Executive Summary of the EIA/EMP Report & Overall justification

Executive Summary

Shri Dinesh Trikannad, is in possession of mining lease for bauxite mining called Kavdoli Bauxite Mines, in Village Kavdoli , Taluka Dapoli, District Ratnagiri, State Maharashtra to an extent of 55.79 Ha which is non-forest private land. Survey No's of the ML area are 7/1 to 7/16, 8/1 to 8/15,9/1 to 9/10,9/11(A),9/11(B),9/12 to 9/14,10/1 to 10/16,11/1 to 11/7 . Latitude/Longitude N 17^0 54' 36.75" to N 17^0 55' 36.98" and E 73^0 06' 38.25" to E 73^0 06' 55.38" Under Toposheet No: 47 G/1. The Lease deed was executed on 15th February 2005 for a period of 20 Years from 15/02/2005 to 14/02/2025. Lessee has appointed Rajnikant Pajwani as Power of Attorney to act on behalf of him. It was earlier proposed to produce 0.018 MTPA of bauxite by manual opencast mining for which the Environmental clearance was obtained. After the exploration with 12 Nos. of Trial Pits and 7 No of Bore Holes (DTH) carried out by the lessee with a gross meterage of 110 m. the reserves & resources potential was estimated to be 5.4 million tonnes and as such the production is proposed to be increased to 2 LTPA of bauxite with mechanized opencast mining. Regular Mining operations are yet to be commenced from this mine.

The common raw material for aluminum production, bauxite is used to produce alumina oxide and subsequently aluminum. On a world-wide average 4 to 5 tonnes of bauxite are needed to produce two tonnes of alumina, from which one tonne of aluminum can be produced. In India, the industries that require aluminum most include power (44%), consumer durables, transportation (10-12%), construction (17%) and packaging etc. Aluminum is the second most used metal in the world after steel. Though India's per capita consumption of aluminum stands too low (under 1 kg) comparing to the per capita consumptions of other countries like China (3 kgs), the demand is growing gradually. To fill the above gaps in supply and demand positions in aluminum, it is

essential to have capacity addition for existing aluminum plants, for which the lessee is proposing for as a raw material supplier. The high grade Bauxite generated from this mine will be sold to local domestic aluminum producers which are facing high shortages for supply of bauxite or exported. The low grade bauxite ore will be sold to Cement plants located in Karnataka, Maharashtra. For all these reasons the proposed increase in production of bauxite by lessee shall benefit industries developed in this region.

Public road from Village Kelshi to village Mandivali is passing through the Lease area. Nearest Village is Kavdoli (1 Km) North of ML & Kelshi (6 Km) West of ML. Nearest Town is Dapoli (26 Km) South of ML. Nearest Railway Station is Khed (75 Km), Nearest Airport is Pune and Nearest National Highway is NH 17 (approx 75 Km).

So far total 7 No of Trial Pits and 7 No of Bore Holes (DTH) are drilled with a gross meterage of 110 m with 100 X 100 m grid pattern covering about 14 ha of ML area to prove the depth persistence of Bauxite Ore. The samples are analyzed in-house laboratory at Dapoli. Further it is proposed to develop 43 Nos. of Trial Pits to explore the rest Lease area. Based on the exploration so far done the following mineable mineral reserves/resources are estimated.

Category	UNFC	Quantity in tonnes	Grade
A. Mineral Reserve			
Proved Mineral Reserve	111	617699	39.35
Probable Mineral Reserve	121 &122	517663	38.84
A. Total Mineral Reserve		**1135362**	**39.09**
B. Mineable Resources			
Feasibility Mineral Resource	211	203954.4	39.81
Prefeasibility Mineral Resource	221&222	112806.45	39.83
Measured Minerals Resource	331		
Indicated Minerals Resource	332		
Inferred Minerals Resource	333	3951641.35	38.31
Reconnaissance Minerals Resource	334		
Total Mineral Resource		**4268402**	**38.43**
Total Reserves + Resources		**5403764.35**	**38.52**

Thus with mineable resources as 5.4 million tonnes, life of the mine shall be 24 years.

The existing land use of study area covering 10 km radius is

S.NO	DESCRIPTION	AREA (HA)	PERCENTAGE (%)
1	Water	3116	9.92
2	Mud	855	2.72
3	Rocky Patches	7914	25.19
4	Waste/degraded land	1112	3.54
5	Sparse vegetation	4794	15.26
6	Medium dense vegetation	8200	26.10
7	Dense vegetation	5186	16.51
8	Habitation	239	0.76
	Total	**31416**	**100**

The existing land use of ML area is a virgin area a private barren land at the top of plateau portion raising up to 200 m RL covered with few scrubs and bushes with a public road covering 0.16 ha which shall be protected by a safety barrier of 100 m width. There are no Perennial water bodies within ML. Important water bodies are: Bharja River (1 Km, North), Savitri River (5.1 Km, North), Arabian Sea (5.2 Km, West)

The kavdoli plateau is located on the north-west of Dapoli Township. The kavdoli plateau which is somewhat rectangular in shape approximately trends NW-SE direction with an area extent of 0.3 sq. km. To the northern there is a valley rising with a gentle slope. To the south a small high ground is present with an altitude of 320 m. The plateau has an elevation of 200 m above the MSL. The highest elevation is 320 m whereas the lowest elevation is 60 m. The plateau area is covered by local shrubs, and bushes. The slope of the hill is covered with shrubs with few scattered trees. The plateau is having a radial drainage system with the consequent erosion of the streams and small nallahs. The area experience humid tropical climate and receives as much as 4000mm of rainfall during the year. A barrier of 7.5m with fencing will be left from the edges of escarpments along the plateau as a point of safety measure. All the workings have been planned beyond this safety barrier zone over the plateau top portion.

It is Category A mine. The Bauxite shall be mined through mechanized opencast mining

with conventional deep hole drilling and blasting Average depth of the pit is 6m. Average Height of the bench will be 6.00 m. There will be only one bench. Bench will have slope angle of 65^0. Access road will be taken to the pit bottom. During present modified scheme of mining period, for the balance four years 2015-16 to 2019-20, which is approved by IBM, Three pits will be operated simultaneously for the purpose of maintaining the desired grade by way of blending different qualities from different pits.

The Operations involved are drilling, by using 115 mm dia drilling machine, for drilling holes of 7m depth. Blasting will be done using slurry& ANFO in conjunction with Delay Detonators and Detonating Cards. Loading of bauxite will be carried by 1.5 Cum excavator and transportation will be by 10 tonnes capacity tippers, to the crusher. In addition to above 1 JCB of capacity 0.9 cum each are deployed for the backfilling operations, removing the intercalated Waste, separating the Subgrade Mineral etc. and loading the ROM into the crushers. One wheel loader of 1.5 cum capacity is deployed to load the sorted ore into buyers/hired trucks for mine. Two water tankers each of 5000 cum capacity shall be used for water spraying. dispatch from the Bauxite produced from the mine, crushed and screened to give 10 to 100m sizes. Processed ore will be loaded into trucks for destination. There is no overburden bench. The total material generation shall only be 2,22,222 tonnes per annum i.e only about 750 tonnes per day.

Summary of production & development during the scheme period in tonnes is given below:

Years	Pit Nos.	Total Excavation	Top soil	Waste	Ore	Reject	Ore to waste
2015/2016	1,2,3	222222	-	22222	200000	-	1:0.1
2016/2017	1,2,3	222222	-	22222	200000	-	1:0.1
2017/2018	1,2	222222	-	22222	200000	-	1:0.1
2018/2019	1	222222	-	22222	200000	-	1:0.1
2019/2020	1	222222	-	22222	200000	-	1:0.1

For the above production following matching capacity machinery shall be used.

Sl. No	Type of machinery	Nos.	Make	Capacity
1	Drill Machine	1	ATLAS COPCO	115 mm dia
2	Excavator	1	TATA	1.5 cum
3	Wheel Loaders	1	HM2021	1.2 cum

4	JCB	1	JCB-3DX	0.9 cum
5	Tippers	5	TATA	10 Tonners
6	Crusher	1	TEREX	150 tph
7	Water Tankers	2	TATA	5000 litres

The wastes consists of intercalated clay, containing 10% ROM which shall be separated through crushing and screening. The intercalated waste/Clay generated will be concurrently backfilled into the worked out portion of pit and no external dumping is required. During the scheme period out of 12.2 ha of the worked out pit about 6.87 ha shall be backfilled stabilized and afforested. At conceptual stage, the total area of worked out pit available shall be 51.44 ha and the total area backfilled and afforested shall be 27.89 ha. Balance areas shall be left as water reservoir shall be beneficial to nearby villagers as the water can be drawn by gravity Back filling details are as given below:

Year	I yr	II Yr	III Yr	IV Yr	V Yr	Total
Area available for rehabilitation (ha)	2.39	2.20	2.71	2.08	2.82	12.20
Afforestation to be done (ha)	1.27	1.29	1.21	1.29	1.81	6.87
No of saplings planted in the year	3175	3225	3025	3225	4525	17175

There are no national park, wild life sanctuary, eco sensitive areas, CRZ. In case of notified industrial area, within the study area. The nearest water source is Bharja River (1 Km, North), Savitri River (5.1 Km, North), Arabian Sea (5.2 Km, West).. The nearest forest which is denuded is within 1 km.

The approximate land use in ha at different stages of mining are given below:

		End of scheme period (ha)	At conceptual (ha)
1	Area excavated /Afforested	12.2	51.44
3	Storage for Top soil	-	-
4	Overburden dump	-	-
5	Mineral storage	0.40	0.40
6	Infrastructure Workshop administrative	0.21	-

7	Road	0.16	0.57
8	Railways	-	-
9	Green belt	0.64	3.38
10	Mineral Separation Plant	0.25	
11	Unused area	41.93	-

One seasonal base line data is collected for winter season of 2015-16. December 2015-February 2016, and presented date wise Environmental monitoring for all the seasons for the parameters prescribed by MoEF is being carried out by engaging the services of M/s Mineral Engineering Services, Bellary, Karnataka Lab recognized by MoEF. Environmental parameters are monitored and analyzed as per CPCB & SPCB guidelines. The area experience humid tropical climate and receives as much as 4000mm of rainfall during the year. Eight soil samples including one from the ML area and others from nearby village agricultural fields are collected and analysed. They are all observed to be within the normal soil quality fit for cultivation. Site specific meteorological data is collected by establishing a weather monitoring station at site. The wind rose prepared show that the prominent wind direction is E & SE. For air quality monitoring 8 stations including one in core zone and 7 in surrounding villages are monitored. The total material generation shall only be 2,22,222 tonnes per annum i.e only about 750 tonnes per day. The maximum values of SO_2, NO_2, PM_{10} & $PM_{2.5}$ in the core zone are observed to be 13, 18, 60 & 32 ugms/cum. All the monitoring results compared to AAQS are observed to be well within the limits. .

The maximum uncontrolled PM_{10} emission level due to proposed increase in production and transport of bauxite & waste generation, predicted by using the software are observed to be well within the limits not exceed 100 $\mu g/m^3$. The dust is not containing harmful free silica. During transportation of bauxite some dust may be deposited on the adjacent fields. The sources of dust emissions are drilling, blasting, loading, transport and crushing & screening operations. To minimize dust deposition, roads will be maintained regularly. All the loaded trucks will be covered with tarpaulin to avoid spillage enroute and speed limits shall be enforced.. Dust suppression measures will be undertaken through regular water spray, wet drilling, low density explosives are used which gives a heaving effect than an explosion. Crusher shall be provided with

enclosure. DGset is provided with proper chimney. Wide green belts shall be developed surrounding the mining area. Regular maintenance of equipment as per manufacturer specification shall be done to minimize the fugitive emissions. PUC shall be undertaken for the transport vehicles. Besides, Avenue plantation will be developed wherever necessary for erosion control.

For noise quality 11 stations including one station in core zone were monitored and Leq(day) & night are estimated. Maximum noise is produced from operation of earth moving m/c's & movement of dumpers and drilling machines, crushing and screening equipment These values in the core zone are observed to be ranging 45.2 & 39.1 dB(A). All the monitoring results compared to Noise Quality Standards are .observed to be well within the limits. The blast induced ground vibrations are controlled by adopting controlled blasting technique using low density slurry and ANFO explosives to have a heaving effect than explosion, with charge per hole is 6-7 Kg in conjunction with Delay Detonators and Detonating Cards, where each hole will have separate delay with spacing and burden as 2,5x2.0 m for 7 m depth of hole. This type of blasting controls ground vibrations, noise levels, fly rock ejections and air blasts. No negative impacts are anticipated at the nearest villages of Kavdoli and also on the road passing through the ML. Further the noise levels are controlled by avoiding drilling & blasting at the time while temperature inversions likely to take place and during the nighttime, avoiding secondary blasting with proper design of spacing & burden, proper maintenance and lubrication of machinery & equipment as per manufactures specification, speed restriction, proper Maintenance of roads with stipulated standards of road congress. Developing wide green belt surrounding ML area, Providing enclosure to the screening & crushing plant and DG set. . .

There is no surface water source passing through the lease area and nearby surroundings. The area falls under Bharja River (1 Km, North) water shed. The drainage pattern is sub dendritic. General drainage pattern is towards NW direction. Ground water within the ML area is 15 m BGL. The maximum depth of pit shall be 6.0 m BGL and therefore no ground water shall be encountered in the pit. No surface water is used for mining purpose. Six surface water samples and seven ground water samples are

collected and analysed and theresults are compared with IS : 2296, 1982 Class C Norms (Stream Water Standards) & IS:10500-2012 Norms (Drinking Water Standards) and the results for all the parameters are observed to be well within the limits.

The ore or the waste do not contain any leachable toxic elements or heavy metals that shall pollute the water regime. The potential impact on the surface water quality is likely to be due to higher load of suspended solids. During the heavy rainfall, the wash off from the bauxite dumps will lead to the adjoining surface water body. Therefore, landscape of the bauxite dumping area should be shaped, capped and graded, so as to prevent soil erosion along with the run-off. Bauxite Stacks will be protected by way of construction of retention wall along the toe of the dump to prevent wash offs during rainy season. Further garland drains are provide to collect the wash of and runoff from the ML area.

The discharge from this drain is diverted to a settling tank an unused pit workings, which allows the sediments to settle. Further to arrest the silted drainage entering into the area down below, check dams and gully plugs shall be erected in the existing natural drains The following engineering control structures shall be provide

1	Check Dams	2 Nos. (15 m x 2.5 m x 1.5 m)
2	Gully Plugs	5 Nos. (5 m x 1.5 m x 1.5 m)
3	Retention wall	140 m x 3 m x 2 m
4	Garland drain	140 m x1.2m x 0.75 m
4	Settling pit (old pit)	1 No (5mx3mx 1.5m)

The maximum water requirement 45 m^3/day. Potable water requirement is very less as only the working population will be stationed at the mining unit during the operational phase. This water shall be drawn from stored mine discharge and from the bore wells

The ML areas consist of non-forest private land area covering plateau and slopes. There is no thick vegetation on the plateau top. Shrubs and bushes grow sparsely on

the plateau top. On the slopes, however some coconut, cashew nuts, mango plantation etc. are noticed along the slope which shall not be disturbed as they fall under non-mining zone. The grass & shrub species on the plateau and slopes identified during the survey will be rehabilitated to the extent possible.

Various plant species commonly noticed in the study area are : Grass: Kushali,Gondval, Marvel, Lavali, Phulsari, Shurbs: Chambli, Abai, Chilar, Bondwel, Bhovasi, Gunj, Kawli, Palasvet, Shemba, Wagati, Dinda, Karvi, Bharang, Amoni, Papdi,Esar, Kirma, Bhaman, Papat, Dhayati. No wild life of any sort is found within the lease hold area. The fauna found in the area are of common variety like Indian hare , Wild Boar, Jackal , Peacock , ranmanjar , Squirrel ,Rabbit ,Birds like Koel, row, Dove ,reptiles like rat Snake, Lizard Amphibians like Indian toad etc.

The establishment of Green belt will help wild life movement, and also protects human health. The greenbelt will act as a barrier to trap the suspended dust particles and also suppresses air pollutants. It is also important to create a green belt with tall seedlings (>1 m height) of fast growing species to hasten the process of greening the area. In the green barrier of 7.5 m along the ML boundary, three rows of saplings/seedlings at 2.5 m centre to centre are to be planted. While planting, the pits that are dug out will be filled with a mixture of manure and soil. Similar procedure is adopted for plantation over the backfilled area, which are dumped in stages within the exhausted pit with an overall slope of 27^0. Time bound Progressive Greenbelt Development Plan is furnished below

S.NO	YEAR	UN WORKED AREA GREEN BELT		PLANTATION OVER BACKFILLED AREA		TOTAL	
		AREA (ha)	Saplings	AREA (ha)	saplings	AREA (ha)	Saplings
1	1st	0.13	325	1.27	3175	1.4	3500
2	2nd	0.13	325	1.29	3225	1.42	3550
3	3rd	0.13	325	1.21	3025	1.34	3350
4	4th	0.13	325	1.29	3225	1.42	3550
5	5th	0.12	300	1.81	4525	1.93	4825
	Total	**0.64**	**1600**	**6.87**	**17175**	**7.51**	**18775**
6	Conceptual	1.78	4450	21.02	52550	22.8	20800
	Total	**2.42**	**6050**	**27.89**	**69725**	**30.31**	**39575**

Species for plantation

S. NO.	TREES
1	Mango
2	Cashew
3	Kokum
4	Jamun
5	Imli
6	Casurina

However for species selection advice of the local forest department shall be taken
The worked out pit shall be 51.44 ha and since only 10% of the excavated material constitutes the waste, it is possible to backfill only 27.25 ha and rest 24.19 ha left as water reservoir. The reservoir water shall be used by the villagers through gravity supply. Further, regular environmental monitoring will be conducted during life of the mine in the project site and in the surroundings to maintain the pollutants level from the mining activity within the permissible limits.

Developmental activities such as employment generation of local villagers both in mines and indirectly in the transport activity there by increasing the financial status of villagers, improvement in literacy rate by improving the schooling facility, improvement in the health status by establishing health care units, & health camps in the villages improvement in infrastructure by repair & maintenance of village roads, establishment of business centre near to the project site are expected. Further under self employment scheme the downtrodden women shall be provided with initial investment to start cottage industries

Annual Socio Economic expenditure proposed are :

Sr. No.	Particulars	Capital Cost	Recurring Expense/Annum
1	Health & Medical facilities	4.00	2.00
2	Education facilities	2.00	2.00
3	Drinking and Irrigation Water facilities	1.50	2.00

Sr. No.	Particulars	Capital Cost	Recurring Expense/Annum
4	Infrastructure development	1.50	1.00
5	Drainage and Sanitation Facilities	1.00	1.00
	Total	**10.00**	**8.00**

The mining operations are yet to be started, after the commencement of mining operations occupational health checkup of the workers shall be undertaken by the project proponent. However, Workers in the mines will not be exposed to any extreme or hazardous environment. Noise, Climatic conditions, water and other such parameters which will be well within the limits. Air may get slightly affected. The projected level of damage will also be within the permissible limits but slight damage to the health cannot be over ruled as the process (of damage to the health) is irreversible one due to mine air pollution. Regular monitoring the health of the workers shall be done

This mine shall provide employment for about 550 people by both direct employment which include mine officials, skilled, semi skilled and unskilled labour and indirect employment, in contractual works & transport. The lessee shall extend social benefits like drinking water, health care measure, HIV awareness programmes, educational benefits, Repair & maintenance of the village roads, maintenance of school buildings, awarding scholarships of higher studies to the meritorious backward class students, supply of free books and uniforms to the socially deprived class of students, construction of religious places, shall be taken up. Thus, this project is expected to yield a positive impact on the socio-economic environment of the region. It helps in sustainable development of this area including further development of physical & social infrastructural facilities. Also by this increased production of bauxite, the country achieves the revenue in terms of taxes on aluminum production and exchequer revenue for the State in terms of royalty etc.

The rapid expansion of the aluminum sector has resulted in the demand for bauxite in the country. Hence the project proponent has decided to contribute to the extent possible to meet this demand. This will add to the overall economic growth of the region and the country. Thus for reducing the demand & supply is fully justified..

Overall justification for implementation of the project

India is a major producer of bauxite and has substantial reserves of high grade material. The common raw material for aluminum production, bauxite is used to produce alumina oxide and subsequently aluminum. On a world-wide average 4 to 5 tonnes of bauxite are needed to produce two tonnes of alumina, from which one tonne of aluminum can be produced. In India, the industries that require aluminum most include power (44%), consumer durables, transportation (10-12%), construction (17%) and packaging etc. Aluminum is the second most used metal in the world after steel. Though India's per capita consumption of aluminum stands too low (under 1 kg) comparing to the per capita consumptions of other countries like China (3 kgs), the demand is growing gradually. To fill the above gaps in supply and demand positions in aluminum, it is essential to have capacity addition for existing aluminum plants, for which the lessee is proposing for as a raw material supplier. The high grade Bauxite generated from this mine will be sold to local domestic aluminum producers which are facing high shortages for supply of bauxite or exported. The low grade bauxite ore will be sold to Cement plants located in Karnataka, Maharashtra. For all these reasons the proposed increase in production of bauxite by lessee shall benefit industries developed in this region.

This mine shall provide employment for about 550 people by both direct employment which include mine officials, skilled, semi skilled and unskilled labour and indirect employment, in contractual works. The lessee shall extend social benefits like drinking water health care measure, educational benefits to the neighboring villagers in addition to his own employees. Further, this project is expected to yield a positive impact on the socio-economic environment of the region. It helps in sustainable development of this area including further development of physical infrastructural facilities.

Also by this production of bauxite, the country achieves the revenue in terms of taxes on bauxite & aluminum produced and exchequer revenue for the State in terms of royalty etc and decreases the imports and increases the export possibility. Thus it is very essential to implement this project.