

# EXECUTIVE SUMMARY

Complied as per ToR Obtained vide

**Lr.No.SEIAA-TN/F.No.7661/SEAC/TOR-787/2020 Dated: 06.10.2020**

**For**

**Tvl. Teru Murugan Blue Metal  
ROUGH STONE QUARRY**

S.F. No 126/2(P), 127/1(P), 133/1(P), 133/2(P) – Extent: 4.55.0 ha

Thennilai (East) Village, Pugalur Taluk, Karur District,  
Tamil Nadu State

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

**\* CLUSTER EXTENT = 8.99.0 Ha**

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

**Project Proponent**

**Tvl. Teru Murugan Blue Metal,**

Thiru. P.Subramani  
Managing Partner,  
No. 506, Kattumunnur,  
Pugalur Taulk,  
Karur – 639 111

**Environmental Consultant**



**GEO EXPLORATION AND MINING SOLUTIONS**

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## 1. INTRODUCTION

Tvl. Teru Murugan Blue Metal applied for Rough stone quarry lease over an extent of 4.55.0 ha in S.F. No 126/2(P), 127/1(P), 133/1(P), 133/2(P), in Thennilai (East) Village, Pugalur Taluk, Karur District, Tamil Nadu State as per the Amendment Rules 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959.

There are 2 Existing Quarries within the radius of 500m from the periphery of this Proposed Project Site (Ref: 500 m Radius Letter Issued by Assistant Director (i/c), Department of Geology and Mining vides Letter Rc.No.555/Mines/2019 Dated: 27.05.2020).

Now, as per MoEF & CC Notification S.O. 2269 (E) Dated: 01.07.2016, the cluster area is calculated to an extent of 8.99.0 ha considering this proposed quarry & two existing quarries, the Cumulative Environmental Impact Assessment and Environmental Management Plan prepared accordingly in compliance with the ToR obtained vide Lr.No.SEIAA-TN/F.No.7661/SEAC/TOR-787/2020 Dated: 06.10.2020.

### **“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”**

#### 1.1 DETAILS OF PROJECT PROPONENT –

Name of the Project Proponent : Tvl. Teru Murugan Blue Metal  
 Address : Thiru. P.Subramani ,  
 Managing Partner  
 No. 506, Kattumunnur, Pugalur Taluk,  
 Karur - 639 111  
 State : Tamil Nadu  
 Mobile No : + 91 94422 78601 & 9788854365  
 (The project proponent belongs to the partnership firm category)

#### 1.2 QUARRY DETAILS WITHIN 500 M RADIUS

Sl.No.	Name of Quarry	SF.No.	Extent	Details
P-1	Tvl. Teru Murugan Blue Metal, Rough stone Quarry	126/2(P), 127/1(P), 133/1(P), 133/2(P)	4.55.0 Ha	ToR obtained vide Lr.No.SEIAA-TN/F.No.7661/SEAC/ToR-787/2020 Dated:06.10.2020
E-1	Tvl. Teru Murugan Blue Metal, Rough stone Quarry	126/2(P), 127/1(P)	2.28.0 Ha	20.01.2016 – 19.01.2021
E-2	P.K.Subramani, Rough Stone Quarry	509/1 Part	2.16.0 Ha	19.12.2015 – 18.12.2020
<b>TOTAL CLUSTER EXTENT</b>			<b>8.99.0 Ha</b>	

**Note:**

- Project E1 was stopped due to expiry of quarry lease period (expired on 19.01.2021) and is not considered for cumulative impact as there are no on-going mining operations during the Baseline Monitoring Period of Dec 2020 to Feb 2021. But this project (E1) is considered for cluster calculation.
- Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

### 1.3 SALIENT FEATURES OF THE PROPOSAL – P1

Name of the Quarry	Tvl. Teru Murugan Blue Metal – Rough stone quarry		
Mining Plan Period	5 Years		
Toposheet No	58 F/13		
Latitude between	10°59'08.89"N to 10°59'16.79"N		
Longitude between	77°52'59.75"E to 77°53'09.34"E		
Topography	Plain topography with a gentle slope towards North Eastern side. The altitude of the area is 176m AMSL.		
Existing pit dimension	Length (m)	Width (m)	Depth (m)
	241	170	40m bgl
Geological Resources	Rough stone in m <sup>3</sup>		Topsoil in m <sup>3</sup>
	5,11,978		2,316
Mineable Reserves	Rough stone in m <sup>3</sup>		Topsoil in m <sup>3</sup>
	2,44,209		-
Year wise Production	Rough stone in m <sup>3</sup>		Topsoil in m <sup>3</sup>
	2,44,209		-
Ultimate pit dimension	Length (m)	Width (m)	Depth (m)
	241	170	42m bgl
Proposed depth of mining	42m below ground level (176m - 134m AMSL)		
Water level in surrounding area	60-65 m bgl		
Machinery proposed	Jack Hammer		6
	Compressor		2
	Hydraulic Excavator		2
	Tippers		4
Blasting method	Controlled blasting by using Slurry Explosive with MSD detonators. No deep hole drilling is proposed.		
Manpower deployment	31		
Total Project cost	Project Cost		Rs.66,47,300/-
	Environmental Monitoring Cost		Rs.3,80,000/-
	Total		Rs.70,27,300/-
CER Cost @ 2% of the Project Cost	Rs. 1,40,546/-		
Nearby Water Bodies	Canal		440m NE
	Canal		1.5km NW
	Noyil River		4km NW
	Aathupalayam Tank		8km NW
	Cauvery River		9.5km NW
	Canal		440m NE
Green Belt development	It is proposed to plant 315 trees in 2850 sq.m area in the safety barrier.		
Proposed Water Requirement	5 KLD		
Nearest habitation	400m NW		

Source: Approved Mining Plan

### 1.4 STATUTORY DETAILS

- The project proponent had applied for Rough stone quarry lease over an extent of 4.55.0 ha of Patta Land in SF.No 126/2(P), 127/1(P), 133/1(P), 133/2(P) of , Thennilai (East) Village, Pugalur Taluk and Karur District, Tamil Nadu State – Dated:16.09.2019

- The application was processed and has been recommended for quarrying lease with precise area communication vides Rc. No.555/Mines/2019,Dated:13.03.2020 (Enclosed with Mining plan) issued by the District Collector, Karur for preparation of Mining Plan and Obtaining Prior Environmental Clearance from SEIAA, TN.
- The Mining Plan was prepared and got approved by Joint Director, Geology and Mining, Karur District, vide Letter No: Rc.No:555/Mines/2019, Dated: 22.05.2020.
- 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.
- Therefore, the project proponent submitted their online application for ToR for EC on 25.06.2020 vide online proposal number – SIA/TN/MIN/54182/2020.
- The proposal was placed in 168<sup>th</sup> SEAC Meeting held on 05.08.2020 and considered in 398<sup>th</sup> SEIAA Meeting Dated: 23.09.2020 for grant ToR and issued Terms of Reference (ToR) for preparation of EIA/EMP vide Letter No. SEIAA-TN/F.No.7661/SEAC/TOR-787/2020 Dated: 06.10.2020.

## 2. PROJECT DESCRIPTION

The proponent applied for Quarry lease dated 16.09.2019. The precise area communication letter issued by District Collector, vide Lr. No. 555/Kanimam/2019, Dated 13.03.2020, the mining plan has been prepared and got approved by the Deputy Director, Rc.No. 555/Mines/2019 Dated 22.05.2020. Previously the quarry lease was granted to Thiru.P.K.Palanisamy, S/o.Karuppana Gounder, vide proceeding of the District collector, Karur in Rc.B.No.306/G&M/2010, Dated:06.01.2011 (01.02.2011 to 31.01.2016). During this lease period the lessee excavated a pit in the project area the details of the existing pit dimension is

Pit I- 241m (L) x 170m (W) x 40m (D),

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

<b>Nearest Village/Habitation</b>	Munnur- 1Km-NE (Population = 2,600)
<b>Nearest Town</b>	Kodumudi – 10km-N
<b>Nearest Roadway</b>	Village road- 750m N (NH-81) Karur- Coimbatore- 2.5Km –S (SH-172A) Karur-Kodumudi- 8Km-N
<b>Nearest Railway Station &amp; Line</b>	Kodumudi – 10Km-N Erode - Karur railway line – 9Km NW
<b>Nearest Airport</b>	Coimbatore – 92Km-W
<b>Seaport</b>	Kochi – 212Km - SW

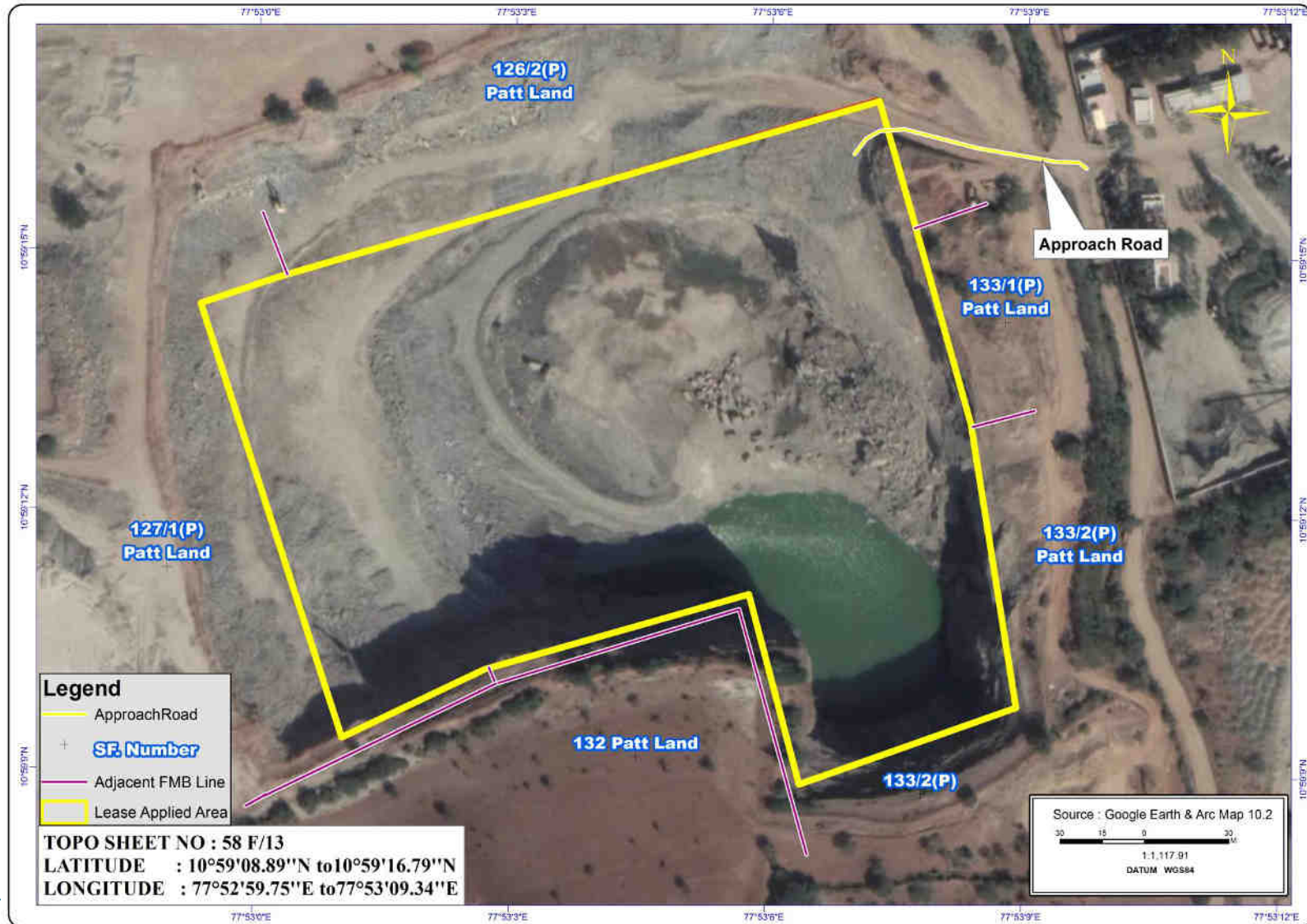
**2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA**

<b>DESCRIPTION</b>	<b>PRESENT AREA IN (HA)</b>	<b>AREA AT THE END OF LIFE OF QUARRY (HA)</b>
Area under quarry	3.87.50	3.87.50
Infrastructure	NIL	0.01.0
Roads	0.01.0	0.02.0
Green Belt	NIL	0.28.50
Un Utilized area	0.66.5	0.36.00
<b>GRAND TOTAL</b>	<b>4.55.0</b>	<b>4.55.0</b>

**2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA**

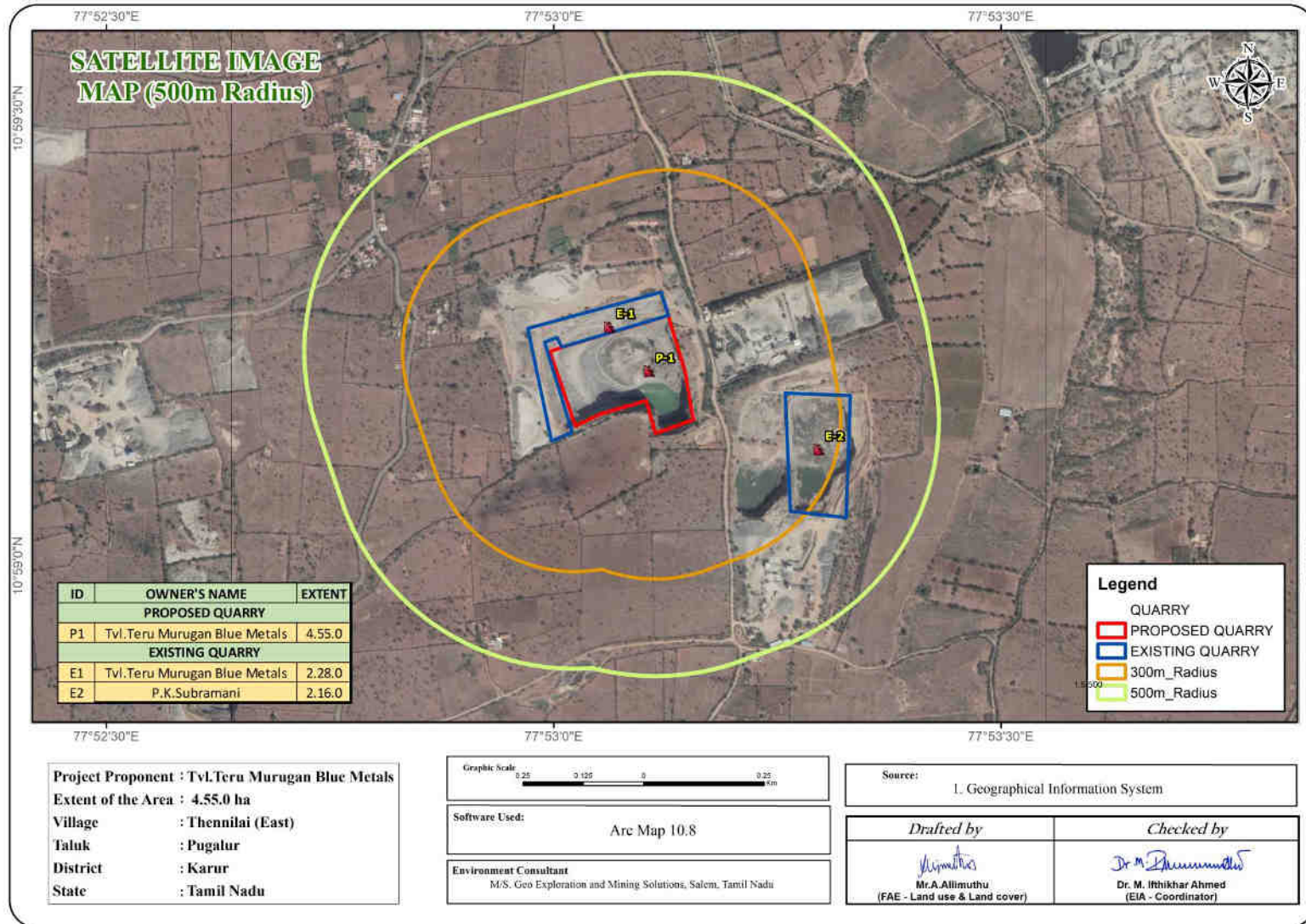
<b>Description</b>	<b>Rough stone in m<sup>3</sup></b>	<b>Topsoil in m<sup>3</sup></b>
Geological Resources	5,11,978	2,316
Mineable Reserves	2,44,209	-
Year-wise Production	2,44,209	-
Number of Working Days	300 Days	
Production per day	163	-
No of Lorry loads (6m <sup>3</sup> per load)	27	-
Proposed depth for mining plan period	42m	-
Total Depth	42m bgl (176 AMSL to 134m AMSL)	

FIGURE – 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA





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



**FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS**

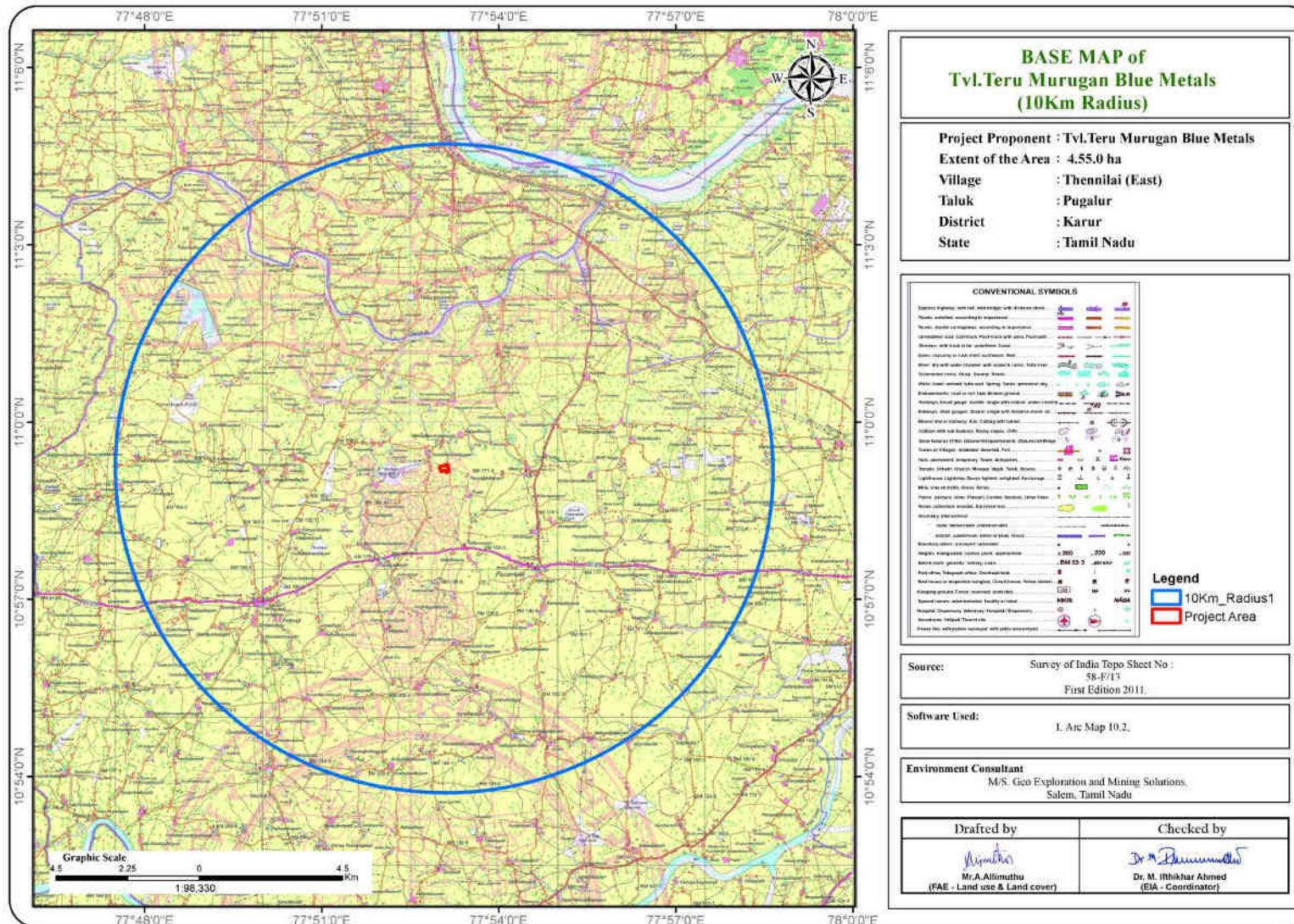




FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN

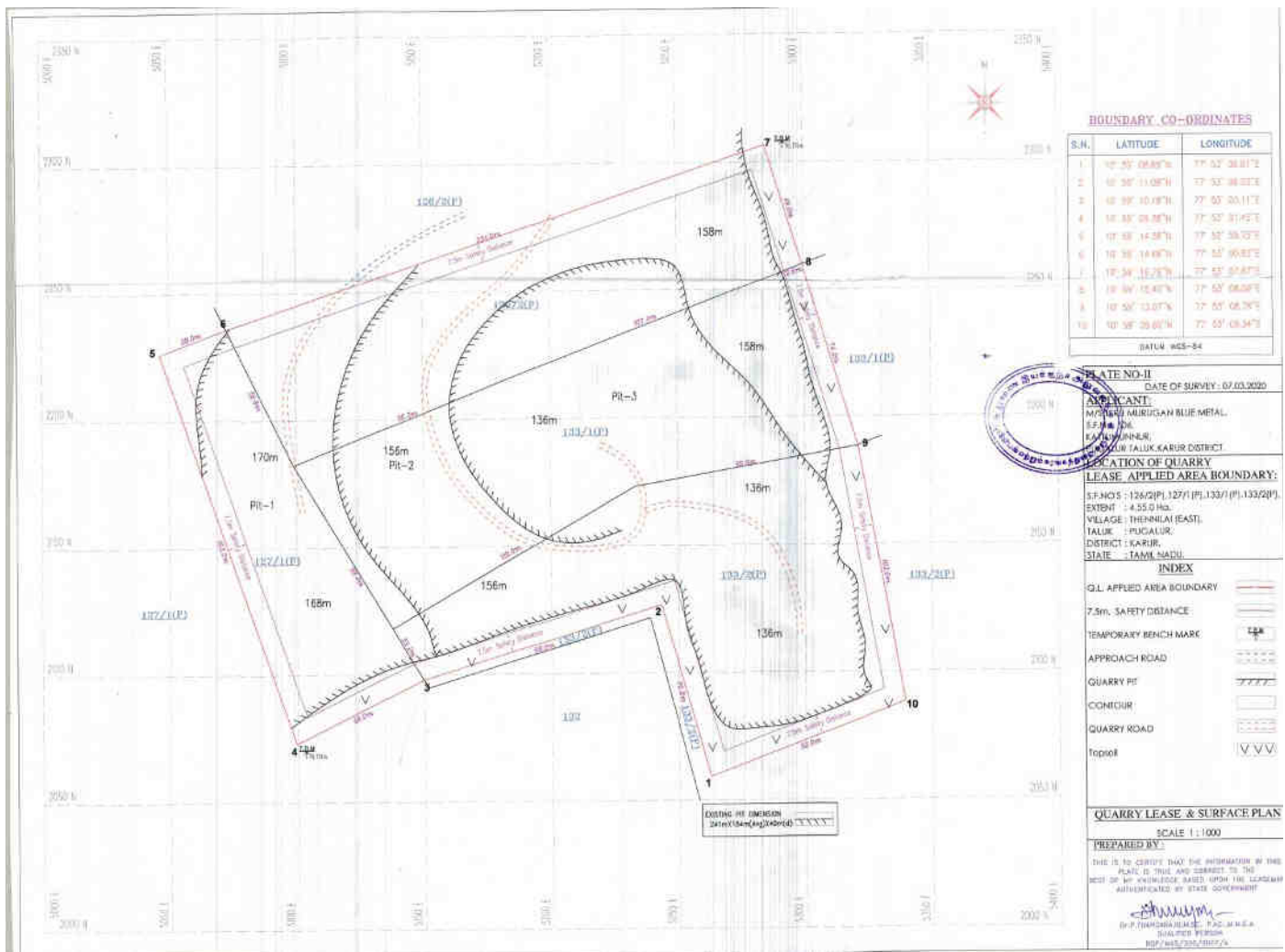


FIGURE – 5: PHOTOGRAPHS OF THE PROJECT AREA



## 2.4 METHOD OF MINING

The method of mining is Opencast Mechanized Mining Method 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 overburden (Top soil) will be safely removed and preserved in the boundary barrier to facilitate the Greenbelt development.

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	6	1.2m to 2.0m	Compressed air
2	Compressor	2	50 HP	Diesel Drive
3	Excavator with Bucket/ Rock Breaker Unit	2	150-200 HP	Diesel Drive
7	Tippers / Dumpers	4	20 Tonnes	Diesel Drive

## 2.6 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 principle closure objectives for rehabilitated mines are 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.

## 2.7 ULTIMATE PIT DIMENSION

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
I	241	170	42m (176m AMSL to 134m AMSL)

### 3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering December 2020, January 2021 & February 2021 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by OMEGAA LABORATORIES ISO 9001: 2008, OHSAS 18001: 2007 Certified & MoEF Notified Laboratory.

#### 3.1 ENVIRONMENT MONITORING ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM10, PM 2.5, SO2, NO2	Continuous 24 hourly samples twice a week for three months at 8 locations (1 Core & 7 Buffer)
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of Tiruchirappalli IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 4 ground water and 2 surface water locations once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was
5	Noise levels	Noise levels in dB(A)	7 locations – data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 5 locations during study period
7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk analysis done for the risk associated with mining.

#### 3.2 LAND ENVIRONMENT

Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

The majority of the land in the study area is Fallow and Crop land 76.1%. The total mining area within the study area is 4.55.0 ha i.e., 0.014 %. The cluster area of 8.99.0 ha contributes about 0.027 % of the total mining area within the study area. This percentage of Mining Activities shall not have any significant impact on the environment. The project area is exhibits Plain Topography, the gentle sloping towards North East side and the altitude of the area is 176m AMSL

There is no Wildlife Sanctuaries, National Park and Archaeological monuments within project area. Therefore, there will be no need to acquisition/diversion of forest land.

### 3.3 SOIL ENVIRONMENT

- ✚ Variation in pH of the soil in the study area was found to be moderately alkaline to strongly alkaline in nature (7.23 to 8.24).
- ✚ Mostly the soils collected from different location in the study area are Clay and Sandy Loam Soil. Its Water Holding capacity range between 36.2 – 42.9 %..
- ✚ The bulk density of the soil in the study area ranged between 1.22 to 1.37g/cc.
- ✚ The available Nitrogen content range between 121 to 142 kg/ha
- ✚ The available Phosphorus content range between 25.4 to 40.3 kg/ha
- ✚ The available Potassium range between 32.3 to 45.7 mg/kg

### 3.4 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

#### Surface Water

The analysis results indicate that the pH is from 7.26 to 7.51, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be 185 to 204 mg/l. The Total Dissolved Solids (TDS) concentrations varied from 251 to 206 mg/l.

Chloride and fluoride concentrations are found within the limit values. Nitrates varied from 10.6 to 13.2 mg/l. Bacteriological studies reveal that coli form bacteria are not present in the samples. The heavy metal content is below detectable limits.

#### Ground Water

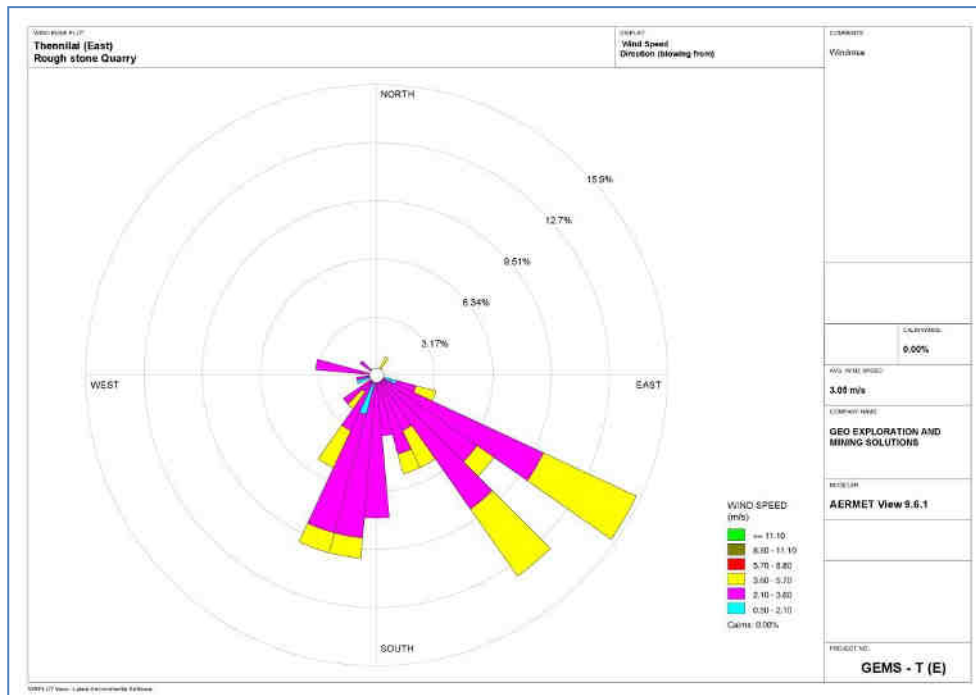
The analysis results indicate that the pH ranges in between 7.16 to 7.31, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 133 to 231 mg/l. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 152 to 368 mg/l.

Chlorides at all the locations were within the permissible limit, The Total Dissolved Solids were found in the range of 152 to 368 mg/l in all samples. The Total hardness varied between 133 to 231 mg/l for all samples.

### 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**

As per monitoring data, PM<sub>10</sub> ranges from 41.2 µg/m<sup>3</sup> to 46.8 µg/m<sup>3</sup>, PM<sub>2.5</sub> data ranges from 20.3 µg/m<sup>3</sup> to 26.7 µg/m<sup>3</sup>, SO<sub>2</sub> ranges from 7.1 µg/m<sup>3</sup> to 18.8 µg/m<sup>3</sup> and NO<sub>2</sub> data ranges from 10.2 µg/m<sup>3</sup> to 18.9 µg/m<sup>3</sup>.

The maximum concentration in the core zone is due to the quarrying activity of the cluster of quarries situated within 500m radius. 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 41.4 – 42.3 dB (A) Leq and during night time were from 38 – 38.5 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 38.4 – 39.8 dB (A) Leq and during night time were from 37.7 – 38.5 dB (A) Leq.

The values of noise observed in some of the areas are primarily owing to quarrying activities due to cluster of quarries within 500m radius, movement of vehicles and other anthropogenic activities. Noise monitoring results reveal that the maximum & minimum noise levels at day time were recorded in the range of 42.3 dB(A) in core zone and 38.4 dB(A) in near crusher and 38.5 dB(A) in core zone & 37.7 dB(A) in Munnur village at night time. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

### 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 project 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.

## **3. 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**

- 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., 7.5 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
- 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 5m x 5m 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.
- 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 include 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 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.

## **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 is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km.

There are no migratory corridors, migratory avian-fauna, and 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.

##### GREENBELT DEVELOPMENT PLAN

Year	No of Trees proposed to be planted	Survival %	Area to be covered	Name of the species	No of trees expected to be grown
I	63	80%	570	Neem, Pongamia Pinnata, Casuarina, etc.	50
II	63	80%	570		50
III	63	80%	570		50
IV	63	80%	570		50
V	63	80%	570		50

#### 4.6 SOCIO ECONOMIC ENVIRONMENT

##### ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 31 persons and indirectly employment will provide around 10 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.

#### 4. 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.

#### 5. ENVIRONMENT MONITORING PROGRAM

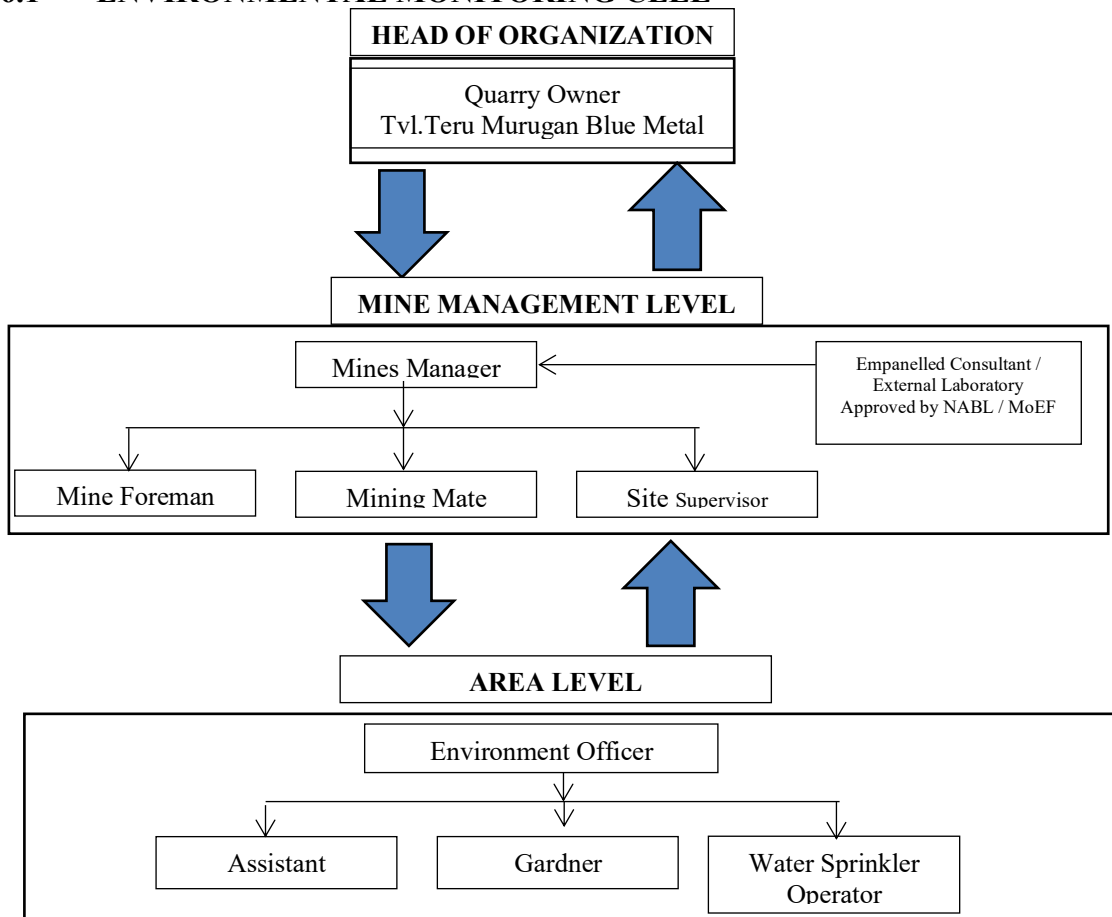
Usually an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

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

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 <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
2	Meteorology	At mine site before start of Air Quality Monitoring & Secondary Data from Tiruchirappalli IMD station.	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1 SW & 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 31<sup>st</sup> 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

Quarry	Mineable Reserves In m <sup>3</sup>	Proposed production for five- year period	Production Per day in m <sup>3</sup>	Number of Lorry loads per Week
P1	2,44,209	2,44,209	163	163
E1	1,14,695	1,14,695	76	13
E2	1,88,787	1,88,787	126	126
<b>Total</b>	<b>5,47,691</b>	<b>5,47,691</b>	<b>365</b>	<b>365</b>

**PREDICTED NOISE INCREMENTAL VALUES IN 500 M RADIUS QUARRIES**

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	42.3	48.1	49.	55
Habitation Near E1	41.4	46.8	47.9	
Habitation Near E2	38.2	40.1	42.3	

**SOCIO ECONOMIC BENEFITS FROM 2 MINES**

Location code	Employment	Project Cost	CER @ 2%
P1	31	Rs.70,27,300/-	Rs.1,40,700/-
E1	11	Rs.60,50,000	Rs.1,21,000/-
E2	11	Rs.60,14,000/-	Rs.1,20,280/-
<b>Total</b>	<b>44</b>	<b>Rs. 1,30,41,300/-</b>	<b>Rs. 3,81,980/-</b>

**8.PROJECT BENEFITS**

The Proposed Quarry aims to produce about 2,44,209 m<sup>3</sup> 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
- ✚ To meet out the demand supply gap of Rough stone

**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**

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.