

EXECUTIVE SUMMARY OF EIA DRAFT

FOR PROJECT PROPONENT

S. No.	Name	Lease Extent
1	Thiru.A. Myilsamy	1.62.0ha

ROUGH STONE & GRAVEL QUARRY LEASE

At

Pachapalayam Village, Sulur Taluk, Coimbatore District, Tamil Nadu State

S.F. No: 42/1B & 43/1B

Extent: 1.62.0 hectares

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

*** CLUSTER EXTENT = 5.38.0 Hectares**

ToR Issued vide Lr.No. SEIAA- TN/F.No.7909/SEAC/ToR-886/2020 Dated
16.03.2021

NAME OF PROPOSED PROJECT PROPONENTS APPLYING IN CLUSTER

Thiru.A. Myilsamy

S/o. Aruchamy, No.4A, Thekani,
Periyaakuyilai Post, Chettipalayam Via,
Coimbatore District- 641 201

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS



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Valid till : 29th Dec.2023

1. INTRODUCTION

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound project.

Rough Stone are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of two Proposed and one Existing quarry, the total extent of Cluster is 5.38.0 ha in Pachapalayam Village, Sulur Taluk, Coimbatore district and the 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 issued vide **Letter No: SEIAA-TN/F.No.7909/SEAC/ToR-886/2020 Dated:16.03.2021** for Thiru.A. Myilsamy rough stone and Gravel quarry and the baseline monitoring study has been carried out during the period of March – May 2021.

Now, 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 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category “B1” and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed project is categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

“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

Code	P1
Name of the Project	Thiru.A. Myilsamy S/o.Aruchamy, No.4A, Thekani, Periyakuyilai Post, Chettipalayam Via, Coimbatore District – 641201 Tamil Nadu
Status	Proponent is Individual

Table 1.2 Quarry Details within 500m Radius

PROPOSED QUARRY				
Code	Name of the Owner	Village & S.F. No's	Extent (Hect)	Status
P1	Thiru.A. Myilsamy, S/o. Aruchamy, No.4A, Thekani, Periyaakuyilai Post, Chettipalayam Via, Coimbatore –641201	Pachapalayam 42/1B and 43/1B	1.62.0 ha	ToR obtained vide Lr.No. SEIAA- TN/F.No.7909/SEAC/To R-886/2020 Dated:16.03.2021
TOTAL			1.62.0 ha	
EXISTING QUARRIES				
CODE	Name of the Owner	S.F. No	Extent	Status
E1	Thiru.E.Anantha Kumar, S\o Eswara Gounder, No.3/105, Malayandipalayam, Eachanari, Coimbatore District	245/2A(P)246 /1A(P) & 246/2(P)	1.62.5 HA	02.06.2016 to 01.06.2021
E2	K. Prakash S/o.M.Krishnasamy, No.3/96, Periyakuylai Post, Chettipalayam Via, Coimbatore District – 641 201	51/1A and 51/1B	2.13.5 ha	EC Granted
TOTAL			3.76.0 ha	
TOTAL CLUSTER EXTENT			5.38.0 ha	

Source: i) AD Letter – Rc.No.424/Mines/2019, Dated:29.07.2020

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

The Proposed Rough Stone and Gravel Quarry require prior Environmental Clearance. There are One proposed and two existing quarries forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 5.38.0 ha

Table 1.3 Salient Features of the Proposed Project in Cluster

Name of the Quarry	Thiru.A. Myilsamy – Rough stone and Gravel quarry	
Toposheet No	58-F/01	
Latitude between	10°52'59.16" N to 10°53'04.27" N	
Longitude between	77°04'16.17" E to 77°04'23.98" E	
Elevation Range	386m-392m AMSL	
Ultimate depth of Mining	32m bgl (2mGravel + 30m Rough Stone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	4,36,896	32,064
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	1,36,150	22,016
Proposed reserve for five years upto the depth of 32m bgl	1,36,150	22,016
Ultimate Pit Dimension	225m (L) x 50m (W) x 32m (D) bgl	
Water Level in the surrounds area	60 to 65m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The area exhibits almost plain topography, gentle sloping towards South western side.	
Machinery proposed	Jack Hammer	4 Nos
	Compressor	1 Nos
	Excavator with Bucket / Rock Breaker	1 Nos
	Tippers	2 Nos
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	20 Nos	
Project Cost	Rs.38,33,400/-	
CER Cost @ 2% of Project Cost	Rs.76,600/-	
Nearby Water Bodies	Odai Near Panappatti	2.7km SE
	Odai	430m NW
	Tank Near Akkanaickenpalayam	7.4km East
	Tank Near Gurunallipalayam	6.6km South
Greenbelt Development Plan	Proposed to plant 350 trees in 3150 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	2.61 KLD	
Nearest Habitation	400m - West	

1.4 STATUTORY DETAILS

- ❖ The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 19.06.2019
- ❖ Precise area Communication Letter was issued by the District Collector, Coimbatore **R.C.424/Mines/2019 Dated:27.02.2020.**
- ❖ The Mining Plan was prepared by Recognized Qualified Person and approved by Joint Director/Assistant Director(i/c), Dept of Geology and Mining, Coimbatore District, vide **Rc.No.424/Mines/2019, Dated: 20.03.2020**
- ❖ 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
- ❖ Proponent applied for ToR for Environmental Clearance videos online Proposal No. **SIA/TN/MIN/57115/2020 Dated: 30.09.2020.**
- ❖ SEIAA–TN office File No. **SEIAA – TN/F.NO. 7909/SEAC/TOR – 886/2020 dated: 16.03.2021.**

2. PROJECT DESCRIPTION

The Proposed Rough Stone and Gravel Quarry require prior Environmental Clearance. There are One proposed and two existing quarries forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 5.38.0 ha.

As the extent of cluster are more than 5 ha, the proposal falls under B1 Category as per the 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, and requirement for EIA, EMP and Public Consultation for obtaining Environmental Clearance.

It is a fresh quarry, the quarrying operation will be carried out by opencast mechanized method involving the 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 CLUSTER QUARRIES

Table 2.1 Accessibility details to the site

Nearest Roadway	(NH-209) Coimbatore- Pollachi – 7km-West (SH-163) Palladam – Cochin Frontier Road – 5km-NW
Nearest Village	Ponnakkani – 2.7km-East
Nearest Town	Sulur-15km-NE
Nearest Railway	Chettipalayam-5km-NW Coimbatore – Pollachi railway line- 3.8km-West
Nearest Airport	Coimbatore- 17km-NW
Seaport	Cochin-130km-SW

2.2 LAND USE PATTERN OF THE CORE ZONE

Table 2.3 Land Use Pattern of the Core zone

LAND USE PATTERN		
Description	Present area in (Hect)	Area at the end of life of quarry (Hect)
Area under quarry	Nil	1.12.50
Infrastructure	Nil	0.01.00
Roads	Nil	0.01.00
Green Belt	Nil	0.31.5
Un – utilized area	1.62.0	0.06.0
Grand Total	1.62.0	1.62.0

Source: Approved mining plan

2.3 OPERATIONAL DETAILS FOR PROPOSED PROJECT

Table 2.4 Operational Details for the Proposed Project

PARTICULARS	DETAILS	
	Rough Stone in m³ (5 Year Plan period)	Gravel in m³
Geological Resources in m ³	4,36,896	32,064
Mineable Reserves in m ³	1,36,150	22,016
Proposed production for five years plan period as per the ToR	1,36,150	22,016
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m ³	91	15
No of Lorry loads (6m ³ per load)	15	3
Total Depth of Mining	32m (D) (2m Gravel + 30m Rough stone bgl)	

Source: Approved Mining Plan



Figure 1 Google image showing quarry lease boundary

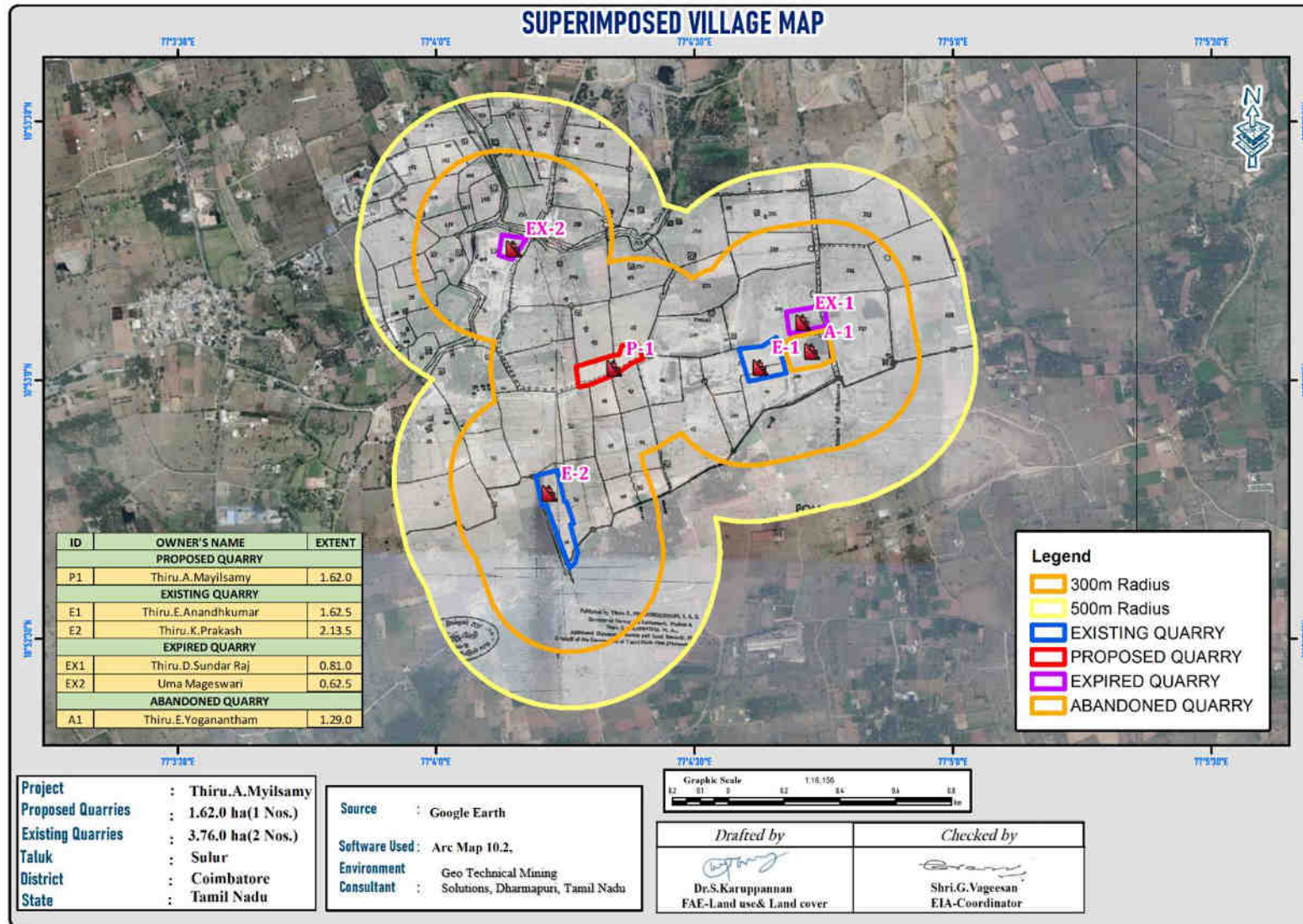


Figure 2 Village map superimposed on the google earth image (500m radius)

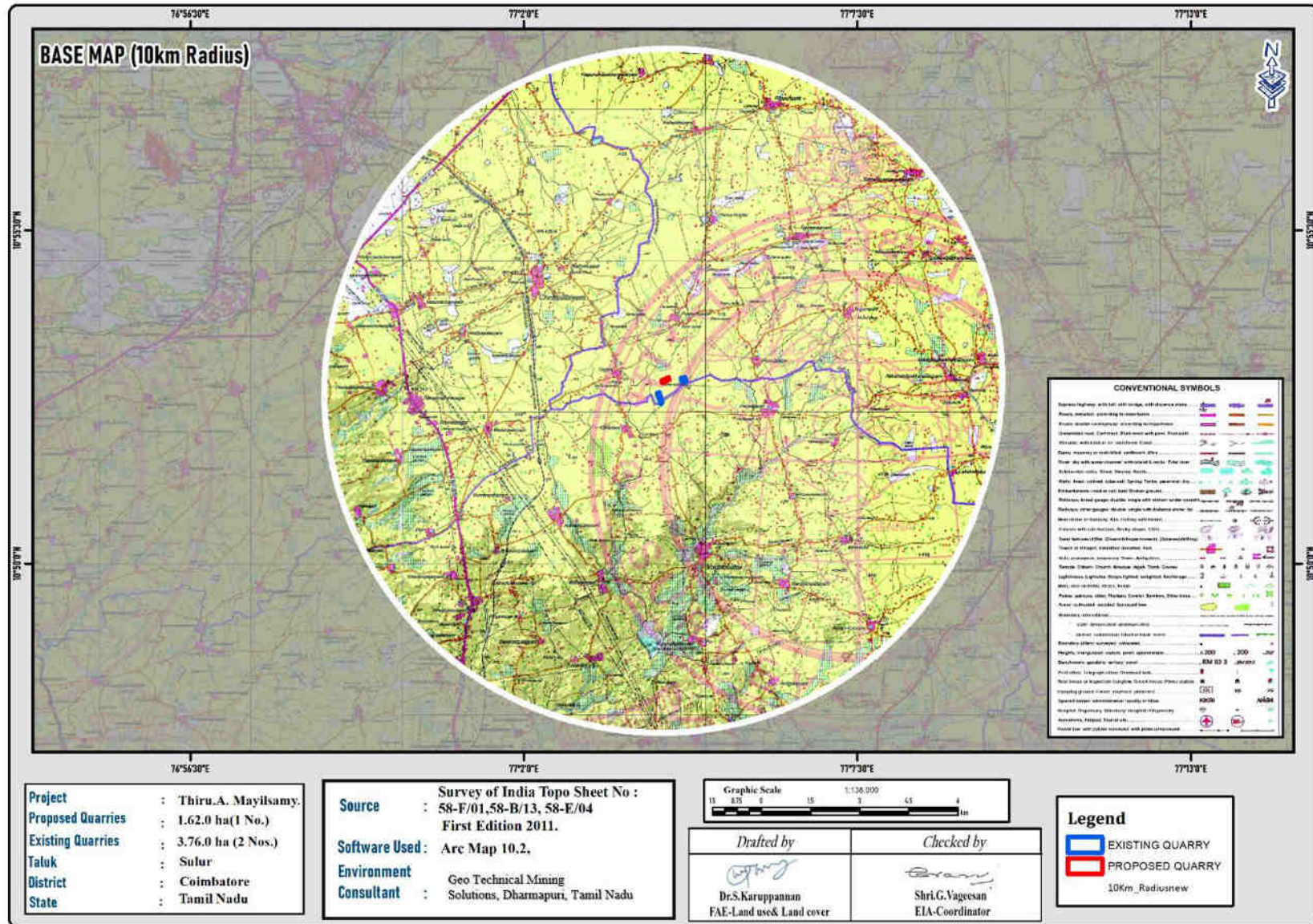


Figure 3 Geo-referenced toposheet showing the proposed project site around 10km radius

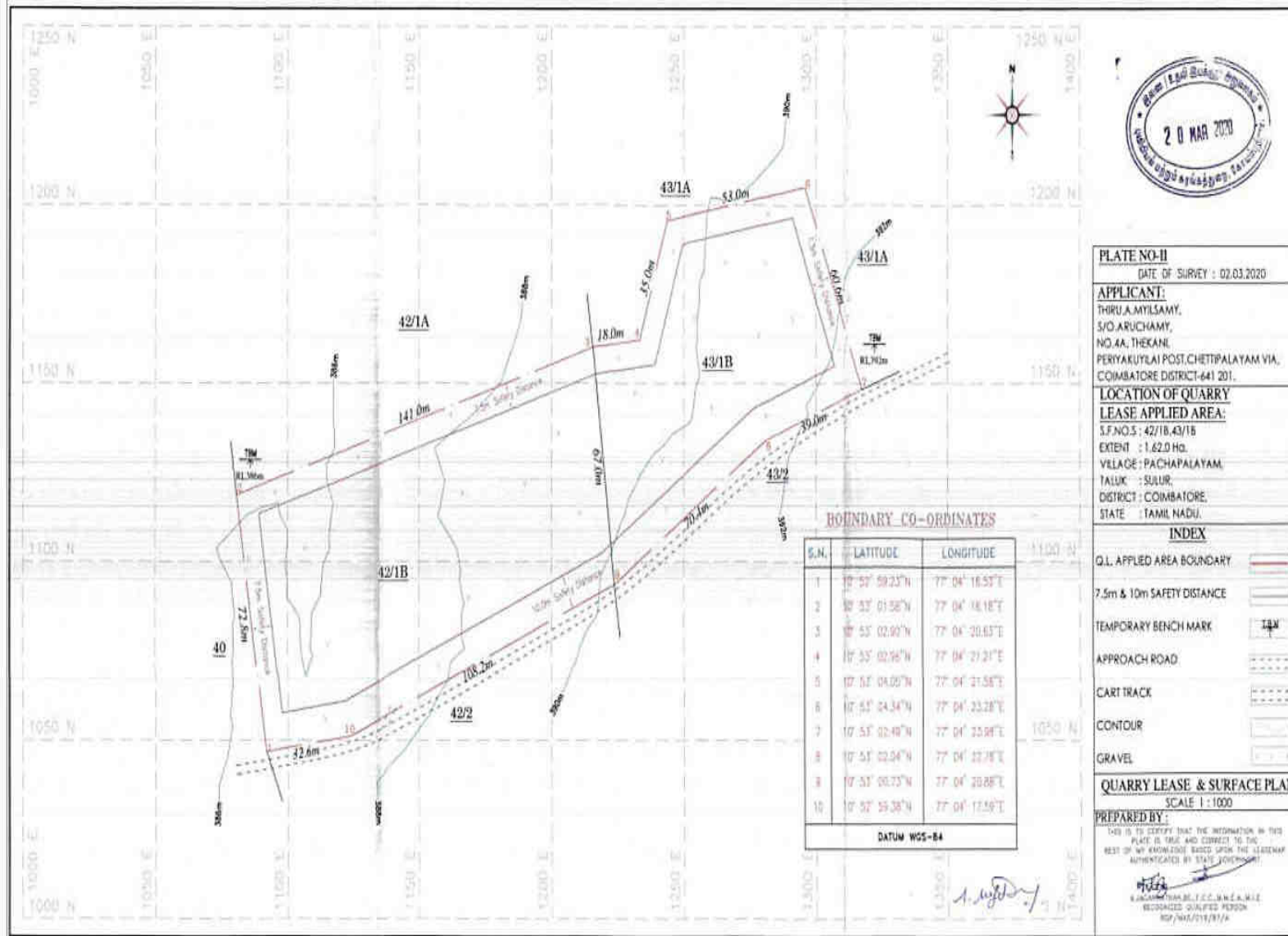


Figure 4 Quarry lease plan & surface plan for proposed project

2.4 METHOD OF MINING

Proposed Method of Mining is common for the proposed project. The method of mining is Opencast Mechanized Mining Method involving formation of 5.0-meter height benches with a bench width of 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 petrogenetic 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.

2.5 PROPOSED MACHINERY DEPLOYMENT

TABLE 2.4 Proposed Machinery Deployment

S.No.	TYPE	NOs	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	4	1.2m to 2m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Tipper / Dumpers	2	20 Tonnes	Diesel Drive

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- At the end of life of mine, the excavated mine pit 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 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.

TABLE 2.6 Ultimate Pit Dimension

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	225	50	32m bgl

3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering March 2021 – May 2021 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by Omega Laboratories, ISO 9001: 2015, ISO 45001: 2018 Certified & MoEF Notified Laboratory

TABLE 3.1 ENVIRONMENT MONITORING ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	24 hourly samples twice a week for three months at 8 locations
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 IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 5 ground water and 1 surface water locations once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	primary survey and secondary data
5	Noise levels	Noise levels in dB(A)	At 8 locations data monitored once for 24 hours during EIA study.
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 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 assessment done for the mining associated activities

3.2 LAND ENVIRONMENT

The guidelines issued by NNRMS, Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. 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.

TABLE 3.2 Land Use / Land Cover Table 10 Km Radius

S.No	CLASSIFICATION	AREA_HA	AREA_%
BUILTUP			
1	URBAN	792.44	2.31
	RURAL	2946.66	8.60
2	MINING	2296.15	6.70
AGRICULTURAL LAND			
3	CROP LAND	10534.29	30.73
4	AGRICULTURAL PLANTATION	5177.62	15.11
BARREN/WASTE LANDS			
7	SCRUB LAND	11919.97	34.78
WETLANDS/ WATER BODIES			
9	WATER BODIES	608.87	1.78
	Total	34213	100.00

Interpretation

From the above table (3.2), pie diagram (Fig.3.1), pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture land (includes crop land) 45.84% followed by Built-up Rural 17.61%, Water bodies 1.78% and Mining – 6.70%.

The total mining area within the study area is 2296.15 ha i.e., 6.70 %. The cluster area of 5.38.0 ha contributes about 0.0023% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

The proposed project area is flat terrain covered with gravel formation of 2-4m thickness. Massive charnockite formation is found beneath the 2-4m gravel formation, which is clearly inferred from the nearby existing quarry pits.

3.3 SOIL ENVIRONMENT

Interpretation & Conclusion

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 Loam Soil and Bulk Density of Soils in the study area varied between 0.91-1.3 g/cc. The Water Holding Capacity of the soil in the study area varied between 40.1-49.1%.

Chemical Characteristics

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.21 to 8.37
- The available Calcium (Ca) content range between 168.7 to 193.8 kg/ha
- The available Magnesium (Mg) content range between 27.1 to 30.4 kg/ha
- The available Sodium (Na) content range between 101 to 130 kg/ha
- The available Potassium (K) content range between 21.9 to 27.2mg/kg
- The available Chlorides content range between 158 to 192 mg/kg

Wilting co efficient in significant level would mean that the soil would support the vegetation. The soil properties in the buffer zone reveal that the soil can sustain vegetation. If amended suitability the core area can also withstand plantation.

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.

Gurunallipalayam Tank is the major surface water body in the study area and 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 drinking water for few months after rainy season.

Interpretation& Conclusion

Surface Water

The pH value of the water is 7.84 and turbidity is 8.10 found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH). Total Dissolved Solid 462 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter. Chloride content is 170 mg/l. sulphates is 14 mg/l. Total hardness 115 mg/l.

Ground Water

The pH of the water samples collected ranged from 6.71 to 8.08 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. The Total Dissolved Solids were found in the range of 312 - 552 mg/l in all samples. The Total hardness varied between 86– 172 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 existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality. 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

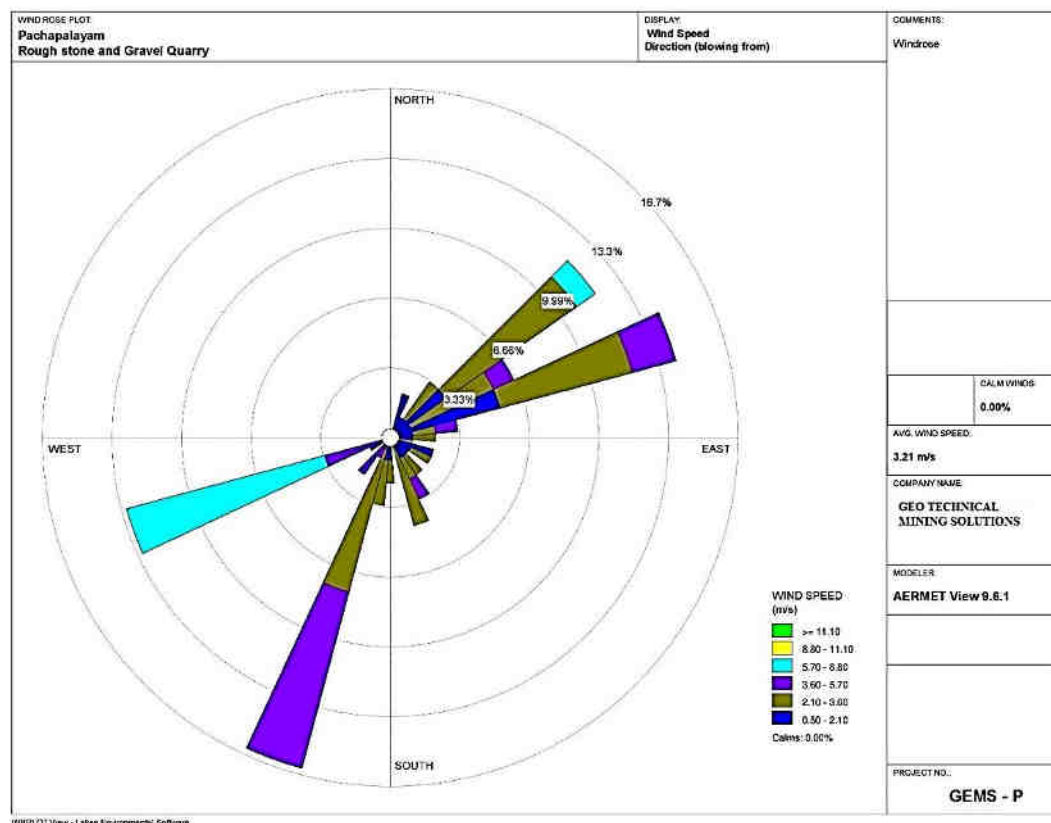


Figure 5.0 onsite windrose diagram

3.6 SUMMARY OF AMBIENT AIR QUALITY

The results of ambient air quality monitoring for the period (March 2021 – May 2021) are presented in the report. Data has been compiled for three months.

Interpretations & Conclusion

As per the monitoring data, PM₁₀ ranges from 36.9 µg/m³ to 46.6 µg/m³; PM_{2.5} from 15.9 µg/m³ to 23.6 µg/m³; SO₂ from 4.1 µg/m³ to 9.9 µg/m³; NO₂ from 14.5 µg/m³ to 21.3 µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. Noise levels recorded in core zone during day time were from 41.1 to 45.1 dB (A) Leq and during night time were from 37.5 to 38.0 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 41.8 to 45.8 dB (A) Leq and during night time were from 37.0 to 39.2 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.8 ECOLOGICAL ENVIRONMENT

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10 km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area.

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.

3.9 SOCIO ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. 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 features 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 20 persons to the local people there by improving the indirect employment opportunity in the area were around 30 persons 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

The main anticipated impact on the Land Environment due to quarrying operation is change in landscape, change in land use pattern. The total extent of the cluster quarries is **5.38.0 ha** including existing and proposed quarries in patta land. The ultimate depth of the quarrying is 32m below the ground level and will not intersect the ground water table. The project is site specific.

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 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 SOIL ENVIRONMENT

IMPACT ON SOIL ENVIRONMENT

The proposed project area is covered by a top soil of 1m thickness. The top soil will be removed during mining operations and preserved all along the boundary barrier to facilitate the greenbelt development which will inturn reduce the removal of the soil by eroding agencies.

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 impact due to quarrying on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity will not intersect ground water table as quarrying is proposed in the cluster quarries is 32m and water table is found at a depth of 60in rainy season and 65m BGL in summer season which is observed from the existing nearby bore wells.

The quarrying operation will be carried out well above the water table. There is no intersection of surface water bodies (Streams, Canal, Odai etc.,) in the project area. During rainy season rain water will be collected in the quarry pit and later used for greenbelt development and for the water sprinkling in the haul roads. There is no proposal for discharging of quarry pit water outside the project area.

MITIGATION MEASURES

The following mitigation measures are suggested for water management

The quarrying operation will be carried out well above the water table. There is no intersection of surface water bodies (Streams, Canal, Odai etc.,) in the proposed project areas. During rainy season rain water will be collected in the quarry pit and later used for greenbelt development and for the water sprinkling in the haul roads. There is no proposal for discharging

of quarry pit water outside the project areas. There is no proposal rough stone processing or workshop within the project area thus there is no effluent anticipated in the mines.

- With respect to Turbidity, Total Iron and Silica, Pre-treatment methods like settling or filtration, Water Softening (Ion Exchange) shall be adopted to make it fit for drinking purposes. But it can be used for other domestic purposes
- Rainwater will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting
- Construction of garland drains to divert surface run-off into the quarrying area
- 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
- Wastewater 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

4.4 AIR ENVIRONMENT

The air borne particulate matter is the main air pollutant in this opencast mining. The mining operation will be carried out by jackhammer drilling (32mm dia) and hydraulic excavators will be utilized for excavation of rough stone

ANTICIPATED IMPACT

The air borne particulate matter generated by quarrying operation and transportation. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO₂) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of rough stone and overburden, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate Matter (PM₁₀) affecting Ambient Air of the area on air environment and net increase in emissions by Open pit source modelling in AERMOD Software.

Anticipated incremental concentration due to this quarrying activity and net increase in emissions due to quarrying activities within 500 meters around the project area is predicted by Open Pit Source modelling using AERMOD Software.

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 time to be confirmed.
- ❖ 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 tarpaulin

- ❖ The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- ❖ 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 tippers
- ❖ 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.

4.5 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 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

- None of the plants will be cut during operational phase of the mine.
- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region.
- Wild life is not commonly found in the cluster area and its immediate environs because of lack of vegetal cover and surface water. Except few domestic animals, reptiles, hares and some common birds are observed in the study area.

MITIGATION MEASURES

The project site has a land to develop greenbelt within the lease area, along roads and other vacant areas. The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. Although, the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality by plantation services. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

- Plants that grow fast will be preferred.

- Preference for high canopy covers plants with local varieties.
- Perennial and evergreen plants will be preferred.

The development of Green Belt is an important aspect for any plant because:

- It helps in noise abatement for the surrounding area.
- It maintains the ecological balance.
- It increases the aesthetic value of site.

TABLE 4.1 GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	70	80%	630	Neem, Pongamia	56
II	70	80%	630	Pinnata,	56
III	70	80%	630	Casuarina etc.,	56
IV	70	80%	630		56
V	70	80%	630		56

4.6 SOCIO ECONOMIC ENVIRONMENT ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 20 persons and indirectly will get employment around 30 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 ENVIRONMENTAL MONITORING CELL

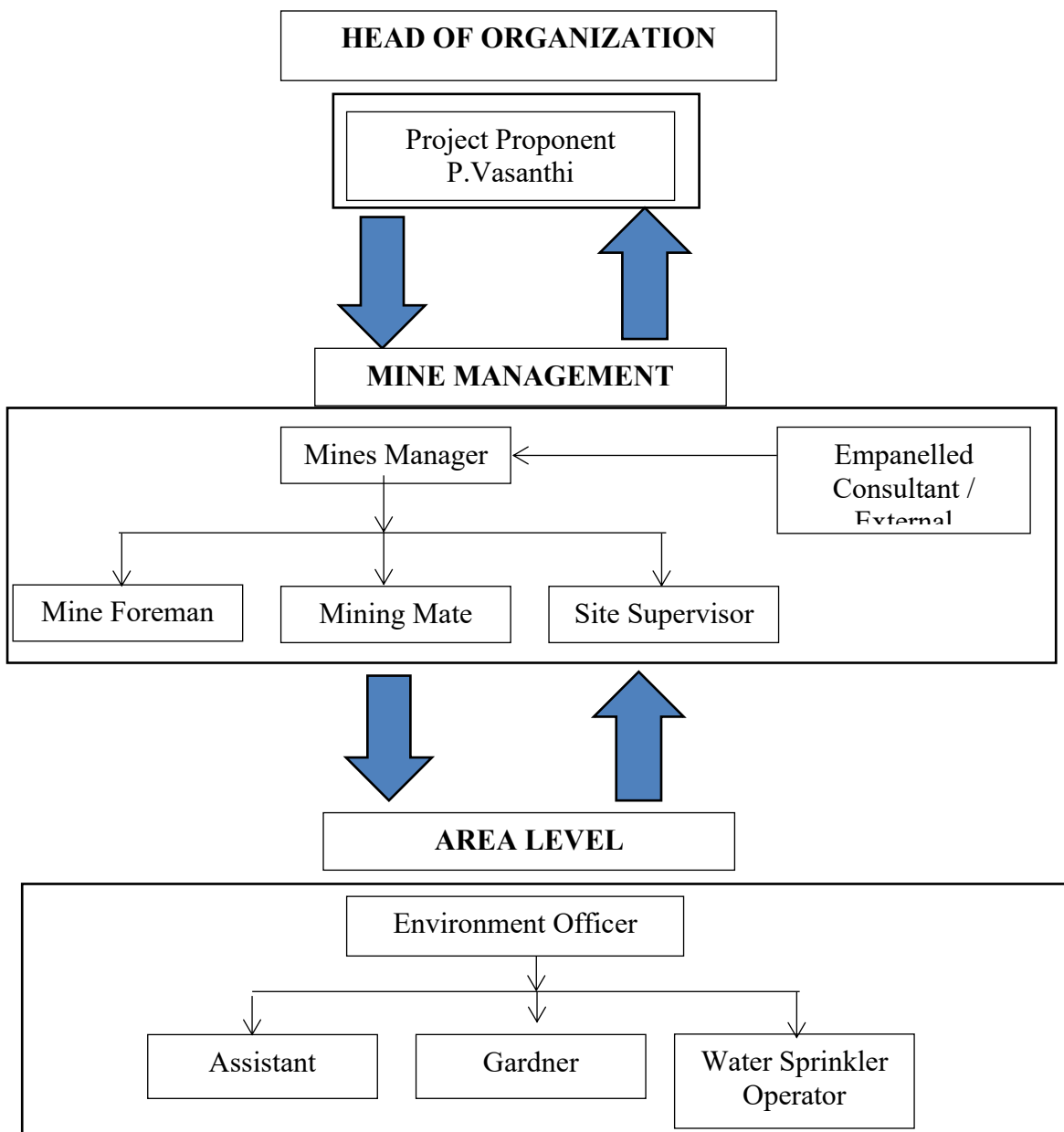


TABLE 6.1 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

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 (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 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 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

TABLE 7.1 CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Quarry	PROPOSED PRODUCTION DETAILS			
	5 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
P1	1,36,150	27,230	91	15
E1	2,05,100	41,020	136	23
E2	1,58,476	31,695	105	18
Grand Total	4,99,726	99,945	332	56

TABLE 7.2 CUMULATIVE PRODUCTION LOAD OF GRAVEL

Quarry	PROPOSED PRODUCTION DETAILS			
	2 - 3 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
P1	22,016	4,403	15	3
E1	24,240	4,848	16	3
E2	39,288	7,857	26	4
Grand Total	85,544	17,108	57	10

TABLE 7.3 PREDICTED NOISE INCREMENTAL VALUES

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	53.8	48.1	54.8	55
Habitation Near E1	48.1	40.4	48.8	
Habitation Near E2	47.3	49.0	51.2	

TABLE 7.4 NEAREST HABITATION FROM EACH MINE

Location ID	Distance in meters
Habitation Near P1	400m
Habitation Near E1	970m
Habitation Near E2	360m

TABLE 7.5 SOCIO ECONOMIC BENEFITS FROM 6 MINES

Code	Project Cost	CER @ 2%
P1	Rs.38,33,400	Rs. 76,600
E1	Rs. 58,47,500	Rs.1,16,950
E2	Rs.74,82,400	Rs.1,50,000
Total	Rs.1,71,63,300	Rs.3,43,550

8. PROJECT BENEFITS

The Proposed Project at Pachapalayam village aims to produce 1,36,150m³ of rough stone and 22,016 m³ of gravel over a period of 5 Years. The quarrying operation in the area will create rural employment. It has been observed that conditions of the villages around quarry areas are better than that of distant villages. 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 in construction industry

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.