

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)

PROJECT PROPONENTS

Name	S.F. Nos.	Extent of Mining Applied
Thiru.K.Sugan	902/1, 903/1	1.29.0 Ha

NATHIKUDI ROUGH STONE AND GRAVEL QUARRY – CLUSTER

“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

CLUSTER EXTENT = 20.34.0 Ha

AT
NATHIKUDI VILLAGE,
VEMBAKOTTAI TALUK, VIRUDHUNAGAR DISTRICT, TAMIL NADU

Complied as per ToR obtained from SEIAA, TN
Letter no. SEIAA/TN/F.No.8987/ ToR-1131/2022 dated 25.03.2022

Environmental Consultant



ENVIRO RESOURCES

(NABET Certificate No: NABET/EIA/2225/RA0277 valid upto 6th July, 2025)

Reg. Add. 1904 Roopnagar CHS, S V Road, Kandivali West,
Mumbai 400067, Maharashtra
E-mail: ecenviroresource@gmail.com, Telephone: +91 8087985556

March 2023

Draft EIA/EMP for Nathikudi Rough stone and Gravel Quarry Cluster with new proposed area of 1.29.0 Ha, While total cluster area is 20.34 Ha located in Nathikudi Village, Vembakkottai Taluk, Virudhunagar District, Tamil Nadu.

Lessee: Thiru. K. Sugan (Lease Area: 1.29.0 Ha)

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1. INTRODUCTION

Rough Stone is the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of Nathikudi Rough Stone Quarries Cluster consisting of three Proposed and five Existing Quarries with total extent of Cluster of 20.34.0 Ha at Nathikudi Village, Vembakkottai Taluk, Virudhunagar District, Tamil Nadu, cluster area calculated as per MoEF & CC Notification S.O. 2269(E), Dated 1st July 2016.

This EIA Report is prepared in compliance with ToR obtained vide – Letter no. SEIAA/TN/F.No.8987/ToR-1131/2022 dated 25.03.2022

The Baseline Monitoring study has been carried out during the period of October to December 2022 and this EIA and EMP report is prepared for considering cumulative impacts arising out of these projects, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) individually to minimize those adverse impacts.

“Draft EIA report prepared on the basis of ToR Issued & Standard ToR for carrying out Public Hearing for the Grant of Environmental Clearance from SEIAA, - Tamil Nadu”

1.1 DETAILS OF PROJECT PROPONENT -

Name of the Project	Thiru. K. Sugan Rough stone and Gravel quarry
S.F. No.	S.F.No. 902/1, 903/1,
Extent	1.29.0 Ha
Land Type	Patta Land
Village ,Taluk and District	Nathikudi Village, Vembakkottai Taluk, Virudhunagar District, Tamil Nadu.

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

Cod e	Name of the lessee	S.F.Nos	Extent Area (Ha)	Period of lease
Proposed				
P1.	Thiru. K. Sugan	Nathikudi, Vembakotta i	902/1, 903/1 (1.29.0)	KV1/485/2019. 18.09.2021.
P2	S.Soundararajan	Nathikudi,	915/3, 916/4B,	KV1/726/2021, 20.09.2021

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Code	Name of the lessee	S.F.Nos	Extent Area (Ha)	Period of lease
		Vembakottai	916/4C2, 916/7B (2.88.0)	
P3	Ranjith Blue Metals	Nathikudi, Vembakottai	968/5, 969, 971/2 (2.72.0)	KV1/130/2021 15.02.2021
Existing				
E1.	G.Guruvammal	Nathikudi, Vembakottai	903/2 (1.35.0)	KV1/705/2012, dated: 04.08.2017 23.08.2017 to 22.08.2022
E2	M/s.Ranjith Blue Metals	Nathikudi, Vembakottai	899/1B2, 901/2A, 901/1A2A (1.60.0)	KV1/738/2017, dated: 27.03.2018 02.04.2018 to 01.04.2023
E3	P.Jeyaraman	Nathikudi, Vembakottai	916/4C1, 916/7A, 920/1A1, 920/1A3 (2.97.50)	KV1/424/2018 dated: 29.01.2019 01.02 2019 to 31.01.2024
E4	S.Soundararajan	Nathikudi, Vembakottai	922/2, 922/3, 922/4 (2.92.0)	KV1/10050/2017. Dated:10.06.2019 18.10.2019 to 17.10.2024
E5	R.Vishnuprasath	Nathikudi, Vembakottai	886/10, 886/1A1, 886/4 (3.47.0)	KV1/825/2017 dated: 01.02.2019 08.02.2019 to 07.02.2024
Abandoned				
A1	M.Pandi	Nathikudi, Vembakottai	924 (0.53.5)	KV1/1525/2010, dated: 12.01.2011 25.01.2011 to 24.01.2016
A2	L.Gayathri	Nathikudi, Vembakottai	919/2B (0.60.0)	KV1/794/2012, dated: 12.09.2013 23.09.2013 to 22.09.2018
Total Extent			20.34.0	

1.3 SALIENT FEATURES OF THE PROPOSAL

S. No.	Particulars	Details
1.	Type of Project	Nathikudi Rough stone and Gravel quarry project
2.	Mine area applied	1.29.0 Ha

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S. No.	Particulars	Details		
3.	Project Location	S.F.No. 902/1, 903/1 Nathikudi Village, Vembakottai Taluk, Virudhunagar District, Tamil Nadu.		
4.	Mine Location on WGS 1984 datum	Latitude		Longitude
		09°25'58.57"N to 09°26'05.73"N		77°41'05.80"E to 77°41'10.25"E
5.	Topo sheet Number	58 - G/11		
6.	Land use at the proposed project site	Non-Forest Land / Patta Land Land Cover: Barren Land which is not fit for vegetation/cultivation		
7.	Site Topography	The lease applied area is flat terrain. The area has gentle sloping towards North eastern side and altitude of the area is 121m above from Mean sea level. The land is not fit for vegetation/ Cultivation. The area is dry barren land.		
8.	Site elevation above Mean Sea Level	121 m (Max)		
9.	Reserves	Description	Rough stone	Gravel in m³
		Geological Reserves	2,58,000 m ³	25,800 m ³
		Mineable	72,165 m ³	15,652 m ³
		Five years plan period As in the approved mining plan	72,165 m ³	15,652 m ³
10.	Lease period	5 years		
11.	Proposed depth of Mining	The ultimate depth of mining is about 22m (2m Gravel + 20m Rough stone)		
12.	Existing Pit Dimension	Nil		
13.	Ultimate Pit Dimension	118 m (L) x 82m (W) x 22m (D) BGL		

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S. No.	Particulars	Details
14.	Land Use Pattern	Land use pattern Quarry Pits -20% Trees/Agri land - 20% Habitation - 30% Tank & Odai - 20% Roads - 10%
15.	Climatic Conditions	Rainfall - 820mm/annum • Temperature - 42°C - 23°C
16.	Ground water level	The Ground water is about 65m – 60m depth below Ground level.
17.	Seismic zone	Seismically, this area is categorized under Zone-III as per IS-1893 (Part-1)-2002. Hence, seismically the site is High Damage Risk Zone. With MSK scale of VII.
18.	Nearest State/National Highway	The Nearest National Highway (NH - 744) Kollam – Madurai Road is situated about 9.72 km on the Northwestern side of the lease applied area. The State Highway (SH-183) Sivakasi - Alangulam Road is about 5.4km on the Southeastern side of the lease applied area
19.	Nearest Railway Station	Srivilliputtur -8.21km – Northwest
20.	Nearest Air Port	Madurai Airport – 62.86km – Northeast
21.	Nearest village/major town	Nathikudi :0.68 Km - South
22.	Nearest Town, city, District Headquarters along with distance in kms.	Virudhunagar : 33.32 Km, Northeast Direction Vembakottai : 14.17 Km, SE Direction
23.	Ecologically sensitive zone	No wildlife sanctuary, national park or biosphere reserve within 10m radius of mine lease area.
24.	Reserved/Protected forests	No wildlife sanctuary, national park or biosphere reserve within 10m radius of mine lease area.

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S. No.	Particulars	Details		
25.	Historical/tourist places	None within 300m radius of mine lease area		
26.	Water bodies within 10 Km Radius	Water bodies	Distance (Km)	Direction
		Red lake	0.63	SE
		Kayalkudi River	0.9	S
		Mamsapuram Pond 2	2.44	SE
		Idayankulam Lake	3.21	SE
		Mamsapuram Pond 1	2.96	SE
		Ettakkapatti lake	8.66	SE
		Periyakulam Kanmai	9.97	NW
		Madavaarkulam Temple Pond	9.86	NW
		Sengulam Kanmai	9.86	NW
27.	Reserve Forest within 10Km Radius	Reserve Forest	Distance (Km)	Direction
		Mottamalai R.F.	9.75	NW
28.	Nearest Hospital	Government Primary Health Center – Maraneri – 6.68 km, E		
29.	Details of other quarries for a radius of 500m around the quarry site	<p>The details of the quarries located within the radius of 500m from the proposed project site.</p> <p>Abandoned quarries – 2 Nos (1.13.5Ha)</p> <p>Existing quarries – 5 Nos (12.31.5Ha)</p> <p>Proposed quarry – 3 Nos (6.89.0Ha)</p> <p>the total extent of the existing and proposed quarry within the radius of 500m is 20.34.0 Ha</p>		
30.	Man power	Total Employees proposed for the quarry operation is 15Nos.		
31.	Water requirement & source	Total water requirement for 2.0KLD from water vendors & nearby Bore well.		
32.	Overburden /Waste	The overburden in the form of Gravel is 15,652m ³ up to depth for 2m for during this period		

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S. No.	Particulars	Details	
33.	Cost of the project	Project cost	= Rs. 80,29,000/-

1.4 STATUTORY DETAILS

PROPOSAL -P1

- The lessee has applied for Rough Stone Quarry Lease Dated: 21.10.2019
- Precise Area Communication Letter was issued by the Assistant Director, Geology and Mining, Virudhunagar District, Rc.No. KV1/485/2019-Mines, Dated: 18.09.2021.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Virudhunagar District, Rc.No. KV1/485/2019, Dated: 19.11.2021.
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide. online Proposal No. SIA/TN/MIN/71875/2022 and ToR was granted by SEAC with letter no. SEIAA-TN/F.No.8987/ToR-1131/2022, dated 25.03.2022.

2. PROJECT DESCRIPTION

The proposed projects are site specific and there is no additional area required for this project. There is no effluent generation/dischage from the proposed quarries. Method is mining is common for all the proposed quarries in the cluster. Rough Stone is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	The Nearest National Highway (NH - 744) Kollam – Madurai Road is situated about 9.72 km on the Northwestern side of the lease applied area. The State Highway (SH-183) Sivakasi - Alangulam Road is about 5.4km on the Southeastern side of the lease applied area
Nearest Village	Nathikudi :0.68 Km - South

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Nearest Town	Virudhunagar : 33.32 Km, Northeast Direction Vembakottai : 14.17 Km, SE Direction
Nearest Railway	Srivilliputtur -8.21km – Northwest
Nearest Airport	Madurai Airport – 62.86km – Northeast

2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

S. No.	Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
1.	Area under quarrying	Nil	0.82.5
2.	Infrastructure	Nil	0.01.0
3.	Roads	Nil	0.02.0
4.	Green Belt	Nil	0.29.1
5.	Unutilized Area	1.29.0	0.14.4
Total		1.29.0	1.29.0

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	DETAILS	
	Rough stone in m ³	Gravel in m ³
Geological Resources	2,58,000 m ³	25,800 m ³
Available Mineable reserves	72,165 m ³	15,652 m ³
Five years plan period As in the approved mining plan	72,165 m ³	15,652 m ³
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m ³	48 m ³ Rough Stone	
No of Lorry loads (6m ³ per load)	10	
Total Depth of Mining	22m (2m Gravel+ 20m Rough stone)	

2.4 YEAR-WISE PRODUCTION PLAN

Year	Rough Stone (m ³)	Gravel (m ³)
I	14440	4368
II	14190	3612
III	19990	7672
IV	11725	-
V	11820	-
TOTAL	72165	15652

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2.5 METHOD OF MINING

Proposed Method of Mining is common for all the Proposed Projects – The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0 meter height bench with a bench width not less than the bench height. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.



FIGURE - 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA

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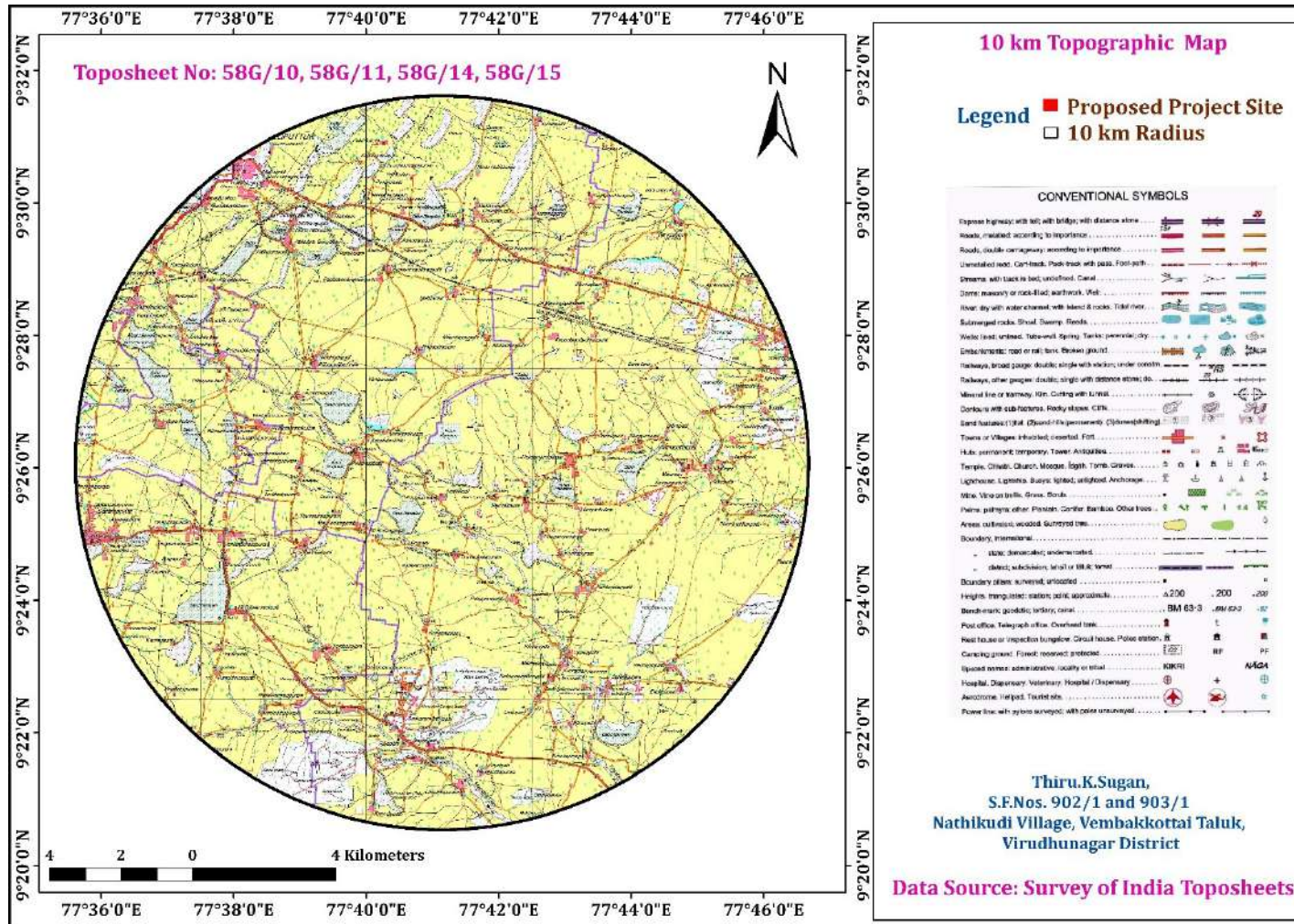


FIGURE - 2: TOPOSHEET MAP COVERING 10 KM RADIUS

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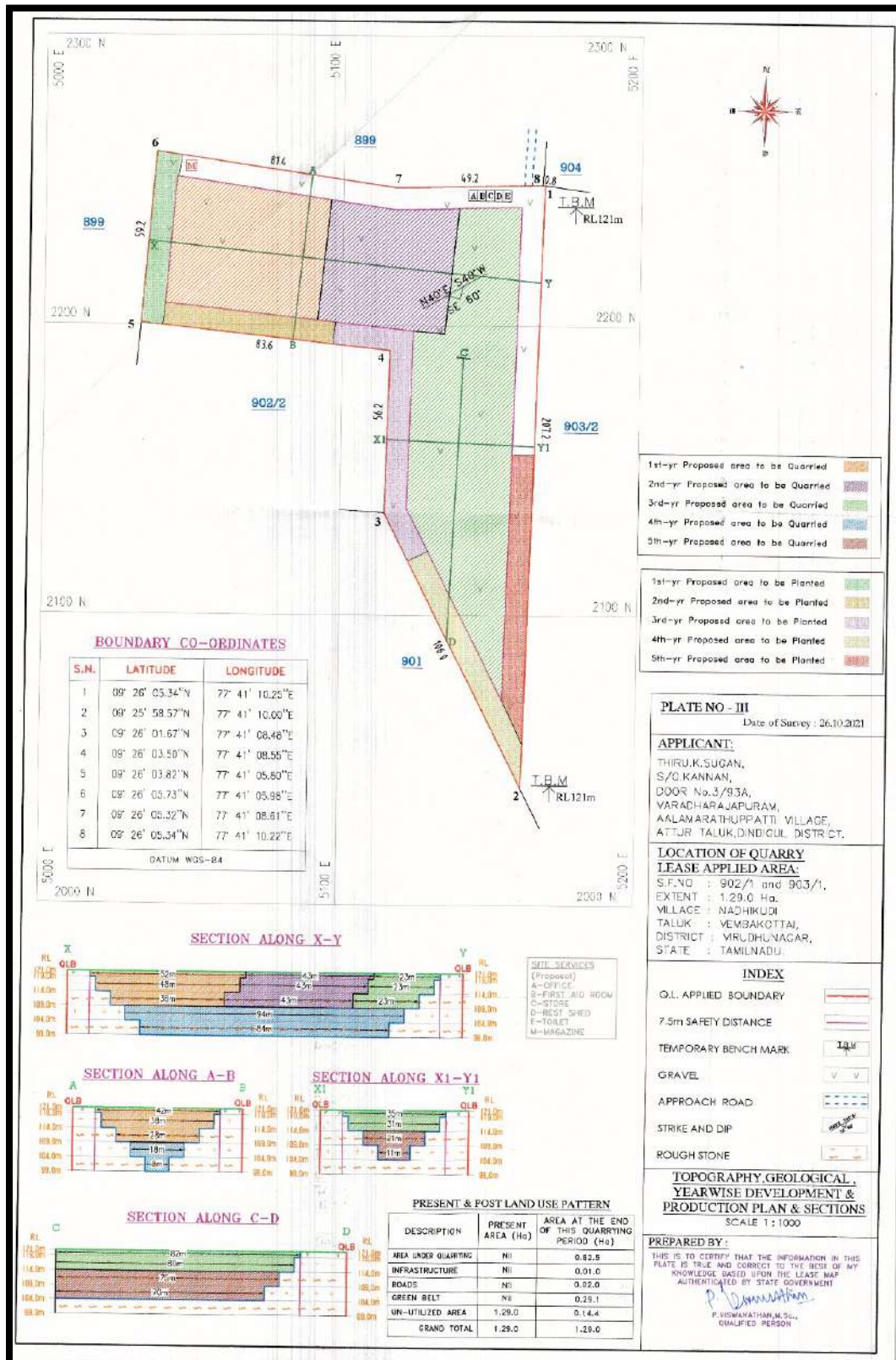


FIGURE - 2A: TOPOGRAPHY, GEOLOGICAL & YEARWISE PLAN

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FIGURE - 2B: TOPOGRAPHY, GEOLOGICAL & YEARWISE PLAN



2.6 PROPOSED MACHINERY DEPLOYMENT

S.No	Particulars	Size capacity	Motive Power	Nos
1.	Jack hammer (30-35mm dia hole)	1.2m to 2.0m	Compressed air	2
2.	Compressor	400 psi	Diesel drive	1
3.	Excavator with Bucket and Rock Breaker	300	Diesel drive	1
4.	Tippers	20 tonnes	Diesel drive	1

2.7 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- ✚ At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- ✚ After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem

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- ✚ Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- ✚ The principal closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/non-contaminating, and capable of sustaining an agreed post-mining land use.

2.8 ULTIMATE PIT DIMENSION

PROPOSAL - P1			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	118	82	22

DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during October to December 2022 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed quarry by Enviro Tech Services, Ghaziabad an NABL Certified & MoEF Notified Laboratory

3.1 ENVIRONMENT MONITORING ATTRIBUTES

S. No.	Attributes	Parameters	Frequency
1	Ambient Air Quality	PM ₁₀ , SO ₂ , NO _x , & mineralogical composition of PM ₁₀ , particularly for free silica	24 hourly samples, twice a week for three months at 7 locations.
2	Meteorology	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall	Continuous hourly recording (one season) at project site. Secondary data from the nearest IMD station.
3	Water quality	Physical and Chemical parameters.	Grab samples collected once during study period from 8 ground water and 1 surface water locations.
4	Soil Quality	Physical and Chemical parameters.	Grab samples collected once during study period from 8 locations.
5	Ecology	Existing terrestrial flora and fauna covering Core Zone (1.29.0 Ha) & Buffer Zone (10-Km radius). Existing aquatic ecological	Through field studies once during study period. Secondary data also collected.

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S. No.	Attributes	Parameters	Frequency
		status in Buffer Zone (10-Km radius).	
6	Noise levels	Noise levels in dB (A) Day and Night.	Hourly Noise levels in and around the project area for 24 hours at each location once during study period at 8 locations.
7	Land use	Current land use scenario	Once during study period based on recent satellite imagery and ground-truthing at site.
8	Geology	Geological details	Once during study period. Data collected from secondary sources
9	Hydrogeology	Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas, etc.	Based on primary and secondary sources, once during study period.
10	Socio-Economic aspects	Socio-economic aspects like demography, population dynamics, infrastructure resources, health status, economic resources, etc.	From primary and secondary sources (like census abstracts of census of India 2011) once during the study period.

3.2 LAND ENVIRONMENT

S.No	Level I	Level -II	Area (Km ²)	Percentage (%)
1	Built-up Land	Built-up Land	29.25	9.28
2	Forest	Dense Forest	0.19	0.06
3	Agricultural Land	Plantation	32.02	10.16
		Crops Land	53.87	17.10
4	Waste Land	Scrub/shrub	143.16	45.46
		Bare land	50.52	16.04
5	Water Body	Water Body	2.8	0.88
6	Others	Mining land	3.05	0.96
Total			314.86	100

The cluster area of 20.34.0 Ha contributes about 0.96% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

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3.3 SOIL ENVIRONMENT

Physical Characteristics -

- pH of the soil samples varied from 7.25 to 8.52 indicating slightly alkaline soil
- Bulk density of the soil samples varied from 0.95 to 1.8 g/cm³
- Organic matter in the soil samples varied from 1.52 to 1.9 %
- Total Nitrogen in the soil samples varied from 142 to 175.1 mg/kg
- Water Holding Capacity (WHC) in the soil samples varied from 30.5 to 47.4 %.

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. This also indicates the poor level of micro-nutrient. The organic matter was found in the range of 1.52 to 1.9 % indicating moderate organic content in the soil. Overall, the soil quality in the area was found to medium to fair fertile with moderate productivity.

3.4 WATER ENVIRONMENT

Surface Water

The pH of the water samples collected is 7.54 and is within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found is 640.6 mg/l in all samples. The total hardness is 272.3 mg/l for all samples collected at 1 location only.

In all samples, iron content is 0.19 mg/l, Nitrate is 4.05 mg/l, fluoride is 0.22 mg/l, chloride is 172.5 mg/l, Sulphate is 78.1 mg/l, alkalinity is 221.6 mg/l, calcium is 90.2 mg/l and magnesium is 48.4 mg/l. The overall surface water quality was found to be good in the village. The levels of heavy metals content were found to be within permissible limits.

Ground Water

The physico-chemical characteristics of groundwater are presented in Table below and are compared with the standards. The pH of the water samples collected ranged from 6.32 to 7.84 and within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found in the range of 436 to 578 mg/l in all samples. The total hardness varied between 125 to 223 mg/l for all samples collected at 8 locations.

In all samples, iron content is 0.1 to 0.25 mg/l, Nitrate in between 10.7 to 25 mg/l, fluoride varied between 0.15 to 0.23 mg/l, chloride 65 to 105.7 mg/l, Sulphate 17.1 to 26 mg/l, alkalinity 139 to 192 mg/l, calcium 20.6 to 46.1 mg/l and magnesium in between 15.1 to 23 mg/l. The overall ground water quality was found to be good in

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most of the villages. The levels of heavy metals content were found to be within permissible limits.

3.5 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

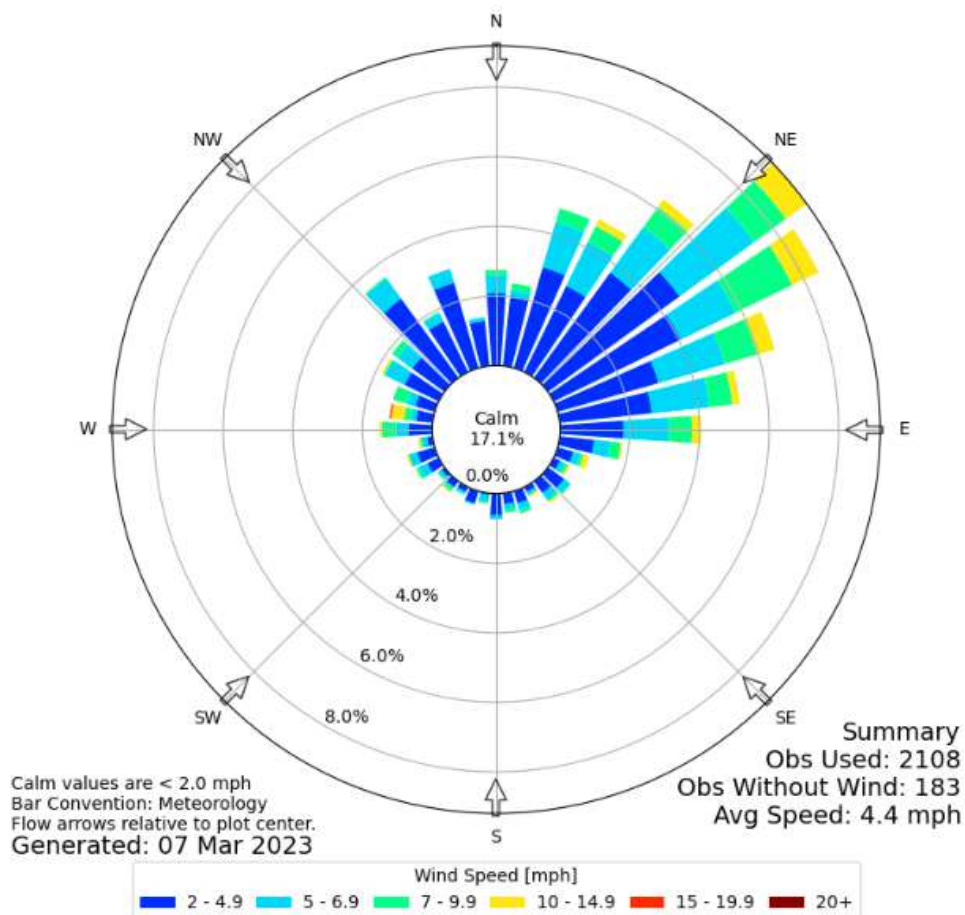


FIGURE - 3: WIND ROSE DIAGRAM

The results of ambient air quality monitoring for the period (October to December 2022) are presented in the report. Data has been compiled for three months. As per monitoring data, PM₁₀ ranges from 48.42 to 79.14 µg/m³, PM_{2.5} data ranges from 29.39 to 46.58 µg/m³, SO₂ ranges from 8.09 to 18.68 µg/m³ and NO₂ data ranges from 24.87 to 35.81 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

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3.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. Noise levels recorded in core zone during day time were from 40.06 to 50.2 dB (A) Leq and during night time were from 31.7 to 42 dB (A) Leq.

3.7 ECOLOGICAL ENVIRONMENT

The study involved in the collection of primary data by conducting a survey in the field, examination of floral and faunal records in previously published reports and records. Analysis of the information is the view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used.

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence this small operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.8 SOCIO ECONOMIC ENVIRONMENT

It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project. The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed projects will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES - IN COMMON FOR ALL PROPOSED QUARRIES

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

4.1 LAND ENVIRONMENT: ANTICIPATED IMPACT

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- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.

If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

MITIGATION MEASURES

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 10 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 WATER ENVIRONMENT

ANTICIPATED IMPACT

- The major sources of water pollution normally associated due to mining and allied operations are:
 - Generation of waste water from vehicle washing.
 - Washouts from surface exposure or working areas
 - Domestic sewage

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- Disturbance to drainage course in the project area
- Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table

MITIGATION MEASURES

- Garland drains, settling tank will be constructed along the individual mining leases. The Garland drains of the individual leases will be connected to settling tank and after settling the water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.

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- Regular monitoring and analysing the quality of water in open well, bore wells and surface water

4.3 AIR ENVIRONMENT

ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

MITIGATION MEASURES

Drilling – To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar.

Advantages of Wet Drilling:-

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting

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blasting to a particular time of the day i.e. at the time lunch hours, controlled charge per hole as well as charge per round of hole

- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & Transportation -

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt -

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

Occupational Health -

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical check-ups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- Ambient Air Quality Monitoring will be conducted six month once to assess effectiveness of mitigation measures proposed

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4.4 NOISE ENVIRONMENT

ANTICIPATED IMPACT

- Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, & Blasting, Loading and during movement of vehicles.

MITIGATION MEASURES

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

There are no National Park and Archaeological monuments within project area. There are no migratory corridors, migratory avian-fauna, rare endemic and endangered species. There are no wild animals in the area. No breeding and nesting site were identified in project site. No National Park and Wildlife Sanctuary found within 10km radius. The dumps / bunds around the mine itself act as a good barrier for entry of stray animals. In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

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MITIGATION MEASURES

To reduce the adverse effects on natural flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

4.5.1 GREENBELT DEVELOPMENT PLAN

Year	No. of tress proposed to be planted	Survival %	Area to be covered sq.m.	Name of the species	No. of trees expected to be grown
I	700	80%	2910	Neem, Pongamia Pinnata, Casuarina, etc.,	560

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

- Employment generation due to the project will provide direct employment for about 15 persons.

MITIGATION MEASURES

- Good maintenance practices will be adopted for plant machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Appropriate air pollution control measure will be taken to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, DMF, NMET etc, from this project directly and indirectly.

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

- The site has been selected based on geological investigation and exploration as below:
- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.

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- Overall impact on environment and mitigation feasibility
- Socio – economic background.
- The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

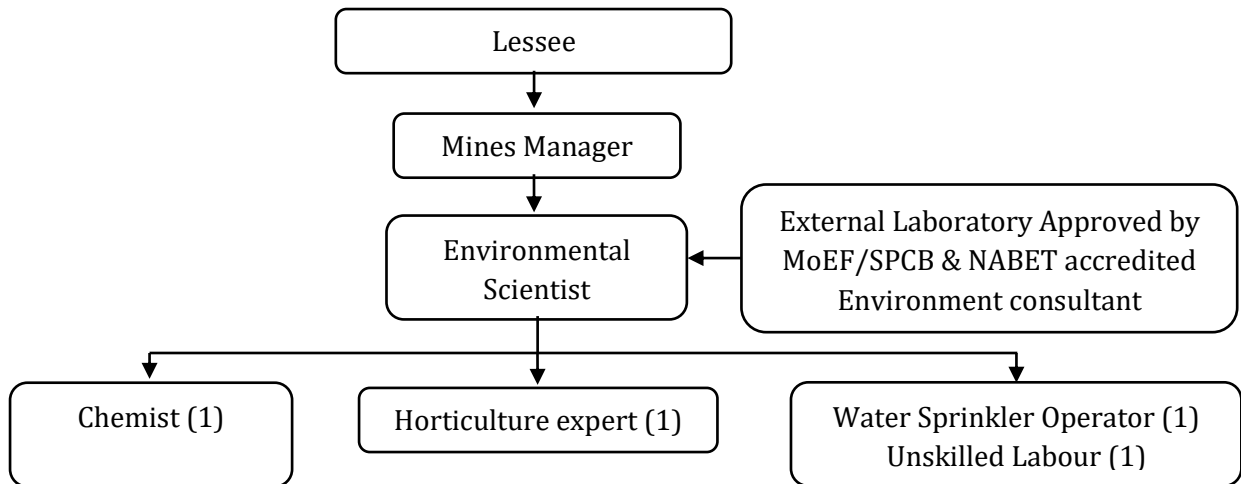
ENVIRONMENT MONITORING PROGRAM

Usually, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

The Objective of Monitoring -

- To check or assess the efficiency of the controlling measures;
- To establish a data base for future impact assessment studies.

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE IN COMMON

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM _{2.5} , PM ₁₀ , SO ₂ and NO _x .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative

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S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
					humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly - 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	-	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

7. ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

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7.2 DISASTER MANAGEMENT PLAN

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- ✚ Rescue and medical treatment of casualties;
- ✚ Safeguard other people;
- ✚ Minimize damage to property and the environment;
- ✚ Initially contain and ultimately bring the incident under control;
- ✚ Secure the safe rehabilitation of affected area; and
- ✚ Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency

7.3 CUMULATIVE IMPACT STUDY

SALIENT FEATURES OF PROPOSAL "P1"

Name of the Mine	Thiru. K. Sukan	
Survey Nos	S.F.No. 902/1, 903/1	
Land Type	Patta land	
Extent	1.29.0 Ha	
Mining Plan Period / Lease Period	5Years/5Years	
Ultimate Pit Dimension	118 m (L) x 82m (W) x 22m (D) BGL	
Latitude between	09°25'58.57"N to 09°26'05.73"N	
Longitude between	77°41'05.80"E to 77°41'10.25"E	
Highest Elevation	121 m	
Machinery Proposed	Jack Hammer	2
	Compressor	1
	Excavator bucket & Rock breaker attached	1
	Tippers (20 tonnes Capacity)	1
Proposed Blasting Method	Controlled Blasting Method	
Manpower Proposed	15 Nos	
Total Project Cost	Rs. 80,29,000/-	

Source: Approved Mining Plan

SALIENT FEATURES OF PROPOSAL "P2"

Name of the Mine	S.Soundararajan
Survey Nos	915/3, 916/4B, 916/4C2, 916/7B

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Land Type	Patta Land
Extent	2.88.0 ha

SALIENT FEATURES OF PROPOSAL "P3"

Name of the Mine	Ranjith Blue Metals
Survey Nos	968/5, 969, 971/2
Land Type	It is a Patta land
Extent	2.72.0 ha

SALIENT FEATURES OF PROPOSAL "E1"

Name of the Mine	G.Guruvammal
Survey Nos	903/2
Land Type	Patta Land
Extent	1.35.0 ha
Rough stone Quantity	19374.25 m ³
Gravel Quantity	--

SALIENT FEATURES OF PROPOSAL "E2"

Name of the Mine	M/s. Ranjith Blue Metals
Survey Nos	899/1B2, 901/2A, 901/1A2A
Land Type	Patta Land
Extent	1.60.0 ha
Rough stone Quantity	125303 m ³
Gravel Quantity	16934 m ³

SALIENT FEATURES OF PROPOSAL "E3"

Name of the Mine	P.Jeyaraman
Survey Nos	916/4C1, 916/7A, 920/1A1, 920/1A3
Land Type	Patta Land
Extent	2.97.50 ha
Rough stone Quantity	290900 m ³
Gravel Quantity	51990 m ³

SALIENT FEATURES OF PROPOSAL "E4"

Name of the Mine	S.Soundararajan
Survey Nos	922/2, 922/3, 922/4
Land Type	Patta Land
Extent	2.92.0 ha
Rough stone Quantity	197250 m ³
Gravel Quantity	72450 m ³

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SALIENT FEATURES OF PROPOSAL "E5"

Name of the Mine	R.Vishnuprasath
Survey Nos	886/10, 886/1A1, 886/4
Land Type	Patta Land
Extent	3.47.0 ha
Rough stone Quantity	124785 m ³
Gravel Quantity	112948 m ³

The Cumulative Impact is anticipated due to drilling & blasting and excavation and transportation activities from proposed mines within the 500 meter radius from the proposed mines and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. The current monitoring was done as existing quarry are working which gives the ambient or present condition of air quality as well as noise.

PREDICTED AIR INCREMENTAL VALUE

S.No.	Locations	PM ₁₀ (µg/m ³)			PM _{2.5} (µg/m ³)			SO ₂ (µg/m ³)			NO ₂ (µg/m ³)		
		Inc	Max	Total	Inc	Max	Total	Inc	Max	Total	Inc	Max	Total
1	AAQ-1	2	79.14	81.14	1	46.58	47.58	0.5	15.44	15.94	1	33.84	34.84
2	AAQ-2	3.2	71.27	74.47	1.1	40.09	41.19	0.8	18.68	19.48	1.9	32.6	34.5
3	AAQ-3	2	68.53	70.53	1	37.6	38.6	0.8	16.06	16.86	1.9	33.08	34.98
4	AAQ-4	1	67.94	68.94	0.5	37.24	37.74	0.1	16.3	16.4	0.9	35.81	36.71
5	AAQ-5	0	70.91	70.91	0	41.28	41.28	0	17.49	17.49	0	34.5	34.5
6	AAQ-6	1	72.46	73.46	0.5	41.17	41.67	0.4	17.25	17.65	0.5	34.15	34.65
7	AAQ-7	1	72.34	73.34	0.5	41.17	41.67	0.4	13.8	14.2	0.9	32.84	33.74
8	AAQ-8	1	73.63	74.63	0.5	41.93	42.43	0.4	14.1	14.5	0.5	33.45	33.95
NAAQS (µg/m³)		100			60			80			80		

MAXIMUM GROUND LEVEL CONCENTRATION

Pollutants	Max. GLC observed, (µg/m ³)	Distance and Direction
PM ₁₀	9.8	1000, SW
PM _{2.5}	5.3	1000, SW
SO ₂	3.8	1000, SW
NO ₂	4.5	1000, SW

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PREDICTED NOISE INCREMENTAL VALUE

Equipment with Highest Noise Level	Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Drilling 90 dB(A)	N2 Nadukkudi, 0.63 Km	48.4	29.1	48.5	55
Shovel 85 dB(A)		48.4	24.1	48.4	
Tipper 75 dB(A)		48.4	14.1	48.4	
Compressor 85 dB(A)		48.4	24.1	48.4	
Excavator 102 dB(A)		48.4	41.1	49.1	

The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone)

ESTIMATED PEAK PARTICLE VELOCITY FOR EXPLOSIVE CHARGE FOR EXISTING AND PROPOSED MINES

Distance from blasting site, m	Quantity of Explosive/Blast, Kg	PPV, mm/s
100	21	20.3
150	21	8.5
200	21	3.5
250	21	2.1
300	21	1.5
350	21	1.1
400	21	0.9
450	21	0.7
500	21	0.6
550	21	0.5
600	21	0.5
650	21	0.9
700	21	0.8
750	21	0.7

Note: The empirical formula does not consider the delay factor in blasting due to use of Delay Detonators.

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The nearest habitation from cluster is Th Nathikudi -0.68Km - South direction. From the above table, the blasting will not cause any significant ground vibrations in the area. The ground vibrations at nearest habitation will be well within the permissible limits recommended by DGMS.

SOCIO ECONOMIC BENEFITS

	Project Cost in Rs.	CER @ 2% in Rs.
P1	80,29,000	5,00,000

CER allocation has been made as per MoEF & CC OM F.No.22-65/2017-IA.III, Dated: 01.05.2018. As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is ≤ 100 crores, they shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC and the total CER amount from is Rs. 5,00,000/-.

EMPLOYMENT BENEFITS

	Direct Employment	Indirect Employment
P1	15	40

A total of 15 people will get employment.

Greenbelt Development -

GREENBELT DEVELOPMENT BENEFITS FROM 3 MINES

CODE	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species	No. of Trees expected to be grown
P1	700	80%	2910	Neem, Pungan, Casuarinas and other regional trees	560

Based on the Proposed Mining Plans its anticipated that there shall growth of native species of Neem, Casuarina, Pungan etc in the Cluster at a rate of 700 Trees Planted over a period of 5 Years with Survival Rate of 80% and expected growth is around 560 Trees over an area of 2910 Sq.m.

8. PROJECT BENEFITS





Proposed Project for Quarrying Rough Stone at Nathikudi Village aims to produce 72,165 m³ Rough Stone & 15,652 m³ gravel over a period of 5 Years. This will

Draft EIA/EMP for Nathikudi Rough stone and Gravel Quarry Cluster with new proposed area of 1.29.0 Ha, While total cluster area is 20.34 Ha located in Nathikudi Village, Vembakkottai Taluk, Virudhunagar District, Tamil Nadu.

Lessee: Thiru. K. Sujan (Lease Area: 1.29.0 Ha)

Executive Summary

enhance the socio-economic activities in the adjoining areas and will result in the following benefits

-  Increase in Employment Potential
-  Improvement in Socio-Economic Welfare
-  Improvement in Physical Infrastructure
-  Improvement in Social infrastructure

9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring Cell discussed formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

1. Implementation of pollution control measures as suggested in Environmental Management Plan and recommended in EC
2. Conducting environmental monitoring as per EMP and EC stipulation through external laboratories approved by MoEF/SPCB and NABL
3. Ensuring compliance with other conditions stipulated in Environmental Clearance for the project.
4. Ensuring compliance with the conditions stipulated in 'Consent to Operate' for the project.
5. Timely submission of compliance status to MoEF/ SPCB
6. Seeking experts' guidance, as and when required.
7. Conducting CSR activities in nearby villages.
8. Co-ordination of the environment related activities within the project as well as with outside agencies
9. Collection of health statistics of the workers and population of the surrounding villages
10. Green belt development
11. Monitoring the progress of implementation of the environmental monitoring programme
12. Monitoring of the water/ waste water quality, air quality and solid waste generated
13. Analysis of the water and air samples collected through external laboratory
14. Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc

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15. Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10. CONCLUSION

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for regular monitoring and immediate rectification at site. Due to the cluster quarrying activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Prior Environmental Clearance shall be granted at the earliest.