EXECUTIVE SUMMARY

Environmental Clearance under EIA Notification – 2006

Schedule Sl. No. 1 (a) (i): Mining Project

"B1" CATEGORY (Cluster) – MINOR MINERAL – CLUSTER –

PATTA LAND – EXISTING QUARRY

THIRU. G. KUMARAPPAN ROUGH STONE AND GRAVEL QUARRY

Cluster Extent – 13.62.5 Ha

Project Proponent

Thiru. G. Kumarappan,
S/o. Ganesan,
Mirattunilai, Thirumayam Taluk,
Pudukkottai District - 622 201.

Mining period – 5 Years

PROJECT LOCATION	PROPOSED PRODUCTION
S.F.Nos. 699/4, 700/3 (Part), 700/4 (Part), 701/1, 701/2, 712/1A, 712/1B1 and 712/1B2 **Extent: 4.99.0Ha** Ethirkottai Village, Vembakottai Taluk, Virudhunagar District, Tamil Nadu State	**Reserves** = 3,94,456m^3 of Rough stone **Peak Production** = 87,738m^3 of Rough stone Proposed Depth =**42m BGL**
ToR obtained vide **File No: 11531 ToR Identification No: TO24B0108TN5686765N Dated: 19.07.2025**	
Environmental Consultant **GEO EXPLORATION AND MINING SOLUTIONS** **Old No. 260-B, New No. 17,** **Advaitha Ashram Road, Alagapuram,** **Salem – 636 004, Tamil Nadu, India** **Accredited for sector 1 Cat 'A', sector 31 & 38 Cat 'B'** **Certificate No : NABET/EIA/2225/RA 0276** Phone: 0427-2431989, Email: ifthiahmed@gmail.com, geothangam@gmail.com **Web: www.gemssalem.com**	**Laboratory** **CHENNAI METTEX LAB PRIVATE LIMITED** **(Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA,** **IOPEPC, MOEF & TEA BOARD)** **Jothi Complex, 83,** **M.K.N Road, Guindy,** **Chennai – 600 032**
Baseline Monitoring Period **MARCH TO MAY 2025**	
AUGUST 2025	

1. INTRODUCTION

Rough Stone quarry are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of Thiru. G. Kumarappan Rough stone and Gravel quarry consisting of 1 Proposed and 3 Existing quarries with total extent of Cluster of 13.62.5Ha in Ethirkottai Village, Vembakottai Taluk, Virudhunagar District, Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

The proponent has obtained necessary statutory clearances from the Department of Geology and Mining, Virudhunagar District, Tamil Nadu (Statutory Clearance Documents are enclosed along with Mining plan as Annexure). The total Extent of the quarries within the radius of 500m from this proposal is > 5Ha, hence the proposal falls under "B1" Category project as per the EIA notification, 2006 (As amended timely).

Proponent applied for Environmental Clearance to SEIAA, Tamil Nadu and obtained for carrying out EIA and EMP studies for the rough stone and gravel quarry.

Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
Thiru. G. Kumarappan	4.99.0 ha	File No: 11531 ToR Identification No: TO24B0108TN5686765N Dated: 19.07.2025

To carry out the EIA studies and to prepare EIA and EMP studies Thiru. G. Kumarappan Rough Stone and Gravel Quarry have engaged a consultant M/s. Geo Exploration and Mining Solutions, Salem, Tamil Nadu. The Baseline Monitoring study has been carried out during Pre-Monsoon season (Mar 2025 – May 2025) considering the provisions of MoEF & CC Office Memorandum Dated: 29.08.2017 and MoEF & CC Notification S.O. 996 (E) Dated: 10.04.2015.

"Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu"

TABLE 1.1: DETAILS OF PROJECT PROPONENT

Name of the Project Proponent	Thiru. G. Kumarappan
Address	S/o. Ganesan, Mirattunilai, Thirumayam Taluk, Pudukkottai District - 622 201
Mobile	+91 63837 58644 and +91 94432 60930
Email	Chendhur2019@gmail.com
Status	Individual

TABLE 1.2: QUARRY DETAILS WITHIN 500 M RADIUS

CODE	Name of the Owner	Village	S.F. Nos	Extent in Ha	Status
PROPOSED QUARRY					
P1	**Thiru. G. Kumarappan**, S/o. Ganesan, Mirattunilai, Thirumayam Taluk, Pudukkottai District - 622 201	Ethirkottai	699/4, 700/3 (Part), 700/4 (Part), 701/1, 701/2, 712/1A, 712/1B1 and 712/1B2	4.99.0 Ha	File No: 11531 ToR Identification No: TO24B0108TN5686765N Dated: 19.07.2025
	TOTAL EXTENT			**4.99.0**	
EXISTING QUARRY					
E-1	Thiru. T.K. Barath 3/53, Ettugapatti Post, Vembakottai Taluk	Ethirkottai	650, 651/1, 651/2, 652, 653/2, 654/2B2, 667	3.65.5Ha	KV1/413/2018 Dated: 10.08.2022 17.08.2022 to 16.08.2027
E-2	Thiru.S.Jacob Rajamani S/o Soundarpandian, 69/A2, Kathiresan Kovil, Theru Kovilpatti Town and Taluk, Thoothukudi District		648	1.03.5 Ha	KV1/516/2019 23.02.2024 15.03.2024 to 14.03.2029
E-3	Thiru. S. Ramachandran 1/48, North Street, E. Rettiapatti, Ethirkottai Post, Vembakkottai Taluk		649/1, 649/3, 668, 670, 687/3 & 688/2	3.94.5 Ha	KV1/373/2017 Dated: 05.05.2018 NEW KV1/458/2023 Dated: 15.05.2023 07.07.2018 to 06.07.2023 Extended lease period 18 Months (18.06.2023 to 17.12.2024)
	TOTAL EXTENT			**8.63.5 Ha**	
	TOTAL CLUSTER EXTENT			**13.62.5 Ha**	

Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

TABLE 1.3: SALIENT FEATURES OF THE PROPOSAL

Name of the Project	Thiru. G. Kumarappan Rough stone and Gravel quarry
S.F. No.	699/4, 700/3 (Part), 700/4 (Part), 701/1, 701/2, 712/1A, 712/1B1 and 712/1B2
Extent	4.99.0 Ha
Village Taluk and District	Ethirkottai Village, Vembakottai Taluk, Virudhunagar District
Land Type	It is a Patta land – Punjai, registered in the name of the applicant (Thiru. G. Kumarappan), vide Patta No. 2095.
Toposheet No	58 – G/11
Latitude between	09°22'10.89"N to 09°22'21.28"N
Longitude between	77°44'10.13"E to 77°44'16.62"E
Previous Lease Details	Lessee: Thiru. G. Kumarappan, Lease Period: 09.07.2019 to 08.07.2029 EC - Lr. No. DEIAA/VNR/063/EC.No.69/2018, Dated: 08.12.2018 CCR – F.No.EP/12.1/2024-25/SEIAA/117/TN/702 Dated: 05.05.2025

Existing Pit	16m (Avg)		
Elevation of the area	100m AMSL		
Revised Scheme of Mining Plan period	5 Years		
Proposed Depth of Mining	42m bgl		
	Rough Stone in m^3	**Weathered Rock in m^3**	**Gravel in m^3**
Geological Resources	16,47,700	20,448	10,856
Mineable Reserves	3,94,456	-	-
Year wise Production	3,94,456	-	-
Peak Production	87,738	-	-
Ultimate Pit Dimension	204m (L) X 164.5m (W) X 42m (D)		
Water Level in the region	58m–63m bgl		
Method of Mining	Opencast Mechanized Mining Method is being carried out with 5.0-meter vertical bench with a bench width is not less than the bench height		
Topography	The lease applied area is almost plain topography. The area has gentle sloping towards South-eastern side and altitude of the area is 100m (max) above Mean Sea level. The area is covered by 2m thickness of Gravel and 2m thickness of weathered rock. Massive Charnockite is found after 4m (Gravel + Weathered Rock) which is clearly inferred from the existing quarry pit.		
Machinery proposed	Jack Hammer	4 Nos	
	Compressor	1 No	
	Wagon Drill Machine	1 No	
	Excavator with Bucket and Rock Breaker	3 Nos	
	Trucks	6 Nos	
	Water sprinkler	1 No	
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.		
Proposed Manpower Deployment	38 Nos		
Project Cost	Rs. 1,67,17,000/-		
CER Cost	Rs. 3,00,000/-		
Nearby Water Bodies	Oorani	50m Safety South	
	Odai	160m SE	
	Gopalasamudram Kulam	200m SW	
	Odai	520m West	
	Kayalkudi River	1.3km West	
	Tank	2.7km SE	
	Vembakottai Reservoir	3.3km SE	
	Vembakottai Dam	4.0km SE	
	Vaippar River	5km South	
	Idayankulam Lake	6km NW	
Greenbelt Development Plan	Proposed to plant 2500 Nos of trees considering 500 Nos of trees/ Ha criteria The plantation will be developed around the project site and nearby village roads		

Proposed Water Requirement	2.4 KLD
Nearest Habitation	870m – North West
Nearest Reserve Forest	Kothankulam RF – 19.5km – North West
Nearest Wild Life Sanctuary	Srivilliputhur Grizzled Squirrel Wildlife Sanctuary –21.0km – North West

Source: Approved Mining & Land Documents.

1.5 STATUTORY DETAILS

SCREENING

- Proponent applied for Rough stone and Gravel quarry lease on 15.05.2018
- Precise area communication letter was issued by the District Collector vide letter no. KV1/1432/2018 Dated: 11.09.2018
- The Mining plan has been prepared by the Qualified person and got approved by the Deputy Director vide letter no. KV1/1432/2018 Dated: 10.10.2018
- Environmental Clearance granted vide Lr.No.DEIAA/VNR/063/EC.No.69/2018 Dated: 08.12.2018
- Proceeding Letter granted vide KV1/1432/2018 Dated: 10.06.2019
- The Revised Scheme of Mining plan has been prepared by the Qualified person and got approved by the Assistant Director vide Rc.No. KV3/1259/2023 Dated: 04.11.2024.
- The revised scheme of mining plan has been approved for the quantity of 3,94,456m^3 of Rough stone up to a depth of 42m bgl for the period of Five years.
- 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

SCOPING:

- Proponent applied for Terms of Reference vide Proposal No. SIA/TN/MIN/508325/2024, Dated: 26.11.2024
- The proposal was placed in 523rd SEAC meeting held on 27.12.2024 and the committee recommended for issue of ToR.
- The proposal was considered in 851st SEIAA meeting held on 14.07.2025 and issued ToR vide File No: 11531 ToR Identification No: TO24B0108TN5686765N Dated: 19.07.2025

2 PROJECT DESCRIPTION

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarries. 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 pit head to the needy crushers and rock breakers to avoid secondary blasting.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	National Highway – (NH-44) Madurai – Tirunelveli – 19.2km – East State Highway – (SH-186) Rajapalayam – Vembakottai – 2.0km – South West
Nearest Village	Ethirkottai – 1.0km – North West
Nearest Town	Vembakottai – 5.0km – South East
Nearest Railway Station	Sivakasi Railway Station – 11.5km – North East
Nearest Airport	Madurai Airport – 64.0km – North East
Seaport	Thoothukudi Seaport – 84.0km – South East

2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

Description	Present area (Ha)	Area at the end of Lease period (Ha)
Area Under Quarrying	3.27.21	3.27.21
Dump	0.41.00	Nil
Site Services	Nil*	Nil*
Roads	0.01.00	0.02.00
Green Belt	Nil	0.34.00
Unutilized Area	1.29.79	1.35.79
Grand Total	**4.99.00**	**4.99.00**

* - Infrastructures are already constructed in the lessee's own patta land

2.3 OPERATIONAL DETAILS FOR PROPOSED PROJECTS

PARTICULARS	DETAILS		
	Rough Stone in m^3	Weathered Rock in m^3	Gravel in m^3
Geological Resources	16,47,700	20,448	10,856
Mineable Reserves	3,94,456	-	-
Year wise Production	3,94,456	-	-
Peak Production	87,738	-	-
Revised Scheme of Mining Period	5 Years		
Number of Working Days	300 Days		
Production per day	292		
No of Lorry loads	24		
Total Depth of Mining	42m BGL		

Source: Approved Mining Plan

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

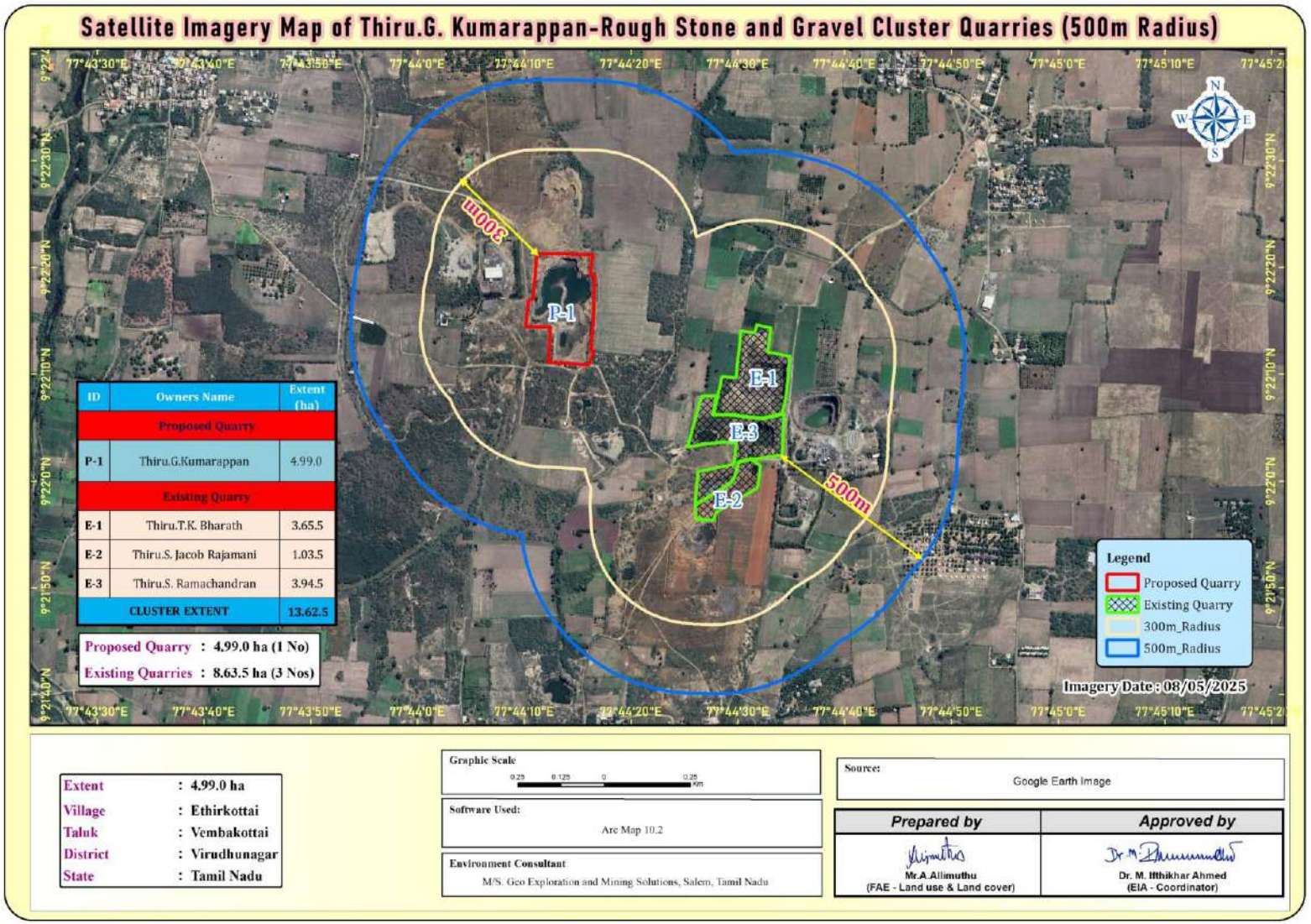


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

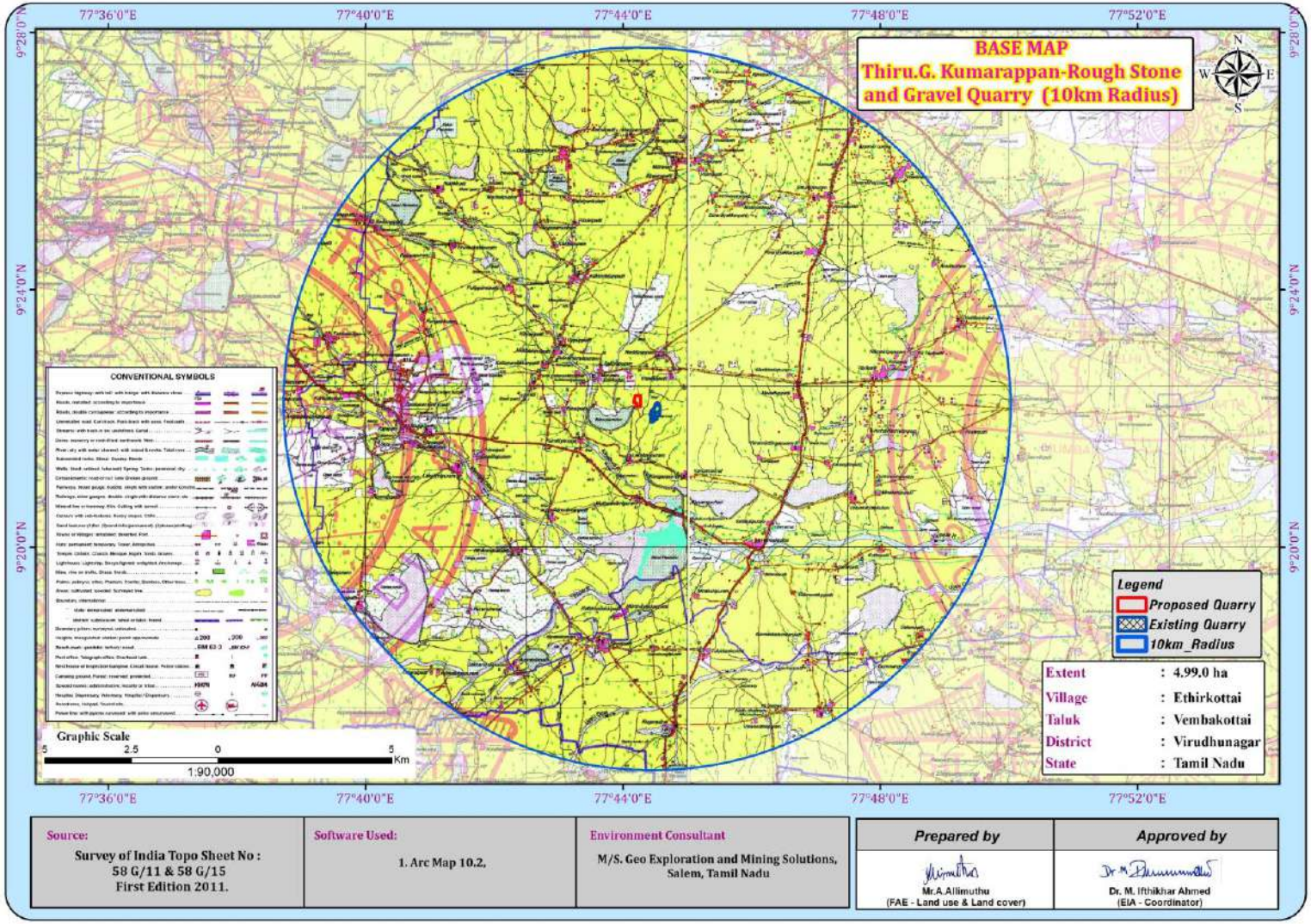
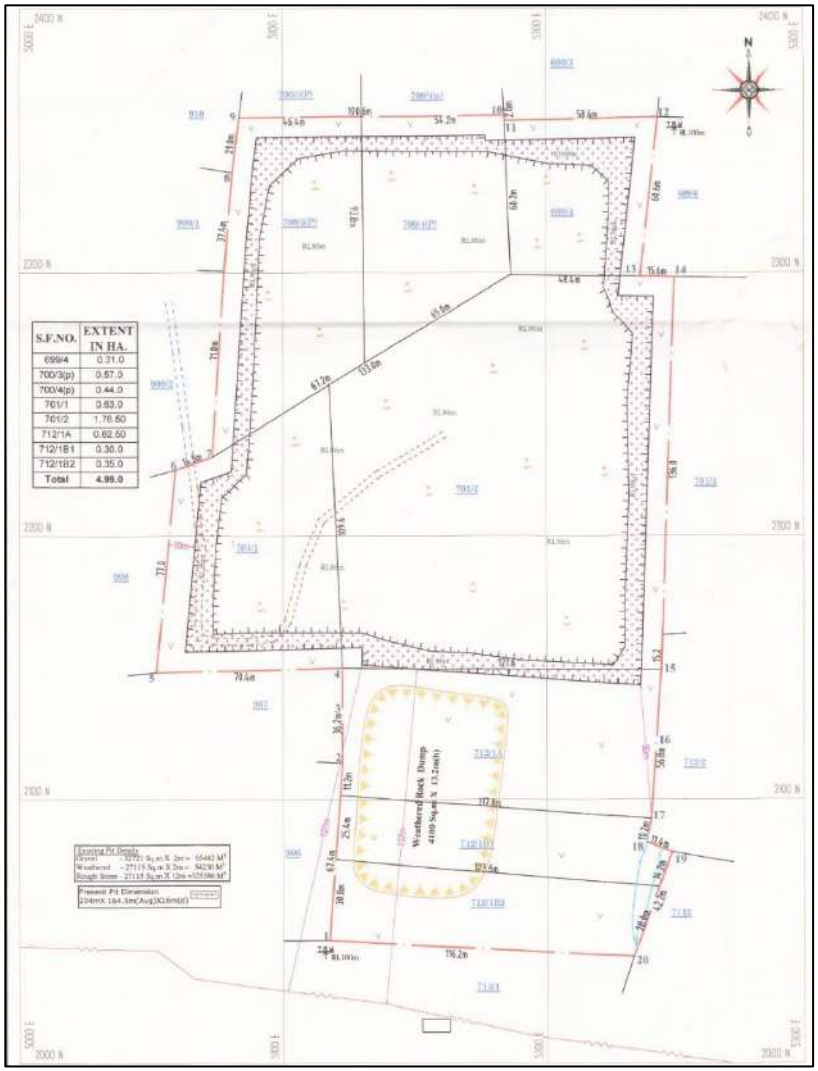


FIGURE 4: QUARRY LEASE PLAN / SURFACE PLAN



2.4 METHOD OF MINING

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. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The top layer of Topsoil will be Excavate directly by Hydraulic Excavators and preserved all along the safety barrier to facilitate greenbelt development during Mine Closure Stage. 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.

2.5 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammer	4	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Wagon Drill Machine	1	60HP	Diesel Drive
4	Excavator with Bucket and Rock Breaker	3	300 HP	Diesel Drive
5	Trucks	6	20 Tonnes	Diesel Drive
6	Water Sprinkler	1	4000 ltrs	Diesel Drive

Source: Approved Mining Plan.

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.,

ULTIMATE PIT DIMENSION

Length (Max) (m)	Width (Max) (m)	Depth (Max)
204	164.5	42m

Source: Approved Mining Plan

3.0 DESCRIPTION OF THE ENVIRONMENT

The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering Mar– May 2025 as per CPCB & MoEF & CC guidelines.

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey

*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 Ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourlies twice a week (March – May 2025)	7 (2 core & 5 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7(2 core & 5 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS.

* All monitoring and testing have been carried out as per the Guidelines of CPCB and MoEF& CC.

3.2 LAND ENVIRONMENT

To study the land use pattern of the core as well as a buffer zone, land use/land cover details have been identified/ maps have been prepared in accordance with the Standard ToR point**.** A visual interpretation technique has been adopted for land use supervised classification based on training site by Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through **LISSIII, Bhuvan, NRSC**. The 10 km radius map of study area was taken for analysis of ***Land use/Landcover.***

LAND USE / LAND COVER TABLE 10 KM RADIUS

S.No	CLASSIFICATION	10km Radius		2.0km Radius	
		AREA_HA	AREA_%	AREA_HA	AREA_%
BUILTUP					
1	URBAN	261.16	0.77	2.13	0.12
2	RURAL	591.10	1.75	15.80	0.89
3	MINING	434.53	1.28	30.56	1.73
AGRICULTURAL LAND					
4	CROP LAND	20164.05	59.54	946.01	53.56
5	PLANTATION	337.55	1.00	0.00	0.00
6	FALLOW LAND	9125.72	26.95	683.54	38.70
BARREN/WASTE LANDS					
7	SCRUB LAND	1019.54	3.01	0.00	0.00
WETLANDS/ WATER BODIES					
8	WATER BODIES/LAKE/RIVER	1932.19	5.71	88.22	4.99
TOTAL		33865.84	100.00	1766.26	100.00

From the Table No.3.2, Pie Diagram 3.1 – 10km Radius and Land Use Map, (Fig No.3.2) is inferred that the majority of the land in the study area is Agriculture land (includes crop land – 59.54%, plantation – 1.0% and Fallow land – 26.95%) range is 87.49% & in Build Up Land, Mining area occupied 1.28%.

The total mining area within the study area is 434.53ha i.e., 1.28%. The cluster area of 13.62.5ha contributes about 0.04% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment

From the Table No.3.2, Pie Diagram 3.1-A – 2.0km Radius and Land Use Map (Fig No.3.2) is inferred that the majority of the land in the study area is Agriculture land (includes crop land – 53.56%, plantation – Nil and Fallow land – 38.70%) range is 92.26% & in Build Up Land, Mining area occupied 1.73%.

The total mining area within the study area is 30.56ha i.e., 1.73%. The cluster area of 13.62.5ha contributes about 0.77% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment

3.3 SOIL ENVIRONMENT

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay varied between 27.6-31.8%, Sand varied between

34.6-37.9% and Silt varied between 32.7-34.9% and Bulk Density of Soils in the study area varied between 1.05-1.1g/cm^3. The Water Holding Capacity of the soil samples is found to be medium i.e., ranging from 41.2-47.9%.

Chemical Characteristics

- The nature of soil is slightly alkaline to strongly alkaline with pH range 6.98-7.31
- The available Nitrogen content range between 253-396.7mg/kg
- The available Phosphorus content range between 2.98–4.65mg/kg
- The available Potassium range between 25.7–33.6mg/kg

3.4 WATER ENVIRONMENT

The study area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

Surface Water

The pH varied from 8.06 to 8.1 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids varied from 714 to 1041 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 348.9 to 360.2mg/l, Nitrates content is 19.3 to 20.1mg/l and Sulphates varied from 71.5 to 76.6mg/l.

Ground Water

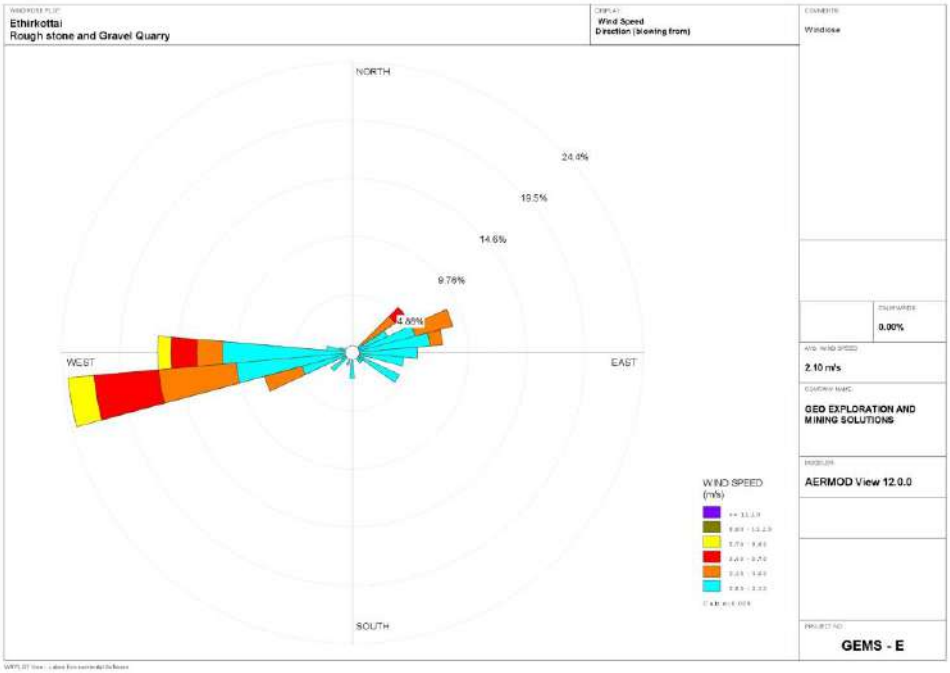
The pH of the water samples collected ranged from 7.32 to 7.59 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 856 to 1005mg/l in all samples. Total hardness varied between 254.5 to 311mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed 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 – 6: WIND ROSE DIAGRAM



SUMMARY OF AMBIENT AIR QUALITY

As per monitoring data, PM_{10} ranges from 30.1 to 40.0µg/m^3, $PM_{2.5}$ data ranges from 18.0 to 24.1µg/m^3, SO_2 ranges from 4.0 to 6.5µg/m^3 and NO_2 data ranges from 19.0 to 25.1µg/m^3. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 44.9-45.2 dB (A) Leq and during night time were from 39.1-40.4 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 46.2-48.3dB (A) Leq and during night time were from 39.6-42.3dB (A)Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.7 ECOLOGICAL ENVIRONMENT

The observations and assessment of the overall ecological scenario involve details such as classification of Biogeographic zone, eco-region, habitat types and land cover, distances from natural habitats, vegetation/forest types, and sensitive ecological habitats such as Wetlands sites, Important Bird areas, migration corridors of important wildlife etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, and wildlife species etc., and consulted

and discussed with local people, from the villages, herders and farmers who inhabit close to the proposed project area.

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 38 persons to the local people there by improving the indirect employment opportunity for 50 persons and in turn the social standards will improve.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

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

- 3.27.21 Ha of the land will be under mining site the Permanent or temporary change on land use and land cover will occur
- 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 3.27.21Ha of the land will be converted into temporary reservoir which will full fill the water scarcity in the drought season and the nearby agriculture land will be benefitted by the supply of water
- About 2500 Nos of trees will be planted in the lease area and approach road will retain the eco system
- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development in the production
- Construction of garland drains all around the quarry pits and construction of silt trap at strategic location in lower elevations to prevent 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.,
- Fencing will be constructed before starting the mining operation and it will be maintained in the conceptual stage Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

IMPACT ON SOIL ENVIRONMENT

Erosion and Sedimentation (Removal of protective vegetation cover; Exposure of underlying soil horizons that may be less pervious, or more erodible than the surface layers; Reduced capacity of soils to absorb rainfall; Increased energy in storm-water runoff due to concentration and velocity; and Exposure of subsurface materials which are unsuitable for vegetation establishment).

MITIGATION MEASURES FOR SOIL CONSERVATION

- Run-off diversion – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry works areas. And will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.3 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
    - 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.
- 2.4 KLD water will be utilized for the quarrying operation

MITIGATION MEASURES

- Garland drain, settling tank will be constructed along the project area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear 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 settling tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- 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 (every 6 month once) 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
- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water.

4.4 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 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 taurpaulin.
- 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 months once to assess effectiveness of mitigation measures proposed.

4.5 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 though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.6 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

The developmental programs, policies, and projects operated or managed by government or private bodies can cause potentially significant changes in the physical, biological, and socio-economic environment. In some cases, the changes may be beneficial while in others it may be detrimental to the environment. Accordingly, environmental impact studies are required for systematic identification, qualification, and interpretation of the anticipated changes. The main environmental problems associated with mining activities are deforestation, land degradation (change in topography, soil erosion), visual intrusion, disturbance to the hydrological system, and water, air, and noise pollution which ultimately impact upon the floral and faunal status of the project area.

MITIGATION MEASURES

Greenbelt means the planting of special types of plants suitable to that particular agroclimatic zone and soil characteristics in a place that will make the area cooler, reduce air pollution, prevent soil erosion, and further improve the soil fertility status. A green belt around the periphery of the boundary and roadside will be created to avoid erosion of soil, prevention of landslides, and minimize air pollution and noise pollution in the project area. Green plants are capable of absorbing air pollutants and forming sinks for pollutants. Leaves with their vast area in a tree crown, absorb pollutants on their surface, effectively reducing their concentration and noise level in the ambient.

The objectives of the green belt cover will cover the following:

- Noise abatement
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Area to be planted	Name of the species
I	It is proposed to plant 2500Nos of trees in the 1st year	Safety barrier, Un utilized areas and nearby village roads	Neem, Pongamia pinnata, Naval, etc

4.7 SOCIO ECONOMIC ENVIRONMENT

Anticipated Impact

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- Approach roads can be damaged by the movement of tippers
- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

Mitigation Measures

- Good maintenance practices will be adopted for all 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.
- 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, duties, etc.., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

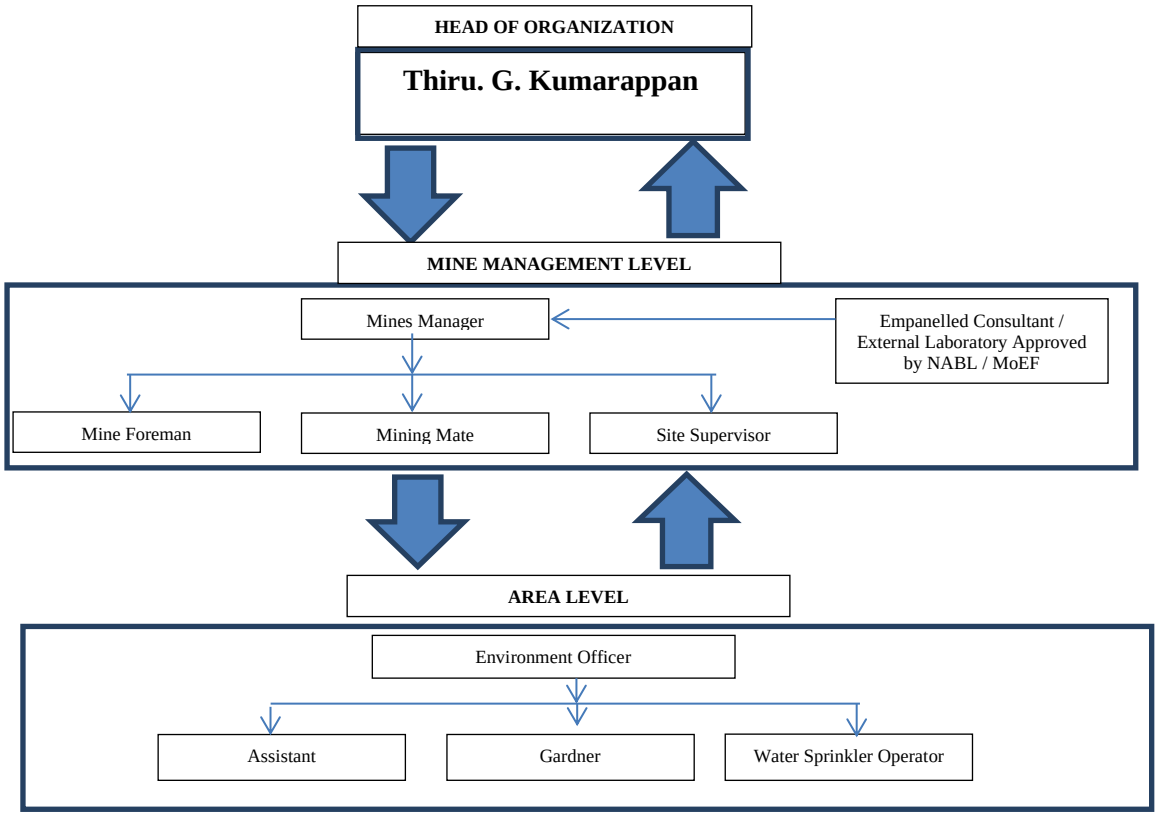
No alternatives are suggested as all the mine sites are mineral specific.

6. ENVIRONMENT MONITORING PROGRAM

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in all the proposed quarries. The responsibilities of this cell will be:

- Implementation of pollution control measures
- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert's advice when needed.

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

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 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

Source: Guidance of manual for mining of minerals, February 2010

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 for proposed project. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

7.2 DISASTER MANAGEMENT PLAN

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone II. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated.

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

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Year wise production (Five Years)	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day
P1	3,94,456	78,891	263	22
Total	**3,94,456**	**78,891**	**263**	**22**
E1	2,48,356	49,671	166	14
E2	85,760	17,152	57	5
Total	**3,34,116**	**66,823**	**223**	**19**
Grand Total	**7,28,572**	**1,45,714**	**486**	**41**

CUMULATIVE PRODUCTION LOAD OF GRAVEL/TOPSOIL IN CLUSTER

Quarry	Year wise production	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day
E1 (5 Years)	1,25,556	25,111	84	7
E2 (4 Years)	7,387	1,847	6	1
Grand Total	**1,32,943**	**26958**	**90**	**8**

PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Industrial Standards dB(A)
P1	48.4	60.1	60.4	**Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)**
E1	53.1	46.1	53.9	
E2	53.1	46.1	53.9	

SOCIO ECONOMIC BENEFITS FROM EACH MINES

Location ID	Project Cost	CER
P1	Rs. 1,67,17,000/-	Rs. 3,00,000/-
Total	**Rs. 1,67,17,000/-**	**Rs. 3,00,000/-**
E1	Rs. 1,67,68,000/-	Rs. 5,00,000/-
E2	Rs. 17,81,900/-	Rs. 5,00,000/-
Total	**Rs. 1,85,49,900/-**	**Rs. 10,00,000/-**
Grand. Total	**Rs. 3,52,66,900/-**	**Rs. 13,00,000/-**

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018 by all the mines.

8. PROJECT BENEFITS

The Proposed Project for Quarrying Rough Stone and Gravel at Ethirkottai Village aims to produce 3,94,456m^3 Rough Stone over a period of 5 years. This will 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:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- 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.
- Co-ordination of the environment related activities within the project as well as with outside agencies.
- Collection of health statistics of the workers and population of the surrounding villages.
- Green belt development.
- Monitoring the progress of implementation of the environmental monitoring programme.

- 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

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 fund has been allocated for the same. 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. Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. 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.

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