

**DRAFT OF 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 = 10.87.0 hectares

At

Kamayagoundanpatti Village, Uthamapalayam Taluk,

Theni District, Tamil Nadu State

ToR letter No. Lr. No. SEIAA-TN/F.No.10410/SEAC/1(1a) ToR-1613/2023

Dated:07.11.2023

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.	Mineral Production
M/s. Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu Mrs.Karthika (Leader), No.172/ Ward-1, Vedhakovil Street, Kamayagoundapatti, Uthamapalayam Taluk, Theni District -625 516	2.50.0 Ha & 1372/1(Part-5)	Rough Stone-191590 m³

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS



No: 1/213-B, Ground Floor, Natesan Complex
Oddapatti, Collectorate Post office,
Dharmapuri-636705. Tamil Nadu.
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NABET ACC. NO: NABET/EIA/2124/SA 0184

Valid till: 02/04/2024



ENVIRONMENTAL LAB

INTERSTELLAR TESTING CENTRE PRIVATE LIMITED

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

Industrial Estate, Perungudi, Chennai, Tamil Nadu

NABL Certificate Number: TC-6952, Valid Until : 30.07.2024

Baseline Study Period – October 2023 through December 2023

TERMS OF REFERENCE (ToR) COMPLIANCE

**ToR issued vide Lr No. SEIAA-TN/F.No.10410/SEAC/ToR-1613/2023 Dated:07.11.2023
for M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu Roughstone Quarry**

1	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.	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 plate used for reserve estimation has been presented in Figure 2.6,2.6a and 2.6b results of geological resources and reserves have been shown in Table 2.3. under Chapter II. Pp.15-16.
2	The Proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50m, (ii) 100m, (iii) 200m and (iv) 300m (v) 500m with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc., with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	There are no structures such as dwelling houses, places of worship, industries, factories, sheds, etc. within the radius of 500m from the proposed project area. The map showing the area of 50m, 100m, 200m, 300m, 500m has been included in Figure 3.31 under Chapter III, p.95.
3	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.	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.39-53.
4	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing	Photographs of adequate fencing, green belt along the periphery of the project area and the photographs showing

	trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	nearby water bodies will be included in final EIA report.
5	The Proponent shall carry out Bio diversity study through Department of Ecology and Environmental Sciences, Pondicherry University and the same shall be included in EIA Report.	The detailed Biodiversity report will be attached in final EIA report.
6	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, pp.144-150. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted along with final EIA.
ANNEXURE I		
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	It is a fresh quarry lease area.
	(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.	The VAO certificate is presented in Annexure – V.
3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50m, (ii)100m, (iii) 200m and (iv) 300m (v)500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	There are no structures such as dwelling houses, places of worship, industries, factories, sheds, etc. within the radius of 500m from the proposed project area. The map showing the area of 50m, 100m, 200m, 300m, 500m has been included in Figure 3.31 under Chapter III, p.95.
4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like rake, water tanks, etc are located within 1km of the proposed quarry.	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.39-53.
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 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 details about the DFO letter is submitted in the Annexure VI.
7	In the case of proposed lease in an existing (or old) quarry where the benches are not	This project does not require the Slope Stability Plan. It is a fresh quarry lease.

	<p>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-IT-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.</p>	
8	<p>However, in case of the fresh/virgin quarries the proponent sha 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 30m below ground level.</p>	<p>This project does not require the Slope Stability Plan. It is a fresh quarry lease.</p>
9	<p>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.</p>	<p>The affidavit for blasting has been enclosed in the approved mining plan report in Annexure III.</p>
10	<p>The PP shall present a conceptual design for carrying out only controlled blasting</p>	<p>A conceptual design of blasting has been given in Section 2.6 under Chapter II,</p>

	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.	pp. 18 -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.	Photographic evidences showing mining activities of the project proponent will be submitted during the presentation.
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?	It is a fresh quarry lease area.
14	Quantity of minerals mined out.	
	<ul style="list-style-type: none"> Highest production achieved in any one year 	
	<ul style="list-style-type: none"> Detail of approved depth of mining. 	
	<ul style="list-style-type: none"> Actual depth of the mining achieved earlier. 	
	<ul style="list-style-type: none"> Name of the person already mined in that leases area. 	
	<ul style="list-style-type: none"> If EC and CTO already obtained, the copy of the same shall be submitted. 	
	<ul style="list-style-type: none"> Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches. 	
15	All comer coordinates of the mine lease area, superimposed on a High-Resolution	All corner coordinates of the mine lease area have been superimposed on a high-

	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).	resolution Google Earth Image, as shown in Figure 2.4 and 2.5, p.14, 15 under Chapter II.
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 surrounding environment, and the remedial measures for the same.	The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. The reserve estimation has been given in under Chapter II, Section 2.5, 2.6. Pp.16-26.
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, p.26.
20	The Project Proponent shall conduct the	Detailed hydrogeological study was

	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.	carried out. The results have been discussed Section 3.2 under Chapter III, pp.39-53.
21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data were collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed under Chapter III, pp. 27-95.
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, pp.126-139.
23	Rain water harvesting management with recharging details along with water balance	As part of rainwater harvesting measures, the rain water from garland

	(both monsoon & non-monsoon) be submitted.	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 under Chapter III, pp.28-38. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.8 under Chapter II, p.21.
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	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the

	provided.	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, pp.88-90.
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.5 under Chapter III, pp.69-84.
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, p.21.
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-1 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	detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV, pp.110-115.

	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	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-friendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.
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, pp.129-130.
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, pp.126-128.
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, pp.116 - 117.
37	Public health implications of the Project and related activities for the population in the	No public health implications are anticipated due to this project. Details of

	impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII, pp.141 & 142.
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 20 people directly as discussed in Section 8.1 under Chapter VIII, p.140.
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.	Benefits of the project details have been given under Chapter VIII.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	It is a fresh quarry lease
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	A detailed environment management plan has been prepared following the suggestion made by SEAC, as shown in

	entire life of mine.	Chapter X, pp.144-150. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted during final EIA presentation.
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.
<p><u>Discussion by SEIAA and the Remarks:-</u></p> <p>The subject was placed in the 671st Authority meeting held on 07.11.2023. The authority noted that the subject was appraised in 417th SEAC meeting held on 18.10.2023.</p> <p>Based on the presentation and documents furnished by the project proponent, SEAC after detailed deliberations, decided to recommend the proposal for the grant of Terms of Reference (ToR).</p> <p>After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the following conditions and the conditions mentioned in 'Annexure B' of this minute:</p>		
1	The depth is restricted to 35m (AGL) in Section XY-AB till bench VII (35m - Rough Stone) & 55m (AGL) in Section X1Y1-AB (55m – Rough Stone) and no quarrying shall be carried out in Section XY – AB from (Bench VIII to Bench X) considering the safety aspect and to maintain contiguity.	The approved mining plan plates were modified as per the TOR recommendation to meet the prescribed reserves and the depth. The modified mining plan plates have been attached in Annexure III.

	Hence, the revised quantity of Rough Stone is 1,91,590m ³ and depth of quarrying is restricted to 70m AGL.	
2	The PP shall obtain Revised Mining Plan approved by AD/Mines before obtaining CTO from TNPCB.	
3	KML file reveals there is intensive agriculture surrounding the proposed project site which will be impacted by the proposed mining activity. Hence the PP shall submit the letter obtained from the Director Department of Agriculture stating the productivity status and productive potential of the proposed mine lease area.	The letter to be obtained from the Director, Department of Agriculture stating the productivity status and productive potential of the proposed mine will be submitted during the final EIA report.
4	PP shall submit the NOC obtained from the Chief Wildlife Warden, Tamil Nadu as the project site is located at a proximate distance of 170m from the eco-sensitive zone of Megamalai Wildlife Sanctuary	The NOC obtained from the Chief Wildlife Warden, Tamil Nadu will be submitted in the final EIA report
Annexure 'B'		
<u>Cluster Management Committee</u>		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	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 including Green Belt	The members of the cluster management committee will be instructed to carry out EMP in coordination.

	Development Water sprinkling, tree plantation, blasting etc.,	
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.
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, pp.18-20.
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 falling under the cluster in a holistic manner.	A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall furnish the Emergency	The committee will submit the

	Management plan within the cluster.	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 7.2 under Chapter VII, pp.126-128.
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, pp.28-38
	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, pp.54-55.
	c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local People.	The information about CO ₂ emission has been added to Section 4.6 under Chapter IV, pp.110 -115.
	d) Possibilities 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, pp.97 & 98. The impact on aquatic ecosystem has been discussed in Section 4.6.4 under Chapter IV, p.114.
	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 ⁰ C/km. As the proposed depth of mining is 70 m AGL, the temperature will increase by 2.5 ⁰ C at the depth of mining.
	g) Bio-geochemical processes and its foot prints including environmental stress.	Data is not included.
	h) Sediment geochemistry in the surface streams.	The details of the sediment geochemistry is discussed in the Table.3.4 under Chapter III, p.65-68.
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, pp.110-115.
14	Impact on soil flora & vegetation around the project site.	The details on flora have been provided in Section 3.5 under Chapter III, pp.69-84. 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, pp.69-84. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV, pp.110-115.
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, pp.69-84 and measures have been provided in Section 4.6 under Chapter IV, pp.110-115.
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, pp.96-119.
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, pp.96.
	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, pp.110-115.

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, pp.110 -115.
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National parks, corridors and wildlife pathways, near project site.	There are no protected areas, National Parks, Corridors and Wildlife pathways near project site. The list of environmentally sensitive areas within 10 km radius has been provided in Table 3.39 under Chapter III, p.91-92.
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.	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.39-53.
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, pp.97 & 98.
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	The matter has been discussed under Chapter IV, pp.96-119.

	areas.	
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 3, pp.69-84.
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, pp.96-119.
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 form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV, pp. 110-115.
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, pp.97
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, pp.97 & 98.
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, pp.96-119.
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	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV, pp.110-115.

	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.	The matter has been discussed in Chapter IV, pp.96-119.
Mine Closure Plan		
34	Detailed Mine closure plan covering the entire mine lease period as per precise area communication order issued.	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, p.21.
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, pp.144-150.
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, pp.145-150.
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, pp.126-128.
Disaster Management Plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all	The disaster management plan for this project has been provided in Section 7.3

	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.	under Chapter VII, pp.129-130.
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 of 300 m radius have been attached in the attached in the Annexure V.
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 will be submitted during the 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, p.138-139.
STANDARD TERMS OF REFERENCE		
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to	Not applicable. This is not a violation category project. This proposal falls under B1 category.

	1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexure III.
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All the documents related to mining plan, EIA and public hearing are compatible to each other and have been provided in the annexure part.
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.4, p.13 under Chapter II.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, as shown in Chapter III.

6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The lease area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	The proponent has framed Environmental Policy and the same has been discussed in Section 10.1 under chapter X, p.144 & 145.
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90 ⁰ bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines

		Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.	The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	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 under Chapter III, pp.28-38. The details of surrounding sensitive ecological features have been provided in Table 3.39 under Chapter III, p.91-92. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.8 under Chapter II, pp.21.
11.	Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given	It is not applicable as no dumps have been proposed outside the lease area. The entire quarried out rough stone will be transported to the needy customers.
12.	Certificate from the Competent Authority in	The details of the forest land involved

	<p>the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.</p>	<p>within the proposed project area have been discussed in Table 3.39 under Chapter III, pp.91-92.</p>
13.	<p>Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.</p>	<p>It is not applicable as the proposed project area does not involve any forest land.</p>
14.	<p>Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.</p>	<p>Not Applicable.</p> <p>The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.</p>
15.	<p>The vegetation in the RF / PF areas in the study area, with necessary details, should be</p>	<p>The details of RF/PF areas have been discussed Table 3.39 under Chapter III,</p>

	given.	pp.91 & 92.
16.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	The details of the wildlife/protected area within 10 km radius from the periphery of the project area is discussed in the Table 3.39 under Chapter III, pp.91 & 92.
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.39 under Chapter III, p.91-92.
18.	A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.5 under Chapter III, pp.69-84.

	provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range'.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable The project doesn't attract the C.R.Z. Notification, 2018.
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise,	Not Applicable. There are no approved habitations of SCs/STs and other weaker sections in the lease area. Therefore, R&R Plan / Compensation Plan for the Project Affected People (PAP) are not provided.

	<p>should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.</p>	
22.	<p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p>	<p>Baseline data were collected for the period of October 2022 - December 2022 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.8 under Chapter III, pp. 27-94.</p>
23.	<p>Air quality modelling should be carried out</p>	<p>Air quality modelling for prediction of</p>

	<p>for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</p>	<p>incremental GLCs of pollutants was carried out using AERMOD view 12.0. The model results have been given in Section 4.4 under the Chapter IV, pp.98-108.</p>
24.	<p>The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.</p>	<p>The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II, p.24.</p>
25.	<p>Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.</p>	<p>Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.</p>
26.	<p>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.</p>	<p>Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has</p>

		been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV, pp. 97 & 98.
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Not Applicable. The ground water table is found at the depth of 60 m below ground level. The ultimate depth of quarry is 70 m AGL. Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2 under Chapter III, pp.39-53.
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
30.	Information on site elevation, working depth, groundwater table etc. Should be	The highest elevation of the project area is 560 m AMSL. Ultimate depth of the

	provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	mine is 70 m AGL. Depth to the water level in the area is 60 m BGL.
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Greenbelt development plan has been given in Section 4.6 under Chapter IV, pp.110-115.
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of	Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Section 3.7 under Chapter III, p.88 & 90.

	Transportation study as per Indian Road Congress Guidelines.	
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.7 under Chapter II, p.24.
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Progressive mine closure plan has been prepared for this project and is given in Section 2.6.4 under Chapter II, p.21.
35.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been explained in detail in Section 4.8 under Chapter IV, pp.116 & 117.
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII, pp.141 & 142.
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be	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 20 people

	given with time frames for implementation.	directly as discussed in Section 8.1 under Chapter VIII, p.140.
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	A detailed Environment Management Plan has been prepared and provided in Tables 10.1 & 10.2 under Chapter X, pp.145-150.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	The outcome of public hearing has been updated in the final EIA/EMP..
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 8419330/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs. 4256310 as capital cost and recurring cost as Rs. 1847602 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. 14550477, as shown in

		Tables 10.1 & 10.2 under Chapter X, pp.145-150.
42	A disaster management Plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII, pp.129-130.
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given under Chapter VIII, pp.140-142.
44.	Besides the above, the below mentioned general points are also to be followed:	
a)	Executive Summary of the EIA/EMP Report	Executive summary has been enclosed as a separate booklet.
b)	All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
c)	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Original Baseline monitoring report will be submitted in the final EIA report.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided here are in English language.
f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled	The questionnaire will be attached in the final EIA report.

	and submitted.	
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4th August, 2009 have been followed while preparing the EIA report.
h)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No changes are made in the basic scope and the project parameters.
i)	As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	It is a fresh quarry lease
j)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and	All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III.

	external dumps, if any, clearly showing the land features of the adjoining area.	
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CHAPTER I

INTRODUCTION

1.0 PREAMBLE

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments 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 obtained vide Lr No. SEIAA-TN/F.No.10410/SEAC/1(1a) ToR-1613/2023 Dated:07.11.2023, this EIA report has been prepared for the project proponent, M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu applied for rough stone quarry lease in the Government land falling in S.F.No.1372/1(Part-5) over an extent of 2.50.0 ha in Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District and Tamil Nadu. This EIA report takes into account the rough stone quarries within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains five proposed projects known as P1, P2, P3, P4, P5. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O.2269 (E) Dated 1st July 2016. The total extent of all the quarries is 10.87.0 ha, 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 500 m radius

Proposed Quarries					
Code	Name of the Owner	S.F. No	Village	Extent (ha)	Status
P1	Tvl. Varumaikottirkku Keelvazhum Mahalir Suvyauthavikuzhu	1372/1 (Part-5)	Kamayagoundanpatty	2.50.0	Proposed Area
P2	Tvl. Annai Sathya Mahalir Suvyauthavikuzhu, Tmt.Usha (President)	1372/1 (Part-3)	Kamayagoundanpatty	1.00.0	Applied Area
P3	Tvl. Annai Therasa Kalludaikkum Magalir Nala Munnetra Sangam	1372/1 (Part-4)	Kamayagoundanpatty	2.50.0	Applied Area
P4	Tvl. K.K.Patty Kalluudaikkum Mahalir Sangam	1372/1 (Part-2)	Kamayagoundanpatty	2.37.0	Applied Area
P5	Tvl. Sangaligaruppan Thanneerparai Kalludaikkum Mahalir Nala Sangam	1372/1 (Part-6)	Kamayagoundanpatty	2.50.0	Applied Area
Existing Quarry					
--Nil--					
Expired Quarries					
--Nil--					
Total Cluster Extent				10.87.0	---

Source:

DD Letter - Rc.No.1049/2022/Mines, Dated:05.09.2023.

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, 2023** 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/444497/2023, dated 16.09.2023) 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 22.09.2023.

Scoping

The proposal was placed in the 417th meeting of SEAC on 18.10.2023. 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 updated in the final EIA report for appraisal.

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.

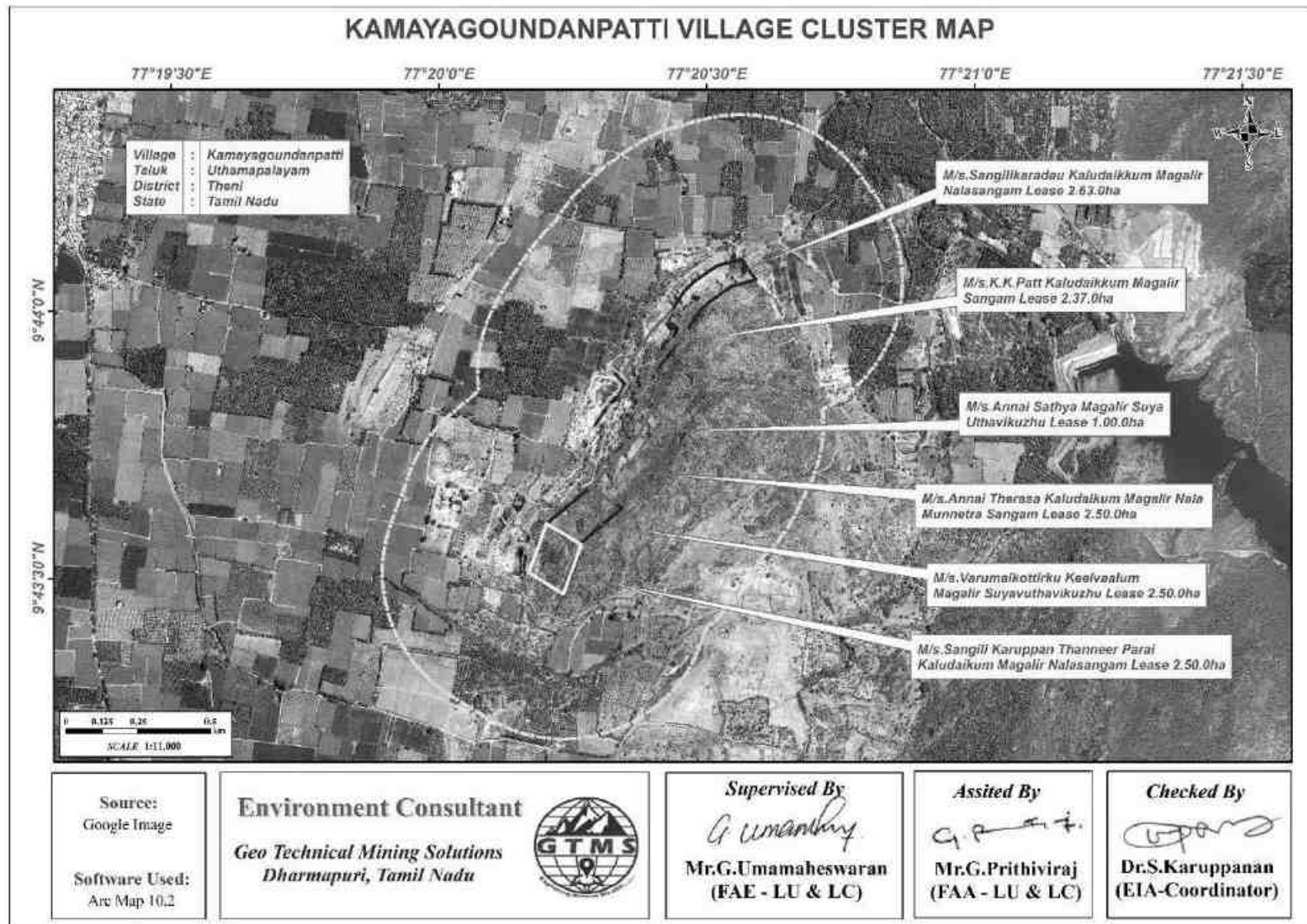


Figure 1.1 Location of the proposed and existing rough stone quarries in the cluster of 500 m radius

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 to the proponent vide **Letter No: SEIAA-TN/F.No.10410/SEAC/1(a)ToR-1613/2023 Dated:07.11.2023.**

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, 20).

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	M/s. Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu
Address	Mrs.Karthika (Leader), No.172/ Ward-1, Vedhakovil Street, Kamayagoundapatti, Uthamapalayam Taluk, Theni District -625 516.
Status	Proprietor

1.7 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of rough stone which is primarily used in construction projects. The method adopted for rough stone 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 Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, and Tamil Nādu 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	M/s. Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu Rough Stone Quarry	
Type of Land	Government Land	
Extent	2.50.0 Ha	
S.F.No	1372/1 (Part-5)	
Toposheet No	58 G/6	
Location of Project Site	9°43'33.94"N to 9°43'40.17"N 77°20'12.10"E to 77°20'20.54"E	
Highest Elevation	560 m AMSL	
Proposed depth of Mining	70 m AGL	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	1188755	28573
Mineable Reserves as per ToR	Rough Stone in m ³	Top Soil in m ³
	191590	21823
Proposed reserves for five years as per ToR	Rough Stone in m ³	Top Soil in m ³
	191590	21823
Method of Mining	Open-Cast Semi Mechanized mining	
Topography	Hillock Topography	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Tipper	7
	Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cast mining using jack hammer	

	drilling and blasting for shattering effect and loosen the rough stone.
Proposed Manpower Deployment	20 Nos
Project Cost	Rs.82,19,330
CER Cost @ 2% of Project Cost	Rs. 5,00,000
Proposed Water Requirement	2.55 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, 2023** 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 DESCRIPTION OF THE PROJECT

The proponent, M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu 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. Therefore, the proponent had applied for quarry lease on 13.09.2022 to extract rough stone. The precise area communication letter was issued by Department of Geology and Mining, Theni vide Rc.No.1049/Mines/2022, dated:10.08.2023. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Theni Rc.No.1049/Mines/2022, dated:04.09.2023. The overall view of the project site is shown in Figure 2.1.



Figure 2.1 Overall View of Proposed Project Site

2.2 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, as shown in Figure 2.2 & 2.3. The area lies between Latitudes from 9°43'33.94"N to 9°43'40.17"N and Longitudes from 77°20'12.10"E to 77°20'20.54"E. The maximum altitude of the project area is 560 m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

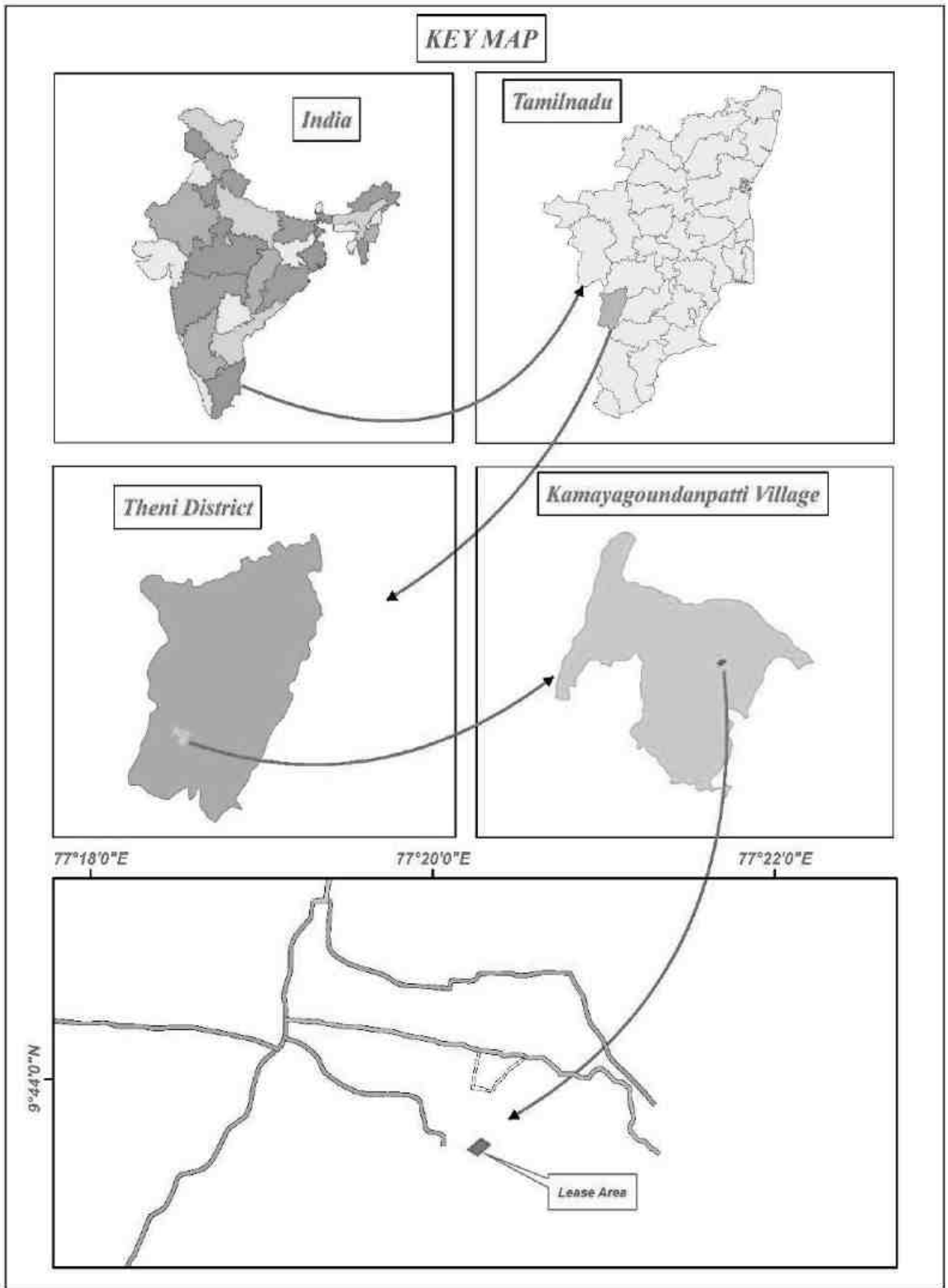


Figure 2.2 Key Map Showing Location of the Project Site

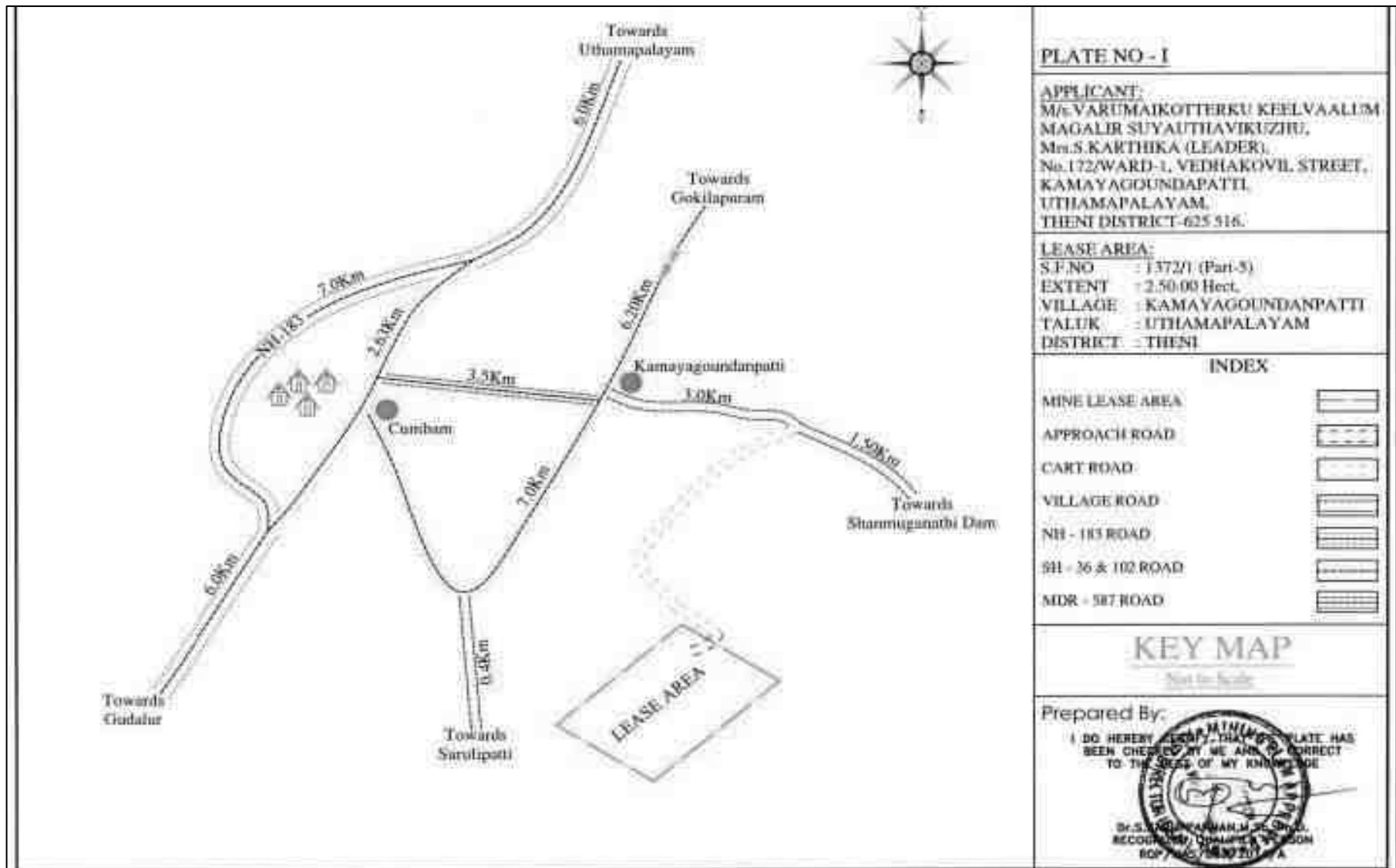


Figure 2.3 Site Connectivity to the Project Area

Table 2.1 Site Connectivity to the Project Area

Nearest Roadways	SH -102 Suruli Road	2.4 km W
	NH – 183 Theni - Cumbum Road	5.5 km W
Nearest Town	Royappanpatti	4.95 km N
Nearest Railway Station	Theni	35.0 km N
Nearest Airport	Madurai	83.2 km E
Nearest Seaport	Thoothukudi	149 km SE
Nearest Villages	Rayappanpatti	4.6 km N
	Anaipatti	2.7 km NW
	Kamayagoundanpatti	1.9 km W
	Narayanattevanpatti	2.9 km SW

2.3 LEASEHOLD AREA

- ❖ The extent of the proposed project site is 2.50.0 ha.
- ❖ 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 2.4 & 2.5.

Table 2.2 Corner Coordinates of Proposed Project

Pillar ID	Latitude	Longitude
1	9°43'40.17"N	77° 20'16.87"E
2	9°43'37.92"N	77° 20'20.54"E
3	9°43'33.94"N	77° 20'15.78"E
4	9°43'36.19"N	77° 20'12.10"E

2.4 GEOLOGY

The lease area geologically occurs on Calc Granulite with limestone. The Charnockite, commercially called as rough stone occurs within the migmatite rock. Also, the lease area geomorphologically occurs low dissected denudational hills and valleys.

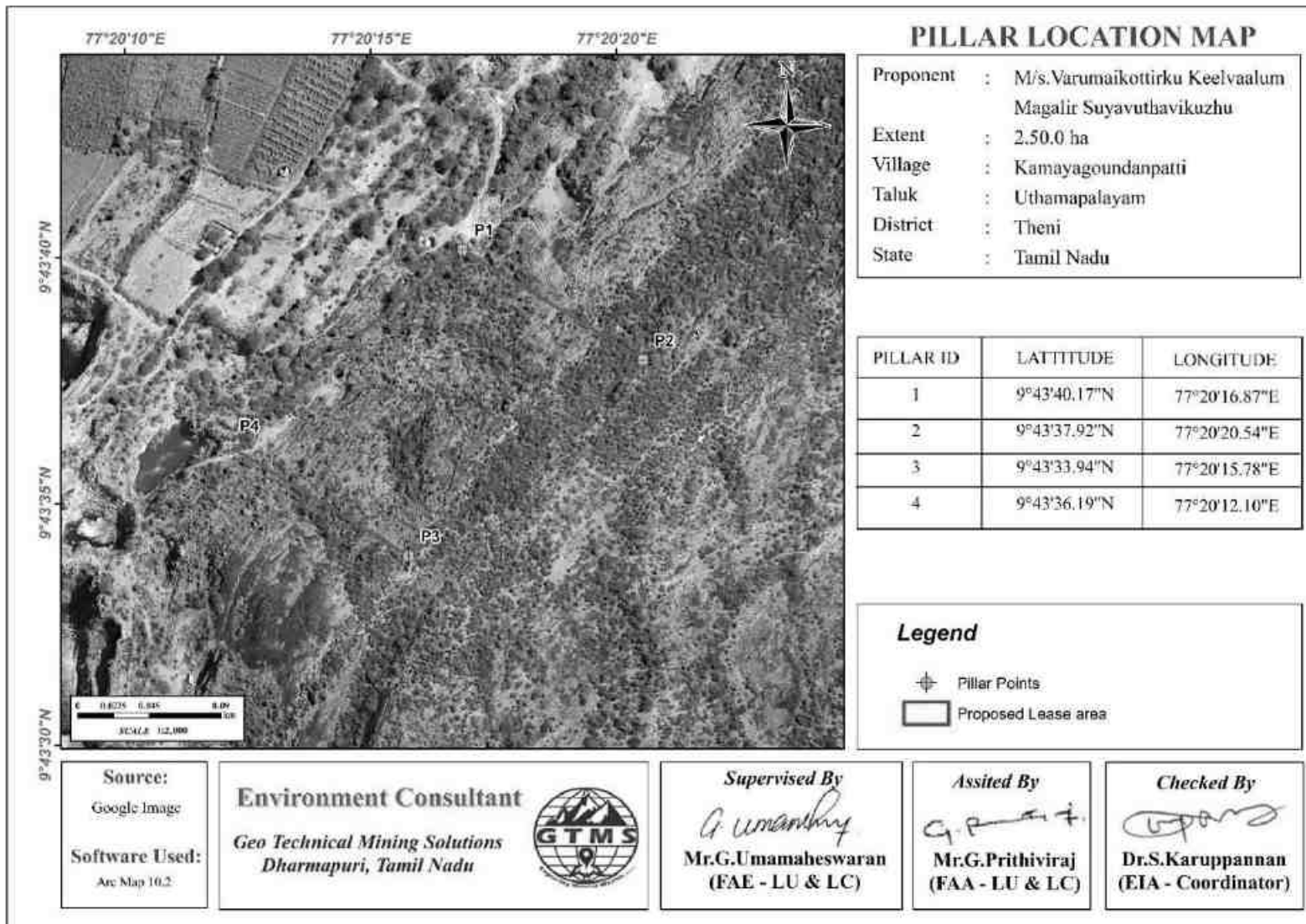


Figure 2.4 Google Earth Image Showing Lease Area with Pillars

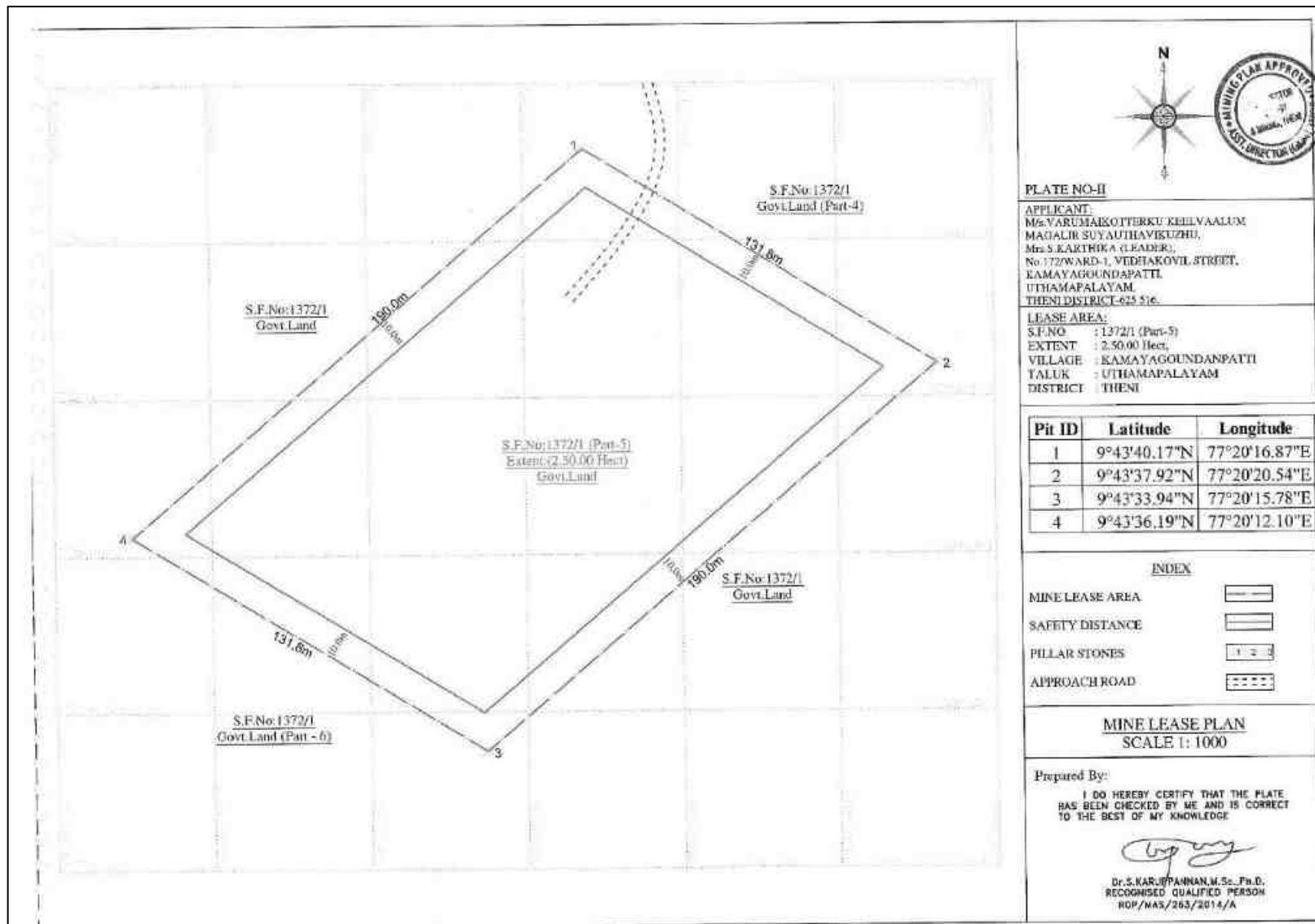


Figure 2.5 Mine Lease Plan

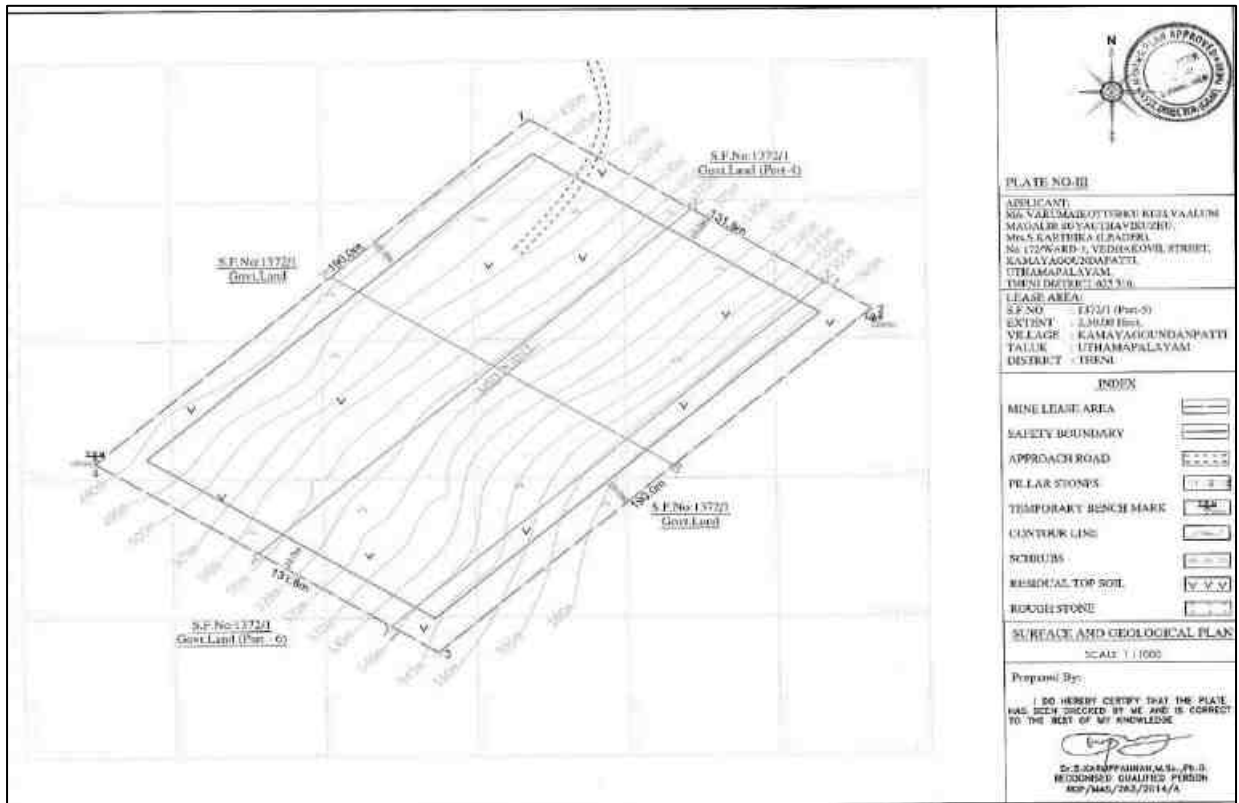


Figure 2.6 Surface and Geological Plan

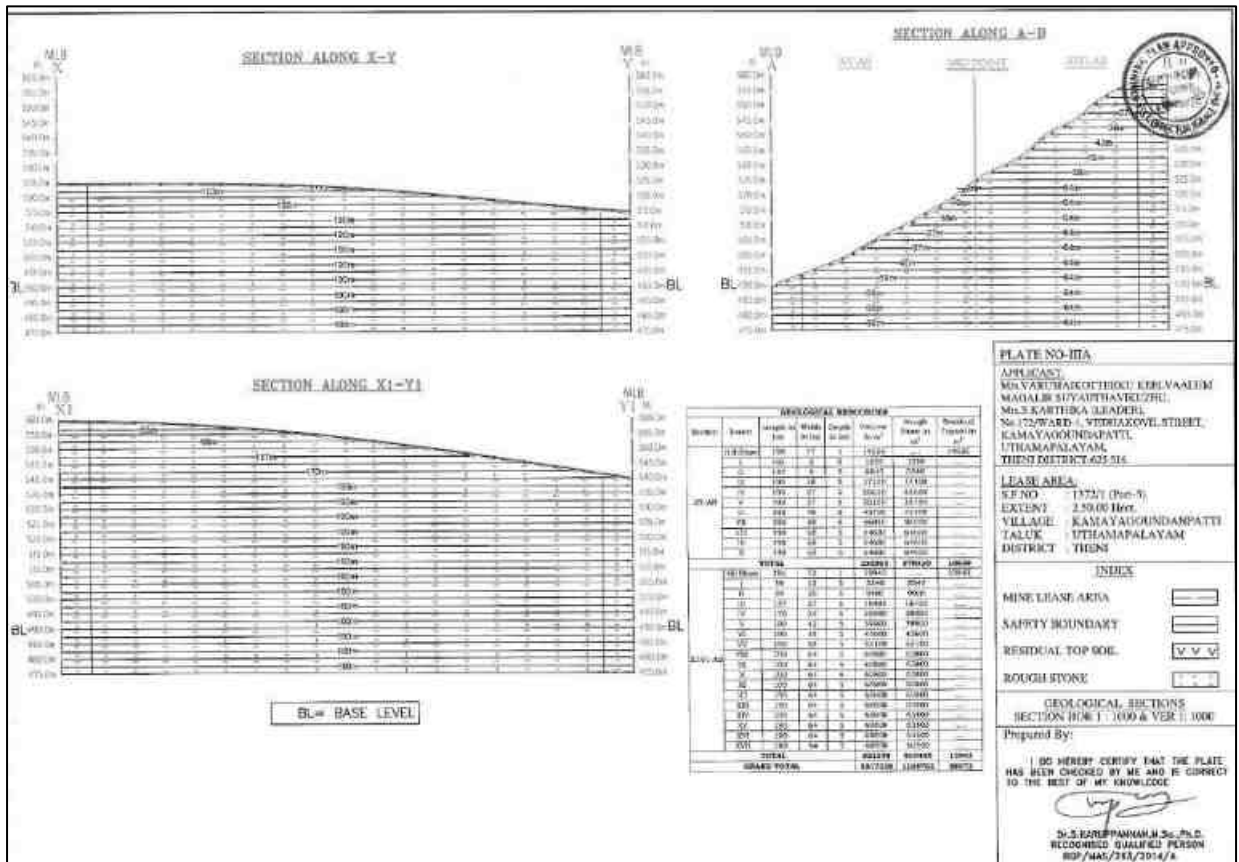


Figure 2.6a Surface and Geological Section

2.5 QUANTITY OF RESERVES

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. 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 7.5m 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 85 m considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The plate used for reserve estimation has been shown in Figure 2.6 and 2.6a 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	Top Soil in m ³
Geological Resource in m ³	1188755	28573
Mineable Reserves in m ³ as per ToR	191590	21823
Proposed production for 5 years m ³ as per ToR	191590	21823

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.4 & Figure 2.7 and Figure 2.7a.

Table 2.4 Year-Wise Production Details

Year	Rough Stone in m ³ (5 years)	Top Soil in m ³ (2 year)
I	43095	10773
II	46895	11050
III	46150	---
IV	49450	---
V	6000	---
Total	191590	21823

Source: Approved Mining Plan & Tord

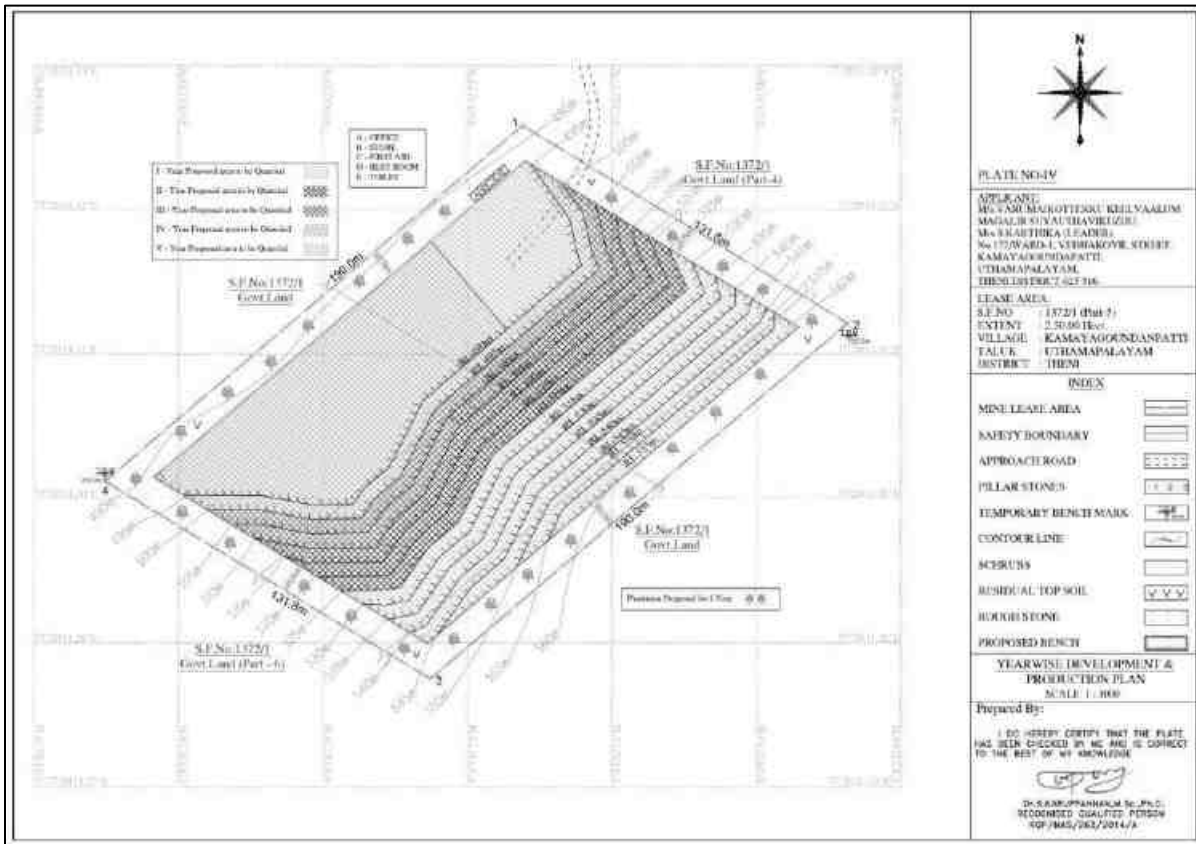


Figure 2.7 Yearwise Development & Production Plan

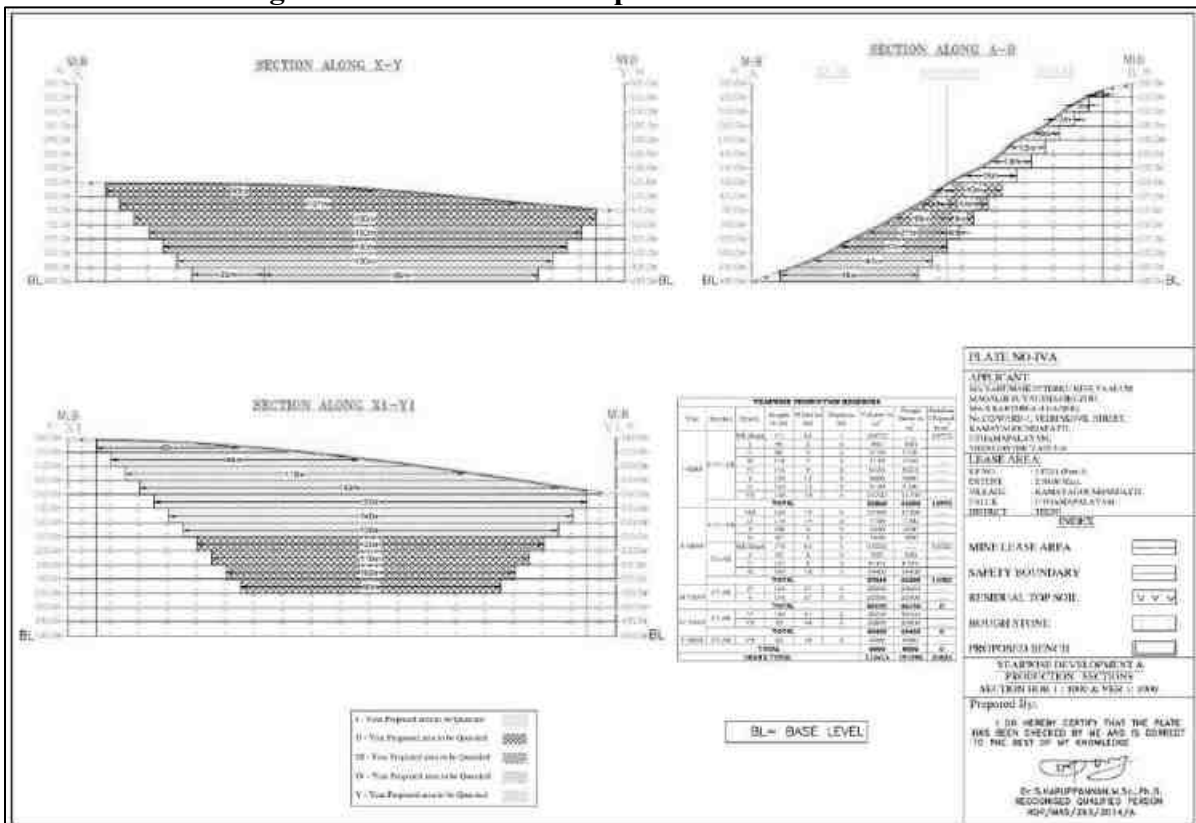


Figure 2.7a Year wise Production Section

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 5 m each. The open cast semi-mechanized method involving drilling and blasting is proposed to extract rough stone. 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.

Conceptual Blasting Design

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

Rules of Thumb for Blast Design

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

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

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

Rule 2: Generally, select the densest explosive possible.

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

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

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

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

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

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

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

Rule 6: Stemming should be equal to the burden.

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

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

Subdrill should be equal to 0.3 of burden. It will work when there is row-for-row delay. In blasts where the delay system is both row-for-row and hole-for-hole, the subdrill should be determined by the largest dimension, which can be the spacing or the burden. An average subdrill of 0.4 of spacing is best to use for planning purposes. Based on the above-mentioned rules, blasting design has been conceptualized 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	1.30
Subdrill in m	0.45
Charge length (C) in m	0.64
Stemming	1.5
Hole Length (L) in m	2.6
Bench Height (BH) in m	2.1
Mass of explosive/hole in g	400
Stemming material size in mm	3.2

Burden stiffness ratio	1.43
Blast volume/hole in m ³	4.16
Production of rough stone/day in m ³	174
Number of blastholes/day	42
Blasthole pattern	Staggered / Rectangular
Mass of explosive /day in kg	16.72
Powder factor in kg/m ³	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	Top Soil in m ³
Proposed production for 5 years	191590	21823
Number of Working Days /Annum	270	270
Production of /Day (m ³)	141	40
No. of Lorry Loads	24	7

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 Drive
2	Compressor	1	Air	--	Diesel Drive
3	Hydraulic Excavator	1	2.9 m ³	--	Diesel Drive
4	Tipper	7	--	--	Diesel Drive

2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan (Figure 2.8) of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.8. Whereas, at the end of the mine life, about 0.68.34 ha of land is used for green belt and 0.03.0 ha will be used for roads and 0.01.0 ha is used for infrastructure and about 1.77.66 ha is used for quarrying.

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	Nil	1.77.66
Infrastructure	Nil	0.01.0
Roads	Nil	0.03.0
Green Belt & Dump	Nil	0.68.34
Drainage & Settling Tank	Nil	Nil
Unutilized area	2.50.0	Nil
Total	2.50.0	2.50.0

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
500 plants inside the lease area	100000
750 plants outside the lease area	225000
Wire Fencing	500000
Renovation of Garland Drain	25000
Total	8,50,000

Source: Environment Management Plan

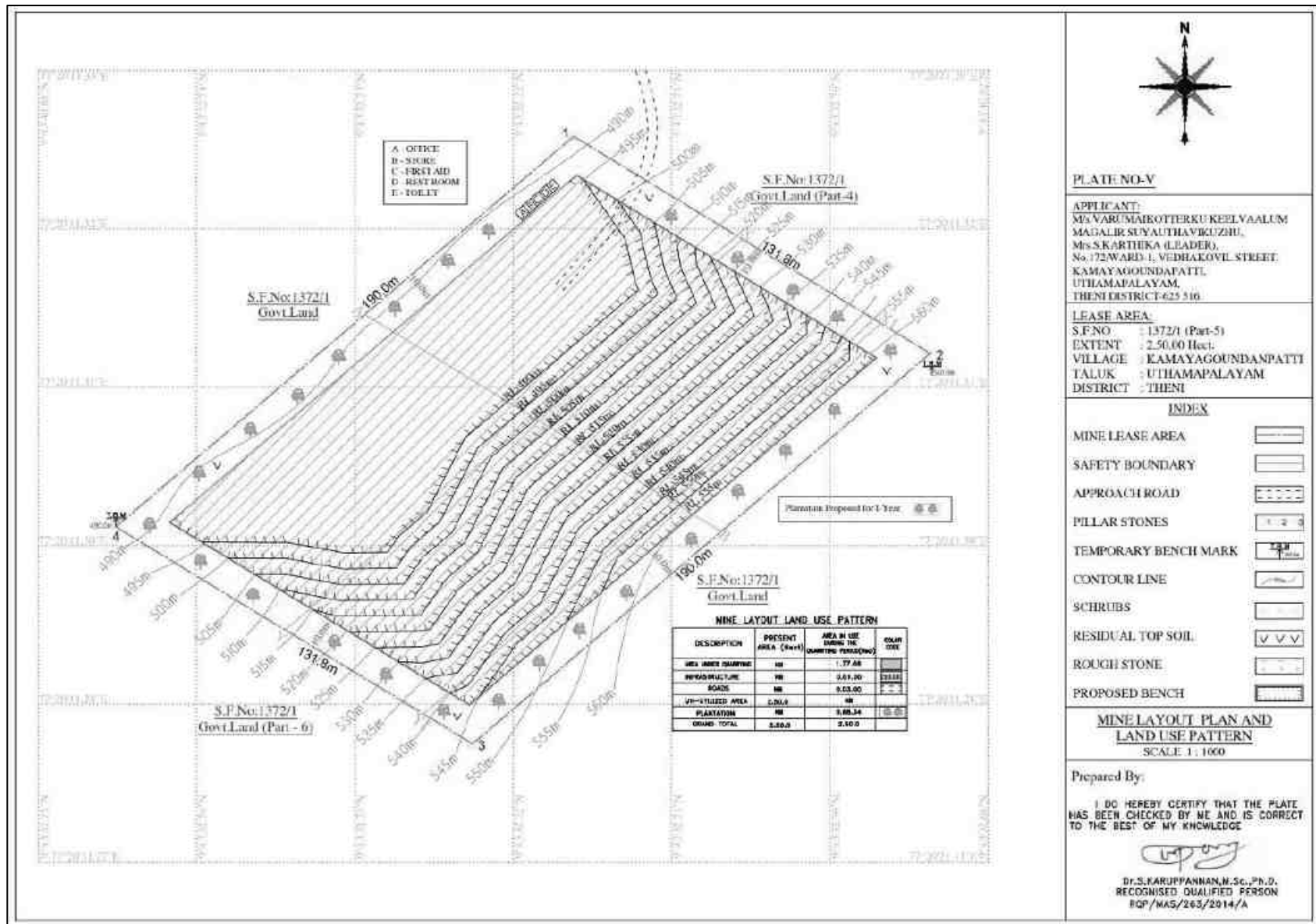


Figure 2.8 Mine Layout Plan and Land Use Pattern

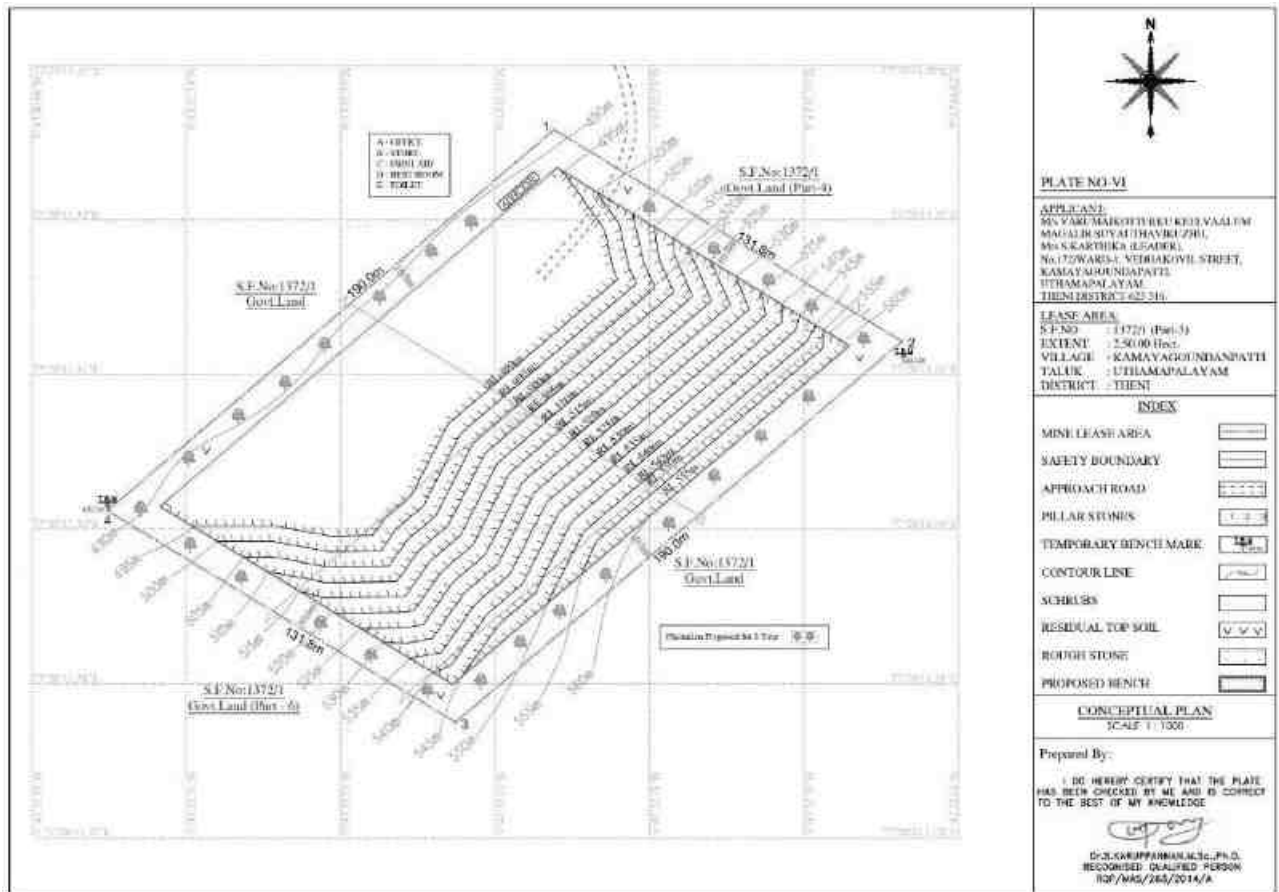


Figure 2.9 Conceptual Plan

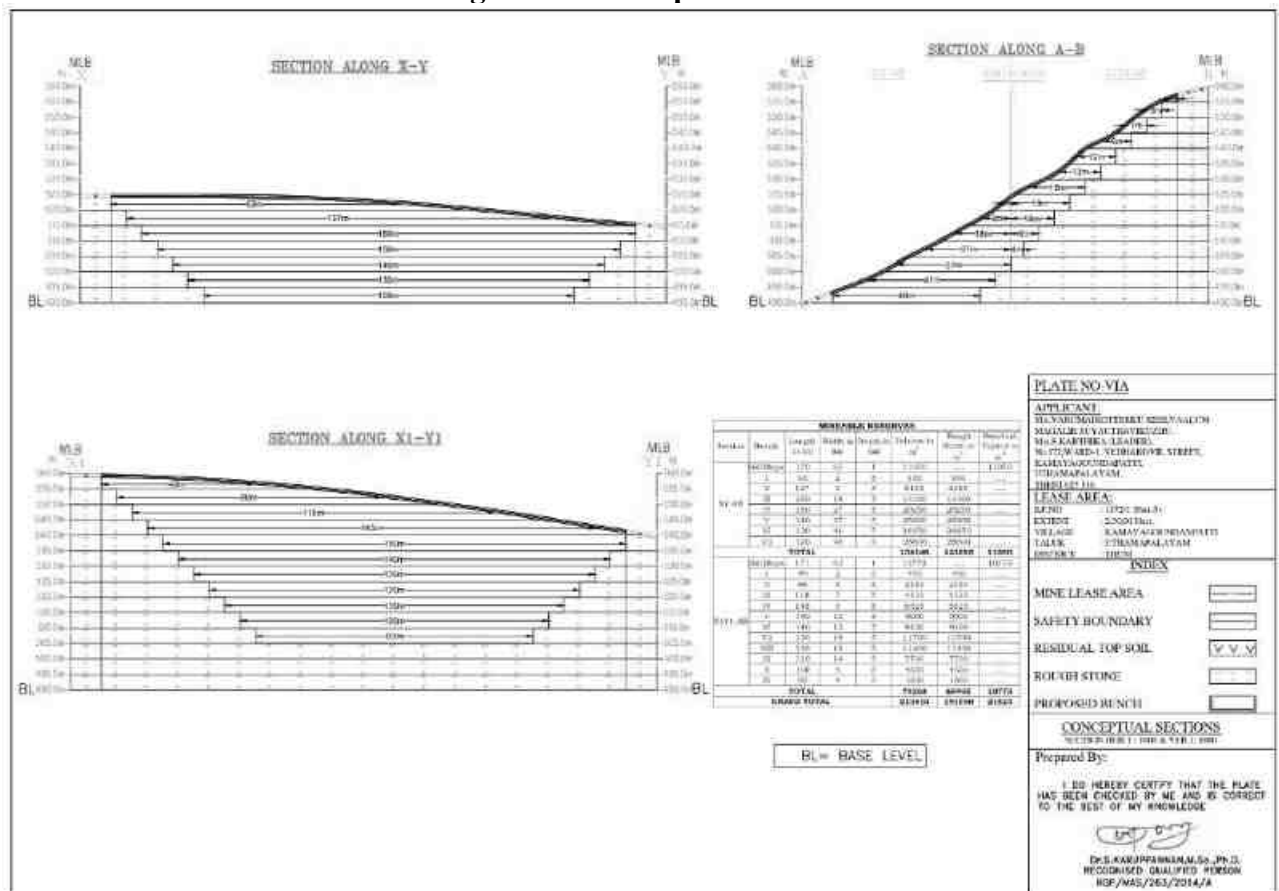


Figure 2.9a Conceptual Sections

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, Figure 2.9 & 2.9a.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth (m)
I	171	65	70

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 2.55 KLD is given in Table 2.11.

Table 2.11 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	0.75 KLD	Existing bore wells nearby the lease area
Green Belt development	0.5 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.3 KLD	Existing bore wells and approved water vendors
Total	2.55 KLD	

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 9,95,956 litres of HSD will be used for rough stone 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 (191590 m³)	Topsoil (21823 m³)	Total Diesel (litre)
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m ³ /hr)	20	60	---
Time Required (hours)	9580	364	---
Total Diesel Consumption for 5 years (litre)	153272	3637	156909
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	42	---	---
Total Diesel Consumption for 5 years (litre)	22680	---	22680
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m ³	6	0	---
Number of Trips / days	29	0*	---
Number of Trips / 5 years	39098	0	---
Total Diesel Consumption for 5 years (litre)	781967	0	781967
Total Diesel Consumption by Excavator, Compressor and Tipper			9,61,556

* Number of truck loads for gravel has been normalized for 5 years.

2.6.9 Capital Requirement

The project proponent will invest **Rs.82,19,330/-** 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	Rs.40,33,330/-
2	Machinery cost	Rs.20,00,000/-
3	EMP Cost	Rs.21,86,000/-
Total Project Cost		Rs.82,19,330 /-

Source: Approved Mining Plan

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	Unskilled	Driver	7
		Hitachi Operator	2
		Musdoor/ Labours	8
Total			20

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
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to Establish						Project Establishment Period
3	Consent to operate						Production starting period.
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

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

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 to December, 2023** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Interstellar Testing Centre Pvt. Ltd** for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.

Study Area

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

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 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	12 (1 in core & 11 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	7 3 surface water & 4 ground water)	IS 10500 & CPCB Standards
Meteorology	Wind speed Wind direction Temperature Cloud cover Dry bulb temperature Rainfall	1 hourly continuous mechanical/automatic weather station	1	Site specific primary data & secondary data from IMD Station
*Ambient Air Quality	PM ₁₀ PM _{2.5} SO ₂ NO _x Fugitive dust	24 hours, twice a week	10 (1 core & 9buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	12 (1 core & 11 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.

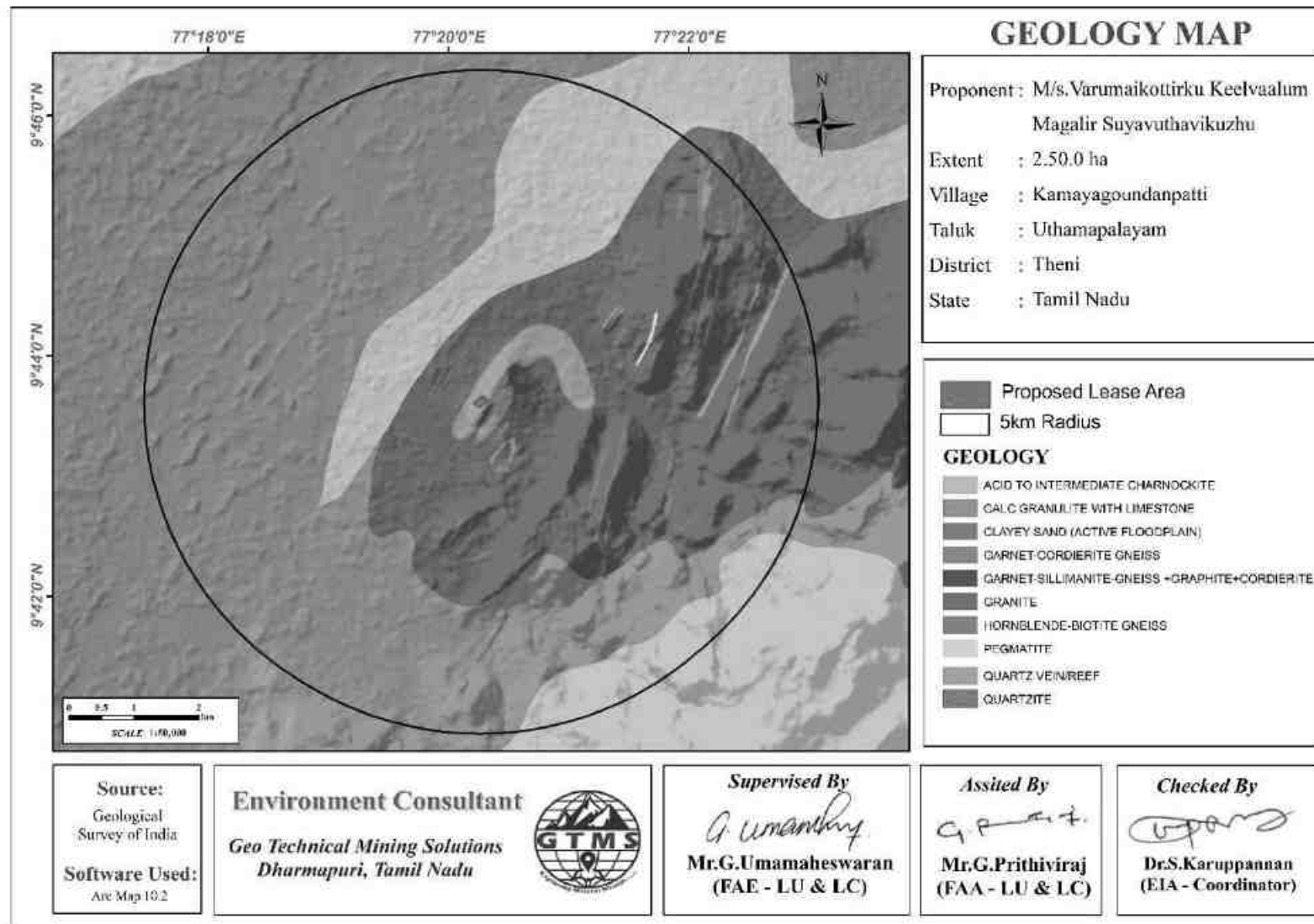
**All monitoring and testing have been carried out as per the Guidelines of CPCB and MoEF & CC.*

3.1 LAND ENVIRONMENT

3.1.1 Geology and Geomorphology

Study area is mainly composed of acid to intermediate charnockite, Hornblende biotite gneiss, clayey sand (active floodplain) and granite sillimanite gneiss+graphite+corderite as shown in Figure 3.1. The lease area occurs in charnockite terrain.

Among the geomorphic units, active flood plain, older alluvial plain, bajada and highly dissected structural hills and valley to the study area, as shown in Figure 3.2. The lease area occurs in shallow weathered/buried pediplain terrain.



Source:
Geological
Survey of India

Software Used:
Arc Map 10.2

Environment Consultant

Geo Technical Mining Solutions
Dharmapuri, Tamil Nadu

Supervised By

G. Umamaheswaran

Mr.G.Umamaheswaran
(FAE - LU & LC)

Assited By

G. Prithiviraj

Mr.G.Prithiviraj
(FAA - LU & LC)

Checked By

Dr.S.Karuppanan

Dr.S.Karuppanan
(EIA - Coordinator)

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

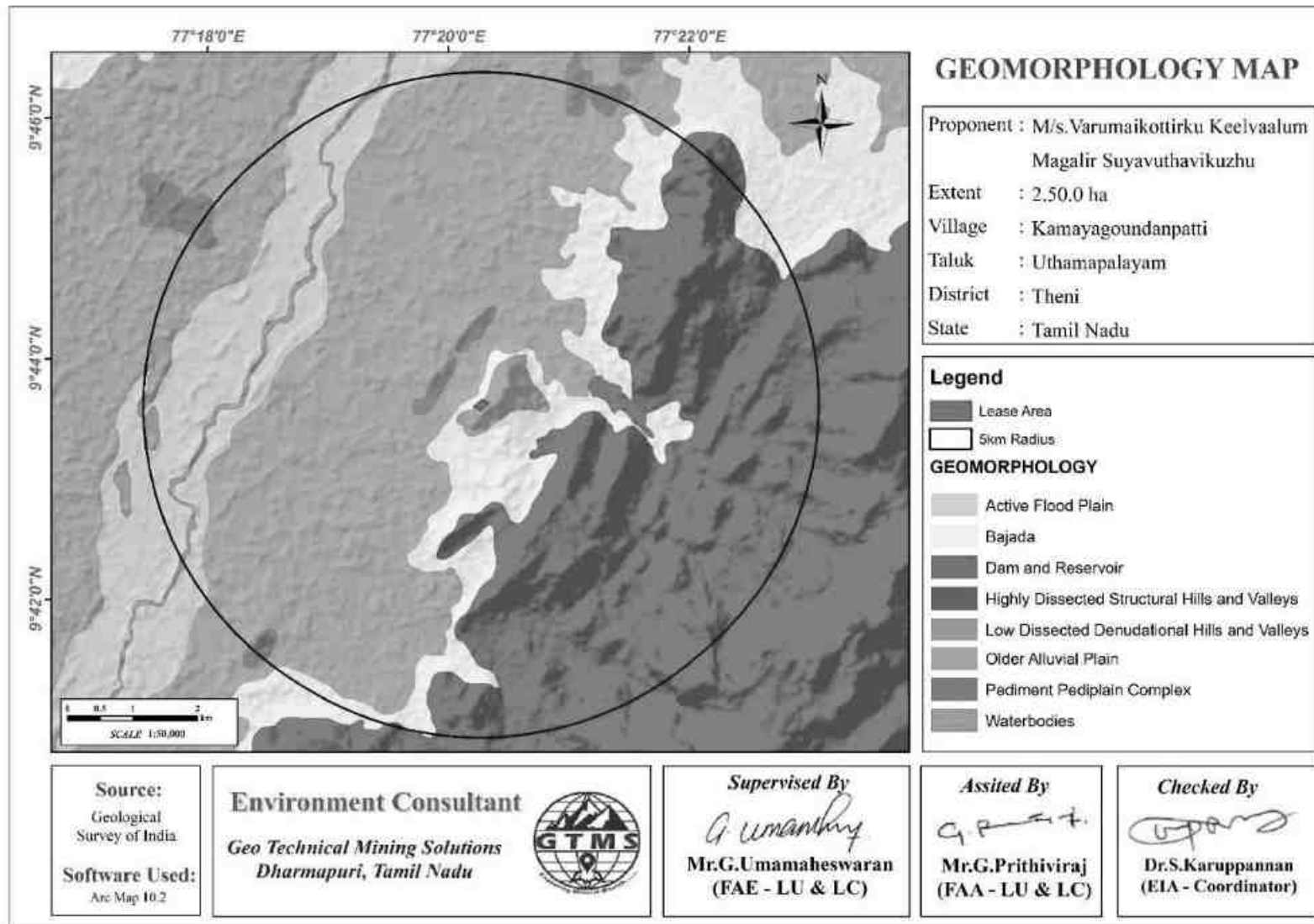


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

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, 8 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 20.20 ha accounting for 0.26 %, of which lease area of 2.50.0 ha contributes only about 0.003%. 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	Crop Land	2778.90	35.82
2	Dense Forest	401.53	5.18
3	Fallow Land	615.30	7.93
4	Mining/Industrial lands	20.20	0.26
5	Land with or Without Scrub	1946.42	25.09
6	Plantations	1753.77	22.60
7	Settlements	158.83	2.05
8	Water bodies	83.48	1.08
Total		7758.44	100.0

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The proposed lease area is located in a flat terrain with an altitude range of 490-560 m AMSL, showing relief of 70 m.

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 Center 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.

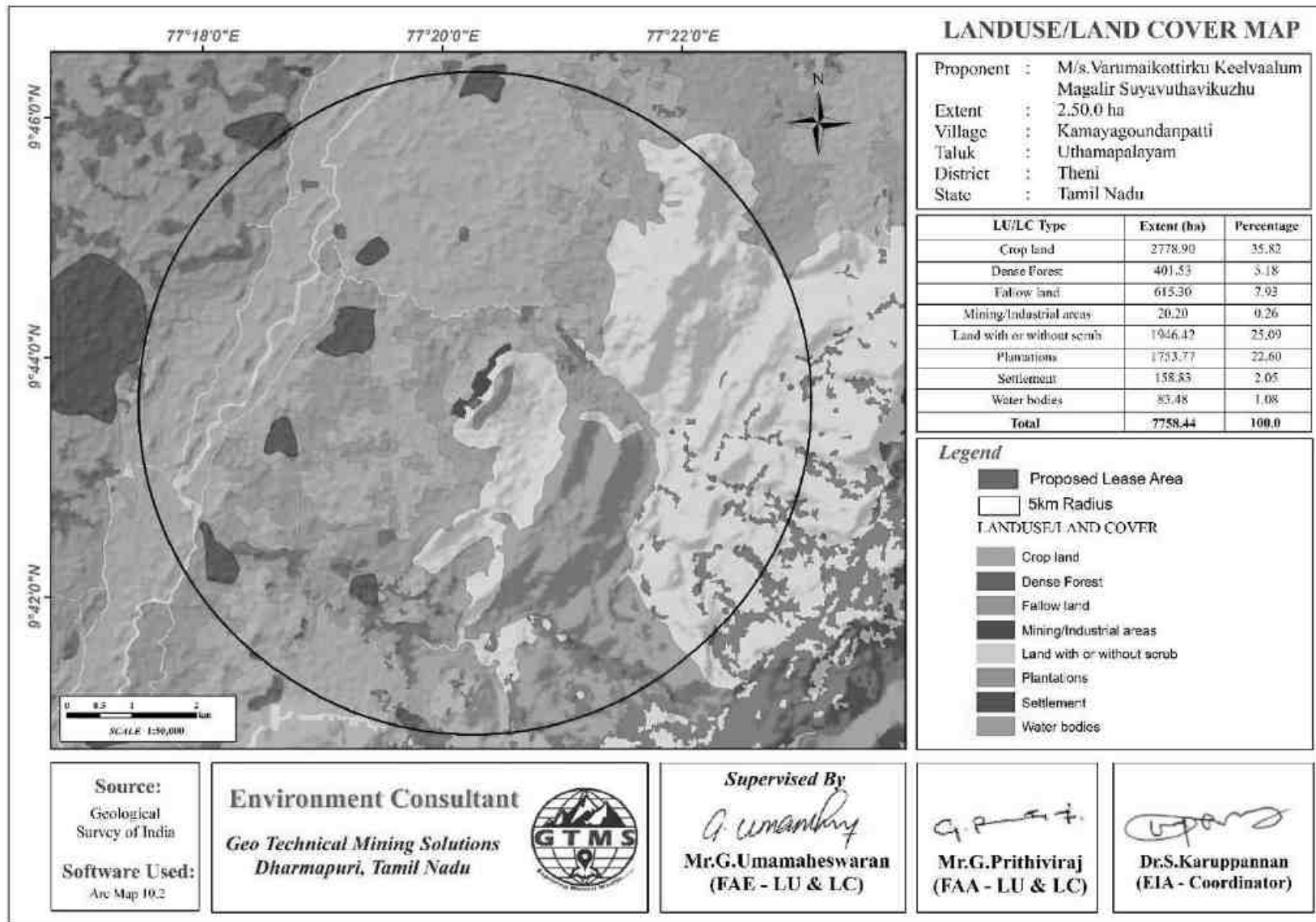


Figure 3.3 LULC Map of 5 km Radius from Proposed Project Site

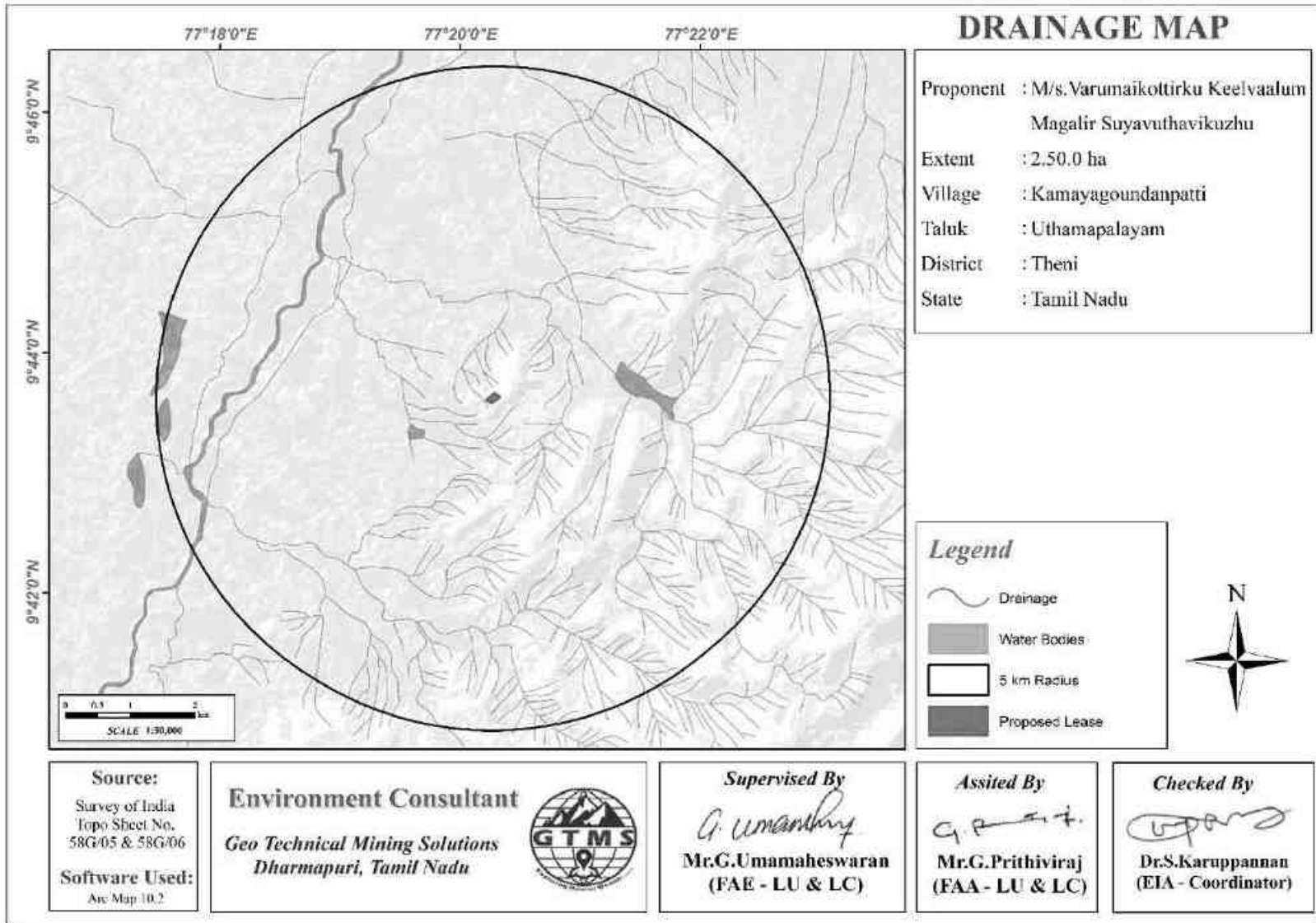


Figure 3.4 Drainage Map of 5 km Radius from Proposed Project Site

3.1.6 Soil

Composite soil samples were collected from 12 locations of the study area to determine the baseline soil characteristics of the soil. The locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.5. The samples thus collected were analysed for physical and chemical characteristics. The physical and chemical characteristic results of soil samples are provided in Table 3.4.

Table 3.3 Soil Sampling Locations

S. No.	Samp ling ID	Location	Distance (km)	Direction	Coordinates
1	S1	M/s. Sangilikaradu Kalvudaikkum Magalir Nalasangam	0.90	NE	9°44'3.77"N, 77°20'34.85"E
2	S2	M/s.K.K.Patti Kaludaykum Magalir Sangam	0.50	NNE	9°43'55.58"N, 77°20'22.66"E
3	S3	M/s.Annai Sathiya Magalir Suya Uthavikuzhu	0.33	NE	9°43'47.10"N, 77°20'26.19"E
4	S4	M/s. Annai Therasa Kaludaikum Magalir Munnetra Sangam	0.03	NE	9°43'40.91"N, 77°20'17.77"E
5	S5	Core	-----	---	9°43'36.14"N, 77°20'12.86"E
6	S6	M/s.Sangili Karuppan Thanneer Parai Magalir Nalasangam	0.17	SSW	9°43'29.11"N, 77°20'13.30"E
7	S7	Kamayagoundanpatti	1.63	NW	9°44'3.57"N, 77°19'26.39"E
8	S8	Rayappanpatti	4.39	N	9°46'3.13"N, 77°20'19.38"E
9	S9	Narayanathevanpatti	3.79	SW	9°42'55.41"N, 77°18'14.73"E
10	S10	Shanmuganathi dam	1.65	E	9°43'45.05"N, 77°21'14.14"E
11	S11	Poosarigoundanpatty	5.0	NE	9°44'55.51"N, 77°22'45.45"E
12	S12	Koothanatchiyar RF	3.57	S	9°41'38.03"N, 77°20'24.19"E

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

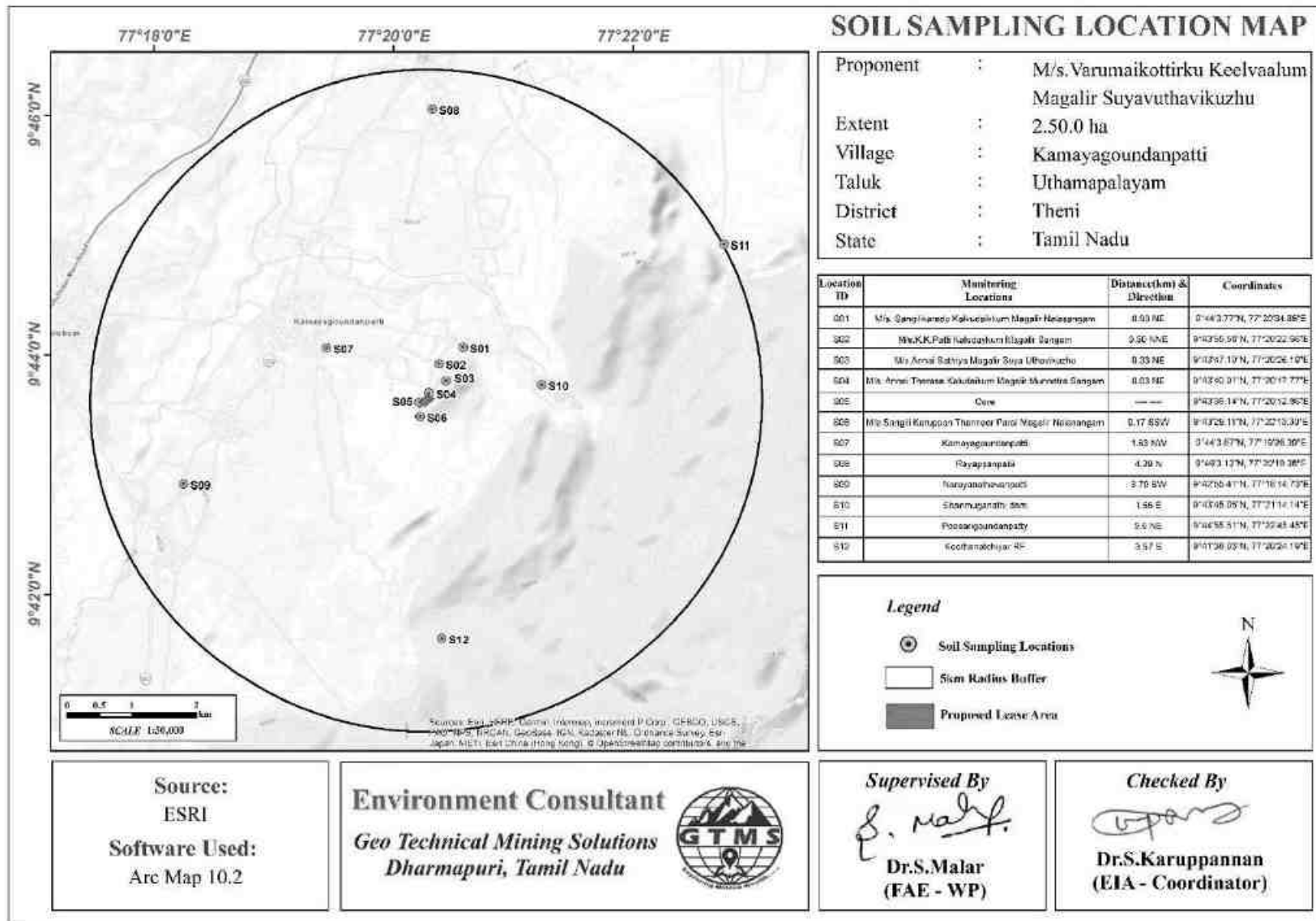


Figure 3.5 Toposheet Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site

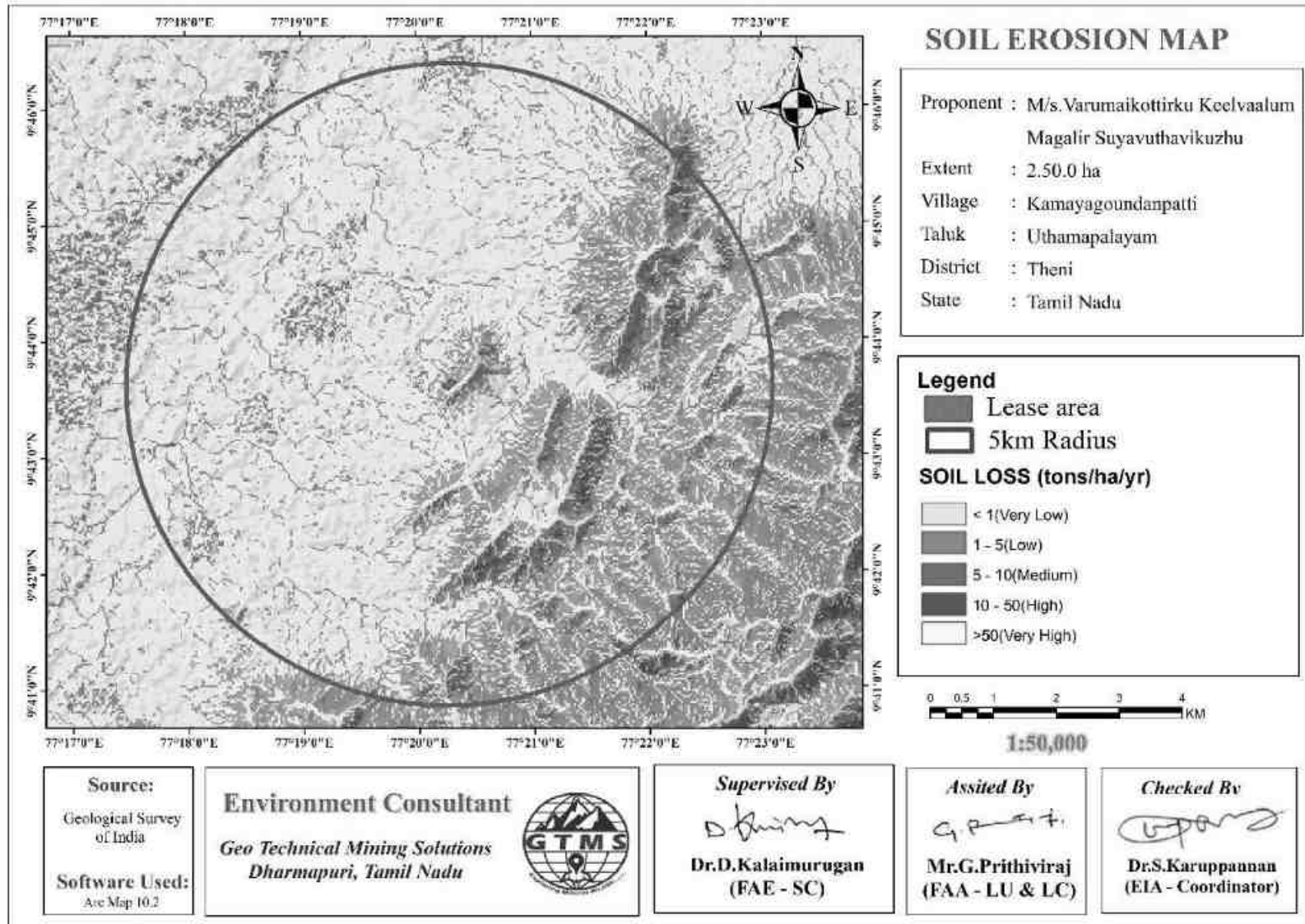


Figure 3.6 Soil Erosion Map within 5 km Radius around Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S.No	Parameters	Units	Core result	Manimum	Maximum	Average
1	Bulk Density	kg/m ³	1458	1076.00	1406.00	1221.55
2	Porosity	% by Weight	32	28.00	42.00	34.55
3	Total Organic Matter	% by mass	0.12	0.05	0.88	0.35
4	Total Nitrogen	N, mg/kg	208	148.00	260.00	201.55
5	Cadmium	Cd ,mg/kg	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)
6	Magnesium as Mg	mg/kg	4799	7432.00	16340.00	10235.00
7	Potassium as K,	mg/kg	1334	1628.00	13171.00	4847.36
8	Lead	Pb, mg/kg	1.03	0.53	5.70	2.11
9	Zinc as Zn	mg/kg	16	13.90	32.90	22.74
10	Iron as Fe	mg/kg	41581	22816.00	38087.00	30617.09
11	Chromium as Cr	mg/kg	174	48.90	139.00	87.73
12	Calcium as Ca	mg/kg	4455	3417.00	21085.00	10796.64
13	Manganese as Mn	mg/kg	588	156.00	997.00	522.73
14	Boron as B,	mg/kg	2.62	0.23	18.50	8.03
15	Total Organic Carbon	% by mass	0.07	0.06	0.51	0.21
16	Sand	% by Weight	19.4	3.50	42.60	24.77
17	Silt	% by Weight	72.8	48.50	88.20	66.84
18	Clay	% by Weight	7.8	6.80	10.40	8.39
19	Copper as Cu	mg/kg	12.6	12.10	674.00	87.26
20	Chloride	mg/kg	96.1	48.00	118.00	96.55
21	Total Phosphorus as P	mg/kg	6.3	5.15	18.70	12.60
22	Cation Exchange Capacity (CEC)	meq/100g	6.83	4.11	19.90	8.10
23	Texture	-	Silt Clay Loam	Clay	Slit	Loam
24	Total Soluble Sulphate as SO ₄	mg/kg	112	52.00	183.00	96.73
25	pH Value	-	6.42	6.23	7.98	7.48
26	Electrical Conductivity	µmhos/cm	43.85	72.17	419.40	149.36

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

Table 3.4a Assigning Scores to Soil Quality Indicators

Soil Quality Score							
SI. No.	OM	BD	pH	CEC	EC	Total Score	Recommendation
S01	S01	30	2	18	2	10	The soil requires major and immediate treatment
S02	S02	30	2	12	2	10	
S03	S03	30	2	18	2	10	
S04	S04	30	2	12	2	10	
S05	S05	30	2	18	2	10	
S06	S06	30	2	12	2	10	
S07	S07	30	2	12	2	10	
S08	S08	30	2	18	2	10	
S09	S09	30	2	12	6	10	
S10	S10	30	2	12	2	10	
S11	S11	30	2	12	2	10	
S12	S12	30	2	18	2	10	

(BD) Bulk Density (OM) Organic Matter (EC) Electrical Conductivity.

Physical Characteristics

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 6.23 to 7.98 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 72.17 to 419.40 $\mu\text{mhos/cm}$. Bulk density ranges between 1076 to 1406 kg/m^3 .

Chemical Characteristics

Nitrogen ranges between 148 and 260 mg/kg. Phosphorus ranges between 5.15 and 18.70 mg/kg. Potassium ranges between 1334 and 13171 mg/kg. Calcium ranges between 3417 and 21085 mg/kg. Total carbon ranges between 0.06 and 0.51 %.

Soil Erosion

There is no soil erosion in the mining lease area. The south east and south west part of the lease area has less moderate soil erosion as shown in the soil erosion map in Figure 3.6

Soil Quality Assessment

Soil quality is the foundation of sustainable crop production. Soil quality assessment helps to understand soil conditions and adopt suitable production practices. It can be done using physical, chemical, and biological properties of soil. For this assessment, four soil quality parameters including pH, EC, OM, and BD were taken into account. The soil quality score for each sample has been provided in Table 3.4a

3.2 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the baseline quality of surface and ground water.

Table 3.5 Water Sampling Locations

S. No.	Sampli ng ID	Location	Distance (km)	Direction	Coordinates
1	OW1	Anaipatti	2.56	NW	9°44'45.29"N77°19'23.34"E
2	OW2	Rayappanpatti	4.8	NNE	9°46'22.26"N77° 20'32.03"E
3	BW1	Mallingapuram	0.44	W	9°43'39.45"N77°20'2.35"E
4	BW2	Kamayagoundan patti	1.92	NW	9°44'7.04"N77°19'19.87"E
5	SW1	Shanmuganathi dam	1.44	E	9°43'52.78"N77°21'11.53"E
6	SW2	Mullaiperiyar River	4.05	W	9°43'32.74"N77°18'4.19"E
7	SW3	Koothanatchiyar Dam	3.83	S	9°41'33.80"N77°20'23.94"E

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

3.2.1 Surface Water Resources and Quality

Shanmuganathi Dam, Mullaiperiyar River and Koothanatchiyar Dam in mine lease area are the three prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 1.44 km E of Shanmuganathi dam, 4.05 km W of Mullaiperiyar River and 3.83 km S of Koothanatchiyar Dam, as shown in Table 3.5 and Figure 3.8. Three surface water samples, known as SW1, SW2 and SW3 were collected from the three surface water bodies to assess the baseline water quality. Table 3.7 summarizes surface water quality data of the three samples.

Result for surface water sample in the Table 3.7 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

3.2.2 Ground Water Resources and Quality

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.

Four groundwater samples, known as OW1, OW2, BW1 and BW2 were collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water. Ground water sampling locations and their distance and direction from the lease area are provided in Table 3.5 and the spatial occurrence of water sampling locations is shown in Figure 3.8. Table 3.6 summarizes ground water quality data of the four samples. Results for ground water samples in the Table 3.6 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

3.2.3. 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.

3.2.3.1 Rainfall

Rainfall data for the study area were collected for the period of 1981-2022 (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 September through November of 2022 is higher than the previous years.

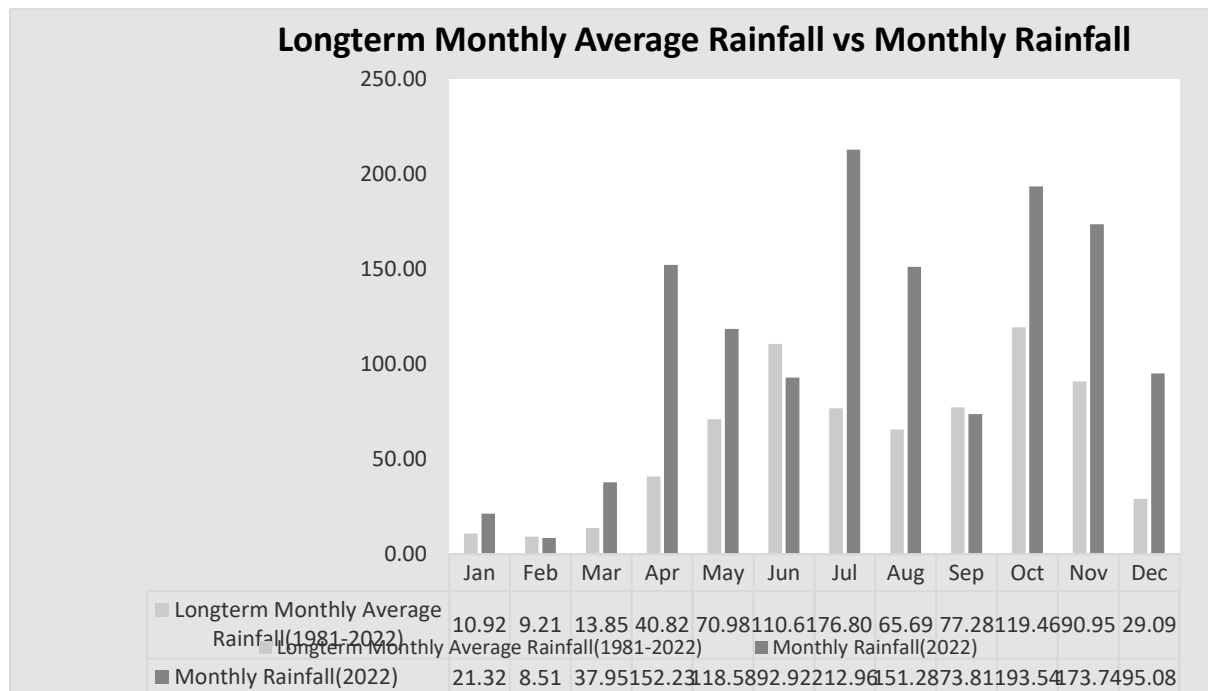


Figure 3.7 Long-Term Monthly Average Rainfall Vs Monthly Rainfall

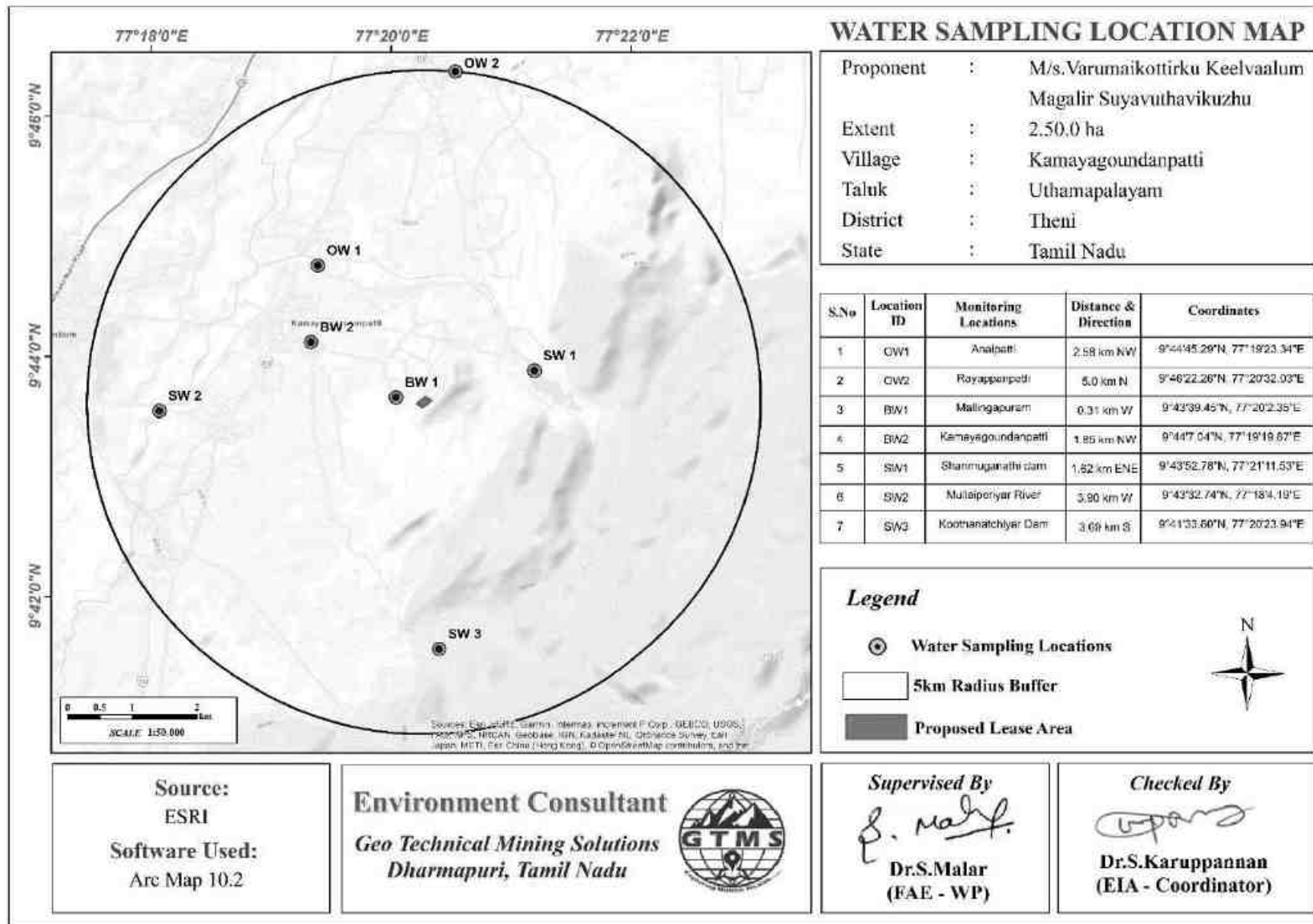


Figure 3.8 Toposheet Showing Water Sampling Locations within 5 km Radius around Proposed Project Site

Table 3.6 Ground Water Quality Result

S.No.	Parameters	Units	Minimum	Maximum	Average	Acceptable Limits As per IS 10500:2012	Permissible Limits As Per IS 10500:2012
1	Colour	Hazen	5	10	6.66	5	15
2	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH Value	–	7.33	8.31	7.73	6.5 – 8.5	No relaxation
4	Total Ammonia	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.5	No relaxation
5	Anionic detergent	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.2	1.0
6	Sulphate (SO ₄)	mg/L	16.9	39	27.96	200	400
7	Calcium (Ca)	mg/L	12.5	72	49.83	75	200
8	Fluoride (F)	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	1.0	1.5
9	Free Residual Chlorine	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.2	1.0
10	Magnesium (Mg)	mg/L	4.4	10.7	7.43	30	100
11	Manganese (Mn)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.1	0.3
12	Nitrate (NO ₃)	mg/L	2.98	3.6	5.4	45	No relaxation
13	Phenolic compounds (C ₆ H ₅ OH)	mg/L	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	0.001	0.002
14	Selenium (Se)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.01	No relaxation
15	Iron (Fe)	mg/L	0.05	0.24	0.14	0.3	No relaxation

16	Aluminium (Al)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.03	0.2
17	Chloride (Cl)	mg/L	29.6	138	95.86	250	1000
18	Copper (Cu)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.05	1.5
19	Barium (Ba)	mg/L	0.06	0.37	0.24	0.5	No relaxation
20	Boron (B)	mg/L	0.1	0.4	0.22	0.5	1.0
21	EC	µS/Cm	466	814	683	-	-
22	Cadmium (Cd)	mg/L	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	0.003	No relaxation
23	Cyanide (CN)	mg/L	BLQ(LOQ:0.01)	BLQ(LOQ:0.01)	BLQ(LOQ:0.01)	0.05	No relaxation
24	Lead (Pb)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.01	No relaxation
25	Mercury (Hg)	mg/L	BLQ(LOQ:0.0005)	BLQ(LOQ:0.0005)	BLQ(LOQ:0.0005)	0.001	No relaxation
26	Total Dissolved Solids	mg/L	274	478	399.8	500	2000
27	Sodium (Na)	mg/L	21.2	106	73.06	20	200
28	Potassium (K)	mg/L	1.1	8.8	8.8	12	No relaxation
29	Molybdenum (Mo)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.07	No relaxation
30	Total Coliform MPN/100ml	MPN/100ml	<2	<2	<2	Shall not be detectable in any 100 ml sample	Shall not be detectable in any 100 ml sample
31	<i>E.coli</i> MPN/100ml	MPN/100ml	<2	<2	<2	Shall not be detectable in any 100 ml sample	Shall not be detectable in any 100 ml sample

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

Table 3.7 Surface Water Quality Result

S.NO	Parameters	Units	Minimum	Maximum	Average	Acceptable Limits As per IS 10500:2012	Permissible Limits As Per IS 10500:2012
1	Colour	Hazen	5	10	7.5	5	300
2	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH Value	–	7.54	8.37	7.88	6.5 – 8.5	No relaxation
4	Total Ammonia	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.5	No relaxation
5	Anionic detergent	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.2	1.0
6	Sulphate (SO ₄)	mg/L	6.3	14.2	9.2	200	400
7	Calcium (Ca)	mg/L	11.7	25.5	17.2	75	200
8	Fluoride (F)	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.0	0.4
9	Free Residual Chlorine	mg/L	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	BLQ(LOQ:0.1)	0.2	1.0
10	Magnesium (Mg)	mg/L	5	10	7.5	30	100
11	Manganese (Mn)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.1	0.3
12	Nitrate (NO ₃)	mg/L	2.2	6.1	3.8	45	No relaxation
13	Phenolic compounds (C ₆ H ₅ OH)	mg/L	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	0.001	0.002
14	Selenium (Se)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.01	No relaxation
15	Iron (Fe)	mg/L	0.19	0.38	0.29	0.3	No relaxation

16	Aluminium (Al)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.03	0.2
17	Chloride (Cl)	mg/L	6.8	13.1	9.53	250	1000
18	Copper (Cu)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.05	1.5
19	Barium (Ba)	mg/L	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	0.5	No relaxation
20	Boron (B)	mg/L	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	BLQ(LOQ:0.05)	0.5	1.0
21	EC	µS/Cm	116	310	205	-	-
22	Cadmium (Cd)	mg/L	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	BLQ(LOQ:0.001)	0.003	No relaxation
23	Cyanide (CN)	mg/L	BLQ(LOQ:0.01)	BLQ(LOQ:0.01)	BLQ(LOQ:0.01)	0.05	No relaxation
24	Lead (Pb)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.01	No relaxation
25	Mercury (Hg)	mg/L	BLQ(LOQ:0.0005)	BLQ(LOQ:0.0005)	BLQ(LOQ:0.0005)	0.001	No relaxation
26	Total Dissolved Solids	mg/L	64	176	114.6	500	2000
27	Sodium (Na)	mg/L	4.6	7.4	6.2	20	200
28	Potassium (K)	mg/L	0.43	0.7	0.52	12	No relaxation
29	Molybdenum (Mo)	mg/L	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	BLQ(LOQ:0.005)	0.07	No relaxation
30	Total Coliform MPN/100ml	MPN/100ml	<2	<2	<2	Shall not be detectable in any 100 ml sample	Shall not be detectable in any 100 ml sample
31	<i>E.coli</i> MPN/100ml	MPN/100ml	<2	<2	<2	Shall not be detectable in any 100 ml sample	Shall not be detectable in any 100 ml sample

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

3.2.3.2 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 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2023 (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 3.8 and 3.9. According to the data, average depths to the static water table in open wells range from 4.08 to 5.80 m BGL in premonsoon and 5.50 to 7.50 m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in bore wells for the period of October through December 2023 (Post-Monsoon Season) vary from 52.0 to 52.7 m and from 57.03 to 57.80 m for the period of March through May, 2023 (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.

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

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Mar-2023	Apr-2023	May- 2023	Average		
DW01	4.5	6	7	5.80	9° 44.095'N	77° 19.358'E
DW02	3.5	5	6.5	5.00	9° 44.272'N	77° 20.018'E
DW03	3	4.5	6	4.50	9° 44.554'N	77° 19.784'E
DW04	4	5	6.5	5.10	9° 44.659'N	77° 20.381'E
DW05	4.5	6	7	5.80	9° 44.172'N	77° 21.213'E
DW06	3.5	5	6.5	5.00	9° 43.927'N	77° 20.774'E
DW07	3.5	5.5	7	5.30	9° 43.195'N	77° 20.223'E
DW08	3	4.5	6	4.50	9° 43.264'N	77° 19.376'E
DW09	4	5	6.5	5.10	9° 43.674'N	77° 19.191'E

Source: Onsite monitoring data

Table 3.9 Post-Monsoon Water Level of Open Wells within 2 km Radius

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2023	Nov- 2023	Dec-2023	Average		
DW01	5	6.5	8	6.50	9° 44.095'N	77° 19.358'E
DW02	4.5	6	7.5	6.00	9° 44.272'N	77° 20.018'E
DW03	4	6	7	5.60	9° 44.554'N	77° 19.784'E
DW04	5.5	7	8.5	7.00	9° 44.659'N	77° 20.381'E

DW05	5.5	7	8	6.80	9° 44.172'N	77° 21.213'E
DW06	4.5	5.5	7	5.80	9° 43.927'N	77° 20.774'E
DW07	4	5.5	7.5	5.60	9° 43.195'N	77° 20.223'E
DW08	6	7.5	9	7.50	9° 43.264'N	77° 19.376'E
DW09	4	5.5	7	5.50	9° 43.674'N	77° 19.191'E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2023	Apr-2023	May- 2023	Average		
BW01	55.2	57.2	59.1	57.2	9° 44.137'N	77° 20.642'E
BW02	55.4	57.6	58.9	57.3	9° 44.025'N	77° 20.381'E
BW03	55.1	58.1	59.8	57.7	9° 43.646'N	77° 19.942'E
BW04	55.6	56.2	59.3	57.0	9° 43.560'N	77° 19.412'E
BW05	56.1	57.1	60.1	57.8	9° 43.612'N	77° 20.711'E
BW06	56.2	57.8	59.4	57.8	9° 43.033'N	77° 20.171'E
BW07	54.9	57.5	59.3	57.2	9° 42.781'N	77° 19.713'E
BW08	55.8	57.9	59.4	57.7	9° 44.460'N	77° 19.608'E
BW09	55.4	57.4	60.1	57.6	9° 44.920'N	77° 20.653'E

Source: Onsite monitoring data

Table 3.11 Post-Monsoon Water Level of Bore Wells within 2 km Radius

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2023	Nov-2023	Dec-2023	Average		
BW01	54.1	52.1	50.1	52.1	9° 44.137'N	77° 20.642'E
BW02	53.2	52.5	51.9	52.5	9° 44.025'N	77° 20.381'E
BW03	53.8	51.9	50.8	52.2	9° 43.646'N	77° 19.942'E
BW04	54.1	51.8	51.3	52.4	9° 43.560'N	77° 19.412'E
BW05	53.2	51.4	52.1	52.2	9° 43.612'N	77° 20.711'E
BW06	53.8	52	51.1	52.3	9° 43.033'N	77° 20.171'E
BW07	54.1	52.4	51.6	52.7	9° 42.781'N	77° 19.713'E
BW08	53.6	52.3	50	52.0	9° 44.460'N	77° 19.608'E
BW09	53.4	52.6	50.3	52.1	9° 44.920'N	77° 20.653'E

Source: Onsite monitoring data

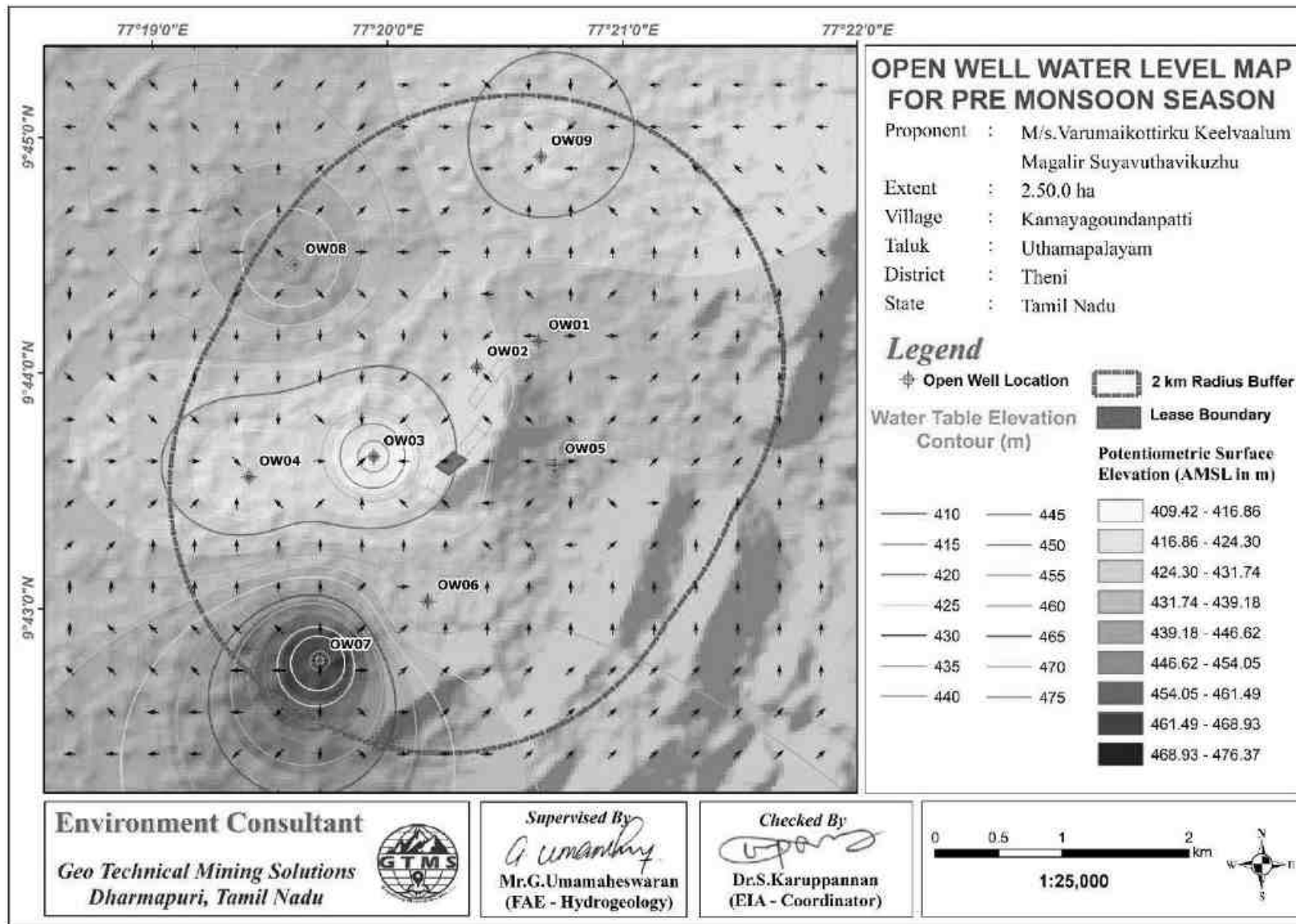


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

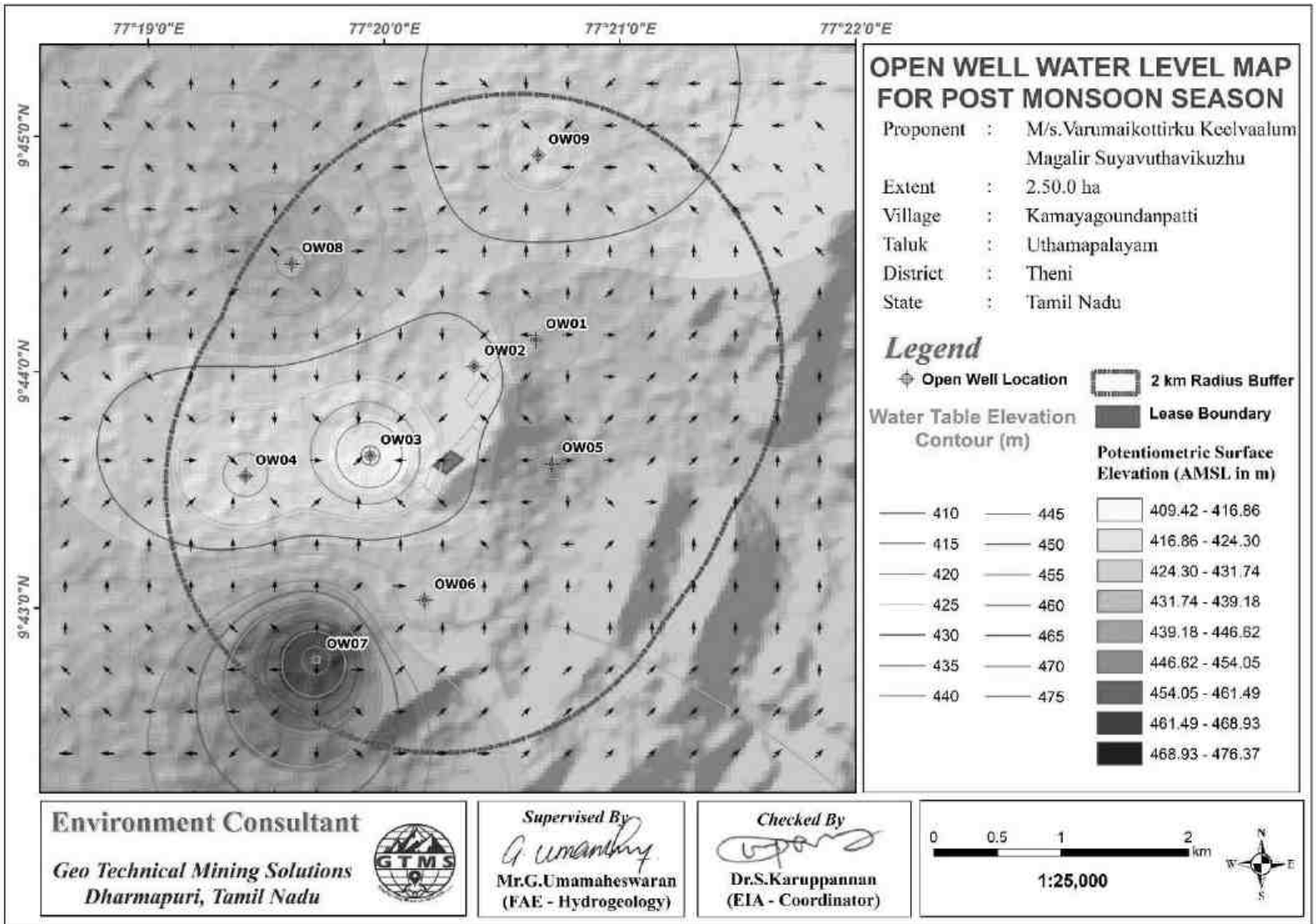


Figure 3.10 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

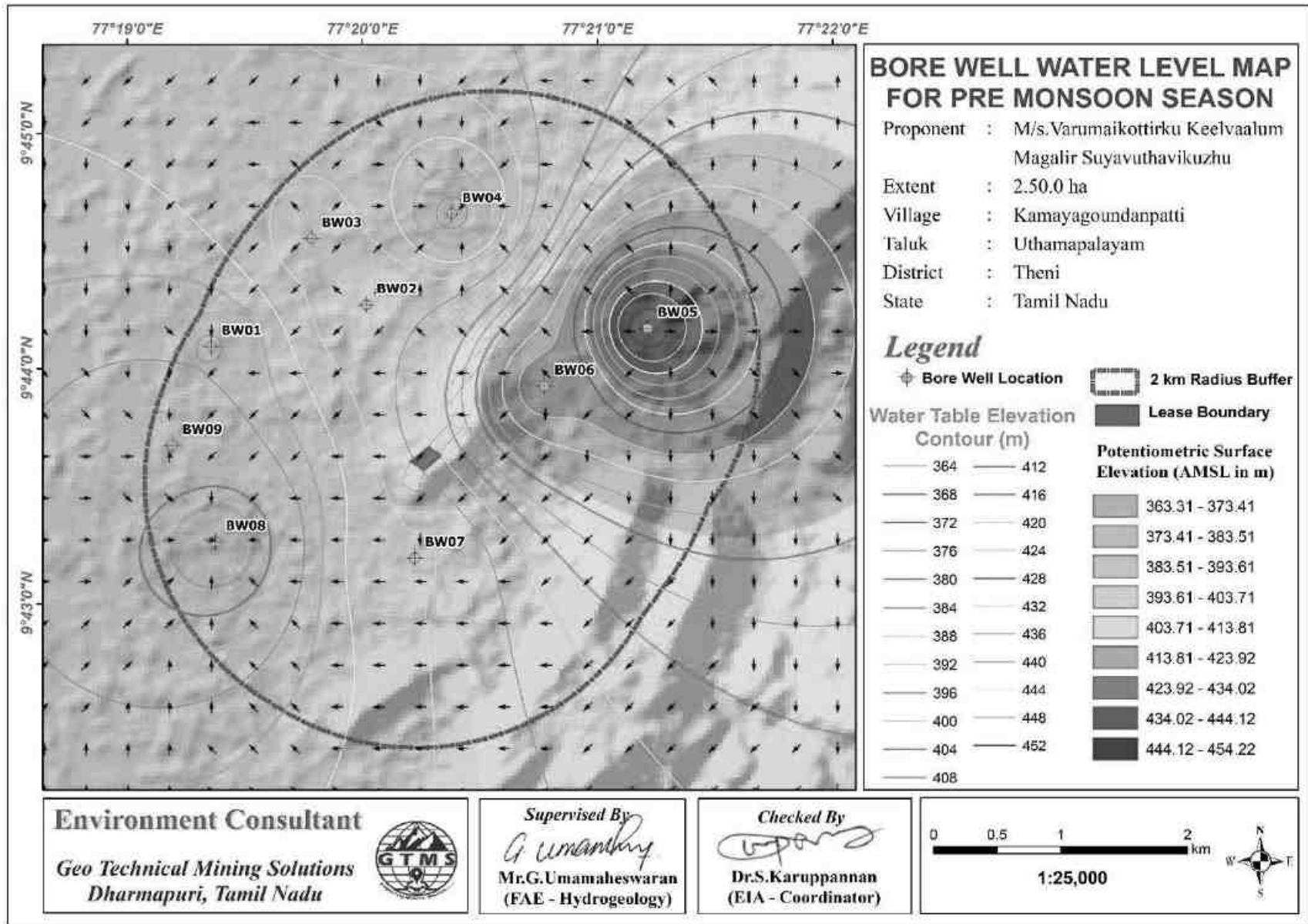


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

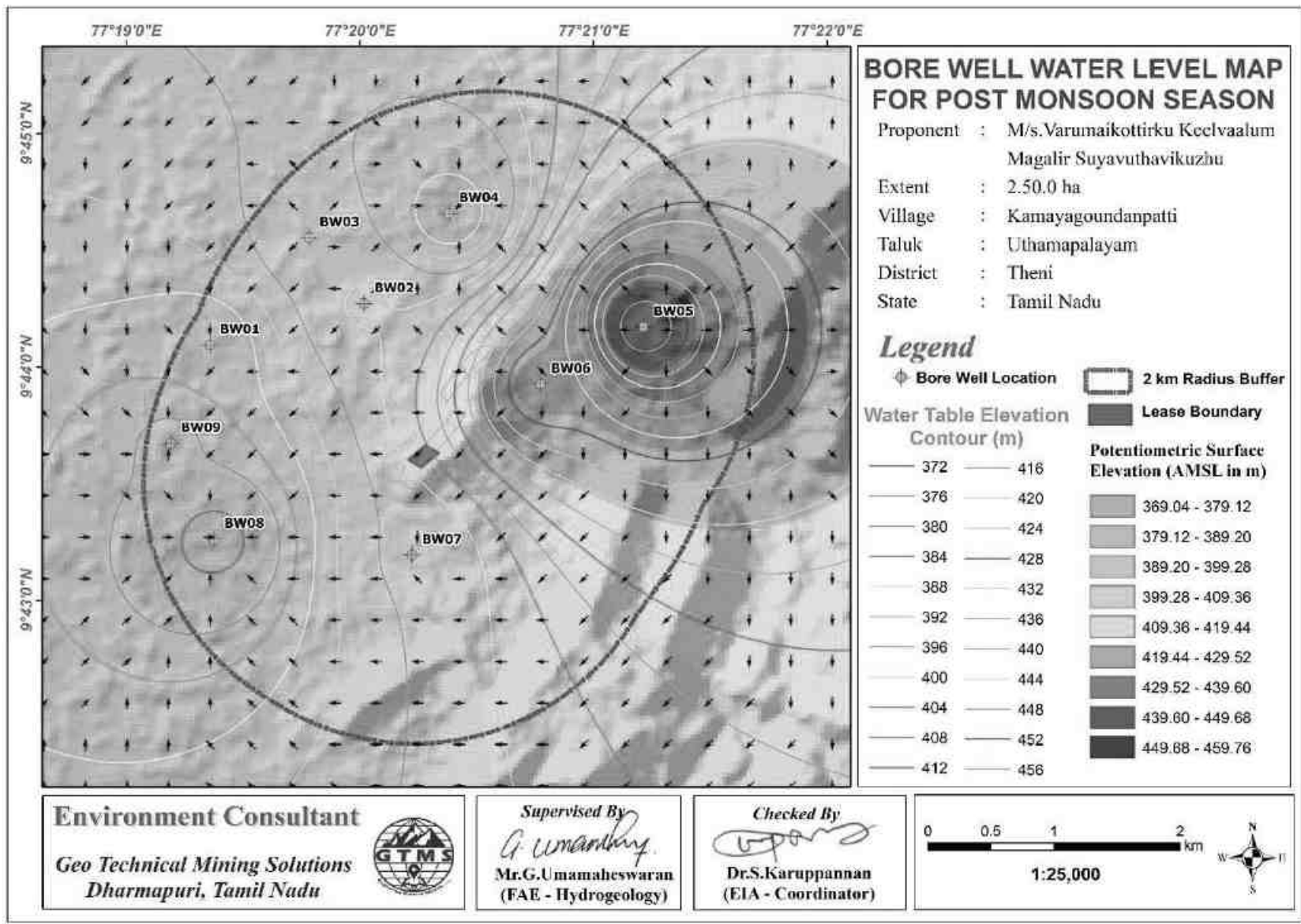


Figure 3.12 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

3.2.3.3 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 3.12. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.13.

Table 3.12 Vertical Electrical Sounding Data

Location Coordinates - 9°44'3.35"N 77°20'29.61"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in Ω	Apparent Resistivity in Ωm
1	2	2	11.78	13.248	156.06
2	4	2	49.46	6.127	303.04
3	6	5	112.26	3.937	441.97
4	8	5	200.18	2.798	560.1
5	10	5	75.36	8.997	678.01
6	15	10	173.49	5.188	900.07
7	20	10	310.86	3.558	1106.04
8	25	10	487.49	2.603	1268.94
9	30	10	274.75	5.001	1374.02
10	35	10	376.8	3.883	1463.11
11	40	10	494.55	3.160	1562.78
12	45	10	628	2.683	1684.92
13	50	10	777.15	2.202	1710.95
14	65	20	453.6	2.213	1003.82
15	70	20	989.1	2.651	2622.1
16	80	20	1256	2.196	2758.18
17	90	20	1554.3	1.846	2869.24
18	100	20	1653.6	2.213	3659.42

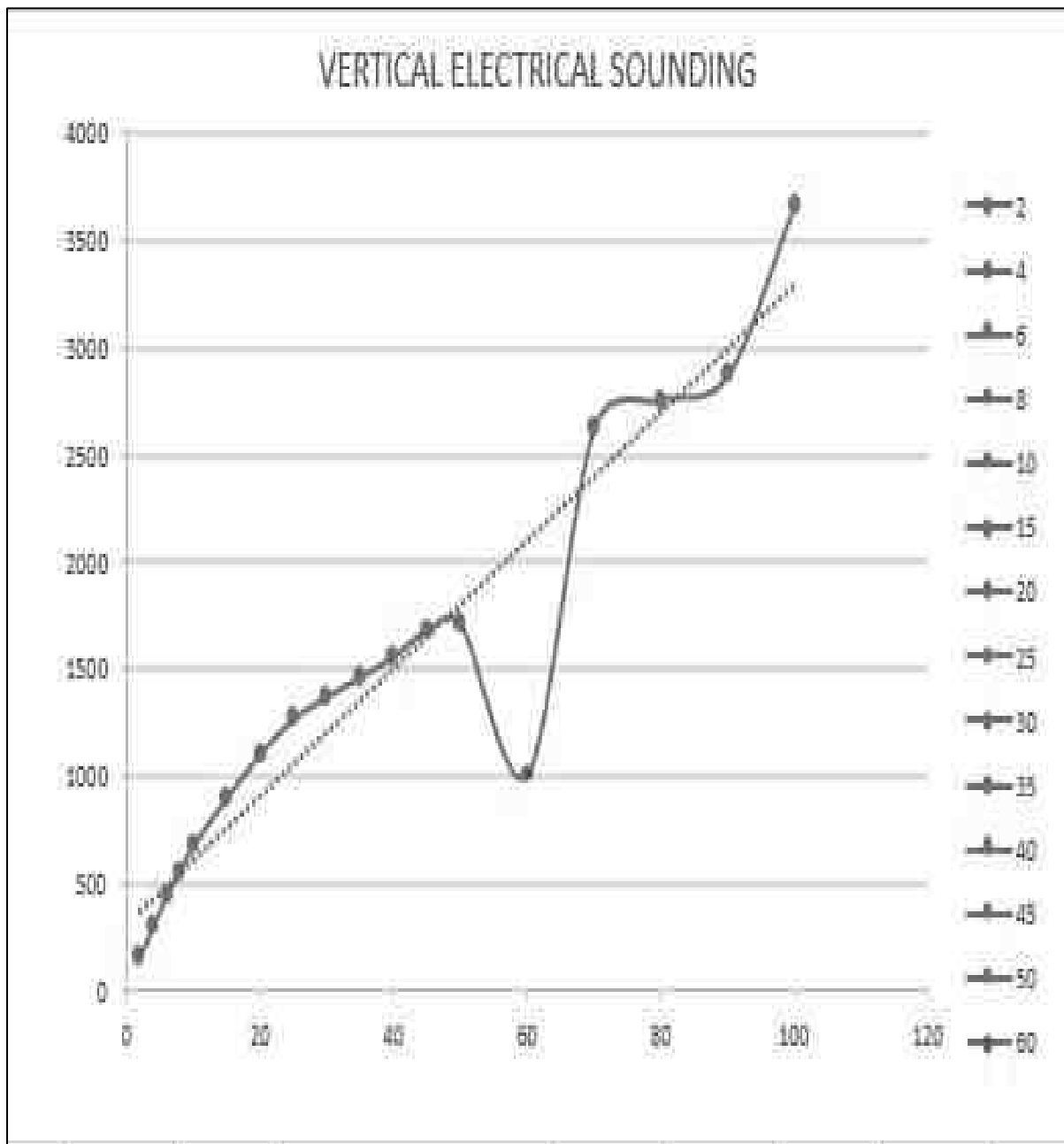


Figure 3.13 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60 m Below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 60 m below ground level. The maximum depth proposed for the proposed project as these are hilly areas, quarrying takes place only 70m AGL. 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 3 m 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 3.13.

According to the onsite data, the temperature in October 2023 varied from 20.93 to 35.26⁰ C with the average of 25.41⁰ C; in November, 2023 from 18.77 to 28.82⁰ C with the average of 23.94⁰ C; and in December, 2023 from 16.37 to 29.48⁰ C with the average of 22.62⁰C. In October, 2023, relative humidity ranged from 35.75 to 99.38 % with the average of 81.92%; in November, 2023, from 64.88 to 100 % with the average of 88.69%; and in December, 2023, from 52.50 to 100 % with the average of 86.40 %. The wind speed in October, 2023 varied from 0.10 to 5.86 m/s with the average of 1.71 m/s; in November, 2023 from 0.27 to 3.48 m/s with the average of 1.53 m/s; and in December, 2023 from 0.59 to 5.13 m/s with the average of 2.06 m/s. In October,2023, wind direction varied from 0.36 to 359.11⁰ with the average of 185.92⁰; in November, 2023, from 0.00 to 359.61⁰ with the average of 84.86⁰; and in December, 2023, from 0.29 to 359.76⁰ with the average of 107.67⁰. In October,2023, surface pressure varied from 95.66 to 96.52 kPa with the average of 96.17 kPa; in November, 2023, from 95.73 to 96.57kPa with the average of 96.17kPa; and in December, 2023, from 95.44 to 96.88 kPa with the average of 96.08 kPa.

Table 3.13 Onsite Meteorological Data

S. No.	Parameters		OCT,2023	NOV,2023	DEC,2023
1	Temperature (°C)	Min	20.93	18.77	16.37
		Max	35.26	28.82	29.48
		Avg	25.41	23.94	22.62
2	Relative Humidity (%)	Min	35.75	64.88	52.50
		Max	99.38	100.00	100.00
		Avg	81.92	88.69	86.40
3	Wind Speed (m/s)	Min	0.10	0.27	0.59
		Max	5.86	3.48	5.13
		Avg	1.71	1.53	2.06
4	Wind Direction (degree)	Min	0.36	0.00	0.29
		Max	359.11	359.61	359.76
		Avg	185.92	84.86	107.67
5	Surface Pressure(kPa)	Min	95.66	95.73	95.44
		Max	96.52	96.57	96.88
		Avg	96.17	96.17	96.08

Source: On-site monitoring/sampling by **Interstellar Testing Centre Pvt. 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 through December of the years from 2019 to 2022 and the seasonal wind rose for the study period of October through December 2023. The wind rose diagrams thus produced are shown in Figures 3.14-3.14a. Figure 3.15 reveals that:

- ❖ The measured average wind velocity during the study period is 1.77m/s.
- ❖ Predominant wind was dominant in the directions ranging from northeast to southwest

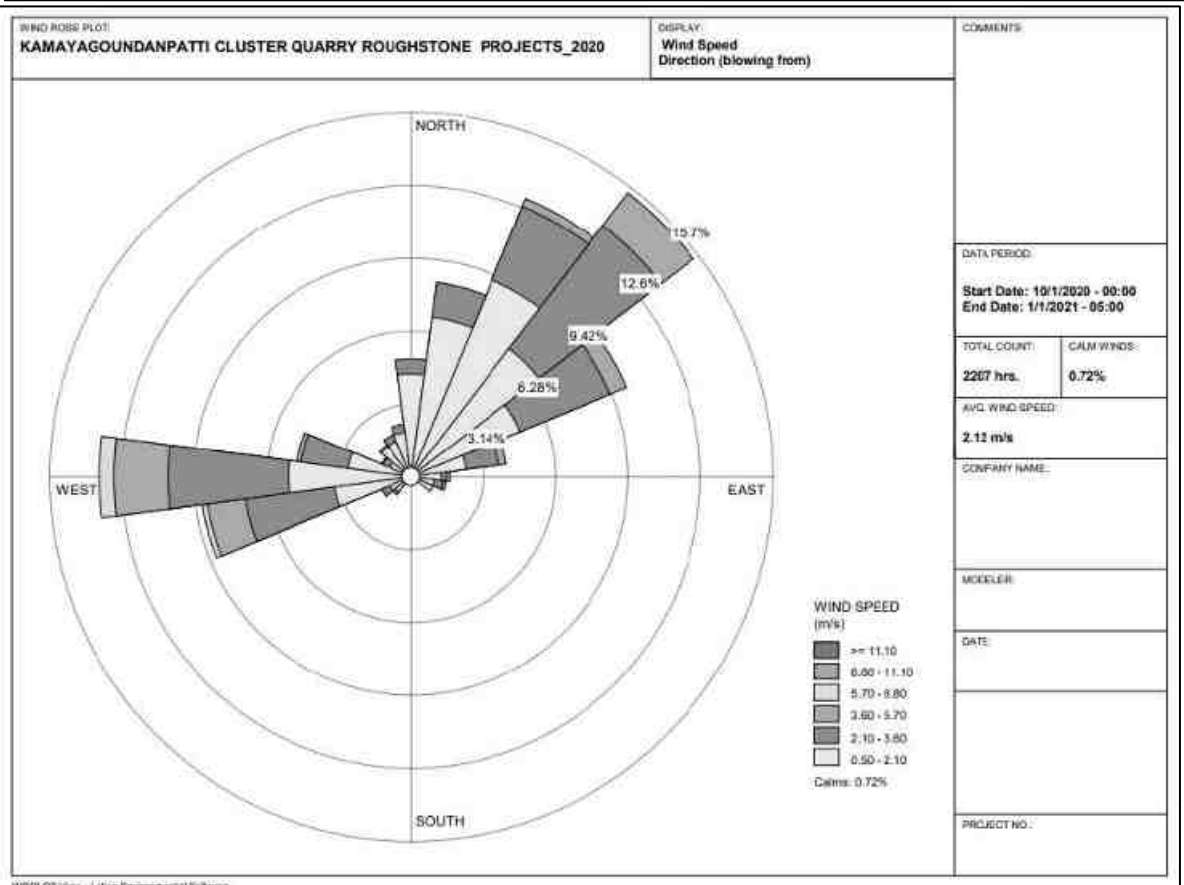
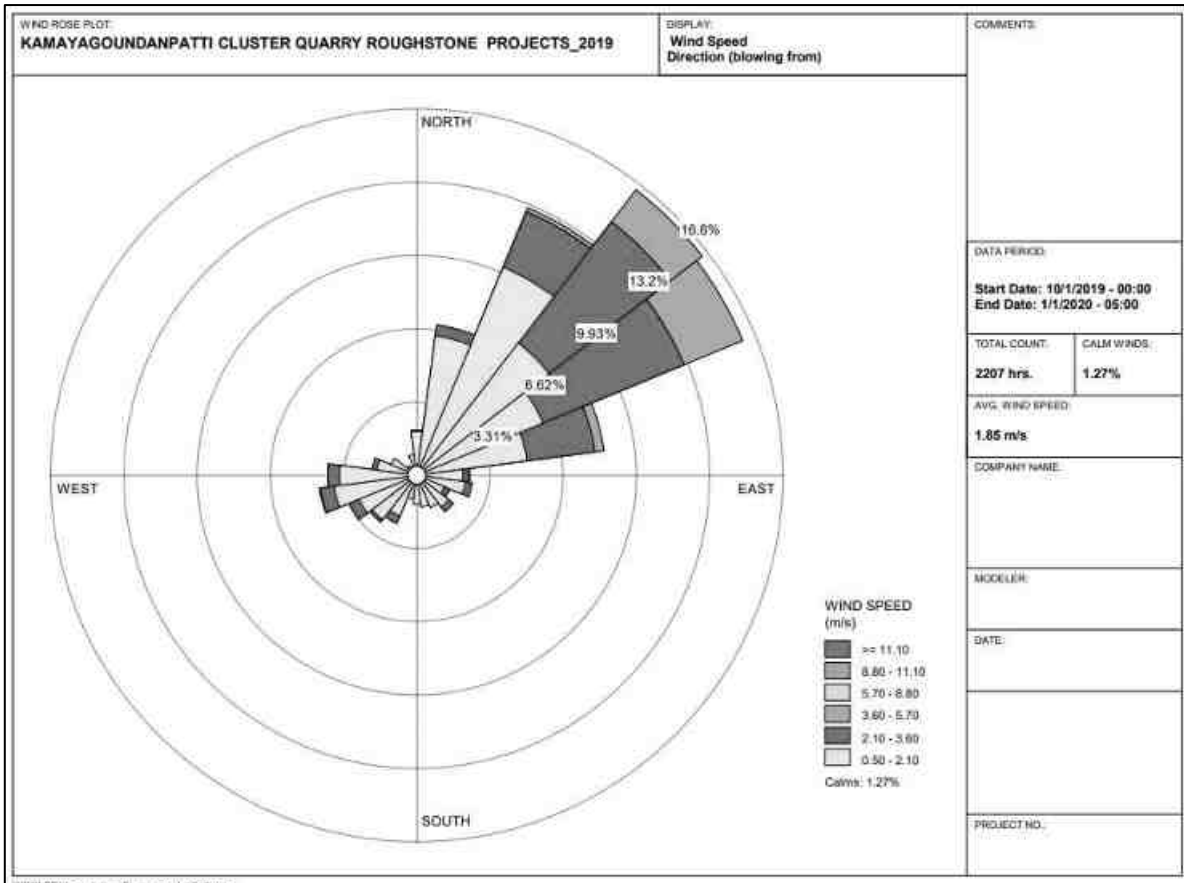


Figure 3.14 Windrose Diagram for 2019 and 2020 (October through December)

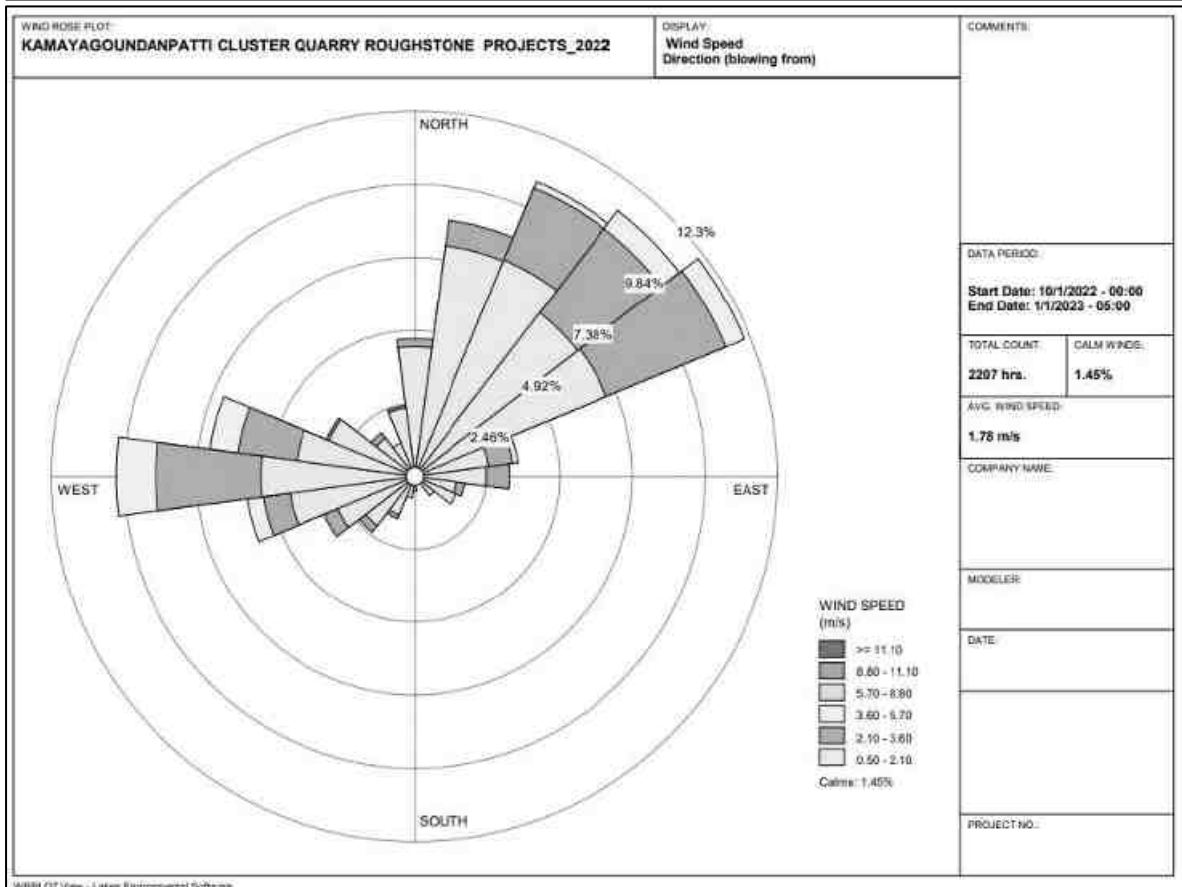
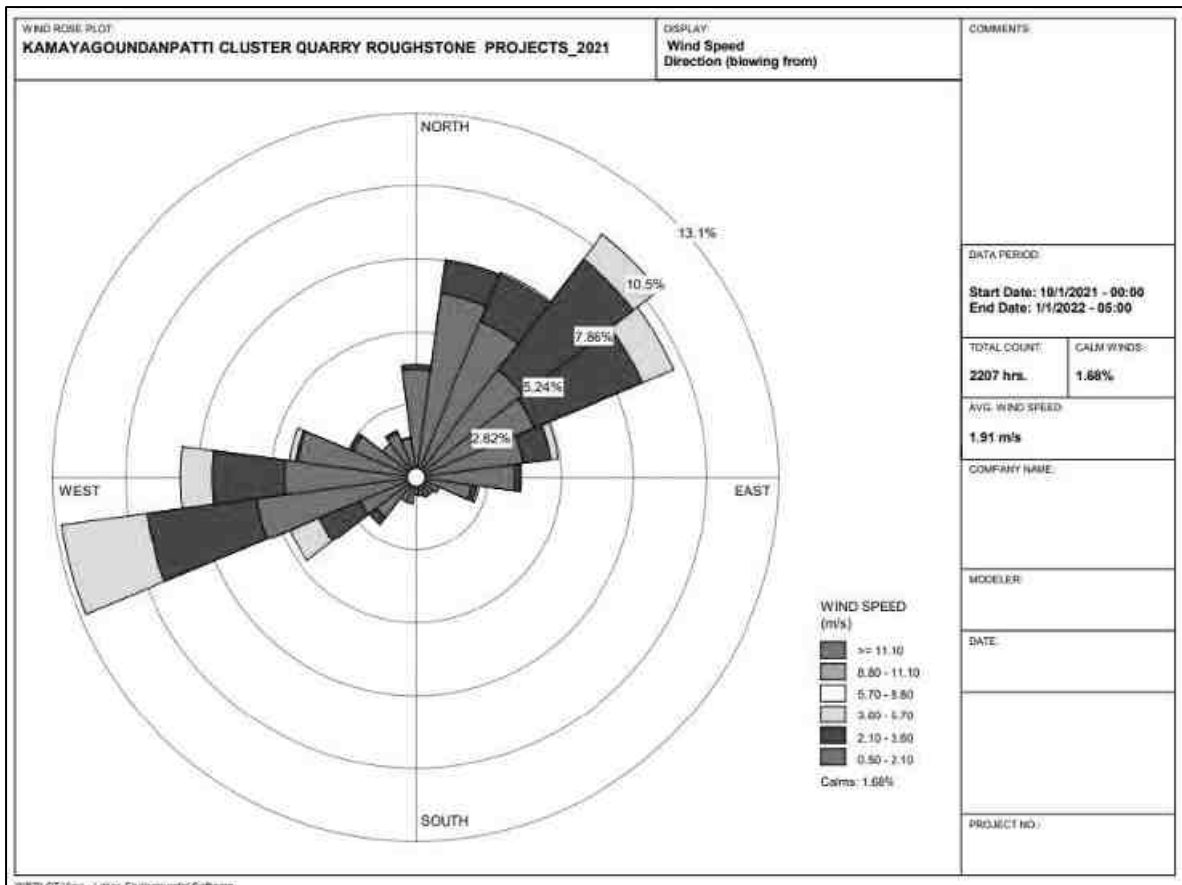


Figure 3.14a Windrose Diagram for 2021 and 2022 (October through December)

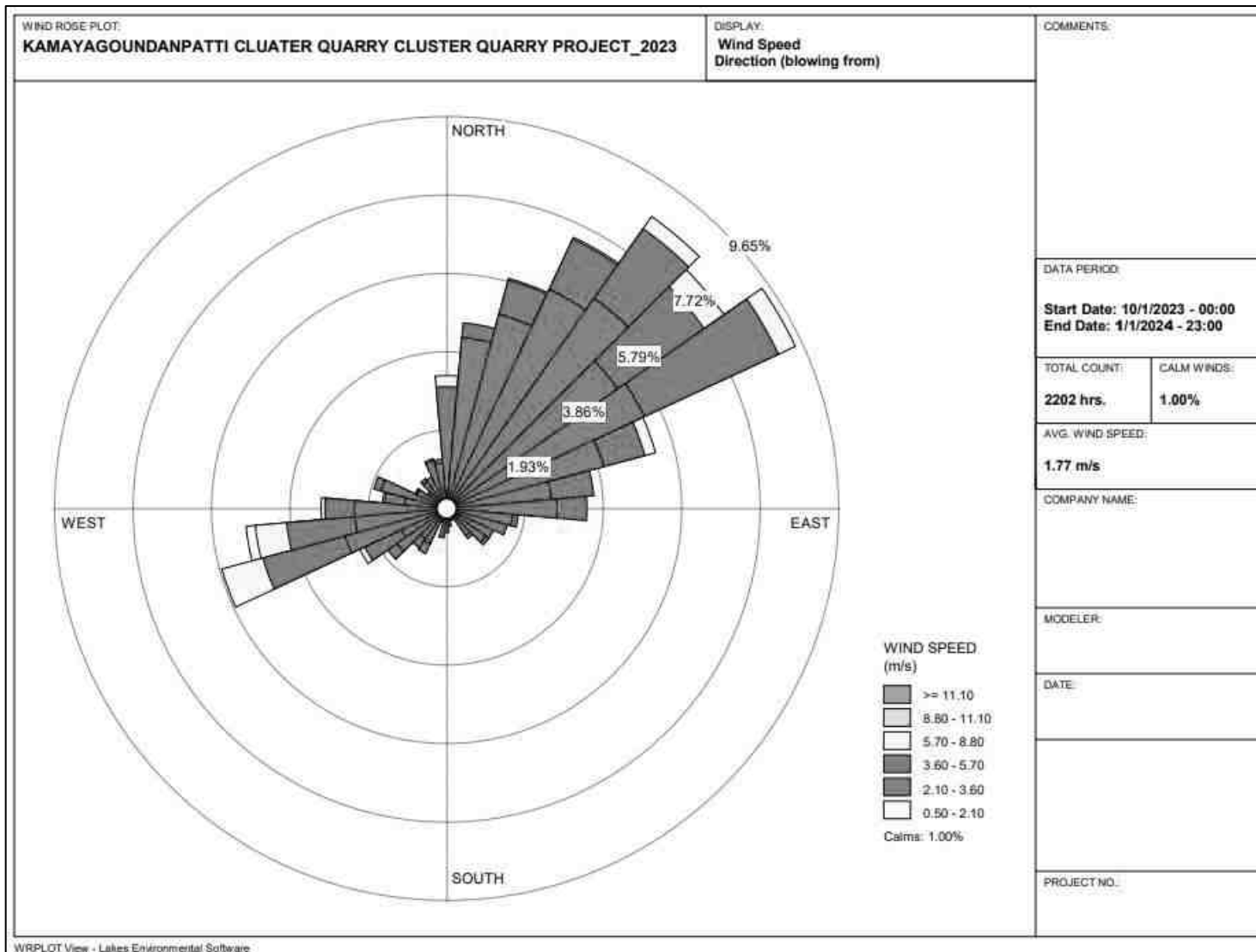


Figure 3.15 Onsite Wind Rose Diagram

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 3.14 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 on *Interstellar Testing Centre Pvt. Ltd* & CPCB Notification

Table 3.15 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 (µg/m ³)	Annual Avg.*	50.0	20.0
		24 hours**	80.0	80.0
2	NO _x (µg/m ³)	Annual Avg.	40.0	30.0
		24 hours	80.0	80.0
3	PM ₁₀ (µg/m ³)	Annual Avg.	60.0	60.0
		24 hours	100.0	100.0
4	PM _{2.5} (µg/m ³)	Annual Avg.	40.0	40.0
		24 hours	60.0	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 ten (10) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period October through December, 2023 as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least $3 \pm 0.5\text{m}$ 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 $\text{PM}_{2.5}$, PM_{10} , sulphur dioxide (SO_2) and nitrogen dioxide (NO_x). The sampling locations are shown in Figure 3.16 and average concentrations of air pollutants are summarized in Tables 3.16 and are shown in Figures 3.17-3.21.

Table 3.16 Ambient Air Quality (AAQ) Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates	
1	AAQ1	Pit I Core	0.89Km	NNE	9°44'5.10"N	77°20'31.69"E
2	AAQ2	Pit II Core	0.64Km	NNE	9°43'59.63"N	77°20'24.82"E
3	AAQ3	Between Pit IV and Pit V	0.02Km	N	9°43'40.70"N	77°20'16.90"E
4	AAQ4	Pit VI Core	0.18Km	SW	9°43'30.31"N	77°20'10.98"E
5	AAQ5	Surulipatti	4.16Km	SW	9°42'25.57"N	77°18'9.92"E
6	AAQ6	Narayanathevanpatti	2.91Km	W	9°43'27.69"N	77°18'36.84"E
7	AAQ7	Kamayagoundanpatti	2.29Km	NW	9°44'19.19"N	77°19'12.71"E
8	AAQ8	Royappanpatti	4.93Km	N	9°46'20.66"N	77°20'17.63"E
9	AAQ9	Koothanachiamman Temple	3.40Km	S	9°41'43.38"N	77°20'12.36"E
10	AAQ10	Puthupati	4.87Km	NW	9°45'53.15"N	77°18'28.99"E

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

Results

As per the monitoring data, $\text{PM}_{2.5}$ ranges from $20.1 \mu\text{g}/\text{m}^3$ to $22.0 \mu\text{g}/\text{m}^3$; PM_{10} from $45.4 \mu\text{g}/\text{m}^3$ to $49.7 \mu\text{g}/\text{m}^3$; SO_2 from $5.2 \mu\text{g}/\text{m}^3$ to $7.7 \mu\text{g}/\text{m}^3$; NO_x from $12.4 \mu\text{g}/\text{m}^3$ to $15.7 \mu\text{g}/\text{m}^3$. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index (AQI)

The AQI shows that the air quality of the study area falls within good category 47 causing minimal impact to human health.

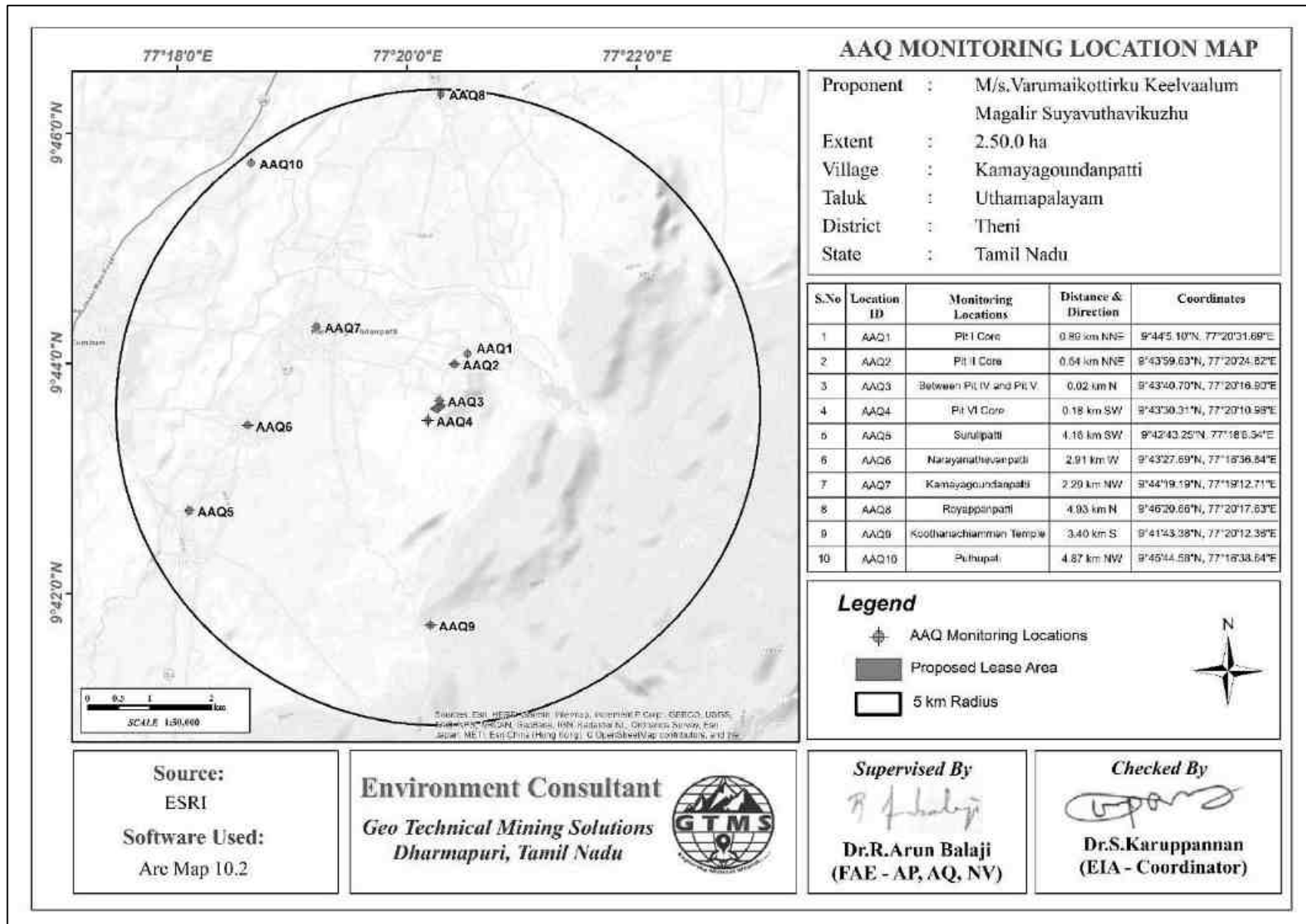


Figure 3.16 Toposheet Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

Table 3.17 Summary of AAQ Result

PM_{2.5}					PM₁₀			
Station ID	Max	Min	Mean	98th Percentile	Max	Min	Mean	98th Percentile
AAQ1	21.4	18.9	19.7	21.3	49.8	43.9	45.8	49.5
AAQ2	23.3	20.7	21.4	23.1	50.5	45.0	46.5	50.2
AAQ3	22.1	20.6	21.1	21.4	49.2	45.7	46.9	48.8
AAQ4	21.1	18.6	19.4	21.0	49.1	43.3	45.2	48.9
AAQ5	22.3	20.7	21.6	22.3	51.8	48.0	50.2	51.8
AAQ6	23.0	21.4	22.3	23.0	53.6	49.7	51.9	53.5
AAQ7	22.5	20.9	21.8	22.5	53.7	49.7	52.0	53.6
AAQ8	25.4	23.6	24.6	25.4	56.5	52.4	54.7	56.5
AAQ9	18.9	17.5	18.0	18.7	40.2	37.3	38.3	39.4
AAQ10	20.0	18.4	19.1	19.8	42.6	39.1	40.6	42.2
SO₂					NO_x			
AAQ1	5.7	5.1	5.3	5.7	16.4	14.5	15.1	16.3
AAQ2	5.7	5.0	5.2	5.6	16.2	14.4	14.9	16.1
AAQ3	5.4	5.0	5.1	5.2	15.3	14.2	14.5	15.1
AAQ4	5.7	5.0	5.2	5.6	16.2	14.3	14.9	16.1
AAQ5	6.0	5.6	5.9	6.0	17.1	15.9	16.6	17.1
AAQ6	15.1	5.3	5.9	10.7	16.1	5.3	15.2	16.1
AAQ7	6.1	5.6	5.9	6.1	17.2	15.9	16.6	17.0
AAQ8	16.4	5.6	6.2	11.6	16.9	5.8	16.0	16.9
AAQ9	5.3	5.0	5.1	5.3	12.5	11.6	11.9	12.3
AAQ10	5.5	5.0	5.2	5.4	13.6	12.5	13.0	13.5

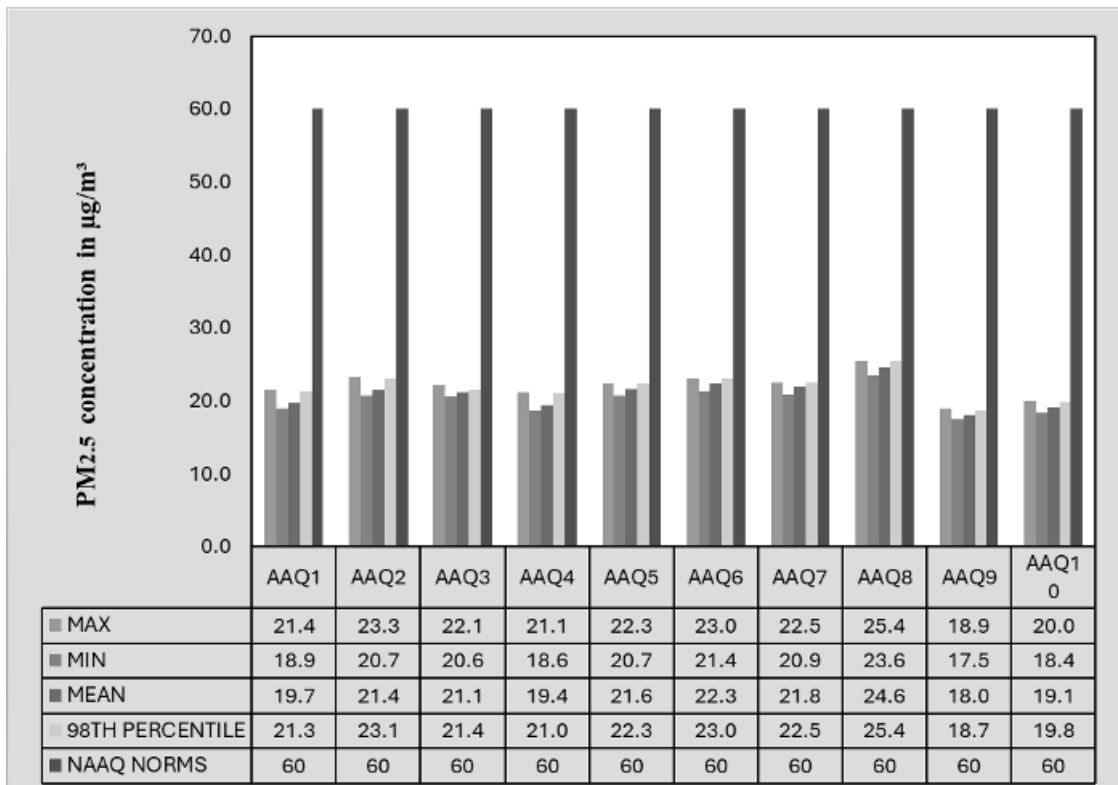


Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM_{2.5} Measured from 10 Air Quality Monitoring Stations within 5 km Radius

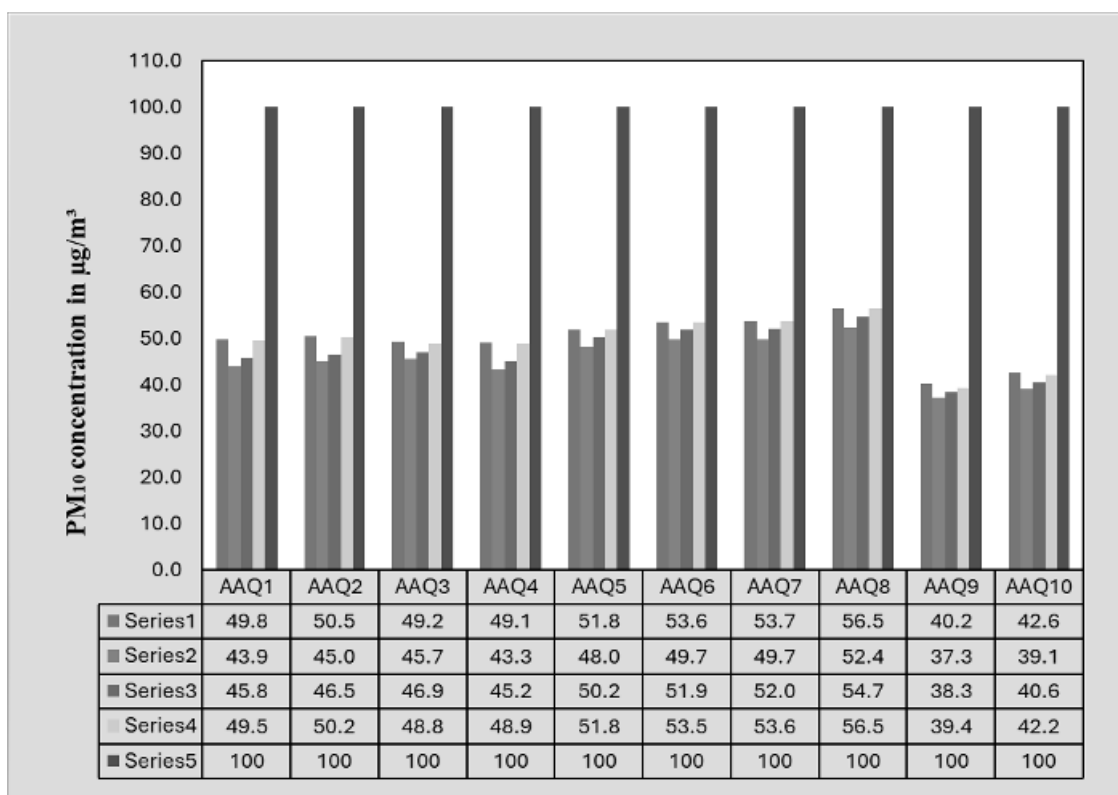


Figure 3.18 Bar Chart Showing Maximum, Minimum and Average Concentrations of PM₁₀ Measured from 10 Air Quality Monitoring Stations within 5 km Radius

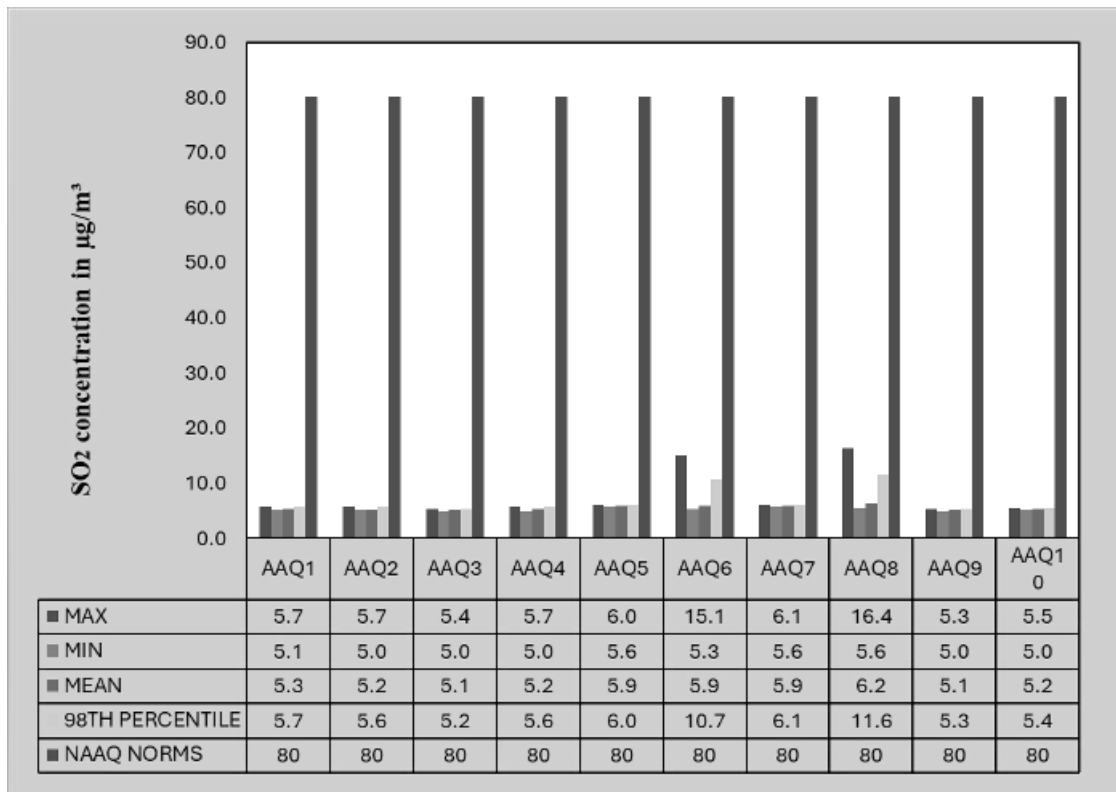


Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO₂ Measured from 10 Air Quality Monitoring Stations within 5 km Radius

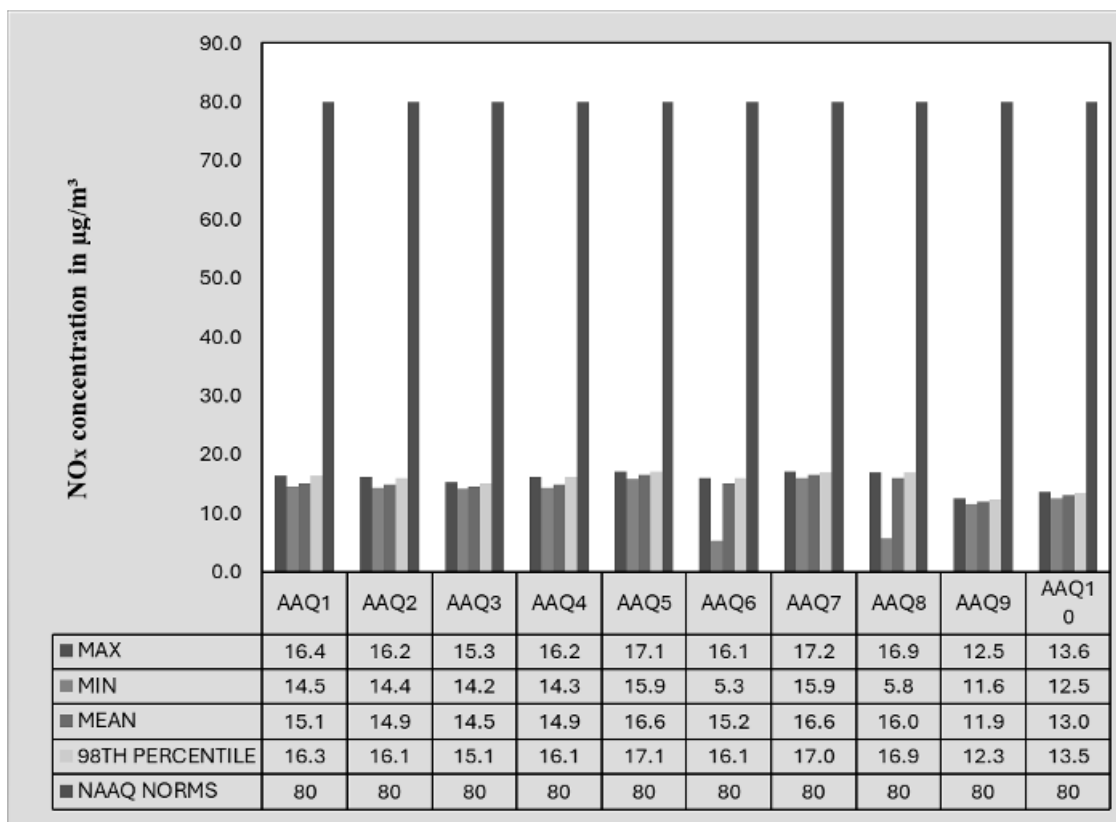


Figure 3.20 Bar Chart Showing Maximum, Minimum and Average Concentrations of NO_x Measured from 10 Air Quality Monitoring Stations within 5km Radius

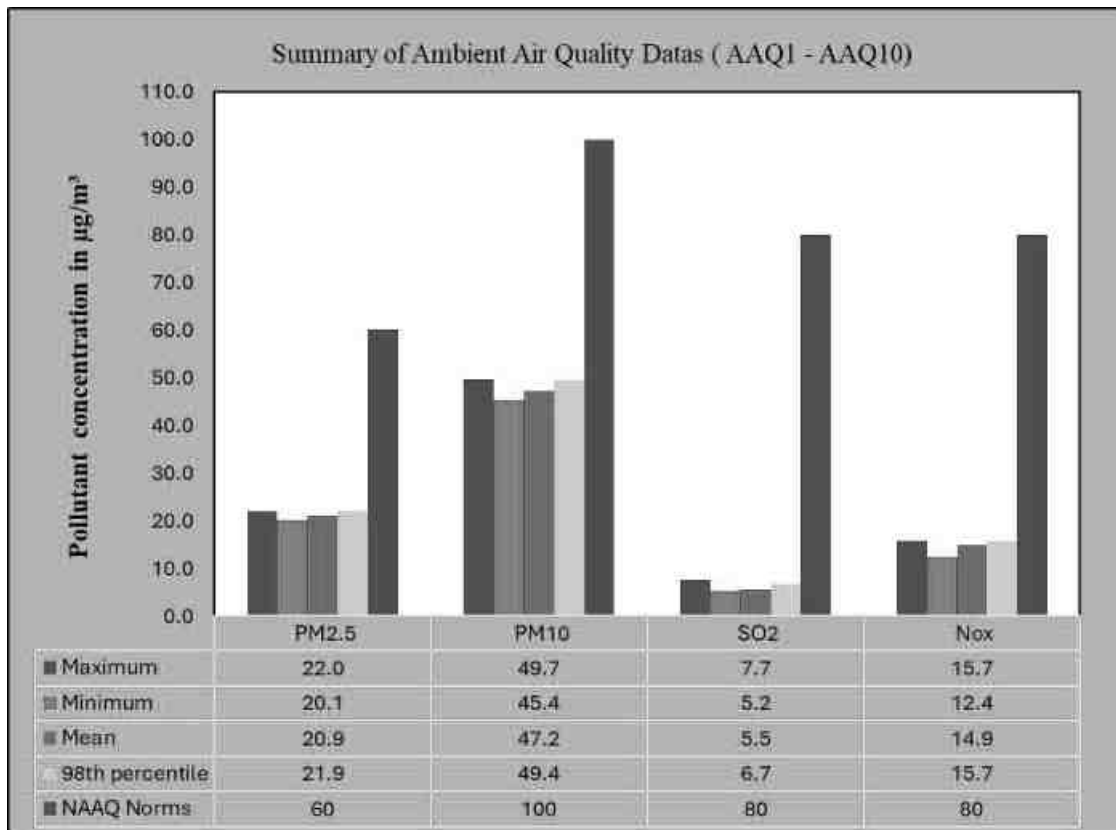


Figure 3.21 Bar Chart Showing Maximum, Minimum and Average Concentrations of Pollutants in Atmosphere within 5 km Radius

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 (12) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.18 and spatial occurrence of the locations are shown in Figure 3.24.

Table 3.18 Noise Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance in km	Direction	Coordinates	
1	N1	PIT I	0.80Km	NNE	9°44'3.33"N	77°20'29.04"E
2	N2	PIT II	0.60Km	NNE	9°43'58.13"N	77°20'24.61"E
3	N3	PIT III	0.26Km	NE	9°43'46.33"N	77°20'22.57"E
4	N4	PIT IV	0.20 Km	NE	9°43'44.74"N	77°20'21.67"E

5	N5	PIT V	--	--	9°43'36.45"N	77°20'12.92"E
6	N6	PIT VI	0.13 Km	W	9°43'32.29"N	77°20'10.61"E
7	N7	Surulipatti	4.40 Km	SW	9°42'26.87"N	77°18'2.28"E
8	N8	Narayanathevanpatti	2.99 Km	W	9°43'28.53"N	77°18'34.41"E
9	N9	Kamayagoundanpatti	2.31 Km	NW	9°44'11.41"N	77°19'5.26"E
10	N10	Royappanpatti	4.98 Km	N	9°46'22.40"N	77°20'10.72"E
11	N11	Koothanachiamman Temple	3.38 Km	S	9°41'43.85"N	77°20'11.55"E
12	N12	Puthupati	5.15 Km	NW	9°45'50.09"N	77°18'30.11"E

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

Table 3.19 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	PIT I	Industrial Area	44.7	41	75	70
N2	PIT II		50.8	43		
N3	PIT III		40	38.1		
N4	PIT IV		44.4	37.2		
N5	PIT V		43.8	40.6		
N6	PIT VI		44.7	43.4		
N7	Surulipatti	Residential Area	42.6	39	55	45
N8	Narayanathevanpatti		49	41.4		
N9	Kamayagoundanpatti		41.9	39.8		
N10	Royappanpatti		46.5	38.9		
N11	Koothanachiamman Temple		41.9	39.9		
N12	Puthupati		44.6	39.1		

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

The Table 3.19 shows that noise level in core zone was 43.8 dB (A) Leq during day time and 40.6 dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 40.0 to 50.8 dB (A) Leq and during night time from 37.2 to 43.4 dB (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.

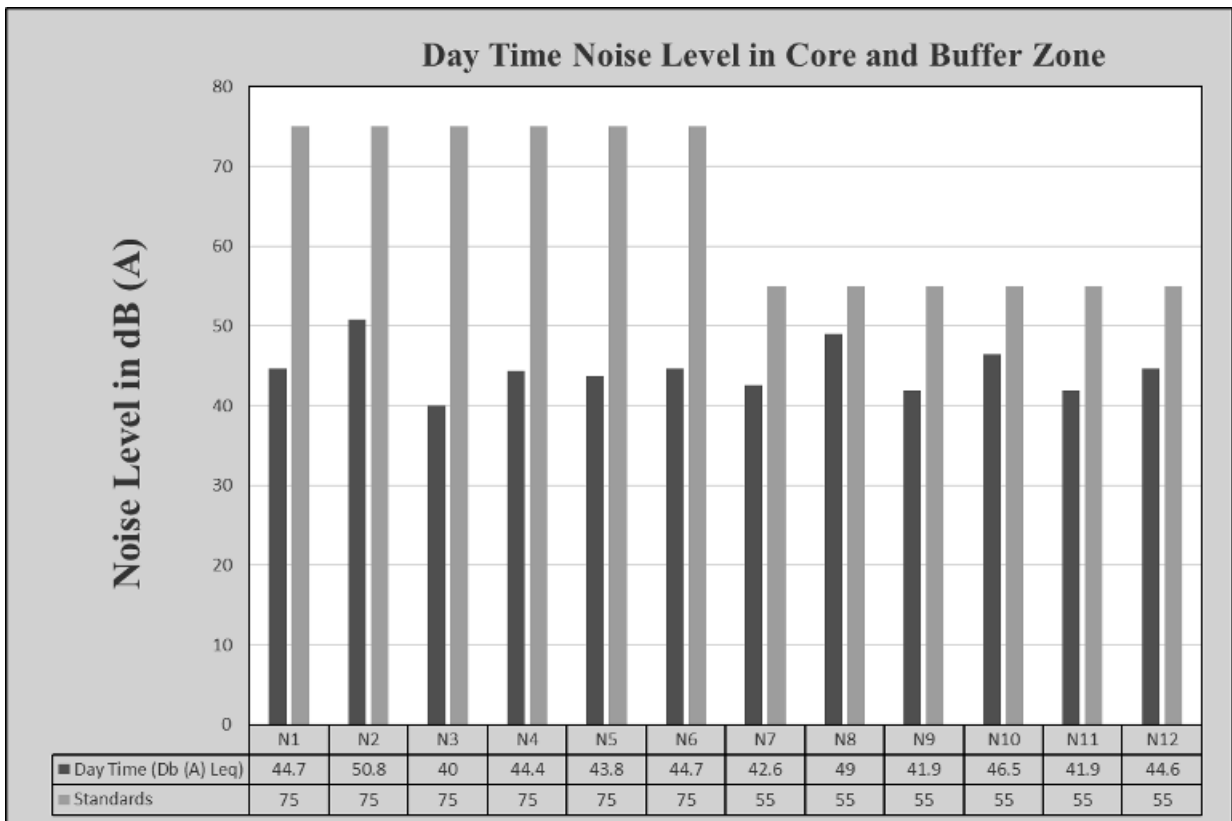


Figure 3.22 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

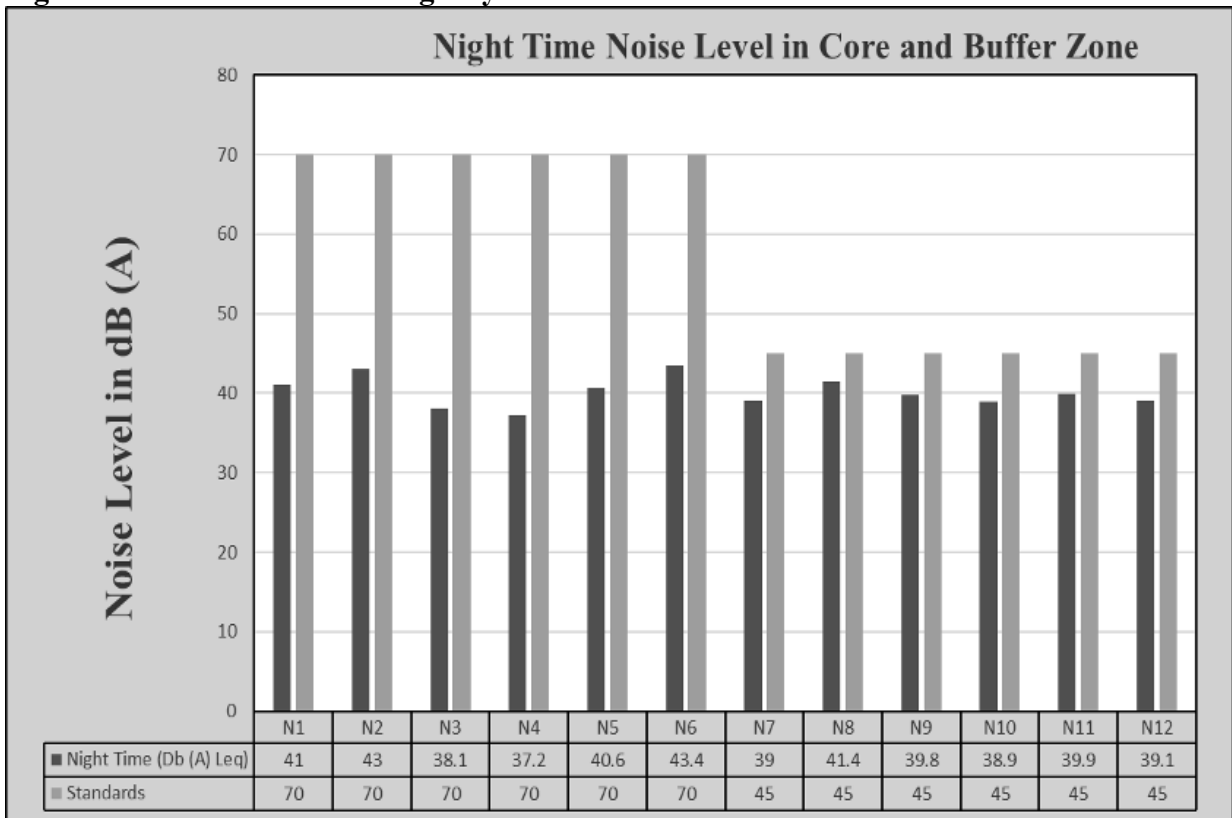


Figure 3.23 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

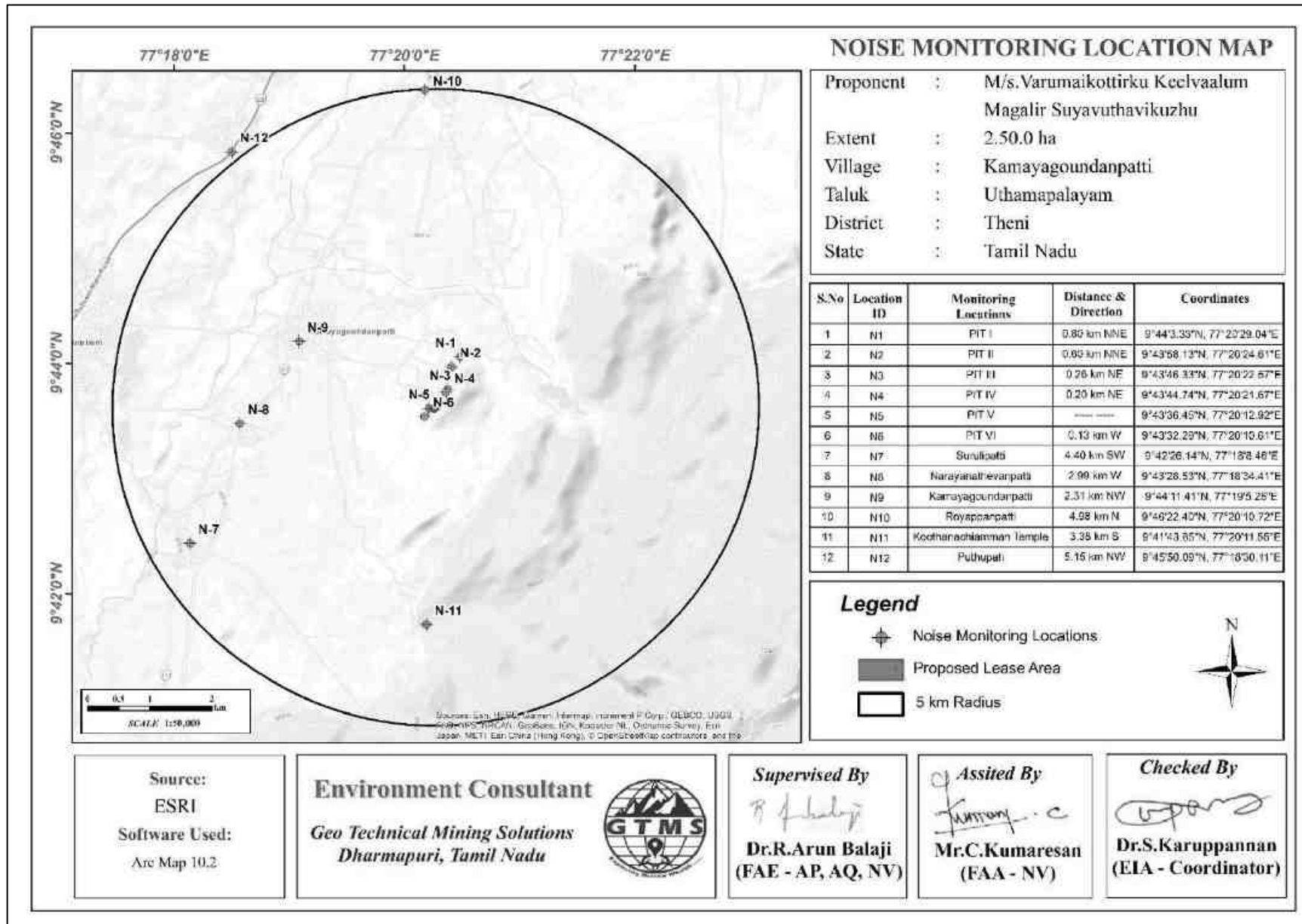


Figure 3.24 Toposheet Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

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

Sampling locations were selected with reference to topography, land use, vegetation pattern, etc. In this study, quadrats of 25 m × 25 m were laid down to assess trees and quadrats of 10 m × 10 m were laid down for shrubs, as shown in Figure 3.25.



Figure 3.25 Quadrates Sampling Methods of Flora

Phyto-Sociological Studies

Phyto sociological parameters, such as *Density, Frequency, Abundance and Importance Value Index* of individual species were determined in randomly placed quadrat of different sizes in the study area, as shown in Table 3.20. Relative frequency, and relative density were calculated and the sum of these three represented Importance Value Index (IVI) for various species. For shrubs, herbs and grasses, *Density, Frequency, Relative Density & Relative Frequency were found*. Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the

study area of 10 km radius. Analysis of the vegetation will help in determining the relative importance of each species in the study area and to reveal if any economically valuable species is threatened in the process.

Table 3.20 Calculation of Density, Frequency (%), Dominance, Relative Density, Relative Frequency, Relative Dominance & Important Value Index

Parameters	Formula
Density	Total No. of individuals of species/ Total No. of Quadrats used in sampling
Frequency (%)	(Total No. of Quadrats in which species occur/ Total No. of Quadrats studied)100
Abundance	Total No. of individuals of species/ No. of Quadrats in which they occur
Relative Density	(Total No. of individuals of species/Sum of all individuals of all species) * 100
Relative Frequency	(Total No. of Quadrats in which species occur/ Total No. of Quadrats occupied by all species) * 100
Important Value Index	Relative Density + Relative Frequency

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 corresponding formulas are given in Table 3.21.

Table 3.21 Calculation of Species Diversity by Shannon – Wiener Index, Evenness and Richness

Description	Formula
Species diversity – Shannon – Wien Index	$H = \sum [(p_i) * \ln(p_i)]$ Where p_i : Proportion of total sample represented by species i: number of individuals of species i/ total number samples
Evenness	H/H_{max} $H_{max} = \ln(s) =$ maximum diversity possible $S =$ No. of species
Species Richness by Margalef	$RI = S - 1 / \ln N$ Where $S =$ Total Number of species in the community $N =$ Total Number of individuals of all species in the Community

3.5.1 Flora

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. Photographs showing various species are provided in Figure 3.27.

Flora in mine lease area (core zone)

The mine lease area contains total of 30 species belonging to 17 families have been recorded from the mine lease area. 5 Tree, 12 shrubs, 13 herbs were identified. It is a grassy land. There are no endangered species in mine lease area. The Meghamalai Wildlife Sanctuary Eco-Sensitive Zone is located 356.4 meters S of the quarry lease area. the megamalai wildlife sanctuary core located in the 1.18 km SE side from the lease area. During the study period There are no rare, endangered, threatened (RET) and endemic species recorded in mine lease area. Details of vegetation with scientific name indicated in Table 3.22. Wildlife Sanctuary and Eco Sensitive zone showing in figure3.28

Table 3.22 Flora in mine lease area

S. No	Local name	Scientific name	Family name	IUCN Conservation Status
Trees				
1	Semai Karuvealan	<i>Prosopis juliflora</i>	Fabaceae	NL
2	Unjai maram	<i>Albizia amara</i>	Fabaceae	NL
3	Neem	<i>Azadirachta indica</i>	Meliaceae	NL
4	Vetpalai	<i>Wrightia tinctoria</i>	Apocynaceae	NL
5	Mullu maram	<i>Vachellia karroo</i>	Fabaceae	NL
Shrubs				
1	Avaram chadi	<i>Senna auriculata</i>	Fabaceae	NL
2	Earuku	<i>Calotropis gigantea</i>	Apocynaceae	NL
3	Virali chadi	<i>Dodonaea viscosa</i>	Sapindaceae	LC
4	Unichadi	<i>Lantana camara</i>	Verbenaceae	NL
5	Sapathikalli	<i>Opuntia ficus-indica</i>	Cactaceae	NL
6	Katralai	<i>Agave americana</i>	Asparagaceae	NL
7	Karaichadi	<i>Canthium coromandelicum</i>	Rubiaceae	NL
8	Suraimullu	<i>Ziziphus oenopolia</i>	Rhamnaceae	NL
9	Kari indu mullu	<i>Acacia caesia</i>	Fabaceae	NL
10	Sulli maral	<i>Barleria prionitis</i>	Acanthaceae	NL
11	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	NL
12	Hedge cactus	<i>cereus hildmannianus</i>	Cactaceae	NL
Herbs /Climber				
1	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	NL
2	Parthiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	NL
3	Kombukkalli	<i>Euphorbia tirucalli L.</i>	Euphorbiaceae	NL

4	Thathapondu	<i>Tridax procumbens</i>	Asteraceae	NL
5	Kolunji chadi	<i>Tephrosia purpurea</i>	Fabaceae	NL
6	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	NL
7	Nearunji Mull	<i>Tribulus zeyheri</i>	Zygophyllaceae	NL
8	Seemai nayuruvi	<i>Stachytarpheta indica</i>	Verbenaceae	NL
9	Poolapu	<i>Aerva lanata</i>	Amaranthaceae	NL
10	Vellaikaattukottai	<i>Jatropha gossypifolia L.</i>	Euphorbiaceae	NL
11	American Mint	<i>Hyptis suaveolens</i>	Lamiaceae	NL
12	Siddhamutti	<i>Sida cordifolia</i>	Malvaceae	NL
13	Kolunji chadi	<i>Tephrosia purpurea</i>	Fabaceae	NL

The Flora in lease area and 300 m radius (buffer zone)

There is no agricultural land nearby lease area. It contains a total of 48 species belonging to 23 families have been recorded from the buffer zone. 14 Trees 12 Shrubs and 22 Herbs, Climbers, Creeper, Grass & Cactus (53.7%) were identified. Details of flora with the scientific name details and of diversity species Rich ness index were mentioned in Table 3.23-3.25 and Figure 3.26. There is no threat to the Flora species in 300 m radius. The Meghamalai Wildlife Sanctuary Eco-Sensitive Zone is located 356.4 meters S of the quarry lease area.

Flora in 10 km radius buffer zone

The buffer zone has more vegetation than the core zone. Meghamalai Wildlife Sanctuary is located 1.18 Km SE side of the quarry lease area. The wildlife sanctuary has red listed plants and medicinal plants. The primary and secondary data collected during the field survey is attached in Annexure-IV and the list of reserve forests within 10 km radius is given in 3.39. Total of 510 species belonging to 80 families have been recorded from the buffer zone. 101 Trees 69 Shrubs 191 Herbs and Climbers & Straggler 86, Grass 63 were identified.

Meghamalai Wildlife Sanctuary

Meghamalai Wildlife Sanctuary is located 1.18 Km SE h of the quarry lease area The Meghamalai Wildlife Sanctuary Eco-Sensitive Zone is located 356.4 meters S of the quarry lease area. The Megamalai hill is lying between the geographical range of 9°31'- 9°51'N and 77°10' - 77°30'E. The altitude reaches upto 2000 m (msl.). The mountain range is otherwise popularly known as High Wavy Mountains and Pachakumatchi hills. It is a spur of the Western Ghats in Agastyamalai range. The Megamalai WLS is located on the border of Kerala and Tamil Nadu, this hill range is adjoining to the periyar tiger reserve, Idukki district of Kerala, and Grizzled Squirrel sanctuary, Srivillipudur in Tamil Nadu. This is the main catchment area for some important perennial rivers like Vaigai, Vaipar and Suruliar. Most of the sanctuary area is often sheltered by several tea, coffee, and cardamom estates interspersed with patches of dense forest cover. The study area represented the several forest types such as scrub forest, dry deciduous forest, moist deciduous forest, wet evergreen forest, dry grasslands, savannas, sholas and riparian forest. The detail of Meghamalai Wildlife Sanctuary flora and fauna list attached in annexure IV.

Table 3.23 Flora in 300 m Radius

S.No.	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Karuvealan	<i>Prosopis juliflora</i>	Fabaceae	4	3	5	0.8	60.0	1.3	7.7	7.9	15.6	Not Listed
2	Palm tree	<i>Borassus flabellifer</i>	Fabaceae	3	2	5	0.6	40.0	1.5	5.8	5.3	11.0	Not Listed
3	Vembu	<i>Azadirachta indica</i>	Meliaceae	5	4	5	1.0	80.0	1.3	9.6	10.5	20.1	Not Listed
4	Vealli vealan	<i>Vachellia leucophloea</i>	Babesiae	2	1	5	0.4	20.0	2.0	3.8	2.6	6.5	Not Listed
5	Unjai maram	<i>Albizia amara</i>	Fabaceae	3	2	5	0.6	40.0	1.5	5.8	5.3	11.0	Not Listed
6	Vetpalai	<i>Wrightia tinctoria</i>	Apocynaceae	4	3	5	0.8	60.0	1.3	7.7	7.9	15.6	Not Listed
7	Teke	<i>Tectona grandis</i>	Verbenaceae	5	4	5	1.0	80.0	1.3	9.6	10.5	20.1	Not Listed
8	Allamaram	<i>Ficus benghalensis</i>	Morassie	2	1	5	0.4	20.0	2.0	3.8	2.6	6.5	Not Listed
9	Pungamaram	<i>Pongamia pinnata</i>	Fabaceae	3	2	5	0.6	40.0	1.5	5.8	5.3	11.0	Not Listed
10	Piliyamaram	<i>Tamarindus indica</i>	Fabaceae	4	3	5	0.8	60.0	1.3	7.7	7.9	15.6	Not Listed
11	Theannaimaram	<i>Cocos nucifera</i>	Arecaceae	5	4	5	1.0	80.0	1.3	9.6	10.5	20.1	Not Listed
12	Vathanarayani	<i>Delonix elata</i>	Fabaceae	3	2	5	0.6	40.0	1.5	5.8	5.3	11.0	Not Listed
13	Ilavapanju maram	<i>Ceiba pentandra</i>	Malvaceae	4	3	5	0.8	60.0	1.3	7.7	7.9	15.6	Not Listed
14	Manga maram	<i>Mangifera indica</i>	Anacardiaceae	5	4	5	1.0	80.0	1.3	9.6	10.5	20.1	Not Listed
Shrubs													
1	Avaram chadi	<i>Senna auriculata</i>	Fabaceae	7	6	10	0.7	60.0	1.2	8.0	7.9	15.8	Not Listed
2	Earuku	<i>Calotropis gigantea</i>	Apocynaceae	8	7	10	0.8	70.0	1.1	9.1	9.2	18.3	Not Listed
3	Virali chadi	<i>Dodonaea viscosa</i>	Sapindaceae	6	5	10	0.6	50.0	1.2	6.8	6.6	13.4	Not Listed
4	Unichadi	<i>Lantana camara</i>	Verbenaceae	9	8	10	0.9	80.0	1.1	10.2	10.5	20.8	Not Listed
5	Sapathikalli	<i>Opuntia ficus-indica</i>	Cactaceae	8	7	10	0.8	70.0	1.1	9.1	9.2	18.3	Not Listed
6	Katralai	<i>Agave americana</i>	Asparagaceae	7	6	10	0.7	60.0	1.2	8.0	7.9	15.8	Not Listed

7	Karaichadi	<i>Canthium coromandelicum</i>	Rubiaceae	6	5	10	0.6	50.0	1.2	6.8	6.6	13.4	LC
8	Suraimullu	<i>Ziziphus oenopolia</i>	Rhamnaceae	7	6	10	0.7	60.0	1.2	8.0	7.9	15.8	Not Listed
9	Kari indu mullu	<i>Acacia caesia</i>	Fabaceae	8	7	10	0.8	70.0	1.1	9.1	9.2	18.3	Not Listed
10	Sulli maral	<i>Barleria prionitis</i>	Acanthaceae	9	8	10	0.9	80.0	1.1	10.2	10.5	20.8	Not Listed
11	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	7	6	10	0.7	60.0	1.2	8.0	7.9	15.8	Not Listed
12	Hedge cactus	<i>cereus hildmannianus</i>	Cactaceae	6	5	10	0.6	50.0	1.2	6.8	6.6	13.4	Not Listed
Herbs													
1	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	8	7	15	0.5	46.7	1.1	4.5	4.4	8.9	Not Listed
2	Nearunji mull	<i>Tribulus zeyheri</i> Sond	Zygophyllaceae	9	8	15	0.6	53.3	1.1	5.0	5.0	10.1	
3	pill	<i>Cenchrus ciliaris</i>	Poaceae	10	11	15	0.7	73.3	0.9	5.6	6.9	12.5	Not Listed
4	pulapoo	<i>Aerva lanata</i>	Amaranthaceae	7	6	15	0.5	40.0	1.2	3.9	3.8	7.7	Not Listed
5	kapok bush	<i>Aerva javani</i>	Amaranthaceae	6	5	15	0.4	33.3	1.2	3.4	3.1	6.5	Not Listed
6	Rail poondu	<i>Croton bonplandianus</i>	Euphorbiaceae	8	7	15	0.5	46.7	1.1	4.5	4.4	8.9	Not Listed
7	Yanai neariji	<i>pedalium murex</i>	Pedaliaceae	9	8	15	0.6	53.3	1.1	5.0	5.0	10.1	Not Listed
8	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	11	10	15	0.7	66.7	1.1	6.1	6.3	12.4	Not Listed
9	Thumbai chadi	<i>Leucas aspera</i>	Lamiaceae	8	7	15	0.5	46.7	1.1	4.5	4.4	8.9	Not Listed
10	Umathai	<i>Datura metel</i>	Solanaceae	9	8	15	0.6	53.3	1.1	5.0	5.0	10.1	Not Listed
11	Sethamutti	<i>Sida cordata</i>	Malvaceae	7	6	15	0.5	40.0	1.2	3.9	3.8	7.7	Not Listed
12	Annam	<i>Iva annua</i>	Asteraceae	6	5	15	0.4	33.3	1.2	3.4	3.1	6.5	Not Listed
13	Kolunji	<i>Tephrosia purpurea</i>	Fabaceae	9	8	15	0.6	53.3	1.1	5.0	5.0	10.1	Not Listed
14	Vealiparuthi	<i>Pergularia daemia</i>	Apocynaceae	8	7	15	0.5	46.7	1.1	4.5	4.4	8.9	Not Listed
15	Seppu nerinji	<i>Indigofera linnaei</i> Ali	Fabaceae	6	5	15	0.4	33.3	1.2	3.4	3.1	6.5	Not Listed
16	Sapathikalli	<i>Opuntia ficus-indica</i>	Cactaceae	10	9	15	0.7	60.0	1.1	5.6	5.7	11.2	Not Listed
17	Pal kodi	<i>Cynanchum viminalis</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	3.9	3.8	7.7	Not Listed
18	Ila perandai	<i>Cissus rotundifolia</i>	Vitaceae	9	8	15	0.6	53.3	1.1	5.0	5.0	10.1	Not Listed
19	Katralai	<i>Aloe vera</i>	Asphodelaceae	8	7	15	0.5	46.7	1.1	4.5	4.4	8.9	Not Listed
20	Seammulli	<i>Barleria prionitis</i>	Acanthaceae	6	5	15	0.4	33.3	1.2	3.4	3.1	6.5	Not Listed
21	Thuthi	<i>Abutilon indicum</i>	Malvaceae	8	7	15	0.5	46.7	1.1	4.5	4.4	8.9	Not Listed
22	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	10	9	15	0.7	60.0	1.1	5.6	5.7	11.2	Not Listed

Table 3.24 Calculation of Species Diversity in 300 m Radius

S.No.	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Karuvealan	<i>Prosopis juliflora</i>	4	0.08	-2.56	-0.20
2	Palm tree	<i>Borassus flabellifer</i>	3	0.06	-2.85	-0.16
3	Vembu	<i>Azadirachta indica</i>	5	0.10	-2.34	-0.23
4	Vealli vealan	<i>Vachellia leucophloea</i>	2	0.04	-3.26	-0.13
5	Unjai maram	<i>Albizia amara</i>	3	0.06	-2.85	-0.16
6	Vetpalai	<i>Wrightia tinctoria</i>	4	0.08	-2.56	-0.20
7	Teke	<i>Tectona grandis</i>	5	0.10	-2.34	-0.23
8	Allamaram	<i>Ficus benghalensis</i>	2	0.04	-3.26	-0.13
9	Pungamaram	<i>Pongamia pinnata</i>	3	0.06	-2.85	-0.16
10	Piliyamaram	<i>Tamarindus indica</i>	4	0.08	-2.56	-0.20
11	Theannaimaram	<i>Cocos nucifera</i>	5	0.10	-2.34	-0.23
12	Vathanarayani	<i>Delonix elata</i>	3	0.06	-2.85	-0.16
13	Ilavapanju maram	<i>Ceiba pentandra</i>	4	0.08	-2.56	-0.20
14	Manga maram		5	0.10	-2.34	-0.23
H (Shannon Diversity Index) =2.60						
Shrubs						
1	Avaram chadi	<i>Senna auriculata</i>	7	0.08	-2.53	-0.20
2	Earuku	<i>Calotropis gigantea</i>	8	0.09	-2.40	-0.22
3	Virali chadi	<i>Dodonaea viscosa</i>	6	0.07	-2.69	-0.18
4	Unichadi	<i>Lantana camara</i>	9	0.10	-2.28	-0.23
5	Sapathikalli	<i>Opuntia ficus-indica</i>	8	0.09	-2.40	-0.22
6	Katralai	<i>Agave americana</i>	7	0.08	-2.53	-0.20
7	Karaichadi	<i>Canthium coromandelicum</i>	6	0.07	-2.69	-0.18
8	Suraimullu	<i>Ziziphus oenopolia</i>	7	0.08	-2.53	-0.20
9	Kari indu mullu	<i>Acacia caesia</i>	8	0.09	-2.40	-0.22
10	Sulli maral	<i>Barleria prionitis</i>	9	0.10	-2.28	-0.23
11	Communist pacha	<i>Chromolaena odorata</i>	7	0.08	-2.53	-0.20
12	Hedge cactus	<i>cereus hildmannianus</i>	6	0.07	-2.69	-0.18
H (Shannon Diversity Index) =2.48						
Herbs						
1	Nayuruvi	<i>Achyranthes aspera</i>	8	0.04	-3.11	-0.14
2	Nearunji mull	<i>Tribulus zeyheri</i> Sond	9	0.05	-2.99	-0.15
3	pill	<i>Cenchrus ciliaris</i>	10	0.06	-2.88	-0.16
4	pulapoo	<i>Aerva lanata</i>	7	0.04	-3.24	-0.13
5	kapok bush	<i>Aerva javani</i>	6	0.03	-3.40	-0.11
6	Rail poondu	<i>Croton bonplandianus</i>	8	0.04	-3.11	-0.14
7	Yanai neariji	<i>pedalium murex</i>	9	0.05	-2.99	-0.15
8	Perandai	<i>Cissus quadrangularis</i>	11	0.06	-2.79	-0.17
9	Thumbai chadi	<i>Leucas aspera</i>	8	0.04	-3.11	-0.14
10	Umathai	<i>Datura metel</i>	9	0.05	-2.99	-0.15

11	Sethamutti	<i>Sida cordata</i>	7	0.04	-3.24	-0.13
12	Annam	<i>Iva annua</i>	6	0.03	-3.40	-0.11
13	Kolunji	<i>Tephrosia purpurea</i>	9	0.05	-2.99	-0.15
14	Vealiparuthi	<i>Pergularia daemia</i>	8	0.04	-3.11	-0.14
15	Seppu nerinji	<i>Indigofera linnaei</i> Ali	6	0.03	-3.40	-0.11
16	Sapathikalli	<i>Opuntia ficus-indica</i>	10	0.06	-2.88	-0.16
17	Pal kodi	<i>Cynanchum viminalale</i>	7	0.04	-3.24	-0.13
18	Ilia perandai	<i>Cissus rotundifolia</i>	9	0.05	-2.99	-0.15
19	Katralai	<i>Aloe vera</i>	8	0.04	-3.11	-0.14
20	Seammulli	<i>Barleria prionitis</i>	6	0.03	-3.40	-0.11
21	Thuthi	<i>Abutilon indicum</i>	8	0.04	-3.11	-0.14
22	Thulasi	<i>Ocimum tenuiflorum</i>	10	0.06	-2.88	-0.16
H (Shannon Diversity Index) =3.08						

Table 3.25 Species Richness (Index) in 300-meter radius

Details	H	H max	Evenness	Species Richness
Tree	2.60	2.64	0.98	3.29
Shrubs	2.48	2.48	1.00	2.46
Herbs	3.08	3.09	1.00	4.05

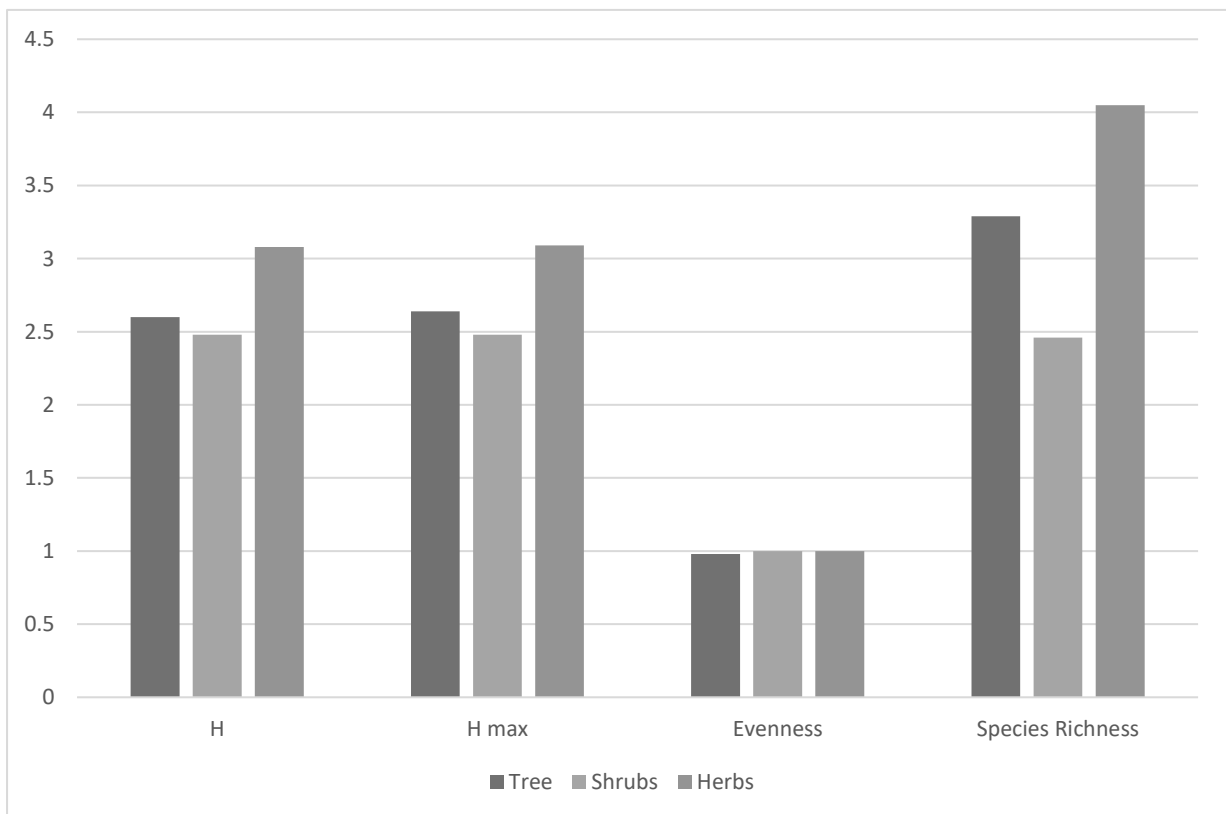
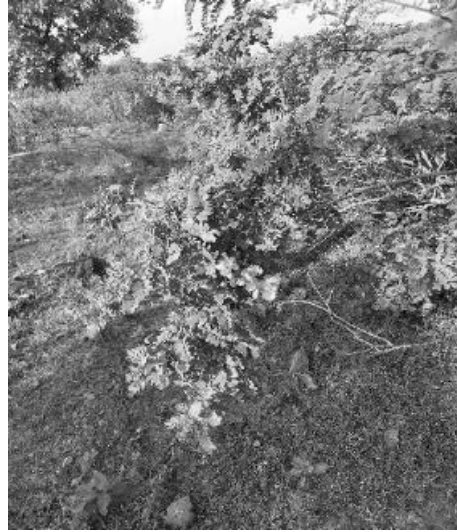


Figure. 3.26 Species Richness (Index) in 300-meter radius



Tephrosia purpurea



Senna auriculata



Chromolaena odorata



Ocimum tenuiflorum



Ziziphus oenopolia



Aerva lanata



Euphorbia tirucalli



Azadirachta indica



Dichrostachys cinerea



Cereus hildmannianus



Euphorbia tirucalli



Opuntia ficus-indica



Vachellia karroo



Tectona grandis



Lantana camara



Ceiba pentandra

Figure 3.27 Plant Species Identified in The Study area

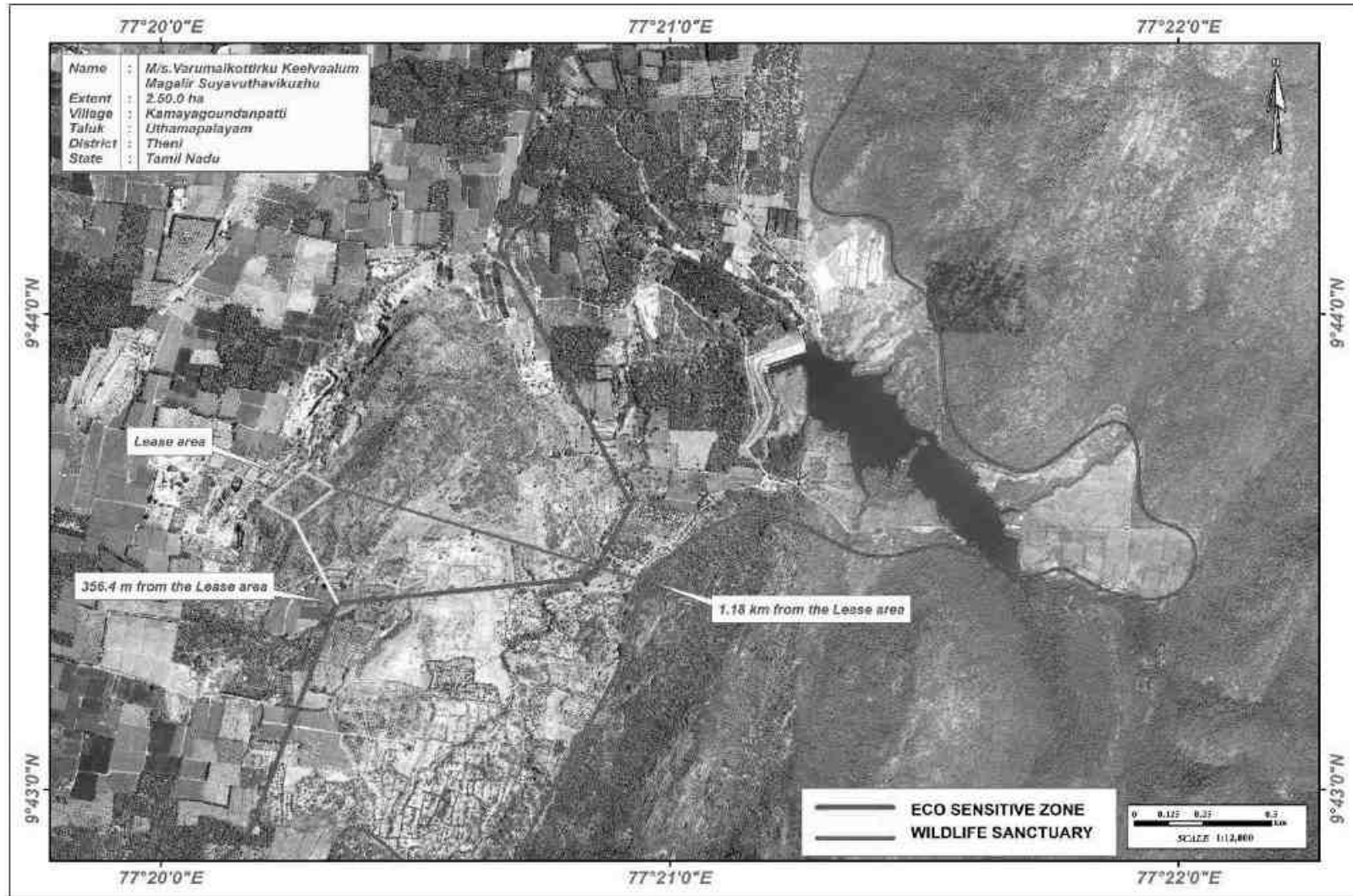


Figure 3.28 Map Showing has Meghamalai Wildlife Sanctuary and Eco-Sensitive Zone boundary

3.5.2 Fauna

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

Fauna Methodology

Table 3.26 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)

Fauna in Core Zone

A total of 24 varieties of species observed in the Core zone among them numbers of Insects 7 (29%), Reptiles 5 (21%), Mammals 3 (13%) and Avian 9 (37%). A total of 24 species belonging to 19 families have been recorded from the core mining lease area. There are one schedule II species and 8 species are under schedule IV according to Indian wild life Act 1972. A total of 9 species of bird were sighted in the study area. The Meghamalai Wildlife Sanctuary Eco-Sensitive Zone is located 356.4 meters S of the quarry lease area. Meghamalai wildlife sanctuary core located in the 1.18 km SE side from the lease area. During the study period There are no rare, endangered, threatened (RET) and endemic species recorded in mine lease area. Details of fauna in core zone with the scientific name were mentioned in Table. 3.27. Wildlife Sanctuary and Eco Sensitive zone showing in figure 3.28

Fauna in Buffer Zone

During the study buffer zone has more Faunal species due to reserve forest and Megamalai wildlife sanctuary. Reserve Forests and Wildlife Sanctuaries Details Table 3.27 Taxonomically a total of 188 species have been recorded from the buffer zone area. Based on habitat classification the majority of species were Birds 98 followed by reptiles 27 (23%), mammals 49 (6%) and amphibians 14 (6%). A total of 98 species of bird were sighted in the study area. Details of fauna in buffer zone with the scientific name were attached in Annexure-IV.

3.27 Table 3.32 Fauna in Core Zone

S. No	Common Name/English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	IUCN Red List data
Insects					
1	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
2	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
3	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
4	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
5	Stick insect	Lonchodidae	<i>carausius morosus</i>	NL	LC
6	Praying mantis	Mantidae	<i>Mantis religiosa</i>	NL	NL
7	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	NL	NL
Reptiles					
8	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
9	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
10	Common skink	Scincidae	<i>Mabuya carinatus</i>	NL	LC
11	Brahminy skink	Scincidae	<i>Eutropis carinata</i>	NL	LC
12	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
Mammals					
13	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	NL
14	Common rat	Muridae	<i>Rattus rattus</i>	Schedule IV	LC
15	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule (Part II)	LC
Aves					
16	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
17	Koel	Cuculidae	<i>Eudynamys</i>	Schedule IV	LC
18	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	NL	
19	Two-tailed Sparrow	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
20	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
21	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
22	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
23	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotus cafer</i>	Schedule IV	LC
24	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC

*NE- Not Evaluated; LC- Least Concern, NT –Near Threatened, T-Threatened

Aquatic Vegetation

The field survey for assessing the aquatic vegetation was also undertaken during the study period. Fish is commonly found in all types of natural water bodies and very common source of food in Eastern South India. The local fishermen were enquired and also the secondary resources were reviewed to collect information on the fishes found in the study area. Few common species are; *Catla (Catla catla)*, *Channa striata*, *Oreochromis niloticus*.

Table 3.28 Aquatic Fauna and Flora

Sl. No	Common Name	Scientific name	Family Name	IUCN Red List of Threatened Species
Flora				
1	Water hyacinth	<i>Eichornia crassipes</i>	Pontederiaceae	NA
2	Blue waterlily	<i>Nymphaea nouchali</i>	Nymphaeaceae	LC
3	Cross Grass	<i>Carex cruciata</i>	Cyperaceae	NA
4	Scutch grass	<i>Cynodon dactylon</i>	Poaceae	LC
Fauna				
5	Thilopia	<i>Oreochromis niloticus</i>	Cichlidae	LC
6	Catla	<i>Catla catla</i>	Cyprinidae	LC
7	Koravi meen	<i>Channa striata</i>	Channidae	LC
8	Roghu	<i>Labeo rohita</i>	Cyprinidae	LC

*LC- Least Concern, NA-Not yet assessed

Phytoplankton's:

Microcystis, Nitzschia, Oscillatoria, Navicula and Pediasstrum sps.

Zooplanktons:

These consist of microscopic organisms from groups Protozoa, Rotifers, Cladocera and Copepoda etc. Some common species of zooplanktons are; *Deflandre*, *Arcella vulgaris*, *Centropyxis spinosa*, *Arcella discoides*, *Arcella hemispherica*, *Centropyxis aculeate*, *Trigonopyxis arcula*, *Brachionus calyciflorus*, *Lecane curvicornis*, *Brachionus angularis*, *Polyarthra vulgaris*, *Filinia longiseta*.

Food chain

The food chain in aquatic ecosystems often begins with the algae or phytoplankton producers, and then the zooplankton that feed on them. This type of food chain is found in nearby lakes and rivers with phytoplankton, zooplankton, fish *Artiola gray* and humans.

Ex: Phytoplankton→Zooplankton→small fish→large fish → Human

3.5.3 Agriculture & Horticulture in Theni district:

Major horticulture crops cultivated in this district are fruits crops like mango, banana, sapota aonla and guava, vegetables like brinjal, bhendi, capsicum, beans, theratachai, onion and chillies, spices like turmeric and pepper, and flower crops.

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 Agricultural in 1km radius is given in Table. 3.29.

Table 3.29 Major Agricultural Crops in 1km radius

S. No	Major crops	Scientific name	Families
1	Sorghum	<i>Sorghum bicolor</i>	Poaceae
2	Gingelly	<i>Sesamum indicum</i>	Pedaliaceae
3	Groundnut	<i>Arachis hypogaea</i>	Legumes
5	Millets	<i>Panicum miliaceum L</i>	Poaceae
6	Sesame	<i>Sesamum indicum</i>	Pedaliaceae
7	Cotton	<i>Gossypium herbaceum</i>	Malvaceae
8	Paddy	<i>Oryza sativa</i>	Poaceae
9	Coconet	<i>Cocos nucifera</i>	Arecaceae
10	Sugarcane	<i>Saccharum officinarum</i>	Poaceae

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 Theni district are fruit crops like mango, banana, Sapota and guava, vegetables like tomato, brinjal, Veandai, chillies, beans, thiratchai, kovaikai onion and tapioca, spices like turmeric. Details of major field crops and horticulture cultivation in 1km radius is given in Table 3.30.

Table 3.30 Major Field Crops & Horticulture cultivation in 1km radius.

S. No	Common Name	Scientific Name	Family
Major Horticultural Crops			
1	Guava	<i>Psidium guajava</i>	Myrtaceae
2	Sapota	<i>Manilkara zapota</i>	Sapotaceae
3	Lemon	<i>Citrus × limon</i>	Rutaceae
4	Papaya	<i>Carica papaya</i>	Caricaceae
5	mango	<i>Mangifera indica</i>	Anacardiaceae

6	banana	<i>Musa × paradisiaca</i>	Musaceae
7	Onion	<i>Allium cepa</i>	Amaryllidaceae
8	Tapioca	<i>Manihot esculenta</i>	Spurges
9	Brinjal	<i>Solanum melongena</i>	Nightshade
10	Tomato	<i>Solanum lycopersicum</i>	Nightshade
11	Bottle Gourd	<i>Lagenaria siceraria</i>	Cucurbits
12	Veandai kai	<i>Abelmoschus esculentus</i>	Mallows
13	Moringa	<i>Moringa oleifera</i>	Moringaceae
14	Kovakkai	<i>Coccoloba</i>	Cucurbitaceae
15	Theranchai	<i>Vitis vinifera</i>	Vitaceae
16	Beans	<i>Phaseolus vulgaris</i>	Fabaceae

Results

Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any. The study found that there is no endemic, endangered migratory fauna found in the core zone. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.6 SOCIO ECONOMICS ENVIRONMENT

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment. Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project. Socio-economic study of an area provides a good opportunity to assess the socio-economic condition and possibly makes a change in living and social standards of the particular area benefitted due to the project.

3.6.1 Objectives of the Study

The main objectives of the study are as follows:

- ❖ To know the current socio-economic condition in the region to cover the sub sectors education, health, sanitation, and water & food security.
- ❖ To recommend practical strategic interventions in the sector.

- ❖ To help in providing better living standards.
- ❖ To understand skill sets and plan for employment opportunities which shall be created.

3.6.2 Scope of Work

- ❖ To study the socio-economic environment of the area from the secondary sources
- ❖ Data collection & Analysis
- ❖ Prediction of project impact
- ❖ Mitigation Measures

3.6.3 Socio-Economic Status of Study area

The study area covers 7 villages including Chinnaovalpuram, Erasakkanayackanur, Erasakkanayackanur Hills, Gokilapuram, Mallingapuram, Narayanathevanpatti, Royappanpatti. As Kamayagoundanpatti is the village in which the proposed project site is located, the summary of population facts for the village is exclusively provided in Table 3.31 and for other 8 villages in Tables 3.32 - 3.34.

Table 3.31 Kamayagoundanpatti Village Population Facts

Kamayagoundanpatti	
Number of Households	11545
Population	42305
Male Population	21081
Female Population	21224
Children Population	737
Sex-ratio	1058
Literacy	76.22%
Male Literacy	84.52%
Female Literacy	68.49%
Scheduled Tribes (ST) %	0
Scheduled Caste (SC) %	869
Total Workers	7774
Main Worker	7420
Marginal Worker	354

Table 3.32 Population and Literacy Data of Study Area

Village	No of Households	Total Population Person	Total Population Male	Total Population Female	Literates Population Person	Literates Population Male	Literates Population Female	Illiterate Persons	Illiterate Male	Illiterate Female
Chinnaovalapuram	1308	4573	2317	2256	2814	1645	1169	1759	672	1087
Erasakkanayackanur	1650	6849	3469	3380	4633	2585	2048	2216	884	1332
Erasakkanayackanur Hills	7	18	9	9	12	7	5	6	2	4
Gokilapuram	1196	4512	2245	2267	3208	1775	1433	1304	470	834
Mallingapuram	1540	5728	2846	2882	4118	2229	1889	1610	617	993
Narayanathevanpatti	4311	14622	7139	7483	9729	5400	4329	4893	1739	3154
Royappanpatti	3452	15886	8134	7752	12137	6643	5494	3749	1491	2258

Table 3.33 Details on Educational Facilities, Water, and Drainage & Health Facilities

Village	Private Primary School (Numbers)	Govt Vocational Training School/ITI (Numbers)	Primary Health Centre (Numbers)	Tap Water Untreated	River/Canal	Is the Area Covered under Total Sanitation Campaign (TSC)?	Telephone (landlines)	Public Bus Service	Gravel (kutcha) Roads	Commercial Bank	Agricultural Credit Societies	Self - Help Group (SHG)	Nutritional Centres- Anganwadi Centre	Community Centre with/without TV	Power Supply for Domestic Use
Chinnaovalapuram	0	0	0	1	2	1	1	1	1	2	2	1	1	1	1
Erasakkanayackanur	1	0	1	1	2	1	1	1	1	1	1	1	1	1	1
Erasakkanayackanur Hills	0	0	0	1	2	2	2	2	1	2	2	2	2	2	1
Gokilapuram	0	0	0	1	2	1	1	1	1	2	2	1	1	2	1
Mallingapuram	1	0	0	1	2	1	1	1	1	2	2	1	1	2	1
Narayanathevanpatti	0	0	2	1	1	2	1	1	1	2	2	1	1	2	1
Royappanpatti	3	0	1	1	2	2	1	1	1	1	2	1	1	1	1

Table 3.34 Workers' Profile of Study Area

Village	Total Worker Population Person	Total Worker Population Male	Total Worker Population Female	Main Working Population Person	Main Working Population Male	Main Working Population Female	Main Cultivator Population Person	Main Agricultural Labourers Population Person	Main Other Workers Population Person	Non-Working Population Person
Chinnaovalapuram	2949	1469	1480	2900	1437	1463	350	2406	94	1624
Erasakkanayackanur	3685	1978	1707	3531	1925	1606	436	2784	297	3164
Erasakkanayackanur Hills	18	9	9	18	9	9	0	17	1	0
Gokilapuram	2430	1322	1108	1893	1086	807	85	1283	398	2082
Mallingapuram	2810	1706	1104	2482	1539	943	230	1555	629	2918
Narayanathevanpatti	8127	4452	3675	8018	4399	3619	352	6736	845	6495
Royappanpatti	7226	3852	3374	6477	3492	2985	698	4008	1591	8660

3.6.4 Recommendation and Suggestion

- ❖ Awareness program should be conducted to make the population aware of education and to get a better livelihood.
- ❖ Vocational training programme should be organized to make the people self - employed, particularly for women and unemployed youth.
- ❖ On the basis of qualification and skills local community may be preferred. Long term and short-term employments should be generated.
- ❖ Health care centre and ambulance facility should be provided to the population to get easy access to medical facilities. Apart from that, as these areas are prone to various diseases a hospital with modern facilities should be opened on a priority basis in a central place to provide better health facilities to the villagers around the project.
- ❖ While developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.

3.6.5 Summary & Conclusion

The socio-economic study in the study area 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 a lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

3.7 TRAFFIC DENSITY

The traffic survey conducted based on the transportation route of material, the Rough Stone and gravel is proposed to be transported mainly through Village Road and Uthamapalayam to Surulipatti (SH-102) and Kollam to Theni (NH-220) as shown in Table 3.35 and in Figure 3.29. 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 3.35 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.70 Km-NE	Village Road
TS2	Uthamapalayam-Surulipatti (SH-102)	2.9 Km-W	Uthamapalayam-Surulipatti (SH-102)
TS3	Kollam-Theni (NH-220)	6.5Km-W	Kollam-Theni (NH-220)

Source: On-site monitoring by GTMS FAE & TM

Table 3.36 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	30	90	35	35	80	40	165
TS2	50	150	40	40	98	49	239
TS3	85	255	90	90	105	53	398

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 3.37 Rough Stone Transportation Requirement

Transportation of Rough and Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	24	72

Source: Approved Mining Plan

Table 3.38 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
TS1	165	72	237	1200
TS2	239	72	311	1200
TS3	398	72	470	1500

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

- Due to these projects the existing traffic volume will not exceed the traffic limit. As per the IRC 1018 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.

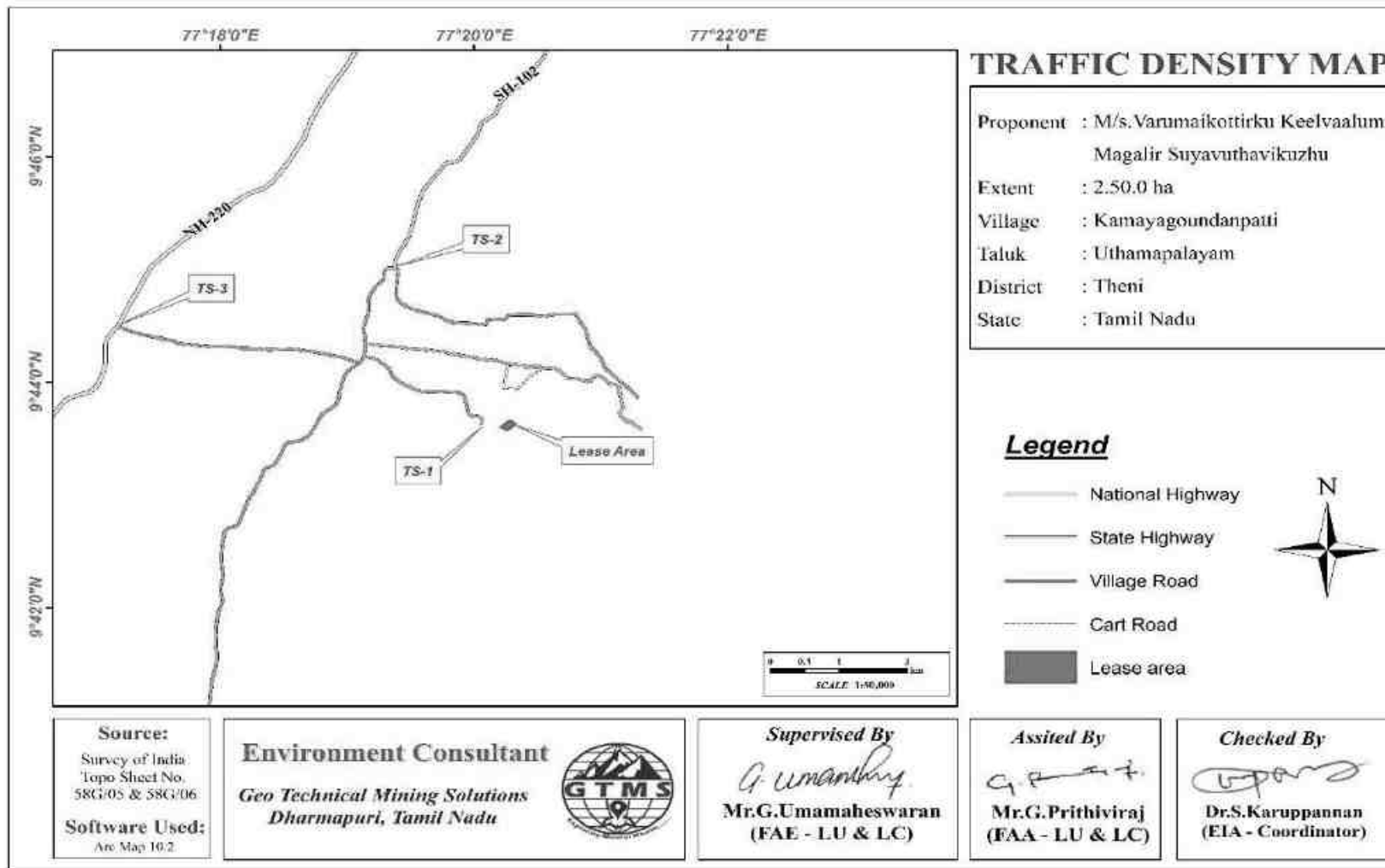


Figure 3.29 Traffic Density Map

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries, Reserve Forest 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 3.39.

Table 3.39 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 /Eco Sensitive Zone	Megamalai WLS	1.26Km E
		Megamalai Eco Sensitive area	0.20Km NE
2	Reserve Forest	Megamalai R.F	1.26 km E
		ErasakkanayakkanurR.F	2.0 km E
		Dhoni Karadu R.F	1.26 km East
		Surulipatti R.F	3.61 km S
		Anaimalayanpatty	5.53 km N
		Poovathikaradu	4.97 km S
		Boothakaradu R.F	7.97 km S
		Hanumantanpatty R.F	9.20Km NW
		Vannathiparai R.F	8.35Km S
		Kombai R.F	9.62Km NW
		PannimuthanKaradu R.F	10.27Km NW
		Salamalai Karadu R.F	12.95Km N
		Machakkal R.F	13.16Km W
		Vellaikaradu R.F	13.80Km NE
		Suranganar R.F	15.65Km SW
Teak Gundu Karadu R.F	15.09Km N		
Chinna Karadu R.F	15.90Km NW		

		Thevaram R.F	18.37Km NW
		KattabommanKaraduR.F	22.61Km N
		Seelayampatty R.F	22.72Km N
		Jambalmedu R.F	23.02Km N
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Varatriner(Shanmuganathi)	1.31 km NE
		Shanmuganathi Dam	1.78 km E
		Canel	2.83 km W
		Narayanathevanpatti North lake	2.45 km W
		Suruli River (Periyar River)	3.05Km NW
		Kuttanachchi river	3.47Km S
		Uttamapuram Lake	4.61Km W
		Cumbum Lake	4.75Km W
		SurukiPatti Lake	5.23Km W
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Critically Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet





Figure 3.30 Base Line Study Photographs



Figure 3.31 Google image of 100m, 200m, 300m and 500m Radius Habitats

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 change on land use and land cover.
- ❖ Change in topography of the mine lease area.
- ❖ 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 agricultural fields during the rainy season
- ❖ Increase in agricultural productivity of land when mine water is discharged to the surrounding lands for irrigation

4.1.2 Common Mitigation Measures from Proposed Project

- ❖ 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
- ❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- ❖ In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help 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

- ❖ Deterioration of soil quality in the surrounding area due to runoff from the project area
- ❖ Decrease in the agricultural productivity of the surrounding land due to soil quality degradation

4.2.2 Common Mitigation Measures from proposed project

- ❖ Construction of garland drains, settling pits, and check dams to prevent runoff and siltation
- ❖ 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 the settling tanks to reduce suspended sediment loads before runoff is discharged from the quarry site.
- ❖ Retain existing or re-plant the vegetation will be retained 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 2.55 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.

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), gases such as sulphur dioxide, oxides of nitrogen from vehicular exhaust are the main air pollutants
- ❖ Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air
- ❖ The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust
- ❖ Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area

4.4.2 Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chauhya et al.,2001. The equations used for SPM, SO₂, and NO_x 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).
Overall Mine	SO ₂	Area	$E = a0.14\{u/(1.83 + 0.93u)\} [\{p/(0.48 + 0.57p)\} + \{b/(14.37 + 1.15b)\}]$	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).
Overall Mine	NO _x	Area	$E = a0.25\{u/(4.3 + 32.5u)\} [1.5p + \{b/(0.06 + 0.08b)\}]$	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. As the SPM emission calculation for overall mine is not considering pollution control measures, one-third of the SPM value is taken for derivation of PM₁₀ keeping

in mind that proper control measures are followed. It is important to note that PM₁₀ emission rate is derived from the SPM estimation in the background that PM₁₀ constitutes 52% of SPM emission. The PM_{2.5}, PM₁₀, SO₂ and NO_x 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}	0.151422085	16400	6.05688E-06
Overall Mine	PM ₁₀	1.009480564	16400	4.03792E-05
Overall Mine	SO ₂	0.065466076	16400	2.61864E-06
Overall Mine	NO _x	0.01276179	16400	5.10472E-07

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 4.3-4.6.

4.4.2.2 Model Results

The post project resultant concentrations of PM₁₀, PM_{2.5}, SO₂ & NO_x (GLC) is given in Tables 4.3-4.6.

Table 4.3 Incremental & Resultant GLC of PM_{2.5}

Station ID	Distance to core	Direction	PM 2.5 concentrations(µg/m ³)			Comparison against air quality standard (60 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.89	NNE	19.7	1	20.7	Below standard	5.1	Not significant
AAQ2	0.64	NNE	21.4	1	22.4		4.7	
AAQ3	0.02	N	21.1	1	22.1		4.7	
AAQ4	0.18	SW	19.4	1	20.4		5.2	
AAQ5	4.16	SW	21.6	0.5	22.1		2.3	
AAQ6	2.91	W	22.3	0.1	22.4		0.4	
AAQ7	2.29	NW	21.8	0.5	22.3		2.3	
AAQ8	4.93	N	24.6	0.1	24.7		0.4	
AAQ9	3.40	S	18.0	0.5	18.5		2.78	
AAQ10	4.87	NW	19.1	0.1	19.2		0.52	

Table 4.4 Incremental & Resultant GLC of PM₁₀

Station ID	Distance to core area (km)	Direction	PM ₁₀ concentrations(µg/m ³)			Comparison against air quality standard (100 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.89	NNE	43.9	1	44.9	Below standard	2.3	Not significant
AAQ2	0.64	NNE	45.0	1	46		2.2	
AAQ3	0.02	N	45.7	5	50.7		10.9	
AAQ4	0.18	SW	43.3	1	44.3		2.3	
AAQ5	4.16	SW	48.0	1	49		2.1	
AAQ6	2.91	W	49.7	0	49.7		0.0	
AAQ7	2.29	NW	49.7	1	50.7		2.0	
AAQ8	4.93	N	52.4	0	52.4		0.0	
AAQ9	3.40	S	37.3	1	38.3		2.68	
AAQ10	4.87	NW	39.1	0	39.1		0.00	

Table 4.5 Incremental & Resultant GLC of SO₂

Station ID	Distance to core area (km)	Direction	SO ₂ concentrations(µg/m ³)			Comparison against air quality standard (80 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.89	NNE	5.3	0.5	5.8	Below standard	9.4	Not significant
AAQ2	0.64	NNE	5.2	0.5	5.7		9.6	
AAQ3	0.02	N	5.1	1	6.1		19.6	
AAQ4	0.18	SW	5.2	1	6.2		19.2	
AAQ5	4.16	SW	5.9	0.1	6		1.7	
AAQ6	2.91	W	5.9	0	5.9		0.0	
AAQ7	2.29	NW	5.9	0.1	6		1.7	
AAQ8	4.93	N	6.2	0	6.2		0.0	
AAQ9	3.40	S	5.1	0.1	5.2		1.96	
AAQ10	4.87	NW	5.2	0	5.2		0.00	

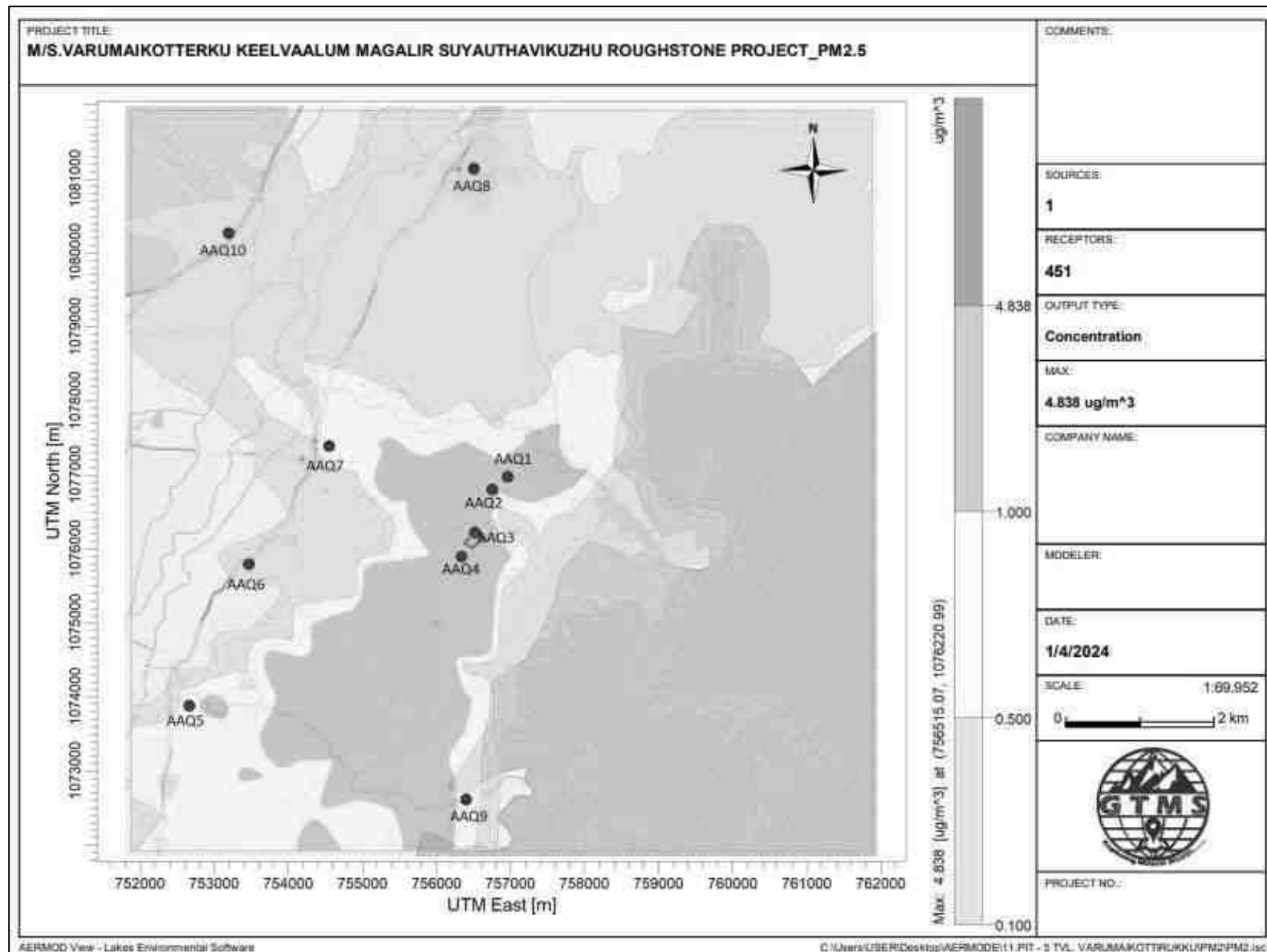


Figure 4.1 Predicted Incremental Concentration of PM_{2.5}

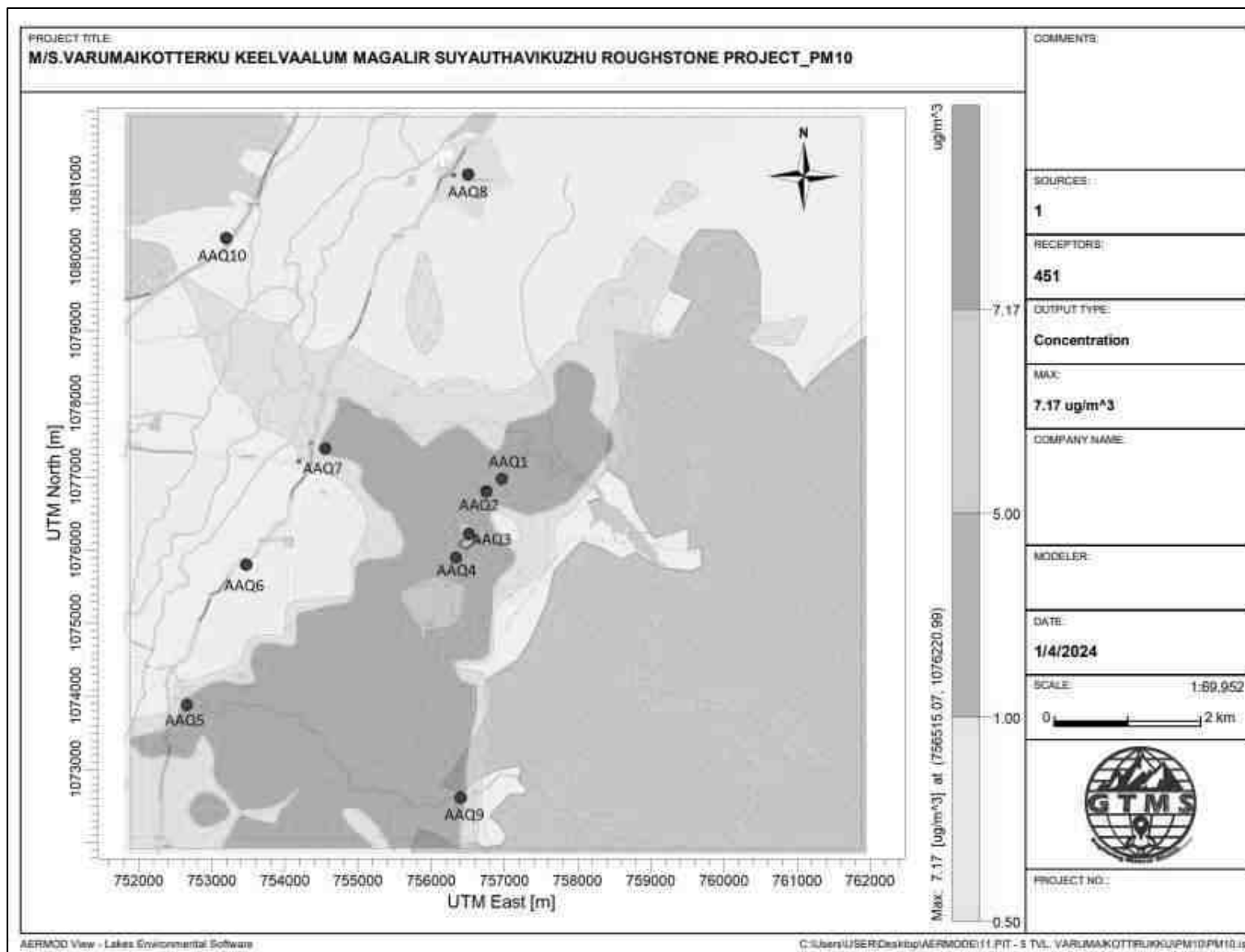


Figure 4.2 Predicted Incremental Concentration of PM₁₀

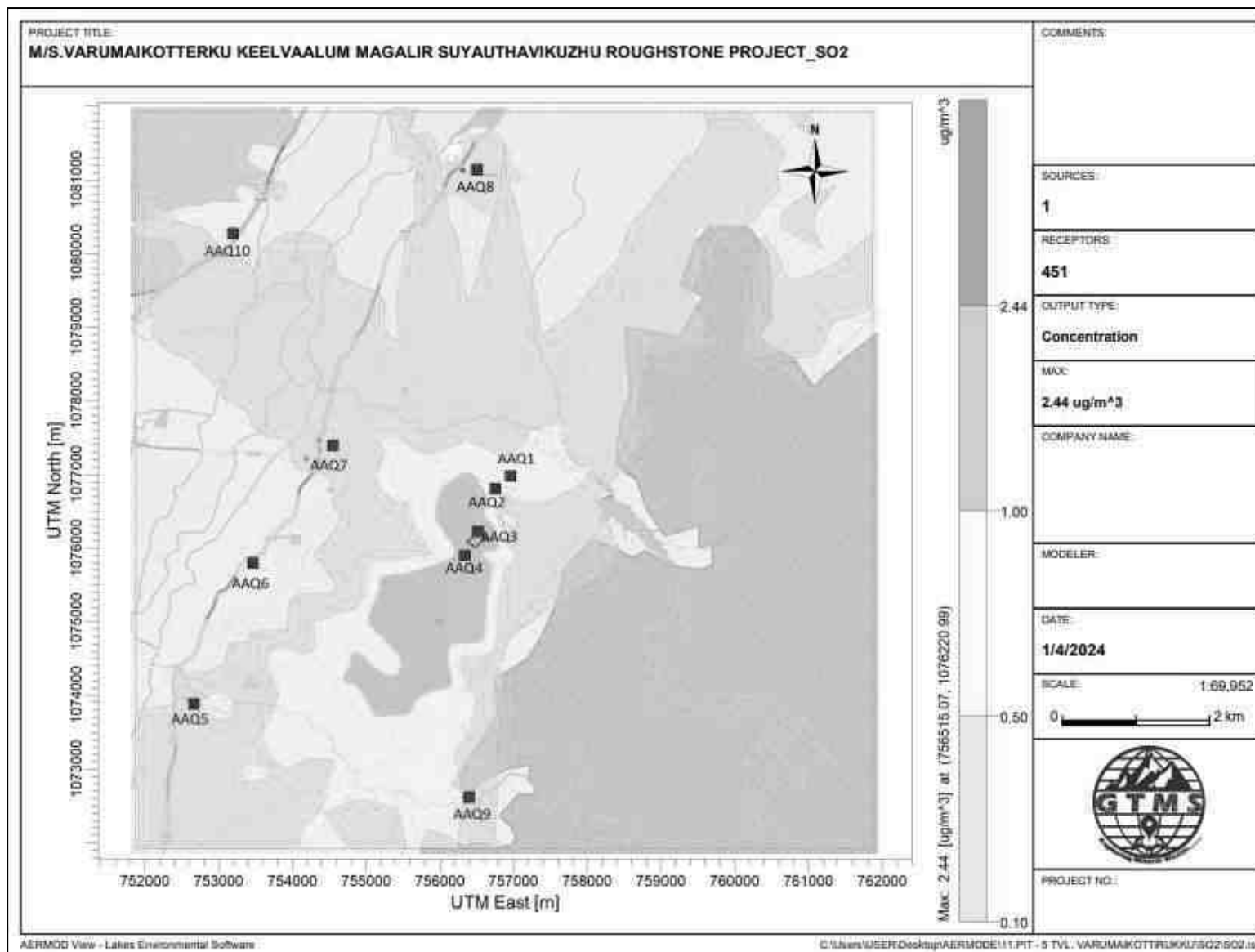


Figure 4.3 Predicted Incremental Concentration of SO₂

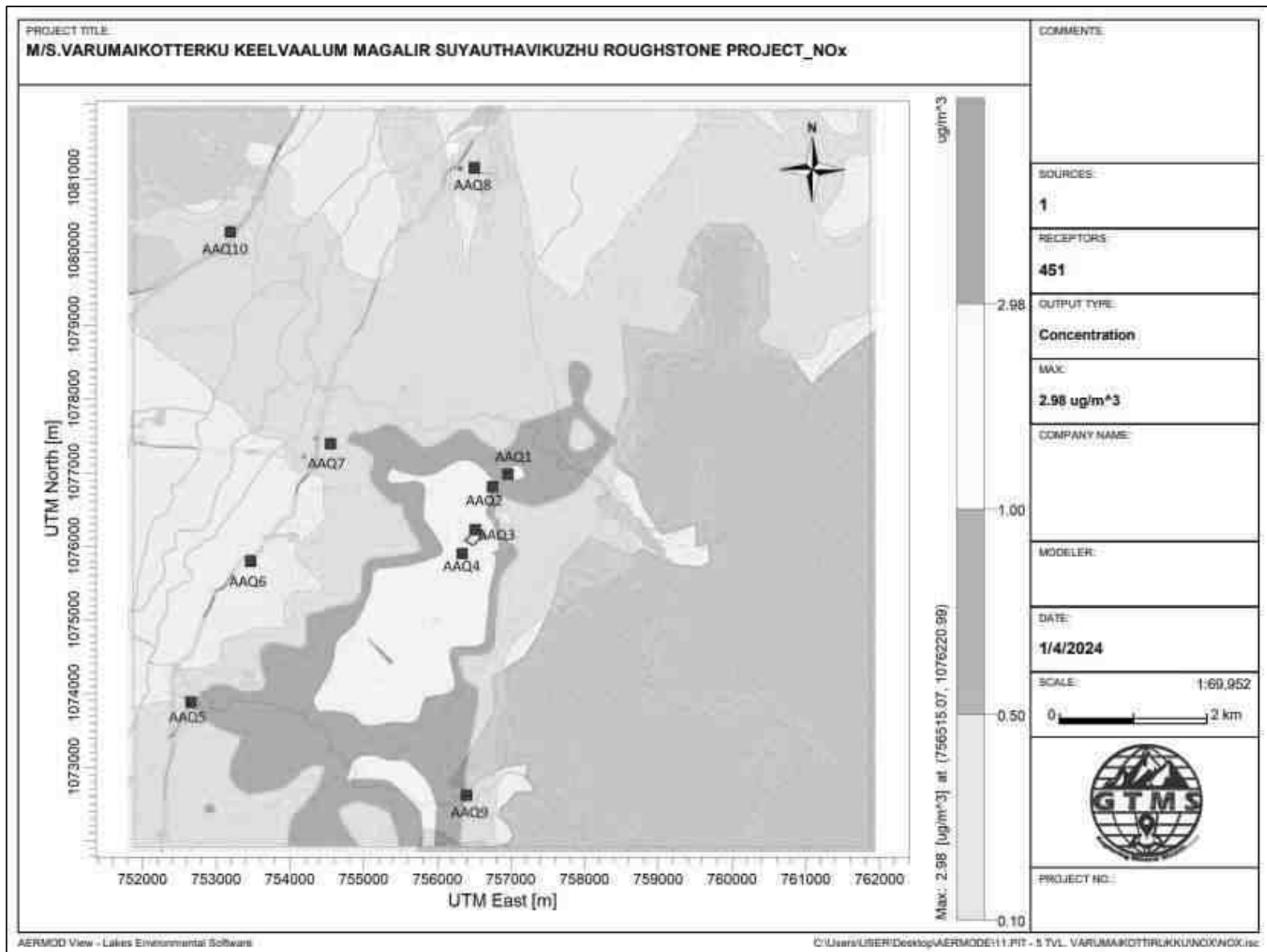


Figure 4.4 Predicted Incremental Concentration of NO_x

Table 4.6 Incremental & Resultant GLC of NO_x

Station ID	Distance to core	Direction	NO _x concentrations(µg/m ³)			Comparison against air quality standard (80 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.89	NNE	15.1	1	16.1	Below standard	6.6	Not significant
AAQ2	0.64	NNE	14.9	1	15.9		6.7	
AAQ3	0.02	N	14.5	1	15.5		6.9	
AAQ4	0.18	SW	14.9	1	15.9		6.7	
AAQ5	4.16	SW	16.6	0.5	17.1		3.0	
AAQ6	2.91	W	15.2	0	15.2		0.0	
AAQ7	2.29	NW	16.6	0.1	16.7		0.6	
AAQ8	4.93	N	16.0	0	16		0.0	
AAQ9	3.40	S	11.9	0.1	12		0.84	
AAQ10	4.87	NW	13.0	0.1	13.1		0.77	

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.

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, L_{p1} & L_{p2} are sound levels at points located at distances r_1 and r_2 from the source; $A_{e1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$L_{p \text{ total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

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 4.7.

Table 4.7 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).

Table 4.8 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)
PIT I	800	44.7	25.90	44.76
PIT II	600	50.8	28.40	50.82
PIT III	260	40	35.66	41.36
PIT IV	200	44.4	37.94	45.28
PIT V	100	43.8	43.96	46.89
PIT VI	130	44.7	41.68	46.46
Surulipatti	4400	42.6	11.09	42.60
Narayanathevanpatti	2990	49	14.45	49.00

Kamayagoundanpatti	2310	41.9	16.69	41.91
Royappanpatti	4980	46.5	10.02	46.50
Koothanachiamman Temple	3380	41.9	13.38	41.91
Puthupati	5150	44.6	9.72	44.60
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 through 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

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 4.9 Predicted PPV Values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	16.7	2310	0.02	19	0.01	113

Table 4.10 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	16.7	100	3.0	19	0.39	146
		200	0.99		0.17	138
		300	0.51		0.10	134
		400	0.32		0.07	131
		500	0.22		0.06	129

The PPV results shows that the ground vibration is well below the permissible limits set by DGMS through circular 7,1997 for domestic houses near by the lease area at the dominant frequency of <8 Hz.

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

- ❖ blasting and during clearing routes.
- ❖ Erecting structures for the project.
- ❖ Vehicular movement and movement of men and materials.
- ❖ Vibrations, smoke, noise and operation of earthmoving machinery.
- ❖ Storage of muck / debris, and transport and disposal of excavated overburden, debris and muck.
- ❖ Disposal of spills of wastes and fuels.

- ❖ 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 table 3.21 which vegetation in the lease area may be removed during mining.
- ❖ Carbon released from quarrying machineries and tippers during quarrying would be 1977 kg per day, 533832 kg per year and 2669162 kg over five years, as provided in Table 4.11.

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

	Per day	Per year	Per five years
Fuel consumption of excavator	142	38262	191309
Fuel consumption of compressor	16.8	4536	22680
Fuel consumption of tipper	579	156393	781967
Total fuel consumption in liters	738	199191	995956
Co ₂ emission in kg	1977	533832	2669162

4.6.2 Mitigation Measures on Flora

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ None of the plants in the lease area will be cut during operational phase of the mine. we recommend uprooting and planting of the 10 trees along the 7.5 m safety zone to prevent environmental pollution during quarrying. As the survival rate due to uprooting was only 30%, 100 seedlings will be procured at the rate of 10 seedlings per tree and planted in 7.5 m safety zone.
- ❖ Existing roads will be used; 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 29970 kg of carbon per year. Therefore, we recommend 1250 planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.13), about 1250 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 20994 kg of the total carbon, as provided in Table 4.12.

Table 4.12 CO₂ Sequestration

CO ₂ sequestration in kg	111	29970	149850
Remaining CO ₂ not sequestered in kg	1866	503862	2519312
Trees required for environmental compensation	20994		
Area required for environmental compensation in hectares	42		

Table 4.13 Recommended Species for Greenbelt Development Plan

S. No	Botanical Name	Common Name
1	<i>Aegle marmelos</i>	Vilvam
2	<i>Adenaanthera pavonina</i>	Manjadi
3	<i>Albizia lebbeck</i>	Vaagai
4	<i>Albizia amara</i>	Usil
5	<i>Bauhinia purpureu</i>	Mantharai
6	<i>Bauhinia racemosa</i>	Aathi
7	<i>Bauhinia tomentosa</i>	lruvathi
8	<i>Buchanania axillaris</i>	Kattuma
9	<i>Borassus flabellifer</i>	Panai
10	<i>Butea monosperma</i>	Murukka maram
11	<i>Bobax ceiba</i>	Ilavu, Sevvilavu
12	<i>Calophyllum inophyllum</i>	Punnai
13	<i>Cassia fistula</i>	Sarakondrai
14	<i>Cassia roxburghii</i>	Sengondrai
15	<i>Chloroxylon sweitenia</i>	Purasa maram
16	<i>Cochlospermum religiosum</i>	Kongu, Manjal Ilavu
17	<i>Cordia dichotoma</i>	Mookuchali maram
18	<i>Creteva adansonii</i>	Mavalingum
19	<i>Dillenia indica</i>	Uva,Uzha
20	<i>Dillenia pentagyna</i>	Siru Uva. Sitruzha
21	<i>Diospyros ebumum</i>	Karungali
22	<i>Diospyros chloroxylon</i>	Vaganai
23	<i>Ficus amplissima</i>	Kal Itchi
24	<i>Hibiscus tiliaceus</i>	Aatru poovarasu
25	<i>Hardwickia binata</i>	Aacha
26	<i>Holoptelia integrifolia</i>	Aayili
27	<i>Lannea coromandelica</i>	Odham

28	<i>Lagerstroemia speciosa</i>	Poo Marudhu
29	<i>Lepisanthus tetraphylla</i>	Neikottai maram
30	<i>Limonia acidissima</i>	Vila maram
31	<i>Litsea glutinosa</i>	Pisin pattai
32	<i>Madhuca longifolia</i>	Illuppai
33	<i>Manilkara hexandra</i>	Ulakkai Paala
34	<i>Mimusops elengi</i>	Magizha maram
35	<i>Mitragyna porvdolia</i>	Kadambu
36	<i>Morinda pubescens</i>	Nuna
37	<i>Morinda citrifolia</i>	Vellai Nuna
38	<i>Phoenix sylvestre</i>	Eachai
39	<i>Pongamia pinnata</i>	Pungam
40	<i>Premna mollissima</i>	Munnai
41	<i>Premna serratifolia</i>	Narumunnai
42	<i>Premna tomentosa</i>	Purangai Naari,
43	<i>Prosopis cinerea</i>	Vanni maram
44	<i>Pterocarpus marsupium</i>	Vengai
45	<i>Pterospermum canescens</i>	Vennangu, Tada
46	<i>Pterospermum xylocarpum</i>	Polavu
47	<i>Puthranjiva roxburghii</i>	Puthranjivi
48	<i>Salvadora persica</i>	Ugaa Maram
49	<i>Sapindus emarginatus</i>	Manipungan, Soapu kai
50	<i>Saraca asoca</i>	Asoca
51	<i>Streblus asper</i>	Piraya maram
52	<i>Strychnos nuxvomica</i>	Yetti
53	<i>Strychnos potatorum</i>	Therthang Kottai
54	<i>Syzygium cumini</i>	Naval
55	<i>Terminalia bellerica</i>	Thandri
56	<i>Terminalia arjuna</i>	Ven marudhu
57	<i>Toona ciliate</i>	Sandhana vembu
58	<i>Thespesia populnea</i>	Puvarasu
59	<i>Walsuratrifoliata</i>	valsura
60	<i>Wrightia tinctoria</i>	Veppalai
61	<i>Pithecellobium dulce</i>	Kodukkapuli

Table 4.14 Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered(m²)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	500	400	4500
	Number of plants outside the mine lease area		
	750	600	6750
Total	1250	1000	11250

Table 4.15 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recurring Cost-per annum
Plantation inside the mine lease area (in safety margins)	500	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))"	100000	15000
Plantation outside the area	750	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	225000	22500
Total			3,25,000	37,500

Source: EMP budget

4.6.3 Anticipated Impact on Fauna

- ❖ Meghamalai Wildlife Sanctuary is located near the quarry lease area, so there is a possibility of wild animals migrating to the quarry lease area.
- ❖ Noise and dust generated during quarrying may cause disturbance to birds and animals and may lead to migration of birds.
- ❖ Rare, endemic & endangered species are reported in the buffer zone. Therefore, during the course of mining, the management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.
- ❖ Fencing around all the proposed mine lease areas will be constructed to restrict the entry of stray animals.
- ❖ Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

Measures for Protection and Conservation of Wildlife Species

- ❖ Undertaking mitigative measures for conducive environment to the flora and fauna in consultation with Forest Department.

- ❖ Dust suppression system will be installed within mine and periphery of mine for proposed project
- ❖ Plantation around mine area will help in creating habitats for small faunal species and to create better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

Mitigation Measures

- ❖ All the preventive measures will be taken for growth & development of fauna.
- ❖ Creating and development awareness for nature and wildlife in the adjoin villages.
- ❖ The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm.

Mitigation Measures in Elephants, Leopards and other wildlife animals

- ❖ Possibility of using coppicing and pollarding of fodder trees/poles preferred by elephants for fresh fodder at appropriate scale
- ❖ Plantation of fodder grass keeps elephant herds confined to forest.
- ❖ After removal of weeds, locally available palatable grasses should be planted/ grass seeds should be sown in the area.
- ❖ New bamboo plantations/Restocking of existing degraded bamboo areas and also in lantana removed areas.
- ❖ To improve the habitat by adding fodder and canopy, Ficus cuttings and bamboo wildlings have been planted around the waterholes

4.6.4. Aquatic Biodiversity

Impact

- ❖ There is a small pond and lake within 1km around the quarry lease area and the dust generated during the quarrying may affect water bodies.
- ❖ Dust generated during quarrying can affect aquatic plants and animals in water bodies.

Mitigation Measures

- ❖ Planting trees around quarries prevents dust from escaping and prevents dust from spreading into water bodies. Aquatic plants and animals in water bodies are not affected.

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.
- ❖ It is a granite quarry, no explosives are used, there is no possibility of vibration and dust, thus there is no possibility of damage to the adjacent agricultural land.
- ❖ 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.

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

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

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 discharge 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.

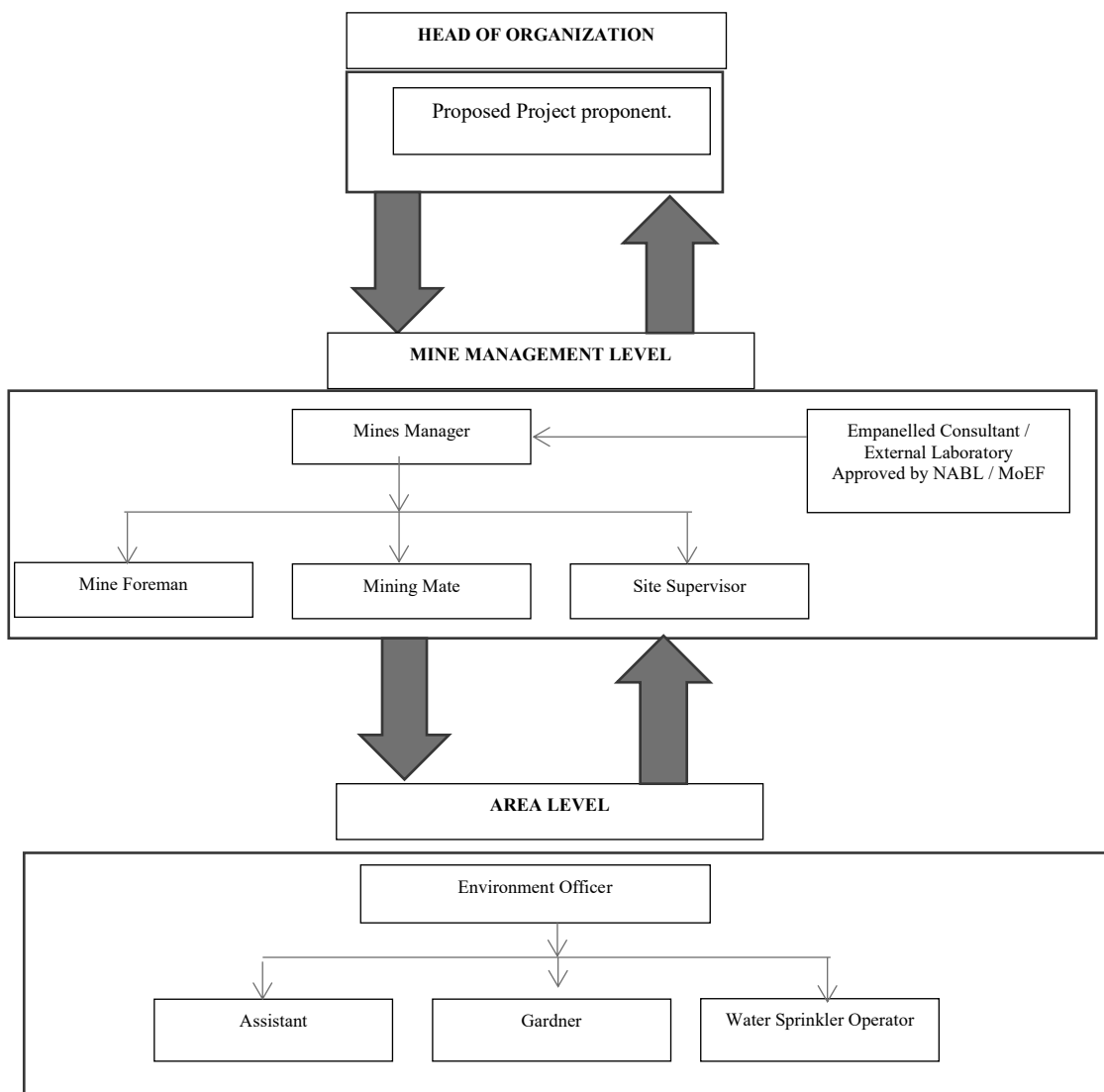


Figure 6.1 Proposed environmental monitoring chart

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	<ul style="list-style-type: none"> ✓ 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;	<ul style="list-style-type: none"> ✓ 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.

			<ul style="list-style-type: none"> ✓ 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	Transportation	<p>Potential hazards and unsafe workings contributing to accident and injuries</p> <p>Overloading of material</p> <p>While reversal & overtaking of vehicle</p> <p>Operator of truck leaving his cabin when it is loaded.</p>	<ul style="list-style-type: none"> ✓ 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
4	Natural calamities	Unexpected happenings	<ul style="list-style-type: none"> ✓ Escape Routes will be provided to prevent inundation of storm water ✓ Fire Extinguishers & Sand buckets
5	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	<ul style="list-style-type: none"> ✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and Proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone II. The area is far away from the sea. Hence, the disaster due to heavy floods and tsunamis are not anticipated. The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations. Structure of the team has been shown in Figure 7.1.

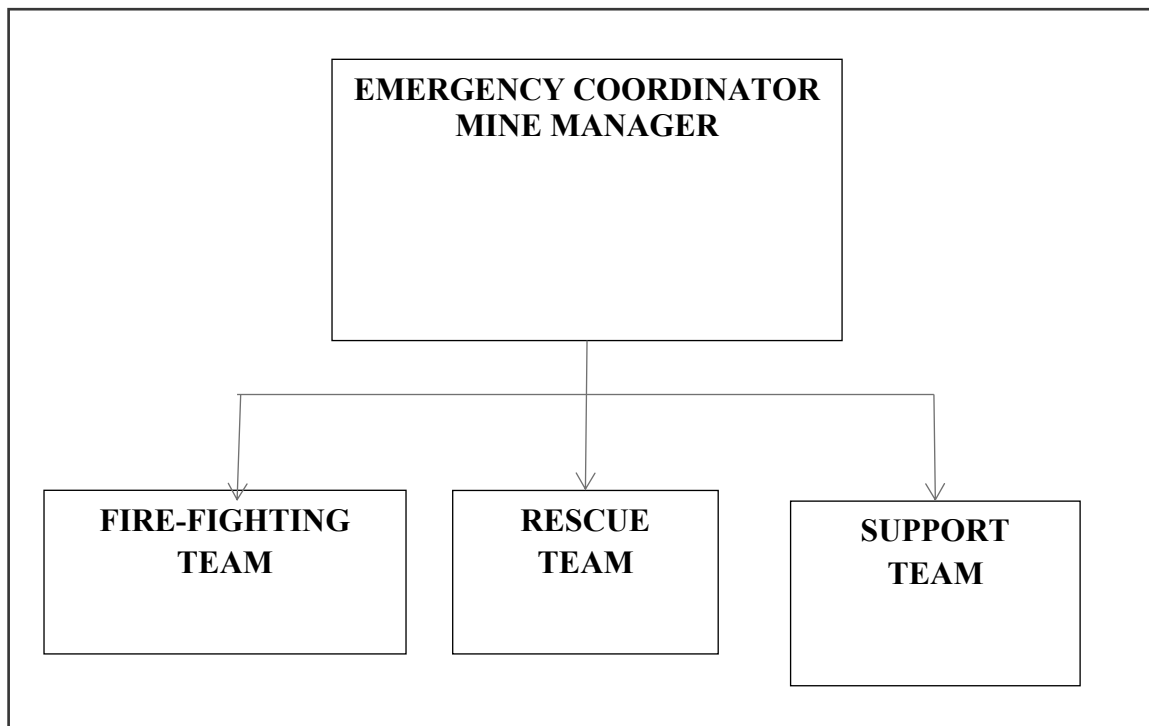


Figure 7.1 Disaster management team layout for proposed project

7.3.1 Emergency Control Procedure

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

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

7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the quarries within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative study, 5 proposed projects, known as P1, P2, P3, P4, P5 are taken into consideration. The details of P1 have been given in Table 1.2 and the details of P2, P3, P4 and P5 are given in the Table 7.2, 7.3, 7.4, 7.5.

Table 7.2 Salient Features of the Proposed Project P2

Name of the Quarry	M/s. Annai Sathya Magalir Suya Uthavikuzhu Rough Stone Quarry	
Type of Land	Government Land	
Extent	1.00.0 Ha	
S.F.No	1372/1 (Part-3)	
Toposheet No	58 G/6	
Location of Project Site	9°43'44.44"N to 9°43'49.07"N 77°20'22.43"E to 77°20'26.67"E	
Highest Elevation	585 m AMSL	
Proposed depth of Mining	70 m 65m AGL+5m BGL	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	366605	6553
Mineable Reserves	Rough Stone in m ³	Top Soil in m ³
	53565	4486
Proposed reserves for five years	Rough Stone in m ³	Top Soil in m ³
	53565	4486
Method of Mining	Open-Cast Semi Mechanized mining	
Topography	Hillock Topography	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Tipper	3
	Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cast mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	15 Nos	
Project Cost	Rs.62,00,832 /-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	2.55 KLD	

Table 7.3 Salient Features of the Proposed Project P3

Name of the Quarry	M/s. Annai Therasa Kaludaikum Magalir Nala Munnetra Sangam Rough Stone Quarry	
Type of Land	Government Land	
Extent	2.50.0 Ha	
S.F.No	1372/1 (Part-4)	
Toposheet No	58 G/6	
Location of Project Site	9°43'38.46"N to 9°43'46.15"N 77°20'16.87"E to 77°20'25.22"E	
Highest Elevation	570 m AMSL	
Proposed depth of Mining	(85m) 70m AGL + 15m BGL	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	1096980	20512
Mineable Reserves	Rough Stone in m ³	Top Soil in m ³
	188331	19272
Proposed reserves for five years	Rough Stone in m ³	Top Soil in m ³
	188331	19272
Method of Mining	Open-Cast Semi Mechanized mining	
Topography	Hillock Topography	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Tipper	4
	Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cast mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs.81,76,830 /-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	3.5 KLD	

Table 7.4 Salient Features of the Proposed Project P4

Name of the Quarry	M/s.K.K.Patty Kaludaykum Magalir Sangam Rough Stone Quarry	
Type of Land	Government Land	
Extent	2.37.0 Ha	
S.F.No	1372/1 (Part-2)	
Toposheet No	58 G/6	
Location of Project Site	9°43'50.83"N to 9°44'0.16"N 77°20'20.77"E to 77°20'27.84"E	
Highest Elevation	530 m AMSL	
Proposed depth of Mining	50m) 45m AGL +5m BGL	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	632445	4926
Mineable Reserves	Rough Stone in m ³	Top Soil in m ³
	185120	920
Proposed reserves for five years	Rough Stone in m ³	Top Soil in m ³
	185120	920
Method of Mining	Open-Cast Semi Mechanized mining	
Topography	Hillock Topography	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Tipper	1
	Excavator	2
Blasting Method	The quarrying operation is proposed to carried out by open cast mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	16 Nos	
Project Cost	Rs.80,19,097 /-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	3.5 KLD	

Table 7.5 Salient Features of the Proposed Project P5

Name of the Quarry	M/s. Sangili Karuppan Thaneer Parai Kaludaikum Magalir Nalasangam Rough Stone quarry	
Toposheet No	58-G/6	
Lattitude	9°43'28.31"N to 9°43'36.19"N	
Longitude	77°20'10.08"E to 77°20'15.98"E	
Highest Elevation	545 m AMSL	
Ultimate depth of Mining	50m AGL	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	934558	6714
Mineable Reserves	Rough Stone in m ³	Top Soil in m ³
	355773	3914
Proposed reserve for five years As per ToR	Rough Stone in m ³	Top Soil in m ³
	267033	3914
Ultimate Pit Dimension	94m (L) x 79m (W) x 65m (D)	
Method of Mining	Opencast Mechanized Mining Method	
Topography	Hillock area	
Machinery proposed	Jack Hammer	4 Nos
	Compressor	2 Nos
	Hydraulic Excavator	1 Nos
	Tippers	5 Nos
Blasting Method	The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	20 Nos	
Project Cost	Rs.99,01,330 /-	
CER Cost	Rs.5,00,000/-	
Proposed Water Requirement	3.5 KLD	

7.4.1 Air Environment

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

Table 7.6 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	5 Years in m³	Per Year in m³	Per Day in m³	Number of Lorry Load Per Day
P1	191590	38318	174	29
P2	53565	10713	40	7
P3	18831	3766	14	2
P4	185120	37024	137	23
P5	267033	53407	263	44
Grand Total	716139	143228	530	88

The cumulative study shows that the overall production of rough stone from the quarry is 628 m³ per day with a capacity of 88 trips of rough stone per day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the 5 proposed projects on air environment of the cluster have been provided in Table 7.7. The cumulative values resulting from the 6 projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.7 Cumulative Impact Results from the 5 proposed projects

Pollutants	Baseline Data (µg/m³)	Incremental Values (µg/m³)					Cumulative Value (µg/m³)
		P1	P2	P3	P4	P5	
PM _{2.5}	20.9	4.83	3.53	4.50	4.86	5.25	43.87
PM ₁₀	47.2	7.17	5.24	7.33	6.24	9.32	82.5
SO ₂	5.5	2.44	1.51	1.75	1.97	2.56	15.73
NO _x	14.9	2.98	2.54	4.72	4.25	4.37	33.76

7.4.2 Noise Environment

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

Table.7.8 Cumulative Impact of Noise from 6 Proposed Quarries on Kamayagoundanpatti Habitation

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	2310	NW	41.9	16.69	41.91	55
Habitation Near P2	2740	NW	41.9	15.20	41.91	
Habitation Near P3	2380	NW	41.9	16.43	41.91	
Habitation Near P4	2370	WNW	41.9	16.46	41.91	
Habitation Near P5	2300	NW	41.9	16.73	41.91	
Cumulative Noise (dB (A))					47.9	

Source: Lab Monitoring Data

The cumulative analysis of noise due to 5 proposed projects shows that habitation of Kamayagoundanpatti will receive about 47.9dB(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 5 mines have been shown in Table 7.9.

Table 7.9 Cumulative Effect of Ground Vibrations Resulting from 5 Mines on Habitation of Kamayagoundanpatti

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	16.7	2310	0.020
P2	3.8	2740	0.005
P3	13.4	2380	0.016
P4	13.2	2370	0.016
P5	25.36	2300	0.028
Total			0.085

Results from the above tables 7.10 indicate that the cumulative PPV value of each habitation is well below the peak particle velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

7.4.3 Socio Economic Environment

Socio Economic benefits of the proposed project were calculated and the results have been shown in Table 7.10 the project together will contribute Rs. 25,00,000/-towards CER fund.

Table 7.10 Socio Economic Benefits from 5 Mines

Location ID	Project Cost	CER Cost
P1	Rs.82,19,330	Rs. 5,00,000
P2	Rs.62,00,832	Rs. 5,00,000
P3	Rs.81,76,830	Rs. 5,00,000
P4	Rs.80,19,097	Rs. 5,00,000
P5	Rs.99,01,330	Rs. 5,00,000
Grand Total	Rs.4,05,17,419	Rs.25,00,000

Table 7.11 Employment Benefits from 5 Mines

Location ID	Employment
P1	20
P2	15
P3	18
P4	16
P5	20
Grand Total	89

A total of 106 people will get employment due to 6 proposed mines in cluster

7.4.4 Ecological Environment

Table 7.12 Greenbelt Development Benefits from Mine

Code	Number of Trees proposed	Area to be covered (m ²)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	1250	11250	1000	<i>Azadirachta indica, Albizia lebbeck, Delonix regia, Tectona grandis, etc.,</i>
P2	500	4500	400	
P3	1250	11250	1000	
P4	1185	10665	948	
P5	1250	11250	1000	
Total	5435	48,915	4348	

Cumulative studies show that the proposed project will plant about 5435 native tree species like *Azadirachta indica, Albizia lebbeck, Delonix regia, Tectona grandis*, etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 4348 trees will survive in this green belt development program.

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

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

7.5.1 Objective

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

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

Table 7.13 Action Plan to Manage Plastic Waste

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

Source: Proposed by FAEs and EC

CHAPTER VIII

PROJECT BENEFITS

8.0 GENERAL

The proposed project at Kamayagoundanpatti Village aims to produce 191590 m³ of rough stone 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 20 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 Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District and 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 Kamayagoundanpatti Village. CSR budget of the profit.

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 \leq 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.17,24,310** 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.)
CER	5,00,000
Seigniorage @ Rs.90/m ³ of rough stone	1,72,43,100
District Mineral Foundation Tax @ 10% of Seigniorage	17,24,310
Green Tax @ 10% of Seigniorage	17,24,310
Total	17,24,310

CHAPTER IX
ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

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

10.1 ENVIRONMENTAL POLICY

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance.

The Proponent M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu will:

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

10.1.1 Description of the Administration and Technical Setup

The environment monitoring cell discussed under chapter VI will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level of each proposed quarry. The said team will be responsible for:

- ❖ Monitoring of the water/ waste water quality, air quality and solid waste generated.
- ❖ Analysis of the water and air samples collected through external laboratory.

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

10.2 Budgetary Provision for Environmental Management

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

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost	Recurring Cost/annu m
			(Rs.)	(Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	25000	25000
	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	35000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	8750
	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	50000
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			960000	228750
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	Provision made in Operating Cost	0	0

	diesel engines of vehicles.			
	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	656852
Total Noise Environment			50000	658852
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum (4.82.7 ha X 10000)	25000	12500
Total Water Environment			25000	12500
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 Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed display board at the quarry entrance as permanent structure	10000	1000
Total Implementation of EC, Mining Plan			10000	1000
Occupational Health and Safety	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	80000	20000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	20000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	10000
	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 (4.82.7 hectare)	500000	25000
	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	125000	25000

	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 (1 st Class / 2 nd 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			745000	887000
Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)	Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	100000	15000
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	225000	22500
Total Development of Green Belt			325000	37500
Mine Closure	Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs)		0	85000
	G.O.(Ms)No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Roughstone = Rs.90)	2111310	0
Total Seigniorage Fee			2111310	0
TOTAL			4256310	1847602 (Exclude. Mine Closure)

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

Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year (including Mine Closure Cost)	Total Recurring Cost	Total EMP Cost
1847602	1939982	2036981	2138830	2330772	10294167	14550477

In order to implement the environmental protection measures, an amount of **Rs.4256310** as capital cost and recurring cost as **Rs.1847602** 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.14550477** 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 mining project (P1) falls within the quarry cluster of 500 m radius with the total extent of 10.87.0 ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No.1372/1(Part-5) over the extent of 2.50.0 ha is situated in the cluster falling in Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District and Tamil Nadu. The quarries involved in the calculation of cluster extent are five proposed quarries.

11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes from 9°43'33.94"N to 9°43'40.17"N and Longitudes from 77°20'12.10"E to 77°20'20.54"E in Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, and Tamil Nadu State. According to the approved mining plan, about 191590 m³ of rough stone will be mined up to the ultimate depth of 70 m in the five years. The quarrying operation is proposed to be carried out by opencast semi mechanized mining method involving drilling, blasting, 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 to December, 2023 as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified Interstellar Testing Centre Pvt Ltd for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

11.3.1 Land Environment

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	Crop Land	2778.90	35.82
2	Dense Forest	401.53	5.18
3	Fallow Land	615.30	7.93
4	Mining/Industrial lands	20.20	0.26
5	Land with or Without Scrub	1946.42	25.09
6	Plantations	1753.77	22.60
7	Settlements	158.83	2.05
8	Water bodies	83.48	1.08
Total		7758.44	100.0

Source: Sentinel II Satellite Imagery

11.3.2 Soil Environment

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 6.23 to 7.98 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 72.17 to 419.40 $\mu\text{mhos/cm}$. Bulk density ranges between 1076 to 1406 kg/m^3 . Nitrogen ranges between 148 and 260 mg/kg . Phosphorus ranges between 5.15 and 18.70 mg/kg . Potassium ranges between 1334 and 13171 mg/kg . Calcium ranges between 3417 and 21085 mg/kg . Total carbon ranges between 0.06 and 0.51 %.

11.3.3 Water Environment

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. Four groundwater samples were collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water. The results of all the ground water samples fall within the permissible limits of IS10500:2012.

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Therefore, data regarding groundwater elevations were collected from 9 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 2023 (Pre-

Monsoon Season) and from October through December 2023, (Post Monsoon Season). . According to the data, average depths to the static water table in open wells range from 4.08 to 5.80 m BGL in premonsoon and 5.50 to 7.50 m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in bore wells for the period of October through December 2023 (Post-Monsoon Season) vary from 52.0 to 52.7 m and from 57.03 to 57.80 m for the period of March through May, 2023 (Pre-Monsoon Season).

11.3.4 Air Environment

As per the monitoring data, PM_{2.5} ranges from 20.1 µg/m³ to 22.0 µg/m³; PM₁₀ from 45.4µg/m³ to 49.7µg/m³; SO₂ from 5.2 µg/m³ to 7.7 µg/m³; NO_x from 12.4µg/m³ to 15.7g/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index (AQI)

The AQI shows that the air quality of the study area falls within good category 47 causing minimal impact to human health.

11.3.5 Noise Environment

Noise level in core zone was 43.8 dB (A) Leq during day time and 40.6 dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 40.0 to 50.8 dB (A) Leq and during night time from 37.2 to 43.4 dB (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.

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

- Change in land use and land cover and topography of the mine lease area
- Problems to human habitations due to dust and noise caused by movement of heavy vehicles
- Soil erosion and sediment deposition in the nearby water bodies during the rainy season
- Siltation of water course due to wash off from the exposed working area
- Deterioration of soil quality in the surrounding area due to runoff from the project area
- Decrease in the agricultural productivity of the surrounding land due to soil quality degradation

Mitigation Measures

- Construction of garland drains, settling pits, and check dams to prevent runoff and siltation
- Runoff water will be discharged into the settling tanks to reduce suspended sediment loads before runoff is discharged from the quarry site
- The vegetation will be retained at the site wherever possible
- Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season

11.4.2 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 2.55KLD 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

11.4.3 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-metalled 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

11.4.4 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 58.55kg 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.

11.4.5 Biological Environment

Anticipated Impact

- 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.
- Carbon released from quarrying machineries and tippers during quarrying would be 1977 kg per day, 533832 kg per year and 2669162 kg 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
- Quarry approach roads are sprayed with water 3 times a day to control dust. Thus, the damage to the nearby farmlands is controlled
- 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 29970 kg of carbon per year. Therefore, we recommend 1250 planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc
- About 1250 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 20994 kg of the total carbon

11.4.6 Socio Economic Environment

Anticipated Impact

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

Mitigation Measures

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems

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

11.4.7 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, Spirometric 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

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	-	Once in 6 months	Depth in m BGL

		specific wells			
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 four 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 five proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- The proposed five projects will allocate Rs. 25,00,000/- towards CER as recommended by SEAC
- The proposed five projects will directly provide jobs to 89 local people, in addition to indirect jobs
- The proposed five projects will plant 5435 about trees in and around the lease area
- The proposed five projects will add 315 PCU per day to the nearby roads.

11.7 Project Benefits

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

- Direct employment to 20 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.4256310** as capital cost and recurring cost as **Rs.1847602** 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.14550477**.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu 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.

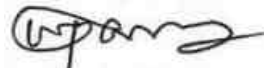
The accredited experts and associated members who were engaged in this EIA study are given below:

S.No	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
Approved Functional Area Experts & EC					
1.	Dr. S. Karuppanan	EIA Coordinator (EC) In-house	1(a)(i)	Mining	B
2.	Dr. M. Vijayprabhu	In-house FAE	1(a)(i)	HG	B
3.	Dr. J. Rajarajeswari	In-house, FAE	1(a)(i)	EB	B
4.	Dr. G. Prabakaran	In-house, FAE	1(a)(i)	SE	B
5.	Dr. R. Arunbalaji	In-house, FAE	1(a)(i)	AQ, NV	B
6.	J.N. Manikandan	Empanelled FAE	1(a)(i)	RH, SH, AP	B
7.	Dr. S. Malar	In-house, FAE	1(a)(i)	WP	B
8.	G. Umamaheswaran	In-house, FAE	1(a)(i)	LU	B
9.	S. Gopalakrishnan	In-house, FAE	1(a)(i)	GEO	B
10.	P. Venkatesh	In-house, FAE	1(a)(i)	AP	B
11.	Dr. D.Kalaimurugan	In-house, FAE	1(a)(i)	SC	B
Approved Functional Area Associates					
12.	G. Prithiviraj	FAA	1(a)(i)	LU, HG	B
13.	C. Kumaresan	FAA	1(a)(i)	NV	B
14.	P. Vellaiyan	FAA	1(a)(i)	GEO	B
15.	P. Dhatchayini	FAA	1(a)(i)	AQ	B
16.	V. Malavika	FAA	1(a)(i)	NV, SHW	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. S. Karuppannan**



Designation : EIA Coordinator

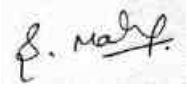





Name of the EIA Consultant Organization : Geo Technical Mining Solutions





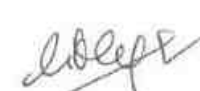
Period of Involvement : Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for M/s Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu rough stone quarry project with the extent of 2.50.0 ha situated in the cluster with the extent of 10.87.0 ha in Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District of Tamil Nadu is true and correct to the best of our knowledge.


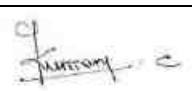
List of Functional Area Experts Engaged in this Project




S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	o Identification of different sources of air pollution due to the proposed mine activity	J.N. Manikandan	
		o Prediction of air pollution and propose mitigation measures / control measures	P.Venkatesh	

2	WP	<ul style="list-style-type: none"> ○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures. 	Dr.S. Malar	
3	HG	<ul style="list-style-type: none"> ○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics 	Dr.M. VijayPrabhu	
4	GEO	<ul style="list-style-type: none"> ○ Field Survey for assessing the regional and local geology of the area. ○ Preparation of mineral and geological maps. ○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology. 	G.Gopala Krishnan	
5	SE	<ul style="list-style-type: none"> ○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility. 	Dr. G. Prabhakaran	
6	EB	<ul style="list-style-type: none"> ○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna. ○ Suggesting species for greenbelt development. 	Dr.J.Rajarajeshwari	
7	RH	<ul style="list-style-type: none"> ○ Identification of hazards and hazardous substances ○ Risks and consequences analysis ○ Vulnerability assessment 	J.N. Manikandan	

		<ul style="list-style-type: none"> ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety. 		
8	LU	<ul style="list-style-type: none"> ○ Construction of Land use Map ○ Impact of project on surrounding land use ○ Suggesting post closure sustainable land use and mitigative measures. 	G.Uma Maheswaran	
9	NV	<ul style="list-style-type: none"> ○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP. 	Dr.R. Arun Balaji	
10	AQ	<ul style="list-style-type: none"> ○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ Recommending mitigations measures for EMP 	Dr.R. Arun Balaji	
11	SC	<ul style="list-style-type: none"> ○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation 	Dr. D.Kalaimurugan	
12	SHW	<ul style="list-style-type: none"> ○ Identify source of generation of non-hazardous solid waste and hazardous waste. ○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled. 	J.N. Manikandan	

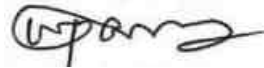
List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	G. Prithiviraj	LU, HG	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU and HG 	
2	C. Kumaresan	NV	<ul style="list-style-type: none"> ○ Assistance to FAE in both primary and secondary data collection 	

			○ Assistance in noise prediction modelling	
3	P. Vellaiyan	GEO	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
4	P. Dhatchayini	AQ	○ Site visit with FAE ○ Assistance to FAE in collection of both primary and secondary data	
5	V. Malavika	NV, SHW	○ Site visit along with FAE ○ Assistance in report preparation	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu rough stone quarry project with the extent of 2.50.0 ha situated in the cluster with the extent of 10.87.0 ha in Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni 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/2124/SA 0184

Validity : Till 02.04.2024



THIRU.DEEPAK S. BILGI, I.F.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU

3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr.No. SEIAA-TN/F.No.10410/SEAC/1(a)ToR- 1613/2023 Dated: 07.11.2023.

To

M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu,
Mrs. Karthika (Leader),
No.172/Ward-1, Vedhakovil Street,
Kamayagoundanpatti,
Uthamapalayam Taluk,
Theni District - 625516.

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Proposed Rough Stone quarry lease over an extent of 2.50.0 Ha at S.F.Nos. 1372/1 (Part-5) of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, Tamil Nadu by M/s. Varamaikkotterku Keelvaalum Magalir Suyauthavikuzhu - under project category – “B1” and Schedule S.No.1(a) “Mining of Minerals Projects” – **ToR issued along with Public Hearing** - preparation of EIA report – Regarding.

- Ref:**
1. Online proposal No.SIA/TN/MIN/444497/2023, Dated: 16.09.2023.
 2. Your application submitted for Terms of Reference dated: 22.09.2023.
 3. Minutes of the 417th SEAC meeting held on 18.10.2023.
 4. Minutes of the 671st SEIAA meeting held on 07.11.2023.

Kindly refer to your proposal submitted to the State Level Impact Assessment Authority for Terms of Reference.

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MEMBER SECRETARY
SEIAA-TN

The proponent, M/s. Varumaikkotterku Keelvaalum Magalir Suyauthavikuzhu has submitted an application for Terms of Reference (ToR) on 22.09.2023, for the Proposed Rough Stone quarry lease over an extent of 2.50.0 Ha at S.F.Nos. 1372/1 (Part-5) of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, Tamil Nadu.

Discussion by SEAC and the Remarks:-

The proposal was placed for appraisal in this 417th SEAC meeting held on 18.10.2023. The details of the project furnished by the proponent are given in the website parivesh.nic.in).

The SEAC noted the following:

1. The project proponent, M/s. Varumaikkotterku Keelvaalum Magalir Suyauthavikuzhu has applied for Terms of Reference for the Proposed Rough Stone quarry lease over an extent of 2.50.0 Ha at S.F.Nos. 1372/1 (Part-5) of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, Tamil Nadu.
2. The project/activity is covered under Schedule 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. Mine plan period is approved for 5 years. The approved production is 234590m³ of Rough stone and the ultimate depth is 85m (70m AGL+ 15m BGL) m. The annual peak production shall not exceed 49450 m³ of Rough stone.
4. The DFO, Theni in his letter dated 10.12.2020 addressed to the District Collector, Theni has informed that this project site is located at a distance of 170m away from the eco-sensitive zone of Megamalai Wildlife Sanctuary.

Now, the proposal was placed in the 417th SEAC meeting held on 18.10.2023. Based on the presentation made by the proponent SEAC recommended grant of Terms of Reference (TOR) with Public Hearing, subject to the following TORs as per the **Annexure I** of this minute, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. 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.
2. 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, 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.
3. 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.
 4. 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.
 5. The Proponent shall carry out Bio diversity study through Department of Ecology and Environmental Sciences, Pondicherry University and the same shall be included in EIA Report.
 6. 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.

ANNEXURE I

1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:
 - (i) Original pit dimension
 - (ii) Quantity achieved Vs EC Approved Quantity
 - (iii) Balance Quantity as per Mineable Reserve calculated.
 - (iv) Mined out Depth as on date Vs EC Permitted depth
 - (v) Details of illegal/illicit mining
 - (vi) Violation in the quarry during the past working.
 - (vii) Quantity of material mined out outside the mine lease area
 - (viii) Condition of Safety zone/benches
 - (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.
2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.

3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.
5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.
8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.
9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.

11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
14. Quantity of minerals mined out.
 - Highest production achieved in any one year
 - Detail of approved depth of mining.
 - Actual depth of the mining achieved earlier.
 - Name of the person already mined in that leases area.
 - If EC and CTO already obtained, the copy of the same shall be submitted.
 - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,
17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.

20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

28. Impact on local transport infrastructure due to the Project should be indicated.
29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

Appendix -I
List of Native Trees Suggested for Planting

No	Scientific Name	Tamil Name	Tamil Name
1	<i>Aegle marmelos</i>	Vilvam	வில்வம்
2	<i>Adenaanthera pavonina</i>	Manjadi	மஞ்சாடி, ஆனைக்குன்றுமணி
3	<i>Albizia lebbek</i>	Vaagai	வாகை
4	<i>Albizia amara</i>	Usal	உசல்
5	<i>Bauhinia purpurea</i>	Mantharai	மந்தாரை
6	<i>Bauhinia racemosa</i>	Aathu	ஆத்தி
7	<i>Bauhinia tomentosa</i>	Iruvathu	இருவாத்தி
8	<i>Buchanania axillaris</i>	Kattuma	காட்டுமா
9	<i>Borassus flabellifer</i>	Panai	பனை
10	<i>Butea monosperma</i>	Murukkamarai	முருக்கமரம்
11	<i>Bobax ceiba</i>	Ilavu, Sevvilavu	இலவு
12	<i>Calophyllum inophyllum</i>	Purnai	புள்ளை
13	<i>Cassia fistula</i>	Sarakondrai	சரக்கொன்றை
14	<i>Cassia roxburghii</i>	Sengondrai	செங்கொன்றை
15	<i>Chloroxylon sweetenia</i>	Purasamaram	புரசு மரம்
16	<i>Cochlospermum religiosum</i>	Kongu, Marjallavu	கோங்கு, மஞ்சள் இலவு
17	<i>Cordia dichotoma</i>	Naruvuli	நருவளி
18	<i>Creteva adansonii</i>	Mavalingum	மாவிளங்கம்
19	<i>Dillenia indica</i>	Uva, Uzha	உடா
20	<i>Dillenia pentagyna</i>	SiruUva, Sitruzha	சீறு உடா
21	<i>Diospyro sebenuum</i>	Karungali	கருங்காலை
22	<i>Diospyro schloroxylon</i>	Vaganai	வாகளை
23	<i>Ficus amplissima</i>	Kallitchi	கல் இச்சி
24	<i>Hibiscus tiliaceou</i>	Aatrupoovarasu	ஆற்றுப்புலக
25	<i>Hardwickia binata</i>	Aacha	ஆச்சா
26	<i>Holoptelia integrifolia</i>	Aayili	ஆயா மரம், ஆயில்
27	<i>Lamnea coromandelica</i>	Odhiam	ஒதியம்
28	<i>Lagerstroemia speciosa</i>	Poo Marudhu	பூ மருது
29	<i>Lopisanthus tetraphylla</i>	Neikottaimaram	நெய் கொட்டை மரம்
30	<i>Limonia acidissima</i>	Vila maram	வில்லா மரம்
31	<i>Litsea glutinos</i>	Pisinpattai	அரம்பா பிச்சுட்டை
32	<i>Madhuca longifolia</i>	Illuppai	இலுப்பை
33	<i>Manilkara hexandra</i>	UlakkaiPaalai	உலக்கை பாலை
34	<i>Mimusops elengi</i>	Magizhamaram	மகிழ்மரம்
35	<i>Mitragyna parvifolia</i>	Kadambu	கடம்பு
36	<i>Morinda pubescens</i>	Nuna	நுணா
37	<i>Morinda citrifolia</i>	Vellai Nuna	வெள்ளை நுணா
38	<i>Phoenix sylvestre</i>	Eachai	ஈச்சமரம்
39	<i>Pongamia pinnat</i>	Pungam	புங்கம்
40	<i>Premna mollissima</i>	Munru	முள்ளை
41	<i>Premna serratifolia</i>	Narumunai	நறு முள்ளை
42	<i>Premna tomentosa</i>	Malipoovarasu	மலை புலக
43	<i>Prosopis cinerea</i>	Vanni maram	வள்ளி மரம்
44	<i>Pterocarpus marsupium</i>	Vengai	வேங்கை
45	<i>Pterospermum canescens</i>	Vemangu, Tada	வெண்ணாங்கு
46	<i>Pterospermum xylocarpum</i>	Polavu	புலவு
47	<i>Puthranjiva roxburghii</i>	Karipala	கறிபாலா
48	<i>Salvadora persica</i>	Ugaa Maram	ஊகா மரம்
49	<i>Sapindus emarginatus</i>	Marupangan, Soapukai	மாண்புமரம் சோப்புக்காய்
50	<i>Sarcia asoca</i>	Asoca	அசோகா
51	<i>Strobilus asper</i>	Piray maram	பிராய் மரம்
52	<i>Strychnos nuxvomica</i>	Yetti	யெட்டி
53	<i>Strychnos potatorum</i>	Therthang Kottai	தேத்தாங்கு கொட்டை
54	<i>Syzygium cumini</i>	Naval	நாவல்
55	<i>Terminalia belleric</i>	Thandri	தாண்டி
56	<i>Terminalia arjuna</i>	Ven marudhu	வெண் மருது
57	<i>Toona ciliata</i>	Sandhana vembu	சந்தனை வேம்பு
58	<i>Thespesia populnea</i>	Puvarasu	புலக
59	<i>Walsuratrifoliata</i>	valsura	வாலசுரா
60	<i>Wrightia tinctoria</i>	Veppalai	வேப்பலை
61	<i>Pithecolobium dulce</i>	Kodukkapuli	கொடுக்காய்ப்பளி

Discussion by SEIAA and the Remarks:-

The subject was placed in the 671st Authority meeting held on 07.11.2023. The authority noted that the subject was appraised in 417th SEAC meeting held on 18.10.2023.

Based on the presentation and documents furnished by the project proponent, SEAC after detailed deliberations, decided to **recommend the proposal for the grant of Terms of Reference (ToR).**

After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the following conditions and the conditions mentioned in 'Annexure B' of this minute:

1. The depth is restricted to 35m (AGL) in Section XY-AB till bench VII (35m - Rough Stone) & 55m (AGL) in Section X1Y1-AB (55m - Rough Stone) and no quarrying shall be carried out in Section XY - AB from (Bench VIII to Bench X) considering the safety aspect and to maintain contiguity. Hence, the revised quantity of Rough Stone is 1,91,590m³ and depth of quarrying is restricted to 70m AGL.
2. The PP shall obtain Revised Mining Plan approved by AD/Mines before obtaining CTO from TNPCB.
3. KML file reveals there is intensive agriculture surrounding the proposed project site which will be impacted by the proposed mining activity. Hence the PP shall submit the letter obtained from the Director, Department of Agriculture stating the productivity status and productive potential of the proposed mine lease area.
4. PP shall submit the NOC obtained from the Chief Wildlife Warden, Tamil Nadu as the project site is located at a proximate distance of 170m from the eco- sensitive zone of Megamalai Wildlife Sanctuary

Annexure 'B'**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 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

31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.

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

34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.

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

37. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.

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.

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.
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.

A. STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/

topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided,

confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should

- also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including

action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-

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

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).

2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.

20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training

(NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I) (part) dated 29th August, 2017.


MEMBER SECRETARY
SEIAA-TN

Copy to:

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

From
Assistant Director,
Dept. of Geology and Mining,
Theni.

To
Tvl Varumaikottirkku keelvazhum
Mahalir Suyauthavikuzhu,
No. 172/Ward No.1,Vedhakovil
Street, Kamayagoundanpatti
village,Uthamapalayam Taluk,
Theni District-625 516

Sir,

Rc.No.1049/Mines/2022, dated:05.09.2023

Sub: Mines and Minerals - Minor Mineral - Rough stone -
Theni District - Uthamapalayam Taluk -
Kamayagoundanpatti Village - Govt. Poramboke land -
S.F.No. 1372/1(Part-5) - over an extent 2.50.0Hects -
Application of Tvl Varumaikottirkku keelvazhum
Mahalir Suyauthavikuzhu for grant of quarry lease for
quarrying Rough Stone - Precise area communicated -
Mining Plan approval Accorded- 500 meter radius
quarry details requested - Furnished - Regarding.

- Ref:
1. The District Gazette Extraordinary Notification
No.16, dated.18.08.2022.
 2. Application of Tvl Vaumaikottirkkukeelvazhum
Mahalir Suvyauthavikuzhu, Kamayagoundan
pattyvillage, dated: 13.09.2022.
 3. Precise area communication letter Roc No.
Roc.1057/Mines/2022, dated:10.08.2023
 4. Mining Plan Approval letter Roc No.
1049/Mines/2022, dated:04.09.2023

In the reference 1st cited, the District Gazette Extraordinary
Notification No.16, dated.18.08.2022 was issued by the District
Collector for inviting application from the SGSY Groups registered
under the Tamil Nadu Co-operative Act, 1983 or under Societies Act,
1975 and Societies formed by the released bonded laborers under rule
8(10)(A) of Tamil Nadu Minor Mineral Concession Rules, 1959 for direct
grant of quarry lease for quarrying rough stone in Government
poramboke land.

2) Based on the Gazette notification, the applicant Tvl Varumaikottirkku keelvazhum Mahalir Suyauthavikuzhu submitted an application on 13.09.2022 with a request to grant of rough stone quarry lease in Government poramboke land in S.F.No.1372/1(Part-5), over an extent of 2.50.0 Hects of Kamayagoundanpatti Village, Uthamapalayam Taluk for a period of five years under rule 8(10-A) of Tamil Nadu Minor Mineral Concession Rules, 1959.

3) The Precise area was communicated by the District Collector vide reference 3rd cited to applicant Tvl Varumaikottirkku keelvazhum Mahalir Suyauthavikuzhu with a direction to submit the mining plan and Environmental Clearance issued by the competent authority for grant of rough stone quarry lease in S.F.No.1372/1(Part-5), over an extent of 2.50.0 Hects of Kamayagoundanpatti Village, Uthamapalayam Taluk and Theni District.

4) Accordingly, Tvl Varumaikottirkku keelvazhum Mahalir Suyauthavikuzhu has submitted the draft Mining Plan and the same has been approved on 04.09.2023. The applicant has requested to furnish the details of quarry lease situated within 500 mts radius from the subject quarry for obtaining Environmental Clearance from the State Level Environment Impact Assessment Authority.

5) In this connection, it is informed that the following existing and abandoned quarries are located within 500 radius distance from the proposed area for clearance.

A. Existing Quarries

S. N o.	Name of the owner	Village and Taluk	S.F.No.	Extent (in Hects)	Collector's Proc No.& Date.	Lease Period
NIL						

B.Expired/Abandoned Quarries


S. N o.	Name of the owner	Village and Taluk	S.F.No.	Extent (in Hects)	Collector's Proc No.& Date.	Lease Period
1.	Sankalika radu	Kamayagoun danpatty	1372/1(Part-II) 191	2.50.0	Roc No.443/2008/	23.02.2009 -

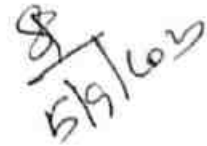
	Kalludaik kum Mahalir Nala sangam	village & Uthamapala yma Taluk			Mines, dated.22.01.200 9	22.02.2 012
2.	AnnaiTher asa Kalludaik kum Mahalir Nala Munnetra Sangam	Kamayagoun danpatty village & Uthamapala yma Taluk	1372/1 (Part-III)	2.50. 0	Roc No.444/2008/ Mines, dated.22.01.200 9	23.02.2 009 - 22.02.2 012
3.	Manbumi gu Ithaya deivam puratchith alavi doctor amma mahalir nala sangam	Kamayagoun danpatty village & Uthamapala yma Taluk	1372/1 (Part-IV)	2.50. 0	Roc No.224/2003/ Mines, dated.18.07.200 4	18.07.2 004 - 17.07.2 007
4.	M.Tamil selvi n	Kamayagoun danpatty village & Uthamapala yma Taluk	1427/1, 1428, 1429/1, 1430/1, 1430/2,1431	1.21. 0	District Collector Proceedings Roc.No. 1058/2010/Min es, dated 20.04.2012	20.04.2 012 to 19.04.2 017
5.	I.Muruges wari,	Kamayagoun danpatty village & Uthamapala yma Taluk	1372/5, 1373	1.33. 5	District Collector Proceedings Roc.No. 9/2012/Mines, dated 20.04.2012	20.04.2 012 to 19.04.2 017
6.	V. Rajendira n,	Kamayagoun danpatty village & Uthamapala yma Taluk	1412	0.35. 0	District Collector Proceedings Roc.No. 167/2012/Mine s, dated 20.08.2013	22.11.2 013 to 21.11.2 016

C.Present Proposed Quarries

S. No.	Name of the owner	Village and Taluk	S.F.No.	Extent (in Hects)
1.	Tvl K.K.Patty Kallaudaikkum Mahalir Sangam	Kamayagoundanpatty village & Uthamapalayma Taluk	1372/1 (Part-2)	2.37.0

2.	Tvl Annai Sathya Mahlir Suvyauthavikuzhu, Tmt.Usha (President),	Kamayagoundanpatty village & Uthamapalayma Taluk	1372/1 (Part-3)	1.00.0
3.	Tvl Annai Therasa Kalludaikkum Mahalir Nala Munnetra Sangam	Kamayagoundanpatty village & Uthamapalayma Taluk	1372/1 (Part-4)	2.50.0
4.	Tvl Vaumaikottirkkukeelvazhum Mahalir Suvyauthavikuzhu	Kamayagoundanpatty village & Uthamapalayma Taluk	1372/1 (Part-5)	2.50.0
5.	Tvl Sangaligaruppan Thanneerparai Kalludaikkum Mahalir Nala Sangam	Kamayagoundanpatty village & Uthamapalayma Taluk	1372/1 (Part-6)	2.50.0


 Assistant Director,
 Dept. of Geology and Mining,
 Theni.


 5/9/62

Copy to,
 The Chairman,
 State level Environment
 Impact Assessment Authority,
 3rd floor, Panagal Maligai, No.1, Jeenis

From
Thiru T.Vinoth, M.Sc.,
Assistant Director,
Dept. of Geology & Mining,
Theni.

To
Tvl Varumaikottirkku keelvazhum
Mahalir Suyauthavikuzhu,
No. 172/Ward No.1, Vedhakovil
Street, Kamayagoundanpatti
village, Uthamapalayam Taluk,
Theni District-625 516

Rc.No.1049/Mines/2022, dated:04.09.2023

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone
- Theni District - Uthamapalayam Taluk -
Kamayagoundanpatti Village - Govt. Poramboke
land - S.F.No. 1372/1(Part-5) - over an extent
2.50.0 Hects - Application of Tvl Varumaikottirkku
keelvazhum Mahalir Suyauthavikuzhu for grant of
quarry lease for quarrying Rough Stone - Precise
area communicated - Draft Mining plan submitted
- Approval Accorded - Reg. .

- Ref: 1. The District Gazette Extraordinary Notification
No.16, dated.18.08.2022.
2. Application of Tvl Varumaikottirkku
keelvazhum Mahalir Suyauthavikuzhu,
Kamayagoundanpatti village,
dated: 13.09.2022.
3. Precise area communication letter Roc No.
Roc.1049/Mines/2022, dated:10.08.2023
4. Requisition letter received from Tvl
Varumaikottirkkukeelvazhum Mahalir
Suyauthavikuzhu, dated.25.08.2023

In the reference 1st cited, the District Gazette Extraordinary
Notification No.16, dated.18.08.2022 was issued by the District
Collector for inviting application from the SGSY Groups registered
under the Tamil Nadu Co-operative Act, 1983 or under Societies Act,
1975 and Societies formed by the released bonded laborers under rule
8(10)(A) of Tamil Nadu Minor Mineral Concession Rules, 1959 for direct
grant of quarry lease for quarrying rough stone in Government
poramboke land.

2) Based on the Gazette notification, the applicant Tvl Varumaikottirkku keelvazhum Mahalir Suyauthavikuzhu submitted an application on 13.09.2022 with a request to grant of rough stone quarry lease in Government poramboke land in S.F.No.1372/1(Part-5), over an extent of 2.50.0 Hects of Kamayagoundanpatti Village, Uthamapalayam Taluk for a period of five years under rule 8(10-A) of Tamil Nadu Minor Mineral Concession Rules, 1959.

3) After examining the application submitted by the applicant, the special committee has furnish its recommendation to the District Collector to grant of quarry lease to applicant Tvl Varumaikottirkku keelvazhum Mahalir Suyauthavikuzhu to quarry rough stone in S.F.No.1372/1(Part-5), over an extent of 2.50.0 Hects of Kamayagoundanpatti Village, Uthamapalayam Taluk for a period of five years.

4) Based on the recommendation of the Revenue Divisional Officer, Uthamapalayam and the Special Committee, the precise area was communicated by the District Collector vide reference 3rd cited to applicant Tvl Varumaikottirkku keelvazhum Mahalir Suyauthavikuzhu with a direction to submit the mining plan and Environmental Clearance issued by the competent authority for grant of rough stone quarry lease in S.F.No.1372/1(Part-5), over an extent of 2.50.0 Hects of Kamayagoundanpatti Village, Uthamapalayam Taluk and Theni District.

5) In response to the precise area communicated, the applicant has submitted three copies of draft Mining Plan duly prepared by a Qualified Person and requested for approval of the same vide reference 4th cited.

6) The draft Mining Plan submitted by the applicant has been examined in detail. The applicant has proposed to production of 2,34,590 cbm of Rough stone for a period of 5 years. All the conditions

stipulated in the precise area communicated have been incorporated in the Mining Plan.

7) In exercise of the powers vested under sub rule (2) and (5) of Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959, I hereby approve the mining plan subject to the following conditions:-

- i. The mining plan is approved without prejudice to any other order or direction from any court of contempt jurisdiction.
- ii. 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.
- iii. The 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 and the Tamil Nadu Minor Mineral Concession Rules, 1959.
- iv. The applicant is entitled for production of 2,34,590 cbm of Rough stone for a period of 5 years as per Mining plan.
- v. Quarrying operations should be carried out in accordance with the Approved Mining Plan.
- vi. A safety distance of 7.5 meters should be provided to the adjoining patta lands.
- vii. A safety distance of 10 meters should be provided to the adjoining Government poramboke lands.
- viii. No hindrance shall be caused to the adjacent pattadars lands, Government poramboke odai and public while carrying out quarrying operations.
- ix. Environmental Clearance should be obtained from the State Level Environment Impact Assessment Authority, Chennai.

6) As directed by the Assistant Director of Geology and Mining, Theni in the reference 3rd cited, you are hereby requested to produce Environmental Clearance obtained from the State Level Environment Impact Assessment Authority (SEIAA), Chennai as applicable under Rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for grant of quarry lease, in respect of the precise area communicated.

Encl: Approved Mining plan.

G. A. Anand
Assistant Director,
Dept. of Geology and Mining,
Theni.

S
AK/2023

MINING PLAN



FOR

KAMAYAGOUNDANPATTI VILLAGE ROUGH STONE MINING LEASE WITH
PROGRESSIVE QUARRY CLOSURE PLAN

Govt Poramboke land /-Semi-Mechanized mining/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 : THENI
TALUK : UTHAMAPALAYAM
VILLAGE : KAMAYAGOUNDANPATTI
S.F. NO'S : 1372/1 (Part-5)
EXTENT : 2.50.0 Hectares

ADDRESS OF THE APPLICANT

M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu,
Mrs. Karthika (Leader),
No.172/ Ward-1, Vedhakovil street,
Kamayagoundanpatti,
Uthamapalayam Taluk,
Theni District – 625 516.

PREPARED BY

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

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. Tamil Nadu.

Mob. : +91 9443937841, +917010076633,

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

Website: www.gtmsind.com





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ANNEXURES



Sl. No.	Description	Annexure No.
1.	Copy of District Tender Gazette	I
2.	Copy of precise area communication letter	II
3.	Copy of FMB (Field Measurement book)	III
4.	Copy of "A" register and Adangal	IV
5.	Copy of Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu Registration Certificate	V
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LIST OF PLATES

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1	Key map	I	Not to scale
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13.	Conceptual sections	VIA	Sections HOR 1:1000 VER 1:1000



M/s. Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu,
Mrs. Karthika (Leader),
No.172/ Ward-1, Vedhakovil street,
Kamayagoundanpatti,
Uthamapalayam Taluk,
Theni District – 625 516.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone quarry lease in Government Poramboke land at S.F.No's: 1372/1 (Part-5) over an extent of 2.50.0hectares of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, Tamil Nadu State has been prepared by

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

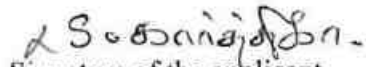
I request "The Assistant Director", Department of Geology and Mining, Theni District to make further correspondence regarding modifications of the Mining Plan with the said Recognized Qualified Person on this following address,

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
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 9443937841,7010076633.
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: Theni, TN.

Date:


Signature of the applicant
(M/s. Varumaikotterku Keelvaalum
Magalir Suyauthavikuzhu)



M/s. Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu,
Mrs. Karthika (Leader),
No.172/ Ward-1, Vedhakovil street,
Kamayagoundanpatti,
Uthamapalayam Taluk,
Theni District – 625 516.

DECLARATION

The Mining Plan in respect of rough stone quarry lease in Government Poramboke land at S.F.No's: 1372/1 (Part-5) over an extent of 2.50.0hectares of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni 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: Theni, TN.

Date:

L. S. S. S. S. S.
Signature of the applicant
(M/s. Varumaikotterku Keelvaalum
Magalir Suyauthavikuzhu)



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

RQP/MAS/263/2014/A

GEO TECHNICAL MINING SOLUTIONS

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Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841,7010076633

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

Website: www.gtmsind.com

CERTIFICATE

This is to certify that, the provisions of 8 (10-A) (b) (iii) Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone quarry lease in S.F.No's: 1372/1 (Part-5) over an extent of 2.50.0hectares of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, Tamil Nadu State applied to **M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu**, Theni District.

Wherever specific permission / exemptions / relaxations or approvals are required, the applicant will approach the concerned authorities of State and Central governments for granting such permissions etc.

Place: Dharmapuri, TN

Date: 22/8/23

Signature of the Recognized Qualified Person.

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

RQP/MAS/263/2014/A

GEO TECHNICAL MINING SOLUTIONS

A NABET Accredited and ISO Certified Company

1/213-B, Ground Floor, Natesan Complex,

Collectorate Post Office, Oddapatti,

Dharmapuri-636705, TamilNadu, India



Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
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E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

I certify that, in preparation of Mining Plan for rough stone quarry lease in S.F.No's: 1372/1 (Part-5) over an extent of 2.50.0hectares of Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District, Tamil Nadu State prepared to **M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu** Theni District, covers all the provisions of Mines Act, Rules, and Regulations etc., made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date: 22/8/23

Signature of the Recognized Qualified Person.

Dr.S.KARUPPANNAN,M.Sc,Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, TamilNadu, India

MINING PLAN

FOR KAMAYAGOUNDANPATTI VILLAGE ROUGH STONE MINING LEASE WITH
PROGRESSIVE QUARRY CLOSURE PLAN

Govt Poramboke land / Open cast-Semi-Mechanized mining/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:** Special publication No.16 dated 18.08.2022 and the applications invited for grant of direct quarry lease license to M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu, Mrs.Karthika (Leader) office at No.172/ Ward-1, Vedhakovil street, Kamayagoundanpatti, Uthamapalayam Taluk, Theni District – 625 516, Tamilnadu State. The special committee formed under the District Collector, Theni District and report submitted to district collector on 27.02.2023. Therefore, the district collector granted rough stone quarry lease in government poramboke land for a period of 5 years in S.F.No: 1372/1 (Part-5), over an extent of 2.50.0Hectare, Kamayagoundanpatti Village, Uthamapalayam Taluk, Theni District.
- b) **The Precise area communication letter:** The District Collector, Theni has directed to the applicant M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu, through his precise area communication letter vide **Rc.No.1049/Mines/2022 Dated 10.08.2023**, for quarrying lease rough stone at Tamil Nadu State, Theni District, Uthamapalayam Taluk, Kamayagoundanpatti Village in S.F.No's: 1372/1 (Part-5) over an extent of 2.50.0hectares has recommended as following conditions for a period of Five (5) years under Rule 8 (10A) (b) (iii), Tamil Nadu Minor Mineral concession rules, 1959
- (i) A safety distance of 7.5meter and 10 meter should be provided to the adjacent patta lands and government lands.
 - (ii) Quarrying should be carried out without any disturbance to the neighboring lease holders/ without any encroachment on the neighboring leasehold and government lands.
 - (iii) DGPS Measurement of applied boundaries before commencement of mining by lessee as per letter No.2921/MM4/2016 dated: 09.03.2021 from Commissioner, Geology and Mines, Chennai before obtaining mining lease license. It should be recorded on CD and submitted as a report.





- c) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 and submitted under rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for mining lease as per conditions mentioned in the precise area communication letter **Rc.No.1049/Mines/2022 Dated 10.08.2023.**
- d) **Geological resources and Mineable reserves:** Geological resource of estimated as **1217328m³** including the resources of safety zone, residual topsoil etc. Of which, rough stone resources of about **1188755m³**, and residual topsoil is **28573m³**. The total mineable reserve is estimated to be **256413m³** by deducting the reserve safety zone, block in benches from the total Geological resources. of which, rough stone is about **234590m³** and residual topsoil is **21823m³** up to a depth of 85m (Which is 70m above base level + 15m below base level) (Refer Plate No. VI & VIA).
- e) **Proposed Production Schedule:** Total proposed production of rough stone is **234590m³** and residual topsoil is **21823m³** up to a depth of 85m (Which is 70m above base level + 15m below base level) for five years plan period. (Refer Plate No. IV & IVA).
- f) **Environmental Sensitivity of the proposed lease area: -**
- i). **Interstate boundary:** There is no Interstate boundary within the 10km radius from the lease area.
 - ii). **Wildlife Protection Act, 1972:** There is a Megamalai wild life sanctuary situated about 1.26km on the east side from the applied lease area.
 - iii). **Indian Reserve Forest Act, 1980:** There is no reserve forest within the 1.0km radius periphery of proposed lease area. The nearest reserved forest is Doni Karadu R.F – 1.26km – East 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 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	:	M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu
	Applicant address	:	Mrs. Karthika (Leader), No.172/ Ward-1, Vedhakovil street, Kamayagoundanpatti, Uthamapalayam Taluk, Theni District – 625 516.
	District	:	Theni
	State	:	Tamilnadu
	Pin code	:	625 516
	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 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 (5) years.
	Name of the RQP / QP preparing the Mining Plan	:	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.	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, Theni vide Rc.No.1049/Mines/2022 Dated 10.08.2023

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB		
	District & State	:	Theni, Tamil Nadu		
	Taluk	:	Uthamapalayam		
	Village	:	Kamayagoundanpatti		
Khasra No./ Plot No./ Block Range/ Felling Series etc.:					
	Survey No.	Sub division	Total Extent in Hect	Patta No.	Ownership / Occupancy
	1372	1 (Part-5)	2.50.00	---	Govt Poramboke land
	Lease area (hectares)	:	2.50.0 Hectares		
	Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	It is a Government Poramboke Land		
	Ownership / Occupancy	:	Government of Tamil Nadu		
	Existence of Public Road / Railway line if any nearby and approximate distance	:	<ul style="list-style-type: none"> ✓ Exploited quarry materials will be transported through the village road in situated on the western side. ✓ There is an SH-102 is situated on the west side about 2.4km which is connecting Suruli Road. ✓ There is an NH-183 is situated on the west 		



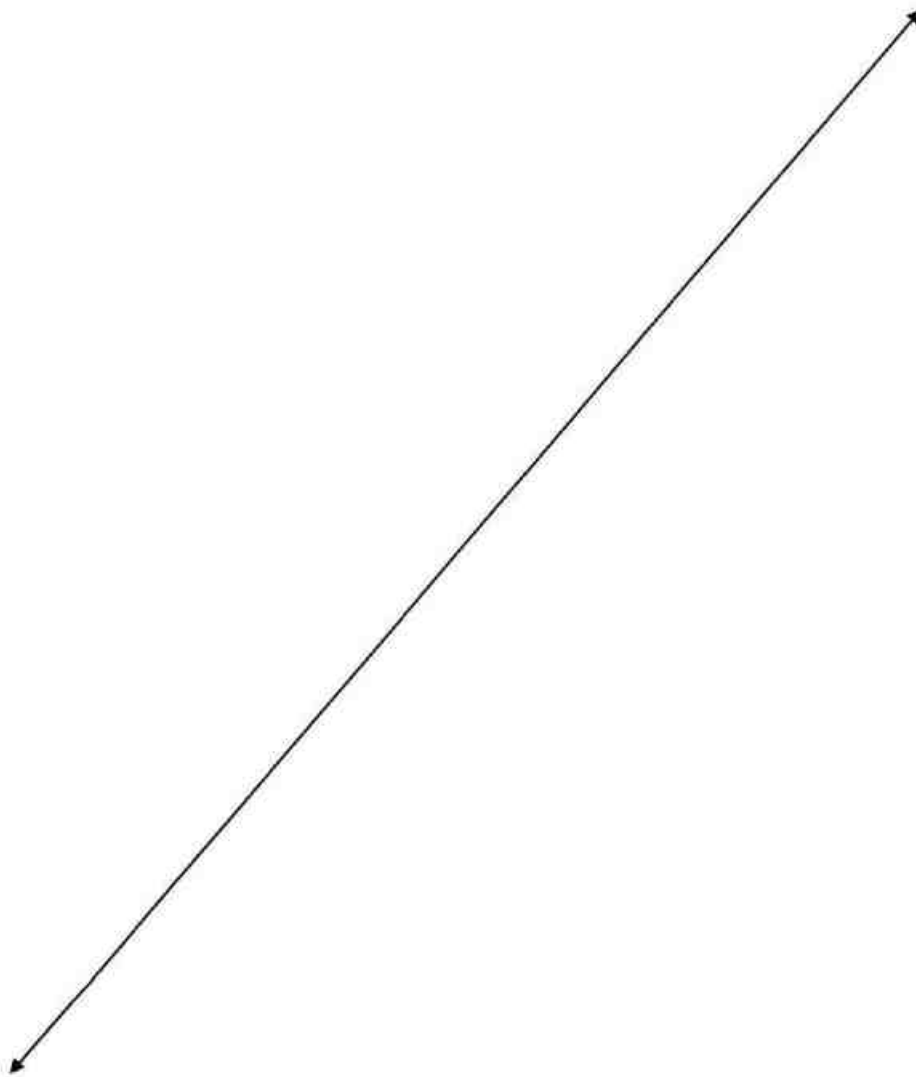
	side about 5.5km which is connecting - Cumbum Road. ✓ There is no railway line situated around 5km radius from the site.															
Toposheet No. with latitude and longitude:	: Toposheet No. 58 G/6 Latitude: From 9°43'33.94"N to 9°43'40.17"N Longitude: From 77°20'12.10"E to 77°20'20.54"E															
Geo-Coordinates of the lease boundary:																
<table border="1"> <thead> <tr> <th>Pit ID</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>9°43'40.17"N</td> <td>77°20'16.87"E</td> </tr> <tr> <td>2</td> <td>9°43'37.92"N</td> <td>77°20'20.54"E</td> </tr> <tr> <td>3</td> <td>9°43'33.94"N</td> <td>77°20'15.78"E</td> </tr> <tr> <td>4</td> <td>9°43'36.19"N</td> <td>77°20'12.10"E</td> </tr> </tbody> </table>		Pit ID	Latitude	Longitude	1	9°43'40.17"N	77°20'16.87"E	2	9°43'37.92"N	77°20'20.54"E	3	9°43'33.94"N	77°20'15.78"E	4	9°43'36.19"N	77°20'12.10"E
Pit ID	Latitude	Longitude														
1	9°43'40.17"N	77°20'16.87"E														
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3	9°43'33.94"N	77°20'15.78"E														
4	9°43'36.19"N	77°20'12.10"E														
Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	: It is an barren Land.															
b. <i>Attach a general location and vicinity map showing area boundaries and existing and proposed access 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.</i>	: Refer plate no-IA & IB															

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Kamayagoundanpatti	2.18Km	West
b.	Nearest police station	Royappanpatti	4.95km	North



c.	Nearest fire station	Cumbum	6.45km	West
d.	Nearest medical facility	Kamayagoundanpatti	2.45Km	West
e.	Nearest school	Kamayagoundanpatti	2.18km	West
f.	Nearest railway station	Theni	35.0km	North
g.	Nearest port facility	Thoothukudi	149km	Southeast
h.	Nearest airport	Madurai	83.2km	East
i.	Nearest DSP office	Uthamapalayam	8.9km	Northwest
j.	Nearest villages	Rayappanpatti	4.6Km	North
		Anaipatti	2.7Km	Northwest
		Kamayagoundanpatti	1.9Km	West
		Narayanattevanpatti	2.9km	Southwest



PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

(a) Briefly describe the topography and general geology and local/mine geology of the mineral deposit including drainage pattern:

(i)	Topography	:	The proposed lease area is Hillock topography. The maximum elevation (560m) was observed in Northeast side of the site, while the minimum elevation (490m) was observed Southwest side of the site. The slope is towards Southwest side and falls in Toposheet no. 58- G/6.
(ii)	<p>a) General Geology of the District: Crystalline rocks of Archaean to late Proterozoic age occupy over 80% of the area of the state of Tamil Nadu. The high-grade metamorphic rocks are well exposed in southern Tamil Nadu (Theni district) on the moderate to steeply sloping hills. These rocks are characterized into three Groups, namely i. Khondalite Group comprises quartzite, pyroxene granulite, calc gneiss / crystalline limestone, garnet sillimanite / garnet-cordierite ± spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo feldspathic gneiss (leptynite). ii. Charnockite Group consisting of acid charnockite and pyroxene granulite. iii. Migmatite Complex, represented by hornblendebiotite gneiss, grey granitic gneiss and pink migmatite.</p> <p>b) Soils: The district is characterized by Red, Black and Brown soils. The major part of the area is characterized by red soil, which can be either transported or lateritic. These are medium to heavy textured soils with moderate to higher permeability. The black soils are limited to less than 1% of the area. They are fine textured with low permeability. The brown soils are limited to less than 1% of the area and they characterized by low permeability.</p> <p>c) Lineaments: The NNE-SSW trending structurally controlled Kambam Valley comprises the following landforms. The Archaean rock are exposed in the pediments, amphitheatre, ridges, monadnocks and inselbergs, The plain areas are away from the pediment and the slopes of pediments with minor gullies and hills, delineated as Cumbam surface. The data have been checked by field studies and Survey of India topographical maps at the 1:1,00,000 scale.</p>		



Age	Group	Rock Formation
Recent to Sub recent	---	Topsoil Soil
Archaean to Lower Proterozoic	Khondalite Group	Quartzite, pyroxene granulite, calc gneiss / crystalline limestone, garnet sillimanite
Archaean	Charnockite Group	Charnockite and pyroxene granulite
	Migmatite Complex	Hornblende biotite gneiss, grey granitic gneiss and pink migmatite

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

Topography of the proposed lease area:

The proposed lease area is Hillock topography. The maximum elevation (560m) was observed in Northeast side of the site, while the minimum elevation (490m) was observed Southwest side of the site. The slope is towards Southwest side.

Residual Topsoil is obtained about 0-1m hill slope and rough stone starts from 1-85m Which is 70m above base level 15m below base level. The charnockite forms as country rock in the area with trending of NE-SW, slope towards SW. The Surface plan showing elevation, contour, accessibility road and Geological map was prepared the proposed lease area.

Mode of origin:

The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures.

Physiography of the rocks:

General characteristics of the rocks of this series has recorded that the rocks are in general bluish gray or darkish in colour and extremely fresh in appearance with an even grained granular structure

Chemical composition of rocks:

The compositional characteristics of coexisting orthopyroxene, garnet and biotite have established several petrographic varieties within the



Charnockites-Enderbites such as the granulite's and gneisses. Plagioclase feldspars, alkali feldspars and quartz are the salic minerals present in this series of rocks. **Order of superposition of the proposed lease area,**

Age	Group	Rock Formation
Recent to Sub recent	---	Topsoil (Clayey soil)
Archaean	Charnockite Group	Charnockite.

(iv) Drainage Pattern : There is no major river situated around 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: : The RQP examined the surface features during survey. It is an fresh quarry lease.

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 on a scale of 1: 1000 / 1: 2000: : Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:1000, 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 :-*
 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 85m (width is 70m above base level and 15m below base level) for five years plan period. (Refer Plan No. III & IIIA). The longitudinal and transverse cross sections were assigned XY-AB, & XIY1-AB as respectively. Using the cross-sectional method, total reserve is estimated to be **1217328m³** including the resources of safety zone, and topsoil, etc. Of which, rough stone resources of about **1188755m³** and residual topsoil is **28573m³**

GEOLOGICAL RESOURCES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough Stone in m ³	Residual Topsoil in m ³
XY-AB	Hill Slope	190	77	1	14630	.....	14630
	I	103	2	5	1030	1030	.....
	II	152	9	5	6840	6840	.....
	III	190	18	5	17100	17100	.....
	IV	190	27	5	25650	25650	.....
	V	190	37	5	35150	35150	.....
	VI	190	46	5	43700	43700	.....
	VII	190	59	5	56050	56050	.....
	VIII	190	68	5	64600	64600	.....
	IX	190	68	5	64600	64600	.....
X	190	68	5	64600	64600	.....
TOTAL					393950	379320	14630
XIY1-AB	Hill Slope	191	73	1	13943	.....	13943
	I	59	12	5	3540	3540	.....
	II	99	20	5	9900	9900	.....
	III	137	27	5	18495	18495	.....
	IV	170	34	5	28900	28900	.....
	V	190	42	5	39900	39900	.....
	VI	190	48	5	45600	45600	.....
	VII	190	58	5	55100	55100	.....
	VIII	190	64	5	60800	60800	.....
	IX	190	64	5	60800	60800	.....
	X	190	64	5	60800	60800	.....
	XI	190	64	5	60800	60800	.....
	XII	190	64	5	60800	60800	.....
	XIII	190	64	5	60800	60800	.....
	XIV	190	64	5	60800	60800	.....
	XV	190	64	5	60800	60800	.....
	XVI	190	64	5	60800	60800	.....
XVII	190	64	5	60800	60800	.....
TOTAL					823378	809435	13943
GRAND TOTAL					1217328	1188755	28573



(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 256413m^3 by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 85m (which is 70m above base level and 15m below base level). Of which, rough stone is about 234590m^3 and residual topsoil is 21823m^3 . 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 1:1000 as vertical axis (Refer plate no's.VI & VIA).

MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m^3	Rough Stone in m^3	Residual Topsoil in m^3
XY-AB	Hill Slope	170	65	1	11050	.....	11050
	I	93	2	5	930	930	.....
	II	137	9	5	6165	6165	.....
	III	160	18	5	14400	14400	.....
	IV	150	27	5	20250	20250	.....
	V	140	37	5	25900	25900	.....
	VI	130	41	5	26650	26650	.....
	VII	120	48	5	28800	28800	.....
	VIII	110	38	5	20900	20900	.....
	IX	100	28	5	14000	14000	.....
	X	90	18	5	8100	8100	.....
TOTAL					177145	166095	11050
X1Y1-AB	Hill Slope	171	63	1	10773	.....	10773
	I	49	2	5	490	490	.....
	II	86	5	5	2150	2150	.....
	III	118	7	5	4130	4130	.....
	IV	145	9	5	6525	6525	.....
	V	150	12	5	9000	9000	.....
	VI	140	13	5	9100	9100	.....
	VII	130	18	5	11700	11700	.....
	VIII	120	19	5	11400	11400	.....
	IX	110	14	5	7700	7700	.....
	X	100	9	5	4500	4500	.....
	XI	90	4	5	1800	1800	.....
TOTAL					79268	68495	10773
GRAND TOTAL					256413	234590	21823



4.0 MINING:

a) Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.
(Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)

: The mining operation is open-cast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.

b) **Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.**

Total proposed production rough stone is about **234590m³** and residual topsoil is **21823m³** up to a depth of 85m (which is 70m above base level and 15m below base level) for five years plan period. (Refer Plate No's. IV & 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	10773	53868	43095	...	...	...	1:4.0
Second	I	11050	57945	46895	...	...	...	1:4.2
Third	I	...	46150	46150	...	...	...	...
Fourth	I	...	49450	49450	...	...	...	...
Fifth	I	...	49000	49000	...	...	...	...
Total	—	21823	256413	234590	...	...	...	1:4.1

c) **Composite plans and Year wise sections (In case of 'A' class mines):**

: Not applicable. It is a "B" class quarry lease

YEARWISE PRODUCTION RESERVES								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough Stone in m ³	Residual Topsoil in m ³
I-YEAR	X1Y1-AB	Hill Slope	171	63	1	10773	.....	10773
		I	49	2	5	490	490	.....
		II	86	5	5	2150	2150	.....
		III	118	7	5	4130	4130	.....



		IV	145	9	5	6525	6525	.....
		V	150	12	5	9000	9000	.....
		VI	140	13	5	9100	9100	.....
		VII	130	18	5	11700	11700	.....
		TOTAL				53868	43095	10773	
II-YEAR	XIYI-AB	VIII	120	19	5	11400	11400	.....
		IX	110	14	5	7700	7700	.....
		X	100	9	5	4500	4500	.....
		XI	90	4	5	1800	1800	.....
	XY-AB	Hill Slope	170	65	1	11050	.....	11050
		I	93	2	5	930	930	.....
		II	137	9	5	6165	6165	.....
		III	160	18	5	14400	14400	.....
			TOTAL				57945	46895	11050
	III-YEAR	XY-AB	IV	150	27	5	20250	20250
V			140	37	5	25900	25900	.....
			TOTAL				46150	46150	0
IV-YEAR	XY-AB	VI	130	41	5	26650	26650	.....
		VII	95	48	5	22800	22800	.....
			TOTAL				49450	49450	0
V-YEAR	XY-AB	VII	25	48	5	6000	6000	.....
		VIII	110	38	5	20900	20900	.....
		IX	100	28	5	14000	14000	.....
		X	90	18	5	8100	8100	.....
		TOTAL				49000	49000	0	
GRAND TOTAL						256413	234590	21823	

d)	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	:	Composite plan not prepared in this proposed lease area
e)	<p><i>Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:</i></p> <p>At this rate of production, the expected life of quarry is calculated as given below:</p> <p>Rough stone:</p> <p>Mineable reserves of rough stone = 234590m³</p> <p>Yearly production = 46918m³</p> <p>Monthly production of rough stone = 3910m³</p>		
f)	<p><i>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)</i></p>		



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 85m (which is 70m above base level and 15m below base level) (R.L.560m to 475m) from the petrogenetic character of the charnockite rock as well as from the actual mining practice in the area and with the current trend of rough stone production the quarry may sustain for 5 years.

ii) Whether ultimate pit limit has been determined and demarcated on surface and geological plan :-

The ultimate pit limit has been determined and demarcated in the conceptual plan

SECTION XY-AB					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
---	5 years	Residual Topsoil	170	65	1
I		Rough stone	93	2	5
II			137	9	5
III			160	18	5
IV			150	27	5
V			140	37	5
VI			130	41	5
VII			120	48	5
VIII			110	38	5
IX			100	28	5
X			90	18	5
SECTION XIYI-AB					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
---	5 years	Residual Topsoil	171	63	1
I		Rough stone	49	2	5
II			86	5	5
III			118	7	5
IV			145	9	5
V			150	12	5
VI			140	13	5
VII			130	18	5
VIII			120	19	5
IX			110	14	5
X			100	9	5
XI	90	4	5		

iii) Whether the site for disposal of waste rock or an un- : The recovery of rough stone in this quarry is 100%. There is no waste rock will be



	saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: -		proposed in this lease area.
iv)	Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal: -	:	As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.
v)	Whether post mining land use envisaged: -	:	At the end of mining activities over the quarry pit may be utilized for storage of rain water and may be converted in to dumping yards for solid waste by adopting suitable technologies.
g)	Open cast mining		
i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	:	The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.
ii)	Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/waste. A reference 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 and transported to the needy



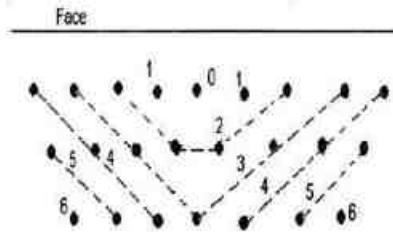
		customer. Bench height = 5mts. Bench width = 5mts.																																													
a.	Details of Topsoil/Overburden	The residual topsoil 21823m ³ shall be removed and dumped all along the safety area.																																													
b.	Rough Stone waste and side burden waste:-	The recovery of rough stone in this quarry is 100%. There is no rough stone waste or side burden will be removed.																																													
H	Underground Mining	Not applicable																																													
i)	<p>Extent of mechanization: Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.</p> <p>(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.</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Dia of hole (mm)</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Jack Hammer</td> <td>2</td> <td>32 mm</td> <td>Hand held</td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> <tr> <td>Compressor</td> <td>1</td> <td>---</td> <td>Air</td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> </tbody> </table> <p>(2) Loading Equipment:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Hydraulic Excavator</td> <td>1</td> <td>2.9-4.5m³</td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> </tbody> </table> <p>(3) Haulage and Transport Equipment (a) Haulage within the mining leasehold:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Tipper</td> <td>7</td> <td>--</td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> </tbody> </table> <p><i>Whether the dumpers are fitted with exhaust conditioner should be indicated:</i> The dumpers not used in this quarry area, hence it's a small B2 category mine.</p>		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	--	Type	Nos	Size / Capacity	Make	Motive power	H.P.	Hydraulic Excavator	1	2.9-4.5m ³	--	Diesel	--	Type	Nos	Size / Capacity	Make	Motive power	H.P.	Tipper	7	--	--	Diesel	--
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b)	Transport from mine head to the destination	Tipper will be used for transport rough stone from the mine head to needy customer.																																													
c)	Describe briefly the transport system (please specify)	Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customer's area.																																													



i) Ore transported by: own trucks / hired trucks	Hired trucks for initially production purposes																					
ii) Main destination to which ore is transported (giving to and from distance)	The excavated stone materials road metal will be supplied to the consumers like road laying, earth filling, building construction, etc																					
a) Details of hauling / transport equipment:																						
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4) (4). Miscellaneous: Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.																						
(A) Operations	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.																					
(B) Machineries deployed	Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted.																					
<p>5 BLASTING:</p> <p>a) <i>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.</i></p> <p>Blasting pattern:</p> <p>The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.</p> <table border="1"> <tr> <td>1</td> <td>Diameter of the hole</td> <td>32 mm</td> </tr> <tr> <td>2</td> <td>Spacing between hole</td> <td>1.2m</td> </tr> <tr> <td>3</td> <td>Burden for hole</td> <td>1.0m</td> </tr> <tr> <td>4</td> <td>Depth of each hole</td> <td>1.5m</td> </tr> <tr> <td>5</td> <td>Output per hole = Spacing × Burden × depth 1.2 × 1.0 × 1.5 = 1.8</td> <td>1.8m</td> </tr> <tr> <td>6</td> <td>Output per hole = 1.8 x 2.8 = 5.04 T</td> <td>5.04 MT</td> </tr> <tr> <td>7</td> <td>Production per annum 46918m³ * 2.8= 131370MT</td> <td>131370MT</td> </tr> </table>		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	1.8m	6	Output per hole = 1.8 x 2.8 = 5.04 T	5.04 MT	7	Production per annum 46918m ³ * 2.8= 131370MT	131370MT
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8	Total handling per day (280 working day)	469MT
9	Nos. of holes per day (469/5.04 = 93)	93holes.
10	Meterage required per day (93× 5.5 = 512)	512meters
11	Charge per hole	0.375kg
12	Powder factor 93X 0.375 kg =35	35kg



Staggered method of mining

b) Type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

Small dia. 25mm slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of rough stone. No deep hole drilling or primary blasting is proposed.

c) Measures proposed to minimize ground vibration due to blasting:

The control blasting measures is being adopted for minimizing ground vibration and fly rock.

Shallow depths 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	:	93holes
Yield	:	469MT



	Total explosive required	:	35kg-Slurry explosives
	Charge per hole	:	0.5kg
	Blasting at day time only	:	12.0p.m-1.0p.m
c)	Powder factor in ore and overburden / waste / development heading / stope	:	Powder factor is proposed as 0.375kg per hole of explosives
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.
e)	Storage of explosives (like capacity and type of explosive magazine)	:	<ol style="list-style-type: none"> 1. The applicant is advised to engage an authorized explosive agency to carry out blasting. 2. First Aid Box will be keeping ready at all the time. 3. Necessary precautionary announcement will be carried out before the blasting operation.
6.	MINE DRAINAGE:		
a)	Likely depth of water table based on observations from nearby wells and water bodies	:	The ground water table is reported as of 55m in summer and 50m in rainy season from the general ground level observed in the adjacent bore well.
b)	Workings expected to be _____ m. above / reach below water table by the year _____	:	Proposed mining depth is 85m (which is 70m above base level and 15m below base level). Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.
c)	Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is	:	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



	finally proposed to be discharged		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 or any other wastes are removed during next five years.		
b).	Land chosen for disposal of waste with proposed justification	:	The residual topsoil 21823m³ shall be removed and dumped all along the safety area and may be used for plantation purpose.
c).	Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise.	:	The recovery of rough stone in this quarry is 100%. If rough stone may be unsold will be keep within the lease boundary.
8.	USE OF MINERAL:		
a).	Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc
b).	Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone (charnockite) and gravel the same are used for building materials and road metal. So, there is no chemical specifications are specified. Only physical specifications are involved.
c).	Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.	:	Not blending process is involved, after blasting the rough stone and gravel will be directly loaded to the needy customer.



9.	OTHERS										
	<p>Describe briefly the following</p> <p>a) Site services</p>	<p>: Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and booth rooms have been provided as per the Metalliferous Mines Regulations, 1961 as a welfare amenity for our quarry laborers.</p>									
	<p>b) Employment potential:</p> <p>As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision.</p> <p>The following man power is proposed for quarrying rough stone during the five years period the same manpower will be utilize for this Mining Plan period to achieve the proposed production and to comply the provisions of the DGMS norms.</p>										
	1.	<table border="1"> <tr> <td>Highly Skilled</td> <td>IInd class Mines Manager</td> <td>1No.</td> </tr> <tr> <td></td> <td>Mine Geologist</td> <td>1No.</td> </tr> <tr> <td></td> <td>Blaster</td> <td>1No.</td> </tr> </table>	Highly Skilled	IInd class Mines Manager	1No.		Mine Geologist	1No.		Blaster	1No.
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	Musdoor / Labours	8 No's									
	<p style="text-align: right;">Total = 20 No's</p>										
10	MINERAL PROCESSING/BENEFICIATIONS:										
(a)	<p>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.</p>	<p>: Excavated rough stone minerals directly will be used by the applicant for required size ½, ¼ and 1½ inches Jelly which are mainly used in road and building construction purpose.</p> <p>The recovery of rough stone in this quarry is 100%.</p>									



(b)	Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	: No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.
(c)	A flow sheet or schematic diagram of the processing procedure should be attached.	: Not applicable.
(d)	Specify quantity and type of chemicals to be used in the processing plant.	: Not applicable
(e)	Specify quantity and type of chemicals to be stored on site / plant.	: Not applicable
(f)	Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and of recycling.	: Drinking is 0.3KLD, utilized water is 1.0KLD, Dust suppression is 0.75KLD and Green Belt is 0.5KLD. Minimum quantity of water 2.55KLD per day. It is proposed to make an own bore well for providing uninterrupted supply of RO drinking water, dust suppression and green belt development. The sewage water to a tune of 0.8KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit.

PART – B



11.0 ENVIRONMENTAL MANAGEMENT PLAN:

a) Attach a note on the status of Baseline information with regard to the following :

11.1	Fresh lease land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Sl. No.</th> <th style="width: 45%;">Land Use</th> <th style="width: 40%;">Present area (Hect.)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.</td> <td>Area under Mining</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Infrastructure</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Roads</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Unutilized</td> <td style="text-align: center;">2.50.0</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Green belt</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Settling Tank & Drainage</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td colspan="2" style="text-align: center;">Grand Total</td> <td style="text-align: center;">2.50.0</td> </tr> </tbody> </table>			Sl. No.	Land Use	Present area (Hect.)	1.	Area under Mining	Nil	2	Infrastructure	Nil	3	Roads	Nil	4	Unutilized	2.50.0	5	Green belt	Nil	6	Settling Tank & Drainage	Nil	Grand Total		2.50.0
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11.2	Water Regime	: Water table in this area is noticed at a depth of 55m in summer and 50m in rainy season from the general ground level and presently the quarrying of rough stone is proposed up to a depth of 85m (Which is 70m above base level and 15m below base level). Hence, it will not affect the ground water depletion of this area. It is made own borewell for providing uninterrupted supply of RO drinking water, dust suppression and 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	<p>Climatic conditions:</p> <p>In the plains, the temperatures ranges from a minimum of 19.9°C to a maximum of 39.5°C. In the hills the temperatures can range from as low as 4-5°C to 25°C. The mean daily minimum temperature varies from 20.9°C (January) to 26.3°C (May) and mean daily maximum temperature varies from 29.7°C (December) to 37.5°C (May). The district is known for its salubrious climate. Theni District comes under the Western Agro climatic Zone. In general, the humidity is high and during the month of November, it is highest. The relative humidity ranges from 37 to 75 percent.</p>																										
11.6	<p>Human Settlement:</p> <p>The nearest villages are found in the buffer zone with population as per 2011 census.</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Village</th> <th>Direction</th> <th>Distance in Kms</th> <th>Population</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Rayappanpatti</td> <td>North</td> <td>4.6Km</td> <td>15886</td> </tr> <tr> <td>2</td> <td>Anaipatti</td> <td>Northwest</td> <td>2.7Km</td> <td>5212</td> </tr> <tr> <td>3</td> <td>Kamayagoundanpatti</td> <td>West</td> <td>1.9Km</td> <td>16134</td> </tr> <tr> <td>4</td> <td>Narayanattevanpatti</td> <td>Southwest</td> <td>2.9km</td> <td>14622</td> </tr> </tbody> </table>		S.No	Village	Direction	Distance in Kms	Population	1	Rayappanpatti	North	4.6Km	15886	2	Anaipatti	Northwest	2.7Km	5212	3	Kamayagoundanpatti	West	1.9Km	16134	4	Narayanattevanpatti	Southwest	2.9km	14622
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11.7	Public buildings, places of worship and monuments	: No infrastructure like residential building, are found within radius of 300m. The places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.																									
11.8	Attach plans showing the locations of sampling stations	: The proposed Ambient air quality, Water quality Ambient noise level and vibration are periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.																									
11.9	Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974	: The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974																									



b) Attach an Environmental Impact Assessment Statement describing the impacts of Mining and beneficiation on environment on the following over the next five years (and upto conceptual plan period for 'A' category mines)

i)	<p><i>Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc:</i></p> <p>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:</p>																						
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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 and gravel 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 river or any odai track are found around 50m radius.
vii).	Socio-economics	1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.	There are no historical monuments, etc found around 300m radius.

c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

i).	temporary storage and utilization of topsoil	: The residual topsoil 21823m³ shall be removed and dumberd all along the safety area and may be used for plantation purpose.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.	: The present mining is proposed to an average depth of 85m (Which is 70m above base level and 15m below base level) from the below ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
iii).	<p><i>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.</i></p> <p>Green Belt Development:</p> <p>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</p>	



Year	Place	Area in Sq.m	No. of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	6834	760	80%		76,000/-
Second	Approach road and Nearby Village Road	--	300	80%	@100 Rs Per sapling	30,000/-
Third	Schools	--	300	80%		30,000/-
Total						1,36,000/-
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).	:	The residual topsoil 21823m³ shall be removed and dumberd all along the safety area and may be used for plantation purpose.			
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 open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.			
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.			
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.			



d). *Monitoring schedules for different environmental components after 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 85m (Which is 70m above base level and 15m below base level). The mined-out area will be fenced on top of working bench with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 760 trees will be proposed in the quarry area. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	The quarry lease is a fresh mining lease, no mitigation measures observed.
12.4	Mine closure activity	:	The present mining plan is proposed to depth of 85m (Which is 70m above base level and 15m below base level) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the



			<p>circulars and amendments made for Mitigation of dust and noise to the labours under the guidance of DGM, being a mechanized operation.</p>
12.6	Disaster management and Risk Assessment	:	<p>Open cast mining method is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.</p>
12.7	Care and maintenance during temporary discontinuance	:	<p>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.</p>
12.8	Economic repercussions of closure of quarry and man power entrenchments	:	<p>During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 14 labours will be improved.</p>

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

A	Fixed Asset Cost:	
	1. Land Cost (Tender Cost)	: Rs. 32,83,330/-
	2. Labour Shed	: Rs. 1,00,000/-
	3. Sanitary Facility	: Rs. 1,00,000/-
	4. Fencing	: Rs. 1,50,000/-
	5. Other expenses (Security guard, dust bin, etc)	: Rs. 4,00,000/-
	Total	: Rs. 40,33,330/-



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. 1,50,000/-
	4. Afforestation and its maintenance	:	Rs. 1,36,000/-
	5. Safety Kits	:	Rs. 1,00,000/-
	6. Provision of tyre washing facility	:	Rs. 1,00,000/-
	7. Surface runoff management structures like garland drain, settling pond & Bund	:	Rs. Nil
	8. Blasting materials with blast mat cost	:	Rs. 10,00,000/-
	9. Environment monitoring	:	Rs. 5,00,000/-
	Total	:	Rs. 21,86,000/-
D	Total Project Cost (A+B+C)	:	Rs. 82,19,330/-

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small B2 rough stone quarry.

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- (i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (ii) The applicant will endeavor every attempt to quarry the rough stone economically without any wastage and to improve the environment and ecology.
- (iii) The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued by the Assistant Director, Department of Geology and Mining, Theni vide letter **Rc.No.1049/Mines/2022 Dated 10.08.2023.**
- (iv) Total proposed production rough stone is **234590m³** up to a depth of 85m (Which is 70m above base level and 15m below base level) for five years plan period.



17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the applicant @ 2.0% 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: 22/8/23

Signature of the Recognized Qualified Person

Dr.S.KARUPPANNAN, M.Sc, Ph.D.,
RQP/M7-5/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, TamilNadu, India

This Mining Plan is approved based on incorporation of the particulars specified under guidelines given by the Commissioner of Geology and Mining (Rec. No: 10 49/12/2012 Dated 19-11-2012

Assistant Director,
Geology and Mining
Chennai

This Mining Plan is approved subject to the condition / Stipulated and indicated in the Mining Plan Approval
Rec. No:10 49/12 Dated: 4-9-2023

4/9/2023



தேனி மாவட்ட அரசிதழ்

சிறப்பு வெளியீடு

ஆணையின்படி வெளியிடப்பட்டது

தேனி, ஆகஸ்ட் 18, 2022
ஆவணி 2, சுபகிருது, திருவள்ளூர் ஆண்டு-2053

[எண் 16

மாவட்ட ஆட்சியர் அறிவிக்கை

(ந.க. எண்.883/கனிமம்/2022, நாள்: 16.08.2022)

கல்குவாரிகள் ஏல அறிவிப்பு

தேனி மாவட்டத்தில் உள்ள அரசு புறம்போக்கு நிலத்தில் அமைந்துள்ள கல்குவாரிக்கு பொன்விழா கிராம மகளிர் சுய வேலைவாய்ப்புத் திட்டக்குழு (SGSY) மற்றும் விடுவிக்கப்பட்ட கொத்தடிமை தொழிலாளர்களால் அமைக்கப்பட்ட சங்கம் ஆகியவற்றிற்கு முன்னுரிமை அடிப்படையில் நேரடியாக கல்குவாரி குத்தகை உரிமம் வழங்குதல் தொடர்பாக விண்ணப்பம் கோரும் அறிவிப்பு.

1959-ஆம் ஆண்டு தமிழ்நாடு சிறுவகைக் கனிமச் சலுகை விதிகளின் விதி எண் 8-ன் உள்விதி (10-A)-ன் படி இந்த அறிவிப்புடன் இணைக்கப்பட்டுள்ள அட்டவணையில் கண்டுள்ள அரசுப் புறம்போக்கு நிலத்தில் அமைந்துள்ள கல்குவாரியிலிருந்து சாதாரண பொது உபயோக சிறுவகை கனிமங்கள், அதாவது உடைகல், ஜல்லி, முண்டுக்கல், கட்டுக்கல், பலகைக்கல் முதலியவை மட்டும் குவாரியில் இருந்து வெட்டி எடுத்துச் செல்ல குத்தகை பெற 1983-ஆம் ஆண்டு தமிழ்நாடு கூட்டுறவுச் சங்கங்கள் சட்டத்தின் (1983-ஆம் ஆண்டு தமிழ்நாடு சட்டம் 30) அல்லது 1975-ஆம் ஆண்டு தமிழ்நாடு சங்கப் பதிவுச் சட்டத்தின் (1975-ஆம் ஆண்டு தமிழ்நாடு சட்டம் 27) கீழ் பதிவு செய்யப்பட்ட பொன்விழா கிராம சுய வேலைவாய்ப்புத் திட்டக்குழு (SGSY) மற்றும் விடுவிக்கப்பட்ட கொத்தடிமை தொழிலாளர்களால் அமைக்கப்பட்ட சங்கத்தினரால் கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு குவாரி குத்தகை உரிமம் கோரும் விண்ணப்பங்கள் தேனி மாவட்ட ஆட்சியரால் வரவேற்கப்படுகின்றன.



பகுதி I மனு செய்வதற்கான நிபந்தனைகள்

1. மேற்குறிப்பிடப்பட்டுள்ள, குத்தகைகோரும் குழு / சங்கத்தின் எல்லா உறுப்பினர்களும் கல்குவாரிகளில் குறைந்தபட்சம் இரண்டு ஆண்டுகள் வேலை செய்திருக்க வேண்டும். இதற்கான சான்றிதழை மாவட்ட ஆட்சியரிடமிருந்து பெற்று இணைக்க வேண்டும்.
2. மேற்குறிப்பிட்ட ஒவ்வொரு குழு / சங்கத்திற்கும் குவாரி குத்தகை கோரும் எல்லை வரம்பு அந்தந்த ஊராட்சி எல்லைக்கு உட்பட்டது என்று சங்கத்தின் துணை விதிகளில் குறிப்பிடப்பட்டிருக்க வேண்டும்.
3. குழு / சங்க உறுப்பினர்களின் எண்ணிக்கைக்கு ஏற்ப குத்தகைக்கு வழங்கப்பட உள்ள பரப்பைத் தீர்மானிக்க மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு.
4. குவாரி குத்தகை வழங்கப்படும் பட்சத்தில் எந்தவொரு தனி நபர் பெயரிலும் வழங்கப்படமாட்டாது. மனு செய்துள்ள குழு / சங்கத்தின் பெயரில்தான் குத்தகை வழங்கப்படும்.
5. ஒவ்வொரு குழு / சங்கத்தின் துணை விதிகளில் குறிப்பிடப்பட்டுள்ள எல்லை வரம்புக்குள் அமைந்துள்ள கல்குவாரிக்கு மட்டுமே அச்சங்கத்தினர் மனு செய்ய வேண்டும். இவ்விதிக்கு முரண்பாடாக பெறப்படும் மனுக்கள் விசாரணையின்றி தள்ளுபடி செய்யப்படும்.
6. குவாரி குத்தகை கோரும் மனுக்கள், 1959-ஆம் ஆண்டு தமிழ்நாடு சிறுவகைக் கனிமச் சலுகை விதிகளின் பின்னிணைப்பு VI B -யில் கண்டுள்ள படிவத்தில் அசல் மற்றும் இரண்டு நகல்களுடன் கொடுக்கப்படவேண்டும். அதன் மாதிரிப்படிவம் இவ்வறிவிக்கையின் கடைசியில் இணைக்கப்பட்டுள்ளது.
7. மனுவின் அசல் மற்றும் நகல்களுடன் கீழ்க்கண்ட சான்றிதழ் மற்றும் ஆவணங்களின் அசல் மற்றும் நகல்கள் இணைத்து கொடுக்கப்பட வேண்டும்.
 - (அ) திரும்ப பெற இயலாத விண்ணப்பக்கட்டணம் ரூ. 500/-ஐ தேனி மாவட்டத்தில் பாரத மாநில வங்கி / மாவட்ட கருவூலத்தில் செலுத்தி அதற்குண்டான அசல் சலான்
 - (ஆ) சங்கம் பதிவு செய்யப்பட்டதற்கான சான்றிதழின் ஒப்புதல் அளிக்கப்பட்ட நகல்.
 - (இ) சங்கத்தின் துணை விதிகளின் ஒப்புதல் அளிக்கப்பட்ட நகல்.



- (ஈ) சங்கத்தின் வருமான வரி சான்றிதழ் அல்லது வருமான வரி திட்டம், 1961-ன்படி செலுத்தப்பட்டதற்கான ஆணை உறுதி ஆவணம், சான்று உறுதி அலுவலரிடம் ஒப்புதல் பெற்று இணைக்கப்பட வேண்டும்.
- (உ) ஏற்கனவே சங்கத்திற்கு குவாரி குத்தகை, சுரங்க குத்தகை பெறப்பட்டிருந்தால் "சுரங்க வரி நிலுவை இன்மை" சான்று
- (ஊ) ஏற்கனவே சங்கத்தினர் குவாரி குத்தகை ஏதும் பெற்றிருக்கவில்லையெனில், சுரங்கவரி செலுத்த தேவையில்லை என்பதற்கான ஆணை உறுதி ஆவணம் சான்று உறுதி அலுவலரிடம் ஒப்புதல் பெற்று இணைக்கப்பட வேண்டும்.
- (எ) சங்க உறுப்பினர்களின் பெயர் மற்றும் முகவரிப் பட்டியல்கள், உறுப்பினர்களின் எண்ணிக்கையுடன் இணைக்கப்பட வேண்டும்.
- (ஏ) ஒவ்வொரு உறுப்பினரும் இரண்டு ஆண்டுகளுக்கு குறையாமல் கல்குவாரி பணி செய்ததற்கான சம்பந்தப்பட்ட மாவட்ட ஆட்சியரிடம் பெறப்பட்ட சான்றின் நகல் இணைப்பட வேண்டும்.
- (ஐ) தமிழ்நாட்டில் மாவட்ட வாரியாக மனுதாரர் சங்கத்திற்கு ஏற்கனவே பெறப்பட்ட குவாரி குத்தகை விவரங்கள், குத்தகை கோரி நிலுவையில் உள்ள மனுக்கள் பற்றிய விவரங்கள் அடங்கிய ஆணை உறுதி ஆவணம், சான்று உறுதி அலுவலரிடம் ஒப்புதல் பெற்று இணைக்கப்பட வேண்டும்.

8. விவரங்கள் எழுதி பூர்த்தி செய்யப்பட்ட மனுவுடன் மேற்குறிப்பிட்ட ஆவணங்களை இணைத்து ஒரு அசல் மற்றும் இரண்டு நகல்களுடன் மூன்று பிரதிகளை 15.09.2022 அன்று மாலை 05.00 மணிக்குள் மாவட்ட ஆட்சியர் அவர்களுக்கு முகவரியிட்டு, கீழ் குறிப்பிடப்படும் அலுவலரிடம் ஒப்படைத்து அதற்குரிய ஒப்புரை சான்றிதழ் பெற்றுக்கொள்ள வேண்டும்.

"உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை அலுவலகம்,
அறை எண். 51, 2-ம் தளம்,
மாவட்ட ஆட்சியர் அலுவலக வளாகம்,
தேனி - 625 531

9. மேற்குறிப்பிடப்பட்டுள்ள காலத்திற்குள் பெறப்பட்ட மனுக்கள் ஆய்வு செய்யப்பட்டு மனு மற்றும் ஆவணங்களில் காணப்படும் குறைகளை நிவர்த்தி செய்யக்கோரி பதிவு அஞ்சல் மூலம் மனுதாரர் சங்கத்திற்கு அனுப்பப்படும்.



10. நிபந்தனை 9-ல் குறிப்பிடப்படும் தகவலைப் பெற்றுக்கொண்ட பதினைந்து தினங்களுக்குள் குறைகளை நிவர்த்தி செய்து தேவைப்படும் ஆவணங்களை மனுதாரர் சங்கத்தினர் / குழுவினர் மாவட்ட ஆட்சியரிடம் ஒப்படைக்க வேண்டும்.

11. மேற்குறிப்பிட்டவாறு உரிய காலத்திற்குள் ஆவணங்கள் மற்றும் குறைபாடுகள் ஆகியவற்றைத் தீர்வு செய்யாத சங்கத்தினர் / குழுவினர் மனுக்கள் விசாரணையின்றி உடனடியாக தள்ளுபடி செய்யப்படும்.

12. மாவட்ட ஆட்சியரை தலைவராகக் கொண்டும், மாவட்ட ஊராட்சி மன்றத் தலைவர் மற்றும் குவாரி அமைந்துள்ள ஊராட்சி ஒன்றியத் தலைவர் / தனி அலுவலரை உறுப்பினராகக் கொண்டும், ஊரக வளர்ச்சித் துறையின் கூடுதல் ஆட்சியர் பதவிக்கு இணையான அலுவலர் மற்றும் புவியியல் மற்றும் சுரங்கத்துறை உதவி இயக்குநரை அலுவல் சார்ந்த உறுப்பினராகக் கொண்டும் அமைந்துள்ள சிறப்பு குழுவின் முன்னிலையில் மனு பரிசீலிக்கப்பட்டு இறுதி ஆணை பிறப்பிக்கப்படும்.

13 (அ). மேற்குறிப்பிடப்பட்ட மனுவை ஆய்வு செய்யும்போது குவாரி குத்தகை கோரி விண்ணப்பித்துள்ள சங்கத்தின் தலைவரோ அல்லது அவரால் நியமனம் செய்யப்பட்ட வேறு நபரோ சிறப்பு அழைப்பாளராக அனுமதிக்கப்படுவர்.

(ஆ). சங்கத்தின் தலைவரால் சிறப்பு அழைப்பாளராக நியமிக்கப்படுபவர், சான்றுறுதி அலுவலர் முன்பு நியமனக் கடிதத்தில் மாதிரி கையொப்பமிட்டு அதனை சங்கத்தலைவரால் மேலொப்பம் செய்யப்பட்டு, சான்று உறுதி அலுவலரின் ஒப்புதல் பெற்று மனுக்களை ஆய்வு செய்யும்போது ஒப்படைக்க வேண்டும்.

14. மனுக்களை ஆய்வு செய்ய குறிப்பிடப்பட்ட நாள் மற்றும் நேரத்தில் குழு உறுப்பினர்கள் மற்றும் பதிவு சார்ந்த உறுப்பினர்கள் யாரேனும் ஆய்வுக்கு வரவில்லையென்றால், மனு ஆய்வுப்பணி தள்ளி வைக்கப்பட மாட்டாது.

15 (அ). சிறப்பு குழுவின் பரிந்துரையின் அடிப்படையில் குவாரி குத்தகை கோரும் மனுவினமீது மாவட்ட ஆட்சியரால் ஆணை பிறப்பிக்கப்படும்.

(ஆ). ஆய்வு செய்ய வந்திருக்கும் சிறப்புக் குழுவின் உறுப்பினர்களிடையே மனு மீது குத்தகை வழங்குவது தொடர்பாக கருத்து வேறுபாடு இருப்பின் பெரும்பாலான உறுப்பினர்கள் கருத்து மாவட்ட ஆட்சியரால் ஏற்றுக் கொள்ளப்படும்.



(இ). மனுதாரர் சங்க உறுப்பினர்களின் பணித்திறன், நடத்தைமுறை நிதிவசதி, உறுப்பினர்களின் அனுபவம் ஆகியவற்றின் உண்மை நிலையை கருத்தில் கொண்டு சிறப்புக் குழு குத்தகை கோரும் சங்கத்தின் மனுவினமீது அளிக்கும் பரிந்துரையை ஏற்று குவாரி குத்தகை வழங்குவது பற்றி மாவட்ட ஆட்சியரால் முடிவெடுக்கப்படும்.

(ஈ). பொன்விழா கிராம சுயவேலை வாய்ப்புத் திட்டக்குழு மற்றும் விடுவிக்கப்பட்ட கொத்தடிமை தொழிலாளர் சங்கங்கள் ஆகியோர் ஒரே குவாரிக்கு குத்தகை கோரி விண்ணப்பித்திருந்தால், விடுவிக்கப்பட்ட கொத்தடிமை தொழிலாளர் சங்கத்திற்கு விதிகளின்படி இருந்தால் முன்னுரிமை அடிப்படையில் குவாரி குத்தகை வழங்கப்படும்.

பகுதி II குத்தகை பெறுவது தொடர்பான நிபந்தனைகள்

1. மேற்குறிப்பிட்டவாறு முடிவு செய்யப்பட்டு வழங்கப்படும் குவாரி குத்தகை காலம் குத்தகை ஒப்பந்தப் பத்திரம் நிறைவேற்றப்பட்ட நாளிலிருந்து ஐந்து ஆண்டுகளுக்கு உரியதாகும். ஆனால் சரியான காரணங்களின் அடிப்படையில் குத்தகை காலத்தை ஐந்து ஆண்டுகளுக்கு குறைவாகவும் மாவட்ட ஆட்சியர் நிர்ணயிக்கலாம். குத்தகை காலமானது எக்காரணத்தினைக் கொண்டும் நீட்டிப்பு செய்து வழங்கப்பட மாட்டாது.

2. குத்தகையாளர் சங்கத்தினர் / குழுவினர் குவாரியிலிருந்து வெட்டி வெளியில் எடுத்துச்செல்லும் கனிமங்களுக்கு சீனியரேஜ் தொகை அல்லது குத்தகை பரப்பிற்குரிய முடக்குவரி (Dead rent) இரண்டில் எது அதிகமோ அதை தமிழ்நாடு சிறுவகைக் கனிமச் சலுகை விதிகள், 1959-ன் பின்னிணைப்பு-II-ல் கண்டுள்ளவாறு அவ்வப்போது அரசு நிர்ணயிக்கும் விகிதத்தில் கணக்கிட்டு அரசுக்கு செலுத்துவதுடன் பின்வரும் நிபந்தனை 3-ல் குறிப்பிட்டவாறு குத்தகைத் தொகையை அரசுக்குச் செலுத்த வேண்டும்.

3 (அ). குத்தகைக்கு வழங்கப்படும் குவாரி அமைந்துள்ள ஊராட்சி ஒன்றிய எல்லைக்குள் உள்ள ஏற்கனவே டெண்டர் முறையிலோ அல்லது டெண்டருடன் இணைந்த பொது ஏல முறையிலோ குத்தகைக்கு வழங்கப்பட்ட எல்லா குவாரிகளின் மொத்த குத்தகைத்தொகையின் சராசரியை கணக்கிடப்படும். குத்தகைக்கு வழங்கப்பட உள்ள புலம் அமைந்துள்ள ஊராட்சி ஒன்றிய எல்லைக்குள், டெண்டர் அல்லது டெண்டருடன் இணைந்த பொது ஏலத்தில் குவாரிகள் ஏதும் வழங்கப்பட்டிருக்காத பட்சத்தில் மாவட்டம் முழுவதும் டெண்டர் அல்லது டெண்டருடன் இணைந்த பொது ஏலமுறையில் ஏலம் விடப்பட்ட எல்லா



குவாரிகளுக்கும் பெறப்பட்ட மொத்த ஏலத் தொகையின் சராசரி கணக்கிடப்படும் கணக்கிடப்பட்ட மொத்த குத்தகை தொகையில் 50 சதவீதம் தள்ளுபடி செய்யப்பட்டு மீதமுள்ள 50 சதவீத தொகையானது தற்போதைய வழங்கப்படும் குவாரிக்கு ஒருமுறை குத்தகைத் தொகையாக நிர்ணயம் செய்யப்படும். நிர்ணயம் செய்யப்பட்ட குத்தகையை நான்கு தவணைகளாக ஒவ்வொரு காலாண்டிற்கு ஒருமுறை அடுத்த காலாண்டு தொடங்குவதற்கு 15 நாட்களுக்கு முன்பே செலுத்தப்பட வேண்டும். இக்குத்தகைத் தொகையின் மீது 2% சதவீதத் தொகையை வருமான வரியாக கணக்கிட்டு, அதனை மட்டும் வருமான வரித்துறை கணக்குத் தலைப்பில் தனியாக செலுத்த வேண்டும்.

(ஆ). மேற்படி நிர்ணயம் செய்யப்பட்ட குத்தகைத் தொகையை ஏற்று அதன் முதல் தவணையாகிய 25% குத்தகைத் தொகையையும், அதற்குரிய 2% சதவீத வருமான வரித் தொகையையும், குவாரி குத்தகை வழங்க சிறப்பு குழுவினரால் தேர்வு செய்யப்பட்ட சங்கமானது தேர்வு செய்து பரிந்துரைக்கப்பட்ட நாளிலிருந்து ஒரு வார காலத்திற்குள் அரசு கணக்கில் செலுத்தி அதன் அசல் செலுத்து சீட்டினை மாவட்ட ஆட்சியரிடம் ஒப்படைப்பு செய்ய வேண்டும்.

(இ). மேற்படி முதல் தவணை குத்தகைத் தொகை பெறப்பட்டவுடன் சம்மந்தப்பட்ட கற்குவாரிக் குத்தகை வழங்கப்படவுள்ள அரிதியிடப்பட்ட குத்தகைப் பரப்பு தொடர்பான தகவல் (Precise Area Communication) தேர்வு செய்யப்பட்ட சங்கத்திற்கு மாவட்ட ஆட்சியரால் அனுப்பி வைக்கப்படும்.

(ஈ). குத்தகை வழங்கப்படவுள்ள அரிதியிடப்பட்ட குத்தகை பரப்பு தொடர்பான மாவட்ட ஆட்சியரின் தகவல் கிடைக்கப்பெற்ற நாளிலிருந்து மூன்று மாத காலத்திற்குள் சம்மந்தப்பட்ட கல் குவாரிக்கு மாவட்ட ஆட்சியரால் அனுமதிக்கப்பட்ட குத்தகை காலத்திற்கான வரைவு சுரங்க திட்டத்தை (Draft Mining Plan) அங்கீகரிக்கப்பட்ட சுரங்க திட்ட வரைவாளரிடம் (Recognized Qualified Person- RQP) பெற்று உதவி இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, தேனி அவர்களின் ஒப்புதல் பெற சமர்ப்பிக்க வேண்டும்.

(உ). மேற்கண்ட வரைவு சுரங்க திட்டத்தில் குத்தகை வழங்கப்பட்ட பரப்பு, குத்தகைக்கு அனுமதிக்கப்பட்ட கனிமம் தொடர்பான விபரம், ஐந்தாண்டு குத்தகைக் காலத்தில் குத்தகை பரப்பில் குவாரி தோண்டுவது தொடர்பான உத்தேச திட்டம், புவி அமைப்பியல் மற்றும் கனிம இருப்பு தொடர்பான விவரம், குவாரியில் பயன்படுத்தப்படும் இயந்திர தளவாடங்கள், இயற்கையான நீர்நிலை அமைவுகள் அருகிலுள்ள காப்பு மற்றும் வனக்காடுகளின் எல்லைகள், சுற்றுச்சூழல் பாதிப்பு தொடர்பாக மதிப்பீடு, காற்று மற்றும் நீர் மாசுபடுதல், குவாரி பகுதியில் மரங்கள் நடுவதின் மூலம் மீளக் கொண்டுவரல் (Afforestation), நில சீர்திருத்தம் (Land Reclamation), குத்தகைப் பரப்பில் பயன்படுத்தப்படும் மாசுக்கட்டுப்பாட்டு கருவிகள் (Pollution Control Devices) குத்தகை சிறப்பு நிபந்தனைகள் மற்றும் அரசால் நடைமுறைப்படுத்துவதற்காக கருதக்கூடிய தேவையான இதர விவரங்களும் கண்டிப்பாக இடம் பெற்றிருக்க வேண்டும்.



(ஊ)மேற்கண்ட விவரங்களுடன் சமர்ப்பிக்கப்பட்ட வரைவு திட்டத்தினை உதவி இயக்குநர், புவியியல் மற்றும் சரங்கத்துறை, தேனி அலுவலகத்தின் ஒப்புதல் பெற்று ஏற்பளிக்கப்பட்ட நாளிலிருந்து மூன்று மாத காலத்திற்குள் மாநில அளவிலான சுற்றுச்சூழல் செயல் மதிப்பீட்டு அதிகார அமைப்பு (State Level Environmental Impact Assessment Authority) (SEIAA)-விடம் சுற்றுச் சூழல் தடையின்மை சான்று பெற தேர்வு செய்யப்பட்ட சங்கத்தினரால் சமர்ப்பிக்க வேண்டும்.

(எ) தகுந்த காரணங்களின்றி குறிப்பிட்ட காலகெடுவிற்குள் மேற்கண்ட துறையினரின் தடையின்மை சான்று பெற்று மாவட்ட நிர்வாகத்திடம் சமர்ப்பிக்க தவறும் பட்சத்தில், மேற்படி சங்கத்திற்கு கல்குவாரி குத்தகை வழங்க சிறப்பு குழுவினரால் முடிவு செய்யப்பட்ட பரிந்துரையை மாவட்ட ஆட்சியரால் ரத்து செய்யப்பட்டு மேற்படி குவாரியை பொது ஏலத்திற்கு கொண்டு வர நடவடிக்கை எடுக்கப்படும். இது தொடர்பாக எவ்வித முறையிடோ, வேண்டுகோளோ ஏற்றுக் கொள்ளப்படமாட்டாது. அரசுக்கு ஏற்கனவே செலுத்திய 25% குத்தகை தொகை அரசுடைமையாக்கப்படும்.

- 4 (அ) (i). குவாரி குத்தகை வழங்கப்பட உள்ள சங்கத்தினர் பின் குறிப்பிடப்படும் தொகைகளைச் செலுத்தவும், ஆவணங்களை உரிய காலக்கெடுவுக்குள் கொடுக்குமாறும் கோரி மாவட்ட ஆட்சியரால் அறிவிக்கை அனுப்பப்படும். நிபந்தனை 3-ல் குறிப்பிட்டவாறு கணக்கிடப்பட்ட நான்கு தவணைகளில் முதல் தவணை குத்தகைத் தொகை செலுத்த வேண்டும். மீதமுள்ள குத்தகைத் தொகையை மூன்று தவணைகளாக விதிகளின்படி உரிய காலக்கெடுவிற்குள் செலுத்த சம்மதம் தெரிவித்து ஆணையறுதி ஆவணம் சமர்ப்பிக்க வேண்டும்.
- (ii). முழுத் தொகையின் 10 சதவீதம் தொகையை காப்புத் தொகையாக செலுத்த வேண்டும்.
- (iii). குத்தகைக்கு வழங்கப்பட உள்ள புலத்தின் மீதான பரப்புவரி செலுத்த வேண்டும்.
- (iv). குத்தகை பெறுவது தொடர்பான மாதிரி வரைவு ஒப்பந்தப்பத்திரம் மற்றும் குத்தகைக்கு வழங்கப்படும் பரப்பைக் காட்டும் புலப்பட நகல் தமிழ்நாடு சிறுகனிம சலுகை விதிகள், 1959-ன் பின்னிணைப்பு I -ல் கண்டுள்ள படிவத்தில் சரத்துகள் சேர்க்கை, நீக்கம் மற்றும் மாற்றங்கள் செய்து மனுதாரர் சங்கத்தினரின் / குழுவினரின் ஏற்புக்கு அனுப்பப்படும். அவைகளில் குத்தகை பெறவுள்ள சங்கத்தினர் ஒப்பமிட்டு ஏற்புக் கடிதத்துடன் மாவட்ட ஆட்சியருக்கு திருப்பி அனுப்ப வேண்டும்.



(v). குவாரி குத்தகை ஒப்பந்தம் நிறைவேற்ற இந்திய முத்திரைத்தாள் சட்டத்தின்படி கணக்கிடப்படும் மதிப்பிற்கான முத்திரைத்தாள்களை குத்தகை பெறவுள்ள சங்கத்தினர் / குழுவினர் தங்கள் செலவில் பெற்று மேல் நடவடிக்கைக்காக மாவட்ட ஆட்சியருக்கு அனுப்பி வைக்க வேண்டும்.

(ஆ). குவாரி குத்தகை ஒப்பந்தம் நிறைவேற்ற இந்திய முத்திரைத்தாள் சட்டத்தின்படி கணக்கிடப்படும் மதிப்பிற்கான முத்திரைத் தாள்களை குத்தகை பெறவுள்ள சங்கத்தினர் / குழுவினர் தங்கள் செலவில் பெற்று மேல் நடவடிக்கைக்காக மாவட்ட ஆட்சியருக்கு அனுப்பி வைக்க வேண்டும்.

5 (அ). கோரப்படும் ஆவணங்கள் மற்றும் தொகைகளை அரசுக்கு குத்தகை பெறவுள்ள சங்கத்தினர் / குழுவினர் செலுத்தியபின், அறிவிக்கை மூலம் தெரிவிக்கப்படும் நாளில் மேற்படி சங்கத்தினர் / குழுவினர் மாவட்ட ஆட்சியரின் முன்பு ஆஜராகி குத்தகை ஒப்பந்த ஆவணங்களில் கையெழுத்திட்டபின் குத்தகையாளராக அறிவிக்கப்படுவர்.

(ஆ). குத்தகை ஒப்பந்த பத்திரம் மற்றும் குத்தகை புலப்படும் ஆகியவற்றில் மேற்படி சங்கத்தினர் / குழுவினர் கையொப்பம் இட்ட பின்னர், அவைகளில் மாறுதல் செய்யவோ, அவற்றின்மீது மாற்றுக் கருத்து தெரிவிக்கவோ குத்தகையாளர் சங்கத்தினர் / குழுவினர் அனுமதிக்கப்படமாட்டார்கள்.

6 (அ). குத்தகை காலத்தின் ஆரம்பம் மற்றும் முடிவு தேதிகள் ஒப்பந்த ஆவணத்தில் தெளிவாக எழுதப்பட்டிருக்கும்.

(ஆ). ஒப்பந்த ஆவணத்தில் குறிப்பிடப்பட்டபடி குத்தகை முடிவுறும் தேதிக்கு பின்னர் குத்தகைகால நீட்டிப்பு எந்த கோரிக்கையின் அடிப்படையிலும் செய்யப்படமாட்டாது.

(இ). குத்தகை முடிவடையும்போது இக்குத்தகை புதுப்பிக்கப்படமாட்டாது. அவ்வாறு புதுப்பிக்க மனு அனுப்பப்பட்டால் அது விசாரணையின்றி தள்ளுபடி செய்யப்படும்.

(ஈ). பகுதி II-ன் பத்தி 1 முதல் 5 வரை உள்ள நிபந்தனைகளை நிறைவேற்றாமல் சங்கத்தினர்/குழுவினர் குவாரிப் பணி செய்தால், அப்பணி குத்தகை பெறாமல் செய்ததாகக் கருதப்பட்டு விதிமுறைகளின்படி மேல்நடவடிக்கை தொடரப்படும்.



7. மாவட்ட ஆட்சியருடன் இணைந்து முத்திரைத்தாளில் கையொப்பமிட்ட ஆவணத்தின் அடிப்படையில் குத்தகை ஆவணத்தை, குத்தகைதாரர் சங்கத்தினர் / குழுவினர் தங்கள் செலவை சார்பதிவாளர் அலுவலகத்தில் பதிவு செய்து பதிவு செய்யப்பட்ட ஆவணத்தின் அடிப்படையில் மாவட்ட ஆட்சியரிடம் ஒப்படைக்க வேண்டும்.

8. குவாரி குத்தகை பெறும் சங்கத்தினர் ஏற்கனவே செலுத்திய முதல் தவணை குத்தகை தொகை போக மீதமுள்ள மூன்று சமதவணைகளை மூன்று மாதத்திற்கு ஒரு தவணை வீதம் குத்தகை வழங்கிய முதல் ஒன்பது மாத காலத்திற்குள் செலுத்த வேண்டும். அவ்வாறு, செலுத்தத் தவறினால், குவாரி குத்தகை மாவட்ட ஆட்சியரால் ரத்து செய்து ஆணையிடப்படும். மேலும், அந்நாள் வரை செலுத்தப்பட்ட குத்தகைத் தொகை முழுவதும் அரசுடைமையாக்கப்படும். மேற்கண்டவாறு குத்தகைத் தொகை செலுத்தாத காரணத்தினால் ரத்து செய்யப்பட்ட குவாரி குத்தகை பெற்ற சங்கத்தினர் தமிழ்நாடு சிறுவகைக் கனிமச் சலுகை விதிகள் 1959 விதி எண் 8-ன் உள்விதி (10-A)(c)-ன் அடிப்படையில் குவாரி குத்தகை பெற தகுதியற்றவர் என முடிவு செய்யப்பட்டு, எதிர்காலத்தில் எப்போதும் அச்சங்கத்தினரின் மனுக்கள் குவாரி குத்தகை வழங்க ஏற்றுக்கொள்ளப்படாமல் தள்ளுபடி செய்யப்படும்.

பகுதி III - குவாரிப்பணி செய்வது தொடர்பான விதிமுறைகள்

1. குவாரிப் பணி செய்வதற்கான பொது விதிமுறைகள், மாவட்ட ஆட்சியருடன் சங்கத்தினர் / குழுவினர் கையொப்பமிடும் குத்தகை ஆவணத்தில் குறிப்பிடப்பட்டிருக்கும்.

2. மேலும் ஒவ்வொரு தனி குத்தகை புலத்திற்கும் சிறப்பு நிபந்தனைகள் ஏதும் இருக்குமானால் அவைகள் மாவட்ட ஆட்சியரால் குறிப்பிடப்படும் பணி அனுமதி ஆணையில் குறிக்கப்பட்டிருக்கும். குத்தகை பெற்றவர் அவ்வனுமதி ஆணையை ஏற்று நடக்க வேண்டும்.

3. மேற்குறிப்பிட்டவை தவிர பின்வரும் சிறப்பு நிபந்தனைகள் குத்தகைதாரர் சங்கத்தினரால் / குழுவினரால் குத்தகை காலத்தில் கடைபிடிக்கப்பட வேண்டும்.

(அ). ஒவ்வொரு நிதியாண்டிற்கும், குத்தகையாளர் குத்தகைப் பகுதியில் வெட்டியெடுத்து வெளியில் அனுப்பும் சிறுவகைக் கனிமத்திற்கு உரிய கணக்குகளை தேனி மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை உதவி இயக்குநர், குறிப்பிடும் படிவத்தில் சுரங்க விவரப் பதிவேடு ஏற்படுத்தி விவரங்கள் எழுதி ஒவ்வொரு மாதத்திற்கும் விவரப்பட்டியல் தயாரித்து அதனை அடுத்த மாதம் ஐந்தாம் தேதிக்குள் உதவி இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, தேனி அவர்களுக்கு அனுப்ப வேண்டும்.



- (ஆ). குத்தகை காலத்தில் ஏற்படுத்தப்பட்ட சுரங்க விவரப்பதிவேடுகளை குத்தகை பெற்ற சங்கத்தினர் / குழுவினர் குத்தகை காலம் முடிந்த பின்னரும் பாதுகாத்து அரசு அலுவலர்கள் ஆய்வுக்கு கேட்கும்போது ஒப்படைக்க வேண்டும்.
- (இ). குத்தகையாளர் கனிமங்களை வெளியில் அனுப்ப அனுப்புகை சீட்டுகளில் (பிஸ்புக்) துணை இயக்குநர் ஒப்புதல் பெற வரும்போது உரிய மனு அளித்து, சீனியரேஜ் தொகையைச் செலுத்தி அனுப்புகை சீட்டுகளில் உரிய அலுவலரின் மேலொப்பம் பெற்றுச் சென்று பயன்படுத்த வேண்டும்.
- (ஈ). கனிமங்களை குத்தகைப் பகுதியிலிருந்து வெளியில் அனுப்பும்போது அனுப்பப்படும் கனிமத்தின் வகை, அதன் அளவு, கனிமம் எடுத்துச் செல்லும் வாகனத்தின் வகை மற்றும் பதிவு எண். கனிமம் கொண்டு சேர்க்கப்படும் இடம், குவாரியிலிருந்து வாகனம் புறப்படும் நேரம் மற்றும் சென்றடையும் உத்தேச நேரம் ஆகிய விவரங்களை அசல் சீட்டில் ஒரே பேனாவாலும் நகலை கார்பன் பேப்பர் மூலமும் எழுதி அசலை வாகனத்துடன் அனுப்பி நகலை (அடிக்கட்டு) அடுத்த முறை அனுமதிபெற வரும்போது ஆய்வுக்கு காண்பித்துவிட்டு திரும்பப் பெற்றுச் சென்று பாதுகாப்பாக வைத்திருக்க வேண்டும்.
- (உ). அனுப்புகைச் சீட்டில் எல்லா விவரவினாக்களுக்கும் விவரங்கள் எழுதப்படாமலோ அல்லது திருத்தப்பட்டோ அல்லது மேல் எழுதப்பட்டோ அல்லது வெவ்வேறு மையினால் எழுதப்பட்டிருப்பின் அந்த அனுப்புகைச் சீட்டு செல்லுபடியாகத்தக்கதல்ல என்பதுடன், அச்சீட்டை பயன்படுத்தி எடுத்துச் செல்லப்படும் கனிமம், அனுமதியின்றி எடுத்துச் செல்லப்படுவதாக கருதி, விதிமுறைகளின்படி நடவடிக்கை எடுக்கப்படும்.
- (ஊ). குத்தகை பகுதியிலிருந்து மெருகேற்றுவதற்கு தகுந்த கிராண்ட் கந்துண்டங்கள் வெட்டுதல் கூடாது. மெருகேற்றுவதற்கு தகுந்த கிராண்ட் கந்துண்டங்கள் குத்தகை பகுதியில் வெட்டியெடுக்கப்பட வாய்ப்பு ஏற்படுமானால் தற்போதைய குவாரி குத்தகை ரத்து செய்யப்படும்.



- (எ). குத்தகை பகுதிக்குச் சென்றுவர பாதைவகைகளை குத்தகையாளர் சங்கம் / குழு தனது சொந்த பொதுமன்ற ஏற்படுத்திக் கொள்ள வேண்டும்.
- (ஏ) குத்தகை தொடர்பான விவரங்கள் அடங்கிய தகவல் பலகையை குவாரி முகப்பில் நிரந்தரமாக நட்டு வைத்து பாதுகாப்பதுடன் குவாரி எல்லைகளை தெளிவாக காட்ட உயரமான கற்றூண்கள் நட்டு வண்ண மையினால் அடையாளமிட்டு பாதுகாக்கப்பட வேண்டும்.
- (ஐ) குவாரியில் பணிபுரியும் தொழிலாளர்களை தொழிலாளர் நலவாரியத்தில் பதிவு செய்தும், மற்றும் பிரதமர் மந்திரி பாதுகாப்பு காப்பீடு திட்டத்தில் பதிவு செய்து புவியியல் மற்றும் சுரங்கத்துறையிடம் சமர்ப்பிக்கப்படவேண்டும்.
- (ஓ) ஆணையர் புவியியல் மற்றும் சுரங்கத்துறை சென்னை, அவர்களின் கடிதம் ந.க.எண்.2921/எம்.எம்.4/2016, நாள்:09.03.2021-ன்படி குவாரிக்குத்தகை புலத்தைச்சுற்றி எல்லைக்கற்கள் நட்டு அதனை (DGPS) மூலம் அளவீடு செய்து அதன் அறிக்கையை இவ்வலுவலகத்தில் சமர்ப்பிக்கப்படவேண்டும்.

4. குத்தகையாளர் குவாரிப்பணிக்கு குழந்தை தொழிலாளர்களை வேலைக்கு அமர்த்துதல் கூடாது.

5. குத்தகை காலத்தில் குத்தகை ஒப்பந்த சரத்துக்கள், சுற்றுச்சூழல் செயல் விளைவு மதிப்பீட்டு குழு மற்றும் தமிழ்நாடு மாசுக்கட்டுப்பாட்டு வாரியம் ஆகியோரின் பரிந்துரையில் தெரிவிக்கப்பட்டுள்ள அனைத்து நிபந்தனைகளையும் குத்தகை காலம் முழுவதும் முறையாக கடைபிடித்து குவாரிப்பணி செய்ய வேண்டும். விதி மீறல்கள் உறுதி செய்யப்பட்டால் குத்தகையை உடனடியாக ரத்து செய்யப்படும் என்பதுடன் அரசுக்கு செலுத்திய குத்தகை தொகை முழுவதும் அரசுடைமையாக்கப்படும்.



அட்டவணை

கல்குவாரிப் பட்டியல்

விண்ணப்பம் வந்து சேருவதற்கு கடைசி நாள் 2022 ஆம் ஆண்டு செப்டம்பர் மாதம் 15-ம் நாள் மாலை 05.00 மணி.

வ. எண்.	வட்டம்	கிராமம்	புல எண்.	மொத்தப் பரப்பு	குத்தகை விடும் பரப்பு	வகைப்பாடு
1	உத்தமபாளையம்	காமயகவுண்டன்பட்டி	1372/1 பகுதி-1	102.61.0	2.63.0	அரசு புறம்போக்கு பழைய குவாரி
2	உத்தமபாளையம்	காமயகவுண்டன்பட்டி	1372/1 பகுதி-2	102.61.0	2.37.0	அரசு புறம்போக்கு பழைய குவாரி
3	உத்தமபாளையம்	காமயகவுண்டன்பட்டி	1372/1 பகுதி-3	102.61.0	1.00.0	அரசு புறம்போக்கு பழைய குவாரி
4	உத்தமபாளையம்	காமயகவுண்டன்பட்டி	1372/1 பகுதி-4	102.61.0	2.50.0	அரசு புறம்போக்கு பழைய குவாரி
5	உத்தமபாளையம்	காமயகவுண்டன்பட்டி	1372/1 பகுதி-5	102.61.0	2.50.0	அரசு புறம்போக்கு பழைய குவாரி
6	உத்தமபாளையம்	காமயகவுண்டன்பட்டி	1372/1 பகுதி-6	102.61.0	2.50.0	அரசு புறம்போக்கு பழைய குவாரி

ஒப்பம்,
மாவட்ட ஆட்சித்தலைவர்,
தேனி.

தேனி.
16.08.2022.



2022 ஆகஸ்ட் 18]

தேனி மாவட்ட அரசிதழ் சிறப்பு வெளியீடு

இணைப்பு - VI (B)

(விதி 8 (10-A) ஐ காணவும்)

அரசு புறம்போக்கு நிலங்களில் உள்ள சாதாரணக் கல் குவாரிகளை (SGSY) குழுக்கள் / விடுவிக்கப்பட்ட கொத்தடிமைத் தொழிலாளர்களால் அமைக்கப்பட்ட சங்கம் ஆகியவற்றிற்கு குத்தகை உரிமம் வழங்கக் கோரும் மனு

(அசல் மற்றும் 2 நகல்களில் இணைப்புகளுடன் அளிக்க வேண்டும்)

அனுப்புநர்	பெறுநர்: மாவட்ட ஆட்சியர், தேனி மாவட்டம், தேனி.
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அம்மா,

நாங்கள் 1959ம் வருடத்தை தமிழ்நாடு சிறுவகைக் கனிமச் சலுகை விதிகளின் விதி 8-ன் உள்விதி (10-A) ன்படி எங்கள் சுய உதவிக் குழுவிற்கு / விடுவிக்கப்பட்ட கொத்தடிமைத் தொழிலாளர்கள் சங்கத்திற்கு சாதாரண கற்கள் வெட்டிக் கொள்ள குவாரி குத்தகை வேண்டி, தேனி மாவட்ட அரசிதழில் வெளியான நாளிட்ட அறிவிக்கை எண்ன்படி இவ்விண்ணப்பித்தினை சமர்ப்பிக்கிறோம்.

மனு தொடர்பான விவரங்கள் கீழே கொடுக்கப்பட்டுள்ளது:-

1. பொன்விழா கிராம சுய வேலைவாய்ப்பு :
திட்டக் (SGSY) குழு / விடுவிக்கப்பட்ட
கொத்தடிமைத் தொழிலாளர் சங்கத்தின்
பெயர் மற்றும் முகவரி
2. அ) குழு / சங்கம் தமிழ்நாடு கூட்டுறவு :
சங்க சட்டம் 1983 (தமிழ்நாடு
சட்டம் 30, 1983) அல்லது
தமிழ்நாடு சங்கங்கள் பதிவுச்
சட்டம் 1975 (தமிழ்நாடு சட்டம் 27,
1975) சான்றொப்பம் பெற்ற பதிவுச்
சான்றிதழ் இணைக்கப்பட
வேண்டும்)-ன்படி பதிவு
செய்ததற்கான பதிவு எண்:
ஆ) குழு / சங்க உறுப்பினர் பெயர் :
மற்றும் முகவரிப் பட்டியல்
(உறுப்பினர் பற்றிய விவரம் மற்றும்
உறுப்பினர் எண் விவரம்
இணைக்கப்பட வேண்டும்
இ) குழு / சங்கம் செயல்பட :
அனுமதிக்கப் பட்டுள்ள பஞ்சாயத்து
விவரம்



3. மனுக்கட்டணம் செலுத்திய விவரம் :
(சலான் எண் மற்றும் நாள்)
4. மனுதாரர் சங்கத்தினர் வெட்டி எடுக்க :
விரும்பும் சிறுகனிமம்
5. கல்குவாரி தேவைப்படும் குத்தகை காலம் :
6. விண்ணப்பிக்கும் மொத்த பரப்பு :
7. குத்தகைக்கு மனு செய்யப்படும் புலம் :
பற்றிய விவரம்

வட்டம்	கிராமம்	பஞ்சாயத்து விவரம்	புல எண்.	பரப்பு ஹெக்டேரில்
(1)	(2)	(3)	(4)	(5)

8. ஏற்கனவே மனுதாரர் குழு / சங்கத்திற்கு :
தமிழ்நாட்டில் குவாரி குத்தகை இருந்தால்
அதன் விவரம்
9. குழு / சங்கத்திற்கான வருமான வரி :
நிலுவையின்மை சான்று
இணைக்கப்பட்டுள்ளதா?
இல்லையெனில் கீழ்க்கண்டவற்றுக்கான
உறுதிமொழி ஆவணம்
இணைக்கப்பட்டுள்ளதா?
அ) நடப்பு ஆண்டு வரை வருமான வரி :
விவரப் பட்டியல் அத்துணை
கொடுக்கப்பட்டுள்ளதா?
ஆ) துறையினரால் கணக்கிடப்பட்ட :
வருமானவரி செலுத்தப்
பட்டுள்ளதா?
இ) 1961-ம் வருடத்திய வருமான வரி :
சட்டப்படி சுய மதிப்பீடு செய்து வரி
செலுத்தப்பட்டுள்ளதா?
10. அ) மனுதாரர் குழு / சங்கத்திற்கு :
சுரங்க வரி நிலுவை இல்லை
என்பதற்கான சான்று
பெற்றுள்ளனரா? ஆம் எனில் நகல்
இணைக்கவும்
ஆ) இந்த மனு கொடுக்கப்படும் நாளில் :
சங்கங்களுக்கு சுரங்கக் குத்தகை
இல்லை எனில் அதற்கான
உறுதிமொழி ஆவணம்
இணைக்கப்பட வேண்டும்.



11. இது தவிர மனுதாரர் வேறு :
விவரங்கள் ஏதேனும் கொடுக்க
விரும்பினால் இங்கு குறிப்பிடவும்

மேலே கொடுக்கப்பட்டுள்ள விவரங்கள் யாவும் உண்மையெனவும், இது தவிர, வேறு விவரங்கள் அரசினால் கோரப்படுமானால் அதனை அளிக்க தயாராக உள்ளோம் எனவும் உறுதியளிக்கிறோம். காப்புத் தொகையை செலுத்தத் தயாராக உள்ளோம் எனவும், குத்தகை பெறுவது தொடர்பாகவும், குவாரியில் சாதாரண கற்கள் வெட்டுவது தொடர்பாகவும் 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகளையும், மாவட்ட அரசிதழில் வெளியிடப்பட்டுள்ள விதிகளையும் நன்கறிவோம் என்றும் உறுதியளிக்கிறோம்.. சாதாரணக்கற்கள் வெட்ட வழங்கப்படும் கல்குவாரியில் மெருகேற்றி அழகுப்படுத்தப் பயன்படும் வகையில் கிராளைட் கந்துண்டங்கள் எந்த அளவிலும் வெட்டமாட்டோம் எனவும் உறுதியளிக்கிறோம்.

இடம் :
நாள் :

தாங்கள் உண்மையுள்ள,

மனுதாரர் கையொப்பம்



ஆதலுப்படி
மாவட்ட ஆட்சித்தலைவர்,
தேனி.

பெறுநர்
தி/ள். வறுமைக்கோட்டிற்கு கீழ்வாழும்
மகளிர் சுய உதவிக்குழு,
திருமதி.கார்த்திகா, தலைவி,
எண்.172/வார்டு-1, வேதக்கோவில் தெரு,
காமயகவுண்டன்பட்டி,
உத்தமபாளையம் வட்டம்,
தேனி-625 516.

ந.க.எண்.1049/கனிமம்/2022, நாள்:10.08.2023.

பொருள்: கனிமங்களும், குவாரிகளும் - சிறுவகைக் கனிமம் - உடைகல் - தேனி மாவட்டம் - உத்தமபாளையம் வட்டம் - காமயகவுண்டன்பட்டி கிராமம் - அரசு புறம்போக்கு புல எண். 1372/1 (பகுதி-5) - விஸ்தீரணம் 2.50.0 ஹெக்டேர் பரப்பில் தி/ள். வறுமைக்கோட்டிற்கு கீழ்வாழும் மகளிர் சுய உதவிக்குழு விண்ணப்பித்தது - முன்னுரிமை அடிப்படையில் நேரடி சுற்குவாரி குத்தகை உரிமம் வழங்க சிறப்பு குழுவால் தேர்வு செய்யப்பட்டது - ஏற்பளிக்கப்பட்ட சுரங்க திட்டம் மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் ஒப்புதல் பெற்று சமர்ப்பிக்க கோருதல் - தொடர்பாக.

- பார்வை:
1. வருவாய் கோட்டாட்சியர் (பொ), உத்தமபாளையம், கடிதம் ந.க.எண்.1841/2020/அ4, நாள்:24.11.2020.
 2. வனஉயிரின காப்பாளர், மேகமலை வனஉயிரின கோட்டம், தேனி கடிதம் எண்.1532/2020/டி1, நாள்:10.12.2020.
 3. தேனி மாவட்ட அரசிதழ் சிறப்பு வெளியீடு எண்.16, நாள்:18.08.2022.
 4. தி/ள்.வறுமைக்கோட்டிற்கு கீழ்வாழும் மகளிர் சுய உதவிக்குழு, திருமதி.கார்த்திகா, தலைவி, உத்தமபாளையம் விண்ணப்பம் நாள்.13.09.2022.
 5. இவ்வலுவலக குறிப்பாணை ந.க.எண்.1049/கனிமம்/2022, நாள்:10.04.2023.
 6. தி/ள்.வறுமைக்கோட்டிற்கு கீழ்வாழும் மகளிர் சுய உதவிக்குழு, மனு நாள்:25.04.2023.

பார்வை 1 மற்றும் 2-ல் காணும் பரிந்துரை அறிக்கையின்படி, பார்வை 3-ல் காணும் தேனி மாவட்ட அரசிதழ் சிறப்பு வெளியீடு எண்.16, நாள்:18.08.2022-ல் தேனி மாவட்டம், உத்தமபாளையம் வட்டம், காமயகவுண்டன்பட்டி கிராமம், அரசு புறம்போக்கு புல எண். 1372/1 (பகுதி-5) விஸ்தீரணம் 2.50.0 ஹெக்டேர் பரப்பில் மகளிர் சுங்கங்களுக்கு நேரடி குவாரி குத்தகை உரிமம் வழங்க விண்ணப்பங்கள் வரவேற்கப்பட்டது. அதனை தொடர்ந்து, பார்வை 4-ல் காணும் தி/ள்.வறுமைக்கோட்டிற்கு கீழ்வாழும் மகளிர் சுய உதவிக்குழுவானது தேனி மாவட்டம், உத்தமபாளையம் வட்டம், காமயகவுண்டன்பட்டி கிராமம், அரசு புறம்போக்கு புல எண். 1372/1 (பகுதி-5) விஸ்தீரணம் 2.50.0 ஹெக்டேர் பரப்பு கல்குவாரிக்கு விண்ணப்பம் செய்தது.



1	2	3	4	5	6	7	8	9	10	11	
1366	...	1366	ர	4	...	8-1	4	2 77	1 11.5	3 08	1392 பெ. ராமசாமி தேவர்.
1367	...	1367	ர	4	...	8-1	4	2 77	0 16.0	0 44	932 கி. பெருமாயி அம்மாள்.
1368	...	1368	ர	4	...	8-1	4	2 77	0 69.0	1 90	932 கி. பெருமாயி அம்மாள்.
1369	...	1369	ர	4	...	8-1	4	2 77	0 15.5	0 43	371 பொ. சண்முக வேலு.
1370	...	1370	ர	4	...	8-1	4	2 77	0 15.5	0 35	..... தரிச.
1371	...	1371	ர	4	...	8-1	4	2 77	0 48.5	1 34	265 கு. கிருஷ்ண சாமித் தேவர்.
1372	1	1372-1	ச	தி.ஏ.த.	...	...	...	...	102 61.0	...	..... கரடு.
	2	-2	ர	4	...	8-1	4	2 77	0 97.0	2 69	327 க. குருசாமி.
	3	-3	ர	4	...	8-1	4	2 77	0 06.0	0 17	1286 அ. ராமசாமி சாம்பான்.
	4	-4	ர	4	...	8-1	4	2 77	0 14.0	0 38	1286 அ. ராமசாமி சாம்பான்.
	5	-5	ர	4	...	8-1	4	2 77	0 79.0	2 18	2148 மாடசாமி சாம்பான் மற்றும் ஐந்து பேர்களும்.*
	6	-6	ர	4	...	8-1	4	2 77	1 18.0	3 27	770 கா. நாகம் யாள்.
	7	-7	ர	4	...	8-1	4	2 77	0 24.0	0 66	73 ஆவுடையம் மாள்.
	8	-8	ர	4	...	8-1	4	2 77	0 31.0	0 85	1546 ம. லட்சுமணன்.
	9	-9	ர	4	...	8-1	4	2 77	0 32.5	0 90	623 வீ. சுப்பையன் செட்டியார்.
	10	-10	ர	4	...	8-1	4	2 77	0 16.0	0 45	7 அழகர்சாமி சாம்பான்.

/ சிவசுப்ரமணியன் /

* விவரப்பட்டியலைப் பார்க்கவும்.

25/11/2023
கிராம நிர்வாக அலுவலர்
காமயகவுண்டன்பட்டி



PHOTOCOPY OF THE APPLIED LEASE AREA

Site photos in respect of rough stone quarry lease in S.F.No's: 1372/1 (Part) Govt. Land - over an extent of 2.50.0 hectares - Kamayagoundanpatti village Uthamapalayam Taluk - Theni District, Tamil Nadu State in belongs to M/s.Varumaikotterku Keelvaalum Magalir Suyauthavikuzhu, Mrs. Karthika (Leader),





இந்திய அடையாள அட்டை

இந்திய அரசாங்கம்

Unique Identification Authority of India
Government of India

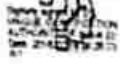
பதிவேட்டு எண் / Enrolment No.: 2189/56470/03481

To
கார்த்திகா சிவகுமார்
Karthika Sivakumar
W/O Sivakumar
3-3-77A
Kappu Savdi Street
KAMAYAGOUNDANPATTI
Kamayakoundanpatti
Theni Tamil Nadu - 625521
9629832979

Download Date: 18/02/2018

Generation Date: 18/02/2018

Valid unknown



உங்கள் ஆதார் எண் / Your Aadhaar No. :

4107 0987 8377

எனது ஆதார், எனது அடையாளம்



இந்திய அரசாங்கம்
Government of India



கார்த்திகா சிவகுமார்
Karthika Sivakumar
தேய்த நாள்/DOB: 30/04/1978
பெண்/FEMALE

4107 0987 8377



எனது ஆதார் எனது அடையாளம்

MINICAL



Government of India



தகவல்

- ஆதார் அடையாளத்திற்காக சான்று, குடியரிமைக்கு அல்ல.
- அடையாள சான்றை ஆதாரை ஆதாரிடுகவும் மூலமாகப் பெறவும்.
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

INFORMATION

- Aadhaar is a proof of identity, not of citizenship.
- To establish identity, authenticate online.
- This is electronically generated letter.

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.
- வருங்காலத்தில் அரசு மற்றும் அரசு சாரா சேவைகளை பயன்படுத்திக் கொள்ள ஆதார் உதவிகரமாக இருக்கும்
- Aadhaar is valid throughout the country.
- Aadhaar will be helpful in availing Government and Non-Government services in future.



இந்திய அடையாள அட்டை
Unique Identification Authority of India

Address: W/O Sivakumar, 3-3-77A, Kappu Savdi Street, KAMAYAGOUNDANPATTI, Theni, Tamil Nadu - 625521
முகவரி: W/O சிவகுமார், 3-3-77A, கப்பு சவடி தெரு, காமையகூண்டன்பட்டி, தேனி, தமிழ்நாடு - 625521

4107 0987 8377

आयकर विभाग
INCOME TAX DEPARTMENT



भारत

GOVT. OF INDIA



स्थायी लेखा संख्या कार्ड
Permanent Account Number Card

GCIPK7439H

नाम / Name
S KARTHIKA

पिता का नाम / Father's Name
SAMIAPPAN

जन्म की तारीख / Date of Birth
30/04/1978

S. Karthika.

हस्ताक्षर / Signature





தமிழ்நாடு அரசு
உணவுப்பொருள் வழங்கல் மற்றும் நுகர்வோர் பாதுகாப்பு
GOVERNMENT OF TAMILNADU
CIVIL SUPPLIES AND CONSUMER PROTECTION DEPARTMENT



குடும்ப அட்டை / FAMILY CARD



NPHH
333989520395

குடும்பத் தலைவரின் பெயர் : சிவக்குமார்

தந்தை / கணவரின் பெயர் :
பிறந்த தேதி :
முகவரி :

657

பொன்னையாகவுண்டர்
பொன்னையா கவுண்டர்
: 09/05/1970
: த/க பொன்னையா கவுடர்
7ஏ/3வா, காப்பு சாவடி தெரு.
காமயகவுண்டப்பட்டி. 625521
உத்தமபாளையம் (வ). தேனி.

குடும்ப உறுப்பினர்கள் **பொதுவிநியோகத்திட்ட நிச்சேவகன்**

- * ஹர்ஸ் சிவக்குமார்
- * கார்த்திகா சிவக்குமார்
- * ஹரிஷ்னி சிவக்குமார்
- * குடும்ப உறுப்பினர்கள் - 4

23DP010PN
2018



- புதிய அட்டை விண்ணப்பிக்க
- பெயர் சேர்த்தல் தகவல்
- விற்பனை விவரங்கள்
- புகார் கருத்து பதிவு
- பிறு தகவல்கள்

குறிப்பு
இந்த அட்டை மூலமாக உணவு
தகவல் உடனடி உதவி குடும்ப
சம்பந்தத்தை தொடர, மானியம்

வலைத்தளம்
www.tnpds.gov.in

இலவச உதவி மைய எண்
1967 (80)1800-125-5901



* முகவரியை உணவாதலங்களுக்கு இது சார்பு அல்ல



[Handwritten Signature]

अर्हता प्राप्त व्यक्ति के रूप में मान्यता 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. करुपण्णन, मॉंगनीकाडू, मुत्तमंपट्टी 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), Bommiidi (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 स्थिति 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.

[Handwritten Signature]

PLATE NO - I







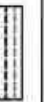
APPLICANT:

M/s. VARUMAIKOTTERKU KEELVAALUM
MAGALIR SUYAUTHAVIKUZHU,
MRS. S.KARTHIKA (LEADER),
No.172/WARD-1, VEDHAKOVIL STREET,
KAMAYAGOUNDAPATTI,
UTHAMAPALAYAM,
THENI DISTRICT-625 516.

LEASE AREA:

S.F.NO : 1372/1 (Part-5)
EXTENT : 2.50.00 Hect,
VILLAGE : KAMAYAGOUNDANPATTI
TALUK : UTHAMAPALAYAM
DISTRICT : THENI

INDEX

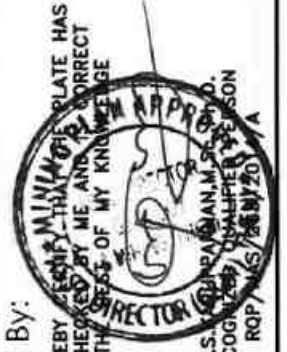
- MINE LEASE AREA 
- APPROACH ROAD 
- CART ROAD 
- VILLAGE ROAD 
- NH - 183 ROAD 
- SH - 36 & 102 ROAD 
- MDR - 587 ROAD 

KEY MAP

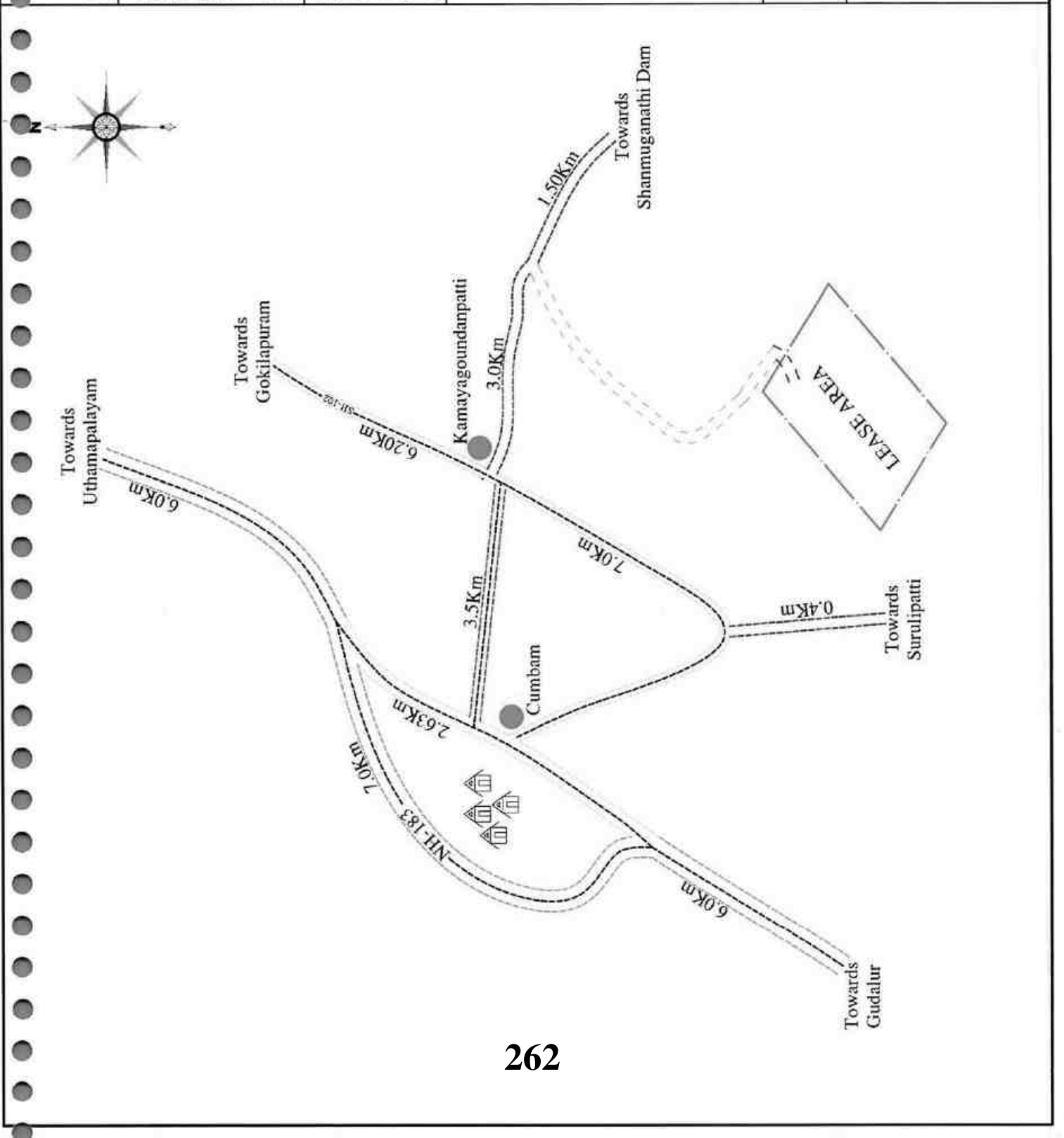
Not to Scale

Prepared By:

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



Dr.S. SURESH KANNAN, M.Sc., D.O.,
RECOGNIZED QUALIFIED PERSON
RQP / MNS / TAMIL NADU



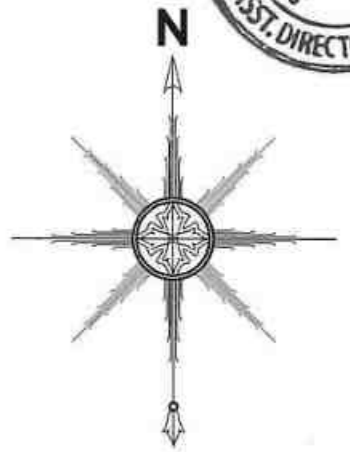


PLATE NO-IA

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
 No.172/WARD-1, VEDHAKOVIL STREET,
 KAMAYAGOUNDAPATTI,
 UTHAMAPALAYAM,
 THENI DISTRICT-625 516.

LEASE AREA:
 S.F.NO : 1372/1 (Part-5)
 EXTENT : 2.50.00 Hect,
 VILLAGE : KAMAYAGOUNDANPATTI
 TALUK : UTHAMAPALAYAM
 DISTRICT : THENI

INDEX

MINE LEASE AREA : ●
 TOPO SHEET NO : 58-G/06
 LATITUDE : 9°43'33.94"N to 9°43'40.17"N
 LONGITUDE : 77°20'12.10"E to 77°20'20.54"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.
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

9°43'40.17"N

77°20'12.10"E

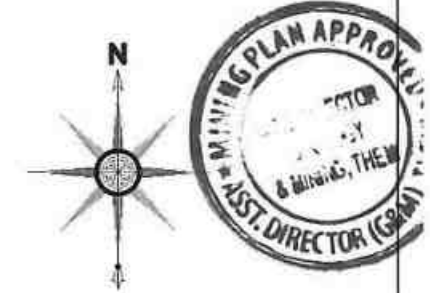


PLATE NO-IC

APPLICANT:
 M/s. VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
 No.172/WARD-1, VEDHAKOVIL STREET,
 KAMAYAGOUNDAPATTI,
 UTHAMAPALAYAM,
 THENI DISTRICT-625 516.

LEASE AREA:
 S.F.NO : 1372/I (Part-5)
 EXTENT : 2.50.00 Hect,
 VILLAGE : KAMAYAGOUNDANPATTI
 TALUK : UTHAMAPALAYAM
 DISTRICT : THENI

INDEX

MINE LEASE AREA	
APPROACH ROAD	
CART ROAD	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	
EXISTING QUARRY PIT	

TOPO SHEET NO : 58-G/06
 LATITUDE : 9°43'33.94"N to 9°43'40.17"N
 LONGITUDE : 77°20'12.10"E to 77°20'20.54"E

SATELITE IMAGERY MAP
 SCALE- 1:5000

Prepared By:
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 TO THE BEST OF MY KNOWLEDGE

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

OCTOBER TO DECEMBER



PLATE NO-ID

APPLICANT:
M/s. VARUMAIKOTTERKU KEELVAALUM
MAGALIR SUYAUTHAVIKUZHU,
Mrs.S.KARTHIKA (LEADER),
No.172/WARD-1, VEDHAKOVIL STREET,
KAMAYAGOUNDAPATTI,
UTHAMAPALAYAM,
THENI DISTRICT-625 516.

LEASE AREA:
S.F.NO : 1372/1 (Part-5)
EXTENT : 2.50.00 Hect,
VILLAGE : KAMAYAGOUNDANPATTI
TALUK : UTHAMAPALAYAM
DISTRICT : THENI

INDEX

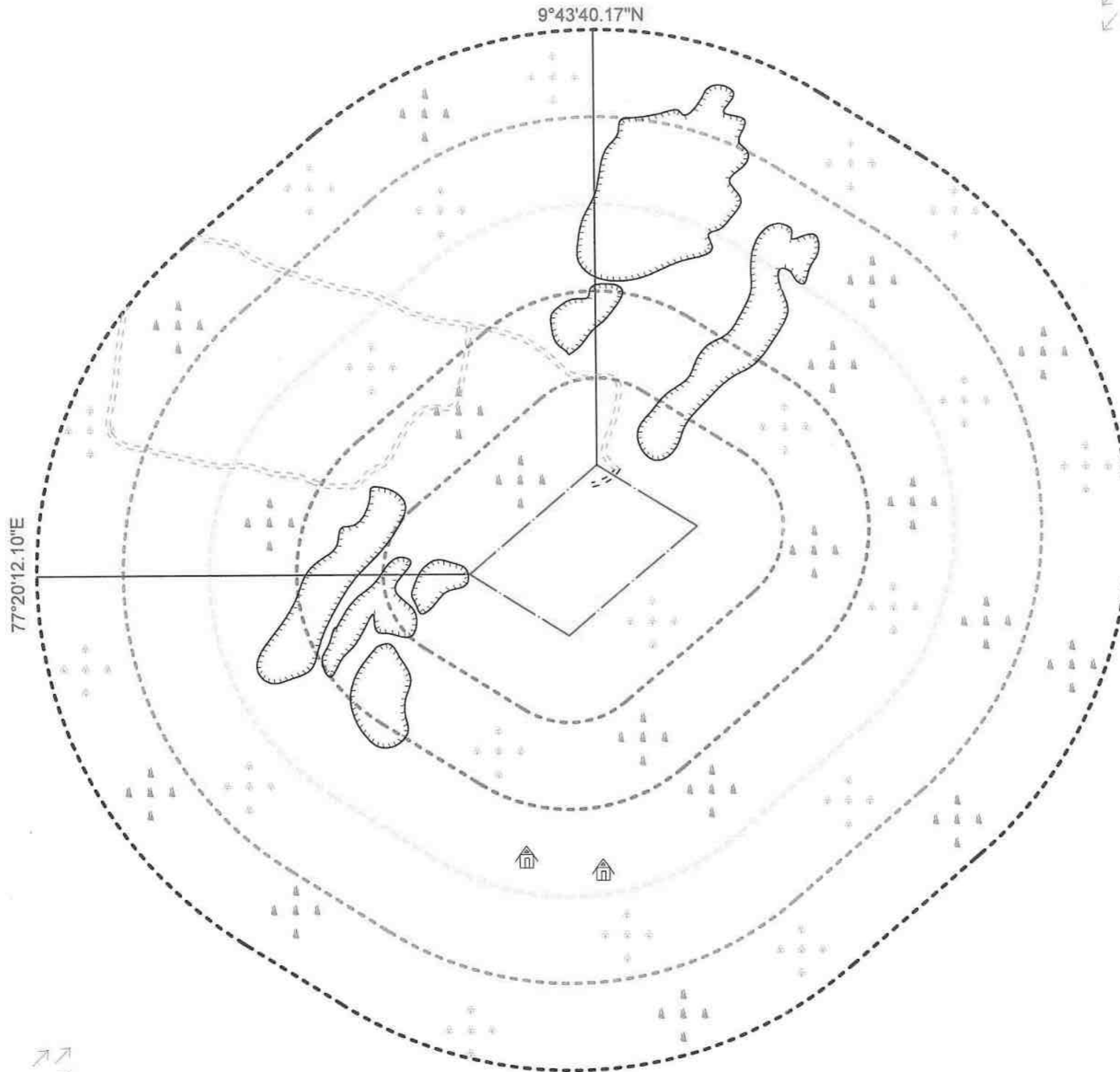
MINE LEASE AREA	
APPROACH ROAD	
CART ROAD	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	
EXISTING QUARRY PIT	
SHURBS & TREES	

TOPO SHEET NO : 58-G/06
LATITUDE : 9°43'33.94"N to 9°43'40.17"N
LONGITUDE : 77°20'12.10"E to 77°20'20.54"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.
RECOGNISED QUALIFIED PERSON
RQP/MAS/263/2014/A



77°20'12.10"E

9°43'40.17"N



JULY TO SEPTEMBER

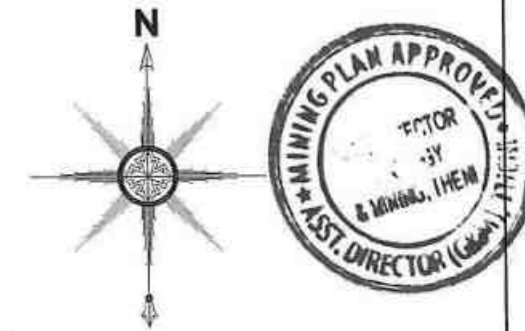


PLATE NO-II

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
 No.172/WARD-1, VEDHAKOVIL STREET,
 KAMAYAGOUNDAPATTI,
 UTHAMAPALAYAM,
 THENI DISTRICT-625 516.

LEASE AREA:
 S.F.NO : 1372/1 (Part-5)
 EXTENT : 2.50.00 Hect,
 VILLAGE : KAMAYAGOUNDANPATTI
 TALUK : UTHAMAPALAYAM
 DISTRICT : THENI

Pit ID	Latitude	Longitude
1	9°43'40.17"N	77°20'16.87"E
2	9°43'37.92"N	77°20'20.54"E
3	9°43'33.94"N	77°20'15.78"E
4	9°43'36.19"N	77°20'12.10"E

INDEX

MINE LEASE AREA	
SAFETY DISTANCE	
PILLAR STONES	
APPROACH ROAD	

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.KARUPANNAN, M.Sc., Ph.D.
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

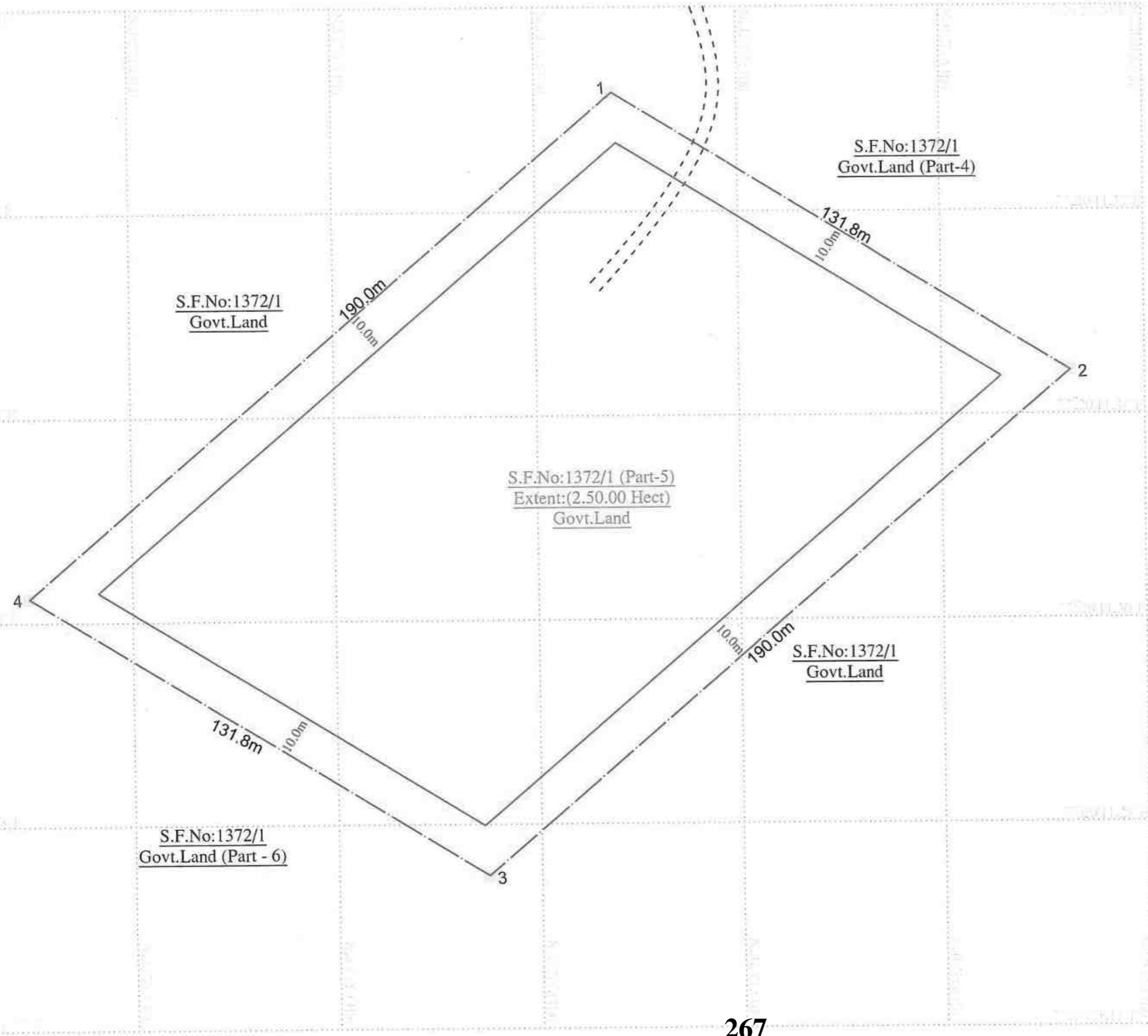




PLATE NO-III

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
 No.172/WARD-1, VEDHAKOVIL STREET,
 KAMAYAGOUNDAPATTI,
 UTHAMAPALAYAM,
 THENI DISTRICT-625 516.

LEASE AREA:
 S.F.NO : 1372/1 (Part-5)
 EXTENT : 2.50.00 Hect,
 VILLAGE : KAMAYAGOUNDANPATTI
 TALUK : UTHAMAPALAYAM
 DISTRICT : THENI

INDEX

MINE LEASE AREA	
SAFETY BOUNDARY	
APPROACH ROAD	
PILLAR STONES	
TEMPORARY BENCH MARK	
CONTOUR LINE	
SCHRUBS	
RESIDUAL TOP SOIL	
ROUGH STONE	

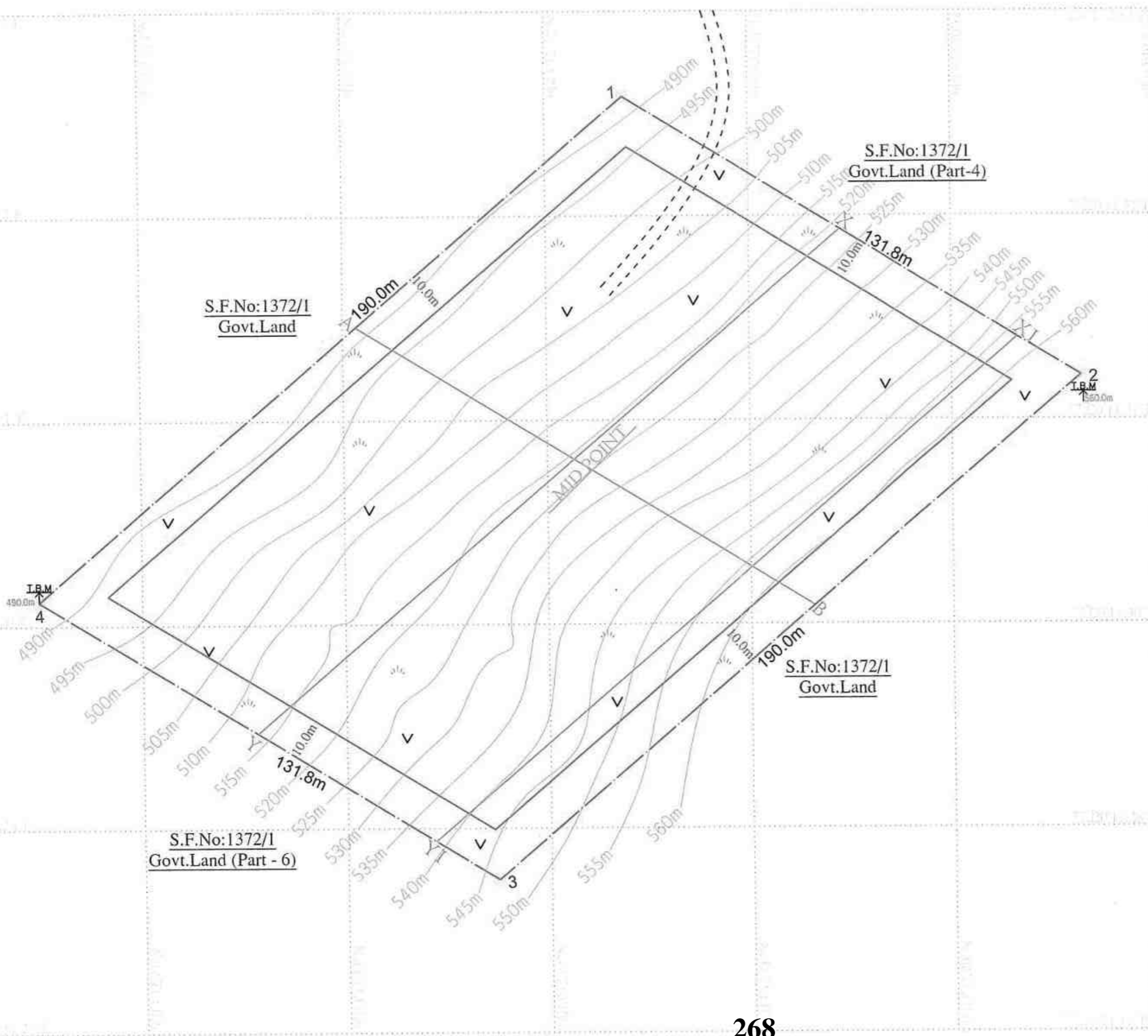
SURFACE AND GEOLOGICAL PLAN

SCALE 1 : 1000

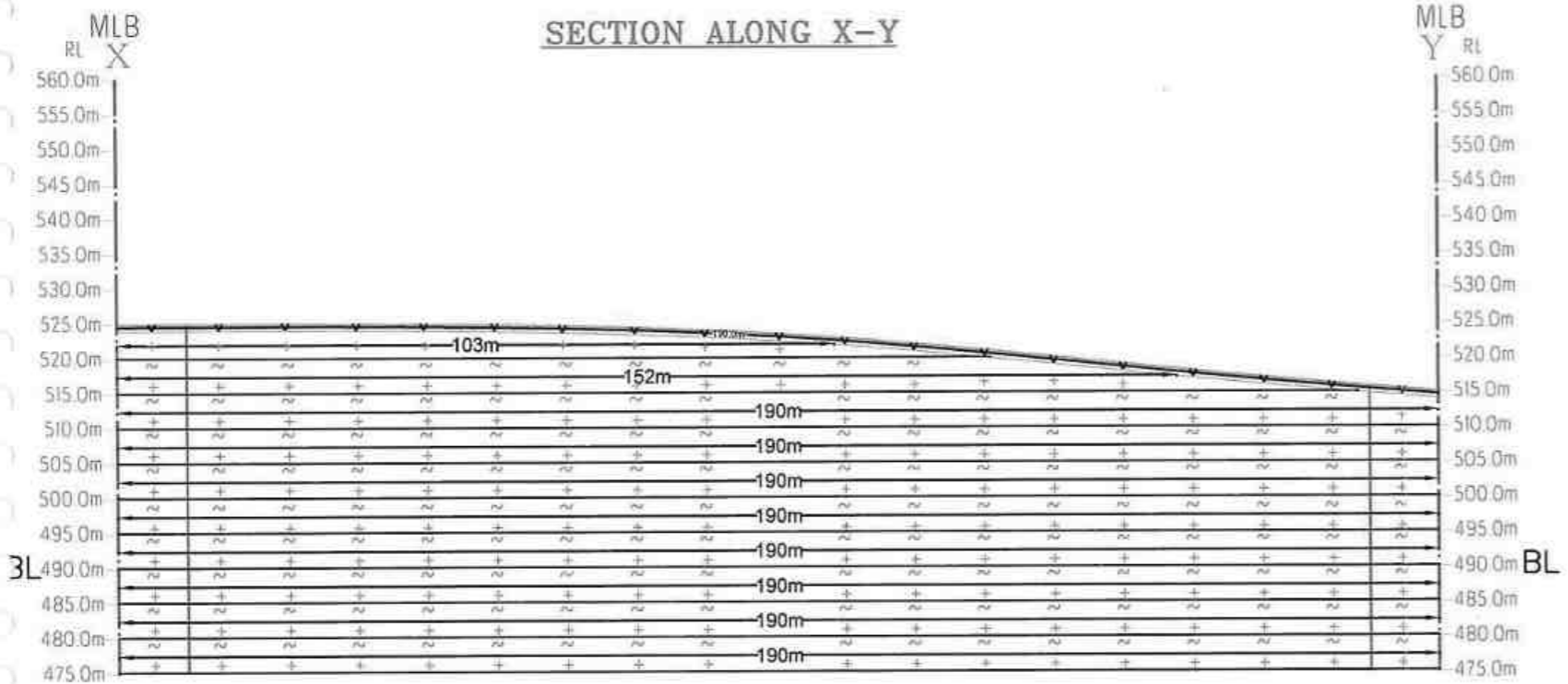
Prepared By:

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

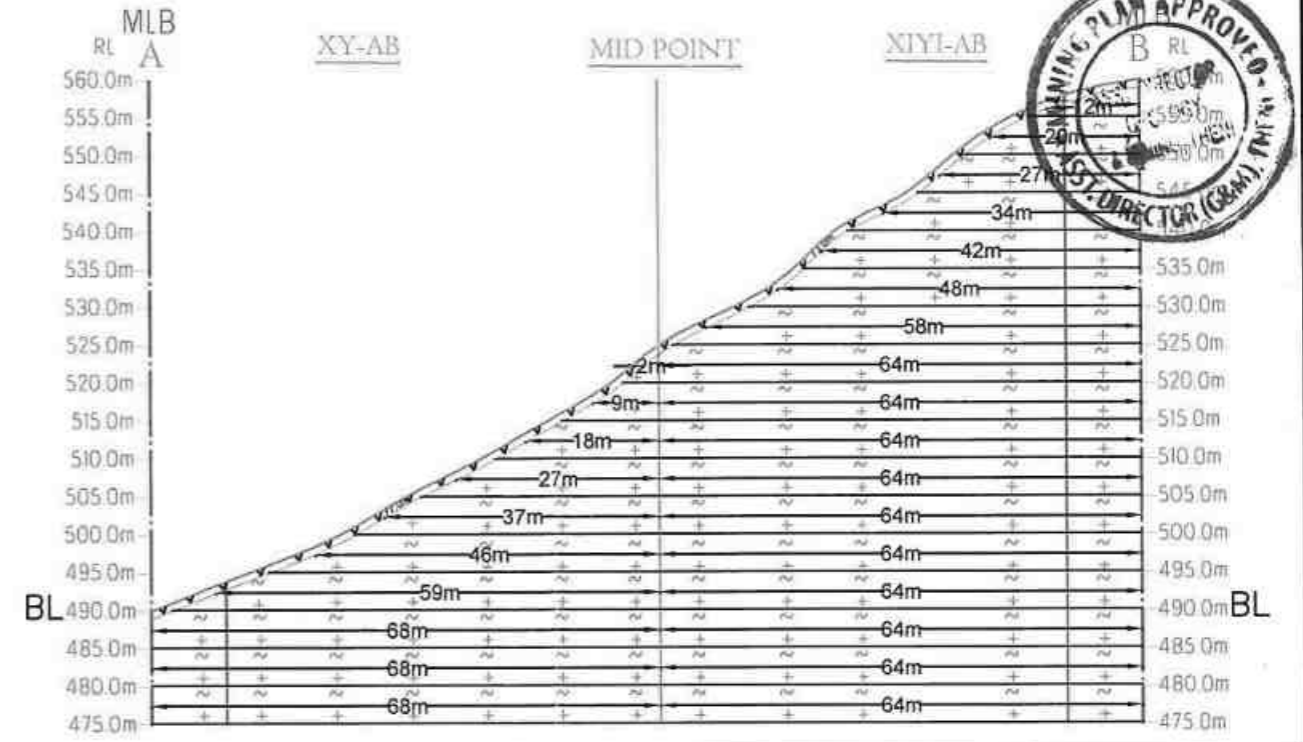
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



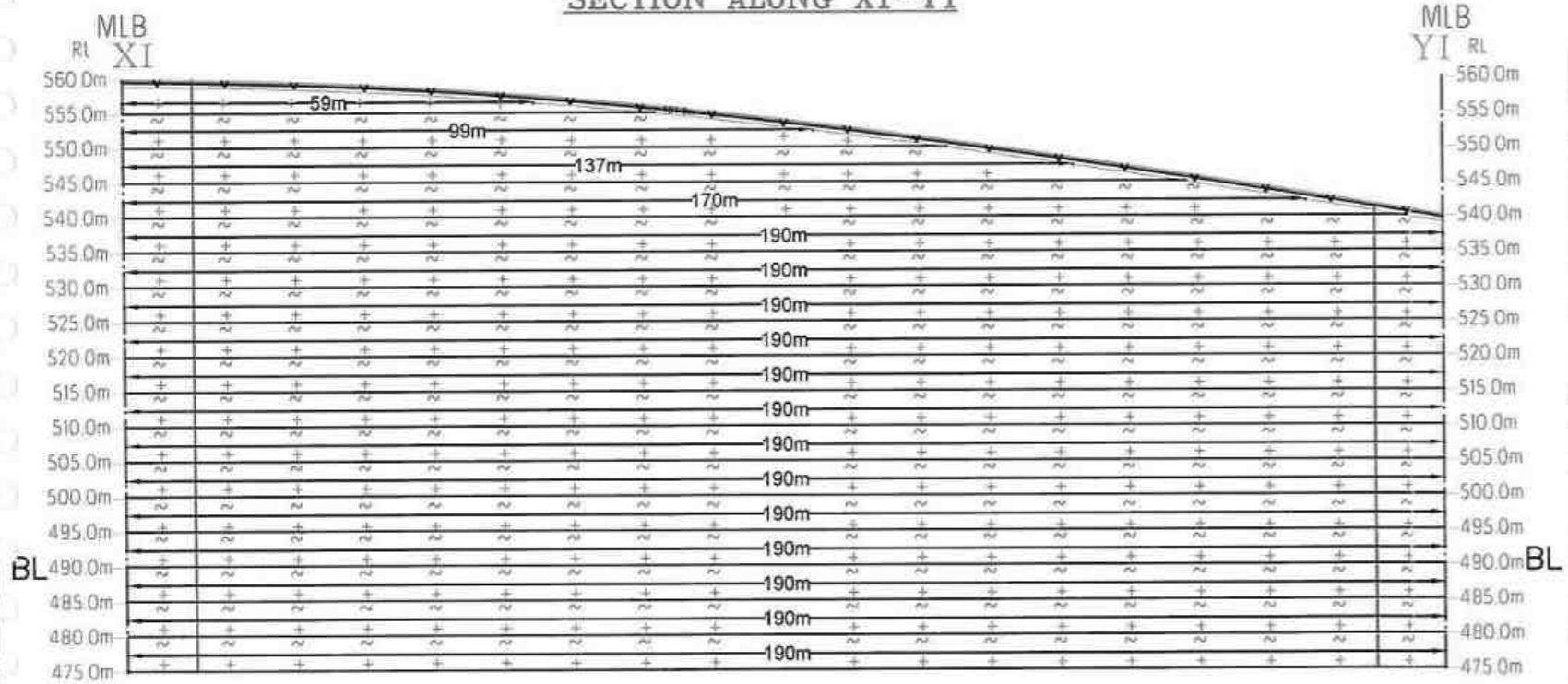
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG X1-Y1



BL = BASE LEVEL

GEOLOGICAL RESOURCES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m³	Rough Stone in m³	Residual Topsoil in m³
XY-AB	Hill Slope	190	77	1	14630	.....	14630
	I	103	2	5	1030	1030	.....
	II	152	9	5	6840	6840	.....
	III	190	18	5	17100	17100	.....
	IV	190	27	5	25650	25650	.....
	V	190	37	5	35150	35150	.....
	VI	190	46	5	43700	43700	.....
	VII	190	59	5	56050	56050	.....
	VIII	190	68	5	64600	64600	.....
	IX	190	68	5	64600	64600	.....
X	190	68	5	64600	64600	.....
TOTAL					393950	379320	14630
X1Y1-AB	Hill Slope	191	73	1	13943	.....	13943
	I	59	12	5	3540	3540	.....
	II	99	20	5	9900	9900	.....
	III	137	27	5	18495	18495	.....
	IV	170	34	5	28900	28900	.....
	V	190	42	5	39900	39900	.....
	VI	190	48	5	45600	45600	.....
	VII	190	58	5	55100	55100	.....
	VIII	190	64	5	60800	60800	.....
	IX	190	64	5	60800	60800	.....
	X	190	64	5	60800	60800	.....
	XI	190	64	5	60800	60800	.....
	XII	190	64	5	60800	60800	.....
	XIII	190	64	5	60800	60800	.....
	XIV	190	64	5	60800	60800	.....
	XV	190	64	5	60800	60800	.....
	XVI	190	64	5	60800	60800	.....
XVII	190	64	5	60800	60800	.....
TOTAL					823378	809435	13943
GRAND TOTAL					1217328	1188755	28573

PLATE NO-III A
APPLICANT:
M/s.VARUMAIKOTTERKU KEELVAALUM
MAGALIR SUYAUTHAVIKUZHU,
Mrs.S.KARTHIKA (LEADER),
No.172/WARD-1, VEDHAKOVIL STREET,
KAMAYAGOUNDAPATTI,
UTHAMAPALAYAM,
THENI DISTRICT-625 516.

LEASE AREA:
S.F.NO : 1372/1 (Part-5)
EXTENT : 2.50.00 Hect,
VILLAGE : KAMAYAGOUNDANPATTI
TALUK : UTHAMAPALAYAM
DISTRICT : THENI

INDEX

MINE LEASE AREA	
SAFETY BOUNDARY	
RESIDUAL TOP SOIL	
ROUGH STONE	

GEOLOGICAL SECTIONS
SECTION HOR 1 : 1000 & VER 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.
RECOGNISED QUALIFIED PERSON
RQP/MAS/263/2014/A



PLATE NO-IV

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
 No.172/WARD-1, VEDHAKOVIL STREET,
 KAMAYAGOUNDAPATTI,
 UTHAMAPALAYAM,
 THENI DISTRICT-625 516.

LEASE AREA:
 S.F.NO : 1372/1 (Part-5)
 EXTENT : 2.50.00 Hect,
 VILLAGE : KAMAYAGOUNDANPATTI
 TALUK : UTHAMAPALAYAM
 DISTRICT : THENI

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RESIDUAL TOP SOIL	
ROUGH STONE	
PROPOSED BENCH	

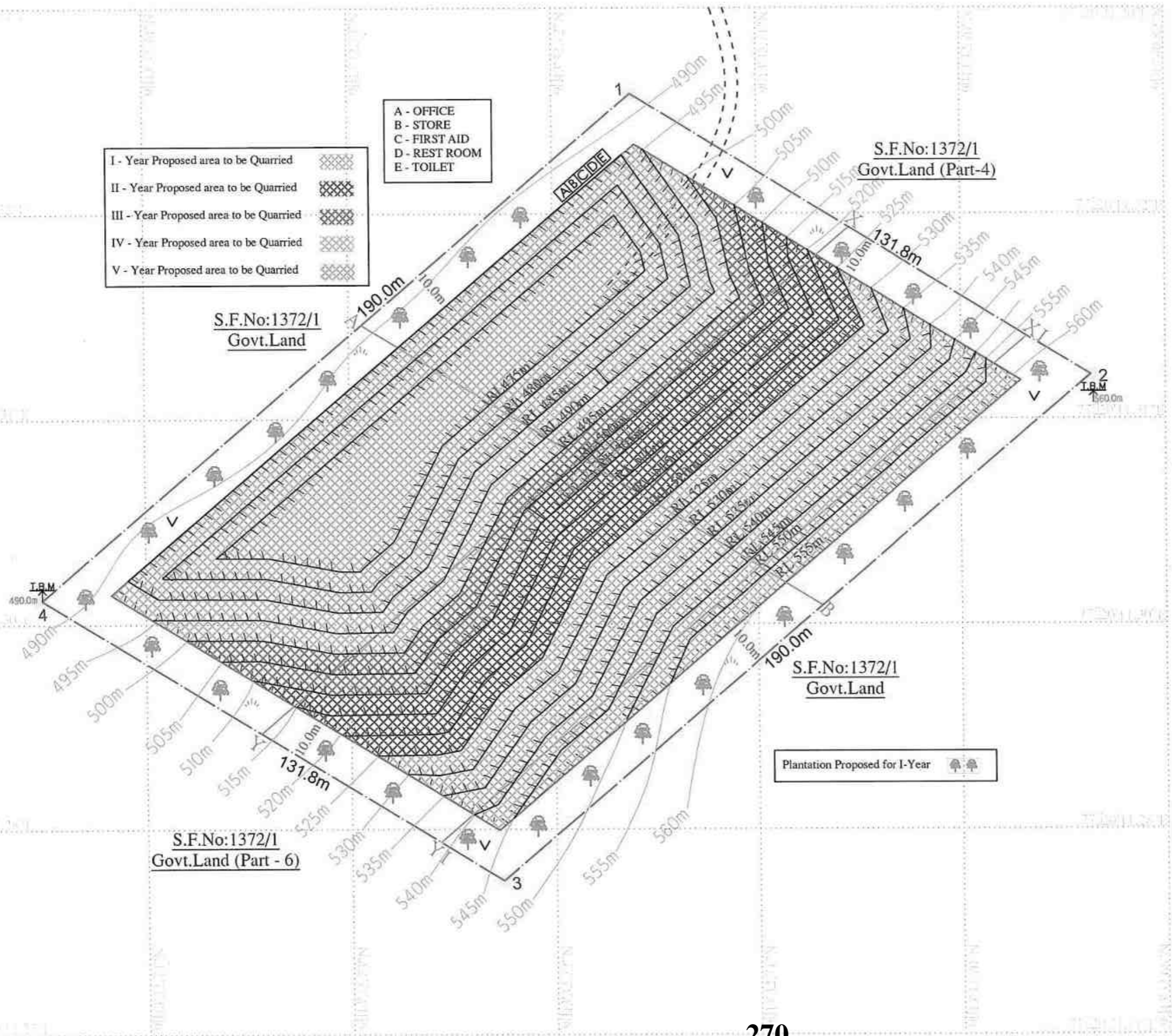
YEARWISE DEVELOPMENT & PRODUCTION PLAN

SCALE 1 : 1000

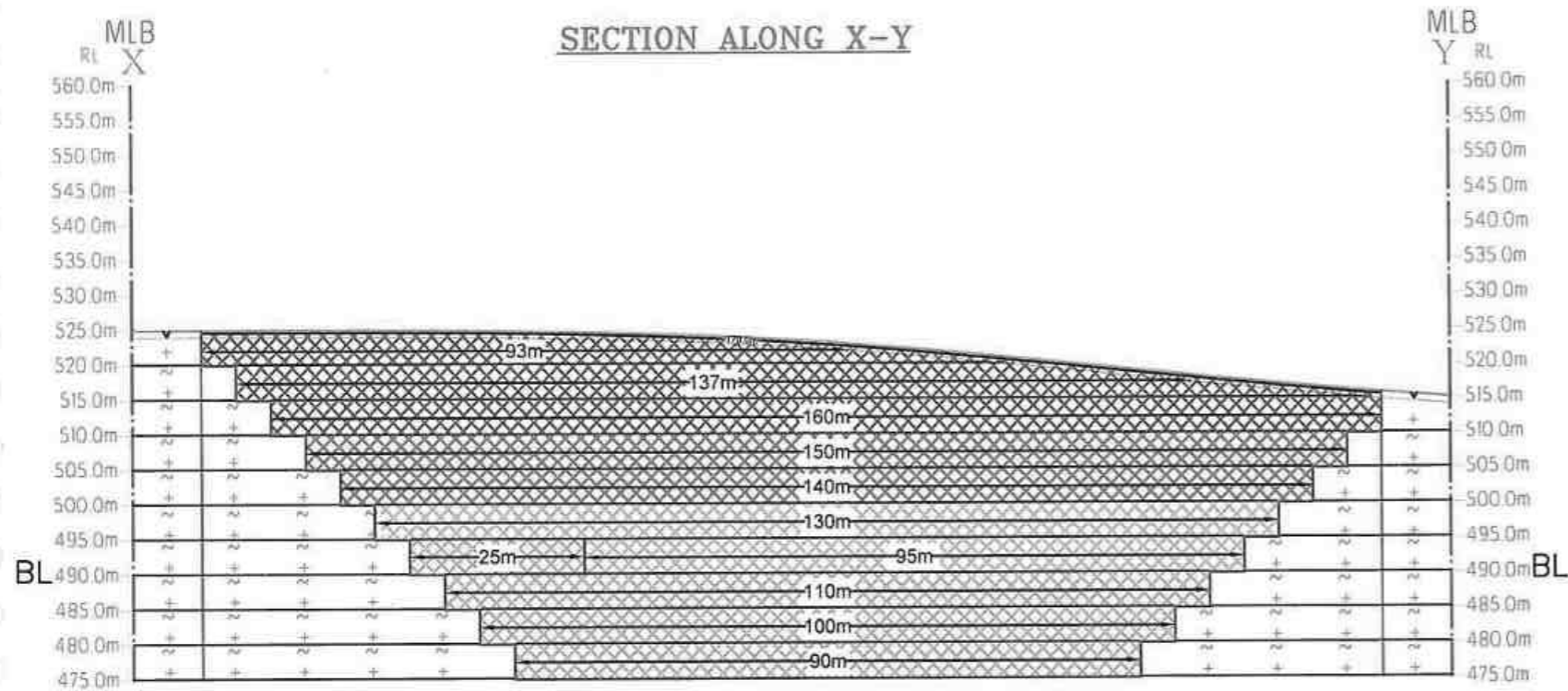
Prepared By:

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

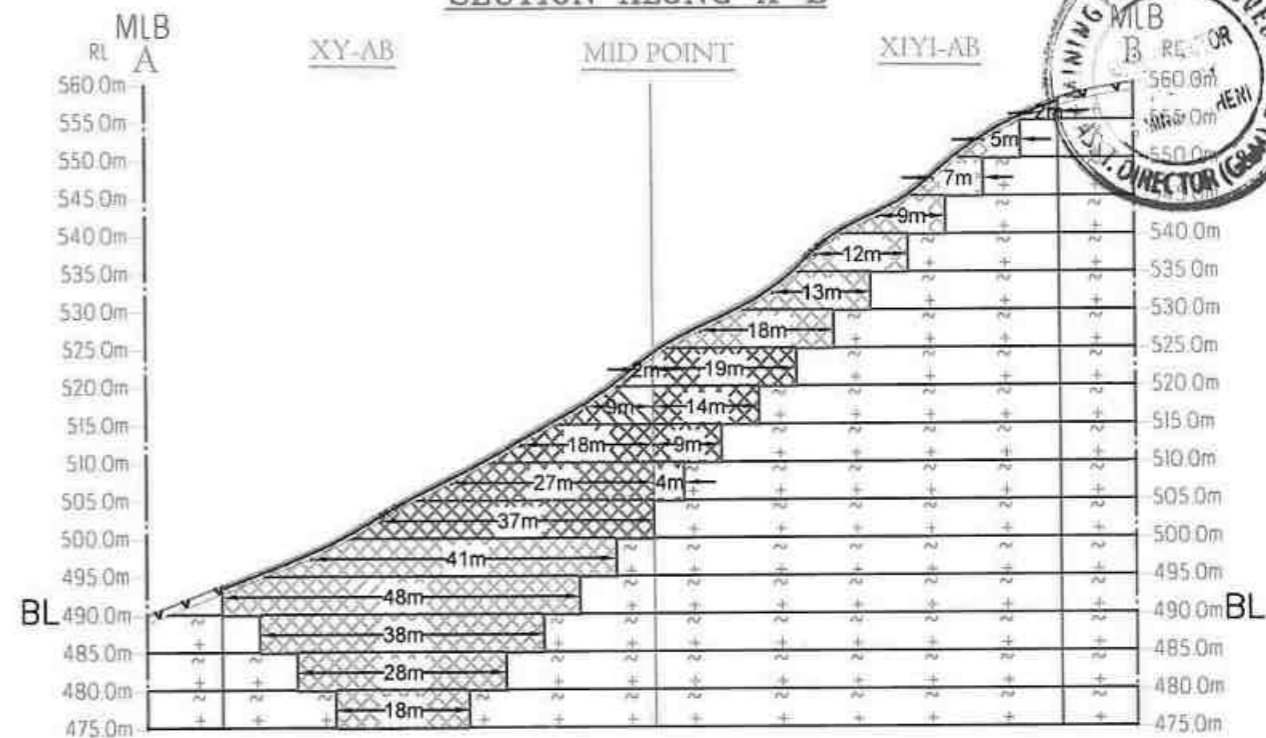
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



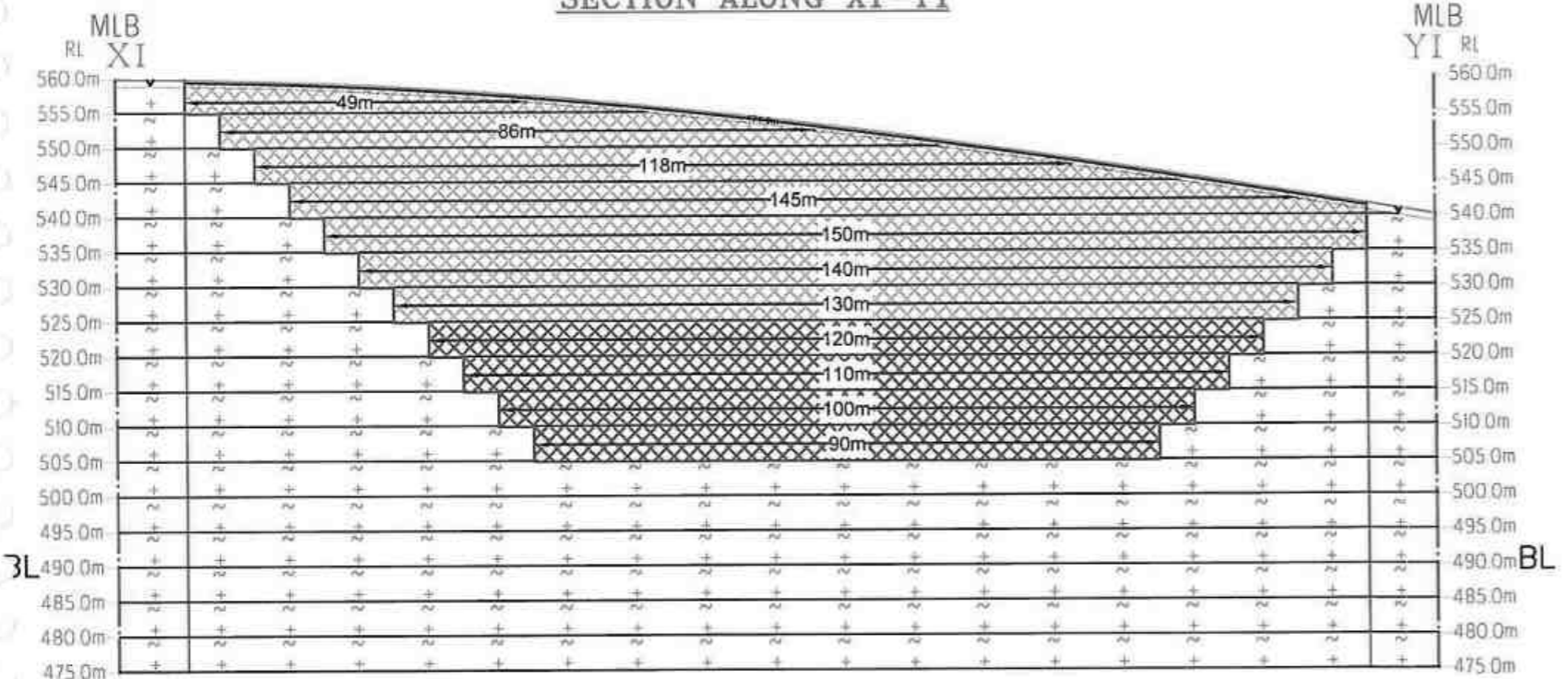
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG X1-Y1



YEARWISE PRODUCTION RESERVES							
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Residual Topsoil in m ³
I-YEAR	X1Y1-AB	Hill Slope	171	63	1	10773	10773
		I	49	2	5	490	490
		II	86	5	5	2150	2150
		III	118	7	5	4130	4130
		IV	145	9	5	6525	6525
		V	150	12	5	9000	9000
		VII	140	13	5	9100	9100
TOTAL						53868	43095
II-YEAR	X1Y1-AB	VIII	120	19	5	11400	11400
		IX	110	14	5	7700	7700
		X	100	9	5	4500	4500
		XI	90	4	5	1800	1800
TOTAL						57945	46895
III-YEAR	XY-AB	Hill Slope	170	65	1	11050	11050
		I	93	2	5	930	930
		II	137	9	5	6165	6165
TOTAL						57945	46895
IV-YEAR	XY-AB	IV	150	27	5	20250	20250
		V	140	37	5	25900	25900
TOTAL						46150	46150
V-YEAR	XY-AB	VII	25	48	5	6000	6000
		VIII	110	38	5	20900	20900
		IX	100	28	5	14000	14000
		X	90	18	5	8100	8100
TOTAL						49000	49000
GRAND TOTAL						256413	234590

PLATE NO-IVA

APPLICANT:
 M/s. VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs. S. KARTHIKA (LEADER),
 No. 172/WARD-1, VEDHAKOVIL STREET,
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- MINE LEASE AREA
- SAFETY BOUNDARY
- RESIDUAL TOP SOIL
- ROUGH STONE
- PROPOSED BENCH

YEARWISE DEVELOPMENT & PRODUCTION SECTIONS
 SECTION HOR 1 : 1000 & VER 1: 1000

Prepared By:
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[Signature]
 Dr. S. KARUPPANNAN, M.Sc., Ph.D.
 RECOGNISED 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

BL = BASE LEVEL

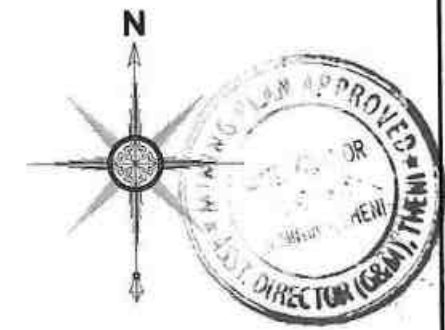


PLATE NO-V

APPLICANT:
 M/s. VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
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 THENI DISTRICT-625 516.

LEASE AREA:
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 TALUK : UTHAMAPALAYAM
 DISTRICT : THENI

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ROUGH STONE	
PROPOSED BENCH	

**MINE LAYOUT PLAN AND
 LAND USE PATTERN**

SCALE 1 : 1000

Prepared By:

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 RQP/MAS/263/2014/A

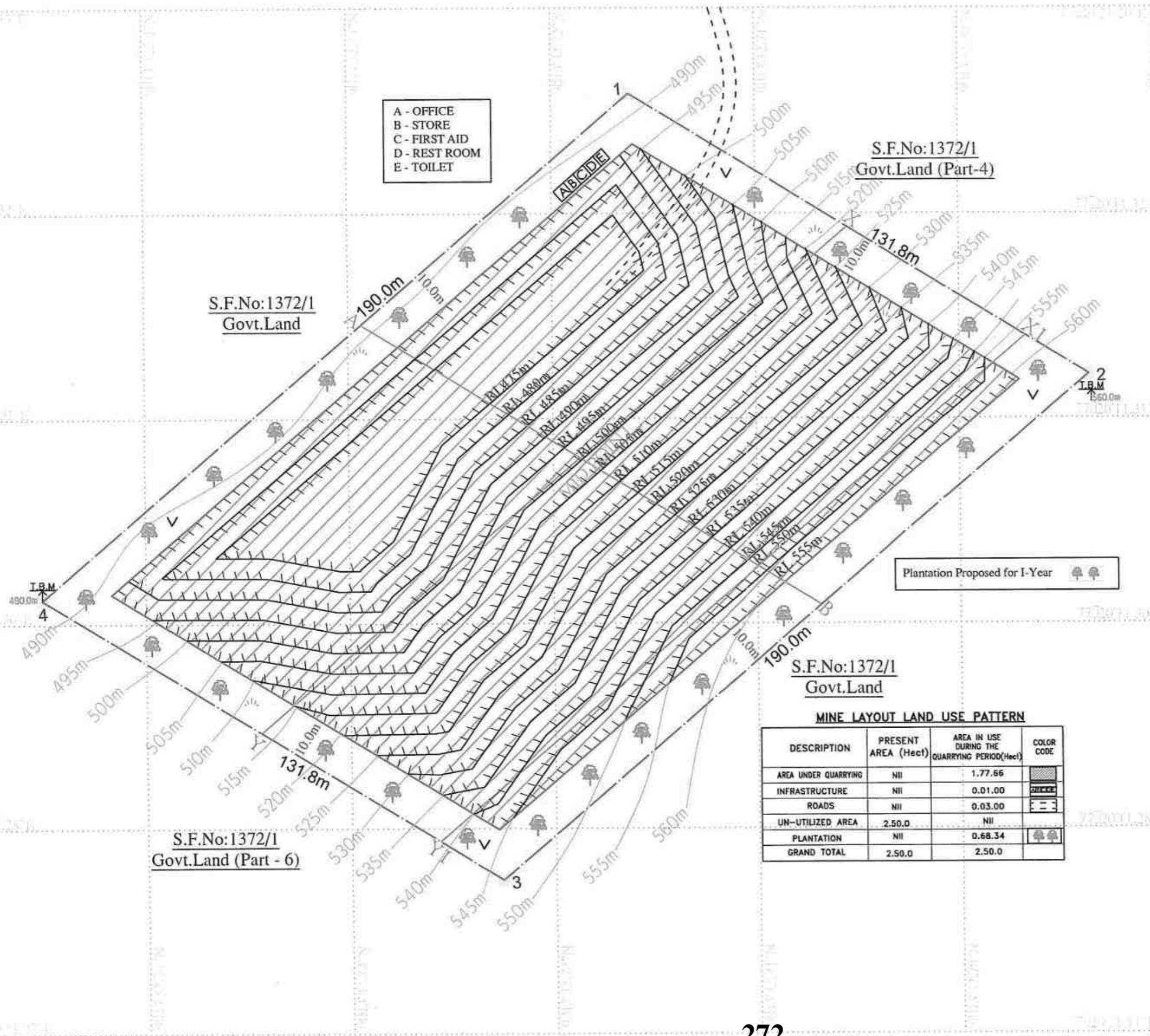




PLATE NO-VI

APPLICANT:
 M/s. VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
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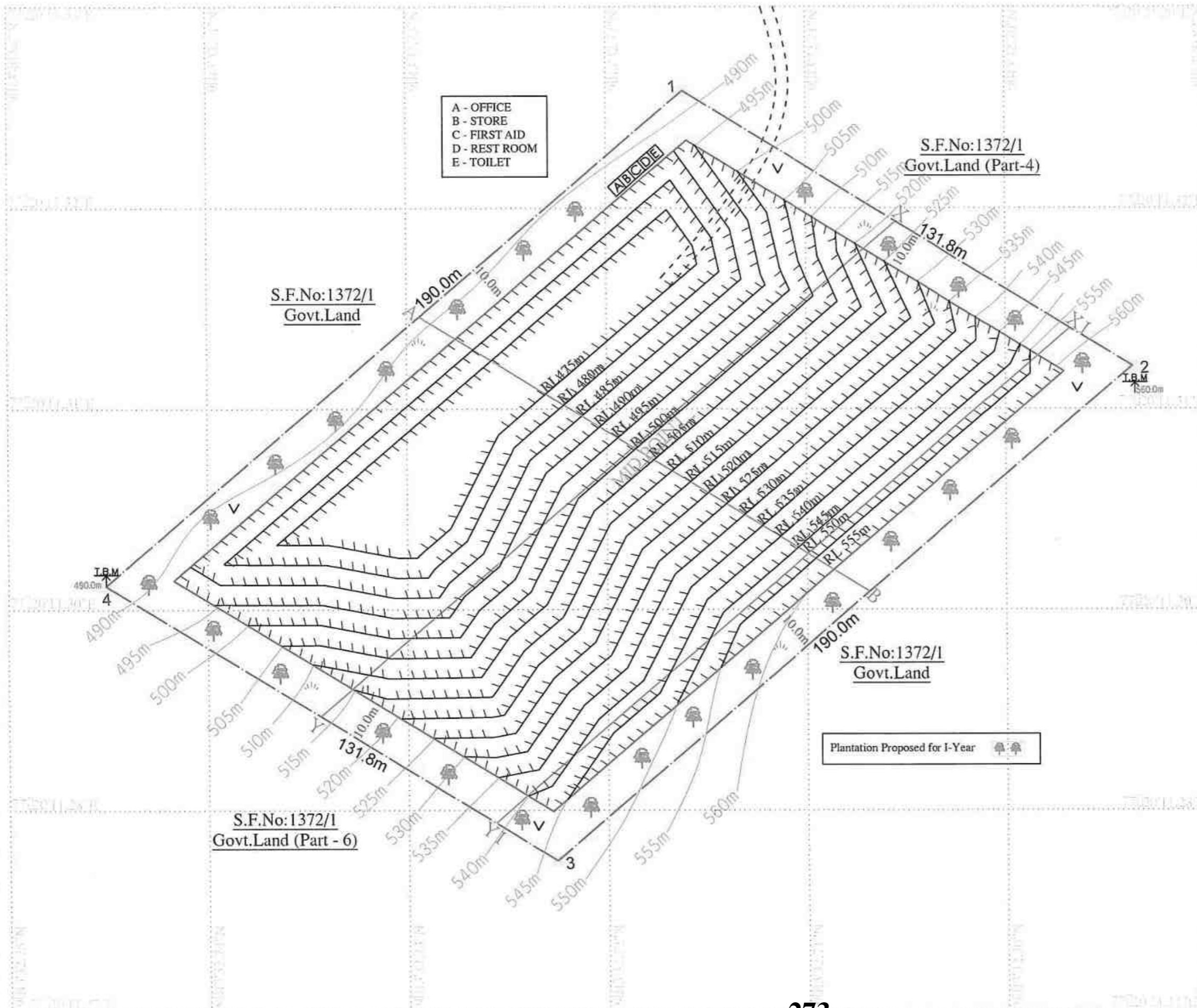
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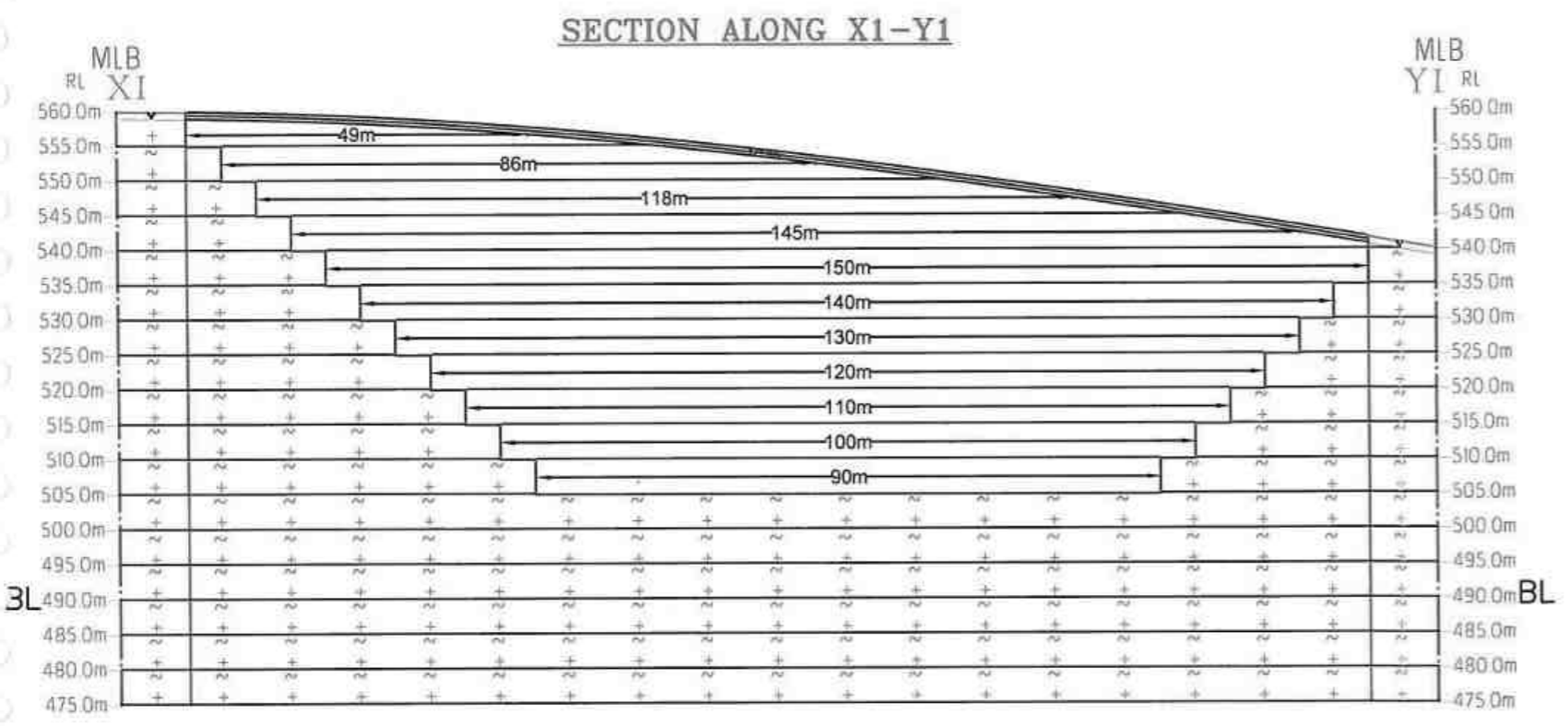
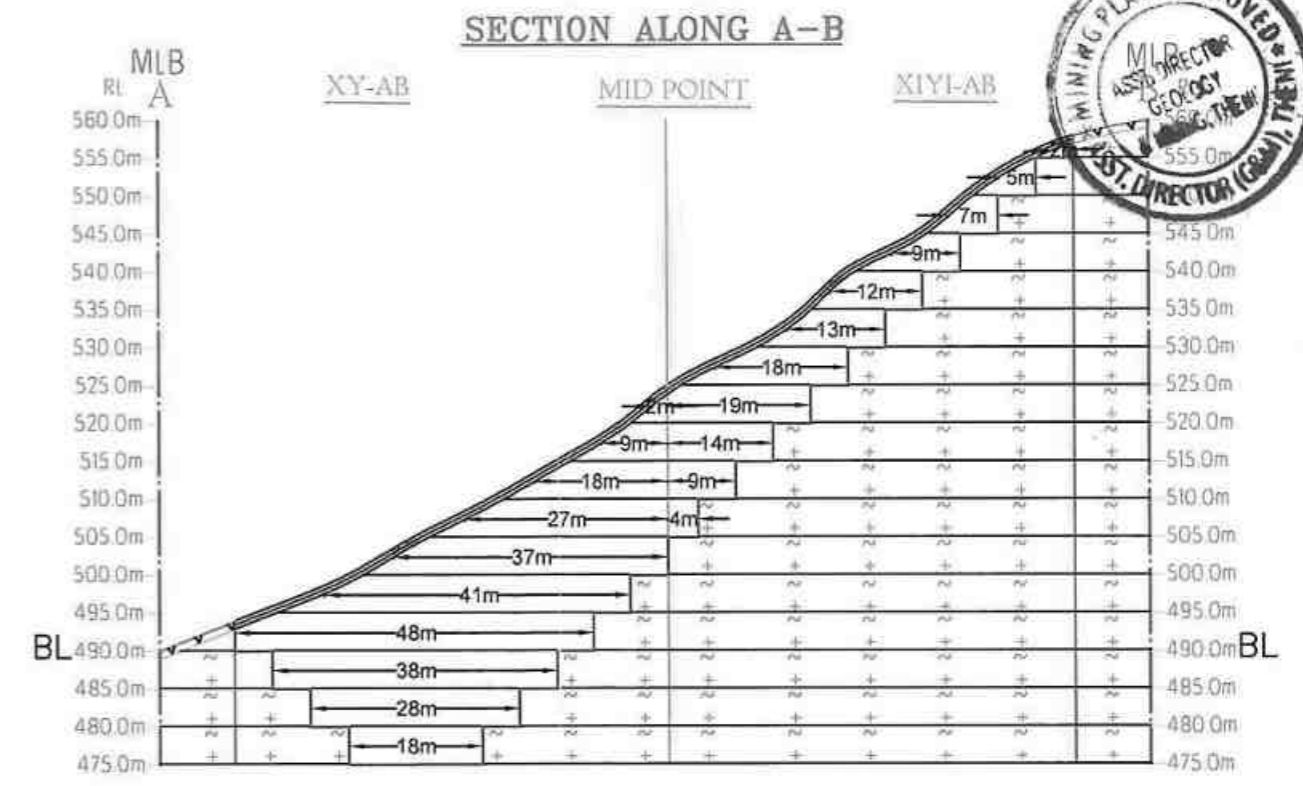
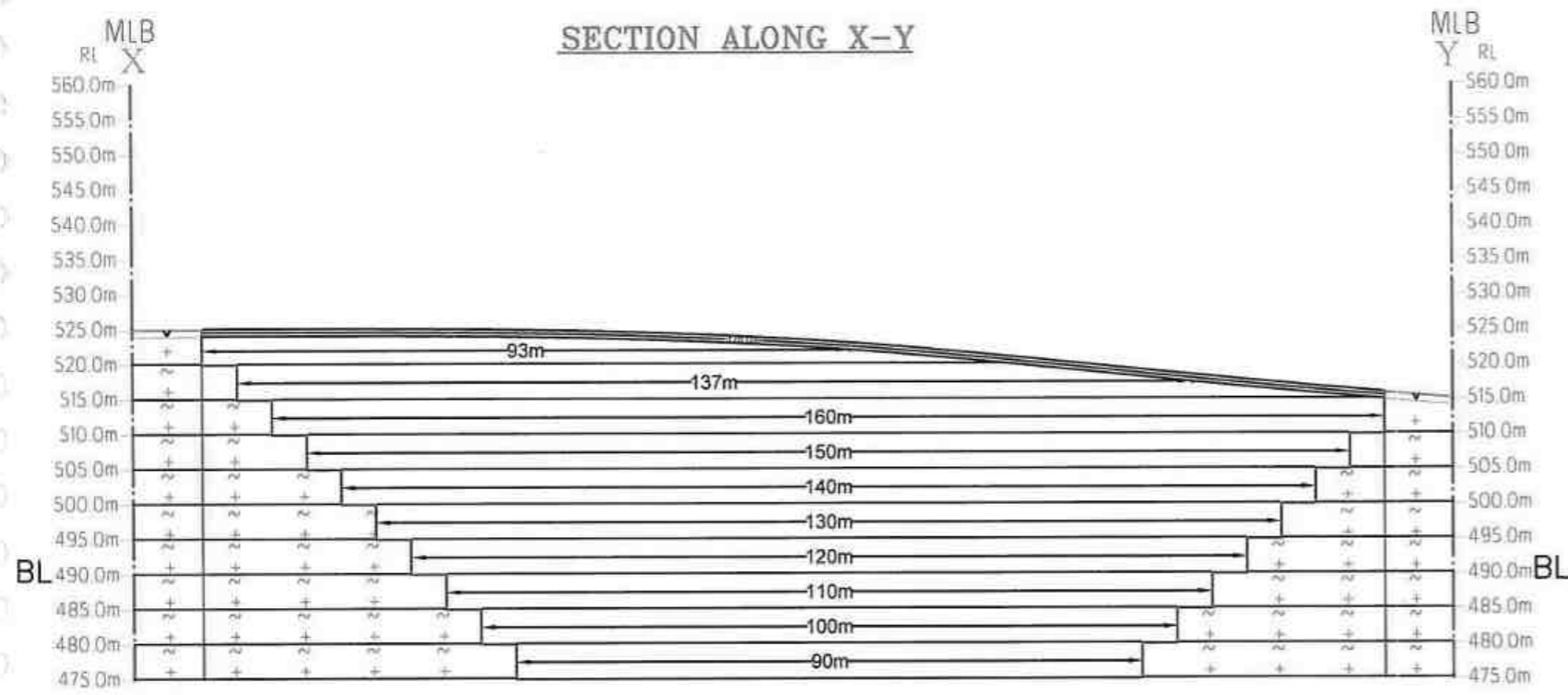
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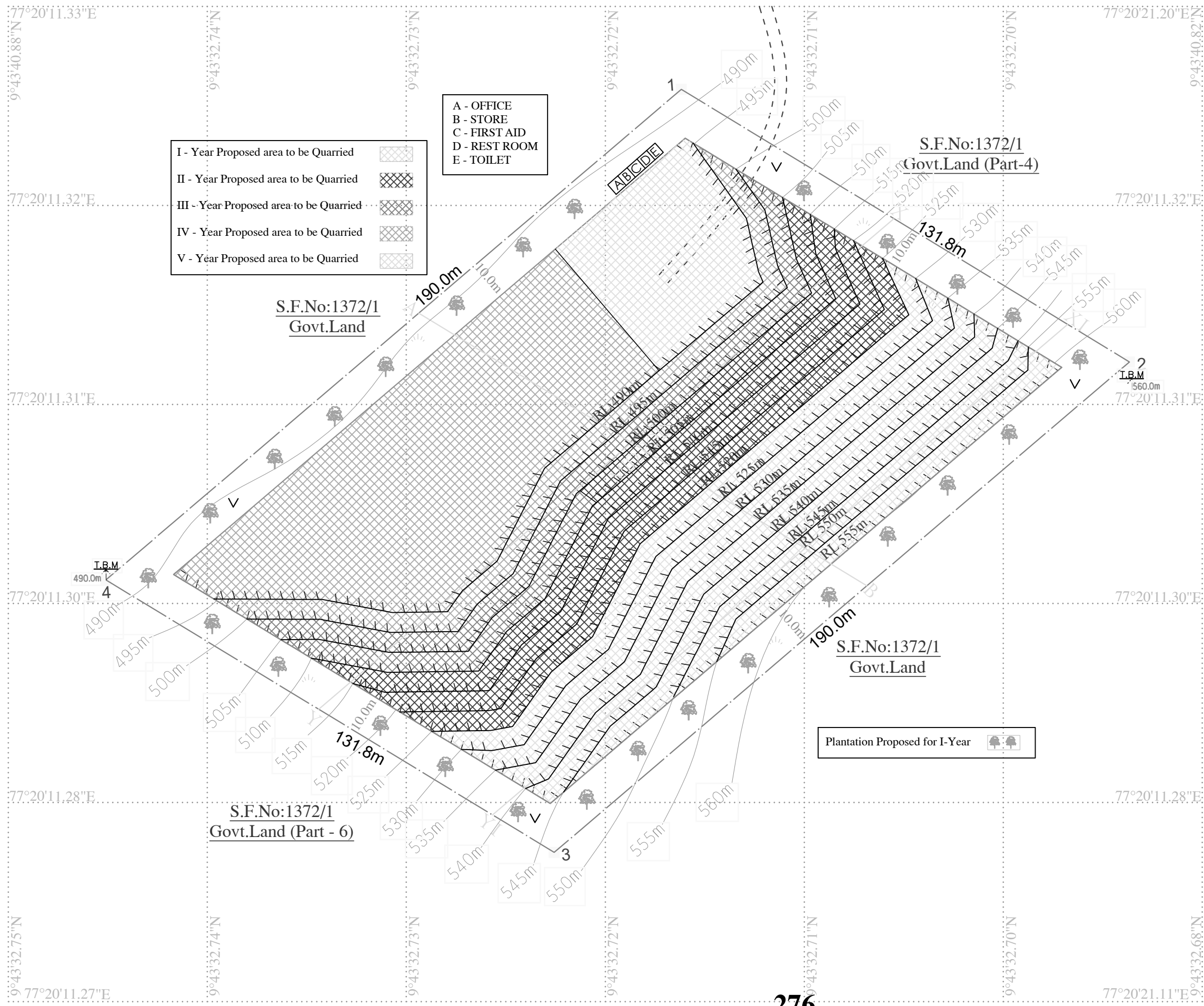
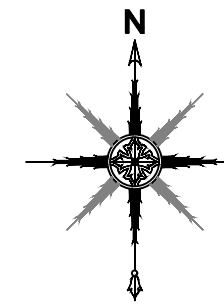
MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Rough Stone in m ³	Residual Topsoil in m ³
XY-AB	Hill Slope	170	65	1	11050	.....	11050
	I	93	2	5	930	930	.....
	II	137	9	5	6165	6165	.....
	III	160	18	5	14400	14400	.....
	IV	150	27	5	20250	20250	.....
	V	140	37	5	25900	25900	.....
	VI	130	41	5	26650	26650	.....
	VII	120	48	5	28800	28800	.....
	VIII	110	38	5	20900	20900	.....
	IX	100	28	5	14000	14000	.....
X	90	18	5	8100	8100	.....
TOTAL					177145	166095	11050
X1Y1-AB	Hill Slope	171	63	1	10773	.....	10773
	I	49	2	5	490	490	.....
	II	86	5	5	2150	2150	.....
	III	118	7	5	4130	4130	.....
	IV	145	9	5	6525	6525	.....
	V	150	12	5	9000	9000	.....
	VI	140	13	5	9100	9100	.....
	VII	130	18	5	11700	11700	.....
	VIII	120	19	5	11400	11400	.....
	IX	110	14	5	7700	7700	.....
	X	100	9	5	4500	4500	.....
XI	90	4	5	1800	1800	.....
TOTAL					79268	68495	10773
GRAND TOTAL					256413	234590	21823

BL= BASE LEVEL

PLATE NO-VIA	
APPLICANT: M/s. VARUMAIKOTTERKU KEELVAALUM MAGALIR SUYAUTHAVIKUZHU, Mrs. S.KARTHIKA (LEADER), No.172/WARD-1, VEDHAKOVIL STREET, KAMAYAGOUNDAPATTI, UTHAMAPALAYAM, THENI-625 516.	
LEASE AREA: S.F.NO : 1372/1 (Part-5) EXTENT : 2.50.00 Hect, VILLAGE : KAMAYAGOUNDANPATTI TALUK : UTHAMAPALAYAM DISTRICT : THENI	
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RESIDUAL TOP SOIL	V V V
ROUGH STONE	~ ~ ~
PROPOSED BENCH	▭
CONCEPTUAL SECTIONS SECTION HOR 1 : 1000 & VER 1: 1000	
Prepared By:	

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



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- V - Year Proposed area to be Quarried

- A - OFFICE
- B - STORE
- C - FIRST AID
- D - REST ROOM
- E - TOILET

Plantation Proposed for I-Year

PLATE NO-IV

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
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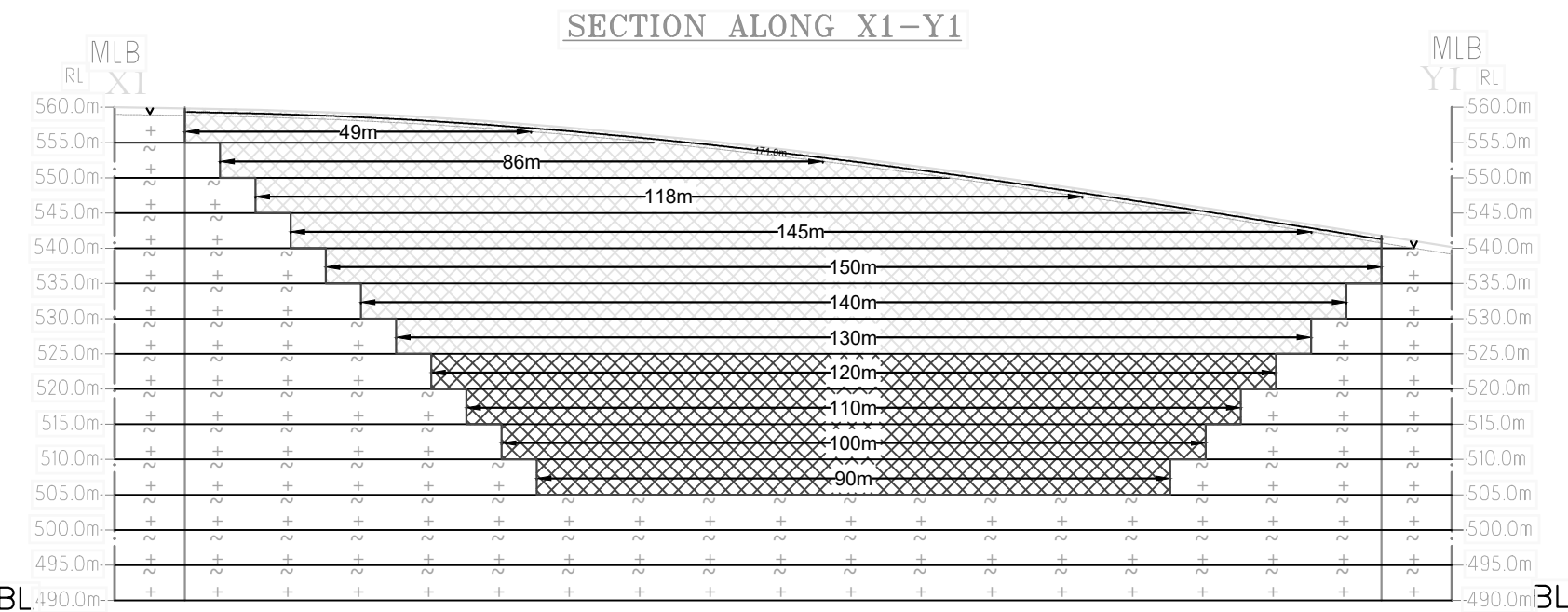
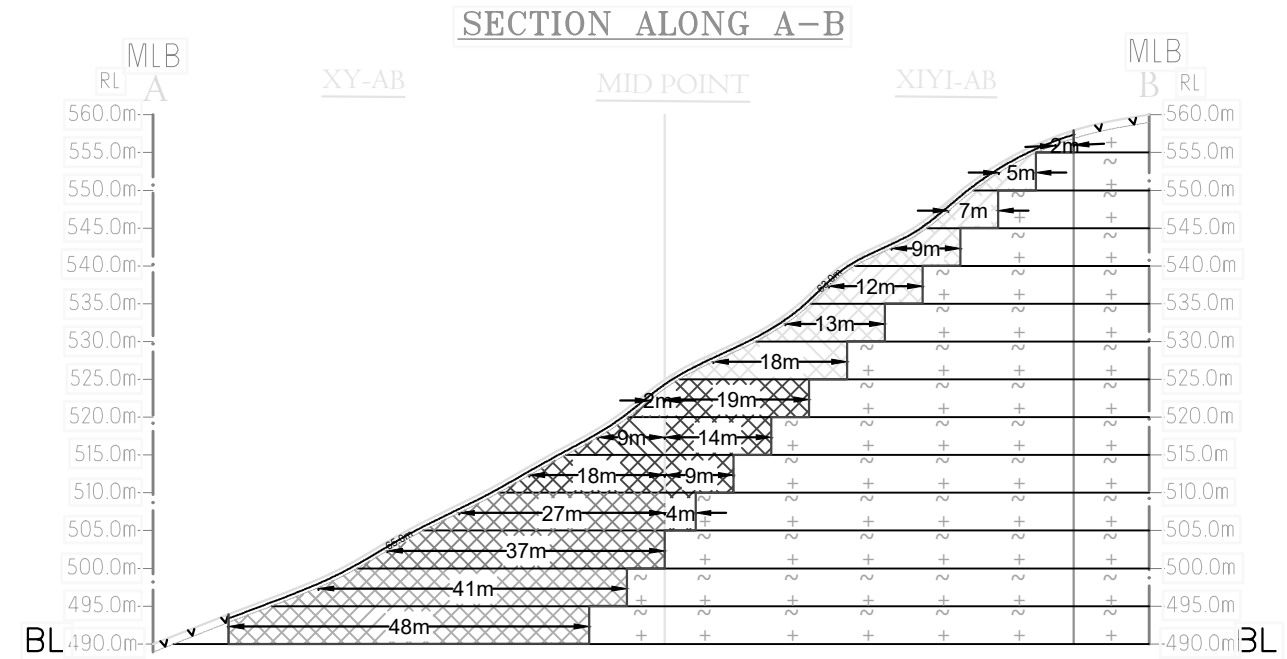
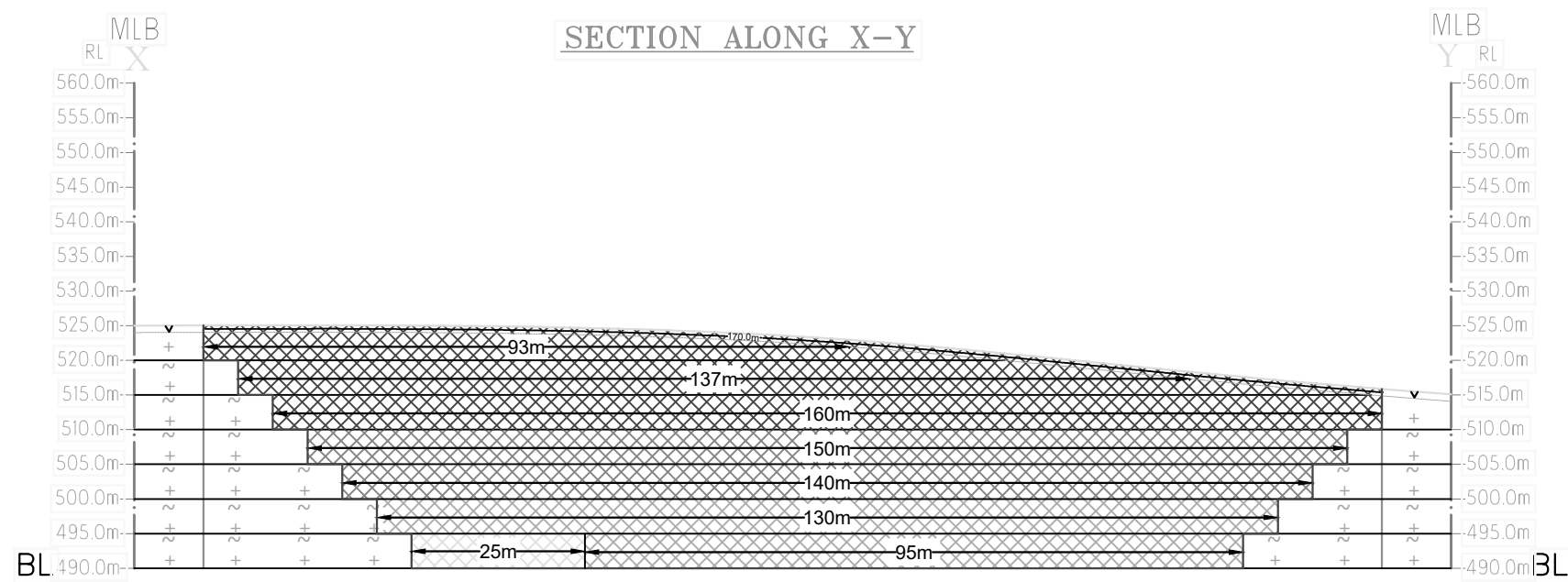
MINE LEASE AREA	
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CONTOUR LINE	
SCHRUBS	
RESIDUAL TOP SOIL	
ROUGH STONE	
PROPOSED BENCH	

YEARWISE DEVELOPMENT & PRODUCTION PLAN
 SCALE 1 : 1000

Prepared By:

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 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



YEARWISE PRODUCTION RESERVES								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Rough Stone in m ³	Residual Topsoil in m ³
I-YEAR	X1Y1-AB	Hill Slope	171	6.3	1	10773	.....	10773
		I	49	2	5	490	490	.....
		II	86	5	5	2150	2150	.....
		III	118	7	5	4130	4130	.....
		IV	145	9	5	6525	6525	.....
		V	150	12	5	9000	9000	.....
		VI	140	13	5	9100	9100	.....
TOTAL						53868	43095	10773
II-YEAR	X1Y1-AB	VIII	120	19	5	11400	11400	.....
		IX	110	14	5	7700	7700	.....
		X	100	9	5	4500	4500	.....
		XI	90	4	5	1800	1800	.....
		Hill Slope	170	6.5	1	11050	.....	11050
XY-AB	I	93	2	5	930	930	.....
	II	137	9	5	6165	6165	.....
	III	160	18	5	14100	14100	.....
TOTAL						57945	46895	11050
III YEAR	XY-AB	IV	150	27	5	20250	20250	.....
		V	140	37	5	25900	25900	.....
TOTAL						46150	46150	0
IV-YEAR	XY-AB	VI	130	41	5	26650	26650	.....
		VII	95	48	5	22800	22800	.....
TOTAL						49450	49450	0
V-YEAR	XY-AB	VII	25	48	5	6000	6000	.....
TOTAL						6000	6000	0
GRAND TOTAL						213413	191590	21823

PLATE NO-IVA

APPLICANT:

M/s.VARUMAIKOTTERKU KEELVAALUM
MAGALIR SUYAUTHAVIKUZHU,
Mrs.S.KARTHIKA (LEADER),
No.172/WARD-1, VEDHAKOVIL STREET,
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THENI DISTRICT-625 516.

LEASE AREA:

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TALUK : UTHAMAPALAYAM
DISTRICT : THENI

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- MINE LEASE AREA
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YEARWISE DEVELOPMENT & PRODUCTION SECTIONS
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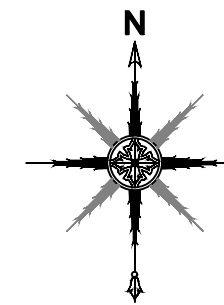
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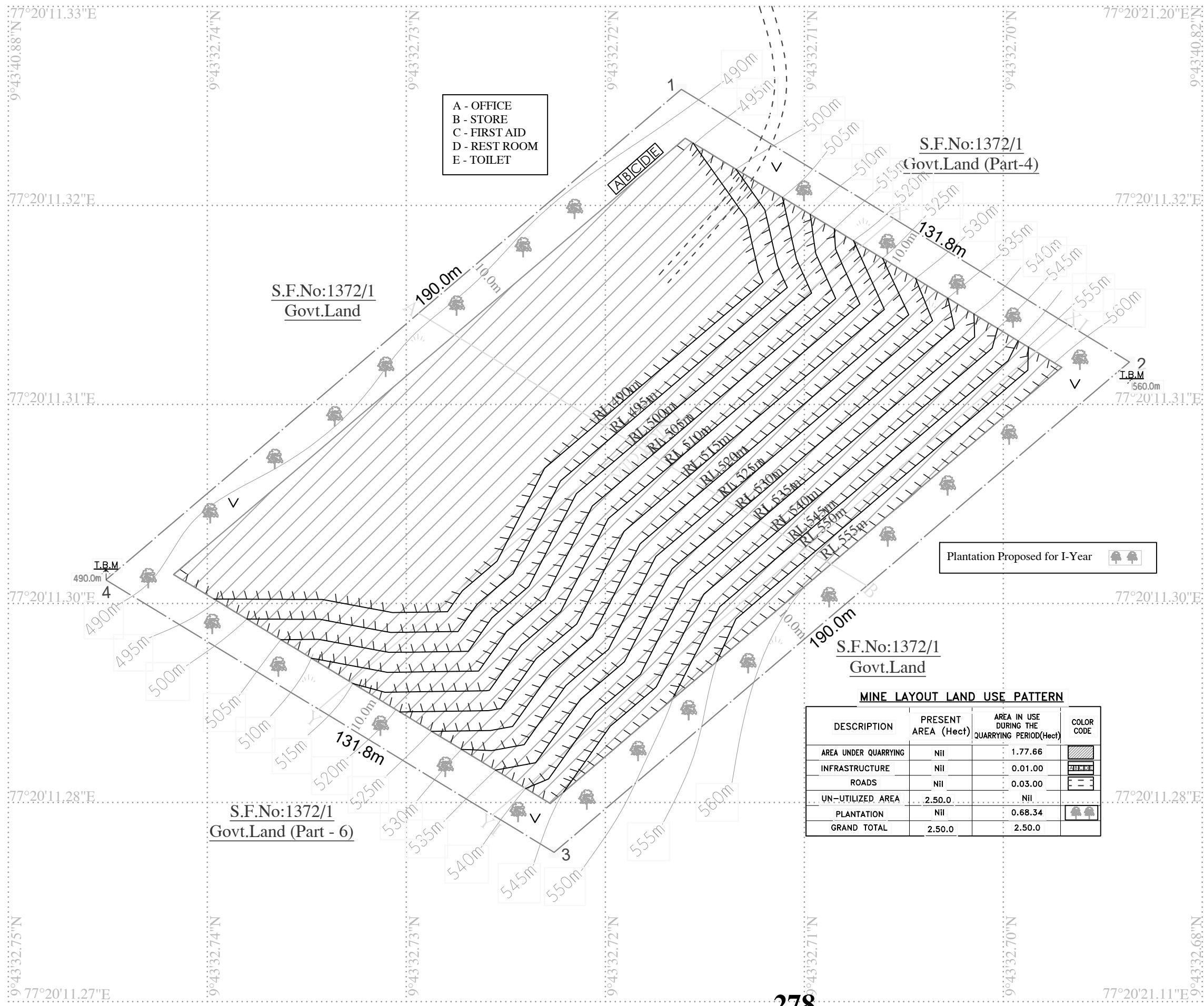
Dr.S.KARUPPANNAN, M.Sc., Ph.D.
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RQP/MAS/263/2014/A

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- III - Year Proposed area to be Quarried
- IV - Year Proposed area to be Quarried
- V - Year Proposed area to be Quarried

BL= BASE LEVEL



- A - OFFICE
- B - STORE
- C - FIRST AID
- D - REST ROOM
- E - TOILET



MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NII	1.77.66	
INFRASTRUCTURE	NII	0.01.00	
ROADS	NII	0.03.00	
UN-UTILIZED AREA	2.50.0	NII	
PLANTATION	NII	0.68.34	
GRAND TOTAL	2.50.0	2.50.0	

PLATE NO-V

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
 MAGALIR SUYAUTHAVIKUZHU,
 Mrs.S.KARTHIKA (LEADER),
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 DISTRICT : THENI

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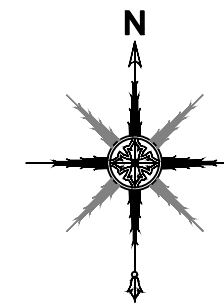
- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- PILLAR STONES
- TEMPORARY BENCH MARK
- CONTOUR LINE
- SCHRUBS
- RESIDUAL TOP SOIL
- ROUGH STONE
- PROPOSED BENCH

**MINE LAYOUT PLAN AND
 LAND USE PATTERN
 SCALE 1 : 1000**

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- A - OFFICE
- B - STORE
- C - FIRST AID
- D - REST ROOM
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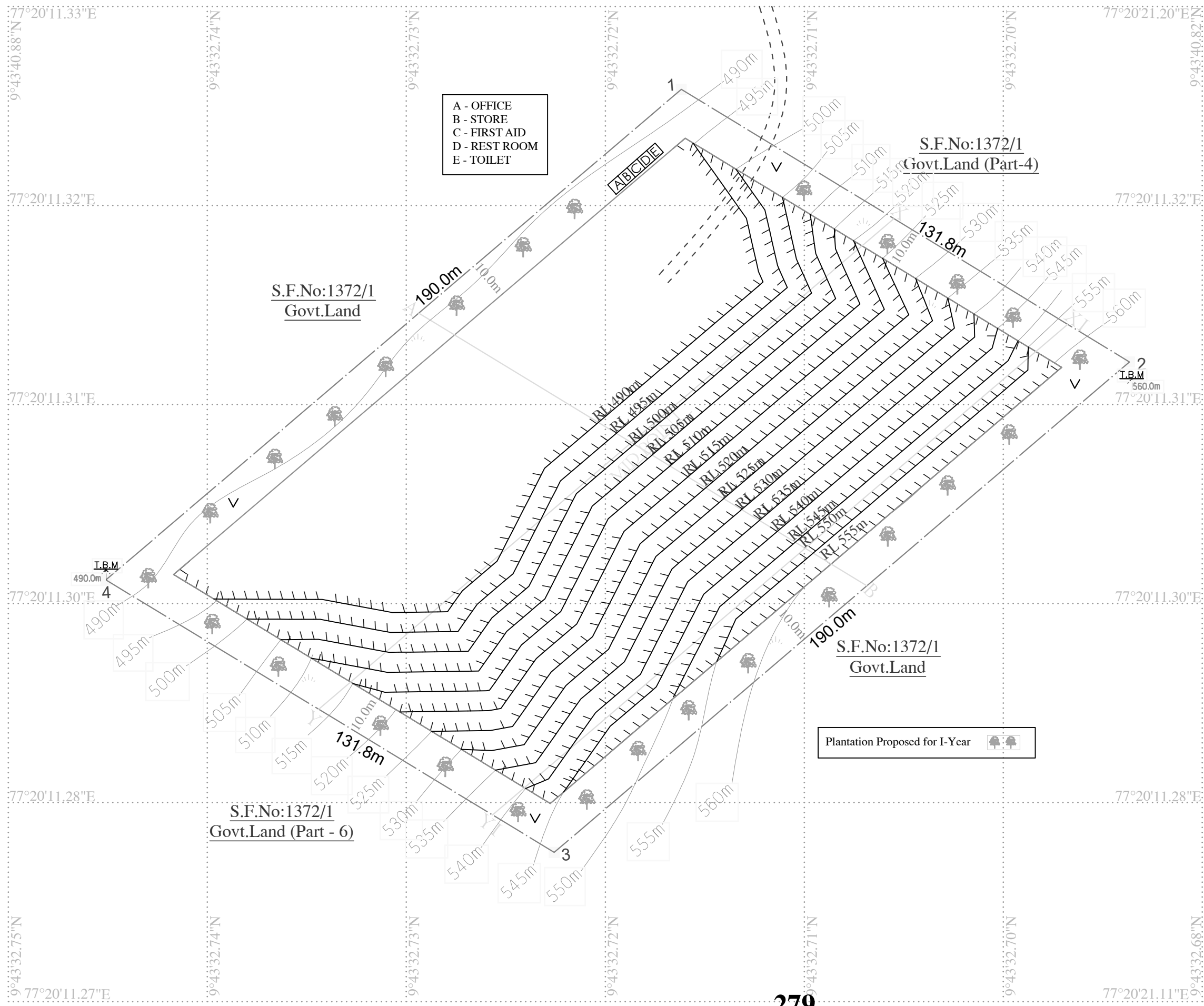


PLATE NO-VI

APPLICANT:
 M/s.VARUMAIKOTTERKU KEELVAALUM
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CONTOUR LINE	
SCHRUBS	
RESIDUAL TOP SOIL	
ROUGH STONE	
PROPOSED BENCH	

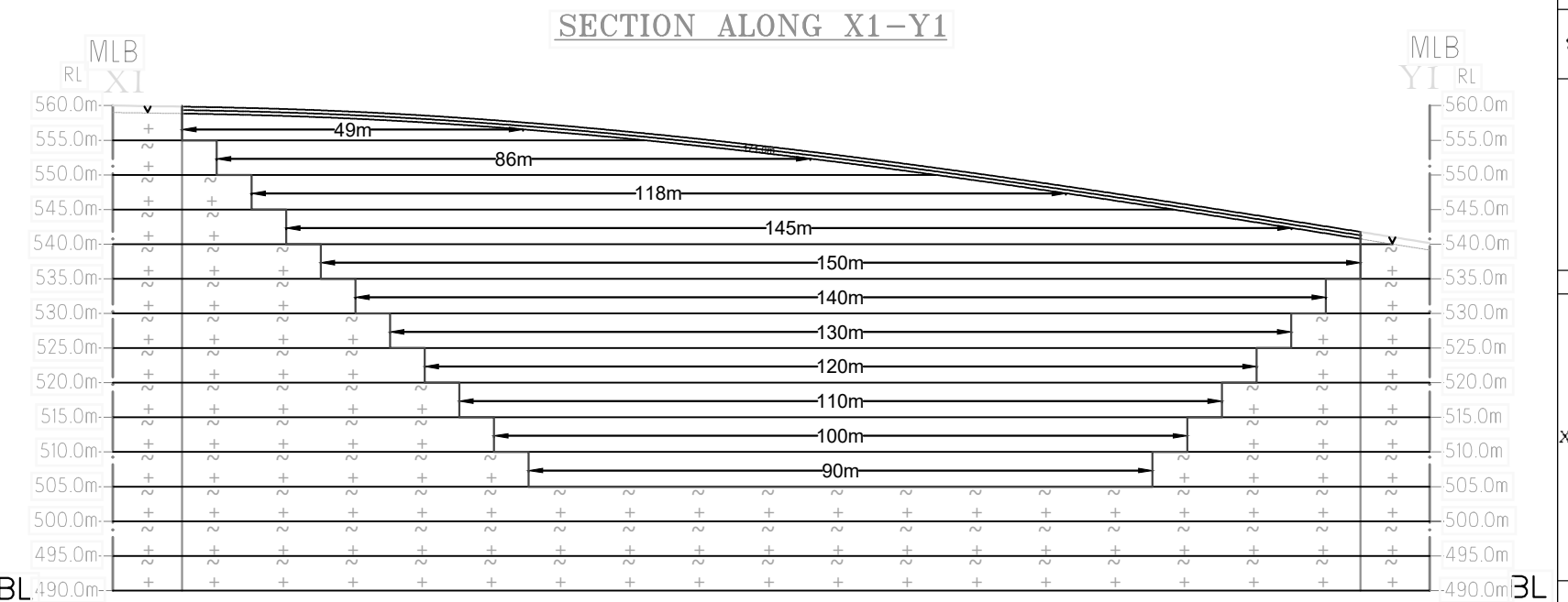
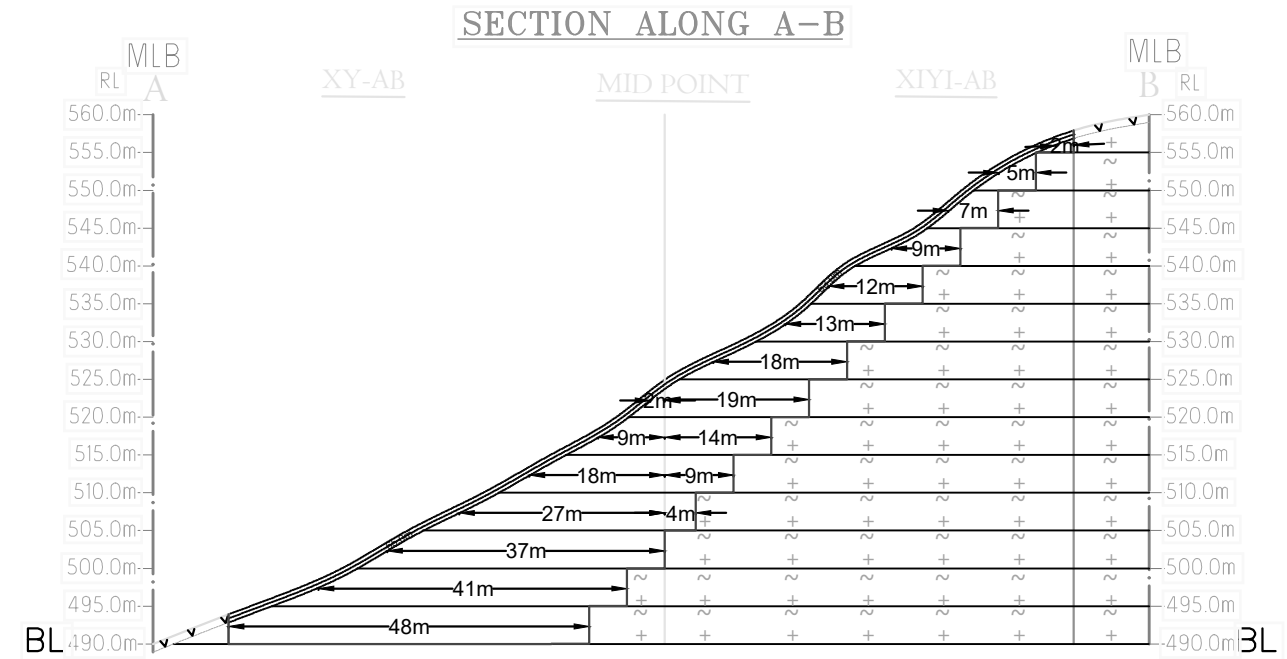
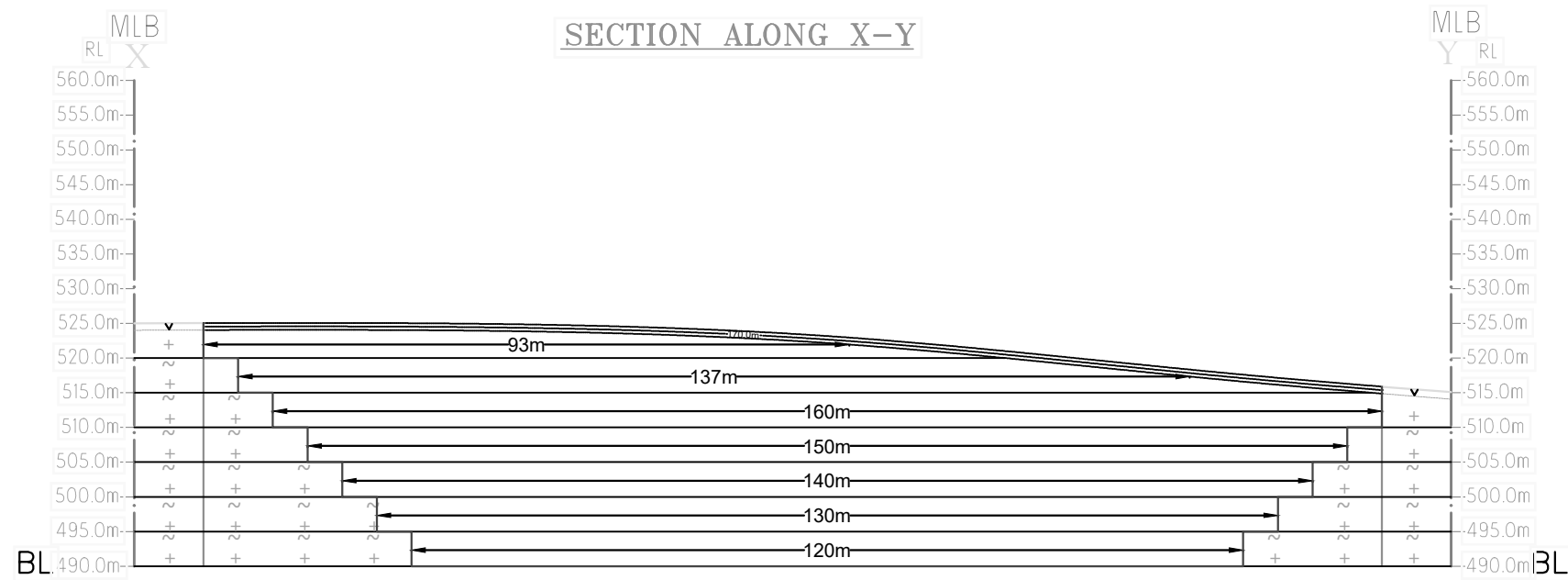
CONCEPTUAL PLAN

SCALE 1 : 1000

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 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough Stone in m ³	Residual Topsoil in m ³
XY-AB	Hill Slope	170	65	1	11050	.....	11050
	I	93	2	5	930	930	.....
	II	137	9	5	6165	6165	.....
	III	160	18	5	14400	14400	.....
	IV	150	27	5	20250	20250	.....
	V	140	37	5	25900	25900	.....
	VI	130	41	5	26650	26650	.....
VII	120	48	5	28800	28800	.....
TOTAL					134145	123095	11050
X1Y1-AB	Hill Slope	171	63	1	10773	.....	10773
	I	49	2	5	490	490	.....
	II	86	5	5	2150	2150	.....
	III	118	7	5	4130	4130	.....
	IV	145	9	5	6525	6525	.....
	V	150	12	5	9000	9000	.....
	VI	140	13	5	9100	9100	.....
	VII	130	18	5	11700	11700	.....
	VIII	120	19	5	11400	11400	.....
	IX	110	14	5	7700	7700	.....
	X	100	9	5	4500	4500	.....
XI	90	4	5	1800	1800	.....
TOTAL					79268	68495	10773
GRAND TOTAL					213413	191590	21823

BL= BASE LEVEL

PLATE NO-VIA

APPLICANT:

M/s.VARUMAIKOTTERKU KEELVAALUM
MAGALIR SUYAUTHAVIKUZHU,
Mrs.S.KARTHIKA (LEADER),
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UTHAMAPALAYAM,
THENI-625 516.

LEASE AREA:

S.F.NO : 1372/1 (Part-5)
EXTENT : 2.50.00 Hect,
VILLAGE : KAMAYAGOUNDANPATTI
TALUK : UTHAMAPALAYAM
DISTRICT : THENI

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MINE LEASE AREA	
SAFETY BOUNDARY	
RESIDUAL TOP SOIL	
ROUGH STONE	
PROPOSED BENCH	

CONCEPTUAL SECTIONS

SECTION HOR 1 : 1000 & VER 1: 1000

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RECOGNISED QUALIFIED PERSON
RQP/MAS/263/2014/A

Table 1.1. Flora in 10 km Radius Buffer Zone

S. No	Scientific name	Family name
Trees		
1	<i>Acacia chundra</i>	Fabaceae
2	<i>Acacia farnesiana</i>	Fabaceae
3	<i>Acacia leucophloea</i>	Fabaceae
4	<i>Acacia mellifera</i>	Fabaceae
5	<i>Acacia nilotica</i>	Fabaceae
6	<i>Acacia pennata</i>	Fabaceae
7	<i>Acacia polyacantha</i>	Fabaceae
8	<i>Agalaia elaeagnoidea</i>	Meliaceae
9	<i>Ailanthus excelsa</i>	Simaroubaceae
10	<i>Alangium salviifolium</i>	Alangiaceae
11	<i>Albizia amara</i>	Caesalpiniaceae
12	<i>Albizia lebbek</i>	Caesalpiniaceae
13	<i>Annona squamosa</i>	Annonaceae
14	<i>Anogeissus latifolia</i>	Combretaceae
15	<i>Atalantia monophylla</i>	Rutaceae
16	<i>Atalantia racemosa</i>	Rutaceae
17	<i>Azadirachta indica</i>	Meliaceae
18	<i>Bambusa arundinacea</i>	Poaceae
19	<i>Bauhinia racemosa</i>	Caesalpiniaceae
20	<i>Bombax malabaricum</i>	Bombacaceae
21	<i>Buchanania lanzan</i>	Anacardiaceae
22	<i>Canthium dicoccum</i>	Rubiaceae
23	<i>Capparis grandis</i>	Capparidaceae
24	<i>Cassine glauca</i>	Celastraceae
25	<i>Celtis philippensis</i>	Ulmaceae
26	<i>Chloroxylon swietenia</i>	Rutaceae
27	<i>Clerodendrum viscosum</i>	Verbenaceae
28	<i>Commiphora berryi</i>	Burseraceae
29	<i>Commiphora caudata</i>	Burseraceae
30	<i>Cordia monoica</i>	Boraginaceae
31	<i>Cordia rothii</i>	Boraginaceae
32	<i>Cordia wallichii</i>	Boraginaceae
33	<i>Crateva adansonii</i>	Caryophyllaceae
34	<i>Crateva magna</i>	Caryophyllaceae
35	<i>Dalbergia latifolia</i>	Fabaceae
36	<i>Dalbergia paniculata</i>	Fabaceae
37	<i>Dalbergia sissoo</i>	Fabaceae
38	<i>Debregaesia velutina</i>	Urticaceae
39	<i>Delonix regia</i>	Mimosaceae

40	<i>Dichrostachys cinerea</i>	Mimosaceae
41	<i>Diospyros chloroxylon</i>	Ebenaceae
42	<i>Diospyros montana</i>	Ebenaceae
43	<i>Dolichandrone atrovirens</i>	Bignoniaceae
44	<i>Dolichandrone spathacea</i>	Bignoniaceae
45	<i>Ehretia ovalifolia</i>	Boraginaceae
46	<i>Ehretia pubescens</i>	Boraginaceae
47	<i>Erythrina stricta</i>	Fabaceae
48	<i>Euphorbia antiquorum</i>	Euphorbiaceae
49	<i>Euphorbia trigonum</i>	Euphorbiaceae
50	<i>Ficus beddomei</i>	Moraceae
51	<i>Ficus benghalensis</i>	Moraceae
52	<i>Ficus hispida</i>	Moraceae
53	<i>Ficus microcarpa</i>	Moraceae
54	<i>Ficus racemosa</i>	Moraceae
55	<i>Ficus religiosa</i>	Moraceae
56	<i>Ficus tinctoria ssp. parasitica</i>	Moraceae
57	<i>Ficus tomentosa</i>	Moraceae
58	<i>Ficus tsjakela</i>	Moraceae
59	<i>Flacourtia indica</i>	Flacourtiaceae
60	<i>Gardenia gummifera</i>	Rubiaceae
61	<i>Gardenia latifolia</i>	Rubiaceae
62	<i>Gardenia resinifera</i>	Rubiaceae
63	<i>Givotia moluccana</i>	Euphorbiaceae
64	<i>Gmelina arborea</i>	Verbenaceae
65	<i>Gyrocarpus americanus</i>	Hernandiaceae
66	<i>Holoptelea integrifolia</i>	Ulmaceae
67	<i>Ixora arborea</i>	Rubiaceae
68	<i>Lepisanthes tetraphylla</i>	Sapindaceae
69	<i>Maba buxifolia</i>	Ebenaceae
70	<i>Macaranga peltata</i>	Euphorbiaceae
71	<i>Mallotus philippensis</i>	Euphorbiaceae
72	<i>Mitragyna parvifolia</i>	Rubiaceae
73	<i>Moringa concanensis</i>	Moringaceae
74	<i>Naringi crenulata</i>	Rutaceae
75	<i>Phyllanthus emblica</i>	Euphorbiaceae
76	<i>Pongamia pinnata</i>	Fabaceae
77	<i>Premna corymbosa</i>	Verbenaceae
78	<i>Premna tomentosa</i>	Verbenaceae
79	<i>Prosopis juliflora</i>	Mimosaceae
80	<i>Santalum album</i>	Santalaceae
81	<i>Sapindus emarginatus</i>	Sapindaceae
82	<i>Schefflera stellata</i>	Araliaceae

83	<i>Schleichera oleosa</i>	Sapindaceae
84	<i>Stereospermum personatum</i>	Bignoniaceae
85	<i>Streblus asper</i>	Moraceae
86	<i>Strychnos nux-vomica</i>	Loganiaceae
87	<i>Strychnos potatorum</i>	Loganiaceae
88	<i>Tectona grandis</i>	Verbenaceae
89	<i>Terminalia arjuna</i>	Combretaceae
90	<i>Terminalia bellirica</i>	Combretaceae
91	<i>Terminalia chebula</i>	Combretaceae
92	<i>Thevetia peruviana</i>	Apocynaceae
93	<i>Trema orientalis</i>	Urticaceae
94	<i>Tricalysia apiocarpa</i>	Rubiaceae
95	<i>Trichilia connaroides</i>	Meliaceae
96	<i>Vepris bilocularis</i>	Rutaceae
97	<i>Vitex altissima</i>	Verbenaceae
98	<i>Wrightia tinctoria</i>	Apocynaceae
99	<i>Ziziphus mauritiana</i>	Rhamnaceae
100	<i>Ziziphus rugosa</i>	Rhamnaceae
101	<i>Ziziphus trinervia</i>	Rhamnaceae
Shrubs		
1	<i>Abutilon hirtum</i>	Malvaceae
2	<i>Abutilon indicum</i>	Malvaceae
3	<i>Acalypha fruticosa</i>	Euphorbiaceae
4	<i>Ageratina adenophora</i>	Asteraceae
5	<i>Alstonia venenata</i>	Apocynaceae
6	<i>Anisomeles malabarica</i>	Lamiaceae
7	<i>Azima tetraacantha</i>	Salvadoraceae
8	<i>Barleria acuminata</i>	Acanthaceae
9	<i>Barleria prionitis</i>	Acanthaceae
10	<i>Barleria tomentosa</i>	Acanthaceae
11	<i>Benkara malabarica</i>	Rubiaceae
12	<i>Breynia vitis-idaea</i>	Euphorbiaceae
13	<i>Cadaba trifoliata</i>	Caryophyllaceae
14	<i>Capparis divaricata</i>	Capparidaceae
15	<i>Carissa carandas</i>	Apocynaceae
16	<i>Carissa spinarum</i>	Apocynaceae
17	<i>Carmona retusa</i>	Boraginaceae
18	<i>Cassia auriculata</i>	Caesalpiniaceae
19	<i>Chromolaena odorata</i>	Asteraceae
20	<i>Cipadessa baccifera</i>	Meliaceae
21	<i>Clausena dentata</i>	Rutaceae
22	<i>Clerodendrum phlomoides</i>	Verbenaceae

23	<i>Crotalaria longipes</i>	Fabaceae
24	<i>Dodonaea viscosa</i>	Sapindaceae
25	<i>Erythroxylum monogynum</i>	Erythroxylaceae
26	<i>Fluggea leucopyrus</i>	Euphorbiaceae
27	<i>Fluggea virosa</i>	Euphorbiaceae
28	<i>Gmelina asiatica</i>	Verbenaceae
29	<i>Helicteres isora</i>	Sterculiaceae
30	<i>Hibiscus lunarifolius</i>	Malvaceae
31	<i>Hibiscus surattensis</i>	Malvaceae
32	<i>Hibiscus vitifolia</i>	Malvaceae
33	<i>Indigofera longiracemosa</i>	Fabaceae
34	<i>Jatropha curcus</i>	Euphorbiaceae
35	<i>Jatropha gossypifolia</i>	Euphorbiaceae
36	<i>Jatropha peltata</i>	Euphorbiaceae
37	<i>Justicia betonica</i>	Acanthaceae
38	<i>Kleinia grandiflora</i>	Asteraceae
39	<i>Lantana camara</i>	Verbenaceae
40	<i>Maytenus ovata</i>	Celastraceae
41	<i>Mundulia sericea</i>	Fabaceae
42	<i>Murraya paniculata</i>	Rutaceae
43	<i>Opuntia stricta</i>	Cactaceae
44	<i>Osbeckia aspera</i>	Melastomataceae
45	<i>Pavetta indica</i>	Rubiaceae
45	<i>Pavetta montana</i>	Rubiaceae
47	<i>Phoenix lourierii</i>	Arecaceae
48	<i>Phyllanthus polyphyllus</i>	Euphorbiaceae
49	<i>Phyllanthus reticulatus</i>	Fabaceae
50	<i>Psychotria</i> sp.	Rubiaceae
51	<i>Randia brandisii</i>	Rubiaceae
52	<i>Randia dumetorum</i>	Rubiaceae
53	<i>Rhus mysorensis</i>	Rhamnaceae
54	<i>Solanum pubescens</i>	Solanaceae
55	<i>Solanum surrettense</i>	Solanaceae
56	<i>Solanum torvum</i>	Solanaceae
57	<i>Solanum violaceum</i>	Solanaceae
58	<i>Strobilanthes consanguinea</i>	Acanthaceae
59	<i>Strobilanthes cuspidatus</i>	Acanthaceae
60	<i>Suregada angustifolia</i>	Euphorbiaceae
61	<i>Tarenna asiatica</i>	Rubiaceae
62	<i>Taxillus cuneatus</i>	Loranthaceae
63	<i>Taxillus heyneanus</i>	Loranthaceae
64	<i>Taxillus recurva</i>	Loranthaceae

65	<i>Triumfetta pentandra</i>	Tiliaceae
66	<i>Triumfetta pilosa</i>	Tiliaceae
67	<i>Triumfetta rotundifolia</i>	Tiliaceae
68	<i>Waltheria indica</i>	Sterculiaceae
69	<i>Xanthium indicum</i>	Asteraceae
Herbes		
1	<i>Abutilon persicum</i>	Malvaceae
2	<i>Acalypha indica</i>	Euphorbiaceae
3	<i>Acalypha paniculata</i>	Euphorbiaceae
4	<i>Acanthospermum hispidum</i>	Asteraceae
5	<i>Achyranthes aspera</i>	Amaranthaceae
6	<i>Achyranthes bidentata</i>	Amaranthaceae
7	<i>Aerva lanata</i>	Amaranthaceae
8	<i>Aerva persica</i>	Amaranthaceae
9	<i>Ageratum conyzoides</i>	Asteraceae
10	<i>Aloe vera</i>	Agavaceae
11	<i>Alternanthera pungens</i>	Amaranthaceae
12	<i>Alternanthera tenella</i>	Amaranthaceae
13	<i>Alysicarpus monilifer</i>	Fabaceae
14	<i>Alysicarpus rugosus</i>	Fabaceae
15	<i>Amaranthus spinosus</i>	Amaranthaceae
16	<i>Amaranthus viridis</i>	Amaranthaceae
17	<i>Andrographis alata</i>	Acanthaceae
18	<i>Aneilema paniculata</i>	Commelinaceae
19	<i>Anisochilus carnosus</i>	Lamiaceae
20	<i>Anisochilus scaber</i>	Lamiaceae
21	<i>Anisomeles indica</i>	Lamiaceae
22	<i>Asclepias curassavica</i>	Asclepiadaceae
23	<i>Asystasia dalzelliana</i>	Acanthaceae
24	<i>Asystasia gangetica</i>	Acanthaceae
25	<i>Bidens pilosa</i>	Asteraceae
26	<i>Biophytum sensitivum</i>	Oxalidaceae
27	<i>Blainvillea acmella</i>	Asteraceae
28	<i>Blepharis maderaspatensis</i>	Acanthaceae
29	<i>Blepharis molluginifolia</i>	Acanthaceae
30	<i>Blumea lacera</i>	Asteraceae
31	<i>Blumea mollis</i>	Asteraceae
32	<i>Boerhavia diffusa</i>	Nyctaginaceae
33	<i>Boerhavia erecta</i>	Nyctaginaceae
34	<i>Borreria hispida</i>	Rubiaceae
35	<i>Borreria ocymoides</i>	Rubiaceae
36	<i>Borreria pusilla</i>	Rubiaceae
37	<i>Bulbostylis barbata</i>	Cyperaceae

38	<i>Bulbostylis puberula</i>	Cyperaceae
39	<i>Canscora decussata</i>	Gentianaceae
40	<i>Caralluma attenuata</i>	Asclepiadaceae
41	<i>Caralluma umbellata</i>	Asclepiadaceae
42	<i>Cassia hirsuta</i>	Caesalpiniaceae
43	<i>Cassia italica</i>	Caesalpiniaceae
44	<i>Cassia mimosoides</i>	Caesalpiniaceae
45	<i>Cassia obtusa</i>	Caesalpiniaceae
46	<i>Cassia occidentalis</i>	Caesalpiniaceae
47	<i>Cassia tora</i>	Caesalpiniaceae
48	<i>Celosia polygonoides</i>	Amaranthaceae
49	<i>Centella asiatica</i>	Apiaceae
50	<i>Cleome felina</i>	Caryophyllaceae
51	<i>Cleome viscosa</i>	Caryophyllaceae
52	<i>Cochorus aestuans</i>	Tiliaceae
53	<i>Commelina benghalensis</i>	Commelinaceae
54	<i>Commelina clavata</i>	Commelinaceae
55	<i>Commelina longifolia</i>	Commelinaceae
56	<i>Conyza bonariensis</i>	Asteraceae
57	<i>Conyza leucantha</i>	Asteraceae
58	<i>Conyza stricta</i>	Asteraceae
59	<i>Corchorus tridens</i>	Tiliaceae
60	<i>Crassocephalum crepedioides</i>	Asteraceae
61	<i>Crossandra infundibuliformis</i>	Acanthaceae
62	<i>Crotalaria biflora</i>	Fabaceae
63	<i>Crotalaria hirta</i>	Fabaceae
64	<i>Crotalaria mysorensis</i>	Fabaceae
65	<i>Crotalaria retusa</i>	Fabaceae
66	<i>Crotalaria</i> sp.	Fabaceae
67	<i>Crotalaria verrucosa</i>	Fabaceae
68	<i>Croton banblandianus</i>	Euphorbiaceae
69	<i>Cynotis tuberosa</i>	Commelinaceae
70	<i>Cynotis villosa</i>	Commelinaceae
71	<i>Cyperus articulatus</i>	Cyperaceae
72	<i>Cyperus corymbosus</i>	Cyperaceae
73	<i>Cyperus difformis</i>	Cyperaceae
74	<i>Cyperus exaltatus</i>	Cyperaceae
75	<i>Cyperus globosus</i>	Cyperaceae
76	<i>Cyperus iria</i>	Cyperaceae
77	<i>Cyperus pangorai</i>	Cyperaceae
78	<i>Cyperus rotundus</i>	Cyperaceae
79	<i>Cyperus triceps</i>	Cyperaceae
80	<i>Desmodium triflorum</i>	Fabaceae

81	<i>Dicliptera cuneata</i>	Acanthaceae
82	<i>Didymocarpus tomentosus</i>	Gesneriaceae
83	<i>Digera muricata</i>	Amaranthaceae
84	<i>Emelia sonchifolia</i>	Asteraceae
85	<i>Emelia zeylanica</i>	Asteraceae
86	<i>Eriocaulon thwaitzii</i>	Eriocaulaceae
87	<i>Eriocaulon truncatun</i>	Eriocaulaceae
88	<i>Euphorbia hirta</i>	Euphorbiaceae
89	<i>Euphorbia rothiana</i>	Euphorbiaceae
90	<i>Euphorbia thymifolia</i>	Euphorbiaceae
91	<i>Evolvulus alsinoides</i>	Convolvulaceae
92	<i>Exacum sessile</i>	Gentianaceae
93	<i>Fimbristylis complanata</i>	Cyperaceae
94	<i>Fimbristylis falcata</i>	Cyperaceae
95	<i>Fimbristylis ovata</i>	Cyperaceae
96	<i>Gisekia pharnaceoides</i>	Aizoaceae
97	<i>Gloriosa suberba</i>	Liliaceae
98	<i>Gomphrena decumbens</i>	Amaranthaceae
99	<i>Gynandropsis pentaphylla</i>	Caryophyllaceae
100	<i>Hibiscus micranthus</i>	Malvaceae
101	<i>Hybanthus enneaspermus</i>	Caryophyllaceae
102	<i>Hyptis suaveolens</i>	Lamiaceae
103	<i>Indigofera barberii</i>	Fabaceae
104	<i>Indigofera cassioides</i>	Fabaceae
105	<i>Indigofera linnaei</i>	Fabaceae
106	<i>Indigofera trita</i>	Fabaceae
107	<i>Indigofera viscosa</i>	Fabaceae
107	<i>Indoneesiella echioides</i>	Acanthaceae
108	<i>Justicia simplex</i>	Acanthaceae
109	<i>Justicia tranquebariensis</i>	Acanthaceae
110	<i>Kalanchoe laciniata</i>	Crassulaceae
111	<i>Lagascea mollis</i>	Asteraceae
112	<i>Lantana wightiana</i>	Verbenaceae
113	<i>Leanotis nepetifolia</i>	Lamiaceae
114	<i>Leucas aspera</i>	Lamiaceae
115	<i>Cyperus corymbosus</i>	Cyperaceae
116	<i>Leucas biflora</i>	Lamiaceae
117	<i>Leucas cephalotus</i>	Lamiaceae
118	<i>Leucas martinicensis</i>	Lamiaceae
119	<i>Leucas vestita</i>	Lamiaceae
120	<i>Lindernia antipoda</i>	Scrophulariaceae
121	<i>Ludwigia octavalis</i>	Onagraceae
122	<i>Ludwigia perennis</i>	Onagraceae

123	<i>Mariscus squarrosus</i>	Cyperaceae
124	<i>Martynia annua</i>	Pedaliaceae
125	<i>Merremia tridentata</i>	Convolvulaceae
126	<i>Micrargeria wightii</i>	Scrophulariaceae
127	<i>Mollugo cerviana</i>	Aizoaceae
128	<i>Mollugo nudicaulis</i>	Aizoaceae
129	<i>Mollugo pentaphylla</i>	Aizoaceae
130	<i>Monothecium aristatum</i>	Acanthaceae
131	<i>Nothosaerva brachiata</i>	Amaranthaceae
132	<i>Ocimum canum</i>	Lamiaceae
133	<i>Ocimum sanctum</i>	Lamiaceae
134	<i>Oldenlandia aspera</i>	Rubiaceae
135	<i>Oldenlandia biflora</i>	Rubiaceae
136	<i>Oldenlandia corymbosa</i>	Rubiaceae
137	<i>Oldenlandia umbellata</i>	Rubiaceae
138	<i>Orthosiphon diffuses</i>	Lamiaceae
139	<i>Orthosiphon pallidus</i>	Lamiaceae
140	<i>Osbeckia octandra</i>	Melastomataceae
141	<i>Oxalis corniculata</i>	Oxalidaceae
142	<i>Parthenium hysterophorus</i>	Asteraceae
143	<i>Pavonia procumbens</i>	Malvaceae
144	<i>Pavonia zeylanica</i>	Malvaceae
145	<i>Peristrophe bicalyculata</i>	Acanthaceae
146	<i>Phyla nodiflora</i>	Verbenaceae
147	<i>Phyllanthus amarus</i>	Euphorbiaceae
148	<i>Phyllanthus maderaspatensis</i>	Euphorbiaceae
149	<i>Phyllanthus wightianus</i>	Euphorbiaceae
150	<i>Plumbago zeylanica</i>	Plumbaginaceae
151	<i>Polycarpaea corymbosa</i>	Caryophyllaceae
152	<i>Polygala bulbothrix</i>	Polygalaceae
153	<i>Polygonum hydropiper</i>	Polygonaceae
154	<i>Portulaca oleracea</i>	Portulacaceae
155	<i>Portulaca quadrifida</i>	Portulacaceae
156	<i>Portulaca tuberosa</i>	Portulacaceae
157	<i>Pouzolzia bennettiana</i>	Urticaceae
158	<i>Pouzolzia indica</i>	Urticaceae
159	<i>Priva cordifolia</i>	Verbenaceae
160	<i>Pseudarthria viscida</i>	Fabaceae
161	<i>Psilotrichum elliotii</i>	Amaranthaceae
162	<i>Pupalia lappacea</i>	Amaranthaceae
163	<i>Pycreus pumilus</i>	Cyperaceae
164	<i>Pycreus puncticulatus</i>	Cyperaceae
165	<i>Rhynacanthus naustatus</i>	Acanthaceae

166	<i>Rhynchoglossum zeylanicum</i>	Gesneriaceae
167	<i>Ruellia patula</i>	Acanthaceae
168	<i>Sansevieria roxburghiana</i>	Agavaceae
169	<i>Scoparia dulcis</i>	Scrophulariaceae
170	<i>Sebastiania chamaelea</i>	Euphorbiaceae
171	<i>Sida acuta</i>	Malvaceae
172	<i>Sida cordata</i>	Malvaceae
173	<i>Sida cordifolia</i>	Malvaceae
174	<i>Sigesbeckia orientalis</i>	Asteraceae
175	<i>Solanum nigrum</i>	Solanaceae
176	<i>Sonchus oleraceus</i>	Asteraceae
177	<i>Sophubia trifida</i>	Scrophulariaceae
178	<i>Spilanthes acmella</i>	Asteraceae
179	<i>Stachytarpheta jamaicensis</i>	Verbenaceae
180	<i>Striga asiatica</i>	Scrophulariaceae
181	<i>Synedrella nodiflora</i>	Asteraceae
182	<i>Tephrosia purpurea</i>	Fabaceae
183	<i>Tephrosia villosa</i>	Fabaceae
184	<i>Trianthema decandra</i>	Aizoaceae
185	<i>Trianthema portulacastrum</i>	Aizoaceae
186	<i>Tribulus subramaniamii</i>	Zygophyllaceae
187	<i>Tribulus terrestris</i>	Zygophyllaceae
188	<i>Trichodesma indicum</i>	Boraginaceae
189	<i>Trichodesma zeylanicum</i>	Boraginaceae
190	<i>Trichurus monsoniae</i>	Amaranthaceae
191	<i>Tridax procumbens</i>	Asteraceae

Climbers/Stragglers			
No	Species	Family	Habit
1	<i>Abrus precatorius</i>	Fabaceae	Straggler
2	<i>Acacia caesia</i>	Mimosaceae	Straggler
3	<i>Acacia planifrons</i>	Mimosaceae	Straggler
4	<i>Acacia torta</i>	Mimosaceae	Straggler
5	<i>Argyria cuneata</i>	Convolvulaceae	Straggler
6	<i>Argyria hirsuta</i>	Convolvulaceae	Straggler
7	<i>Argyria pomacea</i>	Convolvulaceae	Straggler
8	<i>Aristolochia indica</i>	Euphorbiaceae	Straggler
9	<i>Aristolochia tagala</i>	Euphorbiaceae	Straggler
10	<i>Asparagus racemosus</i>	Asparagaceae	Straggler
11	<i>Butea parviflora</i>	Fabaceae	Straggler
12	<i>Cadaba indica</i>	Caryophyllaceae	Straggler
13	<i>Canavalia virosa</i>	Fabaceae	Straggler
14	<i>Cansjeera rheedii</i>	Opeliaceae	Straggler
15	<i>Capparia aphylla</i>	Capparidaceae	Straggler

16	<i>Capparis roxburghiana</i>	Capparidaceae	Straggler
17	<i>Capparis sepiaria</i>	Capparidaceae	Straggler
18	<i>Capparis spinosa</i>	Capparidaceae	Straggler
19	<i>Capparis zeylanica</i>	Capparidaceae	Straggler
20	<i>Cardiospermum canescens</i>	Sapindaceae	Climber
21	<i>Cardiospermum halicacabum</i>	Sapindaceae	Climber
22	<i>Cayratia pedata</i>	Vitaceae	Climber
23	<i>Cayratia trifoliata</i>	Vitaceae	Climber
24	<i>Celastrus paniculatus</i>	Celastraceae	Straggler
25	<i>Centrosema pubescens</i>	Fabaceae	Climber
26	<i>Cissampelos pariera</i>	Menispermaceae	Straggler
27	<i>Cissus bicolor</i>	Vitaceae	Climber
28	<i>Cissus quadrangularis</i>	Vitaceae	Climber
29	<i>Cissus repanda</i>	Vitaceae	Climber
30	<i>Cissus vitigenea</i>	Vitaceae	Climber
31	<i>Clematis gouriana</i>	Ranunculaceae	Straggler
32	<i>Coccinia indica</i>	Cucurbitaceae	Climber
33	<i>Cocculus hirsutus</i>	Menispermaceae	Straggler
34	<i>Cocculus pendulus</i>	Menispermaceae	Straggler
35	<i>Cryptolepis buchananii</i>	Asclepiadaceae	Climber
36	<i>Decalepis hamiltonii</i>	Asclepiadaceae	Climber
37	<i>Diplocyclos palmatus</i>	Cucurbitaceae	Climber
38	<i>Dunbaria heyneana</i>	Fabaceae	Straggler
39	<i>Glycine javanica</i>	Fabaceae	Straggler
40	<i>Grewia disperma</i>	Tiliaceae	Straggler
41	<i>Grewia flavescens</i>	Tiliaceae	Straggler
42	<i>Grewia hirsuta</i>	Tiliaceae	Straggler
43	<i>Grewia tenax</i>	Tiliaceae	Straggler
44	<i>Grewia sp.</i>	Tiliaceae	Straggler
45	<i>Grewia villosa</i>	Tiliaceae	Straggler
46	<i>Hemidesmus indicus</i>	Asclepiadaceae	Climber
47	<i>Hugonia mystax</i>	Linaceae	Straggler
48	<i>Hyptage benghalensis</i>	Malphigiaceae	Straggler
49	<i>Ichnocarpus frutescens</i>	Asclepiadaceae	Climber
50	<i>Ipomoea pescarpae</i>	Convolvulaceae	Climber
51	<i>Ipomoea pesti-gridis</i>	Convolvulaceae	Climber
52	<i>Ipomoea staphylina</i>	Convolvulaceae	Climber
53	<i>Jasminum auriculatum</i>	Oleaceae	Straggler
54	<i>Jasminum azoricum</i>	Oleaceae	Straggler
55	<i>Jasminum rigidum</i>	Oleaceae	Straggler
56	<i>Loseneriella obtusifolia</i>	Hippocrateaceae	Straggler
57	<i>Maclura spinosa</i>	Moraceae	Straggler
58	<i>Mikania cordata</i>	Asteraceae	Climber
59	<i>Mucuna atropurpurea</i>	Fabaceae	Straggler
60	<i>Mucuna monosperma</i>	Fabaceae	Straggler
61	<i>Mucuna pruriens</i>	Fabaceae	Straggler
62	<i>Mukia maderaspatana</i>	Cucurbitaceae	Climber
63	<i>Pachygone ovata</i>	Menispermaceae	Straggler
64	<i>Parsonsia alboflavescens</i>	Asclepiadaceae	Climber
65	<i>Passiflora foetida</i>	Passifloraceae	Climber

66	<i>Pergularia daemia</i>	Asclepiadaceae	Climber
67	<i>Polygonum chinensis</i>	Polygonaceae	Straggler
68	<i>Polygonum nepalensis</i>	Polygonaceae	Straggler
69	<i>Pterolobium hexapetalum</i>	Fabaceae	Straggler
70	<i>Rhynchosia capitata</i>	Fabaceae	Straggler
71	<i>Rhynchosia minima</i>	Fabaceae	Straggler
72	<i>Rivea hypocrateriformis</i>	Convolvulaceae	Straggler
73	<i>Salacia reticulata</i>	Hippocrateaceae	Straggler
74	<i>Sarcostemma brunoniana</i>	Asclepiadaceae	Climber
75	<i>Sarcostemma intermedia</i>	Asclepiadaceae	Climber
76	<i>Scutia myrtina</i>	Rhamnaceae	Straggler
77	<i>Secamone emetica</i>	Asclepiadaceae	Climber
78	<i>Solena amplexicaulis</i>	Cucurbitaceae	Climber
79	<i>Tetrastigma lanceolaria</i>	Vitaceae	Climber
80	<i>Tetrastigma nilagirensis</i>	Vitaceae	Climber
81	<i>Tinospora cordifolia</i>	Menispermaceae	Straggler
82	<i>Toddalia asiatica</i>	Rutaceae	Straggler
83	<i>Tylophora indica</i>	Asclepiadaceae	Climber
84	<i>Watakaka volubilis</i>	Asclepiadaceae	Climber
85	<i>Zehneria mysorensis</i>	Cucurbitaceae	Climber
86	<i>Ziziphus oenoplia</i>	Rhamnaceae	Straggler

Grasses		
No	Species	Family
1	<i>Acrachne racemosa</i>	Poaceae
2	<i>Alloteropsis cimcinna</i>	Poaceae
3	<i>Apluda mutica</i>	Poaceae
4	<i>Aristida adscensionis</i>	Poaceae
5	<i>Aristida funiculata</i>	Poaceae
6	<i>Aristida hystrix</i>	Poaceae
7	<i>Arthraxon micans</i>	Poaceae
8	<i>Arundinella ciliata</i>	Poaceae
9	<i>Arundinella setosa</i>	Poaceae
10	<i>Arundinella tuberculata</i>	Poaceae
11	<i>Bothriochloa pertusa</i>	Poaceae
12	<i>Brachiaria ramosa</i>	Poaceae
13	<i>Brachiaria remota</i>	Poaceae
14	<i>Cenchrus biflorus</i>	Poaceae
15	<i>Cenchrus ciliaris</i>	Poaceae
16	<i>Chloris barbata</i>	Poaceae
17	<i>Chloris dolichostachya</i>	Poaceae
18	<i>Chloris roxburghiana</i>	Poaceae
19	<i>Chrysopogon aciculatus</i>	Poaceae
20	<i>Chrysopogon asper</i>	Poaceae
21	<i>Chrysopogon hackelii</i>	Poaceae
22	<i>Cymbopogon citratus</i>	Poaceae
23	<i>Cynodon barberii</i>	Poaceae
24	<i>Cynodon dactylon</i>	Poaceae
25	<i>Cyrtococcum trigonum</i>	Poaceae
26	<i>Dactyloctenium aegyptium</i>	Poaceae

27	<i>Digitaria bicornis</i>	Poaceae
28	<i>Digitaria longifolia</i>	Poaceae
29	<i>Eleusine indica</i>	Poaceae
30	<i>Enneapogon schimperianus</i>	Poaceae
31	<i>Enteropogon monostachyas</i>	Poaceae
32	<i>Eragrostiella bifaria</i>	Poaceae
33	<i>Eragrostis amabilis</i>	Poaceae
34	<i>Eragrostis atrovirens</i>	Poaceae
35	<i>Eragrostis maderaspatana</i>	Poaceae
36	<i>Eragrostis plumosa</i>	Poaceae
37	<i>Eragrostis unioloides</i>	Poaceae
38	<i>Garnotia courtallensis</i>	Poaceae
39	<i>Garnotia elata</i>	Poaceae
40	<i>Garnotia tenella</i>	Poaceae
41	<i>Heteropogon contortus</i>	Poaceae
42	<i>Isachnae kunthiana</i>	Poaceae
43	<i>Oplismenus compositus</i>	Poaceae
44	<i>Oropetium thomaeum</i>	Poaceae
45	<i>Panicum notatum</i>	Poaceae
46	<i>Panicum psilopodium</i>	Poaceae
47	<i>Panicum trypheron</i>	Poaceae
48	<i>Perotis indica</i>	Poaceae
49	<i>Phragmites karka</i>	Poaceae
50	<i>Pogonatherum critinum</i>	Poaceae
51	<i>Rhynchelytrum repens</i>	Poaceae
52	<i>Sacciolepis indica</i>	Poaceae
53	<i>Setaria pumila</i>	Poaceae
54	<i>Sporobolous coromandelicus</i>	Poaceae
55	<i>Sporobolous indicus</i>	Poaceae
56	<i>Sporobolous spicatus</i>	Poaceae
57	<i>Sporobolous wallichii</i>	Poaceae
58	<i>Themeda cymbaria</i>	Poaceae
59	<i>Themeda triandra</i>	Poaceae
60	<i>Trachys muricata</i>	Poaceae
61	<i>Tragus roxburghii</i>	Poaceae
62	<i>Tripogon bromoides</i>	Poaceae
63	<i>Zenkaria elegans</i>	Poaceae

Table 1.2 Fauna in Buffer Zone

Mammals recorded in the buffer zone			
	<i>English name</i>	<i>Zoological name</i>	<i>IUCN status</i>
1	Asian palm civet	<i>Paradoxurus hermophroditus</i>	LC
2	Bengal Fox	<i>Vulpes bengalensis</i>	LC
3	Black Rat	<i>Rattus rattus</i>	LC
4	Blackbuck	<i>Antelope cervicapra</i>	NT
5	Black-naped hare	<i>Lepus nigricollis</i>	LC
6	Bonnet macaque	<i>Macaca radiata</i>	LC
7	Chital	<i>Axis axis</i>	LC
8	Common Giant flying squirrel	<i>Petaurista petaurista</i>	LC
9	Common mongoose	<i>Herpestes edwardsi</i>	LC
10	Common Palm Squirrel	<i>Funambulus palmarum</i>	LC
11	Coromandel Pipistrelle	<i>Pipistrellus coromandra</i>	LC
12	Dhole	<i>Cuon alpinus</i>	EN
13	Elephant	<i>Elephas maximus</i>	EN
14	Eurasian Otter	<i>Lutra lutra</i>	NT
15	Four-horned Antelope	<i>Tetracerus quadricornis</i>	VU
16	Gaur	<i>Bos gaurus</i>	VU
17	Golden Jackal	<i>Canis aureus</i>	LC
18	Greater Bandicoot Rat	<i>Bandicota indica</i>	LC
19	Hanuman langur	<i>Semnopithecus entellus</i>	LC
20	House Shrew	<i>Suncus murinus</i>	LC
21	Indian bison	<i>Bos gaurus</i>	VU
22	Indian Chevrotain	<i>Moschiola indica</i>	LC
23	Indian crested Porcupine	<i>Hystrix indica</i>	LC
24	Indian Flying Fox	<i>Pteropus giganteus</i>	LC
25	Indian Gerbil	<i>Tatera indica</i>	LC
26	Indian Pangolin	<i>Manis crassicaudata</i>	NT
27	Indian wild pig	<i>Sus scrofa</i>	LC
28	Jungle cat	<i>Felis chaus</i>	LC
29	Leopard	<i>Panthera pardus</i>	NT
30	Leopard cat	<i>Prionailurus bengalensis</i>	LC
31	Lion-tailed Macaque	<i>Macaca silenus</i>	EN
32	Little Indian Field Mouse	<i>Mus booduga</i>	LC
33	Long-eared Hedgehog	<i>Hemiechinus auritus</i>	LC
34	Madras Treeshrew	<i>Anathana ellioti</i>	LC
35	Malabar giant squirrel	<i>Ratufa indica</i>	LC
36	Nilgiri Langur	<i>Semnopithecus johnii</i>	VU
37	Nilgiri Marten	<i>Martes gwatkinsii</i>	VU
38	Nilgiri Tahr	<i>Nilgiritragus hylocrius</i>	EN
39	Ratel or Honey Badger	<i>Mellivora capensis</i>	LC
40	Sambar	<i>Rusa unicolor</i>	VU

41	Slender loris	<i>Loris lydekkerianus</i>	LC
42	Sloth bear	<i>Melursus ursinus</i>	VU
43	Small Indian civet	<i>Viverricula indica</i>	LC
44	Southern Red Muntjac	<i>Muntiacus muntjac</i>	LC
45	Sri Lankan Giant Squirrel	<i>Ratufa macroura</i>	NT
46	Striped hyena	<i>Hyaena hyaena</i>	NT
47	Stripe-necked Mongoose	<i>Herpestes vitticollis</i>	LC
48	Tiger	<i>Panthera tigris</i>	EN
49	White spotted Chevrotain	<i>Tragulus meminna</i>	LC

EN: Endangered; VU: Vulnerable; NT: Near threatened; LC: Least concern. *Not Encountered During the Survey

Reptiles recorded in the buffer zone			
	English name	Zoological name	IUCN status
1	Asian House Gecko	<i>Hemidactylus frenatus</i>	LR
2	Bark Gecko	<i>Hemidactylus leschenaultii</i>	LR
3	Beddome's Grass Skink	<i>Mubuya beddomei</i>	LR
4	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	VU
5	Bronze Grass Skink	<i>Mabuya macularia</i>	LR
6	Brook's House Gecko	<i>Hemidactylus brookii</i>	LR
7	Common Cat Snake	<i>Boiga trigonota</i>	LR
8	Common Sand Boa	<i>Gongylophis conicus</i>	LR
9	Common Vine Snake	<i>Ahaetulla nasuta</i>	LR
10	Common Wolf Snake	<i>Lycodon aulicus</i>	LR
11	Fan throated Lizard	<i>Sitanan ponticeriana</i>	LR
12	Green forest Lizard	<i>Calotes calotes</i>	LR
13	Horseshoe Pit Viper	<i>Trimeresurus strigatus</i>	LR
14	Indian garden Lizard	<i>Calotes versicolor</i>	LR
15	Indian Rat Snake	<i>Ptyas mucosa</i>	LR
16	Indian Rock Python	<i>Python molurus molurus</i>	EN
17	Keeled Grass Skink	<i>Mabuya carinata</i>	LR
18	Large-scaled Pit Viper	<i>Trimeresurus macrolepis</i>	LR
19	Malabar Pit Viper#	<i>Trimeresurus malabaricus</i>	VU
20	Red Sand Boa	<i>Eryx johnii</i>	LR
21	Russell's Viper	<i>Daboia russelii</i>	LR
22	Saw-scaled Viper	<i>Echis carinatus</i>	LR
23	South Asian Chamaeleon	<i>Chamaeleo zeylanicus</i>	VU
24	South Indian Rock Agama	<i>Psammophilus dorsalis</i>	LR
25	Spectacled Cobra	<i>Naja naja</i>	LR
26	Termite-hill Gecko	<i>Hemidactylus triedrus</i>	LR
27	Three-lined Grass Skink	<i>Mubuya trivittata</i>	LR

Endemic to Western Ghats. LR: Low Risk; VU: Vulnerable; EN: Endangered

Birds recorded in the Buffer zone			
<i>No</i>	<i>Common Name</i>	<i>Scientific name</i>	<i>Status</i>
1	Alexandrine Parakeet	<i>Psittacula eupatria</i>	LC
2	Ashy drongo	<i>Dicrurus leucophaeus</i>	LC
3	Ashy prinia	<i>Prinia socialis</i>	LC
4	Ashy Woodswallow	<i>Artamus fuscus</i>	LC
5	Asian fairy blue bird	<i>Irena puella</i>	LC
6	Asian koel	<i>Eudynamys scolopacea</i>	LC
7	Asian palm swift	<i>Cypsiurus balasiensis</i>	LC
8	Asian paradise-flycatcher	<i>Terpsiphone paradise</i>	LC
9	Barn Owl	<i>Tyto alba</i>	LC
10	Barn Swallow	<i>Hirundo rustica</i>	LC
11	Barred buttonquail	<i>Turnix suscitator</i>	LC
12	Baya Weaver bird	<i>Ploceus philippinus</i>	LC
13	Baybacked Shirike	<i>Lanius vittatus</i>	LC
14	Black Bird	<i>Turdus merula</i>	LC
15	Black drongo	<i>Dicrurus macrocercus</i>	LC
16	Black eagle	<i>Ictinaetus malayensis</i>	LC
17	Black or King Vulture	<i>Sarcogyps calvus</i>	CE
18	Black shouldered kite	<i>Elanus caeruleus</i>	LC
19	Blackcapped Kingfisher	<i>Halcyon pileata</i>	LC
20	Black-headed Munia	<i>Lonchura malacca</i>	LC
21	Black-hooded oriole	<i>Oriolus xanthornus</i>	LC
22	Blackwinged Stilt	<i>Himantopus himantopus</i>	LC
23	Blossom Headed Parakeet	<i>Psittacula cyanocephala</i>	LC
24	Blue Rock Thrush	<i>Monticola solitarius</i>	LC
25	Blue-faced malkoha	<i>Phaenicophaeus viridirostris</i>	LC
26	Brahminy starling	<i>Sturnus pagodarum</i>	LC
27	Bronzewinged Jacana	<i>Metopidius indicus</i>	LC
28	Brown Fish Owl	<i>Bubo zeylonensis</i>	LC
29	Cattle egret	<i>Bubulcus ibis</i>	LC
30	Chestnut-headed bee-eater	<i>Merops leschenaulti</i>	LC
31	Chestnut-tailed starling	<i>Sturnus malabaricus</i>	LC
32	Collared Bushchat	<i>Saxicola torquata</i>	LC
33	Common babbler	<i>Turdoides caudatus</i>	LC
34	Common Coot	<i>Fulica arta</i>	LC
35	Common flame back	<i>Dinopium javanense</i>	LC
36	Common Hoopoe	<i>Upupa epops</i>	LC
37	Common iora	<i>Aegithina tiphia</i>	LC
38	Common myna	<i>Acridotheres tristis</i>	LC
39	Common sandgrouse	<i>Pterocles exustus</i>	LC
40	Common tailorbird	<i>Orthotomus sutoris</i>	LC
41	Coppersmith barbet	<i>Megalaima haemacephala</i>	LC
42	Crested Hawk-Eagle	<i>Spizaetus cirratus</i>	LC
43	Crested Lark	<i>Galerida cristata</i>	LC
44	Crested serpent eagle	<i>Spilornis cheela</i>	LC
45	Crested tree-swift	<i>Hemiprocne coronata</i>	LC
46	Dark Green Woodhoopoe	<i>Certhia viridovirens</i>	LC
47	Dusky Crag Martine	<i>Hirundo concolor</i>	LC
48	Emerald dove	<i>Chalcophaps indica</i>	LC

49	Eurasian collared dove	<i>Streptopelia decaocto</i>	LC
50	Eurasian eagle owl	<i>Bubo bubo</i>	LC
51	Eurasian golden oriole	<i>Oriolus oriolus</i>	LC
52	Goldenbacked Woodpecker	<i>Dinopium benghalense</i>	LC
53	Greater coucal	<i>Centropus sinensis</i>	LC
54	Greater racket-tailed drongo	<i>Dicrurus paradiseus</i>	LC
55	Green bea-eater	<i>Merops orientalis</i>	LC
56	Green Pigeon	<i>Treron phoenicoptera</i>	LC
57	Greenish warbler	<i>Phylloscopus trochiloides</i>	LC
58	Grey nightjar	<i>Caprimulgus indicus</i>	LC
59	Grey Tit	<i>Parus major</i>	LC
80	Verditer Flycatcher	<i>Muscicapa albicaudata</i>	NT
81	laughing Thrush	<i>Garrulux cachinnans</i>	EN
82	Open-billed stork	<i>Anastomus oscitans</i>	LC
83	Oriental honey-buzzard	<i>Pernis ptilorhyncus</i>	LC
84	Oriental magpie robin	<i>Copsychus saularis</i>	LC
85	Oriental white-eye	<i>Zosterops palpebrosus</i>	LC
86	Painted stork	<i>Mycteria leucocephala</i>	NT
87	Pallid harrier	<i>Circus macrourus</i>	NT
88	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC
89	Pied bushchat	<i>Saxicola caprata</i>	LC
90	Pied cuckoo	<i>Clamator jacobinus</i>	LC
91	Pied harrier	<i>Circus melanoleucos</i>	LC
92	Plain Flowerpecker	<i>Dicaeum concolor</i>	LC
93	Plain prinia	<i>Prinia inornata</i>	LC
94	Pond Heron	<i>Ardeola grayii</i>	LC
95	Purple sunbird	<i>Nectarinia asiatica</i>	LC
96	Purple-rumped sunbird	<i>Nectarinia zeylonica</i>	LC
97	Red Munia	<i>Estrilda amandava</i>	LC
98	Red Turtle Dove	<i>Streptopelia tranquebarica</i>	LC

CE: Critically endangered; EN: Endangered; NT: Near threatened; LC: Least concern;

Amphibians recorded in the buffer zone

	<i>English name</i>	<i>Scientific name</i>	<i>IUCN Status</i>
1	Beddome's Leaping Frog#	<i>Indirana beddomei</i>	LC
2	Bronzed Frog	<i>Sylvirana temporalis</i>	LC
3	Common Indian Toad	<i>Duttaphrynus melanostictus</i>	LC
4	Common Tree Frog	<i>Polypedatus maculates</i>	LC
5	Cricket Frog	<i>Fejervarya limnocharis</i>	LC
6	Ferguson's Toad	<i>Bufo scaber</i>	LC
7	Indian Bull Frog	<i>Hoplobatrachus tigrinus</i>	LC
8	Indian Burrowing Frog	<i>Sphaerotheca breviceps</i>	LC
9	Indian Painted Frog	<i>Kaloula taprobanica</i>	LC
10	Indian Pond or Green Frog	<i>Euphlyctis hexadactylus</i>	LC
11	Lessor or Marbled Balloon Frog	<i>Uperodon systoma</i>	LC
12	Ornate Narrow-mouthed Frog	<i>Microhyla ornateornata</i>	LC
13	Red Narrow-mouthed Frog	<i>Microhyla rubra</i>	LC
14	Water Skipper or Skipper Frog	<i>Euphlyctis cyanophlyctis</i>	LC

Endemic to Western Ghats. LC=Least Concern

(By email (Scanned Copy)/Soft copy/Postal/RPAD/Courier)

TAMIL NADU FOREST DEPARTMENT

From

Thiru. Bhosale Sachin Tukaram, I.F.S.,
Wildlife Warden,
Megamalai Wildlife Division,
Theni.

To

The District Collector,
Theni.

C. No. 1532/ 2020/ D1 Dt.10.12.2020.

Sir,

Sub: Quarry - Removal of Gravel in Government porampokku Land of Theni District, Uthamapalayam Taluk of Kamayakoundanpatty Village in S.F.No: 1372/1 Part - I to Part - VII - for Tender process - NOC - Requested - Reg.

Ref: 1. The District Collector, Theni. C.No.30/Mines/2020 dated.22.09.2020

With reference to the above subject the Proposed Quarry Project sites falls outside of Eco Sensitive Zone of Megamalai Wildlife Sanctuary and located at a distance from Thonikaradu Reserved Forest and from Eco Sensitive Zone of Megamalai Wildlife Sanctuary are as follows

S.No	Distance from Thonikaradu Reserved Forest (in Km)	Distance to Eco Sensitive Zone (in m)
1372 / 1 Part - I	1.30	170
1372 / 1 Part - II	1.37	519
1372 / 1 Part - III	1.43	600
1372 / 1 Part - IV	1.36	502
1372 / 1 Part - V	1.33	502
1372 / 1 Part - VI	1.277	294
1372 / 1 Part - VII	980	80



National Accreditation Board for Education and Training



Certificate of Accreditation

Geo Technical Mining Solutions

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.