EXECUTIVE SUMMARY FOR

PROPOSED ROUGH STONE AND GRAVEL QUARRY

CATEGORY – B1

(Public Hearing Upgraded after Terms of Reference (ToR) as per the provisions of EIA Notification 2006 & amendments thereof)

ToR Identification No. TO24B0108TN5525413N (F.No.10893), dated 29.06.2024

PROPOSED QUARRY LEASE DETAILS	
SURVEY NOS	613(P) AND 643(P)
VILLAGE	IRUKKANDURAI PART-I
TALUK	RADHAPURAM
DISTRICT	TIRUNELVELI
EXTENT	2.97.57 ha
CLUSTER AREA	7.40.07 ha
PROPOSED PRODUCTION QUANTITY FOR FIVE YEARS	ROUGH STONE : 5,23,006 M^3 GRAVEL : 24,487 M^3
LAND	CONSENT PATTA LAND

(Sector No. 1(a) Sector No.1 as per NABET)

Category of the Project: B1 Cluster Mining, Total Cluster Area – 7.40.07 Ha

Baseline Monitoring Period – March 2024 to May 2024

APPLICANT

THIRU. S. JACOB RAJAMANI
S/O. SOUNDARAPANDIAN, 69A2,
KATHIRESAN KOVIL STREET, V.O.C NAGAR, KOVILPATTI TALUK,
THOOTHUKUDI DISTRICT, PIN CODE– 628 502.

ORGANIZATION

M/s. GLOBAL MINING SOLUTIONS

(NABET ACCREDITED & ISO 9001 CERTIFIED CONSULTANT)

PLOT NO.6, SF NO. 13/2, A2, VS CITY, RC CHETTYPATTY,
KOTTAMETTUPATTY, OMALUR, SALEM, TAMIL NADU – 636 455

NABET ACCREDITATION NO – NABET/EIA/2326/IA 0110

JULY- 2024

EXECUTIVE SUMMARY

1.1 INTRODUCTION

Thiru.S. Jacob Rajamani S/o. Soundarapandian has obtained Precise Area Communication Letter from Assistant Director, Department of Geology and Mining, Viluppuram to quarry out 5,23,006 m^3 of Rough Stone and 24,487 m^3 gravel from an extent of 2.97.57 Ha located in S.F. Nos. 613(P) and 643(P) in Irukkandurai Part-I Village, Radhapuram Taluk, Tirunelveli District, Tamil Nadu State

As per EIA notification, 2006 and its subsequent amendments the proposed "Rough Stone and Gravel Quarry" of Thiru.S. Jacob Rajamani S/o. Soundarapandian mines cluster falls under Schedule 1(a) of EIA Notification and its subsequent amendments the project comes under Category B1. The ToR for preparation of EIA/EMP report of the project was approved vide ToR Identification No. TO24B0108TN5525413N (F.No.10893), dated 29.06.2024. This report has been prepared in line with the approved TOR for production of maximum excavation of 5,23,006 m^3 of Rough Stone and 24,487 m^3 gravel.

S.No.	Description	Status/Remarks
1.	Sector	Non-coal mining
2.	Category of the project	B1
3.	Proposed mineral	Rough Stone & Gravel quarry
4.	Type of Lease	The applied lease is not fresh, there is a quarry pit exists in the S.F. Nos. 643(Part), which was operated by Thiru. Jacob Rajamani during the lease period 21.06.2012 - 20.06.2015.
5.	Extent of the lease	2.97.57 Ha
6.	Proposed depth of Mining	47m BGL
7.	Method of mining	Opencast-Mechanized
8.	Proposed lease period	5 Years
9.	Proposed Environmental Clearance	5 Years
10.	Proposed production quantity for five years	Rough Stone: 5,23,006 m^3 & Gravel: 24,487 m^3

The Lessee Thiru.S. Jacob Rajamani S/o. Soundarapandian is an individual with sound experience in the identification, quarrying and marketing of Rough Stone and Gravel. The proposed land is a Patta land attached as **Annexure 6.**

1.2 LOCATION

This project site is located in Irukkandurai Part-I Village, Radhapuram Taluk, Tirunelveli District, Tamil Nadu State with Latitude 08°10'49.68"N to 08°10'57.99"N and Longitude: 77°38'30.75"E to 77°38'37.19"E. with Survey of India Topo Sheet No. 58- H/12. To conduct the study, the proposed mine lease area (core zone) and an impact zone of 10 km radius (called buffer zone) around the proposed mine site were considered. The EIA report is based on three months baseline data (i.e. March 2024 to May 2024)

1.3 GEOLOGY

The rock type noticed in the area for lease is Charnockite which contains mostly Quartz and Feldspar with some ferromagnesian minerals. The Charnockite is part of peninsular Gneisses, a high-grade metamorphic rock. The strike of the Charnockite formation is with vertical dipping.

1.4 PROJECT DESCRIPTION

This is a proposed Rough Stone and Gravel quarry by Opencast-Mechanized mining method with drilling and blasting. The quarrying is restricted up to a depth of 47 m below ground level. The geological reserves are estimated to be 12,80,866 m^3 of Rough Stone and 30,672 m^3 Gravel. The mineable reserve calculated by deducting 7 m & 50m safety distance and bench loss. The mineable reserves are 5,23,006 m^3 of Rough Stone and 24,487 m^3 of Gravel which will be recovered at the rate of 100% recovery upto a depth of 47m Below ground level for the period of five years.

- It is proposed to quarry out rough stone and Gravel with 5m bench height, 5m width with 454° slope using conventional Open cast Mechanized method. The quarry operation involves shallow jack hammer drilling, slurry blasting, excavation, Loading and transportation of Rough Stone and Gravel.

- There is no overburden anticipated during entire rough stone and Gravel quarrying operation.

S.No.	Type of Detail	Description
1	Sector	1(a) Non coal mining
2	Fresh/Existing project	New Project
3	Category	B1
4	Nature of mineral	The applied lease is not fresh, there is a quarry pit exists in the S.F. Nos. 643(Part), which was operated by Thiru. Jacob Rajamani during the lease period 21.06.2012 - 20.06.2015.
5	Production	5 years
6	Life	Rough Stone - 5,23,006 m^3 Gravel - 24,487 m^3
7	Waste generation and management	Nil
8	Bench height and width	Proposed bench height & width is 5.0m respectively and number of proposed benches is 10 Nos.
9	Ultimate pit depth	47 m BGL
10	End use	The excavated Rough Stone and Gravel is used for construction industries for Government & Public sector projects besides catering domestic housing and infrastructure projects in and around the district.

1.5 PROJECT REQUIREMENTS

The requirements of the project are given below.

S.No.	Nature of requirement	Description
1	Water requirement	Total water requirement of 5.0 KLD which will be procured from the outside agencies. 1.0 KLD drinking water requirement, green belt development is 1.6 KLD and dust suppression is 2.4 KLD.
2	Power requirement	No electricity is needed for mining operations, for office demands, it will be met from the state grid.

3	Manpower requirement	Permanent employees – 15, temporary employees – 17
4	Financial requirement	The total project cost as per PFR will be INR 402.58 lakhs including Operational cost, Fixed Asset cost and EMP cost
5	Funds for Socio economic development	INR 8 Lakhs is allocated. In addition, any demand raised by people during public hearing will also be met.

1.6 DESCRIPTION OF LEASE AREA

The features in the study area are given below.

Table 3.1 Description of the lease area

S.No.	Areas	Distance from project site
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Nil within 15km radius
2	Areas which are important or sensitive for ecological reasons	
A	Wetlands, water courses or other water bodies,	**Water bodies** / **Distance** / **Direction** Hanuman Nadi – 80m – S Tank – 230m – S Marankulam – 3.88 km – NW Chettikulam Beach – 4.16 km – S Chithambai Lake – 4.59 km – NW Sembigulam Lake – 6.61 km – NW Indian Ocean – 3.43 km – S
B	Coastal zone, biospheres,	Nil within 10km radius
C	Mountains, forests	Therkkumalai R.F – 9.80 km (W) Kanniyakumai Wildlife Sanctuary- 9.80 Km (W)

3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering, migration	Nil within 15km radius
4	Inland, coastal, marine or underground waters	Nil within 15km radius
5	State, National boundaries	Nil within 15km radius
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	Nil within 15km radius
7	Defense installations	Nil within 15km radius
8	Densely populated or built-up area	Kanniyakumari – 15.78 km (SW)
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Kanniyakumari – 15.78 km (SW)
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	Nil
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	Nil
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earth quakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	No. The area is not prone to earthquakes, floods, etc.

The baseline data collection for meteorology, air, water, noise and soil environments have been carried out during March to May 2024.

Air, water, noise and soil samples are collected and analyzed through NABL accredited lab.

1.7 AIR ENVIRONMENT

The air monitoring have been carried out in 7 locations and the results are given below.

11.2 Details Of Ambient Air Quality Monitoring Locations				
S. No.	**Station Code**	**Locations**	**Distance & Direction**	**Coordinates**
1	AAQ 1	Project site	Core Zone	8°10'55.51"N 77°38'32.49"E
2	AAQ 2	Chettikulam	2.8 km, SW	8°9'52.62"N 77°37'21.31"E
3	AAQ 3	Erukkandurai	1.0 km, NE	8°11'20.11"N 77°39'0.02"E
4	AAQ 4	T Karungulam	4.4 Km, W	8°11'19.58"N 77°36'8.07"E
5	AAQ 5	Koondankulam	2.6 Km, E	8°10'54.37"N 77°40'1.22"E
6	AAQ6	Adangarkulam	3.18 Km, N	8°12'38.69"N 77°38'5.53"E
	AAQ7	Sanganeri	5.13 Km NE	8°12'24.88"N 77°40'58.77"E

Station ID	Min	Max	Avg.
Particulate matter PM_{10} - ($\mu g/m^3$)			
AAQ-1	47.7	66.6	57.15
AAQ-2	44.4	56.3	50.35
AAQ-3	46.2	61.4	53.80
AAQ-4	56.7	57.9	57.30
AAQ-5	46.3	68.2	57.25
AAQ-6	44.2	55.6	49.90
AAQ-7	43.5	55.9	49.70
CPCB NAAQS 2009 for PM_{10} - 100 $\mu g/m^3$			
Particulate matter $PM_{2.5}$ ($\mu g/m^3$)			
AAQ-1	23.2	32.3	27.75
AAQ-2	21.8	27.9	24.85
AAQ-3	22.5	30.1	26.32
AAQ-4	21.5	28.1	24.85
AAQ-5	22.4	32.9	27.69
AAQ-6	21.4	26.9	24.16
AAQ-7	21.1	27.2	24.19
CPCB NAAQS 2009 for $PM_{2.5}$ - 60 $\mu g/m^3$			
Sulphur Di-oxide as SO_2 ($\mu g/m^3$)			

Station ID	Min	Max	Avg.
AAQ-1	4.9	8.0	6.45
AAQ-2	4.6	7.0	5.80
AAQ-3	4.9	7.7	6.30
AAQ-4	4.5	7.6	6.50
AAQ-5	4.7	8.3	6.50
AAQ-6	4.0	6.9	4.45
AAQ-7	4.3	7.0	5.65
CPCB NAAQS 2009 for SO_2 – 80 µg/m^3			
Oxide of Nitrogen as NO_2 (µg/m^3)			
AAQ-1	7.7	10.9	9.30
AAQ-2	7.1	9.2	8.15
AAQ-3	7.2	9.6	8.40
AAQ-4	7.0	9.4	8.20
AAQ-5	7.5	10.4	8.95
AAQ-6	6.2	8.9	7.55
AAQ-7	6.4	9.2	7.8
CPCB NAAQS 2009 for NO_2 – 80 µg/m^3			

All the values of pollutant concentrations were found to be within the NAAQs Standards.

1.8 WATER ENVIRONMENT

Table 3.7 Results of Ground Water sampling Analysis in 7 locations								**Specification / Limit (As per IS:10500: 2012)**	
	W1	**W2**	**W3**	**W4**	**W5**	**W6**		**Desirable**	**Permissible**
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity	<1	<1	<1	<1	<1	<1	<1	Agreeable	Agreeable
pH at 25 °C	8.37	7.64	7.64	7.34	7.58	7.58	7.37	6.5 - 8.5	No Relax
Electrical Conductivity	176.6	1144	1411	831.4	1036.0	1515.0	1211.0	1	5
Total Dissolved Solids	102	690	850	505	624	910	730	500	2000
Total hardness as CaCO3	52.5	234	303.0	250.0	242.0	230.0	392.0	1	15
Calcium as Ca	9.70	43.6	76.00	48.50	64.60	42.00	85.60	200	600
Magnesium as Mg	6.79	30.1	27.10	31.00	19.40	30.10	42.70	200	600
Calcium as CaCO3	24.2	109	190.0	121.0	162.0	105.0	214.0	75	200

Magnesium as CaCO3	28.3	125	113.0	129.0	80.8	125.0	178.0		
Total alkalinity as CaCO3	59.4	297.0	392.0	333.0	234.0	392.0	198.0		
Chloride as Cl-	35.5	232.0	227.0	121.0	236.0	312.0	256.0	250	1000
Free Residual chlorine as Cl-	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	30	100
Sulphates as SO42-	BDL (D.L-5.0)	183	276	102	156	272	212	45	No Relaxation
Iron as Fe	0.02	0.05	0.09	0.04	0.06	0.07	0.03	200	400
Nitrate as NO3	1.76	2.32	4.56	3.22	3.45	4.52	3.98	1	No Relaxation
Fluoride as F	0.23	0.46	0.57	0.41	0.45	0.51	0.55	0.1	0.3
Manganese as Mn	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	Not Specified	Not Specified

All the values were found to be within permissible limits

1.9 NOISE ENVIRONMENT

Noise levels were measured in 6 locations and the results are given below.

Table.11.4 Noise monitoring results

S. No	Location	Day equivalent	Night equivalent	Day equivalent limits by CPCB	Night equivalent limits by CPCB
1	Project site	50.2	39.9	75	70
2	Chettikulam	47.4	39.9		
3	Erukkandurai	45.8	39.2		
4	T Karungulam	43.6	39.6		
5	Koondankulam	46.0	40.4		
6	Adangarkulam	50.3	38.7		
7	Sanganeri	46.9	42.2		

1.10 SOIL ENVIRONMENT

Soil samples are collected from 7 locations and the results are given below.

Table 11.5 Results of Soil Sample Analysis									
S. N	Parameter	Unit	S1	S2	S3	S4	S5	S6	S7

1	pH at 25 °C	-	6.20	7.25	7.78	7.32	6.50	8.03	7.06
2	Electrical Conductivity	µmho s/cm	81.73	438.40	324.40	295.90	299.80	474.70	235.20
3	Dry matter content	%	95.19	93.65	87.89	90.25	93.30	94.71	95.03
4	Water Content	%	4.81	6.35	12.11	9.75	6.70	5.29	4.97
5	Organic Matter	%	0.59	3.75	1.67	3.06	1.07	0.85	1.22
6	Soil texture	-	CLAY LOAM	CLAY	CLAY	SILT LOAM	LOAM	SILTY CLAY	CLAY
7	Grain Size Distribution	%	30.59	4.01	5.00	16.95	44.23	7.28	4.92
	i. Sand		2.70 33.11	2.86 33.64	5.10 67.05	4.26 52.03	5.74 14.41	4.67 38.99	
8	ii. Silt	%							36.41
9	iii. Clay	%	36.30	62.35	27.96	13.75	14.36	53.73	58.67
10	Phosphorous as P	mg/kg	0.56	0.72	0.91	0.58	0.74	0.55	0.74
11	Sodium as Na	mg/kg	835	943	1039	911	605	1025	768
12	Potassium as K	mg/kg	392	3278	4039	3128	1795	4213	3708
13	Nitrogen and Nitregenous Compounds	mg/kg	210	270	284	397	166	344	344
14	Total Soluble Sulphate	%	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)
15	Porosity	%	14.50	13.2	13.3	12.1	10.2	15.6	13.9
16	Water Holding Cabacity	Inches /foot	40	42	44	38	36	40	44

1.11 BIOLOGICAL ENVIRONMENT

FLORA

For measuring the extent of flora present in the study area, the area is divided in to 4 quadrants. The flora population in each quadrant is summed up for the total population in the study area. Field survey is done. Erukku, Aavarai and Nayuruvi are found in lease area. In the buffer zone, common trees like Neem, papaya, mango, teak, etc and shrubs like Avarai, Aloe vera, etc, climbers like Kovai,jasmine etc are found.

FAUNA

In the study area, commonly found animals like dogs, cats, bush rat, cows, birds like crow, Myna, Sparrow, etc were found.

1.12 LAND USE

The land use land cover data is found using the LANDSAT – 9 satellite imagery. The number of bands used are 11. The land use pattern is given below:

Table No. 11.6: Major Land Use Units of the Study Area in Percentage

S. No	1st Level Classification	Area in (sq.km)	Percentage (%)	2nd Level Classification	Area in (sq.km)	Percentage (%)
1	Built-up or habitation	31.09	9.69	Residential	20.92	6.52
				Commercial/Industrial	10.17	3.17
2	Agriculture	135.56	42.23	Crop/fallow land	135.56	42.23
3	Water bodies	21.31	6.64	Reservoir/Lake /Pond	19.88	6.19
				River/Stram	1.43	0.45
4	Waste Land	28.09	8.85	Open without scrub	16.76	5.22
				Open with scrub	11.33	3.53
5	Mines	4.24	1.32	Mines	4.24	1.32
6	Forest	0.89	0.28	Forest	0.89	0.28
7	Sea	99.82	31.10	Sea	99.82	31.10
Total		**321**	**100**		**321**	**100**

1.13 SOCIO ECONOMIC ENVIRONMENT

The socio-economic environment of the study area is studied by conducting primary sites through site visits and conducting sample surveys. The secondary data obtained from Census 2011 is also used.

The following data area collected from secondary data.

- Demographic pattern.
- Health pattern
- Occupational structure.
- Amenities available.

The expert visited 6 villages in the study area namely Chettikulam, Erukkandurai, T Karungulam, Koondankulam, Adangarkulam and Sanganeri villages. Discussions were held with the people from nearby locality to study the social and economic conditions prevailing in the area. The expert also visited nearby hospitals, primary health centres and Irukkandurai Part -I. The following observations were made.

Primary schools are available in many villages. For hospital facilities, people in the locality have to go to hospital in Irukkandurai Part -I which is about 800m NE from the lease area. Major schools with higher secondary and senior secondary schools are located in Irukkandurai Part -I. The major Irukkandurai Part -I Union located in the area is Irukkandurai Part -I. Facilities like petrol pump stations, ATM facility is available in Irukkandurai Part -I.

1.14 HYDROGEOLOGY OF THE LEASE AREA

There is Indian Ocean is located at a distance of 3.43 km in South direction & Hanuman Nadi is located at a distance of 80m in south direction from lease area, the hydrological and hydrogeological pattern of the study area is studied in detail using satellite imagery.

Indian Ocean is located at a distance of 3.43 km in South direction & Hanuman Nadi is located at a distance of 80m in south direction from lease area. But there is no running water currently in the river. Only during monsoons, water gets stagnated at a few places.

There are many tanks located in the study area, which are mostly dry throughout the year. These tanks get water only during monsoons. The factors may be monsoon

failure, insufficient rainfall, poor rain water management and water consuming patterns.

1.15 GROUND WATER STUDY

For Ground water study, satellite imagery is used. Water levels from monitoring levels are collected through imaging. The pre-monsoon and post-monsoon data are collected and the results are analyzed.

During field visit, it is observed that water is available in wells only after monsoon. The yield is obtained at deep levels only.

As far as the mining lease area is considered, the area is rocky and no major seepage is envisaged. The production quantity is very less and the depth proposed is 47m BGL. Hence, there will not be any major impact due to mining on water levels or ground water levels in the area.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental impacts on the following environments are identified.

- Land environment
- Water environment
- Vegetation
- Fauna
- Air environment
- Noise environment
- Socio-economic impacts

1.16 LAND ENVIRONMENT: IMPACT AND MITIGATION MEASURES

The major impact due to this project on land environment is the change in land use. Since this quarry is a small one and the production is less, mining activity will be carried out upto 47 m BGL. Other than quarrying of minerals, no other change will be done since there is no dumping. To prevent soil erosion during monsoon season,

garland drain will be constructed with silt traps. At the mine closure stage 2.39.76Ha of lease area will be left as rain water harvesting pond 0.55.81 Ha will be developed with green belt. For this, plants like Pungai, Vagai, Vembu, Manjal konrai, Naval, Puvarasu, etc are selected. A total of 1500 trees are planned to be planted. Spacing will be 3m x 3m.

1.17 WATER ENVIRONMENT: IMPACT AND MITIGATION MEASURES

There is no water body present inside the lease area. The entire water requirement for the project is 5.0 KLD which will be sourced from outside agencies. Negligible sewage will be generated, for which a septic tank with soak pit will be set up.

During monsoon season, the excess rain water, if any, will be led through garland drain of 0.6m width and 0.3 m depth to the collection pond with silt traps.

Since the mining operation will be limited upto depth of 47 m (BGL), there will not be any seepage. However, the rain water percolation and collection of water from seepage shall be less than 300 lpm and it shall be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5H.P.Motor. The quality of water is expected to be potable. Hence, water stored in the quarry pit will be pumped into the adjacent agricultural fields. Further the water can also be used for plantation purposes

The major water bodies found in the buffer zone are.

- Hanuman Nadi - 80m - S
- Tank - 230m - S
- Marankulam - 3.88 km (NW),
- Chettikulam Beach - 4.16 km (S)
- Chithambai Lake - 4.59 km (NW),
- Sembigulam Lake - 6.61 km (NW),
- Indian Ocean- 3.43 km (S)

Since these water bodies are located outside the lease area and there is no discharge of effluent or any untreated water from the mines will be made in to these water bodies, there is no major impact. For the canal, adequate safety distance is left. The proponent will restrict the mining operation only within the lease and no other work will be carried out near the canal or any area outside the lease.

It is planned to carryout appropriate rainwater harvesting schemes and artificial recharge schemes in the area.

- Rain water falling in the quarry will be collected efficiently through garland drains.
- Water thus collected will be passed through collection tank with silt traps. This water can be used by the proponent for water sprinkling and for green belt purposes.
- Excess water after desiltation will be provided to downstream users, if any

1.18 BIOLOGICAL ENVIRONMENT: IMPACT AND MITIGATION MEASURES

Impacts

- Fauna is affected due to noise and vibration.
- Dust generation due to mining activities
- Change in land use of the lease area
- Accidental falling of animals

Mitigation measures

- Sirens will be blown before blasting in the mines. To reduce noise levels, plantation will be done. Blasting will be carried out only in the allotted time.
- To reduce dust generation, mist sprayers will be used. During transportation, the material will be covered with tarpaulin. Water sprinkling will be done to reduce generation of pollutants
- After the mine closure stage, the mine pit will be left as rain water collecting tank, which can attract bird population in the nearby areas.

- To prevent entry of animals, the mining area will be properly fenced.

1.19 AIR ENVIRONMENT: IMPACT AND MITIGATION MEASURES

The major air pollutants due to mining operations are fugitive emissions like PM_{10}, $PM_{2.5}$. Other than these pollutants, gaseous emissions of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are the cause of air pollution in the project area.

The major impacts are Dust emission due to drilling, blasting and transportation. The major mitigation measures include Using Wet drilling methods, Allowing drilling only with PPE, Carrying out blasting only during specified times, Avoiding blasting during unfavorable weather conditions, Using explosives of good quality, Using mist sprayers Regular wetting of transport, Covering the materials carried in tippers with tarpaulin, Proper maintenance of vehicles used for transportation, Conducting regular emission tests for vehicles used for transport Development of greenbelt is proposed in the safety zone of 7.5m & 50m barriers in the lease area.

The anticipated data is calculated using AERMOD software and the projected values are found to be within limits.

1.20 NOISE ENVIRONMENT: IMPACT AND MITIGATION MEASURES

Impacts

- Noise generation in mining is due to operation like drilling, blasting and transportation of minerals within and outside the lease area.
- As per DGMS (Directorate General of Mines Safety) and OSHA (Occupational Safety and Health Administration) limits, the acceptable noise level is 85 dB(A) for an exposure period of 8 hours.
- Exposure to loud noise can also cause high blood pressure, heart disease, sleep disturbances, and stress. Noise pollution also impacts the health and well-being of wildlife.

- Noise exceeding prescribed limits may cause impairment like abnormal loudness perception, tinnitus, which causes a persistent high-pitched ringing in the ears, paracusis or distorted hearing

Mitigation measures

- As the distance between the source and receptor increases, the noise level also decreases. Hence, there will be a natural attenuation
- The proposed has planned to develop green belt in the periphery of the lease area, which diminishes sound volume by dampening them.
- All the equipment/machinery/trucks involved will be properly maintained to control noise generation
- Conducting regular health checkups for employees involved
- Employees will be made to work on shifts to reduce their exposure time
- Providing earplugs to all employees

By adopting these measures, the noise levels will be maintained well within MoEF & CC limits since the baseline value is low.

1.21 VIBRATION: IMPACT AND MITIGATION MEASURES

Impacts

- Though vibration will be only felt by the people working inside the lease area, it is usually undesired.
- Vibration may also cause flyrocks
- It may frighten the birds and small insects in the lease area. However, it will be felt only for a short period

Mitigation measures

- Carrying out blasting on limited scale, only from 12:00 PM to 2:00 PM
- Control of fly rock and vibration by maintaining peak particle velocity with in standard as prescribed by the DGMS and MOEF & CC.
- Shallow depths jackhammer drilling and blasting is proposed to be carried out with minimum use of explosive
- Supervising blasting by competent and statutory foreman/ mines manager

1.22 SOCIO ECONOMIC ENVIRONMENT

Impact and Mitigation measures

No land is acquired from anyone. No rehabilitation is needed. Hence, there is no negative impact. The proponent has planned to spend INR 8,00,000 for CER activities. This amount will be subjected to change after public hearing.

1.23 OCCUPATIONAL HEALTH

Impacts

Dust generation due to drilling and blasting, Noise generation due to drilling and blasting, unexpected accidents. Continuous exposure to dust causes Pneumonia, Tuberculosis, Rhematic arthritis and Segmental Vibration, Short term impact will be lack of sleep, high blood pressure and heart ailments. Long term exposure may lead to partial or permanent deafness, Risks include fly rocks, cracks or fissures due to improper mining methods

Mitigation measures

- Using dust suppression measures like water spraying on roads to reduce rise of air pollutants
- Providing green belt for air pollutant and noise attenuation
- Ensuring slope stability
- Employing only trained professionals for blasting
- Conducting Pre-Medical Examination for employees before inducting
- Conducting periodical Medical Examination once in 6 months.
- Making all first aid kits available in mines office
- Keeping fire extinguisher in place

- Educating the employees about how to handle unexpected happenings
- Posting information containing emergency contact numbers in mines office
- By adopting all these measures, the safety of the employees working in the quarry will be ensured.

1.24 ENVIRONMENTAL MONITORING PROGRAMME

Monitoring is done to measure the efficiency of control measures implemented. Regular monitoring of various environmental parameters like air, water, noise and soil environments is needed to assess the status of environment during the project operation. A schedule is framed with timeline to monitor various parameters during the operation of the project. To evaluate the effectiveness of environmental management programme, regular monitoring of the important environmental parameters will be taken up. Air monitoring will be carried out once in 3 months, water sample will be collected once in a season, noise will be monitored once in 3 months, soil samples will be analyzed once per season. For EMP, a budget of INR 301.23 Lakhs is allocated.

1.25 PROJECT BENEFITS

Financial benefits

- This project will contribute financially through payment of taxes like royalty, GST, etc
- The project will also contribute via CSR.
- The demands of people during public hearing will also be considered by the project proponent

Social benefits

- This project provides employment to 32 people directly. Local people will be hired for unskilled labour.

- Through CSR, nearby schools, hospitals will be benefitted.
- For CSR, INR 8,00,000 is allocated.
- Based on the demand of the people during public hearing, further funds will be allocated, if necessary.
- Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and 301.23 lakhs for the five years has been allocated as EMP cost. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.