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 – NON-FOREST LAND

CLUSTER EXTENT = 10.15.50Ha

At

Killukulavaipatti Village, Kulathur Taluk,
Pudukkottai District, Tamil Nadu.

ToR Identification No.TO24B0108TN5838807N Dated: 14.05.2024 File No.10703

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.	Mineral Production
S. Devendiran S/o. Srinivasan, No.25, I.A.S Nagar, Thiruverumbur Taluk, Thiruchirappalli District-620013.	2.28.0Ha & 33, 34/3, 34/4, 34/5, 34/6 & 34/8	Rough Stone-73150m^3 Gravel-810m^3

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

GREENLINK ANALYTICAL AND RESEARCH LABORATORY (INDIA) PRIVATE LTD

No: 414/1, Tex Park Road, Opposite Gudluck Industries,

Civil Aerodrome Post, Nehru Nagar West,

Coimbatore, Tamil Nadu 641014

Valid till: 18.05.2025

Baseline study period-October through December 2024

JAN-2025

TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.11022

TOR Identification No.TO24B0108TN5838807N, Dated.14/05/2024

S.Devendiran, Rough Stone and Gravel Quarry

Specific Terms of Reference for (Mining of Minerals)

1. Seac Standard Conditions:

<table>
<tr><th>S.No</th><th colspan="3">Terms of Reference</th><th>Remarks</th></tr>
<tr><td>1.1</td><td>1</td><td colspan="2">In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:</td><td></td></tr>
<tr><td rowspan="10"></td><td rowspan="10"></td><td>(i)</td><td>Original pit dimension</td><td rowspan="10">The details of AD Mines letter is attached in the Annexure III.</td></tr>
<tr><td>(ii)</td><td>Quantity achieved Vs EC Approved Quantity</td></tr>
<tr><td>(iii)</td><td>Balance Quantity as per Mineable Reserve calculated.</td></tr>
<tr><td>(iv)</td><td>Mined out Depth as on date Vs EC Permitted depth</td></tr>
<tr><td>(v)</td><td>Details of illegal/illicit mining</td></tr>
<tr><td>(vi)</td><td>Violation in the quarry during the past working.</td></tr>
<tr><td>(vii)</td><td>Quantity of material mined out outside the mine lease area</td></tr>
<tr><td>(viii)</td><td>Condition of Safety zone/benches</td></tr>
<tr><td>(ix)</td><td>Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.</td></tr>
</table>

	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 in **Annexure IV.**
	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	The details of structures such as dwelling houses, places of worship, industries, factories, sheds, etc. within the radius of 500m from the proposed project area will be given in the final EIA report.
	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 will be submitted in the **Annexure V.**
	5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	The details of Bio diversity 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.	The Slope Stability report will be submitted in the final EIA report.
	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.	The Slope Stability report will be submitted in the final EIA report
	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	The affidavit for blasting will be enclosed in the final EIA report.

		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.	A conceptual design of blasting has been given in Section 2.6 under Chapter II in the EIA report page 13-20.
	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.	The details will be submitted in the final EIA report.
	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?	The details of AD Mines letter is attached in the **Annexure III.**
	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 2.3 under Chapter II in the EIA report page 11.
	16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.	The drone video will be submitted during final EIA 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 report.
	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	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

		surrounding environment, and the remedial measures for the same.	shown in Table 2.3 under Chapter II in the EIA report page 13.
	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.	Details of manpower required for this project have been given in Table 2.14 under Chapter II in the EIA report page 21.
	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 detailed hydrogeological study will be submitted in the final EIA report.
	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	The baseline data were collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed

		including traffic/vehicular movement study.	under Chapter III in the EIA report page 22-86.
	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 116-120.
	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.
	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.	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 has been discussed in Section 3.1 in the EIA report page 23-29 under Chapter III. The details of surrounding sensitive ecological features have been provided in Table 3.37 under Chapter III in the EIA report page 84. Land use plan of the project area showing pre-operational,

			operational and post-operational phases are discussed in Table 2.8 under Chapter II in the EIA report page 17.
	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.	This condition is not applicable to this project because no dumps have been proposed outside the lease area.
	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 and does not come under 'Aravalli Range.
	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 check dams after treating the water in settling tanks.
	28	Impact on local transport infrastructure due to the Project should be indicated.	Details regarding the impact of the project on traffic are given in Section 3.7 under Chapter III in the EIA report page 82-83.
	29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease	A detailed tree survey was caried out within 300 m radius and the results have been discussed in Section 3.5

		applied area & 300m buffer zone and its management during mining activity.	under Chapter III in the EIA report page 57-71.
	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 attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.9 under Chapter II in the EIA report page 18.
	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.
	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 under Chapter IV in the EIA report page 98-101.
	33	Taller/one year old Saplings raised in appropriate size of bags; preferably ecofriendly bags should be planted as	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in

		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 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.
	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.	A disaster management plan for the project has been provided in Section 7.3 under Chapter VII in the EIA report page 114-116.
	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.	A risk assessment plan for the project has been provided in Section 7.2 under Chapter VII in the EIA report page 112-114.
	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 102-103.
	37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6

		proposed remedial measures should be detailed along with budgetary allocations.	and 8.7 under Chapter VIII in the EIA report page 123-124.
	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 16 people directly as discussed in Section 8.1 under Chapter VIII in the EIA report page 122.
	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 are discussed in the Chapter VIII in the EIA report page 122-124.
	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.	The previous EC details will be submitted in the final EIA report.

	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, as shown in Chapter X in the EIA report page 126-133. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted during 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.	The EIA report has been prepared keeping in mind the fact that 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.

2. Seiaa Standard Conditions:

S.No	**Terms of Reference**		
	Cluster Management Committee		
	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.	A cluster management committee including all the proponents of the rough stone quarrying projects within the cluster of 500 m radius will be constituted for the effective implementation of green belt development plan, water sprinkling, blasting, etc.
	2	The members must coordinate among themselves for the effective implementation of EMP as committed	The members of the cluster management committee will be

		including Green Belt Development Water sprinkling, tree plantation, blasting etc.,	instructed to carry out EMP in coordination.
	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.
	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.	All the information has been discussed in Section 2.6 under Chapter II in the EIA report page 13-20.
	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.	It will be informed to the committee.
	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.	It will be advised 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	A proper action plan regarding the restoration will be followed by the committee.

		falling under the cluster in a holistic manner.		
	8	The committee shall furnish the Emergency Management plan within the cluster.		The committee will submit the emergency management plan to the respective authority in the stipulated time period.
	9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.		The information on the health of the workers and the local people will be updated periodically.
	10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.		A proper action plan with reference to water, sanitation & safety will be devised and submitted by the committee to the respective authority.
	11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.		The committee will submit the fire safety and evacuation plan as discussed in Section 7.3 under Chapter VII in the EIA report page 114-116.
	Impact study of mining			
	12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following.		
		a)	Soil health & soil biological, physical land chemical features.	Soil health and biodiversity have been discussed in Sections 3.1 and 3.5 respectively under Chapter III in the EIA report page 23-29 and 57-71.
		b)	Climate change leading to Droughts, Floods etc.	Climatic condition of the proposed project area has been discussed in Section 3.3.1 under Chapter III in the EIA report page 43-47.
		c)	Pollution leading to release of Greenhouse gases (GHG), rise in	The information about CO_2 emission has been added to Section 4.6 under

			Temperature, & Livelihood of the local People.	Chapter IV in the EIA report page 98-101.
		d)	Possibi1ities of water contamination and impact on aquatic ecosystem health.	Possibilities of both surface and ground water contamination have been discussed in Section 4.3 under Chapter IV in the EIA report page 88-89. The impact on aquatic species has been discussed in Section 4.6 under Chapter IV in the EIA report page 98-101.
		e)	Agriculture, Forestry, & Traditional practices.	Sorgum, millet, groundnut, and coconut are the primary crops that are cultivated in the study area.
		f)	Hydrothermal/Geothermal effect due to destruction in the Environment.	The average geothermal gradient of earth is 25^0C/km. As the proposed depth of mining is 50m below the local ground level, the temperature will increase by 1.25^0C at the depth of mining.
		g)	Bio-geochemical processes and its foot prints including environmental stress.	No, Bio-geochemical processes and its foot prints including environmental stress are anticipated and at the end of life of mine the proposed quarry shall be left as an artificial reservoir structure and allowed to collect rain water and shall enrich the ecosystem.
		h)	Sediment geochemistry in the surface streams.	The details of sediment geochemistry are discussed in the Table 3.5 under Chapter III in the EIA report page 31.
	Agriculture & Agro-Biodiversity			
	13	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 under Chapter IV in the EIA report page 98-101.
	14	Impact on soil flora & vegetation around the project site.	The details on flora have been provided in Section 3.5 under Chapter III in the EIA report page 57-71. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
	15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area shall be given 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 57-71. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV in the EIA report page 98-101.
	16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological details have been provided in Section 3.5 under Chapter III in the EIA report page 57-71 and measures have been provided in Section 4.6 under Chapter IV in the EIA report page 98-101.
	17	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 87-105.
	18	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 87-88.
	Forests		
	19	The project proponent shall study on impact of mining on Reserve forests free ranging wildlife.	The project proponent shall do barbed wire fencing work and develop a green belt around the lease area to prevent wildlife from entering the site.
	20	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 98-101.
	21	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 under Chapter IV in the EIA report page 98-101.
	22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National parks, corridors and wildlife pathways, near project site.	The protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.37 under Chapter III in the EIA report page 84.
	Water Environment		
	23	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,	The hydrogeological study is attached in the **Annexure V.**

		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.	
	24	Erosion control measures.	Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 under Chapter IV in the EIA report page 88-89.
	25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby villages, waterbodies/rivers & any ecological fragile areas.	The matter has been discussed under Chapter IV in the EIA report page 87-105.
	26	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 has been discussed in Section 3.5 under Chapter III in the EIA report page 57-71.
	27	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 have discussed in Chapter IV in the EIA report page 87-105.
	28	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 sits possible land	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV in the EIA report page 98-101.

		form changes visual and aesthetic impacts.	
	29.	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components.	The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV in the EIA report page 88.
	30	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 88-89.
	Energy		
	31	The measures taken to control Noise, Air, water, Dust control and steps adopted to efficiently utilise the Energy shall be furnished.	The measures taken to control noise, air, water, and dust have been given under Chapter IV in the EIA report page 87-105.
	Climate Change		
	32	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 under Chapter IV in the EIA report page 98-101.
	33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The matter has been discussed in Chapter IV in the EIA report page 87-105.
	Mine Closure Plan		
	34	Detailed Mine closure plan covering the entire mine lease period as per	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III.

		precise area communication order issued.	The budget details for the progressive mine closure plan are shown in Table 2.9 under Chapter II in the EIA report page 18.
	EMP		
	35	Detailed Environment Management plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	A detailed Environment Management plan has been given under Chapter X in the EIA report page 126-133.
	36	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	A detailed Environment Management plan has been given in Tables 10.1 & 10.2 under Chapter X in the EIA report page 127-133.
	Risk Assessment		
	37	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 provided in Section 7.2 under Chapter VII in the EIA report page 112-116.
	Disaster Management Plan		
	38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward 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.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 114-116.

	Others		
	39.	The project proponent shall furnish VAO certificate with reference to 300 m radius regard to approved habitations, schools, Archaeological sites, structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, river, lake pond, tank etc.	The VAO certificate is attached in the **Annexure IV.**
	40	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 is submitted in final EIA report.
	41	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 matter on plastic waste management has been given in Section 7.5 under Chapter VII in the EIA report page 120-121.

Standard of terms of Reference for (Mining of Minerals)

1.

S.No	**Terms of Reference**	
1.1	An EIA-EMP Report shall be prepared for peak capacity (...MTPA) operation in an ML/project area of.... ha based on the generic structure specified in	Yes, it is based on the generic structure specified in Appendix III of the EIA Notification, 2006. i.e., the peak capacity of the proposed quarry is 2,04,820 MTPA.

	Appendix III of the EIA Notification, 2006.	
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modelling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection can be for any season (three months) except monsoon.	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 2024 CPCB guidelines. The detailed baseline environmental monitoring studies were carried out and the results are discussed in the Chapter III and the approved mining plan is attached in the Annexure III.
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided	The KML file with proper pin drop and coordinate of the mine will be uploaded during the online submission.
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas	The details of environmentally sensitive ecological features in the study area are given in the Table 3.37 under Chapter III in the final EIA report page 84.

	such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also	
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	The map showing the lease area with cluster details is shown in the Figure 1.1, Chapter I in the EIA report page 4. The details are given in the Table 3.37 under Chapter III in the EIA report page 84.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	The contour map will be submitted in the final EIA report.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need	The catchment area map will be submitted in the final EIA report.

	eloboration in form of length, quantity and quality of water to be diverted.	
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.	The reserve details are discussed in the Section 2.5 under Chapter II in the final EIA report 13.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.	The details of mining method, technology, equipment, etc., is discussed in the Section 2.6 under Chapter II in the final EIA report page 13-20.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channelling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.	There is no drainage/streams or any other water bodies were not intersecting in the mine lease area, so the diversion of drainage is not necessary for this project.

<table>
<tr><td>1.11</td><td>A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.</td><td>Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.8 under Chapter II in the EIA report page 17. The drainage map is shown in Figure 3.4 under Chapter III in the EIA report page 28. 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 Thirukattupalli - Sengipatti - Pattukottai (SH-99) as shown in Table 3.36 and in Figure 3.27 under Chapter III in the EIA report page 82-83.</td></tr>
<tr><td>1.12</td><td colspan="2">Original land use (agricultural land/forestland/grazing land / wasteland / water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights.
<table>
<tr><th>S.No</th><th>ML/Project Land use</th><th>Area under Surface Area Rights(ha)</th><th>Area Under Mining Rights(ha)</th><th>Area under Both (ha)</th><th></th></tr>
<tr><td>1</td><td>Agricultural land</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>2</td><td>Forest Land</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>3</td><td>Grazing Land</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>4</td><td>Settlements</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>5</td><td>Others (specify)</td><td>2.28.0</td><td>2.28.0</td><td>2.28.0</td><td></td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td colspan="3"><table>
<tr><td>S.No</td><td>Details</td><td>Area (ha)</td></tr>
<tr><td>1</td><td>Buildings</td><td>---</td></tr>
<tr><td>2</td><td>Infrastructure</td><td>---</td></tr>
<tr><td>3</td><td>Roads</td><td>---</td></tr>
<tr><td>4</td><td>Others (area under quarry)</td><td>2.28.0</td></tr>
<tr><td colspan="2">Total</td><td>2.28.0</td></tr>
</table></td></tr>
<tr><td>1.13</td><td>Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.</td><td colspan="2">The details on flora and fauna have been provided in Section 3.5 under Chapter III in the EIA report page 57-71.</td></tr>
<tr><td>1.14</td><td>One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals</td><td colspan="2">The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise,</td></tr>
</table>

	such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.	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 2024 with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified *Greenlink Analytical and Research Laboratory (India) Private Ltd* for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and	The detailed study is discussed in the Chapter III in the EIA report page 22-86.

	CPCB classification wherever applicable. Observed values should be provided along with the specified standards.	
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided.	10km baseline study can be conducted only when total cluster area extent of the projects is above 25ha. Here, the proposed cluster area of the projects is less than 25ha, (i.e,12.14.00ha) and so baseline monitoring study is done for 5 km only. The baseline study of the air quality is discussed in the Section 3.3 under Chapter III in the EIA report page 43-53.
1.17	A detailed traffic study along with presence of habitation in 100m distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.	There is no need of road widening, the details of traffic study are discussed in the Section 3.7 under Chapter III in the EIA report page 82-83. Carbon released from quarrying machineries and tippers during quarrying would be 717kg per day, 193683kg per year and 968414kg over five years.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be	The socio-economic study is discussed in the Section 3.6 in Chapter III in the EIA report page 72-81.

	provided from the census data should be provided in EIA/EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.	
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.	There is no forest within 10km. The Ecology and biodiversity study is discussed in the Section 3.5 in Chapter III in the EIA report page 57-71. 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 27333kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.	The occupational health and safety of the personnel and manpower for the mine is submitted in the Section 4.8 under Chapter IV in the EIA report page102-103.

<table>
<tr><td>1.21</td><td>Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.</td><td colspan="3">The details regarding hydrological studies as per GEC 2015 guidelines will be submitted in the final EIA report.</td></tr>
<tr><td>1.22</td><td>Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.</td><td colspan="3">Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program. The detailed rain water harvesting will be submitted in the final EIA report.</td></tr>
<tr><td>1.23</td><td>Study on land subsidence including modelling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.</td><td colspan="3">The slope stability report will be submitted in the final EIA report.</td></tr>
<tr><td rowspan="4">1.24</td><td rowspan="4">Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and</td><td>Purpose</td><td>Quantity</td><td>Source</td></tr>
<tr><td>Dust Suppression</td><td>1.0 KLD</td><td rowspan="3">The water requirement is purchased from the authorized water vendor.</td></tr>
<tr><td>Green Belt development</td><td>1.0 KLD</td></tr>
<tr><td>Drinking & Domestic</td><td>1.5 KLD</td></tr>
</table>

	impacts vis-à-vis the competing users should be provided.	**Total**	**3.5 KLD**	
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Quarry project proponent controls air pollution by water sprinkling method on roads and quarry sites and green belt development method is adopted.		
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored	The LNG/CNG trucks are used in mining operation because these trucks can control air pollution and noise pollution.		
1.27	PP to evaluate the greenhouse emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	There is no greenhouse emission in the project lease area.		
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	The details are discussed in the Section 7.2 & 7.3 under Chapter VII in the EIA report page 112-116.		
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	The impact on the air quality is discussed in the Section 4.4 in Chapter IV in the EIA report page 89-93.		

1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.	The details regarding are discussed in the Section 4.5.2 under Chapter IV in the EIA report page 95.
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.	The details are given in the Section 2.6 under Chapter II in the EIA report page 13-20.
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.	Quarry project proponent controls air pollution by water sprinkling method on roads and quarry sites and green belt development method is adopted.

1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre-mining status should be provided. A Plan for the ecological restoration of the mined-out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.	The ultimate mining is proposed to an average depth 50m BGL, the mined-out area will be fenced on top of working bench with SI fencing to arrest the entry of cattle's and public in to the quarry site. The details of mine closure budget are discussed in the Section 2.6.4 under Chapter II in the EIA report page 17-18.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be	The details are given in the Section 4.6 under Chapter IV in the EIA report page 98-101.
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.	The detailed EMP is given in the Chapter X in the EIA report page 126-133.
1.36	Details of R&R. Detailed project specific R&R plan with data on the existing socio-economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs	Not Applicable. The proposed lease area belongs to the lessee and there is no any habitation in the lease area.

	along with schedule of the implementation of the R&R plan should be given.		
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.		The CSR plan is discussed in the Section 8.6 under Chapter VIII in the EIA report page 123.
1.38	Corporate Environment Responsibility:		
1.39	a)	The Company must have a well laid down Environment Policy approved by the Board of Directors.	The CER plan is discussed in the Section 8.7 under Chapter VIII in the EIA report page 124.
1.40	b)	The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.	
1.41	c)	The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.	
1.42	d)	To have proper checks and balances, the company should have a well laid down 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.	
1.43	e)	Environment Management Cell and its responsibilities to be clearly spleel out in EIA/ EMP report	
1.44	f)	In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.	
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.		No litigation is pending in any court against this project.
1.46	PP shall submit clarification from DFO that mine does not fall under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.		The DFO letter will be submitted in the final EIA report.
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.		The clearance copy of approved mining plan letter is attached in the Annexure III.
1.48	Details on the Forest Clearance should be given as per the format given:		

	Total ML Project Area	Total Forest land (ha) If more than one provides details of each FC	Date of FC	Extent of Forest Land	Balance area for which FC is yet to be obtained	Status of appl For diversion of forest land
	NA	NA	NA	NA	NA	NA

1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine	Approved Mining plan of the expansion proposal is attached in the Annexure III and the mine closure plan is discussed in the

	closure plan shall be detailed in EIA/ EMP report	Section 2.6.4 under Chapter II in the EIA report page 17-18.
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.	The public hearing comments will be submitted during final EIA report.
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes	The drone video survey will be submitted in the final EIA presentation.
1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.	The required documents for the proposed quarry are provided in the chronology order in Annexure III.
1.53	The first page of the EIA/ EMP report must mention the peak capacity	The first page of the EIA report mentions the peak capacity production, area, project

	production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)	proponent details, Consultant and NABET details0 and authorized Laboratory (NABL / MoEF & CC certification) details.
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter's section.	ToR Compliance is cited with respective chapter section and page no in tabular form.

Additional Terms of Reference:

Specific Terms of Reference for (Mining of Minerals)

1. Seac Conditions – Site Specific:

<table>
<tr><th>S.No</th><th colspan="3">Terms of Reference</th></tr>
<tr><td rowspan="8">1</td><td colspan="3">For the existing quarry, the PP shall obtain a letter from the concerned AD (Mines) which shall also stipulate the following information</td></tr>
<tr><td>(i)</td><td>Original pit dimension of the existing quarry</td><td rowspan="7">The details regarding AD Mines letter are attached in the Annexure III.</td></tr>
<tr><td>(ii)</td><td>Quantity achieved Vs EC Approved Quantity</td></tr>
<tr><td>(iii)</td><td>Balance Quantity as per Mineable Reserve calculated.</td></tr>
<tr><td>(iv)</td><td>Month wise Production details</td></tr>
<tr><td>(v)</td><td>Mined out Depth as on date Vs EC Permitted depth</td></tr>
<tr><td>(vi)</td><td>Details of illegal/illicit mining carried out, if any</td></tr>
<tr><td>(vii)</td><td>Non-compliance/Violation in the quarry during the past working.</td></tr>
</table>

	(viii)	Quantity of material mined out outside the mine lease area (or) in the adjacent quarry/land.	
	(ix)	Existing condition of Safety zone/benches	
	(x)	Details of any penalties levied on the PP for any violation in the quarry operation by the Department of Geology and Mining.	
2	The PP shall submit the Certified Compliance Report (CCR) obtained from IRO(SZ), MoEF&CC with the status of non-compliance, and to furnish mitigation measures/remedial action plan with the budget allocation for the non-compliance stated in the CCR.		The CCR will be submitted in final EIA report.
3	The PP shall furnish the consent agreement from the landowner registered with the concerned authority during the EIA appraisal.		The consent agreement will be submitted in the final EIA report.
4	The PP shall complete the fencing, tree plantation and photographs, videos of the same shall be furnished.		The photographs and videos of fencing and tree plantation will be submitted in the final EIA report.
5	The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds, and provide the details during the EIA appraisal.		After receiving the EC, the PP will set up DGPS reference pillar points in blue and white marking the 7.5 m safety barrier.
6	The Proponent shall complete the garland drainage around the boundary of the proposed quarry and the photographs		The photographs of the garland drainage around the boundary of the

	indicating the same shall be shown during the EIA appraisal.	proposed quarry will submit in the final EIA report.
7	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc located within 1 km of the proposed quarry.	The detailed hydrology report is attached in the **Annexure V.**
8	The Proponent shall justify the selection of the site for carrying out the stone quarrying with the total volume arrived for the excavation & production adequate details such as lithology of the deposit, reserve estimation, place for waste dump/mined mineral storage, end-use of mined materials, identified potential customers/end-users and travel path.	All the detailed mining activity information including the site selection, total volume excavation, production, deposit of minerals reserve estimation, place for waste dump/mined mineral storage, mine closure plans are given in Chapter II in the EIA report page 7-21.
9	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 with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, Schools/Colleges 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.	The details of structures such as dwelling houses, places of worship, industries, factories, sheds, etc. within the radius of 500m from the proposed project area will be given in the final EIA report.
10	The proponent shall furnish photographs and video showing the adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries &	Photographs and videos of adequate fencing, green belt, nearby water bodies along the periphery of the project area will be included in the final EIA report.

	water bodies nearby provided as per the approved mining plan.	
11	During the EIA appraisal, the PP shall furnish the affidavit stating that he will not employ any external agency for carrying out the blasting operation in the proposed quarry and he shall also install the temporary (or) permanent magazine approved by the concerned licensing authority before the execution of the lease, for storing the authorized explosives & detonators separately in accordance with the Explosive Rules, 2008.	The affidavit for the blasting will be submitted in the final EIA report.
12	During the EIA appraisal, the PP shall furnish the affidavit stating that he will appoint a First Class/Second Class Mine Manager for managing the quarrying operations before obtaining the CTO from the TNPCB. Further, the PP will also send the 'Notice of Opening' indicating the appointment of such Statutory officials and the proposed usage of HEMM shall be sent to the Director of Mines Safety, Chennai Region of the Mine under the provisions of MMR 1961 atleast 30 days before the commencement of the mining operation after the execution of lease, if the EC is granted	The affidavit for the First Class / Second Class Mine Manager will be submitted in the final EIA report.
13	Since the structures including the houses are situated within a radial distance of 500 m, the PP shall carry out the scientific studies to design the controlled blast parameters for reducing the cumulative	The details regarding will be submitted in the final EIA report.

	blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations carried out in the cluster of quarries located in the region, and subsequently with proper validation of the design through trial blasts in any of the existing & operating quarries to monitor the PPV produced from the blasting in the village (500m) and near the Temples (230 & 300 m), after obtaining the prior permission from the DMS / Chennai Region in accordance with DGMS Circular No. 7 of 1997, by involving anyone of these reputed Research and Academic Institution such as CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, IIT (ISM)/Dhanbad, IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. Further the report shall also include the actual data on the air dust particles produced at the time of blasting. A copy of such scientific study report shall be submitted to the SEIAA, MoEF as a part of EIA study during the appraisal and to the DMS/DGMS-Chennai Region while submitting the Notice of Opening, without any deviation.	
14	Since the quarrying operations are proposed in an existing pit possessing the quarry wall of 3 to 35 m depth without adequate benches in accordance with the provisions of MMR, 1961, the PP shall carry out the scientific studies to assess the slope stability	The details regarding will be submitted in the final EIA report.

	of the working benches and existing quarry wall for spelling out the stabilization measures to ensure the safety of the persons to be employed in the proposed quarry, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research/Dhanbad, NIRM/Bangalore, IIT (ISM)/Dhanbad, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, as a part of EIA study during the appraisal without any deviation.	
15	The PP shall prepare the Standard Operating Procedures (SoP) for carrying out the 'Best Mining Practices' in the areas of drilling, blasting excavation, transportation and green belt development and provide the same during the EIA appraisal.	The detailed scientific mining operation procedure and comprehensive designs are given in Chapter II in the EIA report page 7-21.
16	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.	The EMP for the entire life of mine is discussed in the Section 10.1 & 10.2 under Chapter X in the EIA report page 127-133. The sworn affidavit will be submitted in the final EIA report.

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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 as per Gazette Notification S.O. 3977 (E) of 14th August 2018, all the mining projects are broadly classified into two categories, i.e., category A and category B, based on the spatial extent of the projects. The category B projects are further divided in to B1 and B2 on the basis of the guidelines issued of the Ministry of Environment and Forests. All mining projects included in category B1 require an EIA report for obtaining environmental clearance from the State Environment Impact Assessment Authority (SEIAA). As the proposed project falls within the cluster of quarries of overall extent of greater than 5 ha and less than 50 ha in the case of non-coal mine lease, the proposed project falls under the category B1 and the project requires preparation and submission of an EIA report after public consultation to SEIAA for obtaining environmental clearance as per the order dated 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

In compliance with ToR Identification No.TO24B0108TN5838807N Dated: 14.05.2024 File No.10703, this EIA report has been prepared for the project proponent, Mr.S.Devendiran applied for rough stone and gravel quarry lease in the Patta land falling in S.F. Nos. 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0. ha of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu. This EIA report takes into account the rough stone and Gravel quarry within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains three proposed projects as P1, P2 & P3 and two existing projects known as E1 & E2. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269 (E) Dated 1st July 2016the total extent of all the quarries is 10.15.50ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

Table 1.1 Details of Quarries within the cluster area of 500m radius

Proposed Quarries					
Code	**Name of the Owner**	**S.F. No**	**Village**	**Extent (ha)**	**Status**
P1	Thiru. Devendiran	33 & etc	Killukulavaipatti	2.28.0	Proposed Area
P2	Thiru.V.Sasikumar	30/1 & etc	Killukulavaipatti	2.07.0	Applied area
P3	Thiru.K.Nataraj	111/1B (0.64.0), 111/2 (0.65.0), 115/9 (0.50.5) of Killukulavaipatti & 40/5 (0.66.5) of Themmavur	Themmavur & Killukulavaipatti	2.86.0	Applied area
Existing Quarry					
E1	Thiru.R.Rajmohan	117/1B	Themmavur	2.41.0	08.07.2021 to 07.07.2026
E2	Thiru.S.Devendiran	40/4	Killukulavaipatti	0.53.5	25.04.2022 to 24.04.2027
Total Cluster Extent				**10.15.50**	

Source: *AD Letter - Rc.No. 552/2022(G&M) dated:24.11.2023.*

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

1.1 PURPOSE OF THE REPORT

The purpose of the report is to study baseline environmental conditions in and around the proposed project area for the period of **October-December 2024** according to the provisions of MoEF & CC Office Memorandum dated 29.08.2017 and MoEF & CC Notification, S.O. 996 (E) dated 10.04.2015, to analyse impacts and provide mitigation measures.

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

Screening is the first stage of the EIA process. In this stage, the State level Expert Appraisal Committee (SEAC) examined the application of EC made by the proponent in Form 1 through online (Proposal No. SIA/TN/MIN/461913/2024, Dated:14.02.2024) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on: 16.02.2024.

Scoping

The proposal was placed in the 457th meeting of SEAC on 03.04.2024. Based on the presentation and documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Terms of Reference (ToR) and the recommendation for ToR is subjected

to the outcome of the Honourable NGT, Principal Bench, New Delhi (O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and O.A.No.404/2016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).

Public Consultation

In this stage, an application along with the draft of EIA and EMP report will be made to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing ensuring public participation at the project site or in its close proximity in the district. During public hearing, an opportunity will be given to the people living nearby the project site to express their opinions about the impact of the proposed project on the environment. The outcome of the public hearing meeting will be submitted in the final EIA report.

Appraisal

In this stage, an application along with final EIA report including the outcome of the public consultations will be made to the SEIAA. The application thus made will be scrutinized by the SEAC. Then, the SEAC will make recommendations to grant EC or reject the application to the SEIAA.

1.3 TERMS OF REFERENCE (ToR)

The SEAC framed a comprehensive Terms of Reference (ToR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued ToR Identification No. TO24B0108TN5838807N Dated: 14.05.2024, File No. 10703.

1.4 POST ENVIRONMENT CLEARANCE MONITORING

For category B projects, irrespective of its clearance by MoEF/SEIAA, the project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and the details of MoEF website where it is displayed.

After obtaining EC, the project proponent will submit a half-yearly compliance report of stipulated environmental clearance terms and conditions to MoEF & CC Regional Office & SEIAA on 1st June and 1st December of every year.

1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor or the transferee with a written “no objection” by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period (EIA Guidance Manual for Mining of Minerals, 2010).

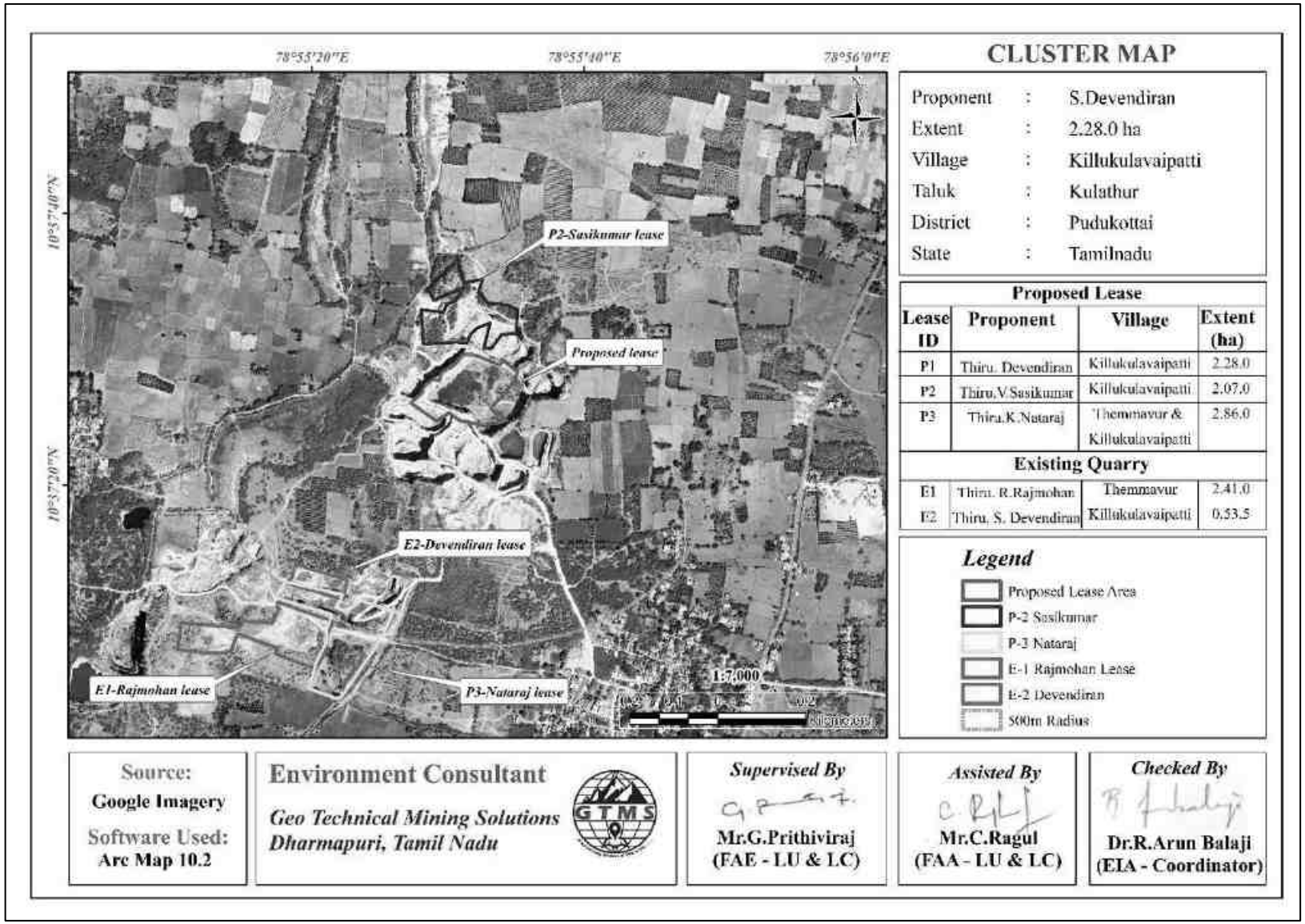


Figure 1.1 Location of the proposed and existing rough stone and gravel quarries in the cluster of 500m radius

1.6 IDENTIFICATION OF THE PROJECT PROPONENT

The profile of the project proponent who has involved in this quarrying project has been given in Table 1.2.

Table 1.2 Details of Project Proponent

Name of the Project Proponent	**S. Devendiran**
Address	S/o. Srinivasan, No.25, I.A.S Nagar, Thiruverumbur Taluk, Thiruchirappalli District-620013.
Status	Proprietor

1.7 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of rough stone and gravel which is primarily used in construction projects. The method adopted for rough stone and gravel excavation is open cast semi mechanized mining method involving formation of benches with 5 m height and 5 m width. The proposed project site is located in Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State. Some of the important features of the proposed project have been provided in Table 1.3.

Table 1.3 Salient Features of the Proposed Project

Name of the Quarry	Mr. S. Devendiran**,** Rough stone and gravel quarry	
Type of Land	Patta Land	
Extent	2.28.0 Ha	
Toposheet No	58-J/14	
Location of Project Site	10°37'24.42"N to 10°37'29.62"N 78°55'27.27"E to 78°55'35.08"E	
Highest Elevation	145m AMSL	
Proposed depth of Mining	50m BGL	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	6141271	5405
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	73150	810
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3
	73150	810
Method of Mining	Open-Cast Mechanized mining	
Topography	Flat Topography	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Tipper	4

	Hydraulic Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	16 Nos	
Project Cost	Rs.50,64,000/-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	3.5 KLD	

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 on the study area and formulate the effective mitigation measures for each individual lease. A detailed account of the emission sources, emissions control equipment, background air quality levels, meteorological measurements, dispersion model and all other aspects of pollution like effluent discharge, and dust generation has been provided in this report. The baseline monitoring study has been carried out during the period of **October-December 2024** for various environmental components such as land, soil, air, water, noise, ecology, etc. to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project. The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of sample analysis, etc., are given in Table 3.1 in Chapter III.

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 GENERAL INTRODUCTION

The open cast mining method, also known as open-pit mining has been proposed to extract the mineral deposit. It is the most commonly used surface mining method all over the world and is generally suitable for mining low-grade mineral deposits that are found close to the surface of the earth and distributed uniformly over a large area. Open pits are also termed quarries when the pits are used for the extraction of building materials and dimension stones.

Opencast mining starts with the development of benches, the widths of which will be determined in such a way to accommodate the use of heavy machinery. The walls of open pits will be dug at an angle that will be decided based on well-established industry standards to provide safety. In some cases where the walls are composed of weak material such as soil and highly weathered rocks, dewatering holes will be drilled horizontally to relieve the water pressure to avoid wall collapse inside the mine site.

The required mine-related infrastructures will be established close to the open pit. The mining infrastructures may include an administration building, a maintenance garage, and a warehouse. The materials mined from open pits will be brought to the surface using trucks. The waste rocks will be piled up in a suitable location, usually close to the open pit. The structure produced by the waste rock pile is known as a waste dump. The dimension of the waste dump will be determined based on industrial safety standards to prevent the rocks from falling into the surrounding area.

2.1 DECSCRIPTION OF THE PROJECT

The proponent **Mr.S.Devendiran** is involved in the undertaking of establishment, construction, development, and closure of opencast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone and gravel. Therefore, the proponent had applied for quarry lease on 27.07.2022 to extract rough stone and gravel. The precise area communication letter was issued by Department of Geology and Mining, Pudukkottai vide Rc.No.552/2022(G&M), Dated:20.11.2023. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Assistant Director Department of Geology and Mining, Pudukottai Rc.No.552/2022 (G&M), Dated 24.11.2023 The overall view of the project site is shown in Figure 2.1.

History of the Project

The proposed project area was previously granted to quarrying of rough stone in favor of M/s.S.Devendiran by the District Collector, Pudukkottai proceedings vide Rc.no.224/2014 dated:22.09.2016 in S.F.No.33, 34/3, 34/4, 34/5, 34/6 & 34/8, Pudukkottai District, Kulathur Taluk, Killukulavaipatti Village over an extent of 2.28.0hectares for a period of five years. The lease was executed 22.10.2016 for a period of five years and it expired on 21.10.2021. The proponent got Environmental Clearence from Lr.No.SEIAA-TN/F.No.5035/1(a)/EC.No.3323/2016, Dated:15.07.2016 for the previous lease.

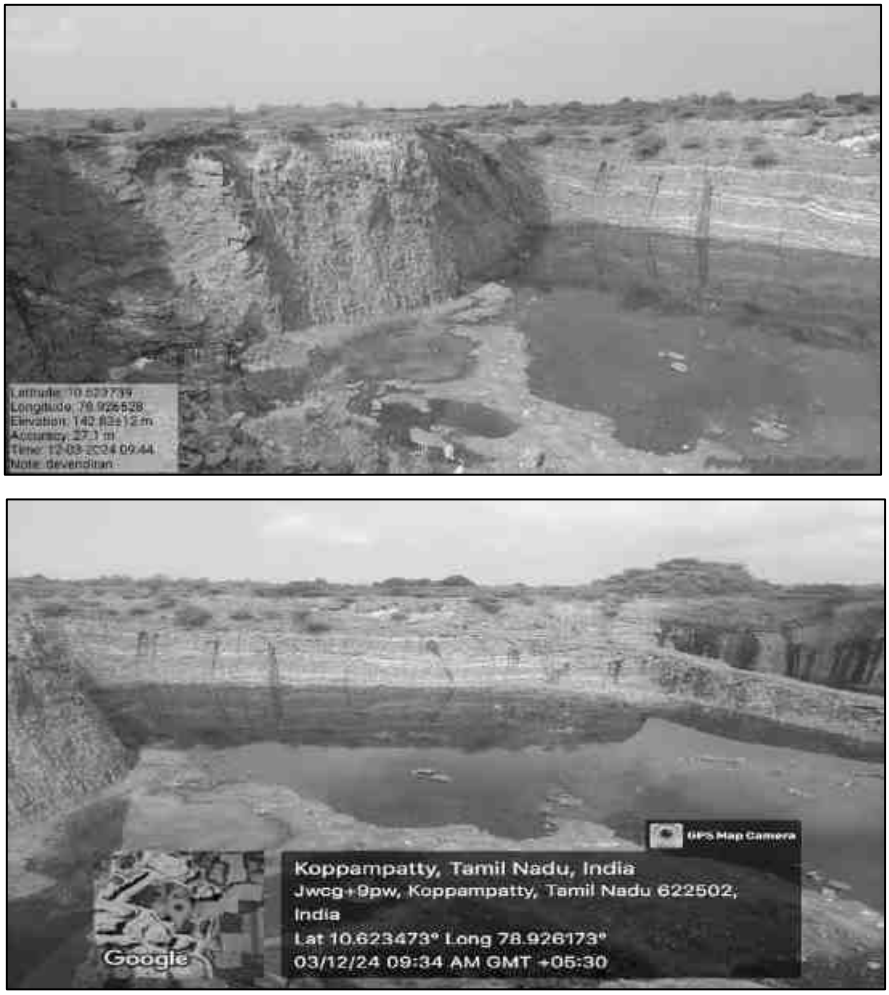


Figure 2.1 Overall View of Proposed Project Site

2.2 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Killukulavaipatti Village, Kulathur Taluk, Pudukottai District, Tamil Nadu as shown in Figure 2.2. The area lies between Latitudes from 10°37'24.42"N to 10°37'29.62"N and Longitudes from 78°55'27.27"E to 78°55'35.08"E. The maximum altitude of the project area is 145m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

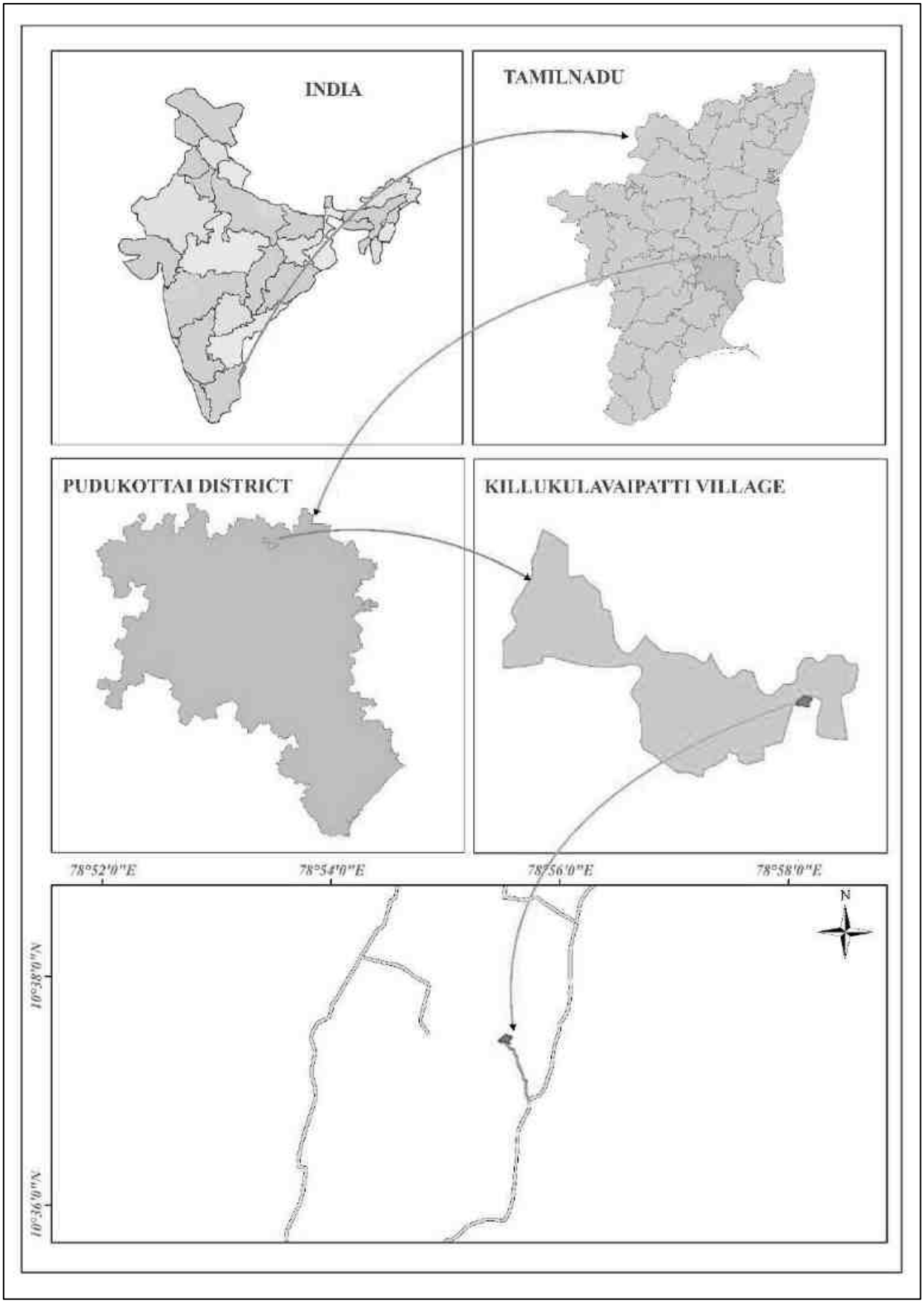


Figure 2.2 Location Map Showing the Project Site

Table 2.1 Site Connectivity to the Project Area

Nearest Roadways	SH-99 Thirukattupalli-Sengipatti-Pattukottai	7.55km E
	NH -36 Vikravandi-Manamadurai	10.25km SE
Nearest Town	Gandarvakkottai	11km SE
Nearest Railway Station	Keeranur	16.0km SW
Nearest Airport	Trichy	28.2km NW
Nearest Seaport	Thoothukudi	222.2km S
Nearest Village	Ulagankattanpatti	1.73km N
	Koppampatti	0.5km SE
	Themmavur	2.5km S
	Killukulavaipatti	0.72km W

2.3 LEASEHOLD AREA

- The extent of the proposed project site is 2.28.0ha.
- 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.

2.3.1 Corner Coordinates

The boundary corner geographic coordinates are given in Table 2.2 and the proposed project site with boundary coordinates has been shown in Figure 2.3 & 2.4.

Table 2.2 Corner Coordinates of Proposed Project

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	10°37'29.19"N	78°55'34.07"E	11	10°37'26.84"N	78°55'28.12"E
2	10°37'28.37"N	78°55'35.08"E	12	10°37'27.21"N	78°55'28.19"E
3	10°37'27.70"N	78°55'34.95"E	13	10°37'27.83"N	78°55'28.92"E
4	10°37'25.66"N	78°55'33.15"E	14	10°37'27.72"N	78°55'29.36"E
5	10°37'24.74"N	78°55'34.34"E	15	10°37'218.31"N	78°55'29.52"E
6	10°37'24.42"N	78°55'32.59"E	16	10°37'28.81"N	78°55'30.40"E
7	10°37'24.76"N	78°55'30.85"E	17	10°37'29.62"N	78°55'31.13"E
8	10°37'25.33"N	78°55'30.07"E	18	10°37'29.60"N	78°55'31.87"E
9	10°37'24.71"N	78°55'29.17"E	19	10°37'28.88"N	78°55'33.78"E
10	10°37'26.05"N	78°55'27.27"E			

2.4 GEOLOGY

The lease area geologically occurs over Hornblende-Biotite Gneiss. The Hornblende-Biotite Gneiss, commercially called as rough stone occurs within the migmatite rock. Also, the lease area geomorphologically occurs Pediment Pediplain Complex.

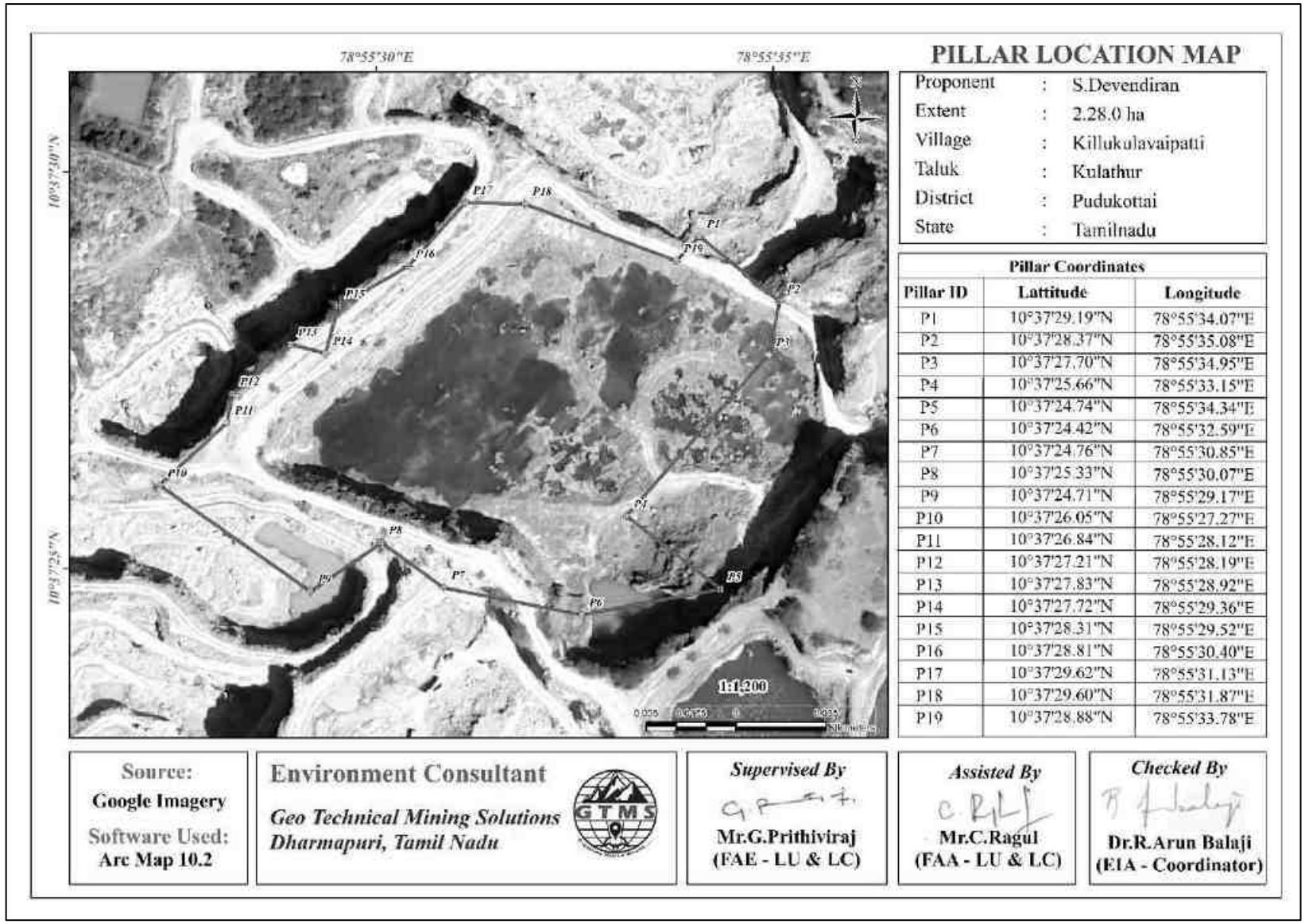


Figure 2.3 Google Earth Image Showing Lease Area with Pillars

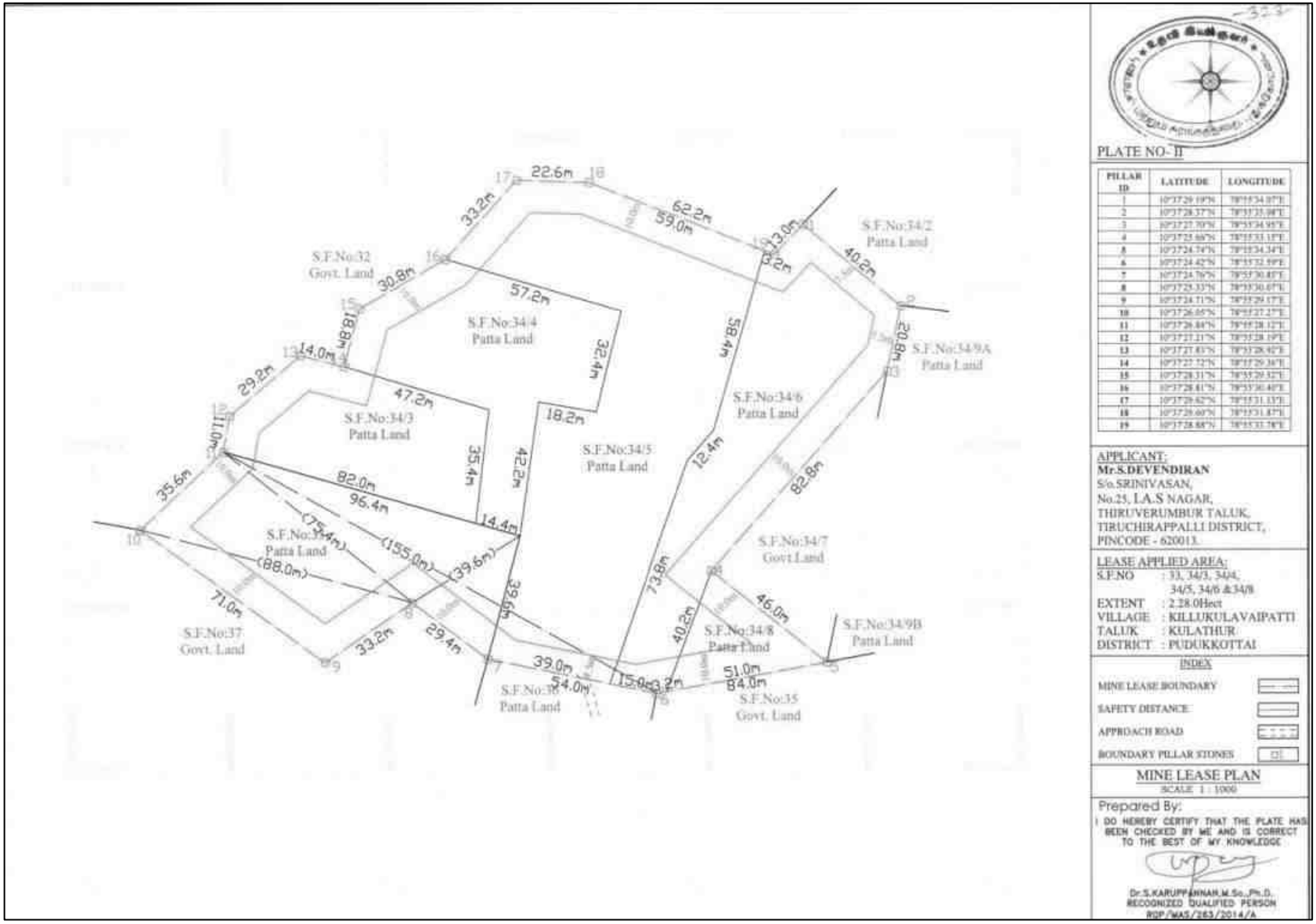


Figure 2.4 Mine Lease Plan

2.5 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 distance of 7.5 m and 10m safety distance as per precise area communication letter and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 50m below the ground level considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The plate used for reserve estimation has been attached in approved mining plan results of geological resources and reserves have been shown in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m^3	Gravel in m^3
Geological Resource in m^3	614271	5405
Mineable Reserves in m^3	73150	810
Proposed production for 5 years in m^3	73150	810

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.4, Year-Wise Production plan has been shown in Figure 2.5

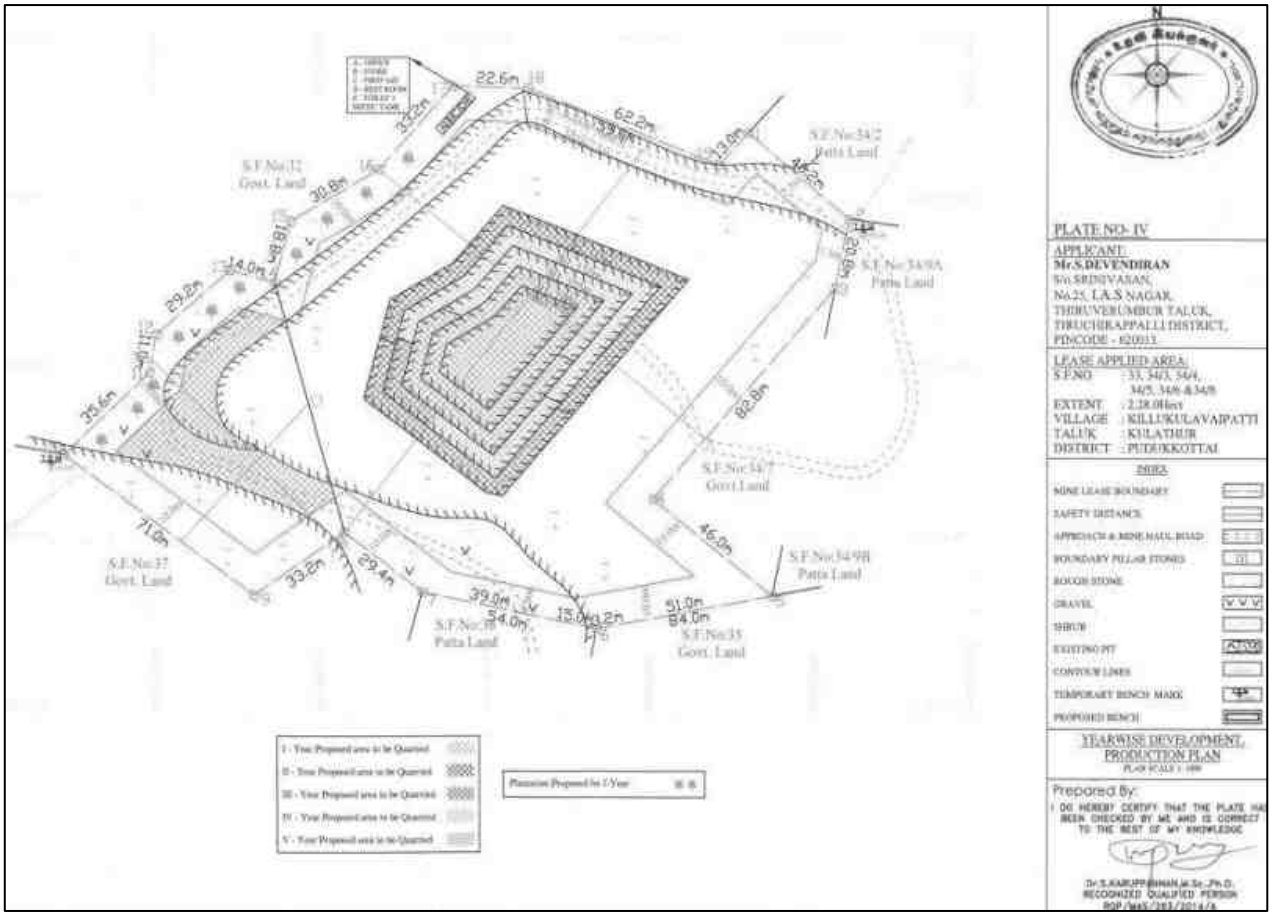
Table 2.4 Year-Wise Production Details

Year	Rough Stone in (m^3)	Gravel in (m^3)
I	14630	810
II	14000	0
III	14100	0
IV	14390	0
V	16030	0
Total	**73150**	**810**

Source: Approved Mining Plan & ToR

2.6 MINING METHOD

The Quarrying operation is proposed to be carried out by open cast semi-mechanized mining method with the bench height and width of 5m each. The open cast semi-mechanized method involving drilling and blasting is proposed to extract rough stone and gravel. The extracted rough stone will be loaded manually to the trucks for dispatch to the customers. In this project, NONEL blasting will be adopted to extract rough stone.



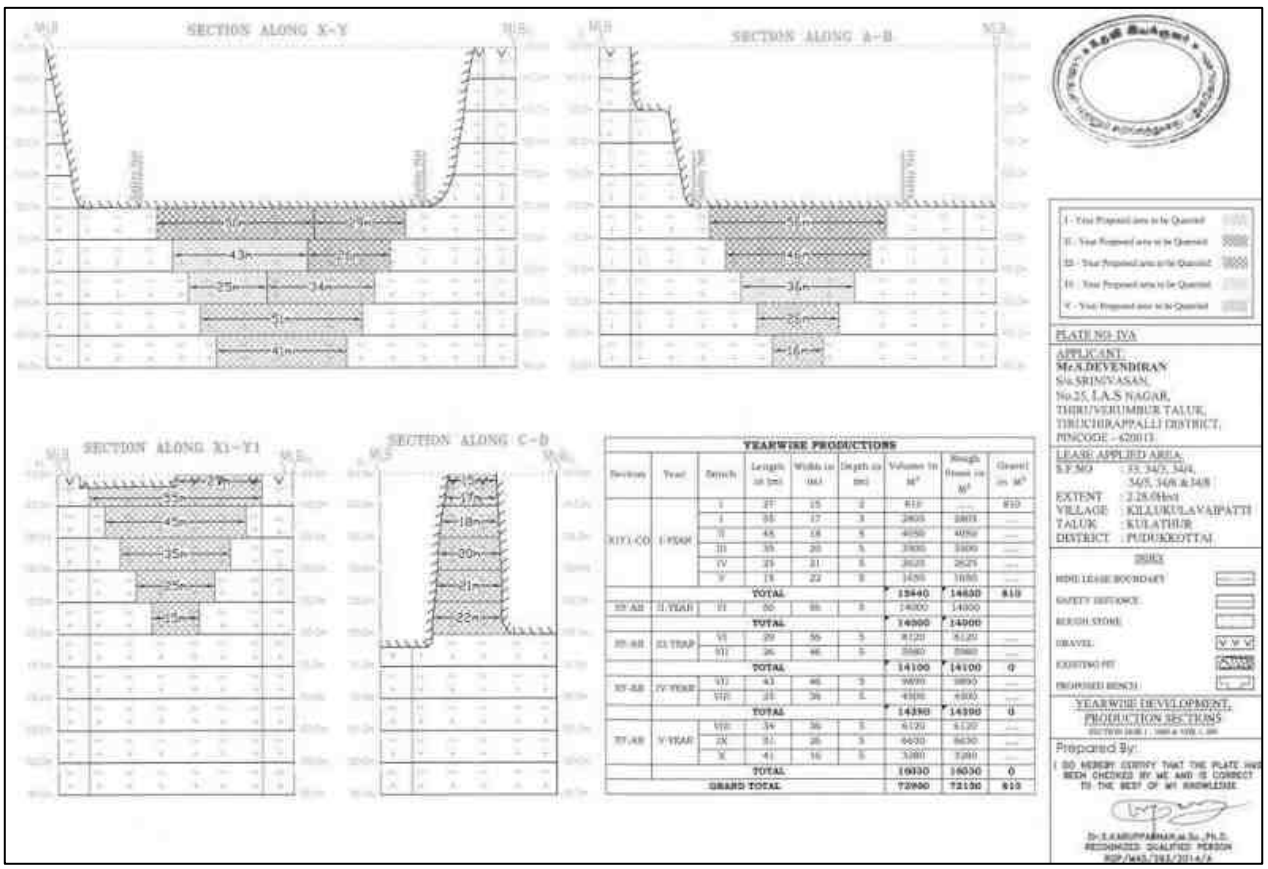


Figure 2.5 Year-Wise Production Plan & Section

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 (Chapter 8 (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 and has been provided in Table 2.5.

Table 2.5 Conceptual Blasting Design

Blasthole Diameter (D) in mm	32
Burden (B) in m	1.5
Spacing (S) in m	1.3
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
Mass of explosive/hole in g	400
Stemming material size in mm	3.2
Burden stiffness ratio	1.43
Blast volume/hole in m3	4.16
Production of rough stone/day in m3	54
Number of blastholes/day	13
Blasthole pattern	Staggered
Mass of explosive /day in kg	5.21
Powder factor in kg/m3	0.10
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL
Fly rock distance in m	19

2.6.1 Magnitude of Operation

Based on the results of estimated production for the 5 years, details about the size of operation have been provided in Table 2.6.

Table 2.6 Operational Details for Proposed Project

	Rough Stone in m^3/ 5 years	Gravel in m^3/1 year
Proposed production for 5 years	73150	810
Number of Working Days /Annum	270	270
Production of /Day (m^3)	54	3
No. of Lorry Loads	9	1

2.6.2 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.7.

Table 2.7 Machinery Details

S. No.	Type	No. of Unit	Size /Capacity	Make	Motive Power
1	Jack Hammers	2	Hand held	--	Diesel
2	Compressor	1	Air	--	Diesel
3	Hydraulic Excavator	1	3.0 m^3	--	Diesel
4	Tipper	4	15T	--	Diesel

2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.8 At present about 0.30.50ha of land is unutilized. Whereas, at the end of the mine life, about 1.70.86ha of land is used for area under quarry, about 0.12.76ha of land is used for green belt, 0.06.0ha will be used for roads, 0.02.0ha is used for infrastructure and 0.36.38ha of land unutilized.

Table 2.8 Land use data at present, during scheme of mining, and at the end of mine life

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under quarry	1.94.50	1.70.86
Infrastructure	Nil	0.02.0
Roads	0.03.0	0.06.0
Green Belt & Dump	Nil	0.12.76
Drainage & Settling Tank	Nil	Nil
Unutilized area	0.30.50	0.36.38
Total	**2.28.0**	**2.28.0**

2.6.4 Progressive Quarry Closure Budget

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, mine closure plan is not proposed for now. Based on the progressive mine closure plan for the scheme period, the mine closure cost is given in Table 2.9.

Table 2.9 Mine Closure Budget

Activity	Capital Cost
456 plants inside the lease area	91,200
684 plants outside the lease area	2,05,200
Wire Fencing	4,56,000
Renovation of Garland Drain	22,800
Total	**7,75,200**

Source: Environment Management Plan

2.6.5 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. Details of ultimate pit dimensions have been derived from given in Table 2.10. Conceptual Plan has been shown in Figure 2.5

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth (m)
I	79	56	50

Source: Approved Mining Plan & ToR

2.6.6 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.

2.6.6.1 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, there is no requirement of waste treatment plant.

2.6.7 Water Requirement

Detail 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	1.0 KLD	Existing bore wells nearby the lease area
Green Belt development	1.0 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.5 KLD	Existing bore wells and approved water vendors
Total	**3.5KLD**	

Source: Prefeasibility Report

2.6.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12. Around 314908 litres of HSD will be used for rough stone and gravel extraction during this 5 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 (73150 m^3)**	**Gravel (810 m^3)**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m^3/hr)	20	60	---
Time Required (hours)	3658	14	---
Total Diesel Consumption for 5 years (litre)	58520	135	**58655**
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	**---**	**---**
Number of Drillholes/day	13	**---**	**---**
Total Diesel Consumption for 5 years (litre)	7020	**---**	**7020**
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m^3	6	6	---
Number of Trips / days	9	1	---
Number of Trips / 5 years	12192	270	---
Total Diesel Consumption for 5 years (litre)	243833	5400	**249233**
Total Diesel Consumption by Excavator, Compressor and Tipper			**314908**

** Number of truck loads for gravel has been calculated for five years.*

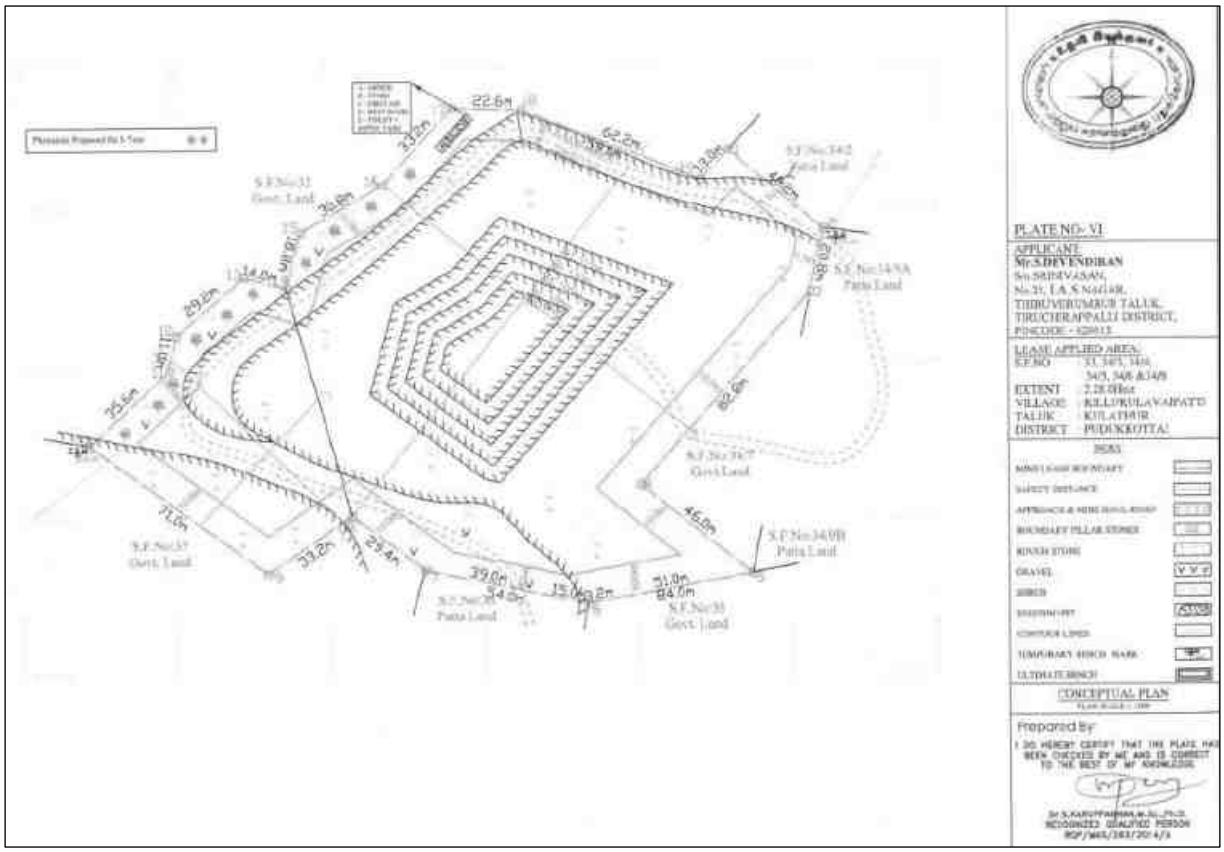
2.6.9 Capital Requirement

The project proponent will invest **Rs. 50,64,000/-** 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 Cost	10,00,000/-
2	Machinery cost	20,00,000/-
3	EMP Cost	20,64,000/-
Total Project Cost		**50,64,000/-**

Source: Approved Mining Plan



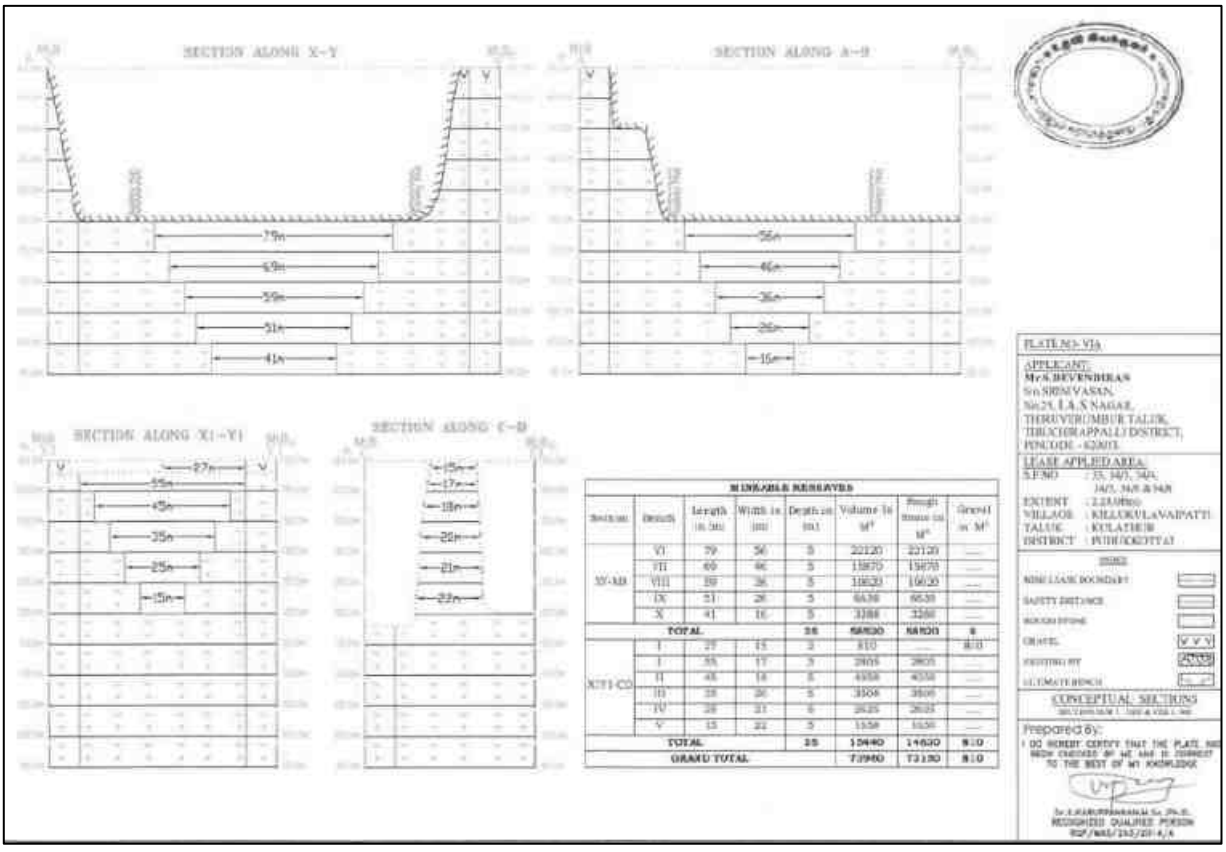


Figure 2.6 Conceptual Plan & Sections

2.7 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	IInd Class Mine manager	1
		Mine Geologist	1
		Blaster	1
2.	Semi - Skilled	Driver	4
		Hitachi Operator	1
3.	Unskilled	Musdoor/ Labours	8
Total			**16**

Source: Prefeasibility Report

2.8 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 Table 2.15.

Table 2.15 Expected Time Schedule

S. No.	Particulars	Time Schedule (in Months)					Remarks if any
		1st	2nd	3rd	4th	5th	
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

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 2024 with CPCB** guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Greenlink Analytical and Research Laboratory (India) Private 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 5 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 (1 in core & 4 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	6 (3 surface water & 3 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 core & 6buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	7 (1 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

Study area is mainly composed of Garnet gneiss, as shown in Figure 3.1. Among the geomorphic units, pediment and pediplain complex dominate the study area, as shown in Figure 3.2. The lease area occurs in pediment pediplain terrain.

3.1.2 Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius to provide a baseline status of the study area covering 5 km radius around the proposed mine site. Totally, 7 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 50.84 ha accounting for 0.60 %, of which lease area of 2.28.0 ha contributes only about 0.026%. This small percentage of mining activities shall not have any significant impact on the land environment.

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Water	20.25	0.24
2	Trees	113.08	1.33
3	Crops	6596.75	77.48
4	Mining/Industrial area	50.84	0.60
5	Built Area	462.17	5.43
6	Bare Ground	22.19	0.26
7	Rangeland	1248.74	14.67
Total		**8514.02**	**100.0**

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The proposed lease area Exhibits flat topography the height elevation in 327m AMSL observed in North Side of the lease area the Slope is towards South Side and falls in Toposheet No 58-E/03.

3.1.4 Drainage Pattern

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin over time that reveals characteristics of the kind of rocks and geological structures in a landscape. The proposed area shows dendritic drainage pattern indicating uniform lithology beneath the surface, as shown in Figure 3.4.

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.

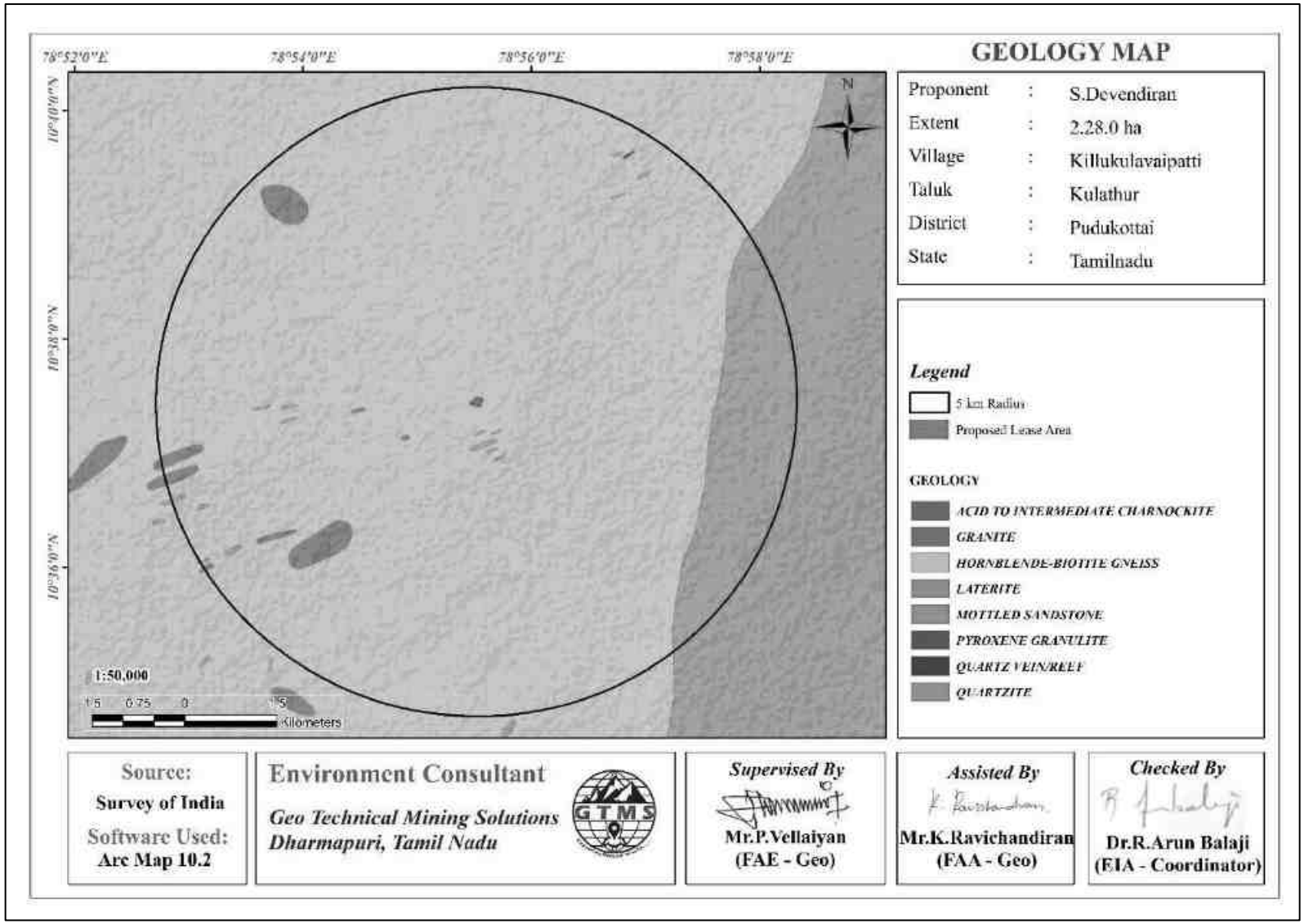


Figure 3.1 Geology Map of 5 km Radius from Proposed Project Site

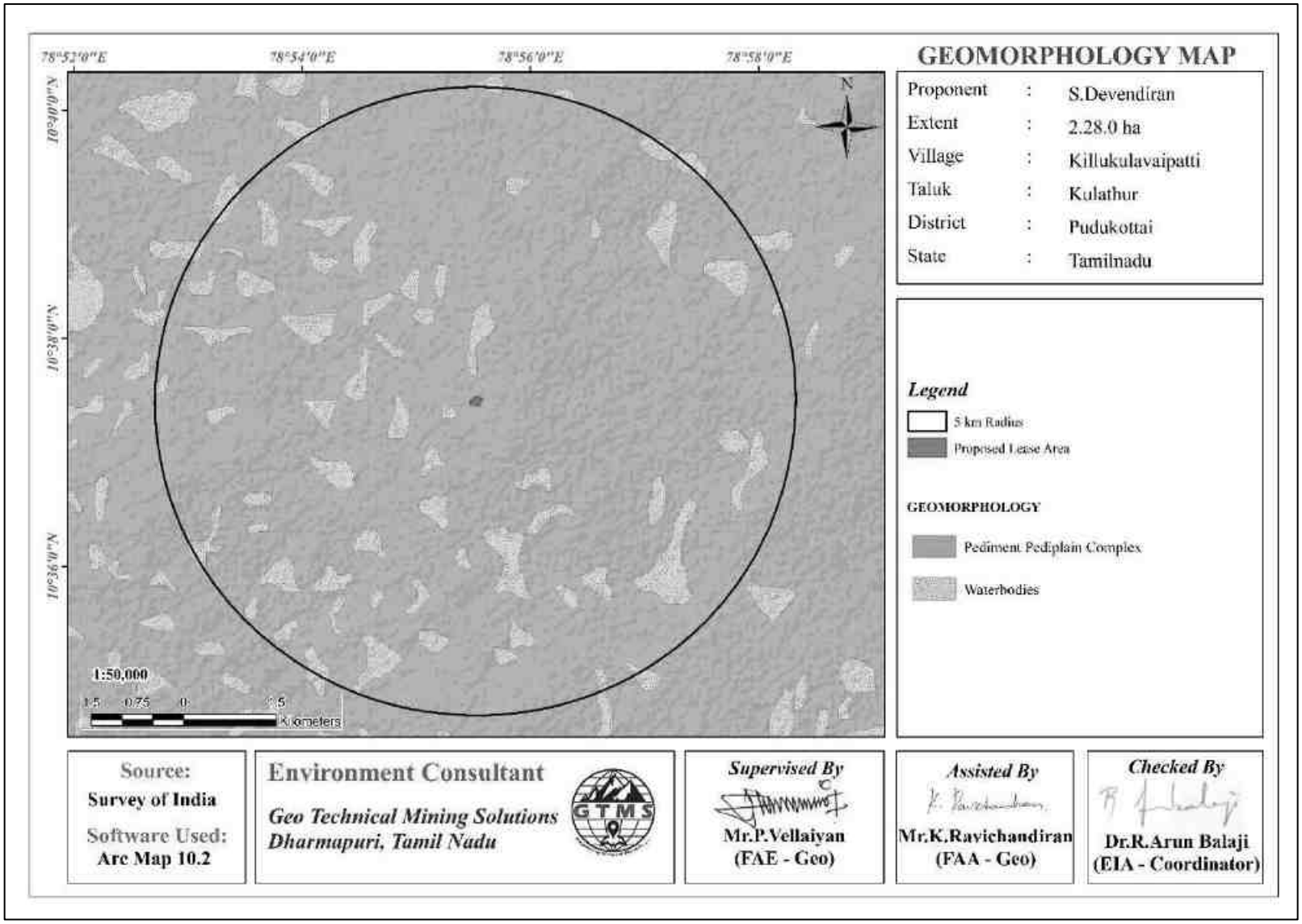


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

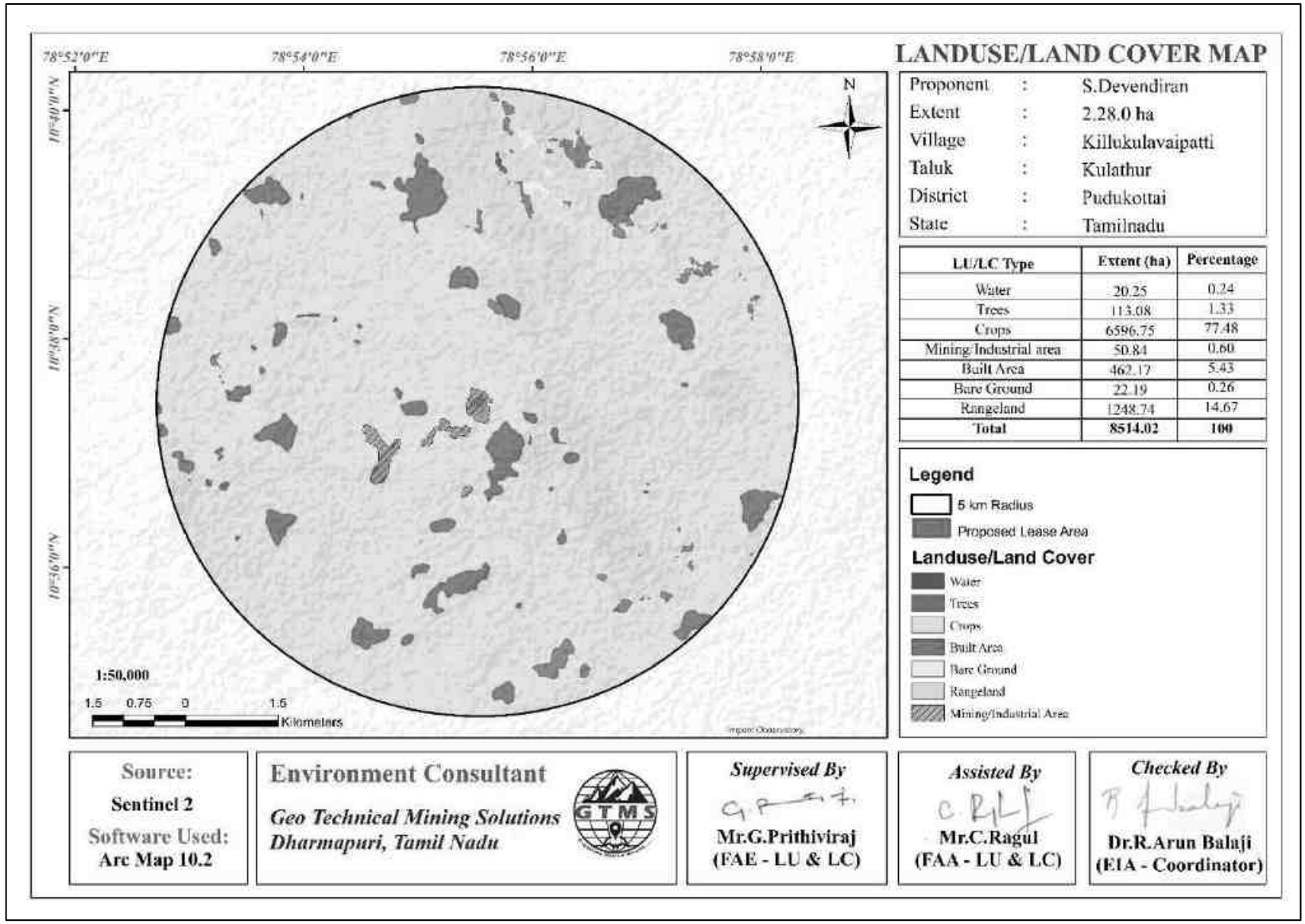


Figure 3.3 LULC Map of 5 km Radius from Proposed Project Site

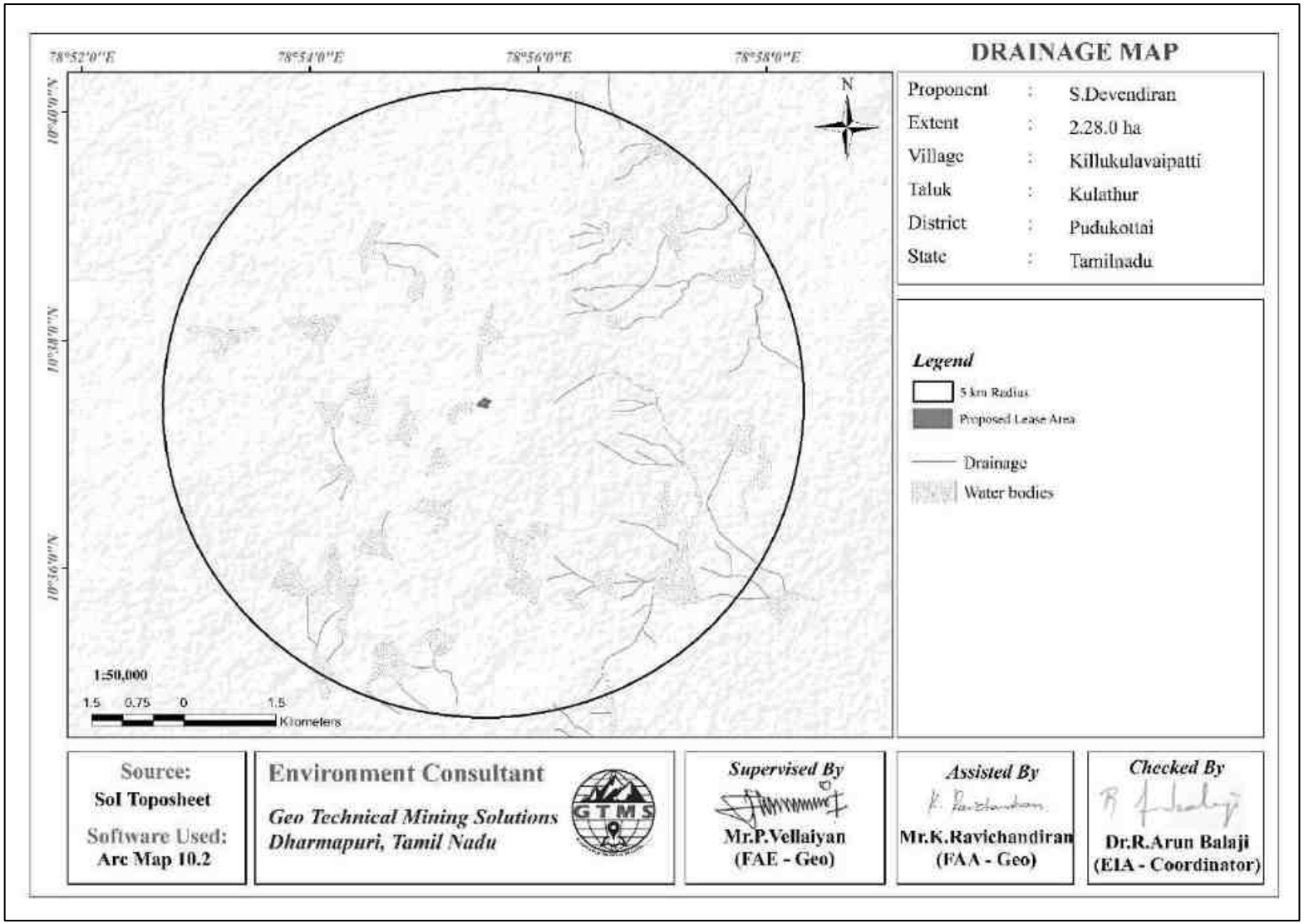


Figure 3.4 Drainage Map of 5 km Radius from Proposed Project Site

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 3.5.

Table 3.3 Soil Sampling Locations

S. No	Location code	Monitoring Locations	Coordinates	
			Latitude	Longitude
1	S1	Near Core	10°37'25.74"N	78°55'36.95"E
2	S2	Koppampatty	10°37'6.14"N	78°55'35.11"E
3	S3	Nathamadipatti	10°38'14.39"N	78°57'5.63"E
4	S4	KillKillukulavaipatti	10°37'22.53"N	78°55'5.15"E
5	S5	Ulagathanpatty	10°38'39.76"N	78°55'29.06"E

*Source: On-site monitoring/sampling **Greenlink Analytical and Research Laboratory (India) Private Ltd,** in association with GTMS.*

Physical Characteristics & Chemical Characteristics

The soil samples in the study area show loamy textures varying between Silt Loam and sandy loam. pH of the soil varies from 7.05 to 7.55 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 185 to 200µS/cm. The physical and chemical properties of soil is shown in the Table 3.5.

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 3.4 Water Sampling Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates
SW01	Minnathur Lake	4.18	SE	10°35'57.54"N, 78°57'20.06"E
SW02	Thenmavur Lake	2.52	SSE	10°36'5.02"N, 78°55'52.79"E
SW03	Killukulavoipatti Lake	2.99	NW	10°38'12.77"N, 78°54'2.74"E
BW 01	KillKillukulavaipatti	0.70	W	10°37'21.78"N, 78°55'4.84"E
BW 02	Koppampatty	0.68	SSE	10°37'4.53"N, 78°55'43.92"E
OW 01	Thenmavur	1.35	SW	10°36'48.50"N, 78°55'3.96"E

Source: On-site monitoring/sampling Greenlink Analytical and Research Laboratory Private Ltd, in association with GTMS.

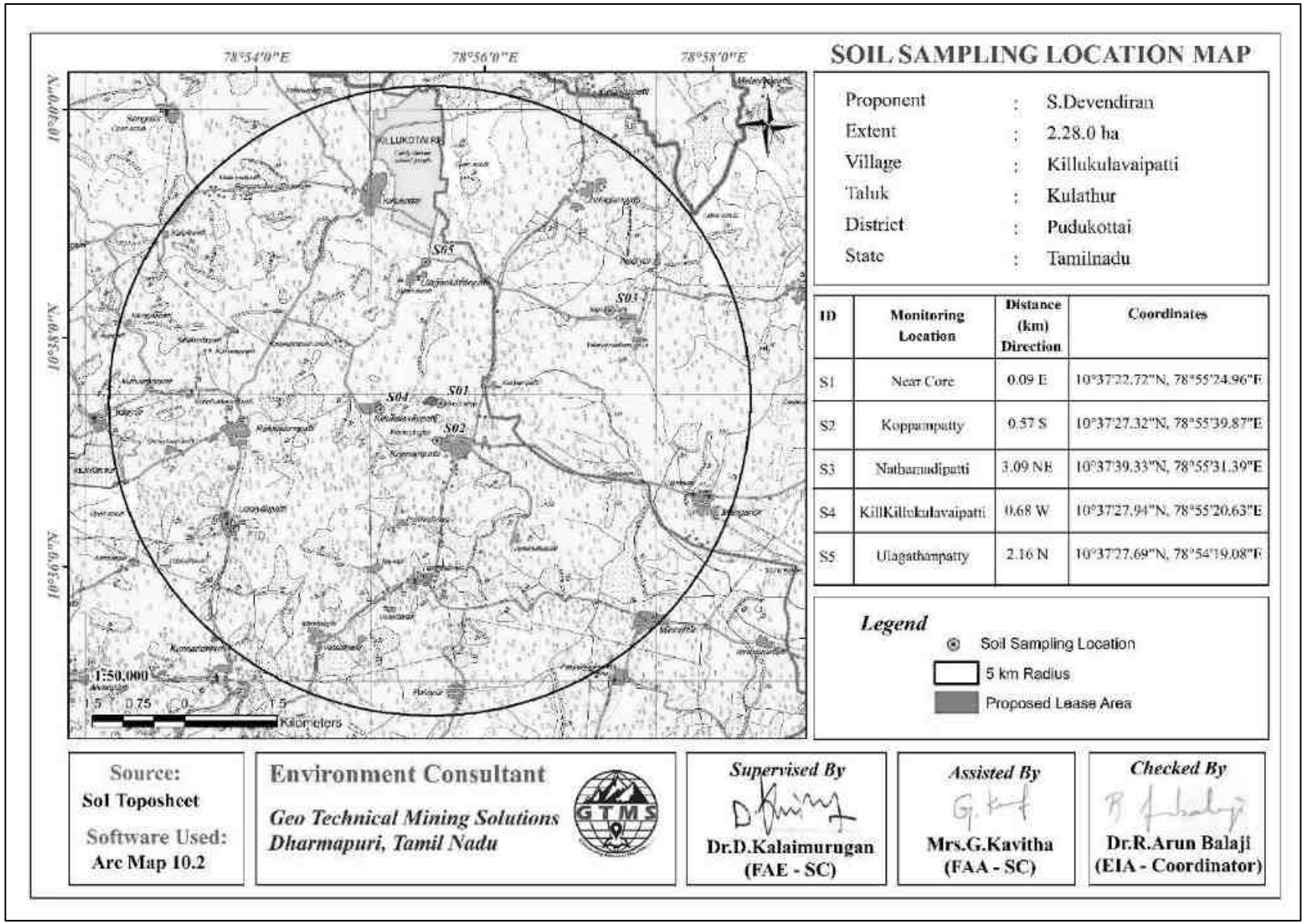
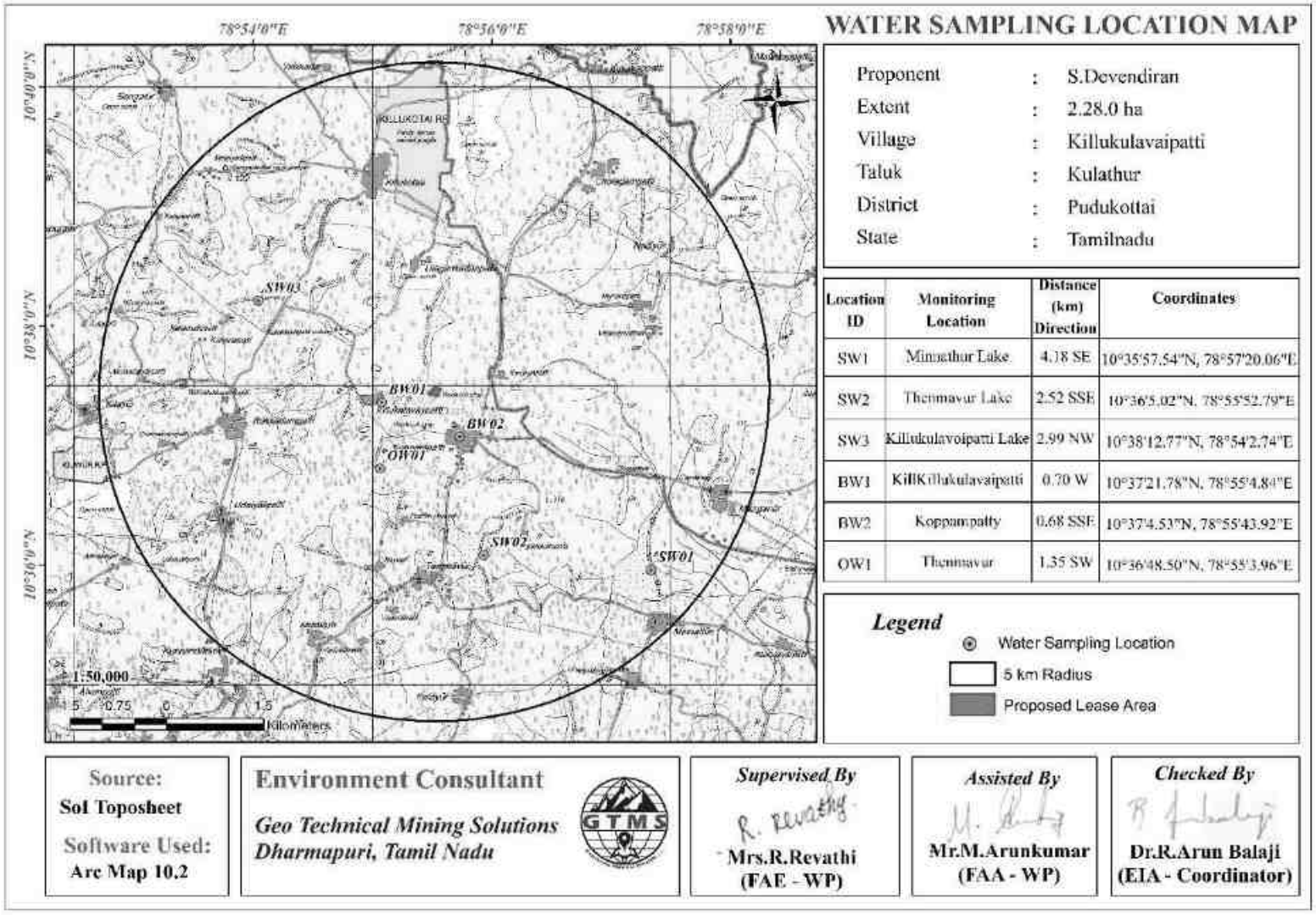


Figure 3.5 Map Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site

Table 3.5 Soil Quality of the Study Area

S. No	Parameters	Unit	Results				
			S1	S2	S3	S4	S5
NABL PARAMETERS							
1	pH	-	7.28	7.10	7.05	7.24	7.55
2	EC	µS/cm	190.0	192.0	185.0	200.0	186.7
3	Total Organic Carbon	%	0.70	0.72	0.65	0.80	0.68
4	Available Nitrogen	kg/ha	185.0	195.0	182.0	198.0	185.0
5	Available Potassium	kg/ha	160.0	140.0	129.0	172.0	130.0
6	Available Phosphorous	mg/kg	70.0	70.0	65.0	75.0	68.0
7	Available Calcium	mg/kg	895.0	850.0	847.0	925.0	850.0
8	Available Magnesium	mg/kg	698.0	600.0	578.0	715.0	598.0
9	Moisture	%	21.7	21.8	22.1	21.5	22.0
10	Organic matter	%	2.00	1.87	1.15	2.85	1.18
11	Chloride	mg/100g	85.4	86.4	80.9	92.4	82.8
NON NABL							
12	Bulk Density	kg/cm^3	1200.0	1100.0	1050.0	1080.0	1100.0
13	Porosity	%	45.0	45.1	48.0	50.9	54.1
14	Copper	ppm	39.4	34.0	35.14	33.41	35.4
15	Nickel	ppm	1.244	1.578	1.558	1.245	1.450
16	Zinc	ppm	23.48	21.45	23.4	24.18	25.48
17	Iron	ppm	9710.0	9985	9548.0	9471	9881
18	Lead	ppm	5.77	6.45	5.38	5.56	5.71
19	Soil Texture	--	Caly loam	Silty clay	Silty clay	Clay	Silty clay loam
20	Sand	%	26.50	8.00	9.00	22.50	18.20
21	clay	%	39.60	40.20	48.50	67.20	39.50
22	Silt	%	33.90	51.80	42.50	10.30	42.30

Source: On-site monitoring/Sampling Results by ***Green link Analytical and Research Laboratory (India) Private Ltd in association with GTMS****.*



Location ID	Monitoring Location	Distance (km) Direction	Coordinates
SW1	Minnathur Lake	4.18 SE	10°35'57.54"N, 78°57'20.06"E
SW2	Thenmavur Lake	2.52 SSE	10°36'5.02"N, 78°55'52.79"E
SW3	Killukulavoipatti Lake	2.99 NW	10°38'12.77"N, 78°54'2.74"E
BW1	KillKillukulavaipatti	0.70 W	10°37'21.78"N, 78°55'4.84"E
BW2	Koppampatty	0.68 SSE	10°37'4.53"N, 78°55'43.92"E
OW1	Thenmavur	1.35 SW	10°36'48.50"N, 78°55'3.96"E

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

Table 3.6 Surface and Ground Water Quality Result

S. No.	Parameters	Units	Results						Permissible Limits as Per IS 10500:2012
			SW1	SW2	SW3	BW1	BW2	OW1	
1	pH value @ 25°C	No	7.85	7.81	7.75	7.51	7.81	7.64	6.5 – 8.5
2	TDS	mg/l	112.0	128.0	135.0	1010.0	1250.0	1100.0	2000
3	EC @ 25°C	µS/cm	180.0	196.0	204.0	1580.0	1350.0	1450.0	---
4	Turbidity	NTU	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5
5	Colour	Hazen	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	15
6	Calcium (Ca)	mg /l	16.03	15.23	18.03	124.24	140.28	112.22	200
7	Magnesium (Mg)	mg/l	7.29	8.99	8.99	58.5	53.82	50.4	100
8	Chlorides (Cl)	mg /l	19.62	21.48	20.48	135.0	155.0	142.0	1000
9	Sulphates (SO_4)	mg/l	5.88	6.01	5.92	59.0	65.0	58.0	400
10	Silica (as SiO_2)	mg/l	4.89	5.12	4.99	20.15	25.41	21.0	---
11	Total Residual Chlorine	mg/l	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	0.2
12	Sodium (Na)	mg/l	3.22	3.82	3.90	41.7	50.7	44.8	---
13	Total Hardness ($CaCO_3$)	mg/l	74.0	75.0	82.0	560.0	580.0	490.9	600
14	Total Alkalinity ($CaCO_3$)	mg/l	70.0	66.0	68.0	250.0	280.0	220.0	600
15	Fluoride (F)	mg/l	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	0.61	0.65	0.55	1
16	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
17	Taste	-	Agreeable	Agreeable	Agreeable	Disagreeable	Disagreeable	Disagreeable	Agreeable
18	Total Solids	mg/l	128.0	135.0	151.0	1040.0	1080	1020	---
19	Dissolved Oxygen	mg/l	5.20	5.41	5.80	5.5	5.8	5.1	---
20	Phosphorous	mg/l	0.71	0.66	0.61	2.08	2.22	2.18	---
21	Potassium	mg/l	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	10.1	11.8	10.9	---
22	Nitrite (NO_2)	mg/l	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	BDL(DL-0.1)	---
23	Phenolphthalein Alkalinity	mg/l	Nil	Nil	Nil	34.0	38.8	35.7	200
24	*Total Coliform*	CFU/ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent
25	*Escherichia Coli*	CFU/ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Source: Sampling Results by Greenlink Analytical and Research Laboratory in association with GTMS.

3.2.1 Surface and Ground Water Quality Resources and Result

Minnathur Lake, Thenmavur Lake and Killukulavoipatti Lake are three prominent surface water resources present in the study area. These lakes are ephemeral in nature, which convey water only after rainfall events. Three surface water sample, known as SW1 were collected from the Minnathur Lake (4.18km SE), SW2 were collected from the Thenmavur Lake (2.52km SSE) and SW3 were collected from the Killukulavoipatti Lake (2.99km NW) to assess the baseline water quality, as shown in Table 3.4 and Figure 3.6.

Groundwater in the study area occurs in the crystalline rocks of Archaean age and recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose. Three groundwater samples, known as BW1, BW2 and OW1 were collected from bore wells and open well were analysed for physico-chemical conditions and bacteriological contents in order to assess baseline quality of ground water. Table 3.6 summarizes surface and ground water quality data of the collected sample. Result for surface and ground water sample in the Table 3.6 indicate that the physical, chemical and biological parameters are within permissible limits except groundwater taste was Disagreeable in compared with standards of IS10500:2012.

Table 3.6a Weighted Arithmetic Water Quality Index (WAWQI) of surface and ground water as per Method of Brown et al., 1972

S. No.	Water Quality Index (WQI)						WQI Range	Classification	Grading
	SW1	SW2	SW3	BW1	BW2	OW1			
1	10.02	13.56	17.53				0 – 25	Excellent	A
2				48.34		35.45	25 – 50	Good	B
3					60.12		50 – 75	Poor	C
4							75 – 100	Very Poor	D
5							> 100	Unsuitable	E

The WQI is a unique digital rating expression that expresses overall water quality status viz: excellent, good, poor, very poor and unsuitable based on various water quality parameters. It is used as an important tool to compare the quality of water and their management in a particular region. The WQI of the surface and ground water, as shown Table 3.6a indicates that three surface water (SW1, SW2 & SW3) samples are Excellent quality and two groundwater (BW1& OW1) samples are good quality and one groundwater (BW2) sample are poor quality. The WQI of ground water samples fall under Excellent, good and suitable for drinking,

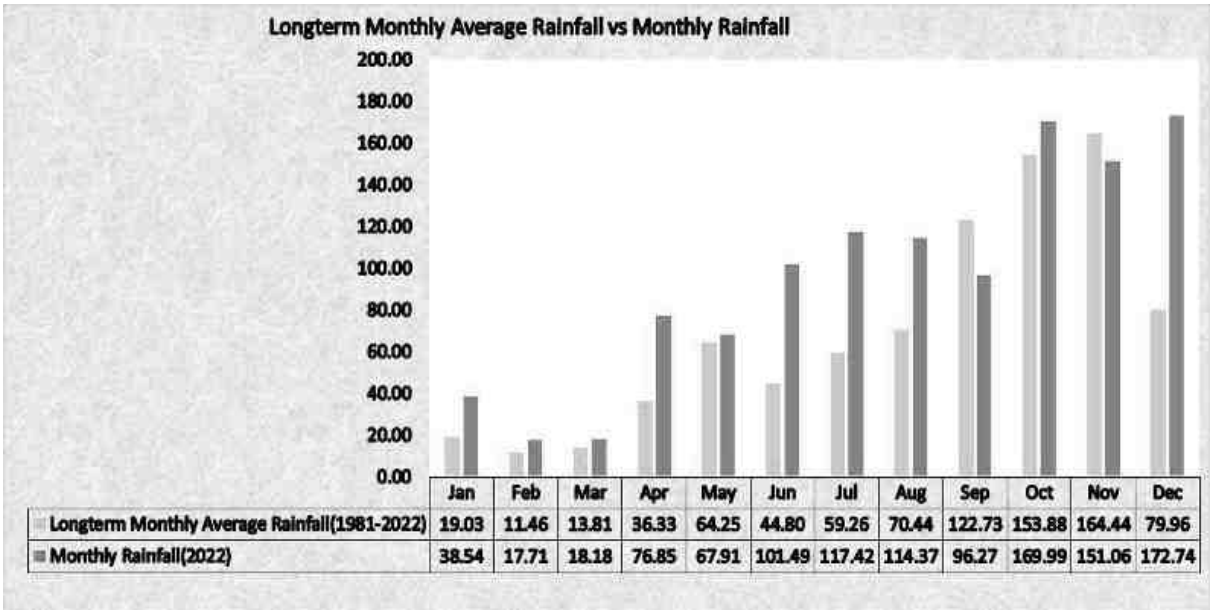
domestic and agriculture purpose. Poor quality indicating they are not suitability for drinking and suitable for domestic and agriculture purpose.

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 1981-2021(POWER | Data Access Viewer (nasa.gov)**)**. Long term monthly average rainfall was estimated from the data of 1981-2022 and compared with the monthly rainfall for the year 2022, 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.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Longterm Monthly Average Rainfall(1981-2022)	19.03	11.46	13.81	36.33	64.25	44.80	59.26	70.44	122.73	153.88	164.44	79.96
Monthly Rainfall(2022)	38.54	17.71	18.18	76.85	67.91	101.49	117.42	114.37	96.27	169.99	151.06	172.74

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 2024 (Pre-Monsoon Season) and from October through December 2023, (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 10.61 to 12.96m BGL in pre monsoon and 10.77 to 12.57m 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 52.53 to 55.14m and from 55.51 to 59.30m 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 3 located in Southern direction the open well number 1 located in Western 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 8. It is located in Southeast 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.

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-2024	Apr-2024	May- 2024	Average		
OW01	11.8	13.3	13.6	12.90	11°25'54.68"N	77°10'35.05"E
OW02	12.5	12.8	13.2	12.83	11°25'14.35"N	77°10'20.21"E
OW03	12.22	12.14	14.52	12.96	11°25'14.77"N	77°11'17.39"E
OW04	9.6	10.9	11.6	10.70	11°25'55.27"N	77°11'29.95"E
OW05	10.6	11.2	10.8	10.87	11°26'46.14"N	77°10'4.18"E
OW06	10.1	10.6	11.12	10.61	11°26'14.15"N	77° 9'47.72"E
OW07	10.4	10.8	11.3	10.83	11°24'47.58"N	77°10'32.77"E
OW08	11.1	11.8	12.3	11.73	11°25'23.51"N	77° 9'27.58"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-2024	Nov- 2024	Dec-2024	Average		
OW01	12.37	11.88	9.35	11.20	11°25'54.68"N	77°10'35.05"E
OW02	13.65	12.55	10.11	12.10	11°25'14.35"N	77°10'20.21"E
OW03	14.85	12.62	10.25	12.57	11°25'14.77"N	77°11'17.39"E
OW04	12.12	10.98	9.21	10.77	11°25'55.27"N	77°11'29.95"E
OW05	12.22	11.02	9.55	10.93	11°26'46.14"N	77°10'4.18"E
OW06	12.65	11.42	10.08	11.38	11°26'14.15"N	77° 9'47.72"E
OW07	13.01	11.89	10.08	11.66	11°24'47.58"N	77°10'32.77"E
OW08	12.44	11.35	10.02	11.27	11°25'23.51"N	77° 9'27.58"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-2024	Apr-2024	May- 2024	Average		
BW01	55.95	58.48	61.84	58.76	11°25'51.21"N	77°10'42.43"E
BW02	56.45	58.23	62.12	58.93	11°25'14.91"N	77°10'28.18"E
BW03	54.18	55.85	59.94	56.66	11°25'40.26"N	77°11'30.88"E
BW04	56.2	57.22	61.22	58.21	11°24'49.06"N	77°10'56.92"E
BW05	57.82	57.98	62.11	59.30	11°25'5.02"N	77° 9'40.41"E
BW06	55.55	57.22	61.35	58.04	11°25'41.29"N	77° 9'48.73"E
BW07	55.48	57.18	61.31	57.99	11°26'16.21"N	77° 9'47.11"E
BW08	52.22	55.11	59.2	55.51	11°26'49.30"N	77°10'7.77"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-2024	Nov-2024	Dec-2024	Average		
BW01	58.85	55.12	51.45	55.14	11°25'51.21"N	77°10'42.43"E
BW02	57.33	53.22	51.12	53.89	11°25'14.91"N	77°10'28.18"E
BW03	56.95	53.08	51.55	53.86	11°25'40.26"N	77°11'30.88"E
BW04	55.22	52.15	50.22	52.53	11°24'49.06"N	77°10'56.92"E
BW05	56.12	54.95	52.85	54.64	11°25'5.02"N	77° 9'40.41"E
BW06	58.23	55.58	51.56	55.12	11°25'41.29"N	77° 9'48.73"E
BW07	56.98	53.98	51.32	54.09	11°26'16.21"N	77° 9'47.11"E
BW08	56.22	53.33	51.12	53.56	11°26'49.30"N	77°10'7.77"E

Source: Onsite monitoring data

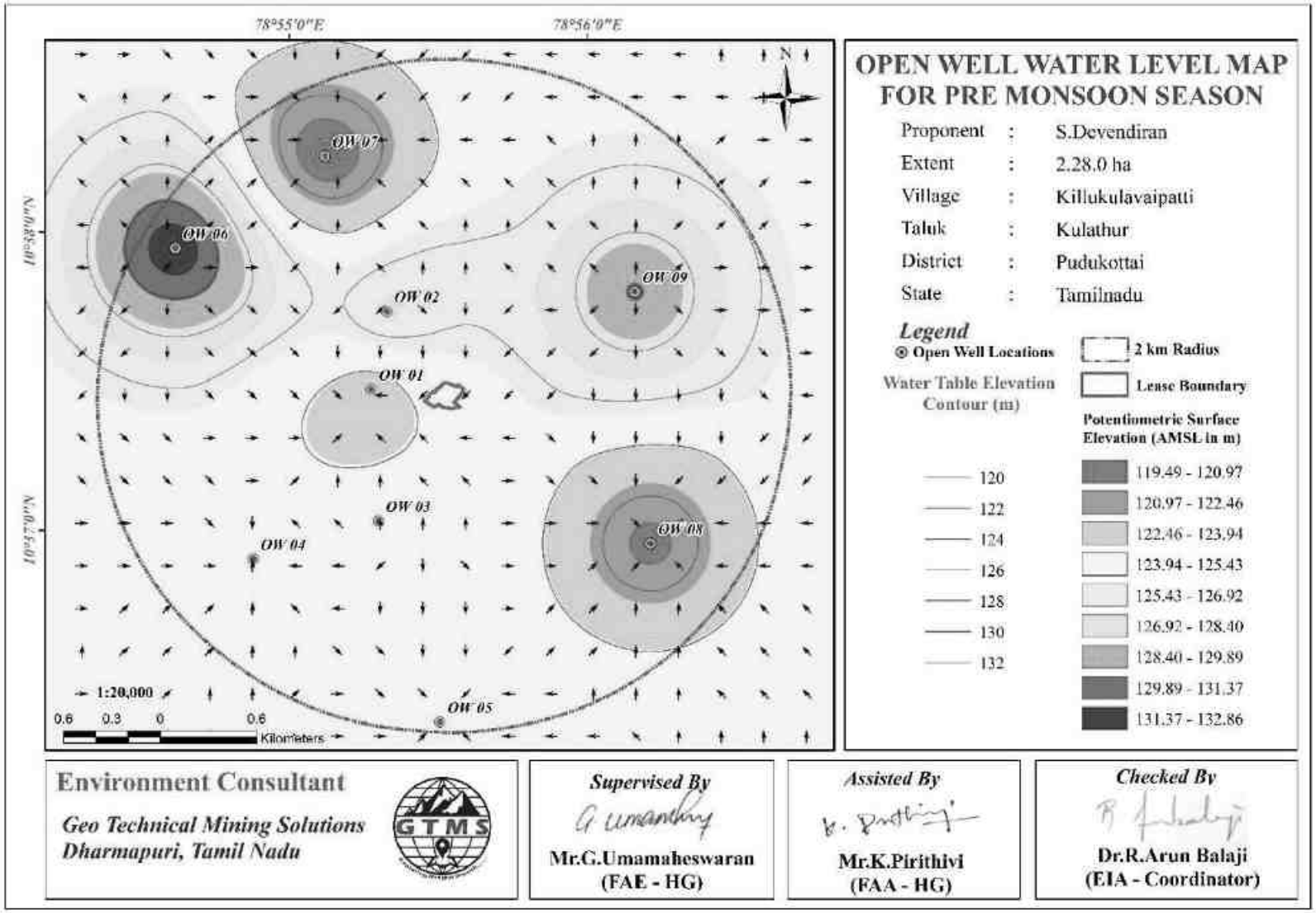


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

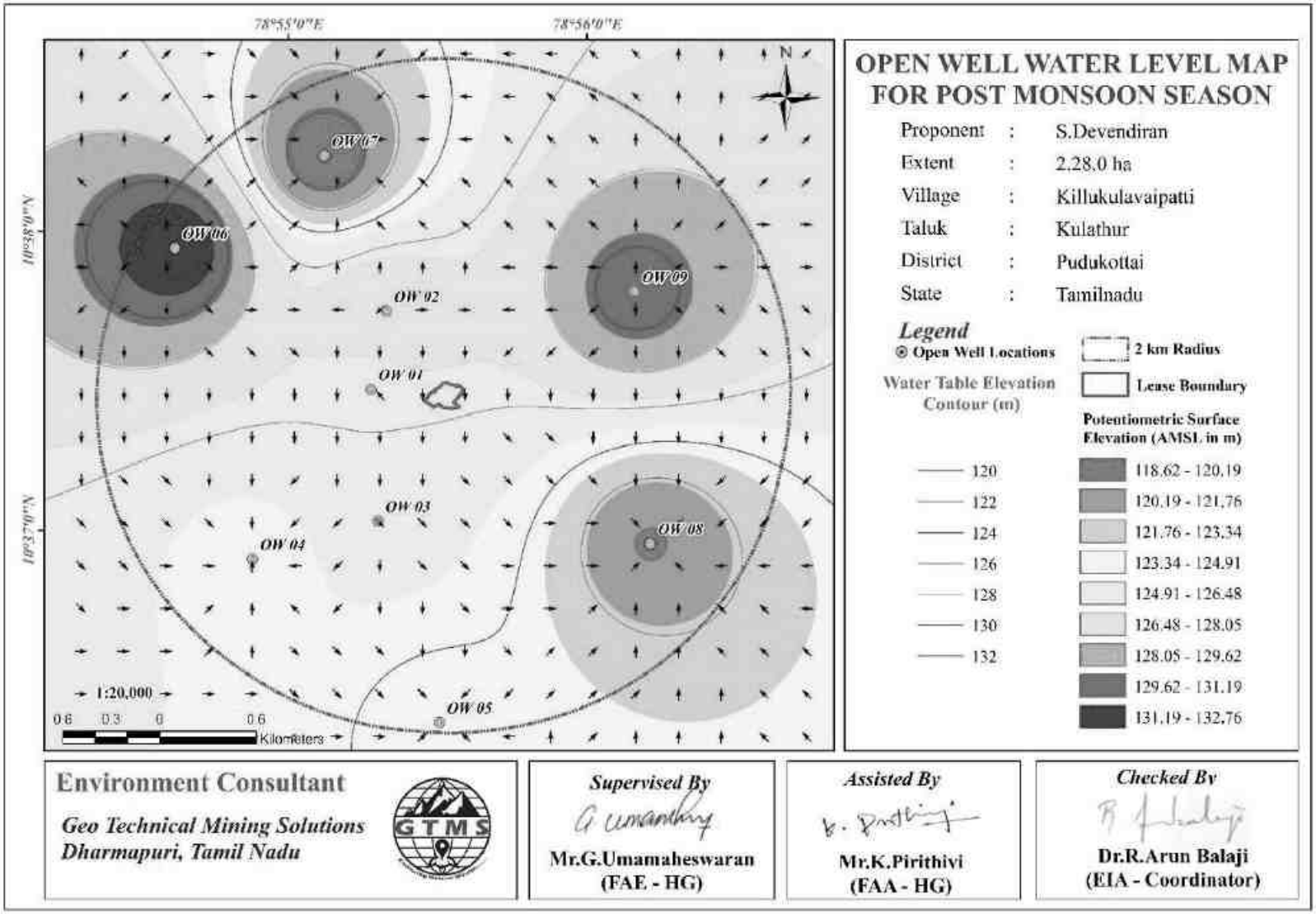


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

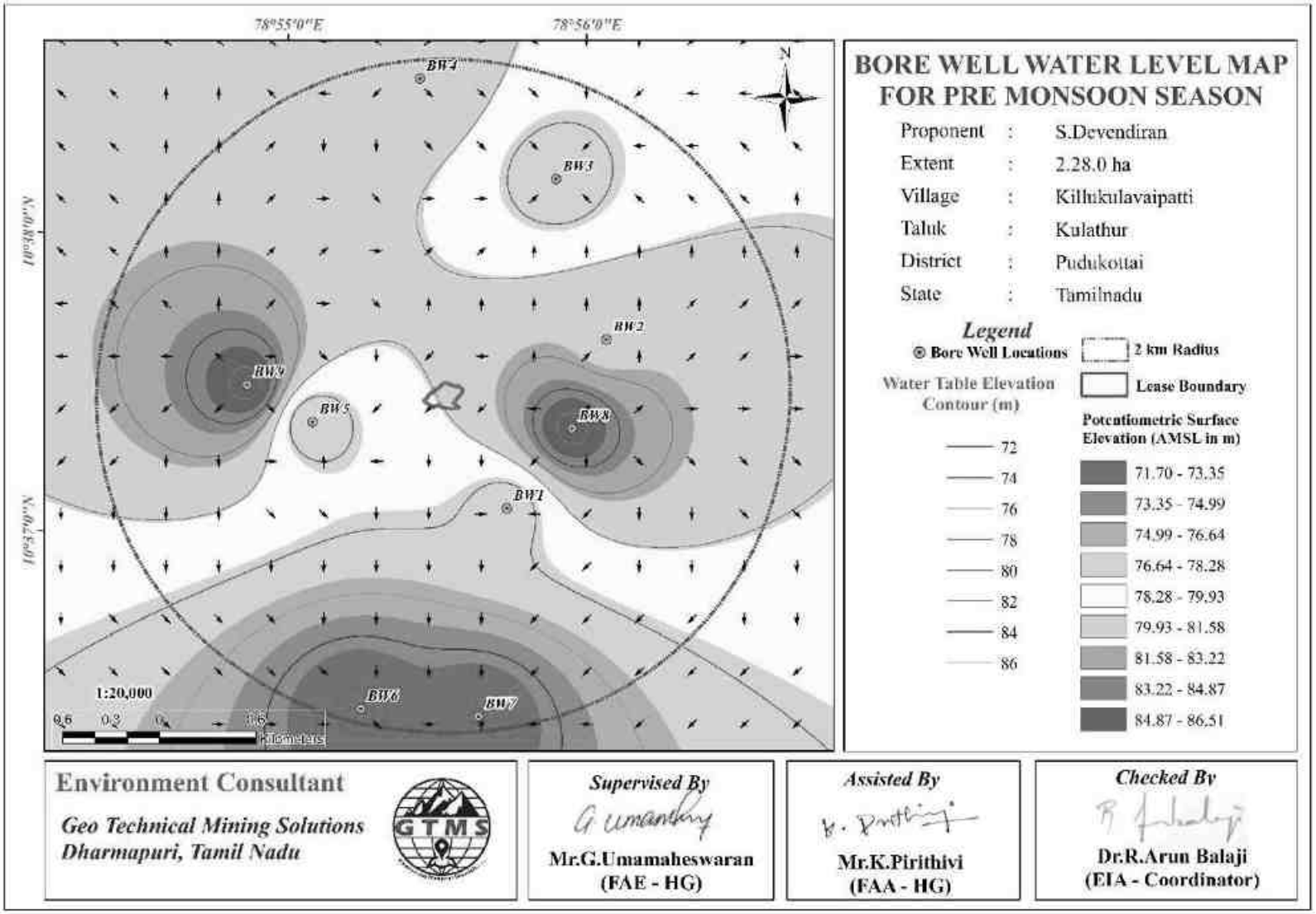


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

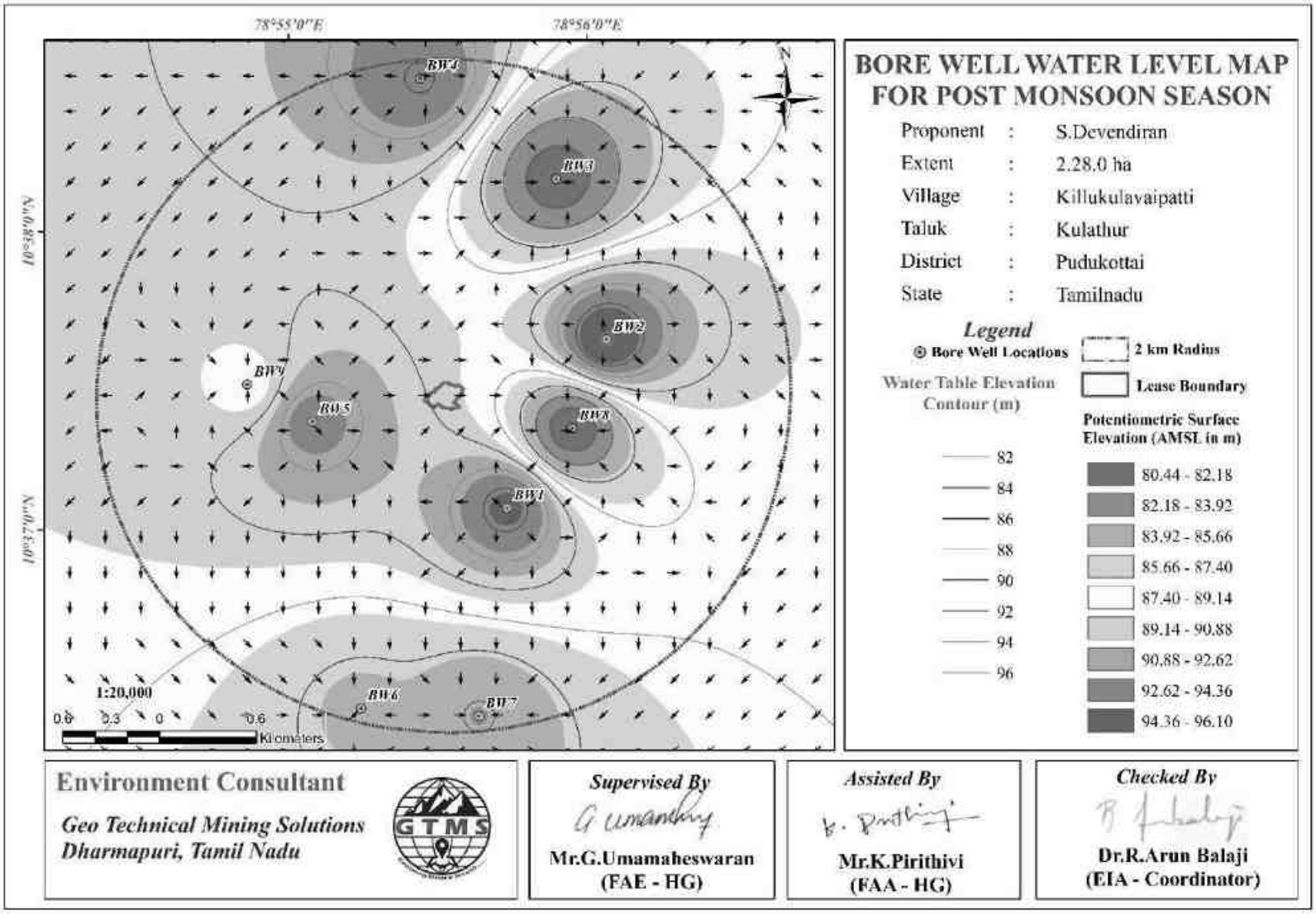


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

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 3.12.

Table 3.11 Vertical Electrical Sounding Data

Location Coordinates - 10°37'28.20"N 78°55'30.02"E					
S. No.	**AB/2 (m)**	**MN/2 (m)**	**Geometrical Factor (G)**	**Resistance in Ω**	**Apparent Resistivity in Ωm**
1	2	1	4.71	6.26	29.55
2	4	1	23.57	1.84	43.55
3	6	1	55.00	1.017	55.94
4	8	1	99.00	1.014	76.39
5	10	2	75.43	0.44	33.19
6	12	2	110.01	0.38	42.63
7	14	2	150.86	0.35	53.57
8	16	2	198.01	0.29	57.62
9	18	2	251.44	0.26	67.40
10	20	2	311.16	0.27	86.55
11	25	5	188.58	0.48	91.14
12	30	5	275.01	0.46	127.23
13	35	5	377.16	0.47	178.85
14	40	5	495.02	0.49	222.39
15	45	5	628.60	0.39	249.22
16	50	5	777.89	0.32	250.04
17	60	10	550.03	0.31	354.51

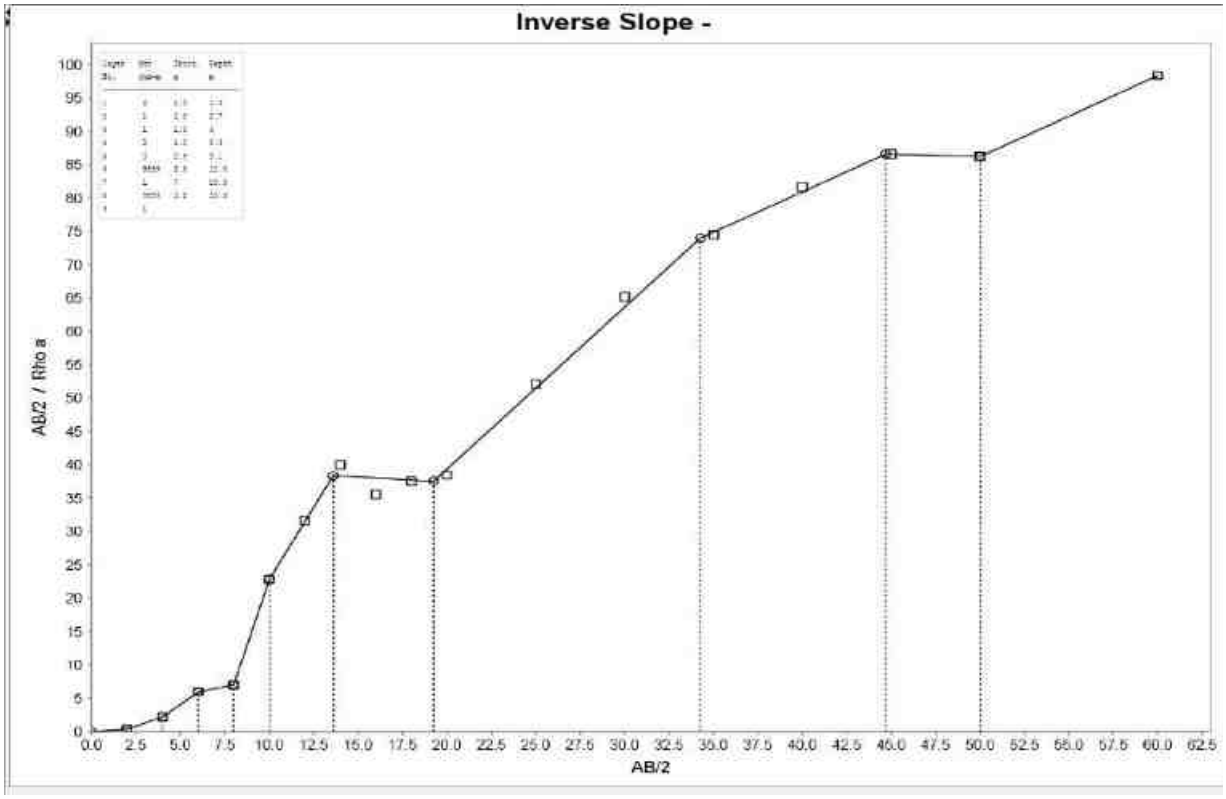


Figure 3.12 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60-65m Below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 60m below ground level. The ultimate depth of proposed project is 50m 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,2024	NOV,2024	DEC,2024
1	Temperature (^{0}C)	Min	21.52	21.11	19.14
		Max	35.94	31.61	31.21
		Avg	27.33	25.58	24.97
2	Relative Humidity (%)	Min	41.50	56.12	57.42
		Max	97.81	100.00	100.00
		Avg	81.45	87.60	87.49
3	Wind Speed (m/s)	Min	0.16	0.65	0.16
		Max	5.45	7.90	6.17
		Avg	2.11	3.69	2.79
4	Wind Direction (degree)	Min	0.40	0.00	0.20
		Max	359.60	359.90	359.90
		Avg	202.69	109.12	112.34
5	Surface Pressure(kPa)	Min	99.38	99.10	98.92
		Max	100.21	100.28	100.47
		Avg	99.78	99.88	99.83

Source: On-site monitoring/sampling by ***Greenlink Analytical and Research Laboratory (India) Private Ltd*** *in association with GTMS*

3.3.1.2 Wind Pattern

Wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction. Two types of wind rose were generated: historical seasonal wind rose for the period of October to December of the years from 2020 to 2023 and the seasonal wind rose for the study period of October through December 2024. The wind rose diagrams thus produced are shown in Figures 3.13-3.13a. Figure 3.14 reveals that:

- The measured average wind velocity during the study period is 2.85m/s.
- Predominant wind was dominant in the directions ranging from Northeast to Southwest.

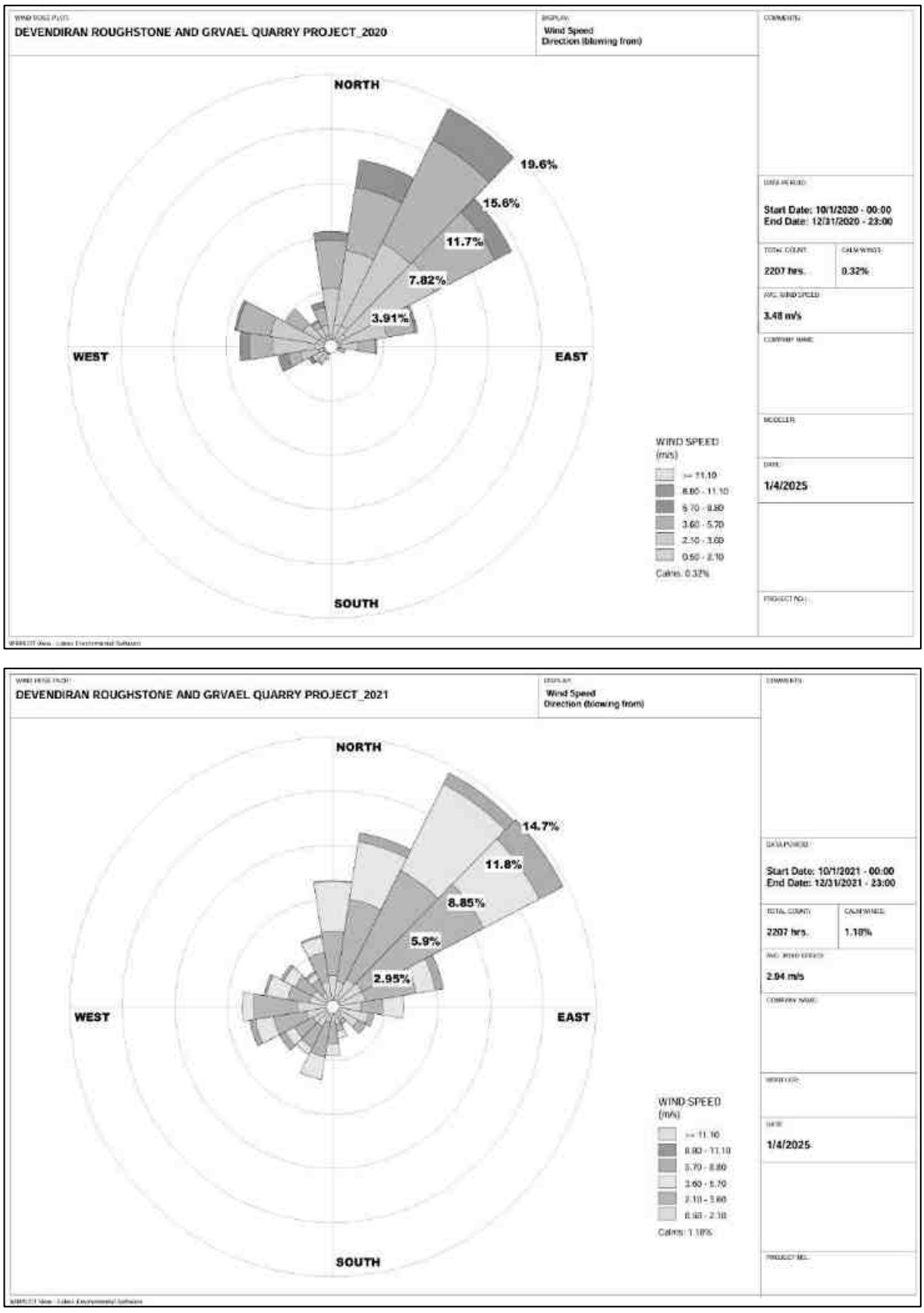
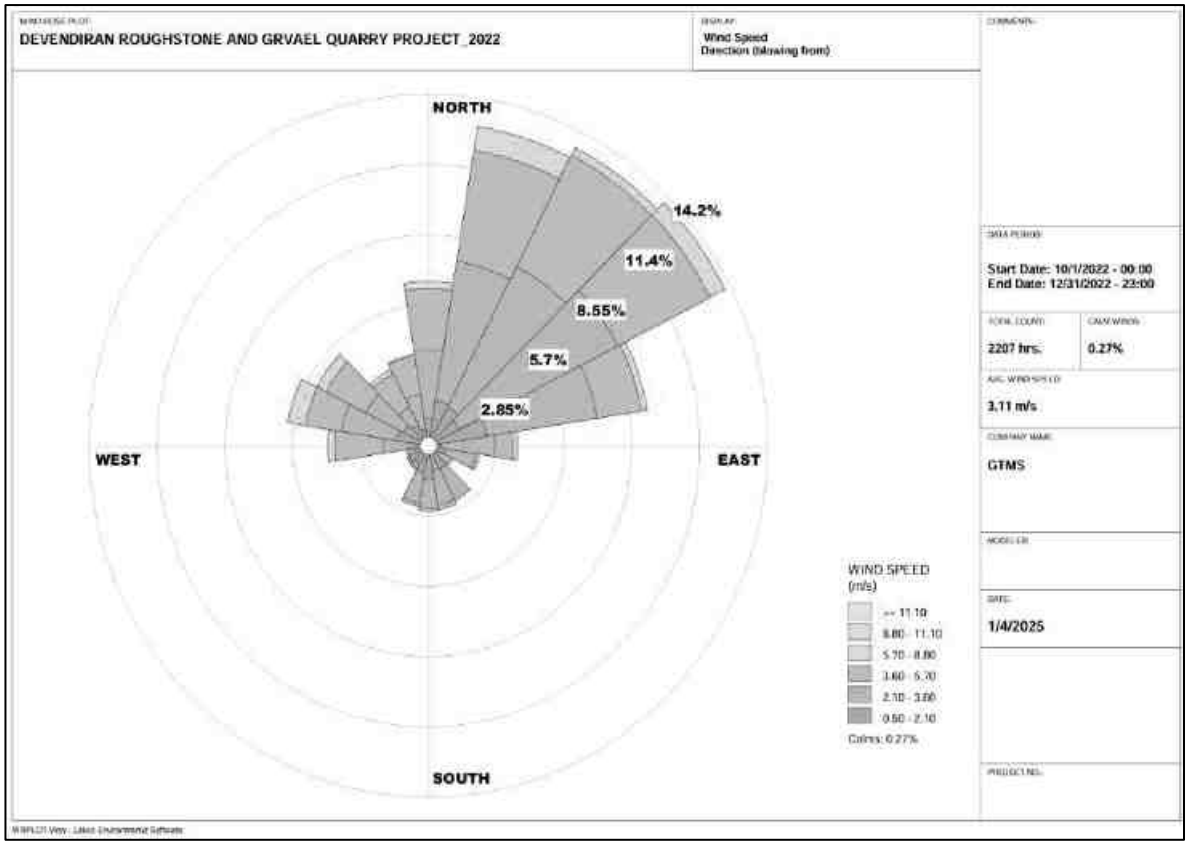


Figure 3.13 Windrose Diagram for 2020 and 2021 (October to December)



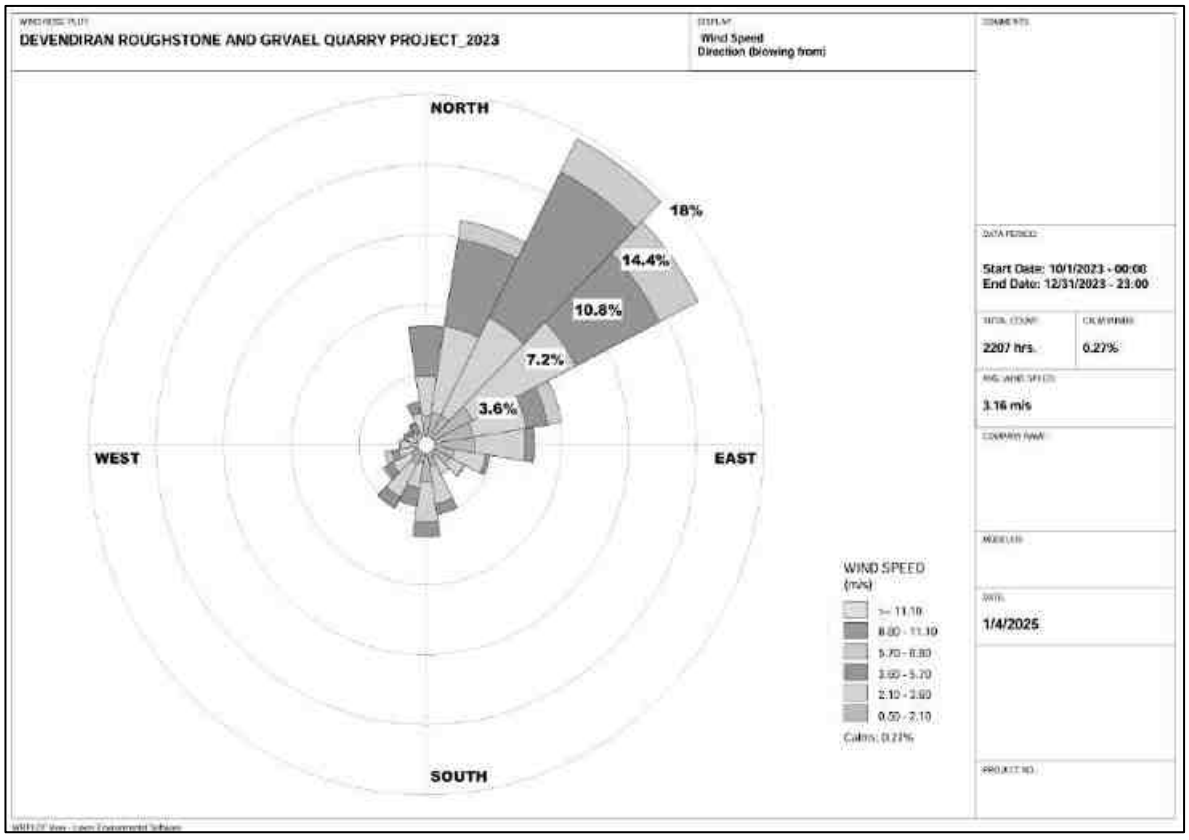


Figure 3.13a Windrose Diagram for 2022 and 2023 (October to December)

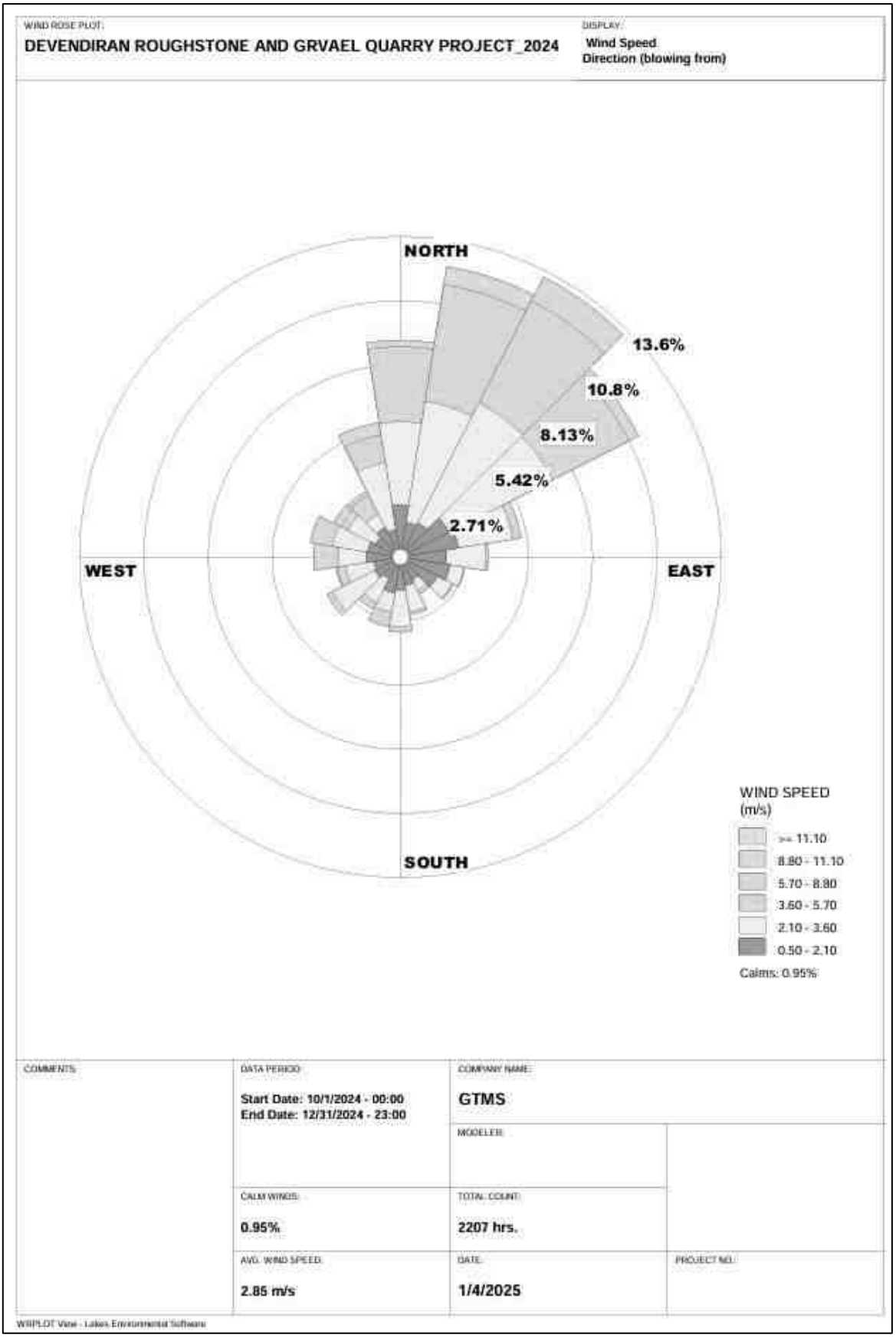


Figure 3.14 Onsite Wind Rose Diagram

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

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
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology based ***Greenlink Analytical and Research Laboratory (India) Private Ltd*** *& CPCB* Notification

Table 3.14 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO_2 ($\mu g/m^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO_x ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM_{10} ($\mu g/m^3$)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	$PM_{2.5}$ ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at Seven (07) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period October to December, 2024 as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5m above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for $PM_{2.5}$, PM_{10}, sulphur dioxide (SO_2) and nitrogen dioxide (NO_x). The sampling locations are shown in Figure 3.15 and average concentrations of air pollutants are summarized in Tables 3.15 and are shown in Figures 3.16-3.20.

Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations

Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
AAQ1	Core area	--	--	10°37'26.44"N, 78°55'28.44"E
AAQ2	Koppampatti	0.53	SE	10°37'10.29"N, 78°55'42.66"E
AAQ3	Kilukulavaipatti	0.70	SW	10°37'21.30"N, 78°55'04.55"E
AAQ4	Nathamadipatti	3.17	NE	10°38'12.46" N,78°57'09.30"E
AAQ5	Ulagankathanpatti East	1.81	N	10°38'28.33"N,78°55'32.27"E
AAQ6	Thenmavur	2.55	S	10°36'1.33"N,78°55'34.46"E
AAQ7	Udayallipatti,	3.56	SW	10°36'27.92"N, 78°53'47.09"E

Source: On-site monitoring/sampling ***Greenlink Analytical and Research Laboratory (India) Private Ltd*** *in association with GTMS*

Results

As per the monitoring data, $PM_{2.5}$ ranges from 14.6µg/m^3 to 16.4µg/m^3; PM_{10} from 36.4µg/m^3 to 40.9µg/m^3; SO_2 from 2.5µg/m^3 to 4.2µg/m^3; NO_x from 7.7µg/m^3 to 13.2g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index

The AQI shows that the air quality of the study area falls within good category 39 causing minimal impact to human health.

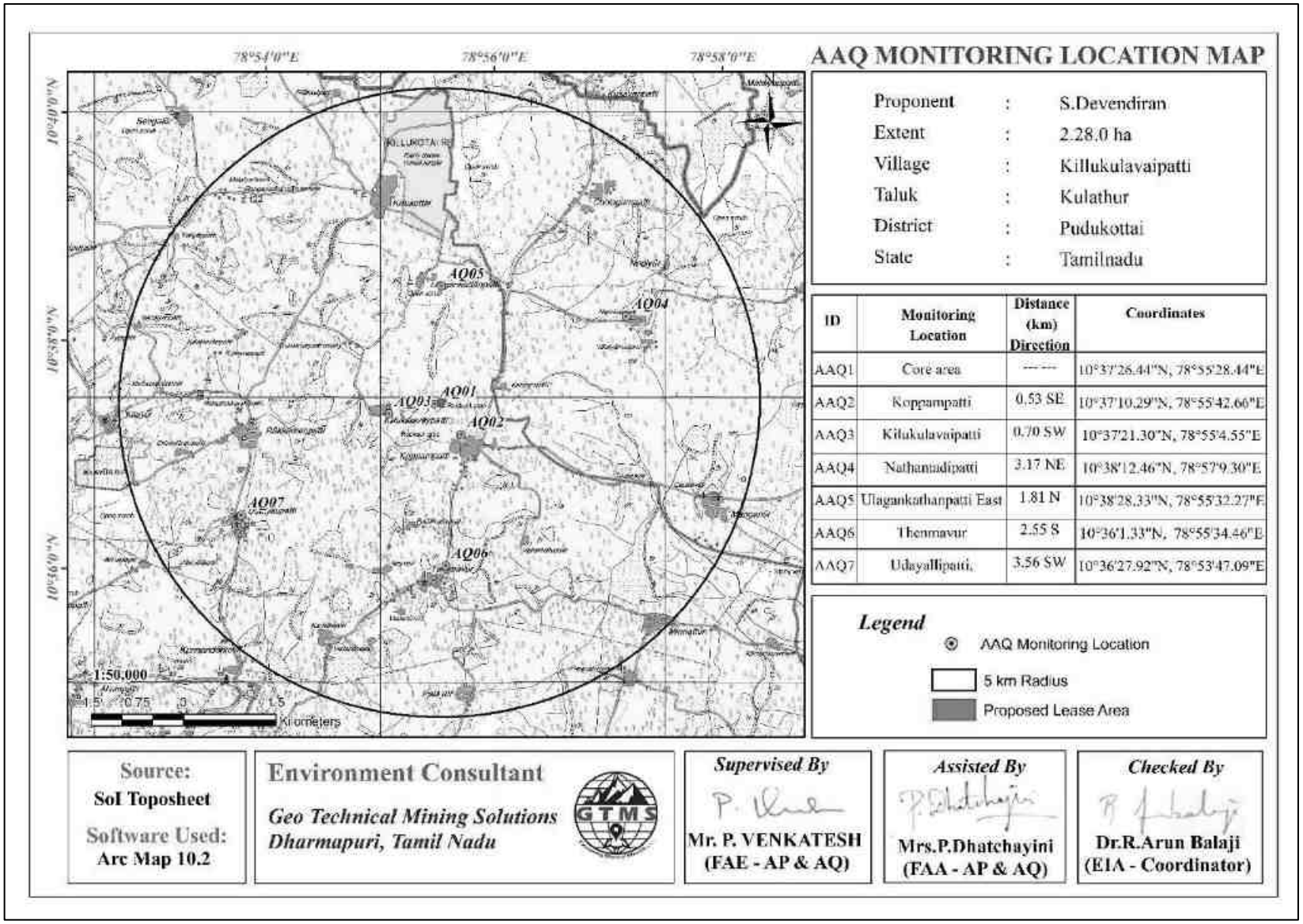


Figure 3.15 Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

Table 3.16 Summary of AAQ Result

$PM_{2.5}$					PM_{10}			
Station ID	**Max**	**Min**	**Mean**	**98th Percentile**	**Max**	**Min**	**Mean**	**98th Percentile**
AAQ1	17.4	15.7	16.6	17.4	43.6	39.2	41.4	43.6
AAQ2	16.6	14.1	15.5	16.5	41.6	35.2	38.8	41.3
AAQ3	16.6	14.6	15.6	15.8	41.4	36.6	38.9	41.1
AAQ4	15.1	13.0	14.3	15.0	37.8	32.6	35.6	37.5
AAQ5	16.2	14.1	15.3	16.0	40.4	35.2	38.2	40.1
AAQ6	15.8	14.7	15.2	15.8	39.6	36.8	38.1	39.4
AAQ7	16.8	15.7	16.2	16.8	42.1	39.3	40.6	41.9
SO_2					**NO_x**			
AAQ1	4.4	2.8	3.7	4.4	13.6	8.7	11.4	13.6
AAQ2	4.5	3.0	3.6	4.4	14.0	9.3	10.3	13.5
AAQ3	4.0	1.7	2.9	3.9	12.4	5.3	8.8	12.0
AAQ4	3.7	2.6	3.0	3.6	10.2	8.1	9.2	10.2
AAQ5	4.9	3.4	4.0	4.9	14.6	9.1	11.7	14.5
AAQ6	3.8	1.8	2.8	3.7	15.1	6.8	10.5	15.0
AAQ7	4.1	2.2	3.0	3.9	12.7	6.8	8.6	10.5

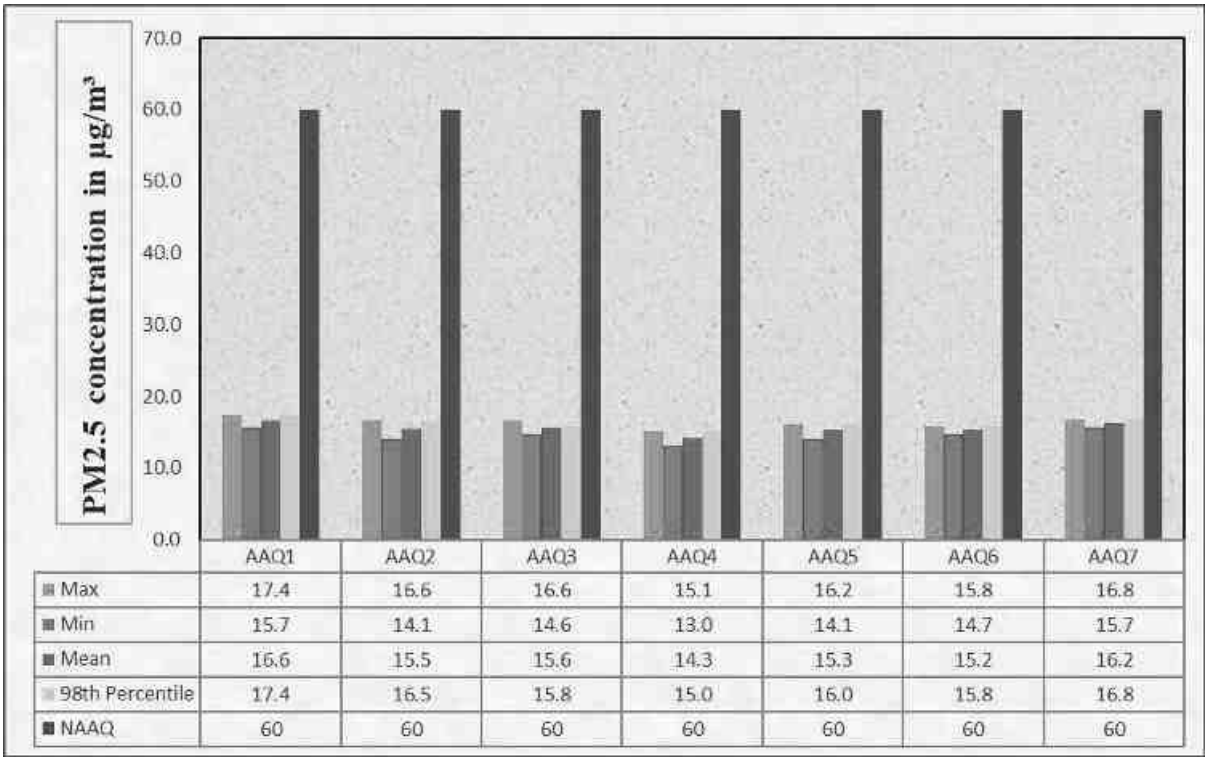
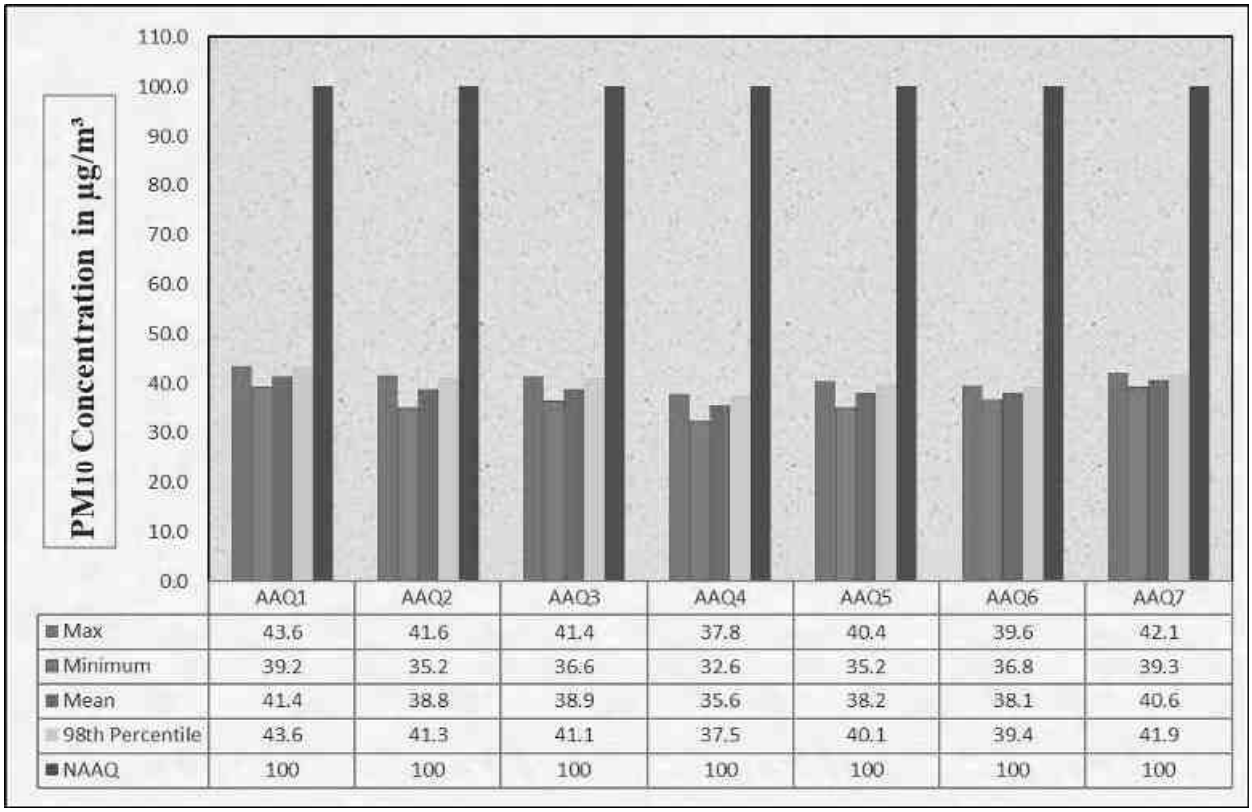
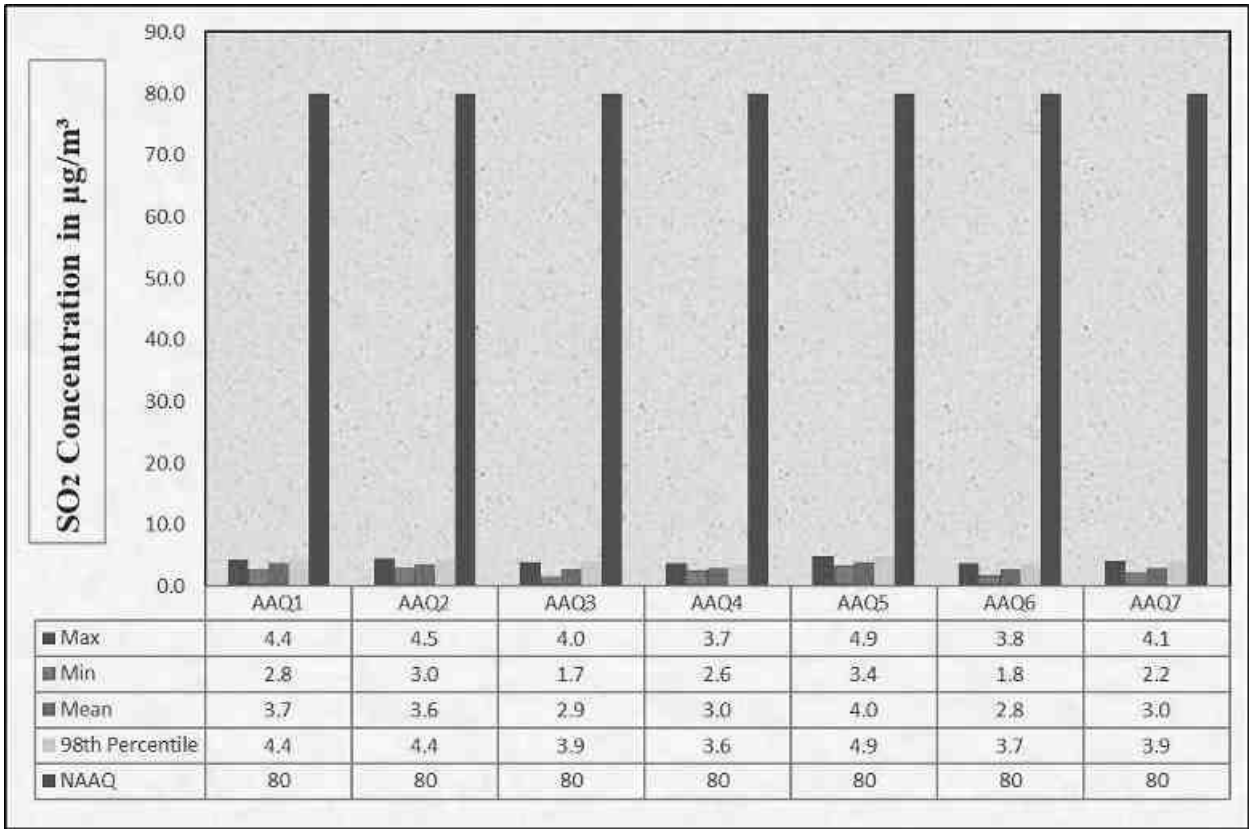


Figure 3.16 Bar Chart Showing Maximum, Minimum, and Average Concentrations of $PM_{2.5}$ Measured from 7 Air Quality Monitoring Stations within 5 km Radius



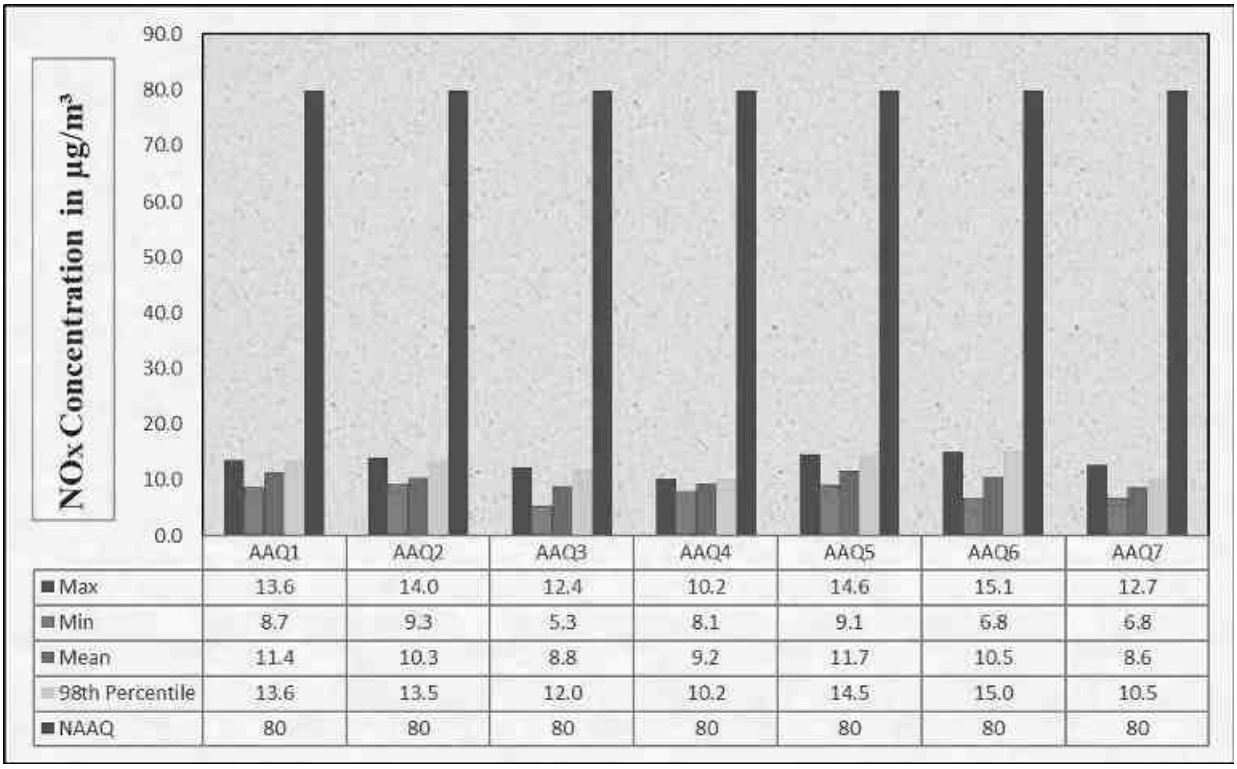
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Max	43.6	41.6	41.4	37.8	40.4	39.6	42.1
Minimum	39.2	35.2	36.6	32.6	35.2	36.8	39.3
Mean	41.4	38.8	38.9	35.6	38.2	38.1	40.6
98th Percentile	43.6	41.3	41.1	37.5	40.1	39.4	41.9
NAAQ	100	100	100	100	100	100	100

Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM_{10} Measured from 7 Air Quality Monitoring Stations within 5 km Radius



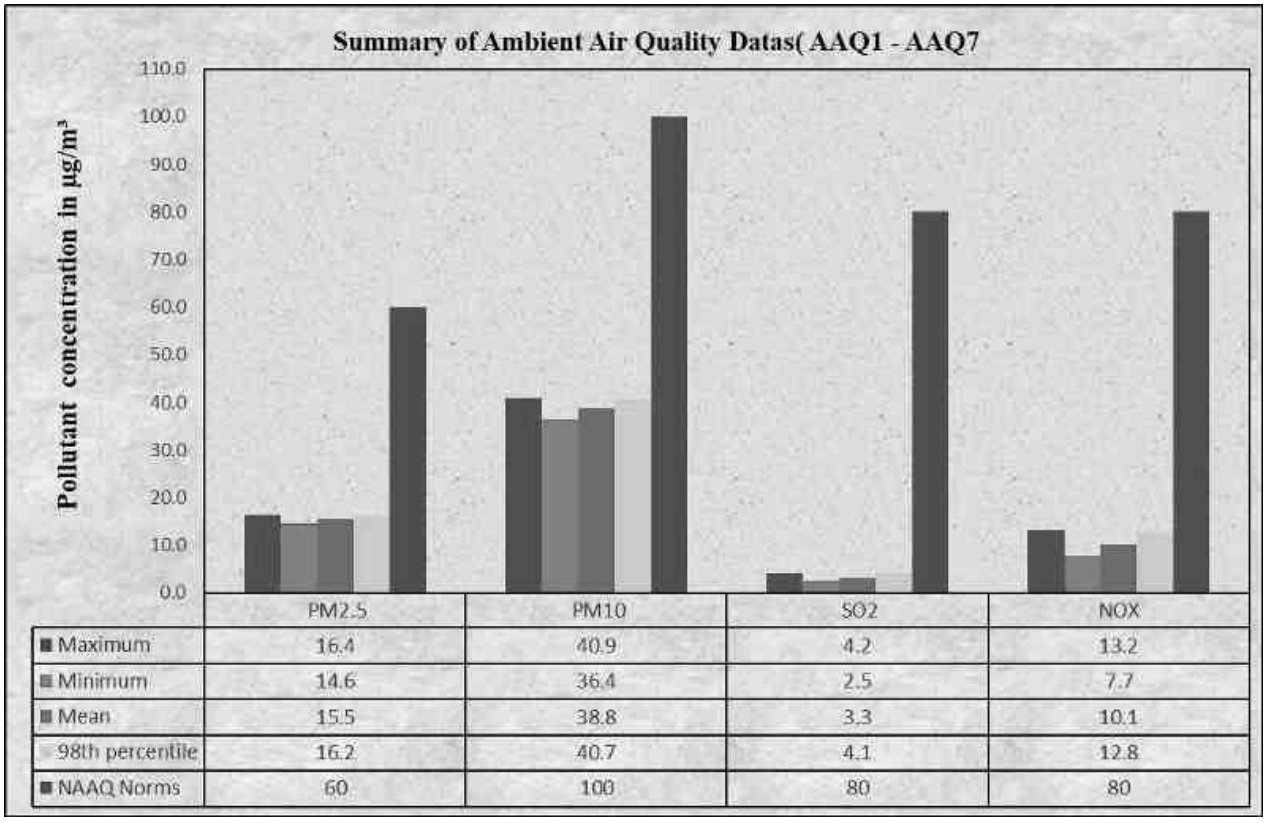
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Max	4.4	4.5	4.0	3.7	4.9	3.8	4.1
Min	2.8	3.0	1.7	2.6	3.4	1.8	2.2
Mean	3.7	3.6	2.9	3.0	4.0	2.8	3.0
98th Percentile	4.4	4.4	3.9	3.6	4.9	3.7	3.9
NAAQ	80	80	80	80	80	80	80

Figure 3.18 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO_2 Measured from 7Air Quality Monitoring Stations within 5 km Radius



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Max	13.6	14.0	12.4	10.2	14.6	15.1	12.7
Min	8.7	9.3	5.3	8.1	9.1	6.8	6.8
Mean	11.4	10.3	8.8	9.2	11.7	10.5	8.6
98th Percentile	13.6	13.5	12.0	10.2	14.5	15.0	10.5
NAAQ	80	80	80	80	80	80	80

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



	PM2.5	PM10	SO2	NOX
Maximum	16.4	40.9	4.2	13.2
Minimum	14.6	36.4	2.5	7.7
Mean	15.5	38.8	3.3	10.1
98th percentile	16.2	40.7	4.1	12.8
NAAQ Norms	60	100	80	80

Figure 3.20 Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5 km 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 3.21.

Table 3.17 Noise Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance in km	Direction	Coordinates
1	N1	Core area	--	--	10°37'29.44"N, 78°55'34.25"E
2	N2	Koppampatti	0.62	SE	10°37'06.06"N, 78°55'40.62"E
3	N3	Kilukulavaipatti	0.68	W	10°37'25.22"N, 78°55'04.79"E
4	N4	Nathamadipatti	3.07	NE	10°38'12.26"N, 78°57'05.80"E
5	N5	Ulagankathanpatti East	1.86	N	10°38'29.92"N, 78°55'25.95"E
6	N6	Thenmavur	2.83	S	10°35'52.30"N, 78°55'30.32"E
7	N7	Udayallipatti	3.61	SW	10°36'29.22"N, 78°53'43.37"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 (L_{eq} in dB (A))	
N1	Core area	Industrial Area	39.2	37.0	75	70
N2	Koppampatti	Residential Area	39.5	35.8	55	45
N3	Kilukulavaipatti		39.8	36.2		
N4	Nathamadipatti		39.5	36.8		
N5	Ulagankathanpatti East		38.2	36.0		
N6	Thenmavur		38.4	35.7		
N7	Udayallipatti,		38.7	36.5		

Source: On-site monitoring/sampling by ***Greenlink Analytical and Research Laboratory (India) Private Ltd*** *in association with GTMS*

The Table 3.18 shows that noise level in core zone was 39.2dB (A) Leq during day time and 37.0dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 38.2to 39.2dB (A) Leq and during night time from 35.7 to 36.8dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.22 and 3.23.

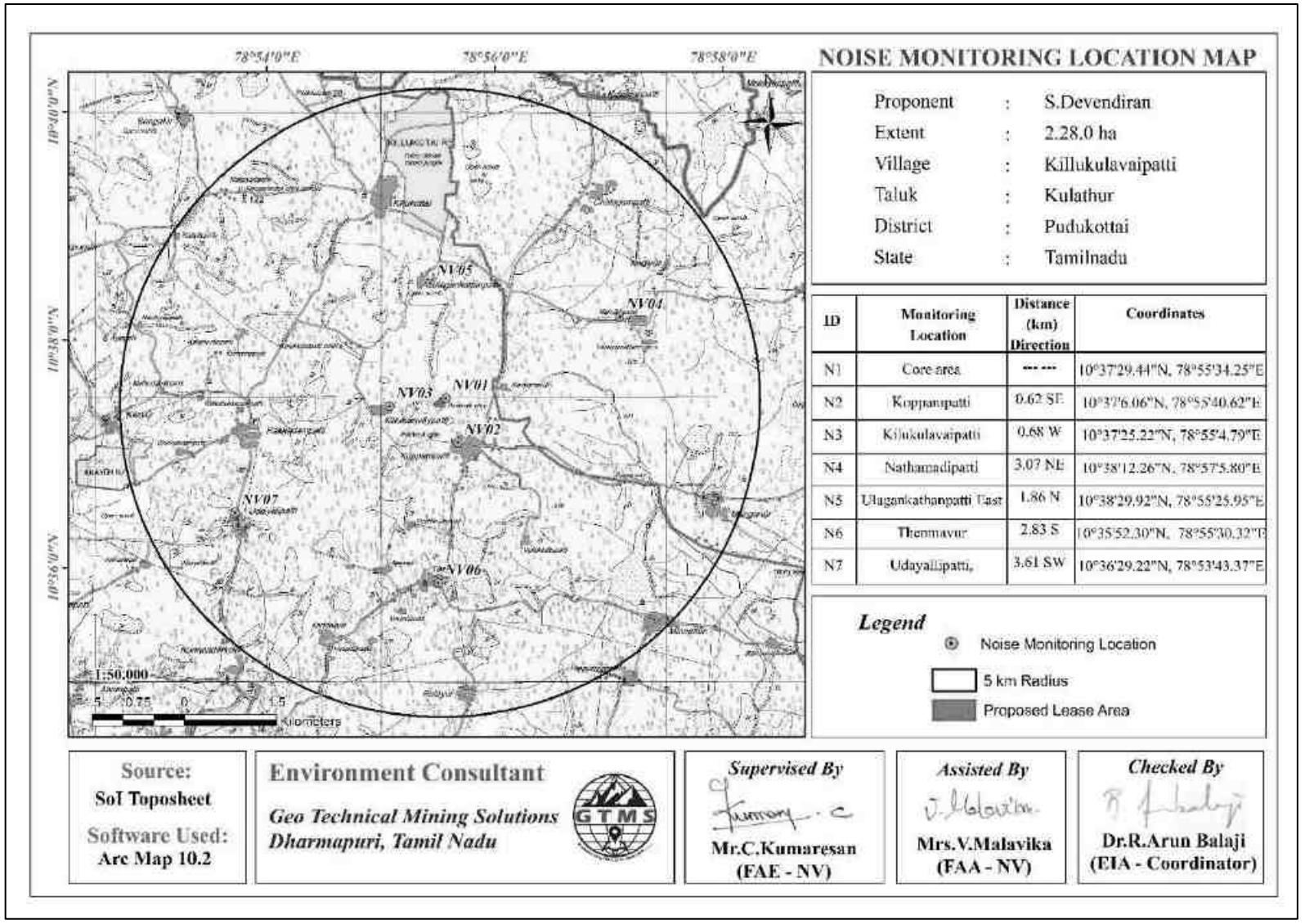


Figure 3.21 Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

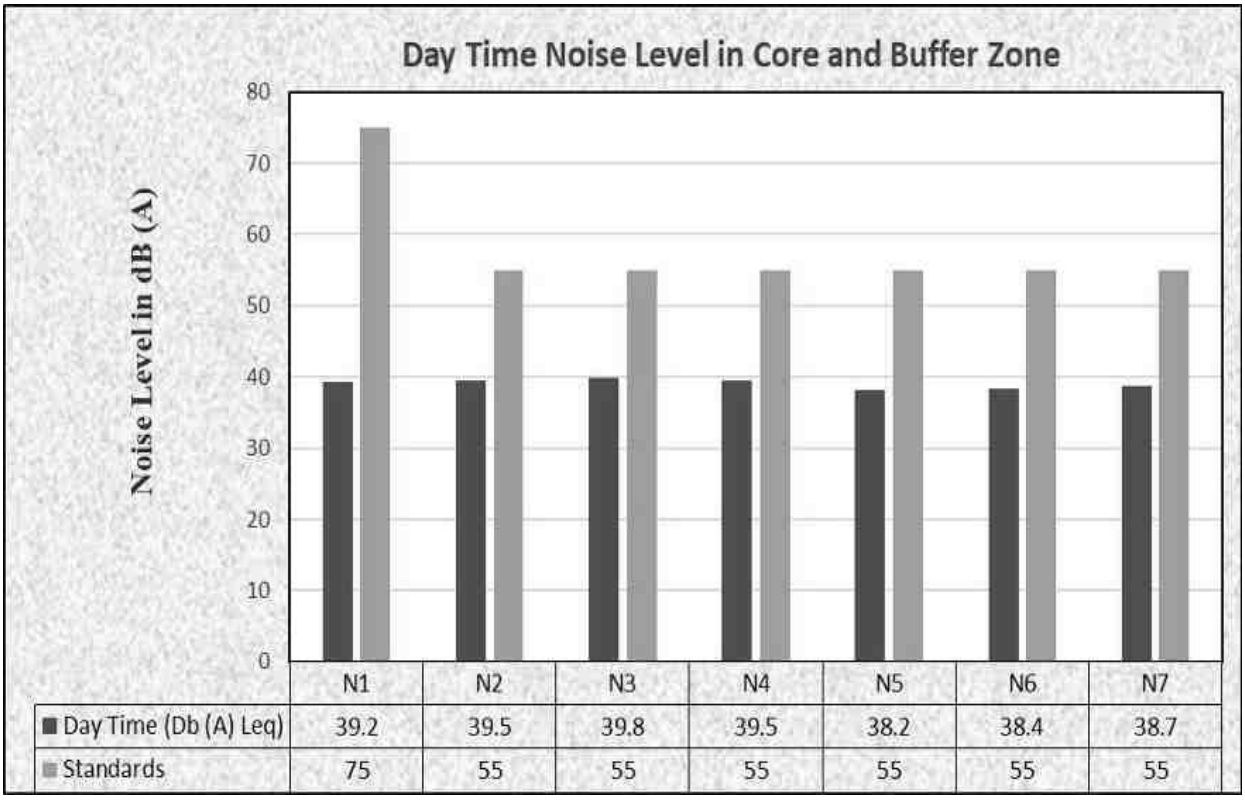


Figure 3.22 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

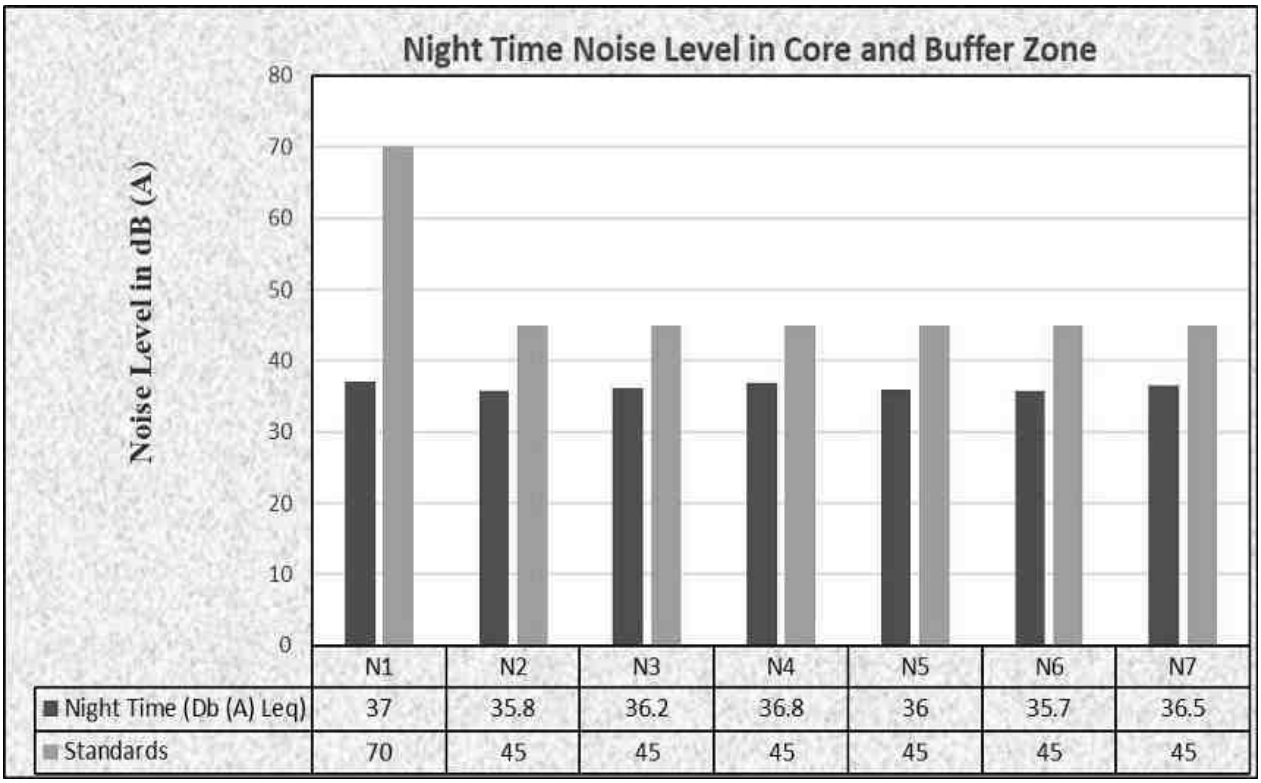


Figure 3.23 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

3.5 BIOLOGICAL ENVIRONMENT

An ecological survey was conducted to collect the baseline data regarding flora and fauna in the study area of 10 km radius. Data were also collected from different sources, i.e., government departments such as District Forest Office, Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared.

Methodology

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 5m × 5m 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).

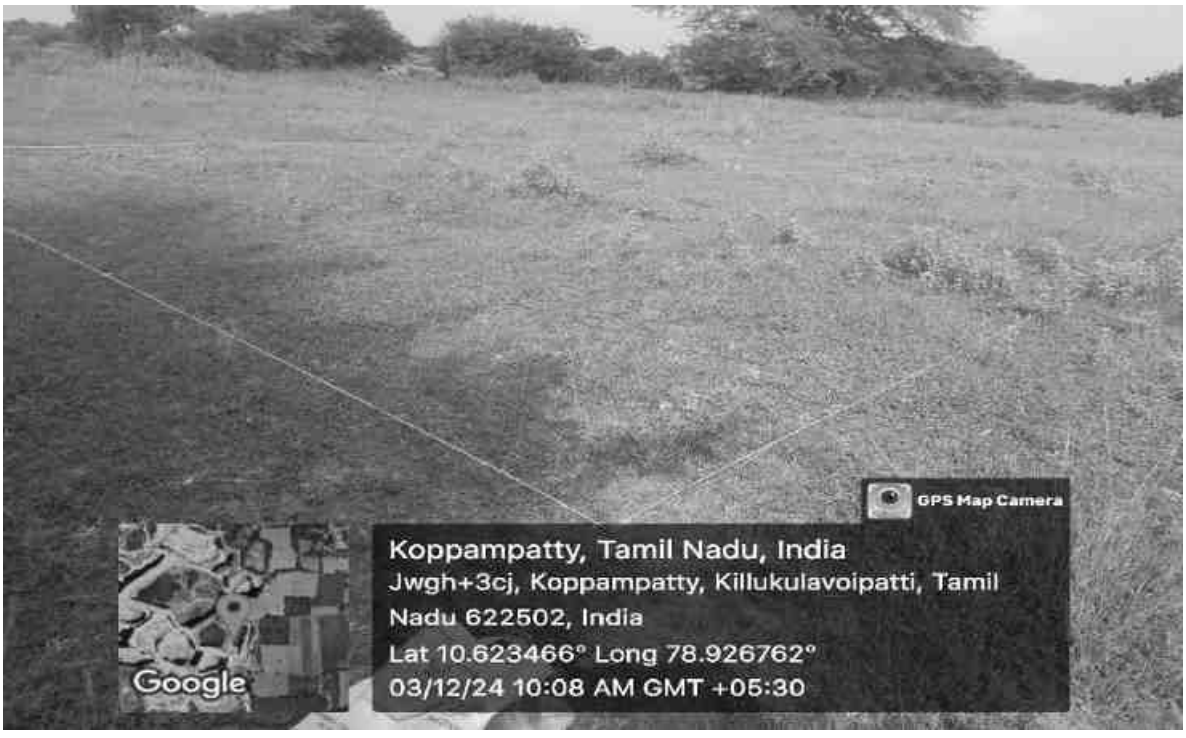


Figure 3.24 Quadrates Sampling Methods of Flora

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 = Relative frequency + Relative abundance + Relative density [RF + RA + RD]

Relative Value Index (RVI) = Relative Density +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 takes into account 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:

$$\mathbf{H = - \Sigma (ni/n) \times \ln (ni/n)}$$

- Where, ni 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

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

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 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 plants species in the quarry lease area its a existing mine. The mine lease area showing in Figure 3.25.

Figure 3.25 the proposed mine lease area

Flora in 300m radius

A total of 52 species of 29 families were recorded in 300m radius. Herbs (24) formed the predominant life form followed by shrubs (19) and trees (09). *Neltuma juliflora*, a weed, is abundant within a radius of 300 km around the quarry lease area. A list of the IUCN Red List analysed plant species recorded in the 300m radius of the proposed project site, along with their binomial names, family, local name, habit, and IUCN category is provided in Table 3.19.

Flora in 10 km radius zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land but presently there are no cultivation. It contains a total of 74 species belonging to 35 families have been recorded from the buffer zone. The floral (74) varieties among them Trees (27), shrubs (15) and herbs, Climbers Creepers and Grasses, (32) were identified. The result of buffer zone of flora studies shows that Fabaceae and Poaceae, Cucurbitaceae are the main dominating species in the study area it mentioned in Table 3.20.

Table 3.19 Flora in 300m Radius

S.No.	Scientific Name	Family Name	Common Name	Habit	Total No Counts	Quadrats with species	Total Quadrats	Density	Frequency	Abundance	Relative Density (RD)	Relative Frequency (RF)	IUCN Conservation Status
Trees													
1	*Albizia amara*	Fabaceae	Unjai maram	Tree	22	7	10	2.2	70	3.1	18.5	13.2	NL
2	*Azadirachta indica*	Meliaceae	Vembu	Tree	13	7	10	1.3	70	1.9	10.9	13.2	LC
3	*Borassus flabellifer*	Arecaceae	Panai maram	Tree	7	3	10	0.7	30	2.3	5.9	5.7	LC
4	*Eucalyptus globulus*	Myrtaceae	Thailamaram	Tree	16	5	10	1.6	50	3.2	13.4	9.4	NL
5	*Neltuma juliflora*	Fabaceae	Simai karuvealan	Tree	26	8	10	2.6	80	3.3	21.8	15.1	LC
6	*Pongamia pinnata*	Fabaceae	Pongam oiltree	Tree	4	4	10	0.4	40	1.0	3.4	7.5	NL
7	*Vachellia leucophloea*	Fabaceae	Velvelam	Tree	14	8	10	1.4	80	1.8	11.8	15.1	NL
8	*Wrightia tinctoria*	Apocynaceae	Wetpalai maram	Tree	11	6	10	1.1	60	1.8	9.2	11.3	NL
9	*Ziziphus jujuba*	Rhamnaceae	Elanthai	Tree	6	5	10	0.6	50	1.2	5.0	9.4	NL
Herbs													
1	*Achyranthes aspera*	Amaranthaceae	Nayuruvi	Herb	16	7	10	1.6	70	2.3	3.0	4.2	NL
2	*Aerva lanata*	Amaranthaceae	Pulapoo	Herb	19	7	10	1.9	70	2.7	3.6	4.2	NL
3	*Aloe vera*	Asphodelaceae	Sodru Kathalai	Herb	72	5	10	7.2	50	14.4	13.5	3.0	NL

4	*Alternanthera pungens*	Amaranthaceae	Mullu Ponnangani	Herb	31	7	10	3.1	70	4.4	5.8	4.2	NL
5	*Boerhavia diffusa*	Nyctaginaceae	Mukuratthai	Herb	11	7	10	1.1	70	1.6	2.1	4.2	NL
6	*Boerhavia erecta*	Nyctaginaceae	Seemai Mookarattai	Herb	4	3	10	0.4	30	1.3	0.7	1.8	NL
7	*Bulbostylis barbata*	Cyperaceae	Mukkorraikkorai.	Herb	10	5	10	1.0	50	2.0	1.9	3.0	NL
8	*Celome viscosa*	Capparidaceae	Nai Kadugu	Herb	10	5	10	1.0	50	2.0	1.9	3.0	NL
9	*Citrullus colocynthis*	Cucurbitaceae	Intiravallarai	Vine	4	3	10	0.4	30	1.3	0.7	1.8	NL
10	*Croton bonplandianum*	Euphorbiaceae	Rail poondu	Herb	7	5	10	0.7	50	1.4	1.3	3.0	NL
11	*Commelina benghalensis*	Commelinaceae	Kanamvazhalai	Herb	25	9	10	2.5	90	2.8	4.7	5.5	NL
12	*Cynodon dactylon*	Poaceae	Arugampul	Herb	8	5	10	0.8	50	1.6	1.5	3.0	LC
13	*Drimia indica*	Asparagaceae	Kattu Venkayam	Herb	12	7	10	1.2	70	1.7	2.2	4.2	NL
14	*Galium asperifolium*	Rubiaceae	Snow flower	Herb	4	6	10	0.4	60	0.7	0.7	3.6	NL
15	*Harpagophytum procumbens*	Pedaliaceae	Devil's claw	Herb	8	5	10	0.8	50	1.6	1.5	3.0	NL
16	*Leucas aspera*	Lamiaceae	Tumbai	Herb	15	5	10	1.5	50	3.0	2.8	3.0	NL
17	*Ocimum sanctum*	Lamiaceae	Nallathulasi	Herb	21	7	10	2.1	70	3.0	3.9	4.2	NL
18	*Phyllanthus niruri*	Phyllanthaceae	Keelaneeli	Herb	20	7	10	2.0	70	2.9	3.7	4.2	NL
19	*Spermacoce hispida*	Rubiaceae	Nattai choori	Herb	18	7	10	1.8	70	2.6	3.4	4.2	NL
20	*Tephrosia purpurea*	Fabaceae	Kolunji chadi	Herb	6	8	10	0.6	80	0.8	1.1	4.8	NL
21	*Tragus sp.*	Poaceae	Pillu	Herb	15	7	10	1.5	70	2.1	2.8	4.2	NL
22	*Tribulus terrestris*	Zygophyllaceae	Nerunji mull	Herb	2	7	10	0.2	70	0.3	0.4	4.2	NL
23	*Tridax procumbens*	Asteraceae	Veetukaayapoondu	Herb	16	7	10	1.6	70	2.3	3.0	4.2	NL
24	*Xenostegia tridentata*	Convolvulaceae	Avvaiyaar koondhal	Herb	6	4	10	0.6	40	1.5	1.1	2.4	NL
Shrubs and Climbers													

1	*Aerva javanica*	Amaranthaceae	Periya Pulapoo	Shrub	18	8	10	1.8	80	2.3	8.7	7.0	NL
2	*Agave sisalana*	Asparagaceae	Kathalai	Shrub	9	6	10	0.9	60	1.5	4.3	5.2	LC
3	*Aristolochia indica*	Aristolochiaceae	Urikaykodi	Climber	10	7	10	1.0	70	1.4	4.8	6.1	LC
4	*Barleria prionitis*	Acanthaceae	Sulli poo	Shrub	4	3	10	0.4	30	1.3	1.9	2.6	NL
5	*Cadaba fruticosa*	Capparidaceae	Vizhuthi	Shrub	7	5	10	0.7	50	1.4	3.4	4.3	NL
6	*Calotropis gigantea*	Apocynaceae	Erukku	Shrub	14	7	10	1.4	70	2.0	6.8	6.1	NL
7	*Calotropis procera*	Apocynaceae	Vellerukku	Shrub	10	7	10	1.0	70	1.4	4.8	6.1	NL
8	*Capparis zeylanica*	Capparaceae	Suduthorat	Liana	7	5	10	0.7	50	1.4	3.4	4.3	LC
9	*Cardiospermum helicacabum*	Sapindaceae	Mudakkotan	Climber	10	7	10	1.0	70	1.4	4.8	6.1	LC
10	*Cereus pterogonus*	Cactaceae	Sippaai kathaalai	Shrub	5	4	10	0.5	40	1.3	2.4	3.5	NL
11	*Cissampelos pareira*	Menispermaceae	Vattattiruppi	Climber	4	4	10	0.4	40	1.0	1.9	3.5	LC
12	*Cissus quadrangularis*	Vitaceae	Perandai	Climber	23	7	10	2.3	70	3.3	11.1	6.1	NL
13	*Coccinia grandis*	Cucurbitaceae	Kovai	Climber	15	7	10	1.5	70	2.1	7.2	6.1	NL
14	*Euphorbia antiquorum*	Euphorbiaceae	Chaturakalli	Shrub	17	8	10	1.7	80	2.1	8.2	7.0	NL
15	*Euphorbia tirucalli*	Euphorbiaceae	Kodi kalli	Shrub	10	5	10	1.0	50	2.0	4.8	4.3	NL
16	*Flueggea leuopyrus*	Phyllanthaceae	Vella Pulanci	Shrub	17	7	10	1.7	70	2.4	8.2	6.1	NL
17	*Pergularia daemia*	Apocynaceae	Veli Paruthi	Climber	9	6	10	0.9	60	1.5	4.3	5.2	NL
18	*Senna auriculata*	Fabaceae	Avaarai	Shrub	10	6	10	1.0	60	1.7	4.8	5.2	NL
19	*Ziziphus oenoplia*	Rhamnaceae	Suraimullu	Shrub	8	6	10	0.8	60	1.3	3.9	5.2	NL

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	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Tree					
1	*Albizia amara*	22	0.16	0.18	-1.69
2	*Azadirachta indica*	13	0.09	0.11	-2.21
3	*Borassus flabellifer*	16	0.11	0.13	-2.01
4	*Eucalyptus globulus*	7	0.05	0.06	-2.83
5	*Neltuma juliflora*	26	0.18	0.22	-1.52
6	*Pongamia pinnata*	4	0.03	0.03	-3.39
7	*Vachellia leucophloea*	14	0.10	0.12	-2.14
8	*Wrightia tinctoria*	11	0.08	0.09	-2.38
9	*Ziziphus jujuba*	6	0.04	0.05	-2.99
H (Shannon Diversity Index) = 2.06					
Herbs					
1	*Achyranthes aspera*	16	0.04	-3.11	-0.14
2	*Aerva lanata*	19	0.05	-2.94	-0.16
3	*Aloe vera*	72	0.20	-1.61	-0.32
4	*Alternanthera pungens*	31	0.09	-2.45	-0.21
5	*Boerhavia diffusa*	11	0.03	-3.49	-0.11
6	*Boerhavia erecta*	4	0.01	-4.50	-0.05
7	*Bulbostylis barbata*	10	0.03	-3.58	-0.10
8	*Celome viscosa*	10	0.03	-3.58	-0.10
9	*Citrullus colocynthis*	4	0.01	-4.50	-0.05
10	*Croton bonplandianum*	7	0.02	-3.94	-0.08
11	*Commelina benghalensis*	25	0.07	-2.67	-0.19
12	*Cynodon dactylon*	8	0.02	-3.81	-0.08
13	*Drimia indica*	12	0.03	-3.40	-0.11
14	*Galium asperifolium*	4	0.01	-4.50	-0.05
15	*Harpagophytum procumbens*	8	0.02	-3.81	-0.08
16	*Leucas aspera*	15	0.04	-3.18	-0.13
17	*Ocimum sanctum*	21	0.06	-2.84	-0.17
18	*Phyllanthus niruri*	20	0.06	-2.89	-0.16
19	*Spermacoce hispida*	18	0.05	-3.00	-0.15
20	*Tephrosia purpurea*	6	0.02	-4.09	-0.07
21	*Tragus sp.*	15	0.04	-3.18	-0.13
22	*Tribulus terrestris*	2	0.01	-5.19	-0.03
23	*Tridax procumbens*	16	0.04	-3.11	-0.14
24	*Xenostegia tridentata*	6	0.02	-4.09	-0.07
H (Shannon Diversity Index) = 2.87					
Shrubs					
1	*Aerva javanica*	18	0.09	-2.44	-0.21
2	*Agave sisalana*	9	0.04	-3.14	-0.14
3	*Aristolochia indica*	10	0.05	-3.03	-0.15
4	*Barleria prionitis*	4	0.02	-3.95	-0.08
5	*Cadaba fruticosa*	7	0.03	-3.39	-0.11
6	*Calotropis gigantea*	14	0.07	-2.69	-0.18
7	*Calotropis procera*	10	0.05	-3.03	-0.15

8	*Capparis zeylanica*	7	0.03	-3.39	-0.11
9	*Cardiospermum helicacabum*	10	0.05	-3.03	-0.15
10	*Cereus pterogonus*	5	0.02	-3.72	-0.09
11	*Cissampelos pareira*	4	0.02	-3.95	-0.08
12	*Cissus quadrangularis*	23	0.11	-2.20	-0.24
13	*Coccinia grandis*	15	0.07	-2.62	-0.19
14	*Euphorbia antiquorum*	17	0.08	-2.50	-0.21
15	*Euphorbia tirucalli*	10	0.05	-3.03	-0.15
16	*Flueggea leuopyrus*	17	0.08	-2.50	-0.21
17	*Pergularia daemia*	9	0.04	-3.14	-0.14
18	*Senna auriculata*	10	0.05	-3.03	-0.15
19	*Ziziphus oenoplia*	8	0.04	-3.25	-0.13
H (Shannon Diversity Index) = 2.94					

Table 3.21 Species Richness (Index) in 300m Radius

Details	H	H max	Evenness	Species Richness
Tree	2.06	2.20	0.94	1.67
Herbs	2.87	3.18	0.90	3.91
Shrubs	2.84	2.94	0.96	3.38

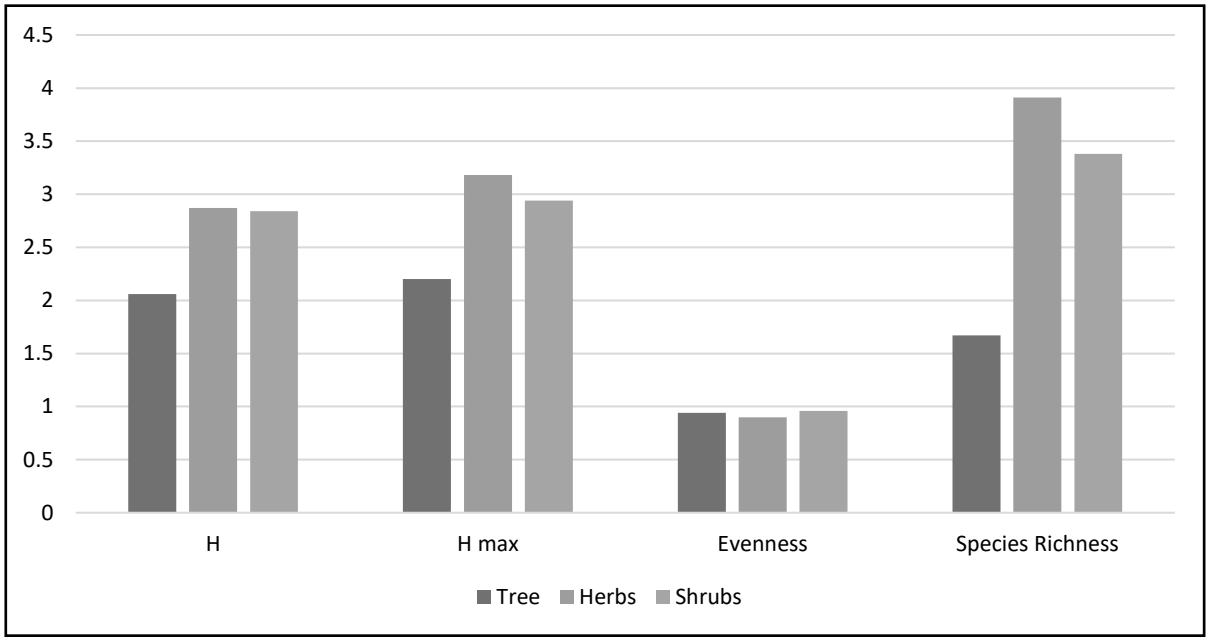


Figure 3.26 Floral Diversity Species Richness (Index) 300m Radius

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	Common name	Scientific name	Family Name
Tree			
1	Vembu	*Azadirachta indica*	Meliaceae
2	Karuvelam maram	*Vachellia nilotica*	Fabaceae
3	Arai nelli	*Phyllanthus acidus*	Phyllanthaceae
4	Nuna maram	*Morinda citrifolia*	Rubiaceae
5	Puliyamaram	*Tamarindus indica*	Fabaceae
6	Nochi	*Vitex negundo*	Lamiaceae
7	Moonghil	*Bambusa bambo*	Poaceae
8	Thailam maram	*Eucalyptus tereticornis*	Myrtaceae
9	Manga	*Mangifera indica*	Anacardiaceae
10	Athi	*Ficus recemosa*	Moraceae
11	Thekku	*Tectona grandis*	Lamiaceae
12	Kadukkai	*Terminalia chebula*	Combretaceae
13	Navalmaram	*Sygygium cumini*	Myrtaceae
14	Pappali maram	*Carica papaya L*	Caricaceae
15	pongam	*Millettia pinnata*	Fabaceae
16	Alamaram	*Ficus benghalensis*	Moraceae
17	Koyya	*Psidium guajava*	Myrtaceae
18	Ezhumuchaipalam	*Citrus lemon*	Rutaceae
19	Murunga maram	*Moringa oleifera*	Moringaceae
20	Marudaani	*Lawsonia inermis*	Lythraceae
21	Kattu Nelli	*Phyllanthus emblica*	Phyllanthaceae
22	Nettilinkam	*Polylathia longifolia*	Annonaceae
23	Vaagai	*Albizia lebbeck*	Fabaceae
24	Panai maram	*Borassus flabellifer*	Arecaceae
25	seethapazham	*Annona reticulata*	Annonaceae
26	Arasanmaram	*Ficus religiosa*	Moraceae
27	Vazhaimaram	*Musa acuminata*	Musaceae
Shrubs			
1	Avarai	*Senna auriculata*	Fabaceae
2	Erukku or Crown flower	*Calotropis gigantea*	Apocynaceae
3	Kattamanakku	*Jatropha curcas*	Euphorbiaceae
4	Thuthi	*Abutilon indicum*	Meliaceae
5	Sundaika	*Solanum torvum*	Solanaceae
6	Chaturakalli	*Euphorbia antiquorum*	Euphorbiaceae
7	Neermulli	*Hydrophila auriculata*	Acanthaceae
8	Thottalchinungi	*Mimosa pudica*	Fabaceae
9	Kundumani	*Abrus precatorius*	Fabaceae
10	Nithyakalyani	*Cathranthus roseus*	Apocynaceae
11	Chemparuthi	*Hibiscu rosa-sinensis*	Malvaceae
12	Arali	*Nerium indicum*	Apocynaceae
13	Virali	*Dodonaea viscosa*	Sapindaceae
14	Nocchi	*Vitex negundo*	Lamiaceae
15	Kaṟivēppilai maram	*Murraya koenigii*	Rutaceae
Herbs & Climber &Creeper & Grass & Catus			

1	Parttiniyam	*Parthenium hysterophorus*	Asteraceae
2	Kuppaimeni	*Acalypha indica*	Euphorbiaceae
3	Arugampul	*Cynodon dactylon*	Poaceae
4	Thulasi	*Ocimum tenuiflorum*	Lamiaceae
5	Korai	*Cyperus rotundus*	Cyperaceae
6	Thumbai	*Leucas aspera*	Lamiaceae
7	Kunnakora	*Cyperus compressus*	Cyperaceae
8	Keelaneeli	*Phyllanthus niruri*	Phyllanthaceae
9	Kanamvazha	*Commelina benghalensis*	Commelinaceae
10	Mukurattai	*Boerhavia diffusa*	Nyctaginaceae
11	Veetukaayapoondu	*Tridax procumbens*	Asteraceae
12	Nai kadugu	*Celome viscosa*	Cleomaceae
13	Manathakkali	*Solanumnigrum*	Solanaceae
14	Kovai	*Coccinia grandis*	Cucurbitaceae
15	Kovakkai	*Trichosanthes dioica*	Cucurbitaceae
16	Karkakartum	*Clitoria ternatea*	Fabaceae
17	Perandai	*Cissus quadrangularis*	Vitaceae
18	Nannari	*Hemidesmus indicus*	Apocynaceae
19	Pavarkai	*Momordica charantia*	Cucurbitaceae
20	Sirupunaikkali	*Passiflora foetida*	Passifloraceae
21	Korai	*Cyperus rotandus*	Cyperaceae
22	Vallikeerai	*Ipomoea aquatica*	Convolvulaceae
23	Siru puladi	*Desmodium triflorum*	Fabaceae
24	Elikkathilai	*Merremia gangetica*	Convolvulaceae
25	Pullu	*Eragrostis ferruginea*	Poaceae
26	Arugampul	*Cynodon dactylon*	Poaceae
27	Chevvarakupul	*Chloris barbata*	Poaceae
28	milkvetch	*Astragalus balearicus*	Fabaceae
29	basora prieta	*Waltheria indica*	Malvaceae
30	Sulli Flower	*Barleria prionitis L*	Acanthaceae
31	Cappattukkalli	*Opuntia dillenii*	Cactaceae
32	Carrion Flower	*Stapelia gettliffei*	Apocynaceae

3.5.2 Funa

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 37 species were observed in core zone of the project site. The core zone exhibited fewer species, with only a limited number of insects and reptiles, while the buffer zone showed greater species diversity. Among the 37 species observed, the distribution was as follows: 14 birds, 12 insects, 3 reptiles, and 8 mammals. These species were cross-checked against the IUCN Red List Database version 3.1 to identify any threatened species. Data analysis revealed that 24 species are categorized as Least Concern on the Red List, while 13 species were not listed. The analysis indicates that there are no REET species in the core zone of the proposed quarry site.

Fauna Composition in the Buffer Zone

A total of 56 species were observed in core zone of the project site. The core zone exhibited fewer species, with only a limited number of insects and reptiles, while the buffer zone showed greater species diversity. Among the 56 species observed, the distribution was as follows: 19 birds, 15 insects, 07 reptiles, and 12 mammals . These species were cross-checked against the IUCN Red List Database version 3.1 to identify any threatened species.

Table 3.24 Fauna in the Core zone

S.No.	Common Name	Scientific Name	Family Name	IUCN Red List Data
Aves				
1	Baya weaver	*Ploceus philippinus*	Ploceidae	LC
2	Black drongo	*Dicrurus macrocercus*	Dicruridae	LC
3	Common myna	*Acridotheres tristis*	Sturnidae	LC
4	European bee- eater	*Merops apiaster*	Meropidae	LC
5	Great cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	LC
6	House Crow	*Corvus splendens*	Corvidae	LC
7	House Sparrow	*Passer domesticus*	Passeridae	LC
8	Indian paradise flycatcher	*Terpsiphone paradisi*	Monarchidae	LC
9	Indian peafowl	*Pavo cristatus*	Phasianidae	LC
10	Indian robin	*Copsychus fulicatus*	Muscicapidae	LC
11	Indian Roller	*Coracias benghalensis*	Coraciidae	LC
12	Rock Pigeon	*Columba livia*	Columbidae	LC
13	Rose-ringed Parakeet	*Alexandrinus krameri*	Psittacidae	LC
14	White browed Wagtail	*Motacilla maderaspatensis*	Motacillidae	LC
Insects				
1	Chocolate pansy	*Junonia iphita*	Nymphalidae	NL
2	Common Mormon	*Papilio polytes*	Papilionidae	NL
3	Crimson dropwing	*Trithemis aurora*	Libellulidae	LC
4	Grasshopper	*Acrotylus humbertianus*	Acrididae	NL
5	Grasshopper	*Cretacanthacris tartarica*	Acrididae	NL
6	Lemon pansy	*Junonia lemonias*	Nymphalidae	NL

7	Lime swallowtail	*Papilio demoleus*	Papilionidae	NL
8	Mottled emigrant	*Catopsilia pyranthe*	Pieridae	NL
9	Plaina tiger butterfly	*Danaus chrysippus*	Nymphalidae	LC
10	Slender skimmer	*Orthetrum sabina*	Libellulidae	LC
11	Spotted locust	*Aularches miliaris*	Pyrgomorphidae	NL
12	Tawny coster	*Acraea terpsicore*	Nymphalidae	NL
Mammals				
1	Cat	*Felis catus*	Felidae	NL
2	Cow	*Bos taurus*	Bovidae	NL
3	Dog	*Canis lupus familiaris*	Canidae	NL
4	Goat	*Capra hircus*	Bovidae	NL
5	House mouse	*Mus musculus*	Muridae	LC
6	Indian hare	*Lepus nigricollis*	Leporidae	LC
7	Indian palm squirrel	*Funambulus palmarum*	Sciuridae	LC
8	Rabbit	*Lepus nigricollis*	Leporidae	LC
Reptiles				
1	Common skink	*Mabuya carinatus*	Scincidae	LC
2	Fan-Throated Lizard	*Sitana ponticeriana*	Agamidae	LC
3	Oriental garden lizard	*Calotes versicolor*	Agamidae	LC
N.L. – Not Listed; LC – Least Control				

Table 3.25 Fauna in the buffer zone

S.No	Common Name/English Name	Family Name	Scientific Name	IUCN Red List Data
INSECTS				
1	Blue tiger	Nymphalidae	*Tirumala limniace*	LC
2	Milkweed butterfly	Nymphalidae	*Danainae*	LC
3	Tawny coster	Nymphalidae	*Danaus chrysippus*	LC
4	Indian honey bee	Apidae	*Apis cerana*	LC
5	Grasshopper	Acrididae	*Hieroglyphus sp*	LC
6	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	LC
7	Lime butterfly	Papilionidae	*Papilio demoleus*	LC
8	Ant	Formicidae	*Camponotus Vicinus*	NL
9	Dragonfly	Gomphidae	*Ceratogomphus pictus*	LC
10	Common Tiger	Nymphalidae	*Danaus genutia*	LC
11	Common Indian crow	Nymphalidae	*Euploea core*	LC
12	Praying mantis	Mantidae	*mantis religiosa*	NL
13	Striped tiger	Nymphalidae	*Danaus plexippus*	LC
14	Lesser grass blue	Lycaenidae	*Zizina Otis indica*	LC
15	Jewel beetle	Buprestidae	*Eurythyrea austriaca*	NA
REPTILES				
16	Garden lizard	Agamidae	*Calotes versicolor*	LC
17	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	LC
18	Indian chameleon	Chamaeleonidae	*Chamaeleo zeylanicusAtretium schistosum*	LC
19	Olive keelback water snake	Natricidae	*Atretium schistosum*	LC
20	Brahminy skink	Scincidae	*Eutropis carinata*	LC
21	Rat snake	Colubridae	*Ptyas mucosa*	LC

22	Common skink	Scincidae	*Mabuya carinatus*	LC
MAMMALS				
23	Indian palm squirrel	Sciuridae	*Funambulus palmarum*	LC
24	Indian hare	Leporidae	*Lepus nigricollis*	LC
25	Indian Field Mouse	Muridae	*Mus booduga*	LC
26	Asian Small Mongoose	Herpestidae	*Herpestes javanicus*	LC
27	Cat	Felidae	*Felis catus*	NA
28	Cow	Bovidae	*Bos taurus*	NA
29	Dog	Canidae	*Canis lupus familiaris*	NA
30	Goat	Bovidae	*Capra hircus*	NA
31	House mouse	Muridae	*Mus musculus*	LC
32	Indian hare	Leporidae	*Lepus nigricollis*	LC
33	Indian palm squirrel	Sciuridae	*Funambulus palmarum*	LC
34	Rabbit	Leporidae	*Lepus nigricollis*	LC
BIRDS				
35	Indian pond heron	Ardeidae	*Ardeola grayii*	LC
36	Black drongo	Dicruridae	*Dicrurus macrocercus*	LC
37	Asian green bee-eater	Meropidae	*Meropsorientalis*	LC
38	Red-breasted parakeet	Psittaculidae	*Psittacula alexandri*	LC
39	Common Coot	Rallidae	*Fulica atra*	LC
40	Common myna	Sturnidae	*Acridotheres tristis*	LC
41	Shikra	Accipitridae	*Accipiter badius*	LC
42	Koel	Cucalidae	*Eudynamys*	LC
43	Common Quail	Phasianidae	*Coturnix coturnix*	LC
44	Red-vented Bulbul	Pycnonotidae	*Pycnonotuscafer*	LC
45	Brahminy starling	Sturnidae	*Sturnia pagodarum*	LC
46	Indian golden oriole	Oriolidae	*Oriolus kundoo*	LC
47	Rose-ringed parkeet	Psittaculidae	*Psittacula krameri*	LC
48	Cattle egret	Ardeidae	*Bubulcus ibis*	LC
49	Common quail	Phasianidae	*Coturnix coturnix*	LC
50	White-breasted waterhen	Rallidae	*Amaurornis phoenicurus*	LC
51	Two-tailed Sparrow	Dicruridae	*Dicrurus macrocercus*	LC
52	Grey Francolin	Phasianidae	*Francolinus pondicerianus*	LC
53	House crow	Corvidae	*Corvussplendens*	LC
AMPHIBIANS				
54	Indian Burrowing frog	Dicroglossidae	*Sphaerotheca breviceps*	LC
55	Green Pond Frog	Ranidae	*Rana hexadactyla*	LC
56	Tiger Frog	Chordata	*Hoplobatrachus tigerinus (Rana tigerina)*	LC

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	*Eichornia Crassipe*	Water Hyacinth	Agayatamarai	NA
2	*Aponogetonnatans*	Floating Lace Plant	Kottikizhangu	NA
3	*Nymphaea Nouchali*	Blue Water Lily	Nellambal	LC
4	*Carex Cruciata*	Cross Grass	Koraipullu	NA
5	*Cynodon Dactylon*	Scutch Grass	Arugampullu	LC
6	*Cyperus Exaltatus*	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 Noyal River by phytoplankton, zooplankton, fish and Artiola gray.

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. There are no biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), ecologically sensitive zone in 10km radius.

Agriculture & Horticulture in Pudukottai district:

The Pudukottai district normal annual average rain fall is 921mm. Single crop under rainfed situation. Two or three crops under irrigation condition. Rice – Rice is the cropping system. Groundnut – Pulses is another system under garden land condition. Vegetable and Oilseeds are also included in the system. Some part of the district, mono cropping of banana & sugarcane are fast spreading due to the start of sugar industries and high return from banana crop.

Major Agricultural Crops

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	*Sorghum bicolor*	Poaceae
2	Gingelly	*Sesamum indicum*	Pedaliaceae
3	Groundnut	*Arachis hypogaea*	Legumes
4	Sugarcane	*Saccharum officinarum*	Poaceae
5	Millets	*Panicum miliaceum L*	Poaceae
6	Sesame	*Sesamum indicum*	Pedaliaceae
7	Cotton	*Gossypium herbaceum*	Malvaceae

Major Horticulture Crops

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.

Horticulture

Major horticulture crops cultivated in Erode district are fruit crops like mango, banana, Sapota and guava, vegetables like tomato, brinjal, ladies finger, 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	*Psidium guajava*	Myrtaceae
2	Sapota	*Manilkara zapota*	Sapotaceae
3	Lemon	*Citrus × limon*	Rutaceae
4	Papaya	Carica papaya	Caricaceae
5	Banana	*Musa*	Musaceae
Vegetables			
5	Onion	*Allium cepa*	Amaryllidaceae
6	Tapioca	*Manihot esculenta*	Spurges
7	Brinjal	*Solanum melongena*	Nightshade
8	Tomato	*Solanum lycopersicum*	Nightshade
9	Bottle Gourd	*Lagenaria siceraria*	Cucurbits
10	Ladies finger	*Abelmoschus esculentus*	Mallows
11	Moringa	*Moringa oleifera*	Moringaceae

Results

The biodiversity assessment of the proposed project site has identified no ecologically sensitive areas within the core or buffer zones. The flora and fauna observed in the study area are commonly occurring species, with no IUCN-listed rare, endangered, endemic, or threatened (REET) species present, except for some species classified as of least concern. Additionally, the site is not located on any migratory routes for fauna. Operations at the stone and gravel quarry may generate dust particles. Implementing a green belt composed of native trees could help mitigate the dust effect on nearby flora and fauna. Key recommendations from the assessment include adopting green mining strategies to minimize environmental impact and developing a green belt with native trees to reduce dust movement from mining activities. 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 in mining/Industrial sector are required for economic development as well as creation of employment opportunities (direct and indirect) and to meet the basic/modern needs of the society, which ultimately results in overall improvement of the quality of life through upliftment of social, economic, health, education and nutritional status in the project region, state as well as the country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for new developmental projects. Thus, the study of socioeconomic component incorporating various facets related to prevailing social and cultural conditions and economic status of the rough stone and granite quarry project region is an important part of EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socio economics and parameters of human interest due to the project.

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.

Baseline Information:

The baseline information is collected in order to define the socio-economic profile of the study area. The process related database thus generated includes:

- Demographic structure
- Infrastructure base in the area
- Economic structure
- Health status
- Cultural attributes
- Public awareness and their concern about the project

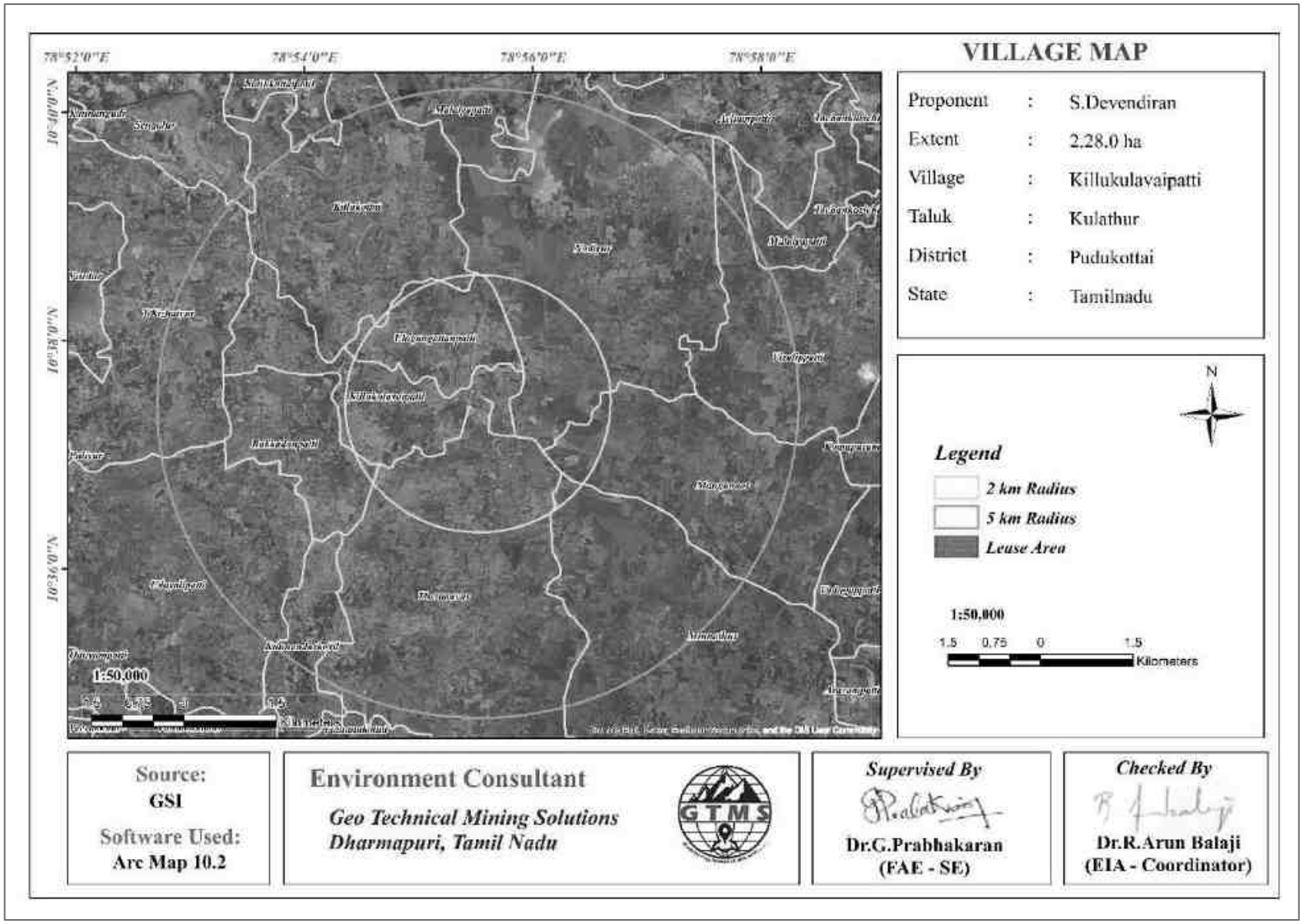


Figure 3.27 Socio Economic Village Boundary Map

3.6.2 Scope of Work

- To study the Socio-economic Environment of area from the secondary sources
- Primary and secondary Data Collection and Analysis
- Identification of impacts due to the mining projects
- Mitigation Measures

3.6.3 Methodology

The methodology adopted for the socio-economic impact assessment is as follows:

a) Data such as number of houses, population, literacy, employment opportunities etc. will be collected directly from local people and analysed.
b) The details of the activities and population structure have been obtained from Census 2011 and analysed.
c) Based on the above data, impacts due to plant operation on the community have been assessed and recommendations for further improvement have been made.

3.6.4 Sources of Information and Data Base

To achieve the above objectives, the information has been collected from both primary and secondary sources. Both primary data and secondary data have been analysed by means of suitable statistical techniques for the purpose of verifying the above selected hypotheses concerned with the surrounding area.

3.6.5 Primary Survey

The primary data collection includes the collection of data through a structured interview schedule by direct observation method. The questionnaire survey includes both open and closed methods. The sample size is limited respondents, who were selected on the basis of simple random sampling from Kurumbapalayam Village, Sathyamangalam Taluk, Erode District, Tamil Nadu State, in the field survey has been divided into two major segments namely Primary Zone (0 -2 km) and Secondary Zone (2 - 5 km). The questionnaires were designed to suit the subjects considering their rural background enabling to furnish correct information and data as par as possible. Data were collected at village level and household level by questionnaires and focused group discussions.

3.6.6 Collection of Data from Secondary Sources

Data from secondary sources were collected on following aspects:

- Demographic profile of the area
- Economic profile of the area

Table 3.29 Type of Information and Sources

Information	Source
Demography	District Census Handbook, Govt. of India
Economic profile of the area	Census of India, Tamil Nadu State

3.6.7 Pudukkottai District

Pudukkottai district as one of the princely states of Tamilnadu holds rich cultural heritage with Fortresses, Palaces, Temples, Cave Paintings and many other historical monuments. The district was one of the homes of pre-historic man. Many of the villages are of ancient foundation and also referenced often in Tamil Sangam Literature. Pudukkottai district is well endowed with natural resources of land and sea bounded by the marine hedge of Bay of Bengal in the east conjoined by the southern districts viz, Trichy, Sivaganga, Ramanathapuram and Thanjavur. The Palaces, Fortress, Canals and Tanks built during the reign of ancient Tamil Kings are the place of interest. Besides, Temple in Avudayarkovil, Kudumiyanmalai, Chitthannavasal are very much prominent. Muslim's sacred place viz Kattubhava pallivasal, christian monument at Avur and jains temples at Annavasal proclaims the religious harmony of the district. Peacock sanctuary at Viralimalai, cave temples, temples built on the mountains are major tourism destination.

Pudukkottai was organised as a separate district, on 14th January 1974, comprising the former Pudukkottai Division of Tiruchirappalli district with some additions from Thanjavur district. At present, this district is composed of three Revenue Divisions, namely, Pudukkottai, Aranthangi and Illuppur and twelve Taluks, namely, Kulathur, Illuppur, Alangudi, Pudukkottai, Gandarvakottai, Thirumayam, Aranthangi, Avudaiyrakoil, Manamelkudi, Ponnamaravathi, Karambakkudi and Viralimalai. There are 763 Revenue Villages. The area of the district is 4663 Sq.Kms.

According to the 2011 census places total population of this districts 16,18,345 females being numerically superior with 8,15,157 as against 8,03,188 males. The rural population is about 13,01,991 and the urban population is about 3,16,354. The total literates number 11,10,545 with 6,08,776 males and 5,01,769 females.

https://pudukottai.nic.in/about-district/

3.6.8 Study area- Killukulavoipatti Village, Kulathur Taluk

Killukulavoipatti is a medium size village located in Kulathur Taluka of Pudukkottai district, Tamil Nadu with total 197 families residing. The Killukulavoipatti village has

population of 930 of which 449 are males while 481 are females as per Population Census 2011.

In Killukulavoipatti village population of children with age 0-6 is 127 which makes up 13.66 % of total population of village. Average Sex Ratio of Killukulavoipatti village is 1071 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Killukulavoipatti as per census is 1309, higher than Tamil Nadu average of 943.

Killukulavoipatti village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Killukulavoipatti village was 62.02 % compared to 80.09 % of Tamil Nadu. In Killukulavoipatti Male literacy stands at 69.04 % while female literacy rate was 55.26 %.

As per constitution of India and Panchyati Raaj Act, Killukulavoipatti village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Killukulavoipatti village.

Table. 3.30 Killukulavoipatti Village Population Facts

Particulars	Total	Male	Female
Total No. of Houses	197	-	-
Population	930	449	481
Child (0-6)	127	55	72
Schedule Caste	166	79	87
Schedule Tribe	0	0	0
Literacy	62.02	69.04	55.26
Total Workers	576	295	281
Main Worker	309	-	-
Marginal Worker	267	103	164

Source: https://www.census2011.co.in/data/village/639309-killukulavoipatti-tamil-nadu.html

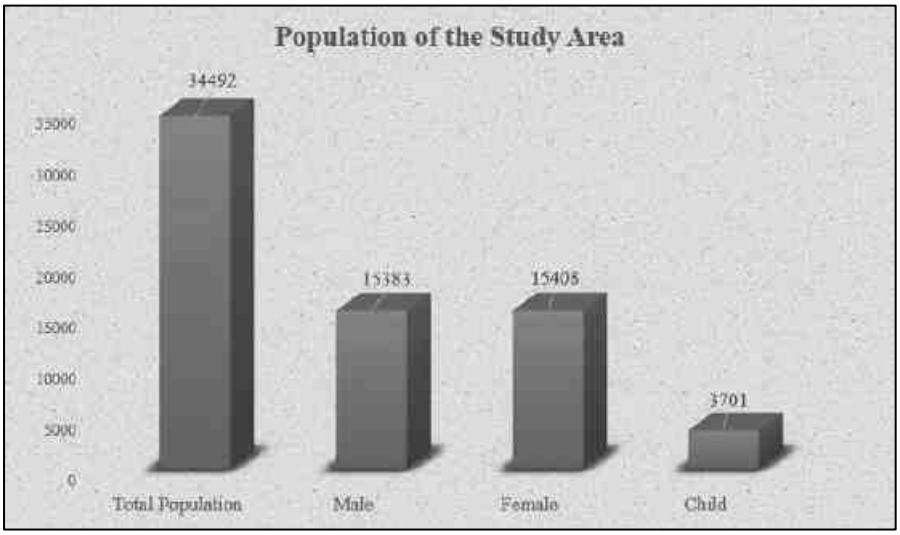
3.6.9 Working Population- Killukulavoipatti Village, Kulathur Taluk

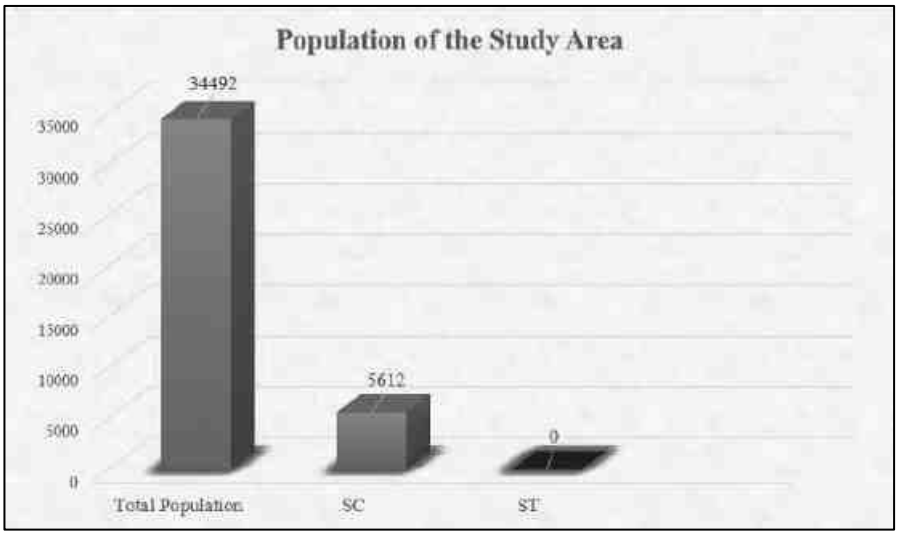
In Killukulavoipatti village out of total population, 576 were engaged in work activities. 53.65 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 46.35 % were involved in Marginal activity providing livelihood for less than 6 months. Of 576 workers engaged in Main Work, 146 were cultivators (owner or co-owner) while 97 were Agricultural labourer.

Table 3.31 Population and Literacy Data of Study Area

Village Name	No. of Houses	Total Population		Child (0-6)		Schedule Caste		Schedule Tribe		Literacy %		Total Workers	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Kattukottaipatti	73	146	137	21	18	2	2	0	0	76.00	55.46	104	100
Killukottai	519	1105	1093	124	129	260	246	0	0	85.52	64.94	632	503
Killukulavoipatti	197	449	481	55	72	79	87	0	0	69.04	55.26	295	281
Kunnandarkovil	147	307	330	26	37	166	177	0	0	82.92	68.60	158	109
Malaiyapatti	104	251	227	30	29	76	60	0	0	62.90	46.46	160	103
Manganoor	399	865	851	93	74	242	216	0	0	69.30	56.11	578	348
Minnathur	1038	2256	2190	261	249	227	227	0	0	81.80	60.79	1460	1301
Nodiyur	708	1536	1571	192	214	446	446	0	0	59.87	52.62	879	501
Rakkadanpatti	324	656	712	66	85	42	40	0	0	70.51	52.31	419	403
Sengalur	646	1424	1454	155	175	113	134	0	0	77.15	61.69	876	677
T.Kizhaiyur	626	1412	1439	168	200	201	201	0	0	75.80	56.66	929	672
Thenmavur	1117	2506	2495	348	321	389	434	0	0	72.38	56.95	1478	917
Udayalipatti	493	1180	1162	127	145	89	93	0	0	78.16	58.80	667	572
Ulagangattanpatti	132	273	293	29	34	84	87	0	0	76.64	49.42	182	147
Viralippatti	452	1017	973	120	104	377	369	0	0	75.92	56.04	576	373
Total	**6975**	**15383**	**15408**	**1815**	**1886**	**2793**	**2819**	**0**	**0**	**74.26**	**56.80**	**9393**	**7007**

Source: *https://www.census2011.co.in/data/subdistrict/5749- Kulathur -pudukottai-tamil-nadu.html*





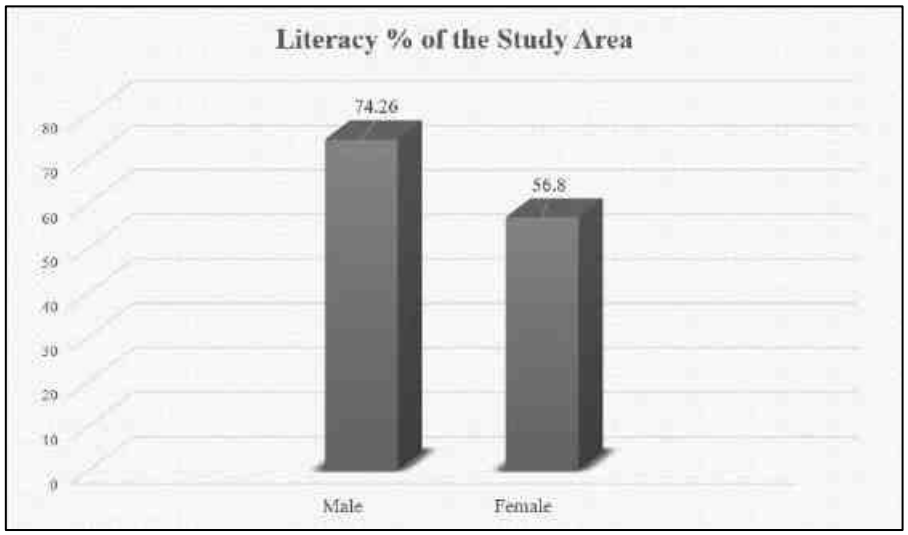


Figure 3.28 Chart Diagram about Population, SC, ST and Literacy in Surrounding Villages

Table 3.32 Workers Profile of Study Area

Village	Total Worker Population Person	Total Worker Population Male	Total Worker Population Female	Main Working Population Person	Main Cultivator Population Person	Main Agricultural Labourers Population Person	Main Other Workers Population Person	Non-Working Population Person
Kattukottaipatti	204	104	100	204	104	72	0	40
Killukottai	1135	632	503	993	221	544	142	810
Killukulavoipatti	576	295	281	309	146	97	267	227
Kunnandarkovil	267	158	109	43	1	3	224	307
Malaiyapatti	263	160	103	174	52	105	77	215
Manganoor	926	578	348	875	312	467	218	790
Minnathur	2761	1460	1301	1522	351	1074	1239	1175
Nodiyur	1380	879	501	978	187	212	325	1727
Rakkadanpatti	822	419	403	648	380	195	174	395
Sengalur	1553	876	677	1535	626	730	18	995
T.Kizhaiyur	1601	929	672	1435	426	790	1435	882
Thenmavur	2395	1478	917	2004	714	853	391	1937
Udayalipatti	1239	667	572	1113	160	835	126	1031
Ulagangattanpatti	329	182	147	297	51	171	32	174
Viralippatti	949	576	373	745	59	112	78	1041

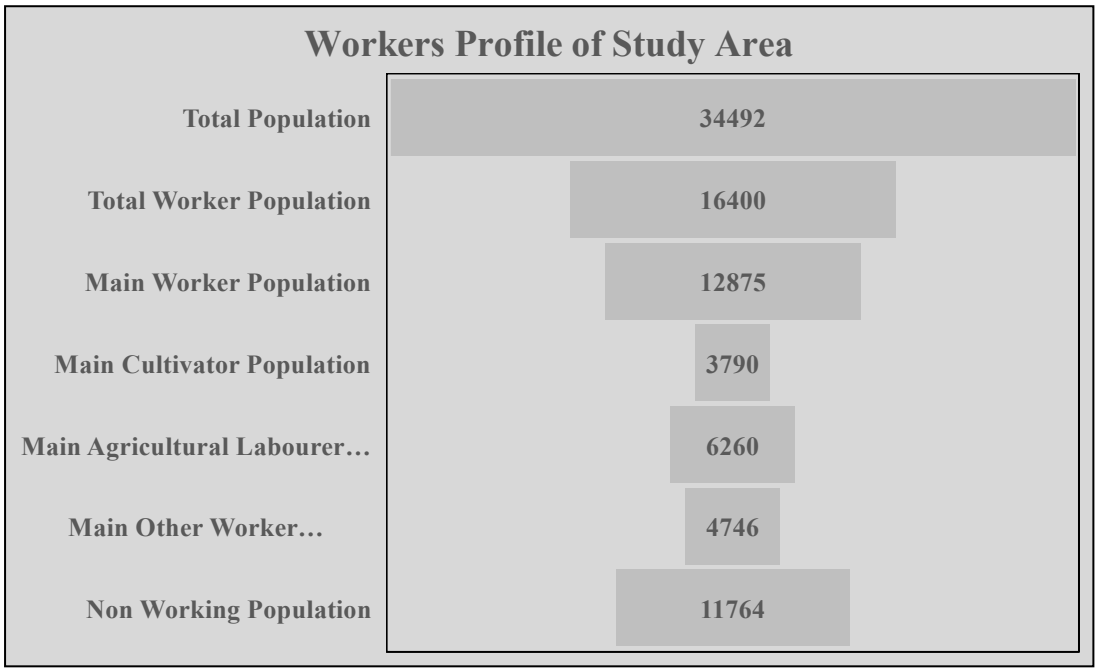


Figure 3.29 Chart Diagram about Workers Profile in Surrounding Villages

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 settlements within a radius of 5 km from the project site along with population, their education level etc., are given in the table 3.32.

As per SEAC recommendation the project proponent should spend minimum of 5 lakh 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 for the assessment of awareness about the project activities and opinion about it, following salient observations were recorded,

During survey it was observed that only nearby villagers are aware and other villagers are not aware about the proposed project. People in the region expect job opportunities and improvement in educational, transportation and sanitation facility from project authority.

3.6.10 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, additional schools for girls, furniture and equipment in schools, up-gradation of existing school infrastructure.
- 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 centers.
- People with disability – Establishment of center for special education, sensitization of the community towards disabled and awareness on Government schemes.
- 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.

3.6.11 Conclusion

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. To evaluate the impacts of proposed quarry project on the surrounding area, it is vital to assess the baseline status of the environmental quality in the locality of the site. Hence, it can be concluded that the present environment status of the study area will not be affected by the Killukulavoipatti rough stone and gravel cluster Quarries project. Hence, we adopt adequate control measures to protect the surrounding environment and will contribute in development of the study areas. The proposed project will provide preferential of employment to the local people there by the livelihood standards will be improved.

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 NH-36 (Vikravandi-Manamadurai) and SH-99 (Thirukattupalli-Sengipatti-Pattukottai) as shown in Table 3.33-3.36 and in Figure 3.30. 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 3.33 Traffic Survey Locations

Station Code	Road Name	Distance and Direction
TS1	NH -36 Vikravandi-Manamadurai	10.25km - Southeast
TS2	SH-99 Thirukattupalli-Sengipatti-Pattukottai	7.55km - East

Source: On-site monitoring by GTMS FAE & TM

Table 3.34 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	139	417	182	182	115	58	657
TS2	114	342	147	147	172	86	575

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 3.35 Rough Stone Transportation Requirement

Transportation of Rough Stone Per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	10	30

Source: Approved Mining Plan

Table 3.36 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 – 1960guidelines
NH -36	657	228	885	1200
SH-99	575	228	803	1200

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

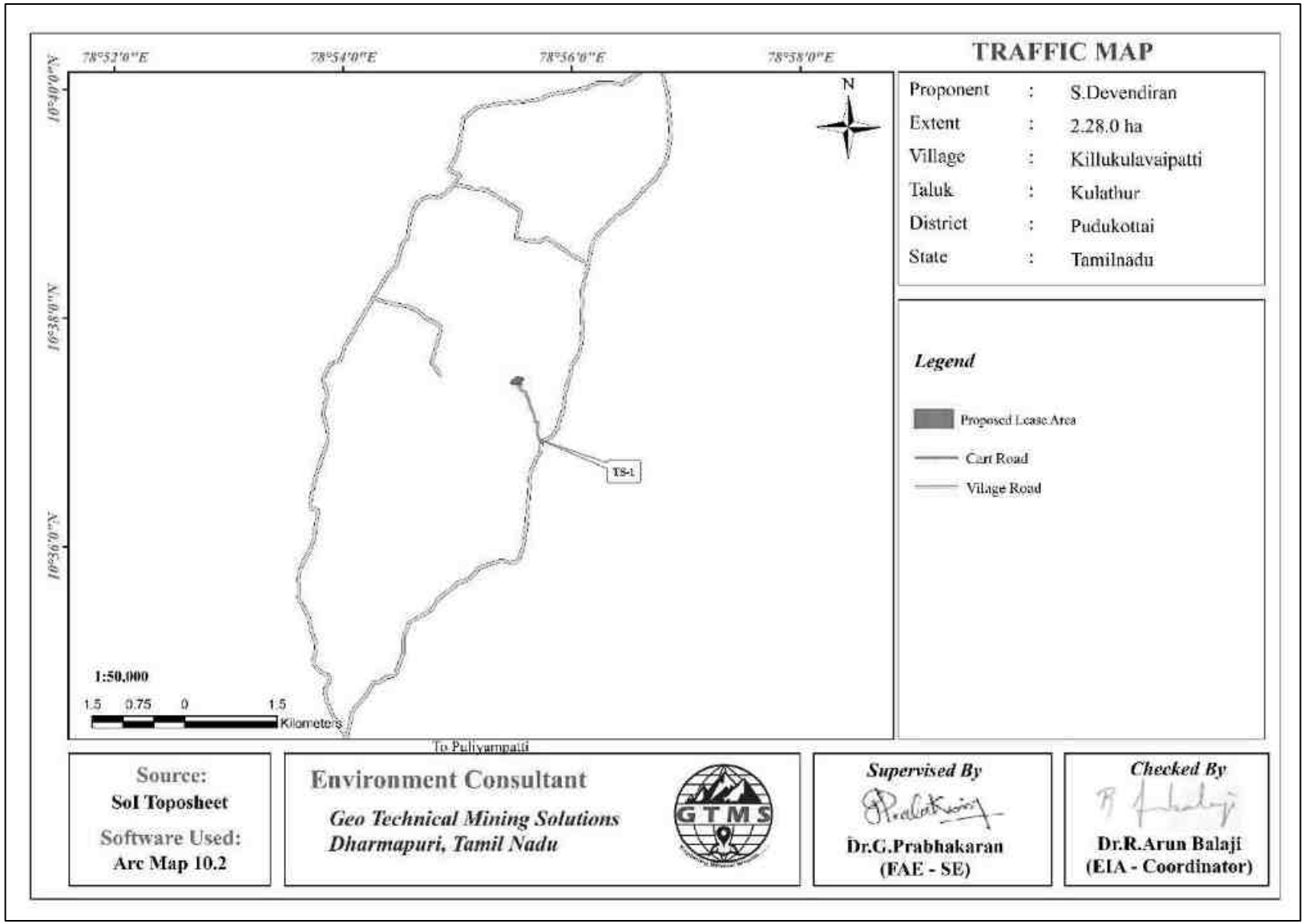


Figure 3.30 Traffic Density Maps

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 3.37.

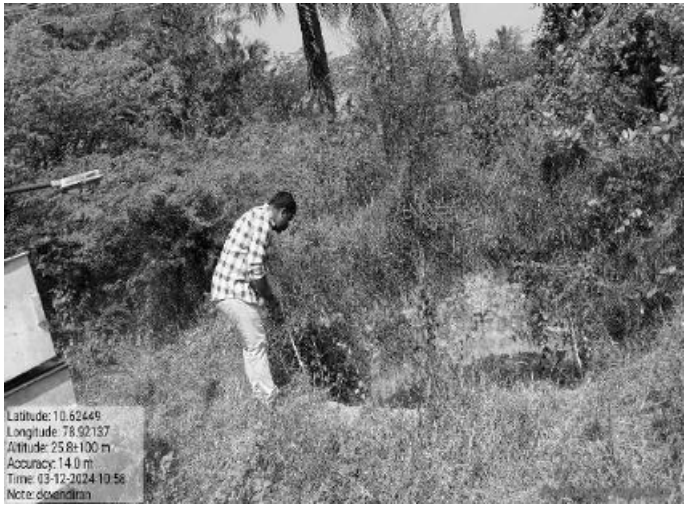
Table 3.37 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius
2	Reserve Forest	Killukottai R.F	2.37km North
		Keelaiyur pathai R.F	4.56Km SW
		Puliyur Pathai R.F	5.51km NW
		Achampatti R.F	5.79km NE
		Komapuram R.F	6.26km West
		Thudiyamparai R.F	7.02km South
		Pudukudi North R.F	9.55km NW
		Veeragudi R.F	11.69km SW
		Maniyachi R.F	11.90km South
		Nemmeli (PDKT)	13.12km SE
		Varappur R.F	15.15km SE
		Chennampatty Bit IV R.F	15.16km NE
		Chennampatty Bit III R.F	15.32km NE
		Chennampatty Bit II R.F	16.27Km NE
		Aladi Perumuthu kadu R.F	17.07km SW
		Nepugai R.F	17.12km SE
		Chennampatty Bit I R.F	17.19km NE
3	Lakes/ Reservoirs/ Dams/Streams/Rivers	Ulagankanthapatty Lake	0.08km West
		Rakkathampatti Chinnmullikulam Lake	2.17km west
		Manganoor Periya Eri	4.38km East
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


Latitude: 10.623738
Longitude: 78.925486
Elevation: 116.98±18 m
Accuracy: 38.9 m
Time: 12-03-2024 10:28
Note: devendiran


Latitude: 10.624336
Longitude: 78.92123?
Elevation: 116.98±100 m
Accuracy: 228.4 m
Time: 03-12-2024 10:57
Note: devendiran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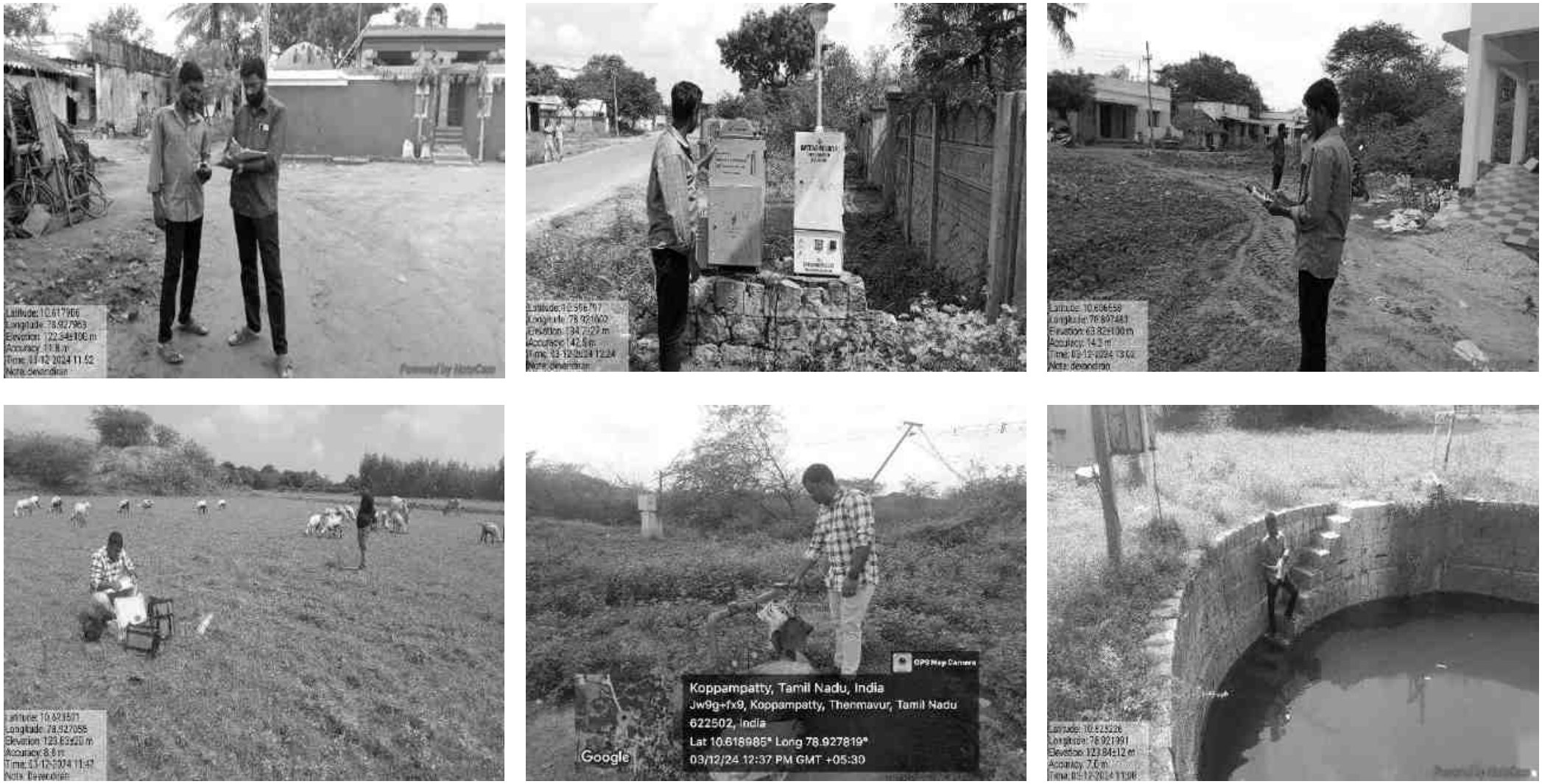


Figure 3.31 Field Study Photographs

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction. This chapter discusses the anticipated impacts on soil, land, water, air, noise, biological, and socioeconomic environments.

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

- Permanent or temporary change on land use and land cover.
- Change in topography of the mine lease area will change at the end of the life of the mine.
- Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- Degradation of the aesthetic environment of the core zone due to quarrying
- Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- Siltation of water course due to wash off from the exposed working area

4.1.2 Mitigation Measures from Proposed Project

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m,10m and 50m safety barrier and other safety provided) so as to help minimize dust emissions.

- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

4.2.1 Anticipated Impact on Soil Environment

Following impacts are anticipated due to mining operations:

- Removal of protective vegetation cover
- Exposure of subsurface materials which are unsuitable for vegetation establishment

4.2.2 Common Mitigation Measures from proposed project

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

4.3 WATER ENVIRONMENT

4.3.1 Anticipated Impact

- Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas
- As the proposed project acquires 3.5KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

4.3.2 Common Mitigation Measures for the Proposed Project

- Rain water from mine pit will be treated in settling tanks before being used for dust suppression and tree plantation purposes
- Domestic sewage from site office will be discharged in septic tank and then directed to soak pits
- Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse

- The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program.

4.4 AIR ENVIRONMENT

4.4.1 Anticipated Impact from proposed project

- During mining at various stages of activities such as excavation, drilling and transportation of materials, particular matter (PM_{10} and $PM_{2.5}$) are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

4.4.2 Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chaulya et al.,2001. The equations used for SPM emission estimation have been given in Table 4.1.

Table 4.1 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).

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 PM_{10} emission rate is derived from the SPM estimation in the background that PM_{10} constitutes 52% of SPM emission. The $PM_{2.5}$ and PM_{10} emission results have been given in Table 4.2.

Table 4.2 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m^2	Calculated Value ($g/s/m^2$)
Overall Mine	$PM_{2.5}$	1.199020784	22800	5.25886E-05
Overall Mine	PM_{10}	0.599510392		2.62943E-05

4.4.2.1 Modelling of Incremental Concentration

Anticipated incremental concentration and net increase in emissions due to quarrying activities within 500 m around the project area is predicted by open pit source modelling using AERMOD Software and the incremental values of the air pollutants were added to the base line data monitored at the proposed site to predict total GLC of the pollutants, as shown in Tables 4.3-4.4.

4.4.2.2 Model Results

The post project resultant concentrations of PM_{10} and $PM_{2.5}$ (GLC) is given in Tables 4.3-4.4.

Table 4.3 Incremental & Resultant GLC of $PM_{2.5}$

Station ID	Distance to core area (km)	Direction	PM 2.5 concentrations(µg/m³)			Comparison against air quality standard (60 µg/m³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	--	--	16.6	1.43	18.03	Below standard	8.61	Not significant
AAQ2	0.53	SE	15.5	0.1	15.6		0.65	
AAQ3	0.70	SW	15.6	0.3	15.9		1.92	
AAQ4	3.17	NE	14.3	0.03	14.33		0.21	
AAQ5	1.81	N	15.3	0.1	15.4		0.65	
AAQ6	2.55	S	15.2	0.03	15.23		0.20	
AAQ7	3.56	SW	16.2	0.08	16.28		0.49	

Table 4.4 Incremental & Resultant GLC of PM_{10}

Station ID	Distance to core area (km)	Direction	PM10 concentrations(µg/m³)			Comparison against air quality standard (100 µg/m³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	--	--	41.4	2.87	44.27	Below standard	6.93	Not significant
AAQ2	0.53	SE	38.8	0.2	39		0.52	
AAQ3	0.70	SW	38.9	1	39.9		2.57	
AAQ4	3.17	NE	35.6	0.1	35.7		0.28	
AAQ5	1.81	N	38.2	0.5	38.7		1.31	
AAQ6	2.55	S	38.1	0.05	38.15		0.13	
AAQ7	3.56	SW	40.6	0.2	40.8		0.49	

The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further.

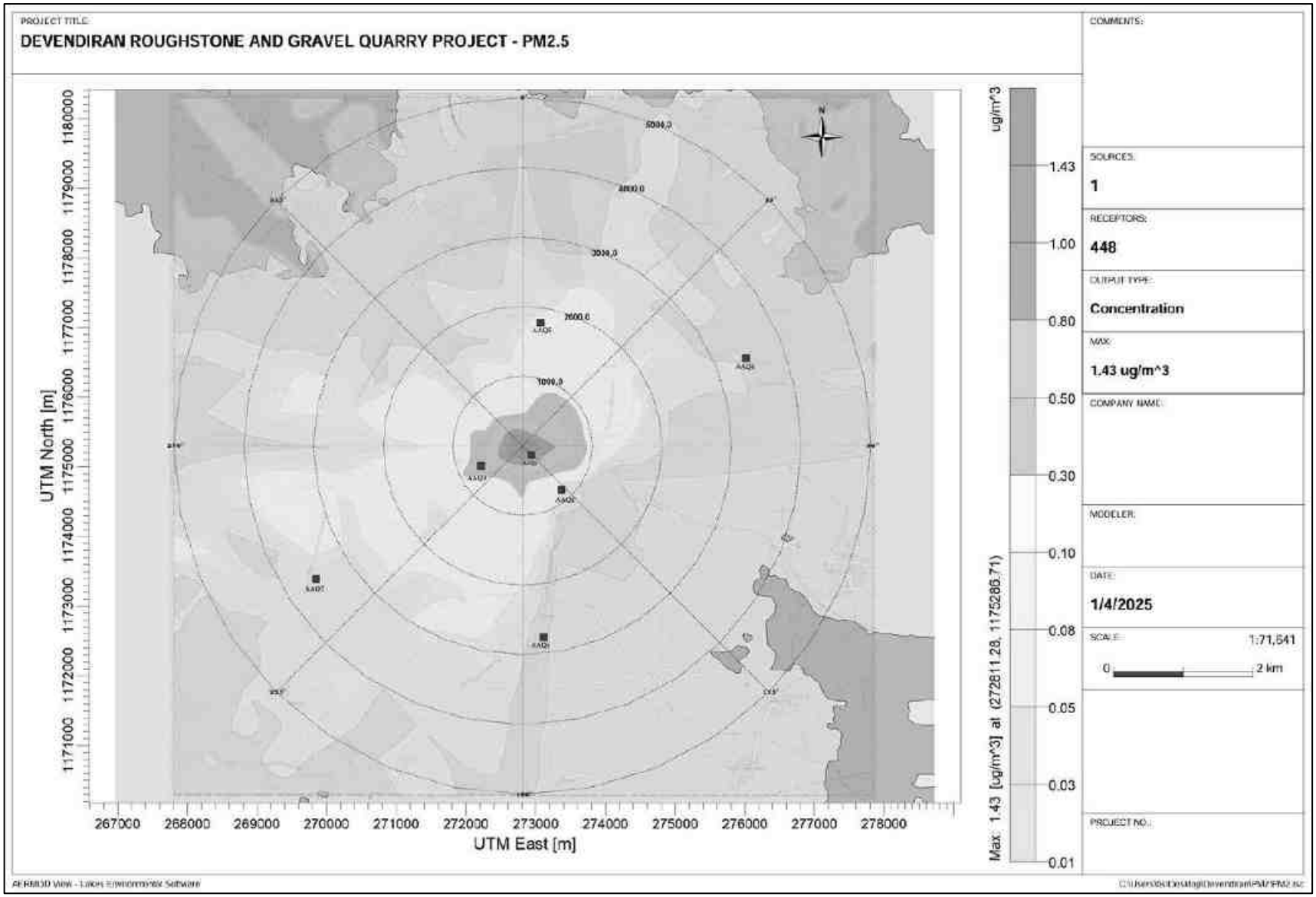


Figure 4.1 Predicted Incremental Concentration of $PM_{2.5}$

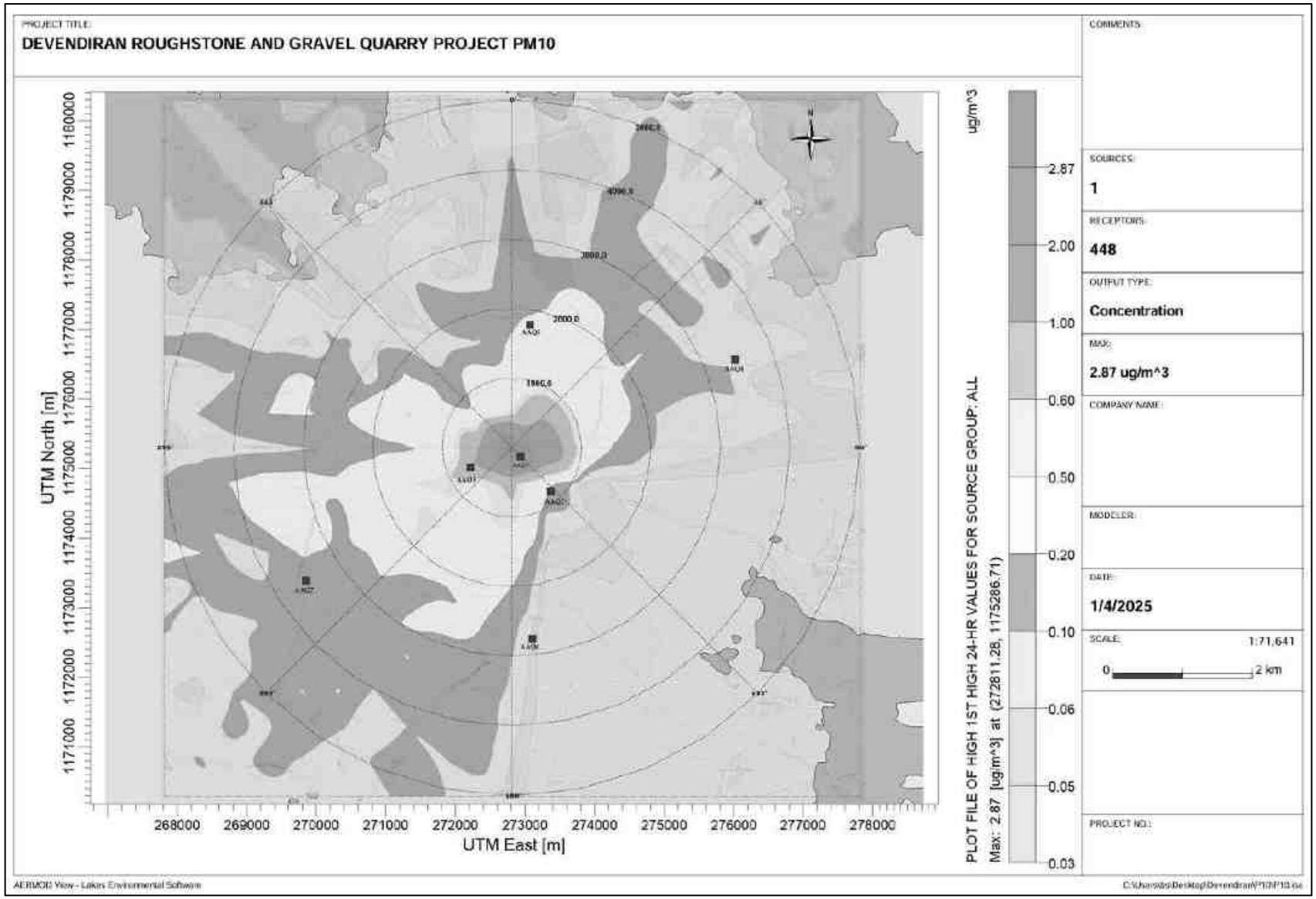


Figure 4.2 Predicted Incremental Concentration of PM_{10}

4.4.3 Mitigation Measures

Drilling

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

Haul Road and Transportation

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

Green Belt

- Planting of trees all along mine haul roads outside the lease and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers.
- Green belt of adequate width will be developed around the project site.

Occupational Health

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers.

Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed

4.5 NOISE ENVIRONMENT

Noise modelling has been carried out to assess the impact on surrounding ambient noise levels. Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outwards from the source through the air at a speed

of 1, 100 ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using a mathematical model based on first principle.

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) - Ae_{1,2}$$

Where,

Lp_1 & Lp_2 are sound levels at points located at distances r_1 and r_2 from the source

$Ae_{1,2}$ is the excess attenuation due to environmental conditions.

Combined effect of all sources can be determined at various locations by logarithmic addition.

$$Lp_{total} = 10 \log \{10^{(Lp1/10)} + 10^{(Lp2/10)} + 10^{(Lp3/10)} + \ldots\ldots\}$$

4.5.1 Anticipated Impact

The attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are: source data, receptor data, and attenuation factor. Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.5.

Table 4.5 Activity and Noise Level Produced by Machinery

S. No.	Machinery / activity	Impact on environment?	Noise produced in dB(A) at 50 ft from source*
1	Blasting	Yes	94
2	Jack hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total			**95.8**

The total noise to be produced by mining activity is calculated to be 95.8 dB (A). Generally, most mining operations produce noise between 95.8 dB (A).

Table 4.6 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level (dBA)	Total (dBA)
Core area	100	39.2	44.0	45.2
Koppampatti	620	39.5	28.1	39.8

Kilukulavaipatti	680	39.8	27.3	40.0
Nathamadipatti	3070	39.5	14.2	39.5
Ulagankathanpatti East	1860	38.2	18.6	38.2
Thenmavur	2830	38.4	14.9	38.4
Udayallipatti	3610	38.7	12.81	38.71
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000. Therefore, no impact is anticipated on the noise environment due to the project.

4.5.2 Common Mitigation Measures

The following noise mitigation measures are proposed for control of noise:

- Usage of sharp drill bits while drilling which will help in reducing noise
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- Silencers / mufflers will be installed in all machineries
- 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 though training and awareness
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects

4.5.3 Ground Vibrations

Ground vibrations due to the proposed mining activities are anticipated due to operation of mining machines like excavators, drilling and blasting, transportation vehicles, etc., however, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kutcha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest habitation from the proposed project areas is listed in below table. The ground vibrations due to the blasting in the quarry are calculated using the empirical equation.

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 4.7 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	5.21	620	0.064	19	0.01	115

Table 4.8 Predicted PPV Values due to Blasting at 100-500 m 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	5.21	100	1.182	19	0.10	134
		200	0.390		0.04	126
		300	0.205		0.03	122
		400	0.129		0.02	119
		500	0.09		0.01	117

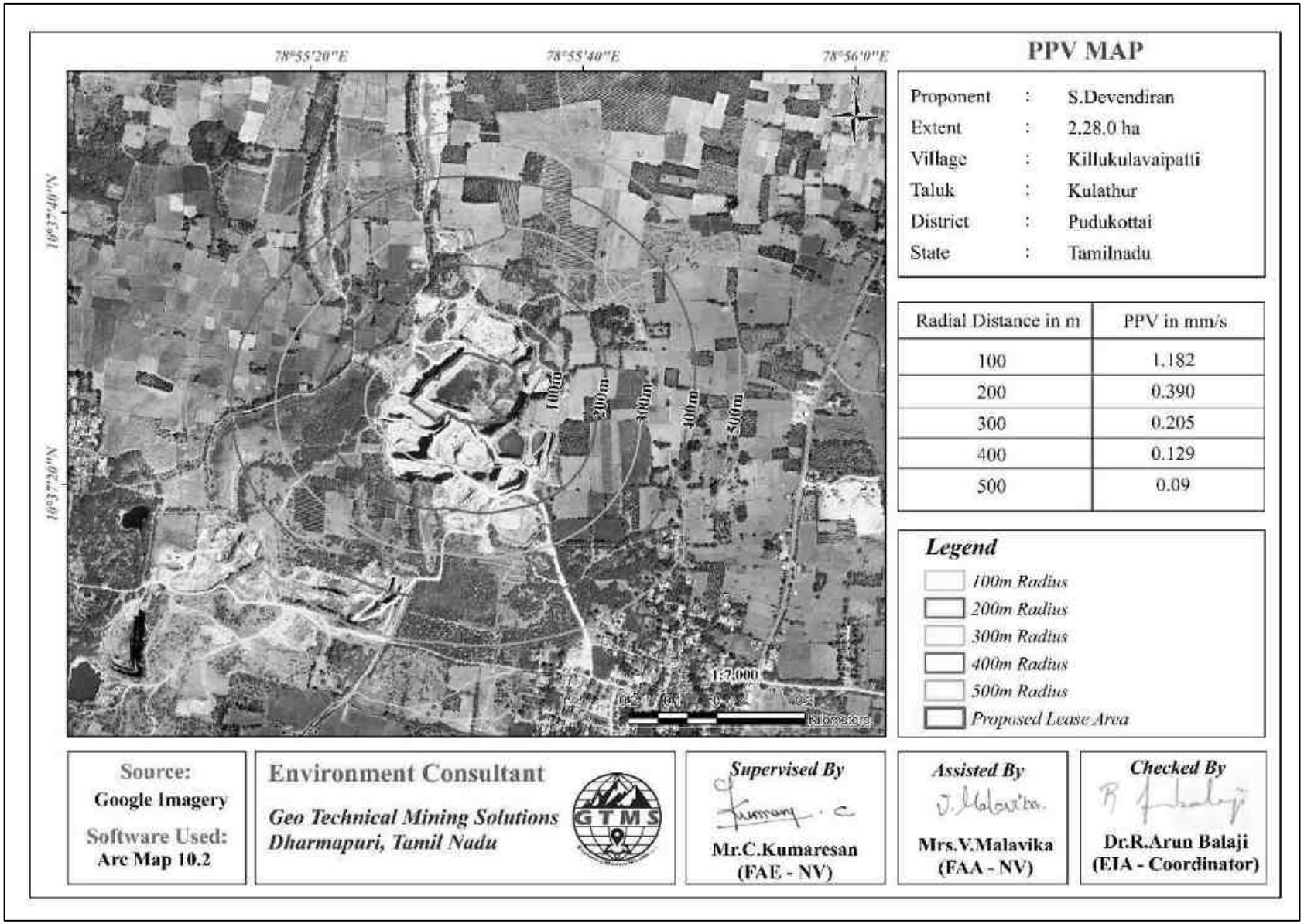


Figure 4.3: Predicted PPV Values due to Blasting at 100-500m radius

4.5.3.1 Common 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
- Blasting shelter will be provided as per DGMS guidelines
- Blasting operations will be carried out only during day time
- 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
- A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- 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.
- Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251mm/s.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 ECOLOGY AND BIODIVERSITY

4.6.1 Impact on Ecology and Biodiversity

- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly

- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region. There are no trees in mine lease area.
- Carbon released from quarrying machineries and tippers during quarrying would be 717kg per day, 193683kg per year and 968414kg over five years, as provided in Table 4.9.

Table 4.9 Carbon Released During Five Years of Rough Stone and Gravel Production

	Per day	Per year	Per five years
Fuel consumption of excavator	43	11731	58655
Fuel consumption of compressor	41.6	11232	56160
Fuel consumption of tipper	183	49307	246533
Total fuel consumption in liters	268	72270	361348
CO_2 emission in kg	717	193683	968414

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.
- Existing roads will be used; new roads will not be constructed to reduce impact on flora.

Carbon Sequestration

- 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 166350kg of carbon per year. Therefore, we recommend 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 4.11), about 1140 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 831750kg of the total carbon, as provided in Table 4.10.

Table 4.10 CO_2 Sequestration

CO_2 sequestration in kg	101	27333	136663
Remaining CO_2 not sequestered in kg	616	166350	831750
Trees required for environmental compensation	6931		
Area required for environmental compensation in hectares	14		

Table 4.11 Recommended Species for Greenbelt Development Plan

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	*Azadirachta indica*	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	*Techtona grandis*	Lamiaceae	Teak	Tree	
3	*Polyalthia longifolia*	Annonaceae	Nettilling	Tree	
4	*Albizia lebbeck*	Fabaceae	Vagai	Tree	
5	*Delonix regia*	Fabaceae	Cemmayir-konrai	Tree	
6	*Bauhinia racemose*	Fabaceae	Aathi	Tree	
7	*Cassia fistula*	Fabaceae	Sarakondrai	Tree	
8	*Aegle marmelos*	Rutaceae	Vilvam	Tree	
9	*Pongamia pinnata*	Fabaceae	Pungam	Tree	
10	*Thespesia populnea*	Malvaceae	Puvarasu	Tree	

Table 4.12 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		
	456	364	3283
	Number of plants outside the mine lease area		
	684	547	4924
Total	**1,140**	**911**	**8,207**

After complete extraction of mineral, the excavated pits will be allowed to collect rainwater and seepage water to serve as a reservoir to charge the nearby wells. Fish culture will also be attempted. A bund will be constructed around the pits. In order to minimize the impact of mining on the vegetation outside the mine lease area, it is recommended that adequate protection measures must be implemented. As mining involves movement of vehicles and increased anthropogenic activities, some of the areas can be fenced by involving local people and educating them about increased benefits of such activities.

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. There is no fauna in mine lease area.

4.6.4 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

4.6.5 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.

4.6.6 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.
- ❖ Quarry approach roads are sprayed with water 3 times a day to control dust. Thus, the damage to the nearby farmlands is controlled.
- ❖ A green belt will be created in 7.5 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
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust.

Aquatic Biodiversity

Mining activities will not disturb the existing aquatic ecology as there is no effluent discharge proposed from the rough stone and gravel quarry. There is no natural perennial surface water body within the mine lease area. Hence, aquatic biodiversity is not observed in the mine lease area.

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 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.

4.7.2 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.
- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

4.8 OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety hazards occur during the operational phase of mining and primarily include the following:

- Respiratory hazards
- Noise
- Physical hazards
- Explosive storage and handling

4.8.1 Respiratory Hazards

Long-term exposure to silica dust may cause silicosis the following measures are proposed:

- Cabins of excavators and tippers will be enclosed with AC and sound proof
- Use of personal dust masks will be made compulsory

4.8.2 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 85 dB(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 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110 dB(A)
- Ear muffs provided will be capable of reducing sound levels at the ear to at least 85 dB(A)
- Periodic medical hearing checks will be performed on workers exposed to high noise levels.

4.8.3 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.

4.8.4 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, Spirometric tests
- Periodic medical examination – yearly
- Lung function test – yearly, those who are exposed to dust
- 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:

4.10.1.1 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.,

4.10.1.2 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.

4.10.1.3 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.

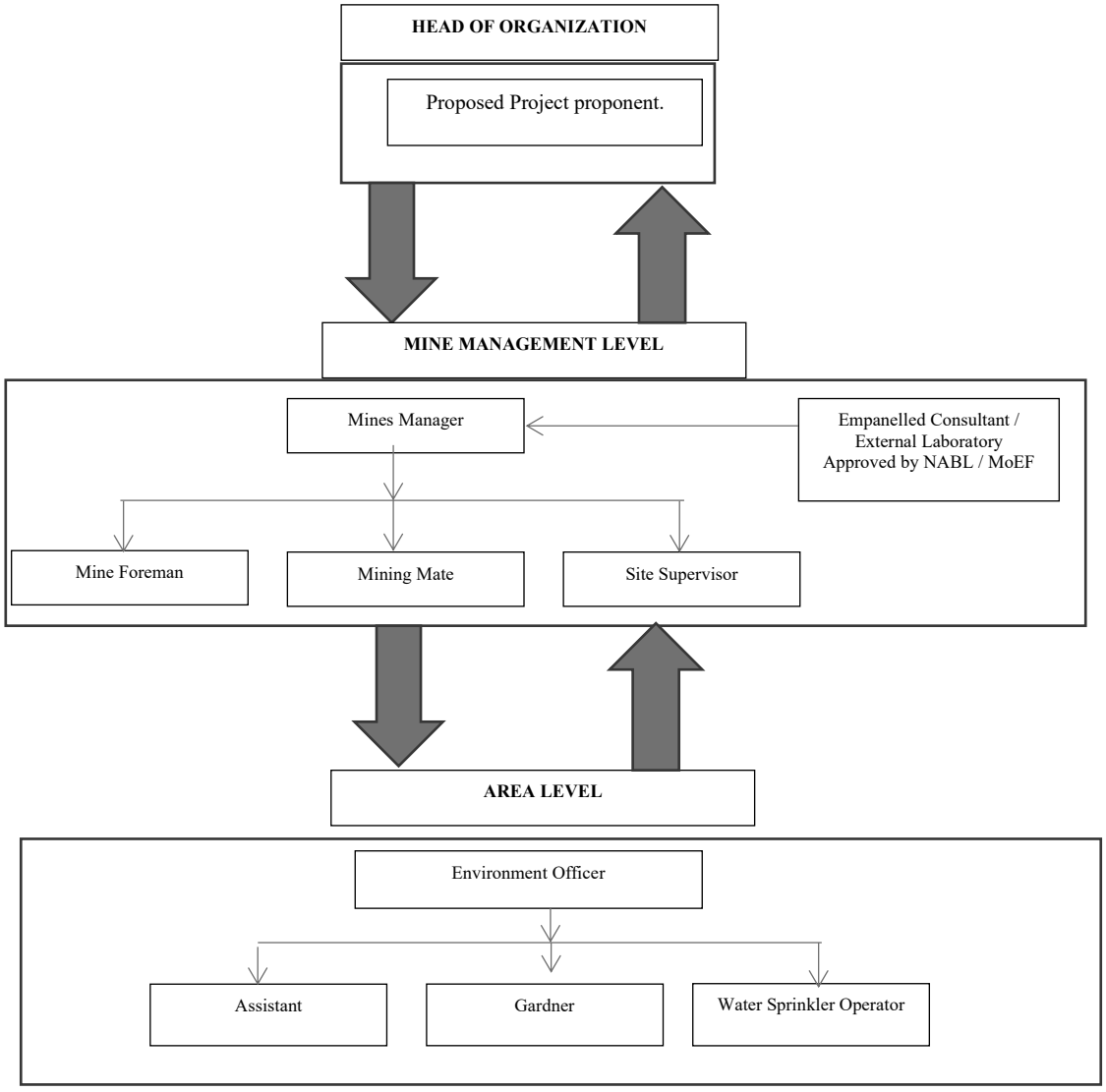


Figure 6.1 Proposed Environmental Monitoring Chart

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,	✓ 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.

		stemming & Blasting/ fining of blast holes Vibration due to movement of vehicles	✓ 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 While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	✓ 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. ✓ 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.

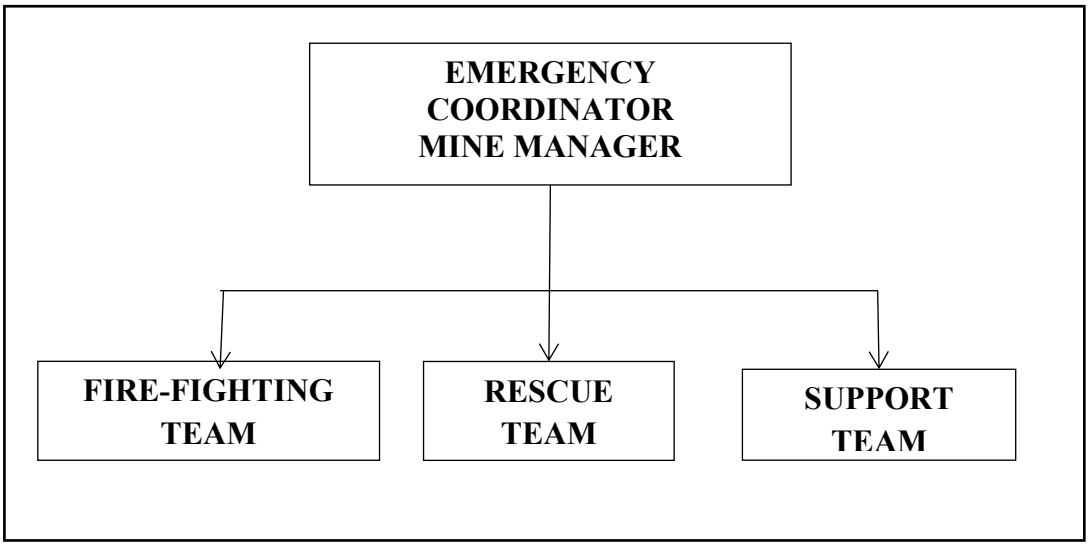


Figure 7.1 Disaster management team layout for proposed project

The emergency organization shall be headed by emergency coordinator who will be qualified competent mines manager. In his absence senior most people available at the mine shall be emergency coordinator till arrival of mines manager. There would be three teams for taking care of emergency situations – Fire-Fighting Team, Rescue Team and Support Team.

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, there is only one proposed project known as P1 is taken into consideration. The details of P1 have been given in Table 1.3 and the details of 'P2' and 'P3' are given in the Table 7.2-7.3.

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 three proposed project have been given in Tables 1.3.

Table 7.2 Salient Features of the Proposed Project 'P2'

Name of the Quarry	Mr.V.Sasikumar**,** Rough stone and gravel quarry	
Type of Land	Patta Land	
Extent	2.07.0 Ha	
Toposheet No	58-J/14	
Location of Project Site	10°37'32.8909"N to 10°37'30.3691"N 78°55'35.0961"E to 78°55'28.2057"E	
Highest Elevation	122m AMSL	
Proposed depth of Mining	42m BGL (6m AGL and 36m BGL)	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	32588	658190
Mineable Reserves	Rough Stone in m^3	Gravel in m^3

	20566	142690
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3
	20566	142690
Method of Mining	Open-Cast Mechanized mining	
Topography	Undulated Topography	
Machinery proposed	Jack Hammer	4
	Compressor	1
	Tipper	2
	Hydraulic Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	15 Nos	
Project Cost	Rs.49,95,000/-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	2.0 KLD	

Table 7.3 Salient Features of the Proposed Project 'P3'

Name of the Quarry	Mr.K.Nataraj**,** Rough stone and gravel quarry	
Type of Land	Patta Land	
Extent	2.86.0 Ha	
Toposheet No	58-J/14	
Location of Project Site	10°37'04.30"N to 10°37'12.91"N 78°55'17.35"E to 78°55'26.60"E	
Highest Elevation	125m AMSL	
Proposed depth of Mining	42m BGL (6m AGL and 36m BGL)	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	1685375	53013
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	267745	37266
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3
	245195	37266
Method of Mining	Open-Cast Mechanized mining	
Topography	Plain terrain	
Machinery proposed	Jack Hammer	3
	Compressor	1

	Tipper	2
	Hydraulic Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	36 Nos	
Project Cost	Rs.69,38,000/-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	2.62 KLD	

Table 7.4 Cumulative Production Load of Rough Stone

Quarry	5 Years in m^3	Per Year in m^3	Per Day in m^3	Number of Lorry Load Per Day
P1	73150	14630	54	9
P2	142690	28538	106	18
P3	245195	49039	182	30
Grand Total	**461035**	**92207**	**342**	**57**

Table 7.5 Cumulative Production Load of Gravel

Quarry	Production Year (m^3)	Yearly Production (m^3)	Daily Production (m^3)	Number of Lorry Loads Per Day
P1	810	810	3	1
P2	20566	20566	76	13
P3	37266	37266	138	23
Grand Total	**58,642**	**58642**	**217**	**37**

The cumulative study shows that the overall production of rough stone from the proposed quarry is 342m^3 per day with a capacity of 57trips of rough stone per day and that production of gravel from the proposed quarry is 217m^3 per day accounting for 37trip/day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the three proposed projects on air environment of the cluster have been provided in Table 7.6 The cumulative values resulting from the three projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.6 Cumulative impact results from the three proposed projects

Pollutants	Baseline Data (µg/m^3)	Incremental Values (µg/m^3)			Cumulative Value (µg/m^3)
		P1	P2	P3	
$PM_{2.5}$	15.5	1.43	3.16	5.46	**25.55**
PM_{10}	38.8	2.87	6.34	10.96	**58.97**

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 projects within the 500m radius.

Table.7.7 Cumulative impact of noise from three proposed 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	620	SE	39.5	28.1	39.8	**55**
Habitation Near P2	760	SE		26.3	39.7	
Habitation Near P3	440	E		31.1	40.1	
Cumulative Noise (dB (A))					**44.6**	

Source: Lab Monitoring Data

The cumulative analysis of noise due to three proposed projects shows that habitation will receive about 44.6dB (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 in the all the three projects have been shown in Table 7.8.

Table 7.8 Cumulative effect of ground vibrations resulting from three projects

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	5.21	620	0.064
P2	10.20	760	0.079
P3	17.50	440	0.291
Total			**0.434**

Results from the above tables 7.8 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 three proposed project were calculated and the results have been shown in Table 7.9. The proposed project will contribute Rs. 15,00,000/-towards CER fund.

Table 7.9 Socio Economic benefits from the proposed project

Location ID	Project Cost	CER Cost
P1	Rs.50,64,000	Rs. 5,00,000
P2	Rs.49,95,000	Rs. 5,00,000
P3	Rs.69,38,000	Rs. 5,00,000
Grand Total	**Rs. 1,69,97,000**	**Rs. 15,00,000**

Table 7.10 Employment benefits from the proposed projects

Location ID	Employment
P1	16
P2	15
P3	36
Grand Total	**67**

A total of 67 people will get employment due to the proposed project in cluster

7.4.4 Ecological Environment

Table 7.11 Greenbelt Development Benefits from three Projects

Code	Number of Trees proposed	Area to be covered (m^2)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	1140	10260	912	*Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis,* etc.,
P2	1035	9315	828	
P3	1430	12870	1144	
Total	**3605**	**32445**	**2884**	

Cumulative studies show that the three proposed Projects will plant about 3605 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Techtona grandis,* etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 2884 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 7.12.

Table 7.12 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 Kurumbapalayam Village aims to produce **73150m^3** of rough stone and **810m^3 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 16 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 Killukulavaipatti Village, Kulathur Taluk, Pudukkottai 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 Kurumbapalayam 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.84,54,632** 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	6583500	45360
District Mineral Foundation Tax @ 10% of Seigniorage	658350	4536
Green Tax @ 10% of Seigniorage	658350	4536
Total	**8400200**	**54432**

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 Mr.S. Devendiran 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 (Rs.)	Recurring Cost/annum (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	22800	22800
	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. 2500 per unit recurring cost for maintenance	50000	5000
	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. 5000/- per tipper/dumper deployed	20000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	5000
	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	45600

	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			**942800**	**218400**
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	204820
Total Noise Environment			**50000**	**206820**
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum (2.96.5 X 10000)	22800	11400
Total Water Environment			**22800**	**11400**
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal).	25000	20000
		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	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. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	64000	16000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	16000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	9120
	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 (2.28.0hectare)	456000	22800
	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 be deployed for traffic management	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	114000	22800

	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			**674000**	**873720**
Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 3 00 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))"	91200	13680
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	205200	20520
Total Development of Green Belt			**296400**	**34200**

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)		77520	0
	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)	662886	0
TOTAL			**2766406**	**1367540**

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**
1367540	1435917	1507713	1583098	1662253	7556522	10322928

In order to implement the environmental protection measures, an amount of **Rs.2766406** as capital cost and recurring cost as **Rs. 1367540** 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. 10322928** 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 10.15.50ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F. Nos. 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over the extent of 2.28.0ha is situated in the cluster falling in Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu. The projects involved in the calculation of cluster extent are of three proposed quarries and two existing quarries.

11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes 10°37'24.42"N to 10°37'29.62"N Longitudes from 78°55'27.27"E to 78°55'35.08"E in Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu. According to the approved mining plan, about 73150m^3 of rough stone and 810m^3 of gravel will be mined up to the depth of 50 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 2024** as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified **Greenlink Analytical and Research Laboratory (India) Private 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

Land use pattern of the area of 5 km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 11.1.

Table.11.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Water	20.25	0.24
2	Trees	113.08	1.33
3	Crops	6596.75	77.48
4	Mining/Industrial area	50.84	0.60
5	Built Area	462.17	5.43
6	Bare Ground	22.19	0.26
7	Rangeland	1248.74	14.67
Total		**8514.02**	**100.0**

Source: Sentinel II Satellite Imagery

11.3.2 Soil Environment

The soil samples in the study area show loamy textures varying between Silt Loam and sandy loam. pH of the soil varies from 7.05 to 7.55 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 185 to 200µS/cm.

11.3.3 Water Environment

Surface and Ground Water Quality Resources and Result

Minnathur Lake, Thenmavur Lake and Killukulavoipatti Lake are three prominent surface water resources present in the study area. These lakes are ephemeral in nature, which convey water only after rainfall events. Three surface water sample, known as SW1 were collected from the Minnathur Lake (4.18km SE), SW2 were collected from the Thenmavur Lake (2.52km SSE) and SW3 were collected from the Killukulavoipatti Lake (2.99km NW) to assess the baseline water quality.

Groundwater in the study area occurs in the crystalline rocks of Archaean age and recent alluvium. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose. Three groundwater samples, known as BW1, BW2 and OW1 were collected from bore wells and open well were analysed for physico-chemical conditions and bacteriological contents in order to assess baseline quality of ground water. Table 3.6 summarizes surface and ground water quality data of the collected sample. Result for surface and ground water sample in the Table 3.6 indicate that the physical, chemical and biological parameters are within permissible limits except groundwater taste was Disagreeable in compared with standards of IS10500:2012.

The WQI of the surface and ground water, as shown Table 3.6a indicates that three surface water (SW1, SW2 & SW3) samples are Excellent quality and two groundwater (BW1& OW1) samples are good quality and one groundwater (BW2) sample are poor quality. The WQI of ground water samples fall under Excellent, good and suitable for drinking, domestic and agriculture purpose. Poor quality indicating they are not suitability for drinking and suitable for domestic and agriculture purpose.

11.3.4 Air Environment

As per the monitoring data, $PM_{2.5}$ ranges from 14.6µg/m^3 to 16.4µg/m^3; PM_{10} from 36.4µg/m^3 to 40.9µg/m^3; SO_2 from 2.5µg/m^3 to 4.2µg/m^3; NO_x from 7.7µg/m^3 to 13.2g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index

The AQI shows that the air quality of the study area falls within good category 39 causing minimal impact to human health.

11.3.5 Noise Environment

39.2dB (A) Leq during day time and 37.0dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 38.2to 39.2dB (A) Leq and during night time from 35.7 to 36.8dB (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, shrubs, herbs and grasses are not present in quarry mine lease area. It's an existing mine.

Flora in 300 m radius zone

A total of 52 species of 29 families were recorded in 300m radius. (Table 3.25). Herbs (24) formed the predominant life form followed by shrubs (19) and trees (09). *Neltuma juliflora*, a weed, is abundant within a radius of 300km around the quarry lease area. A list of the IUCN Red List analysed plant species recorded in the 300m radius of the proposed project site, along with their binomial names, family, local name, habit, and IUCN category.

Flora in 10 km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land but presently there are no cultivation. It contains a total of 74 species belonging to 35 families have been recorded from the buffer zone. The floral (74) varieties among them Trees (27), shrubs (15) and herbs, Climbers Creepers and Grasses, (32) were identified. The result of buffer zone of flora studies shows that Fabaceae and Poaceae, Cucurbitaceae are the main dominating species in the study area.

Fauna in Core Zone

A total of 37 species were observed in core zone of the project site. The core zone exhibited fewer species, with only a limited number of insects and reptiles, while the buffer zone showed greater species diversity. Among the 37 species observed, the distribution was as follows: 14 birds, 12 insects, 3 reptiles, and 8 mammals. These species were cross-checked

against the IUCN Red List Database version 3.1 to identify any threatened species. Data analysis revealed that 24 species are categorized as Least Concern on the Red List, while 13 species were not listed. The analysis indicates that there are no REET species in the core zone of the proposed quarry site.

Fauna in Buffer Zone

A total of 56 species were observed in core zone of the project site. The core zone exhibited fewer species, with only a limited number of insects and reptiles, while the buffer zone showed greater species diversity. Among the 56 species observed, the distribution was as follows: 19 birds, 15 insects, 07 reptiles, and 12 mammals. These species were cross-checked against the IUCN Red List Database version 3.1 to identify any threatened 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 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

11.4.1 Land Environment

Anticipated Impact

- Permanent or temporary change on land use and land cover.
- Change in topography of the mine lease area will change at the end of the life of the mine.
- Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- Degradation of the aesthetic environment of the core zone due to quarrying
- Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- Siltation of water course due to wash off from the exposed working area

Mitigation Measures

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt

- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m,10m safety barrier and other safety provided) so as to help minimize dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

11.4.2 Soil Environment

Anticipated Impact

- Removal of protective vegetation cover
- Exposure of subsurface materials which are unsuitable for vegetation establishment

Mitigation Measures

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

11.4.3 Water Environment

Anticipated Impact

- Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas

- As the proposed project acquires 4.0 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

Mitigation Measures

- Rain water from mine pit will be treated in settling tanks before being used for dust suppression and tree plantation purposes
- Domestic sewage from site office will be discharged in septic tank and then directed to soak pits
- Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program.

11.4.4 AIR ENVIRONMENT

Anticipated Impact

Anticipated increase of the air pollutants due to quarrying activities have been predicted using AERMOD software. The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further

Mitigation Measures

- To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar
- Controlled blasting will be carried out using suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone
- Blasting will be restricted to a particular time of the day i.e., at the time of lunch hours
- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored
- 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 to < 20 km/hr to avoid generation of dust
- The un-metaled haul roads will be compacted weekly before being put into use
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Haul roads and service roads will be graded to clear accumulation of loose materials
- Planting of trees all along main mine haul roads and around the project site will be practiced to prevent the generation of dust
- Dust mask will be provided to the workers and their use will be strictly monitored

11.4.5 Noise Environment

Anticipated Impact

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas. The peak particle velocity produced by the charge of 5.21kg is well below that of 0.3 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Mitigation Measures

- The blasting operations in the cluster quarries will use shallow holes and delay detonators to reduce the ground vibrations
- Proper quantity of explosives, suitable stemming materials and appropriate delay system will be used during blasting
- Adequate safe distance from blasting will be maintained as per DGMS guidelines
- Blasting shelter will be provided as per DGMS guidelines
- Blasting operations will be carried out only during day time
- 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
- A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- 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.

11.4.6 Biological Environment

Anticipated Impact

- 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 3 which vegetation in the lease area may be removed during mining.

Carbon released from quarrying machineries and tippers during quarrying would be 717kg per day, 193683kg per year and 968414kg over five years.

Mitigation Measures

- 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.
- Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- 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 166350kg of carbon per year. Therefore, we recommend 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, about 1140 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 831750kg of the total carbon.

11.4.7 Socio Economic Environment

Anticipated Impact

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area
- Approach roads can be damaged by the movement of tippers

- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

Mitigation Measures

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

11.4.8 Occupational Health

- All the persons will undergo pre-employment and periodic medical examination
- Employees will be monitored for occupational diseases by conducting medical tests: General physical tests, Audiometric tests, Full chest, X-ray, Lung function tests, Spiro metric 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.

11.5 Environment Monitoring Program

Table 11.2 Environment Monitoring Program

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	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature,

		Monitoring & IMD Secondary Data			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

11.6 ADDITIONAL STUDIES

11.6.1 Risk Assessment

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. 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.

11.6.2 Disaster Management Plan

The objective of the disaster management plan is to make use of the combined resources of the mine and the outside services to:

- Rescue and treat 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.

11.6.3 Cumulative Impact Study

- The results on the cumulative impact of the three proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time
- PPV resulting from three proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- The proposed three projects will allocate Rs. 15,00,000/- towards CER as recommended by SEAC
- The proposed three projects will directly provide jobs to 67 local people, in addition to indirect jobs
- The proposed three projects will plant 3605 about trees in and around the lease area.
- The proposed three projects will add 282 PCU per day to the nearby roads.

11.7 Project Benefits

Various benefits are envisaged due to the three proposed mine and benefits anticipated from the proposed project to the locality, neighbourhood, region and nation as a whole are:

- Direct employment to 16 local people
- Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- Strengthening of existing community facilities through the Community Development Program
- Skill development & capacity building like vocational training.
- Rs. 5,00,000 will be allocated for CER

11.8 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs.2766406** as capital cost and recurring cost as **Rs. 1367540** 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. 10322928.**

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, **Mr.S.Devendiran** 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, AP & NV	B
2	P. Vellaiyan	In-house, FAE	1(a)(i)	GEO	B
3	R.Elavarasan	In-house, FAE	1(a)(i)	EB	B
4	Dr. G. Prabakaran	In-house, FAE	1(a)(i)	SE	B
5	Dr. D.Kalaimurugan	In-house, FAE	1(a)(i)	SC	B
6	J.N. Manikandan	Empanelled FAE	1(a)(i)	RH, SHW, AP	B
7	R.Revathy	In-house, FAE	1(a)(i)	WP	B
8	G. Umamaheswaran	In-house, FAE	1(a)(i)	HG	B
9	P. Venkatesh	In-house, FAE	1(a)(i)	AP	B
10	C. Kumaresan	In-house, FAE	1(a)(i)	NV	B
11	G. Prithiviraj	In-house, FAE	1(a)(i)	LU & LC	B
Approved Functional Area Associates					
12	V.Malavika	FAA	1(a)(i)	NV	B
13	P.Dhatchayini	FAA	1(a)(i)	AQ	B
14	M.Arunkumar	FAA	1(a)(i)	WP	B
15	C.Ragul	FAA	1(a)(i)	LU & LC	B

16	K.Ravichandiran	FAA	1(a)(i)	GEO	B
17	K.Prithivi	FAA	1(a)(i)	HG	**B**
18	G.Kavitha	FAA	1(a)(i)	EB, SC	**B**

Abbreviations

EC	EIA Coordinator	NV	Noise and Vibration
FAE	Functional Area Expert	SE	Socio Economics
FAA	Functional Area Associates	HG	Hydrology, ground water and water conservation
TM	Team Member	SC	Soil conservation
GEO	Geology	RH	Risk assessment and hazard management
WP	Water pollution monitoring, prevention and control	SHW	Solid and hazardous wastes
AP	Air pollution monitoring, prevention and control	MSW	Municipal Solid Wastes
LU	Land Use	ISW	Industrial Solid Wastes
AQ	Meteorology, air quality modelling, and prediction	HW	Hazardous Wastes
EB	Ecology and bio-diversity	GIS	Geographical Information System

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**

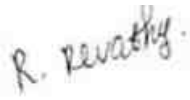
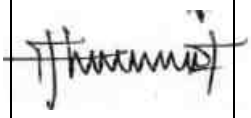
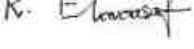
Designation : EIA Coordinator

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

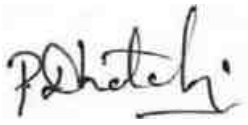
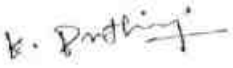
We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for **Mr.S.Devendiran** rough stone and gravel quarry project with the extent of 2.280.0 ha situated in the cluster with the extent of 10.15.50ha in Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District of 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	J.N. Manikandan	
			P.Venkatesh	
2	WP	○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	R.Revathy	
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	G.Umamaheshwaran	
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.	P. Vellaiyan	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility.	Dr. G. Prabhakaran	
6	EB	○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as	R.Elavarasan	

		per IUCN list. o Impact of the project on flora and fauna. o Suggesting species for greenbelt development.		
7	RH	o Identification of hazards and hazardous substances o Risks and consequences analysis o Vulnerability assessment o Preparation of Emergency Preparedness Plan o Management plan for safety.	J.N. Manikandan	
8	LU	o Construction of Land use Map o Impact of project on surrounding land use o Suggesting post closure sustainable land use and mitigative measures.	G. Prithiviraj	
9	NV	o Identify impacts due to noise and vibrations o Suggesting appropriate mitigation measures for EMP.	C. Kumaresan	
10	AQ	o Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. o Recommending mitigations measures for EMP	Dr.R. Arun Balaji	
11	SC	o Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. D.Kalaimurugan	
12	SHW	o Identify source of generation of non-hazardous solid waste and hazardous waste. o 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	V. Malavika	NV, SHW	o Site visit along with FAE Assistance in report preparation. o Assistance to FAE in both primary and secondary data collection o Assistance in noise prediction modelling	
2	P. Dhatchayini	AQ	o Site visit with FAE o Assistance to FAE in collection of both primary and secondary data	
3	K.Prithivi	HG	o Site visit with FAE o Provide inputs & Assisting FAE for HG	
4	K.Ravichandiran	GEO	o Field visits along with FAE o Assistance to FAE in both primary and secondary data collection	
5	C.Ragul	LU & LC	o Field visits along with FAE Assistance to FAE in both primary and secondary data collection	
6	G.Kavitha	EB, SC	o Site visit with FAE o Collection of Baseline data of Flora and Fauna. o Impact of the project on flora and fauna.	
7	M.Arunkumar	WP	o Field visits along with FAE o Assistance to FAE in both primary and secondary data collection	

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 **Mr.S.Devendiran** rough stone and gravel quarry project with the extent of 2.28.0ha situated in the cluster with the extent of 10.15.50ha in Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District of Tamil Nadu is true and correct to the best of my 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: 10703
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
***

Dated **14/05/2024**

To,

DEVENDIRAN SRINIVASAN
DEVENDIRAN SRINIVASAN
S.Devendiran, S/o.Srinivasan, No.25, I.A.S Nagar, Thiruverumbur Taluk, Thiruchirappalli District-620013. Tamil Nadu State., THIRUVERUMBUR, TIRUCHIRAPPALLI, TAMIL NADU, 620013
devendiransri13@gmail.com

Subject: Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project in S.F.Nos. 33, 34/3, 34/4, 34/5, 34/6 & 34/8, of KILLUKULAVAIPATTI VILLAGE KULATHUR TALUK PUDUKOTTAI DISTRICT ROUGH STONE AND GRAVEL QUARRY LEASEOVER AN EXTENT OF 2.28.0 Ha submitted to Ministry vide proposal number SIA/TN/MIN/461913/2024 dated 02/04/2024.

Ref: 1. Online proposal No. SIA/TN/MIN/461913/2024, dt: 14/02/2024.
2. Your application submitted for Terms of Reference dated: 16.02.2024.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO24B0108TN5838807N
(ii) File No.	10703
(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	KILLUKULAVAIPATTI VILLAGE ROUGH STONE AND GRAVEL QUARRY LEASE
(viii) Name of Company/Organization	DEVENDIRAN SRINIVASAN
(ix) Location of Project (District, State)	PUDUKKOTTAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. 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 t(SEIAA under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority(SEIAA) Appraisal Committee of SEIAA in the meeting held on 03/05/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C EIA, EMP)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

5. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference under the

6. provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure(2)

7. 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 grant Terms of Reference for instant proposal of MR. DEVENDIRAN SRINIVASAN under the provisions of EIA Notification, 2006 and as amended thereof.

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

9. The Terms of Reference 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.

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

11. **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, Climate Change and 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 - 110 032.
3. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC,Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. The District Collector, Pudukkottai District.
7. Stock File.

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Seac Standard Conditions

S. No	Terms of Reference
1.1	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

S. No	Terms of Reference
	(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.

S. No	Terms of Reference
	● 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.

S. No	Terms of Reference
	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.

2. Seiaa Standard Conditions:

S. No	Terms of Reference
2.1	**Cluster Management Committee** 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 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. 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. 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 furnish the Emergency Management plan within the cluster. 9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public. 10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety. 11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents. **Impact study of mining** 12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following a) Soil health & soil biological, physical land chemical features . b) Climate change leading to Droughts, Floods etc. c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health. e) Agriculture, Forestry & Traditional practices. f) Hydrothermal/Geothermal effect due to destruction in the Environment. g) Bio-geochemical processes and its foot prints including environmental stress. h) Sediment geochemistry in the surface streams. **Agriculture & Agro-Biodiversity** 13. Impact on surrounding agricultural fields around the proposed mining Area. 14. Impact on soil flora & vegetation around the project site. 15. 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. 16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. **Forests** 19. The project proponent shall detailed study on impact of mining on Reserve forests free

S. No	Terms of Reference
	ranging wildlife. 20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. **Water Environment** 23. 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. 24. Erosion Control measures. 25. 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. 26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities. 28. 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. 29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. **Energy** **Climate Change** 32. 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. 33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock. **Mine Closure Plan** **EMP** 35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued. 36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan. **Risk Assessment** **Disaster Management Plan** **Others** 39. 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. 40. 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 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

S. No	Terms of Reference
	aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported
2.2	**SEIAA SPECIFIC CONDITIONS:** The Authority noted that the subject was appraised in the 457 meeting of SEAC held on 03.04.2024 and the SEAC has furnished its recommendations for the grant of Terms of Reference (TOR) with Public Hearing to the project subject to the conditions stated therein. After detailed discussions, the Authority accepted the recommendation of SEAC and decided to grant Terms of Reference (TOR) with Public Hearing based on studies. assessments and records to be produced as sought by the SEAC and SEIAA, for undertaking the Environment Impact Assessment Study and preparation of Environment Management Plan subject to the conditions as recommended by SEAC. **The production quantity of 73150 cu.m of Rough stone and 810 cu,m of Gravel for the annual peak production not exceeding 16030 cu.m to an ultimate depth 50m BGL for the project life of 5 years** as per the approved mining plan.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	An EIA-EMP Report shall be prepared for peak capacity (…..MTPA)operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of mineral production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
1.3	Propoer KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.

S. No	Terms of Reference
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of lengthe, quantity and quality of water to be diverted
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights S.N ML/Project Land use Area under Surface Rights(ha) Area Under Mining Rights(ha) (ha) Area under Both (ha) 1 Agricultural land 2 Forest Land 3 Grazing Land 4 Settlements 5 Others (specify) S.N. Details Area (ha) 1 Buildings 2 Infrastructure 3 Roads 4 Others (specify)

S. No	Terms of Reference
	Total
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laborartory and NABET accreditation of the consultant to be provided.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that

S. No	Terms of Reference
	area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored
1.27	PP to evaluate the green house emission gases from the mine operation and corresponding carbon absorption plan.
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.

S. No	Terms of Reference
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route.
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with the schedule of the implementation of the R&R Plan should be given.
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.
1.38	Corporate Environment Responsibility:
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.
1.42	d) To have proper checks and balances, the company should have a well laid down 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.
1.43	e) Environment Managament Cell and its responsibilities to be clearly spleel out in EIA/ EMP report
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.

S. No	Terms of Reference
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.
1.48	Details on the Forest Clearance should be given as per the format given: Total ML Project Area (ha) | Total Forest land (ha) If more than one provide details of each FC | Date of FC | Extent of Forest Land | Balance area for which FC is yet to be obtained | Status of appl For diversion of forest land
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes
1.52	Detailed Chronology of the project starting from the first lease deed alloted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET acrreditation) and Laboratory (NABL / MoEF & CC certification)
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.

Additional Terms of Reference

Specific Terms of Reference for (Mining Of Minerals)

1. Seac Conditions - Site Specific:

1. For the existing quarry, the PP shall obtain a letter from the concerned AD (Mines) which shall also stipulate the following information:

i. Original pit dimension of the existing quarry

ii. Quantity achieved Vs EC Approved Quantity

iii. Balance Quantity as per Mineable Reserve calculated.

iv. Month wise Production details

v. Mined out Depth as on date Vs EC Permitted depth

vi. Details of illegal/illicit mining carried out, if any

vii. Non-compliance/Violation in the quarry during the past working.

viii. Quantity of material mined out outside the mine lease area (or) in the adjacent quarry/land.

ix. Existing condition of Safety zone/benches

x. Details of any penalties levied on the PP for any violation in the quarry operation by the Department of Geology and Mining.

2. The PP shall submit the Certified Compliance Report (CCR) obtained from IRO(SZ), MoEF&CC with the status of non-compliance, and to furnish mitigation measures/remedial action plan with the budget allocation for the non-compliance stated in the CCR.

3. The PP shall furnish the consent agreement from the landowner registered with the concerned authority during the EIA appraisal.

4. The PP shall complete the fencing, tree plantation and photographs, videos of the same shall be furnished.

5. The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds, and provide the details during the EIA appraisal.

6. The Proponent shall complete the garland drainage around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal.

7. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc located within 1 km of the proposed quarry.

8. The Proponent shall justify the selection of the site for carrying out the stone quarrying with the total volume arrived for the excavation & production adequate details such as lithology of the deposit, reserve estimation, place for waste dump/mined mineral storage, end-use of mined materials, identified potential customers/end-users and travel path.

9. 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 with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, Schools/Colleges 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.

10. The proponent shall furnish photographs and video showing the 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.

11. During the EIA appraisal, the PP shall furnish the affidavit stating that he will not employ any external agency for carrying out the blasting operation in the proposed quarry and he shall also install the temporary (or) permanent magazine approved by the concerned licensing authority before the execution of the lease, for storing the authorized explosives & detonators separately in accordance with the Explosive Rules, 2008.

12. During the EIA appraisal, the PP shall furnish the affidavit stating that he will appoint a First Class/Second Class Mine Manager for managing the quarrying operations before obtaining the CTO from the TNPCB. Further, the PP will also send the 'Notice of Opening' indicating the appointment of such Statutory officials and the proposed usage of HEMM shall be sent to the Director of Mines Safety, Chennai Region of the Mine under the provisions of MMR 1961 atleast 30 days before the commencement of the mining operation after the execution of lease, if the EC is granted.

13. Since the structures including the houses are situated within a radial distance of 500 m, the PP shall carry out the scientific studies to design the controlled blast parameters for reducing the cumulative blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations carried out in the cluster of quarries located in the region, and subsequently with proper validation of the design through trial blasts in any of the existing & operating quarries to monitor the PPV produced from the blasting in the village (500m) and near the Temples (230 & 300 m), after obtaining the prior permission from the DMS / Chennai Region in accordance with DGMS Circular No. 7 of 1997, by involving anyone of these reputed Research and Academic Institution such as CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, IIT (ISM)/Dhanbad, IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. Further the report shall also include the actual data on the air dust particles produced at the time of blasting. A copy of such scientific study report shall be submitted to the SEIAA, MoEF as a part of EIA study during the appraisal and to the DMS/DGMS-Chennai Region while submitting the Notice of Opening, without any deviation.

14. Since the quarrying operations are proposed in an existing pit possessing the quarry wall of 25 to 27 m depth without adequate benches in accordance with the provisions of MMR, 1961, the PP shall carry out the scientific studies to assess the slope stability of the working benches and existing quarry wall for spelling out the stabilization measures to ensure the safety of the persons to be employed in the proposed quarry, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, IIT (ISM)/Dhanbad, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. A copy of such scientific study report shall be

submitted to the SEIAA, MoEF as a part of EIA study during the appraisal and to the DMS/DGMS-Chennai Region while submitting the Notice of Opening, without any deviation.

15. The PP shall prepare the Standard Operating Procedures (SoP) for carrying out the 'Best Mining Practices' in the areas of drilling, blasting excavation, transportation and green belt development and provide the same during the EIA appraisal.

16. 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 min**e.**

Signature Not Verified

Digitally Signed by : A R Rahul Nadh IAS
Member Secretary, SEIAA

Date: 14/05/2024

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From

Thiru.K.Vijayaragavan,M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To

Thiru.S.Devendiran,
S/o.Srinivasan,
No.25, I.A.S.Nagar,
Thiruverumbur Taluk,
Tiruchirappalli District .

Sir,

Rc.No.552/2022 (G&M) dated 24.11.2023

Sub : Mines and Minerals - Minor Mineral – Pudukkottai District - S.F.Nos.33, 34/3 etc., of Killukkulavaipatti Village, Kulathur Taluk, over an extent of 2.28.0 Hects – Rough stone & gravel -Quarry Lease Application preferred by Thiru.S.Devendiran – Reg.

Ref : 1.Application of Thiru.S.Devendiran, S/o.Srinivasan, dt.27.07.2022.
2.Precise area communication in Rc.No.552/2022 (G&M) dated 20.11.2023.
3.Letter from Thiru.S.Devendiran, S/o.Srinivasan, letter dt. .11.2023.

. . . . .

With reference to your letter in the reference 3rd cited, the details of existing and lease expired quarries located within 500m radius from the proposed Rough stone & gravel quarry, over an extent of 2.28.0 Hects in patta S.F.Nos.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) and 34/8(0.07.5) of Killukulavaipatti village, Kulathur Taluk, Pudukkottai District are as follows:

1) Existing Other Quarries:

S.No	Name of the Lessee / Permit Holder	Village & Taluk	S.F.No	Extent	Lease period
1.	Thiru.G.Ravi, S/o.M.Ganesan (late), B/147, Koothipar Road, Thiruverumbur, Thiruchirappalli	Killukottai Kulathur	383/12 etc.,	2.23.0	10.06.2021 to 09.06.2026
2.	Thiru.R.Rajmohan, S/o.Rajappan, No.2/248-1, Karaiyanpudur, Pappinaickenpatti (post), Namakkal District	Themmavur Kulathur	117/1B etc.,	2.41.0	08.07.2021 to 07.07.2026
3	Thiru.S.Devendiran, S/o.A.R.Srinivasan, No.25, I.A.S. Nagar, Thiruverumbur, Trichy	Killukulavaipatti Kulathur	40/4	0.53.5	25.04.2022 to 24.04.2027
			Total	5.17.5	

2) Proposed Area

S. No	Name of the applicant	Village &Taluk	S.F.No	Extent
1	Thiru.Devendhiran, S/o.Sreenivasalu, No.25, I.A.S.Nagar, Thiruvarambur, Thiruchirappalli	Killukulavaipatti Kulathur	33 & etc.,	2.28.0

3) Lease Expired

S. No	Name of the Lessee / Permit Holder	Village & Taluk	S.F.No	Extent	Lease period
1	Thiru.Devendhiran, S/o.Sreenivasalu, No.25, I.A.S.Nagar, Thiruvarambur, Thiruchirappalli	Killukulavai-patti Kulathur	33 & etc.,	2.28.0	22.10.2016 to 21.10.2021
2	Jeyam Magalir Ponvizha Grama Suya Velai Vaippu Thitta Nala Sangam, Koppampatti, Kulathur Taluk, Pudukkottai District	Killukulavai-patti Kulathur	32(part)	0.72.5	27.06.2017 to 26.06.2022
3	Kanagu Magalir Ponvizha Grama Suya Velai Vaippu Thitta Nala Sangam, Koppampatti, Kulathur Taluk, Pudukkottai District	Killukulavai-patti Kulathur	35(part)	0.75.0	27.06.2017 to 26.06.2022
4	Manjal Magalir Ponvizha Grama Suya Velai Vaippu Thitta Nala Sangam, Koppampatti, Kulathur Taluk, Pudukkottai District	Killukulavai-patti Kulathur	37 (South)	0.80.0	27.06.2017 to 26.06.2022
5	R.Rajmohan, S/o.Rajappan Selvpuram, Thiruvarambur, Trichy-13	Themmavur Kulathur	95/1, 95/16 95/9A & 95/9B	0.38.5	18.03.2008 to 17.03.2013
			Total	4.94.0	

Assistant Director,
Geology and Mining,
Pudukkottai

From

Thiru.K.Vijayaragavan,M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To

Thiru.S.Devendiran,
S/o.Srinivasan,
No.25, I.A.S.Nagar,
Thiruverumbur Taluk,
Tiruchirappalli District

Rc.No. 552/2022 (G&M) dated 24.11.2023

Sir,

Sub: Mines and Quarries – Minor Minerals – Pudukkottai District – Kulathur Taluk – Killukkulavaipatti village in S.F.Nos.33, 34/3 etc., - over an extent of 2.28.0 Hects., of patta lands - Rough stone & Gravel quarry lease – draft mining plan submitted to Thiru.S.Devendiran - Approval of mining plan - Regarding.

Ref: 1.Application of Thiru.S.Devendiran, S/o.Srinivasan, dt.27.07.2022.
2.Precise area communication in Rc.No.552/2022(G&M) dated 20.11.2023.
3.Letter from Thiru.S.Devendiran, S/o.Srinivasan, letter dt. .11.2023.

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In the reference 1st cited, Thiru.S.Devendiran, S/o.Srinivasan, No.25, I.A.S.Nagar, Thiruverumbur Taluk, Tiruchirappalli District has applied for the grant of lease to quarry rough stone & Gravel, over an extent of 2.28.0 hects in patta lands in S.F.Nos.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) and 34/8(0.07.5) of Killukkulavaipatti village, Kulathur Taluk, Pudukkottai District under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

2) The precise area has been communicated to the applicant under reference 2nd cited above, based on the recommendations of the Revenue Divisional Officer, Illuppur and the Assistant Geologist of Geology and Mining, Pudukkottai and Special Revenue Inspector (Mines), Pudukkottai.

3) In exercise of powers delegated under Rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959, I hereby approve the mining plan submitted by Thiru.S.Devendiran, S/o.Srinivasan for grant of lease to quarry rough stone & gravel, over an extent of 2.28.0 hects in patta lands in S.F.Nos.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) and 34/8(0.07.5) of Killukkulavaipatti village, Kulathur Taluk, Pudukkottai District for a period of five years and the proposed mineable reserves of rough stone and gravel after leaving safety distance is arrived as **73960 M³** and **810 M³** to the proposed depth of 50m. This approval is subject to the following conditions:-

(i). That 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.

(ii). This approval of the mining plan does not in any way imply the approval of the Government in terms of 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, Indian Explosives Act, 1884(Central Act IV of 1884) and the rules made there under the Tamil Nadu Minor Mineral Concession Rules, 1959.

(iii). That the mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.

Assistant Director,
Geology and Mining,
Pudukkottai.

Encl: 2 copies of Approved Mining Plan.

Copy submitted to :

1. The Chairman,
   State Level Environment Impact Assessment Authority, Chennai
2. The Commissioner of Geology and Mining, Industrial Estate, Guindy, Chennai- 32.

MINING PLAN

FOR

KILLUKULAVAIPATTI VILLAGE ROUGH STONE AND GRAVEL MINING LEASE

WITH PROGRESSIVE QUARRY CLOSURE PLAN

Patta- Ryotwari land/Non-forest/Captive Use –"B2' Category

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	:	PUDUKKOTTAI
TALUK	:	KULATHUR
VILLAGE	:	KILLUKULAVAIPATTI
S.F.NO'S	:	33, 34/3, 34/4, 34/5, 34/6 & 34/8
EXTENT	:	2.28.0 Hectares

ADDRESS OF THE APPLICANT

Mr.S.Devendiran,

S/o. Srinivasan,

No.25, I.A.S Nagar,

Thiruverumbur Taluk,

Tiruchirappalli District – 620013.

PREPARED BY

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

RQP/MAS/263/2014/A

GEO TECHNICAL MINING SOLUTIONS

No: 1/213 -B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office,
Dharmapuri-636705. Tamil Nadu.
Mob. : +91 9443937841, +917010076633,
E-mail: info.gtmsdpi@gmail.com ,
Website: www.gtmsind.com

CONTENTS

ANNEXURES

Sl. No.	Description	Annexure No.
1.	Copy of precise area communication letter	I
2.	Copy of Previous Lease Particulars a) Copy of Environmental Clearance b) Copy of Proceeding letter c) Copy of Lease deed	II
3.	Copy of **FMB** (Field Measurement book)	III
4.	Copy of "A" registered	IV
5.	Copy of Chitta & adangal	V
6.	Copy of Consent Letter	VI
7.	Photocopy of the proposed lease area	VII
8.	Copy of ID Proof of the authorized signature	VIII
9.	Copy of RQP certificate	IX

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
6	Mine lease plan	II	1:1000
7	Surface & Geological plan	III	1:1000
8	Geological sections	IIIA	**Sections** HOR 1:1000 VER 1:500
9	Year wise Development & Production plan	IV	1:1000
10	Year wise development & Production sections	IVA	**Sections** HOR 1:1000 VER 1:500
11	Mine layout plan and Land use pattern	V	1:1000
12	Conceptual plan	VI	1:1000
13	Conceptual sections	VIA	**Sections** HOR 1:1000 VER 1:500

Mr.S.Devendiran,
S/o. Srinivasan,
No.25, I.A.S.Nagar,
Thiruverumbur Taluk,
Tiruchirappalli District – 620013

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry lease in S.F.No's: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0hectares of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State has been prepared by

Dr. S. KARUPPANNAN. M.Sc., Ph.D. (Regn. No. RQP/MAS/263/2014/A)

I request **"The Assistant Director",** Department of Geology and Mining, Pudukkottai District to make further correspondence regarding modifications of the Mining Plan with the said Recognized Qualified Person on this following address,

Dr. S. KARUPPANNAN. M.Sc., Ph.D.
(Regn. No. RQP/MAS/263/2014/A)
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

I hereby undertake that all modifications so made in the Mining Plan by the Recognized 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: Tiruchirappalli, TN.

Date:

Signature of the applicant
(S. Devendiran)

Mr.S.Devendiran,
S/o. Srinivasan,
No.25, I.A.S.Nagar,
Thiruverumbur Taluk,
Tiruchirappalli District – 620013

DECLARATION

The Mining Plan in respect of rough stone and gravel quarry lease in S.F.No's: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0hectares of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai 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: Tiruchirappalli, TN.
Date:

Signature of the applicant
(S. Devendiran)

Dr. S. KARUPPANNAN. M.Sc., Ph.D.
(Regn. No. RQP/MAS/263/2014/A)
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 & 20 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: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0hectares of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State applied to **Mr.S. Devendiran,** Tiruchirappalli, Tamil Nādu State.

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:

Signature of the Recognized Qualified Person

Dr.S. KARUPPANNAN, M.Sc.,Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, Tamil Nadu, India.

Dr. S. KARUPPANNAN. M.Sc., Ph.D.
(Regn. No. RQP/MAS/263/2014/A)
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

I certify that, in preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No's: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0hectares of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State prepared to **Mr.S. Devendiran,** Tiruchirappalli, Tamil Nādu State 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:

Signature of the Recognized Qualified Person

Dr.S.KARUPPANNAN, M.Sc.,Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex
Collectorate Post Office, Oddapatti,
Dharmapuri, [illegible] Tamil Nadu, India

MINING PLAN

FOR KILLUKULAVAIPATTI VILLAGE ROUGH STONE AND GRAVEL MINE LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

Patta- Ryotwari land/Non-forest/Captive Use –"B2' Category

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 applicant Mr.S.Devendiran S/o. Srinivasan, No.25, I.A.S.Nagar, Thiruverumbur, Tiruchirappalli District, Tamil Nadu State and filed with application for new proposals has submitted to the Assistant Director, Department of Geology and Mining (ADG & M), Pudukkottai dated 27.07.2022 had requested to grant the quarry lease for rough stone and gravel in S.F.No's: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0 hectares of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State.

b) **The Precise area communication letter:** The Assistant Director, Department of Geology and Mining, Pudukkottai has directed to the applicant Mr.S.Devendiran through his precise area communication letter Rc.No.552/2022(G&M) Dated: 03.11.2023 before execution of lease deed The Applicant should submit the mining plan for approval and obtain environmental clearance from the competent authority of **S**tate **L**evel **E**nvironment **I**mpact **A**ssessment **A**uthority-**T**amilNadu (SEIAA) Per EIA notification S.O.1533(E) dated 14th September 2006 and its subsequent amendments S.O.3977(E), dated 14th August 2018, MoEF & CC office memorandum letter F.No.22-1/2019 -IA.III [E116917] dated 15th December, 2021 for quarrying lease of rough stone and gravel at Tamil Nadu State, Pudukkottai District, Kulathur Taluk, Killukulavaipatti Village in S.F.No's. 33, 34/3, 34/4, 34/5, 34/6 & 34/8 over an extent of 2.28.0hectares has recommended as following conditions for a period of five (5) years under Rule 19 & 20 of Tamil Nadu Minor Mineral Concession Rules, 1959.

(i) Leave a safety distance of 7.5meter should be provide to the adjacent patta lands.

(ii) A safety distance of 10m should be provided for the road situated in S.F.No.34/7 on the north side.

(iii) A safety distance of 10m should be provided for the Government Poramboke (Kallankuthu) land situated in S.F.No.32,37,35 on the West and south side of the applied lease area.

c) **The previous lease particulars:** The proposed lease area was previously granted to quarrying of rough stone in favor of **Mr.S.Devendiran** by the District Collector, Pudukkottai proceedings vide Rc.No.224/2014, dated 22.09.2016 in S.F.No.33, 34/3,34/4, 34/5, 34/6 & 34/8, Pudukkottai District, Kulathur Taluk, Killukulavaipatti Village, over an extent of 2.28.0hectares for a period of 5 years. The lease was executed 22.10.2016 to 21.10.2021 for a period of 5 years. The applicant got Environmental Clearance from SEIAA, Lr.No.SEIAA-TN/F.No.5035/1(a)/ EC.No.3323/2016 dated: 15.07.2016.

There is an existing pit was noticed with an average pit dimension as given under the table and the existing pit marked in the surface and geological plan (Ref Plate No's: III).

Avg.Existing pit Dimension			
Pit	**Length (m)**	**Width (m)**	**Depth(m)**
I	133	109	25
II	25	51	27

d) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959 for mining lease as per conditions mentioned in the precise area communication letter **Rc.No. 552/2022(G&M) Dated: 20.11.2023.**

e) **Geological resources and Mineable reserves:** Geological resource of estimated as **619676m³** including the resources of safety zone, and gravel, etc. Of which, rough stone resources of about **614271m³** and gravel is **5405m³**. The total mineable reserve is estimated to be **73960m³** by deducting the reserve safety zone, block in benches from the total Geological resources. Of which, rough stone is about **73150m³** and gravel is **810m³** up to a depth of 50m below the ground level (R.L.145m-95m) (Refer Plate No. IIIA & VIA).

f) **Proposed Production Schedule** Total proposed production of **73960m³**. Of which, rough stone is about **73150m³** and gravel is about **810m³** up to a depth of 50m below the ground level (R.L.145m-95m) for five years plan period. Average production is **14630m³** of rough stone per year and gravel is **162m³**. (Refer Plate No. IVA)

g) **Environmental Sensitivity of the proposed lease area: -**

i). **Interstate boundary:** No interstate boundary around 10Km radius periphery of proposed lease area.

ii). **Wildlife Protection Act, 1972:** There is no wild life animal sanctuary within radius of 10Km from the project site area under the Wildlife (Protection) Act, 1972.

iii). **Indian Reserve Forest Act, 1980:** There is no reserve forest within the 1.0km radius periphery of proposed lease area. The nearest reserve forest is

1. Killukottai R.F = 2.37km-North Side

iv). **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,

a. Usage of sharp drill bits while drilling which will help in reducing noise.
b. Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.
c. Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.
d. Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.
e. Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
f. Transportation of material will be carried out during day time and material will be covered with tarpaulin.
g. The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
h. 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	:	**Mr.S.Devendiran**
	Applicant address	:	S/o. Srinivasan, No.25, I.A.S.Nagar, Thiruverumbur Taluk,
	District	:	Tiruchirappalli
	State	:	Tamil Nadu
	Pin code	:	620013

	Phone	:	
	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 intends to mine	:	Rough stone and gravel quarry lease
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 years.
e.	Name of the Qualified Person	:	**Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,**
	Address	:	**GEO TECHNICAL MINING SOLUTIONS** (A NABET Accredited & ISO certified Company) No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
	Fax	:	Nil
	e-mail	:	info.gtmsdpi@gmail.com
	Telex	:	Nil
	Registration Number	:	RQP/MAS/263/2014/A
	Date of grant/renewal	:	16.12.2014
	Valid upto	:	15.12.2024
f.	Name of the prospecting	:	**Geo Technical Mining Solutions**

	agency		GSR 286(E) No:272, Ministry of Mines Notification 7th April 2022.
	Address	:	No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
g.	Reference No. and date of consent letter from the state government	:	The precise area communication letter issued by the Assistant Director, Department Geology and Mining, Pudukkottai vide **Rc.No.552/2022(G&M) Dated: 20.11.2023**

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB
	District & State	:	Pudukkottai, Tamil Nadu
	Taluk	:	Kulathur
	Village	:	Killukulavaipatti

Khasra No./ Plot No./ Block Range/ Felling Series etc.:

Survey No.	Sub division	Total Extent in Hect	Patta No.	Name of the Land Owner	Mine lease Applied S.F. No.	Mine lease Applied Area out of total area in hect.
33	-	0.43.0	649	Mr.Prassad, Mr.Devendiran, Mr.Prakash Mrs.Santhakumari	33	0.43.0
34	3	0.26.0			34/3	0.26.0
34	4	0.31.50			34/4	0.31.50
34	5	0.72.50			34/5	0.72.50
34	6	0.47.50			34/6	0.47.50
34	8	0.07.50			34/8	0.07.50
Total Extent		**2.28.0**		**Applied lease area extent**		**2.28.0**

	Lease area (hectares)	:	2.28.0 Hectares
	Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	It is a Patta land
	Ownership / Occupancy	:	This is a patta land S.F.No's: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 is registered on the name of Mr.M.Prassad, S/o. Munnirathana naidu, Mr.Devendiran, S/o. Srinivasan, Mr.M.Prakash S/o. Munirathnam & Mrs.Santhakumari W/o

		Munnirathana Naidu as side patta no. 649. (Ref. Annex. No: IV). Hence the pattadhar given consent to the applicant.
Existence of Public Road / Railway line if any nearby and approximate distance	:	✓ Exploited quarry materials will be transported through the approach road situated on the south side which is connecting Koppampatti road. ✓ There is a MDR-833 is situated on the east side about 0.63km which is connecting Sengipatti – Thenmavur Road. ✓ There is no NH road situated around 5km radius from the lease area. ✓ There is no railway line situated around 5km radius from the site.
Toposheet No. with latitude and longitude	:	Toposheet No. **58 J/14** Latitude : From 10°37'24.42"N to 10°37'29.62"N longitude: From 78°55'27.27"E to 78°55'35.08"E

Geo-Coordinates of the lease boundary:

PILLAR ID	LATITUDE	LONGITUDE
1	10°37'29.19"N	78°55'34.07"E
2	10°37'28.37"N	78°55'35.08"E
3	10°37'27.70"N	78°55'34.95"E
4	10°37'25.66"N	78°55'33.15"E
5	10°37'24.74"N	78°55'34.34"E
6	10°37'24.42"N	78°55'32.59"E
7	10°37'24.76"N	78°55'30.85"E
8	10°37'25.33"N	78°55'30.07"E
9	10°37'24.71"N	78°55'29.17"E
10	10°37'26.05"N	78°55'27.27"E
11	10°37'26.84"N	78°55'28.12"E
12	10°37'27.21"N	78°55'28.19"E
13	10°37'27.83"N	78°55'28.92"E
14	10°37'27.72"N	78°55'29.36"E
15	10°37'28.31"N	78°55'29.52"E
16	10°37'28.81"N	78°55'30.40"E
17	10°37'29.62"N	78°55'31.13"E
18	10°37'29.60"N	78°55'31.87"E
19	10°37'28.88"N	78°55'33.78"E

Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is an barren and virgin ground

b).	***Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. 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.***	:	Refer plate no-1A & 1B

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Killukottai	3.4Km	North
b.	Nearest police station	Udaiyalipatti	3.8km	Southwest
c.	Nearest fire station	Gundur	21.0km	Northwest
d.	Nearest medical facility	Killukottai	3.2Km	North
e.	Nearest school	Koppampatti	1.0Km	Southeast
f.	Nearest railway station	Keeranaur	16.0km	Southwest
g.	Nearest port facility	Thoothukudi	222.2km	South
h.	Nearest airport	Trichy	28.2km	NW
i.	Nearest DSP office	Vallam	22.6km	South
j.	Nearest villages	Ulagankattanpatti	1.73Km	North
		Koppampatti	0.5Km	Southeast
		Thenmavur	2.5km	South
		Killukulavaipatti	0.72km	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 exhibits flat topography which is an average altitude of about 145m AMSL. The slope is towards northern side and falls in Toposheet no. 58 J/14.
(ii)	General Geology of the district: The geological formation of Pudukkottai District comprises of the hard rocks formed in the Archean age to the sedimentary deposits of the Quaternary period. Geologically the entire study area can be divided into hard rock and sedimentary rock regions. The hard rocks are found on the western side and sedimentary formation towards the eastern direction of the study area. About 45 per cent of the study area is under hard massive formation of Archean age and the rest 55 per cent comprises of the sedimentary formation ranging from Pre-Cambrian to Quaternary period. The various types of hard rocks found here are Charnockites, Hornblende Gneiss, Biotite Gneiss, Granite and Quartzite's. Various types of Gneiss rocks are found in the western part of Pudukkottai District. Charnockites and granites rocks are mostly found in the central part including the blocks of Kunnandavarkoil, Thirumayam and the southern parts of Pudukkottai Block. The various types of Gneiss rocks are found in the western part of the study area, consisting the blocks of Viralimalai, Annavasal and Ponamaravathy. Quartzite deposits are found in small quantity in some parts of Annavasal and Thirumayam Blocks. In the Blocks of Kulathur, Thirumayam and parts of Pudukkottai crystalline rocks are found. The sedimentary deposits found in this region consist of shaly sandstone, sand, clay and gravels. The sedimentary deposits formed during the		

Tertiary period consist of laterite, arenaceous and argillaceous sandstone clay. These deposits are found in the Blocks of Arantangi, Gandarvakottai, Alangudi and Thiruvarankulam. Creeateous deposits consisting of clay, limestone, sand stone and clayey sand stone are found in some parts of Gandarvakottai, Thirumayam and Pudukkottai. Unconsolidated coastal alluvial deposits consisting of sand gravel and silt are found along the river bed. Silt and clay deposits of Quaternary period are found in the blocks of Avudaiyarkoil and Manalmelkudi. Sand deposits with beach ridges and dunes are identified near the coastal boundary of Pudukkottai District.

The Stratigraphic succession of different rock types in Pudukkottai District is as follows:

Age	Group	Rock Formation
Cainozoic	**1.Quaternary** (Recent) Holocene to late - Pleistocene -	Fluvial, Fluvio – Marine, Aeolian and Marine Sediments
	2. **Teritary** Early to Middle Pleistocene	Laterite
	Mio – Pliocene (Cuddalore Formation)	Sandstone
Proterozoic	Acid intrusive	Pegmatite / Quartz Veins
	(Pudukkottai Granite)	Pink Granite , Granite - Gneiss
Archaean	Migmatite Complex	Grey Migmatite/ Hornblende – Biotite Gneiss, Grey Granolite, Garnet Granolite
	Charnockite Group	Pyroxene Granulite, Charnockite
	Khondalite Group	Calc – Gneiss/ Calc – Granulite, Crystalline, Limestone Quartzite

(iii) Local / Mine Geology of The Mineral Deposit:

Topography of the proposed lease area:

The lease area exhibits a flat topography which is an average altitude of about 145m AMSL.

Mode of origin:

The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. The constituents of the rock suggest of its origin in particularly dry and high temperature conditions which is deduced to have an important bearing in explicating prehistoric crustal

development of the earth.

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 in appearance with an even grained granular structure.

Chemical composition of rocks:

The compositional characteristics of co-existing orthopyroxene, garnet and biotite have established several petrographic varieties within the Charnockites– Enderbites such as the granulites and gneisses. The mineral composition shows an unvarying presence of pleochroic rhombic pyroxene. Plagioclase feldspars, alkali feldspars and quartz are the salic minerals present in this series of rocks. Order of superposition of the proposed lease area, **Order of superposition of the proposed lease area,**

Age	Group	Rock Formation
Recent to Sub recent	----	Gravel
Archaean	Charnockite Group	Charnockite

(iv)	Drainage Pattern	:	No major river located within 50m radius. The drainage in the area is 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:	:	There is an existing pit was noticed by RQP with a pit level-I L133m X W109m X D25m, pit level-II L25m X W51m X D27m. The Charnockite rocks are well seen in the existing pit with covered by lateritic soil over the part of lease area.
	b. Surface Plan	:	Surface plan showing elevation contour and accessibility road was prepared at the scale of 1: 1000, as shown in Plate No. III.
(c)	Geological sections should be prepared at suitable intervals	:	Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1:

	on a scale of 1: 1000 / 1: 2000:		1000 and at the vertical scale of 1:500 as shown in Plate No. IIIA

(d) ***Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below :-***

Year	No.of boreholes	Total meterage	No.of Pits and Dimensions	No.of Trenches and Dimensions
I	N.A	---	---	N.A
II	N.A	---	---	N.A
III	N.A	---	---	N.A
IV	N.A	---	---	N.A
V	N.A	---	---	N.A

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 two longitudinal and two transverse sections to calculate the volume of material up to the depth of 50m below ground level. The longitudinal and transverse cross sections were assigned XY-AB, X1Y1-CD as respectively. Using the cross-sectional method, total reserve is estimated to be **619676m³** including the resources of safety zone, and gravel, etc. Of which, rough stone resources of about **614271m³** and gravel is **5405m³**.

The gravel is obtained about 0-2.0m (R.L.145m -143m) and a rough stone starts from 2 to 50m (R.L.143-95m) from the below the ground level. (Refer plate no's.IIIA).

GEOLOGICAL RESOURCES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M³	Rough Stone in M³	Gravel in M³
XY-AB	I	13	10	2	260	.....	260
	I	17	11	3	561	561	.....
	II	19	11	5	1045	1045	.....
	III	22	23	5	2530	2530	.....
	IV	29	25	5	3625	3625	.....
	V	31	27	5	4185	4185	.....
	VI	149	126	5	93870	93870	.....
	VII	149	126	5	93870	93870	.....
	VIII	149	126	5	93870	93870	.....
	IX	149	126	5	93870	93870	.....
	X	149	126	5	93870	93870	.....
TOTAL				**50**	**481556**	**481296**	**260**

XIY1-CD	I	44	15	2	1320	.....	1320
	I	75	17	3	3825	.....	3825
	II	75	18	5	6750	6750	.....
	III	75	20	5	7500	7500	.....
	IV	75	21	5	7875	7875	.....
	V	75	22	5	8250	8250	.....
	VI	75	40	2	6000	6000	.....
	VI	75	56	3	12600	12600	.....
	VII	75	56	5	21000	21000	.....
	VIII	75	56	5	21000	21000	.....
	IX	75	56	5	21000	21000	.....
	X	75	56	5	21000	21000	.....
TOTAL				**50**	**138120**	**132975**	**5145**
GRAND TOTAL					**619676**	**614271**	**5405**

(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 **73960m³** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 50m (R.L.145-95m) below ground level. Of which, rough stone is about **73150m³** and gravel is **810m³**. The commercially viable rough stone has been prepared on 1: 1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no. VIA).

MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M³	Rough Stone in M³	Gravel in M³
XY-AB	VI	79	56	5	22120	22120	.....
	VII	69	46	5	15870	15870	.....
	VIII	59	36	5	10620	10620	.....
	IX	51	26	5	6630	6630	.....
	X	41	16	5	3280	3280	.....
TOTAL				**25**	**58520**	**58520**	**0**
XIY1-CD	I	27	15	2	810	.....	810
	I	55	17	3	2805	2805	.....
	II	45	18	5	4050	4050	.....
	III	35	20	5	3500	3500	.....
	IV	25	21	5	2625	2625	.....
	V	15	22	5	1650	1650	.....
TOTAL				**25**	**15440**	**14630**	**810**
GRAND TOTAL					**73960**	**73150**	**810**

4.0 MINING:

a.	Briefly describe the existing / proposed method for developing / working the deposit with all design	:	The mining operation is opencast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations,

	parameters. (Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)	:	1961 in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 5m 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 **73960m³**. Of which, rough stone is about **73150m³** and gravel is **810m³** up to a depth of 50m below the ground level (R.L.145-95m) from the below ground level for five years plan period. (Refer Plate No's. IVA).

Year	Pit No.(s)	Topsoil/ Overburden (m^3)	ROM (m^3)	Saleable rough stone (m^3) @ 100%	Rough stone rejects(m^3)	Sub grade/ Weathered rock (m^3)	Saleable Gravel (m^3)	Rough stone to waste ratio
First	I	...	15440	14630	...	...	810	...
Second	I	...	14000	14000	...	...	...	...
Third	I	...	14100	14100	...	...	...	...
Fourth	I	...	14390	14390	...	...	....	...
Fifth	I	...	16030	16030	...	...	....	...
Total	—	**...**	**73960**	**73150**	**...**	**...**	**810**	**...**

c. ***Composite plans and Year wise sections (In case of 'A' class mines):*** : Not applicable. It is a "B" class quarry lease

YEARWISE PRODUCTIONS

Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Rough Stone in M^3	Gravel in M^3
X1Y1-CD	I-YEAR	I	27	15	2	810	.....	810
		I	55	17	3	2805	2805	.....
		II	45	18	5	4050	4050	.....
		III	35	20	5	3500	3500	.....
		IV	25	21	5	2625	2625	.....
		V	15	22	5	1650	1650	.....
	TOTAL					**15440**	**14630**	**810**
XY-AB	II-YEAR	VI	50	56	5	14000	14000	

	TOTAL					**14000**	**14000**	
XY-AB	III-YEAR	VI	29	56	5	8120	8120	.....
		VII	26	46	5	5980	5980	.....
	TOTAL					**14100**	**14100**	**0**
XY-AB	IV-YEAR	VII	43	46	5	9890	9890	.....
		VIII	25	36	5	4500	4500	.....
	TOTAL					**14390**	**14390**	**0**
XY-AB	V-YEAR	VIII	34	36	5	6120	6120	.....
		IX	51	26	5	6630	6630	.....
		X	41	16	5	3280	3280	.....
	TOTAL					**16030**	**16030**	**0**
GRAND TOTAL						**73960**	**73150**	**810**

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. It is "B2" category of mine.

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:

Rough stone:

Mineable reserves of rough stone 5 Years = **73150m³**

Yearly production of rough stone = **14630m³**

Monthly production of rough stone = **1219m³**

Gravel

Production reserves of gravel = **810m³**

Yearly production of gravel = **162m³**

The regular working of the quarry and its production depends upon the demand from the market. The market is always fluctuating and flexible one. Accordingly, there is a possibility to increase or decrease the production. The year wise production, anticipated life of quarry etc., are only a tentative figure.

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 in leasehold area: Give broad description identified potential areas to be covered in the given time frame:	:	Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about up to a depth of 50m below ground level (R.L.145m-95m) 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.

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

ULTIMATE PIT LIMIT-(XY-AB)						
Bench	**Bench R.L**	**Period**	**Overburden/ Mineral**	**L (m)**	**W (m)**	**D (m)**
I-V	R.L.145-120m	Five Years	Existing	-	-	25
VI	R.L.120-115m		Rough stone	79	56	5
VII	R.L.115-110m		Rough stone	69	46	5
VIII	R.L.110-105m		Rough stone	59	36	5
IX	R.L.105-100m		Rough stone	51	26	5
X	R.L.100-95m		Rough stone	41	16	5
					Total	**50**

ULTIMATE PIT LIMIT-(X1Y1-CD)						
Bench	**Bench R.L**	**Period**	**Overburden/ Mineral**	**L (m)**	**W (m)**	**D (m)**
I	R.L.145-140m	Five Years	Gravel	27	15	2
I	R.L.145-140m		Rough stone	55	17	3
II	R.L.140-135m		Rough stone	45	18	5
III	R.L.135-130m		Rough stone	35	20	5
IV	R.L.130-125m		Rough stone	25	21	5
V	R.L.125-120m		Rough stone	15	22	5
					Total	**25**

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	:	The recovery of rough stone in this quarry is 100%. There is no waste rock will be proposed in this lease area.

	activity: -		
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 fish culture or storage of rain water reservoir used for irrigation purposes.
g.	***Open cast Mines:***		
	i). Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	:	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 5m 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 to the plans enclosed under 4(b) and 4(d) will suffice	:	The rough stone is proposed to quarry at 5m bench height & width conventional opencast semi mechanized quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste and are removal using Hydraulic excavator and loaded directly to the tippers. Bench height = 5mts. Bench width = 5mts.
	a. Details of Topsoil/	:	There is no topsoil will be removed.

	Overburden		
	b. Rough Stone waste and side burden waste:-	:	There is no waste or side burden shall be proposed.
h.	***Underground Mines:***	:	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.

Type	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.
Jack Hammer	2	32 mm	Hand held	--	Diesel	--
Compressor	1	---	Air	--	Diesel	--

(2) Loading Equipment:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Hydraulic Excavator	1	3.0m^3	--	Diesel	--

(3) Haulage and Transport Equipment

(a) Haulage within the mining leasehold:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	4	15T	--	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 B2 category mine.

	a. Transport from mine head to the destination	:	Tipper will be used for transport rough stone from the mine head to needy customer.
	b. 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.
	c. Ore transported by: own trucks / hired trucks	:	Hired trucks for initially production purposes
	d. Main destination to which ore is transported	:	The excavated stone materials road metal will be supplied to the consumers like road

	(giving to and from distance)		laying, earth filling, building construction, etc

e. Details of hauling / transport equipment:

Type	Nos	Size / Capacity	Make	Motive power	H.P
--	--	--	--	--	--

(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 opencast, 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. (Refer Part-A- 4 (i))

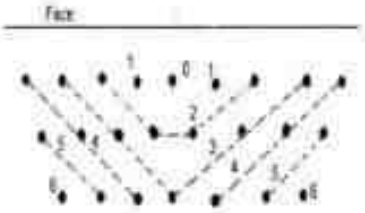
5. BLASTING:

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 opencast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.

1	Diameter of the hole	32 mm
2	Spacing between hole	1.2m
3	Burden for hole	1.0m
4	Depth of each hole	1.5m
5	Output per hole = Spacing × Burden × depth 1.2 × 1.0 × 1.5 = 1.8 x 2.8	5.04MT
6	Output per hole = $1.8m^3$ x 2.8 = 5.04 MT	5.04MT
7	Production per annum $14630m^3$ * 2.8= 40964MT	40964MT
8	Total handling per day (280 working day)	146MT
9	Nos. of holes per day (146/5.04 = 29)	29holes
10	Meterage required per day (29× 5.5 = 160)	160meters
11	Charge per hole	0.5kg
12	Powder factor (29 X 0.5 kg = 15)	15 kg



Stagged 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 jackhammer 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	:	29holes
Yield	:	146 MT
Total explosive required	:	15kg-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 /	:	Powder factor is proposed as 0.5kg per hole of explosives

	development heading / stope		
	d) Whether secondary blasting is needed, if so describe it briefly	:	Irrespective of the method of primary blasting employed, it may be necessary to re-blast a proportion of the rock on the quarry floor so as to reduce it to a size suitable for handling by the excavators and rock breakers. by the excavators and crushers.
	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:***		
	Likely depth of water table based on observations from nearby wells and water bodies	:	The ground water table is reported as of 65m in summer and 60m in rainy season from the general ground level observed in the adjacent bore well.
	Workings expected to be _____m. above / reach below water table by the year _____.	:	Proposed mining depth is 50m below ground level. Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.
	Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged	:	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 Lpm and it shall be pumped out periodically by 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 next five years: No separate of topsoil will be removed. There is no rough stone waste or side burden will be removed in this proposed lease area.		
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.	:	There is no waste or any other mineral dumps are proposed. 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 and the same are used for building stone, sized stone materials only, so there are 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 the mine to meet specifications stipulated by buyers.	:	Not blending process is involved, after blasting the rough stone will be directly loaded to the needy customer.
9.	***OTHERS***		
(a)	**Describe briefly the following**	:	Infrastructure required for such mines like

	Site services		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 Regulations, 1961 and 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 rough stone during the five years period the same manpower will be utilize for this plan period to achieve the proposed production and to comply the provisions of the DGMS norms.

1.	Highly Skilled	II[nd] class Mines Manager	1No.
		Mine Geologist	1No.
		Blaster	1No.
2.	Semi-skilled	Driver	4No's
		Hitachi Operator	1No.
3.	Unskilled	Musdoor / Labours	8No's
		Total =	**16 No's**

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 in his own crusher 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%.
(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,	:	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.

	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).		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 extent of recycling.	:	Drinking is 0.5KLD, utilized water is 1.0KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 3.5KLD per day has to be maintained as per the Mines Rules, 1952. 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 1.0KLD generated from the mine office toilet and mine labor 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 Existing 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:

Sl. No.	Land Use	Present area (Hect.)
1.	Area under mining	1.94.50
2	Infrastructure	Nil
3	Road	0.03.0
4	Green Belt	Nil
5	Drainage & Settling Tank	Nil
6	Un-utilized area	0.30.50
	Grand total	**2.28.0**

11.2	Water Regime	:	Water table in this area is noticed at a depth of 65m in summer and 60m in rainy season from the general ground level and presently the quarrying of rough stone is Ultimate up to a depth of 50m bgl. 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: The normal rainfall for the district has been 827.18 mm (Per Year). However, during the two decades the district has 0 normal. Most of the rains occur during north east monsoon. The heaviest rainfall in the district used to be received in the month of October was 153.99 mm (Average). The average humidity is 74.2%.		
11.6	Human Settlement: The nearest villages are found in the buffer zone with population as per 2011 census.		
11.7	Public buildings, places of worship and monuments	:	No infrastructure like residential building, 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

S.No	Village	Direction	Distance in Kms	Population
1	Ulagankattanpatti	North	1.73Km	566
2	Koppampatti	Southeast	0.5Km	976
3	Thenmavur	South	2.5km	5001
4	Killukulavaipatti	West	0.72km	930

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	1.70.86
2.	Infrastructure	0.02.0
3.	Roads	0.06.0
4.	Green belt	0.12.76
5.	Drainage & Settling tank	Nil
6.	Un-utilized area	0.36.38
	Grand Total	**2.28.0**

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 recoded using mini seismograph devises as per the guidance of MoEF and EIA

			Notification 2006 and also covering DGMS norms.
vi).	Water regime		No major water bodies like rivers, pond, lake etc., located within a radius of 50m.
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 10km 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).	Year wise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and up to 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 to an average depth of 50m below the ground level (R.L.145m-95m) has been envisaged as workable depth for safe & economic mining during the lease period. Low lying areas with water logging shall be used for fish culture. 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, school and nearest panchayat 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	1276	140	80%	@100 Rs Per sapling	14,000/-
Second	Approach road and Nearby Village Road	–	300	80%		30,000/-
Third	Schools	–	200	80%		20,000/-
					Total	**64,000/-**

iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the first five years (and upto conceptual plan period for 'A' category mines).	:	No waste or rejects removed in this lease area.
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 B2 category opencast, 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 B2 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 50m below the ground level (R.L.145m-95m). 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. Green belt development at the rate of 140 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 an existing mining lease, no mitigation measures adopted.
12.4	Mine closure activity	:	The present mining plan is proposed to depth of 50m bgl has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of opencast 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 implemented to the project access to surface opening excavations will be taken as Metalliferous Mines Regulations, 1961 it is a small opencast 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	:	Opencast 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 16 labors will be improved.

12.9 Proposed Financial Estimate / Budget for (EMP) Environment Management:

A	**Fixed Asset Cost:**		
	1. Land Cost (Consent Land)	:	Rs. 2,50,000/-
	2. Labor Shed		Rs. 1,00,000/-
	3. Sanitary Facility	:	Rs. 1,50,000/-
	4. Fencing	:	Rs. 2,00,000/-
	5. Other expenses (Security guard, dust bin, etc)	:	Rs. 3,00,000/-
	Total	:	**Rs. 10,00,000/-**
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. 1,00,000/-
	3. Permanent water sprinkler	:	Rs. 1,00,000/-
	4. Afforestation and its maintenance	:	Rs. 64,000/-
	5. Safety Kits	:	Rs. 1,00,000/-
	6. Provision of tire washing facility	:	Rs. 1,00,000/-
	7. Blasting materials with blast mat cost	:	Rs. 10,00,000/-
	8. Environment monitoring	:	Rs. 5,00,000/-
	Total	:	**Rs. 20,64,000/-**
D	**Total Project Cost (A+B+C)**	:	**Rs. 50,64,000/-**

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small B2 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 and gravel 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 the Assistant Director, Department of Geology and Mining, Pudukkottai vide letter **Rc.No.552/2022(G&M) Dated: 20.11.2023**

(iv) Total proposed production **73960m^3**. Of which, rough stone is **73150m^3** and gravel is **810m^3** up to a depth of 50m below the ground level (R.L.145m-95m) for five years plan period.

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:

Signature of the Recognized Qualified Person

Dr.S.KARUPPANNAN, M.Sc.,PH.D.,
RQP/MAS/263/2014/A
TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri - 636705, Tamil Nadu, India.

This mining plan is approved in exercise of the powers conferred under Rule 22(2) read with (5) TNMMCR 1959 and subject to the conditions stipulated in the mining plan approved letter Rc.No. 552/2022(Geo.) dt. 30.11.2023

ASSISTANT DIRECTOR,
DEPT. OF GEOLOGY & MINING,
PUDUKKOTTAI.

ANNEXURE - I

அனுப்புநர்

திரு.கி.விஜயராகவன்,எம்.எஸ்ஸி,
உதவி இயக்குநர்,
புவியியல் மற்றும் கரங்கத்துறை,
புதுக்கோட்டை.

பெறுநர்

திரு.தேவேந்திரன்,
த/பெ.சீனிவாசன்,
எண்.25, I.A.S.நகர்,
திருவரம்பூர்,
திருச்சிராப்பள்ளி

ந.க.எண்.552/2022(புமகு) நாள் .11.2023

அய்யா,

பொருள் : கனிமங்கள் மற்றும் சுரங்கங்கள் - புதுக்கோட்டை மாவட்டம் - குளத்தூர் வட்டம் - கிள்ளுக்குளவாய்ப்பட்டி கிராமம் - பட்டா புல எண்கள்.33, 34 மற்றும் பலவற்றின் மொத்தப்பரப்பு 2.28.0 ஹெக்டேரில் கல் மற்றும் கிராவல் குவாரி குத்தகை உரிமம் கோரி திரு.S.தேவேந்திரன் த/பெ.சீனிவாசன் என்பவர் விண்ணப்பம் செய்தது - வரைவு சுரங்கத்திட்டம் சமர்ப்பிக்க அறிவுறுத்துதல் - தொடர்பாக தொடர்பாக.

பார்வை :
1. திரு.S.தேவேந்திரன் த/பெ.சீனிவாசன் என்பவரின் விண்ணப்பம் நாள்: 27.07.2022.
2. வருவாய் கோட்டாட்சியர், இலுப்பூர். அவர்களின் கடிதம் ந.க.1791/2023, நாள்: 10.07.2023.
3. உதவி புவியியலாளர், புவியியல் மற்றும் கரங்கத்துறை, புதுக்கோட்டை அவர்களின் அறிக்கை நாள்: 26.07.2023.
4. மற்றும் தொடர்புடைய ஆவணங்கள்.

.....

புதுக்கோட்டை மாவட்டம், குளத்தூர் தாலுகா, கிள்ளுக்கோட்டை சரகம், கிள்ளுக்குளவாய்ப்பட்டி கிராமம், பட்டா புல எண்கள்.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) மற்றும் 34/8(0.07.5) ஆகியவற்றின் மொத்தப்பரப்பு 2.28.0 ஹெக்டேரில் கல் மற்றும் கிராவல் குவாரி குத்தகை உரிமம் கோரி திரு.S.தேவேந்திரன் த/பெ.சீனிவாசன் என்பவர் அனுமதி கோரி விண்ணப்பம் செய்துள்ளார்.

பார்வை 2 மற்றும் 3ல் கண்டுள்ளவாறு வருவாய் கோட்டாட்சியர், இலுப்பூர், உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, புதுக்கோட்டை மற்றும் தனிவருவாய் ஆய்வாளர் (கனிமம்) ஆகியோர் புலத்தணிக்கை மேற்கொண்டு குளத்தூர் தாலுகா, கிள்ளுக்கோட்டை சரகம், கிள்ளுக்குளவாய்ப்பட்டி கிராம புல எண்கள்.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) மற்றும் 34/8(0.07.5) ஆகியவற்றின் மொத்தப்பரப்பு 2.28.0 ஹெக்டேரில் கல் மற்றும் கிராவல் குத்தகை உரிமம் வழங்க அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

எனவே, திரு.S.தேவேந்திரன் த/பெ.சீனிவாசன் என்பவருக்கு குளத்தூர் வட்டம், கிள்ளுக்குளவாய்ப்பட்டி கிராம புல எண்கள்.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) மற்றும் 34/8(0.07.5) ஆகியவற்றின் மொத்தப்பரப்பு 2.28.0 ஹெக்டேர் பரப்பினை 1959-ம் வருடாந்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.19 & 20-ன் கீழ் 5 வருட காலங்களுக்கு கல் மற்றும் கிராவல் குவாரி குத்தகை உரிமம் அனுமதி வழங்க உகந்த புலமாக கருதி அறிவிப்பு செய்யப்படுகிறது.

மேலும், திரு.S.தேவேந்திரன் த/பெ.சீனிவாசன் என்பவர் மூன்று மாத காலத்திற்குள் வரைவு சுரங்கத்திட்ட அறிக்கை (Draft Mining Plan) கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு தயார் செய்து புதுக்கோட்டை மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை, உதவி இயக்குநரிடம் ஒப்புதல் பெற்றும், தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 41 & 42-ன் படி ஏற்பளிக்கப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் மாவட்ட சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்திடமிருந்து தடையின்மைச்சான்று பெற்றும் சமர்ப்பிக்குமாறு அறிவுறுத்தப்படுகிறது.

1. அருகிலுள்ள பட்டா புலங்களுக்கு 7.5மீட்டர் பாதுகாப்பு இடைவெளி விடவேண்டும்.
2. வடக்கு பகுதியில் அமைந்துள்ள புல எண்.34/7 பாதைக்கு 10மீ பாதுகாப்பு இடைவெளி விடவேண்டும்.
3. மேற்கு மற்றும் தெற்கு பகுதிகளில் அமைந்துள்ள புல எண்கள்.32, 37, 35 அரசு புறம்போக்கு கல்லாங்குத்துக்கு 10மீ பாதுகாப்பு இடைவெளி விடவேண்டும்.

20/11/19

உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
புதுக்கோட்டை

ANNEXURE - IIa

Dr. S. KALYANASUNDARAM ,I.F.S.(Retd.)
CHAIRMAN

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY – TAMIL NADU
3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet,
Chennai-15.
Phone No.044-24359974
Fax No. 044-24359975

ENVIRONMENTAL CLEARANCE

Lr. No.SEIAA-TN/F.No.5035/1(a)/ EC.No:3323/2016 dated: 15.07.2016

To
Thiru. S. Devendhiran
No.25, I.A.S. Nagar
Thiruvarambur
Tiruchirappalli

Sir,

Sub: SEIAA-TN – Proposed **Rough Stone** quarry located at S.F.No 33, 34/3, 34/4, 34/5, 34/6 & 34/8, Killukulavaipatti Village,Kulathur Taluk, Pudukkottai District- issue of Environmental Clearance – Reg.

Ref: 1. Your Application for Environmental Clearance dt: 10.02.2016
2. Minutes of the 76th SEAC held on 01.07.2016
3. Minutes of the SEIAA meeting held on 15.07.2016

Details of Minor Mineral Activity:-

This has reference to your application first cited. The proposal is for obtaining environmental clearance for mining/quarrying of minor minerals based on the particulars furnished in your application as shown below.

1	**Name of Project Proponent and address**	Thiru. S. Devendhiran No.25, I.A.S. Nagar Thiruvarambur Tiruchirappalli
2	**Location of the Proposed Activity**	
	Survey Number	33, 34/3, 34/4, 34/5, 34/6 & 34/8
	Latitude and Longitude	10°37'24.63"N to 10°37'29.83"N 78°55'27.04"E To 78°55'34.78"E
	Village	Killukulavaipatti
	Taluk	Kulathur
	District	Pudukkottai

CHAIRMAN
SEIAA-TN

3	**Proposed Activity**	
	i. Minor mineral	Rough Stone
	ii. Mining Lease Area	2.28.0 Ha
	iii. Approved quantity	266601 cu.m of Rough Stone
	iv. Depth of Mining	32 m
	v. Type of mining	Opencast Semi Mechanised Mining
	vi. Category(B1/B2)	B2
	vii. Precise area communication	Rc.No.224/2014 (G&M), dated: 11.01.2016
	viii. Mining plan approval	Deputy Director Rc.No. 224/2014(G&M), dated: 05.02.2016
	ix. Mining lease period	5 Years
4	**Whether Project area attracts any General conditions specified in the EIA notification, 2006 as amended:-**	Not attracted. Affidavit furnished
5	**Man Power requirement per day:**	18 Employees
6	**Utilities**	
	i. Source of Water :	Water vendors/Borewell
	ii. Quantity of Water Requirement in KLD:	
	a. Domestic b. Industrial c. Green Belt & Dust Suppression	0.75KLD } 1.75KLD
	iii. Power Requirement: a. Domestic Purpose b. Industrial Purpose	TNEB
7	**Cost** i. Project Cost ii. EMP Cost	Rs.22.25 Lakhs Rs.3.75 Lakhs
8	**Public Consultation:-**	Not required as per O.M. dated 24.12.2013 of MoEF, GoI.
9	**Date of Appraisal by SEAC:-** **Agenda No:**	01.07.2016 76-52
10	**Date of Review/Discussion by SEIAA and the Remarks:-** The proposal was placed before the SEIAA in its **180th** Meeting held on **15.07.2016** and the Authority after careful consideration, decided to grant environmental clearance to the said project Mining of Rough Stone to terms and conditions stipulated under the provisions of Environment Impact Assessment Notification, 2006 as amended.	
11	**Validity:** **The Environmental Clearance will be coterminous with the mine lease period or limited to a maximum period of 5 Years from the date of issue whichever is earlier.**	

CHAIRMAN
SEIAA-TN

Conditions to be Complied before commencing mining operations:

1. The project proponent shall advertise in at least two local newspapers widely circulated in the region, one of which shall be in the vernacular language informing the public that:
   I. The project has been accorded Environmental Clearance.
   II. Copies of clearance letters are available with the Tamil Nadu Pollution Control Board.
   III. Environmental Clearance may also be seen on the website of the SEIAA.
   IV. The advertisement should be made within 7 days from the date of receipt of the clearance letter and a copy of the same shall be forwarded to the SEIAA.
2. The applicant has to obtain land use classification as industrial use before issue/renewal of mining lease.
3. NOC from the Standing committee of the NBWL shall be obtained, if protected areas are located within 10 Km from the proposed project site.
4. The project proponent shall comply the conditions laid down in the Section V, Rule 36 of Tamil Nadu Minor Minerals Concession Rules 1959.
5. A copy of the Environment Clearance letter shall be sent by the proponent to the concerned Panchayat, Town Panchayat / Panchayat union/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the proponent and also kept at the site, for the general public to see.
6. Quarry lease area should be demarcated on the ground with wire fencing to show the boundary of the lease area on all sides with red flags on every pillar shall be erected before commencement of quarrying.
7. The proponent shall ensure that First Aid Box is available at site.
8. The excavation activity shall not alter the natural drainage pattern of the area.
9. The excavated pit shall be restored by the project proponent for useful purposes.
10. The proponent shall quarry and remove only in the permitted areas as per the approved Mining Plan details.
11. The quarrying operation shall be restricted between 7AM and 5 PM.
12. The proponent shall take necessary measures to ensure that there shall not be any adverse impacts due to quarrying operation on the nearby human habitations, by way of pollution to the environment.
13. A minimum distance of 15 mts. From any civil structure shall be kept from the periphery of any excavation area.
14. Depth of quarrying shall be 2m above the ground water table /approved depth of mining whichever is lesser to be considered as a safe guard against Environmental Contamination and over exploitation of resources.

CHAIRMAN
SEIAA-TN

15. The mined out pits should be backfilled where warranted and area should be suitably landscaped to prevent environmental degradation. The mine closure plan as furnished in the proposal shall be strictly followed with back filling and tree plantation.
16. Wet drilling method is to be adopted to control dust emissions. Delay detonators and shock tube initiation system for blasting shall be used so as to reduce vibration and dust.
17. Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
18. The explosives shall be stored at site as per the conditions stipulated in the permits issued by the licensing Authority.
19. Blasting shall be carried out after announcing to the public adequate through public address system to avoid any accident.
20. A study has to be conducted to assess the optimum blast parameters and blast design to keep the vibration limits less than prescribed levels and only such design and parameters should be implemented while blasting is done. Periodical monitoring of the vibration at specified location to be conducted and records kept for inspection.
21. The Proponent shall take appropriate measures to ensure that the GLC shall comply with the revised NAAQ norms notified by MoEF, GoI on 16.11.2009.
22. The following measures are to be implemented to reduce Air Pollution during transportation of mineral
    i. Roads shall be graded to mitigate the dust emission.
    ii. Water shall be sprinkled at regular interval on the main road and other service roads to suppress dust
23. The following measures are to be implemented to reduce Noise Pollution
    i. Proper and regular maintenance of vehicles and other equipment
    ii. Limiting time exposure of workers to excessive noise.
    iii. The workers employed shall be provided with protection equipment and earmuffs etc.
    iv. Speed of trucks entering or leaving the mine is to be limited to moderate speed of 25 kmph to prevent undue noise from empty trucks.
24. Measures should be taken to comply with the provisions laid under Noise Pollution (Regulation and Control) (Amendment) Rules, 2010, dt: 11.01.2010 issued by the MoE&F, GoI to control noise to the prescribed levels.
25. Suitable conservation measures to augment groundwater resources in the area shall be planned and implemented in consultation with Regional Director, CGWB. Suitable measures should be taken for rainwater harvesting.
26. Permission from the competent authority should be obtained for drawl of ground water, if any, required for this project.
27. Topsoil, if any, shall be stacked properly with proper slope with adequate measures and should be used for plantation purpose.
28. The following measures are to be adopted to control erosion of dumps:-
    i. Retention/ toe walls shall be provided at the foot of the dumps.
    ii. Worked out slopes are to be stabilized by planting appropriate shrub/ grass species on the slopes.

CHAIRMAN
SEIAA-TN

29. Waste oils, used oils generated from the EM machines, mining operations, if any, shall be disposed as per the Hazardous Wastes (Management, Handling, and trans boundary movement) Rules, 2008 and its amendments thereof to the recyclers authorized by TNPCB.
30. Concealing the factual data or failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
31. Rain water harvesting to collect and utilize the entire water falling in land area should be provided.
32. Rain water getting accumulated in the quarry floor shall not be discharged directly to the nearby stream or water body. If it is to be let into the nearby water body, it has to be discharged into a silt trap on the surface within the lease area and only the overflow after allowing settling of soil be let into the nearby waterways. The silt trap should be of sufficient dimensions to catch all the silt water being pumped out during one season. The silt trap should be cleaned of all the deposited silt at the end of the season and kept ready for taking care of the silt in the next season.
33. The lease holder shall undertake adequate safeguard measures during extraction of material and ensure that due to this activity, the hydro-geological regime of the surrounding area shall not be affected. Regular monitoring of ground water level and quality shall be carried out around the mine lease area during the mining operation. If at any stage, if it is observed that the groundwater table is getting depleted due to the mining activity; necessary corrective measures shall be carried out. District Collector/mining officer shall ensure this.
34. No tree-felling shall be done in the leased area, except only with the permission from competent Authority.
35. To take up environmental monitoring of the proposed quarry site before, during and after the mining activities including vibration study data, water, air & flora/fauna environment, slurry water generated/disposed and method of disposal, involving a reputed academic institution.
36. It shall be ensured that the total extent of nearby quarries(existing, abandoned and proposed) located within 500 meter radius from the periphery of this quarry is not exceeding 25 hectares within the mining lease period of this application.
37. It shall be ensured that there is no habitation is located within 300 meter radius from the periphery of the quarry site and also ensure that no hindrance will be caused to the people of the habitation located within 500m radius from the periphery of the quarry site
38. Ground water quality monitoring should be conducted once in 3 Months
39. Transportation of the quarried materials shall not cause any hindrance to the Village people/Existing Village road.
40. Free Silica test should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF , GOI.
41. Air sampling at intersection point should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF , GOI..
42. Bunds to be provided at the boundary of the project site.
43. The project proponent shall undertake plantation/afforestation work by planting the native species on all side of the lease area at the rate of 400/Ha. Suitable tall tree saplings should be planted on the bunds and other suitable areas in and around the work place.

CHAIRMAN
SEIAA-TN

44. At least 10 Neem trees should be planted around the boundary of the quarry site.
45. Floor of excavated pit to be levelled and sides to be sloped with gentle slope (Except for granite quarries) in the mine closure phase.
46. The Project Proponent shall ensure a minimum of 2.5% of the annual turnover will be utilized for the CSR Activity
47. The Project Proponent shall provide solar lighting system to the nearby villages
48. The Project Proponent shall comply with the mining and other relevant rules and regulations where ever applicable.
49. Rainwater shall be pumped out Via Settling Tank only
50. Earthen bunds and barbed wire fencing around the pits with green belt all along the boundary shall be developed and maintained.
51. As per MoEF&CC, GoI, Office Memorandum dated 30.03.2015, prior clearance from Forestry & Wild Life angle including clearance from standing committee of the National Board for Wild life as applicable shall be obtained before starting the quarrying operation, if the project site is located within 10KM from National Park and Sanctuaries.
52. The quarrying activity shall be stopped if the entire quantity indicated in the Mining plan is quarried even before the expiry of the quarry lease period and the same shall be monitored by the District Authorities.
53. Safety equipments to be provided to all the employees.
54. Safety distance of 50m has to be provided in case of railway, reservoir, canal/odai
55. The Assistant/Deputy Director, Department of Geology & mining shall ensure that the proponent has engaged the blaster with valid Blasting license/certificate obtained from the competent authority before execution of mining lease.
56. The proponent shall furnish the Baseline data covering the Air, Water, Noise and land environment quality for the proposed quarry site before execution of mining lease.
57. The proponent shall erect the pillars in accordance with the Rules for depicting GPS details in the earmarked boundary of the quarry site to monitor electronically before execution of mining.
58. The Proponent shall furnish the data obtained from the Public Works Department regarding the details of Ground Water table in the quarry site.
59. The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.
60. The proponent has to display the name board at the quarry site showing the details of Proponent, lease period, extent, etc., with respect to the existing activity before execution of mining.
61. Heavy earth machinery equipments if utilized, after getting approval from the competent authority.

CHAIRMAN
SEIAA-TN

General Conditions:

1. EC is given only on the factual records, documents and the commitment furnished in non judicial stamp paper by the proponent.
2. The Proponent shall obtain the Consent for Establishment from the TNPCB Board before commencing the activity.
3. No change in mining technology and scope of working should be made without prior approval of the SEIAA, Tamil Nadu.
4. No change in the calendar plan including excavation, quantum of mineral (minor mineral) should be made.
5. Effective safeguard measures, such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.
6. Effective safeguards shall be adopted against health risks on account of breeding of vectors in the water bodies created due to excavation of earth.
7. A berm shall be left from the boundary of adjoining field having a width equal to at least half the depth of proposed excavation.
8. Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.
9. Vehicular emissions shall be kept under control and be regularly monitored. The mineral transportation shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.
10. Access and haul roads to the quarrying area should be restored in a mutually agreeable manner where these are considered unnecessary after extraction has been completed.
11. All Personnel shall be provided with protective respiratory devices including safety shoes, Masks, gloves etc. Supervisory people should be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.
12. Periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly. The workers shall be provided with personnel protective measures such as masks, gloves, boots etc.
13. Workers/labourers shall be provided with facilities for drinking water and sanitation facility for Female and Male separately.
14. The project proponent shall ensure that child labour is not employed in the project as per the sworn affidavit furnished.
15. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Chennai.

CHAIRMAN
SEIAA-TN

16. The Environmental Clearance does not absolve the applicant/proponent of his obligation/requirement to obtain other statutory and administrative clearances from other statutory and administrative authorities.
17. This Environmental Clearance does not imply that the other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would be considering the project on merits and be taking decisions independently of the Environmental Clearance
18. The SEIAA, Tamil Nadu may alter/modify the above conditions or stipulate any further conditions in the interest of environment protection.
19. The SEIAA, Tamil Nadu may cancel the environmental clearance granted to this project under the provisions of EIA Notification, 2006, at any stage of the validity of this environmental clearance, if it is found or if it comes to the knowledge of this SEIAA,TN that the project proponent has deliberately concealed and/or submitted false or misleading information or inadequate data for obtaining the environmental clearance.
20. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.
21. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, draft Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957,National Commission for protection of Child Right Rules,2006 and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter.
22. Any other conditions stipulated by other Statutory/Government authorities shall be complied
23. Any appeal against this environmental clearance shall lie with the Hon'ble National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

CHAIRMAN
SEIAA-TN

Copy to:

1. The Secretary, Ministry of Mines, Government of India, ShastriBhawan, New Delhi.
2. The Principal Secretary, Environment and Forests Department, Government of Tamil Nadu, Tamil Nadu.
3. The Additional Chief Secretary, Industries Department, Government of Tamil Nadu, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai – 34.
5. The Chairman, Central Pollution Control Board, PariveshBhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
6. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai,Guindy, Chennai-32
7. The District Collector, Pudukkottai District
8. The Commissioner of Geology and Mines,Guindy,Chennai-32
9. EI Division, Ministry of Environment & Forests, ParyavaranBhawan, New Delhi.
10. Spare.

ANNEXURE-114

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PROCEEDINGS OF THE DISTRICT COLLECTOR, PUDUKKOTTAI

Present : Thiru.S.Ganesh, I.A.S.,

Rc.No. 224/2014 (G&M) Date : .09.2016

Sub: Mines and Minerals – Rough Stone - Pudukkottai District – Application preferred by Thiru.Devendhiran, S/o.Sreenivasalu requesting Stone Quarry Lease in patta lands of S.F.Nos.30/8B & etc. Killukulavaipatti village - Kulathur Taluk – Reports obtained – Precise area Communicated – Approved Mining Plan and Environmental Clearance obtained – Quarry Lease granted - Orders issued.

Read: 1. Quarry lease application of Thiru.Devendhiran, dt.23.02.2015.
2. Land availability report of the Revenue Divisional Officer, Illuppur Rc.A1/987/2015 dated 01.04.2015.
3. The District Revenue Officer, Pudukkottai report dated 25.04.2015.
4. Technical report of the Assistant Geologist (G&M), Pudukkottai report dated 02.12.2015.
5. The District Collector's Rc.No.224/2014(G&M) dt.11.01.16.
6. Environmental Clearance issued by SEIAA, TamilNadu vide Lr.No.SEIAA-TN/F.No.5035/1(a)/EC.No.3323/2016 dt.15.07.16.

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ORDER:

One Thiru.Devendhiran, S/o.Sreenivasalu, No.25, I.A.S.Nagar, Thiruvarambur, Thiruchirappalli has applied for the grant of quarry lease to quarry Rough stone over an extent of 2.55.5 Hects. in patta land bearing SF.Nos.30/8B (0.08.0), 33(0.43.0), 34/3(0.26.0), 34/4 (0.31.5), 34/5 (0.72.5), 34/6(0.47.5) 34/8(0.07.5) and 34/9B(0.19.5) of Killukulavaipatti Village, Kulathur Taluk, Pudukkottai District for a period of five years, under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

2. In this regard, the Revenue Divisional Officer, Illuppur, District Revenue Officer, Pudukkottai and the Assistant Geologist, G&M, Pudukkottai have inspected the proposed area and submitted their recommendations in favour of applicant for the grant of quarry lease in an extent of 2.47.5 hects of SF.Nos.33 (0.43.0), 34/3(0.26.0), 34/4 (0.31.5), 34/5 (0.72.5), 34/6(0.47.5) 34/8(0.07.5) and

34/9B(0.19.5). after deleting the S.F.No.30 & 8B, since it is detached with other applied areas, vide reference 2nd, 3rd and 4th read above.

3. On scrutiny and examine the application and the report submitted by the above officials concerned an extent of 2.28.0hects in the SF.Nos.33 (0.43.0), 34/3(0.26.0), 34/4 (0.31.5), 34/5 (0.72.5) 34/6(0.47.5) and 34/8(0.07.5) of Killukulavaipatti Village, Kulathu Taluk was communicated as precise area to the applicant for quarrying rough stone with a direction to produce Approved Mining Plan and the Environmental Clearances obtain from the State Level Environment Impact Assessment Authority, Chennai –Tamilnadu as per Rule 41 & 42 TNMMCR 1959 vide reference 5th read above.

4.As directed, the applicant has produced the Approved Mining Plan with the duly approval of Deputy Director, G&M, Pudukkottai and the Environmental Clearances issued by the State Level Environment Impact Assessment Authority, Chennai –Tamilnadu for the production of rough stone to a quantum of 266601 cubic metre in the precise area for a period of five years.

5. After careful examination of the above, ~~of the recommendations of the officials concerned and the relevant reports submitted by the applicant~~, the quarry lease is hereby granted to Thiru.Devendhiran, S/o.Sreenivasalu for quarrying and transportation of 266601 cubic metre of rough stone in an extent of 2.28.0 hects in the SF.Nos.33(0.43.0), 34/3(0.26.0), 34/4 (0.31.5), 34/5 (0.72.5), 34/6(0.47.5) and 34/8(0.07.5) of Killukulavaipatti village, Kulathur Taluk, Pudukkottai District for a period of five years under rule 19(1) and 20 of Tamilnadu Minor Mineral Concession Rules 1959, subject to the following special conditions along with all the conditions imposed in Environmental Clearance issued by State Level Environmental Impact Assessment Authority, Chennai-15 and the conditions prescribed in the Annexure to this order.

1. 10 mtrs safety distance all around the abutting poramboke land of S.F.Nos.32, 35, 37 & 34/7 and should not cause any damage to them in any manner by means of quarrying or encroachment while quarrying.
2. The applicant has to earmark 10mtrs safety distance to the Government poramboke lands S.F.Nos.32, 35, 37 & 34/7 by erecting barbed wire fencing at his own cost before commencement of quarrying and it should be maintained in good condition throughout the lease period.

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3. The applicant has to make his own arrangements to form approach road to the applied area at his own cost.
4. No hindrance shall be caused to the adjacent pattadars at any cost during quarrying operation.
5. Quarrying operation should be carried out eco-friendly.
6. The applicant should follow mild blasting only using Jack-Hammer Driller while quarrying operation.
7. The applicant should follow all the safety measures pertaining to the quarrying operation.
8. Before commencing the quarry operation the applicant should obtain the Consent for Establishment from Tamilnadu Pollution Control Board.
9. The lessee should abide all the conditions imposed by the SEIAA, Chennai vide the Environmental Clearance letter Lr.No.SEIAA-TN/ F.No.5035/1(a)/EC.No.3323/2016 dt.15.07.16.

District Collector,
Pudukkottai

22.9.16

To

Thiru.Devendhiran, S/o.Srechivasalu, No.25, I.A.S.Nagar,
Thiruvarambur, Thiruchirappalli.

Copy to :

1. The Revenue Divisional Officer, Illuppur
2. Tahsildar, Kulathur.

ந.க.எண். 2 [illegible] (புமக) — 241

நிபந்தனைகள்

1. குத்தகைதாரர் மேற்படி குவாரியிலிருந்து எடுத்துச் செல்லப்படும் ஒவ்வொரு வகையான சிறுகனிமப் பொருட்களுக்கும் 1959-ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகளின் அனுபந்தம் 2-ல் குறிப்பிடப்பட்டுள்ள விகிதாச்சாரப்படி சீனியரேஜ் கட்டணத்தை செலுத்தி அனுமதி சீட்டு பெற்றுத்தான் சிறு கனிமப் பொருட்களை கொண்டு செல்ல வேண்டும். மேலும் அரசால் அவ்வப்போது திருத்தி நிர்ணயிக்கப்படும் சீனியரேஜ் தொகையைச் செலுத்தி அனுமதிச்சீட்டு பெற வேண்டும்.

2. குத்தகைதாரர் ஒவ்வொரு மாதமும் குவாரி செய்த அளவிற்குரிய கணக்குகளை பிரதிமாதம் 5-ஆம் நாளுக்குள் உதவி/துணை இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை புதுக்கோட்டை அவர்களுக்கு தணிக்கைக்கு ஆஜர் செய்ய வேண்டும்.

3. குவாரிகளுக்கு அருகில் உள்ள போக்குவரத்துச் சாலைகள், குடியிருப்பு வீடுகள், வண்டிப்பாதைகள், மின் கம்பங்கள், டிரான்ஸ்பார்மர்கள் மற்றும் இதர நிலையான அமைப்புகள் இவற்றிலிருந்து நிர்ணயிக்கப்பட்ட பாதுகாப்பு இடைவெளிவிட்டு மீதமுள்ள இடத்திற்குள்தான் குவாரி செய்யும் பணி செய்யப்பட வேண்டும். மேற்கண்ட பொதுமக்கள் உபயோகிக்கும் இடங்கள், குடியிருப்புகள், பட்டா நிலங்கள் அல்லது பொதுச் சொத்துக்கள் ஆகியவற்றிற்கு சேதம் ஏதும் நேரிட்டால் அதற்கு குத்தகைதாரரே முழுப்பொறுப்பேற்க வேண்டும். இந்நேர்வில் பாதுகாக்கப்பட்ட புராதனச்சின்னங்களிலிருந்து 300 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு குவாரிப்பணி மேற்கொள்ள வேண்டும்.

4. குத்தகைதாரர் மேற்குறிப்பிட்ட நிபந்தனைகளும் 1959-ஆம் ஆண்டைய தமிழ்நாடு சிறுகனிம சலுகை விதிகள் மற்றும் சுரங்கங்கள் மற்றும் கனிமங்கள் (அபிவிருத்தி மற்றும் ஒழுங்குமுறை) சட்டம், 1957 மற்றும் அரசால் அவ்வப்போது கொண்டு வரப்படும் ஆணைகளும், விதிகளும் கட்டுப்படுத்தும்.

5. கல்குவாரிகளிலிருந்து சாதாரண கல், சக்கைக்கல், கட்டுக்கல், ஜல்லிக்கற்கள் ஆகிய பொது உபயோக சிறு கனிமங்களை மட்டுமே குவாரி செய்ய வேண்டும். வெளிநாட்டிற்கு ஏற்றுமதி செய்வதற்கும், அலங்கார வகை மற்றும் பெருகேற்றும் செய்வதற்கும் பயன்படும் வகையில் பெரிய/சிறிய கற்துண்டங்களை குவாரி செய்யக்கூடாது.

6. இவ்விதிகளின்படி வழங்கப்படும் குவாரிகளின் காலம் எக்காரணத்தைக் கொண்டும் நீட்டிக்கவோ அல்லது குத்தகைக் காலம் புதுப்பிக்கப்படவோ மாட்டாது.

7. குழந்தைத் தொழிலாளர்களை எக்காரணம் கொண்டும் குவாரிப்பணியில் ஈடுபடுத்தக்கூடாது.

8. குவாரி அமைந்துள்ள இடத்திற்கான பாதை வசதிகளை குத்தகைதாரரின் முழுப் பொறுப்பில் செய்து கொள்ள வேண்டும். குவாரிக்கு செல்லும் பாதைகள் [illegible] [illegible]க்கு அரசு பொறுப்பல்ல.

9. 1959-ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகள் [illegible] IV இல் கண்ட [illegible] தேவையான [illegible] [illegible] [illegible]

10. உறுதி செய்யப்பட்ட குத்தகை உரிமத்தை சம்பந்தப்பட்ட உயர் அதிகாரி பொது நன்மையைக் கருதி ரத்துச் செய்ய நேரிட்டால் அதனால் ஏற்படும் இழப்புக்கு ஈடுகோர குத்தகைதாருக்கு உரிமையில்லை.

11. குத்தகைதாரர் குவாரியை வேறு யாருக்கும் மாற்றவோ, உள்குத்தகைக்கு விடவோ கூடாது. அப்படி ஏதாவது செய்திருப்பது தெரியவந்தால் மேற்படி குத்தகை ரத்து செய்யப்படுவதுடன் அவர் செலுத்திய தொகையும் அரசுக்கு பறிமுதல் செய்யப்படும்.

12. குவாரி செய்வதற்கு அனுமதிக்கப்பட்டுள்ள விஸ்தீரணத்தில் மட்டுமே குத்தகைதாரர் குவாரி செய்ய உரிமையுண்டு. அதற்குக் கூடுதலான விஸ்தீரணத்தில் குவாரி செய்வது தெரியவந்தால் குத்தகை ரத்துச் செய்யப்படும்.

13. அனுமதிக்கப்படாத பிற இடங்களில் முறைகேடாக குத்தகைதாரர் குவாரி செய்து அதனால் அவர் மீது வழக்கு தொடரப்பட்டாலோ, அல்லது அரசுக்கு நஷ்டஈடு முழுவதும் குத்தகைதாரரிடமிருந்து வசூல் செய்யப்படும்.

14. குத்தகை உரிமம் பெறுவோர் புவியியல் மற்றும் சுரங்கத்துறை உதவி/துணை இயக்குநர் அலுவலகத்தில் உரிய உரிமக்கட்டணம் செலுத்தி அரசு குறிப்பிட்ட படிவத்தில் இசைவாணைச்சீட்டையும், நடைச்சீட்டையும் பெற்று கனிமம் அனுப்பும் வாகனத்துடன், கண்டிப்பாக அனுமதிச்சீட்டையும் அனுப்ப வேண்டும்.

15. குத்தகைதாரர் உரிய அனுப்புகைச் சீட்டை குத்தகைக்கு வழங்கப்பட்ட குவாரியில் இருந்துதான் வாகனங்களுக்கு கொடுத்தனுப்ப வேண்டும்.

16. உரிய அதிகாரிகள் ஒப்புதல் பெறப்படாத அனுப்புகைச்சீட்டுடன் கொண்டு செல்லப்படும் சிறு கனிமங்கள் முறையற்ற வகையில் எடுத்ததாகக் கருதப்பட்டு உரிய சட்டத்தின்படி கைப்பற்றப்பட்டு அபராதம் விதிக்கப்படும்.

17. புவியியல் மற்றும் சுரங்கத்துறை அலுவலர்கள் அல்லது வருவாய்த்துறை அலுவலர்கள் முதலானோர் தணிக்கை செய்யும் போது உரிய கணக்குகள் மற்றும் அனுப்புகைச் சீட்டு முதலானவைகளை குவாரி குத்தகை உரிமம் பெற்றவர் அவர்களுக்கு காண்பிக்க வேண்டும்.

18. அனுப்புகைச் சீட்டில் உள்ள காலங்கள் பூர்த்தி செய்யப்படாமலோ அல்லது தவறாக எழுதப்பட்டோ அல்லது திருத்தங்களுடனோ வாகனங்களுக்கு கொடுக்கப்பட்டிருந்தால் குத்தகைதாரர் மற்றும் சிறு கனிமம் கொண்டு செல்லும் வாகன உரிமையாளர் ஆகியவர்களுக்கு அபராதம் விதிக்கப்பட்டு வசூல் செய்யப்படும்.

19. குத்தகைதாரர் ஒவ்வொரு நாளும் குவாரியில் எவ்வளவு சிறு கனிமங்கள் எடுக்கப்பட்டது என்பதையும், அந்த அளவு கனிமங்கள் லாரி/வண்டி மூலம் வெளியே அனுப்பப்பட்டது என்ற விவரத்தையும் காட்டும் பதிவேடு பராமரித்து வர வேண்டும்.

20. அரசு மற்றும் மாவட்ட ஆட்சியரால் இது விடயமாக ஏற்படுத்தப்பட்டுள்ள மற்றும் அவ்வப்போது ஏற்படுத்தப்படும் சட்ட திட்டங்களுக்கும், நிபந்தனைகளுக்கும் குத்தகைதாரர் கட்டுப்பட்டு நடக்கவேண்டும்.

21. குவாரியில் உரிய அரசு அங்கீகாரம் பெற்ற வெடிமருந்து விற்பனையாளரிடம் (Authorised explosive Dealer) மட்டுமே வெடி மருந்துகள் பெற்று உரிமம் பெற்ற வெடிமருந்து வெடிப்பாளரை (Licenced Blaster) மட்டும் கொண்டு குவாரியில் வெடிமருந்துகளை பயன்படுத்தவேண்டும்.

22. குவாரியில் வேட்டு வைப்பதிலும், கட்டைப்போட்டு சுடுவதிலும் யாதொரு அபாயமும் நேரிடாமல் இருக்க வேண்டியதைப் பற்றி குத்தகைதாரர் மிகுந்த கவனத்துடன் இருக்க வேண்டியது. அப்படி வேட்டு வைப்பதிலோ அல்லது கட்டைப்போட்டு சுடுவதிலோ அரசு சொத்துக்களுக்காவது அல்லது பிறர் சொத்துக்களுக்காவது அல்லது வேறு எந்த நபருக்காவது அபாயம் அல்லது சேதம் நேர்ந்தால் குத்தகைதாரர் அவ்விதம் நேரக்கூடிய சேதங்களை தங்கள் செலவிலேயே நிவர்த்தி செய்து கொடுக்க வேண்டியதோடு, அந்த நபருக்கு நஷ்ட ஈடு கொடுக்க குத்தகைதாரர் கடமைப்பட்டவர் ஆவார்.

23. குவாரியில் எல்லைகள் பற்றிய பிரச்சனைகள் ஏற்பட்டால் மாவட்ட ஆட்சியரின் தீர்ப்பே இறுதியானது.

24. குத்தகைக்கு எடுத்தவர் எந்த காரணத்தை முன்னிட்டும் தனக்கு இழப்பு ஏற்பட்டால் நஷ்டஈடு கேட்கக் கூடாது.

25. குவாரியில் வேலை செய்யும் தொழிலாளர்களுக்கும் மற்றும் இதர நபர்களுக்கும் விபத்து ஏற்பட்டால் அதற்கு அரசு பொறுப்பல்ல. முழுப்பொறுப்பும் குத்தகைதாரரைச் சேரும்.

26. குத்தகைதாரர் குவாரியில் புல எண், பரப்பு, குத்தகைதாரர் பெயர், குத்தகை ஆணை எண், குத்தகை தொகை, குத்தகை காலம் போன்ற விபரங்கள் குறிக்கப்பட்ட தகவல் பலகையை தமது சொந்த செலவில் வைத்து குத்தகைகாலம் முழுமைக்கும் நன்கு பராமரித்திடவேண்டும்.

27. குத்தகைக்கு வழங்கப்பட்ட குவாரிகளிலிருந்து அரசு வேலைகளுக்கு கனிமங்கள் வெட்டி எடுத்துச் செல்ல அரசுக்கு சகல உரிமையும் உண்டு.

28. 1959ம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் விதி 22ன் படி பாதுகாப்புத் தொகை ரூ.5000/- தொகையை செலுத்தி குத்தகைதாரர் இந்த செயல்முறை ஆணை கிடைக்கப் பெற்ற 30 தினங்களுக்குள் குத்தகை ஒப்பந்தம் நிறைவேற்றி தனது சொந்தச் செலவிலேயே குத்தகை ஒப்பந்தப்பத்திரத்தைப் பதிவு செய்து பின் ஒப்படைக்க வேண்டும். அதன் பின்னரே குவாரியிலிருந்து கனிமம் எடுத்து செல்ல நடைச்சீட்டு வழங்கப்படும்.

29. குத்தகைதாரர் தன் சொந்த செலவிலேயே குவாரியில் குத்தகைக்கு வழங்கப்பட்ட பரப்பினை நில அளவர் மூலம் அளந்து நான்கு எல்லைகளுக்கும் தெளிவாக தெரியும்படியாக கல்தூண்கள் நட்டு குத்தகைகாலம் முழுமைக்கும் நன்கு பராமரித்திட வேண்டும்.

30. குத்தகைக் காலம் மாவட்ட ஆட்சியரால் குத்தகை ஒப்பந்தப் பத்திரம் நிறைவேற்றப்படும் நாளிலிருந்து கணக்கில் எடுத்துக் கொள்ள வேண்டும். எக்காரணத்தைக் கொண்டும் காலநீட்டிப்பு வழங்க இயலாது.

உதவி இயக்குனர் * புவியியல் மற்றும் சுரங்கத்துறை, புதுக்கோட்டை

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31. இக்கனிம குத்தகை உரிமம் மேற்கண்ட நிபந்தனைகள் 1959-ஆம் ஆண்டு சிறு கனிம சலுகை விதி 1957-ஆம் ஆண்டு சுரங்கங்கள் மற்றும் கனிமங்கள் (ஒழுங்குமுறைப்படுத்துதல் மற்றும் அபிவிருத்தி) சட்டம் ஆகியவற்றின்படி வழங்கப்பட்டுள்ளது.

மாவட்ட ஆட்சித்தலைவர்,
புதுக்கோட்டை.

3/7

22/9/16

22.9.16

22.9.16

ANNEXURE - IIc

APPENDIX V

(See Rules 19 and 33)

தமிழ்நாடு TAMIL NADU B 564317

FORM OF JOINT AGREEMENT FOR QUARRYING AND CARRYING AWAY MINOR MINERALS BY LESSEES IN RESPECT OF LANDS IN WHICH THE MINERALS BELONGS TO THE GOVERNMENT

COLLECTOR'S PROCEEDINGS NO.224/2014 (G&M) DATED 22.09.2016

ANTICIPATED SEIGNIORAGE FEE FOR FIVE YEARS	: Rs.	119,97,045/-
AREA ASSESSMENT FOR FIVE YEARS	: Rs.	1,140/-
SECURITY DEPOSIT	: Rs.	5,000/-
		120,03,185/-

THIS AGREEMENT MADE THE 21st day of October 2016 between Thiru.Prasath, S/o.Munirathinam, No.12, Erumbeswarar Nagar, Thiruvarambur, Tiruchirappalli District-(1) Thiru.Deveddhiran, S/o.Sreenivasalu, 25, I.A.S.Nagar, Thiruvarambur(TP), Thiruvarambur, Tiruchirapalli-(2), Thiru.Prakash, S/o.Munirathinam, No.12, Erumbeswarar Nagar, Thiruvarambur, Tiruchirappalli District -(3), Tmt.Santhakumari, W/o.Munirathinam, No.12, Erumbeswarar Nagar, Thiruvarambur, Tiruchirappalli District-(4) (hereinafter referred to as "the registered holders" which expression shall where the context

1. M.P.A
2.
3.
4. M.R.

REGISTERED HOLDERS LESSEE LESSOR

COLLECTOR, PUDUKKOTTAI

भारतीय गैर न्यायिक INDIA NON JUDICIAL

भारत

रु. 25000 Rs. 25000

पच्चीस हजार रुपये TWENTY FIVE THOUSAND RUPEES

INDIA

தமிழ்நாடு तमिलनाडु TAMILNADU B 56431[illegible]

தமிழ்நாடு எண் : 40997
நாள் : 18.10.2016
வாங்குபவர் பெயர் : S. தேவேந்திரன்
ஊர் : திருச்சி - 13
தொகை :

N.முருகன்
முத்திரைத்தாள் விற்பனையாளர்
உரிமம் எண்: 9/97,
பொது அலுவலக வளாகம்

- 2 -

so admits include his heirs, executors, administrators, legal representatives and assigns) of the first part and **Thiru.Devendhiran, S/o.Sreenivasalu, 25, I.A.S.Nagar, Thiruvarambur(TP), Thiruvarambur, Tiruchirapalli** (hereinafter referred to as "the lessee" which expression shall where the context so admits shall include his heirs, executors, administrators, legal representatives and assigns) of **the second part** and the Governor of Tamil Nadu (hereinafter referred to as the Government which

1. M.R.P.

2. [signature]

3. [signature]

4. M.R. Shantha Kumar.

REGISTERED HOLDERS **LESSEE** **LESSOR**

COLLECTOR,
PUDUKKOTTAI.

3112 - 2016
2 | 32

expression shall where the context so admits shall include (his successors in office and assigns) of **the third part**.

WHEREAS, the registered holders holds the lands described in the schedule hereto and intended to lease out to the lessee of the said lands for the purpose of quarrying **ROUGHSTONE, CHAKKAI, ARALAI, SHOLLING AND JELLY** in the said lands and to deposit mining waste in the said lands and has lodged with Collector the lease and accurate map or sketch of the said lands.

1. M.R.N
2. [signature]
3. [signature]
4. M. R. Shantha Kumar

REGISTERED HOLDERS **LESSEE** **LESSOR**

COLLECTOR,
PUDUKKOTTAI.

3712-2016

3 22

தமிழ்நாடு தமிலநாடு TAMILNADU A 674394

தமிழ்நாடு எண் :
முத்திரைத்தாள் விற்பனையாளர்,
உரிமம் எண்: 9/97,
பொது அலுவலக வளாகம்,
புதுக்கோட்டை.

பணம் செலுத்துபவர் பெயர் :

நோக்கம் :

AND WHEREAS, the Collector, acting for and on behalf of the Government, has granted a quarrying lease to the lessee or tenant of the registered holders and allowed him to commence quarrying operations for **ROUGHSTONE, CHAKKAI, ARALAI, SHOLLING AND JELLY** in the said lands and to deposit mining waste thereon by the lessee or tenant of the registered holders.

AND WHEREAS, the Collector is prepared to allow the said registered holders or lessee to commence mining operations and to deposit mining waste in or on the said lands described in the schedule for a term of **Five years** beginning on day of 2016 upon the registered holders and the lessee entering into the agreement here in contained.

1.

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3.

4.

REGISTERED HOLDERS **LESSEE** **LESSOR**

COLLECTOR,
PUDUKKOTTAI.

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ONE HUNDRED RUPEES

100

INDIA

INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMILNADU -6- BL 222286

N.முருகன்

AND WHEREAS, the lessee has deposited with the Collector, the sum of Rs.5,000/- (Chalan No. Nil dt.20.10.2016 at SBI, Pudukkottai) as Security for the due performance of the covenants, agreements and provisos or damage which may be incurred by the Government by reason of any of the said lands described in the schedule hereto being rendered unfit for cultivation by the mining operations therein or by the deposit of mining waste thereon by either the registered holder or the lessee.

AND WHEREAS, the lessee has at the request of the registered holders and in consideration of such approval by the Collector of the mining operations as hereinbefore recited agreed to join in these presents for the purpose of entering into covenants, agreements and provisos hereinafter contained as surety for the registered holders.

1. M.R.

2.

3.

4. M. R. Shanthi Kumar

REGISTERED HOLDERS **LESSEE** **LESSOR**

COLLECTOR,
PUDUKKOTTAI.

NOW THESE PRESENTS WITNESS and registered holders and the lessee do hereby jointly and severally and each of them doth individually hereby covenant and agree with the Government as follows:-

1. To carry on mining operations during the said term in a proper and workman like manner and to deposit mining waste on the lands described in the schedule hereto and to answer and to account at all reasonable times to Government for all acts and defaults committed by any servants, agents or workmen employed by the registered holders or lessee in carrying on such operations or in making such deposits.
2. The lease grantee has paid a sum of **Rs.1200/- (Rupees One Thousand and Two Hundred only)** towards area assessment for a period of **5 years** vide **Chalan No.Nil dated 20.10.2016 at State Bank of India, Pudukkottai** to the credit of the Government in addition to the land assessment for the time being payable in respect of the said lands liable to pay seigniorage on the minerals mined at the rates prescribed by the Government from time to time.
3. To abide by the rules prescribed by the Government from time to time regarding quarrying of minor minerals.
4. To keep correct accounts in such form as the Collector shall from time to time required and direct showing the quantities and other particulars of all minerals obtained by the registered holders or the lessee from the said lands and also the number of persons employed in carrying on the said mining operations therein and to prepare and maintain from time to time when so directed by the said Collector complete and correct plans of all mines and working in the said lands and to allow any officer thereunto authorised by the Director of Geology and Mining, Tamil Nadu, from time to time and at all times to examine such accounts and any such plans and to supply and furnish when so required all such information and returns regarding all or any of the matters aforesaid as the Government may from time to time required and direct.
5. To allow any officer authorised by the Director of Geology and Mining, Tamil Nadu in that behalf from time to time and at all times to enter upon any part of the said lands where mining operations may be carried on for the purpose of inspecting the same.
6. To forthwith send to the Collector a report of any accident which may occur at or in the said land and also of the discovery therein of any minerals other than Rough Stone.
7. Not to claim any remission of assessment in respect of any of the said lands which shall be rendered unfit for surface cultivation by carrying on of any mining operations or by the deposit of mining waste unless thirty time of the assessment thereon has been deducted under proviso 2 here under.

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PROVIDED ALWAYS and it is hereby further agreed by and between the parties as follows:-

1. That it shall be lawful for the registered holders or lessee as the case may be at any time to cease mining operations under these presents provided the registered holder or lessee shall pay the Government or the Collector, the land assessment, cess and seigniorage payable by the registered holders or the lessee under these presents upto the end of the year in which the registered holders or the lessee shall cease such mining operations and shall restore the said lands fence or fill in abandoned pits and excavations therein if required by the collector as next hereinafter provided and upon, the registered holders or the lessee so doing these presents shall cease and determine.

2. That in case the registered holders or lessee shall relinquish the whole or part of the said lands in case of the expiry or sooner determination of this agreement then and in any such case, the registered holder or lessee in the case of relinquishment and the registered holders and the lessee in other cases shall restore said lands or the area relinquished or so much thereof as the collector shall required to be restored to a state fit for cultivation and shall securely and permanently fence or fill in all abandoned pits and excavation which the registered holders or the lessee shall be required to so fence or fill them and in any such case it may be so fence or fill in any pit or excavation at the expense of the registered holder or lessee and to apply the said sum of **Rs.5,000/-** (**Chalan No.Nil dt.20.10.2016 at SBI, Pudukkottai**) so deposited in or towards the cost of so doing and to deduct from the amount of the said deposit and retain on behalf of the Government a sum equal to thirty times the assessment of the said lands which shall have been rendered unfit for cultivation. If, however the amount of deposit is not sufficient to cover the cost of such restoration or fencing or filling as the case may be or to meet thirty times the assessment of the area rendered uncultivable, it shall be lawful for the Government to recover the balance by resort to Civil Court.

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REGISTERED HOLDERS LESSEE LESSOR

3. That all land assessment, cess and seigniorage payable under the presents shall be recoverable under the provisions of the Madras Revenue Recovery Act, 1864, or any subsisting statutory modification thereof, as if the same were arrear of land revenue.
4. That in the event of any breach of the registered holders or lessee of any of the conditions of these presents, it shall be lawful for the Government to levy enhanced seigniorage subject to the maximum of five times the normal rate or for the collector to give notice in writing to the registered holder or lessee of his intention to cancel these presents whereupon the same shall stand cancelled but without prejudice to any rights which the Government may have against the registered holders or lessee in respect of any antecedent claim or breach of covenant or condition.
5. That any notice to be given to registered holder or lessee may be addressed to their last known place of abode and where a notice has been so addressed it shall be deemed to have been duly served for the purpose of these presents.
6. Should any question or dispute arise regarding an agreement executed in pursuance of these rules or any matter or thing connected therewith or the powers of the registered holder or lessee there under, the amount or payment of the seigniorage fee or area assessment made payable thereby, the matter in issue shall be decided by the Director of Geology and Mining. In case the registered holder/registered holders, lessee/lessees, is/are not satisfied with decision of the Director of Geology and Mining, the matter shall be referred to the State Government.
7. The Lessee shall abide by the conditions laid down in the payment of Wages Act, 1936 (Central Act IV of 1936), the Mines Act, 1952 (Central Act XXXV of 1952) and the Indian Explosives Act, 1884 (Central Act IV of 1884).
8. The date of commencement of the period of lease shall be the date on which the agreement is executed.
9. The lessee shall pay seigniorage or dead rent whichever is more in respect of the actual quantity of Mineral removed all the rates prescribed from time to time in Appendix-II of the Tamil Nadu Minor Mineral Concession Rules 1959.

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4. M. R. Shantha Kerry

REGISTERED HOLDERS | LESSEE | LESSOR

10. The lessee shall carryout the quarrying operations in accordance with the approved mining plan. If the mining operations are not carried out in accordance with the approved Mining Plan, the District Collector may order suspension of all quarrying operations and permit continuance of quarrying operations, by way of rectification to restore the conditions as may be necessary in the quarry as envisaged under the said mining plan.
11. The lessee should restrict his mining operation strictly within the permitted area as defined in the sketch
12. The terms and conditions are also subject to such further modifications, deletion and additions, alternations as may be entered by the Government to be included in the agreement to be executed for this purpose. The lessee should maintain at his cost proper sign boards indicating the Survey Numbers, years of the lease, name of the lease holder and the lease period to the satisfaction of the District Collector/Commissioner of Geology and Mining and maintain it all time at the quarry site
13. The lessee should make his own arrangements to form approach road from the public road to the place of quarry.
14. The lessee shall strictly adhere to the statutory and safety requirements as per Act and Rules from time to time.
15. This quarry lease is governed by the Tamil Nadu Minor Mineral Concession Rules 1959 and M&M(D & R) Act 1957.
16. The period of lease covered under this agreement is valid for a period of **Five years from 11.10.2016 to 10.10.2021.**

SPECIAL CONDITIONS:

1. 10 mtrs safety distance all around the abutting poramboke land of S.F.Nos.32, 35, 37 & 34/7 and should not cause any damage to them in any manner by means of quarrying or encroachment while quarrying.
2. The applicant has to earmark 10mtrs safety distance to the Government poramboke lands S.F.Nos.32, 35, 37 & 34/7 by erecting barbed wire fencing at his own cost before commencement of quarrying and it should be maintained in good condition throughout the lease period.
3. The applicant has to make his own arrangements to form approach road to the applied area at his own cost.
4. No hindrance shall be caused to the adjacent pattadars at any cost during quarrying operation

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5. Quarrying operation should be carried out eco-friendly.
6. The applicant should follow mild blasting only using Jack-Hammer Drill while quarrying operation.
7. The applicant should follow all the safety measures pertaining to the quarrying operation.
8. Before commencing the quarry operation the applicant should obtain the Consent for Establishment from Tamilnadu Pollution Control Board.
9. The lessee should abide all the conditions imposed by the SEIAA, Chennai vide the Environmental Clearance letter Lr.No.SEIAA-TN/ F.No.5035/1(a)/EC.No.3323/2016 dt.15.07.16.

OTHERCONDITIONS:-

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11. குத்தகைதாரர் குவாரியை வேறு யாருக்கும் மாற்றவோ, உள்குத்தகைக்கு விடவோ கூடாது. அப்படி ஏதாவது செய்திருப்பது தெரியவந்தால் மேற்படி குத்தகை ரத்து செய்யப்படுவதுடன் அவர் செலுத்திய தொகையும் அரசுக்கு பறிமுதல் செய்யப்படும்.

12. குவாரி செய்வதற்கு அனுமதிக்கப்பட்டுள்ள விஸ்தீரணத்தில் மட்டுமே குத்தகைதாரர் குவாரி செய்ய உரிமையுண்டு. அதற்குக் கூடுதலான விஸ்தீரணத்தில் குவாரி செய்வது தெரியவந்தால் குத்தகை ரத்துச் செய்யப்படும்.

13. அனுமதிக்கப்படாத பிற இடங்களில் முறைகேடாக குத்தகைதாரர் குவாரி செய்து அதனால் அவர் மீது வழக்கு தொடரப்பட்டாலோ, அல்லது அரசுக்கு நஷ்டஈடு முழுவதும் குத்தகைதாரரிடமிருந்து வசூல் செய்யப்படும்.

14. குத்தகை உரிமம் பெறுவோர் புவியியல் மற்றும் சுரங்கத்துறை உதவி/துணை இயக்குநர் அலுவலகத்தில் உரிய உரிமக்கட்டணம் செலுத்தி அரசு குறிப்பிட்ட படிவத்தில் இசைவாணைச்சீட்டையும், நடைச்சீட்டையும் பெற்று கனிமம் அனுப்பும் வாகனத்துடன் கண்டிப்பாக அனுமதிச்சீட்டையும் அனுப்ப வேண்டும்.

15. குத்தகைதாரர் உரிய அனுப்புகைச் சீட்டை குத்தகைக்கு வழங்கப்பட்ட குவாரியில் இருந்துதான் வாகனங்களுக்கு கொடுத்தனுப்ப வேண்டும்.

16. உரிய அதிகாரிகள் ஒப்புதல் பெறப்படாத அனுப்புகைச்சீட்டுடன் கொண்டு செல்லப்படும் சிறு கனிமங்கள் முறையற்ற வகையில் எடுத்ததாகக் கருதப்பட்டு உரிய சட்டத்தின்படி கைப்பற்றப்பட்டு அபராதம் விதிக்கப்படும்.

17. புவியியல் மற்றும் சுரங்கத்துறை அலுவலர்கள் அல்லது வருவாய்த்துறை அலுவலர்கள் முதலானோர் தணிக்கை செய்யும் போது உரிய கணக்குகள் மற்றும் அனுப்புகைச் சீட்டு முதலானவைகளை குவாரி குத்தகை உரிமம் பெற்றவர் அவர்களுக்கு காண்பிக்க வேண்டும்.

18. அனுப்புகைச் சீட்டில் உள்ள காலங்கள் பூர்த்தி செய்யப்படாமலோ அல்லது தவறாக எழுதப்பட்டோ அல்லது திருத்தங்களுடனோ வாகனங்களுக்கு கொடுக்கப்பட்டிருந்தால் குத்தகைதாரர் மற்றும் சிறு கனிமம் கொண்டு செல்லும் வாகன உரிமையாளர் ஆகியவர்களுக்கு அபராதம் விதிக்கப்பட்டு வசூல் செய்யப்படும்.

19. குத்தகைதாரர் ஒவ்வொரு நாளும் குவாரியில் எவ்வளவு சிறு கனிமங்கள் எடுக்கப்பட்டது என்பதையும், எந்த அளவு கனிமங்கள் லாரி/வண்டி மூலம் வெளியே அனுப்பப்பட்டது என்ற விவரத்தையும் காட்டும் பதிவேடு பராமரித்து வர வேண்டும்.

20. அரசு மற்றும் மாவட்ட ஆட்சியரால் இது விஷயமாக ஏற்படுத்தப்பட்டுள்ள மற்றும் அவ்வப்போது ஏற்படுத்தப்படும் சட்ட திட்டங்களுக்கும், நிபந்தனைகளுக்கும் குத்தகைதாரர் கட்டுப்பட்டு நடக்கவேண்டும்.

21. குவாரியில் உரிய அரசு அங்கீகாரம் பெற்ற வெடிமருந்து விற்பனையாளரிடம் (Authorised explosive Dealer) மட்டுமே வெடி மருந்துகள் பெற்று உரிமம் பெற்ற வெடிமருந்து வெடிப்பாளரை (Licenced Blaster) மட்டும் கொண்டு குவாரியில் வெடிமருந்துகளை பயன்படுத்தவேண்டும்.

22. குவாரியில் வேட்டு வைப்பதிலும், கட்டைப்போட்டு சுடுவதிலும் யாதொரு அபாயமும் நேரிடாமல் இருக்க வேண்டியதைப் பற்றி குத்தகைதாரர் மிகுந்த கவனத்துடன் இருக்க வேண்டியது. அப்படி வேட்டு வைப்பதிலோ அல்லது கட்டைப்போட்டு சுடுவதிலோ அரசு சொத்துக்களுக்காவது அல்லது பிற சொத்துக்களுக்காவது அல்லது வேறு எந்த நபருக்காவது அபாயம் அல்லது சேதம் நேர்ந்தால் குத்தகைதாரர் அவ்விதம் நேரக்கூடிய சேதங்களை தங்கள் செலவிலேயே நிவர்த்தி செய்து கொடுக்க வேண்டியதோடு, அந்த நபருக்கு நஷ்டஈடு கொடுக்க குத்தகைதாரர் கடமைப்பட்டவர் ஆவார்.

23. குவாரியின் எல்லைகள் பற்றிய பிரச்சனைகள் ஏற்பட்டால் மாவட்ட ஆட்சியரின் தீர்ப்பே இறுதியானது.

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24. குத்தகைக்கு எடுக்கும் நஞ்சை மற்றும் புன்செய் நிலங்களுக்கு முன்னிட்டும் தனக்கு இருப்பு [illegible] நாட்டாரு கேட்கக் கூடாது.

25. குவாரியில் வேலை செய்யும் தொழிலாளர்களுக்கும் மற்றும் இதர நபர்களுக்கும் விபத்து ஏற்பட்டால் அதற்கு தரை பொறுப்பில்லை முழுப்பொறுப்பும் குத்தகைதாரரைச் சேரும்.

26. குத்தகைதாரர் குவாரியில் புல் மண், பரப்பு, குத்தகைதாரர் பெயர், குத்தகை ஆணை எண், குத்தகை தொகை, குத்தகை காலம் போன்ற விபரங்கள் குறிக்கப்பட்ட தகவல் பலகையை தமது சொந்த செலவில் வைத்து குத்தகைகாலம் முழுமைக்கும் நன்கு பராமரித்திட வேண்டும்.

27. குத்தகைக்கு வழங்கப்பட்ட குவாரிகளிலிருந்து அரசு வேலைகளுக்கு கனிமங்கள் கொட்டி எடுத்துச் செல்ல அரசுக்கு எவ்வித உரிமையும் உண்டு.

28. 1959ம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் விதி 22ன் படி மாதாந்திர தொகை ரூ.5000/- தொகையை செலுத்தி குத்தகைதாரர் இந்த வேம்முறை ஆணை கிடைக்கப் பெற்ற 30 தினங்களுக்குள் குத்தகை ஒப்பந்தம் நிறைவேற்றி தனது சொந்தச் செலவிலேயே குத்தகை ஒப்பந்தப்பத்திரத்தைப் பதிவு செய்து பின் ஒப்படைக்க வேண்டும். அதன் பின்னரே குவாரியிலிருந்து கனிமம் எடுத்து செல்ல நடைச்சீட்டு வழங்கப்படும்.

29. குத்தகைதாரர் தன் சொந்த செலவிலேயே குவாரியில் குத்தகைக்கு வழங்கப்பட்ட பரப்பினை நில அளவர் மூலம் அளந்து நான்கு எல்லைகளுக்கும் தெளிவாக தெரியக்கூடியவாக கல்தூண்கள் நட்டு குத்தகைகாலம் முழுமைக்கும் நன்கு பராமரித்திட வேண்டும்.

30. குத்தகைக் காலம் முடிவுற்ற அல்லது ஒப்பந்தம் பத்திரம் நிறைவேற்றப்படும் நாளிலிருந்து கணக்கில் எடுத்துக் கொள்ள வேண்டும். எக்காரணத்தைக் கொண்டும் காலநீட்டிப்பு வழங்க இயலாது.

31. இதனில் குத்தகை உரிமம் மேற்கூறிய நிபந்தனைகள் 1959 ஆம் ஆண்டு சிறு கனிம சலுகை விதி, 1957 ஆம் ஆண்டு சாம்பல்கள் மற்றும் கனிமங்கள் (நெறிமுறைப்படுத்துதல் மற்றும் அபிவிருத்தி) சட்டம் அதிகாரத்தின்படி வழங்கப்பட்டுள்ளது.

THE SCHEDULE

In the village of Killukulavaipatti, Taluk Kulathur, in the Sub Registration District of Keeranur in the Registration District of Pudukkottai.

Lease Period : 10.2016 to 10.2021.

No.and Name of Taluk	Name of the village	Survey Field Number	Extent in Hect.	Four Boundaries			
				North by S.F.Nos	South by S.F.Nos	East by S.F.Nos	West by S.F.No.
Kulathur	Killukula vaipatti	33	0.43.0	34/3 - patta	34/7, 35, 37 – Govt. poramboke and 36 patta	Themmavu village boundary	32,37 Govt. poramboke 34/9A, patta
		34/3	0.26.0				
		34/4	0.31.5				
		34/5	0.72.5				
		34/6	0.47.5				
		34/8	0.07.5				
			2.28.0				

1. M.R.M
2. [illegible]
3. [illegible]
4. M. R. [illegible]

-273-

In witness where of **Thiru.Prasath, S/o.Munirathinam, No.12, Erumbeswarar Nagar, Thiruvarambur, Tiruchirappalli District-(1), Thiru.Devendhiran, S/o.Sreenivasalu, 25, I.A.S.Nagar, Thiruvarambur(TP), Thiruvarambur, Tiruchirapalli-(2), Thiru.Prakash, S/o.Munirathinam, No.12, Erumbeswarar Nagar, Thiruvarambur, Tiruchirappalli District -(3), Tmt.Santhakumari, W/o.Munirathinam, No.12, Erumbeswarar Nagar, Thiruvarambur, Tiruchirappalli District-(4)** the Registered holders and **Thiru.Devendhiran, S/o.Sreenivasalu, 25, I.A.S.Nagar, Thiruvarambur(TP), Thiruvarambur, Tiruchirapalli** the lessee, **Thiru.S.Ganesh, I.A.S., District Collector, Pudukkottai** acting for and on behalf of and by the order and direction of the Governor of Tamil Nadu have her[illegible]

1. M.R.N
2. [signature]
3. [signature]
4. M.R. Shanthakumari

Signed by the above named
The Registered holder in the
Presence of

1. S. Marimuthu
   S. MARIMUTHU
   S/o T. Sundaram Pillai
   19, 10 [illegible]
   Pudukkottai
2. [signature]
   T. THAMIZHMANI
   S/o A. PERIYASAMY
   [illegible] THIRUVARAMBUR-[illegible]

REGISTERED HOLDERS

Signed by the above named
the Lessee in the
presence of

[signature]

LESSEE

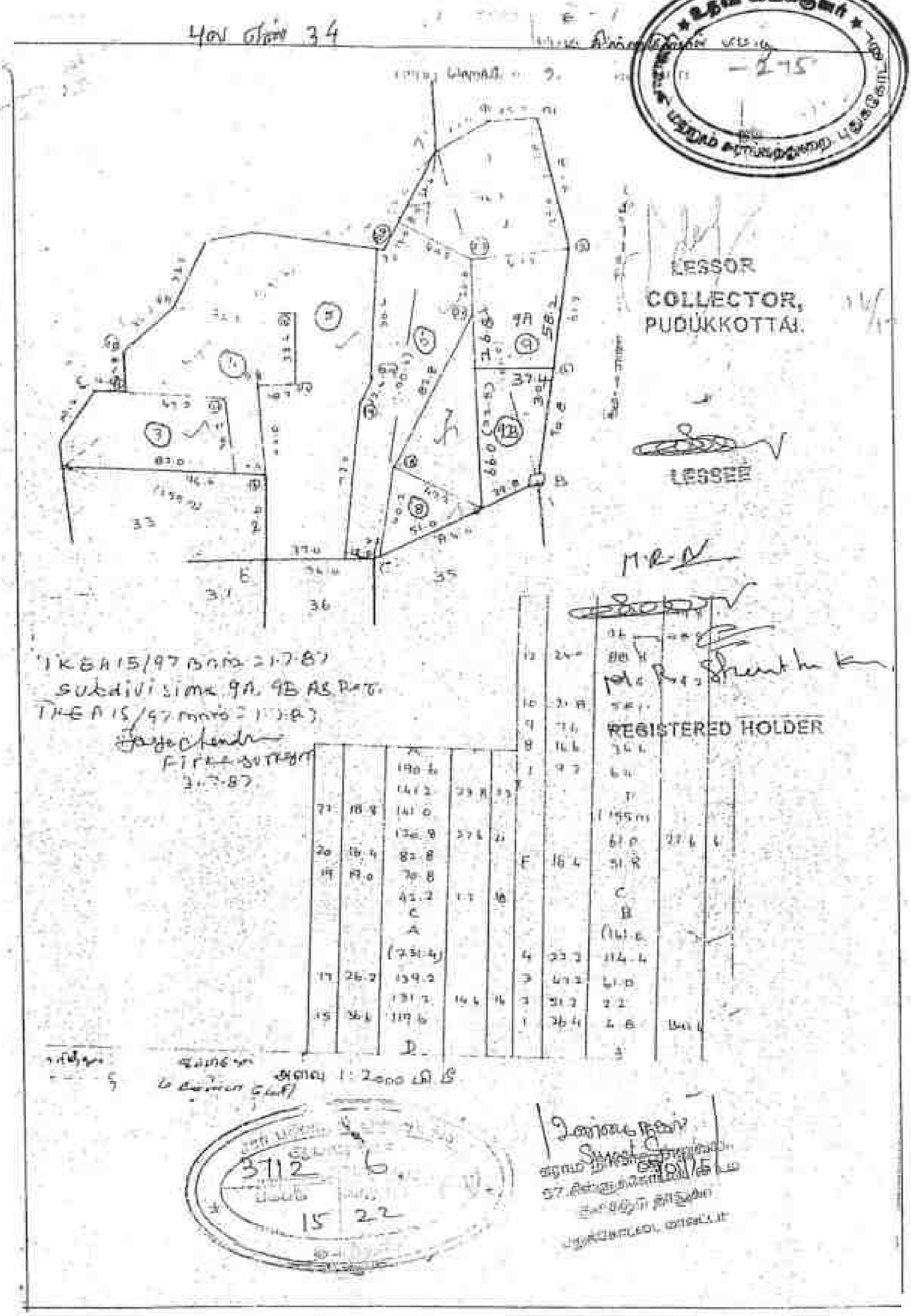
1. S. Marimuthu
   (S. MARIMUTHU
   S/o T. Sundaram Pillai
   19, 10 [illegible]
   [illegible] PUDUKKOTTAI.
2. [signature]
   T. THAMIZHMANI
   S/o A. PERIYASAMY
   [illegible] THIRUVARAMBUR-[illegible]

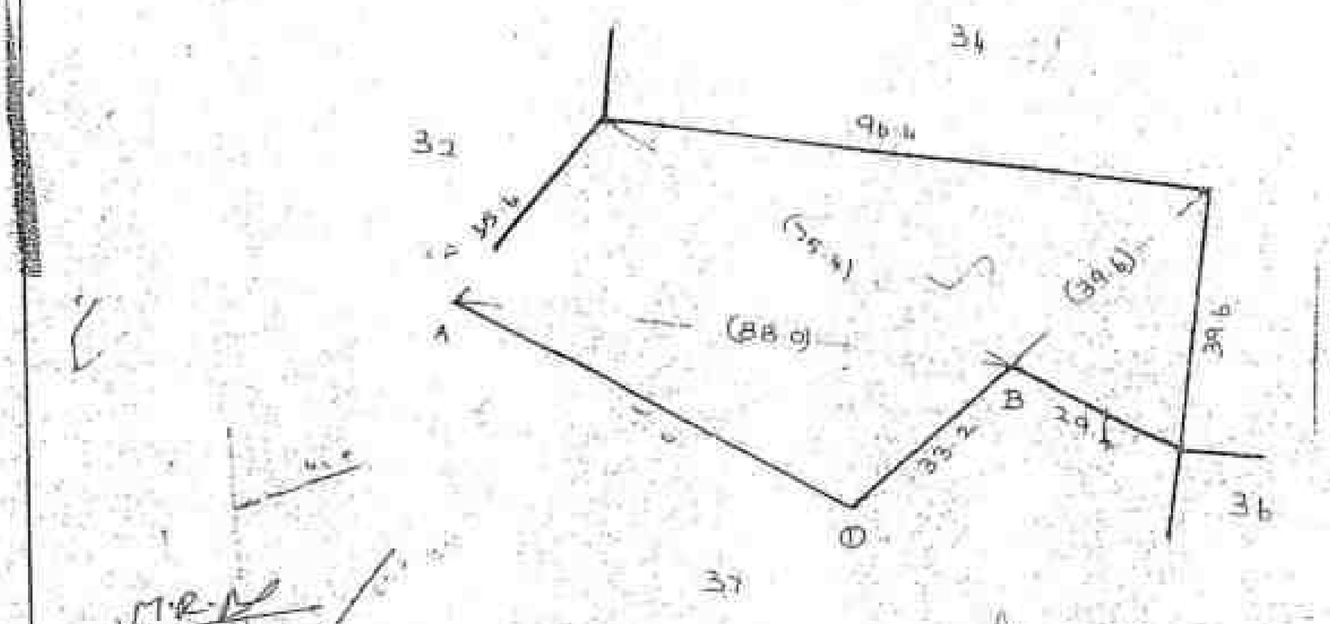
Signed by the above named
Lessor in the presence of

1. [signature]
ASSISTANT DIRECTOR,
GEOLOGY AND MINING,
PUDUKKOTTAI

3112
14/22

[signature]
LESSOR
COLLECTOR,
PUDUKKOTTAI
15/7


LESSOR
COLLECTOR,
PUDUKKOTTAI.
LESSEE
REGISTERED HOLDER



REGISTERED HOLDER

LESSEE

LESSOR

COLLECTOR,
PUDUKKOTTAI.

3712/2016/BK1

CERTICATE UNDER SECTION 42 OF STAMP ACT

S.No. 892 of 2016

I hereby certify that a sum of Rs. 18100/- (Rupees Eighteen thousand and one hundred only) proper / deficit stamp duty has been levied under section 41 of the Stamp Act in respect of this instrument from De. ndhiran residing at THIRUVARAMBUR.

Kolathur
Date:27/12/2016

Signature of SUB REGISTRAR & Collector
Under Section 41 of the Indian Stamp Act.

Presented in the Office of SUB REGISTRAR of Kolathur and fee of Rs. 20285 paid between hours of 10 & 11 on 27/12/2016 by

1 Left Thumb

Additions As per e recitals of the document

Execution Admitted !

I have satisfied my self as to the execution of the instrument by Thiru THIRU.S.GANESH, I.A.S., DISTRICT COLLECTOR, PUDUKKOTTAI who is exempted from Personal Appearance under Section 88(1) of the Registration Act.

3712/2016

17 22

Sheet no. 1 of 1

Execution Admitted by

2 Left Thumb

Additions As per the recitals of the document

3 Left Thumb

Additions As per the recitals of the document

4 Left Thumb

Additions As per the recitals of the document

3712

18/22

Sheet no. 2 of 3

Execution Admitted by

5 Left Thumb

M.R.S/L-7

-293-

Additions As per the recitals of the document

Identified by

Name : Chandran R S/o Ramaiya No.17/8, Ezhil Nagar, 6th St, Kulathur Tk, Pudukkottai

2 Name : Ramkumar M S/o Manickam No.1/6/1, Ulagankathanpatti, killukkottai& po, Kulathur Tk, Pudukkottai

27th day of December 2016

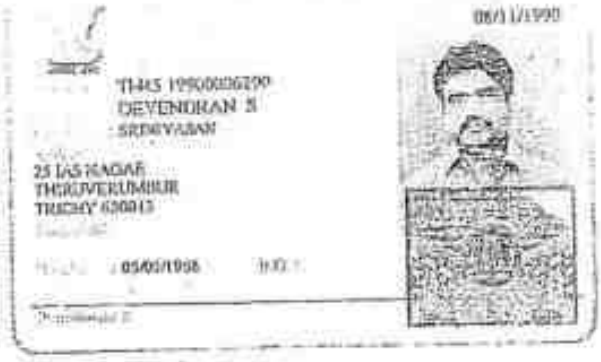
SUB REGISTRAR Kolathur

Registered as No 3712 of 2016 of E ... 1

Date : 27/12/2016 SUB REGISTRAR Kolathur

Sheet no 3 of 3

-285-



M.R.Sharma

M.R.M

ELECTION COMMISSION OF INDIA
IDENTITY CARD
இந்திய தேர்தல் ஆணையம்
வாக்காளர் அடையாள அட்டை
KFS2381945

Elector's Name : Santhakumari
வாக்காளர் பெயர் : சாந்தகுமாரி
Husband's Name : Munirathinam
கணவர் பெயர் : முனிரத்தினம்
Sex / பாலினம் : female / பெண்
Age as on 1.1.2006
1.1.2006 அன்று வயது : 60

KFS2381945

Address : 1E
Enbeeswarar nagar
Ellakkudi panchayat
TIRUCHIRAPPALLI - 620015

Facsimile Signature of Electoral Registration Officer
For 168 - TIRUVERAMBUR Assembly Constituency
168 - திருவெறும்பூர் சட்டமன்ற தொகுதி
Place : TIRUCHIRAPPALLI
இடம் : திருச்சிராப்பள்ளி
Date / நாள் : 29/04/2006

This card may be used as an Identity Card under different Government Schemes.
[illegible]

TIRUVERUMBUR

F/TN/045/013/4025/2003
PRASAD M.R.
MUNIRATHINAM NAIDU
I.D.A NAGAR
7 BLOCK KOOTHAPAR
THIRUERUMBUR
TRICHY-620013
22/03/1967

3712-6
21/22
குளத்தூர்

-289-

भारत सरकार
GOVERNMENT OF INDIA

சந்திரன் ராமையா
Chandran Ramaiya
பிறந்த நாள் / DOB : 07/12/1962
ஆண் / MALE

8106 1108 7867

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

भारतीय विशिष्ट पहचान प्राधिकरण
UNIQUE IDENTIFICATION AUTHORITY OF INDIA

முகவரி:
S/O [illegible], 17/8, [illegible]
622502

Address:
S/O Ramaiya, 17/8, EZHIL [illegible]
Pudukkottai, [illegible]
622502

1947 | help@uidai.gov.in | www.uidai.gov.in | P.O. Box No. 1947, Bengaluru-560 001

M.R. [illegible]

M.R. [illegible]

भारत सरकार
GOVERNMENT OF INDIA

ராம்குமார் மாணிக்கம்
Ramkumar Manickam
பிறந்த நாள் / DOB : 04/02/1956
ஆண் / MALE

6153 7307 3422

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

भारतीय विशिष्ट पहचान प्राधिकरण
UNIQUE IDENTIFICATION AUTHORITY OF INDIA

முகவரி:
S/O மாணிக்கம், 1/8/1,
உலகங்காத்தான்பட்டி,
கிள்ளுக்கோட்டை போஸ்ட்,
குளத்தூர் தாலுகா,
கிள்ளுக்குடவாய்ப்பட்டி,
புதுக்கோட்டை, தமிழ் நாடு,
622502

Address:
S/O Manickam, 1/8/1,
ULAGANKATHANPATTI,
KILLUKKOTTAI POST,
KULATHUR TALUK,
Killukudavoipatti, Pudukkottai,
Tamil Nadu, 622502

1947 1800 180 1947 | help@uidai.gov.in | www.uidai.gov.in | P.O. Box No. 1947, Bengaluru-560 001

M. [illegible]

சார் பதிவாளர் அலுவலகம்
ஆவண எண்
3712-2016
[illegible] பக்கங்கள்
22/22
குளத்தூர்

ANNEXURE - III

District : Pudukkottai

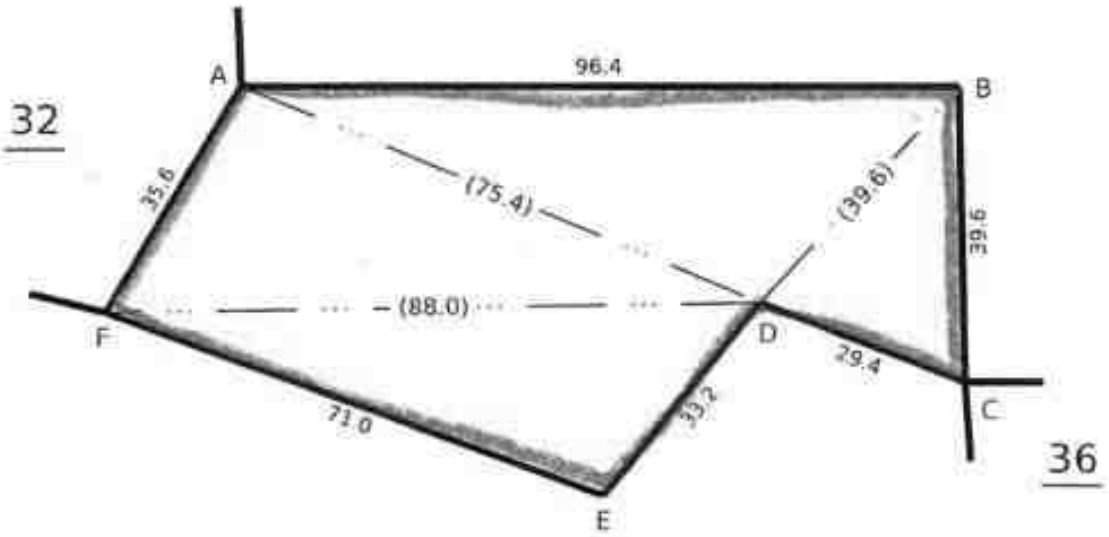
Taluk : Kulathur

Village : Killukulavaippatti [59]

Survey No : 37

Area : Hect 00 Ares 43.00

Scale : 1 : 999



EASE APPLIED AREA

Signed By Tahsildar

Name of approver : kmar

Date of Approval : 20-12-2017

Date of Issue: 03-11-2023 11:21:51

District : Pudukkottai

Taluk : Kulathur

Village : Kiilukulavaippatti [59]

Survey No : 34

Area : Hect 02 Ares 62.07

Scale : 1 : 2000

EASE APPLIED AREA

Signed By Tahsildar
Name of approver : kmar
Date of Approval : 20-12-2017

Date of Issue: 03-11-2023 11:32:28

ANNEXURE IV

- 295 -

District:Pudukkottai Taluk:KULATHUR Village:[illegible]

புல எண்	உட்பிரிவு எண்	பழைய புல எண் உட்பிரிவு எண்	பகுதி	அரசு / ரயத்துவாரி	நிலத்தின் வகை	பாசன ஆதாரம்	இருபோகம்	மண் வகை மற்றும் ரகமும்	மண் தரம்	தீர்வை ஹெக்		பரப்பு		மொத்த தீர்வை		பட்டா எண்	குறிப்பு
										ரூ	பை	ஹெக்	ஏர்	ரூ	பை		
30	6b	[illegible]	P	ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	8.00	0	17	649-பிரசாத் மற்றும் 3 நபர்(கள்)	
30	9	30-9		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	5.50	0	33	795-சசிகுமார	
30	10	30-10		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	7.30	0	16	795-சசிகுமார	
30	11	30-11		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	8.00	0	17	795-சசிகுமார	
TOTAL FOR SURVEY NUMBER- 30												2	3.00	4	35		
31	1A	31-1	P	ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	14.50	2	31	572-முத்துசாமி மற்றும் 1 நபர்(கள்)	
31	1B	31-1	P	ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	31.00	0	45	779-நடராஜ வல்லத்திரர்	
31	2	31-2		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	45.50	0	98	795-சசிகுமார	
31	3	31-3		அரசு	புறம்போக்கு			0-0	0	0	00	0	11.50	2	00		வாரி
31	4	31-4		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	35.50	3	78	545-நடராஜன்	
31	5	31-5		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	64.50	1	39	437-ராமசாமி	
TOTAL FOR SURVEY NUMBER- 31												1	93.50	3	91		
32	-	32		அரசு	தரிசு		0	0-0	0	0	00	0	92.50	0	00		கல்லாங்குத்து
33	-	33		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	63.00	6	92	649-பிரசாத் மற்றும் 3 நபர்(கள்)	
34	1	34-1		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	17.00	0	77	795-சசிகுமார	
34	2	34-2		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	18.50	0	40	795-சசிகுமார	
34	3	34-3		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	26.00	0	36	649-பிரசாத் மற்றும் 3 நபர்(கள்)	
34	4	34-4		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	51.50	0	68	649-பிரசாத் மற்றும் 3 நபர்(கள்)	
34	5	34-5		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	72.50	1	30	649-பிரசாத் மற்றும் 3 நபர்(கள்)	
34	6	34-6		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	47.50	1	02	649-பிரசாத் மற்றும் 3 நபர்(கள்)	
34	7	34-7		அரசு	தரிசு		0	0-0	0	0	00	0	7.50	0	00		பாறை
34	8	34-8		ரயத்துவாரி	புஞ்சை			7-4	6	2	15	0	7.50	0	16	649-பிரசாத் மற்றும் 3	

																நபர்கள்)	
34	9A	34/9	P	ரயத்துவாரி	புஞ்சை			7 - 4	6	2	15	0	20.00	0	42	834-தேவேந்திரன்	
34	9B	34/9	P	ரயத்துவாரி	புஞ்சை			7 - 4	6	2	15	0	10.50	0	42	643-பிரசாத் மற்றும் 3 நபர்கள்	
TOTAL FOR SURVEY NUMBER- 34												2	67.00	3	[illegible]		
35	-	35		அரசு	தரிசு		0	0 - 0	0	0	00	1	6.50	0	00		கலவாய்குத்து
36	-	36		ரயத்துவாரி	புஞ்சை			7 - 4	6	2	15	0	65.00	1	40	793-சசிகுமார்	

Page Number:111

தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : புதுக்கோட்டை

வட்டம் : குளத்தூர்

வருவாய் கிராமம் : இள்ளுகுளவாய்பட்டி

பட்டா எண் : 649

உரிமையாளர்கள் பெயர்

1.	முனிரெத்தின நாயுடு	மகன்	பிரசாத்
2.	சீனிவாசன்	மகன்	தேவேந்திரன்
3.	முனிரெத்தினம்	மகன்	பிரகாஷ்
4.	முனிரெத்தின நாயுடு	மனைவி	சாந்தகுமாரி

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	நீர்வை	பரப்பு	நீர்வை	பரப்பு	நீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
30	8B	0 - 8.00	0.17	--	--	--	--	---- -- 01-03-2001
33	-	0 - 43.00	0.92	--	--	--	--	---- -- 01-03-2001
34	3	0 - 26.00	0.56	--	--	--	--	---- -- 01-03-2001
34	4	0 - 31.50	0.68	--	--	--	--	---- -- 01-03-2001
34	5	0 - 72.50	1.56	--	--	--	--	---- -- 01-03-2001
34	6	0 - 47.50	1.02	--	--	--	--	---- -- 01-03-2001
34	8	0 - 7.50	0.16	--	--	--	--	---- -- 01-03-2001
34	9B	0 - 19.50	0.42	--	--	--	--	---- -- 01-03-2001
		2 - 55.50	5.49					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **22/11/059/00649/60909** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 29-11-2023 அன்று 02:21:43 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

1432 - ஆம் பசலியில் புதுக்கோட்டை மாவட்டம் குளத்தூர் வட்டம் கிள்ளுக்கோட்டை கிராமம்

புல வரித் திட்டத்தின்படி புலன்களின் விபரம்						சாகுபடியாளரின் பெயர்.	முதல் போகம்				
நில அளவை எண்.	உட்பிரிவு எண்.	பரப்பு.	தீர்வை.	ஒரு போகம் அல்லது இரு போகம்.	கைப்பற்று தாரருடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரருடைய பெயர்.	நிலத்தின் எந்த பகுதி யாவது சாகுபடியாளரால் பயிரிடப்பட்டுள்ளதா.	எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	பயிரின் பெயர்.	பயிரிடப்பட்டுள்ள பரப்பு.	உண்மையான பாய்ச்சல் ஆதாரம்.	விளைச்சல் ஆய்வு விருதுகாரு.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
33	—	0430	0.92	649	பி. ஜெயசந்திரன் (63 பட்டா)			திகு	0430		
34	3	0260	0.56	"	-do-			திகு	0260		
34	4	0315	0.68	"	-do-			திகு	0315		
34	5	0725	1.56	"	-do-			திகு	0725		
34	6	0475	1.02	"	-do-			திகு	0475		
34	8	0075	0.16	"	-do-			திகு	0075		
34	9B	0195	0.42	"	-do-			திகு	0195		

(உண்மை நகல்)

[signature]

கிராம நிர்வாக அலுவலர்
கிள்ளுக்கோட்டை வட்டம்
குளத்தூர் தாலுகா
புதுக்கோட்டை மாவட்டம்

1380/30 R.F. III-A 10-23,00,000 Cps,-GBP-Mdu.-7-2018.

ANNEXURE VI

தமிழ்நாடு TAMILNADU

BF 798197

M. முருகன்
முத்திரைத்தாள் விற்பனையாளர்
உரிமம் எண்: 9/93
பொது அலுவலக வளாகம்
புதுக்கோட்டை

நாள் : 02.7.2020

வாங்குபவர் பெயர் : S. தேவேந்திரன்

வகை : திருச்சி-13

தொகை : ரூ/-

குத்தகை ஒப்பந்தப்பத்திரம்

திருச்சிராப்பள்ளி மாவட்டம் திருவரம்பூர் எறும்பீஸ்வரர் நகர் எண்-12-இல் வசித்து வரும் முனிரெத்தினம் மகன் பிரசாத்(1) சீனிவாசன் மகன் தேவேந்திரன்(2) முனிரெத்தின நாயுடு மகன் பிரகாஷ்(3) (1) முனிரெத்தினம் மனைவி சாந்தகுமாரி(4) ஆகியோர் பெயரில் பட்டா எண் 649 கூட்டு பட்டாவாக பதிவாகியுள்ளது. திருச்சிராப்பள்ளி மாவட்டம் திருவரம்பூர் ஐ.ஏ.எஸ் நகர் எண் 25இல் வசிக்கும் சீனிவாசன் மகன் தேவேந்திரன் என்பவருக்கு எழுதிக்கொடுத்த குத்தகை ஒப்பந்தம் அடியிற்கண்ட சொத்து விவரத்தில் உள்ள நிலத்தை புதுக்கோட்டை மாவட்டம் குளத்தூர் தாலுகா கிளைநக்கோட்டை வட்டம் சிங்காரகுளவாய்பட்டி கிராமம் சீனிவாசன் மகன் தேவேந்திரன் என்பவர் பெயரில் மாவட்ட ஆட்சித்தலைவர் புதுக்கோட்டை அவாகளிடம் கல்குவாரி குத்தகை உரிமம் பெற்று கற்கள் வெட்டி எடுப்பதற்கு சமமதம் தெரிவித்து மாவட்ட ஆட்சியரின் ஆணையிட்ட நாளது தேதியிலிருந்து 10(பத்து)வருட காலத்திற்கு குத்தகைக்கு கொடுக்க சமமதிக்கிறோம் கீழகண்ட சொத்தில் எவ்வித வில்லங்கமும் ஏதும் இல்லை என உறுதி கூறுகிறோம்.

K. BALAKRISHNAN, M.A., B.L.
Advocate & Notary Public
Govt. of India Regn. No.19855 / 2020
741, Periyar Nagar, Pudukkottai
PUDUKKOTTAI DISTRICT 622 001
Cell: 99944 21043

305

சொத்து விபரம்

மாவட்டம்	தாலுகா	கிராமம்	புலஎண்	பரப்பு		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	30/8B	0.08.0	649	பிரசாத் தேவேந்திரன் பிரகாஷ் சாந்தகுமாரி
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	33	0.43.0		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	34/3	0.26.0		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	34/4	0.31.5		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	34/5	0.72.5		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	34/6	0.47.5		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	34/8	0.07.5		
புதுக்கோட்டை	குளத்தூர்	கிள்ளுகுளவாய்ப்பட்டி	34/9B	0.19.5		
TOTAL				2.55.5		

இப்படிக்கு

27/09/22

R. பிரசாத் —

S. தேவேந்திரன் —

M. பிரகாஷ் —

M. சாந்தகுமாரி —

NOTARY PUBLIC
GOVT. OF INDIA

K. BALAKRISHNAN, M.A.,B.L.,
Advocate & Notary Public
Govt. of India, Regn. No18955 / 2020
741, Periya Nagar, Narimedu
PUDUKKOTTAI DISTRICT 622 008.
Cell: 93660 31040

ANNEXURE - VII

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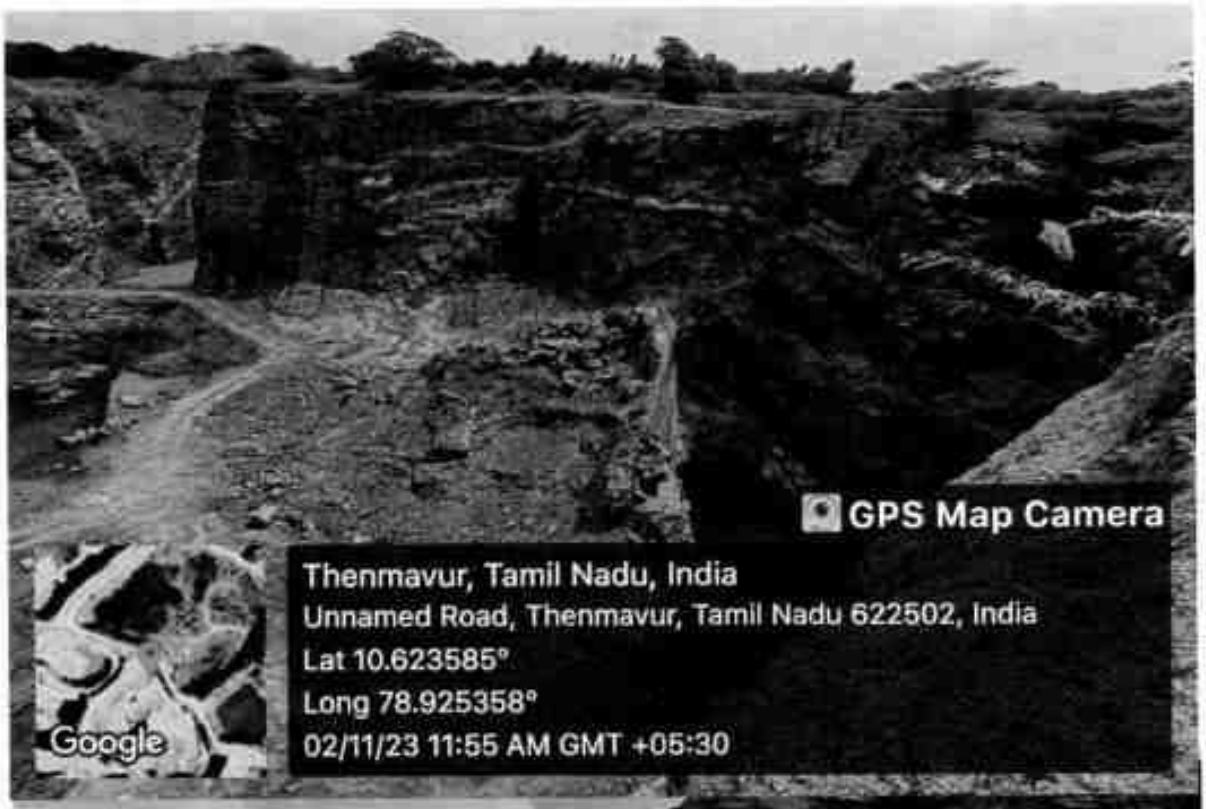
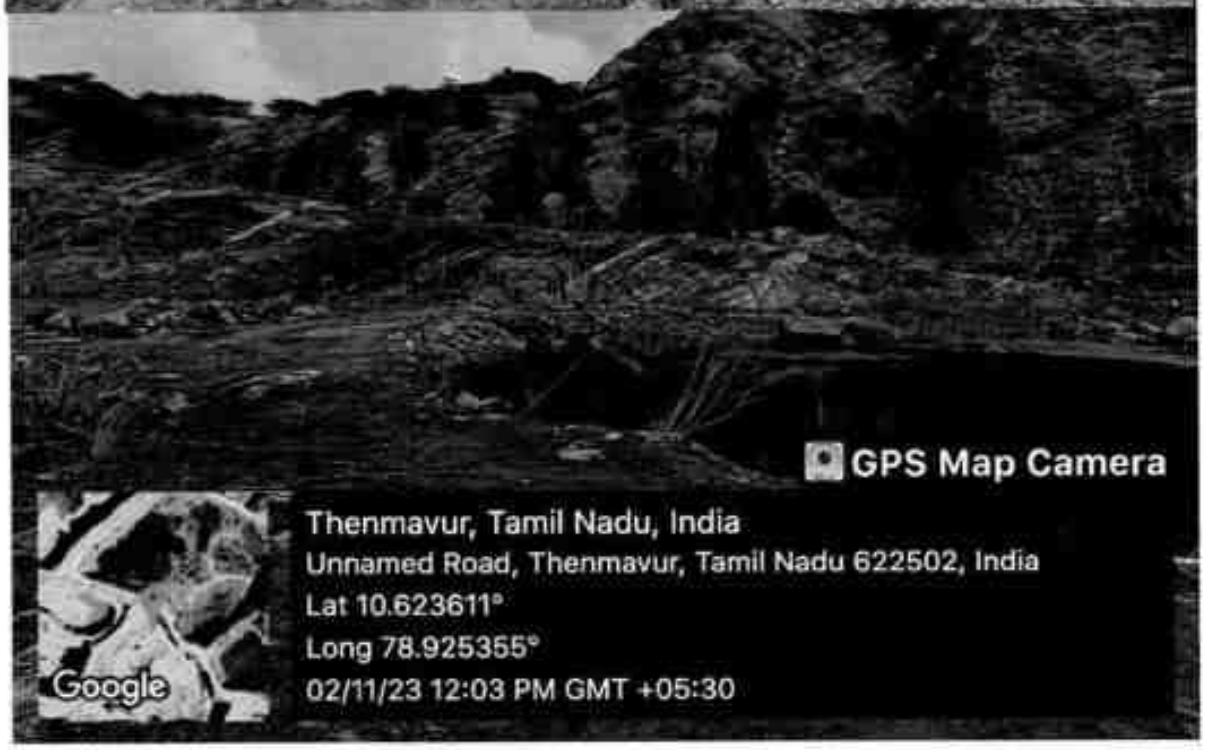
PHOTOCOPY OF THE APPLIED LEASE AREA

Field photos in respect of rough stone and Gravel quarry lease in S.F.No: 33, 34/3, 34/4, 34/5, 34/6 & 34/8 - Patta land – over an extent of 2.28.00 hectares – Killukulavaipatti Village – Kulathur Taluk - Pudukkottai District - Tamil Nadu State belongs to Mr.S.Devendhiran,





ANNEXURE - IV

भारत सरकार / GOVERNMENT OF INDIA
खान मंत्रालय / MINISTRY OF MINES
भारतीय खान ब्यूरो / INDIAN BUREAU OF MINES

-311-

अर्हता प्राप्त व्यक्ति के रुप मेंमान्यता प्रमाण पत्र
(खनिज रियायत नियमावली, 1960 के नियम 22सी के तहत)

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON
(Under Rule 22C of Mineral Concession Rules, 1960)

श्री एस. करुपण्णण, मॉग्गनीकाडू, मुत्तमंपटटी पोस्ट, बोम्मीडी वयॉ , ओमलूर तालुक, सेलम डीस्टीक्ट, तमिलनाडू – 635 301, जिनका फोटो और हस्ताक्षर ऊपर दिया हुआ है, तथा जिनहोंने अपनी अर्हता और अनुभव का संतोष जनक साक्ष्य दिया है, को खनन योजना तैयार करने हेतु खनिज रियायत नियमावली 1960 के नियम 22सी के तहत अर्हता प्राप्त व्यक्ति के रूप में मान्यता प्रदान की जाती है ।

Shri S. Karuppannan, Manganikadu, Muthampatty (Post), Bommidi (Via), Omalur Taluk, Salem District, Tamilnadu – 635 301, whose **Photograph and signature** is affixed herein above, having given satisfactory evidence of his qualifications & experience hereby **RECOGNISED** under Rule 22C of the Mineral Concession Rule, 1960 as a Qualified Person to prepare Mining Plans.

उनकीपंजीयन संख्या है
His registration number is

RQP /MAS/263/2014/A

यह मान्यता 10 वर्षों की अवधि के लिए मान्यता है जो दिनांक 15.12.2024 को समाप्त होगी।
This recognition is valid for a period of 10 years ending on 15.12.2024.

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज पाए जाने की स्थिती में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा।
This certificate will liable to be withdrawn / cancelled in the event of furnishing the wrong information / documents in the Mining Plan submitted by him.

स्थान/ Place : Chennai
दिनांक/ Date : 16.12.2014.

क्षेत्रीय खाननियंत्रक / Regional Controller of Mines
भारतीय खानब्यूरो/ Indian Bureau of Mines
चेन्नई क्षेत्र / Chennai Region

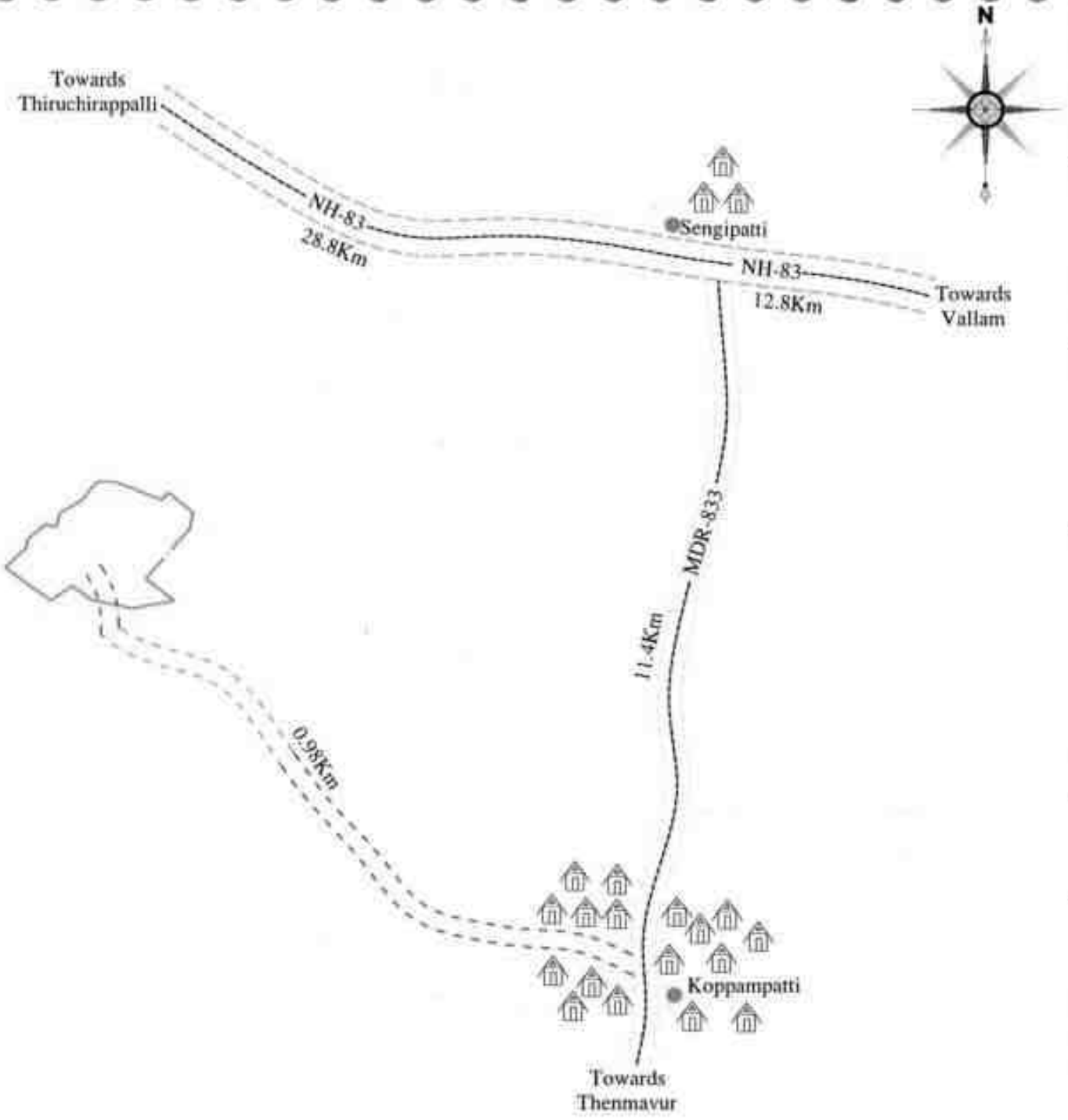


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PLATE NO-I

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

INDEX

MINE LEASE AREA	
APPROACH ROAD	
VILLAGE & CART ROAD	
NH - 83 ROAD	
MDR -833 ROAD	

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014

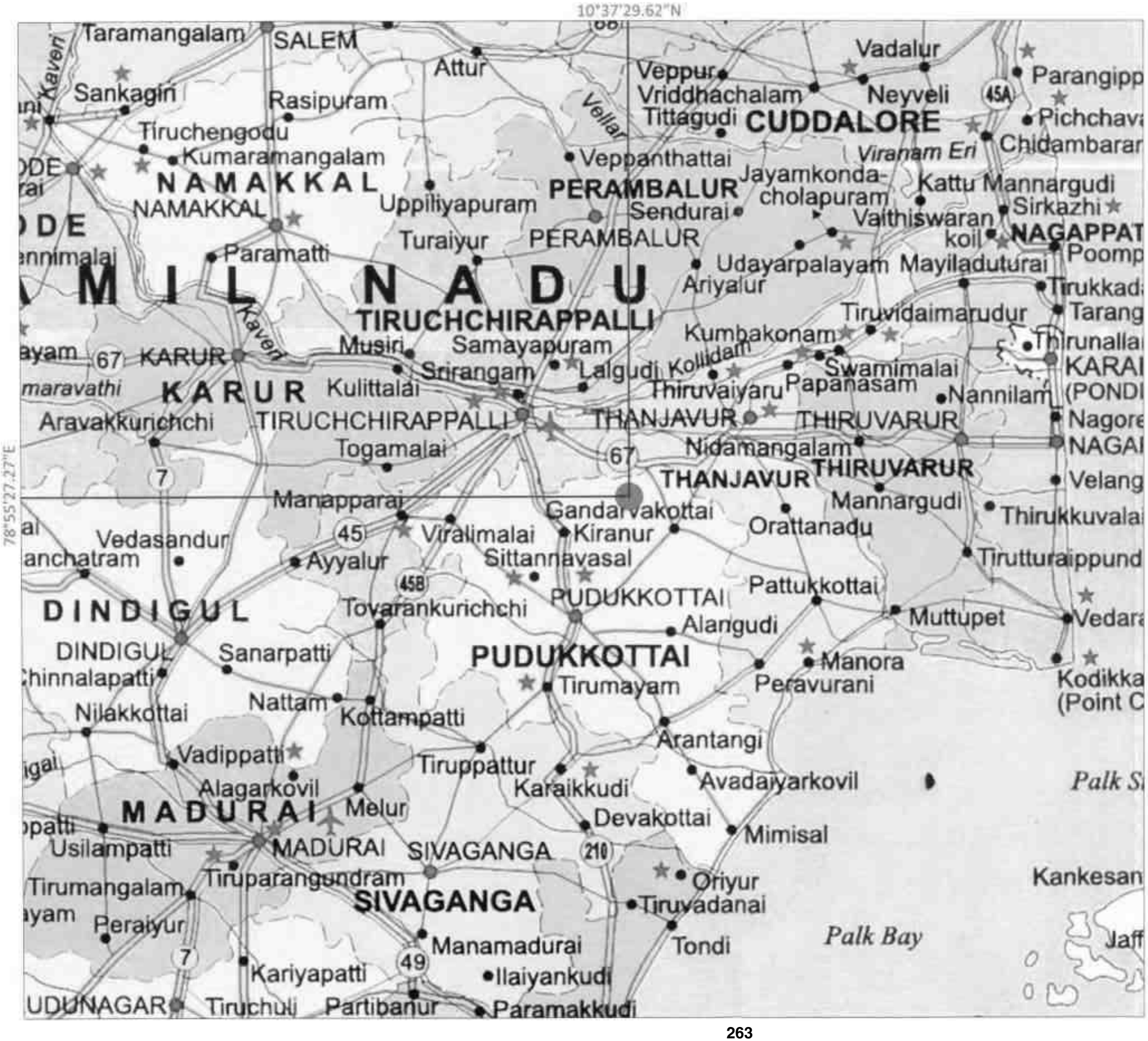


PLATE NO-IA

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

INDEX

MINE LEASE AREA :

TOPO SHEET NO : 58-J/14

LATITUDE : 10°37'24.42"N to 10°37'29.62"N

LONGITUDE : 78°55'27.27"E to 78°55'35.08"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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

10°37'29.62"N

78°55'27.27"E

PLATE NO-1B

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

TOPO SHEET NO : 58-J/14

LATITUDE : 10°37'24.42"N to 10°37'29.62"N

LONGITUDE : 78°55'27.27"E to 78°55'35.08"E

MINE LEASE AREA

10KM RADIUS

CONVENTIONAL SYMBOLS

TOPOSHEET MAP
SCALE- 1:1,00,000

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.
RECOGNIZED QUALIFIED PERSON

10°37'29.62"N

78°55'27.27"E

265

Towards
Koppampatty

-319-

PLATE NO-IC

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH ROAD
- CART ROAD
- 100m RADIUS
- 200m RADIUS
- 300m RADIUS
- 400m RADIUS
- 500m RADIUS
- EXISTING PIT

TOPO SHEET NO : 58-J/14

LATITUDE : 10°37'24.42"N to 10°37'29.62"N

LONGITUDE : 78°55'27.27"E to 78°55'35.08"E

SATELITE IMAGERY MAP

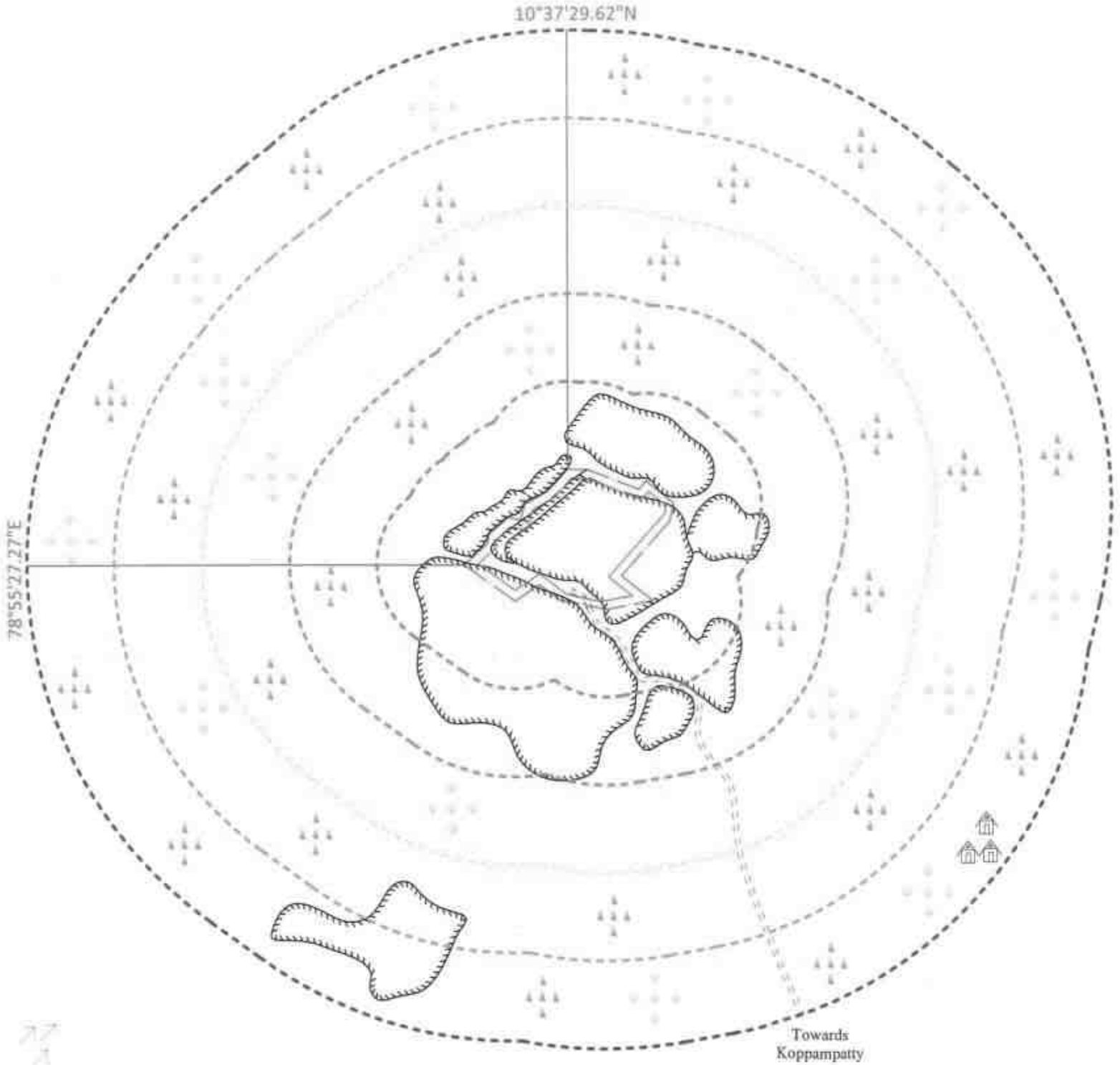
SCALE- 1:5000

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

OCTOBER TO DECEMBER



JULY TO SEPTEMBER

PLATE NO-ID

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH ROAD
- CART ROAD
- 100m RADIUS
- 200m RADIUS
- 300m RADIUS
- 400m RADIUS
- 500m RADIUS
- SHRUBS
- EXISTING PIT
- HABITATIONS

TOPO SHEET NO : 58-J/14

LATITUDE : 10°37'24.42"N to 10°37'29.62"N

LONGITUDE : 78°55'27.27"E to 78°55'35.08"E

ENVIRONMENTAL PLAN

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

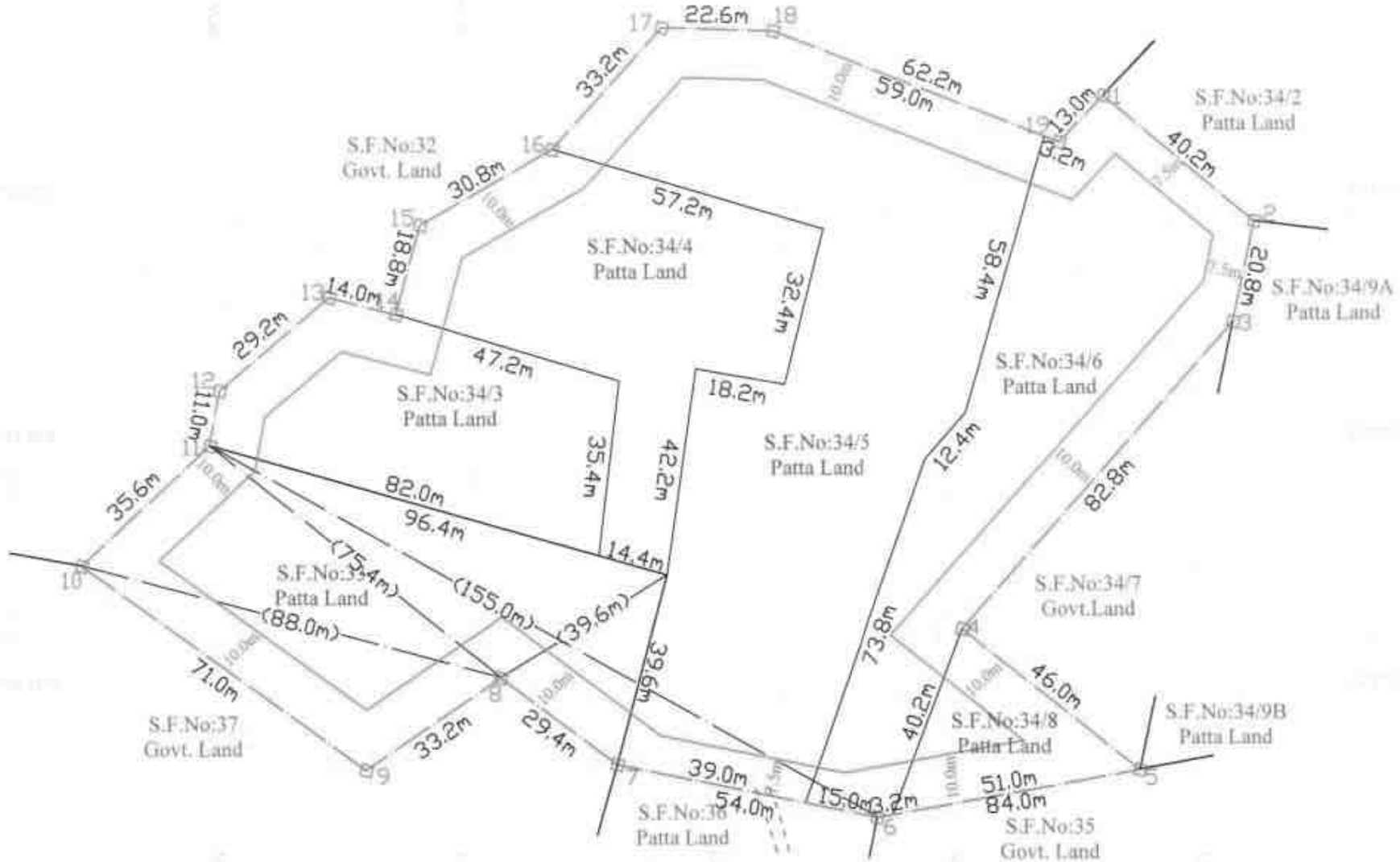


PLATE NO- II

PILLAR ID	LATITUDE	LONGITUDE
1	10°37'29.19"N	78°55'34.07"E
2	10°37'28.37"N	78°55'35.08"E
3	10°37'27.70"N	78°55'34.95"E
4	10°37'25.66"N	78°55'33.15"E
5	10°37'24.74"N	78°55'34.34"E
6	10°37'24.42"N	78°55'32.59"E
7	10°37'24.76"N	78°55'30.85"E
8	10°37'25.33"N	78°55'30.07"E
9	10°37'24.71"N	78°55'29.17"E
10	10°37'26.05"N	78°55'27.27"E
11	10°37'26.84"N	78°55'28.12"E
12	10°37'27.21"N	78°55'28.19"E
13	10°37'27.83"N	78°55'28.92"E
14	10°37'27.72"N	78°55'29.36"E
15	10°37'28.31"N	78°55'29.52"E
16	10°37'28.81"N	78°55'30.40"E
17	10°37'29.62"N	78°55'31.13"E
18	10°37'29.60"N	78°55'31.87"E
19	10°37'28.88"N	78°55'33.78"E

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

INDEX

MINE LEASE BOUNDARY	
SAFETY DISTANCE	
APPROACH ROAD	
BOUNDARY PILLAR STONES	B1

MINE LEASE PLAN
SCALE 1 : 1000

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

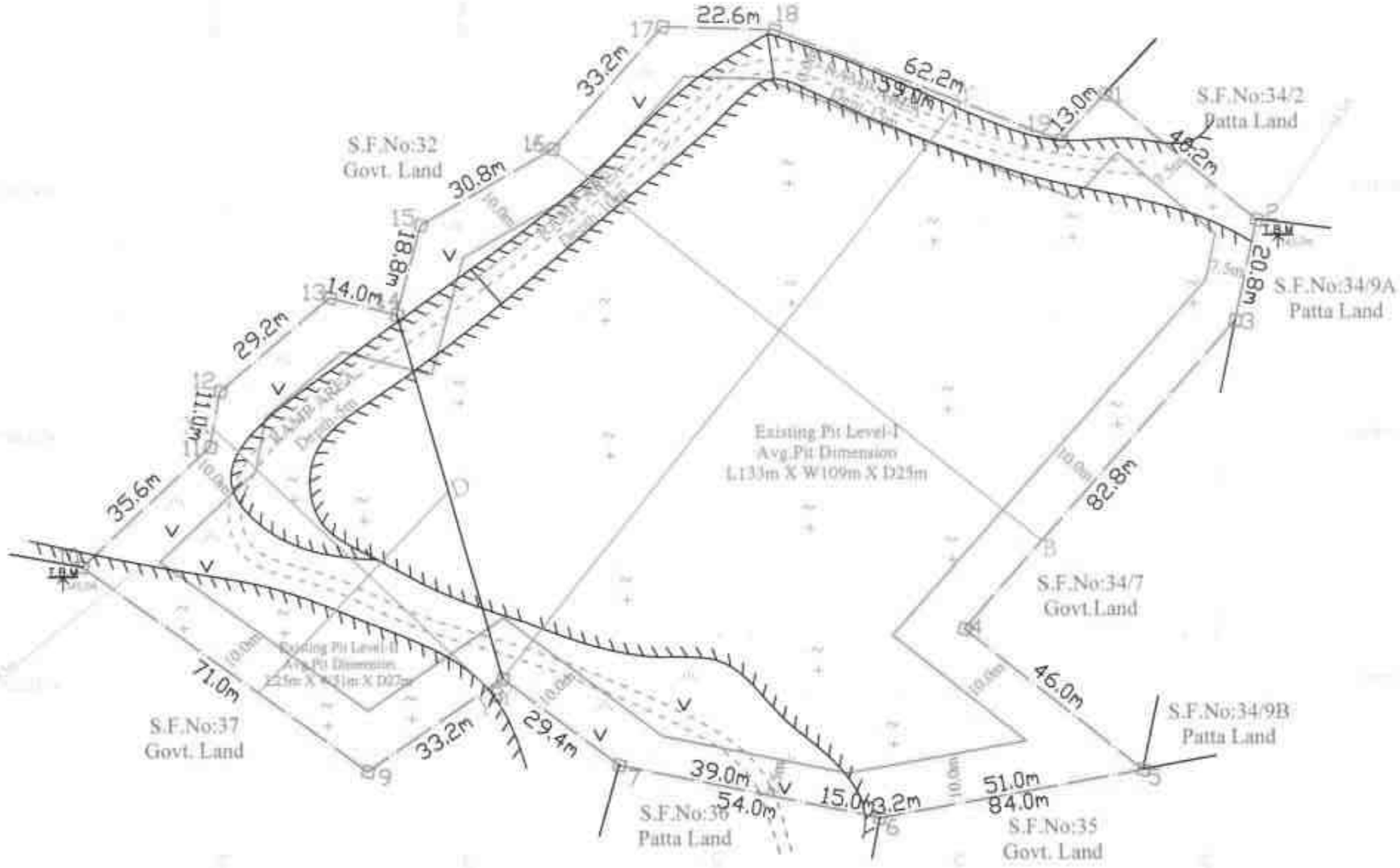


PLATE NO- III

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

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- MINE LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- ROUGH STONE
- GRAVEL
- SHRUB
- EXISTING PIT
- CONTOUR LINES
- TEMPORARY BENCH MARK

SURFACE, GEOLOGICAL PLAN

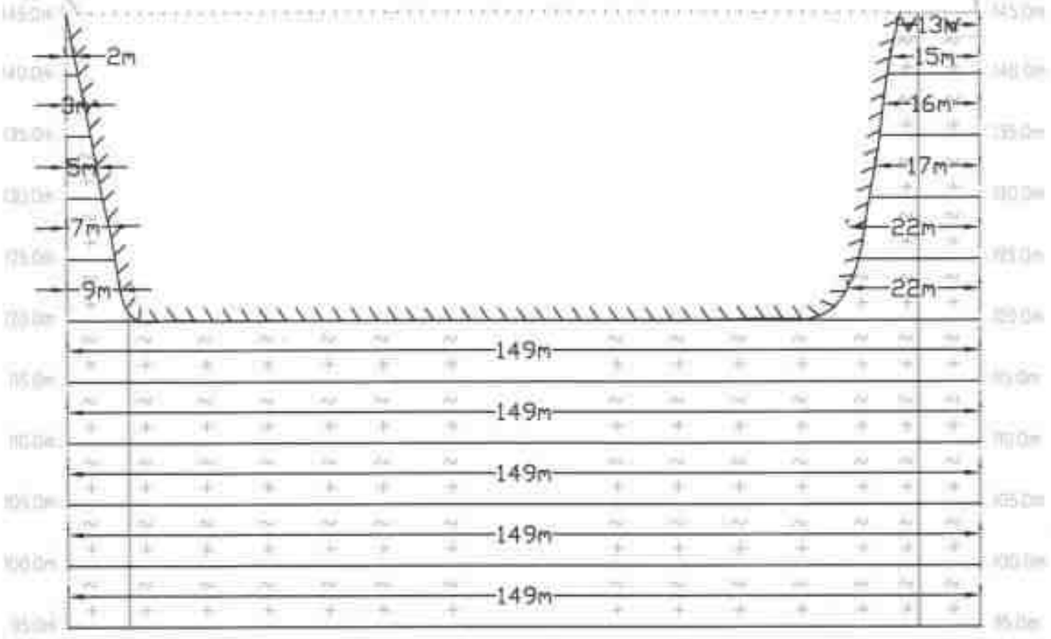
PLAN SCALE 1: 1000

Prepared By:

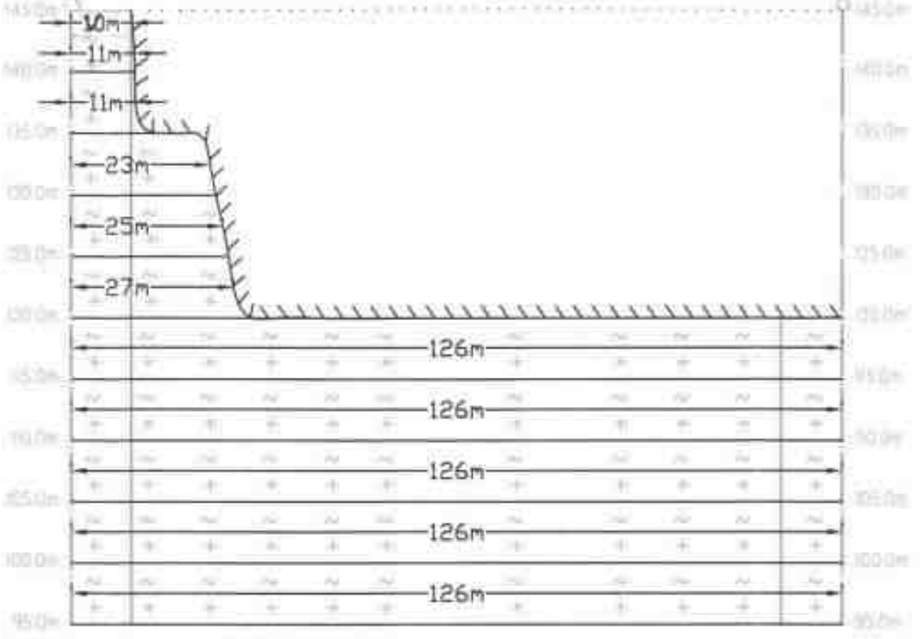
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/283/2014/A

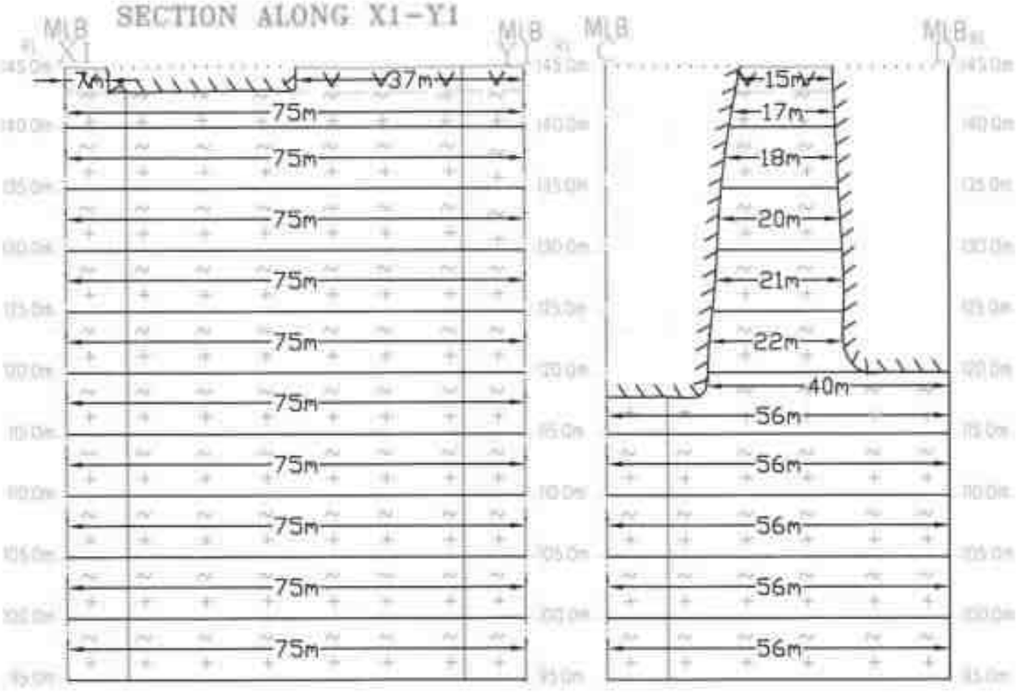
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG X1-Y1



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
XY-AB	I	13	10	2	260	.....	260
	I	17	11	3	561	561	.....
	II	19	11	5	1045	1045	.....
	III	22	23	5	2530	2530	.....
	IV	29	25	5	3625	3625	.....
	V	31	27	5	4185	4185	.....
	VI	149	126	5	93870	93870	.....
	VII	149	126	5	93870	93870	.....
	VIII	149	126	5	93870	93870	.....
	IX	149	126	5	93870	93870	.....
	X	149	126	5	93870	93870	.....
TOTAL				**50**	**481556**	**481296**	**260**
X1Y1-CD	I	44	15	2	1320	.....	1320
	I	75	17	3	3825	.....	3825
	II	75	18	5	6750	6750	.....
	III	75	20	5	7500	7500	.....
	IV	75	21	5	7875	7875	.....
	V	75	22	5	8250	8250	.....
	VI	75	40	2	6000	6000	.....
	VI	75	56	3	12600	12600	.....
	VII	75	56	5	21000	21000	.....
	VIII	75	56	5	21000	21000	.....
	IX	75	56	5	21000	21000	.....
	X	75	56	5	21000	21000	.....
TOTAL				**50**	**138120**	**132975**	**5145**
GRAND TOTAL					**619676**	**614271**	**5405**

PLATE NO- IIIA

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:
S.F.NO : 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT : 2.28.0Hect
VILLAGE : KILLUKULAVAIPATTI
TALUK : KULATHUR
DISTRICT : PUDUKKOTTAI

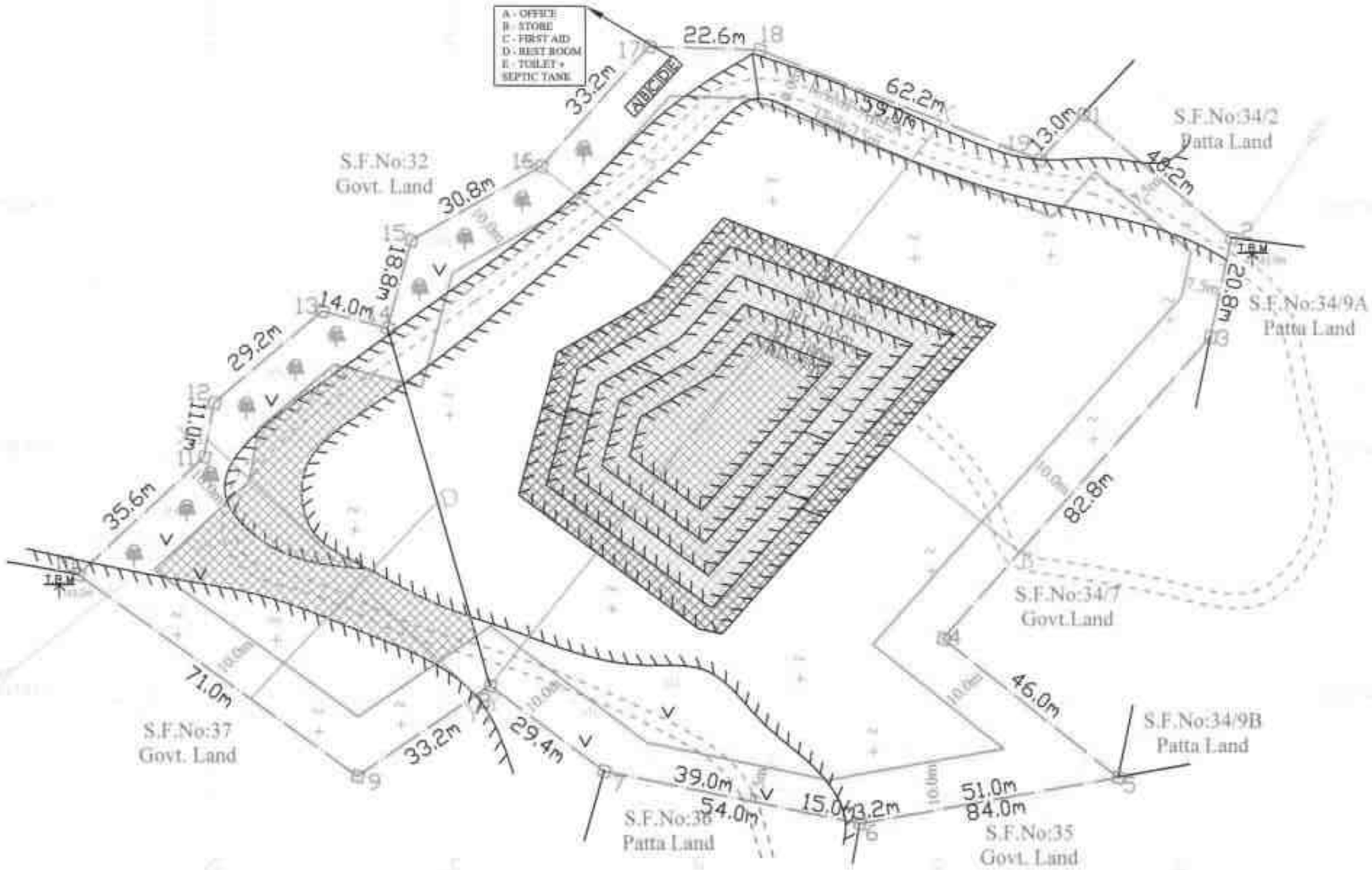
INDEX

MINE LEASE BOUNDARY
SAFETY DISTANCE
ROUGH STONE
GRAVEL
EXISTING PIT

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A



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

Plantation Proposed for I-Year

PLATE NO- IV

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

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- SHRUB
- EXISTING PIT
- CONTOUR LINES
- TEMPORARY BENCH MARK
- PROPOSED BENCH

YEARWISE DEVELOPMENT, PRODUCTION PLAN

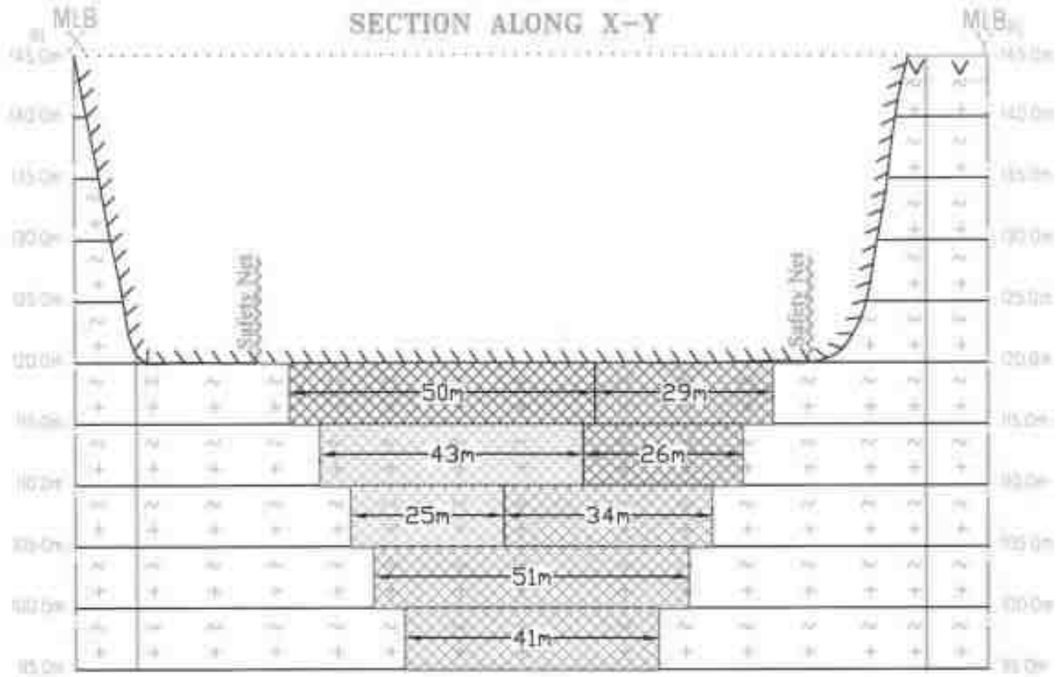
PLAN SCALE 1: 1000

Prepared By:

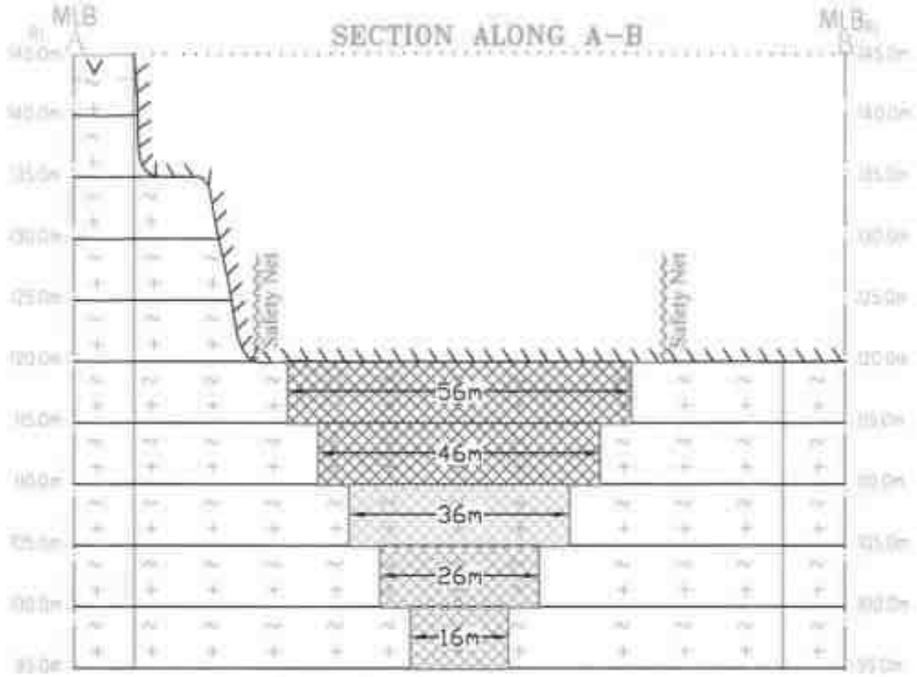
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

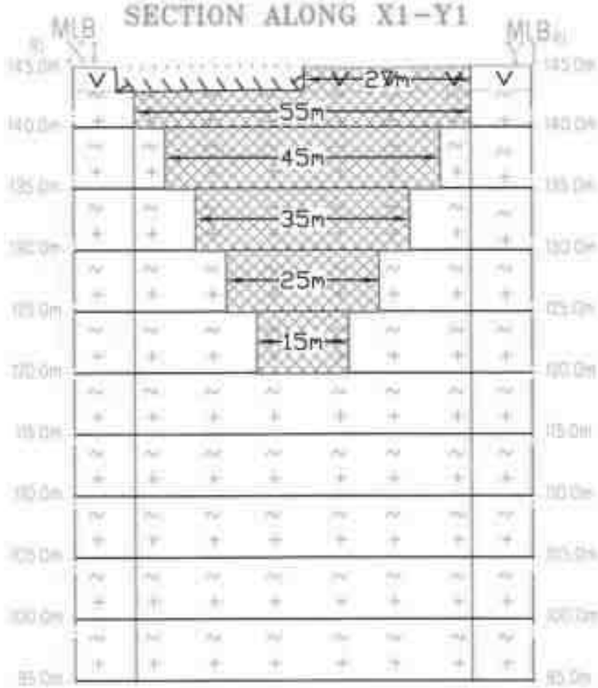
SECTION ALONG X-Y



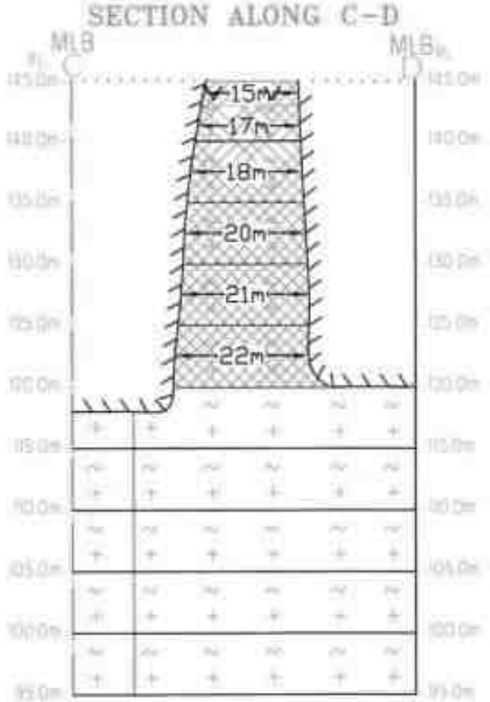
SECTION ALONG A-B



SECTION ALONG X1-Y1



SECTION ALONG C-D



YEARWISE PRODUCTIONS

Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Rough Stone in M^3	Gravel in M^3
X1Y1-CD	I-YEAR	I	27	15	2	810	.....	810
		I	55	17	3	2805	2805	.....
		II	45	18	5	4050	4050	.....
		III	35	20	5	3500	3500	.....
		IV	25	21	5	2625	2625	.....
		V	15	22	5	1650	1650	.....
		TOTAL				**15440**	**14630**	**810**
XY-AB	II-YEAR	VI	50	56	5	14000	14000	
		TOTAL				**14000**	**14000**	
XY-AB	III-YEAR	VI	29	56	5	8120	8120	.....
		VII	26	46	5	5980	5980	.....
		TOTAL				**14100**	**14100**	**0**
XY-AB	IV-YEAR	VII	43	46	5	9890	9890	.....
		VIII	25	36	5	4500	4500	.....
		TOTAL				**14390**	**14390**	**0**
XY-AB	V-YEAR	VIII	34	36	5	6120	6120	.....
		IX	51	26	5	6630	6630	.....
		X	41	16	5	3280	3280	.....
		TOTAL				**16030**	**16030**	**0**
GRAND TOTAL						**73960**	**73150**	**810**

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- IVA

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:
S.F.NO : 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT : 2.28.0Hect
VILLAGE : KILLUKULAVAIPATTI
TALUK : KULATHUR
DISTRICT : PUDUKKOTTAI

INDEX

MINE LEASE BOUNDARY

SAFETY DISTANCE

ROUGH STONE

GRAVEL

EXISTING PIT

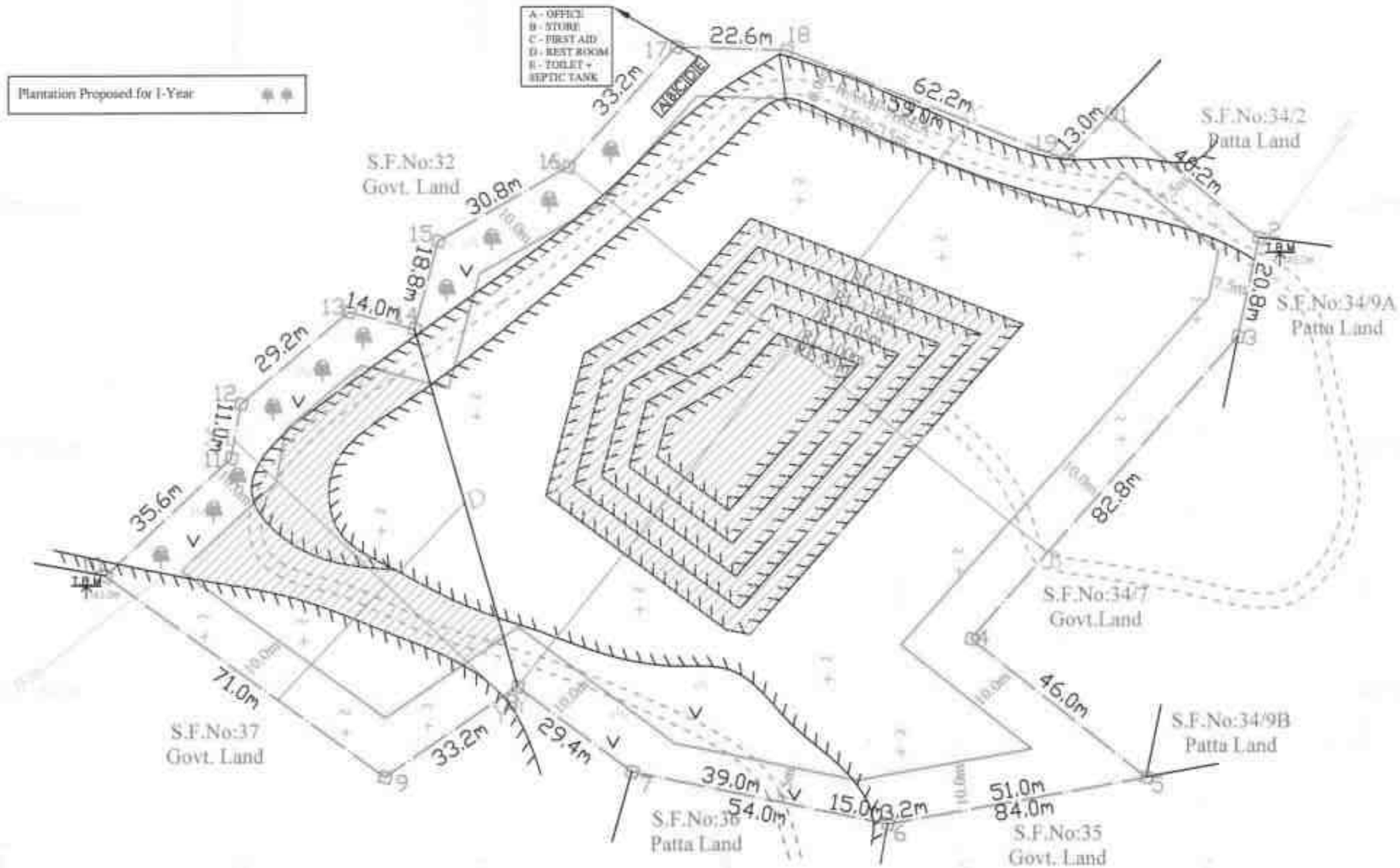
PROPOSED BENCH

YEARWISE DEVELOPMENT, PRODUCTION 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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A



MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	1.94.50	1.70.86	
INFRASTRUCTURE	NIL	0.02.0	
ROADS	0.03.0	0.06.0	
GREEN BELT & EARTH BUND	NIL	0.12.76	
UN-UTILIZED AREA	0.30.50	0.36.38	NIL
GRAND TOTAL	2.28.0	2.28.0	NIL

PLATE NO- V

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

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- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- ROUGH STONE
- GRAVEL
- SHRUB
- EXISTING PIT
- CONTOUR LINES
- TEMPORARY BENCH MARK
- PROPOSED BENCH

MINE LAYOUT PLAN AND LAND USE PATTERN
SCALE 1 : 1000

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

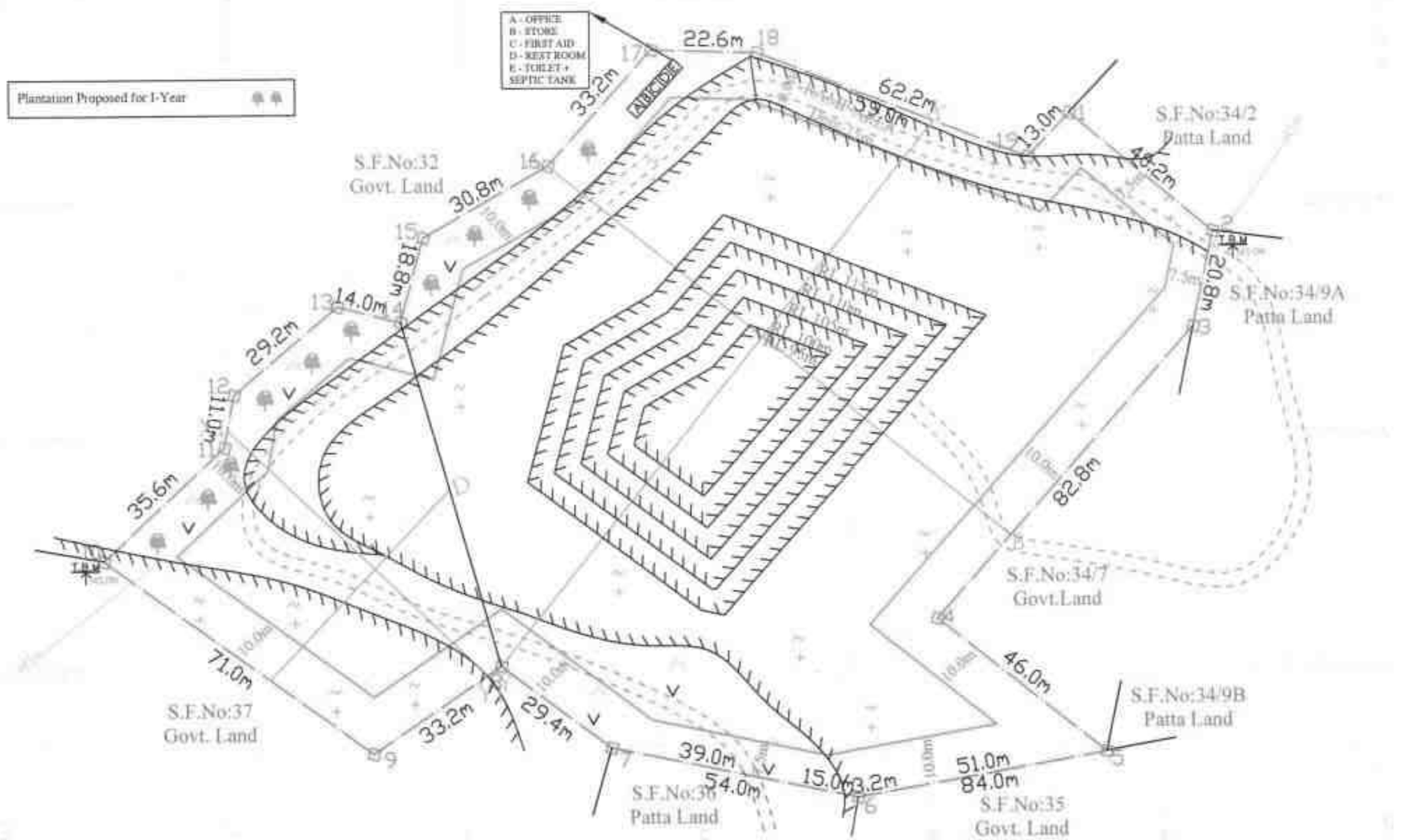

PLATE NO- VI

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:

S.F.NO	: 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT	: 2.28.0Hect
VILLAGE	: KILLUKULAVAIPATTI
TALUK	: KULATHUR
DISTRICT	: PUDUKKOTTAI

INDEX

- MINE LEASE BOUNDARY
- SAFETY DISTANCE
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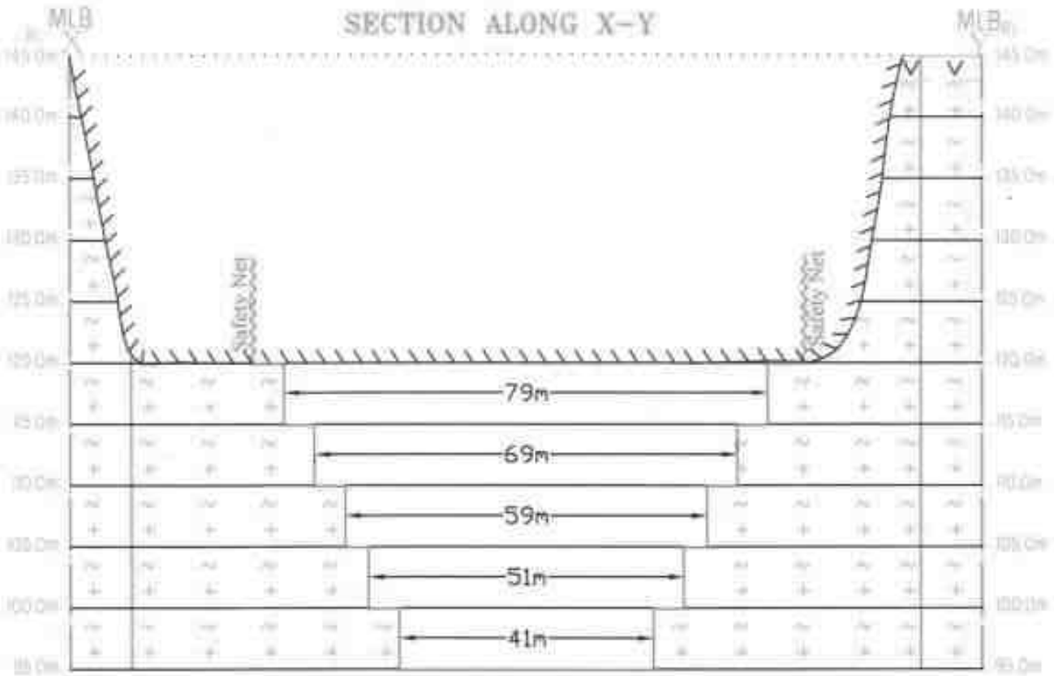
- BOUNDARY PILLAR STONES
- ROUGH STONE
- GRAVEL
- SHRUB
- EXISTING PIT
- CONTOUR LINES
- TEMPORARY BENCH MARK
- ULTIMATE BENCH

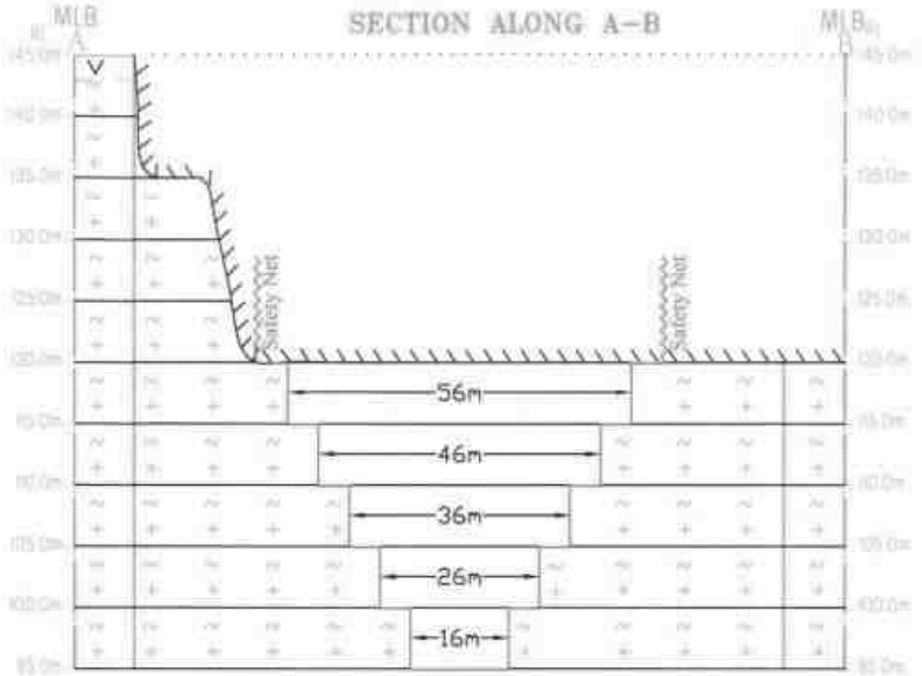
CONCEPTUAL PLAN
PLAN SCALE 1: 1000

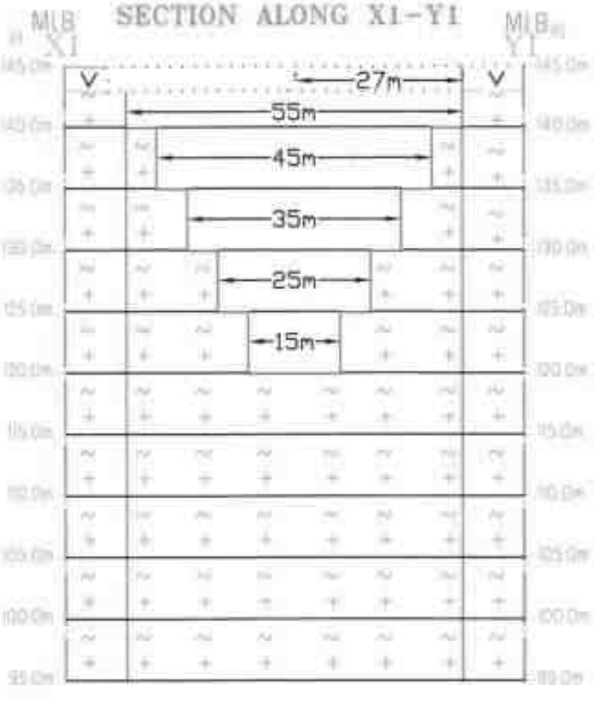
Prepared By:

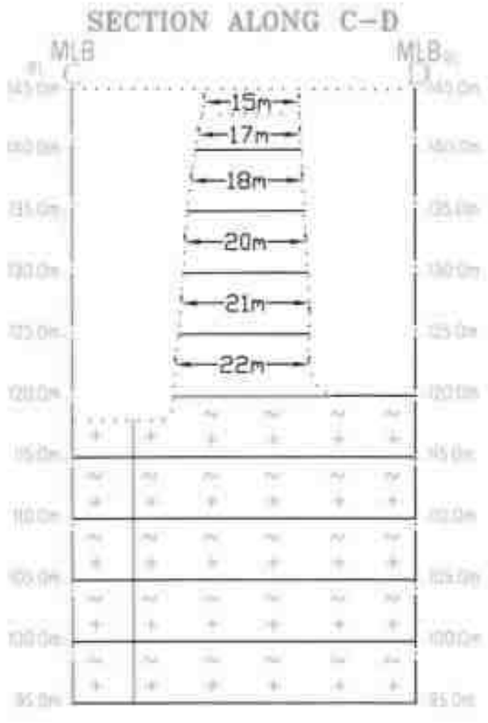
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/283/2014/A









MINEABLE RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Rough Stone in M^3	Gravel in M^3
XY-AB	VI	79	56	5	22120	22120	.....
	VII	69	46	5	15870	15870	.....
	VIII	59	36	5	10620	10620	.....
	IX	51	26	5	6630	6630	.....
	X	41	16	5	3280	3280	.....
TOTAL				**25**	**58520**	**58520**	**0**
X1Y1-CD	I	27	15	2	810	.....	810
	I	55	17	3	2805	2805	.....
	II	45	18	5	4050	4050	.....
	III	35	20	5	3500	3500	.....
	IV	25	21	5	2625	2625	.....
	V	15	22	5	1650	1650	.....
TOTAL				**25**	**15440**	**14630**	**810**
GRAND TOTAL					**73960**	**73150**	**810**

PLATE NO- VIA

APPLICANT:
Mr.S.DEVENDIRAN
S/o.SRINIVASAN,
No.25, I.A.S NAGAR,
THIRUVERUMBUR TALUK,
TIRUCHIRAPPALLI DISTRICT,
PINCODE - 620013.

LEASE APPLIED AREA:
S.F.NO : 33, 34/3, 34/4, 34/5, 34/6 &34/8
EXTENT : 2.28.0Hect
VILLAGE : KILLUKULAVAIPATTI
TALUK : KULATHUR
DISTRICT : PUDUKKOTTAI

INDEX

MINE LEASE BOUNDARY
SAFETY DISTANCE
ROUGH STONE
GRAVEL
EXISTING PIT
ULTIMATE BENCH

CONCEPTUAL 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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

From

Thiru.K.Vijayaragavan,M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To

Thiru.S.Devendiran,
S/o.Srinivasan,
No.25, I.A.S.Nagar,
Thiruverumbur Taluk,
Tiruchirappalli District .

Rc.No.552/2022 (G&M) dated 24.11.2023

Sir,

Sub : Mines and Minerals - Minor Mineral – Pudukkottai District - S.F.Nos.33, 34/3 etc., of Killukkulavaipatti village, Kulathur Taluk over an extent of 2.28.0 Hects – Rough stone & gravel -Quarry Lease Application preferred by Thiru.S.Devendiran – Reg.

Ref : 1.The District Collector, Pudukkottai proceedings Rc.No. 224/2014(G&M) dated 22.09.2016.
2.Application of Thiru.S.Devendiran, S/o.Srinivasan, dt.27.07.2022.
4.Precise area communication in Rc.No.552/2022(G&M) dated 20.11.2023.
5.Letter from Thiru.S.Devendiran, S/o.Srinivasan letter dt. .11.2023.

. . . . .

With reference to your letter in the reference 4th cited, as per the approved mining plan the existing pit dimension in S.F.Nos.33(0.43.0), 34/3(0.26.0), 34/4(0.31.5), 34/5(0.72.5), 34/6(0.47.5) and 34/8(0.07.5), over an extent of 2.28.0 Hects of Killukulavaipatti village, Kulathur Taluk, Pudukkottai District, which was already held under quarrying lease for a period of five years as described below:

Sl. No.	Name & Address	S.F. Nos.	Extent	District Collector's Proceedings	Lease period
1.	Thiru.Devendhiran, S/o.Sreenivasalu, No.25, I.A.S.Nagar, Thiruvarambur, Thiruchirappalli	33, 34 etc.,	2.28.0	Rc.No.224/ 2016 (G&M) dt.22.09.2016	22.10.2016 to 21.10.2021

Existing pit dimension:

Pit	Length (m)	Width (m)	Depth (m)
I	133	109	25
II	25	51	27

Assistant Director,
Geology and Mining,
Pudukkottai

கிள்ளுக்கோட்டை கிராம வருவாய் ஆய்வாளர் அவர்களுக்கு பணிந்து அனுப்பப்படுகின்றது.

கிள்ளுக்கோட்டை வட்டம் மதிரம்

கிள்ளுக்கோட்டை கிராம நிர்வாக அலுவலர் உத்தரவுபோல்.

கிள்ளுக்கோட்டை வட்டம் மதிரம்

கிள்ளுனைப்பட்டி வருவாய் கிராமத்தில் அமைந்து உள்ள கிள்ளுனைப்பட்டி கிராம பட்டா எண்: 649 புல எண்கள் 33/-, 34/3, 34/4, 34/5 34/6, 34/8, 34/9B -ல் கல்குவாரி அமைத்திட தொடர்பாக திருமதி கோணி தேவேந்திரன் என்பவர் கோரிய விண்ணப்பம் தொடர்பாக எனது அறிக்கையை சமர்ப்பிக்கின்றேன்.

புதுக்கோட்டை மாவட்டம், குளத்தூர் தாலுகா.

கிள்ளுக்கோட்டை வட்டம், கிள்ளுக்கோட்டை தகவ கிள்ளுனைப்பட்டி வருவாய் கிராமம் பட்டா எண். கிள்ளுனைப்பட்டி கோணி தேவேந்திரன் (ம) 3நபர் 649 திருமதி கோணி பெயரில் கூட்டு உள்ளன. புல எண் (1) 33/- பரப்பு 0.43.0 ஹெக் (2) 34/3 - பரப்பு - 0.26.0 ஹெக் (3) 34/4 - பரப்பு 0.31.50 ஹெக் (4) 34/5 - பரப்பு - 0.72.50 ஹெக் (5) 34/6 - பரப்பு - 0.47.50 ஹெக் (6) 34/8 - பரப்பு 0.07.50 ஹெக் (7) 34/9B - பரப்பு - 0.19.50 ஹெக் புன்செய் நிலங்களாக உள்ளது. மேற்படி நிலத்தில் ~~[struck out]~~ கள் இயற்கை மற்றும் தற்போது கல்குவாரி உரிமம் கோர விரும்புகிறார்

பொருந்தி வருவதால், மேலும் கல்குவாரி குத்தகை
பெற விண்ணப்பம் செய்ய தடையில்லை. இப்பொருள்
மற்றும் சிபாரிசுரையுடன் அனுப்புகிறேன். மேற்படி
பட்டா எண்: 649 - ல் சின்னையா மகன்
தேவேந்திரன் என்பவர் பெயரில் உள்ள கிராம
புல எண் (1) 33/- (2) 34/3 (3) 34/4 (4) 34/5
(5) 34/6 (6) 34/8 (7) 34/9B ஆகிய புல
எண்களில் கிடைக்க கல்குவாரி அமைந்துள்ளது.

மேற்படி கல்குவாரியை சுற்றி நீர்நிலைகள் அருகாமை உள்ளது. விவசாய நிலங்கள் குறைவாக உள்ளது. அந்த விவசாய நிலங்கள் தரிசு நிலமாக உள்ளது. மேற்படி குவாரியை சுற்றி 300 மீட்டர் தொலைவிற்குள் கட்டிடங்கள் மற்றும் குடியிருப்புகள் அமைந்துள்ளன. 2000 மீட்டர் தொலைவில் கிராம குடியிருப்புகள் மற்றும் கோயில்கள் அமைந்துள்ளது. மேற்படி குவாரியை சுற்றி புராதன சின்னங்கள் ஏதுமில்லை மற்றும் 300 மீட்டருக்கு உள்ளாக எந்த கோவிலும் இல்லை. 300 மீட்டருக்குள்ளாக எந்த விதமான மின் கோபுரம் இல்லை, HD Line மற்றும் LT line ஏதுமில்லை. Burial ground, ஏதுமில்லை ஆகும் சிபாரிசு மேல் இதன் மூலம் தெரிவிக்கின்றேன்.

30/10/2024
கிராம நிர்வாக அலுவலர்
கிள்ளுக்கோட்டை வட்டம்
குளத்தூர் தாலுகா
புதுக்கோட்டை மாவட்டம்

மேலும் மேற்படி புல எண்களில் இரண்டு
முறை அரசு அனுமதி பெற்று [illegible]
இயங்கி வந்தது என்றும், ஆகவே மேற்படி
புல எண்களில் சுற்றி பல குவாரிகள்
முன்பு இயங்கி வந்தது. தற்போதும் சில
குவாரிகள் மட்டும் இயங்கி கொண்டிருக்கிறது
மேற்படி புல எண்களில் குவாரிகள் [illegible]
அனுமதி தொடர்பாக அரசின் உரிய ஆணையில்
ஏற்று [illegible] அரசின் உரிய
சட்ட திட்டங்களை உரிய நிதிபெற்று
ஆணைக்கு உட்படும் மேற்படி புல எண்கள்
ஆ.எ. (1) 33/- (2) 34/3 (3) 34/4 (4) 34/5
(5) 34/6 (6) 34/8 (7) 34/9B ஆகிய புல
எண்களில் கல் குவாரி உரிமம் அனுமதி வழங்க
வேண்டுமென தாசில்தார் ஆய்வாளர் அவர்களின்
பரிந்துரை செய்கின்றேன்.

30/01/2024
கிராம நிர்வாக அலுவலர்
கிள்ளுக்கோட்டை வட்டம்
குளத்தூர் தாலுகா
புதுக்கோட்டை மாவட்டம்

// என் முன்பாக //

வருவாய் ஆய்வாளர் 30/01/2024
கிள்ளுக்கோட்டை சரகம்
குளத்தூர் தாலுகா
புதுக்கோட்டை மாவட்டம்

HYDROGEOLOGICAL REPORT

for

Rough stone Quarry Over an

extent of 2.28.0ha, S.F.No. 33, 34/3, 34/4, 34/5, 34/6 & 34/8,

Killukulavaipatti Village, Kulathur Taluk,

Pudukkottai District, Tamilnadu.

HYDROGEOLOGICAL REPORT FOR KILLUKULAVAIPATTI ROUGH STONE & GRAVEL QUARRY

1. INTRODUCTION

Name of the Applicant	**:**	**Mr. S. Devendiran**
Address	**:**	S/o. Srinivasan, No.25, I.A.S Nagar, Thiruverumbur Taluk, Thiruchirappalli District-620013.

Study Area Details

Land Classification	:	Patta Land
Survey Numbers	:	33, 34/3, 34/4, 34/5, 34/6 & 34/8
Extent in Heaters	:	2.28.0ha
Village	:	Killukulavaipatti
Taluk	:	Kulathur
District	:	Pudukkottai
State	:	Tamil Nadu

The Client requires detailed information on Ground Water Occurrences at Proposed Project Site. The objective of the present study is to assess the availability of groundwater and comment on aspects of depth to potential aquifers, aquifer availability and type, possible yields and water quality. For this purpose, all available hydrogeological information of the areas has been analysed, and a geophysical survey was done.

The investigations involved hydrogeological, geophysical field investigations and a detailed study in which the available relevant geological and hydrogeological data were collected, analysed, collated and evaluated within the context of the Client's requirements. The data sources consulted were mainly:

a. Central Ground Water Board (CGWB) Data
b. State & District Geological and Hydrogeological Reports and Maps.
c. Technical reports of the area by various organizations.

2. SCOPE OF THE WORKS

The scope of works includes:

- Site visits to familiarize with the project areas. Identify any issues that might impact the Ground Water Scenario due to proposed mining activities.

- ❖ To obtain, study and synthesize background information including the geology, hydrogeology and existing borehole data, for the purpose of improving the quality of assessment and preparing comprehensive hydrogeological reports,
- ❖ To carry out hydrogeological evaluation and geophysical investigations in the selected sites in order to determine potential for groundwater at project site.
- ❖ To prepare hydrogeological survey reports in conformity with the provisions of the rules and procedure outlined by the Central Ground Water Board (CGWB), by Assessment of water quality and potential infringement of National standards, Assessment of availability of groundwater and Impact of proposed activity on aquifer, water quality and other abstractors.

3. BACKGROUND INFORMATION

Location

The investigated site falls in the Toposheet No: 58-J/14 Latitude between 10°37'24.42"N to 10°37'29.62"N and Longitude between 78°55'27.27"E to 78°55'35.08"E on WGS datum-1984.

4. GEOLOGY AND GEOMORPHOLOGY

Regional Geology of Pudukkottai District

The geological formation of Pudukkottai District comprises of the hard rocks formed in the Archean age to the sedimentary deposits of the Quaternary period. Geologically the entire area can be divided into hard rock and sedimentary rock regions. The hard rocks are found on the western side and sedimentary formation towards the eastern side. About 45 per cent of the area is under hard massive formation of Archean age and the rest 55 per cent comprises of the sedimentary formation ranging from Pre-Cambrian to Quaternary period.

The various types of hard rocks found here are Charnockites, Hornblende Gneiss, Biotite Gneiss, Granite and Quartzite's. Various types of Gneiss rocks are found in the western part of Pudukkottai District. Charnockites and granites rocks are mostly found in the central part including the blocks of Kunnandavarkoil, Thirumayam and the southern parts of Pudukkottai Block. The various types of Gneiss rocks are found in the western part of the area, consisting the blocks of Viralimalai, Annavasal and Ponamaravathy. Quartzite deposits are found in small quantity in some parts of Annavasal and Thirumayam Blocks. In the Blocks of Kulathur, Thirumayam and parts of Pudukkottai crystalline rocks.

The sedimentary deposits found in this region consist of shaly sandstone, sand, clay and gravels. The sedimentary deposits formed during the Tertiary period consist of laterite, arenaceous and argillaceous sandstone clay. These deposits are found in the Blocks of

Arantangi, Gandarvakottai, Alangudiand Thiruvarankulam. Crecateous deposits consisting of clay, limestone, sand stone and clayey sand stone are found in some parts of Gandarvakottai, Thirumayam and Pudukkottai. Unconsolidated coastal alluvial deposits consisting of sand gravel and silt are found along the river bed. Silt and clay deposits of Quaternary period are found in the blocks of Avudaiyarkoil and Manalmelkudi. Sand deposits with beach ridges and dunes are identified near the coastal boundary of Pudukkottai District.

Geomorphology

The district is characterised by an undulating topography with residual hills in the northern, western and southern parts of the district, whereas in the eastern part of the district is a flat terrain consisting of alluvial plains. The elevation of the terrain of the western part of the area is about 125 m above MSL, whereas towards coast it is about 1 m above MSL.

The geomorphic evolution of the area is mainly controlled by denudation, structural and fluvial processes. The evolution of various landforms has been governed mainly by the varying resistance of geological formations to these processes. Various landforms are occurring in the area, such as erosional plains, residual hills, pediments, buried pediments and deltaic plain. The shallow pediments possess poor to moderate yields with thin soil cover. The buried pediments and deltaic plain possess good ground water potential.

Type of Soils

The soils of the district can be classified into black, red, ferruginous, lateritic, alluvial and beach soils. Black soils are formed in the western part of the district. Red ferruginous lateritic soils are formed on the high grounds, south of Annavasal, west of Illupur, north of Malaipatti around Kulakurichchi near Gandarvakottai, east of Arantangi around Arimalam and Alangudi. Alluvial soils consisting of blackish and brownish sandy and silty soils are observed along the course of the Vellar, Agniyar and Ambuliyar rivers, whereas the beach sands are noticed along the coast of the district.

Rainfall and Climate

The normal annual rainfall recorded at various rain gauge stations in the area ranged from 833.40 (Viralimalai) to 1033.8 mm (Perungalur) with an average of 910.8 mm for the district. There is a gradual increase in precipitation from east to southwest over the district.

The district enjoys a tropical climate. The period from April to June is generally hot and dry. The weather is pleasant during the period from November to January. The mean maximum temperature is around 33.7^0C and means minimum temperature is 24^0C.

The maximum relative humidity in a day varies from 59% to 81% minimum relative humidity in a day varies from 38% to 63%.

Drainage

Vellar is the major river, which flows in an east south easterly direction and confluences with the Bay of Bengal near Manamelkudi.

Agniar, Ambuliyar, Koraiyar, Kundar and Pambar are the other important rivers draining the district. Almost all the rivers are ephemeral in nature causing floods during rainy seasons, which are structurally controlled.

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 5 open wells and 5 bore wells at various locations around the proposed project sites for the period from October through December 2024.

The open well water level data thus collected onsite are provided in Table.1. According to the data, average depths to the static water table in open wells range from 9.21 to 11.27m BGL in the study period. The bore well data thus collected onsite are provided in Table.2. The average depths to static potentiometric surface in bore wells for the period of October through December, 2024 vary from 52.44 to 55.14m BGL. 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. 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.

Table.1. Water Level of Open Wells within 1 km Radius

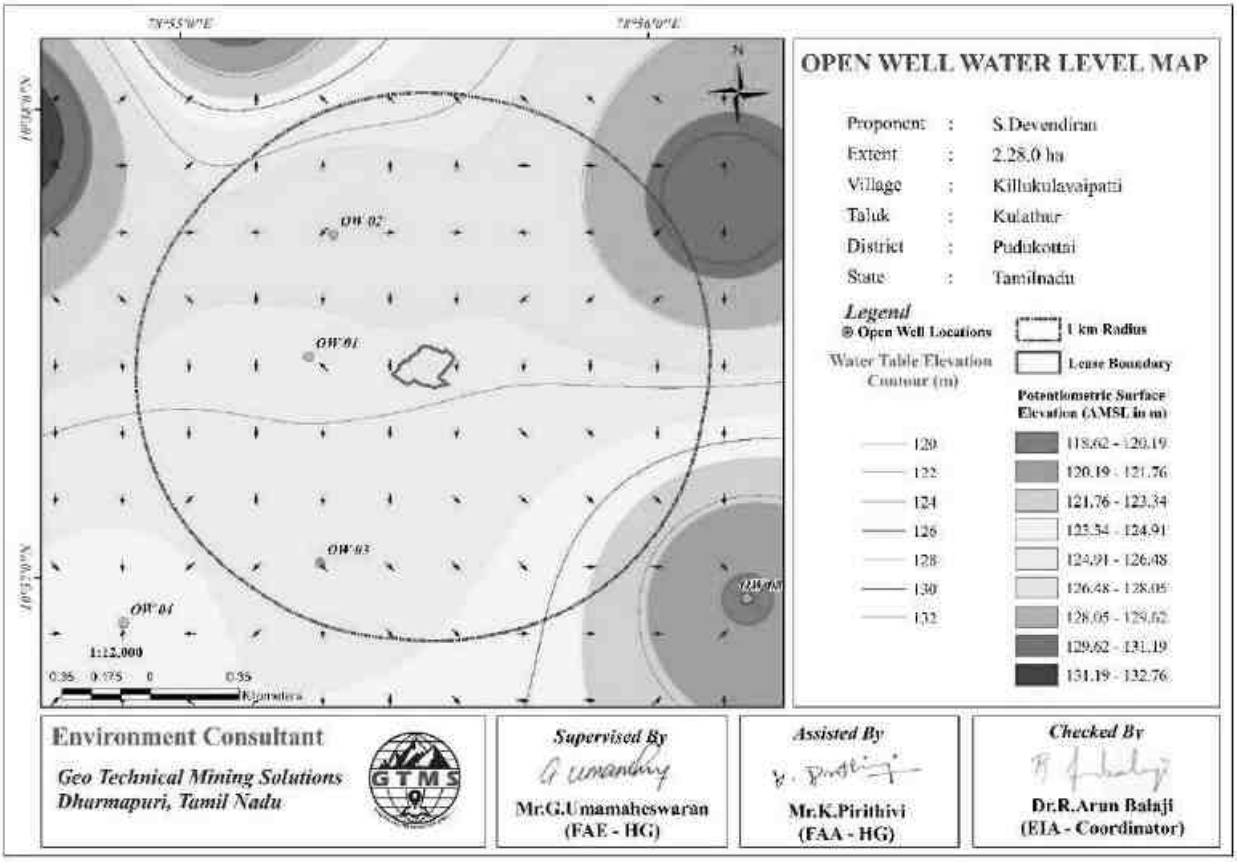
Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2024	Nov- 2024	Dec-2024	Average		
OW01	OW01	12.37	11.88	9.35	10°37'28.31"N	78°55'16.54"E
OW02	OW02	13.65	12.55	10.11	10°37'43.98"N	78°55'19.67"E
OW03	OW03	14.85	12.62	10.25	10°37'1.88"N	78°55'17.96"E
OW04	OW04	12.12	10.98	9.21	10°36'54.22"N	78°54'52.80"E
OW08	12.44	11.35	10.02	11.27	10°36'57.34"N	78°56'12.67"E

Source: Onsite monitoring data

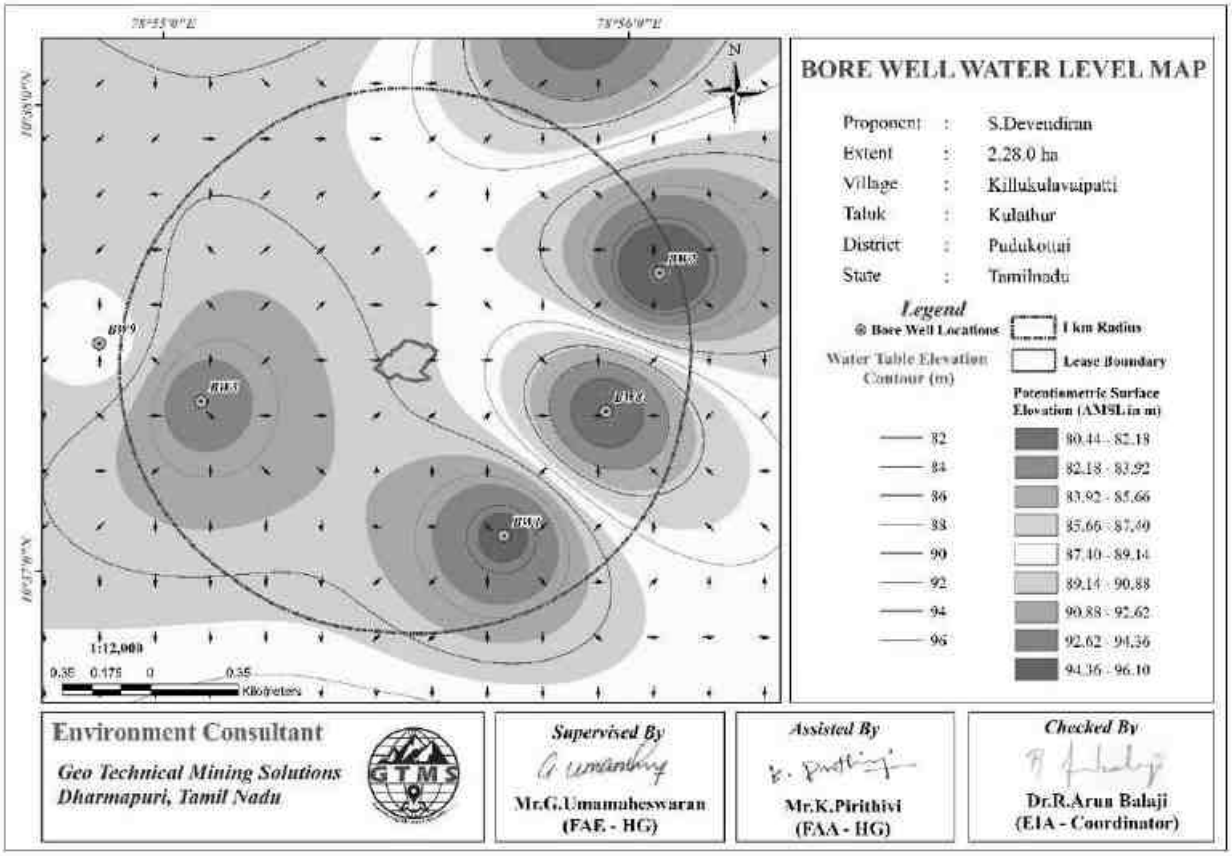
Table.2. Water Level of Bore Wells within 1 km Radius

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2024	Nov-2024	Dec-2024	Average		
BW01	58.85	55.12	51.45	55.14	10°37'8.47"N	78°55'39.87"E
BW02	57.33	53.22	51.12	53.89	10°37'2.63"N	10°37'2.63"N
BW05	56.12	54.95	52.85	54.64	10°38'23.52"N	78°56'19.54"E
BW08	56.22	53.33	51.12	53.56	10°37'33.71"N	78°56'40.45"E
BW09	55.08	52.12	50.12	52.44	10°36'57.53"N	78°56'24.27"E

Source: Onsite monitoring data



Open Well Static Showing Direction of water Flow



Borewell Static Showing Direction of water Flow

5. GEOPHYSICAL INVESTIGATION METHODS

A variety of methods are available to assist in the assessment of geological sub surface conditions. The main emphasis of the fieldwork undertaken was to determine the thickness and composition of the sub-surface formations and to identify water-bearing zones. This information was principally obtained in the field using, and vertical electrical soundings (VES). The VES probes the resistivity layering below the site of measurement. This method is described below.

Resistivity Method

Vertical electrical soundings (VES) were carried out to probe the condition of the sub surface and to confirm the existence of deep groundwater. The VES investigates the resistivity layering below the site of measurement.

Basic Principles

The electrical properties of rocks in the upper part of the earth's crust are dependent upon the lithology, porosity, and the degree of pore space saturation and the salinity of the pore water. Saturated rocks have lower resistivity than unsaturated and dry rocks. The higher the porosity of the saturated rock, or the higher the salinity of the saturating fluids, the lower is the

resistivity. The presence of clays and conductive minerals also reduces the resistivity of the rock.

The resistivity of earth materials can be studied by measuring the electrical potential distribution produced at the earth's surface by an electric current that is passed through the earth. Current is moved through the subsurface from one current electrode to the other and the potential difference is recorded as the current passes. From this information, resistivity values of various layers are acquired and layer thickness can be identified.

The apparent resistivity values determined are plotted as a log function versus the log of the spacing between the electrodes. These plotted curves identify thickness of layers. If there are multiple layers (more than 2), the acquired data is compared to a master curve to determine layer thickness.

This method is least influenced by lateral in-homogeneities and capable of providing higher depth of investigation.

The resistance R of a certain material is directly proportional to its length L and cross sectional area A, expressed as:

$$R = Rs * L/A \text{ (in Ohm)}$$

Where Rs is known as the specific resistivity (characteristic of the material and independent of its shape or size)

With Ohm's Law,

$$R = dV/I \text{ (Ohm)}$$

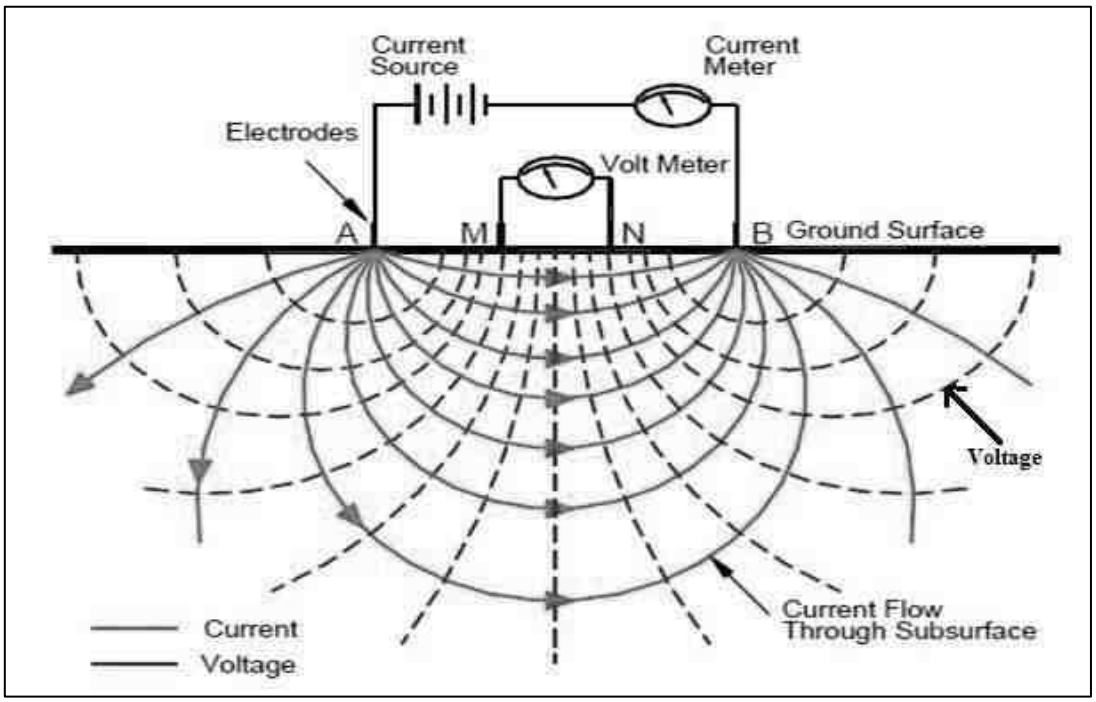
Where dV is the potential difference across the resistor and I is the electric current through the resistor. The specific resistivity may be determined by:

$$Rs = (A/L) * (dV/I) \text{ (in Ohm m)}$$

Vertical Electrical Sounding (VES)

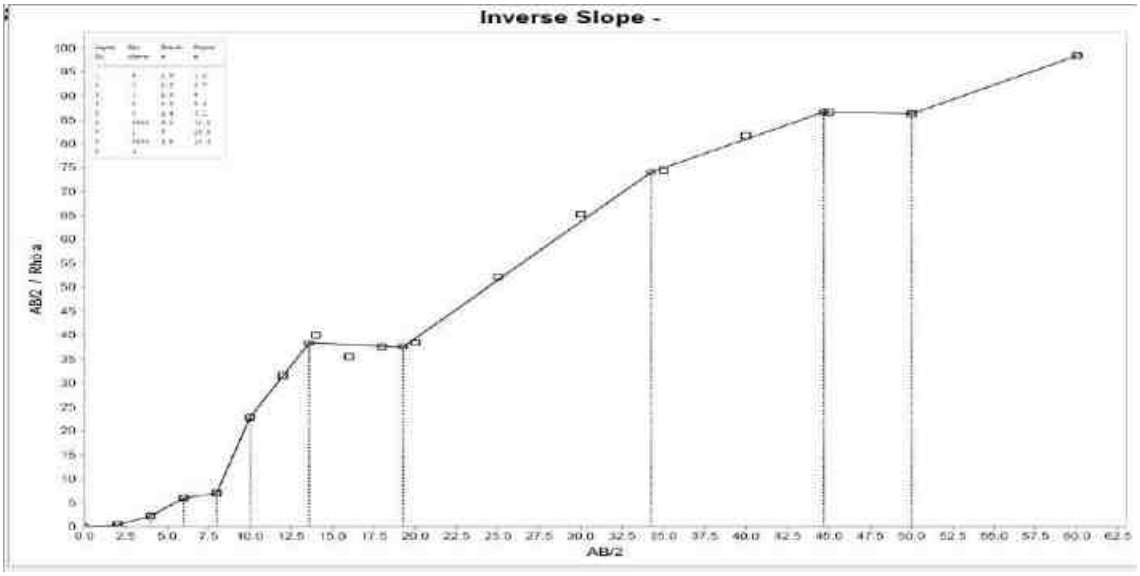
When carrying out a resistivity sounding, current is led into the ground by means of two electrodes. With two other electrodes, situated near the center of the array, the potential field generated by the current is measured. From the observations of the current strength and the potential difference, and taking into account the electrode separations, the ground resistivity can be determined. During a resistivity sounding, the separation between the electrodes is step-wise increased (known as a Schlumberger Array), thus causing the flow of current to penetrate greater depths. When plotting the observed resistivity values against depth on double logarithmic paper, a resistivity graph is formed, which depicts the variation of resistivity with

depth. This graph can be interpreted with the aid of a computer, and the actual resistivity layering of the subsoil is obtained. The depths and resistivity values provide the hydro geologist with information on the geological layering and thus the occurrence of groundwater.



Vertical Electrical Sounding Data

Location Coordinates - 10°37'28.20"N 78°55'30.02"E					
S. No.	**AB/2 (m)**	**MN/2 (m)**	**Geometrical Factor (G)**	**Resistance in Ω**	**Apparent Resistivity in Ωm**
1	2	1	4.71	6.26	29.55
2	4	1	23.57	1.84	43.55
3	6	1	55.00	1.017	55.94
4	8	1	99.00	1.014	76.39
5	10	2	75.43	0.44	33.19
6	12	2	110.01	0.38	42.63
7	14	2	150.86	0.35	53.57
8	16	2	198.01	0.29	57.62
9	18	2	251.44	0.26	67.40
10	20	2	311.16	0.27	86.55
11	25	5	188.58	0.48	91.14
12	30	5	275.01	0.46	127.23
13	35	5	377.16	0.47	178.85
14	40	5	495.02	0.49	222.39
15	45	5	628.60	0.39	249.22
16	50	5	777.89	0.32	250.04
17	60	10	550.03	0.31	354.51



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

Based on the available information and the geophysical investigations it is concluded that the project area is considered to have medium to good groundwater potential. The rock formation of low resistivity values indicates occurrence of water at the depth of about 60m below ground level. The ultimate depth of proposed project is 50m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

Prepared by

S. GOBALAKRISHNAN

EIA Coordinator

Environment Coordinator
NABET/EIA/23-26/RA0319
Geo Technical Mining Solutions
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, TamilNadu, India

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1/213B, Natesan Complex, Dharmapuri Salem Main Road, Oddapatti, Collectorate post office, Dharmapuri, Tamil Nadu-636705

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/ underground mining	1	1 (a) (i)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated September 13, 2022 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/23/2641 dated January 19, 2023. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions following due process of assessment.

Sr. Director, NABET
Dated: January 19, 2023

Certificate No.
NABET/EIA/2124/SA 0184

Valid up to
Dec 31, 2023

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.