EXECUTIVE SUMMARY

THIRU.S. SADHASIVAM ROUGH STONE AND GRAVEL QUARRY

S.F. Nos. 211/1, 211/2, Extent – 1.54.0 ha,
Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State

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

*** CLUSTER EXTENT = 7.83.5 ha**

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

ToR Obtained vide

Lr. No. SEIAA-TN/F.No.8566/ToR-1280/2022 Dated:08.10.2022

Project Proponent

Thiru.S. SADHASIVAM

S/o. K.Subramaniyam,
Door No.4/188, Velliampalayam,
Punnam Chatram Post, Pugalur Taluk,
Karur District.

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS

Old No. 260-B, New No. 17,
Advaitha Ashram Road, Alagapuram,
Salem – 636 004, Tamil Nadu, India
Accredited for sector 1 & 38 Category 'A'
Certificate No: NABET/EIA/1922/SA0139
Phone: 0427-2431989,
Email: ifthiahmed@gmail.com, geothangam@gmail.com
Web: www.gemssalem.com

Baseline Monitoring Period - October to December 2022

Environmental Lab

Chennai Mettex Lab Pvt Ltd

(Approved by AAI, AGMARK, APEDA, BIS, EIC, FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD)
Jothi Complex, 83, M.K.N, Road, Guindy, Chennai – 600 032, Tamil Nadu, INDIA

JANUARY 2023

1. INTRODUCTION

Rough Stone & Gravel is the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of Thiru.S. Sadhasivam Rough Stone & Gravel Quarries Cluster consisting of 4 Proposed and one Expired Quarries, one abandoned with total extent of Cluster of 7.835 ha in Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

The proponent has obtained necessary statutory clearances from the Department of Geology and Mining, Karur District, Tamil Nadu (Statutory Clearance Documents are enclosed along with Mining plan as Annexure No III). The total Extent of the quarries within the radius of 500m from this proposal is > 5Ha, hence the proposal falls under "B1" Category project as per the EIA notification, 2006 (As amended timely).

Proponent applied for Environmental Clearance to SEIAA, Tamil Nadu and obtained ToR vide Letter No SEIAA-TN/F.No.8566/ToR-1280/2022 Dated: 08.10.2022 for carrying out EIA and EMP studies for the Rough stone and Gravel quarry.

To carry out the EIA studies and to prepare EIA and EMP studies the proponent Thiru.S. Sadhasivam, have engaged a consultant M/s. Geo Exploration and Mining Solutions, Salem, Tamil Nadu. The Baseline Monitoring study has been carried out during post monsoon season (October - December 2022) considering the provisions of MoEF & CC Office Memorandum Dated: 29.08.2017 and MoEF & CC Notification S.O. 996 (E) Dated: 10.04.2015.

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

1.1 DETAILS OF PROJECT PROPONENT –

Name of the Project Proponent	Thiru.S. Sadhasivam, Kuppam Rough stone and Gravel Quarry
Address	Door No.4/188, Velliampalayam, Punnam Chatram Post, Pugalur Taluk, Karur District.
Mobile No	99767 92213 & 97879 11811
E-Mail	-

The project proponent is an individual.

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES				
CODE	**Name of the Owner**	**S.F. Nos**	**Extent**	**Status**
P1	**Thiru.S. Sadhasivam,** S/o.K.Subramaniyam, Door No.4/188, Velliampalayam, Punna chatram Post, Pugalur Taluk,Karur District - 639136	211/1, 211/2	1.54.0 ha	TOR Obtained: Lr. No. SEIAA-TN/F.No.8566/ToR-1280/2022 Dated:08.10.2022
P2	**Thiru.G. Prabhakar,** S/o.Govindasamy, 5/187, Samynathapuram, Kattumunnur Post, K.Paramathi Taluk, Karur District	361/2 (P)	1.21.5 ha	-
P3	**Thiru.K. Nallasamy** S/o.Krishnan Punnamchatram Post, Aravakurichi Taluk, Karur District.	226/1(P)	2.89.0 ha	-
P4	**Tvl.NTC Blue Metals LLP,** Prop.of. Mr.S.Muthusamy, Rasampalayam Keelasathambur Village, Namakkal -637 207	362/2(P)	2.19.0	-
TOTAL			**7.83.5 ha**	
EXPIRED QUARRIES				
CODE	**Name of the Owner**	**S.F. No**	**Extent**	**Status**
E1	**Tvl.Venkatachalapathi** Blue Metals. S.F.No.233/1, Puthurpatti, Kuppam Post, Aravakurichi Taluk, Karur District.	213/1, 214/2A,214/2B, 214/2C,220/3P,221/P	4.05.0 ha	23.6.2017 To 22.6.2022 Last permit obtained on 24.05.2022
	TOTAL		**4.05.0 ha**	
ABANDONED QUARRIES				
CODE	**Name of the Owner**	**S.F. No**	**Extent**	**Status**
A1	**N.Saraswathi** W/o.Nachimuthu Thalaiyeethupatti Kuppam Aravakurichi	**362/1**	**1.51.5 ha**	5.5.2006 to 4.5.2011
	TOTAL		**1.51.5 Ha**	
TOTAL CLUSTER EXTENT			**7.83.5 ha**	

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

TABLE 1.3 SALIENT FEATURES OF THE PROPOSAL

Name of the Quarry	**Thiru.S.Sadhasivam,** Rough Stone & Gravel Quarry Project	
Toposheet No	58 - E/16	
Latitude between	10°59'58.89" N to 11°00'04.13" N	
Longitude between	77°57'11.01" E to 77°57'15.51" E	
Highest Elevation	172m AMSL	
Proposed Depth of Mining	The Ultimate depth of Mining up to a depth of **7m (2m Gravel + 5m Rough Stone)** below ground level.	
Geological Resources	Rough Stone in m^3	Gravel m^3
	77,000	30,800
Mineable Reserves	Rough Stone in m^3	Gravel m^3

	35,230	16,270
Ultimate Pit Dimension	121m (L) * 76m (W) * 7m Bgl (D)	
Water Level in the surrounds area	The Water Table in the area is 60m in summer season and 55m in Rainy season	
Method of Mining	Opencast Manual Method, the quarry operation involves equipments like hammer and chisel and mild blasting like expanding chemicals (Calcium carbide)	
Topography	The lease applied area is exhibits plain topography. The area has gentle sloping towards Southeastern side and altitude of the area is 172m above from Mean Sea level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby existing quarry pits.	
Machinery proposed	Splitting of rock mass of considerable volume from the parent rock mass by hand hammer, chisel and mild explosives	
	Tippers	1Nos
Blasting Method	Mild explosives like expanding chemical to loosen the Rough Stone, No deep hole drilling and blasting	
Proposed Manpower Deployment	23 Nos	
Project Cost	Rs.25,78,000/-	
CER Cost of Project	Rs.52,000	
Nearby Water Bodies	Kaveri River - 7.0km-N	
Greenbelt Development Plan	Proposed to plant 920 trees in Approach Road and nearby periphery of the village Road after consulting the local Panchayat authority and Agriculture Experts area 7.5 m Safety Zone	
Proposed Water Requirement	2.0 KLD	
Nearest Habitation	230m-North	

1.3 STATUTORY DETAILS

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: **22.07.2019**
- Precise Area Communication Letter was issued by the District Collector, Karur **Rc.No.428/Mines/2019, Dated: 19.06.2020.**
- The Mining Plan was prepared by Recognized Qualified Person and approved by Deputy Director, Geology and Mining, Karur District, vide **R.c.No.428/Mines/2019, Dated: 23.09.2020.**
- 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 vide online Proposal No. SIA/TN/MIN/62991/2021
- The proposal was placed in 312rd SEAC meeting held on 04.05.2022 and the committee recommended for issue of ToR.
- The proposal was considered in 557th SEIAA meeting held on 08.10.2022 and issued ToR vide Letter No SEIAA-TN/F.No.8566/ToR-1280/2022 Dated: 08.10.2022

2. PROJECT DESCRIPTION

The proposed project is site specific and there is no additional area required for the project. There is no effluent generation/discharge from the proposed quarries, Rough Stone and gravel is proposed to be excavated by Conventional opencast Manual method involving splitting of rock mass of considerable volume from the parent rock mass by using hammer, chisel and Mild blasting like expandable chemicals will be used for loading the Rough Stone in to the tippers from pit head to the needy Customers.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	NH-81- Karur-Kangeyam- 5.0km-SW SH-84 - Erode – Karur – 2.5 km-NE MDR– 332 – Paramathy – Noyyal Road – 3.5 km – NW
Nearest Village	Kuppam – 2.0Km - W
Nearest Town	Pugalur - 9 Km – NE
Nearest Railway	Karur Junction - 14.0Km – SE
Nearest Airport	Trichy – 85km-SE
Seaport	Kochin Port-220km – SW
Interstate Boundary	Tamilnadu-Kerala-126km-W

2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

Description	***Present area (Ha)***	***Area at the end of this quarrying period (Ha)***
Area under quarrying	Nil	0.84.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.08.0
Unutilized Area	1.54.0	0.59.0
Grand Total	**1.54.0**	**1.54.0**

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	**DETAILS**	
	Rough Stone (5Year Plan period)	**Gravel (3 Years Plan period)**
Geological Resources in m^3	77,000	30,800
Mineable Reserves in m^3	35,230	16,270
Yearwise Production in m3	28,430	16,270
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m^3	**19**	**18**
No of Lorry loads ($6m^3$ per load)	**3**	**3**
Total Depth of Mining	Depth of 7m (2m Gravel + 5m Rough Stone)	

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

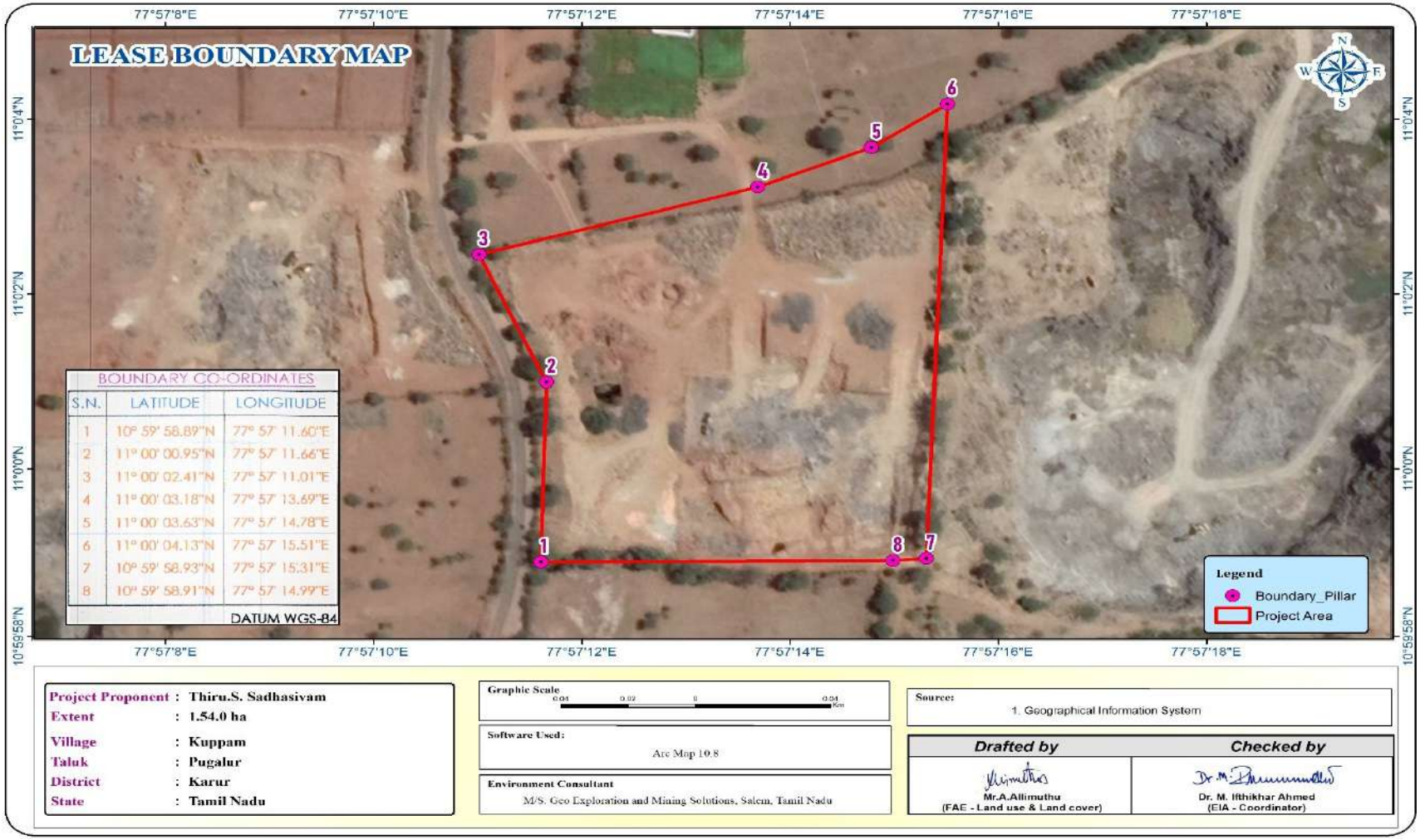


FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

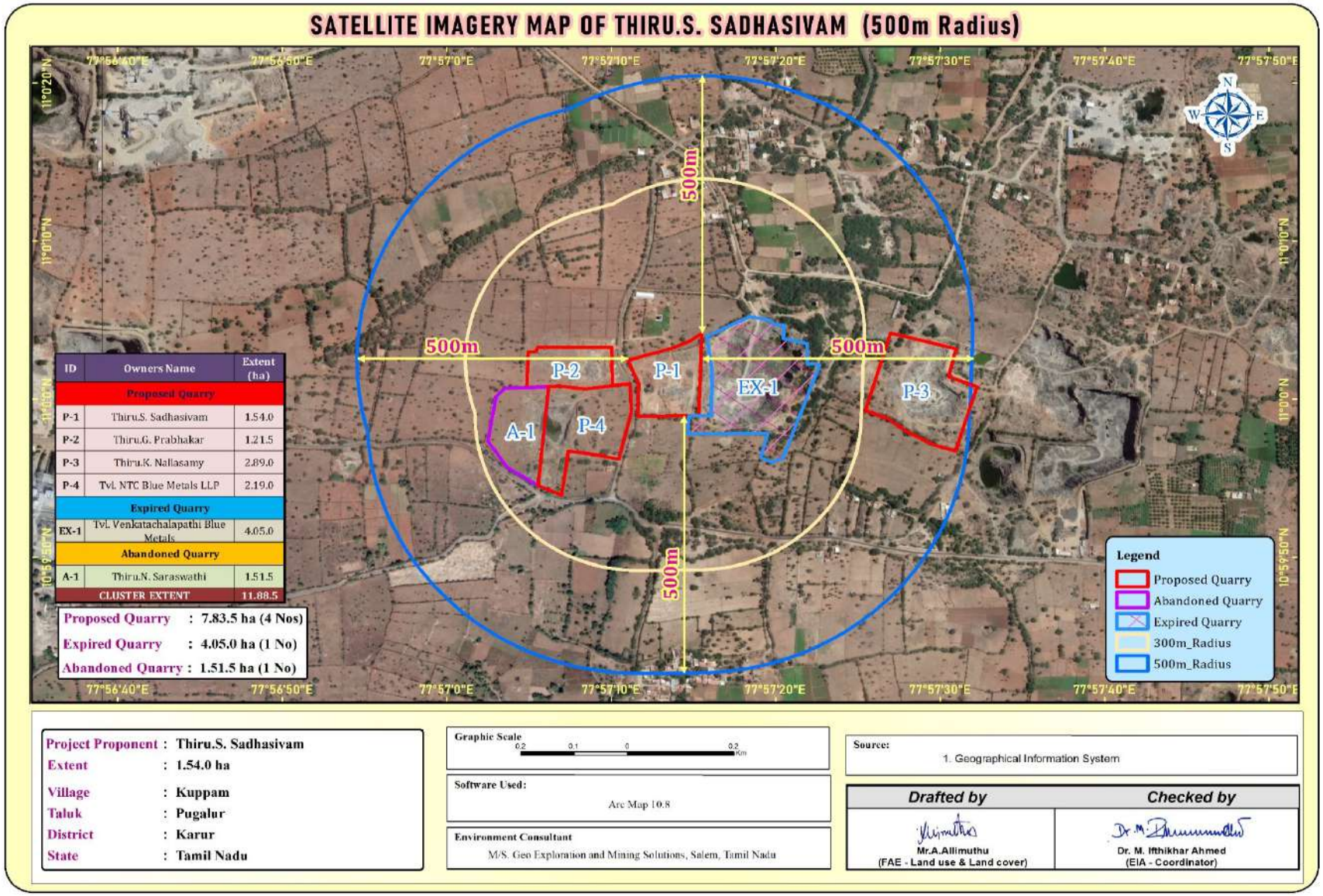


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

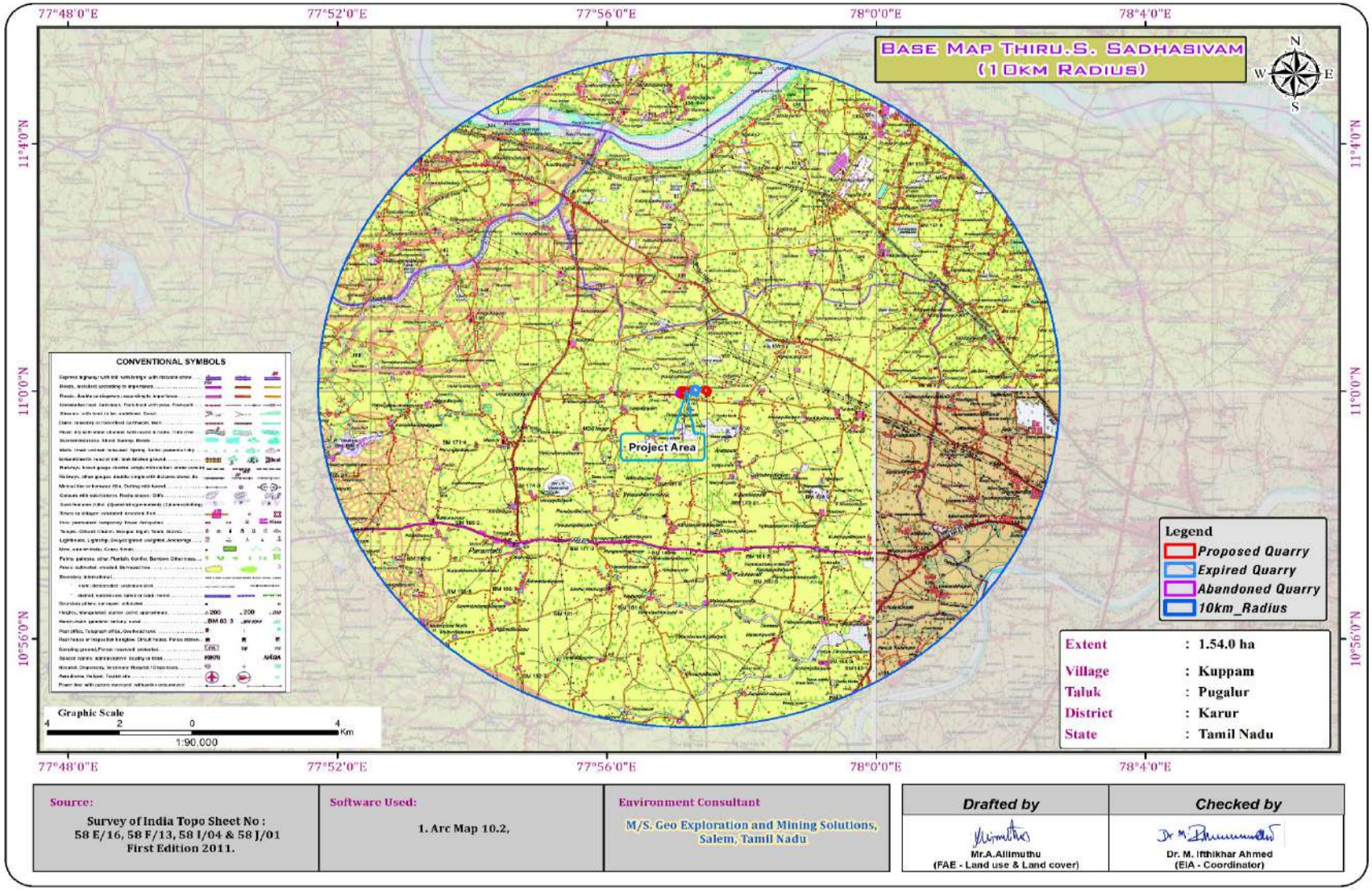
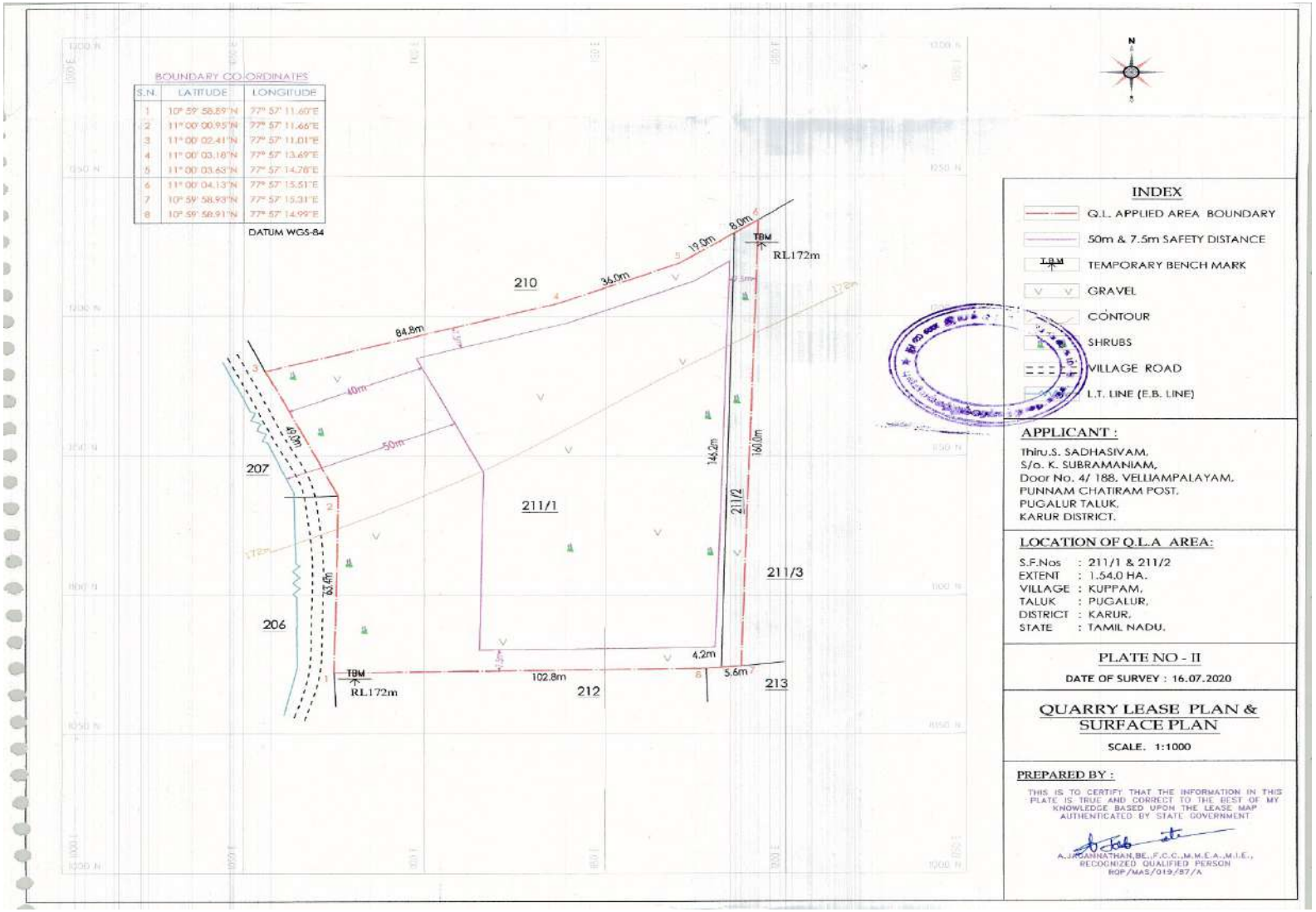


FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN



2.4 METHOD OF MINING

Opencast Mechanized Mining Method is being proposed by formation of 5.0 meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The top layer of Gravel will be Excavate directly by Hydraulic Excavators and facilitate to the needy customers. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass is proposed to be excavated by Conventional opencast Manual method involving splitting of rock mass of considerable volume from the parent rock mass by using hammer, chisel and Mild blasting like expandable chemicals will be used for loading the Rough Stone in to the tippers from pit head to the needy Customers.

2.5 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Tippers / Dumpers	1	10 Tonnes	Diesel Drive

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

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

2.7 ULTIMATE PIT DIMENSION

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
I	121	76	7m bgl

3.0 DESCRIPTION OF THE ENVIRONMENT

The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering October – December 2022 as per CPCB & MoEF & CC guidelines.

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (2 core & 4 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	7 (2 surface water & 5 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM_{10} $PM_{2.5}$ SO_2 NO_X Fugitive Dust	24 hourly twice a week (Oct – Dec 2022)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (2 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by Chennai Mettex Lab Pvt Ltd in association with GEMS

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

3.2 LAND ENVIRONMENT

To study the land use pattern of the core as well as a buffer zone, land use/land cover details have been identified/ maps have been prepared in accordance with the **Generic ToR point no. 4 (ix) and ToR Point no. 4 Stating**:

Point No. 4(ix)."A list of major industries with name and type within the study area (10 km radius) shall be incorporated. Land use details of the study area".

Point No. 4. “Present land use shall be prepared based on satellite imagery. High-resolution satellite image data having 1m - 5m spatial resolution like a quick bird, Ikonos, IRS P-6 pan-sharpened, etc. for the 10 km radius area from the proposed site. The same should be used for land used / land-cover mapping of the area.

TABLE 3.1: LAND USE / LAND COVER TABLE 10 KM RADIUS

Sno	Landuse/Landcover	Area (Hect's)	Area in %
1	Existing quarries	1315.02	4.11
2	Waterbodies	204.91	0.64
3	River sand	189.39	0.59
4	Agriculture Land	4901.43	15.32
5	Dry Agriculture Land	432.64	1.35
6	Builtup Land	7364.68	23.01
7	Industry Land	1319.36	4.12
8	Non-agriculture Land	16273.00	50.85
	Total	**32000.44**	**100**

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 land (includes crop with Horticulture land) 15.32%, Builtup Land is about 23.01% Non-Agriculture land is 50.85% and Existing quarries is about – 4.11%.

The total Existing quarries within the study area is 1315.02 ha i.e., 4.11%. The cluster area has 7.83.5 ha within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.3 SOIL ENVIRONMENT

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

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 0.96 – 1.22 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 39.0 – 42.4 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.69 to 8.59
- The available Nitrogen content range between 251to 388 kg/ha
- The available Phosphorus content range between 0.86 to 1.32 kg/ha
- The available Potassium range between 30.6 to 35.9 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

Ph:

The pH varied from 6.92 to 7.70 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 357 to 425 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 71.3 - 98 mg/l. Nitrates varied from 4.9 to 9.7 mg/l, while sulphates varied from 19.1 to 28.3 mg/l.

Ground Water

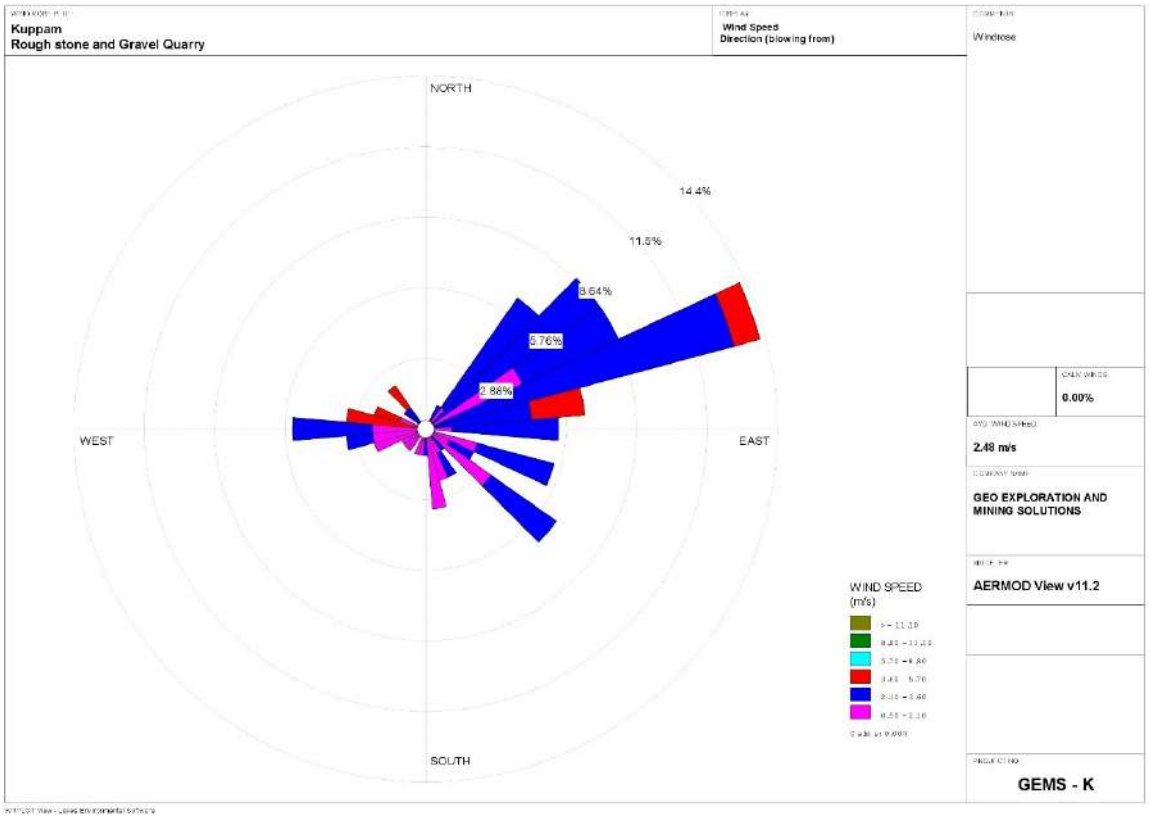
The pH of the water samples collected ranged from 6.92 to 7.70 and within the acceptable limit of 6.5 to 8.5. PH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 357 - 425 mg/l in all samples. Total hardness varied between 115 – 152 mg/l for all samples.

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

3.5 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

FIGURE – 6: WIND ROSE DIAGRAM



3.6 SUMMARY OF AMBIENT AIR QUALITY

As per monitoring data, PM10 ranges from 50.7 µg/m3 to 66.6 µg/m3, PM2.5 data ranges from 20.8 µg/m3 to 39.8 µg/m3, SO2 ranges from 7.5 µg/m3 to 10.3µg/m3 and NO2 data ranges from 20.7 µg/m3 to 23.2 µg/m3. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area.The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

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 47.8 dB (A) Leq and during night time were is 37.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 47.3 to 48.1 dB (A) Leq and during night time were from 37.8 to 40.7 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.

3.8 ECOLOGICAL ENVIRONMENT

An ecological survey of the study area was conducted, particularly with reference to listing of species and assessment of the existing baseline ecological conditions in the study area. The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area. Data has been collected through extensive survey of the area with reference to flora and fauna. Information is also collected from different sources i.e. government departments such as District Forest Office, Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared.

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory of flora and fauna of terrestrial ecosystem within 10 km radius from the boundary of all the Proposed Mine site. Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted.

3.9 SOCIO ECONOMIC ENVIRONMENT

The study of socioeconomic component incorporating various facets related to prevailing social and cultural conditions and economic status of the Rough stone and Gravel quarry project region is an important part of EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socio economics and parameters of human interest due to the project.

Detailed socio-economic survey was conducted in the study area (Core and buffer zone) within 10 km radius of the area at Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State. In order to determine the impact of the proposed project on nature and inhabitant. To get an overview of the villagers and their perspectives about this proposed activity, different demographic parameters and social aspects such population density, sex ratio, literacy rate,

worker ratio etc. has been identified, analyzed, studied together. These impacts may be beneficial or disadvantageous. If disadvantageous anticipated suggestions measures are advocated in order to have collective development. The proposed project will aim to provide preferential 23 persons to the local people there by improving the indirect employment opportunity for 40 persons and in turn the social standards will improve.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

4.1 LAND ENVIRONMENT:

ANTICIPATED IMPACT

- 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 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

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

MITIGATION MEASURES FOR SOIL CONSERVATION

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

4.2 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 drain, settling tank will be constructed along the project area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- De-silting will be carried out before and immediately after the monsoon season
- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water

4.3 AIR ENVIRONMENT

ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation 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

Haul Road & Transportation –

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with taurpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt –

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

Occupational Health –

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical check-ups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- Ambient Air Quality Monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed

4.4 NOISE ENVIRONMENT

ANTICIPATED IMPACT

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Loading and during movement of vehicles.

MITIGATION MEASURES

- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;

- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

There 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

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested conceding the area/site requirements and needed performance of specific species. The details of year wise proposed plantation program are given in Table 4.13.

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas

In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly in proposed areas falls in the cluster earmarked for plantation program as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

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

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

GREENBELT DEVELOPMENT PLAN

Year	No. of tress proposed to be planted	Survival %	Area to be planted	Name of the species
I	920	85%	Safety barrier, Un utilized area's and nearby village roads	Neem, Pongamia Pinnata, Casuarina, etc.,

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

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

MITIGATION MEASURES

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Air pollution control measure will be taken to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc.., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

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

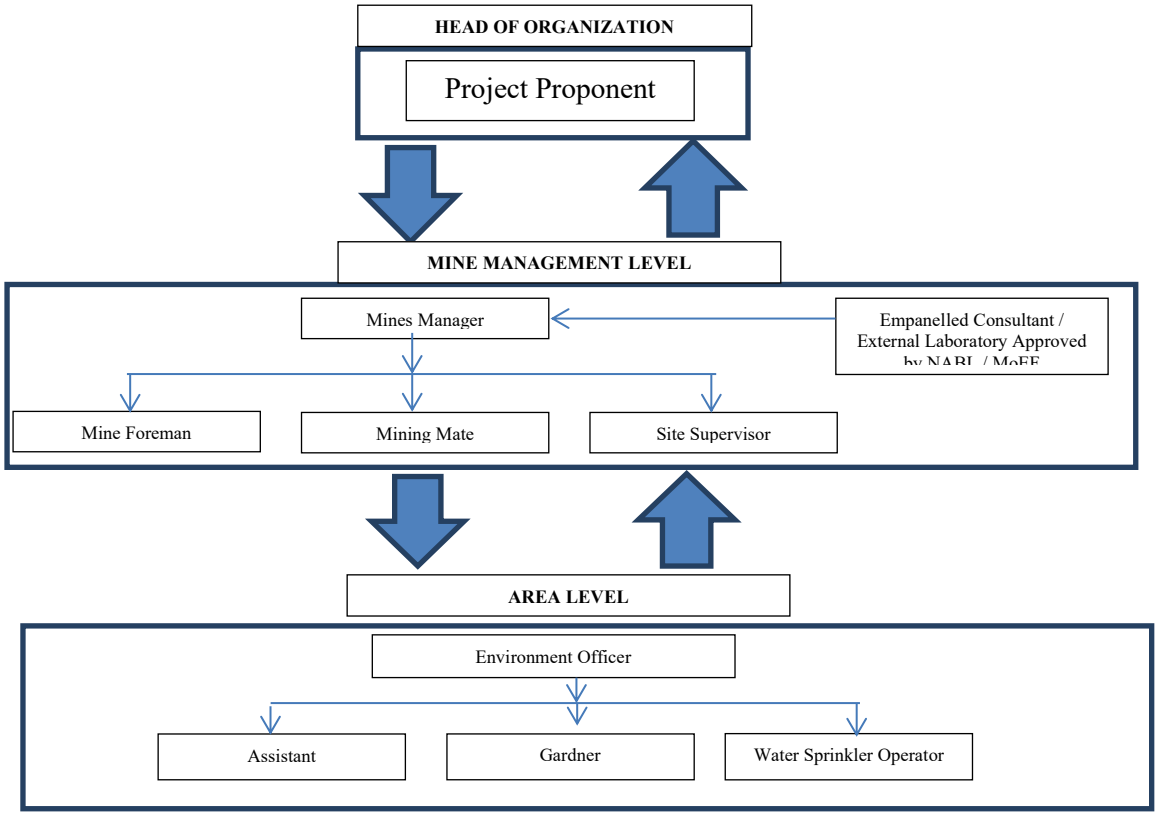
6. ENVIRONMENT MONITORING PROGRAM

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

The responsibilities of this cell will be:

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

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night

6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

7. ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening

7.2 DISASTER MANAGEMENT PLAN

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

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

7.3 CUMULATIVE IMPACT STUDY

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

	PROPOSED PRODUCTION DETAILS			
Quarry	**5 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	28430	5686	19	3
Total	**28430**	**5686**	**19**	**3**
Grant Total	**28430**	**5686**	**19**	**3**

CUMULATIVE PRODUCTION LOAD OF GRAVEL

	PROPOSED PRODUCTION DETAILS			
Quarry	**1 - 3 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	16270	5423	18	3
Total	**16270**	**5423**	**18**	**3**
Grand Total	**16270**	**5423**	**18**	**3**

PREDICTED NOISE INCREMENTAL VALUES FROM MINES

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	45.9	50.0	51.4	55

SOCIO ECONOMIC BENEFITS

Code	Project Cost	CER @ 2%
Proposal Quarry	Rs.25,78,000/-	Rs.52,000/-
Total	**Rs.25,78,000/-**	**Rs.52,000/-**
Grand Total	**Rs.25,78,000/-**	**Rs.52,000/-**

8. PROJECT BENEFITS

Thiru.S. Sadhasivam for Quarrying Rough Stone and Gravel at Kuppam Village aims to produce 28,430 m^3 Rough Stone a period of 5 years & 16,270 m^3 of Gravel over a period of 3 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefitsIncrease in Employment Potential

- Improvement in Socio-Economic Welfare
- Improvement in Physical Infrastructure
- Improvement in Physical Infrastructure
- Improvement in Social infrastructure

9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring cell discussed formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies
- Collection of health statistics of the workers and population of the surrounding villages
- Green belt development
- Monitoring the progress of implementation of the environmental monitoring programme
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10. CONCLUSION

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.