is no National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Elephant Corridor, etc. within the study area. The wild mammals observed in the core zone are five striped squirrel, Field rat, Mongoose and Common house rat. The mammals observed in the study area includes Jackal, Jungle cat, Three striped palm squirrel, Common Mongoose, Indian hare, Common langur, Rhesus macaque, Indian wildboar, Indian fox, Field rat, Common house rat, Barking Deer and Blue Bull. The reptiles observed in the study area include Common Rat Snake, Common Indian Krait, Indian Cobra, Indian Toad, Russell's viper, Common garden lizard, Common Indian House Gecko, Monitor Lizard and Russell's Viper. Birds observed in the study area includes Common Maina, House swift, Indian pond heron, Cattle egret, Crow pheasant, Purple sunbird, Blue rock pigeon, Magpie robin, Indian roller, House crow, Common quail, Black Drongo, Black winged kite, India common Koel, Black partridge, Gray partridge, House sparrow, Indian peafowl, Indian Baya Weaver, Parrot, Redvented Bulbul, Laughing Dove, Jungle babbler, etc.

### 1.3.8 Socio-economic Environment

Information on socio-demographic status and the trends of the communities in the 10 km radius, was collected through primary social survey and secondary data from census 2011 & village directory 2011. Summary of the socio-economic status of the study area is given in **Table 1.5**.

**TABLE 1.5**  
**SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA**

No. of villages	38
Total households	18,524
Total population	93,132
Male Population	47,568
Female population	45,564
SC Population	9,782
ST Population	1,594
Total literates	55,919
Total workers	42,382
Total main workers	37,597
Total marginal workers	4,785
Total non-workers	50,750

## 1.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 1.4.1 Impact on Topography, Drainage&Landuse

It is a proposed Agate Mine. Mining of Agate by opencast method will change the existing topography within the mine lease area. The topography of the area is almost flat having plain surface sloping towards north and north-east. The highest elevation of 109m RL has been recorded in southern corner of the lease area while the lowest elevation of 100 mRL has been recorded in the north-west corner of the lease area. In total mining would be carried upto a depth of 15m during 5 year plan period and would be reclaimed during 5<sup>th</sup> year when mine reaches its ultimate pit depth.

There is no seasonal or perennial stream located in the mine lease area. Surface run-off from the mine lease area flows along the slope and joins seasonal streams outside the mine lease area. There is no perennial water body within the 10 km radius study area of the project. However, there are some seasonal streams flowing in the study area of the project. Sukna River (8.7 km, NE), Dudhana River ( 9.3 km, NE), Water Reservoir near Dhangar pimpri ( 7.0 km, ENE), Kajri Nala (5.5 km, NE), Lendi Nala ( 7.9 km, SW) and Par Nala (9.0 km, ENE) are prominent water bodies observed in the 10 km radius study area of the project. Apart from these, some seasonal streams also flows during rainy season in the study area. Garland drains will be constructed all around the mine lease area in order to divert rainwater away from mine lease.

The lease area comprise of private non-forest land. At present the land in the lease area is under agriculture and Mosque. The present and proposed land use plan of the mine lease area is given in **Table 1.6**.

**TABLE 1.6  
 PRESENT AND PROPOSED LAND USE OF THE MINE LEASE AREA**

Sr. No.	Description	Land use (Area in Ha)		
		Present	Plan Period	Conceptual Period
1	Area to be excavated	-	0.26	10.18 (Back filled)
2	Storage for top soil	-	0.16	-
3	Overburden/ dump	-	0.53	-
4	Mineral storage	-	0.04	-
5	Infrastructure (Workshop adm. building)	-	0.02	-
6	Roads	-	0.02	0.02
7	Green belt	-		3.31
8	Public Infrastructure (Mosque)	0.53	0.53	0.53
9	Unused Land	13.51	12.48	0
<b>Total area</b>		<b>14.04</b>	<b>14.04</b>	<b>14.04</b>

From the above table, it can be seen that at conceptual stage, 10.18 Ha of the mine lease area will be covered by mine pits.

The mining operations will alter most of the mine lease area into mine pits, surface dumps and other infrastructure facilities. However, since there is no forest or built-up land in the mine lease area, no significant impact will be observed on the land use pattern of the mine lease area. The original agriculture land use will be changed into mining area. No changes are proposed in the land use pattern outside the mine lease area.

#### **1.4.2 Ambient Air Quality**

##### **Impacts on Air Quality**

To assess the impact of the stone mining and crushing operations from the Nandi Agate Mine, air quality modeling was carried out for the mining operations and the mineral transportation activities. The modeling was carried out using MoEF/CPCB approved ISCST3 model.

The maximum predicted GLC of PM<sub>10</sub> for activities like drilling/ loading/ unloading/ transportation was found to be 0.95µg/m<sup>3</sup>, maximum incremental ground level concentration due to blasting was 1.9µg/m<sup>3</sup> near the dust generation sources. The incremental PM<sub>10</sub> concentration was observed to be less than 1 µg/m<sup>3</sup> at all the other monitoring locations. From the observations of modeling results, it is observed that the cumulative concentrations of PM<sub>10</sub> in the study area will remain within the permissible limits after commencement of the mining activities.

##### **Air Pollution Control Measures**

- Development of thick green belt in 7.5 m safety barrier along the mine lease boundary.
- Adoption of drills with dust arrestors to control dust generation during drilling.
- Water sprinkling on mine benches during loading of OB & mineral
- Blasting to be avoided during high winds and overcast conditions.
- Controlled blasting using delay detonators will be adopted.
- Periodic maintenance of mining equipments.
- Regular water sprinkling on haul roads.
- Plantation on inactive dump slopes and stabilization of completed dumps by thick plantation.
- Transport of Agate Mineral to the buyers location through trucks covered with tarpaulin.
- Thick plantation will be developed around the Madrasa located in the mine lease.

- Provision of dust masks to all the workers exposed to dusty mining operations
- Periodic monitoring of ambient air quality in the mine lease area and in nearby villages to assess the efficacy of air pollution control measures.

### 1.4.3 Ambient Noise Levels & Ground vibrations

For predicting the impacts on ambient noise levels, 'DHWANI' Noise model, developed by NEERI was used. From the modeling results, it was observed that the resultant noise levels at the mine lease boundary was about 45dB(A), which will further reduce over short distance. The resultant noise levels due to mine operations at the nearest habitation i.e. Nandi village was about 37.5dB(A). Thus, no significant impact will take place on the ambient noise levels due to the Nandi Agate Mine.

#### Ground vibrations

The ground vibrations at Nandi village due to the blasting in Nandi Agate Mine are calculated using the empirical equation: It is proposed to use about 6 kg/day explosives for excavation of hard rock for extraction of Agate Mineral. From the modeling results, it is observed that the maximum charge per blast of 6 kg can be blasted in single blast at a distance of 90 m away from the habitations and a maximum charge of 3 kg can be blasted at a distance of 60 m away from the habitations to restrict the ground vibrations within permissible limits. However, additional control measures needs to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

#### Proposed Noise Control Measures

- Mining will be conducted during day time only. Thus no noise due to mining during night time.
- Use of Sharp drill bits for blast hole drilling to reducing noise.
- Adoption of controlled blasting with optimum charge/delay.
- Conducting blasting during favorable atmospheric condition.
- Green Belt/Plantation will be developed around the mining activity area.
- Development of 50 m wide green belt on the safety barrier left along the mosque and Madarasa located within the mine lease area.
- Periodical monitoring of noise will be done in mining area and in surrounding villages.

#### Measures to Control Ground Vibration & Fly Rocks

- Adoption of proper quantity of explosive, suitable stemming materials for safe blasting.
- Selection of proper blast design to control ground vibration and fly rocks.
- Maintaining adequate safe distance from blasting.
- Minimizing charge per delay and preferably more number of delays will be used per blasts;
- Adoption of muffle blasting using wire mesh and sand bags at mine working near ML boundary towards Mosque/ Madarasa and road.
- Reducing no. of holes to be blasted in a single blast near the mine workings near mosque to control ground vibrations.

### 1.4.4 Water Resources & Quality

#### Impact on Water Resources & Quality

There is no seasonal or perennial stream located in the mine lease area. Surface run-off from the mine lease area flows along the slope and joins seasonal streams outside the mine lease area. There are some seasonal streams flowing in the study area of the project. Sukna River (8.7 km, NE), Dudhana River ( 9.3 km, NE), Water Reservoir near Dhangar pimpri ( 7.0 km, ENE), Kajri Nala (5.5

km, NE), Lendi Nala ( 7.9 km, SW) and Par Nala (9.0 km, ENE) are prominent water bodies observed in the 10 km radius study area of the project. About 55,458 cu.m.per annum storm water run-off will take place from the mine lease area. This run-off may carry soil and silt from the broken up area in the mine to the nearby seasonal streams thereby causing siltation of the water bodies.

There will be no process effluent generation in the proposed Agate Mine. There will be no workshop and mineral beneficiation activities in the mine lease area except manual sorting. Hence, there is no tailings, process or workshop effluent generation in the mine lease. Domestic effluent will be generated from mines office, which will be discharged in septic tank followed by soak pit. There is no township proposed in the mine lease area. Hence, there is no impact envisaged due to the effluent generation on surface or ground water quality in the area.

The pre monsoon water level observed in the region is 14 - 15m while post monsoon water level observed in the area comes to 12-14m. Water level rises to 2-4m meter. The yield of aquifer observed in the area is 1.5 to 2 lps. Mining operations will intersect the ground water table during 4th year of mining. The pit water during rainy season will be collected in the mine sump and will be utilized for dust suppression and plantation in the mine lease area. The ground water seepage in the mine pits, if any, will be collected in the mine sumps and will be used for dust suppression and plantation. The excess water will be pumped to the settling tank located on surface. This water, after proper settling, will be supplied to the nearby farmers for irrigation purposes. Since the ROM is very small in quantity, not much area will be required to achieve daily production target of about 40 TPD. Thus, there will not be any significant pumping of water required.

### **Proposed Water Conservation & Water Pollution Control Measures**

Following measures will be adopted in the proposed Agate Mine to minimize contamination of surface and ground water resources of the area:

- Efforts will be taken to divert surface run-off from virgin area away from the broken up area.
- Construction of garland drains around the mine pit to divert run-off water away from mine pits.
- Garland drains will be construction all along mine lease area and along the working area and connected to a settling tanks for settling of silt.
- Development of thick plantation using herbs and grasses on inactive surface dump and on safety barrier zone left along the mine lease boundary to control soil erosion.
- Collection of rain water and ground water seepage in mine sumps and use of accumulated water in dust suppression and plantation in the mine lease area. Excess water will be pumped to the settling tanks and will be supplied to the nearby farmers after ensuring proper settling.
- Domestic effluent from mine office will be discharged in septic tank and soak pit system.

Suitable rooftop rainwater harvesting structures will be constructed in the public buildings in nearby villages in consultation with the concerned Gram Panchayats. This will also help in improving the ground water recharge in the area and minimize the impact on the ground water table due to mining operations.

#### **1.4.5 Solid Waste Generation & Management**

About 15703 cu.m.of OB and 5067 cu. m. of soil will be generated during the mining plan period. Separate surface dumps will be developed for stacking of top soil and OB/waste. Retention walls and garland drains will be constructed around the toe of the dumps to arrest silt wash off and rolled down boulders from the dumps. The garland drains will be connected to a set of settling tanks and the properly settled water will be supplied to nearby farmers for irrigation. The inactive dump slopes will



be planted with grasses and legumes to ensure effective stabilization of slopes and avoiding soil erosion and gully formations.

OB/ waste rock rejects dumps will be stabilized with local grasses and legumes species in gradual manner during the course of mining once they become in-operative. Once the mineral reserves are exhausted from the working pits, these dumps will be re-handled in backfilling the created mine void to the extent feasible to bring back to the original land profile.

#### **1.4.6 Biological Environment**

Trees were observed within the mine lease area are in the form of hedges of single crop agriculture field. ML area (14.04 Ha.) is devoid of any forest. There is no endangered or endemic species were observed in the mine lease area. During mining, some of the trees within mine lease will be required to be cleared for mining. However, trees will be cut only when the area is immediately required for mining. Trees located in the safety barrier zone will not be disturbed due to mining. There is no endangered or endemic species were observed in the study area except, Indian Peafowl (Schedule – I) as per Wildlife Protection Act, 1972. The major wildlife like Nilgai, Wildboar, Barking Deer, jackal, etc. are confined to the RF of the study area. There will be no direct impact on peafowl due to mining activities as their habitat is confined to reserve forest in the study area which is far away from the mining area. The study area is characterized as a ‘frequently drought prone area’. There is no significant aquatic biodiversity reported in the study area and hence no impact will be envisaged of aquatic biodiversity within study area.

#### **Proposed Biological Environment Conservation Measures**

Following measures are proposed to be adopted for protection and conservation of wildlife species:

- Plantation of local varieties of the tree species near villages in the vicinity of forest in buffer area. Plantation will also be carried in some forest patches identified by local forest department.
- Plants species / varieties will be suggested by the local forest department and plant saplings will be distributed in nearby villages.
- Water holes will be constructed for wild animals. Location of water holes will be suggested by the local forest department.
- As the study area is characterized as a ‘frequently drought prone area’, water will be supplied through tankers in the water holes during summer season.

Plantation@ 1200 saplings per hectare will be carried out along safety zone (7.5 m). Thus, the total area made available for plantation will be 3.31Ha.along the periphery of mine lease area. About 3970 saplings will be planted in the mine lease area. Preference will be given to indigenous plant species. Dense polyculture plantations will be done keeping optimum spacing between the saplings.

#### **1.4.7 Socio-economic Environment**

- There is no habitation in the Mine lease area. The Mine lease area comprise of 14.04 Ha of private land. For private land the mine management has obtained consent from land owners. A mosque and madarsa is located within the mine lease area. However, there is no proposal for mining in the area covered under mosque and madarsa.
- Land owners in the mine lease area will be provided compensation as per mutual agreement and on profit sharing basis.

- This is a small agate mining project. About 15 persons will be employed in the mine. Mostly local persons will be employed in the mine.
- The existing infrastructure facilities are sufficient to cater the needs of the stone mine. However, the mine management will take efforts as a part of CSR for improvement in civic amenities like sanitation, drinking water facilities, public road, etc in the nearby villages.

### **1.5 ENVIRONMENTAL MONITORING PROGRAM**

An Environmental Management Cell (EMC) will be established in the mine under the control of Mines Manager. The EMC will be headed by an Environmental scientist having adequate qualification and experience in the field of environmental management. Environmental monitoring of Ambient Air Quality, Water table depth, Water quality, Ambient Noise Levels, Soil Quality, CSR activities etc will be carried out through MOEF accredited agencies regularly and reports will be submitted to MPCB/MoEF. Expert advice will be obtained from recognized external agencies for implementing the Environmental Management Plan and conducting periodic environmental monitoring of important and crucial environmental parameters to assess the status of environment regularly during mine operations.

### **1.6 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN**

The assessment of risk in the Nandi Agate Mine project has been estimated for Slope failure, Handling of explosives, Fly-rocks during blasting, Movement of HEMM, Inundation due to surface water, Dust hazards, Hazards associated with use of electricity/ Diesel Generator Sets and flooding of lower benches and corresponding mitigation measures are suggested in the Draft EIA/EMP report. A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons is prepared and incorporated in the draft EIA/EMP report for ensuring safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of Disaster Management Plan, it will be widely circulated and personnel training through rehearsals. Site facilities, procedures, Duties and responsibilities, Communications, etcis considered in detail in the Disaster Management Plan.

### **1.7 PROJECT BENEFITS**

The proposed Nandi Agate Mine project at Nandi village would generate direct & indirect employment opportunities which would finally result in improvement in the quality of life of people of the nearby villages. The Lessee, Shri. Sunil R. Bilawar will carry community welfare activities in the following areas:

- Community development
- Education
- Health & medical care
- Drainage and sanitation
- Plantation

A budget of Rs. 2.0 Lakh per annum as recurring expenses has been proposed for implementation of Socio-economic welfare activities in the nearby villages.

## 1.8 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan comprise of following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.
- Minimization of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.
- Control of waste generation and pollution.

Judicious use of the environmental management plan addresses the components of environment, which are likely to be affected by the different operations in the project. A budget of Rs. 15.75 Lakh as capital cost and Rs. 8.06 Lakh as recurring expenses has been allocated for implementation of the Environmental Management Plan.

## 1.9 CONCLUSION

The Nandi Agate Mine of Shri.Sunil R. Bilawar, will be beneficial for the development of the nearby villages. Some environmental aspects like dust emission, noise, siltation due to surface run-off, etc. will have to be controlled within the permissible norms to avoid impacts on the surrounding environment. Necessary pollution control equipment like water sprinkling, plantation, personal protective equipments, etc., will form regular practice in the project. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize impacts on the environment and socio-economic environment of the area. Measures like development of thick green belt and plantation within mine lease area, adoption of rainwater harvesting in the mine and in nearby villages, etc. will be implemented. The CSR measures proposed to be adopted by the mine management will improve the social, economic status of the nearby villages.

The overall impacts of the Nandi Agate Mine will be positive and will result in overall socio-economic growth of nearby villages.