EXECUTIVE SUMMARY

Environmental Clearance under EIA Notification – 2006
Schedule Sl. No. 1 (a) (i): Mining Project

B1" CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND- PATTA LAND

TVL. SUGANYA BLUE METALS ROUGH STONE & GRAVEL QUARRY

CLUSTER EXTENT – 7.70.55 Ha

NAME OF PROPOSED PROJECT PROPONENT

Tvl. Suganya Blue Metals,

Thiru. R. Malaiyarasan (Authorized Signatory)
No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post,
Kallikudi Taluk, Madurai District- 625 022

PROJECT LOCATION	PROPOSED PRODUCTION
S.F. Nos. 108/2D, 109/1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L and 1M Ulagani Village, Kallikudi Taluk, Madurai District. **Extent: 3.48.0 ha**	**Reserves:** 3,84,905m^3 of Rough stone & 48,946m^3 of Gravel Peak Production = 83,010 m^3 of Rough Stone 17,422 m^3 of Gravel Proposed Depth **= 42 m BGL** Mining Plan Period: 5 years

ToR obtained vide
File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024

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: infogeoexploration@gmail.com
Web: www.gemssalem.com

Laboratory
EHS 360 LABS PRIVATE LIMITED,
NABL Accredited Laboratory
10/2 Ground floor, 50th street, 7th Avenue,
Ashok Nagar, Chennai – 600 083.

Baseline Monitoring Period
Dec 2022 to Feb 2023

* Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

1. INTRODUCTION

Rough Stone are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of **Tvl. Suganya Blue Metals** Rough Stone & Gravel Cluster Quarries consisting of two Proposed and one Existing Quarries with total extent of Cluster of 7.70.55 Ha in Ulagani Village, Kallikudi Taluk, Madurai District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries - 2 proposed and 1 Existing quarry forming Cluster Category {Total Extent of the Cluster is 7.70.55 Ha}- 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 for the below proposals in Table 1.1 and the Baseline Monitoring study has been carried out during the period of December 2022 – February 2023.

1.1 ToR OBTAINED PROJECT

CODE	Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
P1	**Tvl. Suganya Blue Metals**	3.48.0	File No.: 10880, TOR Identification No. T024B0108TN5218529N Dated; 25.06.2024

1.2 DETAILS OF PROJECT PROPONENT –

PROPOSAL – P1	
Name of the Company	Tvl. Suganya Blue Metals Thiru. R. Malaiyarasan (Authorized Signatory)
Address	No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District - 625 022.
Mobile	98428 04566 & 80722 79017
Status	Partnership Firm

Source: Approved Mining Plan of Respective Proposal

1.3 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES				
CODE	**Name of the Proponent and Address**	**S.F. Nos, Village & Taluk**	**Extent in Ha**	**Status**
P1	**Tvl. Suganya Blue Metals, (Thiru. R. Malaiyarasan** (Authorized Signatory) No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District- 625 022	108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M Ulagani Village, Kallikudi Taluk,	**3.48.0**	**ToR obtained vide** File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024
P2	**Tmt.M. Meenatchi,** W/o. Mahalingam, Ulagani, Thirumangalam Taluk, Madurai District – 625 022	16/2B, 16/3 & 16/4 etc., of Achankulam Village, Kallikudi Taluk, Madurai District	**1.42.0**	EC Granted vide EC24B0108TN5843396N Dated; 10.05.2024
	Total Extent		**4.90.0**	
EXISTING QUARRIES				

CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
E1	**L.Selvi**	112/10A (0.19.5), 112/10B (0. 12.0), 112/10C (0.19.5), 112/10D1 (0.75.3), 112/10D3 (0.52.75), 112/10E (0.12.0), 112/11 (0.71.0), 112/8A (0.07.0)	2.80.55	ROC.NO.1705/2017 dt 08.06.2023 14.06.2023 to 13.06.2028
	Total Extent		**2.80.55**	
ABANDONED/EXPIRED QURRIES				
CODE	**Name of the Proponent and Address**	**S.F. Nos, Village & Taluk**	**Extent in Ha**	**Lease Period**
A-1	**Thiru. M.Pandi**	3/1,2,3,4,5	**2.11.0 Ha**	ROC.NO.156/2010/mines dt 13.07.2010 19.08.2010 to 18.08.2015
A-2	**ThiruP.R.kalyana Sundaram**	2/3A etc.,	**2.91.0 Ha**	ROC.NO.1135/2009/mines dt 30.07.2010 03.09.2010 to 02.09.2015
A-3	**Thiru R.Ravi**	1/1A etc	**3.82.0**	ROC.NO.15/2014/mines dt 11.05.2015 27.05.2015 to 26.05.2020
	Total Extent		**8.84.0**	
TOTAL CLUSTER EXTENT			**7.70.55**	

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

1.1 SALIENT FEATURES OF THE PROPOSAL

DESCRIPTION OF THE PROJECT

SALIENT FEATURES OF PROPOSAL "P1"		
Name of the Mine	Tvl. Suganya Blue Metals Rough Stone & Gravel Quarry	
Land Type	The Suganya Blue Metals is a Partnership firm and the Partnership deed executed on 03.08.2009 and registered on 04.08.2009 with five partners. The Partnership firm Reconstituted on 01.04.2022 with four partnerships under the Indian Partnership act 1932. Thiru. R. Malaiyarasan is one of the partners an authorized person for signing all the documents on behalf of the firm.	
Previous quarry operation details	It is fresh land	
S.F. Nos,Village, Taluk & District	108/2D, 109, 1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L & 1M. Ulagani Village, Kallikudi Taluk, Madurai District.	
Extent	3.48.0 Ha	
Toposheet No	58 K/01	
Latitude	09°46'28.0212"N to 09°46'36.8935"N	
Longitude	78°02'13.0813"E to 78°02'20.5055"E	
Highest elevation	128m AMSL	
Geological Reserves	Rough Stone	Gravel
	13,91,960 m^3	69,598m^3
Mineable Reserves	Rough Stone	Gravel
	3,84,905m^3	48,946m^3
Proposed Quantity of Reserves Level of production	3,84,905m^3	48,946m^3
Peak Production	83,010 m^3	17,422 m^3
Mining Plan Period / Lease Period	5 Years	
Proposed Depth	42m (2m Gravel + 40m Rough Stone) Bgl	
Ultimate Pit Dimension	204m (L) X 121m (W) X 42m (D) BGL	

Water Level in the surrounds area	The Water table is found at a depth of 73m in summer and at 68m in rainy seasons.	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is a Plain topography. The area has gentle sloping towards eastern side and altitude of the area is 128m (max) above from Mean Sea level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit.	
Machinery proposed	Jack Hammer	12
	Compressor	3
	Excavator with Bucket and Rock Breaker	1
	Trucks	3
Blasting	Usage of Slurry Explosive with MSD detonators	
Manpower Deployment	46 Nos	
Total Project Cost	Project Cost	Rs. 2,74,25,000/-
	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 2,78,05,000/-
CER Cost	Rs.5,00,000/-	
Nearest Habitation	310-NE	
Reserve Forest	Kodimangalam B Block R.F – 17.71Km – North	
Wild Life Sanctuary	Megamalai (Srivilliputhur) Wildlife Sanctuary – 27.5km – South West.	

Source: Approved Mining Plan

1.2 STATUTORY DETAILS

SCREENING –

- The proponent applied for Rough Stone Quarry Lease Dated: 11.10.2023.
- The Deputy Director, Department of Geology and Mining, Madurai District and passed a precise area Communication letter vide Rc. No. 1271/Kanimam/2023, Dated: 23.01.2024 for over an extent of 3.48.0 Hectares of patta lands in S.F.Nos. 108/2D, 109, 1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L & 1M. of Ulagani Village, Kallikudi Taluk, Madurai District.
- As per the precise area communication letter the Mining plan was prepared and got approval from the Assistant Director, Department of Geology and Mining, Madurai District vide: Roc. No. 1271/Mines/2023, Dated: 19.02.2024
- Proponent applied for ToR for Environmental Clearance vides online Proposal No. SIA/TN/MIN/471587 Dated:04.05.2024

SCOPING:

- The proposal was placed in 472th SEAC meeting held on 31.05.2024 and the committee recommended for issue of ToR.
- The proposal was considered in 731th SEIAA meeting held on 19.06.2024 and issued ToR vide File No.; 10880 TO24B0108TN5218529N Dated: 25.06.2024.

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.

Method is mining is common for all the 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	National Highway – Madurai – Tirunelveli (NH – 44) – 6 km – West State Highway – Tirumangalam – Vadipatti (SH – 73) 7.5km – North West
Nearest Village	Ulagani – 350m – North East
Nearest Town	Kallikudi – 10km – SW
Nearest Railway	Thirumangalam – 7.5km – NW
Nearest Airport	Madurai – 9.0km – NE
Seaport	Thoothukudi 113.0 Km - SE

Source: Survey of India Toposheet

2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

LAND USE PATTERN OF PROJECT – P1		
Description	**Present area in (ha)**	**Area at the end of life of quarry (Ha)**
Area under Quarrying	Nil	2.63.60
Infrastructure	Nil	0.1.0
Roads	Nil	0.02.0
Green Belt	Nil	0.34.62
Un – utilized area	3.48.0	0.46.78
Grand Total	**3.48.0**	**3.48.0**

Source: Approved Mining Plans of Proposal

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	**DETAILS**	
	Rough Stone (5Year Plan period)	**Gravel (3Years Plan period)**
Geological Resources	13,91,960m^3	69,598m^3
Mineable Reserves	3,84,905m^3	48,946m^3
Production for first five-year plan period	3,84,905m^3	48,946m^3
Production per day	256	54
No of Lorry loads (6m^3 per load)	21	5
Number of Working Days	300 Days	
Total Depth of Mining	42m (2m Gravel +40m Rough stone)	

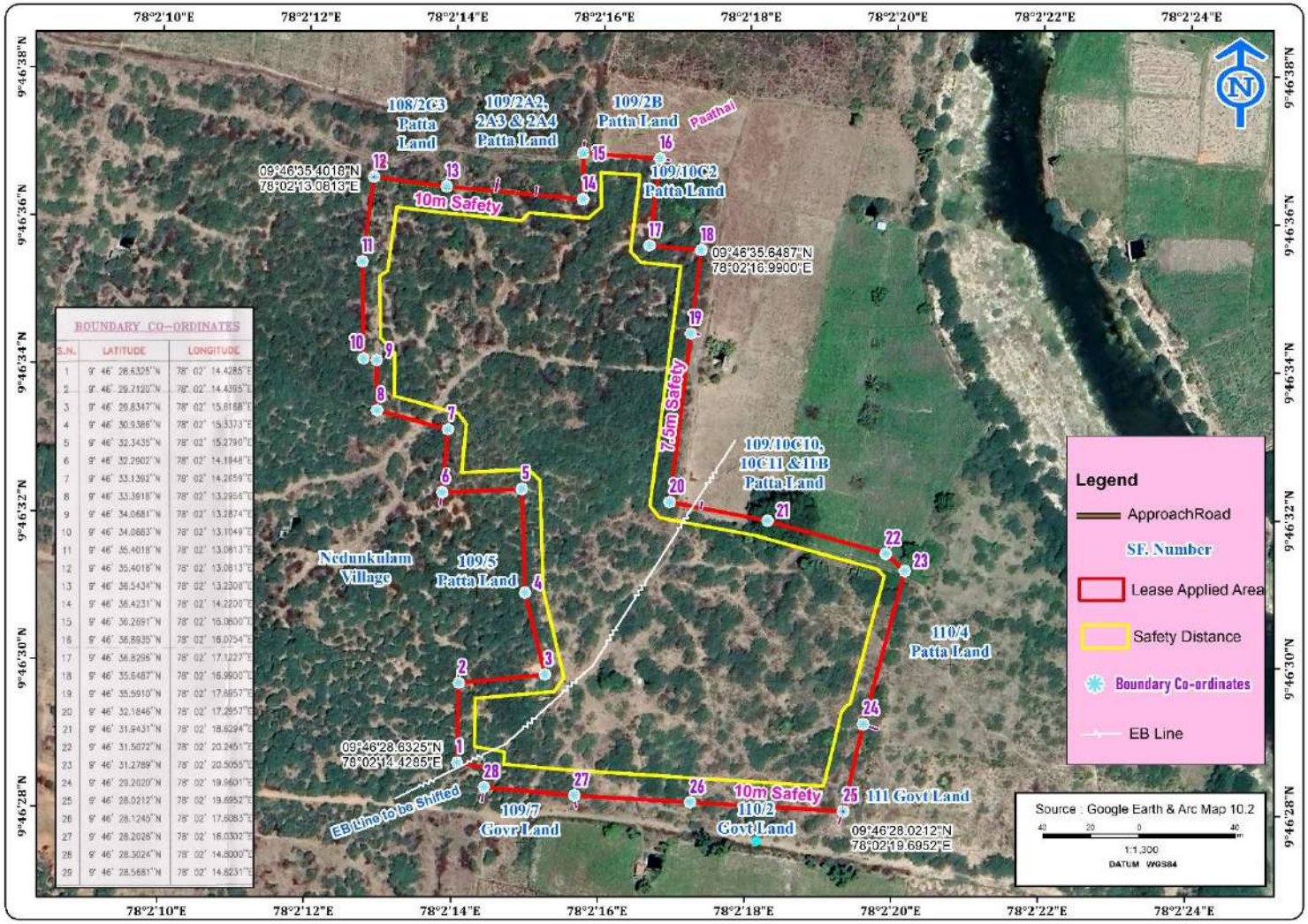
Source: proposed approved mining plan

2.3 YEAR-WISE PRODUCTION PLAN OF PROPOSED PROJECT

YEAR	**ROUGH STONE (m^3)**	**GRAVEL (m^3)**
I	81,720	17,422
II	83,010	16,516
III	68,810	15,008
IV	78,190	-
V	73,175	-
TOTAL	**3,84,905**	**48,946**

Source: Approved Mining Plan

FIGURE – 1: GOOGLE IMAGE OF THE PROJECT AREA



Source: Google Earth Imagery

FIGURE – 2: SATELLITE IMAGERY CLUSTER QUARRIES

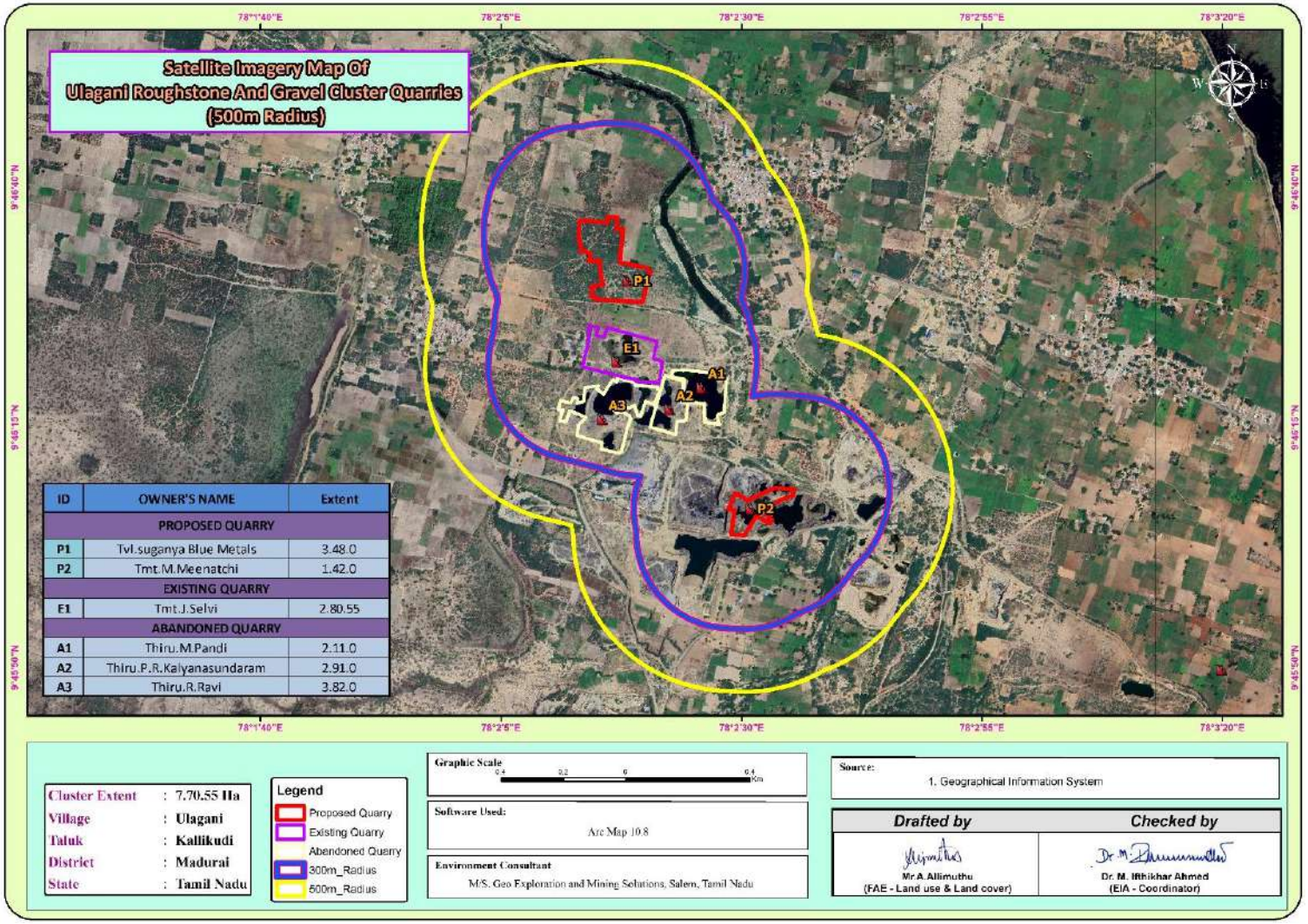
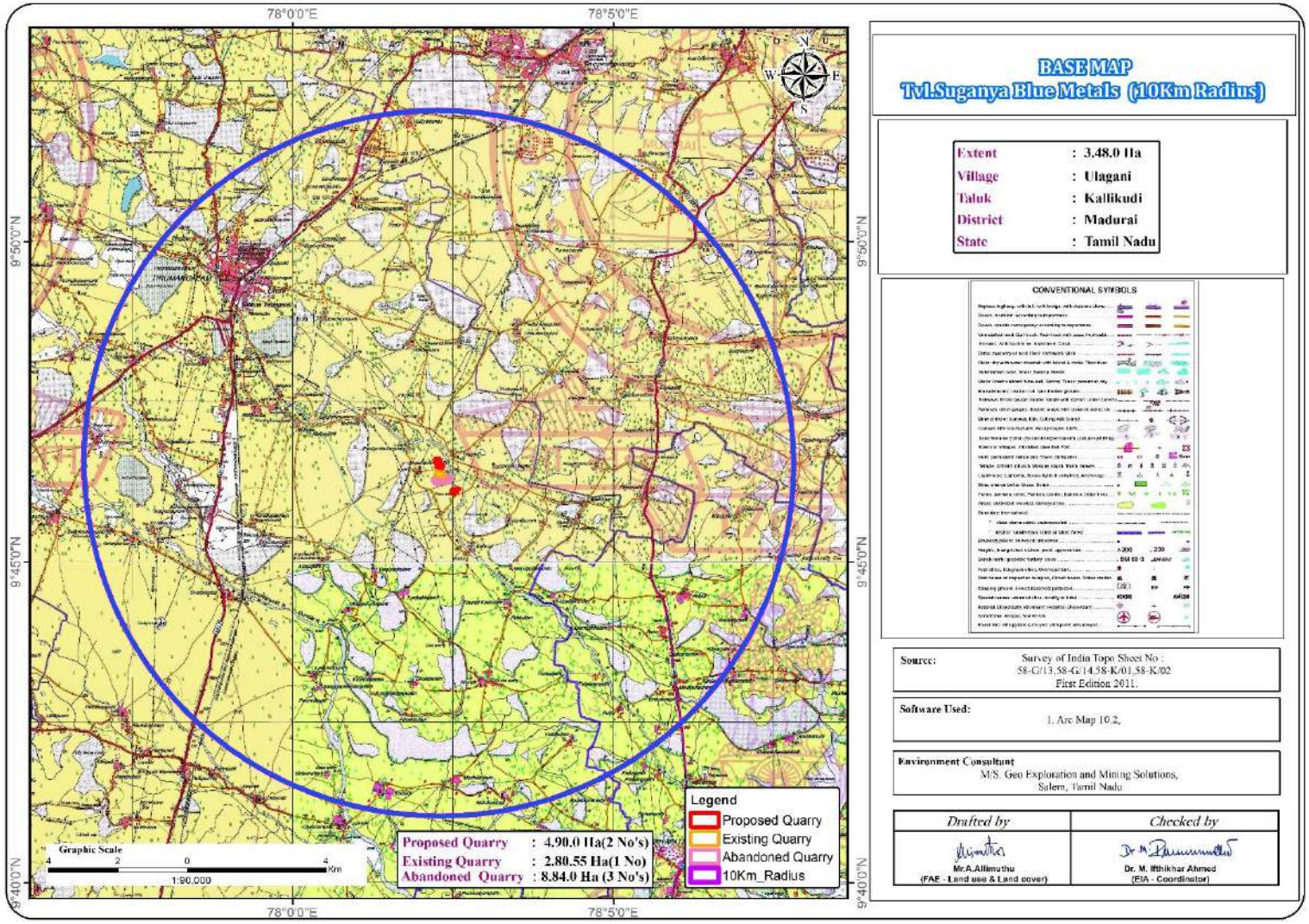


FIGURE 3: QUARRY LEASE PLAN / SURFACE PLAN

FIGURE – 4: TOPOSHEET SHOWING LOCATION OF THE PROJECT SITE AROUND 10 KM RADIUS



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. 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 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.

2.6 PROPOSED MACHINERY DEPLOYMENT

Nearest Roadway	National Highway – Madurai – Tirunelveli (NH – 44) – 6 km – West State Highway – Tirumangalam – Vadipatti (SH – 73) 7.5km – North West
Nearest Village	Ulagani – 350m – North East
Nearest Town	Kallikudi – 10km – SW
Nearest Railway	Thirumangalam – 7.5km – NW
Nearest Airport	Madurai – 9.0km – NE
Seaport	Thoothukudi 113.0 Km - SE

Source: Approved Mining Plans

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
- 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.

3. DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during Dec 2022, Jan & Feb 2023 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by EHS 360 LABS PRIVATE LIMITED, – An accredited by ISO/IEC 17025:2017 (NABL) Laboratory**.**

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	Datas 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	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM_{10} $PM_{2.5}$ SO_2 NO_X Fugitive Dust	24 hourly twice a week (Dec 2022 – Feb 2023)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (1 core & 7 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 Ehs 360 Labs 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

S.No	CLASSIFICATION	AREA_HA	AREA_%
	BUILTUP		
1	URBAN	594.67	1.74
2	RURAL	259.77	0.76
3	MINING	89.12	0.26
	AGRICULTURAL LAND		
4	CROP LAND	19379.66	56.55
5	PLANTATION	382.46	1.12
6	FALLOW LAND	7007.72	20.45
	BARREN LAND/WASTELANDS		
7	SCRUB LAND	1199.92	3.50
8	SALT AFFECTED LAND	65.06	0.19
9	BARREN ROCKY	620.12	1.81
	WETLANDS/ WATER BODIES		
11	WATER BODIES/LAKE/RIVER	4670.61	13.63
TOTAL		**34269.11**	**100.00**

INTERPRETATION

- The 10 km radius study area mainly comprises of crop land & Agriculture Plantation land accounting of 56.55% & 1.12% of the total study area. The study area also consists of fallow land of 20.45%.
- The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.)

- Water Bodies such as ponds/ lakes comprises of 14% of the total buffer area. The two seasonal rivers such as Gundra river at 5.2Km in SW direction, Terku Aaru stream 40m in NE and Canal at 270m in SE direction of the total study area.
- The Scrub land accounts of 3.50%. and Salt affected land is accounts of 0.19% As per the primary survey, it was observed the scrub land is mainly occupied by the stony waste and left-over domestic waste generated by the nearby areas.
- 0.26% of the total study area is occupied by the mine industries of captive mines. The area occupied by Mainly Rough stone and Topsoil of the total buffer area. As also observed within the primary survey, the 10 km buffer area is also occupied by the medium scaled granite and marble and small Brick kiln industries also located in the study area.
- 2.50% of the area is covered under the human Settlement. The nearest village within the 3 km radius from the project site boundary is observed to be villages Achangulam, Nedungulam, Chinna ulagani, Valayankulam etc.,

.3.3 SOIL ENVIRONMENT

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 to Sandy Soil and Bulk Density of Soils in the study area varied between 1.07– 1.41 g/cc. The Water Holding Capacity of the soil samples ranging from 40.4 – 45.9% and Porosity of the soil is found to be medium i.e ranging from 41.7 – 46.8%.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline in nature with pH range 7.08 to 8.46
- The available Nitrogen content range between 292 to 365mg/kg
- The available Phosphorus content range between 1.21 to 2.09mg/kg
- The available Potassium range between 29.7 to 39.8 mg/kg.

Whereas, the micronutrient as zinc (Zn), iron (Fe) and copper (Cu) were found in the range of 1.16 to 2.45 mg/kg; 1.98 to 3.03 mg/kg and cobber is (BDL)

3.4 WATER ENVIRONMENT

Surface Water

The pH of surface 8.06-8.21 while turbidity found within the standards. Total Dissolved Solids 596-757mg/l and Chloride 169.4 – 186.7 mg/l. Nitrates 12.3 – 14.3 mg/l, while sulphates 68.2 – 72.6mg/l.

Ground Water

The pH of the water samples collected ranged from 7.47 to 7.92and 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. The Total Dissolved Solids were found in the range of 490 – 594 mg/l in all samples. The Total hardness varied between 175.4 – 220.3 mg/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 – 5: WIND ROSE DIAGRAM

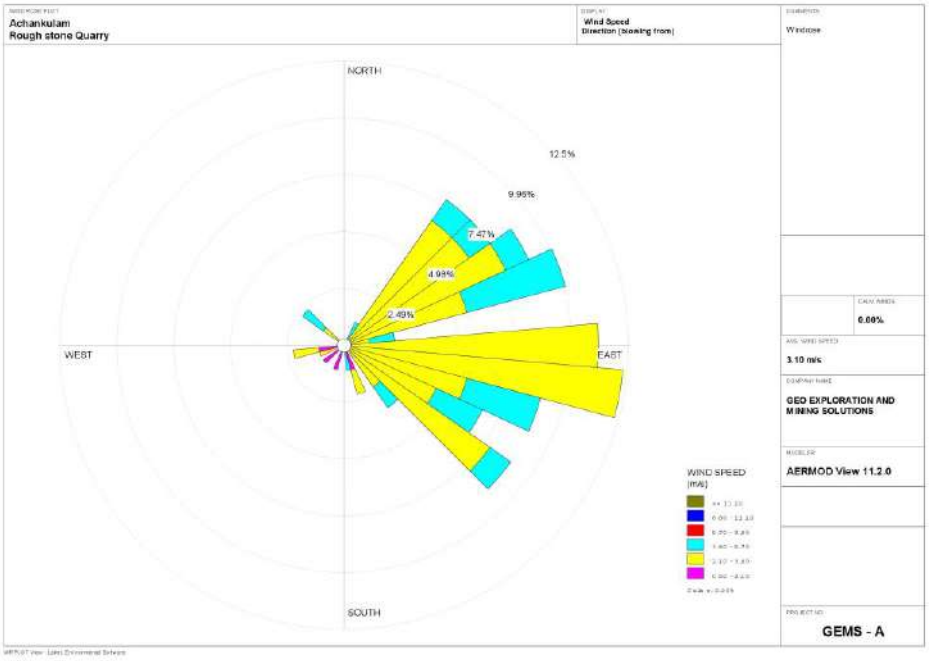
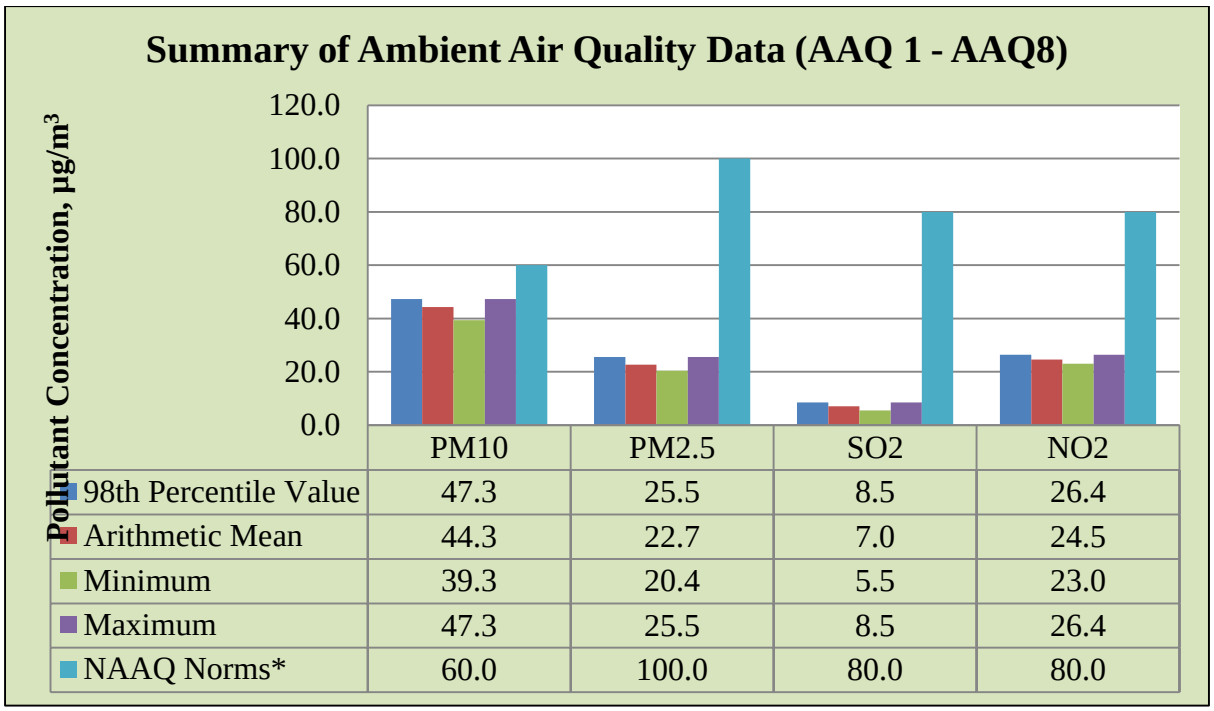


FIGURE – 6. BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ8



	PM10	PM2.5	SO2	NO2
98th Percentile Value	47.3	25.5	8.5	26.4
Arithmetic Mean	44.3	22.7	7.0	24.5
Minimum	39.3	20.4	5.5	23.0
Maximum	47.3	25.5	8.5	26.4
NAAQ Norms*	60.0	100.0	80.0	80.0

The results of ambient air quality monitoring for the period (Dec 2022 to Feb 2023) are presented in the report. Data has been complied for three months.

Interpretations & Conclusion

As per monitoring data, PM_{10} ranges from 35.3 µg/m^3 to 48.2 µg/m^3, $PM_{2.5}$ data ranges from 20 µg/m^3 to 25.5 µg/m^3, SO_2 ranges from 5.0 µg/m^3 to 8.8 µg/m^3 and NO_2 data ranges from 19.1 µg/m^3 to 27.3 µg/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 8 (eight) locations around the project area considering cluster quarries. Noise levels recorded in core zone during day time were from 34.2 – 47.4 dB (A) Leq and during night time were from 30.2 – 38.6 (A) Leq. Noise levels recorded in buffer zone during day time were from 30.2 – 47.2 dB (A) Leq and during night time were from 25.1– 42.1 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.

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

- 2.63.60 Ha of the land will be under mining sine 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 2.63.60 Ha 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 benefitted by the supply of water
- About 1750 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 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

MITIGATION MEASURES

- Water for the quarrying operation such as sprinkling on haul roads, Greenbelt development will be sourced from the lower part of the mine pit which is specifically allotted to collect the rain water.
- Garland drain, settling tank will be constructed along the proposed mining lease 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 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 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.
- 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.

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 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.

4.4 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 though 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.

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 trees proposed to be planted	Survial %	Area to be planted	Name of the species
I	It is proposed to plant 1750 **Nos** of trees in the 1st year	80%	Safety barrier, Un utilized areas and nearby village roads	Neem, Pongamia pinnata, Casuarina, etc

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 33 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.

5. 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.
- 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.

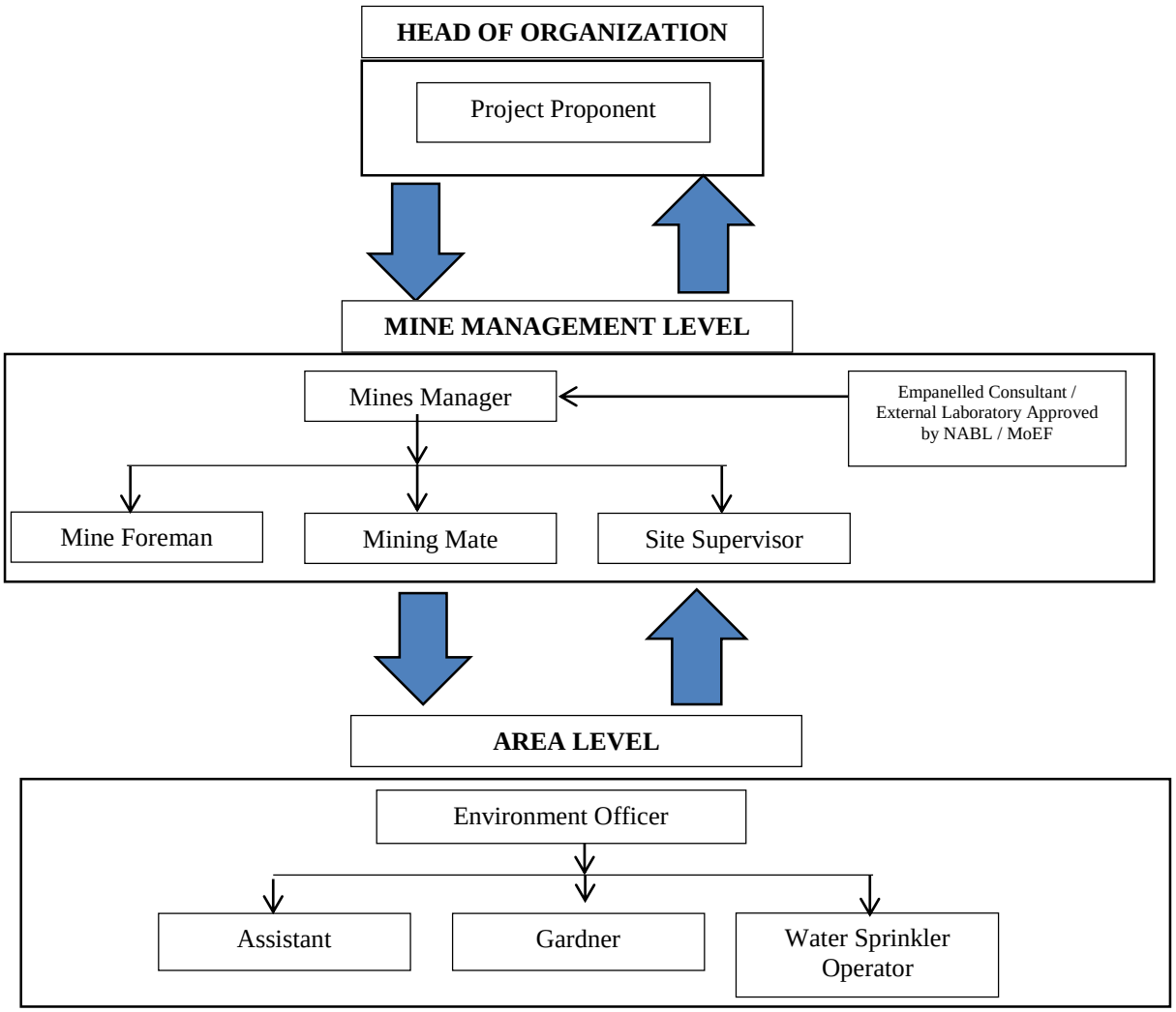
6. ENVIRONMENT MONITORING PROGRAM

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 PROPOSED 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

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.

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

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Proposed Production m^3	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day @ 12m^3 per load
P1	3,84,905	76,981	257	21 Trips /Day
P2	33,148	6,630	22	4 Trips /Day
Total	**4,18,053**	**83,611**	**279**	**25 Trips /Day**
E1	3,89,860	77,972	260	22 Trips /Day
Total	**3,89,860**	**77,972**	**260**	**22 Trips /Day**
Grant Total	**8,07,913**	**1,61,582**	**539**	**47Trips /Day**

CUMULATIVE PRODUCTION LOAD OF GRAVEL IN CLUSTER

Quarry	Mineable Reserves in m^3	Per Year Production in m^3	Per Day in m^3	Number of Lorry Load @ 6m^3 per load
P1	48,946	9,789	33	3 Trips /day
P2	2,520	2,520	8	1Trips /day
TOTAL	**51,466**	**12,309**	**41**	**4 Trips/ day**
E1	34,998	11,666	39	4 Trips/ day
Total	**34,998**	**11,666**	**39**	**4 Trips/ day**
Grand total	**86,464**	**23,975**	**80**	**8 Trips/ day**

SOCIO ECONOMIC BENEFITS FROM 3 MINES

Location Code	Employment	Project Cost (Rs)	CER Cost
P1	46	Rs. 2,78,05,000/-	Rs.5,00,000/-
P2	12	Rs. 19,55,000/-	Rs.5,00,000/-
E1	23	Rs. 75,30,000/-	Rs.1,41,000/-
Total	**81**	**Rs. 3,72,90,000 /-**	**Rs. 11,41,000/-**

A total of 81 people will get employment due to 2 proposed mines in cluster and 23 people are already employed at existing mines.

GREENBELT DEVELOPMENT BENEFITS FROM 2 MINES & 1EXISTING MINES

PROPOSAL FOR P1 – Tvl. Suganya Blue Metals				
Year	**No. of trees proposed to be planted**	**Survial %**	**Area to be planted**	**Name of the species**
I	It is proposed to plant 1750 **Nos** of trees in the 1st year	80%	Safety barrier, Un utilized areas and nearby village roads	Neem, Pongamia pinnata, Casuarina, etc
PROPOSAL FOR P2 – Tmt.M. Meenatchi				
I	It is proposed to plant 700 **Nos** of trees in the 1st year	80%	Safety barrier, Un utilized areas and nearby village roads	Neem, Pongamia, pinnata, Casuarina, etc.,
EXISTING FOR E1 – Tmt. Selvi-J				
I	It is proposed to plant 1400 **Nos** of trees in the 1st year	80%	Safety barrier, Un utilized area's and nearby village roads	Neem, Pongamia Pinnata, Casuarina, Thespesia populnea etc.,

8 PROJECT BENEFITS

The Proposed Projects for Quarrying Rough Stone at Ulagani Village aims to produce cumulatively 3,84,905m3 of Rough Stone over a period of 5 years & 48,946m3 of Gravel over a period of 3Years. 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 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

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.

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