

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

Schedule Sl. No. 1 (a) (i): Mining Project

“B1” CATEGORY-MINOR MINERAL-CLUSTER-NONFOREST LAND-FRESH QUARRY

CLUSTER EXTENT = 10.35.5 hectares

At

Kundiyathandalam Village, Vembakkam Taluk,

Tiruvannamalai District, Tamil Nadu State

TOR File No. 13038 and ToR Identification No. TO25B0108TN5265914N Dated: 22.12.2025

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and address	Extent & S.F.No.	Production in m³ & Tons
M/s. S.A.Enterprises No. 2, Kurunji Nagar, 1st Main Road,Abdul Kalam Park, Sothupakkam Village, Old Perungalattur, Chennai District – 600063.	4.96.0 ha & S.F. Nos. 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1,145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11.	Rough stone 635925m ³ & 1748794Ts Gravel 314313m ³ & 628626Ts

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

No: 1/213-B, Ground Floor, Natesan Complex

Oddapatti, Collectorate Post office,

Dharmapuri-636705. Tamil Nadu.

E-mail: info.gtmsdpi@gmail.com,

Website: www.gtmsind.com

NABET ACC. NO: NABET/EIA/23-26/RA 0319

Valid till: 31.12.2026

ENVIRONMENTAL LAB

INTERSTELLAR TESTING CENTRE Pvt. Ltd

Plot.No.2, Site No.12/2A,

Industrial Estate, Perungudi, Chennai, Tamil Nadu

NABL Certificate Number:TC-6952, Valid Until : 30.07.2026.

Baseline Study Period – Oct through Dec 2025



TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.13038

TOR Identification No. TO25B0108TN5265914N, dated. 22/12/2025

M/s S.A. Enterprises Rough Stone and Gravel Quarry

Specific Terms of References for (Mining of Minerals)

1. SEIAA- Specific Conditions:

S. No	Terms of Reference	Remarks
1.1	The authority noted that the subject was placed in the 647th Meeting of SEAC-I held on 04.12.2025. After detailed discussions, the Authority accepts the recommendation of SEAC-I and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 635925m³ of Rough Stone & 314313m³ of Gravel up to the depth of 60m (BGL) and the annual peak production should not exceed 128352m³ of Rough Stone and 129039m³ of gravel as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-I & normal conditions & the SEIAA Specific and Standard conditions.	Proponent thanking the authorities for granting the ToR with public hearing for the quantity of 635925m³ of Rough Stone & 314313m³ of Gravel up to the depth of 60m (BGL) and the annual peak production should not exceed 128352m³ of Rough Stone and 129039m³ of gravel as per approved mining plan. Being in cluster, combined EIA study is done and described as chapters in report and preparation of separate EMP subject to conditions as recommended by SEAC-II also prepared.

2. SEAC Conditions - Site Specific

	Terms of Reference	Remarks
2.1	1 A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic	CMC has formed, which included all mines in cluster with statutory personnel for the effective environmental monitoring, maintenance of haul roads

		& scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal:		etc., and the same will be submitted as affidavit during the EIA appraisal.
		(i)	Copy of the agreement forming CMC.	Will be submitted during final EIA presentation.
		(ii)	The Organisation chart of the Committee with defining the role of the members	
		(iii)	The 'Standard Operating Procedures' (SoP) executing the planned activities.	
	2	The PP shall ensure the installation of CCTV at the proposed quarry site and ensure its inclusion during the EIA presentation.		Will be submitted during final EIA presentation.
	3	The PP shall furnish details of compensatory plantation in the ratio of 1:10 (i.e. planting of 10 trees for every one tree that is to cut) where the trees need to be cut with prior permission from the concerned local authority		Will be submitted during final EIA presentation.

3. SEIAA Standard Conditions

3.1	1	<u>Cluster Management Committee</u> Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	A cluster management committee including all cluster proponents will be constituted by the proponent.
	2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt	The members of the cluster management committee will coordinate among themselves in effective implementation of EMP.

	Development, Water sprinkling, tree plantation, blasting etc.	
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease and updated every year.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	The plan has prepared and information regarding haul roads as route map and network has been discussed in Section 2.5 under Chapter II in the EIA report page 15-18.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	The committee will frame the risk management plan including the evacuation plan in a holistic manner. However, quarrying will be stopped during the intense rain conditions.
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail in the EIA report.	It will be advised by the proponent to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	The proper action plan regarding the restoration will be framed and followed by the committee.
8	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	The health status of workers and the local people will be monitored and updated periodically.

Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	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, as shown in Section 4.6.4 under Chapter IV in the EIA report page 119.
10	Impact on soil, flora & vegetation around the project site.	The details on flora have been provided in Section 4.6 under Chapter IV in the EIA report page 117-118. There is no endangered red list species found in the study area.
11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III in the EIA report page 69-79. Details about transplantation of plants have been provided in Section 4.6.2 under Chapter IV in the EIA report page 118.
12	The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horticultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological impact details and measures have been provided in Section 4.6 under Chapter IV in the EIA report page 117-119.
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 102-123.
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV in the EIA report page 103-104.

Forests		
15	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	The project proponent will do barbed wire fencing work around the lease area to prevent wildlife from entering the site. A full-time watchman has been appointed in advance to restrict the movements of the local people nearby the quarry site.
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV in the EIA report page 117-119.
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The impacts of the project on standing trees and the existing trees have been discussed in Section 4.6.1 under Chapter IV in the EIA report page 117-118.
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	There are no such areas nearby project site. Protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.36 under Chapter III in the EIA report page 100.
Water Environment		
19	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	The detailed hydro-geological study is carried out and results are discussed in section 3.2.2 chapter-III of EIA report page- 46-54.

20	Erosion Control measures.	Garland drainage structures will be constructed around the lease area to control the erosion and afforestation will be done in order to restore the stability of the terrain, discussed in Section 3.2.3 under Chapter III in the EIA report page 48.
21	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	The impacts have been discussed and provided in Chapter IV of EIA report page 102-123.
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	An analysis for food chain in aquatic ecosystem is discussed in Section 3.5.3 under Chapter 3 in the EIA report page 83.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment are discussed in section 4.1 Chapter IV in the EIA report page 103-123.
24	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 3.5.3 under Chapter III in the EIA report page 83.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV in the EIA report page 104-105.
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV in the EIA report page 105-107.
27	The EIA shall include the impact of mining activity on the following:	

	a. Hydrothermal / Geothermal effect due to destruction in the Environment	The average geothermal gradient of earth is 25 ⁰ C/km. As the proposed depth of mining is 60m below the local ground level, the temperature will increase by 1.25 ⁰ C at the depth of mining. So, there will be no effect on environment.
	b. Bio-geochemical processes and its foot prints including environmental stress.	No Bio-geochemical processes are anticipated as the quarrying is of hard rock type. At the end of life of mine, the proposed quarry shall be left as an artificial reservoir structure to collect rain water and will enrich the ecosystem.
	c. Sediment geochemistry in the surface streams	There will be no effect on sediment geochemistry and are discussed in the Table 3.4 under Chapter III in the EIA report page 41.
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	The measures taken to control noise, air, water, and dust are furnished in Chapter IV of the EIA report page 102-121.
Climate Change		
29	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6.1 under Chapter IV in the EIA report page 117-118.
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.	These aspects have been discussed in section 4.2 Chapter IV of the EIA report page 104-105.

	31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	There will be no such emission impact to local livelihood from this quarry project. All the vehicles used for transportation of the quarry materials will be maintained regularly to keep the GHGs emission within statutory limits.
	Mine Closure Plan		
	32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	This is a fresh lease; a progressive mine closure plan has been given section 4.10, chapter IV, page-122-123 The budget details for the progressive mine closure plan are shown in Table 10.2 under Chapter X in the EIA report page 151.
	EMP		
	33	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.	A detailed Environment Management plan has been given as Chapter X in the EIA report page 146-152.
	34	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	Environment Management plan with budget has been furnished in Tables 10.1 & 10.2 under Chapter X in the EIA report page 147-152.
	Risk Assessment		
	35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and management plan for this project has been prepared and provided in Section 7.2 under Chapter VII in the EIA report page 130-133.
	Disaster Management Plan		
	36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/unfavorable	The disaster management plan for this project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 133-134.

	accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	
Others		
37	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The VAO certificate is included as Annexure IV page-296,297.
38	As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	The concerns raised during the public consultation and responses of proponent will be submitted in final EIA report.
39	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The plastic waste management has been discussed in Section 7.5 of Chapter VII in the EIA report page 140-141

Standard Terms of Reference for (Mining of minerals):

1.

S.No	Terms of Reference	Remarks
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in	Not applicable, it is a fresh quarry lease.

	production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994	
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given	The proposed site for quarrying is a private land. A copy of the document showing that proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexures, pages- 252-269.
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee	All documents are in the name of lessee.
1.4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)	The satellite imagery, topographic sheet displaying corner co-ordinates and images of geomorphology, lithology, geology of the lease area interpreting the land use of the lease area is given in pages-32, 33,34,35 of chapter III.
1.5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics	The image of Survey of India toposheet in 1:50,000 scale indicating the above-mentioned features is enclosed in chapter-III, pages- 40,44.
1.6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority	The mining activity in proposed area is under the land use policy of state or concerned authority. Approval from AD/DD, department of Geology and Mining is obtained and enclosed as annexure-III. Page-243-246.

1.7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report	The proponent has individual ownership over the project, not a part in any group or company with board of directors. The Environmental Policy is discussed in the Section 10.1 under Chapter X in the EIA report page 146.
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided	This is an open cast mining of rough stone excavation. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 45⁰ bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
1.9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period	The data contained in EIA is for the life of the mine/lease period. This project involves excavation of rough stone, which is of 100% recovery and no waste or rejects may generate.
1.10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife

	sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given	sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1.2 under Chapter III in the EIA report page 26-29. The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 100. Land use plan of the project area showing pre- operational, operational and post-operational phases are discussed in Table 2.9 under Chapter II in the EIA report page 18.
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given	Not applicable, this project involves excavation of rough stone, which is of 100% recovery and no waste or rejects may generate. The entire quarried out rough stone will be transported to the needy customers.
1.12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the State Expert Appraisal Committees	Not applicable. No forest land is involved in this project.

1.13	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished	Not applicable. No forest land involved, the lease area is a patta land.
1.14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated	Not applicable, no forest land involved.
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	No RF/PF nearby the project area. The details of RF/PF around the project area is listed in Table- 3.36 chapter-III Page no-100 of EIA report.
1.16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted	This project has no impact on wildlife community and there is no wildlife sanctuary situated within 10km radius. The nearby wildlife/Bird sanctuaries related details furnished in Table- 3.36 chapter-III Page no-100 of EIA report.
1.17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	Not applicable. No any national Park, Sanctuaries, Biosphere Reserves, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), within 10 km of the mine. The nearby ecological sensitive areas are listed in Table- 3.36 chapter-III Page no-100 of EIA report.
1.18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of	The detailed study on flora and fauna including core and buffer zone has been

	the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost	carried out and the report for the same is given in Section-3.5 under Chapter III in the EIA report page 69-84.
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered	Not applicable. The project area is not in proximity of any declared ‘Critically Polluted’ areas and does not come under the Aravalli Range.
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)	Not applicable. This project area does not fall under Coastal Regulation Zone.
1.21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the	Not applicable.

	relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report	The project area is a patta land, no people of any section are displaced and affected by this project, thus no requirement of R&R. The socio-economic aspects of the people are discussed in chapter-III, section 3.6-page no-85-98.
1.22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given	Baseline data were collected for the period of October - December 2025 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.0-3.8 under Chapter III in the EIA report page 24- 101.

1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also consider the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing predominant wind direction may also be indicated on the map	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the Chapter IV in the EIA report page 108-113.
1.24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated	The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II in the EIA report page 20. The artificial rainwater harvesting structures are planned in and around the site. The excavated pits nearby the site will be connected by the garland drain system and water will be stored and this water will be utilised for the green belt maintenance and dust suppression sprinkling purpose. The rooftop harvesting structure is also planned from the labour sheds and other structures will be connected to the nearby excavated pits and utilised. These implementations will reduce the dependency of water from the nearby borewells and open wells. It will help in infiltration of rainwater and recharge the aquifer naturally during monsoon.

1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided	Not applicable. The drinking water will be bought from nearby vendors and rain water stored in pits and garland drainage tanks will be utilised for dust suppression and maintenance of green belt.
1.26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided	The artificial rainwater harvesting structures are planned in and around the site. The excavated pits nearby the site will be connected by the garland drain system and water will be stored and this water will be utilised for the green belt maintenance and dust suppression sprinkling purpose. The rooftop harvesting structure is also planned from the labour sheds and other structures will be connected to the nearby excavated pits and utilised. These implementations will reduce the dependency of water from the nearby borewells and open wells.
1.27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided	Impact and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV in the EIA report page 105-107.
1.28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from State Ground Water Authority for working below ground	The ground water table is found at the depth of 75m below ground level. The ultimate depth of quarry is 60m BGL. Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2.2 under Chapter III in the EIA report page-46-54

	water and for pumping of ground water should also be obtained and copy furnished	
1.29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
1.30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same	The highest elevation of the project area is 90m AMSL. Ultimate depth of the mine is 60m BGL. Depth to the water level in the area is 75m BGL. Schematic diagram is provided as figure 3.12-chapter III, page no-54.
1.31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution	Greenbelt development plan has been given in Section 4.6.2 under Chapter IV in the EIA report page 118.
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including	Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact

	those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines	due to the proposed transportation from the project area. Details are provided in Section 3.7 under Chapter III in the EIA report page 98-99.
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.5.6 under Chapter II in the EIA report page 20.
1.34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report	Progressive mine closure plan has been prepared for this project and is given in Section 4.10 under Chapter IV in the EIA report page 122-123.
1.35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed	Occupational health impacts of the project and preventive measures have been explained in detail in Section 4.8 under Chapter IV in the EIA report page 120-122.
1.36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII in the EIA report page 143-144.

1.37	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation	No negative impact on socio-economic environment due to this project is anticipated. This project shall improve the social and economic status of the people. By offering employment for 25 people directly and many indirectly, CER and CSR activities discussed as Chapter VIII in the EIA report page-142-144.
1.38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project	A detailed Environment Management Plan has been prepared and provided as Chapter X in the EIA report page 146-152.
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project	The minutes of public hearing and commitment of proponent for the same with time bound action plan and budgetary provisions will be provided and incorporated in final EIA/EMP report.
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No litigation is pending in any court against this project.
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	Project Cost is Rs. 91,56,000/- CER Cost is Rs.5,00,000/- In order to implement the environmental protection measures, an amount of Rs.10672478 as capital cost and recurring cost as Rs. 3165880 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5

		years will be Rs. 28334603 as shown in Table 10.2. under Chapter X in the EIA report page-152.
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report	The disaster management plan for this project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 133-134.
1.43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc	Benefits of the project in all aspects have been given as Chapter VIII in the EIA report page 142-144.
1.44	Besides the above, the below mentioned general points are also to be followed: -	
	a) All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
	b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
	c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Original Baseline testing reports will be submitted in final report.
	d) Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided here are in English language only.
	e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted	The questionnaire will be provided in final report.

f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions for proponents and consultants issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4th August, 2009 have been followed while preparing the EIA report.
g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No changes are made in the basic scope and the project parameters.
h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Not applicable, since it is a new quarry lease.
i) The EIA report should also include, (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All the plans including surface & geological plans, and progressive closure plan have been included in Annexures, pages-288-295.

SEAC Standard conditions:

S.No	Terms of Reference	Remarks
1	In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:	
(i)	Original pit dimension	As it is a fresh quarry, these conditions are not applicable.
(ii)	Quantity achieved vs EC Approved Quantity	
(iii)	Balance Quantity as per Mineable Reserve calculated.	
(iv)	Mined out Depth as on date Vs EC Permitted depth	
(v)	Details of illegal/illicit mining	
(vi)	Violation in the quarry during the past working.	
(vii)	Quantity of material mined out outside the mine lease area	
(viii)	Condition of Safety zone/benches	
(ix)	Revised/Modified Mining Plan showing the benches of not exceeding 6m height and ultimate depth of not exceeding 50m.	
2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.	The VAO certificate is attached as Annexure IV page no-296-297.
3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	There are no permanent structures or residing houses within 500m radius of the lease area.

4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Detailed hydrological study report will be submitted in the final EIA report.
5	The Proponent shall carry out Bio-diversity study through reputed Institution and the same shall be included in EIA Report.	The Bio-diversity study report from the reputed institution will be submitted in the final EIA report.
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	The DFO letter will be submitted in the final EIA report.
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg. Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.	This is a fresh quarry lease.
8	However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.	This is a fresh lease area; the Slope Stability report will be submitted once the mining depth reaches 30m BGL.

9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	The affidavit for blasting operation will be enclosed in the final EIA report.
10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	A conceptual design of blasting has been given in Section 2.5.1 under Chapter II in the EIA report page 15-17.
11	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	This is the only quarry in name of the lessee.
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	Not applicable, it is a fresh quarry lease.
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	As it is a fresh quarry lease, these conditions are not applicable.
14	Quantity of minerals mined out.	
	Highest production achieved in any one year.	
	Detail of approved depth of mining.	
	Actual depth of the mining achieved earlier.	
	Name of the person already mined in that leases area.	
	If EC and CTO already obtained, the copy of the same shall be submitted.	

	Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.2 under Chapter II in the EIA report page 9.
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.	The drone video will be submitted during final presentation.
17	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Photographs of adequate fencing, green belt along the periphery of the project area and the photographs showing nearby water bodies will be included in final EIA Presentation.
18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.	The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. The details reserve estimation has been shown in Table 2.4 under Chapter II in the EIA report page 12.
19	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act' 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	The chart including the role of statutory officials is prepared and given in chapter II section -2.8-page no-22-23.

20	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	The hydro-geological study is discussed in the Section 3.2.2 under Chapter III in the EIA report page 46-54.
21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data was collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed in Chapter III of EIA report, page 24-101.
22	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 134-140.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks and further discussed in chapter III EIA report section 3.2.3, page-47-48.
24	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife	Land use of the study area delineating forest area, agricultural land, grazing

	sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1.2 under Chapter III in the EIA report page 27-29. The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 100. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.9 under Chapter II in the EIA report page 18.
25	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Not applicable, this rough stone and gravel is of 100% recovery. So, no waste rejects or dumps have been proposed in or outside the lease area. No requirement of R&R.
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area.
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby structures after treating the water in settling tanks and further discussed in chapter III, section 3.2.3 page-48.
28	Impact on local transport infrastructure due to the Project should be indicated.	Details regarding impact of the project on traffic and transport infrastructure are

		given in Section 3.7 under Chapter III in the EIA report page 98-99.
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.5.1 under Chapter III in the EIA report page 70-79.
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	A progressive mine closure plan has been given in chapter IV, section 4.10 page-122-123.
31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	The EIA coordinator and the FAE for ecology and biodiversity visited the study area and educated the local students about the importance of protecting the biological environment. Also planned for similar sessions in future.
32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	A detailed greenbelt development plan has been provided in Section 4.6.2 under Chapter IV in the EIA report page 118.
33	Taller/one-year old Saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-friendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.

		The green belt development plan including planting procedure is discussed in section 4.6.2-chapter IV page-117-118.
34	A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	The disaster management plan for the project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 133-134.
35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Risk assessment plan for the project has been prepared and provided in Section 7.2 under Chapter VII in the EIA report page 130-133.
36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV in the EIA report 120-122.
37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No Public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII in the EIA report page 143-144.
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 25 people directly as discussed in Section 8.2 under Chapter VIII in the EIA report page 142.
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.

40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The benefits of the project in all these aspects are discussed in the Chapter VIII in the EIA report page 142-144.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	It is fresh lease area and the condition is not applicable.
42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	A detailed environment management plan has been prepared following the suggestion made by SEAC, is added as Chapter X in the EIA report page 146-152. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted in final EIA report.
43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	This EIA report has been prepared keeping in mind that, fact concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.

A. Standard Terms of Reference

1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t.	Not applicable, it is a fresh quarry lease.

	the highest production achieved prior to 1994.	
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a private land. A copy of the document showing that proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexure III, page-238-241.
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All documents are in the name of lessee.
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	The satellite imagery/topographic sheet displaying corner co-ordinates is given in chapter II, figure-2.2 page-9. Images of geomorphology, lithology, geology of the lease area interpreting the land use of the lease area is given in chapter III, pages-32,33,34.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The image of Survey of India toposheet in 1:50,000 scale indicating the above-mentioned features is enclosed in page no-40,44, chapter-III.
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The mining activity in proposed area is under the land use policy of state or concerned authority. Approval from AD/DD, department of Geology and Mining is obtained and enclosed as annexure-III, page-243-246.

7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report	The proponent has individual ownership over the project, not a part in any group or company with board of directors. The Environmental Policy is discussed in the Section 10.1 under Chapter X in the EIA report page 146.
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided	This is an open cast mining of rough stone excavation. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 45° bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.	The data contained in EIA is for the life of the mine/lease period. This project involves excavation of rough stone, which is of 100% recovery and no waste or rejects may generate.
10.	Land use of the study area delineating forest area, agricultural land, grazing land,	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife

	wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1.2 under Chapter III in the EIA report page 27-29. The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 100. Land use plan of the project area showing pre-operational, operational and post- operational phases are discussed in Table 2.9 under Chapter II in the EIA report page 18.
11.	Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Not applicable, this project involves excavation of rough stone, which is of 100% recovery and no waste or rejects may generate. The entire quarried out rough stone will be transported to the needy customers.
12.	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not applicable. No forest land is involved in this project.
13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of Net	Not applicable.

	Present Value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land involved, the lease area is a patta land.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not applicable, no forest land involved.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No RF/PF nearby the project area. The details of RF/PF around the project area is listed in chapter-III, Table 3.36 Page no-100 of EIA report.
16.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	This project has no impact on wildlife community and there is no wildlife sanctuary situated within 10km radius. The nearby wildlife/Bird sanctuaries related details furnished in chapter-III, Table 3.36 Page no-100 of EIA report.
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	Not applicable. No any national Park, Sanctuaries, Biosphere Reserves, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), within 10 km of the mine. The nearby ecological sensitive areas are listed in chapter-III, Table 3.36 Page no-100 of EIA report.

18.	A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	The detailed study on flora and fauna including core and buffer zone has been carried out and the report for the same is given in Section 3.5 under Chapter III in the EIA report page 69-84.
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not applicable. The project area is not in proximity of any declared 'Critically Polluted' areas and does not come under the Aravalli Range.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of	Not applicable. This project area does not fall under Costal Regulation Zone.

	the concerned Coastal Zone Management Authority).	
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspect should be discussed in the Report	Not applicable. The project area is a patta land, no people of any section are displaced and affected by this project, thus no requirement of R&R. The socio-economic aspects of the people are discussed in section 3.6 chapter-III, page no-85-98.
22	One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of	Baseline data were collected for the period of October - December 2025 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.0-3.9 under Chapter III in the EIA report page 24-101.

	sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	
23.	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also consider the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The results are provided in Section 3.3 under the Chapter III in the EIA report page 56-66.
24.	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II in the EIA report page 20. The artificial rainwater harvesting structures are planned in and around the site. The excavated pits nearby the site will be connected by the garland drain system and water will be stored and this water will be utilised for the green belt maintenance and dust suppression sprinkling purpose. The rooftop harvesting structure is also planned from the labour sheds and other structures will be connected to the nearby excavated pits and utilised.

		These implementations will reduce the dependency of water from the nearby borewells and open wells. It will help in infiltration of rainwater and recharge the aquifer naturally during monsoon.
25.	Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.	Not applicable. The drinking water will be bought from nearby vendors and rain water stored in pits and garland drainage tanks will be utilised for dust suppression and maintenance of green belt.
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	The artificial rainwater harvesting structures are planned in and around the site. The excavated pits nearby the site will be connected by the garland drain system and water will be stored and this water will be utilised for the green belt maintenance and dust suppression sprinkling purpose. The rooftop harvesting structure is also planned from the labour sheds and other structures will be connected to the nearby excavated pits and utilised. These implementations will reduce the dependency of water from the nearby borewells and open wells.
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV in the EIA report page 105-107.
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and	The ground water table is found at the depth of 75m below ground level. The ultimate depth of quarry is 60m BGL.

	Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2.2 under Chapter III in the EIA report page 46-54.
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
30.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	The highest elevation of the project area is 90m AMSL. Ultimate depth of the mine is 60m BGL. Depth to the water level in the area is 75m BGL. Schematic diagram is added in chapter III, page no-54.
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution	Greenbelt development plan has been given in Section 4.6.2 under Chapter IV in the EIA report page 117-118.

32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details are provided in Section 3.7 under Chapter III in the EIA report page 98-99.
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.5.6 under Chapter II in the EIA report page 20.
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Progressive mine closure plan has been prepared for this project and is given in Section 4.10 under Chapter IV in the EIA report page 122-123.
35.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been explained in detail in Section 4.8 under Chapter IV in the EIA report page 120-122.
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7

	measures should be detailed along with budgetary allocations.	under Chapter VIII in the EIA report page 143-144.
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment due to this project is anticipated. This project shall improve the social and economic status of the people. By offering employment for 25 people directly and many indirectly, CER and CSR activities. Discussed in Section 4.7 under Chapter IV in the EIA report page 120.
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	A detailed Environment Management Plan has been prepared and provided in Tables 10.1 & 10.2 under Chapter X in the EIA report page 146-152.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	The minutes of public hearing and commitment of proponent for the same with time bound action plan and budgetary provisions will be provided and incorporated in final EIA/EMP report.
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 91,56,000/- CER Cost is Rs.5,00,000/-. In order to implement the environmental protection measures, an amount of Rs.1,06,72,478 as capital cost and recurring cost as Rs. 31,65,880 as recurring cost/annum is

		proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 10 years will be Rs. 2,83,34,603. Provided in Tables 10.1 & 10.2 under Chapter X in the EIA report page 147-152.
42.	A disaster management plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan for this project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 133-134.
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project in all aspects has included as Chapter VIII in the EIA report page 142-144.
44	Besides the above, the below mentioned general points are also to be followed:	
a)	Executive Summary of the EIA/EMP Report.	The Executive summary of EIA/EMP report is prepared incorporating the given points and included as chapter-XI,
b)	All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
c)	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Original Baseline monitoring reports will be submitted in final report.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided here are in English language only.

f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be enclosed in final report.
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions for proponents and consultants issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009 have been followed while preparing this EIA report.
h)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No changes are made in the basic scope and the project parameters.
i)	As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Not applicable, since it is a new quarry lease.
j)	The EIA report should also include, (i) surface plan of the area indicating contours of main	All the plans including surface plan & geological maps have been included in Annexures, pages-288-295.

	topographic features, drainage and mining area,	
	(ii) geological maps and sections and	
	(iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	

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CHAPTER I

INTRODUCTION

1.0 PREAMBLE

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments the projects are categorized into A, B1 & B2 to determine the level of scrutiny and process. The mining projects whose extent is ≥ 5 ha or the cluster of quarries (if homogeneous mineral) within 500m radius extent is greater than 5ha falls under category B1. These projects require preparation and submission of an EIA report after public consultation to SEIAA to obtain environmental clearance as per the Office Memorandum F.No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

1.1 PURPOSE OF THE REPORT

The purpose of the report is to evaluate the project's potential environmental, social and economic effects of the before it is implemented adhering to the guidelines outlined in the MoEF & CC Notification, S.O. 996 (E) dated 10.04.2015 and MoEF & CC Office Memorandum dated 29.08.2017.

1.2 ENVIRONMENTAL CLEARANCE

The Environmental Clearance process for the project will comprise of four stages. These stages are screening, scoping, public consultation & appraisal.

Screening

The project had applied in PARIVESH 2.0 proposal no. SIA/TN/MIN/558866/2025 Dated 20.11.2025 to obtain terms of reference.

Scoping

The mechanism for issuing online system generated Standard ToR as well as reference to SEAC has been enabled on the PARIVESH Portal on the acceptance of the complete application online. The concerned Member Secretary of SEAC shall refer the project to the concerned SEAC for prescribing additional ToR as per the circular F.No. IA 3-22/15/2022-IA-III [Computer No 178038] Dated: 6th May 2022.

Public Consultation

In this stage, an application along with the draft EIA and EMP report will be made to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) and request to conduct Public Hearing as per EIA notification 2006. The outcome of the public hearing Details given in Final EIA Report.

Appraisal

In this stage, the final EIA report will submit in PARIVESH 2.0 to SEIAA, TN. Based on the recommendations of SEAC the SEIAA, TN will grant EC or castoff.

1.3 TERMS OF REFERENCE (ToR)

The total extent of quarries within the 500m radius is greater than 5 ha. The details of the quarries within the cluster are given in Table 1.1.

Table 1.1 Details of quarries within the cluster of 500m radius

Proposed Quarries					
Code	Name of the Owner	S.F. No	Village	Extent (ha)	Status
P1	M/s.S.A.Enterprises	139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1,145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11.	Kundiyanthandalam	4.96.0	Proposed Area
Existing Quarries					
E1	Nagarajan	154/1B1B, 154/2A, 154/2B1, 154/3, 154/4, 154/5, 155/2A, 155/2B	Kundiyanthandalam	2.51.5	09.10.2023 to 08.10.2033

E2	William	159, 160, 164/2(Part)	Kundiyanthandalam	2.88.0	24.12.2021 to 23.12.2026
Total Cluster Extent				10.35.5	---

Source: DD Letter: Rc.No.425/Kanimam/2025, Dated:10.11.2025

The file was appraised in 647th SEAC meeting on 04.12.2025 and issued terms of reference (ToR) identification no **TO25B0108TN5265914N** on **22.12.2025** by SEIAA, TN.

1.4 POST ENVIRONMENT CLEARANCE MONITORING

- The project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and the details of the website where it is displayed.
- The project proponent will submit a half-yearly compliance report of the stipulated environmental conditions to Regional Office, MoEF & CC & SEIAA on 1st June and 1st December of every year.

1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

The prior environmental clearance granted for a project or activity may be transferred as per the provisions of para 11 of the Environmental Impact Assessment Notification, 2006 and its subsequent amendments and the office memorandum File No. IA3-22/19/2023-IA.III [E226246] Dated: 3rd November 2023.

1.6 IDENTIFICATION OF THE PROJECT PROPONENT

The details of the project proponent are given in Table 1.2 below.

1.2 Details of Project Proponent

Name of the Project Proponent	M/s.S.A.Enterprises
Address	No. 2, Kurunji Nagar, 1 st Main Road,Abdul Kalam Park, Sothupakkam Village, Old Perungalattur, Chennai District – 600063.
Status	Proponent

1.7 BRIEF DESCRIPTION OF THE PROJECT

The method adopted for rough stone excavation is open cast semi mechanized method involving formation of benches with 5m height and 5m width and the overall bench slope is less than 65°. The quarry operation involves shallow jackhammer drilling, slurry blasting, excavation, loading and transportation.

The overall extent of the project site is 4.96.0ha and it is located in Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.

The proposed project deals with excavation of rough stone and gravel which is primarily used in construction projects. The increasing demand for rough stone fueled by a booming construction industry presents a valuable opportunity. This project will not only meet the rising demand for rough stone but also create jobs for the surrounding villages.

1.8 SCOPE OF THE STUDY

The main scope of the EIA study is to quantify the cumulative impact of the quarries in the cluster and formulate the effective mitigation measures. The baseline monitoring study has been carried out during the period of **Oct to Dec 2025** for various environmental components such as land, soil, air, water, noise, ecology, etc. to assess the anticipated impacts of the cluster on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project.

1.9 Legislation Applicable to Mining of Mineral Sector

A few important legislations are given below:

- ❖ The Mines Act, 1952
- ❖ The Mines and Mineral (Development and Regulation) Act, 1957
- ❖ Mines Rules, 1955
- ❖ Mineral Concession Rules, 1960
- ❖ Mineral Conservation and Development Rules, 1988
- ❖ State Minor Mineral Concession Rules, 1960
- ❖ Granite Conservation and Development Rule, 1999
- ❖ The Water (Prevention and Control of pollution) Act, 1974
- ❖ The Air (Prevention and Control of pollution) Act, 1981
- ❖ The Environment (Protection) Act, 1986
- ❖ The Forest (Conservation) Act, 1988
- ❖ The Wildlife (Protection) Act, 1972.

CHAPTER II

PROJECT DESCRIPTION

2.0 DECSRIPTION OF THE PROJECT

The proponent M/s. S.A. Enterprises is involved in the mining and its auxiliary activities. The proponent had applied for quarry lease on 20.05.2025 to extract rough stone and gravel. The precise area communication letter was issued by Deputy Director of Geology and Mining, Tiruvannamalai vide (Roc.No.425/Mines/2025, Dated 17.10.2025). The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Tiruvannamalai (Rc.No.484/Kanimam/2025 Dated 10.11.2025). The project area and the proposed excavation details were given in Table 2.1.

Table 2.1 Proposed project area and excavation details

Name of the Quarry	M/s. S.A.Enterprises	
Type of Land	Patta Land	
Extent	4.96.0	
S.F. No	139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1,145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11	
Toposheet No	57 P/10	
Highest Elevation	90m AMSL	
Latitude	12°44'31.09"N to 12°44'38.96"N	
Longitude	79°43'8.05"E to 79°43'22.41"E	
Proposed depth as per ToR	60m BGL	
Ultimate depth for five years	60m BGL	
Geological Resources	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	2531181 & 6960748	446679 & 893358
Mineable Reserves	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	635925 & 1748784	314313 & 628626
Proposed production for 5 years	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	635925 & 1748794	314313 & 628626
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery requirements	Jack hammer	4
	Excavator	1

	Compressor	2
	Tipper	5
Proposed Manpower Deployment	25	
Project Cost	Rs.91,56,000/-	
Proposed Water Requirement	3.5 KLD	

2.1 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Kundiyathandalam village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu as shown in Figure 2.1.

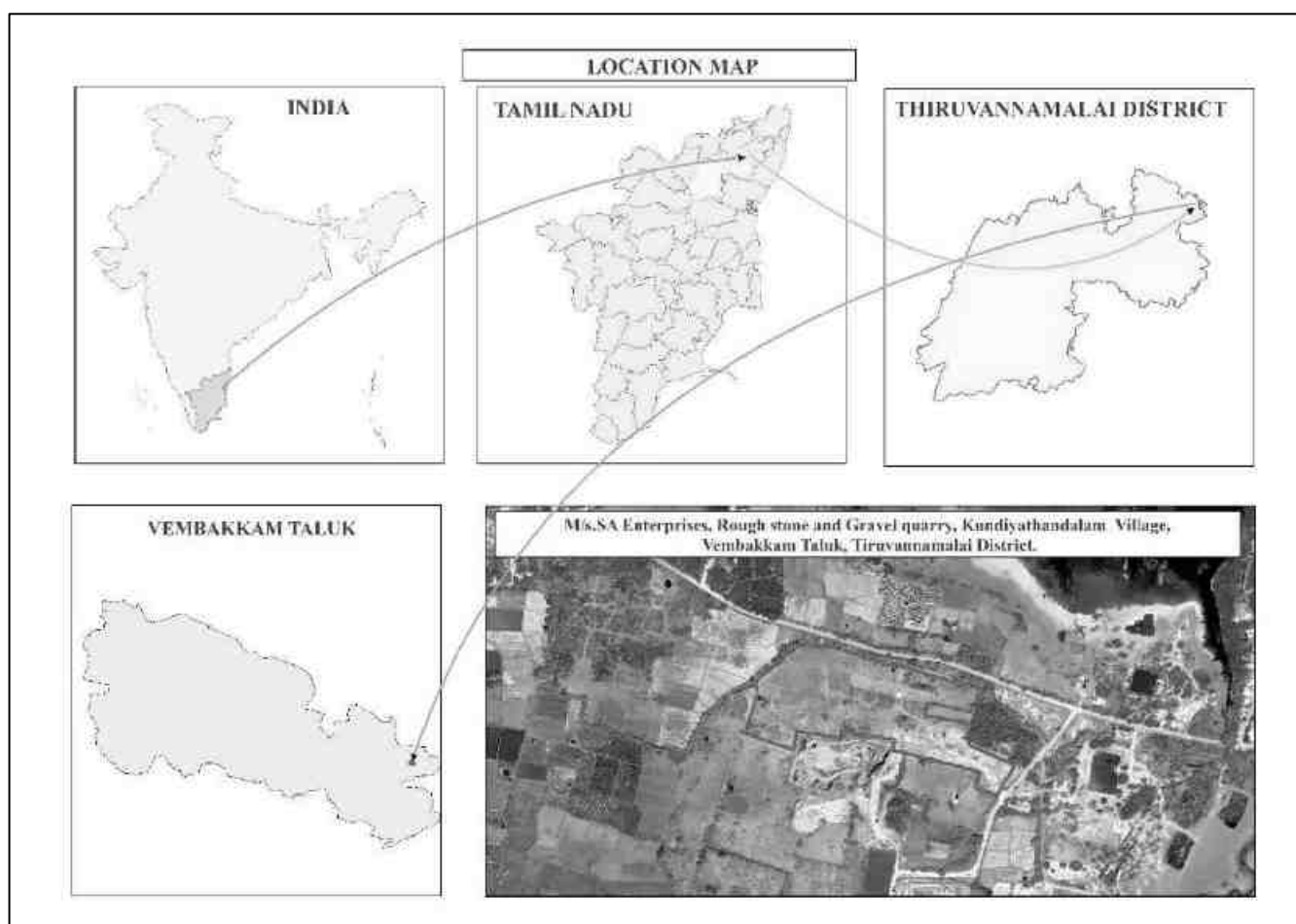


Figure 2.1 Key Map Showing Location of Project Site

The site has access from SH 118A – (Uthiramerur-Kancheepuram road). By travelling the distance of 15.6km from uthiramerur towards kancheepuram in North side and turning left into a bituminous village road near to retteri kanniyamman temple and reach the site in 0.4km. Accessibility details to the proposed project site have been given in Table 2.2.

Table 2.2 Site Connectivity to the Project Area

Type of Features	Name/Location	Distance (km)	Direction
Bituminous road	Village Road	0.4	E
Nearest Roadways	SH – 118A (Kanchipuram to Uthiramerur Road)	2.4	NE
Nearest Town	Kancheepuram	10.2	N
Nearest Airport	Chennai	57.0	NE
Nearest Villages	Kundiyanthandalam	0.5	NE
	Suruttal	1.1	E
	Chinna Elacheri	2.0	S
	Punaithangal	0.6	W

2.2 LEASEHOLD AREA

The details of the field survey number, subdivision and their extent and the overall extent of the proposed project site is given in Table 2.3.

Table 2.3 Lease hold area details

Survey No	Sub Division	Total Extent in Hect	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F.No.	Mine lease Applied area out of total area in hect.
139	-	1.89.0	920	1.Mr. E. Sarankumar S/o.Elumalai 2. Mr.A.Ayyanar S/o.Annamalai	139	1.89.0
140	1A	0.12.5			140/1A	0.12.5
140	1B	0.12.5			140/1B	0.12.5
144	1A1	0.29.5			144/1A1	0.29.5
144	1A2	0.05.0			144/1A2	0.05.0
145	1A	0.22.5			145/1A	0.22.5
145	1B1	0.10.0			145/1B1	0.10.0
145	1B2	0.09.5			145/1B2	0.09.5
145	1B3	0.03.0	927		145/1B3	0.03.0
145	2A	0.15.0	920		145/2A	0.15.0
145	2B1	0.11.34			145/2B1	0.11.34
145	2B2	0.19.16			145/2B2	0.19.16
145	3A	0.33.0			145/3A	0.33.0
145	4	0.21.0			145/4	0.21.0
145	5A	0.03.0	927		145/5A	0.03.0
145	5B	0.26.0	920		145/5B	0.26.0
145	7A	0.09.5			145/7A	0.09.5
145	7B	0.08.5			145/7B	0.08.5
145	9A1	0.04.0			145/9A1	0.04.0
145	9A2	0.03.5			145/9A2	0.03.5
145	9B	0.07.5	933		145/9B	0.07.5
145	10	0.14.5	927		145/10	0.14.5
145	11	0.26.5	920		145/11	0.26.5
Total Extent		4.96.0	Applied lease area extent			4.96.0

The proposed project is site specific. There is no mineral beneficiation or processing proposed inside the project area. There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

The overall extent of the project area is 4.96.0Ha as per the precise area communication letter vide Roc.No.425/Kanimam/2025, Dated 17.10.2025 issued by Dept of Geology and Mining, Tiruvannamalai District lies near the Kundiyanthandalam village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The breakup of the existing land use for mining and ancillary feature is given in Table 2.3a.

Table 2.3a Present Land use pattern of the project area

Sl. No.	Land Use	Present area (Hect.)
1.	Area under Mining	Nil
2	Infrastructure	Nil
3	Roads	Nil
4	Unutilized	4.96.0
5	Green Belt	Nil
6	Settling Tank & Drainage	Nil
	Grand Total	4.96.0

2.2.1 Geo Coordinates

The proposed lease area is almost flat topography. The maximum elevation (90m) was observed north side of the site. The boundary corner and the intermediate stone geographic coordinates is given in Table 2.4 and shown in Figure 2.2.

The quarries within the cluster of 500m radius as per the letter Rc.No.425/kanimam/2025 dated: 10.11.2025 is enclosed as Annexure II is shown in Figure 2.3.

Table 2.4 Geographic coordinates of the Project area

Sl.No.	LATITUDE	LONGITUDE	Sl.No.	LATITUDE	LONGITUDE
1	12°44'36.73"N	79°43'20.67"E	14	12°44'34.05"N	79°43'15.99"E
2	12°44'35.47"N	79°43'20.28"E	15	12°44'34.49"N	79°43'13.20"E
3	12°44'36.01"N	79°43'17.80"E	16	12°44'34.13"N	79°43'13.12"E
4	12°44'35.31"N	79°43'17.63"E	17	12°44'34.48"N	79°43'10.83"E
5	12°44'34.91"N	79°43'20.11"E	18	12°44'33.50"N	79°43'10.62"E
6	12°44'34.16"N	79°43'19.87"E	19	12°44'34.39"N	79°43'8.05"E
7	12°44'33.73"N	79°43'20.02"E	20	12°44'35.12"N	79°43'8.10"E
8	12°44'32.69"N	79°43'22.41"E	21	12°44'36.53"N	79°43'8.75"E
9	12°44'31.09"N	79°43'21.47"E	22	12°44'37.12"N	79°43'8.57"E
10	12°44'31.49"N	79°43'20.34"E	23	12°44'38.91"N	79°43'10.79"E
11	12°44'32.29"N	79°43'20.53"E	24	12°44'38.96"N	79°43'12.72"E
12	12°44'32.53"N	79°43'19.85"E	25	12°44'38.52"N	79°43'14.10"E
13	12°44'32.96"N	79°43'18.02"E	26	12°44'37.41"N	79°43'18.16"E

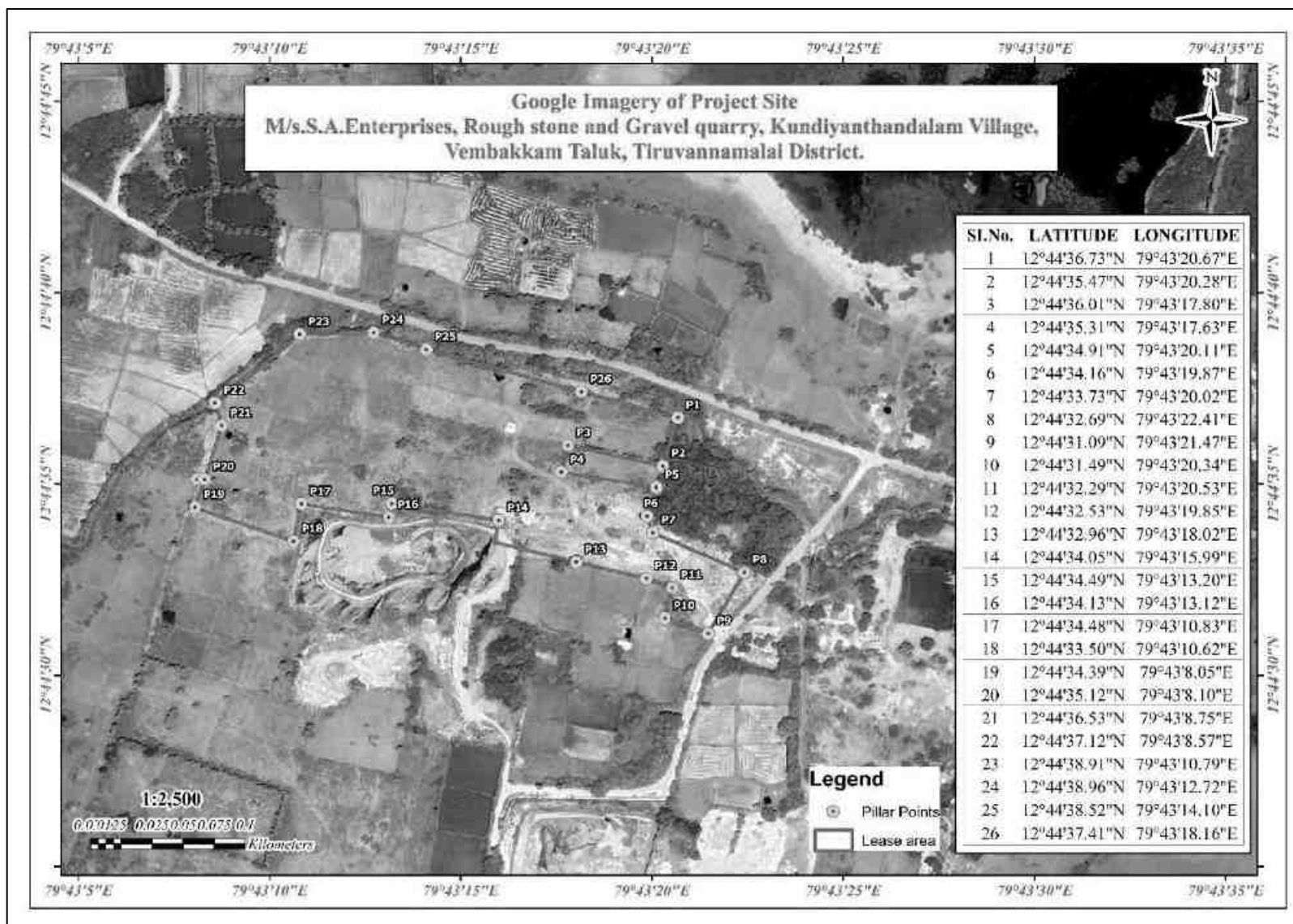


Figure 2.2 Google Earth Image Showing Pillar Coordinates of Lease Area

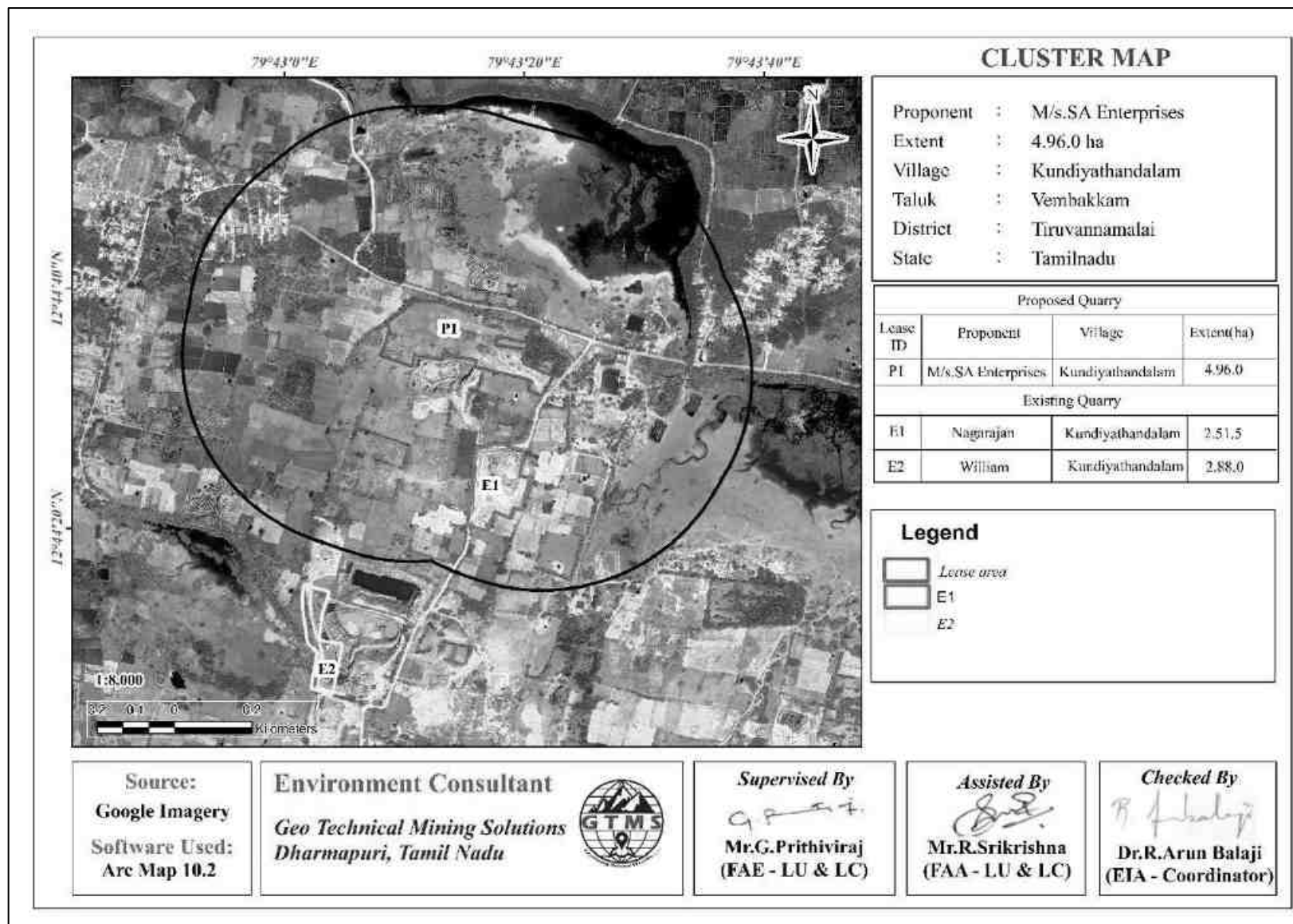


Figure 2.3 Google Earth Image of the cluster

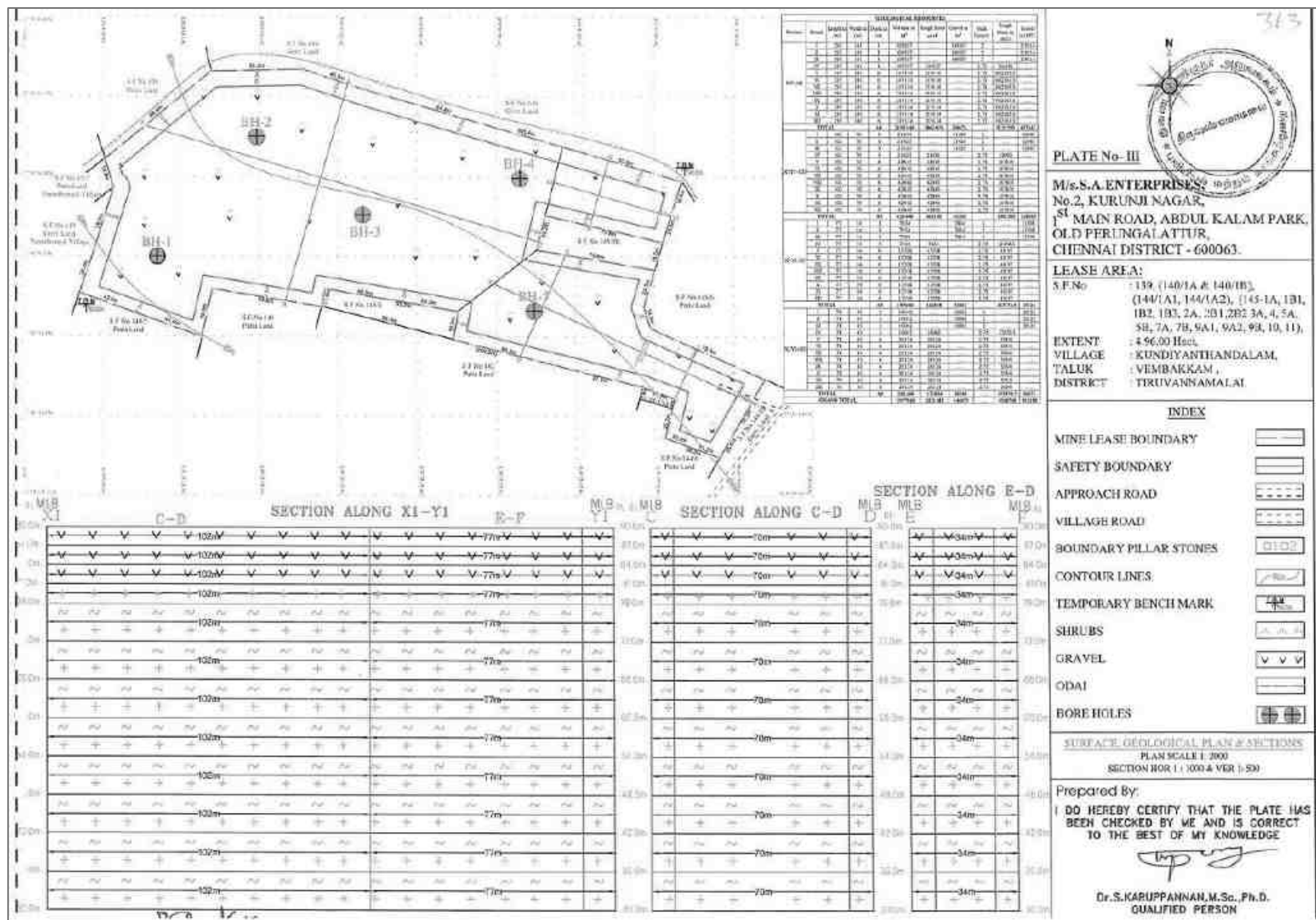


Figure 2.4 Surface & Geological Plan

2.3 GEOLOGY

The entire district is underlain by the rocks belonging to hard crystalline rock masses of Archaean age. General characteristics of the rocks of this series has recorded that the rocks are in general bluish grey or darkish in colour and extremely fresh appearance with an even grained granular structure. Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic ortho pyroxene granite of the series. The alkali feldspar may be intermediate between microcline and orthoclase, the fine micro perthitic texture being common.

Order of superposition of the proposed lease.

Age	Group	Rock Formation
Recent to Sub recent	----	Gravel
Archean	Charnockite Group	Charnockites

The gravel available at a depth of 0.5m followed by gravel exists up to a depth of 5m and the rough stone occurs at a depth of 5m below ground level.

2.4 QUANTITY OF RESERVES

The resources and reserves of rough stone and gravel were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety margins, as shown in Figure 2.5 and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 60m BGL considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The results of geological resources and reserves is given in Table 2.5 and the approved year wise development plan is enclosed as Figure 2.5 & 2.5a.

Table 2.5 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m ³ & Tons	Gravel in m ³ & Tons
Geological Resource in (m ³ & Ts)	2531181 & 6960748	446679 & 893358
Mineable Reserves in (m ³ & Ts)	635925 & 1748794	314313 & 628626
Proposed production for 10 years (m ³ & Ts)	635925 & 1748794	314313 & 628626

Source: Approved Mining Plan & ToR

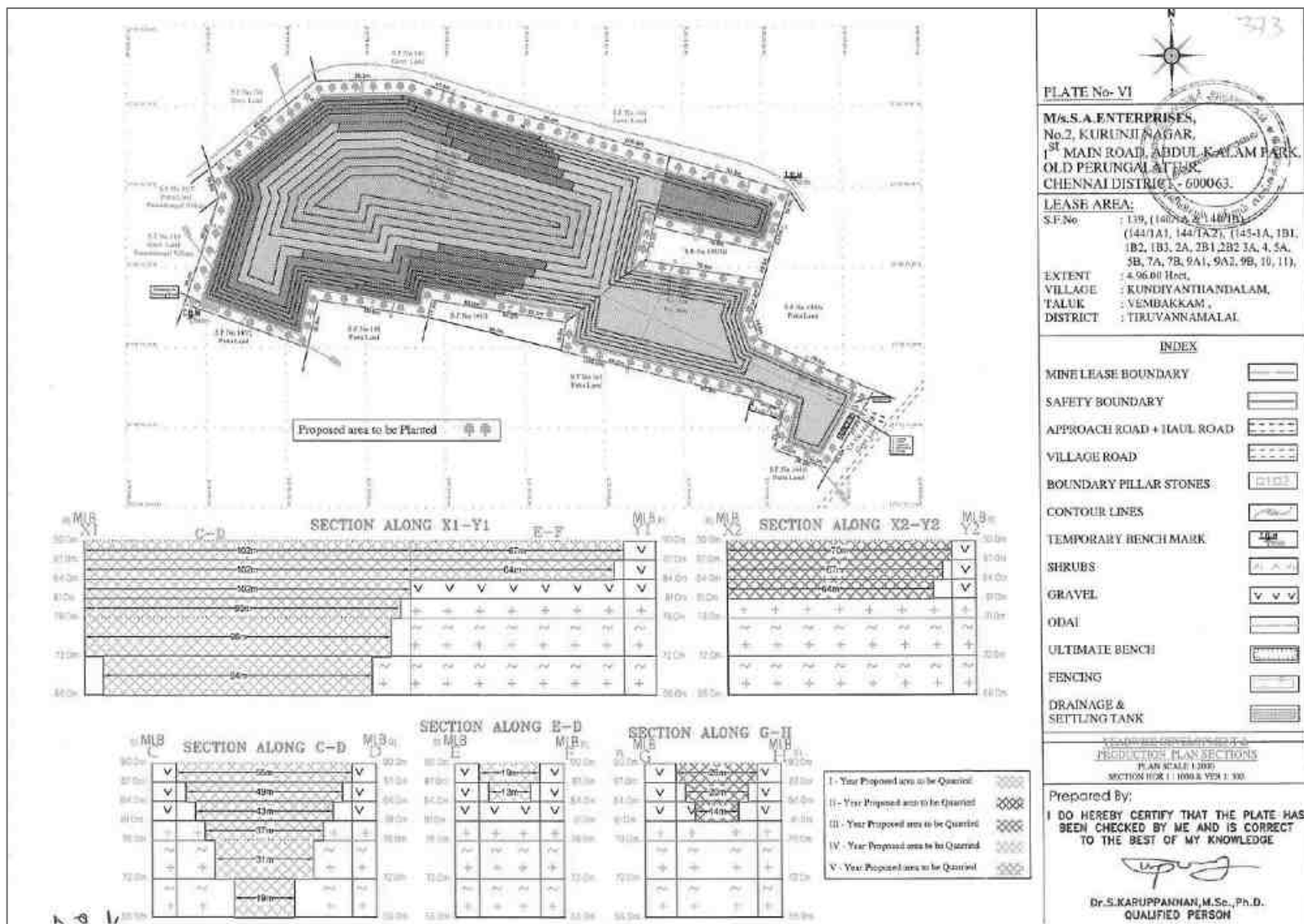
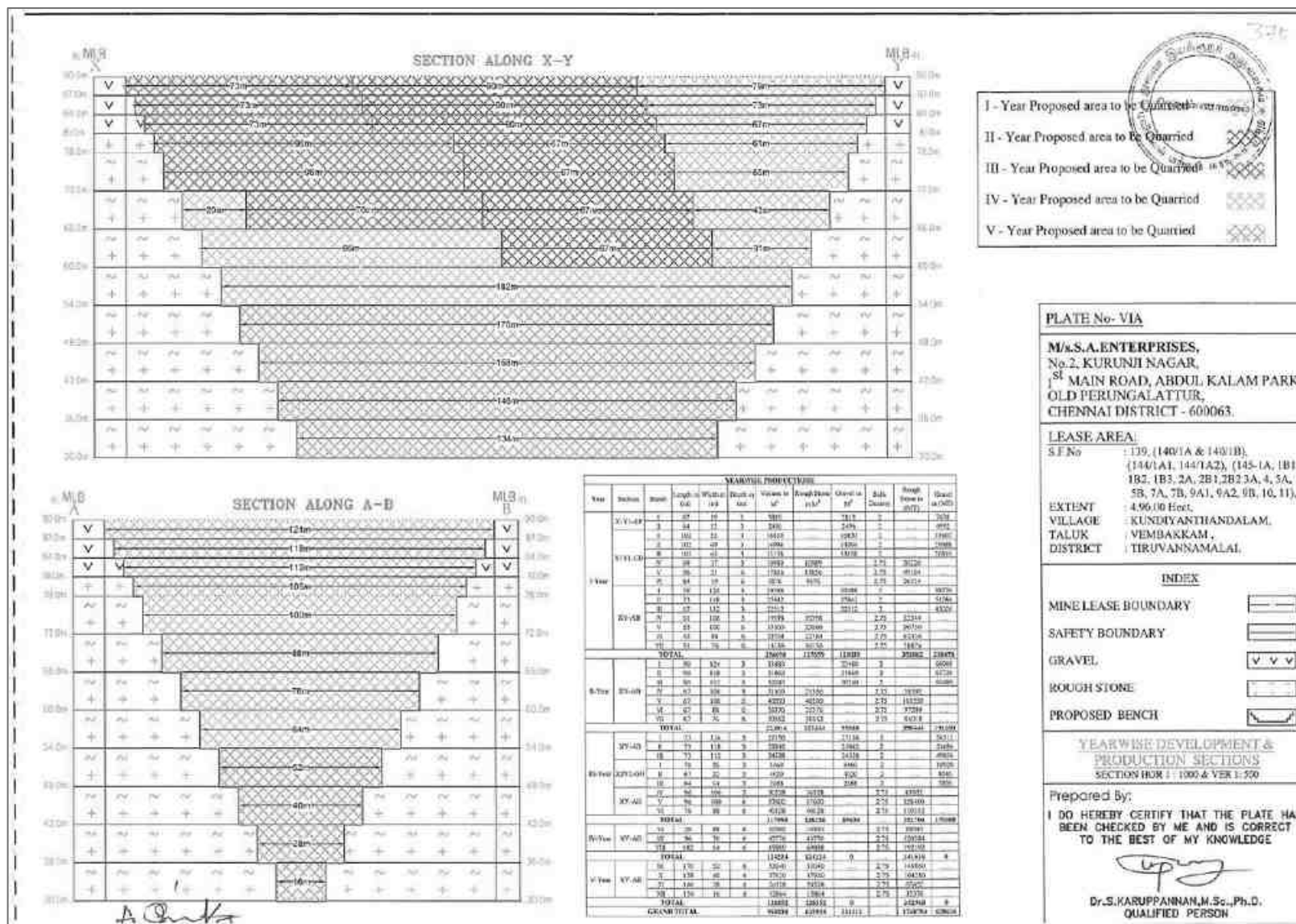


Figure 2.5 Year wise Development & Production Plan



2.5 MINING METHOD

The Quarrying operation is proposed to be carried out by open cast mechanized mining method with the bench height and width of 5 m each. The open cast mechanized method involving drilling and blasting is proposed to extract rough stone. The extracted rough stone will be loaded to the trucks to the nearby stone crushing units. Due permission from D.G.M.S, will be taken as per Rule 106 of MMR 1961 is proposed. Mining operation is proposed in one shift i.e. 8 AM to 4 PM. The average number of working days in a year would be 270 days/yr excluding Sunday & holidays. The production will be slow down trend during monsoon period. In this project, NONEL blasting will be adopted to extract rough stone.

2.5.1 Conceptual Blasting Design

In this project, NONEL blasting will be employed to win rough stone. This method will involve closed spaced perimeter holes to reduce the overbreak/backbreak on a blast. The objective of the blasting design is to prevent fly rocks from damaging the nearby structures.

Rules of Thumb for Blast Design

Based on practical experience and technical information, a set of rules for blasting have been provided as below (Chapter8 (nps.gov)). These rules will be applied to blast rocks in the proposed project.

Rule 1: The detonation velocity (VOD) of the explosive should be close to the same value of the sonic velocity (VSO) of the rock to be blasted.

The sonic velocity of a rock is considered to be a reliable indicator of its structural integrity and resistance to fragmentation. As the VOD of the explosive approaches close to the VSO of the rock, the blasting would result in relatively smaller size of fragmentation with uniformity. There is no value in using an explosive that has a VOD greatly in excess of the VSO of the rock, since there is little or no improvement in fragmentation above the VSO. When selecting an explosive to match up the VSO of a rock mass, variance of < 10% in the velocities is acceptable.

Rule 2: Generally, select the densest explosive possible.

When the density of explosives is higher, the potential energy of the explosives can be greater and the more of it can be placed within a borehole of a given size.

Rule 3: Select explosives according to the characteristics of the rock formation to be blasted.

When planes of separation in the rock are smaller than the degree of fragmentation required, the rock can often be blasted by using lower density and lower detonation velocity explosives.

Rule 4: When using slurry or water gel explosives, always determine the critical temperature below which the explosive will fail to reliably detonate.

Almost all slurry explosives have a critical temperature below which they may not detonate, or may not sustain detonation in elongated columns. The explosives should not be used when the temperature of the explosive at time of loading is below that critical temperature.

Rule 5: The distance between holes (spacing) should not be greater than one-half the depth of the borehole.

When the distance between holes in a row is greater than one-half the depth of the hole, the angles of breakage intersect above the bottom of the holes. This causes both a great deal of vertical throw and a very uneven bottom.

Rule 6: Stemming should be equal to the burden.

Stemming is useful to confine and maximize efficient use of the explosive's energy. It also reduces noise as much as possible. If the stemming is greater than the burden, the rock at the top of the borehole will have less cracking from reflection and refraction of compressive and tensile waves. Therefore, stemming should be equal to burden. Drill fines can be used for loading the borehole.

Rule 7: Subdrill (if necessary) should be between 0.3 and 0.5 of spacing/burden.

Subdrill should be equal to 0.3 of burden. It will work when there is row-for-row delay. In blasts where the delay system is both row-for-row and hole-for-hole, the subdrill should be determined by the largest dimension, which can be the spacing or the burden. An average subdrill of 0.4 of spacing is best to use for planning purposes. Based on the above-mentioned rules, blasting design has been conceptualized is given in Table 2.6.

Table 2.6 Conceptual Blasting Design

Blasthole Diameter (D) in mm	32
Burden (B) in m	1.5
Spacing (S) in m	1.30
Subdrill in m	0.45
Charge length (C) in m	0.64
Stemming	1.5
Hole Length (L) in m	2.6
Bench Height (BH) in m	2.1
Stemming material size in mm	3.2
Burden stiffness ratio	1.43
Blast volume/hole in m ³	4.16
Number of blastholes/day	113
Blasthole pattern	Staggered
Mass of explosive /day in kg	45.33
Powder factor in kg/m ³	0.10
Type of explosives	Slurry
Initiation system	NONEL

Statutory Provision & Precaution during Blasting: -

- Blasting permission from DGMS will be taken by the proponent within 6 months from the date of execution of mine.
- Control blasting will be carried out by using delay detonators during multi rows blasting
- No secondary blasting will be carried out.
- Stemming column will be half of the depth of hole with coarse sand.
- Only Statutory designated Blaster will supervise the blasting operation.
- All persons in the radius of minimum 300m from the blasting site will be removed by siren.
- Blasting operation will be carried out during day time only particularly at noon time.

2.5.2 Magnitude of Operation

Based on the results of estimated production the details about the size of operation had provided in Table 2.7.

Table 2.7 Operational Details for Proposed Project

	Rough Stone (m³) & Ts / 5 years	Gravel (m³) & Ts / 3 years
Proposed production	635925 & 1748794	314313 & 628626
Number of Working Days	270	270
Production /Day (m ³) & Ts	471 & 1295	388 & 776
No. of Lorry Loads	79	65

2.5.3 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.8.

Table 2.8 Machinery Details

S. No.	Type	No. of Unit	Size/Capacity	Dia of Hole (mm)	Motive Power
1	Jack Hammers	2	Hand Held	32mm	Diesel
2	Compressor	2	AIR	---	Diesel
3	Excavator	1	2.9 - 4.5 m ³	---	Diesel
Haulage & Transport Equipment					
4	Tipper	5	---	---	Diesel

2.5.4 Post mining land use

The land use at present, at the end of plan period & at the end of conceptual period is given in Table 2.9 below

Table 2.9 Land Use at the end of mine Life

Description	Present area (Hect.)	Area at the end of life of quarry (ha)
Area under quarry	Nil	3.77.35
Infrastructure	Nil	0.05.0
Roads	Nil	0.03.0
Green Belt	Nil	0.49.5
Un utilized Area	4.96.0	0.47.5
Drainage & Settling Tank	Nil	0.13.65
Total	4.96.0	4.96.0

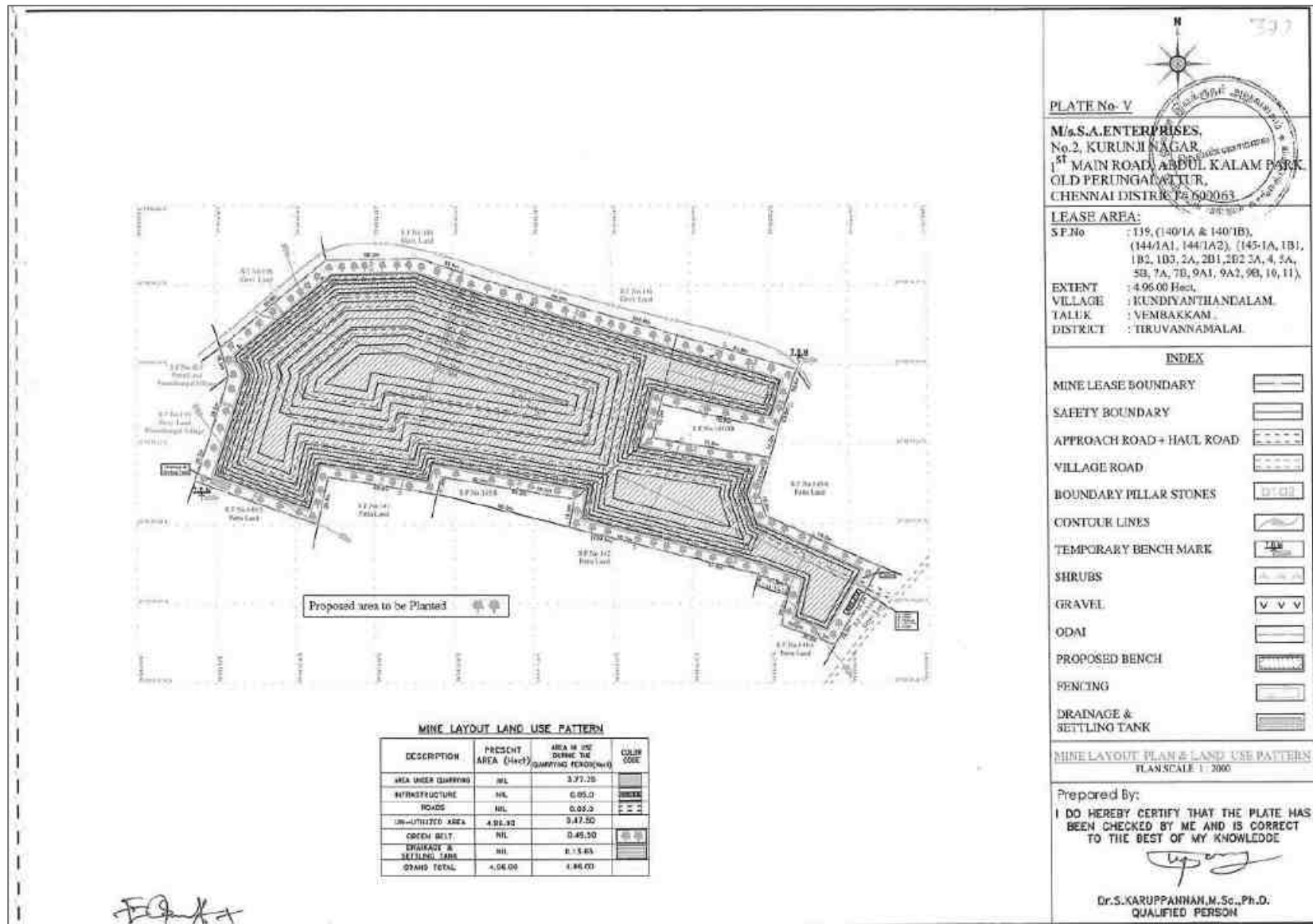


Figure 2.6 Mine Layout Plan and Land Use Pattern

2.5.5 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. The ultimate pit dimension is provided in Table 2.10.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m)	Depth (m)
I	242	124	60

Source: Approved Mining Plan & ToR

2.5.6 Infrastructures

Infrastructures like mines office, temporary rest shelters for workers, latrine and urinal facilities have been proposed as per the mine rule and will be established after the grant of quarry lease. There is no proposal for the mineral processing or ore beneficiation plants in this project.

Other Infrastructure Requirement

No workshops are proposed inside the project area. Hence, there will not be any process effluent generation from the proposed lease area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. As there is no toxic effluent expected to generate in the form of solid, liquid or gaseous form.

2.5.7 Water Requirement

Details of water requirement in 3.5 KLD is given in Table 2.11.

Table 2.11 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	1.2 KLD	Existing bore wells nearby the lease area
Green Belt development	1.3 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.0 KLD	Existing bore wells and approved water vendors
Total	3.5 KLD	

Source: Prefeasibility Report

2.5.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12 Around **38,08,146 litres of HSD** will be used for rough stone extraction during 10 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.12 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	Rough Stone (635925 m³)	Gravel (314313m³)	Total Diesel (litre)
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m ³ /hr)	20	60	---
Time Required (hours)	31796	5239	---
Total Diesel Consumption for 5 years (litre)	5,08,736	52,390	5,61,126
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	113	---	---
Total Diesel Consumption for 5 years (litre)	61,020	---	61,020
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m ³	6	6	---
Number of Trips / days	79	65	---
Number of Trips / 5 years	1,06,650	52,650	---
Total Diesel Consumption for 5 years (litre)	21,33,000	10,53,000	31,86,000
Total Diesel Consumption by Excavator, Compressor and Tipper			38,08,146

2.5.9 Capital Requirement

The project proponent will invest Rs. **91,56,000** to the project. The breakup summary of the investment has been given in Table 2.13.

Table 2.13 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset	37,85,000
2	Machinery	20,00,000
3	EMP	33,71,000
	Total Project Cost	91,56,000

Source: *Approved Mining Plan*

2.6 MANPOWER REQUIREMENT

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community. Number of employees required for this project have been provided in Table 2.14.

Table 2.14 Employment Potential for the Proposed Project

S. No.	Category	Role	Nos
1	Highly Skilled	Mines Manager	1
		Mine Engineer	1
		Mine Geologist	1
		Blaster	1
2	Unskilled	Musdoor/ Labours	21
Total			25

Source: Prefeasibility Report

2.7 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO and CTE will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the environmental clearance will be compiled before the start of mining operation. Expected time schedule for the quarrying operation is given in Table 2.15.

Table 2.15 Expected Time Schedule

S. No.	Particulars	Time Schedule (in Months)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to Establish						Project Establishment Period
3	Consent to operate						Production starting period.
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

Source: Anticipated based on Timelines framed in EIA Notification & CPCB Guidelines

2.8 ORGANIZATION CHART FOR THE PROJECT

The organization chart which allocates the duties and responsibilities of the individuals involved in this project is displayed below,

S.No.	Statutory Official /Competent Person	Role / Responsibility
1	Project Proponent	• Overall incharge for the mining and administration activities, • instructing the manager and other officials regarding the safety precautions, • inspecting the mining area, labour sheds and sanitation facilities regularly, • ensuring safe working environment.
2	Mine Manager	• Executing the instructions given by the proponent, • ensuring the availability of first aid kits and other safety provisions, • arrangement of safe and pure drinking water, • supervising the overall activities of the labours in the mine site.
3	Mine Geologist	• Ensuring the mining activity as per the approved mining plan.
4	Mine Engineer	• Ensuring the safe working of the machineries like DG sets, excavators, compressor drillers etc. in the mine site, • maintenance of loading vehicles and check the smoke emissions, • ensuring the working of the CCTV cameras in the mine site.
5	Blaster/Foreman	• Carryout the controlled and safe blasting in mine site, • alerting the mining area before the blasting, • maintaining the regular time for blasting, • ensuring the travel of fly rock within the planned area.
6	Watchman/Security	• Restricting the entry of the public in the mine site, • recording the movements of the loading and other vehicles into the mine site, • ensuring the loaded vehicle covered with tarpaulin while passing out the gate.
7	Labour 1&2	• Maintenance of labour sheds, toilets, mines office, garland drainage and settling tank, regular sprinkling on roads, • watering of plants regularly and maintain the green belt.
8	Other labours	• Carry out the mining work as per the instructions.

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. 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 through December 2025 with CPCB** guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Interstellar Testing Centre Pvt. Ltd** for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.

Study Area

The study area has been divided into two zones: core zone and buffer zone. Core zone is considered as lease area and buffer zone as 5 km radius from the periphery of the cluster, except for ecological study, which considers 10 km as buffer zone. Both core and buffer zones are taken as the study area. The data was collected from the study area to understand the existing environment conditions of the above-mentioned environmental components. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1.

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 10 km radius of the study area	Once during the study period	Study Area	Satellite Imagery & Primary Survey
*Soil	Physico- Chemical characteristics	Once during the study period	5 (5 in 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	5 (2 surface water ,1 Waste water & 2 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	24 hours, twice a week	7 (1 nearby core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	7 (1 nearby 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.

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

3.1 LAND ENVIRONMENT

3.1.1 Geology and Geomorphology

Vembakkam Taluk forms a part of Tiruvannamalai District covering an area of 310 sq.km and lies in the northern part of Tamilnadu. The geology of the study area showcases a diverse geology with ancient Precambrian crystalline rocks (charnockite, gneisses, khondalites) in southern areas and younger sedimentary formations (Cuddalore Gondwana) covering deeper crystalline basement in the north scattered with Pliocene gravels (Kanjeevaram Gravels) and recent alluvium/laterites illustrating superposition from oldest basement rocks to youngest surface deposits in this South Indian Shield region.

The geological superposition from oldest (bottom) to youngest (top):

1. **Archaean Crystalline Basement:** The oldest rocks consisting of Charnockites (metamorphosed igneous rocks), Garnetiferous Biotite Gneisses and Migmatite complexes form the deep foundation.
2. **Gondwana Supergroup:** Sedimentary rocks deposited over the basement indicating ancient river/delta environments.
3. **Cuddalore Formation (Mio-Pliocene):** Mio-Pliocene age sediments, often fluvial (river-deposited).
4. **Kanjeevaram Gravels (Pliocene-Lower Pleistocene):** Gravel and shingle beds a distinct local deposit.
5. **Laterite & Alluvium (Quaternary):** Youngest deposits including lateritic soils and river alluvium (silts) covering the surface.

The geology of the study area and the proposed area is shown in Figure 3.1.

Geomorphology:

The lease area occurs in shallow weathered pediplain of nearly level terrain with low gradient. These are covered with shallow weathering material ranging from 0 to 5 m. The top soil is generally red soil. The core area soil is fine loamy mixed typic haplustalfs and fine mixed typic rhodustalfs classified in USDA soil taxonomy.

Soils (Alfisols) that are fertile (argillic horizon) have reddish hues (Rhodustalfs have redder tops) fine-loamy texture and are found in semi-arid regions with specific moisture/temperature characteristics indicating important differences in colour, mineralogy (mixed) and management needs for agriculture. Most of the study area is occupied by this unit. The geomorphology of the study area is given in Figure 3.2.

3.1.2 Land Use/ Land Cover

The study area (5 km radius approximately-8400.11ha) around the proposed mine site was classified into seven LULC classes using Sentinel II imagery. The rapid population growth drives significant land-use/land-cover (LULC) changes primarily increasing built-up areas at the expense of agricultural land and water bodies leading to habitat loss, increased land surface temperature (LST) and strain on resources though improved agricultural tech has somewhat reduced pressure on cultivated land. The overall trend shows conversion from natural/agricultural uses to urban infrastructure.

Aerial Coverage by LULC Class

- Crop Land: The dominant feature, comprising the maximum area of 5604.48ha (66.71%).
- Built-up Area: The second largest class covering 1408.09 ha (16.76%).
- Fallow Land: FL Accounts for 197.55 ha (2.35 %) of the landscape.
- Water Bodies: Including major flows and small tanks totalling 893.55 ha (10.64%).
- Mining Area: Covers 197.07 ha, representing the least percentage of the total area (2.35%).
- Sparse Vegetation: Covers 66.23 ha (0.79%).
- Barren Land: The smallest naturally occurring class, with 33.12 ha (0.39%).

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	2025	
		Area in Hectares	Area in %
1	Water Bodies	893.55	10.64
2	Vegetation cover	66.23	0.79
3	Crop Lands	5604.48	66.71
4	Mining area	197.07	2.35
5	Built-up Area	1408.09	16.76
6	Barren Land	33.12	0.39
7	Fallow land	197.55	2.35
Total		8400.11	100.00

Source: Sentinel II Satellite Imagery

The LULC changes within 5 km radius study area between 2017 and 2025 is given in Table 3.2a.

Table 3.2a Comparison of LULC 2017 – 2025

S. No.	Classification	LU in 2017		LU in 2025	
		in Ha	in %	in Ha	in %
1	Water Bodies	1001.00	11.92	893.55	10.64
2	Vegetation	30.61	0.36	66.23	0.79
3	Crop Land	5906.34	70.31	5604.48	66.71
4	Mining Area	161.04	1.92	197.07	2.35

5	Built-up Area	1238.36	14.74	1408.09	16.76
6	Bare Land	16.06	0.19	33.12	0.39
7	Fallow Land	46.70	0.56	197.55	2.35
Total		8400.11	100.00	8400.11	100.00

The study area (8400.11Ha) underwent significant transitions between 2017 and 2025. The primary trend is a shift from agricultural dominance toward urbanization and industrial activities accompanied by an unexpected increase in vegetation cover.

Land Use Change Summary (2017–2025)

Classification	Absolute Change in Hectares	Change in %	Interpretation
Crop Land	- 301.86	- 3.6	Significant loss; likely converted to built-up and fallow lands.
Built-up Area	+169.73	+2.02	Rapid urban expansion due to population growth and infrastructure.
Water Bodies	-107.45	-1.28	Uncertain monsoon: unclassified water bodies- occupied by vegetation.
Fallow Land	+150.85	+1.79	Increase suggests land degradation or pending conversion to built-up.
Mining Area	+36.03	+0.43	Growth in industrial footprint, increasing demand of construction materials.
Vegetation	+35.62	+0.43	Small gain, possibly due to plantation or reclamation efforts.
Bare Land	+17.06	+0.20	Likely due to construction site clearing or land degradation.

From the above table it is observed that the increase in bare and fallow land combined with urban growth typically leads to higher Land Surface Temperatures (LST) and reduced groundwater recharge (ecosystem stress).

A deeper analysis of 2017–2025 LULC data were done to know the annual rates of change and a hypothesized transition matrix are as follows,

1. Annual Rate of Change (ARC)

The ARC represents the average annual percentage increase or decreases for each category over the 8-year period. It is calculated using the formula:

$$ARC = [(Area_{final} - Area_{initial}) / Area_{initial}] / years \times 100.$$

Classification	Change/Year in Ha	Change/Year in %
Built-up Area	+21.21	13.70
Water Bodies	-13.37	-10.73

Mining Area	+4.50	22.37
Crop Land	-37.73	-5.11
Bare Land	+2.13	106.22
Fallow Land	+18.85	323
Vegetation	+4.45	116.36

2. Hypothesized Transition Matrix

A transition matrix identifies which land types likely converted into others. Based on common regional trends and your specific data the built-up area expansion likely came from these sources:

- **Crop Land → Built-up Area:** This is typically the dominant transition, accounting for double of its area of urban expansion as farmers sell land near growing infrastructure.
- **Crop Land → Fallow Land:** Much of the 18.85 Ha/year increase in fallow land likely represents "transitional" crop land that has been left uncultivated in preparation for sale or due to decreasing water availability.
- **Water Bodies → Vegetation:** The 13.37 Ha/Year decrease in water might be linked to the growth in Mining Area and **increase of vegetation in the waterbodies.**
- **Bare Land → Mining Area:** The slight increase in Mining area 4.50Hac/Year often indicates demand for construction materials and urban development in un productive barren lands.

Key Interpretations for 2026 onwards

- **Sustainability Risk:** If the -37.73-ha annual loss of crop land continues the area will lose another ~300 Ha by 2033 significantly impacting local food security.
- **Industrialization Push:** The doubling of mining area (from 1.92% to 2.35%) and the surge in built-up area suggest this region is shifting from a primary (agricultural) economy to a secondary/tertiary (industrial/urban) economy

3.1.3 Topography

The Toposheet 57 P/10 is a specific Survey of India (SoI) topographical map at a 1:50,000 scale, where 1 cm on the map = 500 meters on the ground. Based on the geographical grid this sheet primarily covers parts of Northern Tamil Nadu specifically within the Tiruvannamalai and Kanchipuram districts. The slope is towards eastern side and falls in Toposheet no. 57 P/10 and the topo-map is given in Figure 3.5.

The 2017–2025 land use and land cover data aligns perfectly with the physical characteristics of this specific toposheet:

- The high percentage of agriculture (73%) reflects the rural-agrarian nature of the Palar-Cheyyar sub-basin.
- This grid is known for its traditional Tank Irrigation Systems (Eris). The 13–16% water body coverage in your data corresponds to these large seasonal tanks, which are prominent blue features on the toposheet.
- The expansion noted (from 6.9% to 9.8%) likely reflects the growth of towns and the encroachment of residential layouts into formerly agricultural fringes identified on the map.
- The area is mostly an undulating plain with gentle slopes. Contours are widely spaced indicating a flat terrain ideal for agricultural expansion and the built-up area growth (+40%) recorded.
- Typical elevations range from 80m to 120m above mean sea level. The soil erosion risk is generally low.

3.1.4 Drainage Pattern

"The study area's drainage pattern is influenced by two major seasonal rivers. The drainage pattern is concordant and is characterized by a **sub-dendritic system** with first-order streams."

(A dendritic drainage pattern is the most common type and resembles the branching pattern of a tree. It typically forms in regions with homogeneous (uniform) underlying rock material where erosion occurs at a similar rate in all directions and the river channel follows the general slope of the terrain. The term "sub-dendritic" suggests a variation of this pattern likely still following the general slope and rock characteristics but perhaps with minor structural influences not significant enough to form a completely different pattern like trellis or rectangular.)

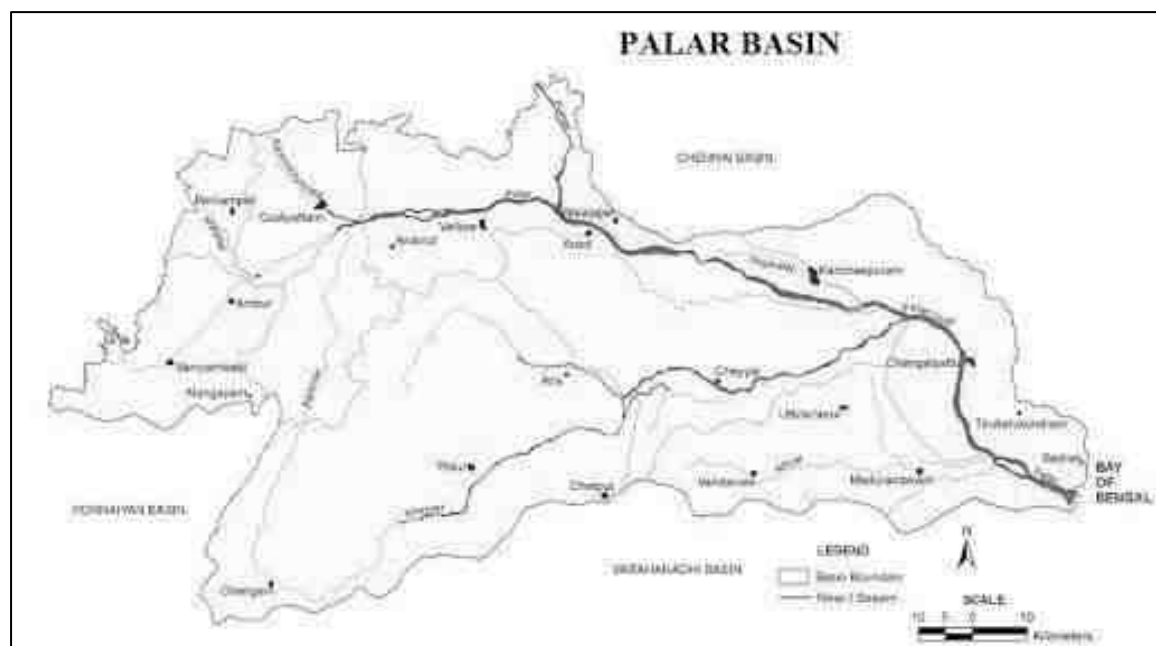
Key Drainage Features of the Study Area

- **Major Water Flows:** The area is situated strategically between two primary surface water flows:
 - The Palar River to the North.
 - The Cheyyar River to the South.

The **Palar Basin** is one of the most important of the 12 basins that lie between the **Pennar** and Cauvery basins.

- There are three primary geographical divisions in this basin:
 - the Eastern Ghats hill ranges
 - the plateau area
 - the coastal plains.

- Though the majority of the drainage region is in Tamil Nadu it also includes sections of **Karnataka and Andhra Pradesh** in the southeast and southwest respectively.
- The basin has a rhombus form and empties into the **Bay of Bengal** at vayalur named as kuvattur village.
- The **Palar River** basin's typical rainfall is modest. Droughts used to be common in this river basin. Although the river does not often flood significant rains have caused it to flood for up to six months. Dams have been built along the river's course particularly in Tamil Nadu to provide irrigation. Vellore, Arcot and Chengalpattu are the main towns along the river's banks.
- However, droughts in **Karnataka and Tamil Nadu** have been reduced by the construction of several small and medium **irrigation reservoirs**.
- Water availability for both surface and **groundwater irrigation** has improved as a result of this.
- The cheyyar river a major tributary of the Palar rises in Tamil Nadu's Jawadhu Hills.



3.1.5 Seismic Sensitivity

The proposed lease area is situated in a Seismic Zone II, as defined by National Centre for Seismology ([Official Website of National Centre of Seismology](#)). The Zone II is defined as the region where only minor damage is expected from seismic events. In this respect, the proposed lease area is located in a low earthquake hazard area.

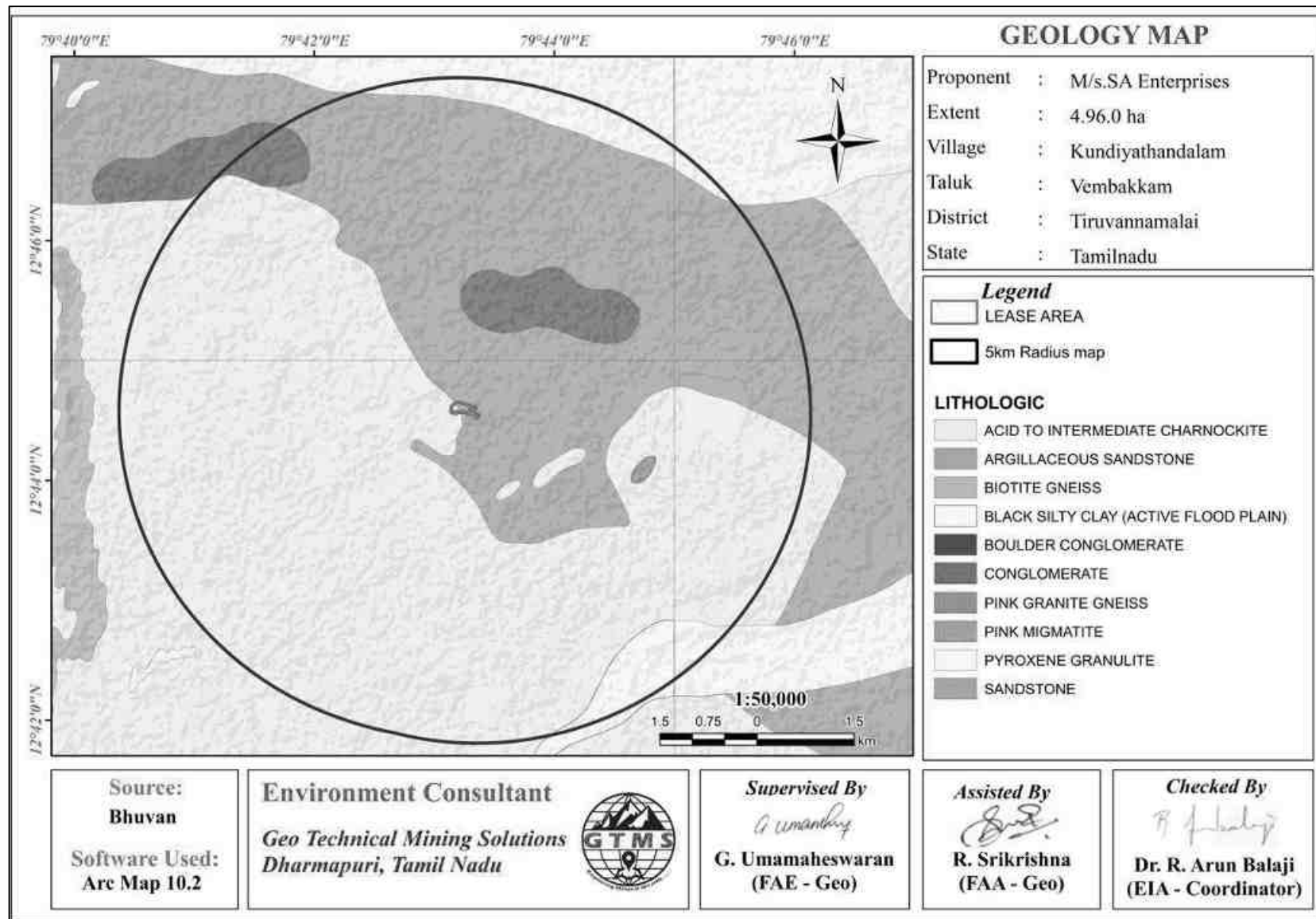


Figure 3.1 Geology Map with 5km Radius around Proposed Project Site

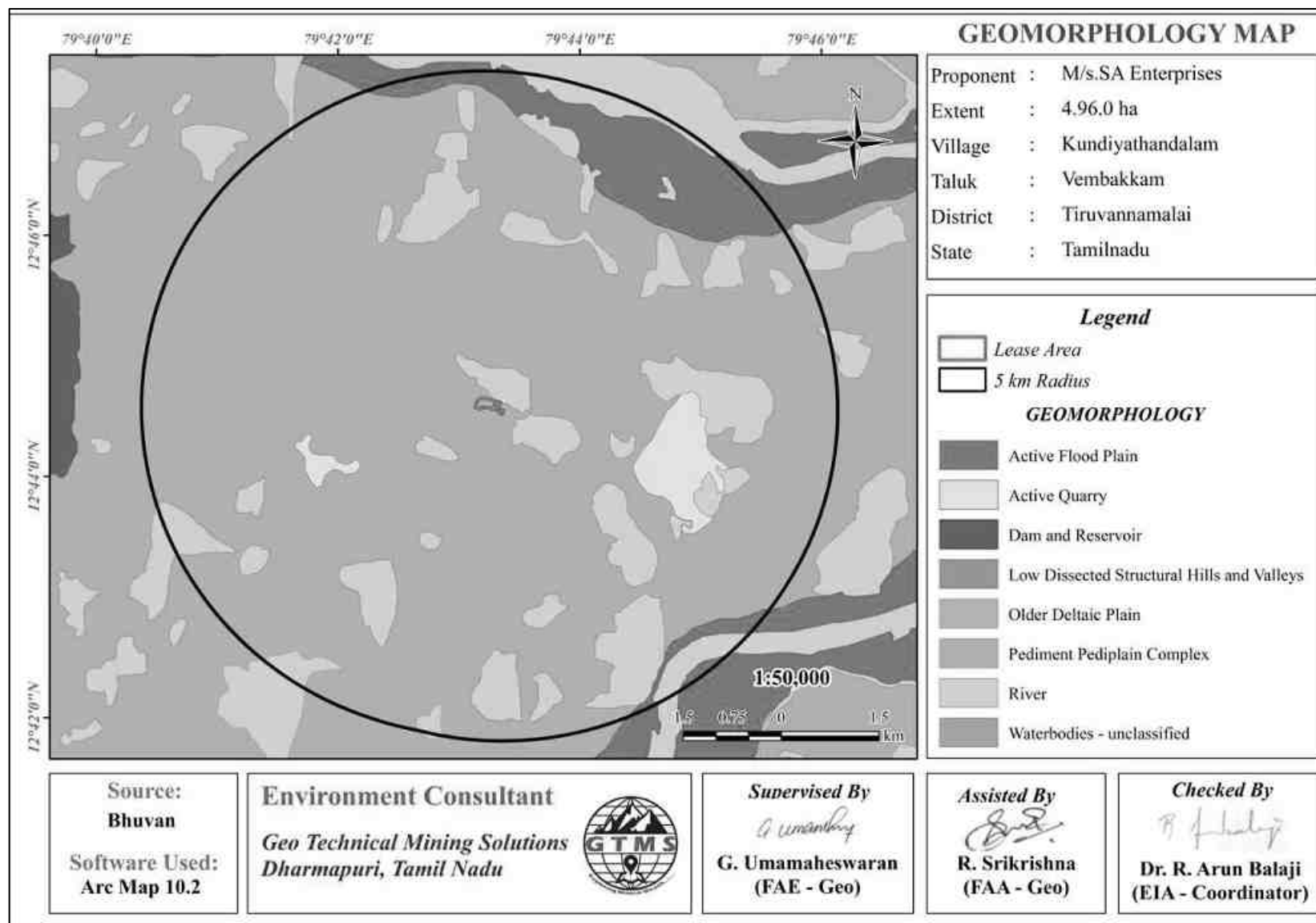


Figure 3.2 Geomorphology Map with 5km Radius around Proposed Project Site

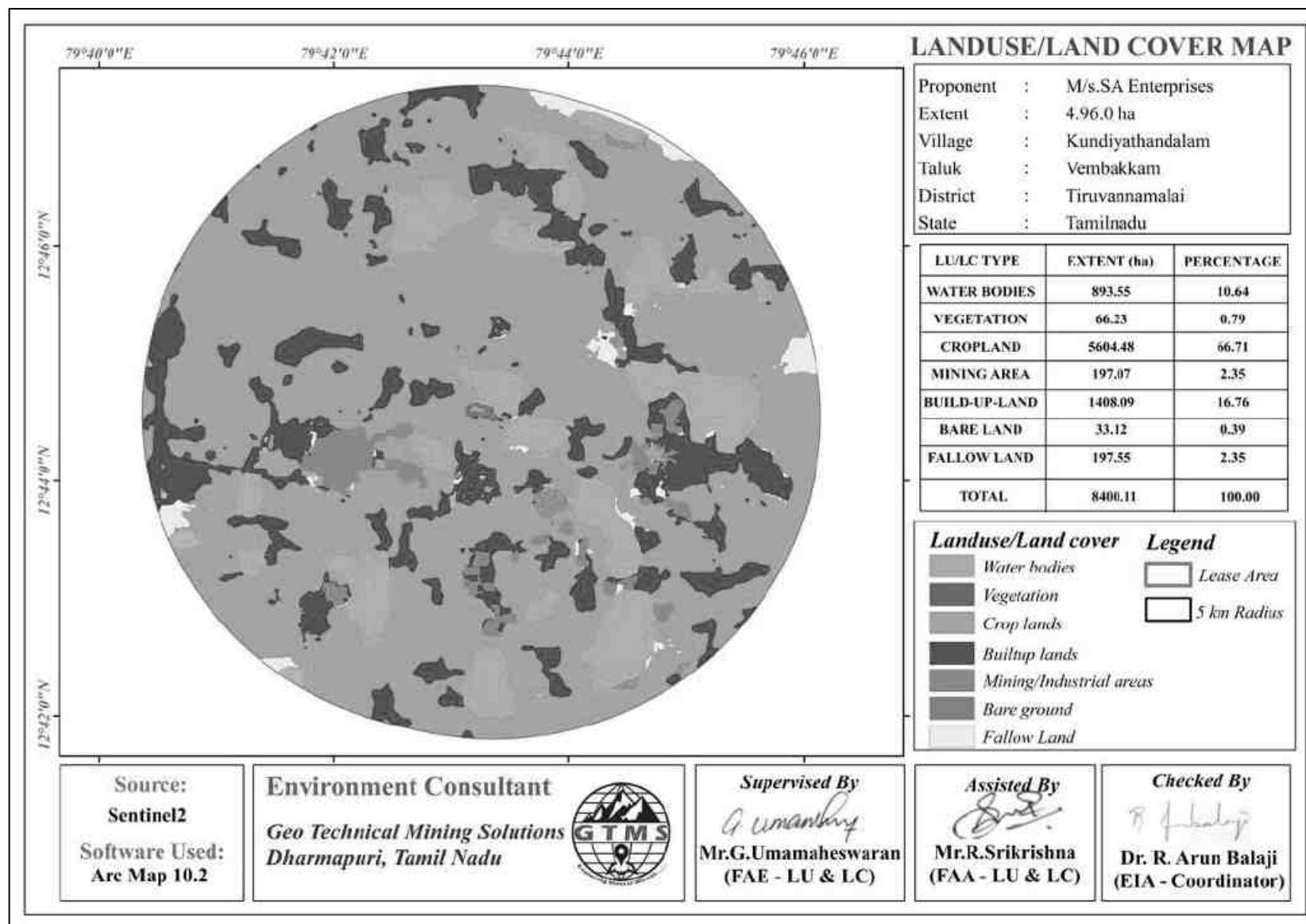


Figure 3.3 LULC Map with 5km Radius around Proposed Project Site (2025)

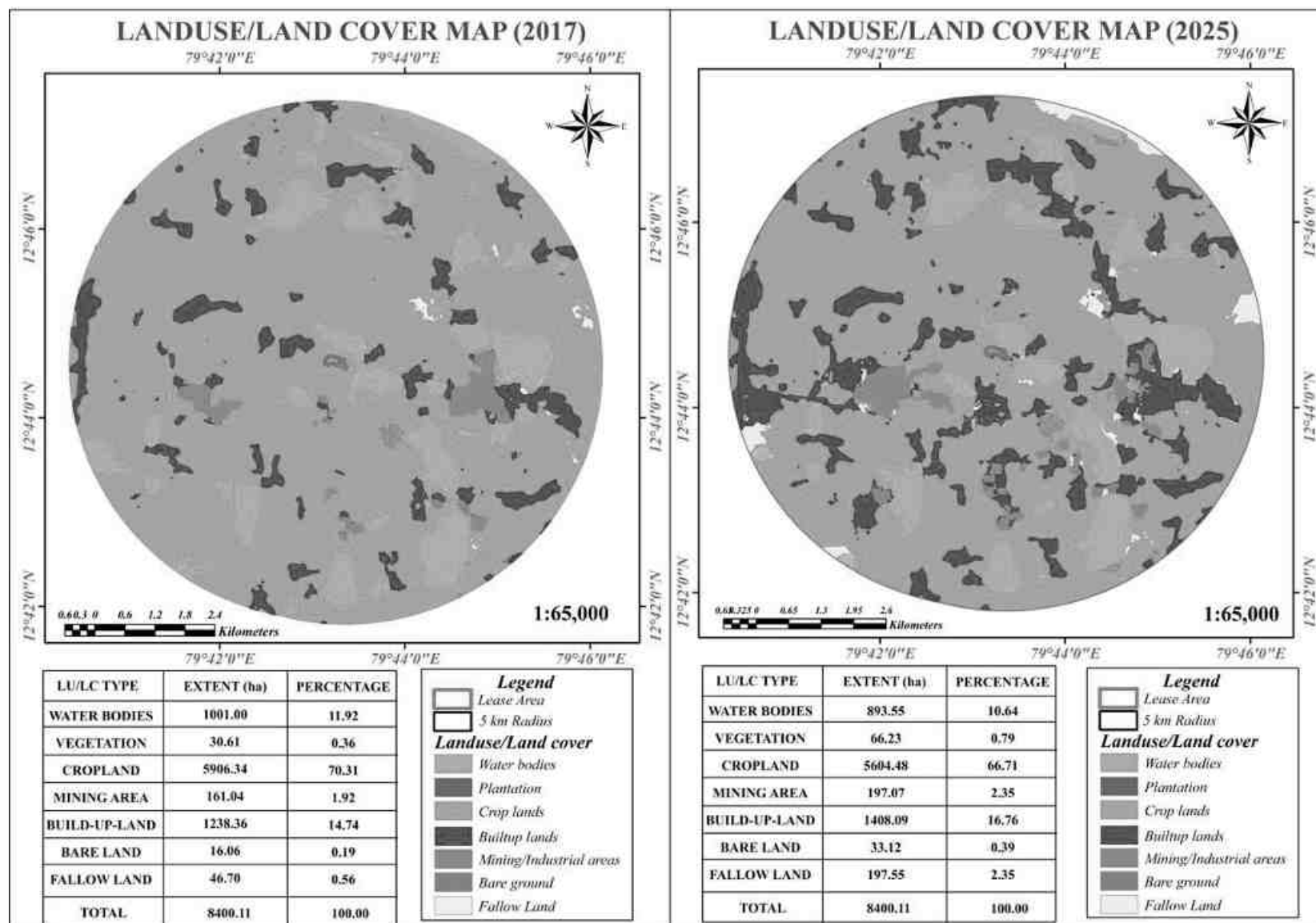


Figure 3.3a Comparison Map of LULC with 5km Radius around Proposed Project Site (2017 & 2025)

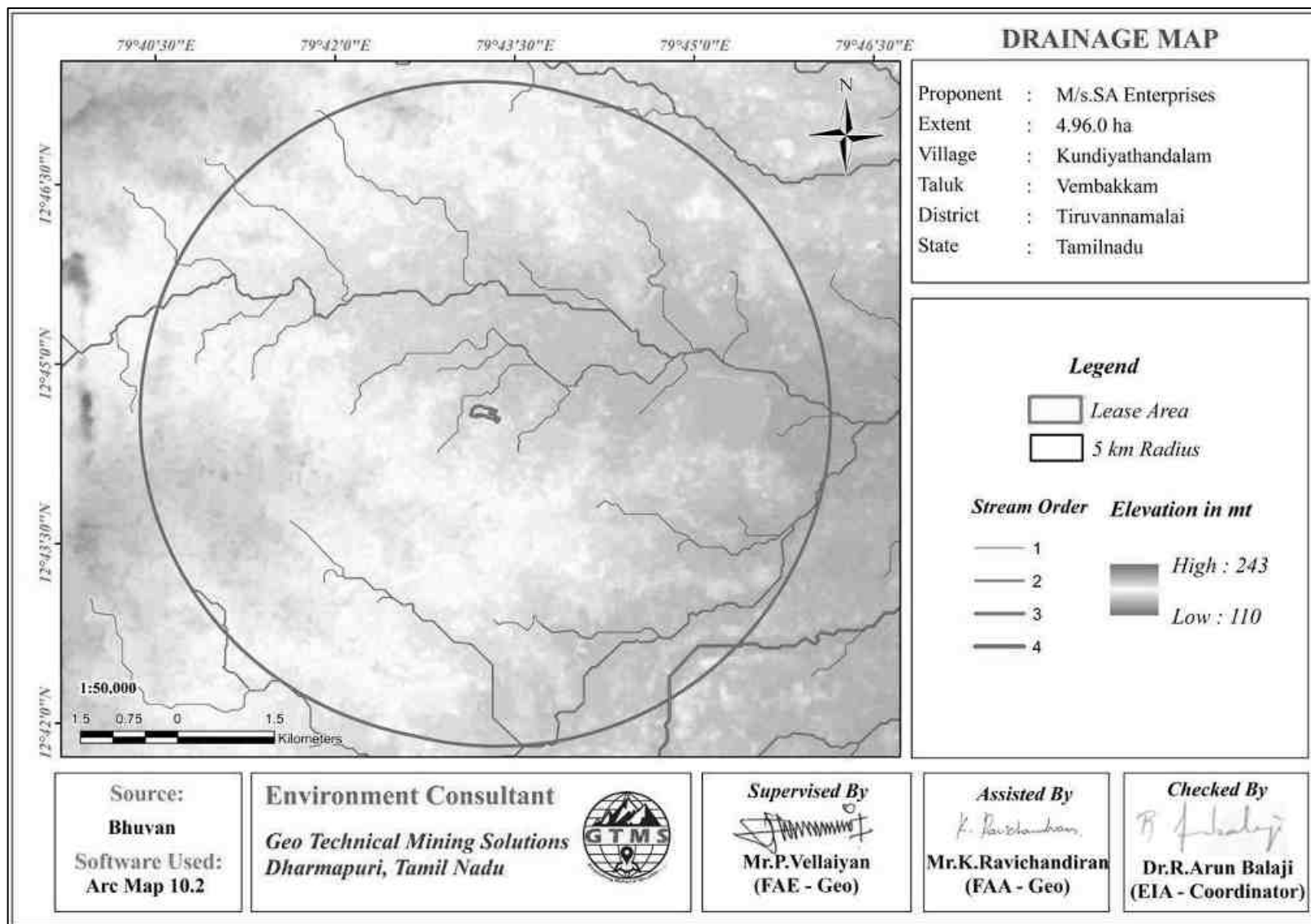


Figure 3.4 Drainage Map with 5km Radius around Proposed Project Site

3.1.6 Soil

Composite soil samples were collected from 5 locations of the study area to determine the baseline soil characteristics of the soil. The locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.5. The samples thus collected were analysed for physical and chemical characteristics. The physical and chemical characteristic results of soil samples are provided in Table 3.4.

Table 3.3 Soil Sampling Locations

Location Id	Monitoring Locations	Distance in m	Direction	Coordinates	
				Latitude	Longitude
S1	Near Core	1.17	SW	12°43'59.50"N	79°42'53.03"E
S2	Sodiyambakkam	2.99	SW	12°43'35.51"N	79°41'49.21"E
S3	Vadakalpakkam	1.22	NW	12°45'11.98"N	79°42'48.36"E
S4	Surutal	0.42	S	12°44'20.03"N	79°44'1.98"E
S5	Mamandur	4.51	NW	12°45'10.43"N	79°40'44.65"E

Source: On-site monitoring/sampling *Interstellar Testing Centre Pvt. Ltd.*, in association with GTMS.

The interpretation of the analytical results for the five soil samples (S1–S5) is as follows

Parameter	Result Range	Interpretation
Organic Matter	0.25 – 0.36%	Critically Low. It requires heavy composting.
Nitrogen (N)	0.056 – 0.068%	Deficient and requires fertilization.
CEC	19.30 – 22.50	Moderate/High shows good nutrient retention potential.
pH	7.35 – 8.53	Neutral to Alkaline except S4. S4 may need sulfur to lower pH.
Texture	Sandy Loam	Well-aerated but dries out quickly.

These are hungry soils. They have a solid physical foundation and a good capacity to store nutrients (CEC) but they currently contain almost no organic fuel or essential nutrients (N-P-K). Significant application of organic manure and balanced N-P-K fertilizers is essential for any agricultural use.

The Total Organic Matter (TOM) and Total Organic Carbon (TOC) in soil samples indicates a critically depleted state that significantly limits agricultural productivity.

Sample	TOC (%)	TOM (%)	Rating
S1	0.16	0.276	Very Low
S2	0.17	0.293	Very Low
S3	0.19	0.327	Very Low

S4	0.15	0.258	Very Low
S5	0.21	0.362	Very Low

Productive agricultural topsoil typically contains 1–6% organic matter. Even the maximum observed value in Sample S5 (0.362%) remains significantly below the minimum threshold required for healthy soil biological activity, nutrient cycling, and structural stability.

The organic matter values follow the **Van Bemmelen conversion factor**, where:

$$\text{TOM} \approx \text{TOC} \times 1.724$$

This calculation assumes that soil organic matter consists of approximately 58% organic carbon, which is a widely accepted standard in soil science.

Agricultural Suitability Evaluation

Due to the dominant sandy loam texture, low organic matter content, and favorable drainage characteristics, the soil is more suitable for horticultural crops than for conventional wet-paddy cultivation.

Feature	Paddy Suitability	Horticulture Suitability
Texture (Sandy Loam)	Low (Poor water retention)	High (Good drainage and aeration)
pH (7.35 – 8.53)	Moderate (Paddy prefers acidic 5.5–6.5)	High (Suitable for citrus, pomegranate, guava)
Organic Matter	Critically Low (Requires heavy organic input)	Low (Manageable with regular compost application)
Nutrients (NPK)	Deficient (Requires heavy fertilization)	Deficient (Requires balanced nutrient management)

Stress Relaxation Behaviour of Soil

Based on the sandy loam texture, very low organic matter content (<0.36%), and moderate cation exchange capacity (19.3–22.5 meq/100 g), the soil is expected to exhibit rapid initial stress relaxation followed by a relatively high residual stress.

Unlike organic-rich soils, which continue to relax over extended periods due to elastic organic matrices, the present soils show limited long-term stress dissipation capacity.

Impact of Vehicular Movement on Soil Sample S1

The cumulative stress generated by repeated vehicle movement over soil sample S1 (Sandy Loam) significantly degrades soil quality by increasing the silt fraction and reducing particulate organic matter, which directly affects plant growth and soil functionality.

Increase in Silt and Particulate Matter

Vehicle-induced stress physically alters soil texture through particle crushing and aggregate fragmentation:

- High dynamic stress from vehicle tires, concentrated within the top 0–20 cm soil layer, acts as a mechanical milling force.

- Larger sand grains ($\approx 64.5\%$ in S1) and coarse particles collide and fracture under repeated pressure.
- This process shifts the grain-size distribution toward finer silt-sized particles.
- Surface-accumulated silt is easily resuspended by moving vehicles, increasing PM_{10} emissions and reducing available topsoil nutrients.

Impact on Plant Growth

The gradual transformation toward a denser and silt-rich soil structure creates unfavorable growth conditions:

- Increasing silt content fills remaining macropores, rapidly increasing bulk density ($\approx 1.0\text{--}1.08\text{ g/cc}$).
- Higher soil strength restricts root elongation, leading to root impedance and shallow root systems.
- Fine pore dominance reduces aeration and drainage, causing oxygen deficiency (hypoxia) in the root zone.
- In soil sample S1, reduced aeration can decrease root respiration and potentially cause a 12–41% reduction in crop yield, depending on crop sensitivity.

Preventive Measures for Soil Protection

To minimize siltation and compaction effects:

- **Surface contact pressure should be maintained below 150 kPa**
- Vehicle movement should be avoided when soil moisture is high (7–12%), as wet soil conditions act as a lubricant
- Moist soils accelerate particle breakdown and promote deep-seated compaction

Summary of Vehicular Stress Effects on Soil Sample S1

Soil Component	Change Due to Stress	Effect on Plant Growth
Silt Content	Increases due to grain crushing	Restricts root penetration
Bulk Density	Increases rapidly	Reduces air and water movement
Organic Matter	Fragmentation and accelerated decomposition	Loss of nutrient-holding capacity
Pore Structure	Loss of macropores	Causes root hypoxia

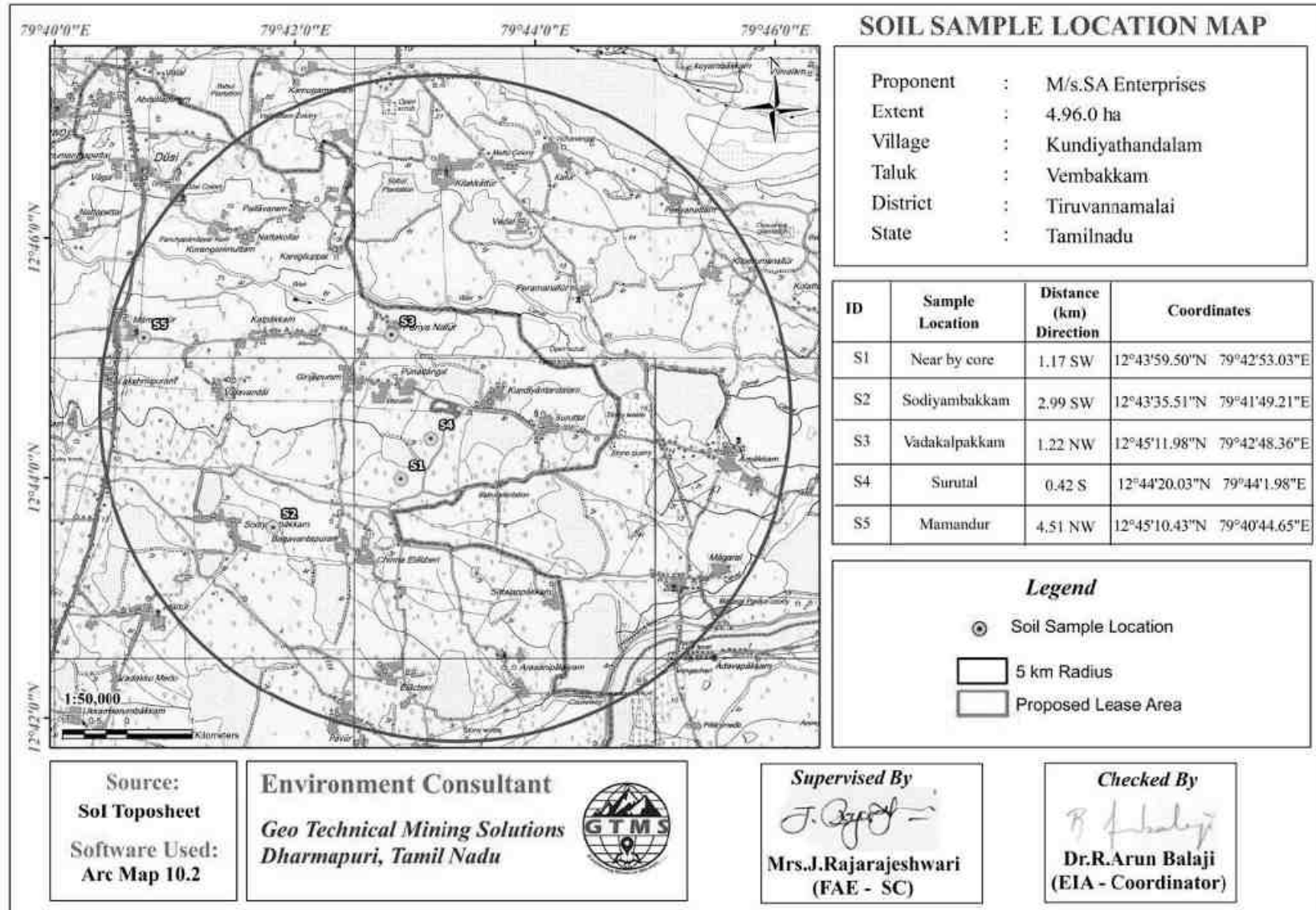


Figure 3.5 Map Showing Soil Sampling Locations within 5km Radius around Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S. No	Parameters	Unit	Results				
			S1	S2	S3	S4	S5
1	Description	--	Light brown coloured Soil sample	Brown coloured soil sample	Light brown coloured Soil sample	Brown coloured soil sample	Brown coloured soil sample
2	Total Organic Matter	%	0.276	0.293	0.327	0.258	0.362
3	pH Value	NA	7.93	8.12	7.35	8.53	8.17
4	Total Nitrogen (as N)	%	0.062	0.058	0.056	0.058	0.068
5	Potassium (as K)	%	0.0108	0.0099	0.0103	0.0112	0.0101
6	Total Phosphate (as P)	%	0.0031	0.0025	0.0029	0.0018	0.0021
7	Total Soluble Sulphate (as SO ₄),	%	0.0071	0.0083	0.0091	0.0077	0.0072
8	Chloride (as Cl)	%	0.0032	0.0023	0.0026	0.0027	0.0031
9	Total Organic Carbon	%	0.16	0.17	0.19	0.15	0.21
10	Cation Exchange Capacity	(meq/100g)	19.30	22.10	20.30	22.50	21.60
11	Grain size: Sand,	% by Weight	64.5	71.3	68.5	63.5	65.1
12	Silt,		19.3	16.2	15.7	19.6	20.3
13	Clay		16.2	12.5	15.8	16.9	14.6
14	Textural Class	--	Sandy Loam	Sandy clay Loam	Sandy Loam	Sandy Loam	Sandy Loam
15	Bulk Density	g/cc	0.997	1.083	0.999	1.086	1.084
16	Electrical Conductivity	(ms/m)	0.315	0.214	0.362	0.205	0.210
17	Moisture content	%	8.3	10.3	7.6	12.3	11.6
18	Calcium as Ca	mg/kg	1632	853	1538	1247	1381
19	Maginesum as Mg	mg/kg	812	312	916	536	617

Source: On-site monitoring/Sampling Results by *Interstellar Testing Centre Pvt. Ltd* in association with *GTMS*.

3.2 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 baseline quality of surface and ground water.

Table 3.5 Water Sampling Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
SW1	Palar River	4.72	NE	12°47'31.56"N	79°42'52.26"E
SW2	Poonathangal Tank	0.75	SW	12°44'14.87"N	79°42'53.53"E
OW1	Nearby Suruttal	0.89	SE	12°44'7.12"N	79°43'38.12"E
BW1	Menallur	1.31	W	12°44'39.36"N	79°42'24.96"E
Wast Water	Vadakalpakkam	2.61	SW	12°44'12.03"N	79°41'44.48"E

Source: On-site monitoring/sampling Interstellar Testing Centre Pvt. Ltd, in association with GTMS.

3.2.1 Ground and Surface Water Quality – Resources & Results

The water quality assessment was carried out based on the analytical results presented in Table 3.6 and evaluated with reference to **IS 10500:2012 (Drinking Water Standards)** and **IS 11624:2019 (Indian Standard for Irrigation Water)**. The samples include surface water (SW1 – Palar River, SW2 – Poonathangal Tank), open well water (OW1), bore well water (BW1) and wastewater (WW).

Overall, **groundwater samples (OW1 and BW1)** exhibit comparatively better and more stable quality than the **surface water samples (SW1 and SW2)**, while the wastewater sample (WW) shows slightly higher turbidity and dissolved solids but remains within permissible limits for irrigation use.

General Water Quality Interpretation

- **Safety Rating:** All samples comply with the **permissible limits of IS 10500:2012** for drinking water, except for marginal exceedances in turbidity, total hardness and iron in surface water samples.
- **pH:** The pH values range from **6.53 to 7.37**, indicating **neutral to slightly alkaline nature**, well within the acceptable range (6.5–8.5). This pH is suitable for drinking, domestic use and irrigation.
- **TDS & Taste:** TDS values range from **486 to 718 mg/L**. Surface water (SW2) and wastewater (WW) slightly exceed the acceptable limit of 500 mg/L but remain well below

the permissible limit of 2000 mg/L. Such levels may impart a mildly mineralized taste but do not pose health risks.

- Hardness: Total hardness varies from 171 to 241 mg/L, classifying the water as moderately hard to hard. SW2 and OW1 marginally exceed the acceptable limit of 200 mg/L but remain far below the permissible limit of 600 mg/L.

- Health Perspective: Calcium and magnesium concentrations are within safe limits and contribute essential minerals without causing excessive scaling or health issues.

Interpretation of Water Quality Results (Based on IS 10500:2012)

Parameter	Observed Range (All Samples)	Acceptable Limit	Permissible Limit*	Status & Interpretation
pH @ 25°C	6.53 – 7.37	6.5 – 8.5	No relaxation	Safe – All samples within ideal range
Turbidity (NTU)	0.7 – 2.1	1.0	5.0	Exceeds acceptable in SW2 & WW; may indicate suspended matter
Colour (Hazen)	5 – 10	5	15	Marginal exceedance in OW1 & WW; aesthetic concern only
TDS (mg/L)	486 – 718	500	2000	Exceeds acceptable in SW2, OW1 & WW; safe under permissible limit
Calcium (as Ca) (mg/L)	58.8 – 85.0	75	200	Slight exceedance in SW2 & OW1; contributes to hardness
Total Hardness (mg/L)	171 – 241	200	600	Exceeds acceptable in SW2 & OW1; classified as hard water
Chloride (mg/L)	136 – 215	250	1000	Safe in all samples
Fluoride (mg/L)	0.16 – 0.51	1.0	1.5	Safe – Ideal range
Nitrate (mg/L)	6.7 – 12.3	45	No relaxation	Safe – No health risk
Iron (mg/L)	0.11 – 0.36	0.3	No relaxation	Slight exceedance in SW2; may cause staining
Total Coliform / E.coli	Absent	Absent	Absent	Satisfactory – No fecal contamination

*Permissible limit applies in the absence of an alternate source.

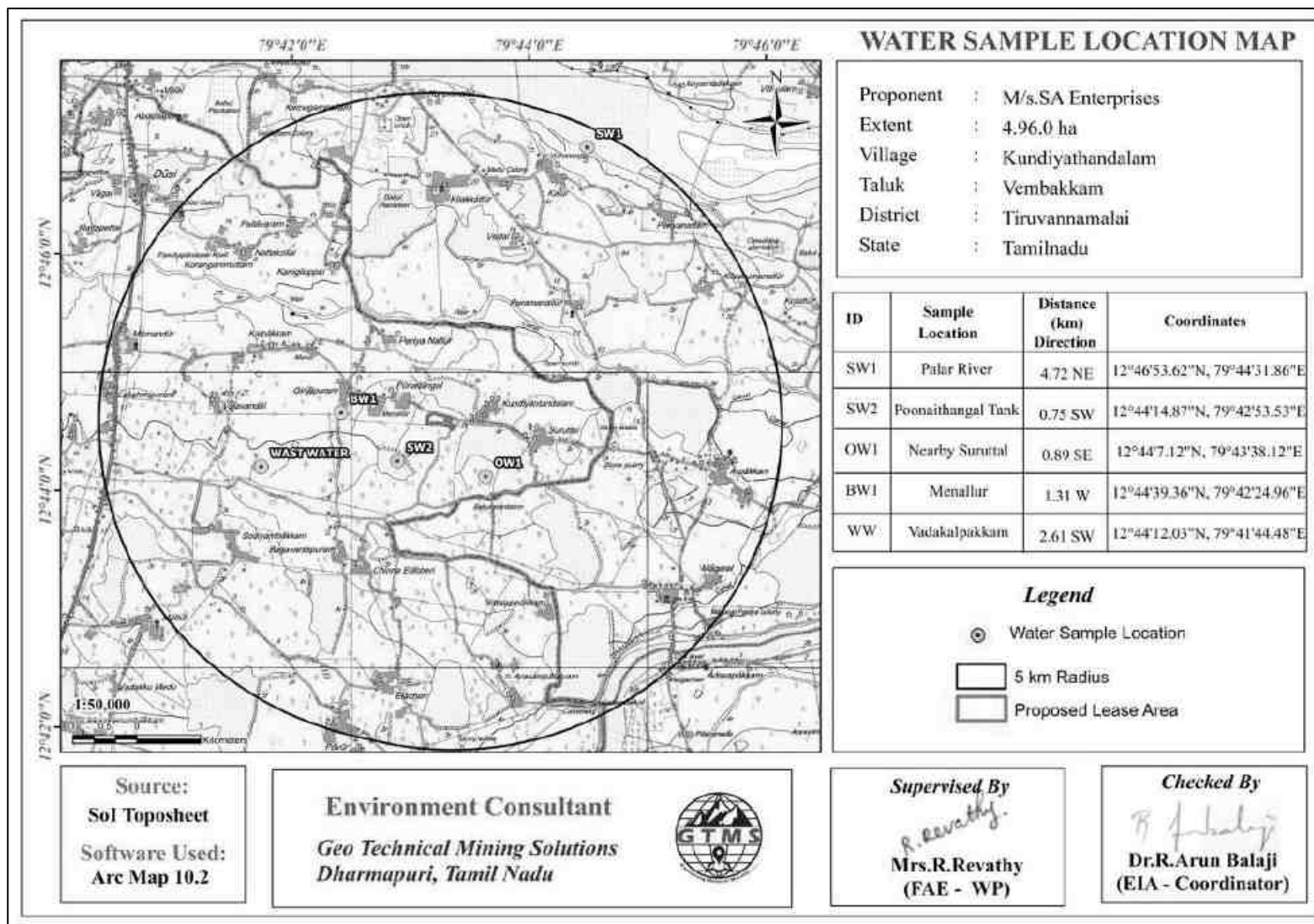


Figure 3.6 Map Showing Water Sampling Locations within 5km Radius around Proposed Project Site

Table 3.6 Surface and Ground Water Quality Result

S. No.	Parameters	Units	Results				
			SW1	SW2	OW1	BW1	WW
1	Location	-	Palar River	Poonathangal tank	Nearby Suruttal	Menallur	Vadakalpakkam
2	Order No.	-	SR02EN-2601020031	SR02EN-2601020032	SR02EN-2601020033	SR02EN-2601020034	SR02EN-2601020035
3	Sample Description	-	Clear liquid	Clear liquid	Clear liquid	Clear liquid	Slightly Turbid Liquid
4	Ammonia as NH ₃	mg /l	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)
5	Carbonate Hardness (as CaCO ₃)	mg /l	157	163	141	147	160
6	Phenolphthalein Alkalinity (as CaCO ₃)	mg /l	BLQ(LOQ:1.0)	BLQ(LOQ:1.0)	BLQ(LOQ:1.0)	BLQ(LOQ:1.0)	BLQ(LOQ:1.0)
7	Non-Carbonate Hardness (as CaCO ₃)	mg/l	32	51	104	22	41
8	EC	µmhos/cm	850	1053	1213	926	1153
9	PO ₄	mg/l	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)
10	Appearance	-	Colourless liquid	Colourless liquid	Clear liquid	Colourless liquid	Slightly Turbid Liquid
11	Sio ₂	mg/l	10.30	8.60	9.30	7.35	6.10
12	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
13	pH	-	6.64	6.53	7.16	7.25	7.37
14	Colour	Hazen	5	5	10	5	10
15	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
16	Turbidity	NTU	0.7	1.5	1.1	0.9	2.1
17	TDS	mg/l	486	611	718	537	638
18	Ca	mg/l	58.8	75.2	85.0	62.1	67.1
19	Fe	mg/l	0.12	0.36	0.11	0.19	0.23
20	Mg	mg/l	9.9	5.9	6.9	3.9	7.9
21	Cl	mg/l	142.0	173.0	215.0	136.0	173.0
22	So ₄	mg/l	31.6	23.5	27.6	30.8	38.9
23	RFC	mg/l	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)
24	Flouride	mg/l	0.31	0.4	0.23	0.16	0.51
25	No ₃	mg/l	12.30	10.60	8.60	11.50	6.70
26	TA	mg/l	156	161	137	149	159
27	TH	mg/l	188	212	241	171	200
28	BOD	mg/l	BLQ(LOQ: 1.0)	BLQ(LOQ: 1.0)	BLQ(LOQ: 1.0)	BLQ(LOQ: 1.0)	BLQ(LOQ: 1.0)
29	COD	mg/l	20	15	BLQ(LOQ: 5.0)	BLQ(LOQ: 5.0)	20
30	Dissolved Oxygen	mg/l	6.3	6.2	6	6.1	6.2
31	Total Coliform	MPN/100 ml	Absent	Absent	Absent	Absent	Absent
32	Escherichia Coli	MPN/100 ml	Absent	Absent	Absent	Absent	Absent

Source: Sampling Results by Interstellar Testing Centre Pvt. Ltd in association with GTMS.

Irrigation Water Suitability (IS 11624:2019)

- **Electrical Conductivity (EC):** EC values range from **850 to 1213 $\mu\text{mhos/cm}$** , placing the water in **medium salinity class**. This category is suitable for most crops with normal soil management practices.
- **Specific Ions:** Chloride, sulphate and nitrate concentrations are low and pose **no risk of leaf burn**, even under sprinkler irrigation.
- **Organic Pollution:** BOD values are below detection limits in all samples, indicating **no organic contamination**.

Paddy & Crop Suitability Assessment

Parameter	SW / GW Range	Recommended Limit (Paddy)	Suitability
EC ($\mu\text{mhos/cm}$)	850 – 1213	<1500	Excellent
TDS (mg/L)	486 – 718	<600 (Ideal)	Good to Ideal
pH	6.53 – 7.37	6.5 – 8.4	Normal
Iron (mg/L)	≤ 0.36	<5.0	Highly Safe
Fluoride (mg/L)	≤ 0.51	<1.0	Safe
Calcium & Magnesium	Moderate	Balanced	Healthy

3.2.2 Hydrogeological Studies

The area within 2 km radius consists of numerous open wells and deep wells. Groundwater level data were collected both from open wells and bore wells for two monsoon seasons as discussed in the following section.

Rainfall

Rainfall data for the study area were collected for the period of 2004-2024([POWER | Data Access Viewer \(nasa.gov\)](#)). Long term monthly average rainfall was estimated from the data of 2004-2024 and compared with the monthly rainfall for the year 2024, shown in Figure 3.7. The Figure 3.7 shows that rainfall is generally high in the months of September through November in every year. Particularly, rainfall in July through August and October, December of 2022 is higher than the previous years.

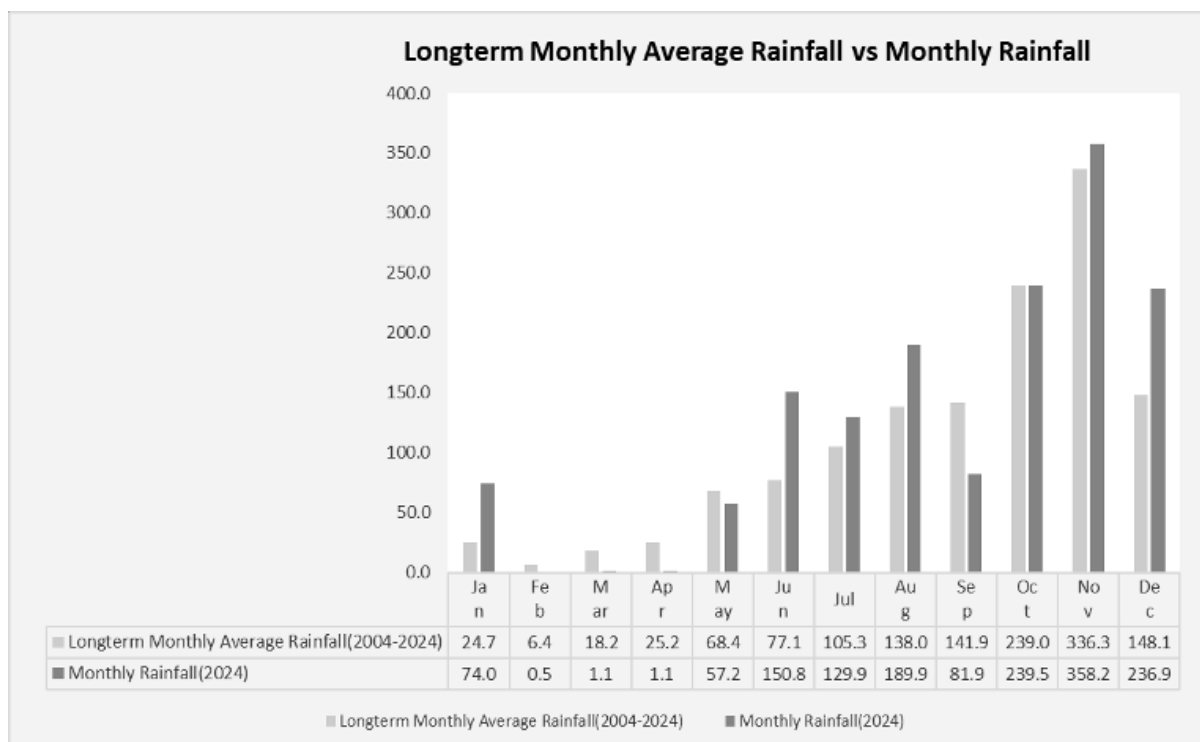


Figure 3.7 Long-Term Monthly Average Rainfall Vs Monthly Rainfall

3.2.3.1 Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 8 open wells and 8 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2025 (Pre-Monsoon Season) and from October through December 2025, (Post Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.7 and 3.8. According to the data, average depths to the static water table in open wells range from 10.97 to 13.90m BGL in pre-monsoon and 10.08 to 13.05m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depths to static potentiometric surface in bore wells for the period of October through December (Post-Monsoon Season) vary from 52.1 to 55.6m and from 61.2-64.8m for the period of March through May, (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines. From the maps of open well groundwater flow direction shown in Figures 3.8-3.9, it is understood that most of the open well groundwater for the post-

and pre-monsoon seasons flows towards the open well number 6,7 located in Northeast direction the open well number 3 located in southeast direction of the proposed project site. The groundwater flow maps in Figures 3.10-3.11 show that most of the bore well groundwater for the post- and pre-monsoon seasons flow towards the bore well number 7. It is located in Northeast direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

Water Balance management & Artificial Recharge in Site

A sustainable eco-friendly water management strategy will be adopted in this project. Since the water requirement during the mining period is estimated about 3.5KLD for drinking, domestic and sanitary needs, creation and maintenance of green belt and for sprinkling purposes. The drinking water must be pure and safe, so it will be outsourced from nearby vendors/RO water plant will be installed in the site. The artificial rainwater harvesting structures are planned in and around the site. In flow direction northeast site. The excavated pits nearby the site will be connected by the garland drain system and water will be stored and this water will be utilised for the green belt maintenance and dust suppression sprinkling purpose. The rooftop harvesting structure is also planned from the labour sheds and other structures will be connected to the nearby excavated pits and utilised. These implementations will reduce the dependency of water from the nearby borewells and open wells. According to the soil resistivity data of the region, few locations are porous and permeable in nature. It will help in infiltration of rainwater and recharge the aquifer naturally during monsoon. This sustainable strategy will be helpful in maintaining the water balance within 2km radius of project site.

Table 3.7 Pre-Monsoon Water Level of Open Wells within 2 km Radius

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Mar-2025	Apr-2025	May- 2025	Average		
OW01	12.9	13.4	14.7	13.67	12°42'59.37"N	79°35'3.31"E
OW02	10.9	11.3	11.7	11.30	12°42'49.46"N	79°34'31.63"E
OW03	13.5	13.9	14.3	13.90	12°42'40.67"N	79°35'21.55"E
OW04	11.8	12.3	13.2	12.43	12°42'22.14"N	79°34'26.13"E
OW05	10.5	10.9	11.5	10.97	12°41'58.63"N	79°35'35.18"E
OW06	12.4	12.7	13.2	12.77	12°43'27.92"N	79°35'26.30"E

OW07	11.4	11.6	11.9	11.63	12°43'39.03"N	79°34'53.83"E
OW08	11.7	12.5	13.2	12.47	12°42'53.93"N	79°35'46.71"E

Table 3.8 Post-Monsoon Water Level of Open Wells within 2 km Radius

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2025	Nov- 2025	Dec-2025	Average		
OW01	13.6	13.2	12.5	13.1	12°42'59.37"N	79°35'3.31"E
OW02	11.7	11.4	10.8	11.3	12°42'49.46"N	79°34'31.63"E
OW03	14.2	13.7	12.6	13.5	12°42'40.67"N	79°35'21.55"E
OW04	12.6	12.1	11.6	12.1	12°42'22.14"N	79°34'26.13"E
OW05	11.3	10.9	10.1	10.8	12°41'58.63"N	79°35'35.18"E
OW06	13.1	12.8	11.7	12.5	12°43'27.92"N	79°35'26.30"E
OW07	11.5	11.2	10.5	11.1	12°43'39.03"N	79°34'53.83"E
OW08	12.6	12.4	11.9	12.3	12°42'53.93"N	79°35'46.71"E

Table 3.9 Pre-Monsoon Water Level of Bore Wells within 2 km Radius

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2025	Apr-2025	May- 2025	Average		
BW01	60.9	63.3	65.8	63.3	12°43'14.99"N	79°34'40.66"E
BW02	60.4	63.7	64.1	62.7	12°42'37.80"N	79°35'29.19"E
BW03	62.8	63.2	63.9	63.3	12°43'4.73"N	79°35'21.96"E
BW04	61.2	65.8	67.4	64.8	12°42'3.22"N	79°35'26.01"E
BW05	61.2	64.8	65.3	63.8	12°41'58.41"N	79°34'45.08"E
BW06	60.6	65.8	66.3	64.2	12°42'42.74"N	79°34'25.68"E
BW07	58.9	63.9	65.4	62.7	12°43'41.96"N	79°35'21.71"E
BW08	59.3	62.5	63.1	61.6	12°43'9.38"N	79°35'58.13"E

Source: Onsite monitoring data

Table 3.10 Post-Monsoon Water Level of Bore Wells within 2 km Radius

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2025	Nov-2025	Dec-2025	Average		
BW01	51.5	54.2	59.7	55.1	12°43'14.99"N	79°34'40.66"E
BW02	51.9	53.5	59.7	55.0	12°42'37.80"N	79°35'29.19"E
BW03	51.8	53.4	58.8	54.7	12°43'4.73"N	79°35'21.96"E
BW04	52.2	56.8	57.1	55.4	12°42'3.22"N	79°35'26.01"E
BW05	52.9	54.2	58.7	55.3	12°41'58.41"N	79°34'45.08"E
BW06	51.7	55.2	59.8	55.6	12°42'42.74"N	79°34'25.68"E
BW07	51.2	53.9	57.2	54.1	12°43'41.96"N	79°35'21.71"E
BW08	50.9	52.1	56.4	53.1	12°43'9.38"N	79°35'58.13"E

Source: Onsite monitoring data

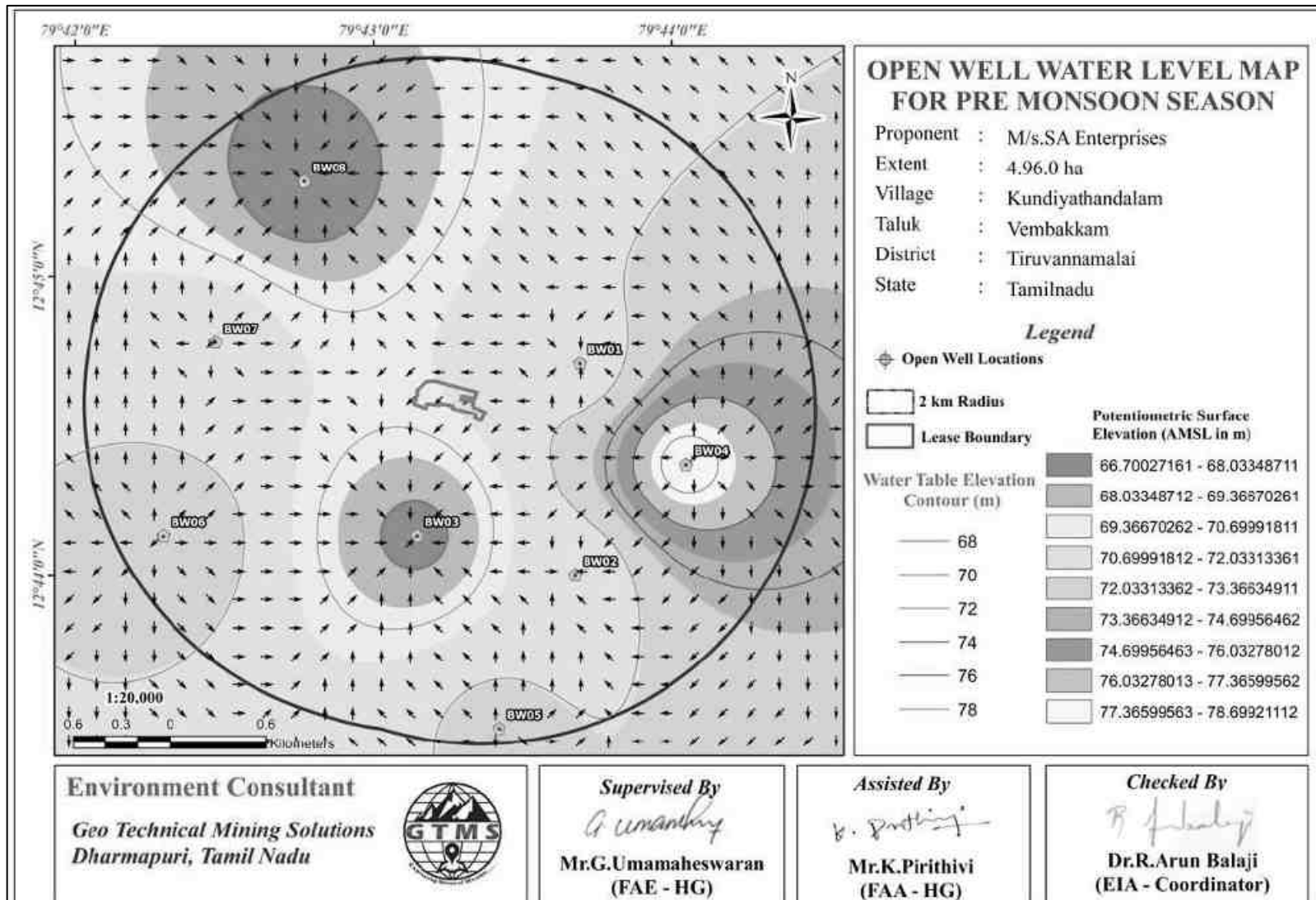


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

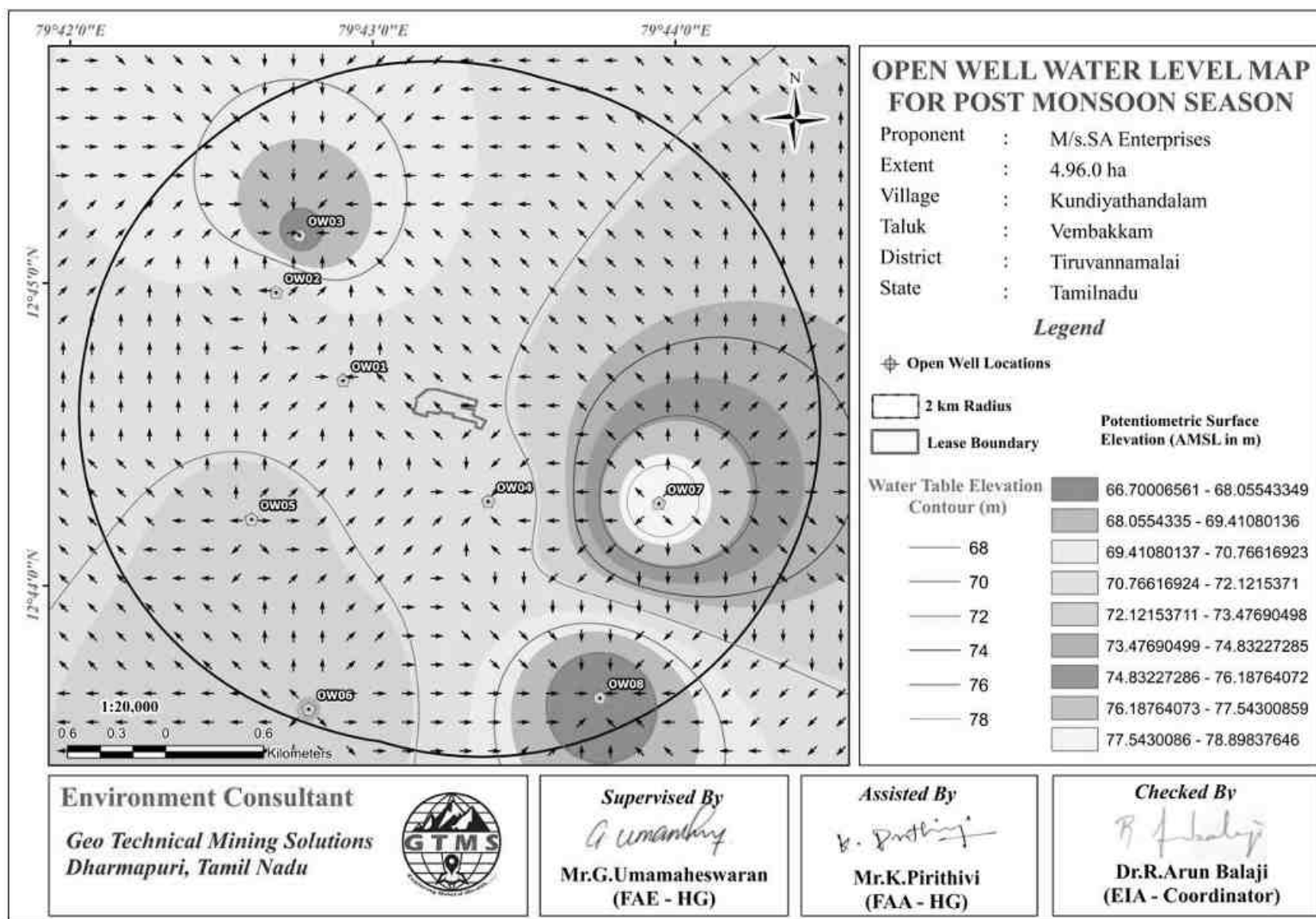


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

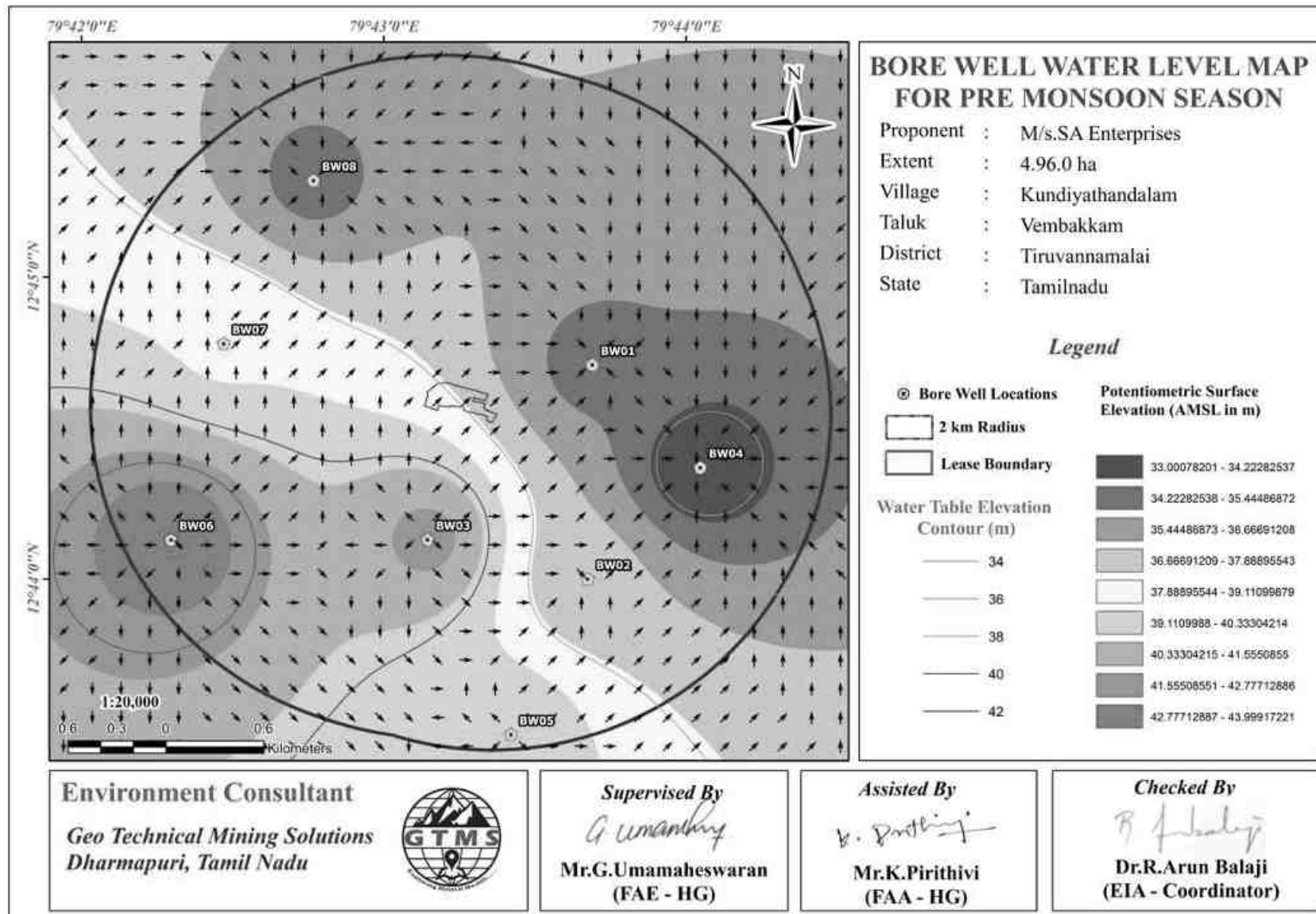


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

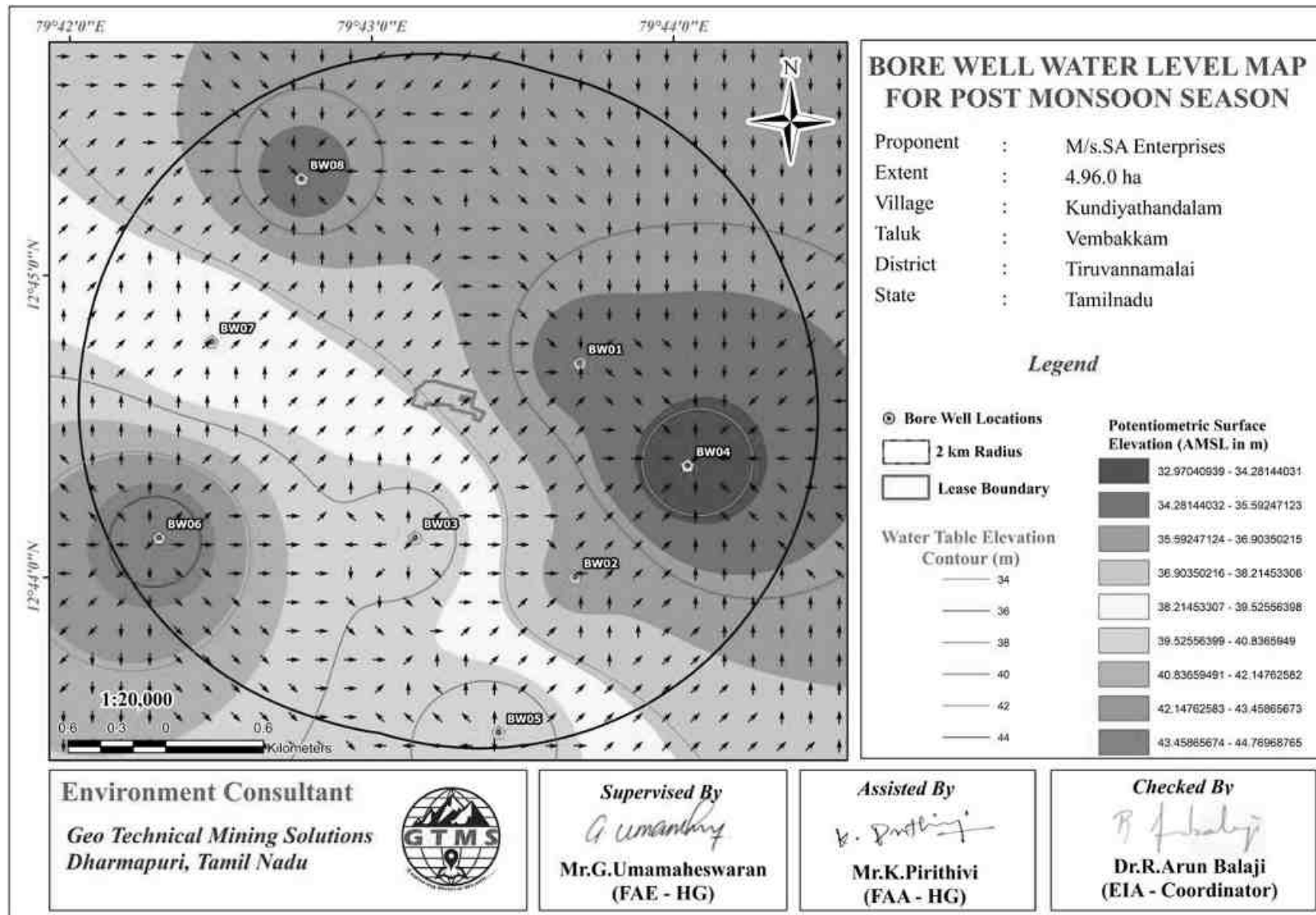


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

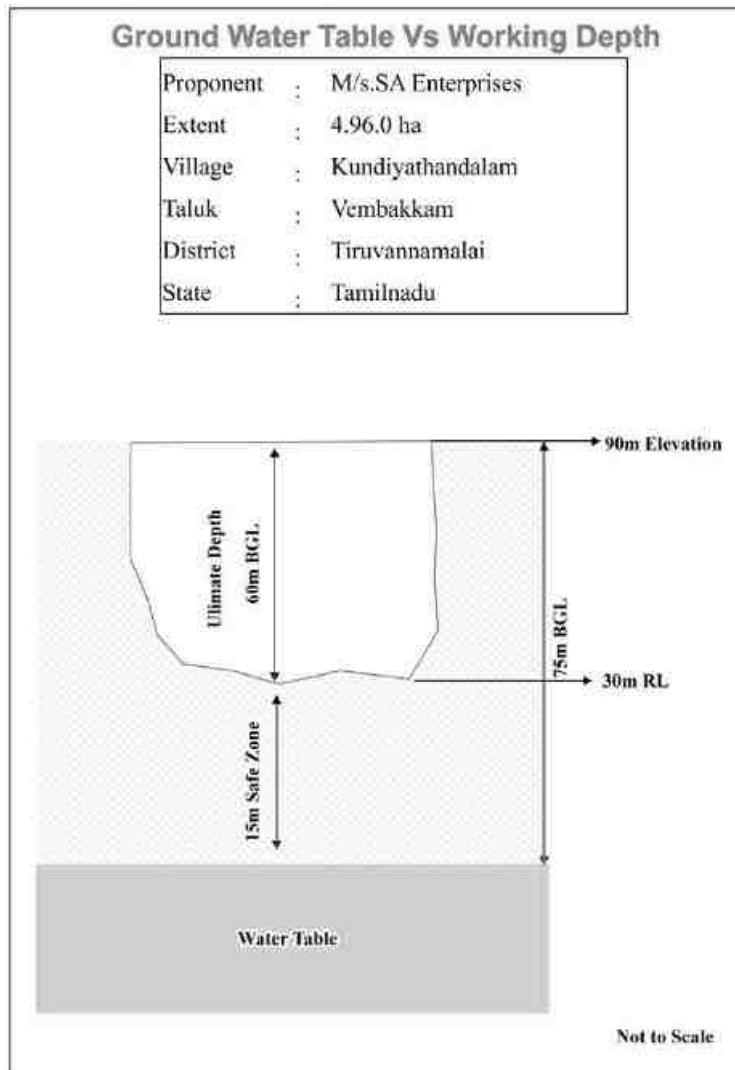


Figure 3.12 Schematic diagram for working depth vs ground water table

3.2.3.2 Electrical Resistivity Investigation

Electrical resistivity investigation is especially useful in the areas where there are no adequate exploratory well data about the aquifer conditions. The present study makes use of vertical electric sounding (VES) to delineate earth's subsurface layers. The electrical resistivity investigation uses four electrodes set up where current is sent through outer electrodes into the ground and the inner electrodes measure the potential difference.

Result

The Geophysical VES data obtained from the project site have been shown in Table 3.11. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.13.

Table 3.11 Vertical Electrical Sounding Data

Location Coordinates - 12°44'36.79"N 79°43'13.39"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in Ω	Apparent Resistivity in Ωm
1	5	1	4.71	33.248	156.60
2	10	1	23.57	12.915	304.40
3	15	1	55.00	7.542	414.79
4	20	1	99.00	5.678	562.15
5	25	2	75.43	8.803	664.02
6	30	2	110.01	7.422	816.48
7	35	2	150.86	6.266	945.32
8	40	2	198.01	5.129	1015.68
9	45	2	251.44	4.170	1048.56
10	50	2	311.16	3.638	1132.15
11	60	5	188.58	5.422	1022.45
12	70	5	275.01	4.891	1345.18
13	80	5	377.16	3.745	1412.50
14	90	5	495.02	2.922	1446.32
15	100	5	628.60	2.556	1606.52

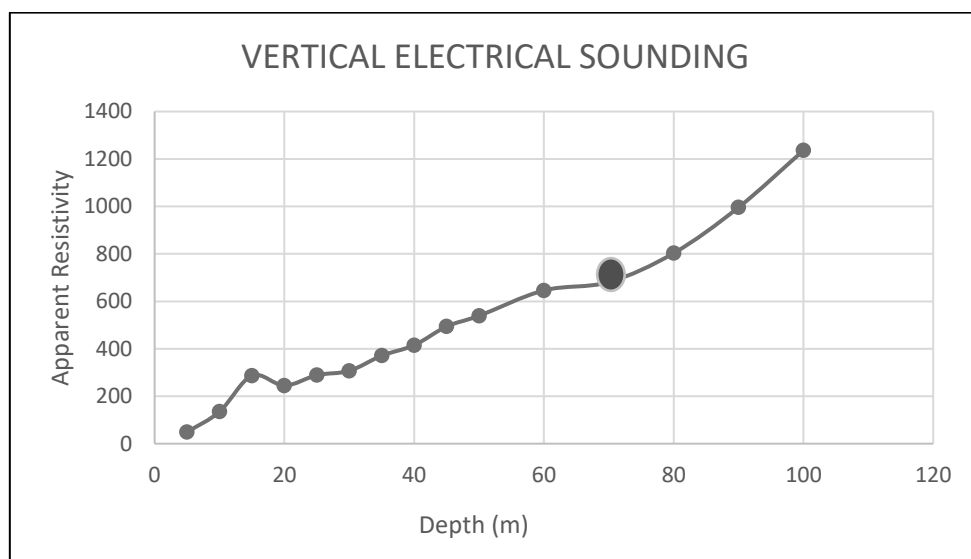


Figure 3.13 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60-65m Below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 75m below ground level. The ultimate depth of proposed project is 60m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

3.3 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollutants and their existing levels in ambient air. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities.

3.3.1 Meteorology

3.3.1.1 Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.12.

Table 3.12 Onsite Meteorological Data

S. No.	Parameters		OCT,2025	NOV,2025	DEC,2025
1	Temperature (°C)	Min	24.01	22.86	20.55
		Max	32.44	31.30	29.48
		Avg	27.59	26.49	25.19
2	Relative Humidity (%)	Min	56.55	58.80	54.92
		Max	94.29	94.13	96.30
		Avg	82.56	81.68	81.64
3	Wind Speed (m/s)	Min	0.11	0.25	1.34
		Max	5.97	8.91	6.34
		Avg	2.40	3.85	3.92
4	Wind Direction (degree)	Min	1.40	0.40	0.10
		Max	358.30	359.50	359.60
		Avg	159.25	87.58	70.49
5	Surface Pressure(kPa)	Min	99.92	100.04	100.29
		Max	100.97	101.21	101.37
		Avg	100.49	100.79	100.91

Source: On-site monitoring/sampling by *Interstellar Testing Centre Pvt. Ltd* in association with GTMS

Temperature:

2025 is officially categorized as the second or third warmest year on record globally. The first half of 2025 saw record-breaking monthly temperatures especially in January followed by a slight cooling in the latter half as the climate transitioned to La Niña conditions.

- Pre-monsoon (March-May): Average maximum reached ~35-36°C nationwide.
- Monsoon (June-September): Average maximum fluctuated around 31-34°C.
- Post-monsoon (Oct-Dec): Dropped from 20.55°C (Dec) to 32.44°C (Oct) as per your local data.

Relative Humidity:

Humidity levels remained exceptionally high during the monsoon and post-monsoon seasons frequently reaching 100% as reflected in the Oct–Dec data. Typical of a year with above normal rainfall where annual averages generally range from 60% in dry months to 85%+ in the latter half of the year.

Rainfall & Winds:

The country received **above-normal rainfall** overall in 2025. 6.1% above normal cumulative rainfall by August's end. Significant excess was noted with October receiving **49% above normal** rainfall. The transition to the Northeast Monsoon in the final quarter saw average speeds of **2.40 to 3.92m/s** with peak gusts up to 8.91m/s in November occurring during the transition period. The measured average wind velocity during the study period is 2.02m/s.

Surface Pressure (kPa):

Atmospheric pressure typically follows a seasonal "U" curve in India being lowest during the peak of the summer/monsoon (May–August) and rising during the cooler months. The data shows this rise in action moving from **99.92 kPa** (Oct) to **101.37 kPa** (Dec) as the air becomes cooler and denser. A wind direction graph **was generated** using annual average values.

3.3.2 Ambient Air Quality Study

The baseline ambient air quality is studied through a scientifically designed ambient air quality monitoring network considering the followings

- ❖ Meteorological condition on synoptic scale
- ❖ Topography of the study area
- ❖ Representatives of regional background air quality for obtaining baseline status
- ❖ Location of residential areas representing different activities
- ❖ Accessibility and power availability

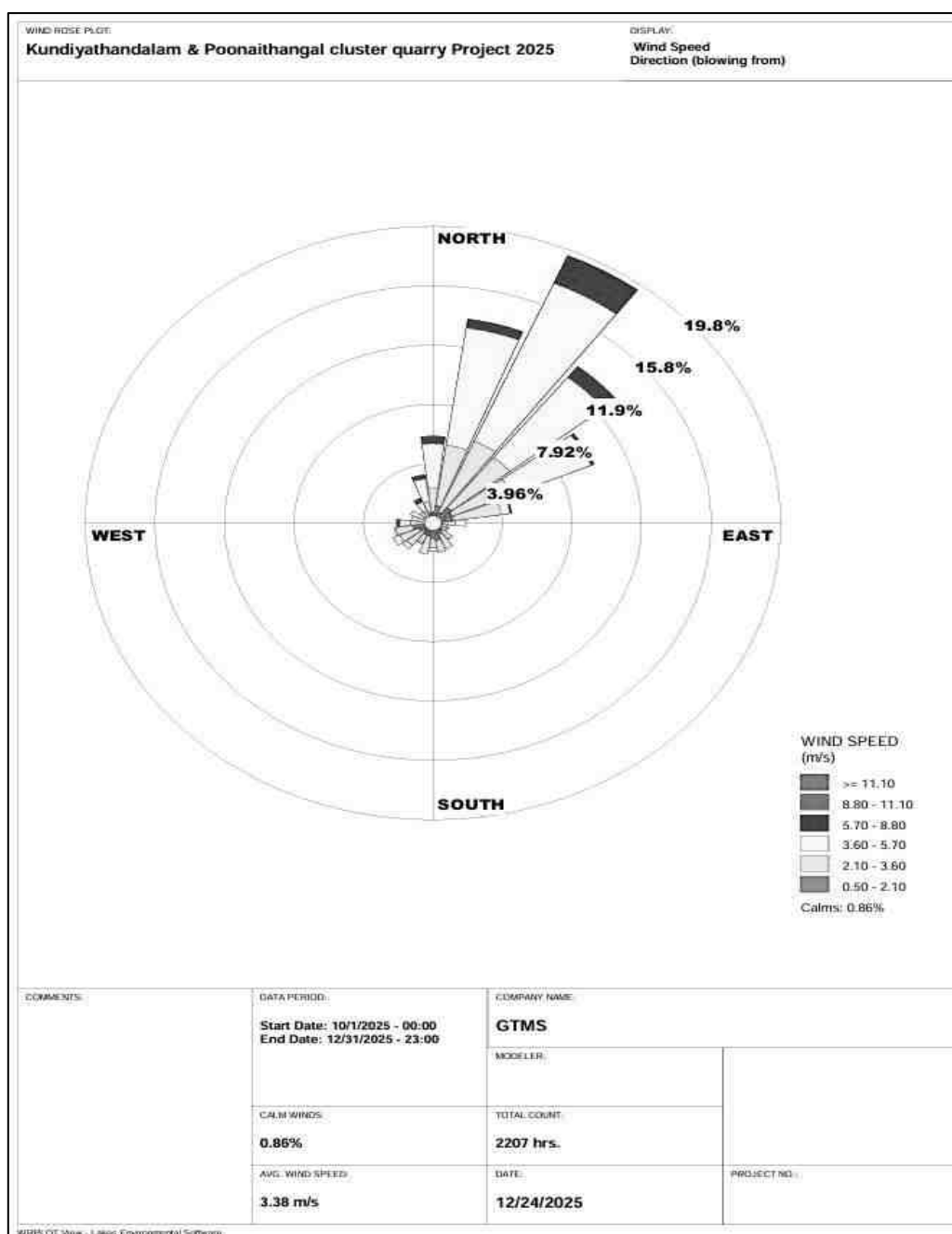


Figure 3.16 Onsite Wind Rose Diagram

Table 3.13 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
PM _{2.5}	Gravimetric method Beta attenuation method	Fine Particulate Sampler
PM ₁₀	Gravimetric method Beta attenuation method	Respirable Dust Sampler
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment

Source: Sampling Methodology based *Interstellar Testing Centre Pvt. Ltd* & *CPCB* Notification

Table 3.14 National Ambient Air Quality Standards

Pollutant	Time Weighted Average	Concentration in ambient air	
		Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
SO ₂ (µg/m ³)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
NO _x (µg/m ³)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
PM ₁₀ (µg/m ³)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
PM _{2.5} (µg/m ³)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0
Ozone (O ₃) µg/m ³	8 hours	100.0	100.0

Source: NAAQS CPCB Notification No. B-29016/20/90/PCI-I Dated: 18th Nov 2009

Methodology

- Monitoring was conducted twice a week at five locations using a 24-hour continuous schedule. This schedule is typically divided into three 8-hour shifts to ensure comprehensive daily data.
- Equipment was positioned at a height of **3 ± 0.5 meters** above ground level to minimize the influence of wind-blown ground dust.
- Stations were placed in open spaces at least 20 meters away from trees and vegetation to prevent these sinks from artificially lowering pollutant readings.

Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
AAQ1	Nearby core	0.84	S	12°44'3.03"N	79°43'0.04"E
AAQ2	Menallur	1.26	W	12°44'42.59"N	79°42'27.10"E
AAQ3	Chinna Elacheri	2.21	SW	12°43'32.84"N	79°42'36.22"E
AAQ4	Poonathangal	0.46	E	12°44'36.07"N	79°43'35.78"E
AAQ5	Mathur	5.95	SW	12°42'52.00"N	79°40'20.73"E
AAQ6	Chittalapakkam	3.15	SE	12°42'57.66"N	79°44'4.80"E
AAQ7	Sodiyambakkam	3.50	SW	12°43'40.93"N	79°41'25.76"E

Source: On-site monitoring/sampling *Interstellar Testing Centre Pvt. Ltd* in association with GTMS

The study generated baseline data for four key parameters:

- Particulate Matter (PM_{2.5} and PM₁₀): Fine and coarse inhalable particles.
- Gaseous Pollutants: Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO_x)

Table 3.16 summarizes the average concentrations of the four pollutants ((PM_{2.5}, PM₁₀, SO₂ and NO_x) recorded across the five stations during the three-month period.

Figure 3.17 shows the map identifying the five specific sampling locations and Figures 3.18–3.23 give the graphical representations showing pollutant trends or comparisons for each monitoring station.

Table 3.16 Summary of AAQ Result
Particulate Matter ($\mu\text{g}/\text{m}^3$)

Station ID	PM2.5 (Mean)	PM2.5 (98th %)	PM10 (Mean)	PM10 (98th %)
AAQ1	24.40	26.32	63.78	68.43
AAQ2	17.22	19.05	44.37	48.79
AAQ3	17.42	18.03	44.88	49.58
AAQ4	17.09	18.97	44.03	48.31
AAQ5	16.62	17.92	42.82	46.17
AAQ6	17.38	19.50	44.79	49.71
AAQ7	17.1	18.6	43.98	48.36

Gaseous Pollutants ($\mu\text{g}/\text{m}^3$)

Station ID	SO ₂ (Mean)	SO ₂ (98th %)	NO _x (Mean)	NO _x (98th %)
AAQ1	7.50	7.87	15.25	16.38
AAQ2	5.27	5.84	10.54	11.68
AAQ3	5.38	5.90	10.77	11.80
AAQ4	5.25	5.66	10.56	11.63
AAQ5	5.20	5.39	10.47	11.01
AAQ6	5.39	5.82	10.78	11.95
AAQ7	5.31	5.59	10.58	10.80

The station AAQ1 has the highest mean and 98th percentile for all four pollutants suggesting it may be located near a higher-intensity emission source like a major traffic intersection or industrial area. The **98th percentile** values represent the levels that 98% of the data falls below. Since these values (e.g., PM_{2.5} max of 26.32 $\mu\text{g}/\text{m}^3$ at AAQ1) are close to the mean it suggests a stable environment without extreme daily pollution spikes.

Pollutant correlation:

- The PM₁₀ levels (42.82– 68.43 $\mu\text{g}/\text{m}^3$) are roughly 2.5 times higher than PM_{2.5} levels, which is typical in areas where coarse dust (construction, road dust) contributes more than fine combustion particles.
- SO₂ and NO_x levels are closely linked likely originating from common vehicular or industrial sources.

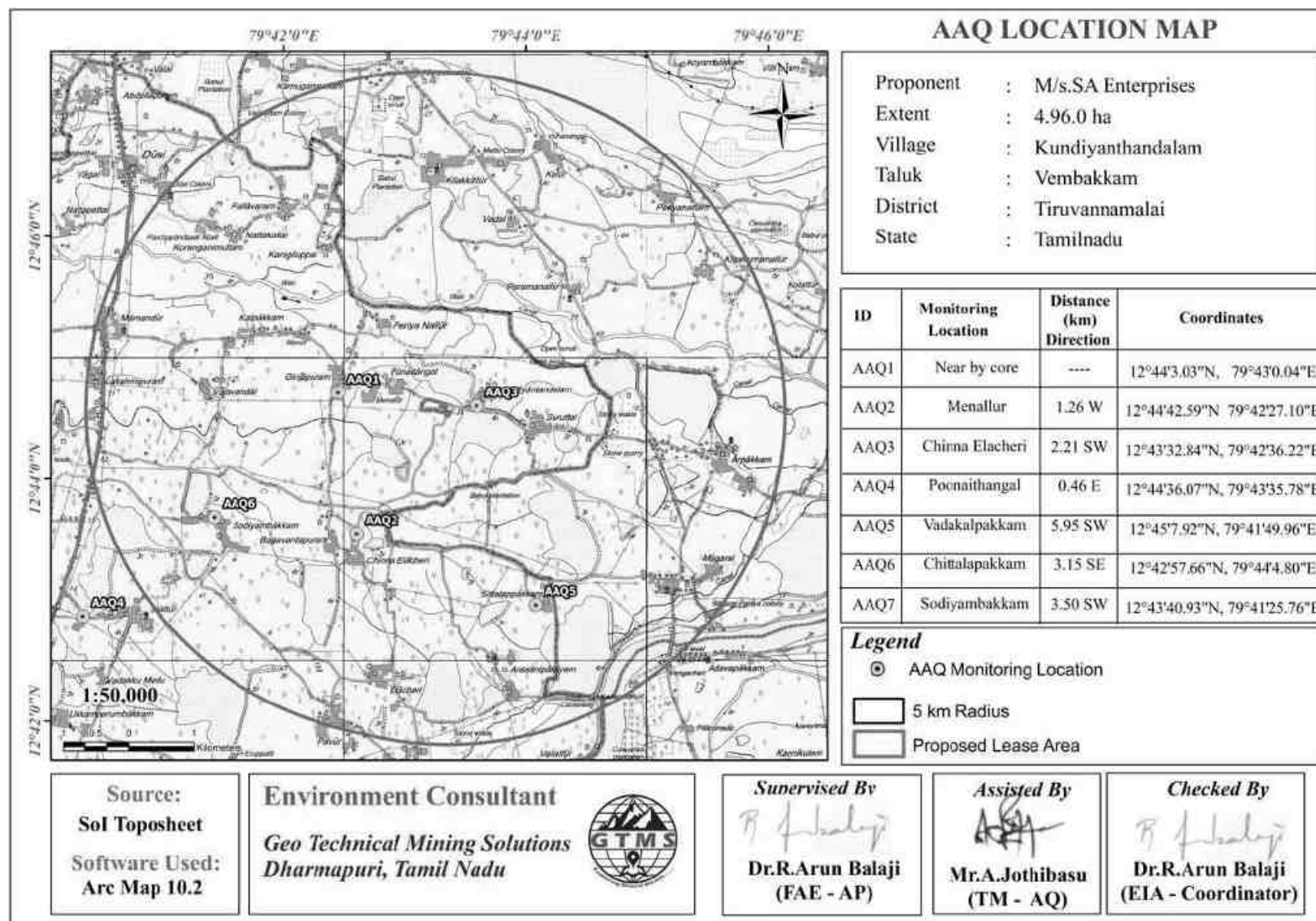


Figure 3.17 Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

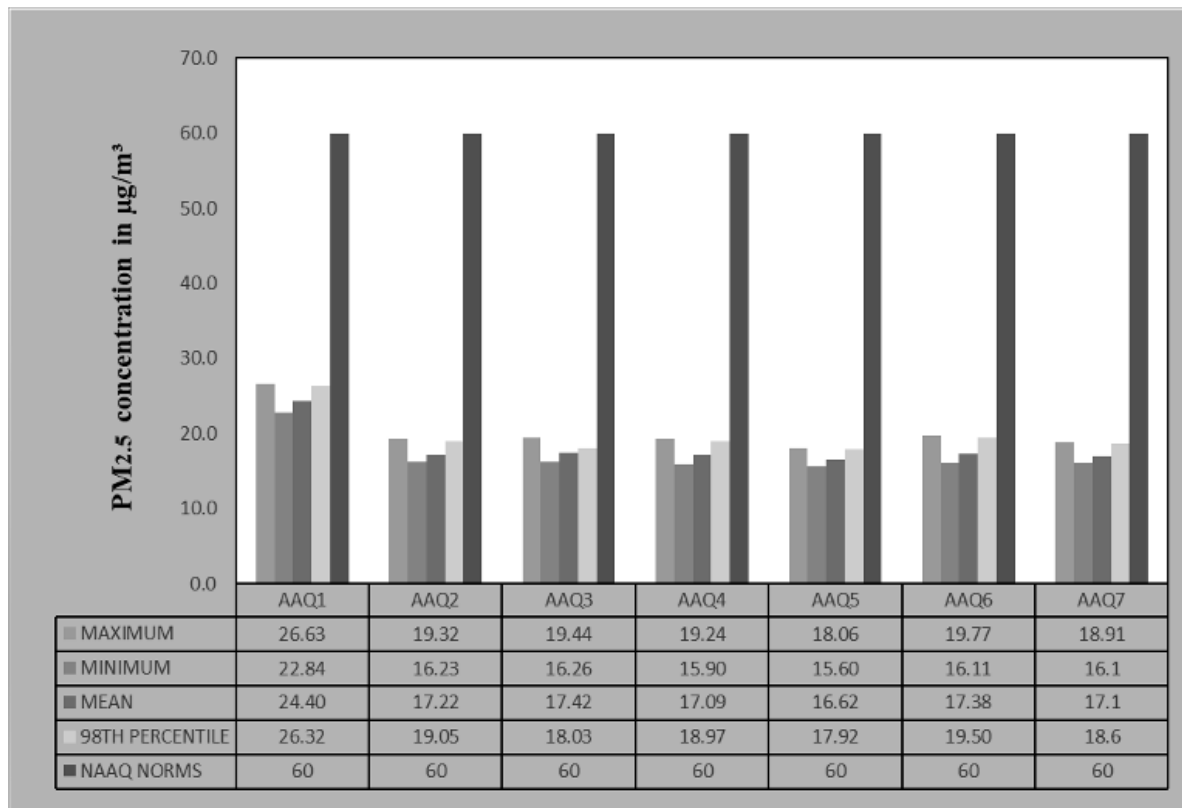


Figure 3.18 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM_{2.5} Measured from 7 Air Quality Monitoring Stations within 5km Radius

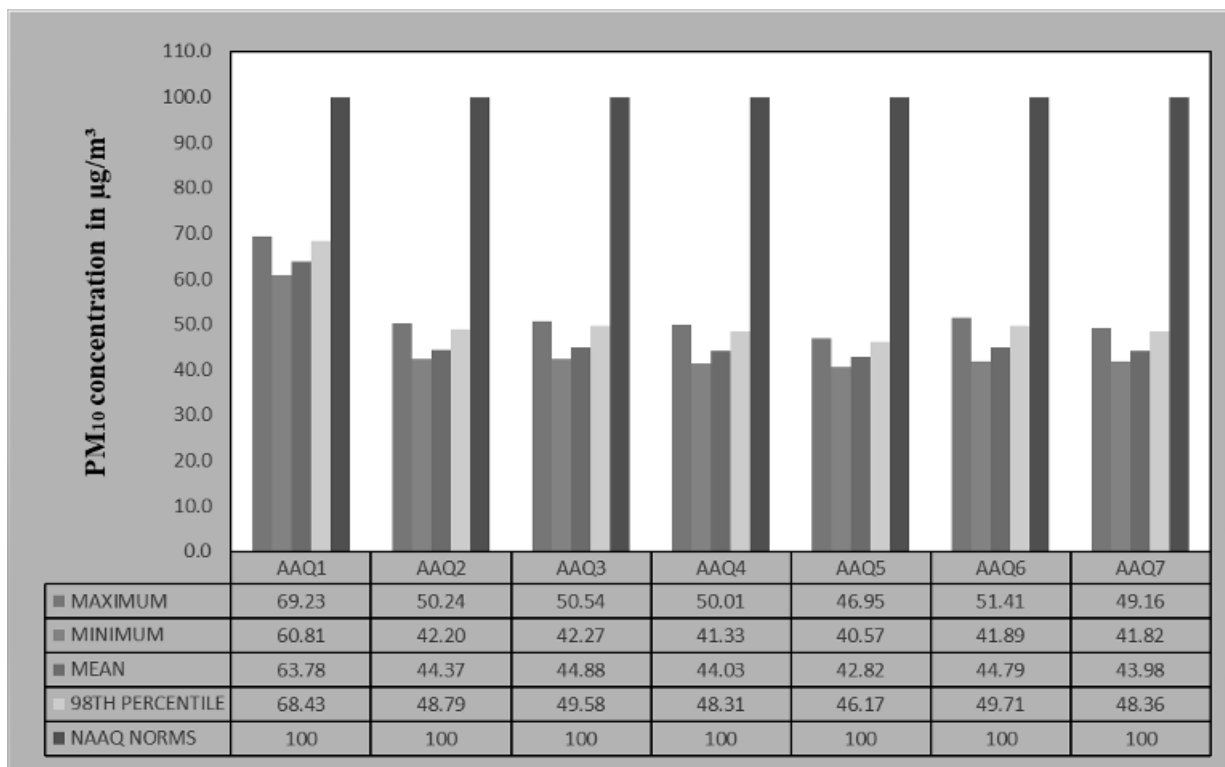


Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM₁₀ Measured from 7 Air Quality Monitoring Stations within 5km Radius

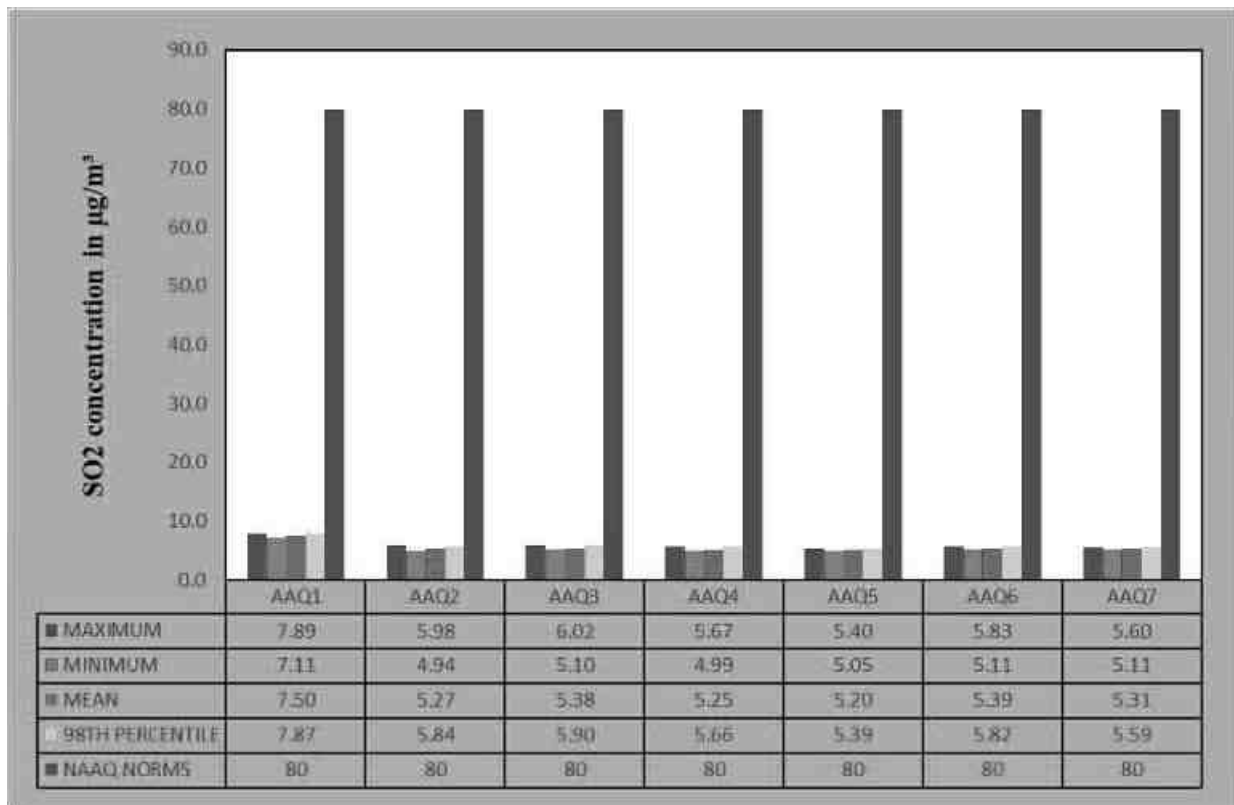


Figure 3.20 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO₂ Measured from 7 Air Quality Monitoring Stations within 5km Radius

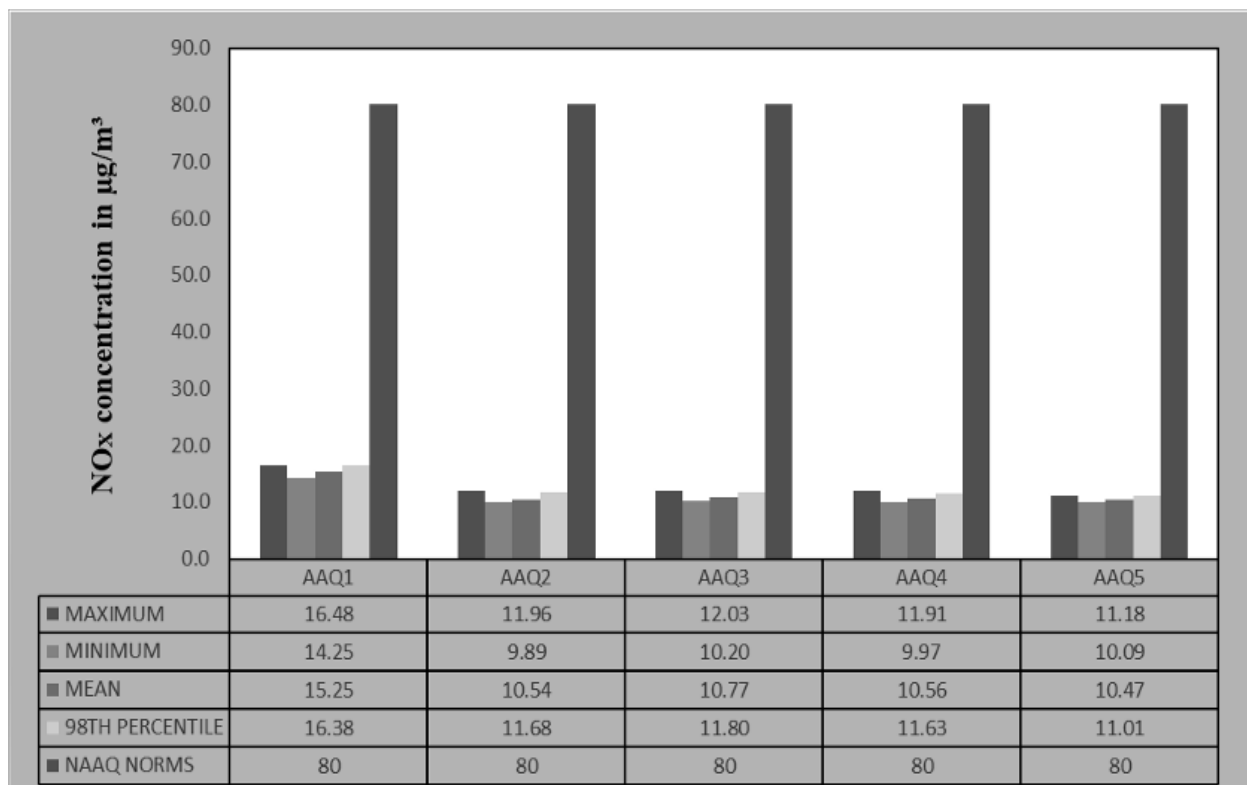


Figure 3.21 Bar Chart Showing Maximum, Minimum, and Average Concentrations of NO_x Measured from 7 Air Quality Monitoring Stations within 5km Radius

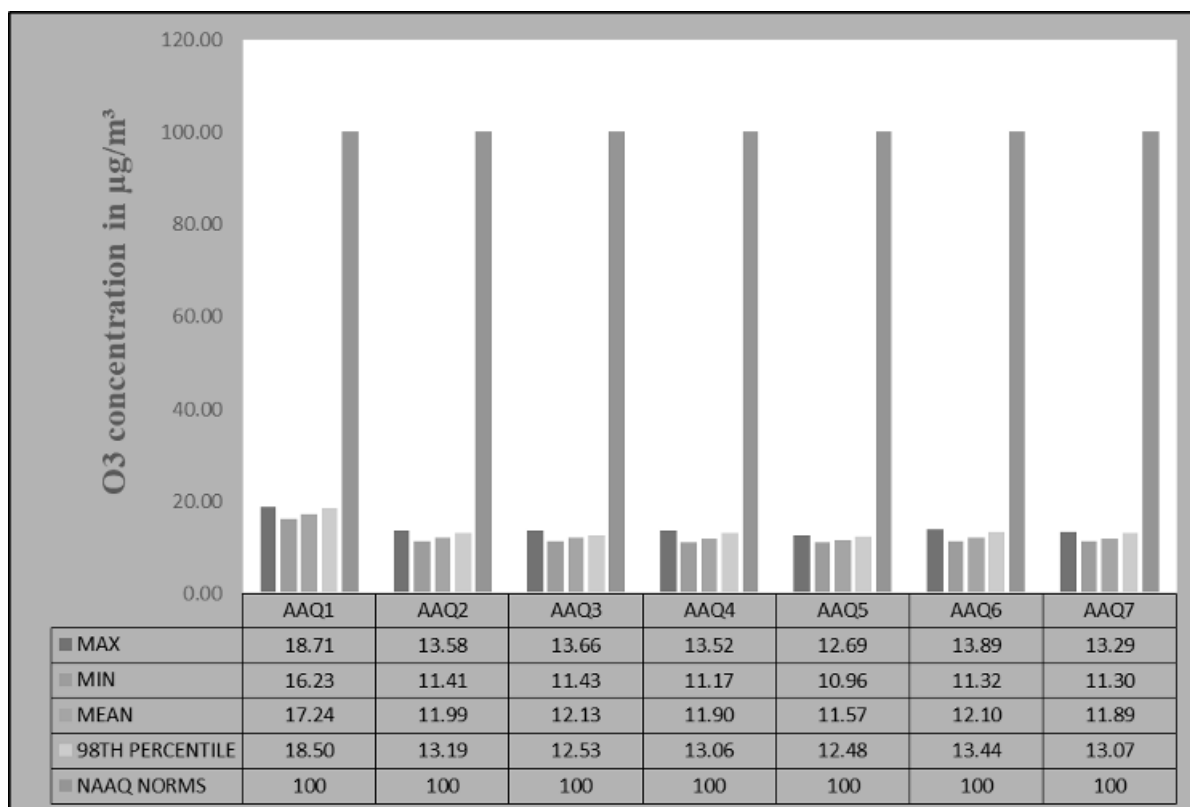


Figure 3.22 Bar Chart Showing Maximum, Minimum, and Average Concentrations of O₃ Measured from 7 Air Quality Monitoring Stations within 5km Radius

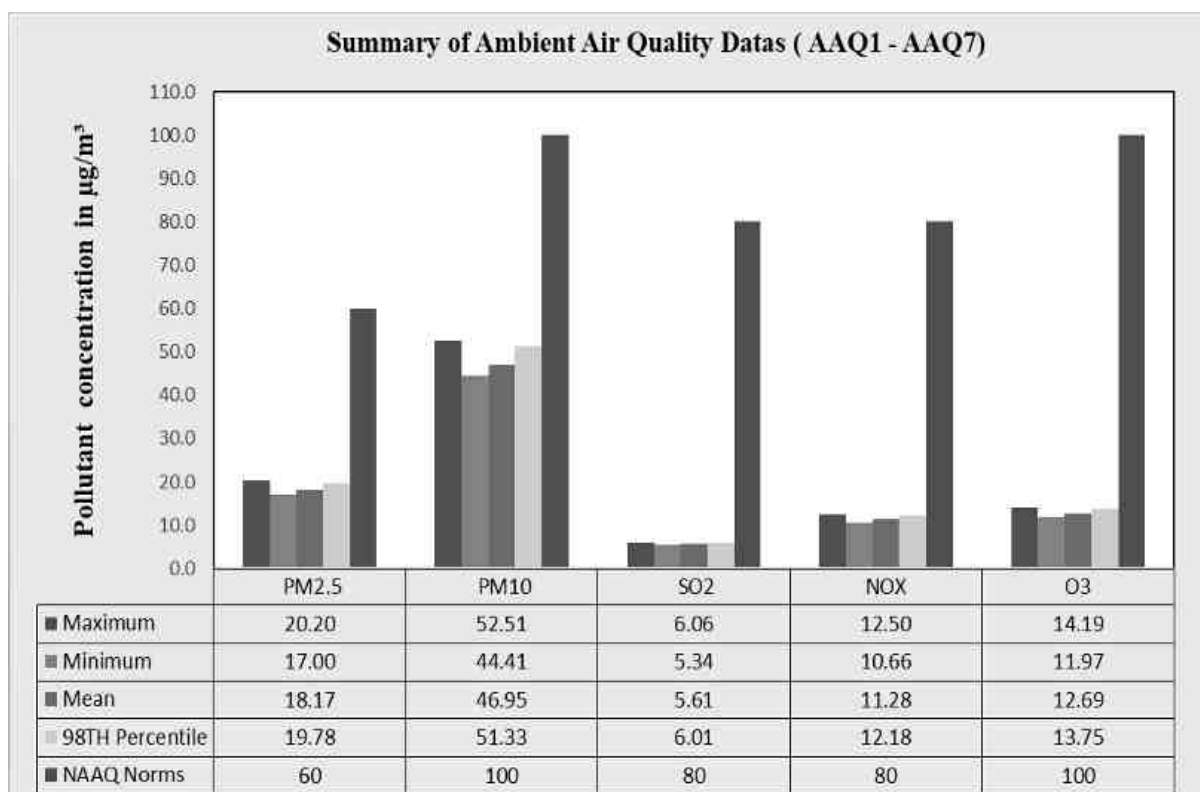


Figure 3.23 Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5km Radius

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (07) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.17 and spatial occurrence of the locations are shown in Figure 3.24.

Table 3.17 Noise Monitoring Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
N1	Nearby core	1.15	S	12°43'59.98"N	79°42'59.50"E
N2	Chinna Elacheri	2.14	SW	12°43'36.00"N	79°42'37.37"E
N3	Poonathangal	0.36	E	12°44'34.00"N	79°43'34.26"E
N4	Menallur	0.67	NW	12°44'47.27"N	79°42'48.81"E
N5	Valavanthal	2.99	W	12°44'39.74"N	79°41'28.92"E
N6	Chittalapakkam	3.24	SE	12°42'57.64"N	79°44'11.41"E
N7	Sodiyambakkam	3.65	SW	12°43'40.70"N	79°41'20.26"E

Table 3.18 Ambient Noise Quality Result

Station ID	Location	Environmental setting	Average day noise level (dB(A))	Average night noise level (dB(A))	Day time (6.00 AM – 10.00 PM)	Night time (10.00 PM – 6.00 AM)
					Standard (Leq in dB (A))	
N1	Core	Industrial Area	58.8	45.1	75	70
N2	Chinna Elacheri	Residential Area	42.1	38.9	55	45
N3	Poonathangal		42.4	40.1		
N4	Menallur		42.0	40.4		
N5	Valavanthal		47.3	43.2		
N6	Chittalapakkam		43.6	41.9		
N7	Sodiyambakkam		39.9	39.5		

Source: On-site monitoring/sampling by Interstellar Testing Centre Pvt. Ltd in association with GTMS

The Table 3.18 shows that noise level in core zone was 58.8dB (A) Leq during day time and 45.1dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 39.9 to 43.6dB (A) Leq and during night time from 38.9 to 43.2dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.25 and 3.26.

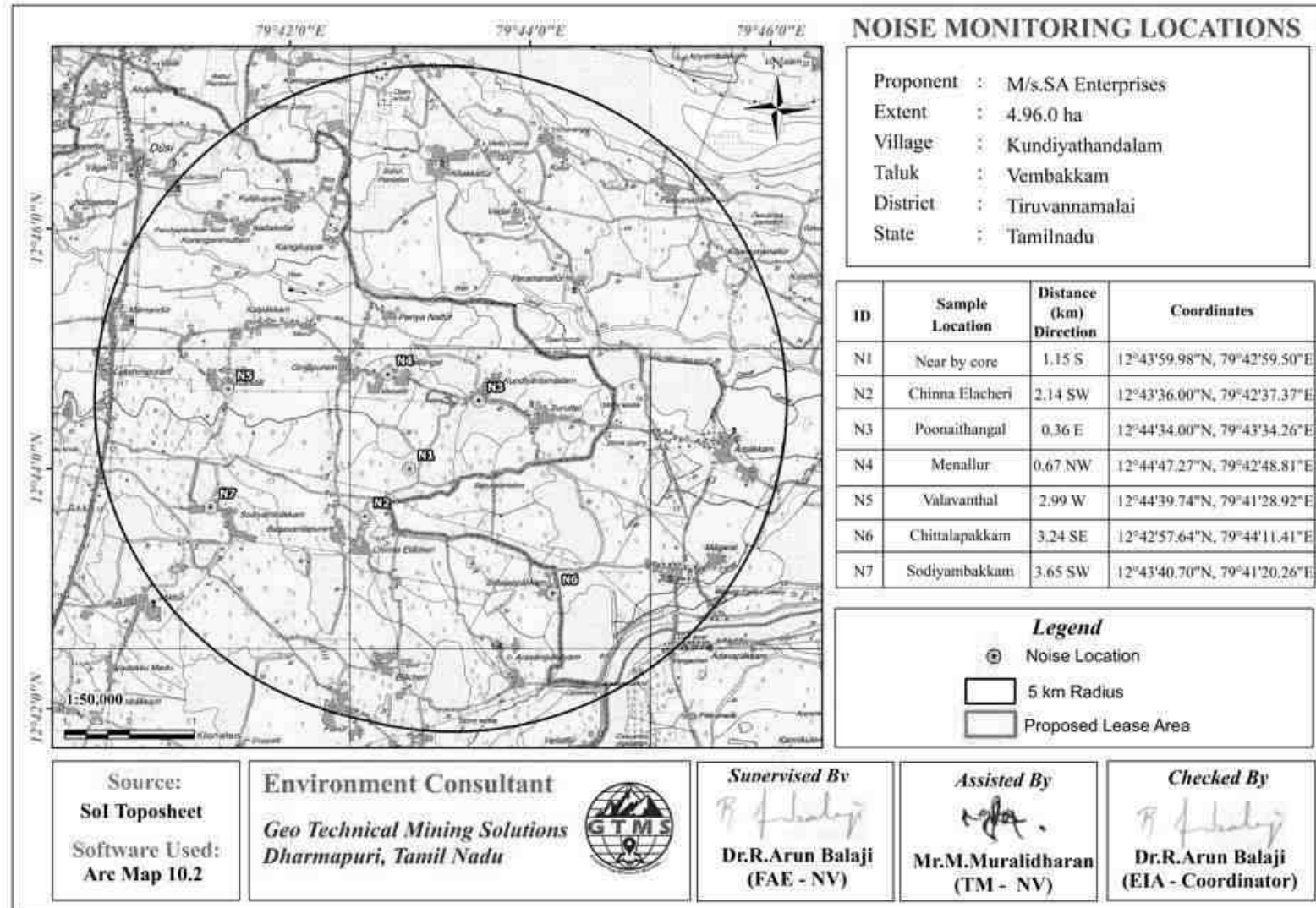


Figure 3.24 Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

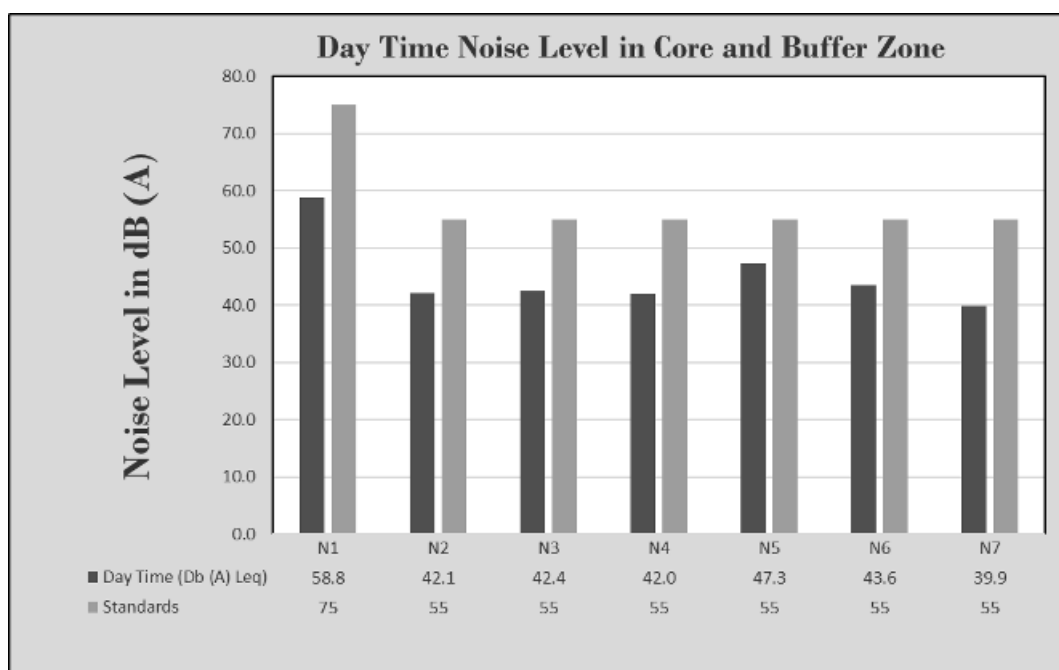


Figure 3.25 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

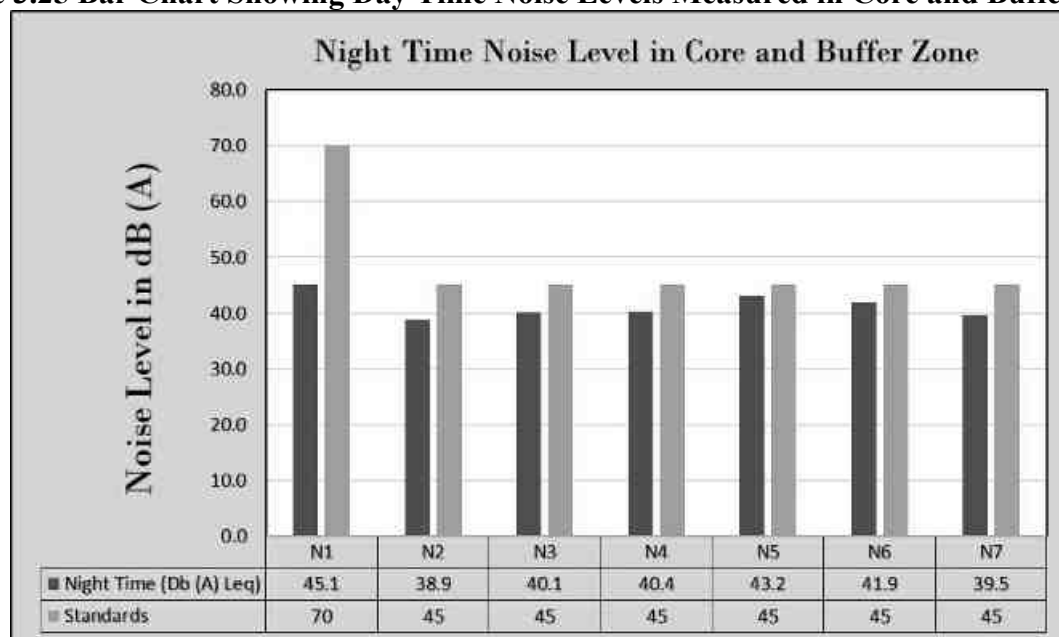


Figure 3.26 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

3.5 BIOLOGICAL ENVIRONMENT

Collection of comprehensive baseline information on flora and fauna is a prerequisite for assessment of impacts of any extractive industries/ activities. Biological environment is an important component of the environment of any area. It covers flora & fauna in the region, details of forests and wildlife sanctuaries in the region, with list of endangered species. Over the years ecological and along with it the loss of biological diversity has become a national and a global concern. Ecological assessment therefore is very critical for decision making and for the setting of a developmental project or an industry. An ecological study of the ecosystem is

essential to understand the impact of industrialization and urbanization on existing flora and fauna of the area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if any.

The objective of this Section is to characterize and understand the present status of the ecosystems in the study area to assess the bio-diversity and to identify the critical areas. The present study was undertaken as a part of EIA report to understand the present status of ecosystem prevailing in the study area, to compare it with the past condition with the help of available data, to predict changes as a result of present activities and to suggest measures for maintaining the conditions.



Figure 3.27 Quadrates Sampling Methods of Flora

3.5.1 Flora

3.5.1.1 Objectives of the Study

The ecological study of the area was conducted in order to understand the existing status of the flora and fauna to generate baseline information and evaluate the possible impacts on biological environment. The present study highlights the various issues pertaining to floristic diversity and faunal wealth in the surrounding area up to 10km radius from the proposed expansion project.

3.5.1.2 Study Approach & Methodology

The baseline study for existing ecological environment was carried out during study period. A participatory and consultative approach was followed. Field visits were under taken for survey of the aquatic and terrestrial vegetation and animals in the study area.

Nested quadrat sampling method was used for the study of community structure of the vegetation. The sampling consisted of randomly placed quadrats of 10m × 10m were laid down to assess trees, and sub quadrats of 5 m × 5 m were laid down for shrubs, 1m x 1m were laid

done for herbs. The size and number of quadrats needed were determined using the species-area curve (Misra, 1968). The data on vegetation were quantitatively analysed for abundance, density, frequency as per Curtis & McIntosh (1950). The Important Value Index (IVI) for trees was determined as the sum of relative density, relative frequency and relative dominance (Curtis, 1959).

3.5.1.3 Survey Methodology

The baseline study for existing biological environmental was carried out in Nov 2024. Study of flora and fauna carried out as per prescribed method addressed in SOP. Field visits were under taken for survey of the vegetation and animals in the study area. The study area is divided into three parts as project site area along with 500m from all direction surrounding site is being considered as core area and rest of 5km study area is buffer part of the study area.

3.5.1.4 Important Value Index (IVI)

The concept of ‘Important Value Index (IVI)’ has been developed for expressing the dominance and ecological success of any species, with a single value (Mishra, 1968, Sharma, 2005). This index utilizes three characteristics, they are (i) Relative frequency and (ii) Relative density. The three characteristics computed using frequency, density and abundance for all the species falling in all the quadrat by using the following formula. The relative frequency, relative density and relative abundance has been calculated to calculate the IVI value

$$IVI = \text{Relative frequency} + \text{Relative abundance} + \text{Relative density} [RF + RA + RD]$$

$$\text{Relative Value Index (RVI)} = \text{Relative Density} + \text{Relative Frequency} [RD + RF].$$

Relative Value Index used for Expressing dominance and Ecological success of Shrub and herb Species in a particular area.

Shannon- Wiener Index, Evenness and Richness

Biodiversity index is a quantitative measure that reflects how many different types of species, there are in a dataset, and simultaneously considers how evenly the basic entities (such as individuals) are distributed among those types of species. The value of biodiversity index increases both when the number of types increases and when evenness increases. For a given number of type of species, the value of a biodiversity index is maximized when all type of species is equally abundant.

The **Shannon Diversity Index** (sometimes called the Shannon-Wiener Index) is a way to measure the diversity of species in a community.

The species diversity index (H) for floral and faunal diversity is calculated by the use of Shannon Wiener Index (Shannon Wiener, 1963) as:

$$H = - \sum (n_i/n) \times \ln (n_i/n)$$

- ✚ Where, n_i is individual density of a species and n is total density of all the species
- ✚ The Evenness Index (E) is calculated by using Shannon's Evenness formula (Magurran, 2004).
- ✚ The higher the value of H , the higher the diversity of species in a particular community

The lower the value of H , the lower the diversity. A value of $H = 0$ indicates a community that only has one species

$$\text{Evenness Index (E)} = H / \ln(S)$$

Where, H is Shannon Wiener Diversity index; S is number of species

The Shannon evenness Index is a way to measure the evenness of species in a community. The term “evenness” simply refers to how similar the abundances of different species are in the community.

3.5.1.5 Floral diversity Analysis

Flora study was conducted using the above said methodology to inventory the existing terrestrial plants in both core and buffer zones. Details of plants have been described in the succeeding sections.

Flora in core zone

There are no trees in inside of the mining lease area, but there are 60 *Borassus flabellifer* trees, *Morinda citrifolia* 5 and *Azadirachta indica* 4 within a 7.5-meter safety zone.

Flora in 300m radius

Taxonomically, a total of 33 species belonging to 19 families have been recorded from the 300m radius from the mining lease area. The species in the 300m radius include herbs (18), trees (08), shrubs (05), the 19 families, Fabaceae and Lamiaceae are the main dominating species in the study area, Species Richness (margalef Index) in the study area it mentioned in Table 3.19-3.21 Moreover, no species are found as threatened category. There is government land around 300 meters. *Vachelia leucophylla* is the dominant tree followed by *Phoenix sylvestris* tree, *Carissa carandas*, *Casapella thevetia* and *Lantana camara* tree.

Flora in 10km radius zone

In the buffer zone, a total of 81 species belonging to 41 families were recorded. Among them are trees (32), shrubs (14), herbs (38), climbers (09), creepers (5), grasses (4), and cactus (1). Majority of the species belongs to the family of Fabaceae and Poaceae, as mentioned in Table 3.22. Species Richness (margalef Index) in the study area it mentioned in Table 3.22 Moreover, no species are found as threatened category.

Table 3.19 Flora in 300m Radius

S.No.	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Velikathan maram	<i>Prosopis juliflora</i>	Fabaceae	6	5	10	0.6	50.0	1.2	12.8	12.8	25.6	Not Listed
2	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	5	4	10	0.5	40.0	1.3	10.6	10.3	20.9	Not Listed
3	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	7	6	10	0.7	60.0	1.2	14.9	15.4	30.3	Not Listed
4	Vembu	<i>Azadirachta indica</i>	Meliaceae	6	5	10	0.6	50.0	1.2	12.8	12.8	25.6	Not Listed
5	Vagai	<i>Albizia lebbek</i>	Fabaceae	5	4	10	0.5	40.0	1.3	10.6	10.3	20.9	Not Listed
6	Eshamaram	<i>Phoenix Reclinata</i>	Arecaceae	7	6	10	0.7	60.0	1.2	14.9	15.4	30.3	Not Listed
7	Teaku	<i>Tectona grandis</i>	Lamiaceae	6	5	10	0.6	50.0	1.2	12.8	12.8	25.6	Not Listed
8	Veallai vealan	<i>Vachellia leucophloea</i>	Fabaceae	5	4	10	0.5	40.0	1.3	10.6	10.3	20.9	Lest Concern
Shrubs													
9	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	9	8	15	0.6	53.3	1.1	22.0	22.2	44.2	Not Listed
10	Kela chadi	<i>Carissa carandas</i>	Apocynaceae	8	7	15	0.5	46.7	1.1	19.5	19.4	39.0	Not Listed
11	Arali	<i>Casapella thevetia</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	17.1	16.7	33.7	Not Listed
12	Sappathikalli	<i>Cereus pterogonus</i>	Cactaceae	9	8	15	0.6	53.3	1.1	22.0	22.2	44.2	Not Listed
13	Unichedi	<i>Lantana camara</i>	Verbenaceae	8	7	15	0.5	46.7	1.1	19.5	19.4	39.0	Not Listed

<i>Herbs, Climbers & Grass</i>													
14	Thumbai	<i>Leucas aspera</i>	Lamiaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
15	Kantang kathrikai	<i>Solanum virginianum</i>	Solanaceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
16	Arugampul	<i>Cynodon dactylon</i>	Poaceae	10	9	20	0.5	45.0	1.1	6.8	7.0	13.8	Not Listed
17	Poolai poondu	<i>Aerva lanata</i>	Amaranthaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
18	Korai	<i>Cyperus rotundus</i>	Cyperaceae	6	5	20	0.3	25.0	1.2	4.1	3.9	8.0	Not Listed
19	Nearunji	<i>Tribulus terrestris</i>	Zygophyllales	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
20	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
21	Vilaiti tulsi	<i>hyptis suaveolens</i>	Lamiaceae	11	10	20	0.6	50.0	1.1	7.5	7.8	15.2	Not Listed
22	Pink Blumea	<i>Blumea axillaris</i>	Asteraceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
23	Rail poondu	<i>Croton bonplandianus</i>	Euphorbiaceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
24	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
25	Veattukaya poondu	<i>Tridax Procumbens</i>	Asteraceae	9	8	20	0.5	40.0	1.1	6.1	6.2	12.3	Not Listed
26	Kundumani	<i>Abrus precatorius</i>	Fabaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
27	Mosukkattan	<i>Passiflora foetida</i>	Passifloraceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
28	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	10	9	20	0.5	45.0	1.1	6.8	7.0	13.8	Not Listed
29	Kandakathari	<i>Solanum xanthocarpum</i>	Solanaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
30	Arugam Pill	<i>Cynodon dactylon</i>	Poaceae	9	8	20	0.5	40.0	1.1	6.1	6.2	12.3	Not Listed
31	Paspalum	<i>Paspalum quadrifarium</i>	Poaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed

LC- Least Concern - [Species categorized as Least Concern (LC) is a taxon when it has been evaluated against the Red List criteria and does not qualify for Endangered Near Threatened.]. DD – Data Deficient [Species categorized as DD is a taxon when there is no inadequate information to make a direct, VU- Vulnerable indirect assessment of its risk of extinction based on its distribution and/or population status].

<https://www.iucnredlist.org/> <https://bsi.gov.in/uploads/documents/research-program/Threatened-plants-of%20India.pdf>

Table 3.20 Calculation of Species Diversity in 300m Radius

S. No	Common name	Scientific name	No. of Species	Pi	ln (Pi)	Pi x ln (Pi)
Tree						
1	Velikathan maram	<i>Prosopis juliflora</i>	6	0.13	-2.06	-0.26
2	Panai maram	<i>Borassus flabellifer</i>	5	0.11	-2.24	-0.24
3	Nuna maram	<i>Morinda citrifolia</i>	7	0.15	-1.90	-0.28
4	Vembu	<i>Azadirachta indica</i>	6	0.13	-2.06	-0.26
5	Vagai	<i>Albizia lebeck</i>	5	0.11	-2.24	-0.24
6	Eshamaram	<i>Phoenix reclinata</i>	7	0.15	-1.90	-0.28
7	Teaku	<i>Tectona grandis</i>	6	0.13	-2.06	-0.26
8	Veallai vealan	<i>Vachellia leucophloea</i>	5	0.11	-2.24	-0.24
H (Shannon Diversity Index) =2.07						
Shrubs						
9	Erukku	<i>Calotropis gigantea</i>	9	0.22	-1.52	-0.33
10	Kela chadi	<i>Carissa carandas</i>	8	0.20	-1.63	-0.32
11	Arali	<i>Cascapella thevetia</i>	7	0.17	-1.77	-0.30
12	Sappathikalli	<i>Cereus pterogonus</i>	9	0.22	-1.52	-0.33
13	Unichedi	<i>Lantana camara</i>	8	0.20	-1.63	-0.32
H (Shannon Diversity Index) =1.61						
Herbs						
14	Thumbai	<i>Leucas aspera</i>	8	0.05	-2.91	-0.16
15	Katang kathrikai	<i>Solanum virginianum</i>	7	0.05	-3.04	-0.14
16	Arugampul	<i>Cynodon dactylon</i>	10	0.07	-2.69	-0.18
17	Poolai poondu	<i>Aerva lanata</i>	8	0.05	-2.91	-0.16
18	Korai	<i>Cyperus rotundus</i>	6	0.04	-3.20	-0.13
19	Nerunji	<i>Tribulus terrestris</i>	8	0.05	-2.91	-0.16
20	Nayuruv	<i>Achyranthes aspera</i>	7	0.05	-3.04	-0.14
21	Vilaiti tulsi	<i>Hyptis suaveolens</i>	11	0.07	-2.59	-0.19
22	Pink Blumea	<i>Blumea axillaris</i>	8	0.05	-2.91	-0.16
23	Rail Pindu	<i>Croton bonplandianus</i>	7	0.05	-3.04	-0.14
24	Communist pacha	<i>Chromolaena odorata</i>	8	0.05	-2.91	-0.16
25	veattukayapundu	<i>Tridax Procumbens</i>	9	0.06	-2.79	-0.17
26	Kundumani	<i>Abrus precatorius</i>	8	0.05	-2.91	-0.16
27	Mosukkattan	<i>Passiflora foetida</i>	7	0.05	-3.04	-0.14
28	Perandai	<i>Cissus quadrangularis</i>	10	0.07	-2.69	-0.18

29	Kandakathari	<i>Solanum xanthocarpum</i>	8	0.05	-2.91	-0.16
30	Arugam Pill	<i>Cynodon dactylon</i>	9	0.06	-2.79	-0.17
31	paspalum	<i>Paspalum quadrifarium</i>	8	0.05	-2.91	-0.16
H (Shannon Diversity Index) =2.88						

Table 3.21 Species Richness (Index) in 300m Radius

Details	H	H max	Evenness	Species Richness
Tree	2.07	2.08	1.00	1.82
Herbs	1.61	1.61	1.00	1.08
Shrubs	2.88	2.89	1.00	3.41

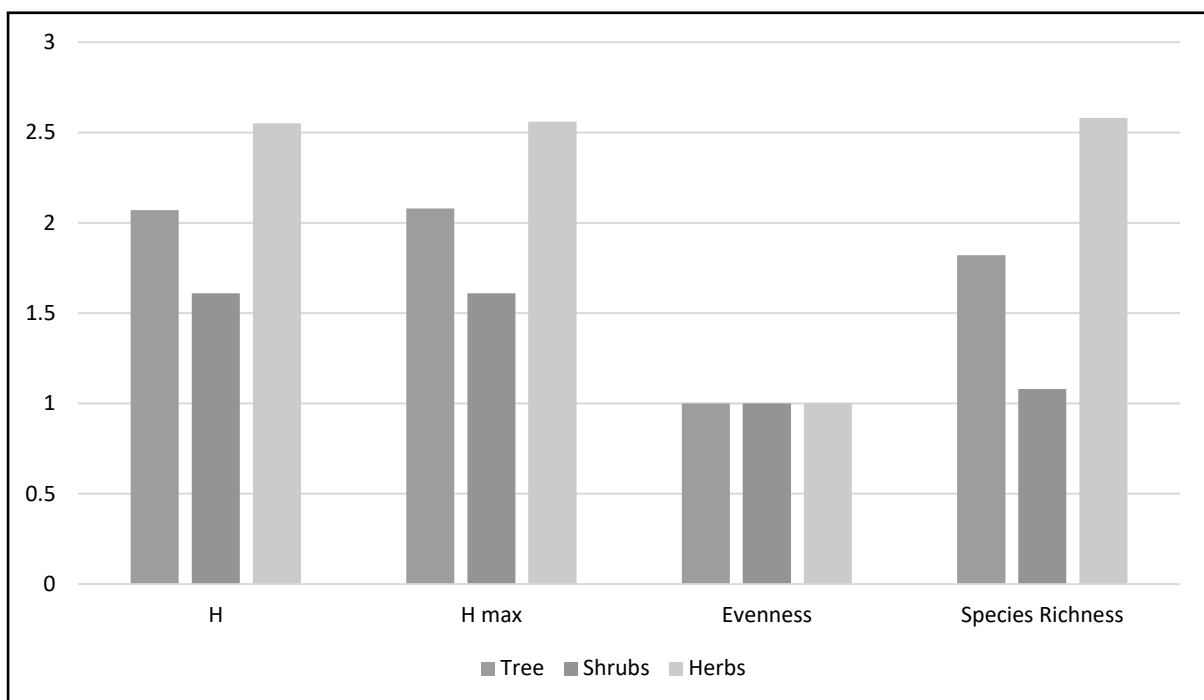


Figure 3.28 Floral Diversity Species Richness (Index) 300m Radius

From the above, it can be interpreted that herb community has higher diversity. While the tree community shows less diversity. It is also observed that most of the quadrates have controlled generation of plant species with older strands. Higher herb species diversity can be interpreted as a greater number of successful species and a more stable ecosystem where more ecological niches are available, environmental change is less likely to be damaging to the ecosystem as a whole. Species richness is high for herb community when compared with tree and shrubs.

Table 3.22 Flora in 10km radius

S.No	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Vembu	<i>Azadirachta indica</i>	Meliaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
2	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
3	Karuvelam	<i>Acacia nilotica</i>	Mimosaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
4	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
5	Puliyamaram	<i>Tamarindus indica</i>	Legumes	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
6	Athi	<i>Ficus recemosa</i>	Moraceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
7	Vazhaimaram	<i>Musa</i>	Musaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
8	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
9	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
10	Perumungil	<i>Bambusa bambos</i>	Poaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
11	Karungali	<i>Acacia sundra</i>	Legumes	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
12	Sapota	<i>Manilkara zapota</i>	Sapotaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
13	Eucalyptus	<i>Eucalyptus globules</i>	Myrtaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
14	Navalmaram	<i>Sygygium cumini</i>	Myrtaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
15	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	8	7	10	0.8	70.0	1.1	4.7	5.0	9.7	Not Listed
16	Alamaram	<i>Ficus benghalensis</i>	Moraceae	3	2	10	0.3	20.0	1.5	1.8	1.4	3.2	Not Listed
17	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
18	Manga	<i>Mangifera indica</i>	Anacardiaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
19	Thekku	<i>Tectona grandis</i>	Verbenaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
20	Nelli	<i>Embllica officinalis</i>	Phyllanthaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
21	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
22	Vadanarayani	<i>Delonix elata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
23	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed

24	Pappali maram	<i>Carica papaya L</i>	Caricaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
25	Nochi	<i>Vitex negundo</i>	Verbenaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
26	Vilvam	<i>Aegle marmelos</i>	Rutaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
27	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
28	Koyya	<i>Psidium guajava</i>	Myrtaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
29	Seethapazham	<i>Annona reticulata</i>	Annonaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
30	Vagai	<i>Albizia lebeck</i>	Fabaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
31	Teaku	<i>Tectona grandis</i>	Lamiaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
32	Teanai Maram	<i>Cocos nucifera</i>	Arecaceae	3	2	10	0.3	20.0	1.5	1.8	1.4	3.2	Not Listed
Shrubs													
33	Avarai	<i>Senna auriculata</i>	Fabaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
34	Sundaika	<i>Solanum torvum</i>	Solanaceae	9	8	15	0.6	53.3	1.1	8.6	8.8	17.4	Not Listed
35	Arali	<i>Nerium indicum</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
36	Idlipoo	<i>Xorococ cineia</i>	Rubiaceae	6	5	15	0.4	33.3	1.2	5.7	5.5	11.2	Not Listed
37	Neermulli	<i>Hydrophila auriculata</i>	Acanthaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
38	Icham	<i>Phoenix pusilla</i>	Arecaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
39	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.7	5.5	11.2	Not Listed
40	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
41	Thuthi	<i>Abutilon indicum</i>	Meliaceae	9	8	15	0.6	53.3	1.1	8.6	8.8	17.4	Not Listed
42	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
43	Kundumani	<i>Abrus precatorius</i>	Fabaceae	6	5	15	0.4	33.3	1.2	5.7	5.5	11.2	Not Listed
44	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
45	Bulangan	<i>Gmelina asiatica L.</i>	Lamiaceae	9	8	15	0.6	53.3	1.1	8.6	8.8	17.4	Not Listed
46	mottled spurge	<i>Euphorbia lactea</i>	Euphorbiaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
Herbs, Climber, Creeper & Grasses													
47	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
48	Vetukaayapoondur	<i>Tridax procumbens</i>	Asteraceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
49	Koraikkilangu	<i>Cyperus articulatus</i>	Cyperaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
50	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
51	Manjal	<i>Curcuma longa</i>	Zingiberaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
52	Chempu	<i>Colocasia indica</i>	Araceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
53	Karisilanganni	<i>Eclipta prostrata</i>	Asteraceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
54	Korai	<i>Cyperus rotundus</i>	Cyperaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
55	Kunnakora	<i>Cyperus compressus</i>	Cyperaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed

56	Milagai	<i>Capsicum frutescens</i>	Solanaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
57	Kanamvazha	<i>Commelina benghalensis</i>	Commelinaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
58	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
59	Thumbai	<i>Leucas aspera</i>	Lamiaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
60	Parttiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
61	Mukurattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
62	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	11	10	20	0.6	50.0	1.1	3.9	4.0	7.9	Not Listed
63	Manathakkali	<i>Solanumnigrum</i>	Solanaceae	7	8	20	0.4	40.0	0.9	2.5	3.2	5.7	Not Listed
64	Kumipoondu	<i>Gomphrena celosioides</i>	Amaranthaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
65	Kattuthulasi	<i>Ocimum sanctum</i>	Lamiaceae	10	9	20	0.5	45.0	1.1	3.5	3.6	7.1	Not Listed
66	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
67	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
68	Mudakkotan	<i>Cardiospermum helicacabum</i>	Sapindaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
69	Karkakartum	<i>Clitoria ternatea</i>	Fabaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
70	Nannari	<i>Hemidesmus indicus</i>	Asclepiadaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
71	Kovakkai	<i>Trichosanthes dioica</i>	Cucurbitaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
72	Malli	<i>Jasminum augustifolium</i>	Oleaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
73	Musumusukkai	<i>Mukia maderaspatana</i>	Cucurbitaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
74	Mosukkattan	<i>Passiflora foetida</i>	Passifloraceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
75	Vallikeerai	<i>Ipomoea aquatica</i>	Convolvulaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
76	Siru puladi	<i>Desmodium triflorum</i>	Fabaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
77	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
78	Korai	<i>Cyperus rotandus</i>	Poaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
79	mookuthi poondu	<i>Wedelia trilobata</i>	Asteraceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
80	Nellu	<i>Oryza sativa</i>	Poaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
81	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	12	11	20	0.6	55.0	1.1	4.2	4.4	8.6	Not Listed
82	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
83	Arugampul	<i>Cynodon dactylon</i>	Poaceae	13	12	20	0.7	60.0	1.1	4.6	4.8	9.4	Not Listed
84	Sapathikalli	<i>Opuntia dillenii</i>	Cactaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed

3.5.2 Fauna

The faunal survey was carried out for Mammals, Birds, Reptiles, Amphibians and Butterflies. There are no rare, endangered, threatened (RET) and endemic species present in core area.

Table 3.23 Methodology applied during survey of fauna

S. No	Taxa	Method of Sampling	References
1	Insects	Random walk, Opportunistic observations	Pollard (1977); Kunte (2000)
2	Reptiles	Visual encounter survey (Direct Search)	Daniel J.C (2002)
3	Amphibians	Visual encounter survey (Direct Search)	
4	Mammals	Tracks and Signs	Menon V (2014)
5	Avian	Random walk, Opportunistic observations.	Grimmett R (2011); ALI S (1941)

The fauna is studied for 10 km radius around the project site. Project site and 2 km around the project site is considered as core zone and from 2 km to 10 km radius, it is considered as buffer zone.

Fauna Composition in the Core Zone

A total of 22 species belonging to 15 families were observed in the core zone (Table 3.24). Among them are 9 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Avian. None of these species are threatened or endemic in the study area and surroundings. There are no Schedule I species and 8 species are under schedule IV according to Indian wild life Act, 1972. There are no critically endangered, endangered, vulnerable and endemic species in the core zone.

Fauna Composition in the Buffer Zone

A total of 44 species belonging to 34 families were recorded from the buffer area. Among them were 20 species of Birds, 13 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Amphibians, as mentioned in Table 3.25. There are four species under Schedule II and twenty-six species under schedule IV according to Indian wild life Act 1972. And there are no critically endangered, vulnerable and endemic species in the buffer area. There is no schedule I Species in study area and there are no critically endangered, endangered, vulnerable and endemic species.

Table 3.24 Fauna in the Core zone

S. No.	Common name/EnglishName	FamilyName	Scientific Name	Schedule List Wildlife Protection Act, 1972	IUCN Red List data
INSECTS					
1	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	NL	NL
2	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
3	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
4	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
5	Stick insect	Lonchodidae	<i>carausius morosus</i>	NL	LC
6	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
7	Praying mantis	Mantidae	<i>Mantis religiosa</i>	NL	NL
8	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
9	Acraea violae	Nymphalidae	<i>Acraea violae</i>	NL	LC
REPTILES					
10	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
11	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
12	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
MAMMALS					
1	Indian Field Mouse	<i>Muridae</i>	<i>Mus booduga</i>	Schedule IV	NL
AVES					
1	Green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
2	Koel	Cuculidae	<i>Eudynamys</i>	Schedule IV	LC
3	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
4	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
5	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
6	Koel	Cuculidae	<i>Eudynamys scolopaceus</i>	Schedule IV	LC
7	Crow Pheasant	Cuculidae	<i>Centropus sinensis</i>	Schedule IV	LC
8	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
9	Grey drongo	Dicruridae	<i>Dicrurus leucophaeus</i>	Schedule IV	LC

Table 3.25 Fauna in the buffer zone

S. No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
INSECTS					
1	Tawny costar	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
3	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
4	Common Indian Crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
5	Green marsh hawk	Libellulidae	<i>Orthetrum sabina</i>	NL	LC
6	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
7	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
8	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
9	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
10	Lesser grass blue	Lycaenidae	<i>Zizina otis indica</i>	Schedule IV	LC
11	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
12	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
13	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
REPTILES					
1	Chameleon	Chamaeleonidae	<i>Chameleonzeylanicus</i>	Sch II (Part II)	LC
2	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
3	Green Vine snake	Colubridae	<i>Ahaetulla nasuta</i>	Schedule IV	LC
4	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
5	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
MAMMALS					
1	palmsquirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
2	Indian FieldMouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
3	Home mouse	Muridae	<i>Mus musculus tyleri</i>	NL	LC
AVES					
1	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
2	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
3	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
4	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotus cafer</i>	Schedule IV	LC
5	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
6	green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
7	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC
8	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
9	Blue Rock Pigeon	Columbidae	<i>Columba livia</i>	Schedule IV	LC
10	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC
11	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC

3.5.3 Aquatic Vegetation

The field survey for assessing the aquatic vegetation was also undertaken during the study period. The list of aquatic plants observed in the study area is given in table 3.26.

Table 3.26 Aquatic Vegetation

S. No.	Scientific Name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1	<i>Eichornia Crassipe</i>	Water Hyacinth	Agayatamarai	NA
2	<i>Aponogeton natans</i>	Floating Lace Plant	Kottikizhangu	NA
3	<i>Nymphaea Nouchali</i>	Blue Water Lily	Nellambal	LC
4	<i>Carex Cruciata</i>	Cross Grass	Koraipullu	NA
5	<i>Cynodon Dactylon</i>	Scutch Grass	Arugampullu	LC
6	<i>Cyperus Exaltatus</i>	Tall Flat Sedge	Koraikizhangu	LC

*Lc- Least Concern, Na-Not Yet Assessed

Food chain

The food chain in aquatic ecosystems often begins with the algae or phytoplankton producers, and then the zooplankton that feed on them. This type of food chain is found in nearby River by phytoplankton, zooplankton, fish and Artiola grey.

Ex: Phytoplankton → Zooplankton → small fish → large fish

Endangered and endemic species as per the IUCN Red List

There are no rare, endangered and endemic species found in the study area

3.5.4 Agriculture & Horticulture in Tiruvannamalai district

The pre-monsoon rainfall is almost uniform throughout the district. The coastal taluks get more rains rather than the interior regions. This district is mainly depending on the seasonal rains, the distress conditions prevail in the event of the failure of rains. Northeast and Southwest monsoon are the major donors with 54% and 36% contribution each to the total annual rainfall. Agriculture is the main occupation of the people with 20% of the population engaged in it. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals and Millets and Pulses are the other major crops. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals & Millets and Pulses are the other major crops cultivated.

3.5.4.1 Major Agricultural Crops 1km radius

Major horticulture crops cultivated in this district are vegetables crops like tomato, brinjal, chillies, onion and turmeric. Details of major field crops and horticulture in 1km radius is given in Table. 3.27.

Table 3.27 Major Crops in 1km radius

S. No	Major crops	Scientific name	Families
1	Sorghum	<i>Sorghum bicolor</i>	Poaceae
2	Gingelly	<i>Sesamum indicum</i>	Pedaliaceae
3	Groundnut	<i>Arachis hypogaea</i>	Legumes
4	Sugarcane	<i>Saccharum officinarum</i>	Poaceae
5	Proso Millets	<i>Panicum miliaceum L</i>	Poaceae
6	Cotton	<i>Gossypium herbaceum</i>	Malvaceae

3.5.4.2 Major Horticulture Crops 1km radius

Horticulture includes cultivation of fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. It also includes plant conservation, landscape restoration, landscape and garden design.

3.5.4.3 Horticulture 1km radius

Major horticulture crops cultivated in Tiruvannamalai district are fruit crops like mango, banana, Sapota and guava, vegetables like tomato, brinjal, Veandai, chillies, onion and tapioca, spices like turmeric. Details of major field crops and horticulture cultivation in 1km radius is given in Table 3.28.

Table 3.28 Major Field Crops & Horticulture cultivation in 1km radius.

S. No	Common Name	Scientific Name	Family
Major Horticultural Crops			
1	Guava	<i>Psidium guajava</i>	Myrtaceae
2	Sapota	<i>Manilkara zapota</i>	Sapotaceae
3	Lemon	<i>Citrus × limon</i>	Rutaceae
4	Papaya	<i>Carica papaya</i>	Caricaceae
Vegetables			
5	Onion	<i>Allium cepa</i>	Amaryllidaceae
6	Tapioca	<i>Manihot esculenta</i>	Spurges
7	Brinjal	<i>Solanum melongena</i>	Nightshade
8	Tomato	<i>Solanum lycopersicum</i>	Nightshade
9	Bottle Gourd	<i>Lagenaria siceraria</i>	Cucurbits
10	Veandai kai	<i>Abelmoschus esculentus</i>	Mallows
11	Moringa	<i>Moringa oleifera</i>	Moringaceae

Results

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. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any. The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species.

Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.6 SOCIO-ECONOMIC ENVIRONMENT

The major developmental activities of the mining and industrial sector are crucial for economic development and the creation of direct and indirect employment opportunities. These activities also fulfil society's basic and modern needs of the society, ultimately improving the quality of life through advancements in social, economic, health, education, and nutritional status within the project region, state, and country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for developmental projects. Thus, the study of socio-economic environment component incorporating various sides related to prevailing social and cultural conditions and economic status of the rough stone mining quarries project region is an important part of the 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.

3.6.1 Objectives of the Study

The objectives of the socio-economic impact assessment are as follows:

- a) To study the socio-economic status of the people living in the study area of the project.
- b) To identify the basic needs of the nearby villages within the study area.
- c) To assess the impact on socio-economic environment due to the project.
- d) To provide the employment and improved living standards.
- e) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

3.6.2 Methodology

The study employed cluster sampling to outline two zones around the proposed project site: Zone 1 (Core Zone, 0-1 km radius) and Zone 2 (Low Impact Zone, 1–5 km radius). The primary data collection was conducted through structured interviews, field observation, and focus group discussions with the local people of in Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The secondary data were collected from the Census report 2011 and official records, covering demographics and basic services including information on population, number of households, literacy rates, sex ratios, worker details and the availability of basic services. This study covers the positive and negative impacts of the project's establishment, and provides recommendations for analysing and mitigating adverse effects. The study areas are illustrated in Figure 3.29.

3.6.3 Demographic Profile of Tiruvannamalai District

Tiruvannamalai District is geographically bounded by Vellore and Ranipet districts to the north, Tirupathur district to the west, Kallakurichi district to the south, Chengalpattu district to the east, Villupuram district to the southeast, and Kanchipuram district to the northeast. Administratively, the district is divided into 12 taluks, which are further subdivided into 18 blocks, comprising a total of 860 villages. According to the 2011 Census, Tiruvannamalai District had a total population of 2,464,875, of which 1,235,889 were males and 1,228,986 were females respectively. In comparison, the 2001 Census recorded a population of 2,186,125, including 1,095,859 males and 1,090,266 females, indicating a significant population growth over the decade. This indicates a population growth of approximately 12.8 percent over the decade, reflecting steady demographic expansion in the district.

The average literacy rate of the district in 2011 was 84.41%, with male literacy at 90.80% and female literacy at 78.13%. In terms of the number of literates, there were 1,626,813 literate individuals, comprising 909,803 males and 717,010 females. However, gender disparities in education remain evident, as the male and female literacy rates stood at 81.18% and 62.05%, respectively. The sex ratio in Tiruvannamalai District was 994 females per 1000 males in 2011, showing a marginal decline from 995 in 2001, yet remaining considerably higher than the national average of 940. The child sex ratio was 930 females per 1000 males in 2011, reflecting a decrease from 948 in 2001, suggesting a continuing gender imbalance among the child population. The demographic characteristics of Tiruvannamalai District reflect moderate population growth, improving literacy levels, and a relatively balanced adult sex ratio, though

the decline in the child sex ratio highlights the need for sustained gender-sensitive interventions and continued focus on educational equity and social awareness.

Source: <https://www.census2011.co.in/census/district/26-tiruvannamalai.html>

3.6.4 Profile of Kundiyanthandalam Village

Kundiyanthandalam is a medium size village located in Vembakkam Taluk of Tiruvannamalai district, Tamil Nadu with total 170 families residing. The Kundiyanthandalam village has population of 703 of which 351 are males while 352 are females as per Population Census 2011.

In Kundiyanthandalam village population of children with age 0-6 is 71 which makes up 10.10 % of total population of village. Average Sex Ratio of Kundiyanthandalam village is 1003 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Kundiyanthandalam as per census is 972, higher than Tamil Nadu average of 943. Kundiyanthandalam village has lower

literacy rate compared to Tamil Nadu. In 2011, literacy rate of Kundiyanthandalam village was 74.68 % compared to 80.09 % of Tamil Nadu. In Kundiyanthandalam Male literacy stands at 83.17 % while female literacy rate was 66.25 %. In Kundiyanthandalam village, most of the villagers are from Schedule Caste (SC). Schedule Caste (SC) constitutes 54.20 % of total population in Kundiyanthandalam village. The village Kundiyanthandalam currently doesn't have any Schedule Tribe (ST) population. In Kundiyanthandalam village out of total population, 254 were engaged in work activities. 38.19 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 61.81 % were involved in Marginal activity providing livelihood for less than 6 months. Of 254 workers engaged in Main Work, 4 were cultivators (owner or co-owner) while 2 were Agricultural labourer, as presented in Table 3.29.

Table. 3.29 Demographic Status of Kundiyanthandalam Village

Particulars			
	Total	Male	Female
Total No. of Houses	170	-	-
Population	703	351	352
Child (0-6)	71	36	35
Schedule Caste	381	182	199
Schedule Tribe	-	-	-
Literacy	74.68%	83.17%	66.25%
Total Workers	254	200	54
Main Worker	97	-	-
Marginal Worker	157	124	33

Source: <https://www.census2011.co.in/data/village/631256-kundiyanthandalam-tamil-nadu.html>

3.6.5 Workforce Participation in the study area

Workforce participation patterns in the study villages reveal notable differences in the nature and extent of employment. In Kundiyanthandalam village, a total of 254 individuals from were engaged in economic activities. Of these, 38.19% were classified as main workers those employed or earning for more than six months during the reference period while a higher proportion (61.81%) were involved in marginal work, indicating irregular or seasonal employment lasting less than six months. Among the main workers, 4 individuals were identified as cultivators (owners or co-owners of land), and 2 individuals were engaged as agricultural labourers, suggesting limited participation in agriculture-based occupations.

In contrast, Mangalam village exhibited a stronger engagement in stable employment. Out of 108 working individuals, a substantial 91.67% were categorized as main workers, with only 8.33% involved in marginal work. Among the main workers, 13 were cultivators (owners or co-owners) and 44 were agricultural labourers, reflecting a greater dependency on agriculture compared to Kundiyanthandalam village. The analysis indicates a higher proportion of stable and agriculture-based employment in Poonathangal, whereas Kundiyanthandalam demonstrates

a predominance of marginal and possibly non-agricultural or seasonal employment. These differences may reflect variations in local resource availability, land ownership patterns, and access to non-farm employment opportunities.

Project Benefits:

The local people have been provided with either direct employments or indirect employment such as business, contract works and development work like roads, etc. and other welfare amenities such as medical facilities, conveyance, free education, drinking water supply etc. The number of villages and human settlements within a radius of 5 km from the project site along with population, their education level etc.

Table 3.30 presents detailed demographic, social, and economic indicators for villages in the study area. The study area comprises 43 villages, with total population of these villages varies considerably, ranging from small settlements such as Dharmacheri (34 residents) and Poonathangal (120 residents) to larger villages like Thenambakkam (4722 residents) and Orikkai (2310 residents). Children aged 0–6 generally account for approximately 8–12% of the total population, indicating a relatively young demographic profile in most villages.

Literacy levels show notable variation across the villages. Larger villages such as Thenambakkam, Magaral, and Elacheri exhibit high numbers of literates, whereas smaller villages such as Poonathangal, Girijapuram, and Dharmacheri report lower literacy levels, reflecting both population size and access to educational facilities. Male literacy consistently exceeds female literacy across the dataset, highlighting ongoing gender disparities in educational attainment.

Workforce participation also varies widely. In larger villages such as Thenambakkam (2789 male workers; 1269 female workers) and Magaral (758 male; 637 female), a significant proportion of the population is engaged in work activities, whereas smaller villages like Dharmacheri and Poonathangal have fewer workers. Across most villages, male workforce participation surpasses female participation, reflecting prevailing social norms and gender-based constraints on employment. The study findings revealed that considerable heterogeneity among the villages in terms of population size, literacy, workforce engagement, and social composition. However, gender disparities in education and employment underscore the need for targeted interventions to enhance female literacy and economic participation. Additionally, the concentration of SC populations in certain villages highlights the importance of caste-sensitive development policies to promote social and economic inclusivity.

Table 3.30 Demographic Structure and Literacy Rate of the villages (5 km radius)

Village Name	No. of Houses	Total Population		Child (0-6)		Schedule Caste		Schedule Tribe		No of Literates		Total Workers	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Orikkai	1020	2310	2297	267	262	416	459	35	31	1709	1378	1469	742
Chinnaiyankulam	282	615	684	83	90	243	253	8	5	410	372	355	165
Thenambakkam	2090	4722	4635	587	550	709	700	97	102	3347	2604	2789	1269
Abdullapuram	456	1062	1016	145	150	155	161	0	0	797	592	657	410
Koyambakkam	49	120	108	16	14	0	0	0	0	72	49	67	49
Dusi	1106	2570	2546	367	351	43	27	37	28	1799	1221	1637	1221
Kuruvimalai	312	649	651	84	77	13	12	21	19	440	325	412	172
Vitchanthangal	200	414	414	47	51	157	144	3	3	267	173	256	159
Kalur	653	1470	1440	218	194	248	269	0	2	949	569	927	671
Kalakattur	330	714	703	76	98	0	0	0	0	436	300	460	347
Vedal	169	386	364	68	52	3	2	16	16	184	133	240	180
Kuranganilmuttam	133	337	304	31	32	267	234	0	0	272	172	215	118
Pallavaram	387	865	825	109	106	188	183	26	20	579	341	513	362
Kanikilluppai	169	389	393	45	45	307	314	0	0	283	223	246	130
Kolathur	75	175	175	19	27	175	175	0	0	120	84	101	89
Kilnaickenpalayam	150	315	318	38	29	166	157	0	0	244	192	195	134
Seniyanallur	103	234	247	22	27	0	0	0	0	199	114	144	114
Mamandur	847	2022	1983	261	263	191	169	20	18	1506	990	1233	770
Kundiyanthandalam	170	364	351	39	42	185	174	0	0	273	173	215	133
Perumanallur	85	172	188	24	27	3	6	3	5	121	90	99	78
Vadakalpakkam	280	639	577	75	56	310	280	3	3	527	373	395	328
Nelveli	134	301	277	45	38	247	214	0	0	132	91	172	118
Valavandal	84	171	183	24	26	33	26	0	0	119	93	110	101
Arpakkam	599	1328	1304	203	203	708	716	107	90	775	454	738	502
Narasamangalam	300	781	766	109	118	4	3	24	22	536	327	431	297
Thalaiyillaperumbakkam	87	163	178	22	23	0	0	54	52	89	73	102	51
Alinjalpattu	188	431	448	72	69	124	137	0	0	338	299	249	184

Girijapuram	56	110	109	15	7	0	0	0	0	91	90	61	77
Suruttal	272	635	606	73	62	8	5	0	0	531	358	366	248
Menallur	307	610	642	72	80	298	278	0	0	444	357	394	318
Poonaitthangal	72	120	120	15	8	0	0	0	0	102	66	71	24
Mathur	395	1010	962	132	113	111	99	0	0	676	395	576	411
Sodiyambakkam	256	602	573	69	57	176	157	0	0	444	279	334	213
Magaral	590	1234	1279	196	168	780	773	21	23	757	591	758	637
Bagavandapuram	152	360	349	45	38	1	3	0	0	232	152	213	133
Mangal	173	359	374	55	55	170	164	14	12	235	171	197	163
Elacheri	429	1010	953	129	106	377	333	0	0	627	375	574	466
Sithalapakkam	128	284	283	43	43	12	17	0	0	140	64	173	37
Pavoor	270	602	639	90	81	449	469	0	0	389	328	362	345
Arasanipalai	227	514	481	80	66	174	148	0	0	272	134	324	313
Vailathur	107	244	241	31	34	163	158	0	0	156	109	141	113
Punnai	158	352	335	54	46	123	121	0	3	221	128	206	166
Dharmacheri	12	13	21	1	1	0	0	0	0	5	3	8	8

Source: Tamil Nadu districts Census Reports – 2011.

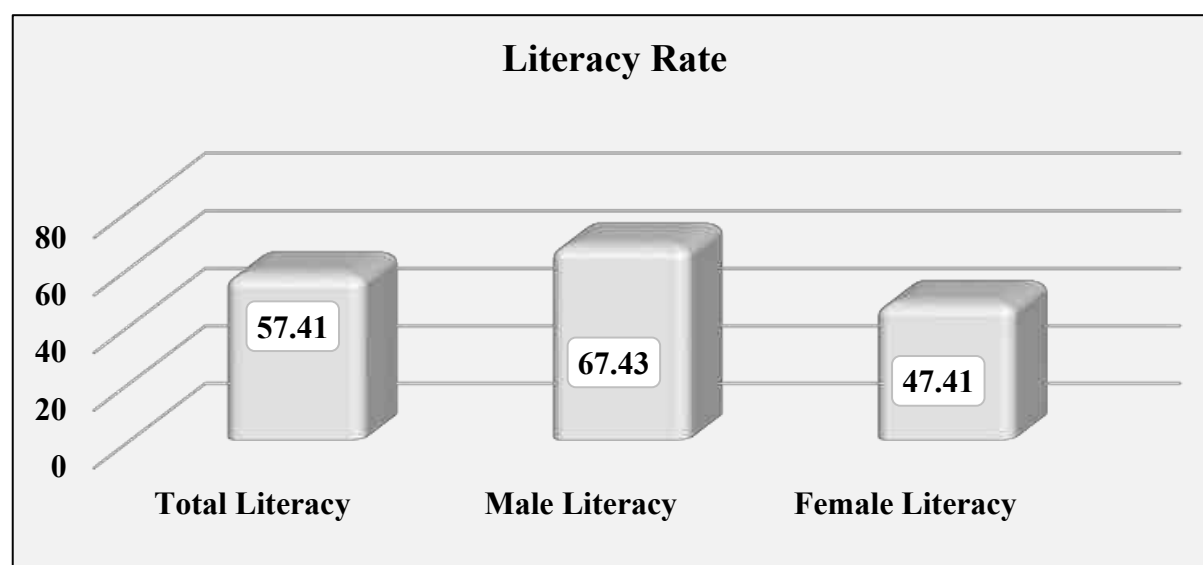
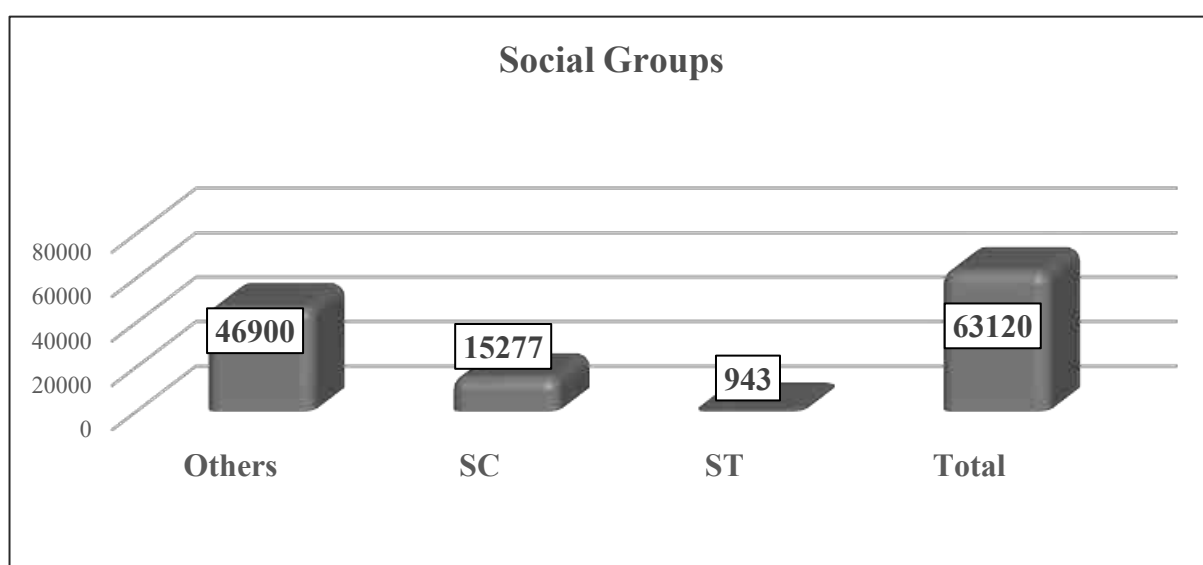
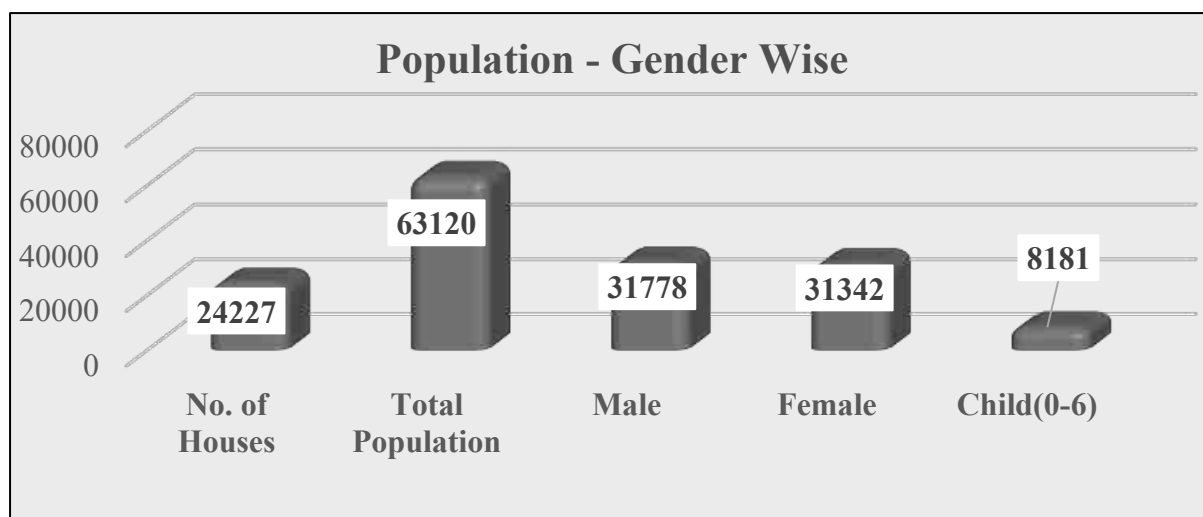


Figure 3.30: Demographic Details – Population, Social Groups, and Literacy Rate in the Study Villages

Table 3.31 Details of Workforce Participation of the Study Area

Village Name	Total Worker	Total Male Workers	Total Female Workers	Main Workers	Main Cultivators	Main Agricultural Labourers	Other Workers	Non-Workers
Orikkai	2211	1469	742	2034	53	15	831	2396
Chinnaiyankulam	520	355	165	247	7	5	147	779
Thenambakkam	4058	2789	1269	3436	73	438	1734	5299
Abdullapuram	1067	657	410	651	15	8	520	1011
Koyambakkam	116	67	49	115	14	86	15	112
Dusi	2858	1637	1221	2160	100	429	385	2258
Kuruvimalai	584	412	172	554	47	60	160	716
Vitchanthangal	415	256	159	197	31	18	102	413
Kalur	1598	927	671	1243	266	568	307	1312
Kalakattur	807	460	347	732	133	309	88	610
Vedal	420	240	180	240	26	27	129	330
Kuranganilmuttam	333	215	118	309	62	197	49	308
Pallavaram	875	513	362	538	89	97	169	815
Kanikilluppai	376	246	130	263	30	210	7	406
Kolathur	190	101	89	189	30	133	25	160
Kilnaickenpalayam	329	195	134	251	80	58	97	304
Seniyanallur	258	144	114	258	104	153	1	223
Mamandur	2003	1233	770	1987	557	772	388	2002
Kundiyanthandalam	348	215	133	92	1	1	90	367
Perumanallur	177	99	78	173	42	101	27	183
Vadakalpakkam	723	395	328	713	318	190	167	493
Nelveli	290	172	118	45	21	6	18	288

Valavandal	211	110	101	211	50	150	9	143
Arpakkam	1240	738	502	1087	128	414	544	1392
Narasamangalam	728	431	297	84	20	5	57	819
Thalaiyillaperumbakkam	153	102	51	150	8	55	82	188
Alinjalpattu	433	249	184	261	116	20	95	446
Girijapuram	138	61	77	134	70	58	6	81
Suruttal	614	366	248	612	177	259	142	627
Menallur	712	394	318	688	160	413	107	540
Poonaihangal	95	71	24	88	14	40	33	145
Mathur	987	576	411	847	314	268	169	985
Sodiyambakkam	547	334	213	468	190	137	79	628
Magaral	1395	758	637	972	230	439	298	1118
Bagavandapuram	346	213	133	345	201	99	17	363
Mangal	360	197	163	72	7	5	60	373
Elacheri	1040	574	466	950	373	380	163	923
Sithalapakkam	210	173	37	204	115	36	46	357
Pavoor	707	362	345	589	168	327	93	534
Arasanipalai	637	324	313	633	344	261	27	358
Vailathur	254	141	113	249	97	119	31	231
Punnai	372	206	166	235	123	33	79	315
Dharmacheri	16	8	8	14	2	7	5	18

Source: <https://censusindia.gov.in/nada/index.php/catalog/45345>

3.6.6 Workforce Participation

The table 3.31 presents an in-depth breakdown of workforce characteristics across villages in the study area of district. The workforce participation across the villages in the study area exhibits significant variability in both size and composition. Total workers range from a minimal 16 in Dharmacheri to as high as 4,058 in Thenambakkam, indicating substantial differences in population size and labor engagement among the villages. Male workers consistently outnumber female workers in nearly all villages, highlighting a pronounced gender disparity in workforce participation. Main workers constitute the majority of employed individuals, reflecting a workforce largely engaged in sustained economic activities rather than marginal or seasonal work.

Agriculture remains the primary occupation, with many individuals employed as cultivators or agricultural labourers. Villages such as Mamandur, Kalur, Magaral, and Thenambakkam have a notable proportion of their workforce involved in cultivation and agricultural labour, underscoring the agrarian nature of the local economy. Non-agricultural employment, classified as ‘other workers,’ is relatively limited, suggesting low economic diversification and limited availability of alternative income sources.

The number of non-workers is substantial in most villages, particularly larger ones, indicating high dependency ratios and a significant portion of the population reliant on the working population for livelihood. Smaller villages, such as Kundiyanthandalam, Mangal, and Dharmacheri, exhibit low workforce numbers, which may reflect either limited local employment opportunities or demographic factors such as higher proportions of children and elderly residents.

Finally, the detailed information indicated a predominantly agrarian economy characterized by gender disparities in employment, a high reliance on agricultural work, and a substantial non-working population. These patterns highlight the need for targeted interventions to promote female workforce participation, diversify economic opportunities, and enhance sustainable livelihoods beyond agriculture.

The data reveals a predominantly agrarian workforce of 31,751 people, with males (19,185) outnumbering females (12,566). Most workers (25,320) are engaged in main employment, primarily in agriculture, with 5,006 cultivators and 7,406 agricultural laborers. Non-agricultural workers number 7,598, indicating some economic diversification. The non-working population is almost as large as the workforce (31,369), reflecting a high dependency

ratio. The notable gender gap points to socio-cultural barriers limiting female participation in the workforce.

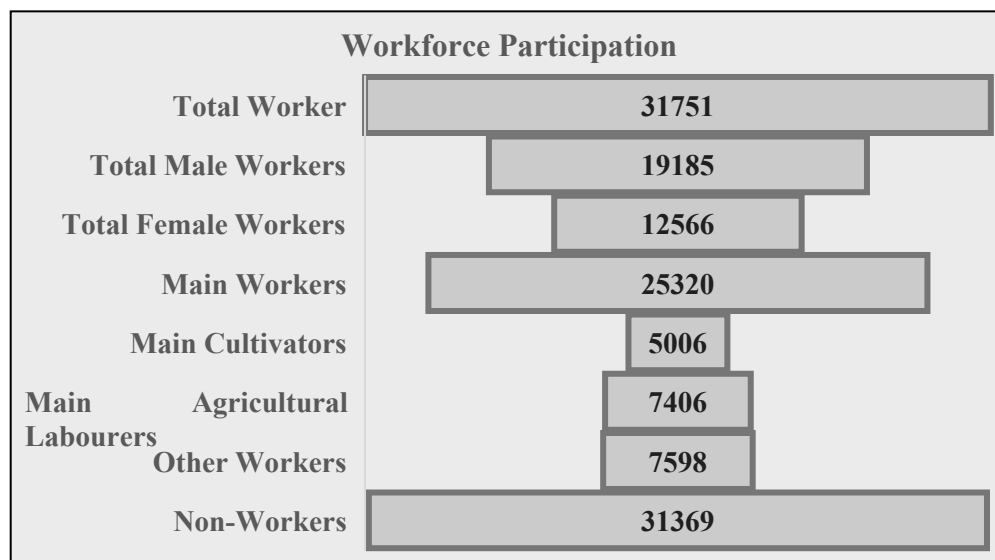


Figure 3.31 Details of Workforce participation in the Study Villages

Additionally, the study finds that while certain villages are progressing with diverse employment and better gender inclusion, others remain heavily reliant on agriculture and have limited workforce engagement. Encouraging non-farm employment, particularly in rural and semi-urban areas, could bridge economic disparities. Skill development programs for women and youth, infrastructure enhancement, and local job creation through MSMEs or agro-processing units would help balance workforce participation and stimulate rural development across the district.

CSR and DMR funds for Development

As per SEAC recommendation the project proponent should spend minimum of 5 lakhs to the nearby school from the proposed project site as part of CER cost. Also, the village panchayat will get direct benefit from the government through District mineral Resource fund (DMF) for infrastructure development activities.

- ❖ Awareness and Opinion of the People About the Project, to assess public awareness and opinions regarding the proposed project, the following key observations were recorded:
- ❖ During the survey, it was observed that only residents of nearby villages were aware of the proposed project, while those in more distant villages were largely unaware.
- ❖ People in the region expressed expectations that the project would generate employment opportunities and lead to improvements in education, transportation, and sanitation facilities provided by the project authorities.

Recommendation and Suggestions

The village development plans are made in consultation with the community through Gram Sabha; these appear to address the needs of the community. However, it may be noted that at the implementation stage these plans often are fraught with problem of inadequate funds, lack of proper planning, corruption, vested interests and political agendas. Hence while ascertaining the scope for convergence with the government activities, care must be taken to ascertain realistic possibilities for implementation.

- Women empowerment: Home based income generation activities, vocational training programs and common education centre for increasing the literacy rate.
- Education: Free uniform, construction of common rooms and library, computer education and physical education, furniture and equipment in schools, up-gradation of existing school infrastructure through the CSR funds.
- Agriculture/livestock: Infrastructure such as agricultural practices, electricity connections, assistance with buying improved tools and equipment, capacity building, supply and/or knowledge of better variety of seeds, pasture land development and trainings on animal husbandry & facility of veterinary doctor.
- Health: Improvements in sanitary conditions of villages, assistance with construction of latrines, improvement in drainage system, health camps and awareness campaigns for diseases like common cold, malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of PHCs and Anganwadi centres.
- People with disability: Establishment of centre for special education, sensitization of the community towards disabled and awareness on Government schemes.
- Marginalized Communities and Vulnerable Groups: While Developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.
- Connectivity: Transport connectivity to easiness accessibility to the region.
- Greenbelt: Establish a greenbelt and plant saplings around quarry boundaries, village schools, and village roads.

While developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.

3.6.7 Conclusion

This study was carried out the baseline socio-economic conditions of the study area. It examined parameters including the population, number of households, literacy rate, sex ratio, workforce details, and the availability of essential amenities like transportation, drinking water, road connectivity, and educational facilities in the study area. The study revealed both positive and negative socio-economic implications associated with the proposed project and cluster quarries. While potential environmental and social impacts must be addressed, the project is expected to provide significant economic benefits in terms of local employment and improved livelihood opportunities in directly and indirectly.

Therefore, with the implementation of effective mitigation and management measures, the project can contribute positively to the socio-economic development of the area while minimizing adverse impacts.

3.7 TRAFFIC DENSITY

The traffic survey conducted based on the transportation route of material, the Rough Stone and gravel is proposed to be transported mainly through Village Road and SH -118A (Kanchipuram – Uthiramerur) and NH - 48 (Chennai – Vellore) as shown in Table 3.32- 3.35 and in Figure 3.32. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Table 3.32 Traffic Survey Locations

Station Code	Road Name	Distance and Direction
TS1	Retteri Village Road	1.52km - West
TS2	SH -118A (Kanchipuram – Uthiramerur)	4.1km - NE
TS3	NH - 48 (Chennai – Vellore)	20.80km - N

Source: On-site monitoring by GTMS FAE & TM

Table 3.33 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	33	99	40	40	55	28	167
TS2	65	195	72	72	80	40	307
TS3	80	240	102	102	125	62	404

Source: On-site monitoring by GTMS FAE & TM

** PCU conversion factor: HMV (Trucks and Bus) = 3, LMV (Car, Jeep and Auto) = 1 and 2/3 Wheelers = 0.5*

Table 3.34 Rough Stone Transportation Requirement

Transportation of Rough Stone Per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	144	432

Source: Approved Mining Plan

Table 3.35 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
TS1	167	432	599	1200
TS2	307	432	739	1200
TS3	404	432	836	1500

Source: On-site monitoring analysis summary by GTMS FAE & TM

- Due to these projects the existing traffic volume will not exceed the traffic limit. As per the IRC 1960 this existing village road can handle 1,200 PCU in hour and Major district road can handle 1500 PCU in hour. Hence there will not be any conjunction due to this proposed transportation

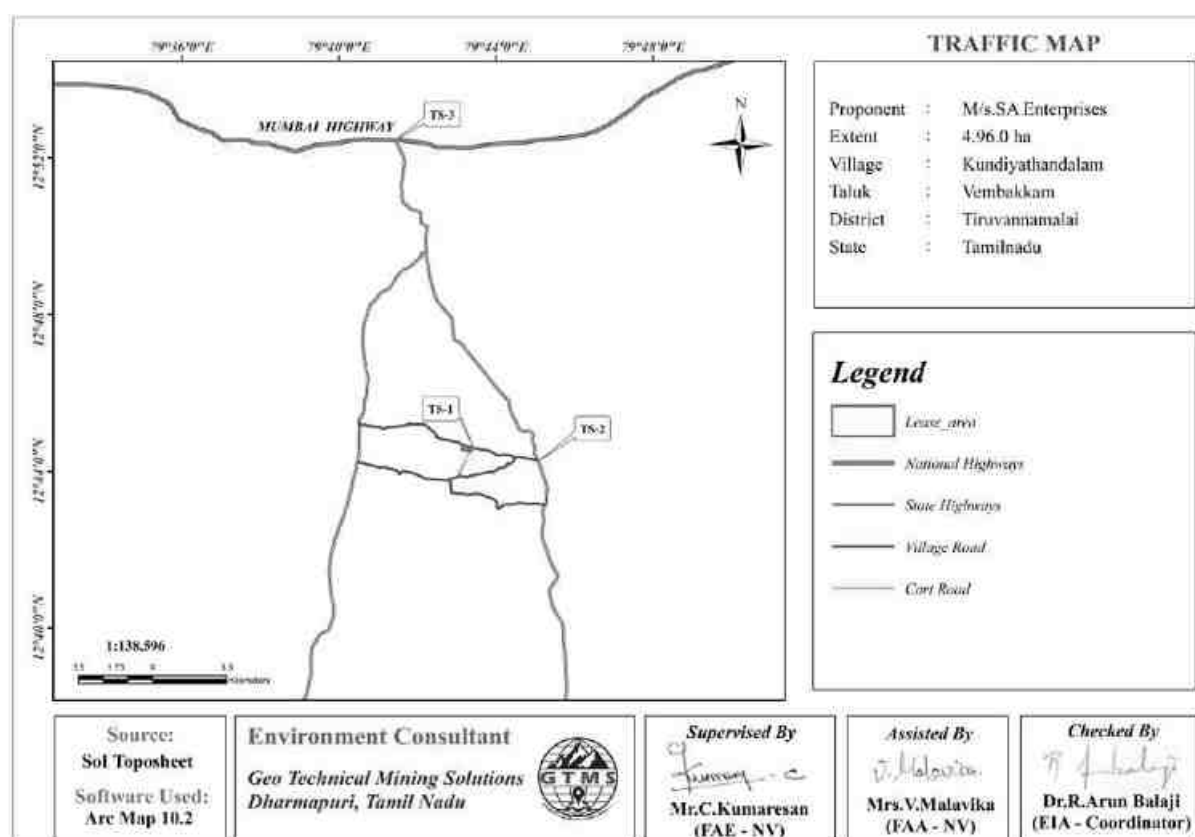


Figure 3.31 Traffic Density Map

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries and National Park within 10 km radius. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environmentally sensitive areas around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Table 3.36.

Table 3.36 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	Karikili Bird Sanctuary	20.16km SE
2	Reserve Forest	Marudham RF	9.28km SE
		Edamachi RF	15.93Km SE
		Kavanipakkam RF	16.26km E
		Perugoli RF	17.36km SE
		Vadakkupattu RF	23.69km E
		Thandappan Thangal RF	19.74km W
		Pullavakkam RF	24.31km W
		Venguam RF	25.7km NW
		Banavaram RF	38.05km South
3	Lakes/ Reservoirs/ Dams/Streams/Rivers	Cheyyar River	4.43km SE
		Palar River	4.80km NE
		Kundiyanthandalam Tank	0.52km N
		Suruttal Big Tank	0.16km E
		Elacheri Chitheri	2.15km S
		Mamandur Lake	5.70km W
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Densely Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet



Figure 3.32 Field Study Photographs

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

The identification of potential environmental impacts is indeed the crucial first step in the Environmental Impact Assessment (EIA) process utilizing various techniques such as checklists, matrices and network diagrams to understand a project's effects. The matrix method used in this study provides a structured way to identify and assess the impacts ensuring the project can be implemented in an eco-friendly manner. This chapter discusses the anticipated impacts on land, soil, water, air, noise, biological and socioeconomic environments.

The proposed stone mining project involves blasting, drilling and screening operations which contribute to environmental impacts is given in Table 4.1. The project is designed to minimize these impacts by implementing mitigation measures and ensuring a marginal environmental footprint with a detailed analysis to follow in subsequent tables.

Table 4.1 Impact identification matrix.

Activities	Environmental Attributes								OHS
	Land	Soil	Water	Air	Noise	Ecology	Socio Economics	Aesthetics	
Site clearing & Site services	√	√		√		√			
Development of Greenbelt						√		√	
Operation Phase (Drilling, Blasting Loading and unloading, Transportation)	√	√		√	√	√			√
	√	√		√	√	√			√
	√	√		√	√	√			√
Employment and the material usage							√		
Mine closure (Removal of machineries, structures and Danger due to inadvertent entry)				√	√		√		√

√ Indicates Impact

4.1 LAND ENVIRONMENT

Anticipated Impacts

- ❖ Converting barren land of 4.96.0hectares to rough stone and gravel mining creates a significant and usually irreversible change in land use and land cover involving the physical alteration of the land's surface, potential deforestation, loss of biodiversity, altered topography from pits and spoil dumps.
- ❖ Heavy vehicle movement causes significant problems to nearby agriculture and human habitation. These pollutants can degrade soil quality and introduce heavy metals into the environment.
- ❖ During transportation the tippers damage the bituminous roads. The primary damage is caused by the fourth power law (*The law posits that if you double an axle's load, the damage caused to the pavement increases by a factor of 2x4 or 16 times*) where pavement damage increases with the fourth power of the axle load. The immense weight of heavy payloads on an axle exerts a concentrated and repetitive stress on the road surface leading to permanent strain, premature failure and a cumulative damage.
- ❖ Rain drops hitting stone crushing waste can break apart the particles and flowing water detaches them from the surface transports and redeposits these particles especially from sloped surfaces. This a form of splash erosion followed by sheet erosion which can lead to environmental issues.

Mitigation measures

- ❖ After mining there is a huge void of 3.37.35hectares upto a depth of 60m is useful for rain water storage structure has an advantage for local farmers. The artificial pond boundary shall be fences to avoid any mishaps.
- ❖ Union ministry of road transport and highways on July 16th 2018 increased the maximum cap of axle load limit by 20 to 25 percent cross various categories to keep the limit “at par with international standards”.

Maximum Safe Axle Weight		
Sl. No.	Axle Type	Maximum Safe Axle Weight
1.	Single Axle	
1.1	Single Axle with single Tyre	3.0 tonnes
1.2	Single Axle with two Tyres	7.5 tonnes
1.3	Single Axle with four Tyres	11.5 tonnes*
2.	Tandem Axles (Two axles) (where the distance between two axles is less than 1.8 Mtr.)	
2.1	Tandem axle for rigid vehicles, trailers and semi-trailers	21 tonnes*
2.2	Tandem axle for Puller tractors for hydraulic and pneumatic trailers	28.5 tonnes
3.	Tri-axes (Three axles) (where the distance between outer axles is less than 3 Mtr.)	
3.1	Tri-axle for rigid vehicles, trailers and semi-trailers	27 tonnes*
4.	Axle Row (two axles with four tyres each) in Modular Hydraulic trailers (9 tonnes load shall be permissible for single axle)	18 tonnes
* Note: If the vehicle is fitted with pneumatic suspension, 1 tonne extra load is permitted for each axle.		

MoRTH knows that previously built Indian roads are made keeping standard axle loads. The new national and state highways along with expressways can be built by using new norms but for the existing roads the life will be reduced on average by one year.

- ❖ 6-wheel tipper generally has a maximum legal speed limit which can be up to 60 km/h and speeds should be reduced for loaded conditions. The mine management should take care of the speed of vehicles i.e up to 40km/h in village roads constructed under Pradhan Mantri Gram Sadak Yojana and other district roads developed by Highways and Minor Ports Department, Government of Tamil Nadu as each time a truck passes the concentrated stress causes a small amount of permanent strain on the pavement. Over time these small strains accumulate and lead to significant fatigue and eventual failure.
- ❖ 6-wheel tippers of not more than 9tons payload capacity covered with tarpaulin to stop the spillage and dust should use.
- ❖ Protective measures such as establish plants like grasses, cover crops and trees to form a dense layer over the dump absorbing raindrop energy and holding particles in place.

4.2 SOIL ENVIRONMENT

Anticipated Impacts

- ❖ The fertility status of the soil near by the lease area may affect due to extra dust deposition on the soil. Dust deposition from a lease area can harm soil fertility by physically blocking soil pores, reducing aeration and water infiltration, and potentially altering the soil's chemical properties. This damage to the topsoil negatively impacts plant growth by interfering with photosynthesis and nutrient uptake ultimately decreasing crop production.
- ❖ Topsoil will be scraped from the area of 4.96.0hectares in the project site will store in safety area left for 7.5m and 10m in the western side as shown in mining plan.

Mitigation measures

- ❖ When stock piling of top soil is done the mound should not be higher than 1.2m and 3.0m.
- ❖ To minimize surface runoff and erosion the topography of a graded surface should be designed to create terraces or benches that follow land contours which intercept sheet flow. Additionally, a bulldozer's tracks can be used to create a fine-scale roughened surface perpendicular to the slope and stockpiles should be constructed with a rough surface to improve drainage, reduce erosion and encourage revegetation.
- ❖ Efforts will be made to minimize the storage time to prevent nutrient loss.

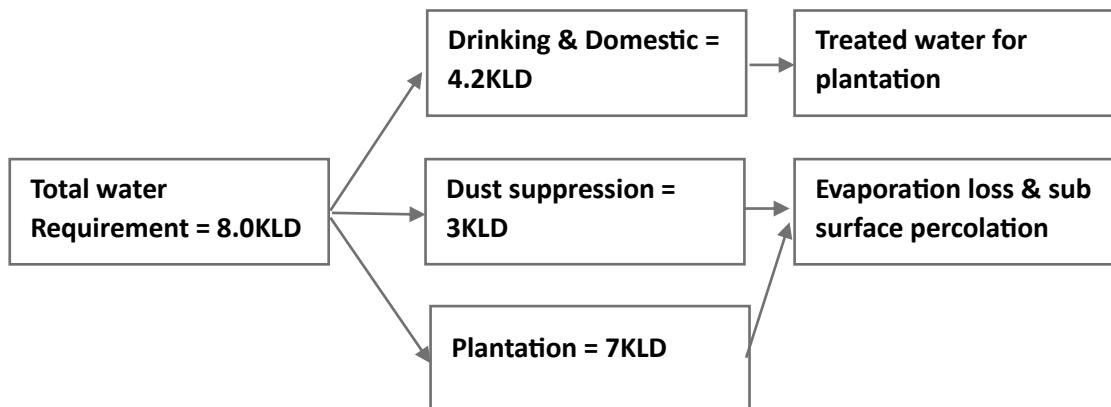
- ❖ To protect the quality of stockpiled topsoil immediate re-vegetation is crucial. Temporary seeding should be done within 30 days of stockpile formation to control erosion, prevent weed growth and maintain healthy soil microbes.
- ❖ If the stockpile will not be reused within 12 months it must be stabilized with permanent vegetation to ensure long-term erosion and weed control.
- ❖ The stored topsoil will be utilized for plantations in later phases during the progressive and final closure of the mine.

4.3 WATER ENVIRONMENT

Anticipated Impacts

- ❖ 14.2KLD (42,200 liters per day) water requirement for drinking, domestic, dust suppression and plantation.

Water Balance Chart of the Mine



- ❖ The domestic effluents being generated during mine operation.
- ❖ Major impact of opencast mining on groundwater regime is quality deterioration. The proposed mining activities shall be carried out upto a depth of 60m from average ground level. The specific water table depth in the core and buffer zone is between 10.8m and 13.5 meters below ground level.
- ❖ The volume of rain water entering to the mine and accumulating in the quarry has been estimated on the basis of direct catchment area, maximum daily precipitation and the run-off coefficient. $(Q = A \times H \times \bar{d})$ *cubic meters/day*.

Where A- catchment area in m²

H- Max daily precipitation in mm

$\bar{d}$ - Run-off Co-efficient.

The run off co-efficient for mined out area is 0.60m³. The all-time record for maximum daily precipitation in The run off co-efficient for mined out area is 0.60m³. The all-time

record for maximum daily precipitation in Tiruvannamalai district was 468mm on September 30, 2018 as reported by [CEIC Data](#). More recent rainfall records are 110mm on October 17, 2025. The maximum broken area is 1.95.50hectares in the sixth year and estimation for make of water done on the quarry parameters for sixth year onwards.

$$Q = 4.96.0\text{hecatres} \times 10000 \times 0.175 \times 0.60 \text{ m}^3.$$

$$Q = 2079\text{m}^3.$$

Total accumulated water in the pit is 5280m^3 .

Additionally, 20% of water from seepage is 1041.6m^3 .

Total water estimated for pumping requirement = **6249.6m^3** .

If we take the all-time record then the total water estimated for pumping = **6249.6m^3** .

To manage rain water runoff into quarry a 5 HP diesel operated pump will be placed at the site during the monsoon.

Mitigation Measures

- ❖ The hard rock itself has very few interconnected pore spaces, limiting the amount of water it can store or transmit. Groundwater flow and storage occur primarily in secondary openings such as joints, cracks and fissures. The thickness of the weathered layer, where more significant porosity can develop, is typically limited to 1-3 meters, particularly in low-lying topographic areas. The groundwater in these shallow zones is under unconfined (or water table) conditions, meaning it is directly connected to the surface and not confined by impermeable layers.
- ❖ The storm water discharge coming out of quarries and dump through a network of garland drains is expected to contain solid particles. These solid particles shall be removed by settling in the settling pond before being used for dust suppression and plantation. Hence, there shall be no change in drainage system due to this mining project in buffer zone.
- ❖ Domestic sewage from site office will be discharged in MAK Anaerobic bacteria digestion bio-septic tank. The treated water will be utilized for watering and maintaining the green belt.
- ❖ Groundwater development efforts would need to focus on the weathered and fractured zones near the surface in the buffer zone.

- ❖ Periodic (every 6 month once) analysis of ground water level and quality from the open well DW8 and bore well BW8 as shown in Figure 3.8 & 3.10 to find the change due to quarrying.
- ❖ The average annual rainfall of the project area is 1521mm and the runoff coefficient factors have been taken as per guidelines of Manual on Norms and Standards for Environmental Clearances by MoEF & CC, Govt. of India.

The total annual runoff can be calculated as:

$$\text{Runoff} = \text{Rainfall} \times \text{Catchment Area} \times \text{Runoff Coefficient}$$

Annual Rainfall = 1521mm

Total Project Area = 49600sq.m

Coefficient of Run off for Rooftop (Inclined) = 0.90

Coefficient of Run off for Rooftop (Flat) = 0.80

Coefficient of Run off for Road/Paved Area = 0.70

Coefficient of Run off for Open Area = 0.25

Coefficient of Run off for Greenbelt Area = 0.15 Rain water can effectively be collected from Maximum size of void in 6th year of mining = 37735sq. m.

Top soil dump area = 4950sq.m

Road & Infrastructure = 800sq.m

Runoff from Void pit area = 37735sq.m x 0.805 m x 0.25 = 7594.16m³

Runoff from Top soil dump area = 0.80m x 4950sq. m x 0.25 = 990m³

Runoff from Road & Infrastructure = 0.805m x 800sq. m x 0.70 = 450.8m³

Total Runoff from Project Area = 9034.96m³

The annual runoff generated in the project site is 9034.96m³. By considering the loss of 20% due to evaporation, spillage and wastage the effective runoff that can be harvested inside the project area is **722.96m³**.

Daily water requirement (except drinking purpose) is 8m³. So, with 300 working days the water requirement will be = 8m³ X 300 = **2400m³**

The surface runoff being generated from the project area will be channelized to rain water harvesting pond of 2m x 2m x 2m through network of drainage system 1m x 1m. The bottom of the ponds is naked and natural seepage from the bottom will recharge the ground water regime. Hence the storage pond will act as recharging structure. Even though rain water

will be sufficient to fulfil the daily requirement of water but in the initial years of mining when the mining pit is smaller in size or in the year with deficit rainfall surface water will be collected with due permission.

4.4 AIR ENVIRONMENT

Anticipated Impact

The main cause of air pollution in open-cast mining is the generation of airborne particulate matter (dust) from various mining activities including drilling, blasting, excavation, loading/unloading, vehicle movement on haul roads and the dumps. These activities release large quantities of fugitive dust which are then carried by the wind and can contribute to respiratory health problems for nearby communities and miners. The source of pollution is given in table below.

Activities	Air pollutants
Drilling	PM ₁₀ , PM _{2.5}
Blasting	PM ₁₀ , PM _{2.5} , SO _x , NO _x
Loading & unloading	PM ₁₀ , PM _{2.5}
Haul road	PM ₁₀ , PM _{2.5}
Transportation	PM ₁₀ , PM _{2.5} , SO _x , NO _x , CO
Waste/Top soil handling	PM ₁₀ , PM _{2.5}

The air dispersion modelling study was conducted using the AERMOD Cloud remote version for assessment of incremental Ground level concentration (GLC) for the proposed production. Area source model taken into consideration taking into consideration of the conceptual quarry area and dump area. Further line source model was taken into consideration for transportation of material through haul road. Model Setup is given in Table below

Parameter	Details
Model Name	Aermod
Model Type	Steady state Gaussian plume air dispersion model
Topography	Plain terrain
Average Time	24 hours
Source Type	Area source
Boundary limit	5km X 5km
Surface Meteorological Data	Site specific data processed by AERMET
Receptor Height	0
Anemometer height	10m

The air pollution modelling correctly focuses on particulate matter as the key pollutant for a mining project given that dust from mining operations and transportation is the primary source of air pollution in such industries rather than SO_x or NO_x which are typically associated with vehicular emissions. The incremental Ground Level Concentrations (GLCs) predicted are

specifically for particulate matter reflecting the anticipated contribution of the proposed mining project to local air quality.

Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formula developed by Chauhya et al.,2001 and Jyothi Prabha, Gurdeep Singh and I.N.Sinha, 2003 “Emission Factor Equations for Haul roads: The Indian Perspective”, Indian Journal of Air Pollution Control Vol. VI No. I March pp 37- 43. The equations used for fugitive emission estimation have been given in Table 4.2.

Table 4.2 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	$E = [u0.4a0.2\{9.7+0.01p+ b/(4+0.3b)\}]$	u = Wind speed(m/s). p = Mineral production (Mt/yr). b = Overburden handling (Mm ³ /yr). a = Lease area(km ²). E = Emission rate(g/s).
Transportation through roads	Fugitive dust	line	$E = [\{(100-m)/m\}^{0.8} \{s/ (100-s)\}^{0.1} u^{0.3} \{2663 + 0.1 (v+fc)\} 10^{-6}]$	E = Emission Rate (g/sec/m) m = Moisture Content of the road = 10% , s = Silt Content of the Road = 10% u = Wind Speed v = Average Vehicle Speed f = frequency of Vehicle movement in number per hour c = Capacity of the dumper in tons = 12 ton

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. It is important to note that PM₁₀ emission rate is derived from the SPM estimation in the background that PM₁₀ constitutes 52% of SPM emission. The PM_{2.5}, PM₁₀ emission results have been given in Table 4.3.

Table 4.3 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m ²	Calculated Value (g/s/m ²)
Overall Mine	PM _{2.5}	0.751280863	49600	1.51468E-05
Overall Mine	PM ₁₀	1.502561727	49600	3.02936E-05

4.4.1 Modelling of Incremental Concentration

The post project resultant concentrations of PM₁₀, PM_{2.5} is given in Tables 4.4 - 4.5.

Table 4.4 Incremental & Resultant GLC of PM_{2.5}

Station ID	Distance to core area	PM _{2.5} concentrations($\mu\text{g}/\text{m}^3$)				Comparison against air quality standard (60 $\mu\text{g}/\text{m}^3$)	Magnitude of change (%)	Limit
		Direction	Baseline	Predicted	Total			
AAQ1	0.84	S	24.40	4	28.4	Below standard	16.4	60
AAQ2	1.26	W	17.22	4	21.22		23.2	60
AAQ3	2.21	SW	17.42	2	19.42		11.5	60
AAQ4	0.46	E	17.09	4	21.09		23.4	60
AAQ5	5.95	SW	16.62	0.9	17.52		5.4	60
AAQ6	3.15	SE	17.38	0.4	17.78		2.3	60
AAQ7	3.50	SW	17.1	2	19.1		11.7	60

Table 4.5 Incremental & Resultant GLC of PM₁₀

Station ID	Distance to core area (km)	PM ₁₀ concentrations($\mu\text{g}/\text{m}^3$)				Comparison against air quality standard (100 $\mu\text{g}/\text{m}^3$)	Magnitude of change (%)	Limit
		Direction	Baseline	Predicted	Total			
AAQ1	0.84	S	63.78	10	73.78	Below standard	15.7	100
AAQ2	1.26	W	44.37	5	49.37		11.3	100
AAQ3	2.21	SW	44.88	5	49.88		11.1	100
AAQ4	0.46	E	44.03	8	52.03		18.2	100
AAQ5	5.95	SW	42.82	3	45.82		7.0	100
AAQ6	3.15	SE	44.79	0.8	45.59		1.8	100
AAQ7	3.50	SW	43.98	3	46.98		6.8	100

The Air Quality index for the baseline and predicted values of PM_{2.5} and PM₁₀ are given in table below.

Station ID	Distance to core area (km)	Direction	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		AQI for PM _{2.5}	PM ₁₀ ($\mu\text{g}/\text{m}^3$)		AQI for PM ₁₀
			Baseline Conc.	Total (Baseline + Predicted GLC)		Baseline Conc.	Total (Baseline + Predicted GLC)	
AAQ1	0.84	S	24.40	28.4	87	63.78	73.78	60
AAQ2	1.26	W	17.22	21.22	74	44.37	49.37	45
AAQ3	2.21	SW	17.42	19.42	70	44.88	49.88	45
AAQ4	0.46	E	17.09	21.09	73	44.03	52.03	48
AAQ5	5.95	SW	16.62	17.52	66	42.82	45.82	42
AAQ6	3.15	SE	17.38	17.78	68	44.79	45.59	42
AAQ7	3.50	SW	17.1	19.1	69	43.98	46.98	44

<https://www.airnow.gov/aqi/aqi-calculator-concentration/>

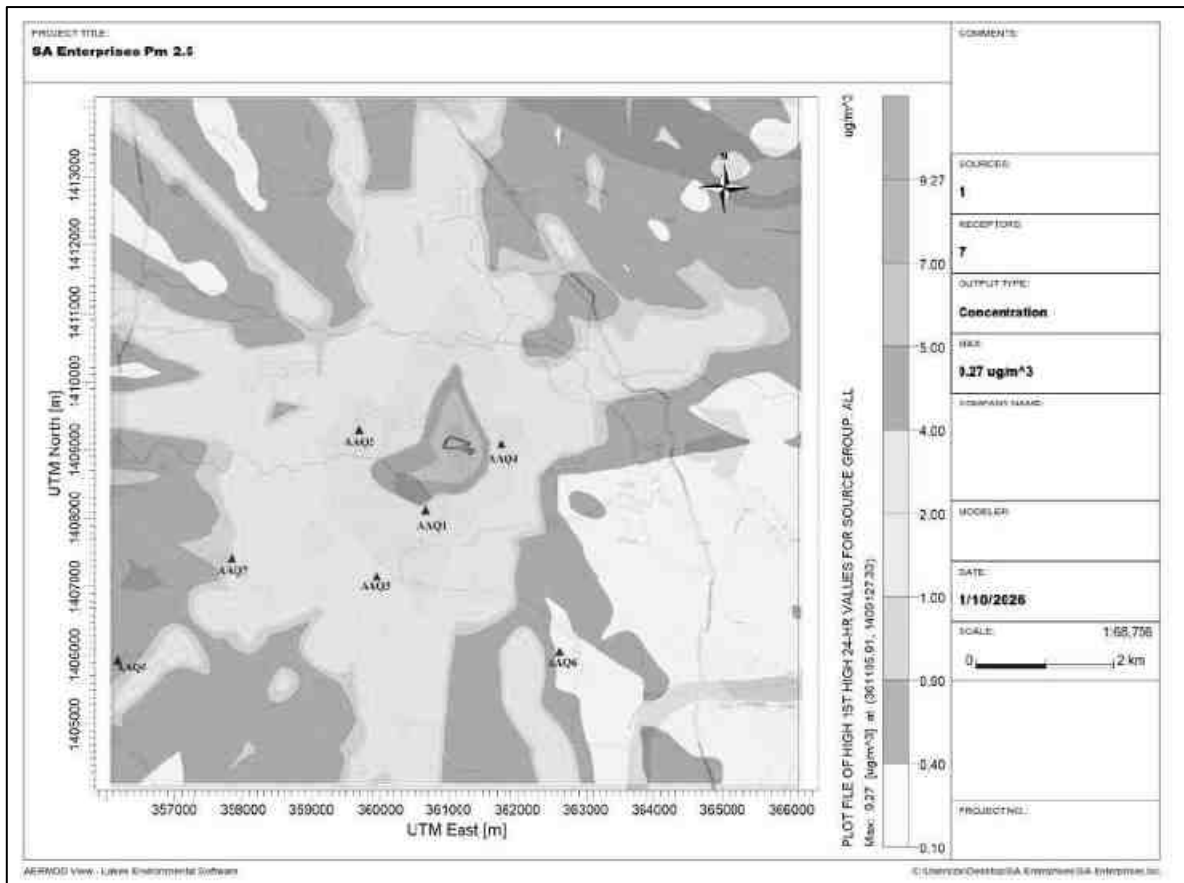


Figure 4.1 Predicted Incremental Concentration of PM_{2.5}

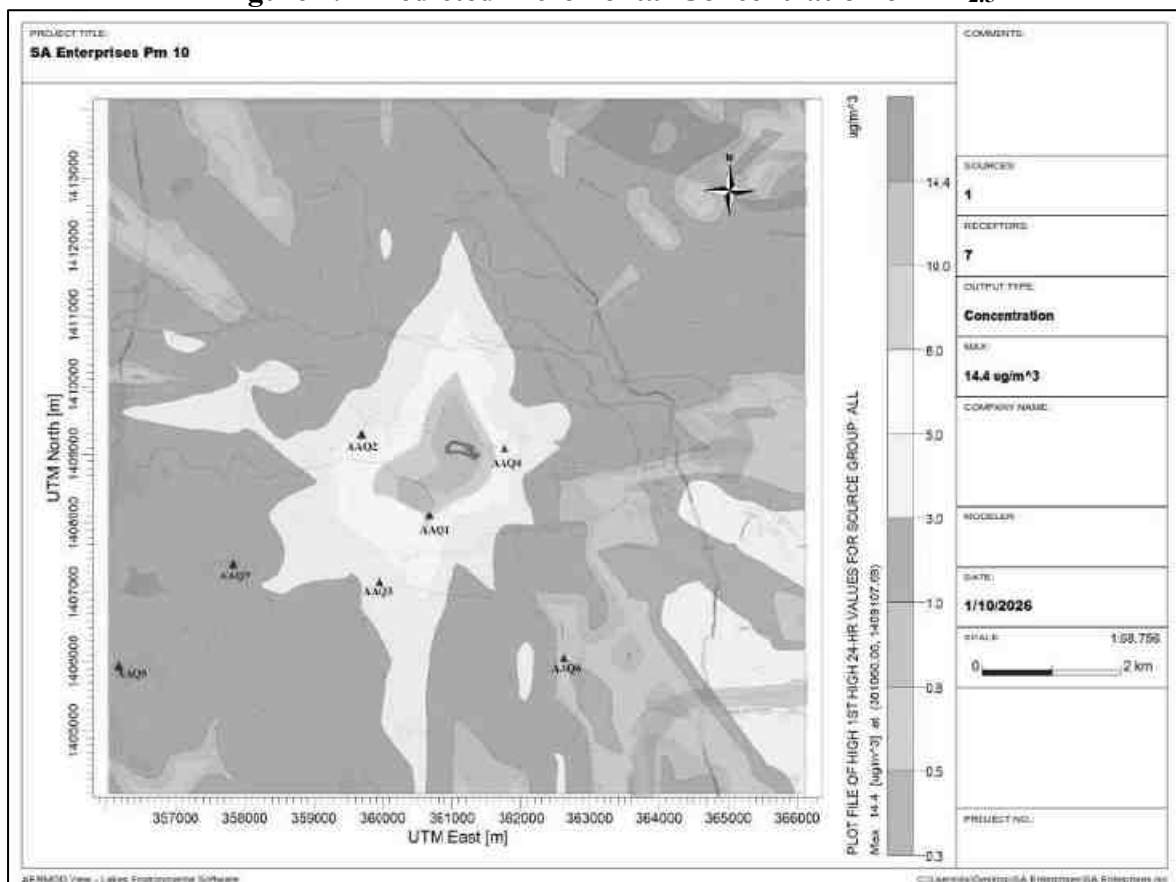


Figure 4.2 Predicted Incremental Concentration of PM₁₀

In the present study American Meteorological Society and the United States Environmental Protection Agency Dispersion Model (AERMOD) air quality model was run for premonsoon season under maximum atmospheric temperature conditions. The AERMOD has been run for PM₁₀ and PM_{2.5} distribution with 24-Hr maximum concentration and concentration contours were obtained as given in Figure 4.1 and 4.2. From these Isopleths plots it is observed that the highest pollutants concentrations predicted by AERMOD was near the major source in the core area and a maximum of 62.4µg/m³ of PM₁₀ and 32.6µg/m³ of PM_{2.5} were found to be below the prescribed NAAQS near the source. The impact assessment matrix of PM_{2.5} was tabled below

Station	Impact Scale	Standard Compliance	Magnitude
AAQ1	High	Below Standard	Significant (35.8%)
AAQ2	Low	Below Standard	Negligible (5.0%)
AAQ3	Low	Below Standard	Negligible (2.6%)
AAQ4	Low	Below Standard	Negligible (2.4%)
AAQ5	Low	Below Standard	Negligible (4.8%)

Leopold Matrix: Air Quality Impact

The Leopold Matrix is used to cross-reference project activities against environmental factors. Based on the PM_{2.5} data the project activities impact the environmental factor air quality. Scale: 1 (Lowest) to 10 (Highest). Magnitude is negative (-) for adverse impacts. Example for AAQ1 (Total 32.6µg/m³): If magnitude is -6 and importance is 6 the resulting -36 indicates a moderate negative impact that requires specific mitigation measures.

Environmental Factor	Project Activity: Construction	Project Activity: Operation
Physical: Air Quality	-4/5	-6/7
Biological: Health	-3/4	-5/8
Social: Aesthetics	-2/2	-3/4

Mitigation Measures: Air Quality Mitigation & Management Plan (2026).

In accordance with 2026 **National Clean Air Programme (NCAP)** targets which aim for a 40% reduction in particulate matter by the end of 2026. These measures focus on reducing PM_{2.5} at the source.

Table 4.6 Proposed Mitigation Measures for Air pollution

Impacted Area	Leopold Score (M/I)	Targeted Mitigation Measure	Implementation Frequency
AAQ1 (High Change)	-7 / 6	Permanent Water sprinkler	Continuous during high-dust activities
Core Area (AAQ2)	-5 / 8	Install continuous wind-breaking walls (min. 3m height) to shield the core area.	Fixed throughout project phase

Transport Routes	-4 / 5	Strictly enforce a 10 km/h limit for heavy vehicles to reduce dust resuspension.	All vehicle movements
Stockpiles	-3 / 4	Use tarpaulins or plastic sheets to cover all sand, cement and loose debris.	Daily at close of work
Site Entry/Exit	-2 / 3	Tire wash unit to prevent track-out onto public roads.	Every vehicle exit

Compliance Requirements

- **Real-Time Monitoring:** As of 2026 large construction sites are required to link low-cost air quality sensors directly to state pollution control board (SPCB) dashboards for live compliance tracking.
- **Emission Norms:** Ensure all on-site machinery and diesel generators (DG sets) meet the latest BS-VI or equivalent standards to minimize $PM_{2.5}$ and NO_x emissions.
- **Emergency Response:** If $PM_{2.5}$ exceeds the $60 \mu g/m^3$ limit trigger the Graded Response Action Plan (GRAP) which may require temporary suspension of excavation or demolition.

4.5 NOISE ENVIRONMENT

According to DGMS Technical Circular No. 18 of 1975 and No.5 of 1990 on “Protection of Workers against noise” it is brought to the knowledge of all concerned that Noise is emerging as an important and challenging health hazard for mine workers. Source data has been computed taking into account of all the machinery and activities used in the open cast mining process had listed in Table 4.7.

Table 4.7 Activity and Noise Produced by Machinery in open cast mines

S. No.	Machinery / activity	Distance of measurement	Noise level dB(A)	
			Idling	Fully accelerated
1.	Jack hammer	1	80	97
2.	Compressor	1	-	96
3.	Bulldozer	2	84	100
4.	Tipper	2	75	92
5.	Drill	1	85	90

The permissible noise exposure levels in Indian mines are based on OSHA standards adapted and enforced by the Indian government through the Factories Act and CPCB norms are given in Table 4.8 below.

Table 4.8 Permissible noise levels adopted by CPCB, 2000 and OSHA

Maximum Exposure Noise level Time per Working Day in hours	Noise level	
	CPCB, 2000 in dB (International Standard Organization)	OSHA code in dB (Occupational Safety and Health Act)
8	90	90

4	93	95
2	96	100
1	99	105
0.5	102	110
0.25	105	115

A noise level of 90 dB causes disruption, leading to annoyance, cognitive errors, and temporary hearing loss, while 85 dB is considered an upper comfort level with potential for cognitive decrements in tasks requiring decision-making with hearing loss possible at 300-1200 Hz frequencies in that range. Prolonged exposure to sounds at or above 85 dB can damage hearing over time. The mitigation measures to minimize the noise pollution are given in Table below.

Impact	Mitigation Measures
Noise impact due to mining activities. Noise impact due to vehicular movement. Auditory impact (hearing impairment resulting from excessive noise exposure)	❖ Diesel powered machineries which are major source of noise in open cast environment will be properly maintained as per maintenance schedule to prevent undesirable noise. ❖ Attention shall be paid towards rigorous maintenance of silencers of diesel engines. ❖ Static diesel engines shall be housed as far as possible (not made of sheet metals or surrounded by baffles). If possible, they will be placed on vibration isolators. ❖ Drill machine operators, blasters and dumper drivers will be issued earplugs and earmuffs. Duty hours of operators of noisy machinery will be regulated to keep their noise exposure levels within limits. ❖ Provision of sound proof cabins for the workers deployed on machines producing higher level of sound like dumpers, shovels etc. ❖ 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

	❖ Greenbelt/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.

4.5.1 Ground Vibrations due to blasting

The major source of ground vibration from the quarry is blasting. The ground vibrations due to the blasting in the quarry are calculated using the empirical equation for assessment of peak particle velocity (PPV) is given below

$$V = K[R/Q^{0.5}]^{-B}$$

where,

V = peak particle velocity (mm/s), K = site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

B = constant related to the rock and site (usually 1.6),

R = distance from charge (m)

Table 4.9 Predicted PPV values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	45.33	360	0.859	19	0.27	143

Table 4.10 Predicted PPV values due to Blasting at 100-500m radius

Location ID	Maximum Charge in kgs	Radial Distance in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	45.33	100	6.669	19	1.28	156
		200	2.22		0.56	149
		300	1.15		0.34	145
		400	0.726		0.24	142
		500	0.508		0.19	139

The PPV results shows that the ground vibration is well below the permissible limits set by DGMS in the circular 7, 1997.

Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts.
- ❖ During blasting other activities in the immediate vicinity will be temporarily stopped. Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast.
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed.
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire.
- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.
- ❖ 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.

4.6 ECOLOGY AND BIODIVERSITY

4.6.1 Impact on Ecology and Biodiversity

- ❖ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ❖ The Number of plants in the mining lease area is given in Chapter III Table 3.21 which vegetation in the lease area may be affected during mining.
- ❖ Carbon released from quarrying machineries and tippers during quarrying would be 2776kg per day, 749520kg per year and 3747600kg over five years, as provided in Table 4.11.

Table 4.11 Carbon Released During Five Years of Rough Stone and Gravel Production

	Per day	Per year	Per ten years
Fuel consumption of excavator	416	112320	561600
Fuel consumption of tipper	2360	637200	3186000
Total fuel consumption in Liters	2776	749520	3747600
CO ₂ emission in kg	7436	2008713	10043568

4.6.2 Mitigation Measures on Flora

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ None of the plants in the lease area will be cut during operational phase of the mine. we recommend uprooting and planting of the 10 trees along the 7.5 m safety zone to prevent environmental pollution during quarrying. As the survival rate due to uprooting was only 30%, 100 seedlings will be procured at the rate of 10 seedlings per tree and planted in 7.5 m safety zone.
- ❖ Existing roads will be used and new roads will not be constructed to reduce impact on flora.
- ❖ Green belt of adequate width will develop around the project site. Dust catching species like *Alstonia scholaris*, *Bombax ceiba*, *Terminalia arjuna*, *Cassia fistula*, *Bombax ceiba*, *Azadirachta indica*, *Nyctanthes arbor-tristis*, *Psidium guajava*, *Tectona grandis* etc will be planted in green belt.
- ❖ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 2008713kg of carbon per year. Therefore, we recommend 500 planting large number of

trees around the quarry and near school campuses, government wasteland, roadsides etc.

- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.13) about 2480 trees (Table 4.14) will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 9741600kg of the total carbon as provided in Table 4.12.

Table 4.12 CO₂ Sequestration

CO ₂ sequestration in kg	220	59400	297000
Remaining CO ₂ not sequestered in kg	7216	1948320	9741600
Trees required for environmental compensation	81261		
Area required for environmental compensation in hectares	163		

Table 4.13 Recommended Species for Greenbelt Development Plan

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	<i>Azadirachta indica</i>	Meliaceae	Neem,Vembu	Tree	Well distinct thick at both the layer Well distinct in Palisade & Spongy parenchyma. Spongy parenchyma is present at lower epidermis Many vascular bundles arranged almost parallel series.
2	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree	
3	<i>Polyalthia longifolia</i>	Annonaceae	Nettilingam	Tree	
4	<i>Albizia lebbbeck</i>	Fabaceae	Vagai	Tree	
5	<i>Delonix regia</i>	Fabaceae	Cemmayir-konrai	Tree	
6	<i>Bauhinia racemose</i>	Fabaceae	Aathi	Tree	
7	<i>Cassia fistula</i>	Fabaceae	Sarakondrai	Tree	
8	<i>Aegle marmelos</i>	Fabaceae	Vilvam	Tree	
9	<i>Pongamia pinnata</i>	Fabaceae	Pungam	Tree	
10	<i>Thespesia populnea</i>	Malvaceae	Puvarasu	Tree	

Table 4.14 Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered (m ²)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	992	794	8928
	Number of plants outside the mine lease area		
	1488	1190	13392
Total	2480	1984	22320

4.6.3. *Anticipated Impact on Fauna*

- ❖ Direct impact is anticipated on fauna of core zone
- ❖ Insignificant impact is anticipated on fauna in the buffer area due to air emissions, noise, vibration, transportation, waste water discharges, and changes in land use

Mitigation Measures on Fauna

- ❖ Fencing will be constructed around the proposed mine lease area to restrict the entry of stray animals
- ❖ The workers shall be trained not to harm any wildlife near the project site
- ❖ The quarry operation using in NONAL blasting Method Technic so controlled in sound and vibration.

4.6.4 *Impact on agriculture and horticulture crops in 1km Radius*

- ❖ Problems to agricultural and horticulture land due to dust caused by movement of heavy vehicles.
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season.
- ❖ The fugitive dust released from the mining operations may cause effect on the agricultural and horticulture land who are directly exposed to the fugitive dust.
- ❖ Dust from the quarries is likely to affect reproductive systems in nearby agricultural and horticulture lands.
- ❖ Dust from quarries can affect plant growth and reduce vegetable yields.

4.6.5 *Mitigation Measures on agriculture and horticulture crops.*

- ❖ 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 inside and outside of the lease area in different phases.
- ❖ A green belt will be created in 7.5m & 10m safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin

4.7 SOCIO ECONOMIC ENVIRONMENT

Anticipated Impact from Proposed and Existing Projects

- ❖ 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.

Common Mitigation Measures for Proposed Project

- ❖ 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

4.8 OCCUPATIONAL HEALTH AND SAFETY

Social and occupational health mitigation is a critical requirement for projects showing a significant magnitude of change such as your 35.8% increase at AAQ1. Under updated Tamil Nadu Occupational Safety and Health Rules and NCAP 2026 targets the following measures are recommended.

Social & Worker Health Mitigation Plan

Category	Mitigation Measure	Purpose
Respiratory Safety	Mandatory N95/FFP2 Masks: Required for all workers during drilling and blasting, loading.	Prevent deep lung penetration of <i>PM2.5</i> .

Health Surveillance	Quarterly Health Camps: Conduct lung function tests (Spirometry) for workers in High Change zones (AAQ1).	Early detection of respiratory illness.
Real-time Monitoring	Wearable AQ Sensors: Deploy wearable sensors for site supervisors in dust-heavy zones to track individual exposure.	Immediate alerts for unhealthy exposure limits.
Workplace Design	Rotation & Scheduling: Limit individual work duration in high-pollution zones and shift dust-heavy work to cooler hours.	Reduce cumulative pollutant load on workers.
Community Engagement	Live AQ Dashboards: Install a public display board at the site entry showing current $PM_{2.5}$ vs. the $60\mu g/m^3$ standard.	Build transparency with local residents near AAQ2

4.8.1 Noise

Workers are likely to get exposed to excessive noise levels during mining activities. The following measures are proposed for implementation

- ❖ No employee will be exposed to a noise level greater than 85dB(A) for a duration of more than 8 hours per day without hearing protection
- ❖ The use of hearing protection will be enforced actively when the equivalent sound level over 8 hours reaches 85dB(A) the peak sound levels reach 140dB(C) or the average maximum sound level reaches 110dB(A)
- ❖ Ear muffs provided will be capable of reducing sound levels at the ear to at least 85dB(A)
- ❖ Periodic medical hearing checks will be performed on workers exposed to high noise levels.

4.8.2 Physical Hazards

The following measures are proposed for control of physical hazards

- ❖ Specific personnel training on work-site safety management will be taken up;
- ❖ Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level;
- ❖ Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up.

4.8.3 Occupational Health Survey

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests: general physical tests, audiometric tests, full chest, X-ray, Lung function tests, spirometry tests, periodic medical examination – yearly, lung function test – yearly, those who are exposed to dust, and eye test. Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

4.9 Mine Waste Management

No waste is anticipated from any of the proposed quarries.

4.10 Mine Closure

Mine closure plan is the most important environmental requirement in mining project. The mine closure plan should cover technical, environmental, social, legal and financial aspects dealing with progressive and post closure activities. The closure operation is a continuous series of activities starting from the decommissioning of the project. Therefore, progressive mine closure plan should be specifically dealt with in the mining plan and is to be reviewed along with mining plan. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have included most of the activities to be included in the closure plan. While formulating the closure objectives for the site, it is important to consider the existing or the pre mining land use of the site and how the operation will affect this activity.

The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved:

- ❖ To create a productive and sustainable after-use for the site, acceptable to mine owners, regulatory agencies, and the public
- ❖ To protect public health and safety of the surrounding habitation
- ❖ To minimize environmental damage to conserve valuable attributes and aesthetics
- ❖ To overcome adverse socio-economic impacts.

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

Physical Stability

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should

continue to perform the functions for which they were designed. The design periods and factors of safety proposed should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

Chemical Stability

The solid wastes on the mine site should be chemically stable. This means that the consequences of chemical changes or conditions leading to leaching of metals, salts or organic compounds should not endanger public health and safety nor result in the deterioration of environmental attributes. If the pollutant discharges likely to cause adverse impacts is predicted in advance, appropriate mitigation measures like settling of suspended solids or passive treatment to improve water quality as well as quantity, etc., could be planned. Monitoring should demonstrate that there is no adverse effect of pollutant concentrations exceeding the statutory limits for the water, soil and air qualities in the area around the closed mine.

Biological Stability

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc., A vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilizing the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful under three situations.

- ❖ Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- ❖ Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- ❖ Where it is desirable to get a quick growth response from the native flora during those times.

when moisture is not a limiting factor. For example, development of green barriers the Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

Consideration of alternatives to a proposed project is a requirement of EIA process. During the scoping process, alternatives to a proposed project can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost-effective options.

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

- ❖ The proposed project is site specific and has the following advantages:
- ❖ The mineral deposit occurs in a non-forest area.
- ❖ There is no habitation within the project area; hence no R & R issues exist.
- ❖ There is no river, stream, nallah and water bodies in the applied mine lease area. Availability of skilled, semi-skilled and unskilled workers in this region.
- ❖ All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are well connected and accessible.
- ❖ The mining operations will not intersect the ground water level. Hence, no impact on ground water environment.
- ❖ As the proposed project area falls in seismic zone II, there is no major history of landslides, earthquake, subsidence etc., recorded in the past history.

5.2 ANALYSIS OF ALTERNATIVE SITE

No alternatives are suggested as the mine site is mineral specific.

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

Manual open cast mining method with secondary blasting will be applied to extract rough stone and gravel in the area. The proposed mining lease areas have following advantages:

- ❖ As the mineral deposition is homogeneous and batholith formation, opencast method of working is preferred over underground method.
- ❖ The material will be loaded with the help of excavators into tractors/tippers and transported to the need by customers.
- ❖ Semi-skilled labours fit for quarrying operations are easily available around the nearby villages

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

Open cast mechanized method has been selected for this project. This technology is having least gestation period, economically viable, safest and less labour intensive. The method has inbuilt flexibility for increasing or decreasing the production as per market condition.

CHAPTER VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections. The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA-TN as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTE/CTO.

6.1 METHODOLOGY OF MONITORING MECHANISM

Implementation of EMP and periodic monitoring will be carried out by respective project proponents. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed project; Environmental protection measures like dust suppression, control of noise and blast vibrations, maintenance of machinery and vehicles, housekeeping in the mine premises, plantation, implementation of Environmental Management Plan and environmental clearance conditions will be monitored by the respective mine management. On the other hand, implementation of area level protection measures like green belt development, environmental quality monitoring etc., are taken up by a senior executive who reports to their Mine Management. An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in the proposed quarry. 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.

The environmental monitoring cell will co-ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies as compliance status reports.

The sampling and analysis report of the monitored environmental attributes will be submitted to the Tamil Nadu Pollution Control Board (TNPCB) at a frequency of half-yearly and yearly by the proposed project proponent. The half-yearly reports are submitted to Ministry of Environment and Forest, Regional Office and SEIAA-TN as well.

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF & CC). The Environmental Monitoring Cell will be formed for the proposed project. The structure of the cell will be as shown in Figure 6.1.

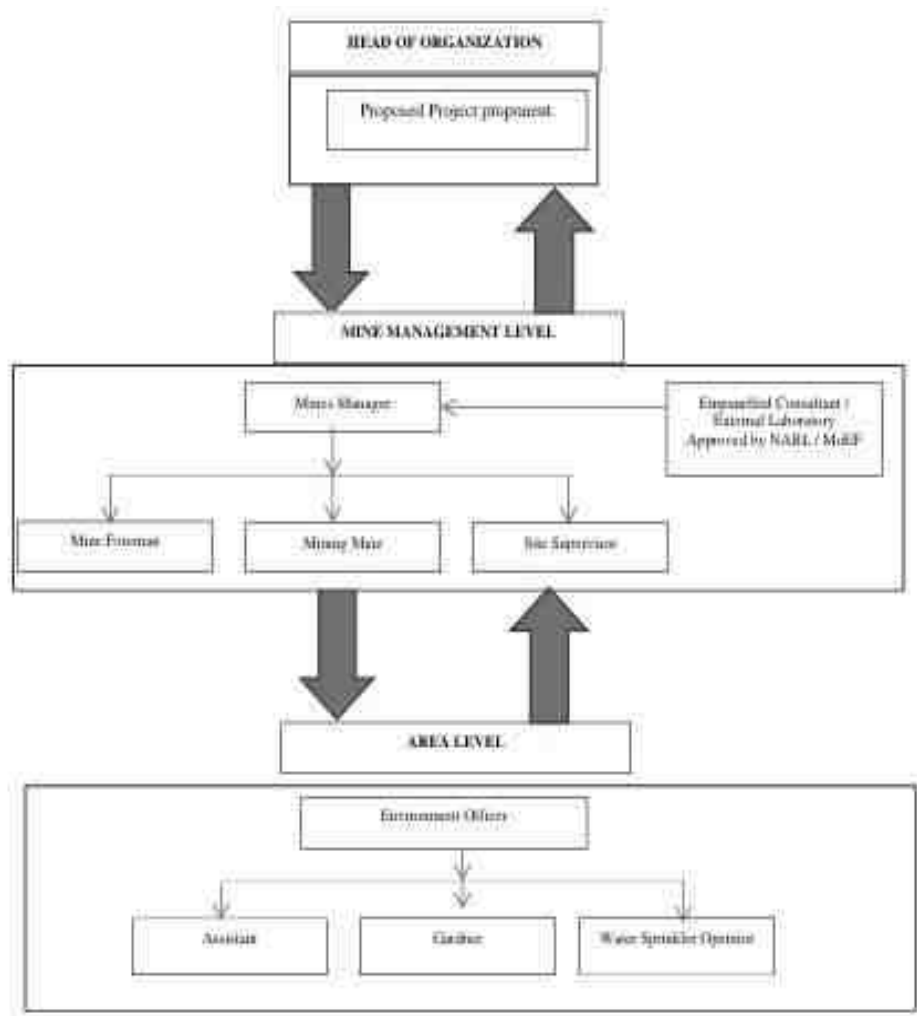


Figure 6.1 Proposed environmental monitoring chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The mitigation measures proposed in chapter IV will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in Table 6.1.

Table 6.1 Implementation Schedule for Proposed Project

S. No.	Recommendations	Time Period	Schedule
1	Land Environment Control Measures	Before commissioning of the project	Immediately after the commencement of project
2	Soil Quality Control Measures	Before commissioning of the project	Immediately after the commencement of project
3	Water Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
4	Air Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
5	Noise Pollution Control measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
6	Ecological Environment	Phase wise implementation every year along with mine operations	Immediately and as project progress

6.3 MONITORING SCHEDULE AND FREQUENCY

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges, emissions and wastes, for measurement against statutory standards. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The environmental monitoring will be conducted in the mine operations as follows:

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil quality and
- ❖ Greenbelt development
- ❖ The details of proposed monitoring schedule have been provided in Table 6.2.

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

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 m 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

Source: Guidance of manual for mining of minerals, February 2010

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each proposal is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF. The proposed recurring cost for Environmental Monitoring Programme is **Rs 2,95,000** /- per annum for the proposed project site.

Table 6.3 Environment Monitoring Budget

S. No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	-	Rs 60,000/-
2	Meteorology	-	Rs 15,000/-
3	Water Quality	-	Rs 20,000/-
4	Water Level Monitoring	-	Rs 10,000/-
5	Soil Quality	-	Rs 20,000/-
6	Noise Quality	-	Rs 10,000/-
7	Vibration Study	-	Rs 1,50,000/-
8	Greenbelt	-	Rs 10,000/-
Total		-	Rs 2,95,000 /-

Source: Field Data

6.5 REPORTING SCHEDULES OF MONITORED DATA

The monitored data on air quality, water quality, noise levels and other environmental attributes will be periodically examined by the Cluster Mine Management Coordinator and Respective Head of Organization for taking necessary corrective measures. The monitoring data will be submitted to Tamil Nadu State Pollution Control Board in the Compliance to CTO Conditions & environmental audit statements every year to MoEF & CC and Half-Yearly Compliance Monitoring Reports to MoEF & CC Regional Office and SEIAA.

Periodical reports to be submitted to:

- ❖ MoEF & CC – Half yearly status report
- ❖ TNPCB - Half yearly status report
- ❖ Department of Geology and Mining: quarterly, half yearly annual reports

Besides the Mines Manager/Agent of respective project will submit the periodical reports to:

- ❖ Director of mines safety
- ❖ Labour enforcement officer
- ❖ Controller of explosives as per the norms stipulated by the department.

CHAPTER VII

ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

- ❖ Public Consultation for Proposed Project
- ❖ Risk Assessment
- ❖ Disaster Management Plan
- ❖ Cumulative Impact Study
- ❖ Plastic Waste Management

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district was made and the public opinions on the proposed project will be updated in the final EIA/EMP report.

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is 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.

Factors of risks involved due to human induced activities in connection with these proposed mining & allied activities with detailed analysis of causes and control measures for the mine is given in Table 7.1.

Table 7.1 Risk Assessment & Control Measures for Proposed Project

S. No.	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. ✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited. ✓ Fire-fighting and first-aid provisions in the mine office complex and mining area. ✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use. ✓ Working of quarry, as per approved plans and regularly updating the mine plans. ✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut. ✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager. ✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.
2	Drilling	Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst; Drill Rod may break;	✓ Safe operating procedure established for drilling (SOP) will be strictly followed. ✓ Only trained operators will be deployed. ✓ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places,

			✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other. ✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ✓ Operator shall regularly use all the personal protective equipment.
3	Blasting	Fly rock, ground vibration, Noise and dust. Improper charging, stemming & Blasting/ fining of blast holes Vibration due to movement of vehicles	✓ The maximum charge per delay and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blast can be conducted safely. ✓ SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation ✓ Shots are fired during daytime only. ✓ All holes charged on any one day shall be fired on the same day. ✓ The danger zone is and will be distinctly demarcated (by means of red flags)
4	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material	✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. ✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle.

		While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	✓ Concave mirrors should be kept at all corners ✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point ✓ Loading according to the vehicle capacity ✓ Periodical maintenance of vehicles as per operator manual
5	Natural calamities	Unexpected happenings	✓ Escape Routes will be provided to prevent inundation of storm water ✓ Fire Extinguishers & Sand buckets
6	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone II. 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.
- ❖ In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations. Structure of the team has been shown in Figure 7.1.

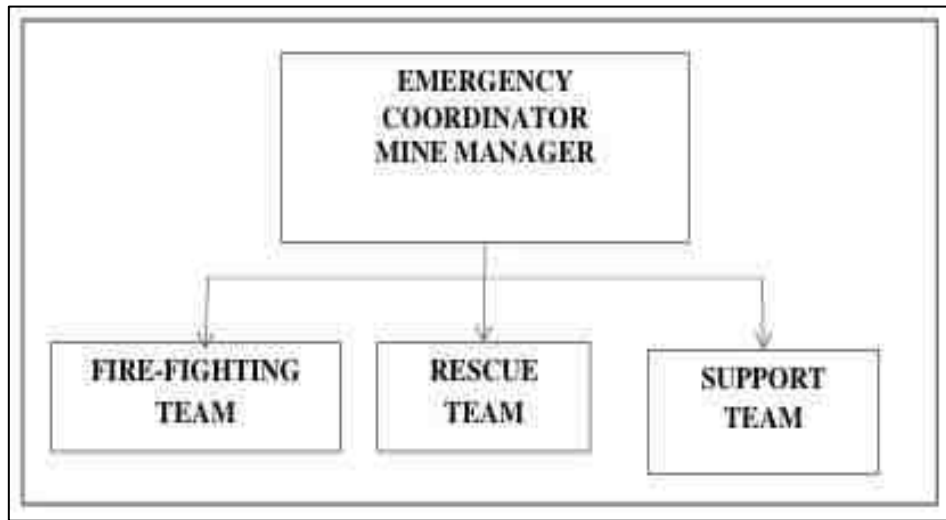


Figure 7.1 Disaster management team layout for proposed project

7.3.1 Emergency Control Procedure

The onset of emergency, will in all probability, commence with a major fire or explosion or collapse of wall along excavation and shall be detected by various safety devices and also by members of operational staff on duty. If located by a staff member on duty, he (as per site emergency procedure of which he is adequately briefed) will go to nearest alarm call point, break glass and trigger off the alarms. He will also try his best to inform about location and nature of accident to the emergency control room. In accordance with work emergency procedure the following key activities will immediately take place to interpret and take control of emergency.

- ❖ On site fire crew led by a fireman will arrive at the site of incident with fire foam tenders and necessary equipment.
- ❖ Emergency security controller will commence his role from main gate office
- ❖ Incident controller shall rush to the site of emergency and with the help of rescue team and will start handling the emergency.
- ❖ Site main controller will arrive at MECR with members of his advisory and communication team and will assume absolute control of the site.
- ❖ He will receive information continuously from incident controller and give decisions and directions to: Incident controller, Mine control rooms, Emergency security controller

7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the projects within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative study, the proposed project, known as P1, E1 & E2 are taken into consideration. The details of P1, E1 & E2 have been given in Table 7.2, 7.3 & 7.4.

Table 7.2 Salient Features of the Cluster P1

Name of the Quarry	M/s. S.A.Enterprises	
Type of Land	Patta Land	
Extent	4.96.0	
S.F. No	139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1,145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11	
Toposheet No	57 P/10	
Highest Elevation	90m AMSL	
Latitude	12°44'31.09"N to 12°44'38.96"N	
Longitude	79°43'8.05"E to 79°43'22.41"E	
Proposed depth as per ToR	60m BGL	
Ultimate depth for five years	60m BGL	
Geological Resources	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	2531181 & 6960748	446679 & 893358
Mineable Reserves	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	635925 & 1748784	314313 & 628626
Proposed production for 5 years	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	635925 & 1748794	314313 & 628626
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery requirements	Jack hammer	4
	Excavator	1
	Compressor	2
	Tipper	5
Proposed Manpower Deployment	25	
Project Cost	Rs.91,56,000/-	
Proposed Water Requirement	3.5 KLD	

Table 7.3 Salient Features of the Cluster E1

Name of the Quarry	Thiru.N. Nagarajan
Type of Land	Patta Land
Extent	2.51.5 ha
S.F. No	154/1B1B,154/2A,154/2B1,154/3,154/4,154/5, 155/2A,155/2B and 155/2C

Toposheet No	57 P/10	
Highest Elevation	117m AMSL	
Latitude	12°44'19.79"N to 12°44'26.97"N	
Longitude	79°43'15.24"E to 79°43'20.47"E	
Ultimate depth for five years	42m (2m AGL + 40m BGL)	
Geological Resources	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	1130085 & 3107733	50226 & 100452
Mineable Reserves	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	461025 & 1267818	38724 & 77448
Proposed production for 5 years	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	444630 & 1222732	38724 & 77448
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery proposed	Jack hammer	1
	Excavator	1
	Compressor	1
	Tipper	4
Proposed Manpower Deployment	14	
Project Cost	Rs.79,26,000/-	
Proposed Water Requirement	10.0 KLD	

Table 7.4 Salient Features of the Cluster E2

Name of the Quarry	Thiru A.William	
Type of Land	Patta Land	
Extent	2.88.0ha	
S.F. No	159,160,164/2(P)	
Toposheet No	57 P/10	
Highest Elevation	60m AMSL	
Latitude	12°44'06.24"N to 12°44'21.05"N	
Longitude	79°43'01.47"E to 79°43'05.11"E	
Ultimate depth for five years	28m BGL	
Geological Resources	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	692200 & 1903550	83064 & 166128
Mineable Reserves	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	85250 & 234438	28686 & 57372

Proposed production for 5 years	Rough stone (m³) & Tons	Gravel (m³) & Tons
	85250 & 234438	28686 & 57372
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery proposed	Jack hammer	2
	Excavator	1
	Compressor	1
	Tipper	2
Proposed Manpower Deployment	18	
Project Cost	Rs.36,10,720/-	
Proposed Water Requirement	3.5 KLD	

7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from the proposed project have been given in Tables 7.5 and 7.6.

Table 7.5 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	5 Years in (m ³ & Ts)	Per Year in (m ³ & Ts)	Per Day in (m ³ & Ts)	Number of Lorry Load Per Day
P1	635925 & 1748794	127185 & 349759	471 & 1295	79
E1	444630 & 1222732	88926 & 244546	329 & 906	55
E2	85250 & 234438	17050 & 46888	63 & 174	10
Grand Total	1165805 & 3205964	233161 & 641193	863 & 2375	144

Table 7.6 Cumulative Production Load of Gravel

Proposed Production Details				
Quarry	3 Years in (m ³ & Ts)	Per Year in (m ³ & Ts)	Per Day in (m ³ & Ts)	Number of Lorry Load Per Day
P1	314313 & 628626	104771 & 209542	388 & 776	65
E1	38724 & 77448	12908 & 25816	48 & 96	8
E2	28686 & 57372	9562 & 19090	35 & 70	6
Grand Total	381723 & 763446	127241 & 254448	471 & 942	79

The cumulative study shows that the overall production of rough stone from the quarry is 863 m³ or 2375 Ts per day with a capacity of 144 trips of rough stone per day and gravel from the quarry is 471 m³ or 942 Ts per day with a capacity of 79 trips of gravel per day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the proposed project on air environment of the cluster have been provided in Table 7.7. The cumulative values resulting from the project for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.7 Cumulative Impact Results from the proposed project

Pollutants	Baseline Data ($\mu\text{g}/\text{m}^3$)	Incremental Values ($\mu\text{g}/\text{m}^3$)	Cumulative Value ($\mu\text{g}/\text{m}^3$)
		P1	
PM _{2.5}	18.17	9.27	27.44
PM ₁₀	46.95	14.4	61.35

7.4.2 Noise Environment

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. Cumulative Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities. Predictions have been carried out to compute the noise level at various distances around the different quarries within the 500 m radius.

Table.7.8 Cumulative Impact of Noise for one Cluster Projects

Table 7.3: Cumulative Impact of Noise for one Cluster Projects						
Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	362	NE	42.4	32.79	42.85	55
Habitation Near E1	490	NE		30.16	42.65	
Habitation Near E2	1094	N		23.18	42.45	
Cumulative Noise (dB (A))					42.72	

Source: Lab Monitoring Data

The cumulative analysis of noise due to cluster project shows that habitation will receive about 42.72dB(A) respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for day time.

Ground Vibrations

Cumulative results of ground vibrations due to mining activities from the cluster project have been shown in Table 7.9.

Table 7.9 Cumulative Effect of Ground Vibrations Resulting from cluster Project

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	362	45.33	0.859
E1	490	23.48	0.310
E2	1094	4.50	0.023
Total			1.192

Results from the above indicate that the cumulative PPV value of each habitation is well below the peak particle velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

7.4.3 Socio Economic Environment

Socio Economic benefits of the proposed project were calculated and the results have been shown in Table 7.10 the project together will contribute Rs. 15,00,000/-towards CER fund.

Table 7.10 Socio Economic Benefits from the Cluster Project

Location ID	Project Cost	CER Cost
P1	Rs.91,56,000/-	Rs.5,00,000
E1	Rs.79,26,000/-	Rs.5,00,000
E2	Rs.36,10,720/-	Rs.5,00,000
Grand Total	Rs.2,06,92,720	Rs.15,00,000

Table 7.11 Employment Benefits for Cluster Project

Location ID	Employment
P1	25
E1	14
E2	18
Grand Total	57

A total of 57 people will get employment from the cluster project.

7.4.4 Ecological Environment

"Gap Plantation" procedure:

Developing a three-tier green belt of native plant species around industrial peripheries is a vital environmental guideline for mitigating pollution and enhancing ecosystem services. Dig pits of substantial dimensions (1m x 1m x 1m for large trees, half for smaller ones) fill them with a mixture of earth, sand, silt and manure and then water the saplings generously. Care for the first three years involves nutrient supplementation, plant protection, managing water stress and ensuring exposure to normal atmospheric conditions.

The chosen species should be fast-growing, deep-rooted, wind-firm possess a dense and potentially permeable canopy, tolerate air pollution (SO₂, NO₂) and ideally be indigenous.

Additional preferred characteristics include long-lasting foliage, large, sturdy leaves, abundant stomata, rough bark and a general ability to withstand local environmental stresses such as drought or inundation while also contributing positively to the environment through soil improvement, aesthetic appeal and attracting wildlife.

Activities for Maintenance:

- Regular pruning
- Watering
- Weed removal
- Manuring
- The growing plants are cared at least for the first 3 years under favourable condition of climate and irrigation.
- For healthy and vigorous growth adequate nutrient will be supplied
- To avoid water stress condition regular watering will be done.

Table 7.12 Greenbelt Development

Code	Number of Trees proposed	Area to be covered (m ²)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	2480	22320	1984	<i>Azadirachta indica</i> , <i>Albizia lebbeck</i> , <i>Delonix regia</i> , <i>Tectona grandis</i> , etc.,
E1	1258	11318	1006	
E2	1440	12960	1152	
Total	5178	46598	4142	

Cumulative studies show that the proposed project proponent will plant about 5178 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Tectona grandis*, etc inside and outside the lease area. It is expected that 80% of trees, i.e., 4142 trees will survive in this green belt development program.

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

All the Project Proponent shall comply with Tamil Nadu Government Order (Ms) No. 84 Environment and Forest (EC.2) Department Dated: 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986.

7.5.1 Objective

- ❖ To investigate the actual supply chain network of plastic waste.

- ❖ To identify and propose a sustainable plastic waste management by installing bins for collection of recyclables with all the plastic waste
- ❖ Preparation of a system design layout, and necessary modalities for implementation and monitoring.

A detailed action plan to manage plastic waste has been provided in Table 7.13.

Table 7.13 Action Plan to Manage Plastic Waste

S. No.	Activity	Responsibility
1	Framing of Layout Design by incorporating provision of the Rules, user fee to be charged from waste generators for plastic waste management, penalties/fines for littering, burning plastic waste or committing any other acts of public nuisance.	Mines Manager
2	Enforcing waste generators to practice segregation of bio degradable, recyclable and domestic hazardous waste.	Mines Manager
3	Collection of plastic waste.	Mines Foreman
4	Setting up of Material Recovery Facilities.	Mines Manager
5	Segregation of Recyclable and Non-Recyclable plastic waste at Material Recovery Facilities.	Mines Foreman
6	Channelization of Recyclable Plastic Waste to registered recyclers.	Mines Foreman
7	Channelization of Non-Recyclable Plastic Waste for use either in Cement kilns, in Road Construction.	Mines Foreman
8	Creating awareness among all the stakeholders about their responsibility.	Mines Manager
9	Surprise checking's of littering, open burning of plastic waste or committing any other acts of public nuisance.	Mine Owner

Source: Proposed by FAEs and EC

CHAPTER VIII

PROJECT BENEFITS

8.0 GENERAL

The proposed project at Kundiyanthandalam Village, aims to produce 635925m³ or 1748794 Ts of rough stone and 314313m³ or 628626 Ts of gravel over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 25 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

The impact of mining activity in the area will be more positive on the socio-economic environment in the immediate project impact area. The employment opportunities both direct and indirect will contribute to enhanced money incomes to job seekers with minimal skill sets especially among the local communities.

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

The proposed quarry project is located in Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The area has already well-established communications roads and other facilities. The following physical infrastructure facilities will further improve due to proposed project.

- ❖ Road transport facilities
- ❖ Communications
- ❖ Medical, Educational and social benefits will be made available to the nearby civilian population in addition to the workmen employed in the mine.

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily

temporary or contractual and involvement of unskilled labour will be more. A major part of the labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.5 OTHER TANGIBLE BENEFITS

The proposed mine is likely to have other tangible benefits as given below

- ❖ Indirect employment opportunities to local people in contractual works like construction of infrastructural facilities, transportation, sanitation for supply of goods and services to the mine and other community services
- ❖ Additional housing demand for rental accommodation will increase
- ❖ Cultural, recreation and aesthetic facilities will also improve
- ❖ Improvement in communication, transport, education, community development and medical facilities and overall change in employment and income opportunity
- ❖ The State Government will also benefit directly from the proposed mine, through increased revenue from royalties, cess, DMF, GST etc.,

8.6 CORPORATE SOCIAL RESPONSIBILITY

Individual project proponents will take responsibility to develop awareness among all levels of their staff about CSR activities and the integration of social processes with business processes. Those involved with the undertaking of CSR activities will be provided with adequate training and re-orientation.

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 5 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas –

- ❖ Health Services Social Development
- ❖ Infrastructure Development
- ❖ Education & Sports
- ❖ Self-Employment
- ❖ CSR Cost Estimation
- ❖ CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Maruthadu Village. CSR budget is allocated.

8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is ≤ 100 crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 5,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

Table 8.1 CER Action Plan

S. No.	Activity	Budget (Rs.in Lakh)
1	The applicant Indents to involve in corporate environment responsibilities (CER) activities such as renovation of existing toilet, plantation within the school premises, donating environment related books to the nearby school library, etc.	Rs.5,00,000
	Total	Rs.5,00,000

Source: Field survey conducted by FAE in consultation with project proponent

8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs.9,03,01,734** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget for Rough Stone (Rs.)	Budget for Gravel (Rs.)
CER	5,00,000	
Seigniorage @ Rs.90/m ³ of rough stone / Rs.56/m ³ of gravel	5,72,33,250	1,76,01,528
District Mineral Foundation Tax @ 10% of Seigniorage	57,23,325	17,60,153
Green Tax @ 10% of Seigniorage	57,23,325	17,60,153
Total	6,91,79,900	2,11,21,834

CHAPTER IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

Not Applicable, Since Environmental Cost Benefit Analysis not recommended at the Scoping stage.

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of environmental management plan will ensure to keep all the environmental parameters of the project in respect of ambient air quality, water quality, socio economic improvement standards. Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.1 ENVIRONMENTAL POLICY

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance. The Proponent M/s.S.A. Entrprises will:

- ❖ Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities.
- ❖ Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- ❖ Allocate necessary resources to ensure the implementation of the environmental policy.
- ❖ Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- ❖ Implement monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- ❖ Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

10.1.1 Description of the Administration and Technical Setup

The environment monitoring cell discussed under chapter VI will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level of each proposed quarry. 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 program.
- ❖ 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.

10.2 Budgetary Provision for Environmental Management

Adequate budgetary provision has been made by the company for execution of Environmental Management Plan. The Table 10.1 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost	Recurring Cost/annum
			(Rs.)	(Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	49600	49600
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring	800000	50000
	Air quality will be regularly monitored as per norms within ML area & ambient area	Yearly compliance as per CPCB norms	0	50000

	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2,500 per unit recurring cost for maintenance	100000	10000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5,000/- per tipper/dumper deployed	25000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	6250
	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare	0	992000
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			1024600	305050
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0

	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for Portable blaster shed	Installation of portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	1780590
	Total Noise Environment		50000	1782590
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	49600	24800
	Total Water Environment		49600	24800
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring	25000	20000

		cost for collection /disposal).		
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Total Waste Management			30000	22000
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed display board at the quarry entrance as permanent structure	10000	1000
Total Implementation of EC, Mining Plan			10000	1000
Occupational Health and Safety	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4,000/- per employee with recurring based on wear and tear (say, @ Rs. 1,000/- per employee)	100000	25000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1,000/- per employee	0	25000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2,000/-	0	19840
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum	992000	49600
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	248000	49600

	be deployed for traffic management			
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1st Class / 2nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
Total Occupational Health and Safety			1380000	956040
Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)	Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	198400	29760
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	446400	44640
Total Development of Green Belt			644800	74400
Mine Closure	Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs)		0	168640

	G.O.(Ms)No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Rough stone = Rs.90)	7483478	0
TOTAL			10672478	3165880

Table 10.2 Estimation of Overall EMP Budget after Adjusting 5% Annual Inflation

Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year	Total Recurring Cost	Total EMP Cost
3165880	3324174	3490383	3664902	4016787	17662125	28334603

In order to implement the environmental protection measures, an amount of **Rs. 1,06,72,478** as capital cost and recurring cost as **Rs. 31,65,880** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 2,83,34,603** as shown in Table 10.2.

10.3 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.

CHAPTER XI

SUMMARY AND CONCLUSION

11.1 INTRODUCTION

As the proposed rough stone and gravel mining project (B1) falls within the quarry cluster of 500 m radius with the total extent of 1ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F. Nos. 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over the extent of 4.96.0ha is situated in the cluster falling in Kundiyaandalam Village, Vembakkam Taluk, Tiruvannamalai District. The projects involved in the calculation of cluster extent are of one proposed quarry and two existing quarries.

11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes 12°44'31.09"N to 12°44'38.96"N Longitudes from 79°43'8.05"E to 79°43'22.41"E in Kundiyaandalam Village, Vembakkam Taluk, Tiruvannamalai District. According to the approved mining plan, about 635925m³ & 1748794Ts of rough stone and 314313m³ & 628626 Ts of gravel will be mined up to the depth of 60 m BGL in the five years. The quarrying operation is proposed to be carried out by open cast semi-mechanized mining method involving drilling and formation of benches of the prescribed dimensions.

11.3 DESCRIPTION OF THE ENVIRONMENT

Baseline data were collected to evaluate the existing environmental condition in the core and buffer areas during **October through December 2025** as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified **Interstellar Testing Centre Pvt. Ltd** for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

11.3.1 Land Environment

The study area (5 km radius approximately-8400.11ha) around the proposed mine site was classified into seven LULC classes using Sentinel II imagery. The rapid population growth drives significant land-use/land-cover (LULC) changes primarily increasing built-up areas at the expense of agricultural land and water bodies leading to habitat loss, increased land surface temperature (LST) and strain on resources though improved agricultural tech has somewhat reduced pressure on cultivated land. The overall trend shows conversion from natural/agricultural uses to urban infrastructure.

Areal Coverage by LULC Class

- Crop Land: The dominant feature, comprising the maximum area of 5604.48ha (66.71%).
- Built-up Area: The second largest class covering 1408.09 ha (16.76%).
- Fallow Land: FL Accounts for 197.55 ha (2.35 %) of the landscape.
- Water Bodies: Including major flows and small tanks totalling 893.55 ha (10.64%).
- Mining Area: Covers 197.07 ha, representing the least percentage of the total area (2.35%).
- Sparse Vegetation: Covers 66.23 ha (0.79%).
- Barren Land: The smallest naturally occurring class, with 33.12 ha (0.39%).

LULC Statistics of the Study Area

S. No.	Classification	2025	
		Area in Hectares	Area in %
1	Water Bodies	893.55	10.64
2	Vegetation cover	66.23	0.79
3	Crop Lands	5604.48	66.71
4	Mining area	197.07	2.35
5	Built-up Area	1408.09	16.76
6	Barren Land	33.12	0.39
7	Fallow land	197.55	2.35
Total		8400.11	100.00

Source: Sentinel II Satellite Imagery

11.3.2 Soil Environment

The interpretation of the analytical results for the five soil samples (S1–S5) is as follows

Parameter	Result Range	Interpretation
Organic Matter	0.25 – 0.36%	Critically Low. It requires heavy composting.
Nitrogen (N)	0.056 – 0.068%	Deficient and requires fertilization.
CEC	19.30 – 22.50	Moderate/High shows good nutrient retention potential.
pH	7.35 – 8.53	Neutral to Alkaline except S4. S4 may need sulfur to lower pH.
Texture	Sandy Loam	Well-aerated but dries out quickly.

These are hungry soils. They have a solid physical foundation and a good capacity to store nutrients (CEC) but they currently contain almost no organic fuel or essential nutrients (N-P-K). Significant application of organic manure and balanced N-P-K fertilizers is essential for any agricultural use.

The Total Organic Matter (TOM) and Total Organic Carbon (TOC) in soil samples indicates a critically depleted state that significantly limits agricultural productivity.

Sample	TOC (%)	TOM (%)	Rating
S1	0.16	0.276	Very Low
S2	0.17	0.293	Very Low
S3	0.19	0.327	Very Low
S4	0.15	0.258	Very Low
S5	0.21	0.362	Very Low

Productive agricultural topsoil typically contains 1–6% organic matter. Even the maximum observed value in Sample S5 (0.362%) remains significantly below the minimum threshold required for healthy soil biological activity, nutrient cycling, and structural stability. The organic matter values follow the **Van Bemmelen conversion factor**, where:

$$\text{TOM} \approx \text{TOC} \times 1.724$$

This calculation assumes that soil organic matter consists of approximately 58% organic carbon, which is a widely accepted standard in soil science.

Agricultural Suitability Evaluation

Due to the dominant sandy loam texture, low organic matter content, and favorable drainage characteristics, the soil is more suitable for horticultural crops than for conventional wet-paddy cultivation.

Feature	Paddy Suitability	Horticulture Suitability
Texture (Sandy Loam)	Low (Poor water retention)	High (Good drainage and aeration)
pH (7.35 – 8.53)	Moderate (Paddy prefers acidic 5.5–6.5)	High (Suitable for citrus, pomegranate, guava)
Organic Matter	Critically Low (Requires heavy organic input)	Low (Manageable with regular compost application)
Nutrients (NPK)	Deficient (Requires heavy fertilization)	Deficient (Requires balanced nutrient management)

Stress Relaxation Behaviour of Soil

Based on the sandy loam texture, very low organic matter content (<0.36%), and moderate cation exchange capacity (19.3–22.5 meq/100 g), the soil is expected to exhibit rapid initial stress relaxation followed by a relatively high residual stress.

Unlike organic-rich soils, which continue to relax over extended periods due to elastic organic matrices, the present soils show limited long-term stress dissipation capacity.

Impact of Vehicular Movement on Soil Sample S1

The cumulative stress generated by repeated vehicle movement over soil sample S1 (Sandy Loam) significantly degrades soil quality by increasing the silt fraction and reducing particulate organic matter, which directly affects plant growth and soil functionality.

Increase in Silt and Particulate Matter

Vehicle-induced stress physically alters soil texture through particle crushing and aggregate fragmentation:

- High dynamic stress from vehicle tires, concentrated within the top 0–20 cm soil layer, acts as a mechanical milling force.
- Larger sand grains ($\approx 64.5\%$ in S1) and coarse particles collide and fracture under repeated pressure.
- This process shifts the grain-size distribution toward finer silt-sized particles.
- Surface-accumulated silt is easily resuspended by moving vehicles, increasing PM_{10} emissions and reducing available topsoil nutrients.

Impact on Plant Growth

The gradual transformation toward a denser and silt-rich soil structure creates unfavorable growth conditions:

- Increasing silt content fills remaining macropores, rapidly increasing bulk density ($\approx 1.0\text{--}1.08\text{ g/cc}$).
- Higher soil strength restricts root elongation, leading to root impedance and shallow root systems.
- Fine pore dominance reduces aeration and drainage, causing oxygen deficiency (hypoxia) in the root zone.
- In soil sample S1, reduced aeration can decrease root respiration and potentially cause a 12–41% reduction in crop yield, depending on crop sensitivity.

Preventive Measures for Soil Protection

To minimize siltation and compaction effects:

- **Surface contact pressure should be maintained below 150 kPa**
- Vehicle movement should be avoided when soil moisture is high (7–12%), as wet soil conditions act as a lubricant
- Moist soils accelerate particle breakdown and promote deep-seated compaction

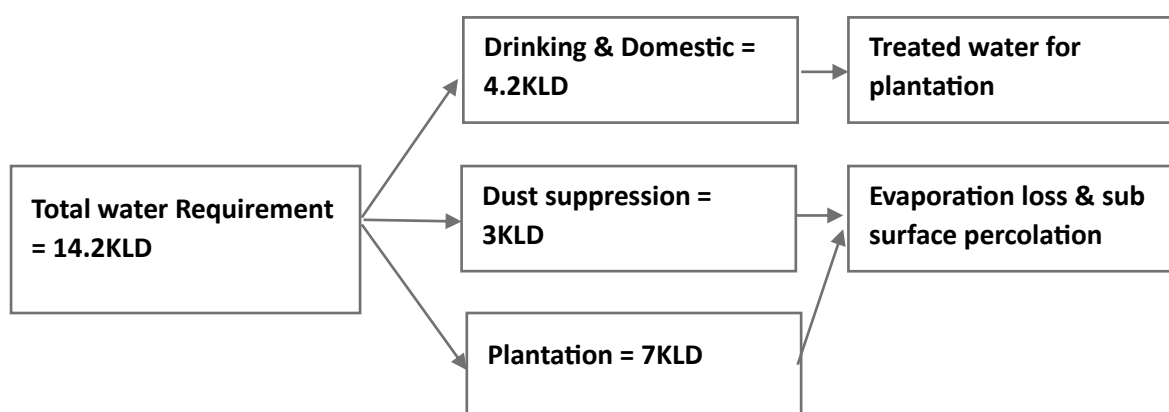
Summary of Vehicular Stress Effects on Soil Sample S1

Soil Component	Change Due to Stress	Effect on Plant Growth
Silt Content	Increases due to grain crushing	Restricts root penetration
Bulk Density	Increases rapidly	Reduces air and water movement
Organic Matter	Fragmentation and accelerated decomposition	Loss of nutrient-holding capacity
Pore Structure	Loss of macropores	Causes root hypoxia

11.3.3 Water Environment

14.2KLD (14,200 liters per day) water requirement for drinking, domestic, dust suppression and plantation.

Water Balance Chart of the Mine



- ❖ The domestic effluents being generated during mine operation.
- ❖ Major impact of opencast mining on groundwater regime is quality deterioration. The proposed mining activities shall be carried out upto a depth of 60m from average ground level. The specific water table depth in the core and buffer zone is between 10.8m and 13.5 meters below ground level.
- ❖ The volume of rain water entering to the mine and accumulating in the quarry has been estimated on the basis of direct catchment area, maximum daily precipitation and the run-off coefficient. $(Q = A \times H \times \bar{d})$ cubic meters/day.

Where A- catchment area in m²

H- Max daily precipitation in mm

$\bar{d}$ - Run-off Co-efficient.

The run off co-efficient for mined out area is 0.60m³. The all-time record for maximum daily precipitation in The run off co-efficient for mined out area is 0.60m³. The all-time record for maximum daily precipitation in Tiruvannamalai district was 468mm on September 30, 2018 as

reported by [CEIC Data](#). More recent rainfall records are 110mm on October 17, 2025. The maximum broken area is 1.95.50hectares in the sixth year and estimation for make of water done on the quarry parameters for sixth year onwards.

$$Q = 4.96.0\text{hecatres} \times 10000 \times 0.175 \times 0.60 \text{ m}^3.$$

$$Q = 2079\text{m}^3.$$

Total accumulated water in the pit is 5280m^3 .

Additionally, 20% of water from seepage is 1041.6m^3 .

Total water estimated for pumping requirement = **6249.6m^3** .

If we take the all-time record then the total water estimated for pumping = **6249.6m^3** .

To manage rain water runoff into quarry a 5 HP diesel operated pump will be placed at the site during the monsoon.

11.3.4 Air Environment

The study generated baseline data for four key parameters:

- Particulate Matter (PM2.5 and PM10): Fine and coarse inhalable particles.
- Gaseous Pollutants: Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_x)

Table 3.15 summarizes the average concentrations of the four pollutants (($\text{PM}_{2.5}$, PM_{10} , SO_2 and NO_x) recorded across the five stations during the three-month period.

Figure 3.15 shows the map identifying the five specific sampling locations and Figures 3.16–3.20a give the graphical representations showing pollutant trends or comparisons for each monitoring station.

Summary of AAQ Result

Particulate Matter ($\mu\text{g}/\text{m}^3$)

Station ID	PM2.5 (Mean)	PM2.5 (98th %)	PM10 (Mean)	PM10 (98th %)
AAQ1	24.40	26.32	63.78	68.43
AAQ2	17.22	19.05	44.37	48.79
AAQ3	17.42	18.03	44.88	49.58
AAQ4	17.09	18.97	44.03	48.31
AAQ5	16.62	17.92	42.82	46.17
AAQ6	17.38	19.50	44.79	49.71
AAQ7	17.1	18.6	43.98	48.36

Gaseous Pollutants ($\mu\text{g}/\text{m}^3$)

Station ID	SO2 (Mean)	SO2 (98th %)	NOx (Mean)	NOx (98th %)
AAQ1	7.50	7.87	15.25	16.38
AAQ2	5.27	5.84	10.54	11.68

AAQ3	5.38	5.90	10.77	11.80
AAQ4	5.25	5.66	10.56	11.63
AAQ5	5.20	5.39	10.47	11.01
AAQ6	5.39	5.82	10.78	11.95
AAQ7	5.31	5.59	10.58	10.80

The station AAQ1 has the highest mean and 98th percentile for all four pollutants suggesting it may be located near a higher-intensity emission source like a major traffic intersection or industrial area. The **98th percentile** values represent the levels that 98% of the data falls below. Since these values (e.g., PM_{2.5} max of 26.32 µg/m³ at AAQ1) are close to the mean it suggests a stable environment without extreme daily pollution spikes.

Pollutant correlation:

- The PM₁₀ levels (42.82– 68.43 µg/m³) are roughly 2.5 times higher than PM_{2.5} levels, which is typical in areas where coarse dust (construction, road dust) contributes more than fine combustion particles.
- SO₂ and NO_x levels are closely linked likely originating from common vehicular or industrial sources.

11.3.5 Noise Environment

Noise level in core zone was 58.8dB (A) Leq during day time and 45.1dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 39.9 to 43.6dB (A) Leq and during night time from 38.9 to 43.2dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.3.6 Biological Environment

The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

Flora in core zone

There are no trees in inside of the mining lease area, but there are 60 *Borassus flabellifer* trees, *Morinda citrifolia* 5 and *Azadirachta indica* 4 within a 7.5-meter safety zone.

Flora in 300 m radius zone

Taxonomically, a total of 33 species belonging to 19 families have been recorded from the 300m radius from the mining lease area. The species in the 300m radius include herbs (18), trees (08), shrubs (05), the 19 families, Fabaceae and Lamiaceae are the main

dominating species in the study area, Species Richness (margalef Index) in the study area it mentioned in Table 3.19-3.21 Moreover, no species are found as threatened category. There is government land around 300 meters. *Vachelia leucophylla* is the dominant tree followed by *Phoenix sylvestris* tree, *Carissa carandas*, *Casapella thevetia* and *Lantana camara* tree.

Flora in 10 km radius buffer zone

In the buffer zone, a total of 81 species belonging to 41 families were recorded. Among them are trees (32), shrubs (14), herbs (38), climbers (09), creepers (5), grasses (4), and cactus (1). Majority of the species belongs to the family of Fabaceae and Poaceae, as mentioned in Table 3.28. Species Richness (margalef Index) in the study area it mentioned in Table 3.22 Moreover, no species are found as threatened category.

Fauna in Core Zone

A total of 22 species belonging to 15 families were observed in the core zone (Table 3.24). Among them are 9 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Avian. None of these species are threatened or endemic in the study area and surroundings. There are no Schedule I species and 8 species are under schedule IV according to Indian wild life Act, 1972. There are no critically endangered, endangered, vulnerable and endemic species in the core zone.

Fauna in Buffer Zone

A total of 44 species belonging to 34 families were recorded from the buffer area. Among them were 20 species of Birds, 13 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Amphibians, as mentioned in Table.3.25. There are four species under Schedule II and twenty-six species under schedule IV according to Indian wild life Act 1972. And there are no critically endangered, vulnerable and endemic species in the buffer area. There is no schedule I Species in study area and there are no critically endangered, endangered, vulnerable and endemic species.

11.3.7 Socio Economic Environment

The proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of people's standard of living.

11.4 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs. 1,06,72,478** as capital cost and recurring cost as **Rs. 31,65,880** as recurring cost/annum is proposed considering present market price considering present market scenario for the

proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 2,83,34,603.**

11.5 OVERALL STUDY AREA CONCLUSION

The Environmental Impact Assessment (EIA) for the proposed rough stone and gravel quarry project in Kundiyathandalam Village, Tiruvannamalai District, Tamil Nadu, has comprehensively evaluated the baseline environmental conditions and projected impacts associated with quarry operations. The study concludes that the project is environmentally sustainable with appropriate mitigation and management practices in place.

The land use analysis using Sentinel II imagery reveals that agricultural land dominates the study area, with limited urbanization and industrial activity. While minor land use changes are expected due to quarrying, these are localized and reversible.

The soil environment is assessed to be healthy and agriculturally productive, with good moisture retention, neutral to slightly alkaline pH, and moderate nutrient levels.

Surface and groundwater quality are generally good. Surface water meets all drinking and irrigation standards with minimal treatment, and groundwater is safe for consumption after mild treatment for hardness and taste. No microbial contamination was detected, and key parameters fall within permissible limits.

Air quality and noise levels are within Central Pollution Control Board (CPCB) norms, and the Air Quality Index remains causing minimal impact to human health. Quarrying impacts on air and noise can be effectively controlled through dust suppression, green belt development, and controlled blasting techniques.

The biological environment in the core zone shows limited flora and fauna due to existing quarry activity, but the buffer zone hosts a healthy diversity of species with no presence of endangered or migratory species. Green belt development and post-mining reclamation plans are proposed to enhance biodiversity and carbon sequestration.

The socio-economic environment will benefit from direct and indirect employment, infrastructure development, and improved livelihoods. The project also contributes to the local economy through taxes, royalty payments, and community development initiatives under Corporate Environmental Responsibility (CER).

Potential environmental impacts such as dust, noise, and runoff are anticipated but can be managed with the proposed Environment Management Plan (EMP). Adequate provisions have been made for water management, air pollution control, soil conservation, occupational health, and post-mining restoration. Risk assessment and a disaster management plan have been integrated to ensure safety and emergency preparedness.

Overall, the study concludes that the proposed quarry project is technically feasible, environmentally sound, and socio-economically beneficial. With strict implementation of the mitigation measures and monitoring programs, the project can proceed without causing significant adverse impacts on the environment or local communities.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, **M/s.S.A.Enterprises** has engaged **Geo Technical Mining Solutions**, a NABET accredited consultancy for carrying out the EIA study as per the ToR issued.

Address of the consultancy:

No: 1/213B Natesan Complex,
Oddapatti, Dharmapuri – 636705,
Tamil Nadu, India.
Email:info.gtmsdpi@gmail.com
Web: www.gtmsind.com
Phone: 04342 232777.

The accredited experts and associated members who were engaged in this EIA study are given below:

S.No.	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
Approved Functional Area Experts & EC					
1.	Dr. R. Arunbalaji	EIA Coordinator (EC) In-house	1(a)(i)	AQ	B
2.	G. Umamaheswaran	In-house, FAE	1(a)(i)	GEO	B
3.	G. Prithiviraj	In-house, FAE	1(a)(i)	LU	B
4.	G. Umamaheswaran	In-house, FAE	1(a)(i)	HG	B
5.	Dr.R.Arunbalaji	In-house, FAE	1(a)(i)	AP	B
6.	R.Revathy	In-house, FAE	1(a)(i)	WP	B
7.	Dr.R.Arunbalaji	In-house, FAE	1(a)(i)	NV	B
8.	J.Rajarajeshwari	In-house, FAE	1(a)(i)	SC, EB	B
9.	Dr. G. Prabakaran	In-house, FAE	1(a)(i)	SE	B
10.	J.N. Manikandan	Empanelled FAE	1(a)(i)	RH, SHW	B
Approved Functional Area Associates					
11.	R.Srikrishna	FAA	1(a)(i)	LU	B
12.	K.Prithivi	FAA	1(a)(i)	HG	B
13.	R.Srikrishna	FAA	1(a)(i)	Geo	B
Team Members					
14.	G. Umamaheswaran	TM	1(a)(i)	TM for EC	-

15.	M.Muralidharan	TM	1(a)(i)	TM for FAE NV, HW	-
16.	A.Jothibas	TM	1(a)(i)	AP & AQ	-

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the EIA & EMP report.

Signature : 

Date :

Name : **Dr.R. Arun Balaji**

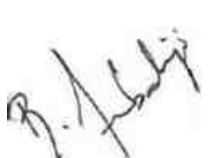
Designation : EIA Coordinator

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

We, the FAEs, FAAs and TM hereby declare that information furnished in this EIA/EMP report for **M/s.S.A.Enterprises**, rough stone and gravel quarry project with the extent of 4.96.0ha situated in the cluster with the extent of 10.35.50ha in Kundiyathandalam Village, Vembakkam Taluk, Tiruvannamalai District, and Tamil Nadu is true and correct to the best of our knowledge.

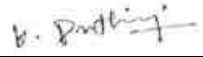
List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity ○ Prediction of air pollution and propose mitigation measures / control measures	Dr.R.Arunbalaji	
2	WP	○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving	R.Revathy	

		environment/water bodies and suggesting control measures.		
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	G. Umamaheswaran	
4	GEO	○ Field Survey for assessing the regional and local geology of the area. ○ Preparation of mineral and geological maps. ○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	G. Umamaheswaran	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility.	Dr. G. Prabakaran	
6	EB	○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna. ○ Suggesting species for greenbelt development.	J.Rajarajeshwari	
7	RH	○ Identification of hazards and hazardous substances	J.N. Manikandan	

		○ Risks and consequences analysis ○ Vulnerability assessment ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety.		
8	LU	○ Construction of Land use Map ○ Impact of project on surrounding land use ○ Suggesting post closure sustainable land use and mitigative measures.	G. Prithiviraj	
9	NV	○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP.	Dr.R. Arun Balaji	
10	AQ	○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ Recommending mitigations measures for EMP	Dr.R. Arun Balaji	
11	SC	○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation	J.Rajarajeshwari	
12	SHW	○ Identify source of generation of non-hazardous solid waste and hazardous waste. ○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	J.N. Manikandan	

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	R.Srikrishna	LU	○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU	
2	R.Srikrishna	GEO	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
3	K.Prithivi	HG	○ Site visit with FAE ○ Provide inputs & Assisting FAE for HG	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for **M/s.S.A.Enterprises**, rough stone and gravel quarry project with the extent of 4.96.0ha situated in the cluster with the extent of 10.35.50ha in Kundiyathandalam Village, Vembakkam Taluk, Tiruvannamalai District, and Tamil Nadu is true and correct to the best of our knowledge.

Signature

:



Date

:

Name

: **Dr. S. Karuppannan**

Designation

: Managing Partner

Name of the EIA Consultant Organization

: Geo Technical Mining Solutions

NABET Certificate No & Issue Date

: NABET/EIA/23-26/RA 0319

Validity

: Till 31.12.2026



File No: 13038
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA),
TAMIL NADU)



Dated: 22/12/2025



To,

Thiru. Sarankumar
M/s. S A ENTERPRISES
No.2, Kurunji Nagar, 1st Main Road, Abdul Kalam Park, Old Perungalattur, Chennai District - 600063.
TAMIL NADU.
info.saenterprises2025@gmail.com

Subject: Grant of Terms of Reference along with Public Hearing under the provision of the EIA Notification 2006-regarding.

Sir/Madam,

Sub: SEIAA, TN - Proposed Rough Stone & Gravel Quarry over an Extent of 4.96.0 Ha in S.F. Nos. 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu by M/s. S.A. Enterprises - under project category - "B1" and Schedule S.No.1(a) "Mining of Minerals Projects" of EIA Notification, 2006, as amended - **ToR issued along with Public Hearing** - preparation of EIA report - Regarding.

Ref:

1. Online proposal No. SIA/TN/MIN/558866/2025 Dated 20.11.2025.
2. Your application submitted for Terms of Reference dated: 21.11.2025.
3. Minutes of the 647th SEAC meeting held on 04.12.2025.
4. Minutes of the 932nd SEIAA meeting held on 16.12.2025.

2. The particulars of the proposal are as below:

(i) TOR Identification No.	TO25B0108TN5265914N
(ii) File No.	13038
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals, 1(a) Mining of minerals
(vii) Name of Project	Kundiyanthandalam Village Rough Stone and Gravel Quarry Lease

(viii) Name of Company/Organization	S A ENTERPRISES
(ix) Location of Project (District, State)	TIRUVANNAMALAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xi) Applicability of General Conditions	no
(xii) Applicability of Specific Conditions	no

1. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1 (Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

2. The above-mentioned proposal has been considered by SEIAA in the meeting held on 16.12.2025. The minutes of the meeting and all the Application and documents submitted [viz. Form-1 Part A, Part B] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).

4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal of **M/s. S.A. Enterprises** under the provisions of EIA Notification, 2006 and as amended thereof.

5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

6. The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/Regulations or Statutes, as applicable, to the project.

7. This issues with the approval of the Competent Authority.

8. The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

Copy To

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Chairperson, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
5. The District Collector, Tiruvannamalai District.
6. Stock File.

Annexure 1

Specific Terms of Reference s for (Mining Of Minerals)

1. Seiaa Specific Conditions :

S. No	Terms of Reference
1.1	The Authority noted that the subject was placed in the 647th meeting of SEAC-I held on

S. No	Terms of Reference
	04.12.2025. After detailed discussions, the Authority accepts the recommendation of SEAC-I and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 6,35,925 m³ of Rough Stone and 3,14,313 m³ of Gravel up to the depth of 60m BGL and the annual peak production should not exceed 1,28,352 m³ of Rough Stone & 1,29,039 m³ of gravel as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-I & normal conditions & the SEIAA Specific & Standard conditions.

2. Seac Conditions - Site Specific

S. No	Terms of Reference
2.1	1. A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: (i) Copy of the agreement forming CMC. (ii) The Organization chart of the Committee with defining the role of the members (iii) The 'Standard Operating Procedures' (SoP) executing the planned activities. 2. The PP shall ensure the installation of CCTV at the proposed quarry site and ensure its inclusion during the EIA presentation. 3. The PP shall furnish details of compensatory plantation in the ratio of 1:10 (i.e. planting of 10 trees for every 1 tree that is cut) where the trees need to be cut with prior permission from the concerned local authority.

3. Seiaa Standard Conditions :

S. No	Terms of Reference
3.1	<u>Cluster Management Committee</u> 1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry. 2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc., 3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines. 4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. 5. The committee shall deliberate on risk & emergency management plan, fire safety & evacuation plan and sustainable development goals pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. 6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report.

S. No	Terms of Reference
	7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner. 8. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity. <u>Agriculture & Agro-Biodiversity</u> 9. Impact on surrounding agricultural fields around the proposed mining Area. 10. Impact on soil flora & vegetation around the project site. 11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP. 12. The Environmental Impact Assessment should study the agro-biodiversity, agro- forestry, horticultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. <u>Forests</u> 15. The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife. 16. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 17. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 18. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. <u>Water Environment</u> 19. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. 20. Erosion Control measures. 21. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 23. The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment, by the activities. 24. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. 25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. 27. The EIA shall include the impact of mining activity on the following: - Hydrothermal/Geothermal effect due to destruction in the Environment. - Bio-geochemical processes and its foot prints including Environmental stress. - Sediment geochemistry in the surface streams. <u>Energy</u>

S. No	Terms of Reference
	28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished. <u>Climate Change</u> 29. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. 30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features. 31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood. <u>Mine Closure Plan</u> 32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued. <u>EMP</u> 33. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs. 34. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan. <u>Risk Assessment</u> 35. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining. <u>Disaster Management Plan</u> 36. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/unfavorable accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. <u>Others</u> 37. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc. 38. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan. 39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the Environment. The ecological risks and impacts of plastic & microplastics on aquatic Environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994

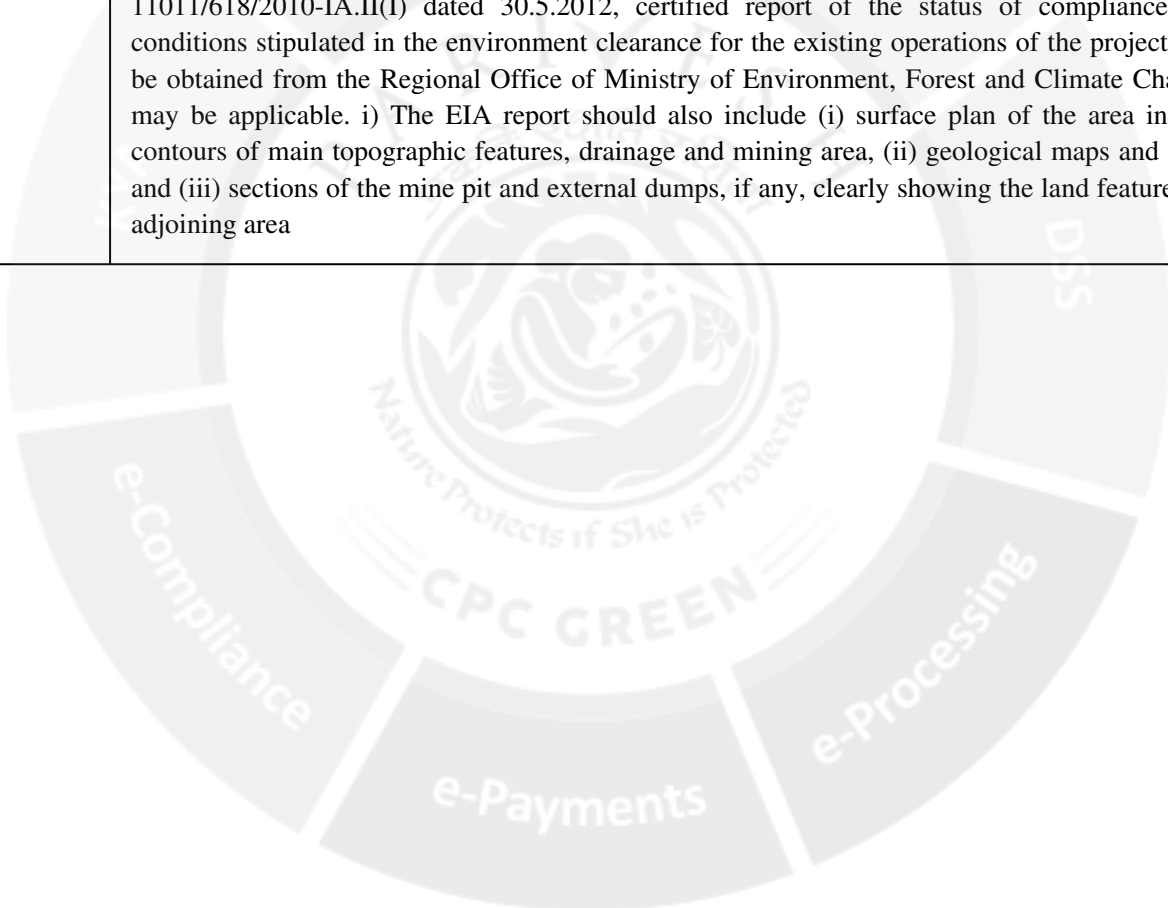
S. No	Terms of Reference
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)
1.5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics
1.6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority
1.7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided
1.9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period
1.10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given
1.12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it

S. No	Terms of Reference
	would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees
1.13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished
1.14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given
1.16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted
1.17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished
1.18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)
1.21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in

S. No	Terms of Reference
	the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report
1.22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given
1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map
1.24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided
1.26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided
1.27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided
1.28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished
1.29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out
1.30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same
1.31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating

S. No	Terms of Reference
	the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report
1.34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report
1.35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed
1.36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations
1.37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation
1.38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report
1.43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc

S. No	Terms of Reference
1.44	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area



SEAC Standard conditions

1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:
 - (i) Original pit dimension
 - (ii) Quantity achieved Vs EC Approved Quantity
 - (iii) Balance Quantity as per Mineable Reserve calculated.
 - (iv) Mined out Depth as on date Vs EC Permitted depth
 - (v) Details of illegal/illicit mining
 - (vi) Violation in the quarry during the past working.
 - (vii) Quantity of material mined out outside the mine lease area
 - (viii) Condition of Safety zone/benches
 - (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.
2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.
3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.
5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-

IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.

8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.
9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.
11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
 13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
 14. Quantity of minerals mined out.
 - Highest production achieved in any one year
 - Detail of approved depth of mining.
 - Actual depth of the mining achieved earlier.
 - Name of the person already mined in that leases area.
 - If EC and CTO already obtained, the copy of the same shall be submitted.
 - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
 15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the

mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,
17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.

23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
28. Impact on local transport infrastructure due to the Project should be indicated.
29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.

33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.

43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be

given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed

to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
 - a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - e) Where the documents provided are in a language other than English, an English translation should be provided.
 - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
 - g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
 - h) Changes, if any made in the basic scope and project parameters (as submitted in

Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

In addition to the above, the following shall be furnished:-

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance

Manual for Mining of Minerals published February 2010.

11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent

should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

Besides the above, the below mentioned general points should also be followed:-

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
 - After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
 - The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.

- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.



From
Dr.S.Vediappan, M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Tiruvannamalai - 4.

To
M/s.S.A.Enterprises,
No.2, Kurinji Nagar,
1st Main Road, Abdul Kalam Park,
Old Perungalattur,
Chennai District 600 063..

Rc.No.425/Kanimam/2025, dated 10.11 .2025.

Sir,

Sub: Mines and Minerals – Minor Mineral - Rough stone and Gravel - Tiruvannamalai District – Vembakkam Taluk - Kundiyanthandalam Village Patta land SF.Nos. 139, 140/1A & etc., over an extent of 4.96.0 hecsts., – Application preferred by M/s.S.A.Enterprises - Precise area communicated – Submission of three copies of draft Mining Plan for approval - Approval accorded - regarding.

Ref: 1. M/s.S.A.Enterprises Online Application No.25TVM0403048 dated. 20.05.2025.
2. Precise Area Communication Notice Rc.No.425/Kanimam/2025, dated 17.10.2025.
3. Mining Plan submitted by M/s.S.A.Enterprises dated 17.10.2025.

M/s.S.A.Enterprises has preferred an application for the grant of Rough Stone and Gravel quarry lease over an extent of 4.96.0 hecsts., of Patta land in SF.Nos. 139 (1.89.0), 140/1A (0.12.5), 140/1B (0.12.5), 144/1A1 (0.29.50), 144/1A2 (0.05.0), 145/1A (0.22.50), 145/1B1 (0.10.0), 145/1B2 (0.09.5), 145/1B3 (0.03.0), 145/2A (0.15.0), 145/2B1 (0.11.34), 145/2B2 (0.19.16), 145/3A (0.33.0), 145/4 (0.21.0), 145/5A (0.03.0), 145/5B (0.26.0), 145/7A (0.09.5), 145/7B (0.08.5), 145/9A1 (0.04.0), 145/9A2 (0.03.5), 145/9B (0.07.5), 145/10 (0.14.5) & 145/11 (0.26.5) of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District for a period of 10 (Ten years) vide in the reference 1st cited and the precise area has been communicated to the applicant vide in the reference 2nd cited with a direction to submit the approved mining plan and Environmental Clearance.

2. Accordingly, the applicant has submitted three copies of mining plan for approval vide in the reference 3rd cited. The Mining Plan has been verified

in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

Depth in Mts.	Geological Resources			Mineable Reserves		
	Mineral	in Cbm	in Tons	Mineral	in Cbm	in Tons
60m (BGL)	Rough Stone	2531181	6960748	Rough Stone	635925	1748794
	Gravel	446679	893358	Gravel	314313	628626

ii) Year wise production proposed for the 1st five year period are as follows:-

Year	Rough Stone Quantity		Gravel Quantity	
	CBM	Tons	CBM	Tons
I	127659	351062	129039	258078
II	127434	350444	95580	191160
III	128256	352704	89694	179388
IV	124224	341616	-	-
V	128352	352968	-	-
Total	635925	1748794	314313	628626

3. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:-

- The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.
- This approval of the mining plan does not in any way convey the approval of the Government in terms or any other provisions of the Mines and Minerals (Development and Regulation) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

- iii. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- iv. Scheme of Mining shall be submitted for the 2nd five year 180 Days prior to expiry of 1st five year period as stipulated in rule 41 (a) of TNMMCR.
- v. Quarrying shall be done in accordance with the approved Mining Plan.
- vi. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- vii. All the conditions stipulated in the precise area communication dated 17.10.2025 should be duly complied with.

4. Further, other quarries situated within 500m radial distance are as follows.

Existing Quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
Nagarajan	Kundiyanthandalam 154/1B1B (0.30.0), 154/2A (0.17.5), 154/2B1 (0.18.5), 154/3 (0.14.5), 154/4 (0.09.0), 154/5 (0.08.0), 155/2A (0.07.0) & 155/2B (1.05.0)	2.51.5	09.10.2023 to 08.10.2033	Existing Quarry
William	Kundiyanthandalam 159 (1.79.0), 160 (0.33.0), 164/2 Part (0.76.0)	2.88.0	24.12.2021 to 23.12.2026	

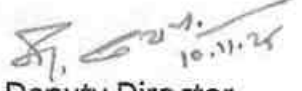
Abandoned quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
S.Gunasekaran	Kundiyanthandalam 141, 142/1, 142/3, 142/4B, 142/5C, 142/6, 144/1A5B, 144/1A6B, 145/8 & 145/9B	1.86.8	23.09.2020 to 22.09.2025	Expired Quarry

Present Proposed Quarries

Sl. No	Name of the Owner	Village & S.F. Nos.	Extent in Hects.
1	M/s.S.A.Enterprises,	139 (1.89.0), 140/1A (0.12.5) & etc.,	4.96.0

Encl: 2 Copies of Approved Mining Plan.


Deputy Director,
Geology and Mining,
Tiruvannamalai.

Copy submitted to:

1. The Chairman, SEIAA,
Tamil Nadu, 3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Director of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.
4. The Regional Joint Director, Geology and Mining, Villupuram.


10/11/25

From
Dr.S.Vediappan, M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Tiruvannamalai - 4.

To
M/s.S.A.Enterprises,
No.2, Kurinji Nagar,
1st Main Road, Abdul Kalam Park,
Old Perungalattur,
Chennai District 600 063..

Rc.No.425/Kanimam/2025, dated 10.11 .2025.

Sir,

Sub: Mines and Minerals – Minor Mineral - Rough stone and Gravel - Tiruvannamalai District – Vembakkam Taluk - Kundiyanthandalam Village Patta land SF.Nos. 139, 140/1A & etc., over an extent of 4.96.0 hecsts., – Application preferred by M/s.S.A.Enterprises - Precise area communicated – Submission of three copies of draft Mining Plan for approval - Approval accorded - regarding.

Ref: 1. M/s.S.A.Enterprises Online Application No.25TVM0403048 dated. 20.05.2025.
2. Precise Area Communication Notice Rc.No.425/Kanimam/2025, dated 17.10.2025.
3. Mining Plan submitted by M/s.S.A.Enterprises dated 17.10.2025.

M/s.S.A.Enterprises has preferred an application for the grant of Rough Stone and Gravel quarry lease over an extent of 4.96.0 hecsts., of Patta land in SF.Nos. 139 (1.89.0), 140/1A (0.12.5), 140/1B (0.12.5), 144/1A1 (0.29.50), 144/1A2 (0.05.0), 145/1A (0.22.50), 145/1B1 (0.10.0), 145/1B2 (0.09.5), 145/1B3 (0.03.0), 145/2A (0.15.0), 145/2B1 (0.11.34), 145/2B2 (0.19.16), 145/3A (0.33.0), 145/4 (0.21.0), 145/5A (0.03.0), 145/5B (0.26.0), 145/7A (0.09.5), 145/7B (0.08.5), 145/9A1 (0.04.0), 145/9A2 (0.03.5), 145/9B (0.07.5), 145/10 (0.14.5) & 145/11 (0.26.5) of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District for a period of 10 (Ten years) vide in the reference 1st cited and the precise area has been communicated to the applicant vide in the reference 2nd cited with a direction to submit the approved mining plan and Environmental Clearance.

2. Accordingly, the applicant has submitted three copies of mining plan for approval vide in the reference 3rd cited. The Mining Plan has been verified

in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

Depth in Mts.	Geological Resources			Mineable Reserves		
	Mineral	In Cbm	In Tons	Mineral	In Cbm	In Tons
60m (BGL)	Rough Stone	2531181	6960748	Rough Stone	635925	1748794
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ii) Year wise production proposed for the 1st five year period are as follows:-

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IV	124224	341616	-	-
V	128352	352968	-	-
Total	635925	1748794	314313	628626

3. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:-

- The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.
- This approval of the mining plan does not in any way convey the approval of the Government in terms or any other provisions of the Mines and Minerals (Development and Regulation) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

- iii. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- iv. Scheme of Mining shall be submitted for the 2nd five year 180 Days prior to expiry of 1st five year period as stipulated in rule 41 (a) of TNMMCR.
- v. Quarrying shall be done in accordance with the approved Mining Plan.
- vi. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- vii. All the conditions stipulated in the precise area communication dated 17.10.2025 should be duly complied with.

4. Further, other quarries situated within 500m radial distance are as follows.

Existing Quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
Nagarajan	Kundiyanthandalam 154/1B1B (0.30.0), 154/2A (0.17.5), 154/2B1 (0.18.5), 154/3 (0.14.5), 154/4 (0.09.0), 154/5 (0.08.0), 155/2A (0.07.0) & 155/2B (1.05.0)	2.51.5	09.10.2023 to 08.10.2033	Existing Quarry
William	Kundiyanthandalam 159 (1.79.0), 160 (0.33.0), 164/2 Part (0.76.0)	2.88.0	24.12.2021 to 23.12.2026	

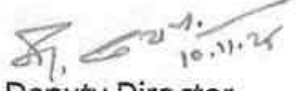
Abandoned quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
S.Gunasekaran	Kundiyanthandalam 141, 142/1, 142/3, 142/4B, 142/5C, 142/6, 144/1A5B, 144/1A6B, 145/8 & 145/9B	1.86.8	23.09.2020 to 22.09.2025	Expired Quarry

Present Proposed Quarries

Sl. No	Name of the Owner	Village & S.F. Nos.	Extent in Hects.
1	M/s.S.A.Enterprises,	139 (1.89.0), 140/1A (0.12.5) & etc.,	4.96.0

Encl: 2 Copies of Approved Mining Plan.


Deputy Director,
Geology and Mining,
Tiruvannamalai.

Copy submitted to:

1. The Chairman, SEIAA,
Tamil Nadu, 3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Director of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.
4. The Regional Joint Director, Geology and Mining, Villupuram.


10/11/25

MINING PLAN

FOR

KUNDIYANTHANDALAM VILLAGE ROUGH STONE AND GRAVEL MINING LEASE

WITH PROGRESSIVE QUARRY CLOSURE PLAN

Patta land /Open Cast-Semi-Mechanized mining/Non- Forest/Non-Captive Use

Lease period 5 Years from the date of lease execution

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

LOCATION OF THE LEASE AREA

STATE : TAMILNADU
 DISTRICT : TIRUVANNAMALAI
 TALUK : VEMBAKKAM
 VILLAGE : KUNDIYANTHANDALAM
 S.F. No's : 139, 140/1A, 140/1B, 144/1A1,
 144/1A2, 145/1A, 145/1B1,
 145/1B2, 145/1B3, 145/2A,
 145/2B1, 145/2B2, 145/3A, 145/4,
 145/5A, 145/5B, 145/7A, 145/7B,
 145/9A1, 145/9A2, 145/9B,
 145/10 & 145/11
 EXTENT : 4.96.0 Hectares

ADDRESS OF THE APPLICANT

M/s.S.A.Enterprises,
 No.2, Kurunji Nagar,
 1st Main Road, Abdul Kalam Park,
 Old Perungalattur,
 Chennai District - 600063.

PREPARED BY

Dr. S. KARUPPANNAN. MSc., Ph.D.
 Qualified Person



GEO TECHNICAL MINING SOLUTIONS
 (ANABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,
 Oddapatti, Collectorate Post office, Dharmapuri -636705
 Ph: +91 9443937841, 7010076633
 E-mail: info.gtmsdpi@gmail.com,
 Website: www.gtmsind.com

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ANNEXURES

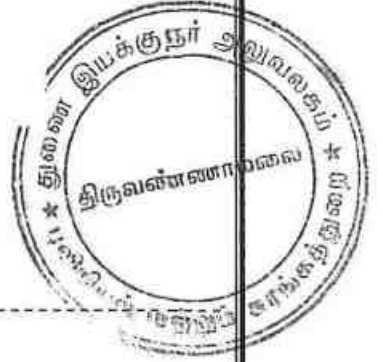
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1.	Copy of precise area communication letter	I
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9.	Photo copy of the applied lease area	IX
10.	Copy of ID Proof of the authorized signatory	X
11.	Copy of Qualified Person Certificate	XI

LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Toposheet Map	I-B	1:1,00,000
4	Satellite Imagery Map	I-C	1: 5,000
5	Environmental Plan	I-D	1: 5,000
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8	Geological Sections	IIIA	Sections Hor 1:1000 Ver 1:500
9	Conceptual Plan and Sections	IV	Plan 1:2000 Sections Hor 1:1000 Ver 1:500
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11	Mine Layout Plan and Land Use Pattern	V	Plan 1:2000
12	Year wise Development, Production Plan and Sections	VI	Plan 1:2000 Sections Hor 1:1000 Ver 1:500
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M/s.S.A.Enterprises,
No.2, Kurunji Nagar,
1st Main Road, Abdul Kalam Park,
Old Perungalattur,
Chennai District - 600063.



CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry lease in patta land at S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over an extent of 4.96.0 hectares of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State has been prepared by

Dr. S. KARUPPANNAN. M.Sc., Ph.D. (Qualified Person)

I request **Deputy Director**, Department of Geology and Mining, Tiruvannamalai District to make further correspondence regarding modifications of the Mining Plan with the said Qualified Person on this following address,

Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,

Qualified Person

GEO TECHNICAL MINING SOLUTIONS

(A NABET Accredited & ISO Certified Company)

No: 1/213-B, Ground Floor, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, 7010076633,

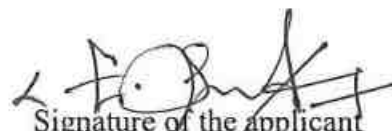
E-mail: info.gtmsdpi@gmail.com,

Website: www.gtmsind.com

I hereby undertake that all modifications so made in the Mining Plan by the Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

Place: Chennai, TN.

Date:


Signature of the applicant
(M/s.S.A.Enterprises)



M/s.S.A.Enterprises,
No.2, Kurunji Nagar,
1st Main Road, Abdul Kalam Park,
Old Perungalattur,
Chennai District - 600063.

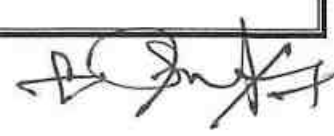
DECLARATION

The Mining Plan in respect of rough stone and gravel quarry lease in Patta land at S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over an extent of 4.96.0 hectares of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State have been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

Place: Chennai, TN.

Date:


Signature of the applicant
(M/s.S.A.Enterprises)



Dr. S. KARUPPANNAN. M.Sc., Ph.D.

Qualified Person

GEO TECHNICAL MINING SOLUTIONS

(A NABET accredited & ISO certified Company)

No: 1/213-B, Ground Floor, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

E-mail: info.gtmsdpi@gmail.com,

Website: www.gtmsind.com



CERTIFICATE

This is to certify that, the provisions of 19 Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone and gravel quarry lease in S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over an extent of 4.96.0 hectares of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State granted to **M/s.S.A.Enterprises**, Chennai District.

Wherever specific permission / exemptions / relaxations or approvals are required, the applicant will approach the concerned authorities of State and Central governments for granting such permissions etc.

Place: Dharmapuri, TN

Date: 27/10/25

Signature of the Qualified Person

Dr.S.KARUPPANNAN, M.Sc, Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, TamilNadu, India

Dr. S. KARUPPANNAN. M.Sc., Ph.D.

Qualified Person

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No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

E-mail: info.gtmsdpi@gmail.com,

Website: www.gtmsind.com



CERTIFICATE

I certify that, in preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over an extent of 4.96.0 hectares of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State prepared to **M/s.S.A.Enterprises**, Chennai District, covers all the provisions of Mines Act, Rules, and Regulations etc., made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date: 27/10/25

Signature of the Qualified Person

Dr.S.KARUPPANNAN,M.Sc,Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, TamilNadu, India

MINING PLAN

FOR KUNDIYANTHANDALAM VILLAGE ROUGH STONE AND GRAVEL MINING

LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

Patta land / Open cast-Semi-Mechanized mining/Non-forest/Non-Captive Use

Lease period 5 Years from the date of lease execution

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

INTRODUCTORY NOTES:

- a) **Introduction:** The Mining plan with progressive quarry closure plan is prepared for M/s.S.A.Enterprises, office at No.2, Kurunji Nagar, 1st Main Road, Abdul Kalam Park, Old Perungalattur, Chennai District, Tamilnadu State – 600063 and filed with application for new proposals has submitted to the Department of Geology and Mining, Tiruvannamalai dated 20.05.2025 had requested to grant the quarry lease for rough stone and gravel in S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over an extent of 4.96.0 hectares of Kundiyanthandalam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State.
- b) **The Precise area communication letter:** The Deputy Director, Department of Geology and mining, Tiruvannamalai has directed to the applicant M/s.S.A.Enterprises, through his precise area communication letter vide **Roc.No.425/Mines/2025 Dated 17.10.2025**, for quarrying lease rough stone and gravel at Tamil Nadu State, Tiruvannamalai District, Vembakkam Taluk, Kundiyanthandalam Village in S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 over an extent of 4.96.0 hectares has recommended as following conditions for a period of Five (5) years under Rule 19 Tamil Nadu Minor Mineral concession rules, 1959.
 - a) The minerals to be quarried shall be transported on payment of seniority amount from time to time as per Schedule II of the Tamil Nadu Minor Mineral Concession Rules, 1959.
 - b) A safety distance of 7.5m should be provided for adjacent patta lands and 10m for government lands.
 - c) Quarrying work should be carried out in accordance with the conditions specified in the technical report of the Executive Engineer, Water Resources

Department, Kilpalar Basin Division, Kanchipuram, leaving a safety distance of 10 m for the canal located in S.F.No. 138 and 146.

- d) Quarrying shall be carried out by experienced explosive users using low-energy explosives without any disturbance to the adjoining Pattadhars without any encroachment on the adjoining Patta and Government lands.
- e) The mining plan shall be submitted within the time limit as per the rules.
- f) The quarry license shall be granted only if the Environmental Impact Assessment Commission has obtained and submitted a no-objection certificate for the area to be granted the quarry license.
- c) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 and submitted under rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for mining lease as per conditions mentioned in the precise area communication letter Roc.No.425/Mines/2025 Dated 17.10.2025.
- d) **Geological resources and Mineable reserves:** Geological resource of estimated as 2977860m^3 or 7854106MT including the resources of safety zone, gravel etc. Of which, rough stone resources of about 2531181m^3 or 6960748MT and gravel is 446679m^3 or 893358MT. The total mineable reserve is estimated to be 950238m^3 or 2377420MT by deducting the reserve safety zone, block in benches from the total Geological resources. of which, rough stone is about 635925m^3 or 1748794MT and gravel is 314313m^3 or 628626MT up to a depth of 60m below ground level. (Refer Plate No. IIIA & IVA).
- e) **Proposed Production Schedule:** Total proposed production of rough stone is 635925m^3 or 1748794MT and gravel is 314313m^3 or 628626MT up to a depth of 60m below ground level for five years lease period. (Refer Plate No.VIA).
- f) **Environmental Sensitivity of the proposed lease area: -**
- Interstate boundary:** There is no interstate boundary around 10Km radius periphery of proposed lease area.
 - Wildlife Sanctuaries any:** There are no notified wildlife sanctuaries within the radius of 10km from the project site under the wildlife (Protection) Act, 1972.
 - Forest (conservation) Act, 1980:** No forest land granted for quarrying and there is no reserve forest around 60m radius.
 - CRZ Notification, 2019:** There is no Sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 2019.

h) Environmental measures to be adopted during the ongoing activity period,

- 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.
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.
- 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.
- And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

a.	Name of the Applicant	:	M/s.S.A.Enterprises
	Applicant address	:	No.2, Kurunji Nagar, 1 st Main Road, Abdul Kalam Park, Old Perungalattur, Chennai District - 600063.
	District	:	Chennai District.
	State	:	Tamilnadu
	Pin code	:	600063
	Phone	:	+91 9940073783
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	---
b.	Status of the Applicant		
	Private individual	:	Private individual
	Cooperative Association	:	---
	Private company	:	---
	Public Company	:	---
	Public Sector Undertaking	:	---
	Joint Sector Undertaking	:	---
	Other (pl. specify)	:	---
c.	Mineral(s) Which are occurring in the area and which the applicant	:	Rough Stone and Gravel Quarry Lease



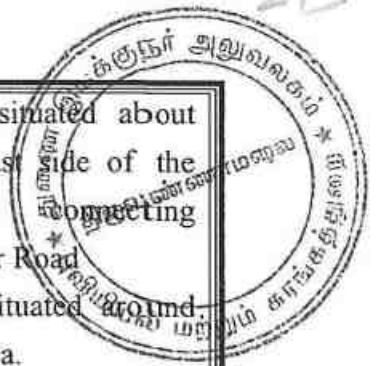
	intends to mine		
d.	Period for which the mining lease granted /renewed/ proposed to be applied :		The precise area has been communicated to the applicant for quarrying period of Five (5) years.
	Name of the QP preparing the Mining Plan :		Dr. S.KARUPPANNAN, M.Sc., Ph.D.
	Address :		GEO TECHNICAL MINING SOLUTIONS No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Ph: +91 9443937841, +917010076633, E-mail: info.gtmsdpi@gmail.com, Website: www.gtmsind.com
	Phone :		+91 9443937841, 7010076633
	Fax :		Nil
	e-mail :		info.gtmsdpi@gmail.com
f.	Name of the prospecting agency :		The Commissioner, Department of Geology and Mining
	Address :		Thiru.Ve.Ka.Industrial Estate,Guindy, Chennai-600032
	Phone :		----
g.	Reference No. and date of consent letter from the state government :		The precise area communication letter issued by the Deputy Director, Department Geology and Mining, Tiruvannamalai vide Roc.No.425/Mines/2025 Dated 17.10.2025.

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB			
	District & State	:	Tiruvannamalai, Tamil Nadu			
	Taluk	:	Vembakkam			
	Village	:	Kundiyanthandalam			
	Khasra No./ Plot No./ Block Range/ Felling Series etc.:					
Survey No	Sub Division	Total Extent in Hect	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F.No.	Mine lease Applied area out of total area in hect.
139	-	1.89.0	920	1.Mr.E.Sarankumar	139	1.89.0
140	1A	0.12.5		S/o.Elumalai	140/1A	0.12.5
140	1B	0.12.5		2.Mr.A.Ayyanar	140/1B	0.12.5
144	1A1	0.29.5		S/o.Annamalai	144/1A1	0.29.5



144	1A2	0.05.0		144/1A2	0.05.0
145	1A	0.22.5		145/1A	0.22.5
145	1B1	0.10.0		145/1B1	0.10.0
145	1B2	0.09.5		145/1B2	0.09.5
145	1B3	0.03.0	927	145/1B3	0.03.0
145	2A	0.15.0		145/2A	0.15.0
145	2B1	0.11.34		145/2B1	0.11.34
145	2B2	0.19.16	920	145/2B2	0.19.16
145	3A	0.33.0		145/3A	0.33.0
145	4	0.21.0		145/4	0.21.0
145	5A	0.03.0	927	145/5A	0.03.0
145	5B	0.26.0		145/5B	0.26.0
145	7A	0.09.5		145/7A	0.09.5
145	7B	0.08.5	920	145/7B	0.08.5
145	9A1	0.04.0		145/9A1	0.04.0
145	9A2	0.03.5		145/9A2	0.03.5
145	9B	0.07.5	933	145/9B	0.07.5
145	10	0.14.5	927	145/10	0.14.5
145	11	0.26.5	920	145/11	0.26.5
Total Extent		4.96.0	Applied lease area extent		4.96.0
Lease area (hectares)			:	4.96.0 Hectares	
Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)			:	The proposed lease area is recorded as patta land. (Ref.Anne.No's:IV)	
Ownership / Occupancy			:	This is a patta land S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 is registered on the name of 1.Mr.E.Sarankumar S/o.Elumalai 2.Mr.A.Ayyanar S/o.Annamalai as patta no.920, 927 & 933.	
Existence of Public Road / Railway line if any nearby and approximate distance			:	✓ Exploited quarry materials will be transported through the approach road is situated on the Eastern side. ✓ There is no NH road situated around 5km radius from the lease area.	



	:	✓ There is an SH-118A is situated about 2.4km away on the northeast side of the lease area which is connecting Kancheepuram – Uthiramerur Road ✓ There is no railway line situated around 5km radius from the lease area.			
Toposheet No. with latitude and longitude	:	Toposheet No. 57 P/10 Latitude: From 12°44'31.09"N to 12°44'38.96"N Longitude: From 79°43'8.05"E to 79°43'22.41"E			
Geo-Coordinates of the lease boundary:					
SI. No.	LATITUDE	LONGITUDE	SI.No.	LATITUDE	LONGITUDE
1	12°44'36.73"N	79°43'20.67"E	14	12°44'34.05"N	79°43'15.99"E
2	12°44'35.47"N	79°43'20.28"E	15	12°44'34.49"N	79°43'13.20"E
3	12°44'36.01"N	79°43'17.80"E	16	12°44'34.13"N	79°43'13.12"E
4	12°44'35.31"N	79°43'17.63"E	17	12°44'34.48"N	79°43'10.83"E
5	12°44'34.91"N	79°43'20.11"E	18	12°44'33.50"N	79°43'10.62"E
6	12°44'34.16"N	79°43'19.87"E	19	12°44'34.39"N	79°43'8.05"E
7	12°44'33.73"N	79°43'20.02"E	20	12°44'35.12"N	79°43'8.10"E
8	12°44'32.69"N	79°43'22.41"E	21	12°44'36.53"N	79°43'8.75"E
9	12°44'31.09"N	79°43'21.47"E	22	12°44'37.12"N	79°43'8.57"E
10	12°44'31.49"N	79°43'20.34"E	23	12°44'38.91"N	79°43'10.79"E
11	12°44'32.29"N	79°43'20.53"E	24	12°44'38.96"N	79°43'12.72"E
12	12°44'32.53"N	79°43'19.85"E	25	12°44'38.52"N	79°43'14.10"E
13	12°44'32.96"N	79°43'18.02"E	26	12°44'37.41"N	79°43'18.16"E
Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is an barren Land.			
b. <i>Attach a general location and vicinity map showing area boundaries and existing and proposed access routes. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.</i>	:	Refer plate no-IA & IB			

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Menalur	1.3Km	West
b.	Nearest police station	Magaral	4.0km	Southeast
c.	Nearest fire station	Kancheepuram	10.2km	North
d.	Nearest medical facility	Ezhacheri	4.0km	South
e.	Nearest school	Melperamanallur	2.6km	Northeast
f.	Nearest railway station	Nathapettai	9.7km	North
g.	Nearest port facility	Chennai	88km	Northeast
h.	Nearest airport	Chennai	57.0km	Northeast
i.	Nearest DSP office	Vandavasi	28.0km	South
j.	Nearest villages	Kundiyanthandalam	0.5km	Northeast
		Suruttal	1.1km	East
		Chinna Elacheri	2.0km	South
		Punaithangal	0.6km	West

PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

(a) Briefly describe the topography and general geology and local/mine geology of the mineral deposit including drainage pattern:

(i)	Topography	:	The proposed lease area is almost flat topography. The maximum elevation (90m) was observed north side of the site. The slope is towards southwest side and falls in Toposheet no. 57 P/10
(ii)	General Geology of the District: The Entire district is underlain by the rocks belonging to hard crystalline rock masses of Archaean age. The Archaean rocks in this area are represented by rocks of eastern Ghat complex comprising charnockites, Migmatite complex of composite gneiss. The district is covered by metamorphic crystalline rocks of charnockite, composite gneiss of Archaean age. These rocks are highly metamorphosed and have been subjected to sever folding, crushing and faulting. Charnockites group is occupied by North and Southern part of the basin. The other rock type is encountered by composite granitic gneiss of Epidote hornblende biotite gneiss and hornblende biotite gneiss are occupy in the middle portion of the basin. Charnockite group occupies the high ground as well as plain and it is poorly weathered and jointed. They are generally black grey to dark grey in colour medium to coarse grained texture, and generally massive and un-foliated. A gneissic rock occurs as linear bands in the middle portion of the area and is highly migmatised. Mostly, micaccous with bands of granites, pegmatites, quartz veins the rock is well foliated. The Hornblende biotite gneiss forms the country rock of the area and epidote hornblende gneiss (Proterozoic age) occurs as small isolated outcrops. The crystalline formations are charnockite, granitic gneiss of Archean age have been intrude by dolerite dykes and pegmatite veins. These rocks are highly metamorphosed and have been subjected to very severe folding, crushing and faulting. The crystalline rocks are subjected to tectonic activities under various orogenic cycles resulting in the development of secondary structures such as joints, fissures and cleavages. The intensity of weathering varies from place to place. Highly weathered zones and granitic rock occurs in masses are around some of the villages like Ariyanallur, Mukkunam, Kaarunkuli Tondur, vedal,) Melokkur, Pennagar, Chinngam(57p/7). The general geological requence of formation is		



given in the Table

Age	Stage	Lithology
Recent	Migmatite	Biotite Gneiss, Hornblende gneiss
Archean	Charnockite Group	Magnetite

(iii)

Local / Mine Geology of The Mineral Deposit:

Topography of the proposed lease area:

The applied lease area exhibits an almost flat topography and the maximum elevation 90m was observed north side of the site. The rocks exhibits layered, medium to coarse grained hornblende biotite, orthopyroxene charnockite gneiss.

The applicant was drilled 5 boreholes in the proposed lease area. The details of boreholes are as tabulated below.

S.No	Bh.No	Elevation	Coordinate		Total Depth (m)	Inclination
1	01	90m	12°44'34.95"N	79°43'9.72"E	60	Vertical
2	02	90m	12°44'37.48"N	79°43'11.78"E	60	Vertical
3	03	90m	12°44'35.99"N	79°43'13.88"E	60	Vertical
4	04	90m	12°44'36.67"N	79°43'17.32"E	60	Vertical
5	05	90m	12°44'34.04"N	79°43'17.53"E	60	Vertical

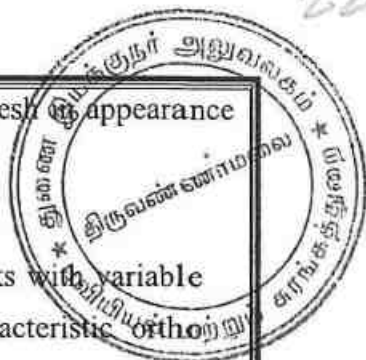
Every 5 meters the drill pit retrieves the samples from the earth replica the DDR3 measurements. Upto 9m depth the pit yields clayey soil without humid. Further the drilling extends 60m depth the hard rock of charnockite obtained from 9m. The surface plan showing elevation, bore hole, contour, accessibility road and Geological map was prepared the proposed lease area.

Mode of origin:

The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures.

Physiography of the rocks:

General characteristics of the rocks of this series has recorded that the rocks



are in general bluish gray or darkish in colour and extremely fresh appearance with an even grained granular structure.

Chemical composition of rocks:

Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic orthopyroxene granite of the series. The alkali feldspar may be intermediate between microcline and orthoclase, the fine micro perthitic texture being common.

Order of superposition of the proposed lease area,

Age	Group	Rock Formation
Recent to Sub recent	----	Gravel
Archaean	Charnockite Group	Charnockites.

(iv) Drainage Pattern : There is no major river found within 50m radius. The drainage in the area is sub-dendritic in nature.

(b) *The topographic plan of the lease area prepared on a scale of 1 :1000 or 1 : 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:*

a. Present status: : The preliminary survey carried out and conformed that the charnockite rock covered by clayey soil. Using DDR3 equipment, the resistivity of the mineral existence conformed. The resistivity shows that there is no variation of upto 9m depth which proves clayey soil. The Geologist in Geo Technical Mining Solutions didn't come to the conclusion due to increase in soil depth may have possibility of water bed near the surface. Drilling is the last steps in the mineral exploration process has yielded sufficiently successful results, physically confirmed any mineralization and further developed the geological picture. Drilling in five places were completed and the samples were collected in core box in the present of GTMS geologist. Every 5 meters the drill pit retrieves the samples from the earth replica the DDR3 measurements. Upto 9m

		depth the pit yields clayey soil without humid. Further the drilling extends 60m depth the hard rock of charnockite obtained from 9m. In this study the Geologist came to the conclusion that 1. Geo Technical & Geological exploration studies are more or less same. 2. Geo Technical study is less expensive than geological exploration. 3. So far in general the geological community accepted that the hydro table appear nearer to the surface where the depth of soil extends more than 10m in dendric nature. 4. No occurrence of Ground water upto 9m depth due to hard rock presence depends upon the intensity and depth of weathering, fractures and fissures present in the rocks.
	b. Surface Plan	: Surface plan showing elevation contour and accessibility road was prepared at the scale of 1: 2000, as shown in Plate No. III.
(c)	Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:	: Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:500, as shown in Plate No. III & IIIA
(d)	<i>Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below:-</i> No future programmed proposed in this area. Its massive homogeneous parent rock. Hence exploration proposal is not required to this mining project.	

(e) Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.

The geological resources were computed by cross section method with respect to the boundaries of the lease area. In this method, the lease area was divided into three longitudinal

and four transverse section to calculate the volume of material up to the depth of 60m below ground level for Five years plan period. (Refer Plate No. III & IIIA). The three longitudinal and four transverse cross section were assigned XY-AB, X1Y1-CD, X1Y1-EF and X2Y2-GH as respectively. Using the cross-sectional method, total reserve is estimated to be 2977860m³ or 7854106MT including the resources of safety zone, and gravel, etc. Of which, rough stone resources of about 2531181m³ or 6960748MT and gravel is 446679m³ or 893358MT.

GEOLOGICAL RESOURCES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	259	141	3	109557	.....	109557	2	.....	219114
	II	259	141	3	109557	.....	109557	2	.....	219114
	III	259	141	3	109557	.....	109557	2	.....	219114
	IV	259	141	3	109557	109557	.....	2.75	301282	.....
	V	259	141	6	219114	219114	.....	2.75	602563.5	.....
	VI	259	141	6	219114	219114	.....	2.75	602563.5	.....
	VII	259	141	6	219114	219114	.....	2.75	602563.5	.....
	VIII	259	141	6	219114	219114	.....	2.75	602563.5	.....
	IX	259	141	6	219114	219114	.....	2.75	602563.5	.....
	X	259	141	6	219114	219114	.....	2.75	602563.5	.....
	XI	259	141	6	219114	219114	.....	2.75	602563.5	.....
	XII	259	141	6	219114	219114	.....	2.75	602563.5	.....
TOTAL				60	2191140	1862469	328671	.....	5121790	657342
X1Y1-CD	I	102	70	3	21420	.....	21420	2	.....	42840
	II	102	70	3	21420	.....	21420	2	.....	42840
	III	102	70	3	21420	.....	21420	2	.....	42840
	IV	102	70	3	21420	21420	.....	2.75	58905	.....
	V	102	70	6	42840	42840	.....	2.75	117810	.....
	VI	102	70	6	42840	42840	.....	2.75	117810	.....
	VII	102	70	6	42840	42840	.....	2.75	117810	.....
	VIII	102	70	6	42840	42840	.....	2.75	117810	.....
	IX	102	70	6	42840	42840	.....	2.75	117810	.....
	X	102	70	6	42840	42840	.....	2.75	117810	.....
	XI	102	70	6	42840	42840	.....	2.75	117810	.....
	XII	102	70	6	42840	42840	.....	2.75	117810	.....
TOTAL				60	428400	364140	64260	.....	1001385	128520
X1Y1-EF	I	77	34	3	7854	.....	7854	2	.....	15708
	II	77	34	3	7854	.....	7854	2	.....	15708
	III	77	34	3	7854	.....	7854	2	.....	15708
	IV	77	34	3	7854	7854	.....	2.75	21598.5	.....
	V	77	34	6	15708	15708	.....	2.75	43197	.....
	VI	77	34	6	15708	15708	.....	2.75	43197	.....



	VII	77	34	6	15708	15708	.....	2.75	43197	.....
	VIII	77	34	6	15708	15708	.....	2.75	43197	.....
	IX	77	34	6	15708	15708	.....	2.75	43197	.....
	X	77	34	6	15708	15708	.....	2.75	43197	.....
	XI	77	34	6	15708	15708	.....	2.75	43197	.....
	XII	77	34	6	15708	15708	.....	2.75	43197	.....
TOTAL				60	157080	133518	23562	.....	367174.5	47124
X2Y2-GH	I	78	43	3	10062	.....	10062	2	.....	20124
	II	78	43	3	10062	.....	10062	2	.....	20124
	III	78	43	3	10062	.....	10062	2	.....	20124
	IV	78	43	3	10062	10062	.....	2.75	27670.5	.....
	V	78	43	6	20124	20124	.....	2.75	55341	.....
	VI	78	43	6	20124	20124	.....	2.75	55341	.....
	VII	78	43	6	20124	20124	.....	2.75	55341	.....
	VIII	78	43	6	20124	20124	.....	2.75	55341	.....
	IX	78	43	6	20124	20124	.....	2.75	55341	.....
	X	78	43	6	20124	20124	.....	2.75	55341	.....
	XI	78	43	6	20124	20124	.....	2.75	55341	.....
	XII	78	43	6	20124	20124	.....	2.75	55341	.....
TOTAL				60	201240	171054	30186	.....	470398.5	60372
GRAND TOTAL					2977860	2531181	446679	.....	6960748	893358

(f) Indicate mineable reserves by slice plan / level plan method, as applicable, as per the proposed mining parameters: -

The total mineable reserve is estimated to be **950238m³** or **2377420MT** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 60m below ground level. Of which, rough stone is about **635925m³** or **1748794MT** and gravel is **314313m³** or **628626MT**. The commercially viable rough stone has been prepared on 1:2000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no's IV & IVA).

MINEABLE RESERVE										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	242	124	3	90024	.....	90024	2	.....	180048
	II	236	118	3	83544	.....	83544	2	.....	167088
	III	230	112	3	77280	.....	77280	2	.....	154560
	IV	224	106	3	71232	71232	.....	2.75	195888.0	.....
	V	218	100	6	130800	130800	.....	2.75	359700.0	.....
	VI	206	88	6	108768	108768	.....	2.75	299112.0	.....
	VII	194	76	6	88464	88464	.....	2.75	243276.0	.....
	VIII	182	64	6	69888	69888	.....	2.75	192192.0	.....

	IX	170	52	6	53040	53040	.....	2.75	145860.0	
	X	158	40	6	37920	37920	.....	2.75	104280.0	
	XI	146	28	6	24528	24528	.....	2.75	67452.0	
	XII	134	16	6	12864	12864	.....	2.75	35376.0	
TOTAL				60	848352	597504	250848	.....	1643136	501696
X1Y1-CD	I	102	55	3	16830	.....	16830	2	.....	29988
	II	102	49	3	14994	.....	14994	2	.....	26316
	III	102	43	3	13158	.....	13158	2	.....	30220
	IV	99	37	3	10989	10989	.....	2.75	30220	.....
	V	96	31	6	17856	17856	.....	2.75	49104	.....
	VI	84	19	6	9576	9576	.....	2.75	26334	.....
TOTAL				24	83403	38421	44982	.....	105658	89964
X1Y1-EF	I	67	19	3	3819	.....	3819	2	.....	7638
	II	64	13	3	2496	.....	2496	2	.....	4992
TOTAL				6	6315	0	6315	.....	0	12630
X2Y2-GH	I	70	26	3	5460	.....	5460	2	.....	10920
	II	67	20	3	4020	.....	4020	2	.....	8040
	III	64	14	3	2688	.....	2688	2	.....	5376
TOTAL				9	12168	0	12168	.....	0	24336
GRAND TOTAL					950238	635925	314313	.....	1748794	628626

4.0 MINING:

a)	Briefly describe the existing / proposed method for developing / working the deposit with all design parameters. (Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)	:	The mining operation is open-cast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961, in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.
b)	Indicate quantum of development and tonnage and grade of production expected pit wise as in table below. Total proposed production of rough stone is 635925m³ or 1748794MT and gravel is 314313m³ or 628626MT up to a depth of 60m below ground level for Five years lease period. (Refer Plate No.VI & VIA).		



Year	Pit No.(s)	Topsoil/ Overburden (m ³)	ROM (m ³)	Saleable rough stone (m ³) @ 100%	Rough stone (MT)	Saleable Gravel (m ³)	Saleable Gravel (MT)	Rough stone to waste ratio
I	I	...	256698	127659	351062	129039	258078	...
II	I	...	223014	127434	350444	95580	191160	...
III	I	...	217950	128256	352704	89694	179388	...
IV	I	...	124224	124224	341616	...	...	...
V	I	...	128352	128352	352968	...	...	...
Grand Total			950238	635925	1748794	314313	628626	...
c) Composite plans and Year wise sections (In case of 'A' class mines):				: Not applicable. It is a "B" class quarry lease				

YEARWISE PRODUCTIONS											
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
I-Year	X1Y1-EF	I	67	19	3	3819	.....	3819	2	.....	7638
		II	64	13	3	2496	.....	2496	2	.....	4992
	X1Y1-CD	I	102	55	3	16830	.....	16830	2	.....	33660
		II	102	49	3	14994	.....	14994	2	.....	29988
		III	102	43	3	13158	.....	13158	2	.....	26316
		IV	99	37	3	10989	10989	.....	2.75	30220	.....
		V	96	31	6	17856	17856	.....	2.75	49104	.....
		VI	84	19	6	9576	9576	.....	2.75	26334	.....
	XY-AB	I	79	124	3	29388	.....	29388	2	.....	58776
		II	73	118	3	25842	.....	25842	2	.....	51684
		III	67	112	3	22512	.....	22512	2	.....	45024
		IV	61	106	3	19398	19398	.....	2.75	53344	.....
		V	55	100	6	33000	33000	.....	2.75	90750	.....
		VI	43	88	6	22704	22704	.....	2.75	62436	.....
		VII	31	76	6	14136	14136	.....	2.75	38874	.....
TOTAL						256698	127659	129039	.....	351062	258078
II-Year	XY-AB	I	90	124	3	33480	.....	33480	2	.....	66960
		II	90	118	3	31860	.....	31860	2	.....	63720
		III	90	112	3	30240	.....	30240	2	.....	60480
		IV	67	106	3	21306	21306	.....	2.75	58592	.....
		V	67	100	6	40200	40200	.....	2.75	110550	.....
		VI	67	88	6	35376	35376	.....	2.75	97284	.....
		VII	67	76	6	30552	30552	.....	2.75	84018	.....
TOTAL						223014	127434	95580	.....	350444	191160



III- Year	XY-AB	I	73	124	3	27156	.....	27156	2	.....	54312
		II	73	118	3	25842	.....	25842	2	.....	51684
		III	73	112	3	24528	.....	24528	2	.....	49056
	X2Y2-GH	I	70	26	3	5460	.....	5460	2	.....	10920
		II	67	20	3	4020	.....	4020	2	.....	8040
		III	64	14	3	2688	.....	2688	2	.....	5376
	XY-AB	IV	96	106	3	30528	30528	.....	2.75	83952	.....
		V	96	100	6	57600	57600	.....	2.75	158400	.....
		VI	76	88	6	40128	40128	.....	2.75	110352	.....
TOTAL					217950	128256	89694	.....	352704	179388	
IV- Year	XY-AB	VI	20	88	6	10560	10560	.....	2.75	29040	.....
		VII	96	76	6	43776	43776	.....	2.75	120384	.....
		VIII	182	64	6	69888	69888	.....	2.75	192192	.....
TOTAL					124224	124224	0	.....	341616	0	
V- Year	XY-AB	IX	170	52	6	53040	53040	.....	2.75	145860	.....
		X	158	40	6	37920	37920	.....	2.75	104280	.....
		XI	146	28	6	24528	24528	.....	2.75	67452	.....
		XII	134	16	6	12864	12864	.....	2.75	35376	.....
TOTAL					128352	128352	0	.....	352968	0	
GRAND TOTAL					950238	635925	314313	.....	1748794	628626	

d)	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	:	Composite plan not prepared in this proposed lease area
e)	Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected: At this rate of production, the expected life of quarry is calculated as given below: <u>Rough stone:</u> Mineable reserves of rough stone (5 Years) = 635925m³ or 1748794MT Annual Peak production = 128352m³ or 352968MT <u>Gravel:</u> Mineable reserves of gravel = 314313m³ or 628626MT		
f)	Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:		
i)	Time frame of completion of mineral exploration program	:	Considering the indefinite depth persistence of the rough stone deposit is proved beyond

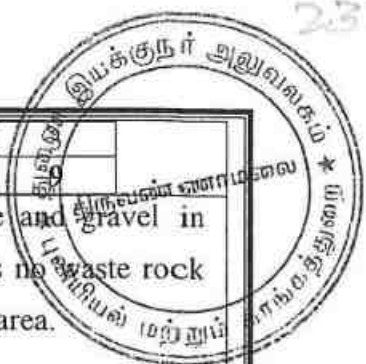
in leasehold area: Give broad description * identified potential areas to be covered in the given time frame:

the workable limits about up to a depth of 60m below ground level (R.L. 90m to 30m) from the petrogenetic character of the charnockite rock as well as from the actual mining practice in the area and with the current trend of rough stone production the quarry may sustain for 5 years.

ii) Whether ultimate pit limit has been determined and demarcated on surface and geological plan :-

The ultimate pit limit has been determined and demarcated in the conceptual plan

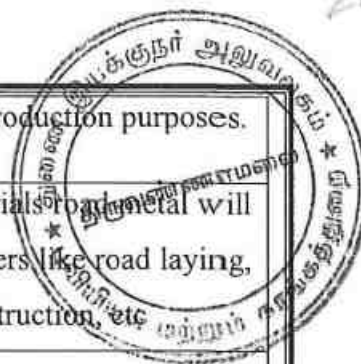
SECTION XY-AB					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	Five years Plan period	Gravel	242	124	3
II			236	118	3
III			230	112	3
IV		Rough stone	224	106	3
V			218	100	6
VI			206	88	6
VII			194	76	6
VIII			182	64	6
IX			170	52	6
X			158	40	6
XI			146	28	6
XII			134	16	6
Total Depth					60
SECTION X1Y1-CD					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	Five years Plan period	Gravel	102	55	3
II			102	49	3
III			102	43	3
IV		Rough stone	99	37	3
V			96	31	6
VI			84	19	6
Total Depth					24
SECTION X1Y1-EF					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	Five years Plan period	Gravel	67	19	3
II			64	13	3
Total Depth					6
SECTION X2Y2-GH					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	Five years Plan period	Gravel	70	26	3
II			67	20	3



		III		Rough stone	64	14	
				Total Depth			
iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: -			:	The recovery of rough stone and gravel in this quarry is 100%. There is no waste rock will be proposed in this lease area.		
iv)	Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal: -			:	As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.		
v)	Whether post mining land use envisaged: -			:	At the end of mining activities over the quarry pit may be utilized for storage of rain water and may be converted in to dumping yards for solid waste by adopting suitable technologies.		
g)	Open cast mining						
i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)			:	It is a fresh quarry lease. The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.		
ii)	Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/waste. A reference			:	The rough stone is proposed to quarry at 6m bench height & width conventional opencast semi mechanized quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack		



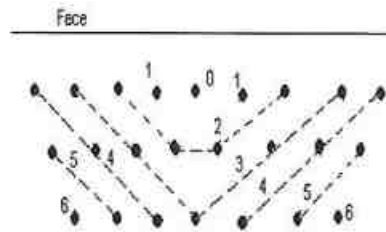
	to the plans enclosed under 4(b) and 4(d) will suffice	hammers, smooth blasting and removal using Hydraulic excavator and loaded directly to the tippers and transported to the needy customer. Bench height = 6mts. Bench width = 6mts.																					
	a. Details of Topsoil/ Overburden	No separate of topsoil will be removed.																					
	b. Rough Stone waste and side burden waste:-	The recovery of rough stone in this quarry is 100%. There is no rough stone waste or side burden will be removed.																					
H	Underground Mining	Not applicable																					
i)	Extent of mechanization: Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.																						
(1) Drilling Machines: Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Details of drilling equipment's are given below.																							
	<table border="1"> <thead> <tr> <th>Type</th><th>Nos</th><th>Dia of hole (mm)</th><th>Size / Capacity</th><th>Make</th><th>Motive power</th><th>H.P.</th></tr> </thead> <tbody> <tr> <td>Jack Hammer</td><td>4</td><td>32 mm</td><td>Hand held</td><td>--</td><td>Diesel</td><td>--</td></tr> <tr> <td>Compressor</td><td>2</td><td>---</td><td>Air</td><td>--</td><td>Diesel</td><td>--</td></tr> </tbody> </table>	Type	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.	Jack Hammer	4	32 mm	Hand held	--	Diesel	--	Compressor	2	---	Air	--	Diesel	--	
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(2) Loading Equipment: <table border="1"> <thead> <tr> <th>Type</th><th>Nos</th><th>Size / Capacity</th><th>Make</th><th>Motive power</th><th>H.P.</th></tr> </thead> <tbody> <tr> <td>Hydraulic Excavator</td><td>1</td><td>2.9-4.5m³</td><td>--</td><td>Diesel</td><td>--</td></tr> </tbody> </table>			Type	Nos	Size / Capacity	Make	Motive power	H.P.	Hydraulic Excavator	1	2.9-4.5m ³	--	Diesel	--									
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(3) Haulage and Transport Equipment (a) Haulage within the mining leasehold: <table border="1"> <thead> <tr> <th>Type</th><th>Nos</th><th>Size / Capacity</th><th>Make</th><th>Motive power</th><th>H.P.</th></tr> </thead> <tbody> <tr> <td>Tipper</td><td>5</td><td>--</td><td>--</td><td>Diesel</td><td>--</td></tr> </tbody> </table>			Type	Nos	Size / Capacity	Make	Motive power	H.P.	Tipper	5	--	--	Diesel	--									
Type	Nos	Size / Capacity	Make	Motive power	H.P.																		
Tipper	5	--	--	Diesel	--																		
Whether the dumpers are fitted with exhaust conditioner should be indicated: The dumpers not used in this quarry area, hence it's a small "B" category mine.																							
b)	Transport from mine head to the destination	Tipper will be used for transport rough stone from the mine head to needy customer.																					
c)	Describe briefly the transport system (please specify)	Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customer's area.																					



	i) Ore transported by: own trucks / hired trucks	Hired trucks for initially production purposes.																								
	ii) Main destination to which ore is transported (giving to and from distance)	The excavated stone materials will be supplied to the consumers like road laying, earth filling, building construction, etc.																								
a)	Details of hauling / transport equipment:																									
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--	--	--	--	--	--																					
4)	(4). Miscellaneous: Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.																									
	(A) Operations	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.																								
	(B) Machineries deployed	Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted.																								
5.	BLASTING: a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc. Blasting pattern: The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. Rough stone production for 5 years = 635925m³ or 1748794MT																									
	<table border="1"> <thead> <tr> <th colspan="2">BLAST DESIGN</th></tr> </thead> <tbody> <tr> <td>Blasthole Diameter (D) in mm</td><td>32</td></tr> <tr> <td>Burden (B) in m</td><td>1.2</td></tr> <tr> <td>Spacing (S) in m</td><td>1.38</td></tr> <tr> <td>Subdrill in m</td><td>0.5</td></tr> <tr> <td>Charge length (C) in m</td><td>0.70</td></tr> <tr> <td>Stemming</td><td>0.5</td></tr> <tr> <td>Hole Length (L) in m</td><td>1.2</td></tr> <tr> <td>Bench Height (BH) in m</td><td>2.5</td></tr> <tr> <td>Mass of explosive/hole in g</td><td>437.5</td></tr> <tr> <td>Stemming material size in mm</td><td>3.2</td></tr> <tr> <td>Burden stiffness ratio</td><td>2.08</td></tr> </tbody> </table>		BLAST DESIGN		Blasthole Diameter (D) in mm	32	Burden (B) in m	1.2	Spacing (S) in m	1.38	Subdrill in m	0.5	Charge length (C) in m	0.70	Stemming	0.5	Hole Length (L) in m	1.2	Bench Height (BH) in m	2.5	Mass of explosive/hole in g	437.5	Stemming material size in mm	3.2	Burden stiffness ratio	2.08
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Blast volume/hole in m ³	4.14
Production of rough stone/day in m ³	454
Number of blast holes/day	110
Number of blast round/day	4
Blasthole pattern	Staggered
Mass of explosive /day in kg	48.0
Powder factor in kg/m ³	0.11
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL

Note: If >2kg of explosives per day use for blasting if proponent get the permission from the DGMS



Staggered method of mining

b) Type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

Small dia. 25mm slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of rough stone. No deep hole drilling or primary blasting is proposed.

c) Measures proposed to minimize ground vibration due to blasting:

The control blasting measures is being adopted for minimizing ground vibration and fly rock.

Shallow depths jack hammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give hearing effect in rough stone for easy excavation and to control fly rock.

Delay detonators:

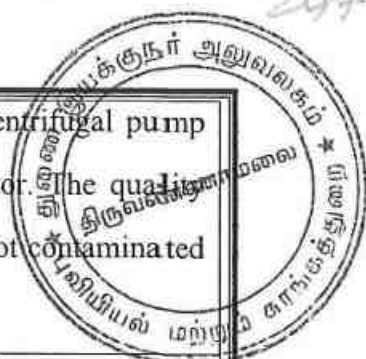
Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals. The major advantages of delay blasting are:

- ❖ Reduction of ground vibration
- ❖ Reduction in air blast
- ❖ Reduction in over break
- ❖ Improved fragmentation
- ❖ Better control of fly rock

Blasting program for the production per day	
No of holes	: 110holes
Yield	: 454m ³
Total explosive required	: 48kg-Slurry explosives
Charge per hole	: 0.5kg
Blasting at day time only	: 12.0p.m-1.0p.m
c)	Powder factor in ore and overburden / waste / development heading / stope : Powder factor is proposed as 0.11kg per hole of explosives
d)	Whether secondary blasting is needed, if so describe it briefly : There is no secondary blasting involved.
e)	Storage of explosives (like capacity and type of explosive magazine) : 1. The applicant is advised to engage an authorized explosive agency to carry out blasting. 2. First Aid Box will be keeping ready at all the time. 3. Necessary precautionary announcement will be carried out before the blasting operation.
6. MINE DRAINAGE:	
a)	Likely depth of water table based on observations from nearby wells and water bodies : The ground water table is reported as of 75m in summer and 70m in rainy season from the general ground level observed in the adjacent bore well.
b)	Workings expected to be _____ m. above / reach below water table by the year _____ : Proposed mining depth is 60m below ground level. Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.
c)	Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be : The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300 L pm and it shall be pumped out periodically by



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	discharged		a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and it is not contaminated with any hazardous things.
7.	STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:		
a).	Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the years: No other wastes are removed during years.		
b).	Land chosen for disposal of waste with proposed justification	:	There is no waste are proposed.
c).	Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise.	:	The recovery of rough stone in this quarry is 100%. If rough stone may be unsold will be keep within the lease boundary.
8.	USE OF MINERAL:		
a).	Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc
b).	Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone (charnockite) and gravel the same are used for building materials and road metal. So, there is no chemical specifications are specified. Only physical specifications are involved.
c).	Give details in case blending of different grades of ores is being practiced or is to be practiced at	:	Not blending process is involved, after blasting the rough stone and gravel will be directly loaded to the needy customer.



	the mine to meet specifications stipulated by buyers.																									
9.	OTHERS																									
	Describe briefly the following a) Site services	: Infrastructure required for such mines like office, stores, canteen, first aid station, shelter, latrine and bath rooms have been provided as per the Metalliferous Mines Regulations, 1961 as a welfare amenity for our quarry laborers.																								
	b) Employment potential: As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision. The following man power is proposed for quarrying stone material during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of as per the MMR, 1961 norms. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">1.</td> <td style="width: 25%;">Highly Skilled</td> <td style="width: 50%;">Mines Manager</td> <td style="width: 20%;">1No.</td> </tr> <tr> <td></td> <td></td> <td>Mine Engineer</td> <td>1No.</td> </tr> <tr> <td></td> <td></td> <td>Mine Geologist</td> <td>1No.</td> </tr> <tr> <td></td> <td></td> <td>Blaster</td> <td>1No.</td> </tr> <tr> <td>2.</td> <td>Unskilled</td> <td>Musdoor / Labours</td> <td>21 No's</td> </tr> <tr> <td colspan="3" style="text-align: right;">Total =</td> <td>25 No's</td> </tr> </table>		1.	Highly Skilled	Mines Manager	1No.			Mine Engineer	1No.			Mine Geologist	1No.			Blaster	1No.	2.	Unskilled	Musdoor / Labours	21 No's	Total =			25 No's
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10	MINERAL PROCESSING/BENEFICIATIONS:																									
(a)	If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.	: Excavated rough stone minerals directly will be used by the applicant for required size ½, ¾ and 1½ inches Jelly which are mainly used in road and building construction purpose. The recovery of rough stone in this quarry is 100%.																								

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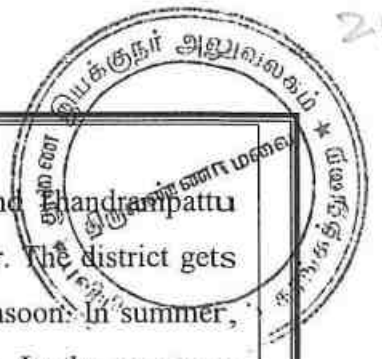
(b)	Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	:	No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.
(c)	A flow sheet or schematic diagram of the processing procedure should be attached.	:	Not applicable.
(d)	Specify quantity and type of chemicals to be used in the processing plant.	:	Not applicable
(e)	Specify quantity and type of chemicals to be stored on site / plant.	:	Not applicable
(f)	Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and of recycling.	:	Drinking is 0.2KLD, utilized water is 0.8KLD, Dust suppression is 1.2KLD and Green Belt is 1.3KLD. Minimum quantity of water 3.5KLD per day. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. The sewage water to a tune of 0.9KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit.

PART – B

11.0 ENVIRONMENTAL MANAGEMENT PLAN:

a) Attach a note on the status of Baseline information with regard to the Following :

11.1	Fresh lease land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.																									
	<table border="1"> <thead> <tr> <th>Sl. No.</th><th>Land Use</th><th>Present area (Hect.)</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Area under Mining</td><td>Nil</td></tr> <tr> <td>2</td><td>Infrastructure</td><td>Nil</td></tr> <tr> <td>3</td><td>Roads</td><td>Nil</td></tr> <tr> <td>4</td><td>Unutilized</td><td>4.96.0</td></tr> <tr> <td>5</td><td>Green belt</td><td>Nil</td></tr> <tr> <td>6</td><td>Settling Tank & Drainage</td><td>Nil</td></tr> <tr> <td></td><td>Grand Total</td><td>4.96.0</td></tr> </tbody> </table>	Sl. No.	Land Use	Present area (Hect.)	1.	Area under Mining	Nil	2	Infrastructure	Nil	3	Roads	Nil	4	Unutilized	4.96.0	5	Green belt	Nil	6	Settling Tank & Drainage	Nil		Grand Total	4.96.0	
Sl. No.	Land Use	Present area (Hect.)																								
1.	Area under Mining	Nil																								
2	Infrastructure	Nil																								
3	Roads	Nil																								
4	Unutilized	4.96.0																								
5	Green belt	Nil																								
6	Settling Tank & Drainage	Nil																								
	Grand Total	4.96.0																								
11.2	Water Regime	: Water table in this area is noticed at a depth of 75m in summer and 70m in rainy season from the general ground level and presently the quarrying of rough stone is ultimate up to a depth of 60m below ground level. Hence, it will not affect the ground water depletion of this area. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development.																								
11.3	Flora and Fauna	: There is no major flora observed in this area and except bushes, shrubs, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.																								
11.4	Quality of air, ambient noise level and water	: Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc..., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.																								



11.5 Climatic conditions:

This district has moderate climate. In Tiruvannamalai and Chidambaram taluks, the climate is cool in winter and hot during summer. The district gets rainfall during both north-east monsoon and southwest monsoon. In summer, from march to June, the wind is hot and uncomfortable. In the monsoon season, from July to November, the wind is mild and from December to February, the wind is cold. The hottest month in this district was April (36.3°C) and coldest month in this district was January (21.2°C). The general climate is tropical. The district receives rainfall from Northeast and Southwest monsoons. The total rainfall during 2016-17 districts is 635.8mm.

11.6 Human Settlement:

The nearest villages are found in the buffer zone with population as per 2011 census.

S.No	Village	Direction	Distance in Kms	Population
1	Kundiyanthandalam	Northeast	0.5km	703
2	Suruttal	East	1.1km	1266
3	Chinna Elacheri	South	2.0km	2080
4	Punaithangal	West	0.6km	707

11.7 Public buildings, places of worship and monuments

No infrastructure like residential building, are found within radius of 300m. The places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.

11.8 Attach plans showing the locations of sampling stations

The proposed Ambient air quality, Water quality Ambient noise level and vibration are periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.

11.9 Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974

The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974

[Handwritten signature]

b) Attach an Environmental Impact Assessment Statement describing the impact of Mining and beneficiation on environment on the following over the next five years (and upto conceptual plan period for 'A' category mines)

i) Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc:

Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:

Sl. No.	Land Use	Area in use during the quarrying period (Hect.)
1	Area under Mining	3.77.35
2	Infrastructure	0.05.0
3	Roads	0.03.0
4	Green Belt	0.49.5
5	Un-Utilized Area	0.47.5
6	Drainage & Settling Tank	0.13.65
Grand Total		4.96.0

ii).	Air Quality	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.
iii).	Water quality	A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.
iv).	Noise levels	Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)	No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity shall be recorded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.



vi).	Water regime	No major river or any oda track are found around 50m radius.
vii).	Socio-economics	1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.	There are no historical monuments, etc found around 300m radius.

c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

i).	temporary storage and utilization of topsoil	:	No separate of topsoil will be removed.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.	:	The present mining is proposed depth of 60m below ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
iii).	Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares. Green Belt Development: Safety barrier, nearby school area and Nearest Panchayat approach Roads		

has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below

Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	4950	550	80%	@100 Rs Per sapling	55,000/-
Second	Approach road and Nearby Village Road	--	400	80%		40,000/-
Third	Schools	--	300	80%		30,000/-
Total						1,25,000/-

iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the five years (and upto conceptual plan period for 'A' category mines).	:	No waste or rejects shall be proposed.
v).	Measures to control erosion / sedimentation of water courses.	:	Not applicable. There is no major dumps are stabilize in this quarry area.
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses.
vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.
viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	It is a small "B" category open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

d). Monitoring schedules for different environmental components after the commencement of mining and other related activities. (for 'A' category mines only)

Not applicable. It is B category quarry

12.0 PROGRESSIVE QUARRY CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The Ultimate mining is proposed to an average depth of 60m below ground level. The mined-out area will be fenced on top of working bench with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 550 trees will be proposed in the quarry area. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	The quarry lease is a fresh mining lease, no mitigation measures observed.
12.4	Mine closure activity	:	The present mining plan is proposed to depth of 60m below ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet,



			goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS, being a mechanized operation.
12.6	Disaster management and Risk Assessment	:	Open cast mining method is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.
12.7	Care and maintenance during temporary discontinuance	:	A board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.
12.8	Economic repercussions of closure of quarry and man power entrenchments	:	During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 25 labors will be improved.

12.9 Proposed Financial Estimate / Budget for (EMP) Environment Management:

A	Fixed Asset Cost:		
	1. Land Cost (https://tnreginet.gov.in)	:	Rs. 26,35,000/-
	2. Labour Shed	:	Rs. 1,00,000/-
	3. Sanitary Facility	:	Rs. 1,00,000/-
	4. Fencing	:	Rs. 5,50,000/-



	5. Other expenses (Security guard, dust bin, etc)	: Rs. 4,00,000/-
	Total	: Rs. 37,85,000/-
B	B. Machinery cost	: Rs. 20,00,000/- (Hire Basis)
C	Total Expenditure of EMP cost (for five years)	
	1. Drinking Water Facility	: Rs. 1,00,000/-
	2. Sanitary facility & Maintenance	: Rs. 2,00,000/-
	3. Permanent water sprinkler	: Rs. 1,50,000/-
	4. Afforestation and its maintenance	: Rs. 1,25,000/-
	5. Safety Kits	: Rs. 1,00,000/-
	6. Provision of tyre washing facility	: Rs. 1,50,000/-
	7. Blasting materials with blast mat cost	: Rs. 15,00,000/-
	8. Drainage & Settling Tank (0.13.65Hect or 1365 Sq.m x 400)	: Rs. 5,46,000/-
	9. Environment monitoring	: Rs. 5,00,000/-
	Total	: Rs. 33,71,000/-
D	Total Project Cost (A+B+C)	: Rs. 91,56,000/-

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small "B" rough stone and gravel quarry.

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- (i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (ii) The applicant will endeavor every attempt to quarry the rough stone economically without any wastage and to improve the environment and ecology.
- (iii) The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued by Deputy Director, Department of Geology and Mining, Tiruvannamalai vide letter **Roc.No.425/Mines/2025 Dated 17.10.2025.**
- (iv) Total proposed production of rough stone is **635925m³** or **1748794MT** and gravel is **314313m³** or **628626MT** up to a depth of 60m below ground level for five years lease period. (Refer Plate No.VIA).

17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the applicant @ 2.0% of average net profit of the company for the last three financial years to the nearby village on the Ministry has notified the amendments in section 135 of the Act as well in the CSR Rules on 22nd January 2021 as circular no. CSR-05/01/2021-CSR-MCA dated 25th August 2021.

Place: Dharmapuri, TN

Date: 27/10/25



Signature of the Qualified Person

Dr.S.KARUPPANNAN,M.Sc,Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-626705, TamilNadu, India

This Mining Plan is Approved
Subject to the Conditions/Stipulation
Indicated In The Mining Plan Approval
Letter No. 425/mines/2025 Dt: 10-11-2025
Office Of The Deputy Director Of
Geology And Mining, Tiruvannamalai.


10.11.25
Deputy Director,
Geology and Mining,
Tiruvannamalai.



நக.எண்.425/கனிமம்/2025

துணை இயக்குநர் அலுவலகம்,
மாவட்ட ஆட்சியர் அலுவலக
வளாகம், திருவண்ணாமலை மற்றும் கரங்கத்துறை
நாள். 17.10.2025



அறிவிக்கை

பொருள்: கனிமங்களும் கரங்கங்களும் - சிறுகனிமம் - சாதாரண கற்கள் மற்றும் கிராவல் - திருவண்ணாமலை மாவட்டம் வெம்பாக்கம் வட்டம், குண்டியாந்தண்டலம் கிராம புல எண்கள். 139, 144/1A1 மற்றும் பலவற்றின் மொத்தப்பரப்பு 4.96.0 ஹெக்டேர் பரப்பில் - சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க குவாரி குத்தகை உரிமம் வழங்கக்கோரி M/s.S.A. Enterprises என்ற நிறுவனத்தின் 1959ம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் விதி எண்.19-ன் கீழ் இணையதள வழியே விண்ணப்பம் செய்தது - புலத்தணிக்கை செய்யப்பட்டது - அறிக்கைகள் வரப்பெற்றது தகுதியான நிலப்பரப்பாக கருதி ஏற்பளிக்கப்பட்ட கரங்கதிட்டம் மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்று பெற்று சமர்ப்பிக்க கோருதல் தொடர்பாக.

- பார்வை: 1. M/s.S.A. Enterprises என்ற நிறுவனத்தின் இணையதள விண்ணப்பம் எண்.25TVM0403048 நாள். 20.05.2025.
2. இவ்வலுவலக கடிதம் இதே எண். நாள். 04.06.2025.
3. வட்டாட்சியர், வெம்பாக்கம் அவர்களின் நக.ஆ1/1868/2025, நாள்.18.07.2025.
4. வருவாய் கோட்ட அலுவலர் (மு.க.பொ.) செய்யார் அவர்களின் நக.அ5/1868/2025, நாள். 21.07.2025.
5. உதவி புனியியலாளர், புனியியல் மற்றும் கரங்கத்துறை அவர்களின் புலத்தணிக்கை நாள். 02.08.2025.
6. செயற்பொறியாளர், நீவது, கீழ்பாலாறு வடிநில கோட்டம், காஞ்சிபுரம் அவர்களின் கடித எண்.இவ.அ.2/கோ.22(கனிமம்- குண்டியாந்தண்டலம்)/2025, நாள்.04.09.2025.
7. M/s.S.A. Enterprises என்ற நிறுவனத்தின் கடிதம் நாள்.16.10.2025.
8. மற்றும் உரிய ஆவணங்கள்



பார்வையில் காணும் கடிதங்களின் மீது கனிவான கவணம் வேண்டப்படுகிறது.

2) திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், குண்டியாந்தண்டலம் கிராம புல எண்கள். 139 (1.89.0), 140/1A (0.12.5), 140/1B (0.12.5), 144/1A1 (0.29.50), 144/1A2 (0.05.0), 145/1A (0.22.50), 145/1B1 (0.10.0), 145/1B2 (0.09.5), 145/1B3 (0.03.0), 145/2A (0.15.0), 145/2B1 (0.11.34), 145/2B2 (0.19.16), 145/3A (0.33.0), 145/4 (0.21.0), 145/5A (0.03.0), 145/5B (0.26.0), 145/7A (0.09.5), 145/7B (0.08.5), 145/9A1 (0.04.0), 145/9A2 (0.03.5), 145/9B (0.07.5), 145/10 (0.14.5) & 145/11 (0.26.5) ஆகியவற்றின் மொத்தப்பரப்பு 4.96.0 ஹெக்டேர் பரப்பில் சாதாரண கற்கள் / கிராவல் மண் குவாரி செய்ய 10 ஆண்டுகளுக்கு குத்தகை உரிமம் வழங்கக்கோரி M/s.S.A. Enterprises என்ற நிறுவனத்தினர் உரிய ஆவணங்களுடன் 20.05.2025 அன்று இணையதளம் வழியே விண்ணப்பம் அளித்துள்ளனர்.

3. மேற்கண்ட விண்ணப்பம் தொடர்பாக வட்டாட்சியர் வெம்பாக்கம், வருவாய் கோட்ட அலுவலர் (மு.சு.பொ), செய்யார், உதவி புவியியலாளர் (கனிமம்) திருவண்ணாமலை ஆகியோர் புலத்தணிக்கை மேற்கொண்டு அளித்த அறிக்கையின் அடிப்படையில் திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், குண்டியாந்தண்டலம் கிராம புல எண்கள். 139 (1.89.0), 140/1A (0.12.5), 140/1B (0.12.5), 144/1A1 (0.29.50), 144/1A2 (0.05.0), 145/1A (0.22.50), 145/1B1 (0.10.0), 145/1B2 (0.09.5), 145/1B3 (0.03.0), 145/2A (0.15.0), 145/2B1 (0.11.34), 145/2B2 (0.19.16), 145/3A (0.33.0), 145/4 (0.21.0), 145/5A (0.03.0), 145/5B (0.26.0), 145/7A (0.09.5), 145/7B (0.08.5), 145/9A1 (0.04.0), 145/9A2 (0.03.5), 145/9B (0.07.5), 145/10 (0.14.5) & 145/11 (0.26.5) ஆகியவற்றின் மொத்தப்பரப்பு 4.96.0 ஹெக்டேரில் மட்டும், வடக்கே புல எண்.146 மற்றும் 138ல் அமைந்துள்ள வாய்க்கால்களுக்கு விடப்பட வேண்டிய பாதுகாப்பு இடைவெளி குறித்த கருத்துருவை சம்மந்தப்பட்ட துறை அலுவலரிடம் பெற்று, M/s.S.A. Enterprises என்ற நிறுவனத்திற்கு கிராவல் மண் மற்றும் சாதாரண கற்குவாரி உரிம அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

4. செயற்பொறியாளர், நீர்வள ஆதார அமைப்புத்துறை, கீழ்பாலாறு வடிநில கோட்டம், காஞ்சிபுரம் அவர்களின் 04.09.2025 நாளிட்ட கடிதத்தில் விண்ணப்ப புலத்தின் வடக்கே புல எண். 146 மற்றும் 138ல் உள்ள கால்வாய்க்கு 10 மீ. பாதுகாப்பு இடைவெளி (set back) விட வேண்டும் எனவும், மேலும் சில நிபந்தனைகள் கொண்ட தொழில்நுட்ப அறிக்கையினை சமர்ப்பித்துள்ளனர்.



5. இயக்குநர், புவிமியல் மற்றும் சுரங்கத்துறை, சென்னை அவர்களின் 10.08.2020 நாளிட்ட கடிதத்துடன் இணைத்து வரப்பெற்ற அரசாணை எண்.169 தொழில் துறை (எம்.எம்.சி-1) நாள் 04.08.2020-ன்படி பட்டா புலங்களில் கிராவல், சாதாரண வகை கற்கள் ஆகிய சிறுகனிம உரிமம் வழங்கும் நேர்வுகளில் நடவடிக்கை எடுக்க விதி 19 மற்றும் 33-ல் மாவட்ட ஆட்சியருக்கு வழங்கப்பட்ட அதிகாரம் தற்போது சம்மந்தப்பட்ட உதவி/துணை இயக்குநர் அவர்களுக்கு மாற்றி வழங்க உத்திரவிடப்பட்டுள்ளது.

6. விண்ணப்பதாரர் M/s.S.A. Enterprises என்ற நிறுவனத்தினர் 16.10.2025 நாளிட்ட கடிதத்தில் மேற்படி விண்ணப்ப புலமானது ஏற்கனவே குவாரிப்பணி செய்யாத புலமாக இருப்பினும் 5 ஆண்டுகள் குவாரி குத்தகை வழங்க நடவடிக்கை மேற்கொள்ளுமாறு கேட்டுக்கொண்டுள்ளனர்.

7. எனவே, வட்டாட்சியர் வெம்பாக்கம், வருவாய் கோட்ட அலுவலர் (மு.கூ.பொ), செய்யார், உதவி புவிமியலாளர் (கனிமம்) திருவண்ணாமலை மற்றும் செயற்பொறியாளர், நீர்வள ஆதார அமைப்புத்துறை, கீழ்பாலாறு வடிநில கோட்டம், காஞ்சிபுரம் ஆகியோரின் பரிந்துரை, நிபந்தனைகள் மற்றும் மனுதாரரின் கோரிக்கையின் அடிப்படையில் திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், குண்டியாந்தண்டலம் கிராம புல எண்கள். 139 (1.89.0), 140/1A (0.12.5), 140/1B (0.12.5), 144/1A1 (0.29.50), 144/1A2 (0.05.0), 145/1A (0.22.50), 145/1B1 (0.10.0), 145/1B2 (0.09.5), 145/1B3 (0.03.0), 145/2A (0.15.0), 145/2B1 (0.11.34), 145/2B2 (0.19.16), 145/3A (0.33.0), 145/4 (0.21.0), 145/5A (0.03.0), 145/5B (0.26.0), 145/7A (0.09.5), 145/7B (0.08.5), 145/9A1 (0.04.0), 145/9A2 (0.03.5), 145/9B (0.07.5), 145/10 (0.14.5) & 145/11 (0.26.5) ஆகியவற்றின் மொத்தப்பரப்பு 4.96.0 ஹெக்டேரில் 1959-ம் வருட தமிழ்நாடு சிறுகனிம விதிகள், விதி எண்.19-ன்படி கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு 5 (ஐந்து) வருட காலத்திற்கு M/s.S.A. Enterprises என்ற நிறுவனத்திற்கு கிராவல் / சாதாரண கற்கள் குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதப்படுகிறது.

நிபந்தனைகள்

- 1959-ம் வருடத்திய தமிழ்நாடு சிறு கனிம சலுகை விதிகள், அட்டவணை II-ல் கண்டுள்ளபடி குவாரி செய்யப்படும் கனிமங்களுக்கு சீனியரேஜ் தொகை அவ்வப்போது செலுத்தி கனிமம் கொண்டு செல்லப்பட வேண்டும்.
- அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5மீ. மற்றும் அரசு நிலங்களுக்கு 10 மீ. பாதுகாப்பு இடைவெளியும் விட வேண்டும்.



- c. புல எண். 138 மற்றும் 146 ஆகியவற்றில் அமைந்துள்ள கால்வாய்க்கு செயற்பொறியாளர், நீவது, கீழ்பாலாறு வடிநில கோட்டம், காஞ்சிபுரம் அவர்கள் தொழில்நுட்ப அறிக்கையில் தெரிவித்துள்ளவாறு 10 மீ. பாதுகாப்பு இடைவெளி விட்டு அதில் குறிப்பிடப்பட்டுள்ள நிபந்தனைகளுக்கு உட்பட்டு குவாரிப்பணி மேற்கொள்ள வேண்டும்.
- d. அனுபவம் வாய்ந்த வெடிபொருள் பயன்படுத்துவோர் மூலம் குறைந்த அளவு சக்தி கொண்ட வெடிபொருட்களை பயன்படுத்தி அருகிலுள்ள பட்டாதாரர்களுக்கு எவ்வித இடையூறுமின்றி / அருகிலுள்ள பட்டா மற்றும் அரசு புலங்களில் எவ்வித ஆக்கிரமிப்பும் இன்றி குவாரிப் பணி மேற்கொள்ள வேண்டும்.
- e. விதிகளின்படி ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினை உரிய காலத்திற்குள் சமர்ப்பிக்க வேண்டும்.
- f. குவாரி உரிமம் வழங்க உள்ள பகுதிக்கு சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையின்மை சான்று பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும்.

7. மேலும், தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959, விதி 41-ன்படி குவாரிப் பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு மனுதாரரைக் கேட்டுக் கொள்ளப்படுகிறது. மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின் தொடர்ச்சியாக 1959-ம் வருடத்திய தமிழ்நாடு சிறு கனிம சலுகை விதிகள், விதி எண்.42-ன்படி சுற்றுச் சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையின்மை சான்று பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.

17.10.25
இணை இயக்குநர்,
புவிமியல் மற்றும் சுரங்கத்துறை,
திருவண்ணாமலை.

பெறுநர்

M/s.S.A. Enterprises,
எண்.2, குறிஞ்சி நகர்,
1வது மெயின் ரோடு,
அப்துல்கலாம் பூங்கா,
பழைய பெருங்குளத்தூர்,
சென்னை.

நகல்.

1. தலைவர், மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையகம், சென்னை.
2. இயக்குநர், புவிமியல் மற்றும் சுரங்கத்துறை, சென்னை.
3. மண்டல இணை இயக்குநர், புவிமியல் மற்றும் சுரங்கத்துறை, விழுப்புரம்.

DD/AD-Mines Tiruvannamalai,
Officer in Charge, Dept of
Tamil Nadu. Date: 17-10-2025
07:51 pm.

279



District : Tiruvannamalai



Survey No : 139

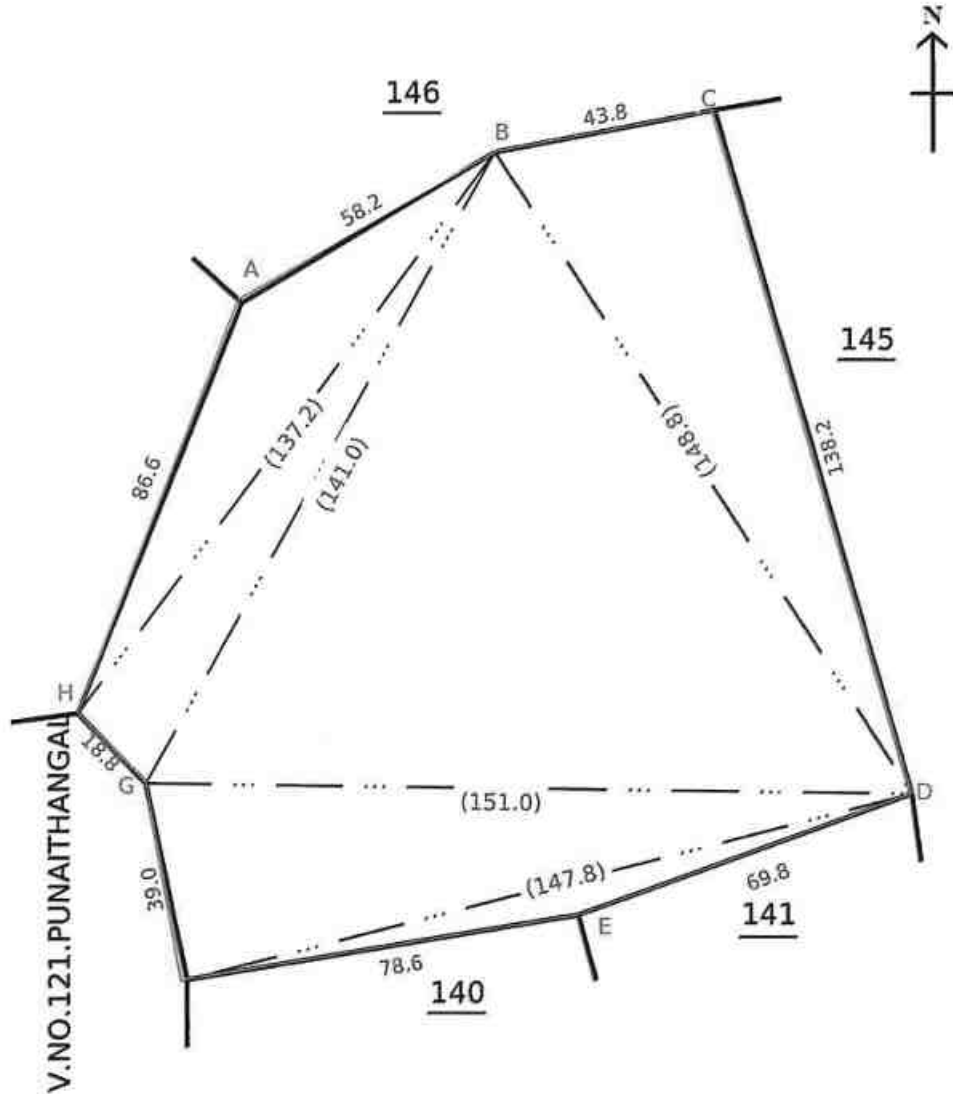
Taluk : Vembakkam

Area : Hect 01 Ares 89.00

Village : Kundiyanthandalam

[122]

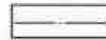
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V.NO.121.PUNAITHANGAI

INDEX

LEASE APPLIED AREA



Date of Issue: 12-12-2024 10:33:50

Signed By Tahsildar

Name of approver : tahv

Date of Approval : 18-11-2017



Survey and Settlement Department, Government of TamilNadu

240 fv.1

District : Tiruvannamalai

Taluk : Vembakkam

Village : Kundiyanthandalam

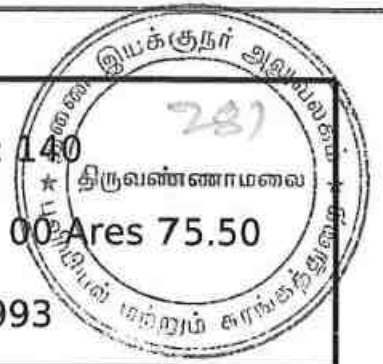


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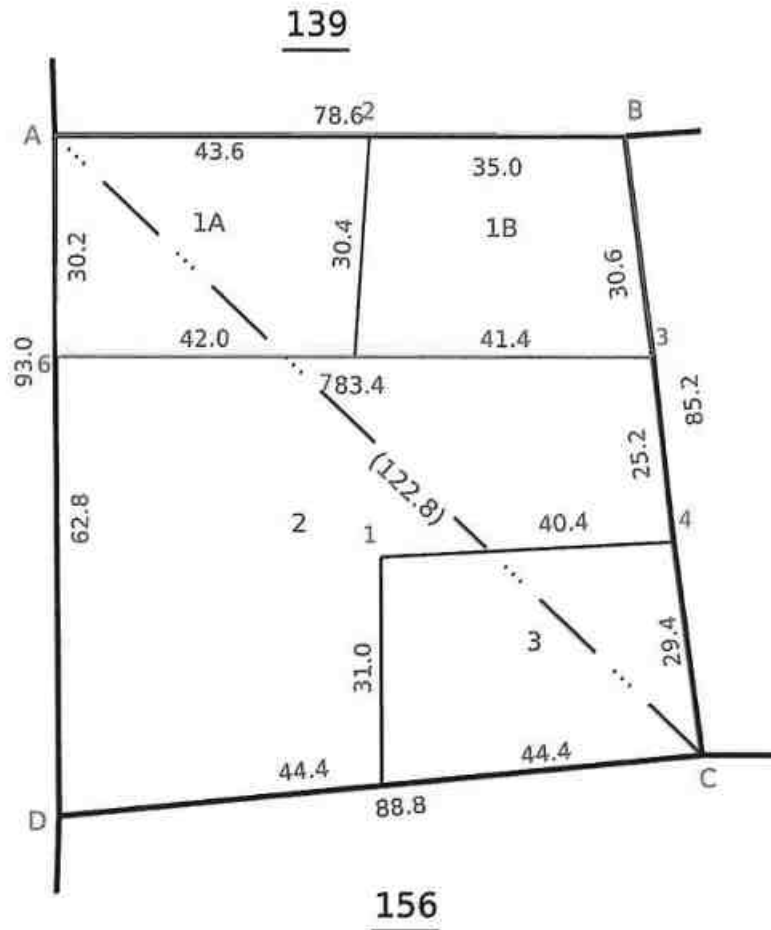
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Area : Hect 00 Ares 75.50

Scale : 1 : 993



PUNNAITHANGAL



INDEX

LEASE APPLIED AREA



5

Signed By Tahsildar

Name of approver : tahv

Date of Approval : 18-11-2017



Date of Issue: 12-12-2024 10:37:20

Survey and Settlement Department, Government of TamilNadu

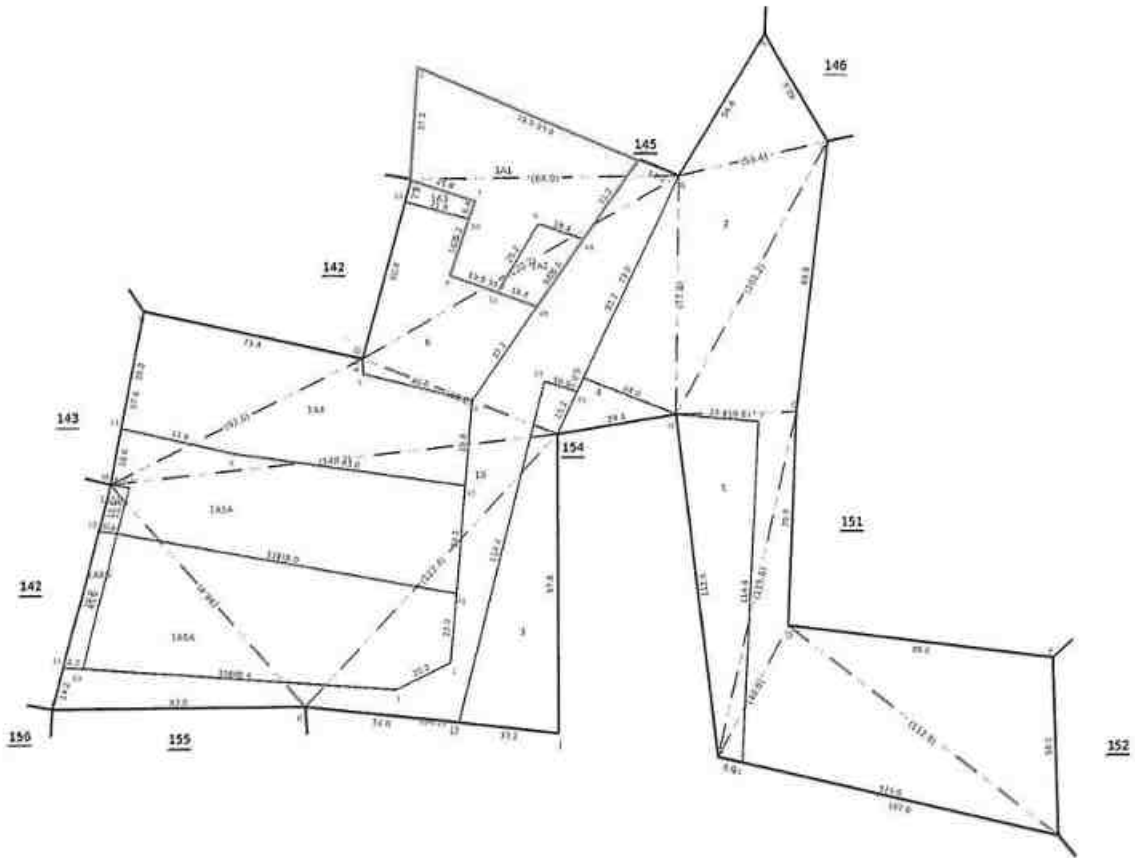
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240 fv.1

District : Tiruvannamalai
Taluk : Vembakkam
Village : Kundiyanthandalam [122]



Survey No : 144
Area : Hect 03 Ares 97.52
Scale : 1 : 839



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LEASE APPLIED AREA



Signed By Tahsildar
Name of Approver :
Date of Approval : 24.11.2022

District : Tiruvannamalai

Taluk : Vembakkam

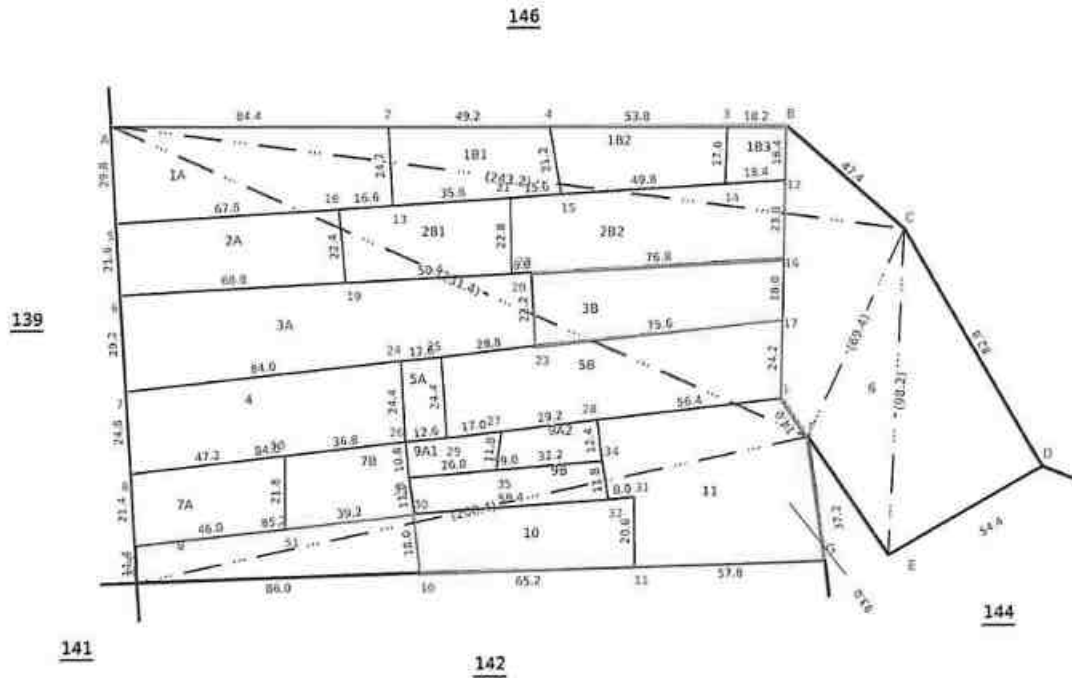
Village : Kundlyanthandalam [122]



Survey No : 145

Area : Hect 03 Ares 47.00

Scale : 1 : 1097



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LEASE APPLIED AREA



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MAP SHOWING THE PROPOSED LEASE AREA IN
SF No. 139 (145-1A, 1B1, 1B2,
1B3, 2A, 2B1, 2B2 3A, 4, 5A, 5B, 7A, 7B, 9A, 9A2, 9B,
10, 11), 144/1A1, 144/1A2, 140/1A & 140/1B,
EXTENT: 4.96.0 Hect.
KUNDIYANTHANDALAM VILLAGE,
VENBAKKAM TALUK &
TIRUVANNMALAI DISTRICT.

INDEX

PROPOSED LEASE AREA

APPROACH ROAD

CART ROAD

100m RADIUS

200m RADIUS

300m RADIUS

400m RADIUS

500m RADIUS

EXISTING QUARRY'S PIT

ODAI

ERI

VILLAGE MAP FOR 500m

RADIUS

SCALE - 1:5000

புலியியல் மற்றும் காரங்கத்துறை

திருவண்ணாமலை

இயக்குநர் அலுவலகம்

★ திருவண்ணாமலை ★

★ திருவண்ணாமலை ★

★ திருவண்ணாமலை ★

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★ திருவண்ணாமலை ★

★ திருவண்ணாமலை ★

★ திருவண்ணாமலை ★

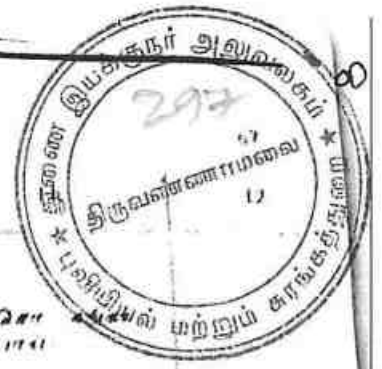
★ திருவண்ணாமலை ★

NO. 123
SILVETTANO. 123
PUNNETHAL



[illegible]

சுரும துருக அலுவலர்



1	2	3	4	5	6	7	8	9	10		
144	4	144 A	ர	4	...	7-3	4	3 85	0 01 0	0 12	75 செ. கண்ணம்மாள்.
	5	-5	ர	4	...	7-3	4	3 85	0 18.5	0 12	75 செ. கண்ணம்மாள்.
	6	-1A3பா	ர	4	...	7-3	4	3 85	0 25.0	0 92	131 மா. சக்கரை முதலியார்.
								3 94.0	9 01		
145	1A	145-1A	ர	4	...	7-3	4	3 85	0 22.5	0 88	31 வே. கண்ணம்மாள்.
	1B1	-1B1	ர	4	...	7-3	4	3 85	0 10.0	0 39	127 ஆ. கோவிந்தராஜ்.
	1B2	-1B2	ர	4	...	7-3	4	3 85	0 09.5	0 57	131 மா. சக்கரை முதலியார்.
	1B3	-1B3	ர	4	...	7-3	4	3 85	0 03.0	0 11	241 வ. நா.ராஜ் முதலியார்.
	2A	-2A	ர	4	...	7-3	4	3 85	0 15.0	0 58	31 வே. கண்ணம்மாள்.
	2B	-2B	ர	4	...	7-3	4	3 85	0 30.5	1 17	168 க. சிவஞான முதலியார்.
	3A	-3பா	ர	4	...	7-3	4	3 85	0 33.0	1 25	204 த. செல்வராஜ்.
	3B	-3பா	ர	4	...	7-3	4	3 85	0 15.5	0 62	408 அருள்மிகு சோமநாத ஸ்வரர் கோவில்.
	4	-4	ர	4	...	7-3	4	3 85	0 21.0	0 81	31 வே. கண்ணம்மாள். (எ) ஆயி.
	5A	-5A	ர	4	...	7-3	4	3 85	0 03.0	0 12	131 மா. சக்கரை முதலியார்.
	5B	-5B	ர	4	...	7-3	4	3 85	0 26.0	1 00	131 மா. சக்கரை முதலியார்.
	6	-6	ர	4	...	7-3	4	3 85	0 71.0	2 75	408 அருள்மிகு சோமநாத ஸ்வரர் கோவில்.
	7A	-7பா	ர	4	...	7-3	4	3 85	0 09.5	0 36	292 மா. பெருமாள்.
	7B	-7பா	ர	4	...	7-3	4	3 85	0 08.5	0 32	169 மா. சிங்காரவேல்.
	8	-8	ர	4	...	7-3	4	3 85	0 13.0	0 59	74 க. கணேச முதலியார்.

கிராம நிர்வாக அலுவலர்
 77 காவல் துறை

சாணம்.

ACE Scanner



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு



மாவட்டம் : திருவண்ணாமலை

வருவாய் கிராமம் : குண்டியாந்தண்டலம்

வட்டம் : வெம்பரக்கம்

பட்டா எண் : 920

உரிமையாளர்கள் பெயர்

1. அண்ணாமலை

மகன்

அய்யனார்



2. ஏழுமலை

மகன்

சரண்குமார்



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புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
139	-	1 - 89.00	7.29	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
140	1A	0 - 12.50	0.50	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
140	1B	0 - 12.50	0.50	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
144	1A1	0 - 29.50	1.13	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
144	1A2	0 - 5.00	0.19	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	11	0 - 26.50	1.03	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	1A	0 - 22.50	0.88	--	--	--	--	2025/0103/06/459538- ----- Digitally signed: Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM



145	1B1	0 - 10.00	0.39	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	1B2	0 - 9.50	0.37	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	2A	0 - 15.00	0.58	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	2B1	0 - 11.34	0.40	--	--	--	2025/0103/06/459538- -2019/06/10/000034SD Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	2B2	0 - 19.16	0.70	--	--	--	2025/0103/06/459538- -2019/06/10/000034SD Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	3A	0 - 33.00	1.25	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	4	0 - 21.00	0.81	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM

145	5B	0 - 26.00	1.00	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	7A	0 - 9.50	0.36	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	7B	0 - 8.50	0.32	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	9A1	0 - 4.00	0.15	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
145	9A2	0 - 3.50	0.15	--	--	--	2025/0103/06/459538- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 18/01/2025 02:06:54:PM
		4 - 68.00	18.00				

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் P/06/10/122/00920/150201 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 28-05-2025 அன்று 02:41:30 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

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தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு



மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

வருவாய் கிராமம் : குண்டியாந்தண்டலம்

பட்டா எண் : 933

உரிமையாளர்கள் பெயர்

1. அண்ணாமலை

மகன்

அய்யனார்



2. ஏழுமலை

மகன்

சரண்குமார்



புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
145	98	0 - 7.50	0.28	--	--	--	--	2025/0103/06/482010- ----- Digitally signed: approved through AutoMutation - 15/04/2025 03:37:54:PM
		0 - 7.50	0.28					

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் S/06/10/122/00933/150235 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 13-05-2025 அன்று 12:46:42 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை
நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு



மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

வருவாய் கிராமம் : குண்டியாந்தண்டலம்

பட்டா எண் : 927

உரிமையாளர்கள் பெயர்

1. அண்ணாமலை

மகன்

அய்யனார்



2. ஏழுமலை

மகன்

சரண்குமார்



புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
145	10	0 - 14.50	0.66	--	--	--	--	2025/0103/06/470154- ----- Digitally signed:approved through AutoMutation - 27/02/2025 06:30:43:PM
145	1B3	0 - 3.00	0.11	--	--	--	--	2025/0103/06/486667- ----- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 06/05/2025 11:31:07:PM
145	5A	0 - 3.00	0.12	--	--	--	--	2025/0103/06/486667- ----- Digitally signed:Vadivel A Head Quarters Deputy Tahsildar 06/05/2025 11:31:07:PM
		0 - 20.50	0.89					

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை
1.தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில்
P/06/10/122/00927/150278 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி
செய்துகொள்ளவும்.
- இத் தகவல்கள் 28-05-2025 அன்று 02:54:47 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில்
சரிபார்க்கவும்

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தமிழ்நாடு தமில்நாடு TAMILNADU

3.0 MAY 2025

DG 197549

S.A ENTERPRISES

CHENNAI

V. MANOHARI (S.V.)
W. TAMBARAM, CHENNAI.
No. 16558 / C / 89 DT. 4.1.2000
Cell: 90945 80808

குத்தகை ஒப்பந்தப்பத்திரம்

2025-ம் வருடம் மே மாதம் 30-ம் தேதி, சென்னை மாவட்டம், பழைய பெருங்களத்தூர், அப்துல் கலாம் பூங்கா, 1-வது பிரதான சாலை, குறிஞ்சி நகர், இலக்கம் 2, என்ற முகவரியில் இயங்கி வரும் M/s. S.A. Enterprises (PAN No. AFNFS4046Q) நிறுவனத்தின் பங்குதாரர்யாகிய திரு. சரண்குமார் (ஆதார் எண்: 694703756543), (PAN No. AFCPE4137P) (கைபேசி எண்: +9199401 27048) 1-ம் லக்கமிட்டவர்,

எழுதிக்கொடுப்பவர்

2.

3.

A. Ayyanar



எழுதி வாங்குபவர்

1.

M. Paul Pandi
M. PAUL PANDI, M.A., B.L.,
ADVOCATE & NOTARY PUBLIC
No. 5/9, Thirupur Kumaran Street,
Moongileri, Pammal, Chennai - 75.
Cell: 87545 67844 / 98415 56935



செங்கல்பட்டு மாவட்டம், கொள்பாக்கம் அஞ்சல், நெடுங்குன்றம், சி.எஸ்.ஐ கோயில் தெரு, இலக்கம் 177/3 உடைய இல்லத்தில் வசிக்கும் திரு. ஏழுமலை அவர்களின் மகன் திரு. சரண்குமார் (ஆதார் எண்: 694703756543), (PAN No. AFCPE4137P) (கைபேசி எண்.+91994027048) 2-ம் லக்கமிட்டவர்,

திருநெல்வேலி மாவட்டம், கல்பாக்கம் அஞ்சல், சீவலராயனேந்தல், மேலத் தெரு, இலக்கம் 174, உடைய இல்லத்தில் வசிக்கும் திரு. அண்ணாமலை அவர்களின் மகன் திரு. அய்யனார் (ஆதார் எண்: 680211735935), (PAN No. BGLPA3262Q) (கைபேசி எண்.+9189733 32076) 3-ம் லக்கமிட்டவர் (குத்தகைக்கு விடுபவர்கள்) ஆகிய நாம் இருவரும் இணைந்து சம்மதித்து எழுதிக்கொடுத்த குத்தகை ஒப்பந்தப்பத்திரம் யாதெனில்

இப்பவும், நம்மில் 2 மற்றும் 3-ம் லக்கமிட்டவர்களுக்கு கூட்டுப்பட்டாவாக பதியப்பட்ட கீழ்க்கண்ட சொத்து விபரத்தில் கண்டுள்ள புலங்களை இருவரும் இணைந்து மேற்கண்ட நிறுவனத்திற்கு கீழ்க்கண்ட நிபந்தனைகளுக்கு உட்பட்டு குவாரி குத்தகை விடுவதாக சம்மதம் தெரிவிக்கிறோம்.

நிபந்தனைகள்:

1. கீழ்க்கண்ட குத்தகை புலத்தில் அமைந்துள்ள சாதாரண கற்கள் மற்றும் மண் ஆகியவை M/s. S.A. Enterprises நிறுவனம் (1-ம் லக்கமிட்டவர்) தனது சொந்த செலவில் அரசாங்கத்திடம் முறையாக குவாரி குத்தகை உரிமம் பெற்று, சுரங்க விதிமுறைகளுக்கு உட்பட்டு குவாரிப்பணி செய்ய வேண்டும்.
2. மேற்படி, குத்தகை தொடர்பாக ஆண்டு குத்தகை தொகையாக ரூ.50000/- (ஐம்பதாயிரம்) மட்டும், நம்மில் 1-ம் லக்கமிட்டவர், 2, 3-ம் லக்கமிட்டவர்களுக்கு பிரதி வருடம் ஏப்ரல் 5-ம் தேதிக்குள் கட்டணம் செலுத்தியதற்கான சான்று பெற்றுக்கொள்ள வேண்டும்.
3. இந்த குத்தகை காலத்தில் நம்மில் 2,3-ம் லக்கமிட்டவர் ஆகிய நாங்கள் வேறு நபர்களுக்கு விற்கவோ, அடமானம் வைக்கவோ, மற்றும் யாதெனில் வில்லங்கப்படுத்தவோ மாட்டோம் என்று உறுதியளிக்கிறோம். அவ்வாறு தவறும் பட்சத்தில் அது செல்லத்தக்கதாக கருதப்படுவதோடு, எங்கள் மீது தக்க நடவடிக்கை எடுக்கவும் ஒப்புக்கொள்கிறோம்.
4. குத்தகை காலங்களில் உரிமம் சம்மந்தமாக ஏதேனும் கையொப்பம் தேவைப்படின் நம்மில் 2,3-ம் லக்கமிட்டவர்கள், 1-ம் லக்கமிட்டவருக்கு செய்து கொடுக்கிறோம்.
5. மேற்படி, M/s. S.A. Enterprises நிறுவனம் (1-ம் லக்கமிட்டவர்) அடியிற்கண்ட இடத்தை தங்கள் தொழில்லுக்குகேற்றவாறு பயன்படுத்தி கொள்ளலாம்.

எழுதிக்கொடுப்பவர்

எழுதி வாங்குபவர்



2. A. Ayyanar

1.

M. Paul Pandi, M.A., B.L.,
ADVOCATE & NOTARY PUBLIC
No. 5/9, Thirupur Kumaran Street,
Moongilleri, Pammal, Chennai - 75.
Cell: 87545 67844 / 98415 96935



6. குத்தகைக்கு ஒப்புக்கொண்ட சொத்தில் அரசாங்க சட்ட விரோதமான காரியங்களை எக்காரணத்தைக்கொண்டும் செய்யக்கூடாது.
7. குத்தகைக்கெடு முடிவடைந்ததும் சொத்தை எந்த வித அபிவிருத்தி இல்லாமல் எங்களிடம் ஒப்படைத்து விடவேண்டும்.
8. மேலும், இந்த குத்தகை ஒப்பந்தமானது குத்தகை நிறைவேற்றிய காலத்திலிருந்து (இருபது) ஆண்டுகளுக்கு செல்லத்தக்கது.

மேற்கண்ட நிபந்தனைகளுக்குட்பட்டு நாம் எழுதிக்கொடுத்த குத்தகை ஒப்பந்தப்பத்திரம்.

சொத்துவிபரம்

திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், குண்டியாந்தண்ணல் கிராமம், இதில்

1. புல எண். 139 இதில் பு.ஹெ.1.89.00 இதற்கு தீ.ரு.7.29
2. புல எண். 140/1A இதில் பு.ஹெ.0.12.50 இதற்கு தீ.ரு.0.50
3. புல எண். 140/1B இதில் பு.ஹெ.0.12.50 இதற்கு தீ.ரு.0.50
4. புல எண். 144/1A1 இதில் பு.ஹெ.0.29.50 இதற்கு தீ.ரு.1.13
5. புல எண். 144/1A2 இதில் பு.ஹெ.0.05.00 இதற்கு தீ.ரு.0.19
6. புல எண். 145/1A இதில் பு.ஹெ.0.22.50 இதற்கு தீ.ரு.0.88
7. புல எண்.145/1B1 இதில் பு.ஹெ.0.10.00 இதற்கு தீ.ரு.0.39
8. புல எண்.145/1B2 இதில் பு.ஹெ.0.9.50 இதற்கு தீ.ரு.0.37
9. புல எண்.145/1B3 இதில் பு.ஹெ.0.03.00 இதற்கு தீ.ரு.0.11
10. புல எண்.145/2A இதில் பு.ஹெ.0.15.00 இதற்கு தீ.ரு.0.58
11. புல எண்.145/2B1 இதில் பு.ஹெ.0.11.34 இதற்கு தீ.ரு.0.40
12. புல எண்.145/2B2 இதில் பு.ஹெ.0.19.16 இதற்கு தீ.ரு.0.70
13. புல எண்.145/3A இதில் பு.ஹெ.0.33.00 இதற்கு தீ.ரு.1.25
14. புல எண்.145/4 இதில் பு.ஹெ.0.21.00 இதற்கு தீ.ரு.0.81
15. புல எண்.145/5A இதில் பு.ஹெ.0.03.00 இதற்கு தீ.ரு.0.12
16. புல எண்.145/5B இதில் பு.ஹெ.0.26.00 இதற்கு தீ.ரு.1.00
17. புல எண்.145/7A இதில் பு.ஹெ.0.09.00 இதற்கு தீ.ரு.0.36
18. புல எண்.145/7B இதில் பு.ஹெ.0.08.50 இதற்கு தீ.ரு.0.32
19. புல எண்.145/9A1 இதில் பு.ஹெ.0.04.00 இதற்கு தீ.ரு.0.15
20. புல எண்.145/9A2 இதில் பு.ஹெ.0.03.50 இதற்கு தீ.ரு.0.15
21. புல எண்.145/9B இதில் பு.ஹெ.0.07.50 இதற்கு தீ.ரு.0.28
22. புல எண்.145/10 இதில் பு.ஹெ.0.14.50 இதற்கு தீ.ரு.0.66

எழுதிக்கொடுப்பவர்

எழுதி வாங்குபவர்

2. 
3. A. Anyanas

M. PAUL PANDI, M.A., B.L.,
ADVOCATE & NOTARY PUBLIC
No. 5/9, Thirupur Kumaran Street,
Moongilery, Pammal, Chennai - 75.
Cell: 87545 67844 / 98415 96935





23. புல எண்.145/11 இதில் பு.ஹெ.0.26.50 இதற்கு தீ.ரு.1.03

ஆக மொத்தம் பு.ஹெ. 4.96.00 இதற்கு தீ.ரு.19.17 ஆகும்

மேற்கண்ட நிலங்கள் மட்டும் இந்த குத்தகைக்கு பாத்தியப்பட்டது.

எழுதிக்கொடுப்பவர்

2. 
3. A. Ayyanar

எழுதி வாங்குபவர்

1. 

சாட்சிகள்

1. B. Karigharathi
no: 10 Balakrishnaapuram
Atha Pakkam, ch - 88
- 2.

P.S. Sathish

no: 1/63 Pillaiyaru vilas
Erumaiyur, ch - 44




M. PAUL PANDI, M.A., B.L.,
ADVOCATE & NOTARY PUBLIC
No. 5/9, Thirupur Kumaran Street,
Moongileri, Pammal, Chennai - 75.
Cell: 87545 67844 / 98415 96935



Government of India

Form GST REG-06

[See Rule 10(1)]

Registration Certificate

Registration Number : 33AFNFS4046Q1ZB

ANNEXURE VII

325



1.	Legal Name	S A ENTERPRISES		
2.	Trade Name, if any	S A ENTERPRISES		
3.	Additional trade names, if any			
4.	Constitution of Business	Partnership		
5.	Address of Principal Place of Business	Building No./Flat No.: No.2 Road/Street: Kurunji Nagar, 1st Main Road Nearby Landmark: Abdul Kalam Park Locality/Sub Locality: Old Perungalattur City/Town/Village: Chennai District: Chengalpattu State: Tamil Nadu PIN Code: 600063		
6.	Date of Liability	03/03/2025		
7.	Period of Validity	From	03/03/2025	To Not Applicable
8.	Type of Registration	Regular		
9.	Particulars of Approving	Tamil Nadu		
Signature Digitally signed by DS GOODS AND SERVICES TAX NETWORK 15 Date: 2025.03.21 17:16:59 IST				
Name		MANICKAM PONMUDI		
Designation		Assistant Commissioner		
Jurisdictional Office		TAMBARAM		
Date of issue of Certificate		21/03/2025		
Note: The registration certificate is required to be prominently displayed at all places of business in the State.				

This is a system generated digitally signed Registration Certificate issued based on the approval of application granted on 21/03/2025 by the jurisdictional authority.

Handwritten signature

Annexure A



Goods and Services Tax Identification Number: 33AFNFS4046Q1ZB

Details of Additional Place of Business(s)

Legal Name S A ENTERPRISES

Trade Name, if any S A ENTERPRISES

Total Number of Additional Places of Business in the State 0



Goods and Services Tax Identification Number: 33AFNFS4046Q1ZB

Legal Name S A ENTERPRISES

Trade Name, if any S A ENTERPRISES

Details of Managing / Authorized Partners

1		Name	SARANKUMAR ELUMALAI
		Designation/Status	Partner
		Resident of State	Tamil Nadu
2		Name	AYYANAR ANNAMALAI
		Designation/Status	Partner
		Resident of State	Tamil Nadu

आयकर विभाग
INCOME TAX DEPARTMENT



भारत सरकार
GOVT. OF INDIA

स्थायी लेखा संख्या कार्ड
Permanent Account Number Card

AFNFS4046Q

नाम / Name
S A ENTERPRISES



08022025

निगमन/गठन की तारीख
Date of Incorporation/Formation
01/02/2025



[Handwritten signature]



தமிழ்நாடு தமில்நாடு TAMILNADU

01 FEB 2025

BK 573182

S'A ENTERPRISES
CHENNAI 63

V.m

V. MANOHARI (S.V.)
W. TAMBARAM, CHENNAI - 45.
No. 16558 / C / 89 DT. 4.12.89
Cell: 90945 80808

PARTNERSHIP DEED

Partnership Deed of "S A ENTERPRISES"

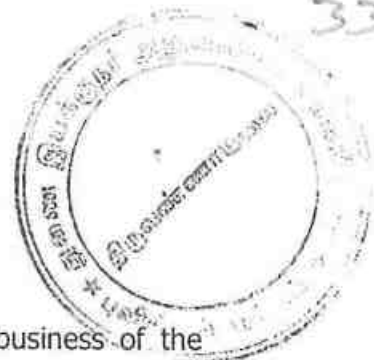
This deed of partnership is made on 01/02/2025 between:

1. **Mr.E.SARANKUMAR** Son of **Mr.ELUMALAI**, aged about 29 years, residing at No.177/3, C S I Kovil Street, Nedunkundram, Kolapakkam, Chennai - 600048, (Herein after referred to as Party of the **First part**).
2. **Mr.A.AYYANAR** Son of **Mr.ANNAMALAI AYYANAR AALAPAKONAR**, aged about 35 years, residing at No.174, West Street, Seevalarayanenthal, Kalappakulam, Tirunelveli. Pin-627756, (Herein after referred to as Party of the **Second part**)

[Handwritten signature]

A. Ayyanar

[Handwritten signature]



-2-

WHEREAS it is mutually agreed between the parties that the business of the partnership shall be formed and to be carried on the following terms and conditions:

Now this deed witnesseth as follows:

1. The Partnership business shall be carried on under the name and style **"S A ENTERPRISES"** having its headquarters at No.2, Kurunji Nagar, 1st Main Road, Old Perungalathur, Chennai – 600063.
2. The principal place of business of the partnership firm shall be No.2, Kurunji Nagar, 1st Main Road, Old Perungalathur, Chennai – 600063 and wherever required branches shall be opened as per the mutual agreement among the partners.
3. The business of partnership shall be to undertake the business of Mining and supply of raw blue metals and other related finished products works.
4. The partnership shall commence on the execution of this deed and shall be a **Partnership at Will**.
5. If any partner wants to retire from the firm he shall give at least three months notice in writing.
6. The capital of the partnership business shall be Rs.1,00,000/- (Rupees One Lakh Only) which is to be brought in equally by the partners.
7. The shares of the parties hereto in the net profit and losses of the partnership will be as follows –
 1. **Mr. E.SARAN KUMAR** - **50%**
 2. **Mr. A.AYYANAR** - **50%**
8. The management of the business of the partnership shall be carried on by the managing partner (Party of the First Part). All the borrowings for the business shall be by the parties hereto as jointly. The remuneration of the partners shall be fixed by mutual consent among the partners.



-3-

9. The Partners may open necessary bank account or accounts with any bank or banks and the accounts shall be operated by the Party of the First and Second Part Jointly. Proper books of account shall be maintained of all the transactions of the partnership.
10. No partner shall without the consent in writing of other partners sell, assign, transfer, mortgage or part with his share or interest in the partnership or property.
11. The party of the First part shall be the managing partner of the firm and he shall be in charge and he shall represent the firm in all proceedings connected with the firm before viz., income tax, or any other state and central government authorities, or tribunals where the partnership has to be represented in connection with the business of the firm and she is authorized to sign any paper on behalf of the firm in that respect.
12. On dissolution of the firm, the assets and liabilities of the partnership shall be dealt with as provided in the Partnership Act (Act IX of 1932) unless otherwise agreed to by the partners. compromises
13. The firm shall not be dissolved in the death of either of the parties hereto but shall be carried on with the heirs of the deceased partner or partners.
14. No new partners shall be admitted to the partnership except with the written consent of the other partners.
15. In case of any dispute between the partners the same shall be referred to the arbitrators under the provisions of the arbitration of act X of 1940 then in force, and whatever decision they take will be final and binding on the other partners.
16. In all matters which are not specifically provided for, the provisions of Indian Partnership Act 1932, shall apply accordingly.

[Signature]

A. Ayyanar

[Signature]



-4-

IN WITNESSETH WHEREOF THE PARTIES HERE TO
HAVE SET THEIR HANDS HERETO ON THE DAY,
MONTH AND YEAR FIRST ABOVE WRITTEN.

PARTY OF THE FIRST PART

WITNESSES:

PARTY OF THE SECOND PART

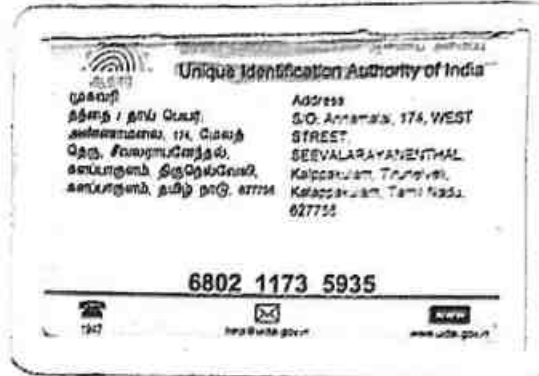
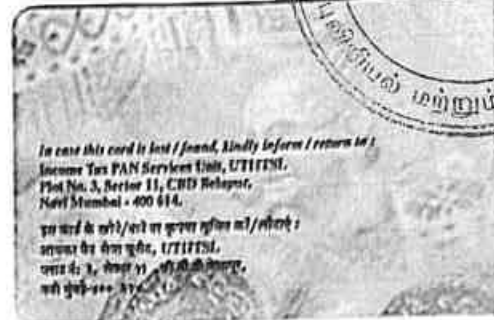
1.
V. RAMARATHNAM
117, South Street,
Seeralahayalankal,
Kalappakulam (P.O.)
Savikabavikavil (T.K.)
Tamil Nadu (S.T.)
9489575935

2.
PRABHU V.
No. 39, North Main,
Ind Street, Chidambaram
603202.
994111125.

PHOTOCOPY OF THE APPLIED LEASE AREA

Site photos in respect of Rough stone and gravel quarry lease in S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 Patta Land - over an extent of 4.96.0Hectares - Kundiyanthandalam Village - Vembakkam Taluk- Tiruvannamalai District - Tamil Nadu State in belongs to M/s.S.A.Enterprises.






Reg No. 03BBH1007
Col Code 013 / 106



அறிவியல் புலம்
FACULTY OF SCIENCE

பெரியார் பல்கலைக்கழக ஆட்சிக்குழு 2005 ஆம் ஆண்டு ஏப்ரல் மாதம்
நடந்த பயன்பாட்டு புவியமைப்பியல் தேர்வில்
S கருப்பண்ணன் என்பவர்
தனிச்சிறப்புடன் முதல் வகுப்பில் தேர்ச்சி பெற்றார் என்று தக்க
தேர்வாளர்கள் சான்றளித்தபடி அறிவியல் நிறைஞர்
என்னும் பட்டத்தை அவருக்குப் பல்கலைக்கழக இலச்சினையுடன் வழங்குகிறது.

The Syndicate of the Periyar University hereby makes known
that **KARUPPANNAN S** has been
admitted to the **DEGREE OF MASTER OF SCIENCE in**
APPLIED GEOLOGY

he/she having been certified by duly appointed Examiners to be qualified
to receive the same and was placed in the **FIRST CLASS WITH DISTINCTION**
at the Examination held in **APR-2005**



Given under the seal of this university

IAC. No. 142 / TNGST. No. 2702141
CST. No. 704829 / SLM / Dt. 7-4-99



BALAJI MINES

Proprietor: E. SANTHARAMAN,
PURITY LIME STONE SUPPLIERS,
5/88, CHINNAGOLLAPATTI, KANNANKURICHI
SALEM-636 008, Tamil Nadu.



Mines : Devar Malai Village, Kulithalai Tk., KARUR Dt. (Via) Kerur to

Date 15-10-2010

EXPERIENCE CERTIFICATE

I E.SANTHARAMAN being the Managing Director of BALAJI MINES do hereby certify that Thiru. S.KARUPPANNAN, son of T.SUNDARAM (Whose signature is appended) worked as a Geologist in Balaji Mine, Devar malai village, kulithalai Taluk, Karur District, from 01.06.2005 to 10.10.2010. During his term of work aforesaid, he has obtained practical experience as detailed overleaf. The duties connected with his work have involved his continuous attendance at the mine, and have been efficiently performed by him.

I believe him to be of good character and a fit and proper person to be examined for Certificate of Competency.

(Signature with date and official Seal)

TIN No: 33852702141
CST No: 704829 / 7-4-99

BALAJI MINES

5/88, Chinnagollapatty,
Kannankurichi (P.O), SALEM-8.

(Signature of Candidate)



K. RAMAJAYAM
Cell 94876 33359

SRI RAMAJAYAM
GRANITES

731, Krishnagin Main Road, Opp. E.B. Office, MATHUR - 635 203
email: sramajayamgranites@gmail.com

K. R. LAKSHMAN
Cell 94876 33359
Cell 94876 33359



Date: 11/10/2011

EXPERIENCE CERTIFICATE

This is to certify that **Mr. Karuppannan Sundaram** has been worked as a "Senior Geologist" in our company from 11th October 2010 to 11th October 2011. During this period, he has been involved in the Quality Control for Granite block extraction from quarry. Involvement of his work is highly appreciated and have been efficiently worked in our company. The duties connected with his work have been continuous attendance at the quarry.

I wish him all the best in all his future endeavors.

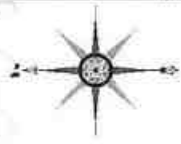
FOR SRI RAMAJEYAM GRANITES

K. R. Lakshman
Proprietor

11/10/2011

*Attested /
K. R. Lakshman
11/10/2011*

DEPUTY DIRECTOR
DEPARTMENT OF GEOLOGY AND MINING
DHARMAPURI



TOWARDS
KANCHIPURAM

12.8Km



Kalakattur



Suruttal

1.17Km

0.99Km

2.94Km

TOWARDS
MAGARAL

283

PLATE No-I

APPLICANT:

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),

EXTENT : 4.96.00 Hect,

VILLAGE : KUNDIYANTHANDALAM,

TALUK : VEMBAKKAM,

DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA

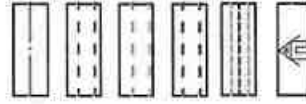
APPROACH ROAD

CART ROAD

VILLAGE ROAD

SH - 118A ROAD

HABITATION



KEY MAP

Not to Scale

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

[Signature]

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

357

[Signature]

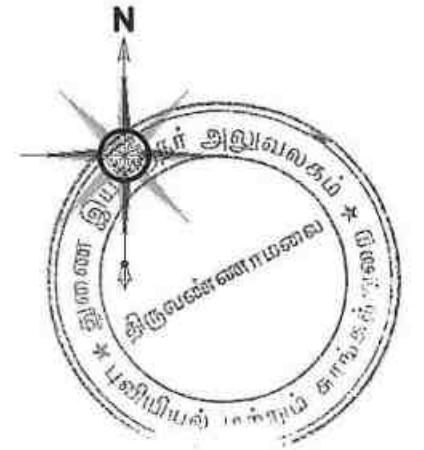


PLATE No-IA

APPLICANT:

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA : ●

TOPO SHEET NO : 57-P/10

LATITUDE : 12°44'31.09"N to 12°44'38.96"N

LONGITUDE : 79°43'8.05"E to 79°43'22.41"E

LOCATION PLAN

NOT TO SCALE

Prepared By:

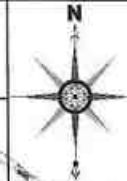
I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

79°43'8.05"E



355



M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

S.F.No 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1
1B2, 1B3, 3A, 3B1, 3B2, 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),

TOPO SHEET NO : 57-P/10

LONGITUDE : 79°43'8.05"E to 79°43'22.41"E

[illegible]

SCALE- 1:1,00,000

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE



Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

12°44'38.96"N

Towards
Girijapuram

79°43'8.05"E



Towards
Kilnaickenpalayam

286

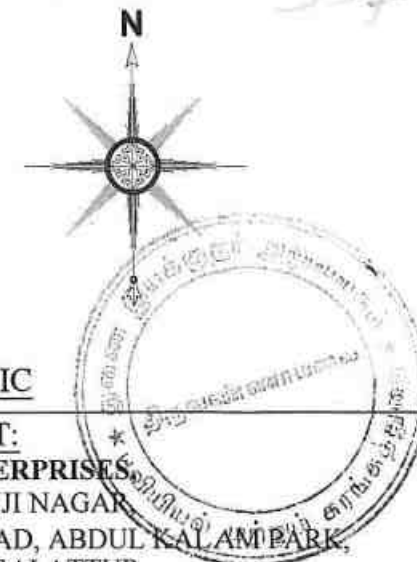


PLATE No-IC

APPLICANT:

M/s.S.A.ENTERPRISES
No.2, KURUNJI NAGAR
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA	
APPROACH ROAD	
CART ROAD	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	
EXISTING PIT	

TOPO SHEET NO : 57-P/10

LATITUDE : 12°44'31.09"N to 12°44'38.96"N

LONGITUDE : 79°43'8.05"E to 79°43'22.41"E

SATELITE IMAGERY MAP
SCALE- 1:5000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

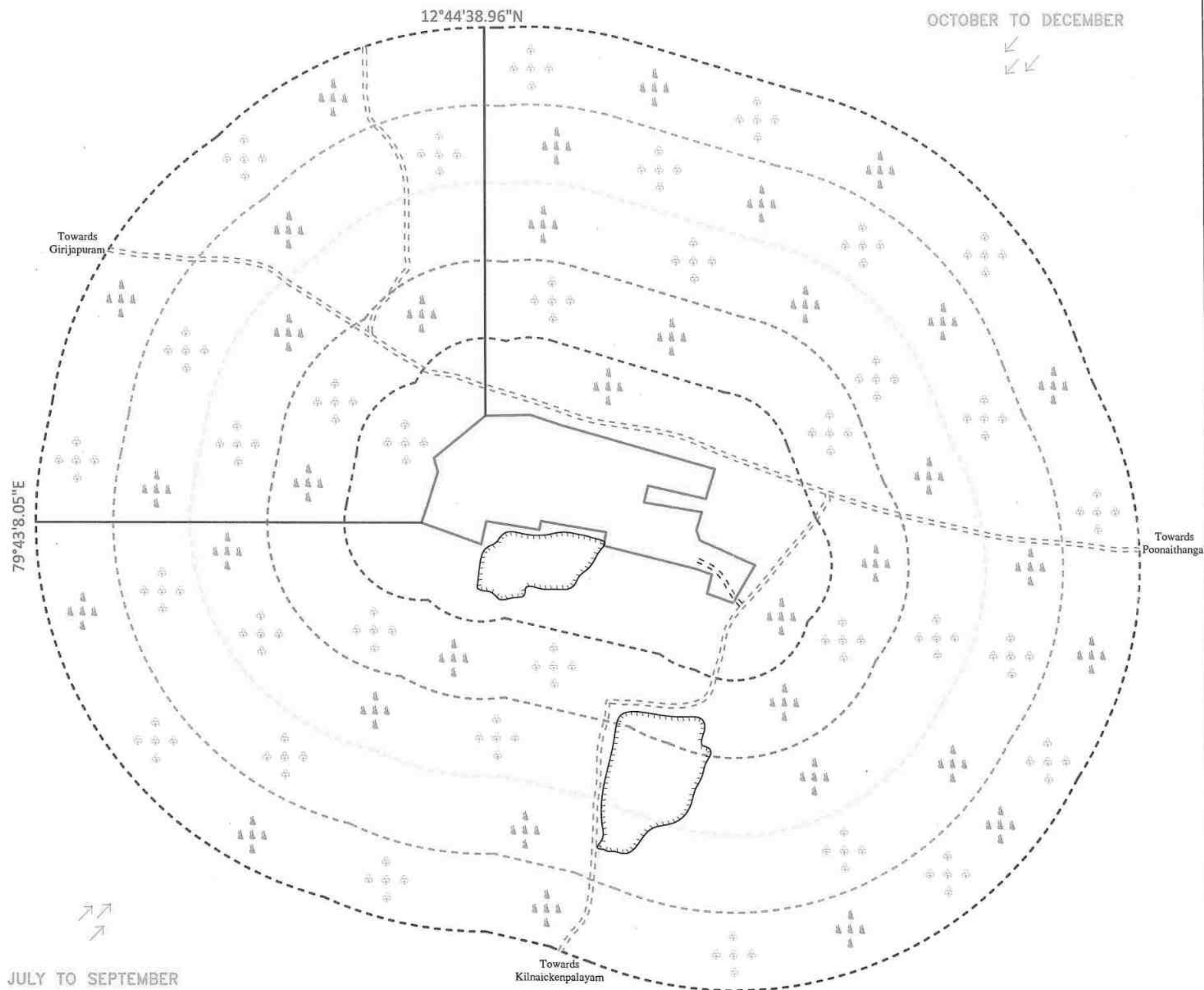


PLATE No-ID

APPLICANT:

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1ST MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA

APPROACH ROAD

CART ROAD

100m RADIUS

200m RADIUS

300m RADIUS

400m RADIUS

500m RADIUS

EXISTING PIT

SHRUBS & TREES

TOPO SHEET NO : 57-P/10

LATITUDE : 12°44'31.09"N to 12°44'38.96"N

LONGITUDE : 79°43'8.05"E to 79°43'22.41"E

SATELITE IMAGERY MAP

SCALE- 1:5000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

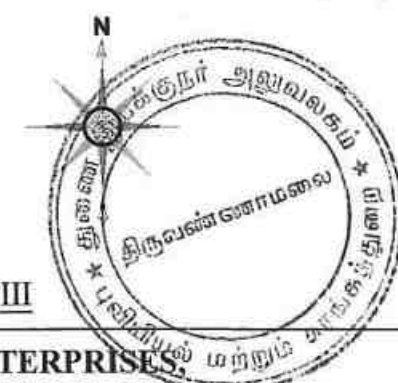


PLATE No- III

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

- MINE LEASE BOUNDARY
- SAFETY BOUNDARY
- APPROACH ROAD
- VILLAGE ROAD
- BOUNDARY PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARK
- SHRUBS
- GRAVEL
- ODAI
- BORE HOLES

SURFACE, GEOLOGICAL PLAN & SECTIONS

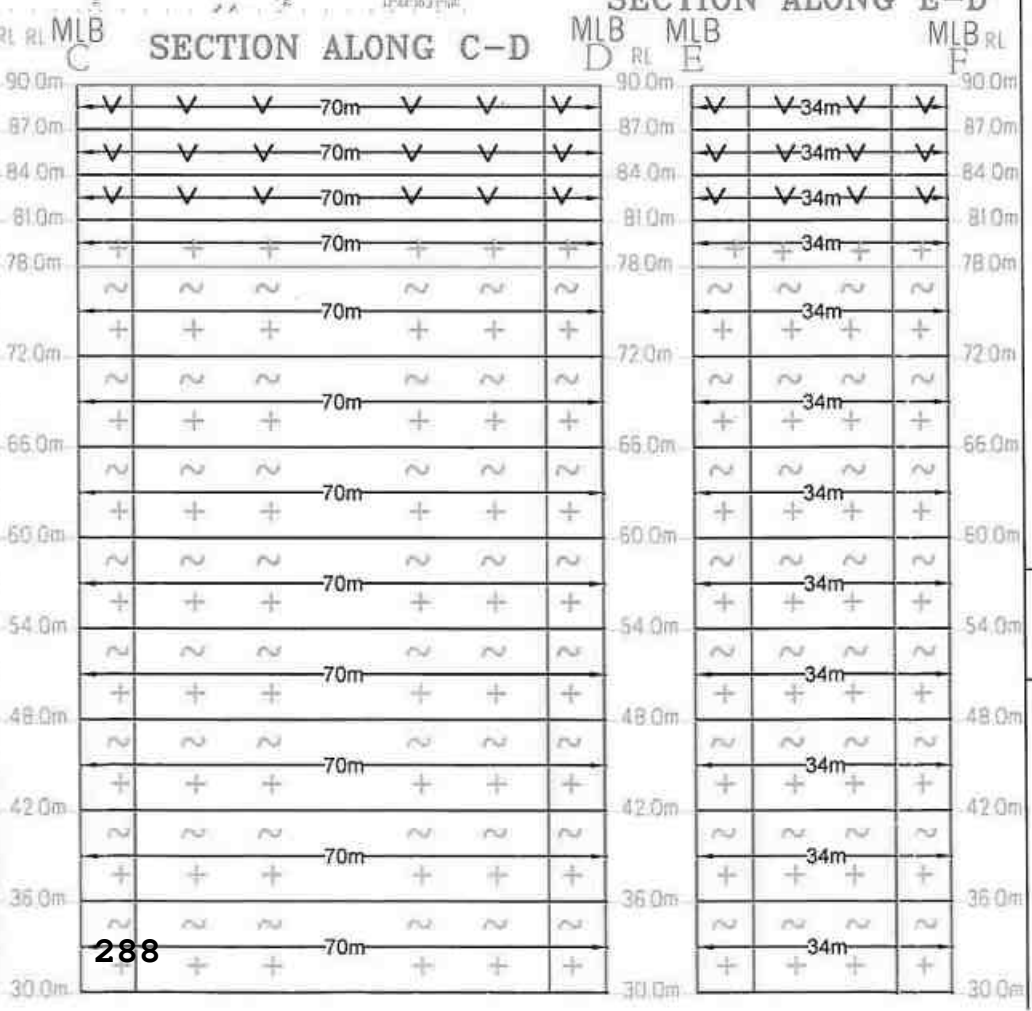
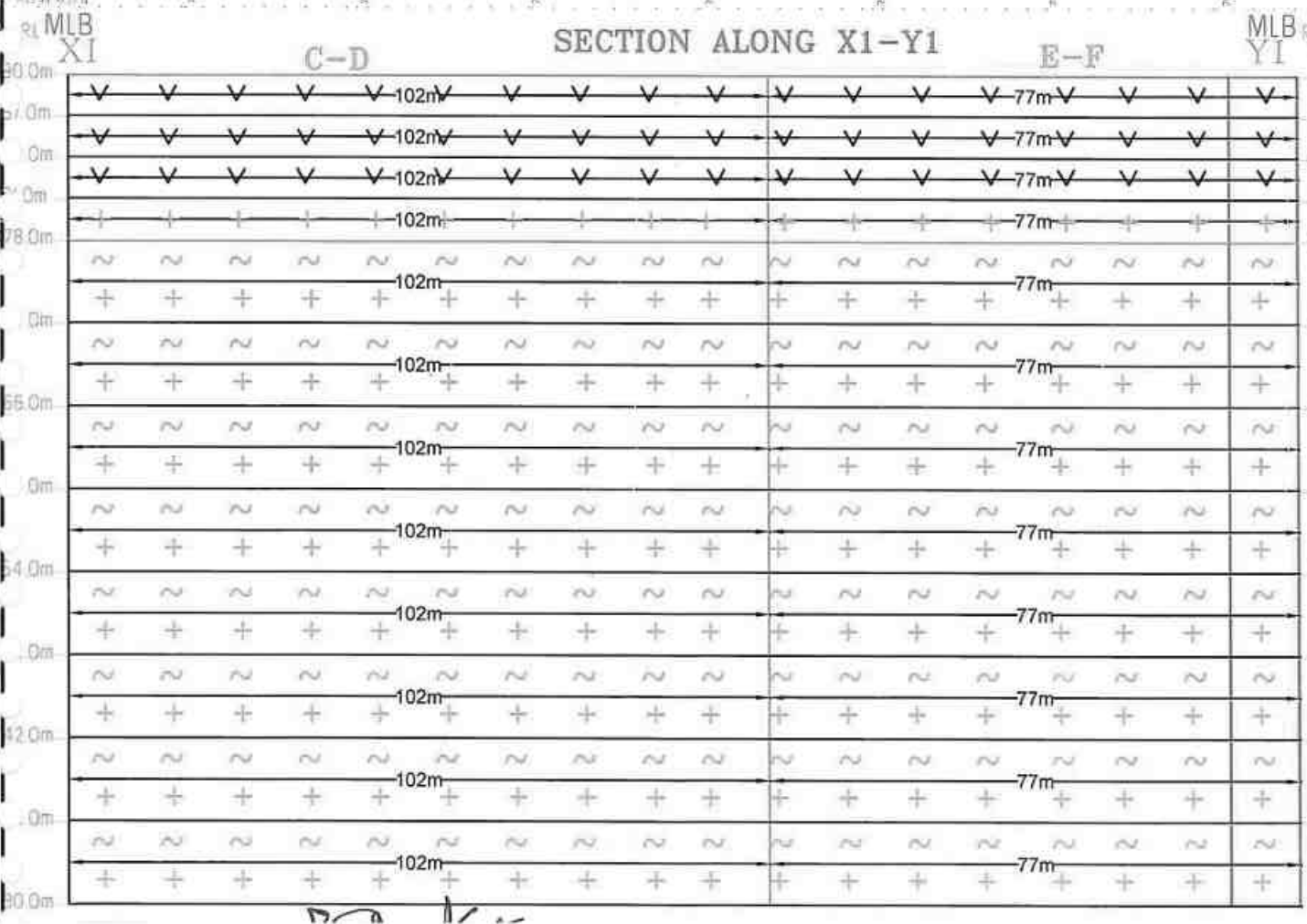
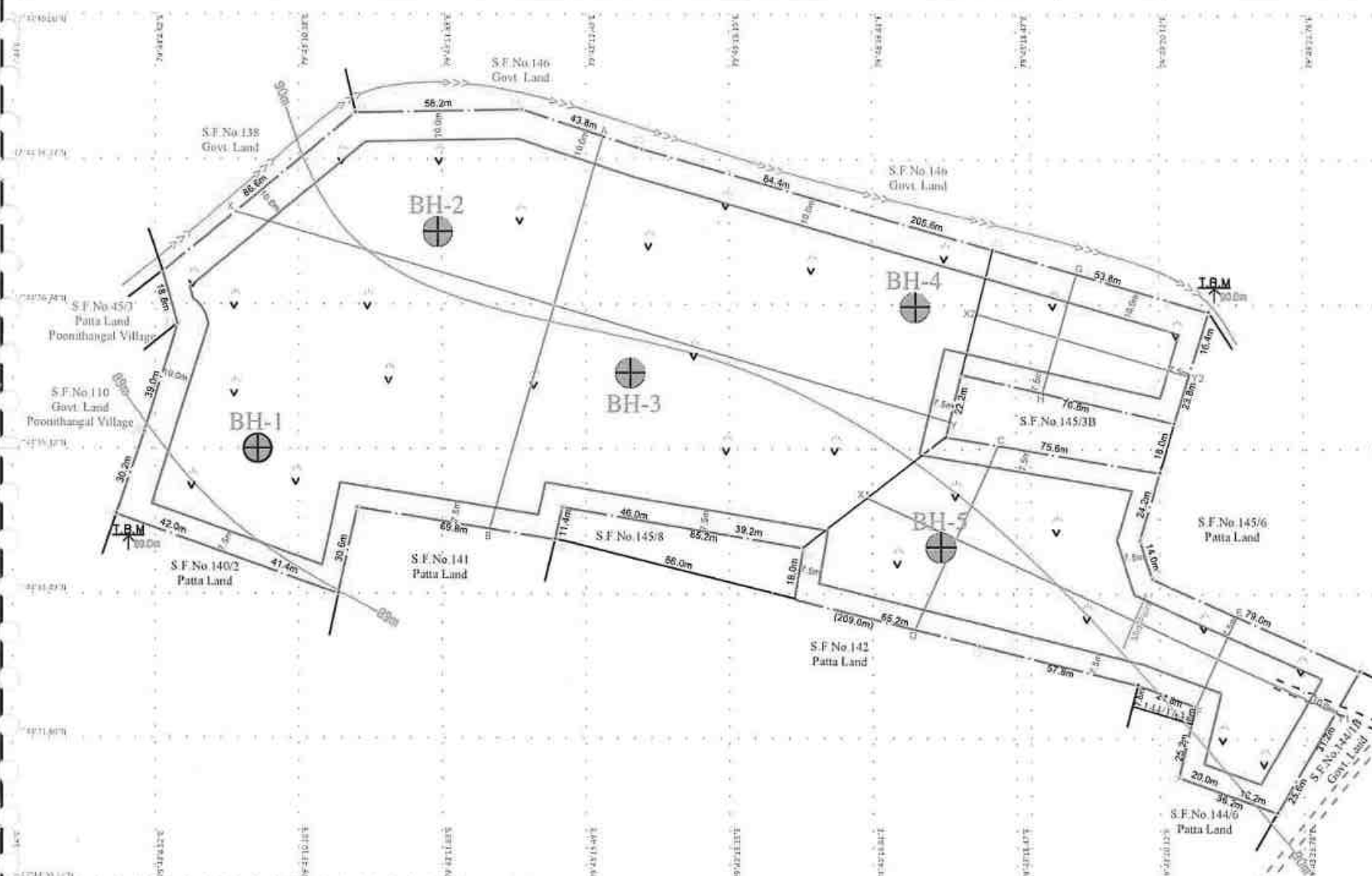
PLAN SCALE 1: 2000
SECTION HOR 1: 1000 & VER 1: 500

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

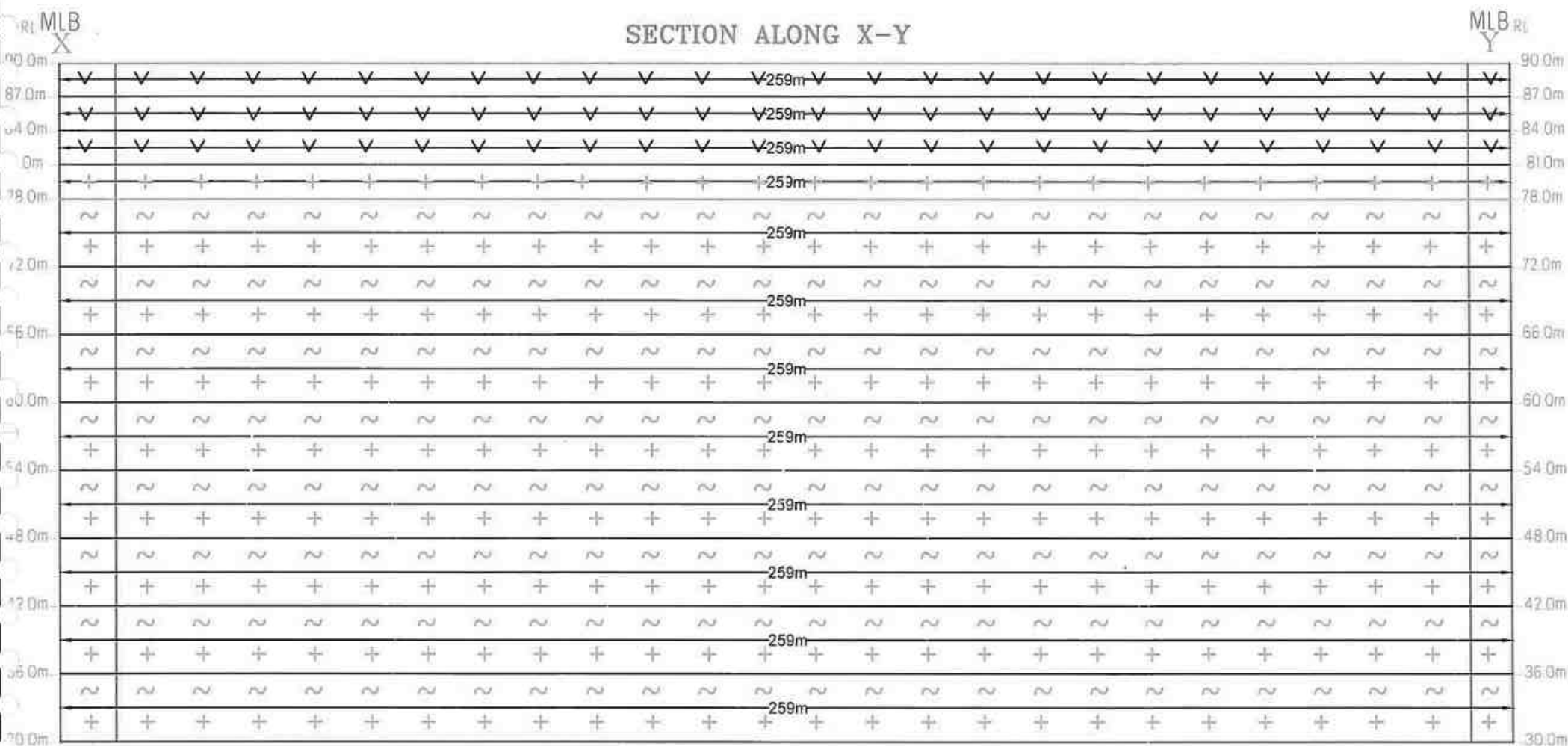
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

GEOLOGICAL RESOURCES									
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XV-AB	I	259	141	2	109557	109557	2	21914	21914
	II	259	141	2	109557	109557	2	21914	21914
	III	259	141	2	109557	109557	2	21914	21914
	IV	259	141	2	109557	109557	2.25	301282	
	V	259	141	6	219114	219114	2.25	602563.5	
	VI	259	141	6	219114	219114	2.25	602563.5	
	VII	259	141	6	219114	219114	2.25	602563.5	
	VIII	259	141	6	219114	219114	2.25	602563.5	
	IX	259	141	6	219114	219114	2.25	602563.5	
	X	259	141	6	219114	219114	2.25	602563.5	
	XI	259	141	6	219114	219114	2.25	602563.5	
	XII	259	141	6	219114	219114	2.25	602563.5	
TOTAL		60			2191140	1963489	22671	5111790	657342
XIV-CD	I	102	70	1	21420	21420	2	4284	4284
	II	102	70	1	21420	21420	2	4284	4284
	III	102	70	1	21420	21420	2	4284	4284
	IV	102	70	1	21420	21420	2.25	58905	
	V	102	70	6	42840	42840	2.25	117810	
	VI	102	70	6	42840	42840	2.25	117810	
	VII	102	70	6	42840	42840	2.25	117810	
	VIII	102	70	6	42840	42840	2.25	117810	
	IX	102	70	6	42840	42840	2.25	117810	
	X	102	70	6	42840	42840	2.25	117810	
	XI	102	70	6	42840	42840	2.25	117810	
	XII	102	70	6	42840	42840	2.25	117810	
TOTAL		60			428400	364140	64300	1001385	118520
XIV-BE	I	77	34	3	7854	7854	2	15708	15708
	II	77	34	3	7854	7854	2	15708	15708
	III	77	34	3	7854	7854	2	15708	15708
	IV	77	34	3	7854	7854	2.25	21398.5	
	V	77	34	6	15708	15708	2.25	43197	
	VI	77	34	6	15708	15708	2.25	43197	
	VII	77	34	6	15708	15708	2.25	43197	
	VIII	77	34	6	15708	15708	2.25	43197	
	IX	77	34	6	15708	15708	2.25	43197	
	X	77	34	6	15708	15708	2.25	43197	
	XI	77	34	6	15708	15708	2.25	43197	
	XII	77	34	6	15708	15708	2.25	43197	
TOTAL		60			157080	133518	23562	367174.5	47324
XIV-GH	I	78	43	3	10002	10002	2	20004	20004
	II	78	43	3	10002	10002	2	20004	20004
	III	78	43	3	10002	10002	2	20004	20004
	IV	78	43	3	10002	10002	2.25	27670.5	
	V	78	43	6	20004	20004	2.25	55341	
	VI	78	43	6	20004	20004	2.25	55341	
	VII	78	43	6	20004	20004	2.25	55341	
	VIII	78	43	6	20004	20004	2.25	55341	
	IX	78	43	6	20004	20004	2.25	55341	
	X	78	43	6	20004	20004	2.25	55341	
	XI	78	43	6	20004	20004	2.25	55341	
	XII	78	43	6	20004	20004	2.25	55341	
TOTAL		60			200040	171054	30196	470398.5	60372
GRAND TOTAL					2977860	2531181	446670	6566740	893358

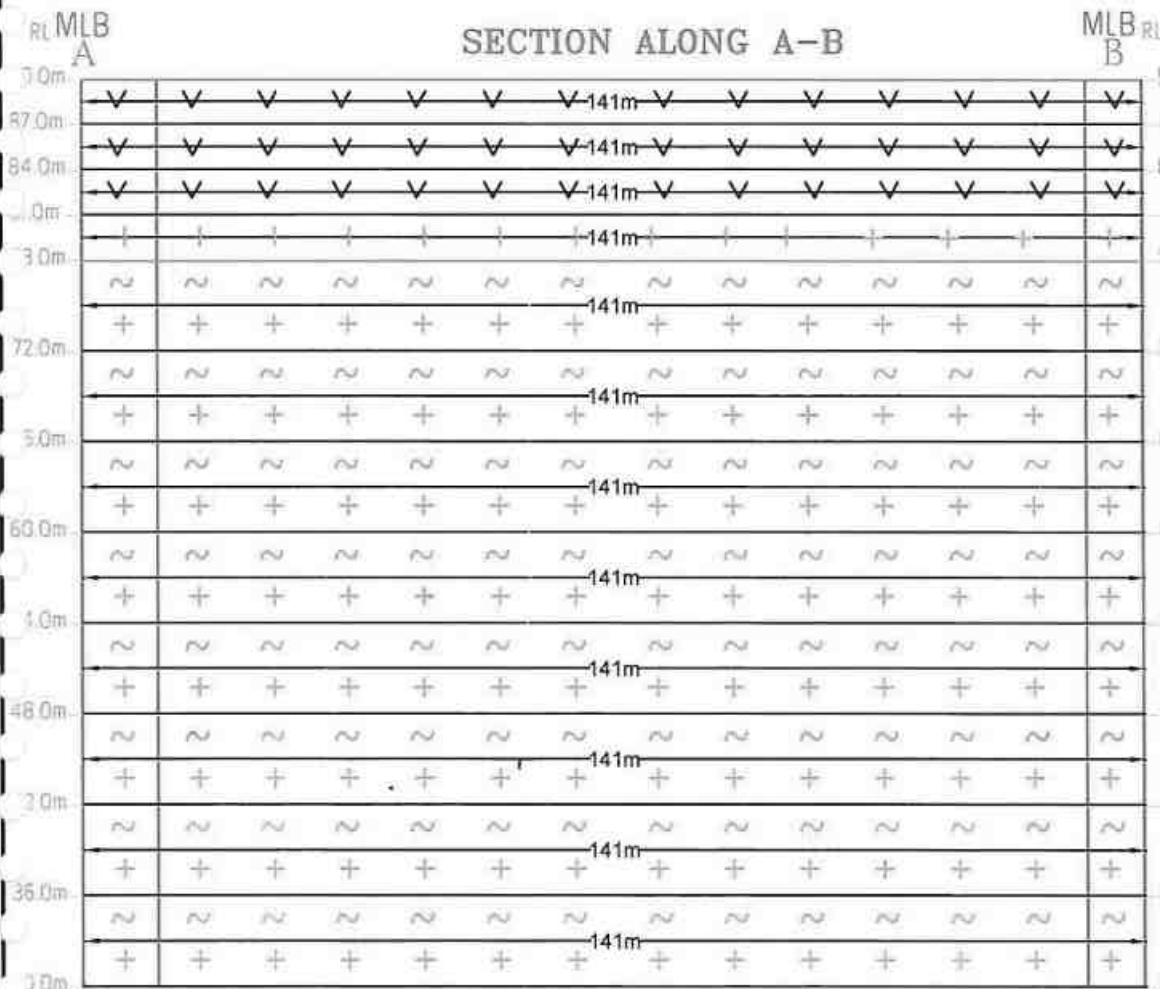




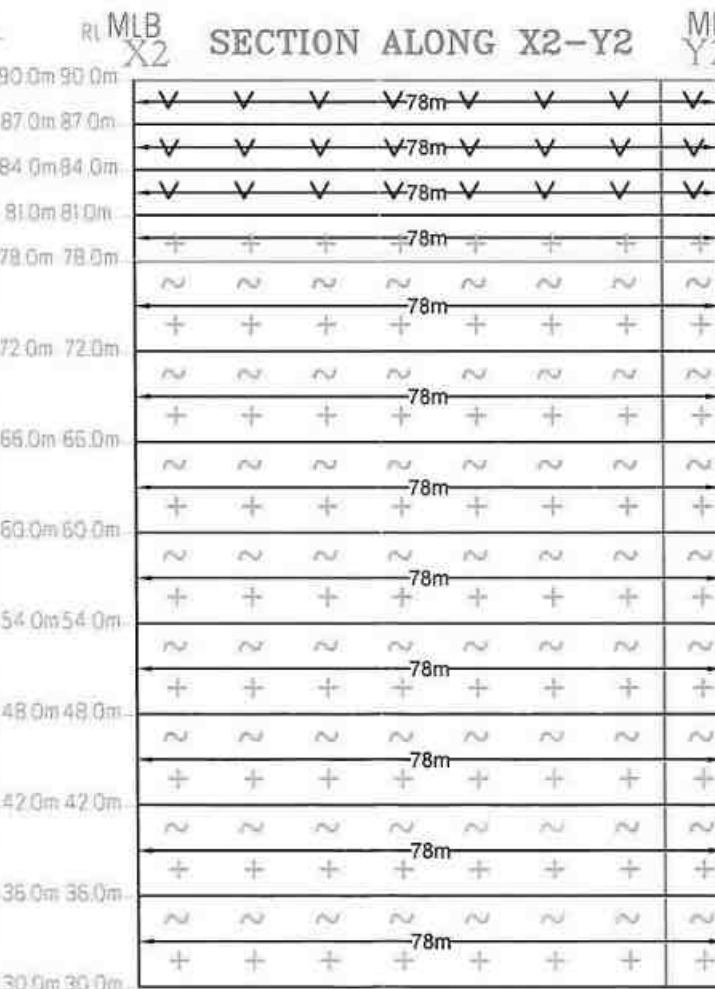
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG X2-Y2



SECTION ALONG G-H

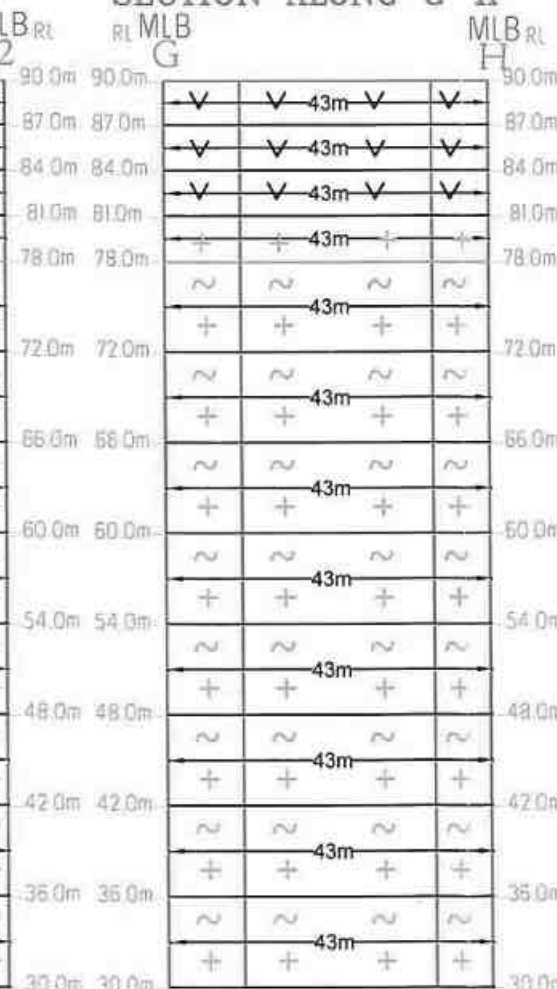


PLATE No- IIIA

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE BOUNDARY 
SAFETY BOUNDARY 
GRAVEL 
ROUGH STONE 

GEOLOGICAL SECTIONS SECTION HOR 1 : 1000 & VER 1 : 500

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

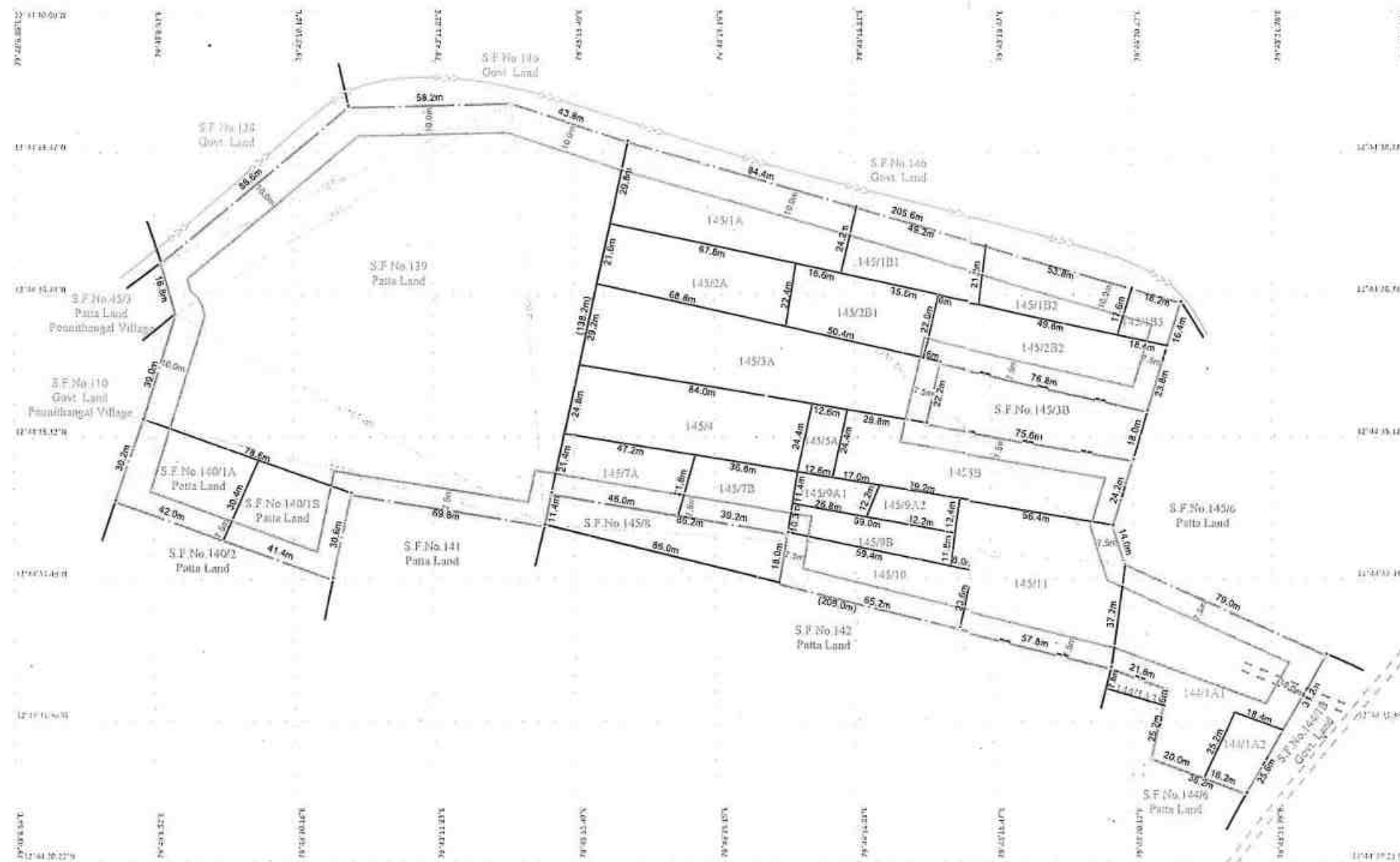


PLATE No- II

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),

EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE BOUNDARY	
SAFETY BOUNDARY	
APPROACH ROAD	
VILLAGE ROAD	
BOUNDARY PILLAR STONES	
ODAI	

MINE LEASE PLAN
SCALE 1 : 2000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS
BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN, M.Sc., Ph.D.
QUALIFIED PERSON

SL.No.	LATITUDE	LONGITUDE	SL.No.	LATITUDE	LONGITUDE
1	12°44'36.73"N	79°43'20.67"E	14	12°44'34.05"N	79°43'15.99"E
2	12°44'35.47"N	79°43'20.28"E	15	12°44'34.49"N	79°43'13.20"E
3	12°44'36.01"N	79°43'17.80"E	16	12°44'34.13"N	79°43'13.12"E
4	12°44'35.31"N	79°43'17.63"E	17	12°44'34.48"N	79°43'10.83"E
5	12°44'34.91"N	79°43'20.11"E	18	12°44'33.50"N	79°43'10.62"E
6	12°44'34.16"N	79°43'19.87"E	19	12°44'34.39"N	79°43'8.05"E
7	12°44'33.73"N	79°43'20.02"E	20	12°44'35.12"N	79°43'8.10"E
8	12°44'32.69"N	79°43'22.41"E	21	12°44'36.53"N	79°43'8.75"E
9	12°44'31.09"N	79°43'21.47"E	22	12°44'37.12"N	79°43'8.57"E
10	12°44'31.49"N	79°43'20.34"E	23	12°44'38.91"N	79°43'10.79"E
11	12°44'32.29"N	79°43'20.53"E	24	12°44'38.96"N	79°43'12.72"E
12	12°44'32.53"N	79°43'19.85"E	25	12°44'38.52"N	79°43'14.10"E
13	12°44'32.96"N	79°43'18.02"E	26	12°44'37.41"N	79°43'18.16"E

Sl.No	S.F.No.	Sib Division	Extent in Hect
1	139	-	1.89.00
2	140	1A	0.12.50
3		1B	0.12.50
4	144	1A1	0.29.50
5		1A2	0.05.00
6		1A	0.22.50
7		1B1	0.10.00
8		1B2	0.09.50
9		1B3	0.03.00
10		2A	0.15.00
11		2B1	0.11.34
12		2B2	0.19.16
13		3A	0.33.00
14	145	4	0.21.00
15		5A	0.03.00
16		5B	0.26.00
17		7A	0.09.50
18		7B	0.08.50
19		9A1	0.04.00
20		9A2	0.03.50
21		9B	0.07.50
22		10	0.14.50
23		11	0.26.50
Total Extnt			4.96.0 Hect

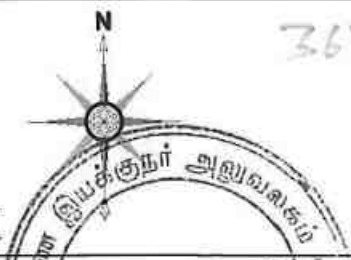


PLATE No- IV

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI

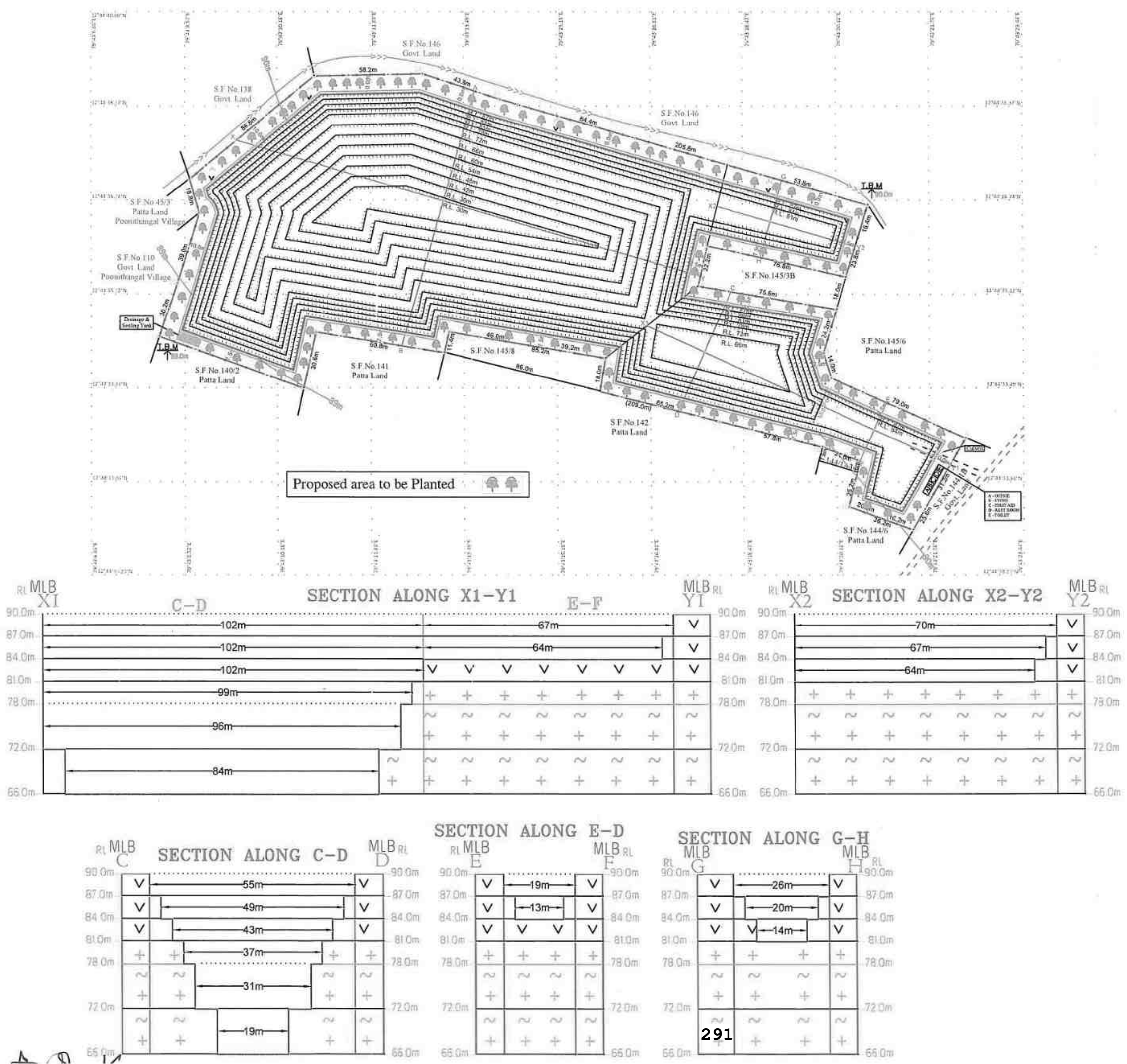
INDEX

MINE LEASE BOUNDARY	
SAFETY BOUNDARY	
APPROACH ROAD + HAUL ROAD	
VILLAGE ROAD	
BOUNDARY PILLAR STONES	
CONTOUR LINES	
TEMPORARY BENCH MARK	
SHRUBS	
GRAVEL	
ODAI	
ULTIMATE BENCH	
FENCING	
DRAINAGE & SETTLING TANK	

CONCEPTUAL PLAN & SECTIONS
PLAN SCALE 1: 2000
SECTION HOR 1: 1000 & VER 1: 500

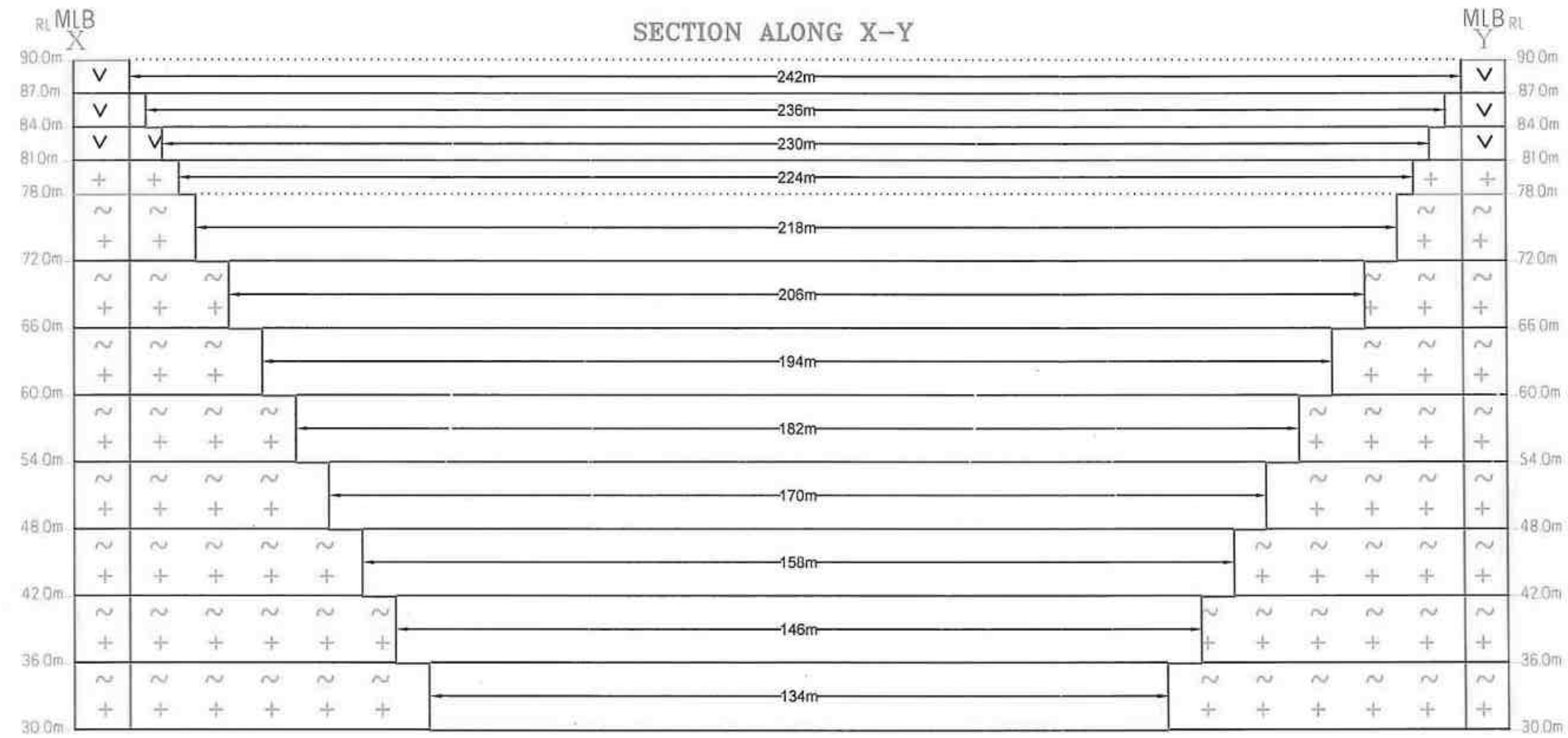
Prepared By:
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BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

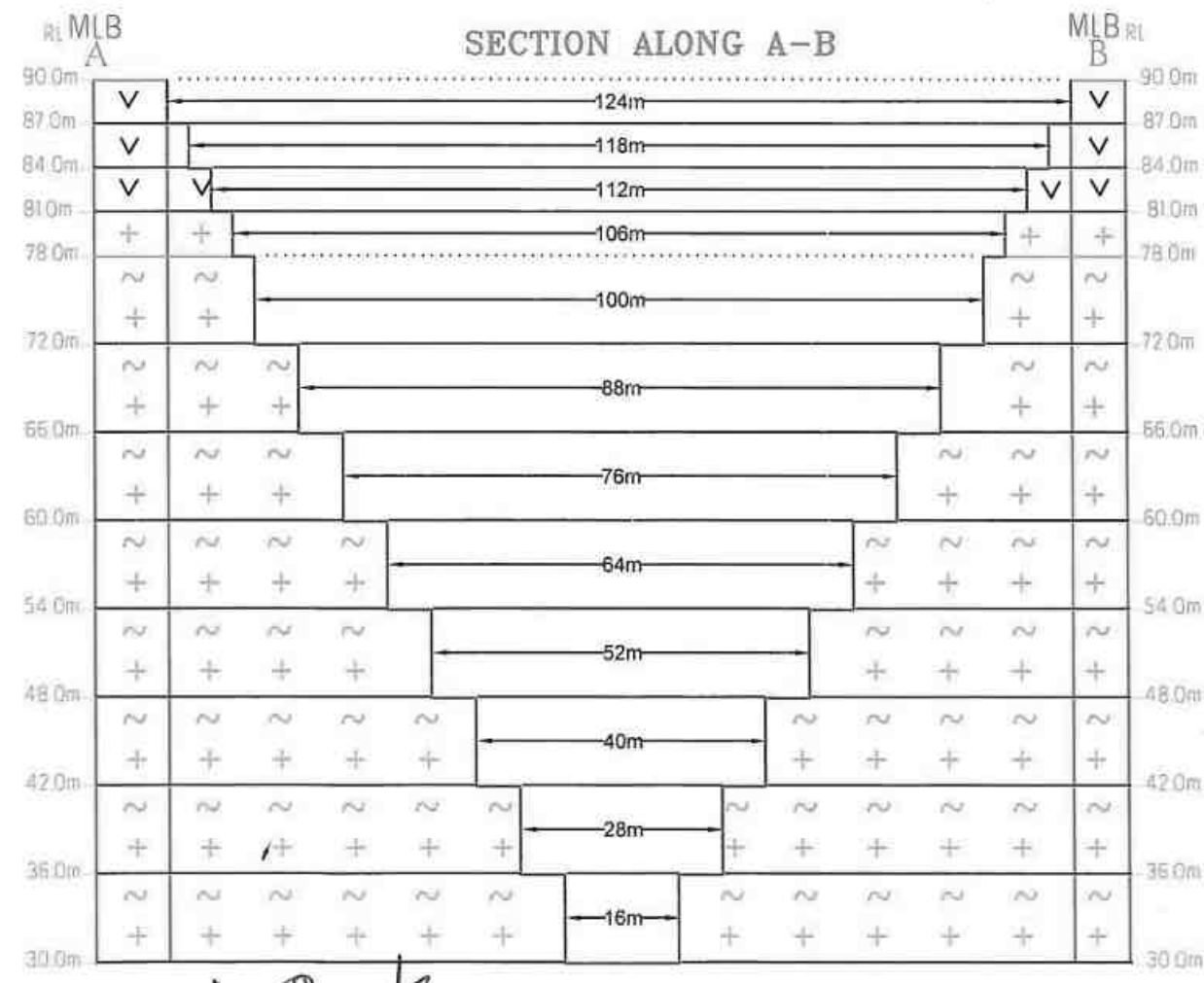




SECTION ALONG X-Y



SECTION ALONG A-B



MENIABLE RESERVE										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	242	124	3	90024	.....	90024	2	.....	180048
	II	236	118	3	83544	.....	83544	2	.....	167088
	III	230	112	3	77280	.....	77280	2	.....	154560
	IV	224	106	3	71232	71232	.....	2.75	195888.0	.....
	V	218	100	6	130800	130800	.....	2.75	359700.0	.....
	VI	206	88	6	108768	108768	.....	2.75	299112.0	.....
	VII	194	76	6	88464	88464	.....	2.75	243276.0	.....
	VIII	182	64	6	69888	69888	.....	2.75	192192.0	.....
	IX	170	52	6	53040	53040	.....	2.75	145860.0	.....
	X	158	40	6	37920	37920	.....	2.75	104280.0	.....
	XI	146	28	6	24528	24528	.....	2.75	67452.0	.....
	XII	134	16	6	12864	12864	.....	2.75	35376.0	.....
TOTAL				60	848352	597504	250848	.....	1643136	501696
X1Y1-CD	I	102	55	3	16830	.....	16830	2	.....	33660
	II	102	49	3	14994	.....	14994	2	.....	29988
	III	102	43	3	13158	.....	13158	2	.....	26316
	IV	99	37	3	10989	10989	.....	2.75	30220	.....
	V	96	31	6	17856	17856	.....	2.75	49104	.....
	VI	84	19	6	9576	9576	.....	2.75	26334	.....
TOTAL				24	83403	38421	44982	.....	105658	89964
X1Y1-EF	I	67	19	3	3819	.....	3819	2	.....	7638
	II	64	13	3	2496	.....	2496	2	.....	4992
TOTAL				6	6315	0	6315	.....	0	12630
X2Y2-GH	I	70	26	3	5460	.....	5460	2	.....	10920
	II	67	20	3	4020	.....	4020	2	.....	8040
	III	64	14	3	2688	.....	2688	2	.....	5376
TOTAL				9	12168	0	12168	.....	0	24336
GRAND TOTAL					950238	635925	314313	.....	1748794	628626

PLATE No- IVA

M/s.S.A.ENTERPRISES,
 No.2, KURUNJI NAGAR,
 1st MAIN ROAD, ABDUL KALAM PARK,
 OLD PERUNGALATTUR,
 CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
 (144/1A1, 144/1A2), (145-1A, 1B1,
 1B2, 1B3, 2A, 2B1,2B2 3A, 4, 5A,
 5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
 EXTENT : 4.96.00 Hect,
 VILLAGE : KUNDIYANTHANDALAM,
 TALUK : VEMBAKKAM,
 DISTRICT : TIRUVANNAMALAI.

INDEX

- MINE LEASE BOUNDARY
- SAFETY BOUNDARY
- GRAVEL
- ROUGH STONE
- ULTIMATE BENCH

CONCEPTUAL SECTIONS

SECTION HOR 1 : 1000 & VER 1: 500

Prepared By:
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 BEEN CHECKED BY ME AND IS CORRECT
 TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
 QUALIFIED PERSON

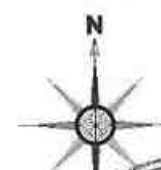


PLATE No- V

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

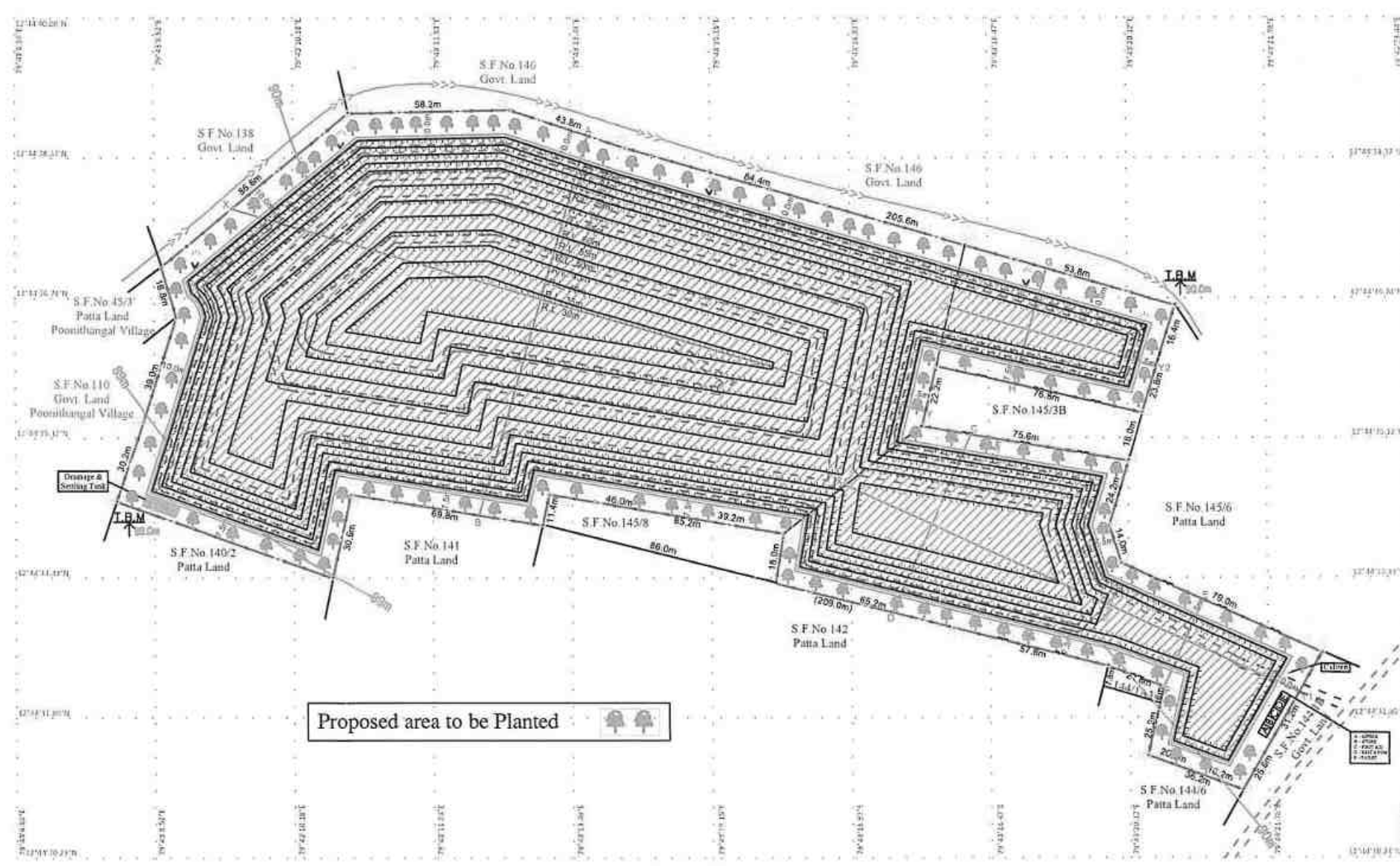
- MINE LEASE BOUNDARY
- SAFETY BOUNDARY
- APPROACH ROAD + HAUL ROAD
- VILLAGE ROAD
- BOUNDARY PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARK
- SHRUBS
- GRAVEL
- ODAI
- PROPOSED BENCH
- FENCING
- DRAINAGE & SETTLING TANK

MINE LAYOUT PLAN & LAND USE PATTERN
PLAN SCALE 1 : 2000

Prepared By:
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BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

[Signature]

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON



MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	3.77.35	
INFRASTRUCTURE	NIL	0.05.0	
ROADS	NIL	0.03.0	
UN-UTILIZED AREA	4.96.00	0.47.50	
GREEN BELT	NIL	0.49.50	
DRAINAGE & SETTLING TANK	NIL	0.13.65	
GRAND TOTAL	4.96.00	4.96.00	

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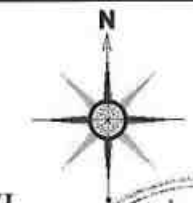


PLATE No- VI

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),
EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

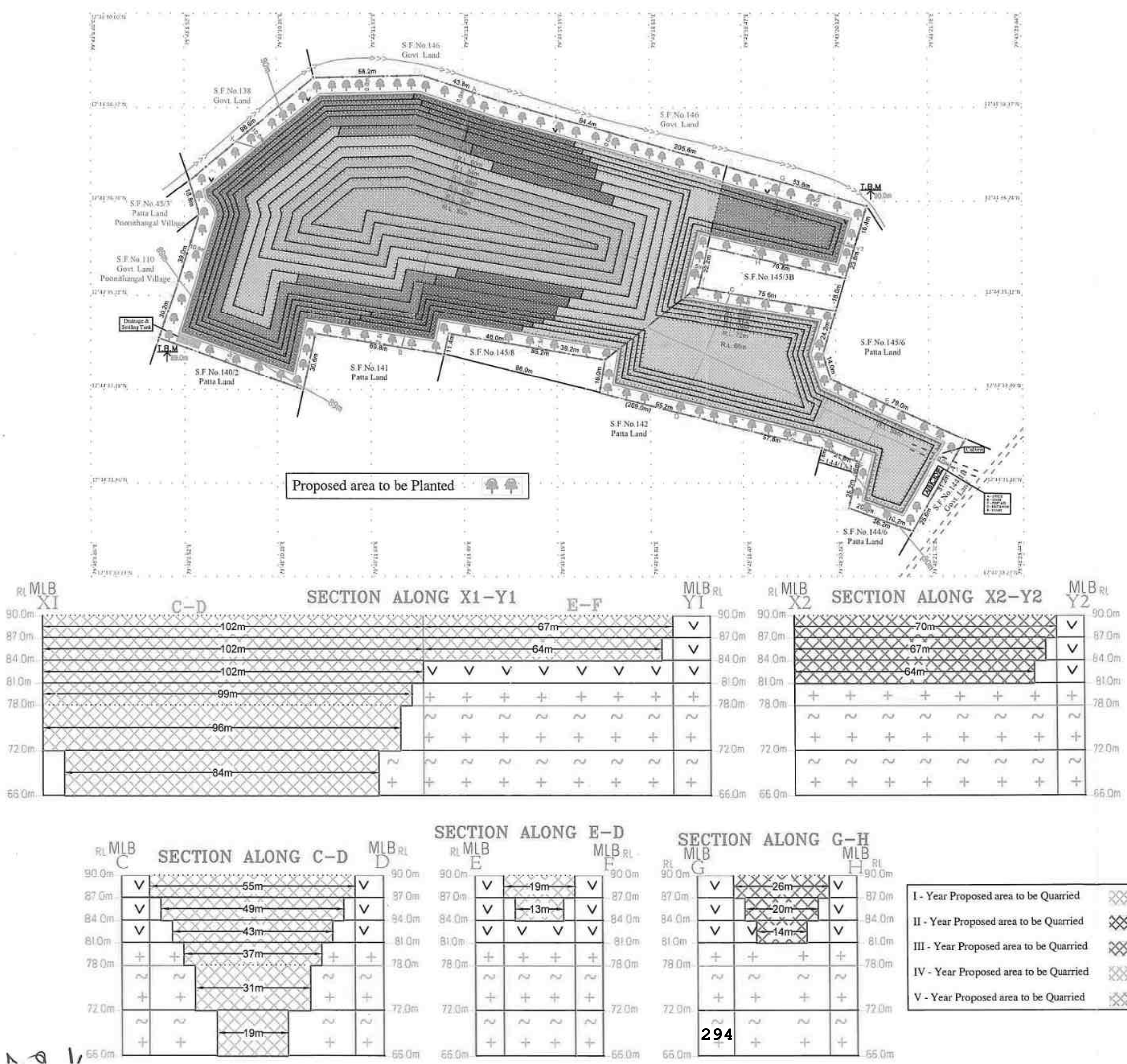
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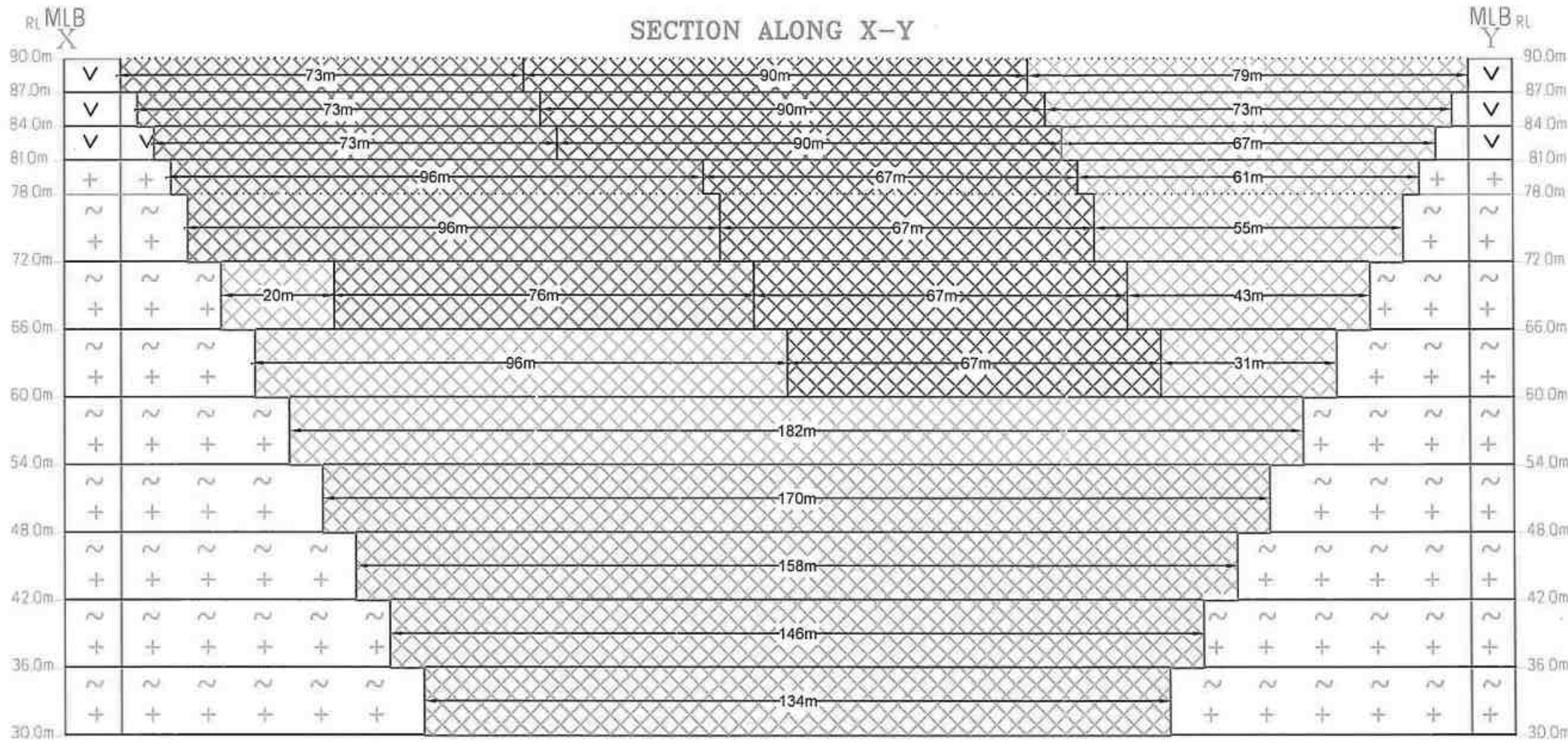
MINE LEASE BOUNDARY	
SAFETY BOUNDARY	
APPROACH ROAD + HAUL ROAD	
VILLAGE ROAD	
BOUNDARY PILLAR STONES	
CONTOUR LINES	
TEMPORARY BENCH MARK	
SHRUBS	
GRAVEL	
ODAI	
ULTIMATE BENCH	
FENCING	
DRAINAGE & SETTLING TANK	

YEARWISE DEVELOPMENT &
PRODUCTION PLAN SECTIONS
PLAN SCALE 1:2000
SECTION HOR 1: 1000 & VER 1: 500

Prepared By:
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BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON





- I - Year Proposed area to be Quarried
- II - Year Proposed area to be Quarried
- III - Year Proposed area to be Quarried
- IV - Year Proposed area to be Quarried
- V - Year Proposed area to be Quarried

PLATE No- VIA

M/s.S.A.ENTERPRISES,
No.2, KURUNJI NAGAR,
1st MAIN ROAD, ABDUL KALAM PARK,
OLD PERUNGALATTUR,
CHENNAI DISTRICT - 600063.

LEASE AREA:

S.F.No : 139, (140/1A & 140/1B),
(144/1A1, 144/1A2), (145-1A, 1B1,
1B2, 1B3, 2A, 2B1, 2B2 3A, 4, 5A,
5B, 7A, 7B, 9A1, 9A2, 9B, 10, 11),

EXTENT : 4.96.00 Hect,
VILLAGE : KUNDIYANTHANDALAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE BOUNDARY

SAFETY BOUNDARY

GRAVEL

ROUGH STONE

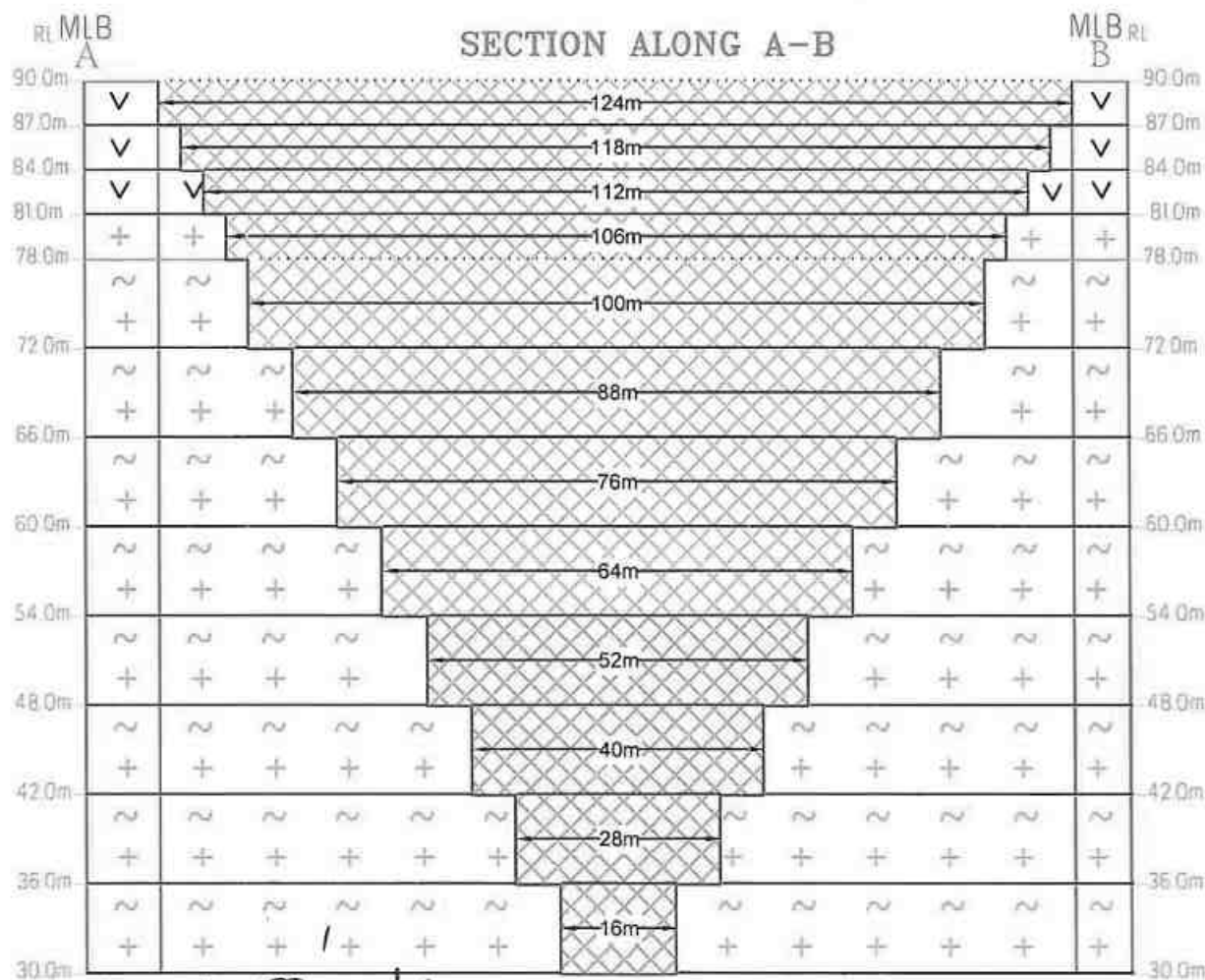
PROPOSED BENCH

YEARWISE DEVELOPMENT &
PRODUCTION SECTIONS
SECTION HOR 1 : 1000 & VER 1 : 500

Prepared By:

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TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON



YEARWISE PRODUCTIONS												
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)	
I-Year	XIY1-EF	I	67	19	3	3819	3819	3819	2	7638		
		II	64	13	3	2496	2496	2496	2	4992		
	XIY1-CD	I	102	55	3	16830	16830	16830	2	33660		
		II	102	49	3	14994	14994	14994	2	29988		
		III	102	43	3	13158	13158	13158	2	26316		
		IV	99	37	3	10989	10989	10989	2.75	30220		
		V	96	31	6	17856	17856	17856	2.75	49104		
		VI	84	19	6	9576	9576	9576	2.75	26334		
	XY-AB	I	79	124	3	29388	29388	29388	2	58776		
		II	73	118	3	25842	25842	25842	2	51684		
		III	67	112	3	22512	22512	22512	2	45024		
		IV	61	106	3	19398	19398	19398	2.75	53344		
		V	55	100	6	33000	33000	33000	2.75	90750		
		VI	43	88	6	22704	22704	22704	2.75	62436		
			VII	31	76	6	14136	14136	14136	2.75	38874	
			TOTAL			256698	127659	129039		351062	258078	
II-Year	XY-AB	I	90	124	3	33480	33480	33480	2	66960		
		II	90	118	3	31860	31860	31860	2	63720		
		III	90	112	3	30240	30240	30240	2	60480		
		IV	67	106	3	21306	21306	21306	2.75	58592		
		V	67	100	6	40200	40200	40200	2.75	110550		
		VI	67	88	6	35376	35376	35376	2.75	97284		
		VII	67	76	6	30552	30552	30552	2.75	84018		
		TOTAL			223014	127434	95580		350444	191160		
III-Year	XY-AB	I	73	124	3	27156	27156	27156	2	54312		
		II	73	118	3	25842	25842	25842	2	51684		
		III	73	112	3	24528	24528	24528	2	49056		
	X2Y2-GH	I	70	26	3	5460	5460	5460	2	10920		
		II	67	20	3	4020	4020	4020	2	8040		
		III	64	14	3	2688	2688	2688	2	5376		
	XY-AB	IV	96	106	3	30528	30528	30528	2.75	83952		
		V	96	100	6	57600	57600	57600	2.75	158400		
VI		76	88	6	40128	40128	40128	2.75	110352			
		TOTAL			217950	128256	89694		352704	179388		
IV-Year	XY-AB	VI	20	88	6	10560	10560	10560	2.75	29040		
		VII	96	76	6	43776	43776	43776	2.75	120384		
		VIII	182	64	6	69888	69888	69888	2.75	192192		
		TOTAL			124224	124224	0		341616	0		
V-Year	XY-AB	IX	170	52	6	53040	53040	53040	2.75	145860		
		X	158	40	6	37920	37920	37920	2.75	104280		
		XI	146	28	6	24528	24528	24528	2.75	67452		
		XII	134	16	6	12864	12864	12864	2.75	35376		
		TOTAL			128352	128352	0		352968	0		
GRAND TOTAL						950238	635925	314313		1748794	628626	

PHOTOCOPY OF THE APPLIED LEASE AREA

Site photos in respect of Rough stone and gravel quarry lease in S.F.No's: 139, 140/1A, 140/1B, 144/1A1, 144/1A2, 145/1A, 145/1B1, 145/1B2, 145/1B3, 145/2A, 145/2B1, 145/2B2, 145/3A, 145/4, 145/5A, 145/5B, 145/7A, 145/7B, 145/9A1, 145/9A2, 145/9B, 145/10 & 145/11 Patta Land - over an extent of 4.96.0Hectares - Kundiyanthandalam Village - Vembakkam Taluk- Tiruvannamalai District - Tamil Nadu State in belongs to M/s.S.A.Enterprises.



சில சில பரப்புகளில் சாதாரண கற்கள் மஞ்சும் கிராமல் மண்
பொருள் கிடைக்க சில சில கிடைக்க கிடைக்க கிடைக்க, இந்த பரப்புகள் பலவகையில்
300 மீட்டர் சுற்றளவில் இருப்பதால், டயலாக், அரங்க அங்கீகரிக்கப்பட்ட
அபிவிருத்தி பரப்புகள், அபிவிருத்தி பரப்புகள், பரப்புகள் சிதைவடைகின்ற
பரப்புகள் சிதைவடைகின்ற பரப்புகள் சிதைவடைகின்ற பரப்புகள் சிதைவடைகின்ற

திரு: கண்ணப்பன்

பிள்ளை: 17.11.2025.

திரு: கண்ணப்பன்

17/11/25
கிராம நாயக அலுவலர்
77, கருட்டல் கிராமம்
76 குண்டியாந்தலம் கிராமம்
வெம்பாக்கம் வட்டம்.
கிருஷ்ண மலை மாவட்டம்

திரு: கண்ணப்பன்



National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Technical Mining Solutions, Dharmapuri

5/1485-3, Salem Main Road, Elakkiyampatty, Dharmapuri, Tamil Nadu

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors.

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals - including opencast and underground mining	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated January 24, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3142 dated Feb 19, 2024. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.

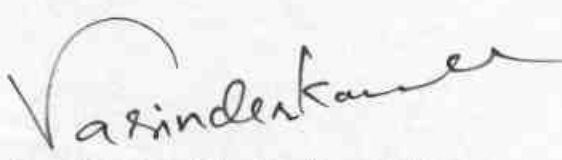
Issue Date
Feb 19, 2024

Valid up to
Dec 31, 2026




Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0319


Prof (Dr) Varinder S Kanwar
(CEO NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.