

EXECUTIVE SUMMARY

PROJECT PROPONENT

Sl. No.	Proponent Name	Extent
1	Tmt.M.Selvathal, W/o.Meignanam, No. 3/78, Karamadaiyan Thottam, Periyakuyilai, Sulur Taluk, Coimbatore District 641 201.	1.13.7 ha

Tmt.M. SELVATHAL, PACHAPALAYAM ROUGH STONE AND GRAVEL-CLUSTER QUARRY

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

CLUSTER EXTENT = 12.01.20 ha

At

Pachapalayam Village, Sulur Taluk, Coimbatore District.

Complied as per ToR obtained

Lr No.SEIAA-TN/F.No.9727/ToR-1431/2022 Dated: 21.04.2023 for P1

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS



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Salem – 636 004, Tamil Nadu, India



Accredited for sector 1 Category ‘A’ 31 & 38 Category ‘B’

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Laboratory

EHS 360 LABS PRIVATE LIMITED,

10/2 Ground floor, 50th street, 7th Avenue,

Ashok Nagar, Chennai – 600 083

Baseline Monitoring Period: March 2023 to May 2023

OCTOBER 2023

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

1. INTRODUCTION

Rough Stone and Gravel are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of proposed & existing quarries of Pachapalayam Rough Stone and Gravel Cluster Quarries consisting of two Proposed and four Existing Quarries with total extent of Cluster of 12.01.20 Ha in Pachapalayam Village, Sulur Taluk, Coimbatore District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

This EIA Draft is prepared in compliance with ToR obtained vide:

Code	Proponent Name	Extent	ToR obtained
P1	Tmt.M.Selvathal,	1.13.70 ha	Lr.No. SEIAA-TN/F.No.9727/ToR-1431/2022 Dated: 21.04.2023

The Baseline Monitoring study has been carried out during summer season (March 2023 to May 2023) and the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) individually to minimize those adverse impacts.

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

1.1 DETAILS OF PROJECT PROPONENT –

PROPOSAL – P1	
Name of the Project Proponent	Tmt.M.Selvathal, Rough stone and Gravel quarry
Address	W/o. Meignanam, residing at No. 3/78, Karamadaiyan Thottam, Periyakuyilai, Sulur Taluk, Coimbatore District – 641 201.
Mobile	98650 44822
Status	Individual

Source: Approved Mining Plan of Respective Proposal

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES					
CODE	Name of the Owner	Village	S.F. Nos	Extent in Ha	Status
P1	Tmt.M. Selvathal	Pachapalayam	279/2C1B	1.13.70	LrNo.SEIAA-TN/F.No.9727/ToR-1431/2022 Dated: 21.04.2023.
P2	Thiru.S.A.Ganesan	Pachapalayam	273/2A & 281/2	2.03.0	Letter No. SEIAA-TN/F.No.7833/SEAC/ToR-828/2020 Dated:16.12.2020 PH -conducted
TOTAL EXTENT				3.16.70	
EXISTING QUARRIES					
CODE	Name of the Owner	Village	S.F. Nos	Extent in Ha	Status
E-1	Thiru.B.Sakthivel	Pachapalayam	281/1(P) & 280/2(P)	1.34.5	06.06.2016 to 05.06.2021
E-2	Thiru.R.S.Senthilkumar	Pachapalayam	285/3, 286/2	3.15.0	11.11.2017 to 10.11.2022
E-3	Thiru.K.Chinnasamy	Pachapalayam	282/1A & 282/1B (P)	1.73.0	06.12.2017 to 05.12.2022

E-4	Thiru.T.Ragupathi	Pachapalayam	273/1B, 273/2B, 273/3E(P),2 74/1A & 274/2A	2.62.0	03.01.2019 to 02.01.2024
TOTAL EXTENT				8.84.5	
EXPIRED QUARRIES					
Ex-1	Thiru.M.Muralikrishnan	Pachapalayam	281/1 & 286/1B4	2.30.0	02.06.2014 to 01.06.2018
Ex-2	Thiru.V.Gopalakrishnan	Pachapalayam	282/2A2	1.28.5	02.06.2014 to 01.06.2018
TOTAL EXTENT				3.58.5	
ABANDONED QUARRIES					
A-1	Thiru.A.Velusamy	Pachapalayam	285/1B1	1.72.5	05.05.2010 to 04.05.2015
TOTAL EXTENT				1.72.5	
TOTAL CLUSTER EXTENT				12.01.2	

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

1.2 SALIENT FEATURES OF THE PROPOSAL

DESCRIPTION OF THE PROJECT – P1

Name of the Project	Tmt.M.Selvathal, Rough Stone & Gravel Quarry		
Land type	It is a Patta land (Barren land) which is not fit for vegetation/ Cultivation		
Land owner details	Registered in the name of the applicant (Tmt.M.Selvathal). Refer the Patta No.1605		
Previous lease details	It is a fresh lease application.		
Toposheet No	58 - F/01		
Latitude between	10° 54' 23.73"N to 10° 54' 27.69"N		
Longitude between	77° 04' 04.52"E to 77° 04' 09.12"E		
Highest Elevation	415m AMSL		
Mining Plan period	5 years		
Proposed Depth of Mining	41m (2m Gravel + 4m Weathered Gravel + 35m Rough stone) below ground level.		
Geological Resources	Rough Stone in m ³	Weathered Rock m ³	Gravel m ³
	3,95,500	45,200	22,600
Mineable Reserves	Rough Stone in m ³	Weathered Rock m ³	Gravel m ³
	1,08,990	32,592	16,296
Yearwise Production	Rough Stone in m ³	Weathered Rock m ³	Gravel m ³
	1,08,990	32,592	16,296
Ultimate Pit Dimension	97m (L) x 84m (W) x 41m(D) bgl		
Water Level in the surrounding areas	70 – 65 m bgl		
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives		
Topography	The lease applied area is flat terrain. The area has gentle sloping towards Southern side and altitude of the area is 415m above from Mean sea level. The area is covered by 2m thickness of Gravel, 4 Weathered Rock and followed by Massive Charnockite which is clearly inferred from the nearby existing quarry pit.		
Machinery proposed	Jack Hammer	3 Nos	
	Compressor	1 Nos	

	Excavator with Bucket and Rock Breaker	1 No
	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	18 Nos	
Project Cost	Rs. 35,94,000/-	
EMP Cost	Rs. 3,80,000/-	
Total Project cost	Rs. 39,74,000/-	
CER Cost	Rs. 5,00,000/-	
Nearby Water Bodies	Seasonal Odai	120m West
	Seasonal Odai	340m SE
	Odai	3.3km SE
	Noyyal River	9km North
	Pallapalayam Lake	8.5km NE
Greenbelt Development Plan	As per Mining plan it is Proposed to plant 210trees in the 7.5 m Safety Zone, approach road and panchayat roads.	
Proposed Water Requirement	1.4 KLD	
Nearest Habitation	370m – North West	

Source: Approved Mining Plan

1.3 STATUTORY DETAILS

SCREENING:

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 24.09.2020.
- Precise Area Communication Letter was issued by the District Collector, Coimbatore Rc.No544/Mines/2020, Dated: 27.01.2021.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide Rc.No544/Mines/2020, Dated: 16.03.2021
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No.SIA/TN/MIN/413115/2023. dated: 04.01.2023.

SCOPING:

PROPOSAL – P1

- The proposal was placed in 366th SEAC meeting held on 30.03.2023 and the committee recommended for issue of ToR.
- The proposal was considered in 613rd SEIAA meeting held on 21.04.2023 and issued ToR vide Lr No.SEIAA-TN/F.No.9727/ToR-1431/2022 Dated: 21.04.2023

2. PROJECT DESCRIPTION

The proposed projects are 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	NH544- Salem – Kochi Road -7.0km-NW SH163- Othakalmandapam – Palladam Road-3.0km-NW
Nearest Village	Pachapalayam – 800m- SE
Nearest Town	Kinathukadavu – 11.0km-SW
Nearest Railway Station	Chettipalayam – 4.0km-NW
Nearest Airport	Coimbatore – 14.0km – NW
Seaport	Kochi- 139 km – South West

1.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
Area under quarrying	Nil	0.84.8
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.12.8
Unutilized Area	1.13.7	0.13.1
Grand Total	1.13.7	1.13.7

Source: Approved Mining Plans of respective Proposal

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PROJECT – P1			
PARTICULARS	DETAILS		
	Rough Stone (5Year Plan period)	**Weathered Rock m ³	*Gravel in m ³
Geological Resources	3,95,500	45,200	22,600
Mineable Reserves	1,08,990	32,592	16,296
Production for five-year plan period	1,08,990	32,592	16,296
Mining Plan Period / Lease Applied Period	5 Years		
Number of Working Days	300 Days		
Production per day	73	27	18
No of Lorry loads (6m ³ per load)	12	5	3
Total Depth of Mining	41m (2m Gravel + 4m Weathered Gravel + 35m Rough stone) below ground level.		

Source: Respective proposed quarries mining plan Source: Respective proposed quarries Approved mining plan** Weathered Rock 4 years * Gravel 3 years as per plan.

2.4 YEAR-WISE PRODUCTION PLAN

PROPOSAL – P1			
YEAR	ROUGH STONE (m ³)	WEATHERED ROCK m ³	GRAVEL (m ³)
I	21790	13104	6552
II	21780	7392	3696
III	21780	7392	6048
IV	21910	4704	-
V	21730	-	-
TOTAL	1,08,990	32,592	16,296

Source: Approved Mining Plan

FIGURE – 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA – P1



Source: Google Earth Imagery

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

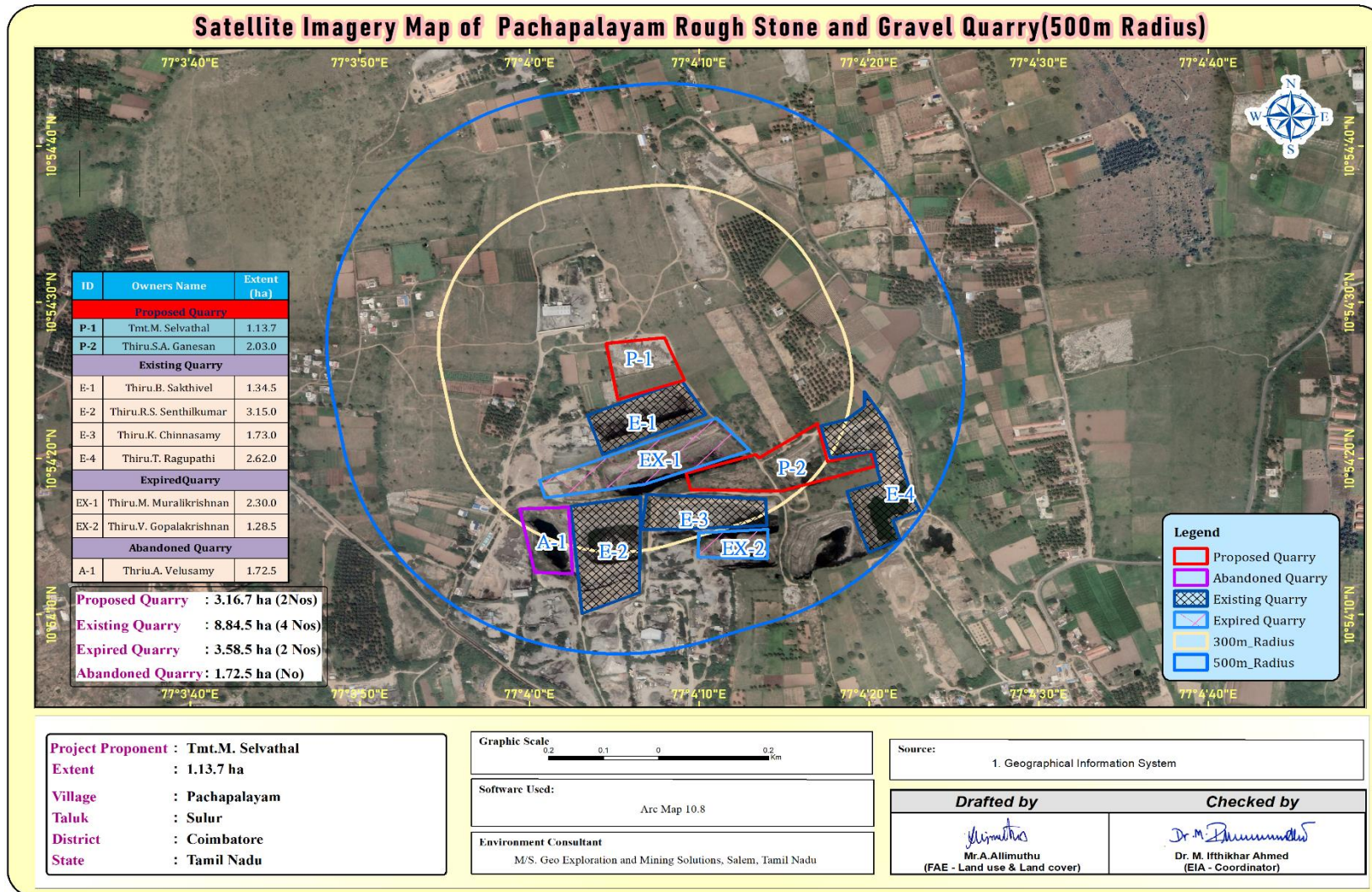


FIGURE 3: QUARRY LEASE PLAN / SURFACE PLAN – P1

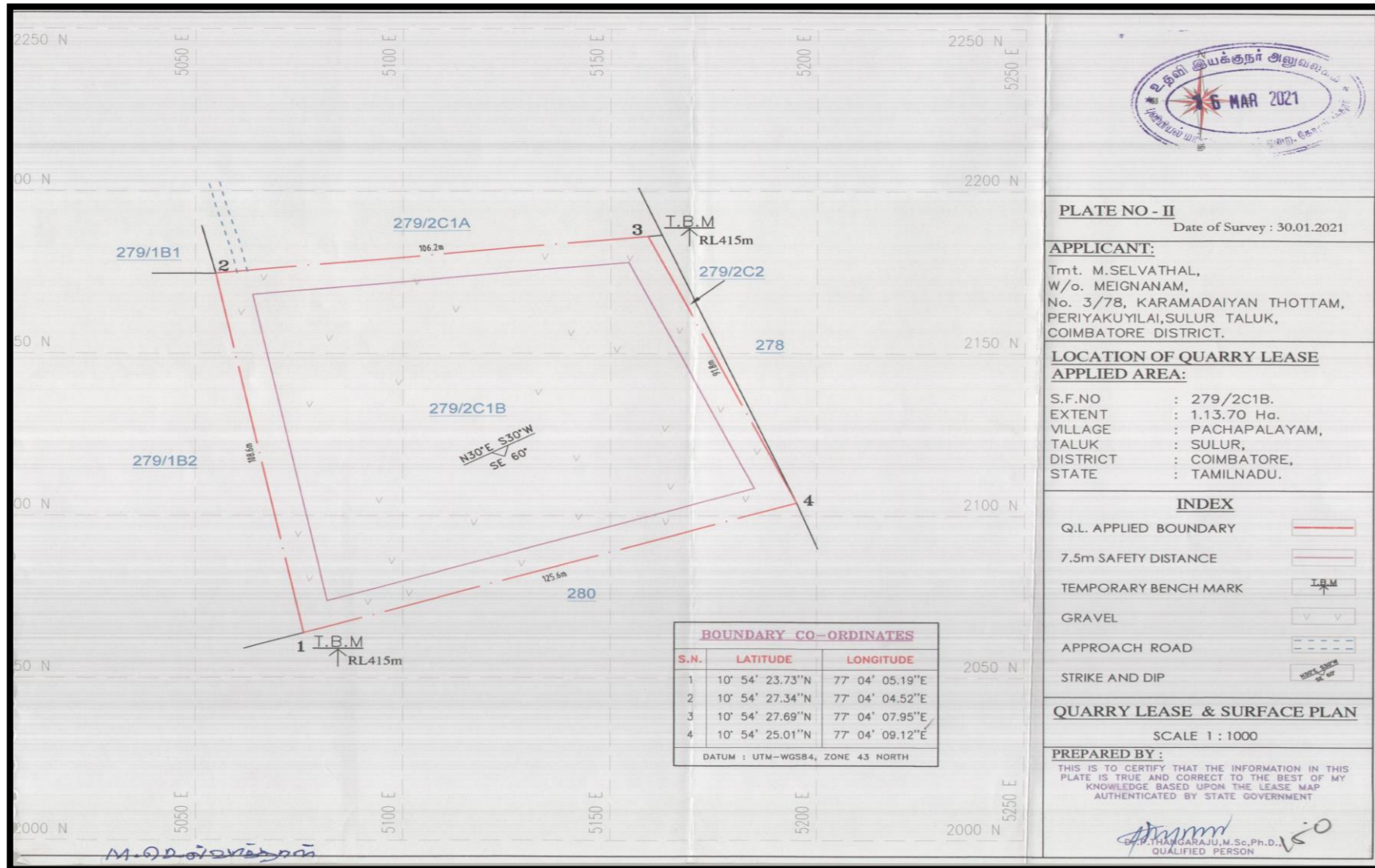


PLATE NO - II
Date of Survey : 30.01.2021

APPLICANT:
Tmt. M.SELVATHAL,
W/o. MEIGNANAM,
No. 3/78, KARAMADAIYAN THOTTAM,
PERIYAKUYILAI, SULUR TALUK,
COIMBATORE DISTRICT.

**LOCATION OF QUARRY LEASE
APPLIED AREA:**
S.F.NO : 279/2C1B.
EXTENT : 1.13.70 Ha.
VILLAGE : PACHAPALAYAM,
TALUK : SULUR,
DISTRICT : COIMBATORE,
STATE : TAMILNADU.

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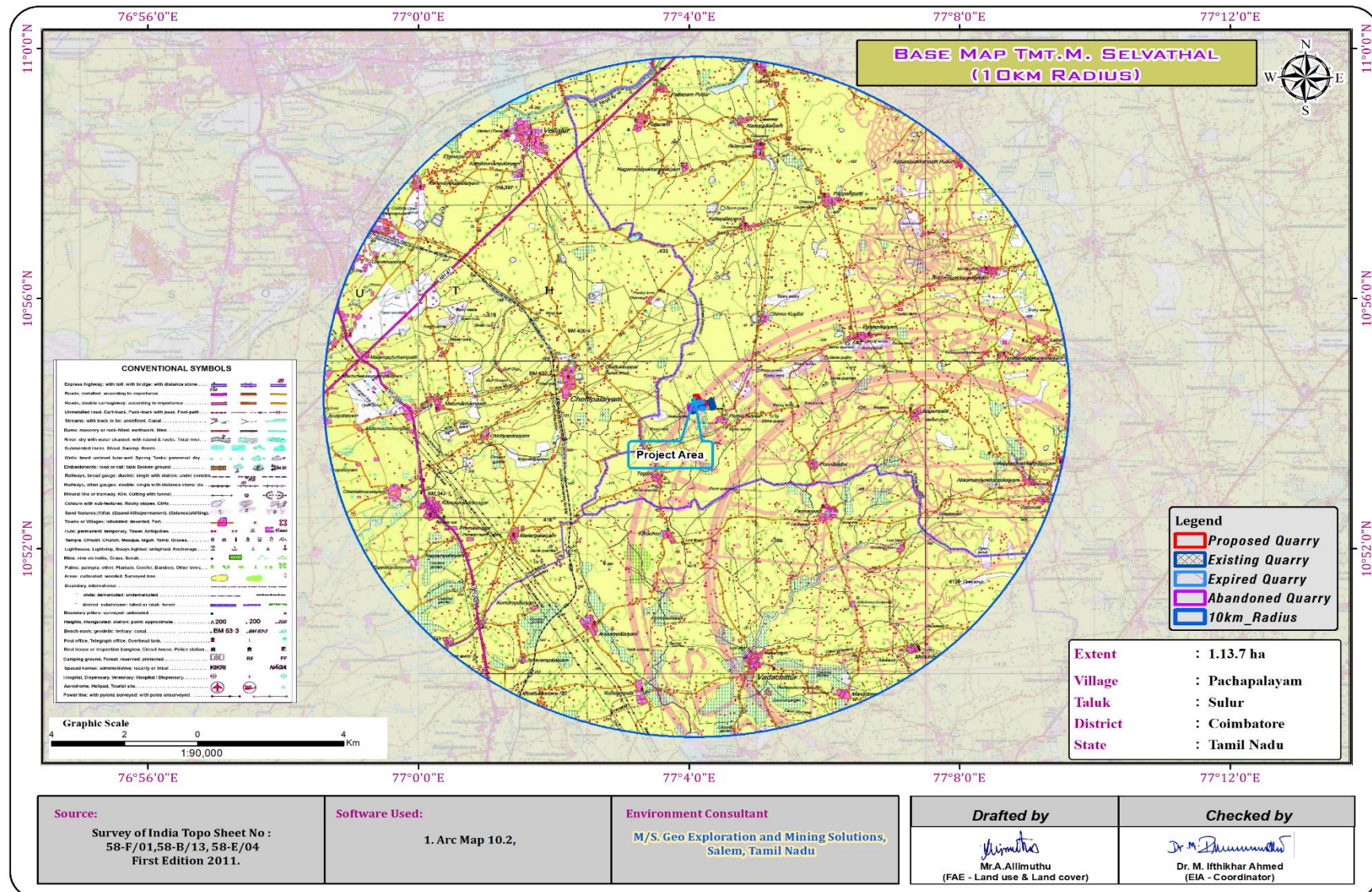
Q.L. APPLIED BOUNDARY	
7.5m SAFETY DISTANCE	
TEMPORARY BENCH MARK	
GRAVEL	
APPROACH ROAD	
STRIKE AND DIP	

QUARRY LEASE & SURFACE PLAN
SCALE 1 : 1000

PREPARED BY:
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

M. P. Thangaraju
M. P. THANGARAJU, M.Sc, Ph.D.
QUALIFIED PERSON

FIGURE – 4: TOPOSHEET MAP COVERING 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

PROPOSAL – P1				
S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	3	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Tippers	2	20 Tonnes	Diesel Drive

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 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.

2.8 ULTIMATE PIT DIMENSION

PROPOSAL – P1			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	97	84	41m bgl

Source: Approved Mining Plan

3. DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during March 2023 to May 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 (NABL).

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	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 IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 6 locations – 2 ground water and 4 surface water samples; 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 collected from the Forest department.
5	Noise levels	Noise levels in dB(A)	8 locations (1 Core & 7 Buffer)– 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 analysis done for the risk associated with mining.

Source: Onsite Monitoring Data/Sampling by EHS360 Labs Private Limited, The data has been collected as per the requirement of the ToR issued by SEIAA – TN.

3.2 LAND ENVIRONMENT

S.No	CLASSIFICATION	AREA_HA	AREA_%
BUILTUP			
1	URBAN	646.18	2.03
2	RURAL	1207.34	3.79
3	MINING	544.10	1.71
AGRICULTURAL LAND			
4	CROP LAND	24599.52787	77.20
5	PLANTATION	3508.36	11.01
BARREN/WASTE LANDS			
6	SCRUB LAND	1225.24	3.85
WETLANDS/ WATER BODIES			
7	WATER BODIES/LAKE/RIVER	132.10	0.41
TOTAL		31862.85	100.00

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 77.20% followed by Built-up Lands – 5.82%, Scrub land – 3.85%, and Water bodies 0.41%.

The total mining area within the study area is 544.10 ha i.e., 1.71%. The cluster area of 12.01.20 ha contributes about 0.02% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.3 SOIL ENVIRONMENT

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 (27.5 % 31.5 %) to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 0.99– 1.22 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 40.0 – 44.8 % . and 40.2-43.5 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.85 to 8.25
- The available Nitrogen content range between 256 to 638 mg/kg
- The available Phosphorus content range between 1.65 to 3.2 mg/kg
- The available Potassium range between 16.5 mg/kg to 105 mg/kg

3.4 WATER ENVIRONMENT

Surface Water

Ph:

The pH varied from 7.31 to 7.58 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids varied from 570 to 571mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 88.0 – 108mg/l. Nitrates varied from 6.8 to 8.4 mg/l, while sulphates varied from 29.6 to 39.6 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.36 to 7.68 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 658– 789mg/l in all samples. Total hardness varied between 127– 166mg/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

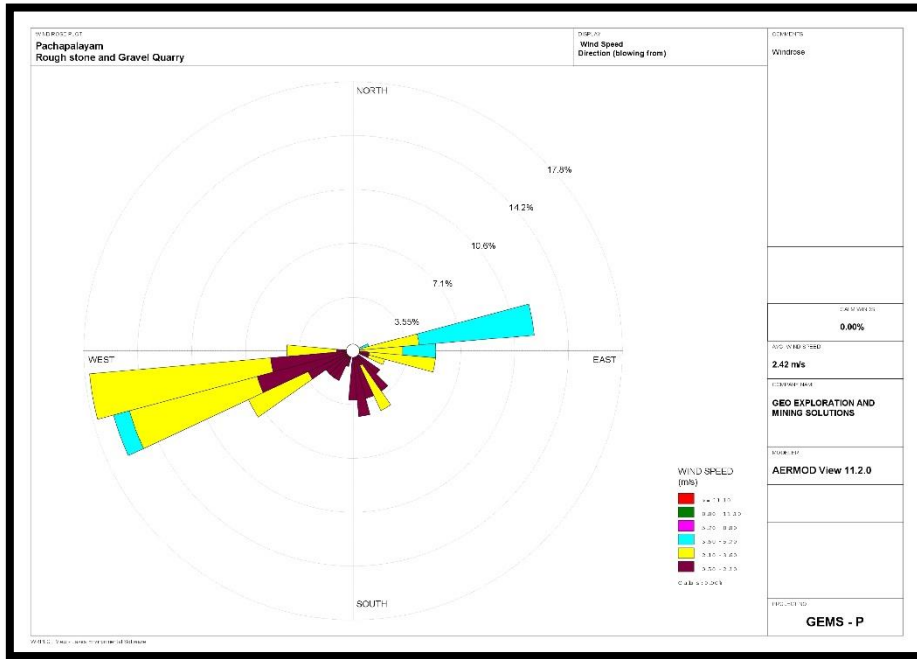
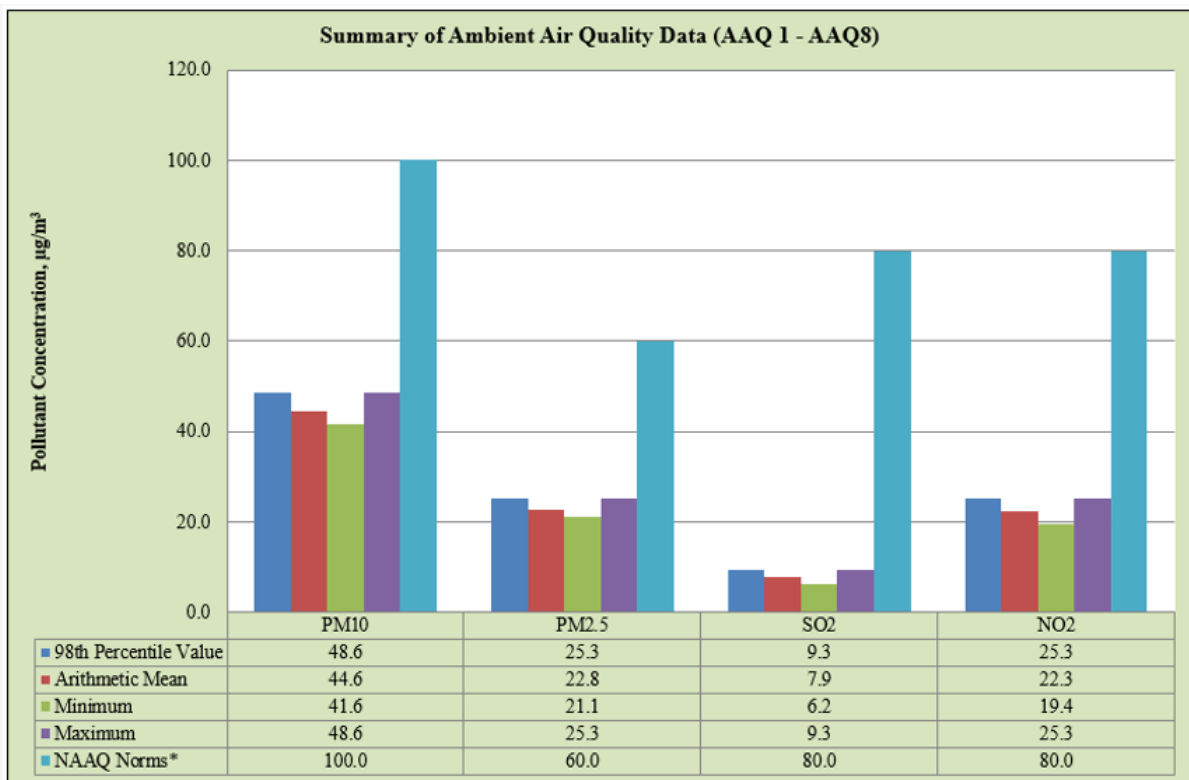


FIGURE – 6. SUMMARY OF AMBIENT AIR QUALITY DATA



The results of ambient air quality monitoring for the period (Mar 2023 to May 2023) are presented in the report. Data has been compiled for three months.

Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 39.9 µg/m³ to 49.2 µg/m³, PM_{2.5} data ranges from 20.1 µg/m³ to 26.3 µg/m³, SO₂ ranges from 5.2µg/m³ to 9.8 µg/m³ and NO₂ data ranges from 17.8 µg/m³ to 27.6 µg/m³. 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 proposed project area. Noise levels recorded in core zone during day time were from 42.1 dB (A) Leq and during night time were from 35.1 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 38.5 to 39.7 dB (A) Leq and during night time were from 36.2 to 38.9 dB (A) Leq.

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 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

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

4.3 AIR ENVIRONMENT

ANTICIPATED IMPACT

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

MITIGATION MEASURES

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

Advantages of Wet Drilling:

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

Blasting

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting 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 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 through training and awareness.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

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

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

PROPOSAL – P1					
Year	No. of trees proposed to be planted	Area to be covered in m ²	Name of the species	Survival rate expected in %	No. of trees expected to be grown
I	570	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development.	Neem, Pongamia Pinnata, Casuarina etc.,	80	450

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 18 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.

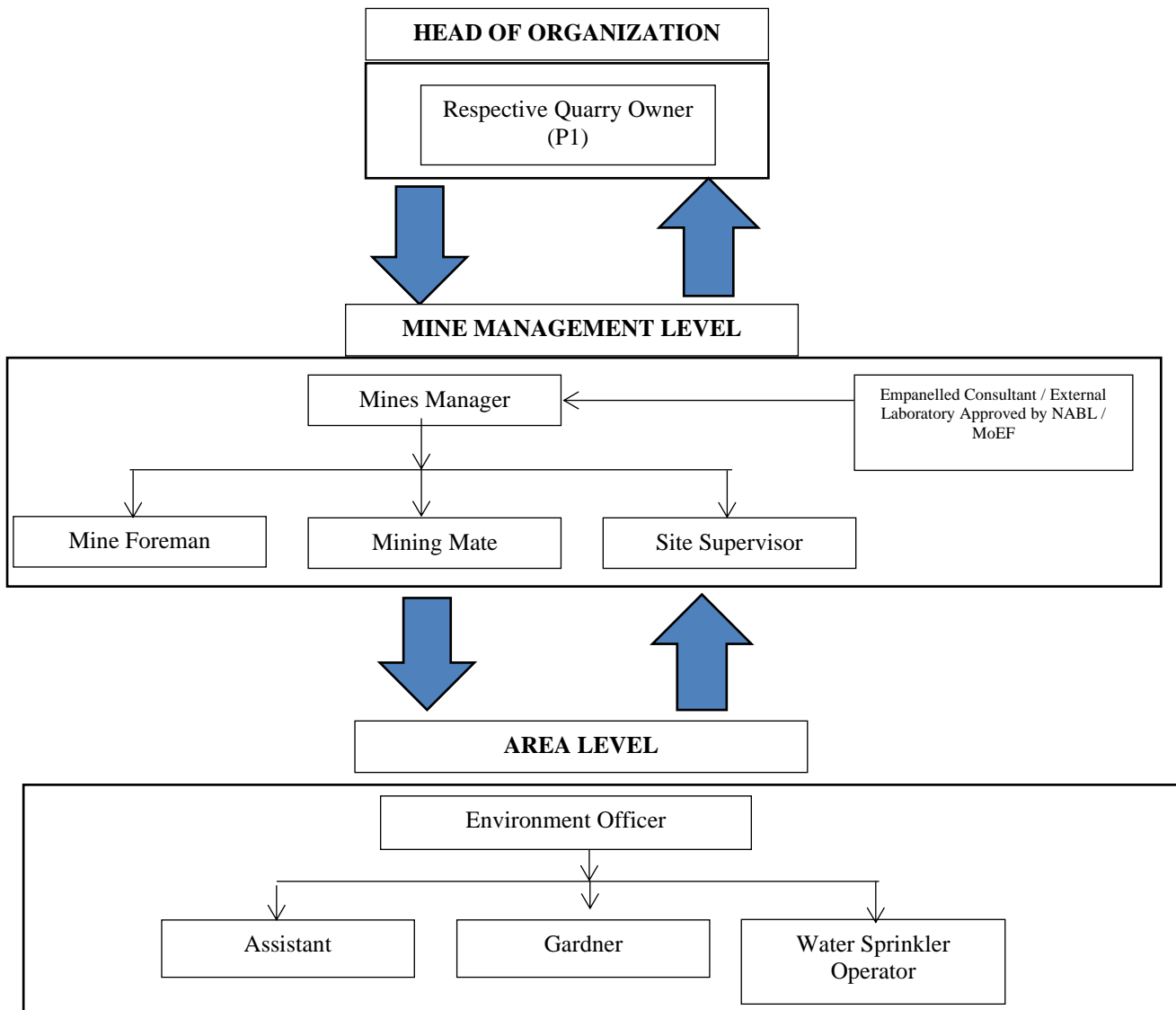
6. ENVIRONMENT MONITORING PROGRAM

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



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

P1					
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

Quarry	Production for five-year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	1,08,990	21,798	73	12
P2	1,23,669	24,734	82	14
Total	2,32,659	46,532	155	26
E1	24,239	4,848	16	3
E2	1,12,850	22,570	75	13
E3	90,310	18,062	60	10
E4	65,435	13,087	44	7
Total	2,92,834	31,149	195	33
Grand Total	5,25,493	77,681	350	59

CUMULATIVE PRODUCTION LOAD OF GRAVEL

Quarry	Production for five-year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	16296	5,432	18	3
P2	6,576	3,288	11	2
Total	22872	8720	29	5
PROPOSED PRODUCTION OF TOPSOIL				
E1	-	-	-	-
E2	-	-	-	-
E3	5,037	2,519	8	1
E4	15,742	5,247	17	3
Total	20,779	7,766	25	4
Grand Total	43,651	16,486	54	9

CUMULATIVE PRODUCTION LOAD OF WEATHERED ROCK

Quarry	Production during five year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	32592	8148	27	5
Total	32592	8148	27	5

SOCIO ECONOMIC BENEFITS FROM CLUSTER

Location ID	Project Cost	CER
P1	Rs. 39,74,000	Rs.5,00,000
P2	Rs.41,89,300/-	Rs.5,00,000
Total	Rs. 81,63,300/-	Rs.10,00,000
E1	Rs.67,70,000/-	Rs.5,00,000
E2	Rs.29,74,000/-	Rs.5,00,000

E3	Rs.73,37,500/-	Rs.5,00,000
E4	Rs.58,73,000/-	Rs.5,00,000
Total	Rs.2,29,54,500/-	Rs.20,00,000
Grand Total	Rs. 3,11,17,800/-	Rs.30,00,000/-

EMPLOYMENT BENEFITS FROM CLUSTER

Description	Employment
P1	18
P2	21
Total	39
E1	15
E2	31
E3	14
E4	14
Total	74
Grand Total	113

GREENBELT DEVELOPMENT BENEFITS FROM CLUSTER

CODE	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species	No. of Trees expected to be grown
P1	210	80%	1,280	Neem, Pinnata, Casuarina	168
P2	250	80%	2300	Neem, Pinnata, Casuarina	200
Total	460	80%	3,580	Neem, Pinnata, Casuarina	368
E1	150	80%	670	Neem, Pinnata, Casuarina	120
E2	250	80%	400	Neem, Pinnata, Casuarina	200
E3	50	80%	500	Neem, Pinnata, Casuarina	40
E4	100	80%	1000	Neem, Pinnata, Casuarina	80
Total	550		2,570		800
G.Total	1010		6,150		1168

8. PROJECT BENEFITS

The Proposed Projects for Quarrying Rough Stone and gravel quarry at Pachapalayam Village aims to produce 1,08,990m³ Rough Stone over a period of 5 Years and Gravel 16,296m³ for period of 3 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits,

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

9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring Cell 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.