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 = 12.25.85 hectares

At

Pachapalayam Village, Sulur Taluk,

Coimbatore District and Tamil Nadu

ToR letter No. Lr No. SEIAA-TN/F.No.10366/SEAC/ToR-1623/2023

Dated 12.12.2023

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.	Mineral Production
Mr.G.Thangavel S/o. Ganapathy Gounder, Thiyagi Kumaran Street, Periyakulli Pachapalayam, Sulur Taluk, Coimbatore District- 641 201	**2.65.5 Ha & 333/3**	**Rough Stone-307059 m^3 Gravel – 39852 m^3**

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

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

NABET ACC. NO: NABET/EIA/2124/SA 0184
Valid till: 02/04/2023

ENVIRONMENTAL LAB

EXCELLENCE LABORATORY

No.23/93, 5th Street Ram Nagar, S.S.Colony,

Madurai, Tamil Nadu

NABL Certificate Number: TC-6932, Valid Until : 19.03.2024
Baseline Study Period – October 2023 through December 2023

TERMS OF REFERENCE (ToR) COMPLIANCE

ToR issued vide

Lr No. SEIAA-TN/F.No.10366/SEAC/ToR-1623/2023 Dated:12.12.2023

Thiru.G.Thangavel Rough Stone & Gravel Quarry

1	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, place of worship, industries, factories, sheds, etc.	The map showing the structures such as dwelling houses, places of worship, industries, factories, sheds, etc. within the radius of 500m from the proposed project area will be included in the final EIA report.
2	The project proponent shall study on impact of the quarrying operations on the surrounding environment and the pp shall furnish mitigation measures/action plan for the same	The impact of the quarrying operations on the surrounding environment and the mitigation measures/action plan for the same is discussed in the Chapter IV, pp.89 – 108.
3	The proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal	Greenbelt and Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 & Section 4.6 under Chapter IV, p.90 & pp.102-105. The photographs of the greenbelt and garland will be submitted in the final EIA report.
4	The PP shall furnish registered lease consent document obtained from all the pattadhars of proposed mining area	Th registered lease consent document will be attached in the final EIA report
5	The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5m to be left under the Rule 13 (1) of MCDR,1988 within the lease boundary and protective bunds.	Details of the DGPS reference pillars painted will be submitted in the final EIA report.
6	The PP shall develop green belt/plantation all along the mining lease boundary in a safety	The details of green belt/plantation along the mine lease area are discussed

	barrier.		in the Section 4.6 under Chapter IV, pp.102-105.
7	The PP shall furnish the total manpower required for the proposed mining project including statutory officials, supervisory Staff, Skilled, Semi-skilled & unskilled staff with showing the representation of the local people as per their eligibility and experience.		Details of manpower required for this project have been given in Table 2.14 under Chapter II, p.26.
	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	As the proposed project is a new lease area, the conditions are not applicable to this project.
	(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 attached in the Annexure IV.

3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m, (iv) 300 m, (v) 500 m with details such as dwelling houses with number of occupants, whether it belongs to the owner or not, places of worship, industries, factories, sheds, etc with indicating the owner of the building nature of construction, age of the building, number of residents, their profession and income, etc.	The map showing the structures such as dwelling houses, places of worship, industries, factories, sheds, etc. within the radius of 500m from the proposed project area will be included in the final EIA report.
4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the water bodies like lake, water tanks, etc are 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.38-51.
5	The proponent shall carry out Bio diversity study through reputed institution and the same shall be included in EIA Report.	The biodiversity study report will be submitted in the final EIA report.
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc, up to a radius of 25 km from the proposed site.	The DFO letter will be attached in the final EIA report.
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions – CSIR-Central Institute of	It is a new lease area; the condition is not applicable.

	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.	It is a new lease area; the condition is not applicable.
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 l96l such as blaster. mining mate, mine foreman. II/I Class mines manager appointed by the proponent.	The affidavit for blasting has been enclosed in the approved mining plan report in Annexure III.
10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	A conceptual design of blasting has been given in Section 2.6 under Chapter II, pp.18-25.
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?	As the proposed project is a new lease area, the conditions are not applicable to this project.
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 lease area.	
	• If EC and CTO already obtained, the copy of the same shall be submitted.	
	• Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
15	All corner coordinates of the mine lease area. superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.4 under Chapter II, p.13.
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	The drone video will be submitted during presentation.
17	The proponent shall furnish photographs of adequate fencing, green belt along the	Photographs of adequate fencing, green belt along the periphery of the project

	periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	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 plate used for reserve estimation has been presented in Figure 2.6 results of geological resources and reserves have been shown in Table 2.3. under Chapter II, p.15 & 16.
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 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 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) 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	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.38-51.

	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.	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. 27-88.
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.119-122.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.
24	Land use of the study area delineating forest area, agricultural land, gazing 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,	Land use of the study area delineating forest area, agricultural land2grazing 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

	operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	details of surrounding sensitive ecological features have been provided in Table 3.42 under Chapter III, p.86 & 87. 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 provided.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.
28	Impact on local transport infrastructure due to the project should be indicated.	The traffic density study is given in EIA report, Section 3.7, under Chapter III. pp.84-86.
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc,) both	A detailed tree survey was caried out within 300 m radius and the results

	within the mining lease applied area & 300m buffer zone and its management during mining activity.	have been discussed in Section 3.5 under Chapter III, pp.65-79.
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	A progressive mine closure plan has been 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-I in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	A detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV, pp.102-105.
33	Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities, botanist/Horticulture with regard to site	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

	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.	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.118-119.
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, p.115-117.
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.106 & 107.
37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII, pp.125 & 126.
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit

	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.	the socio-economic environment by offering employment for 16 people directly as discussed in Section 8.1 under Chapter VIII, p.124.
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, pp.124-126.
41	If any quarrying operation were carried out in the proposed quarrying sile 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 lease area, the CCR is not applicable to this project.
42	The PP Shall prepare the EMP for the entire life/lease period of mine and also Furnish the sworn affidavit starting 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.128-135. 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	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

	mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act' 1986.	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.
	Discussion by SEIAA and the Remarks: - The subject was placed in the 677th Authority meeting held on 11.12.2023 & 12.12.2023. The Authority noted that the subject was earlier appraised in the 416th SEAC meeting held on 13.10.2023. Based on the presentation made by the proponent, SEAC decided to recommend for grant of Terms of Reference (TOR) with Public Hearing, study to the TORs stated therein, 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. Subsequently, the subject was placed in the 670th Authority meeting held on 06.11.2023. After detailed discussions, the Authority decided to obtain the following and place before the Authority for further course of action.	
1	The PP shall furnish registered lease consent document obtained from all the pattadhars of proposed mining area.	The registered lease consent document from all the pattadhars will be submitted in the final EIA report.
	Based on the Proponent's reply, the subject was again placed in the 677th Authority meeting held on 11.12.2023 & 12.12.2023. 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 **Annexure 'B'** of this minute.	
	Annexure 'B'	
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 Development Water sprinkling, tree plantation, blasting etc.,	The members of the cluster management committee will be instructed to carry out EMP in coordination.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	All the information has been discussed in Section 2.6 under Chapter II, pp.18-25.
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	A proper action plan regarding the

	regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.		restoration will be followed by the committee.
8	The committee shall furnish the Emergency Management plan within the cluster.		The committee will submit the emergency management plan to the respective authority in the stipulated time period.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.		The information on the health of the workers and the local people will be updated periodically.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.		A proper action plan with reference to water, sanitation & safety will be devised and submitted by the committee to the respective authority.
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.		The committee will submit the fire safety and evacuation plan as discussed in Section 7.3 under Chapter VII, pp.118-119.
	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 & pp. 65-79.
	b)	Climate change leading to Droughts, Floods etc.	Climatic condition of the proposed project area has been discussed in Section 3.3 under Chapter III, pp.51-61.
	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.102-105.

	d)	Possibi1ities of water contamination and impact on aquatic ecosystem health.	Possibilities of both surface and ground water contamination have been discussed in Section 4.3 under Chapter IV, pp.90. The impact on aquatic species has been discussed in Section 4.6 under Chapter IV, pp.102-105.
	e)	Agriculture, Forestry, & Traditional practices.	Sorgum, millet, groundnut, and coconut are the primary crops that are cultivated in the study area.
	f)	Hydrothermal/Geothermal effect due to destruction in the Environment.	The average geothermal gradient of earth is 25^0C/km. As the proposed depth of mining is 30 m below the local ground level, the temperature will increase by 0.75^0C 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 regarding sediment geochemistry are discussed in the Table 3.4 under Chapter III, p.37.
	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. 102-105.
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. 65-

		79. 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. 65-79. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV, pp.102-105.
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. 65-79 and measures have been provided in Section 4.6 under Chapter IV, pp. 102-105.
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.89-108.
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, p.89.
	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. 102-105.
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. 102-105.
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National parks, corridors and wildlife pathways, near project site.	The details of protected areas, National Parks, Corridors and Wildlife pathways near project site and the list of environmentally sensitive areas has been provided in Table 3.39 under Chapter III, pp.86 & 87.
	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.38-51.
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, p.90.
25	Detailed study shall be carried out in regard	The matter has been discussed under

	to impact of mining around the proposed mine lease area on the nearby villages, waterbodies/rivers & any ecological fragile areas.	Chapter IV, pp.89-108.
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.65-79.
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. 89-108.
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.102-105.
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.89-90.
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, p.90.
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. 89-108.
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	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV, pp. 102-105.

	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.	The matter has been discussed in Chapter IV, pp.89-108.
	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.128-135.
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.129-135.
	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.115-117.
	Disaster Management Plan	
38	To furnish disaster management plan and	The disaster management plan for this

	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.	project has been provided in Section 7.3 under Chapter VII, pp.118-119.
	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 IV.
40	As per the MoEF & CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management plan.	The concerns raised during the public consultation will be submitted in 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 7.4 under Chapter VII, pp.119-122.
	STANDARD TERMS OF REFERENCE	
1.	Year-wise production details since 1994 should be given, clearly stating the highest	Not applicable. This is not a violation category project. This proposal falls

	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.	under B1 category.
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 under Chapter II, p.13.
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, pp.128 & 129.
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.86 & 87. 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.
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	It is not applicable as there is no forest

	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.	land involved within the proposed project area. The details have been discussed in Table 3.39 under Chapter III, pp.86 & 87.
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.	It is not applicable as the proposed project area does not involve any forest land.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. 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.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is found within the study area. The details of reserve forest within 10km have been discussed Table

		3.39 under Chapter III, pp.86 & 87.
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.	There is no any wildlife/protected area from the periphery of the project area. Information regarding wildlife /protected area within 10km has been given in Table 3.39 under Chapter III, pp.86 & 87.
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	The details of National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from the periphery of the project area has been given in Table 3.39 under Chapter III, pp.86 & 87.
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	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. 65-79.

	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 '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	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

	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.	provided.
22.	One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Baseline data were collected for the period of October 2023 - December 2023 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. 28-88.
23.	Air quality modelling should be carried out for prediction of impact of the project on the	Air quality modelling for prediction of incremental GLCs of pollutants was

	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.	carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the Chapter IV, pp.91-97.
24.	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II, p.24.
25.	Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.	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.
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.	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 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, p.90.
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 70 m below ground level. The ultimate depth of quarry is 30m (10m above base level & 20m below base level). 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.38-51.
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
30.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	The highest elevation of the project area is 414 m AMSL. Ultimate depth of the mine is 30m (10m AGL + 20m BGL). Depth to the water level in the area is 70 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. 102-105.
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to 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.84-86.
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be	Infrastructure & other facilities will be provided to the mine workers after the

	included in the EIA Report.	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.106 & 107.
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.125 & 126.
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 16 people directly as discussed in Section 8.1 under Chapter VIII, p.124.

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.129-135.
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 will be submitted in the final EIA report.
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 78,65,900/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs.5165702 as capital cost and recurring cost as Rs.2051765 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.16592250, as shown in Tables 10.1 & 10.2 under Chapter X, pp.129-135.
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.118-119.
43.	Benefits of the Project if the Project is	Benefits of the project details have been

	implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	given under Chapter VIII, pp.124-126.
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 and submitted.	The questionnaire will be attached in the final EIA report.
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions 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	No changes are made in the basic scope

	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.	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 fresh lease area and the CCR is not applicable to this project.
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.	All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

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.10366/SEAC/ToR-1623/2023 Dated 12.12.2023, this EIA report has been prepared for the project proponent, Mr.G.Thangavel applied for rough stone and gravel quarry lease in the Patta land falling in S.F.No.333/3 over an extent of 2.62.50 ha in Pachapalayam Village, Sulur Taluk, Coimbatore 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 two proposed projects known as P1, P2 and three existing quarries known E1, E2, E3 and one Expired Quarry known as EX1. 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 **12.25.85 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	Thiru.G.Thangavel	333/3	Pachapalayam	2.62.5	Proposed Area
P2	Thiru.A.Natarajan	342/7E	Pachapalayam	1.04.0	Applied Area
Existing Quarries					
E1	Thiru.S.Sakthivel	334/2B, 334/3B, 334/4A, 334/4B	Pachapalayam	2.28.5	24.11.2018 to 23.11.2023
E2	Thiru.A.Selvaraj	342/7D	Pachapalayam	1.33.5	22.01.2019 to 21.01.2024
E3	Thiru.M.Muralikrishnan	343/2A, 343/2B1, 343/3A, 343/4A	Pachapalayam	2.35.85	13.12.2022 to 12.12.2027
Expired Quarry					
EX1	Thiru.Meiyarasu	333/1	Pachapalayam	2.61.5	12.08.2017 to 11.08.2022
Total Cluster Extent				**12.25.85**	---

Source:

AD Letter - Rc.No.423/Mines/2019, Dated:01.08.2023.

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/ 442308/2023, dated 30.08.2023 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) 30.08.2023.

Scoping

The proposal was placed in the 416th meeting of SEAC on 13.10.2023. 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.

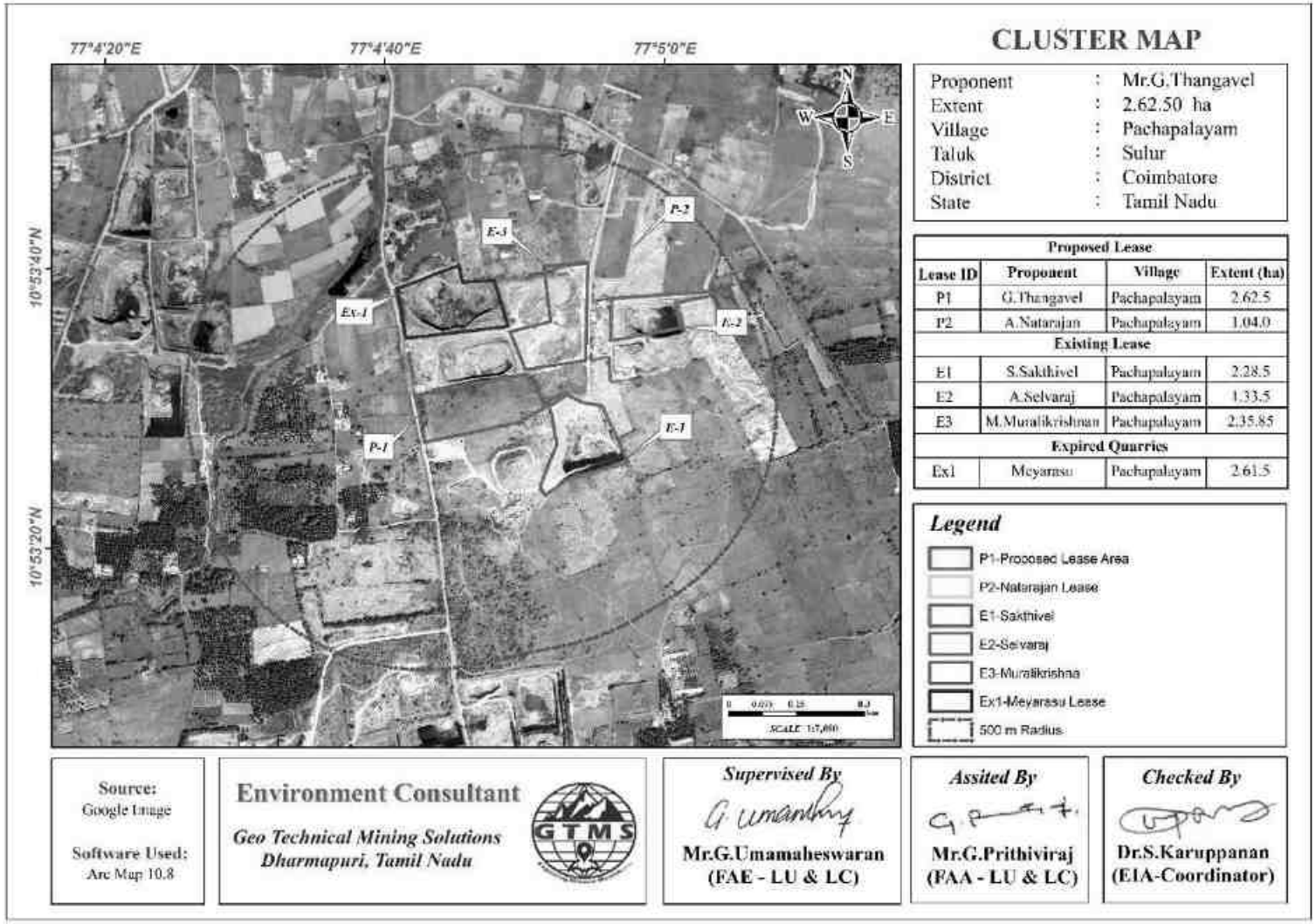


Figure 1.1 Location of the Proposed and Existing Rough Stone and Gravel Quarries in the Cluster of 500 m Radius

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 **Lr No. SEIAA-TN/F.No.10366/SEAC/ToR-1623/2023 Dated 12.12.2023** for the preparation of an EIA report.

1.4 POST ENVIRONMENT CLEARANCE MONITORING

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

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

1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

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

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	**Mr.G.Thangavel**
Address	S/o. Ganapathy Gounder, Thiyagi Kumaran Street, Periyakulli Pachapalayam, Sulur Taluk, Coimbatore District- 641 201.
Status	Proprietor

1.7 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of rough stone and gravel which is primarily used in construction projects. The method adopted for rough stone and gravel excavation is Open Cast Semi-Mechanized mining method involving formation of benches with 5 m height and 5 m width. The proposed project site is located in Pachapalayam Village,

Sulur Taluk, Coimbatore 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	Mr.G.Thangavel Rough Stone and Gravel Quarry		
Toposheet No	58-F/01		
Latitude	10°53'27.58015"N to 10°53'32.44183"N		
Longitude	77°04'42.22100"E to 77°04'51.52142"E		
Highest Elevation	414 m AMSL		
Proposed Depth as per ToR	30 m (10m AGL + 20mBGL)		
Ultimate Pit Dimension	Length (m)	Width (m)	Depth (m)
	243	82	30
Geological Resources	Rough Stone in m^3	Gravel in m^3	
	869065	50960	
Mineable Reserves	Rough Stone in m^3	Gravel in m^3	
	356189	39852	
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3	
	307059	39852	
Method of Mining	Open-Cast Semi Mechanized Method		
Topography	Flat Terrain		
Machinery proposed	Jack Hammer	2	
	Compressor	2	
	Hydraulic Excavator	1	
	Tippers	7	
Blasting Method	Quarrying Operation is proposed to done with conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.		
Proposed Manpower Deployment	16 Nos		
Project Cost	Rs.78,65,900 /-		
CER Cost	Rs.5,00,000/-		
Proposed Water Requirement	4.0 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 DECSCRIPTION OF THE PROJECT

The proponent Mr.G.Thangavel 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 19.06.2019 & 05.06.2023 to extract rough stone and gravel. The precise area communication letter was issued by Department of Geology and Mining, Coimbatore vide Rc.No.423/Mines/2019, dated:10.07.2023. 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, Coimbatore Rc.No 423/Mines/2019, dated:01.08.2023. 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 Pachapalayam Village, Sulur Taluk, Coimbatore District, as shown in Figure 2.2 & 2.3. The area lies between Latitudes from 10°53'27.58015"N to 10°53'32.44183"N and Longitudes from 77°04'42.22100"E to 77°04'51.52142"E. The maximum altitude of the project area is 414 m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

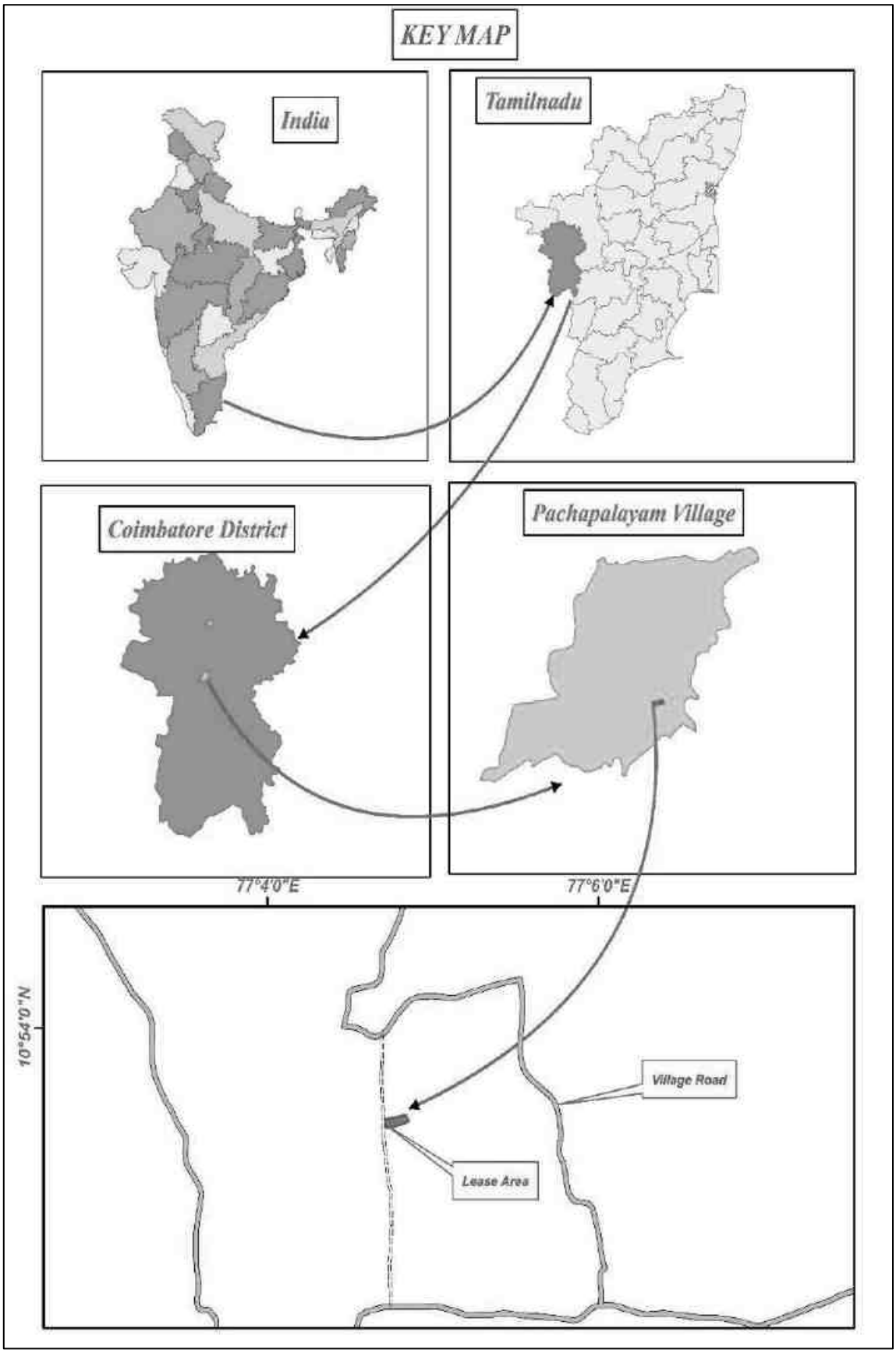


Figure 2.2 Key Map Showing Location of the Project Site

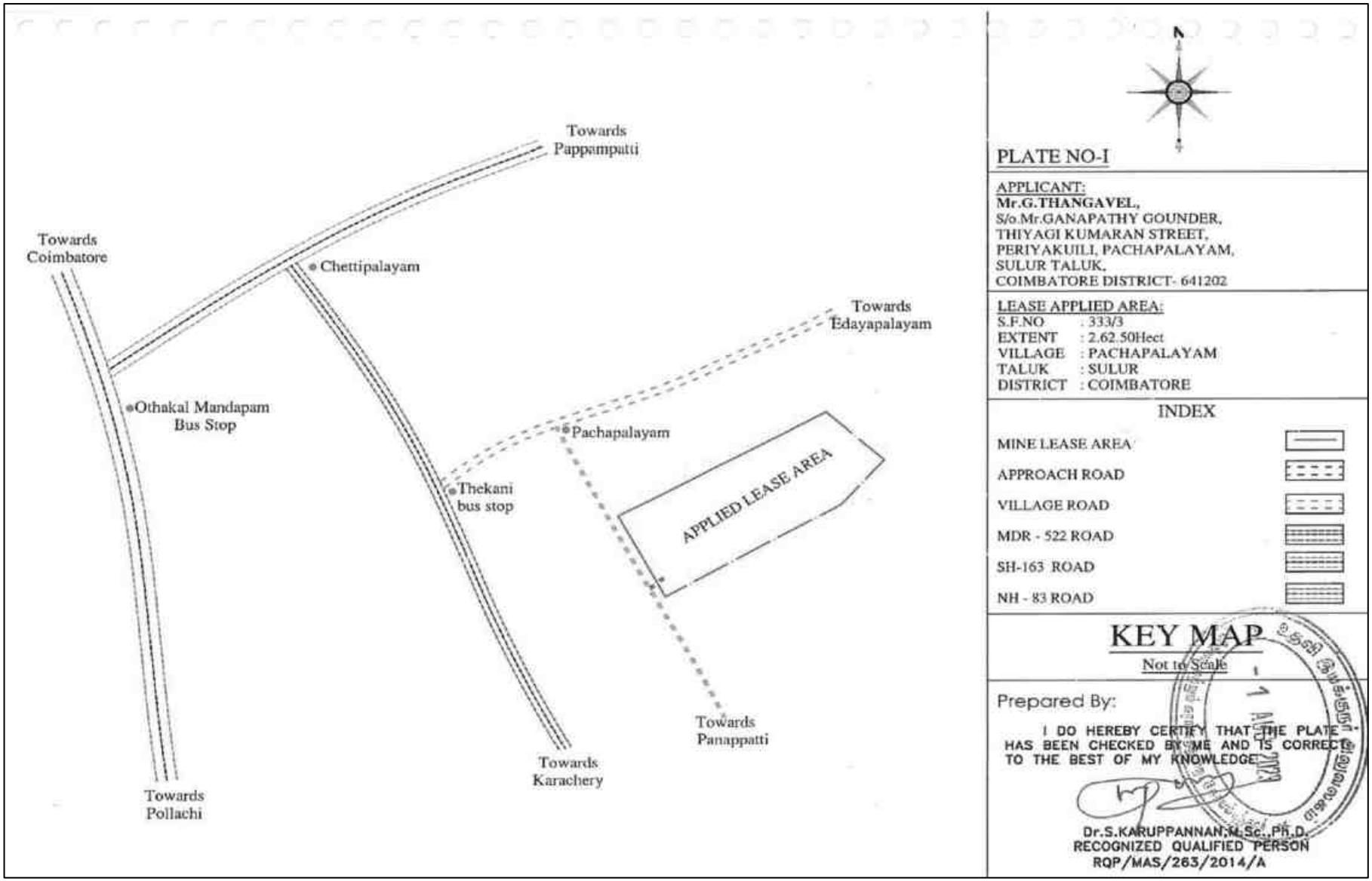


Figure 2.3 Site Connectivity to the Lease Area

Table 2.1 Site Connectivity to the Project Area

Nearest Roadways	MDR – 522 Chettipalayam - Vadasithur	2.09 km W
Nearest Town	Chettipalayam	5.29 km NW
Nearest Railway Station	Chettipalayam	5.6 km NW
Nearest Airport	Coimbatore	18.4 km NW
Nearest Seaport	Thoothukudi	261 km SE
Nearest Villages	Pachapalayam	0.9 km NW
	Ponnakkani	1.72 km E
	Pannapatti	2.4 km SE
	Thekani	2.15 km SW

2.3 LEASEHOLD AREA

- The extent of the proposed project site is 2.62.5 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.

Table 2.2 Corner Coordinates of Proposed Project

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	10°53' 32.44183"N	77°04'50.20100"E	10	10° 53' 27.58015" N	77° 04' 42.81700"E
2	10°53' 31.02552"N	77°04'51.01094"E	11	10° 53' 29.18242"N	77° 04' 42.53211"E
3	10°53' 30.13284"N	77°04'51.52142"E	12	10° 53' 30.78483"N	77° 04' 42.24724"E
4	10°53' 29.29913"N	77°04'50.10800"E	13	10° 53' 30.93221"N	77° 04' 42.22100"E
5	10°53' 28.99231"N	77°04'49.58783"E	14	10° 53' 31.23800"N	77° 04' 43.83773"E
6	10°53' 28.65642"N	77°04'47.97721"E	15	10° 53' 31.54394"N	77° 04' 45.45442"E
7	10°53' 28.32053"N	77°04'46.36673"E	16	10° 53' 31.84983"N	77° 04' 47.07111"E
8	10°53' 27.98452"N	77°04'44.75613"E	17	10° 53' 32.15552"N	77° 04' 48.68783"E
9	10° 53' 27.64861N	77° 04' 43.14552"E			

2.4 GEOLOGY AND GEOMORPHOLOGY

The lease area geologically occurs on Hornblende-Biotite Gneiss. The Charnockite, commercially called as rough stone. In addition, the lease area geomorphologically occurs over Pediment Pediplain Complex.

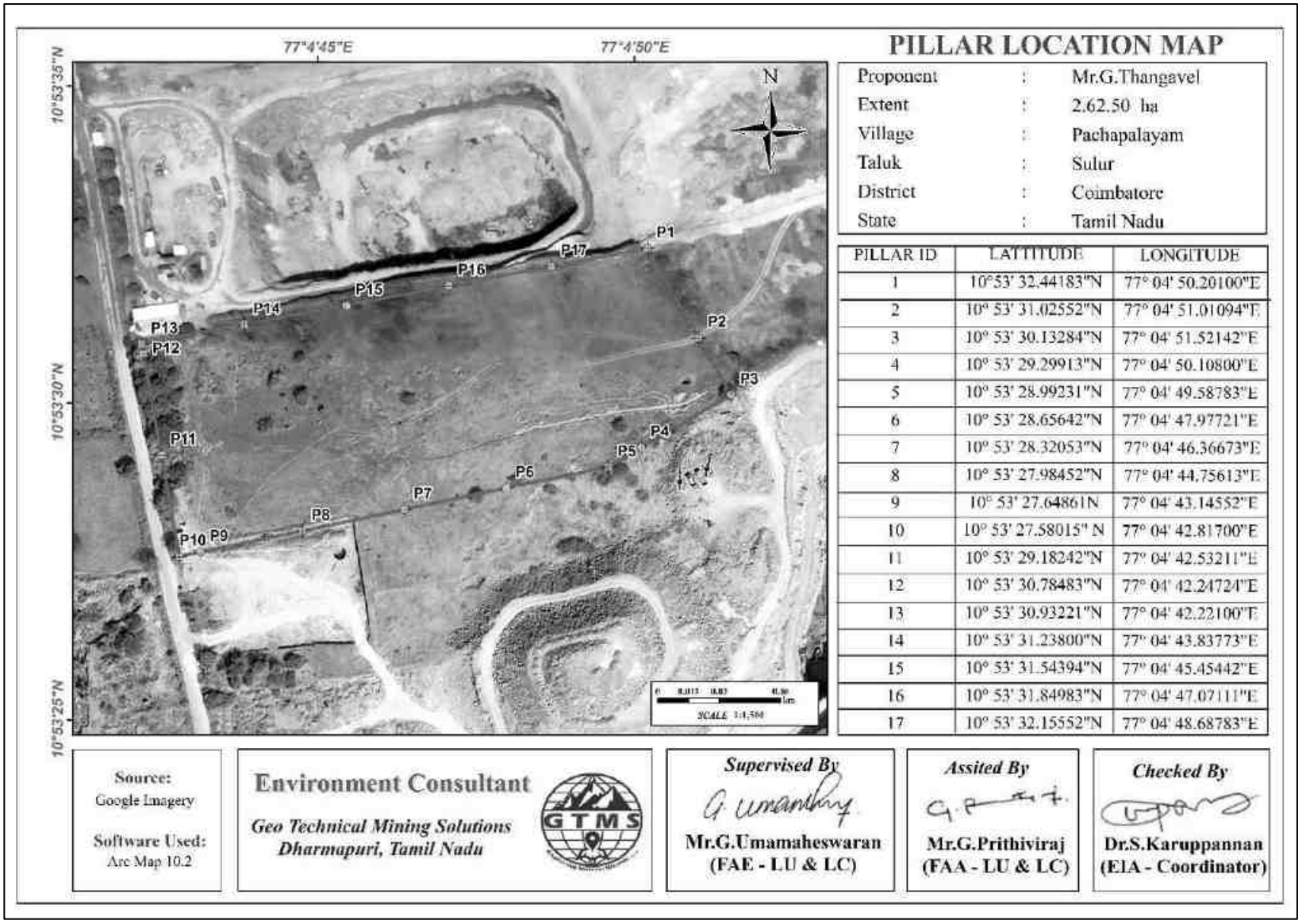


Figure 2.4 Google Earth Image Showing Lease Area with Pillars

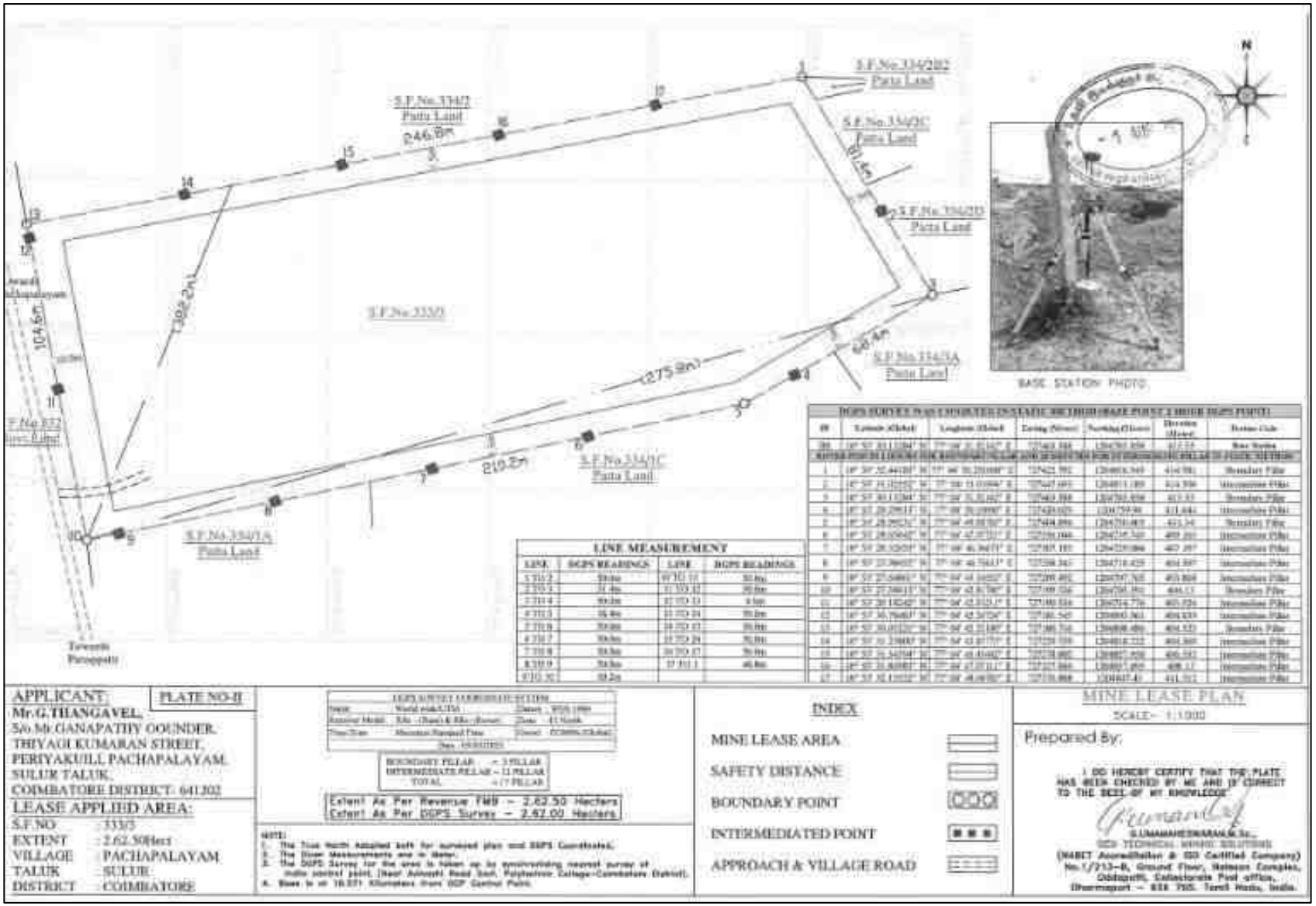


Figure 2.5 Mine Lease Plan

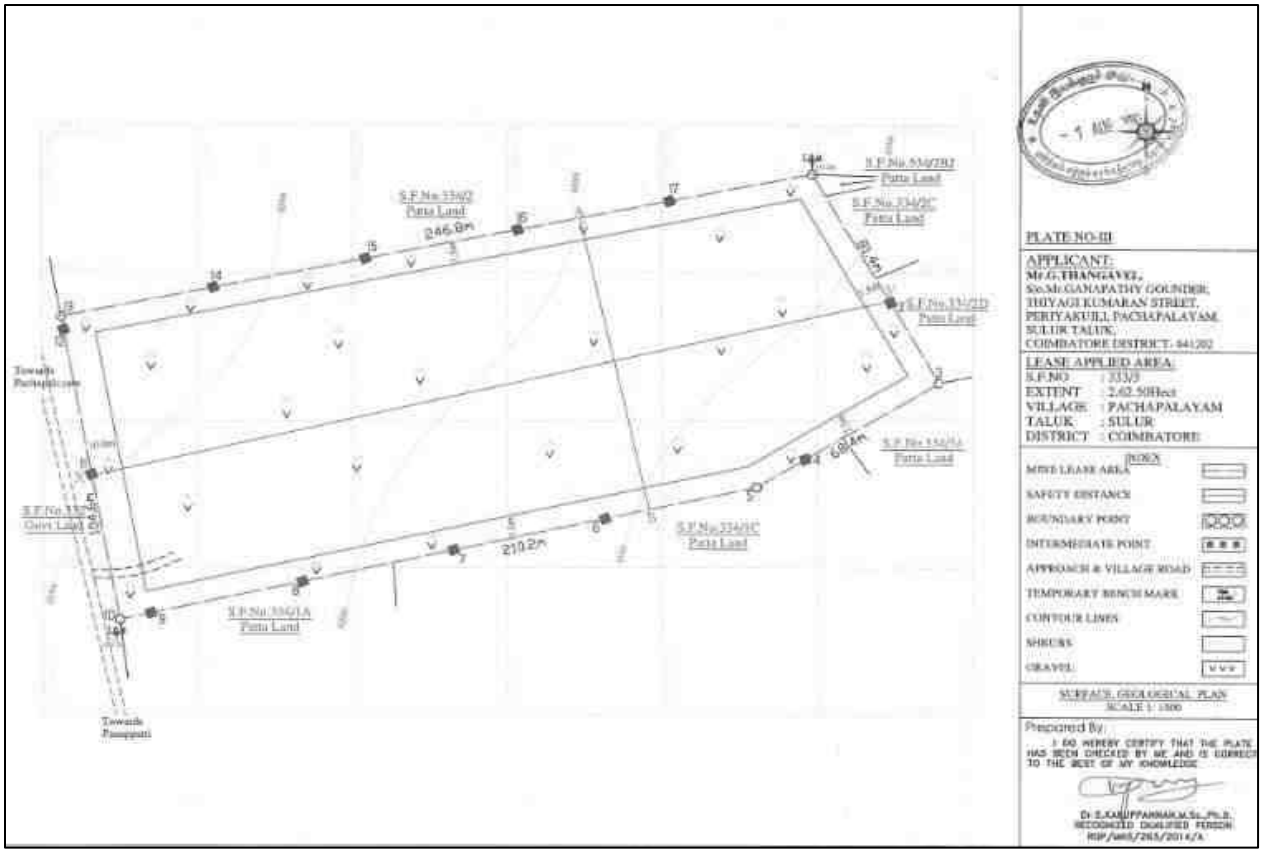


Figure 2.6 Surface and Geological plan and Sections

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 7.5 m and 10 m 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 30m 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 results of geological resources and reserves have been shown in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

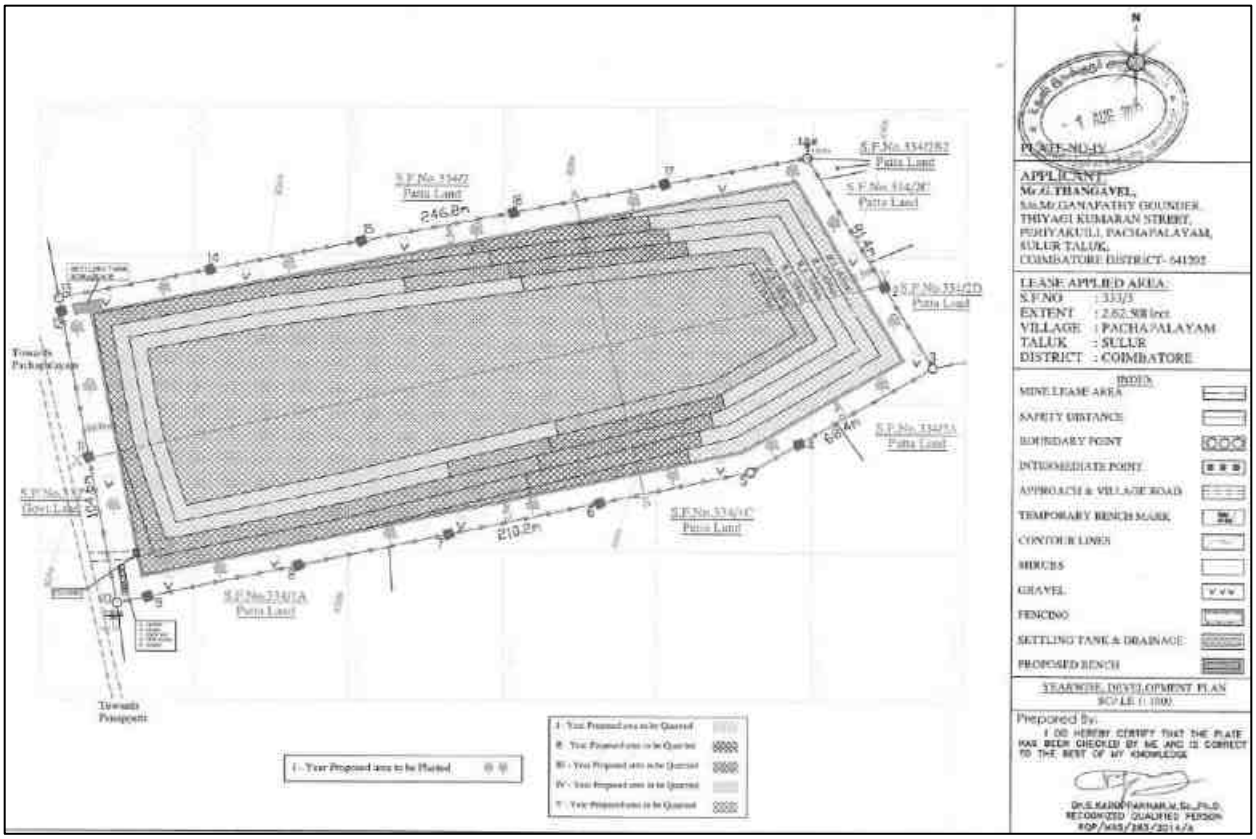
Resource Type	Rough stone in m^3	Gravel in m^3
Geological Resource in m^3	869065	50960
Mineable Reserves as per ToR in m^3	356189	39852
Proposed production as per ToR for 5 years m^3	307059	39852

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.

Table 2.4 Year-Wise Production Details

Year	Rough stone in (m^3) / 5 years	Gravel in (m^3) / 3 years
I	57739	10824
II	61770	8692
III	62645	20336
IV	62125	---
V	62780	---
Total	**307059**	**39852**

Source: Approved Mining Plan & ToR



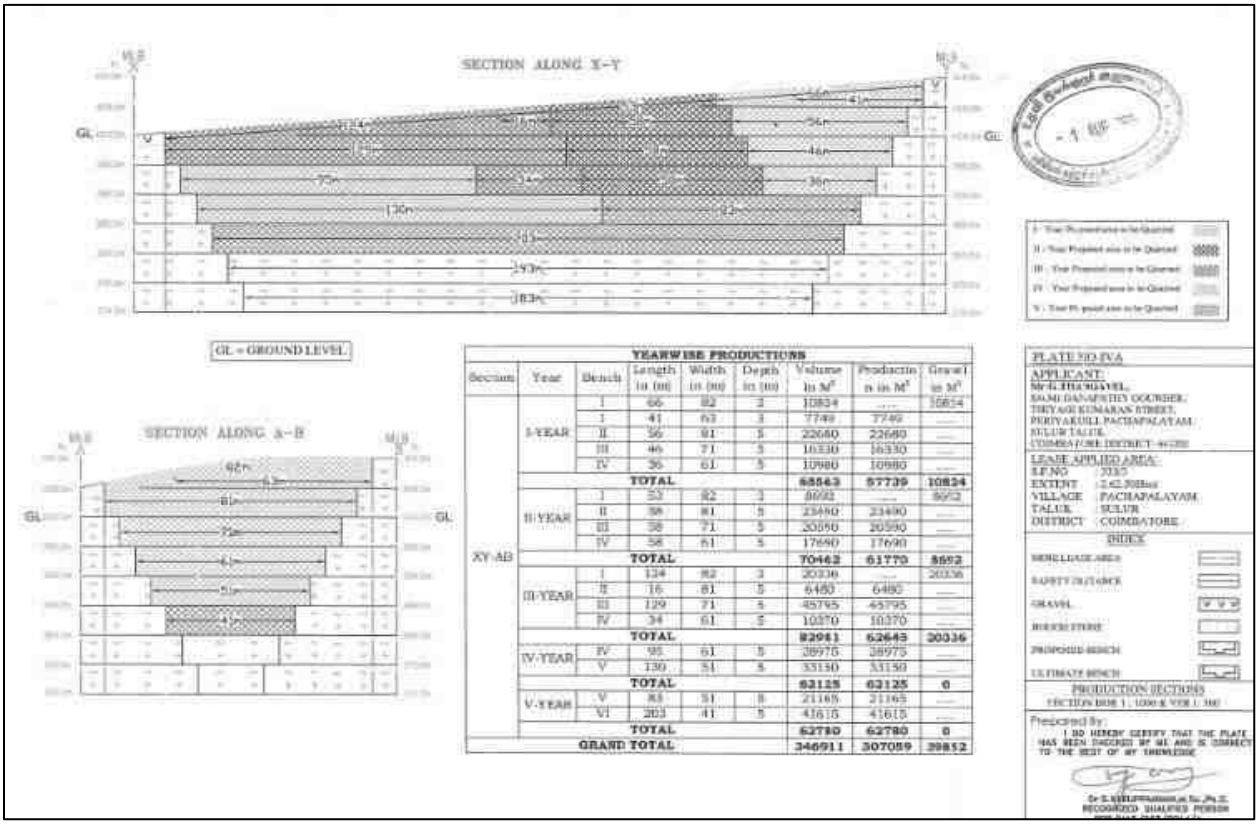


Figure 2.7 Year wise Development and Production Plan and Sections

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 and gravel. The extracted rough stone will be loaded manually to the trucks for dispatch to the customers. In this project, NONEL blasting will be adopted to extract rough stone.

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	227
Number of blastholes/day	55
Blasthole pattern	Staggered / Rectangular
Mass of explosive /day in kg	22
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 / 5 years	**Gravel/ 3 years**
Proposed production for 5 years	307059	39852
Number of Working Days /Annum	270	270
Production of /Day (m^3)	227	49
No. of Lorry Loads	38	8

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**	**Capacity**	**Make**	**Motive Power**
1	Jack Hammers	2	Hand held	-	Diesel Drive
2	Compressor	2	Air	-	Diesel Drive
3	Excavator	1	-	-	Diesel Drive
Haulage & Transport Equipment					
4	Tipper	7	**-**	**-**	Diesel Drive

2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.8 whereas, at the end of the mine life, about 2.08.49 ha of land will have been quarried; about 0.02.0 ha of land will be used for infrastructure, about 0.05.0 ha of land will be used for roads, about 0.43.05 ha of land will be used for green belt & dump, about 0.03.96 ha of land will be used for drainage & settling tank.

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	2.08.49
Infrastructure	Nil	0.02.0
Roads	Nil	0.05.0
Green Belt	Nil	0.43.05
Drainage & Settling Tank	Nil	0.03.96
Unutilized area	2.62.5	Nil
Total	**2.62.5**	**2.62.5**

2.6.4 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
525 plants inside the lease area	1,05,000
788 plants outside the lease area	2,36,250
Wire Fencing	5,25,000
Renovation of Garland Drain	26,250
Total	**8,92,500**

Source: Environment Management Plan.

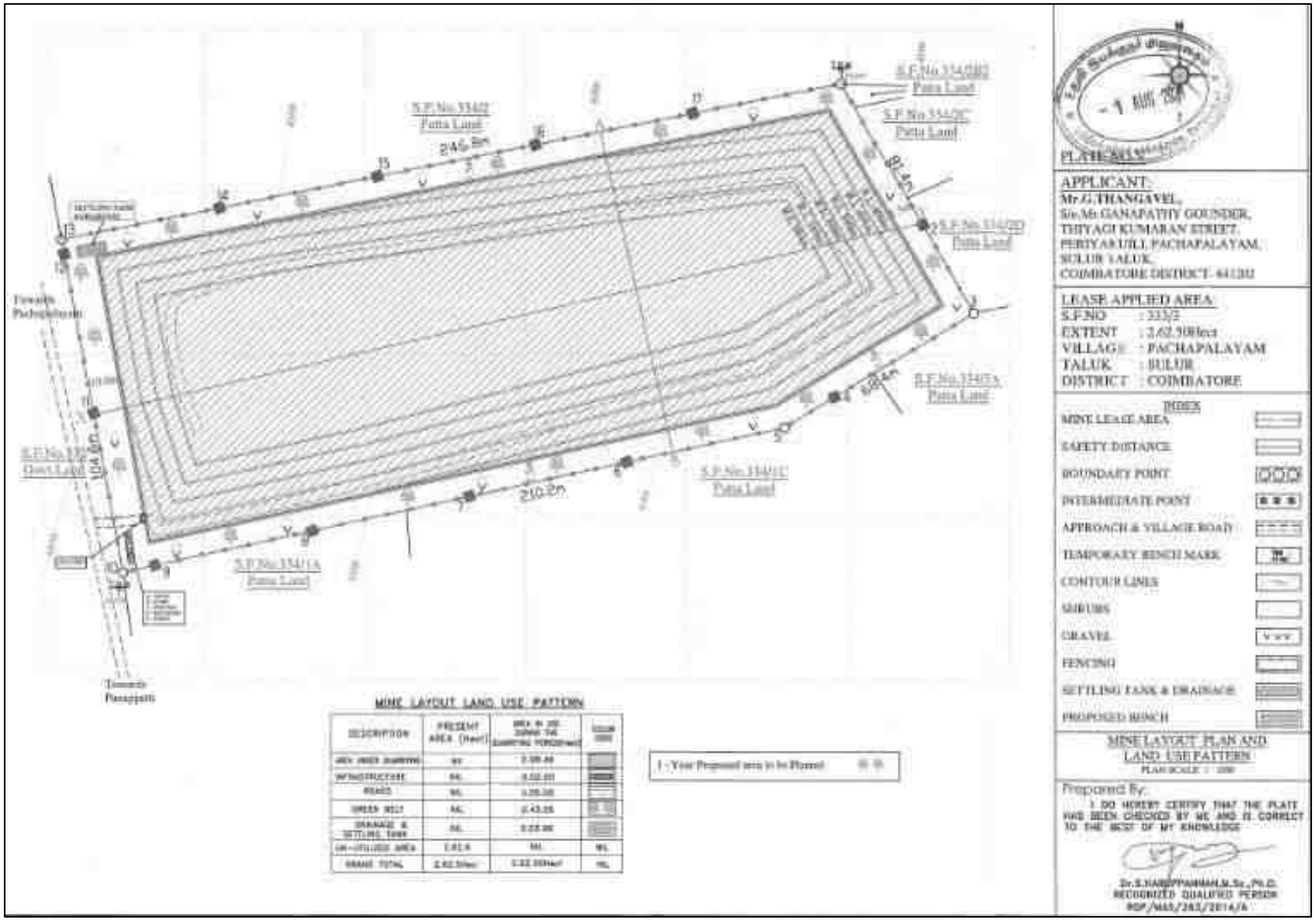
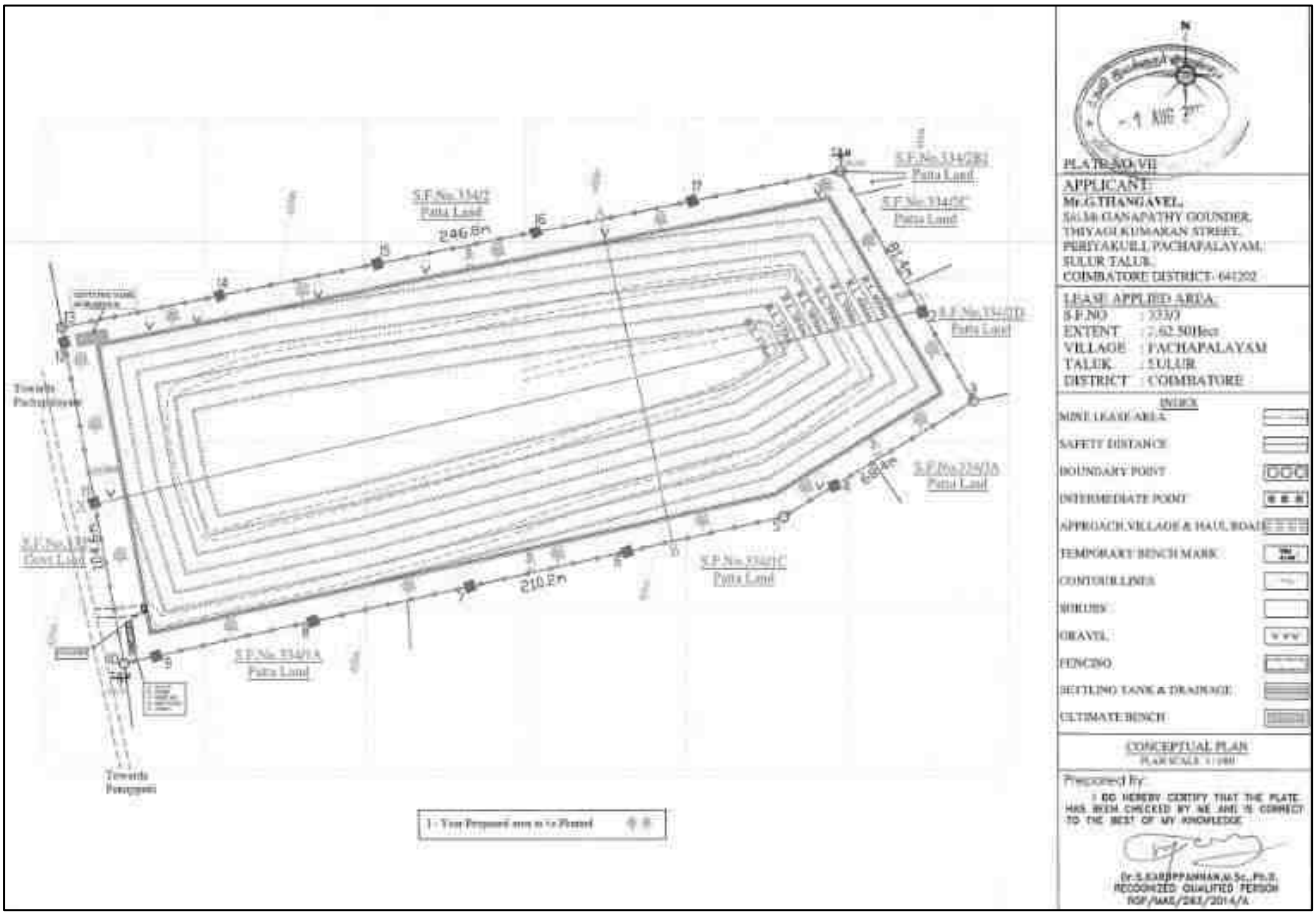
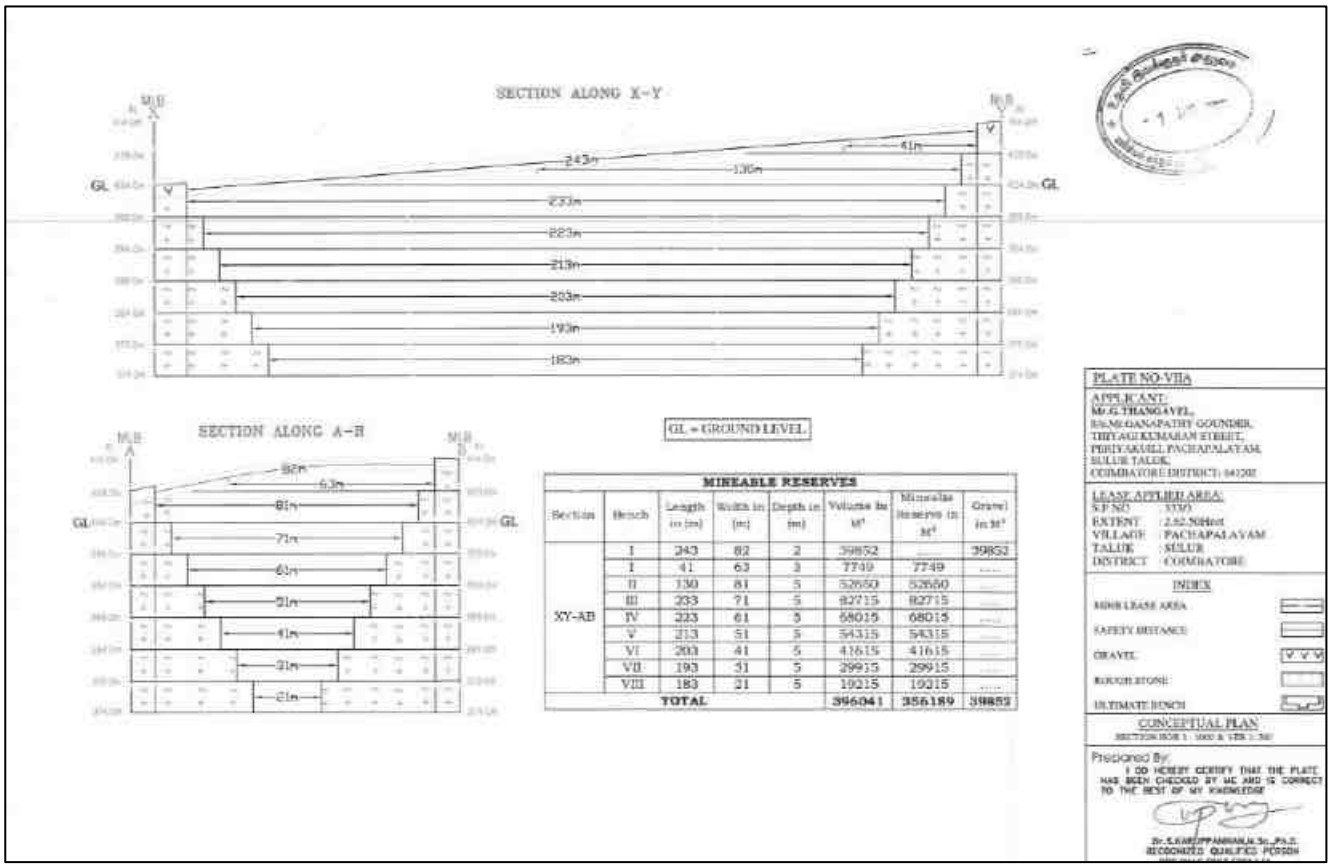


Figure 2.8 Mine Layout Plan and Land Use Pattern





Section	Bench	Length (in m)	Width (in m)	Depth (in m)	Volume in M³	Mineable Reserves in M³	Gravel in M³
XY-AB	I	243	82	2	39852	----	39852
	I	41	63	3	7749	7749	----
	II	130	81	5	52650	52650	----
	III	233	71	5	82715	82715	----
	IV	223	61	5	68015	68015	----
	V	213	51	5	54315	54315	----
	VI	203	41	5	41615	41615	----
	VII	193	31	5	29915	29915	----
	VIII	183	21	5	19215	19215	----
TOTAL					396041	356189	39852

Figure 2.9 Conceptual Plan and 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.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth (m)
I	243	82	30

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 4.0 KLD is given in Table 2.11.

Table 2.11 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	1.0 KLD	Existing bore wells nearby the lease area
Green Belt development	1.0 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	2.0 KLD	Existing bore wells and approved water vendors
Total	**4.0 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 **14,38,359** litres of HSD will be used for rough stone and gravel extraction during this 5 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.12 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	**Rough Stone (307059 m^3)**	**Gravel (39852 m^3)**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	16	10	**---**
Working Capacity (m^3/hr)	20	60	**---**
Time Required (hours)	15353	664	**---**
Total Diesel Consumption for 5 years (litre)	245647	6642	252289
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	55	---	---
Total Diesel Consumption for 5 years (litre)	29700	**---**	29700
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	**---**
Carrying Capacity in m^3	6	6	**---**
Number of Trips / days	38	5	**---**
Number of Trips / 5 years	51177	6642	**---**
Total Diesel Consumption for 5 years (litre)	1023530	132840	1156370
Total Diesel Consumption by Excavator, Compressor and Tipper			**14,38,359**

2.6.9 Capital Requirement

The project proponent will invest Rs.78,65,900/- 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.16,00,000
2	Machinery Cost	Rs.25,00,000
3	EMP Cost	Rs.37,65,900
Total Project Cost		**Rs.78,65,900**

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 Mines Manager	1
		Mine Geologist	1
		Blaster	1
2	Unskilled	Driver	7
		Hitachi Operator	2
		Musdoor / Labours	4
Total			**16**

Source: Prefeasibility Report

2.8 PROJECT IMPLEMENTATION SCHEDULE

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

Table 2.15 Expected Time Schedule

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

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

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering **October through December, 2023** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Excellence Laboratory** 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	7 (1 core & 6 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 (1 surface water & 6 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	7 (1 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	7 (1 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing flora and fauna	Through field visit during the study period	Study area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-economic characteristics, Population statistics and existing infrastructure in the study area	Site visit & Census Handbook, 2011	Study area	Primary Survey, census handbook & need based assessments.

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

3.1 LAND ENVIRONMENT

3.1.1 Geology and Geomorphology

Study area is mainly composed of Hornblende biotite gneiss and Acid intermediate charnockite, as shown in Figure 3.1. The lease area occurs in Grey Hornblende biotite gneiss terrain. Among the geomorphic units, shallow weathered/buried pediplain and pediment dominate the study area, as shown in Figure 3.2. The lease area occurs in shallow weathered/buried pediplain terrain.

3.1.2 Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius. Totally, 8 LULC were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 333.54 ha accounting for 4.38%, of which cluster area of 2.62.50 ha contributes only about 0.0344%. This small percentage of mining activities shall not have any significant impact on the land environment.

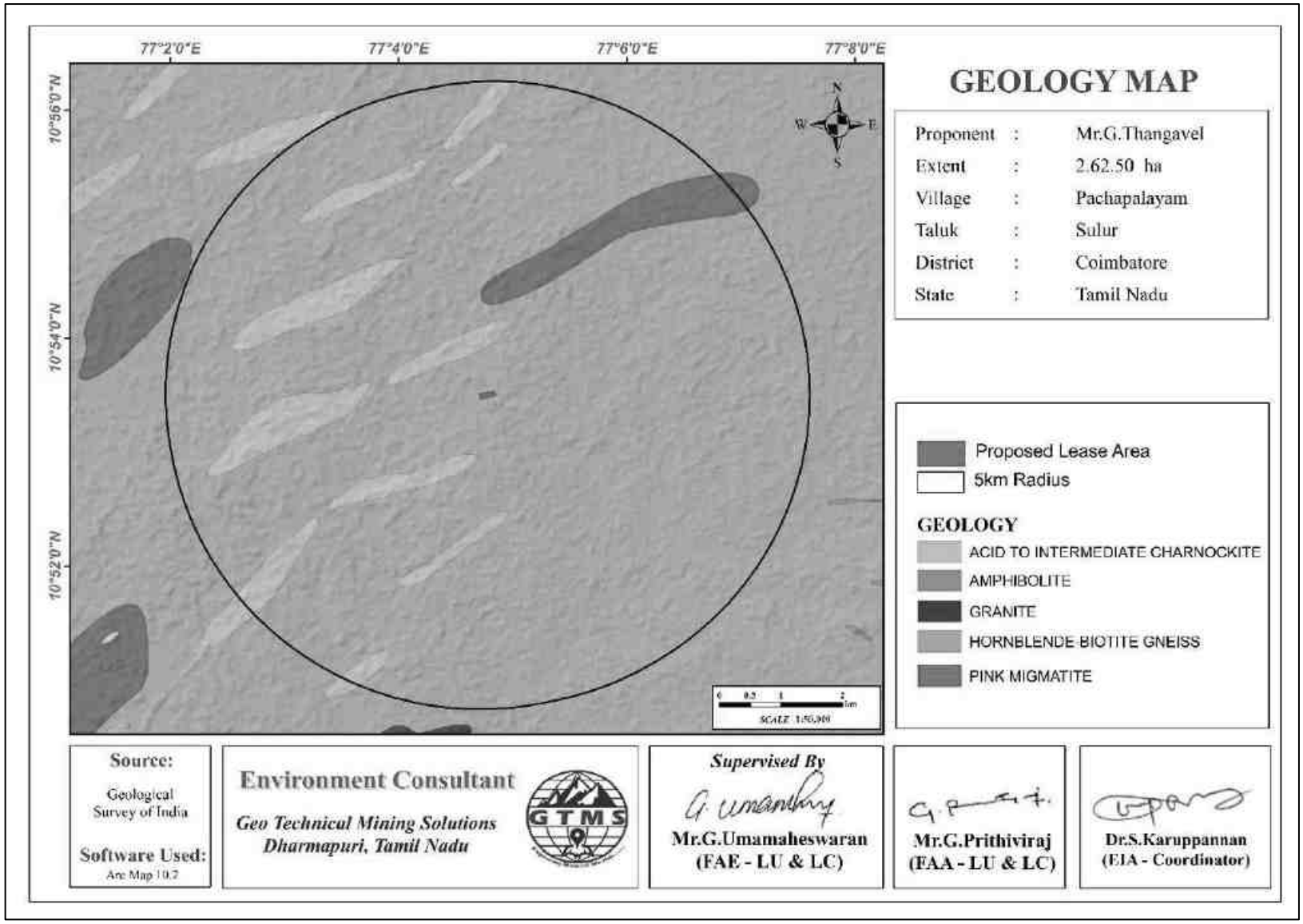


Figure 3.1 Geology Map of 5 km Radius from Proposed Project Site

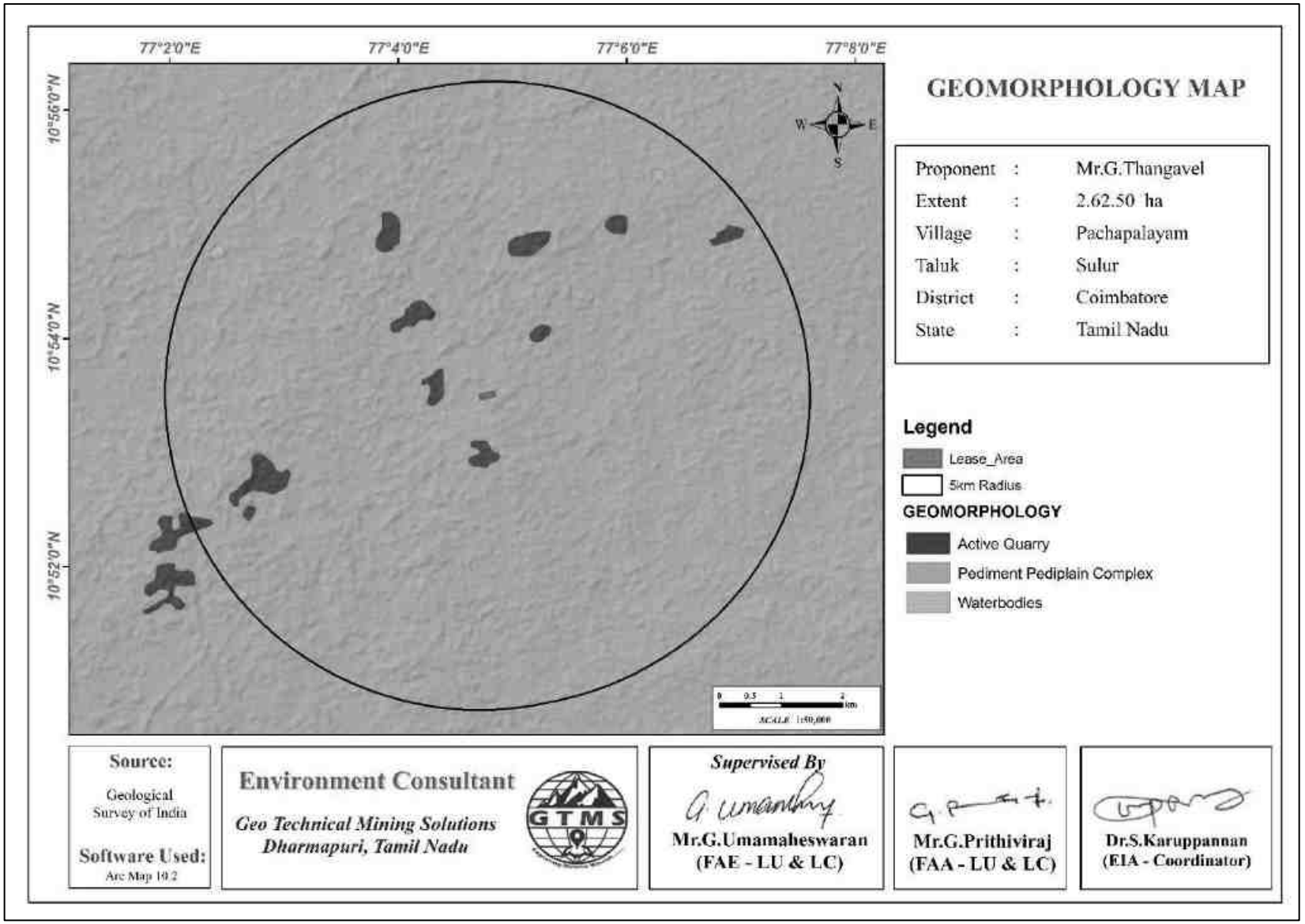


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky / stony waste	86.27	1.13
2	Crop land	5984.53	78.50
3	Dense Forest	62.76	0.82
4	Fallow Land	687.29	9.02
5	Land with or without scrub	25.84	0.34
6	Mining / Industrial wastelands	333.54	4.38
7	Plantations	419.01	5.50
8	Settlement	24.39	0.32
Total		**2623.63**	**100.0**

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The proposed lease area is located in an undulated terrain with an altitude range of 415-426 m AMSL, showing relief of 11 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 a portion of 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 III, as defined by National Centre for Seismology (Official Website of National Centre of Seismology). The Zone III 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.

3.1.6 Soil Environment

Soil is one of the important components of the land environment. Composite soil samples were collected from the study area and analysed for different parameters to determine the baseline soil characteristics of the study area.

3.1.6.1 Methodology

7 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 as per the standard methods prescribed in "Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India". The physical and chemical characteristic results of soil samples are provided in Table 3.4.

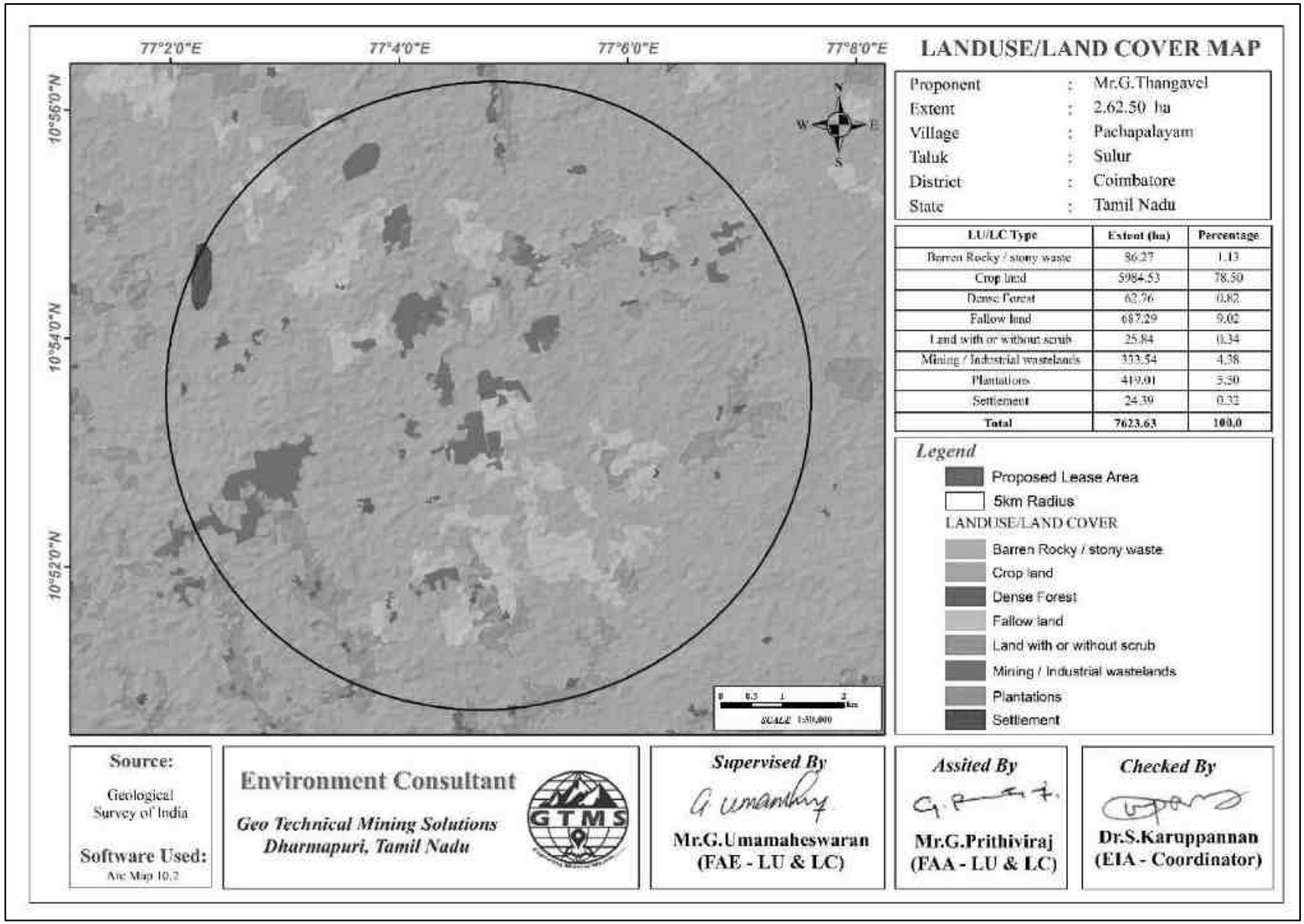


Figure 3.3 LULC Map of 5 km Radius from the Proposed Project Site

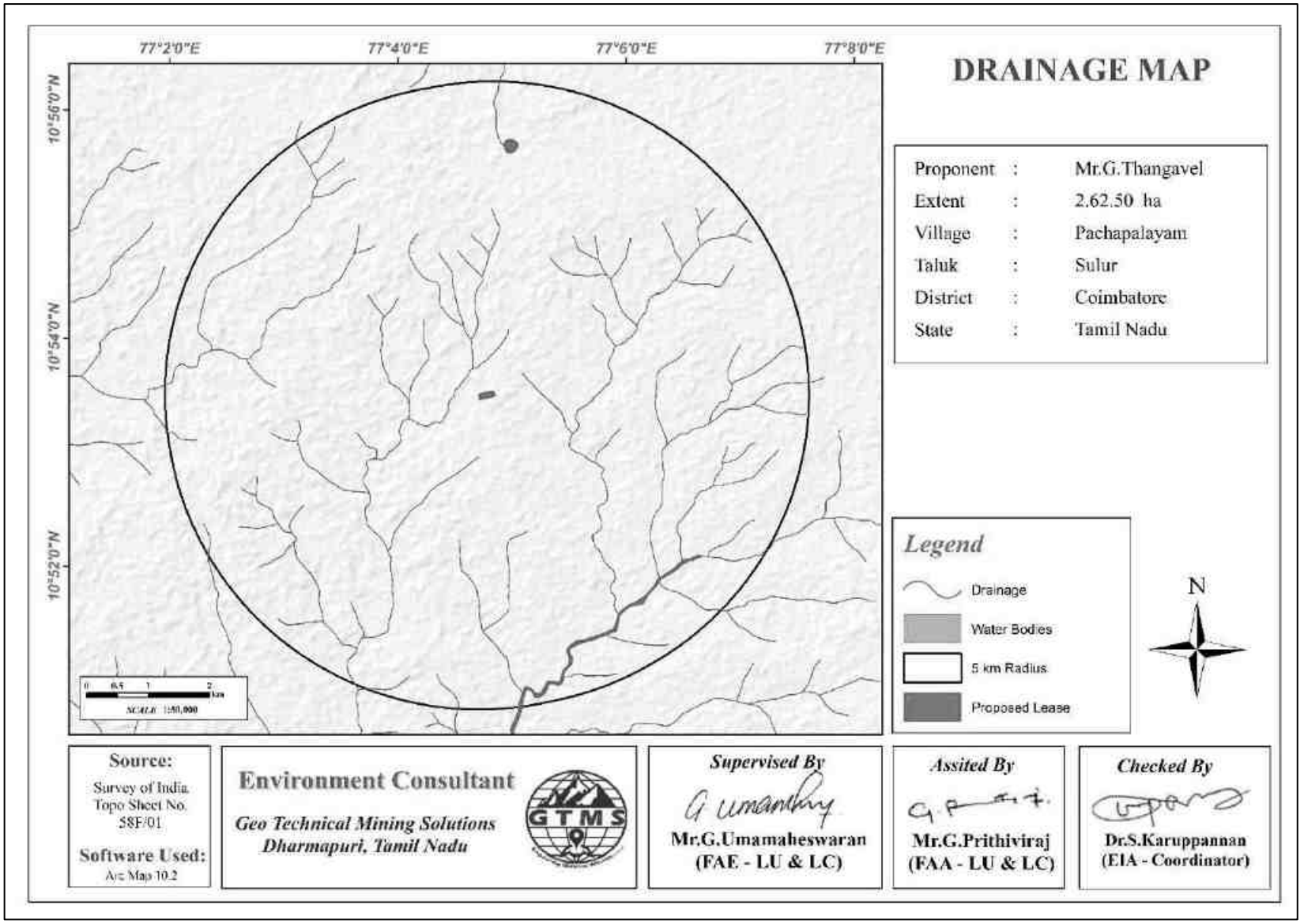


Figure 3.4 Drainage Map of 5 km Radius from the Proposed Project Site Showing a Portion of Dendritic Pattern

Table 3.3 Soil Sampling Locations

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	S01	Core	----	----	10°53'29.18"N 77° 4'48.08"E
2	S02	Pannapatti	3.14 km	SE	10°52'33.56"N 77° 6'16.63"E
3	S03	Karachery	2.45 km	SW	10°52'24.16"N 77° 3'54.04"E
4	S04	Chettipalayam	3.16 km	NW	10°54'33.73"N 77° 3'19.90"E
5	S05	Chinnakuyili	3.78 km	N	10°55'34.51"N 77° 5'3.85"E
6	S06	Bogampatti	3.76 km	NE	10°54'8.29"N 77° 6'48.57"E
7	S07	Pachapalayam	1.19 km	NW	10°54'7.88"N 77° 4'30.77"E

Source: On-site monitoring/sampling by ***Excellence Laboratory,*** *in association with GTMS.*

3.1.6.2 Results and Discussion

Physical Characteristics & Chemical Characteristics

The soil samples in the study area show loamy textures varying between sandy loam, silty loam and Sandy Clay. pH of the soil varies from 7.9 to 8.2 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 272 to 340µs/cm. Bulk density ranges between 1.1 and 1.4 g/cm^3. Figure 3.5 shows the soil composition as calculated based on the laboratory report. Manganese ranges between 236 and 411 mg/kg Chlorides ranges between 353 and 573 mg/kg. Potassium ranges between 0.084 and 0.162%. Calcium ranges between 156 and 192 mg/kg. Organic matter content ranges between 1 and 2.3 %.

Soil Erosion

There is no soil erosion in the mining lease area. The northern east 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 3.5.

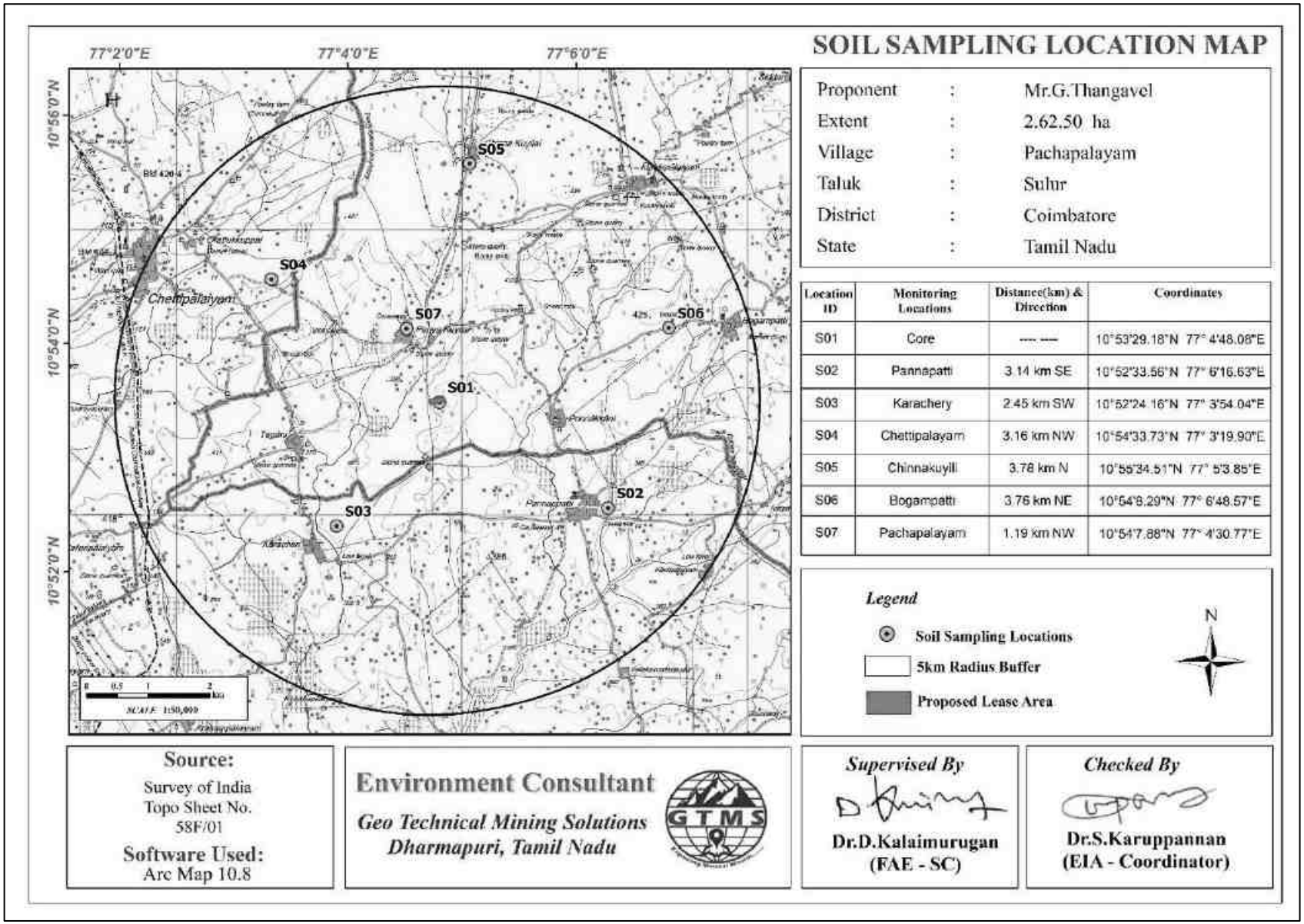


Figure 3.5 Toposheet Showing Soil Sampling Locations within 5 km Radius around the Proposed Project Site

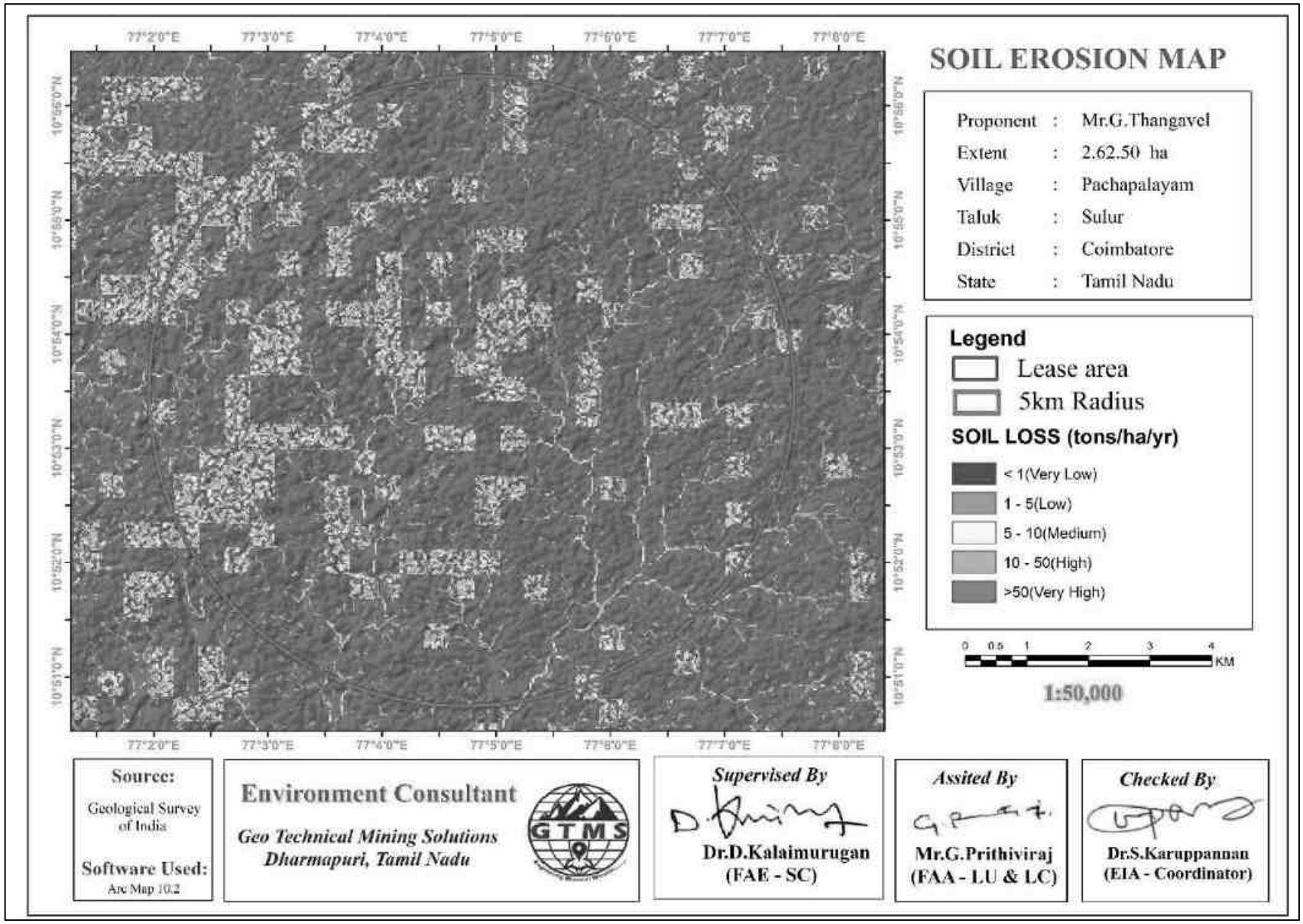


Figure 3.6 Soil Erosion map within 5 km Radius around the Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S. No	Parameters	Unit	S1 Core zone	Minimum	Maximum	Average
1	Bulk Density	g/cm^3	1.1	1.1	1.4	1.3
2	Cadmium (Cd)	mg/kg	<1.0	<1.0	<1.0	<1.0
3	CEC	meq%	27	23	83	48.2
4	Chromium (Cr)	mg/kg	81	82	421	194.8
5	Copper (Cu)	mg/kg	20	17	36	23.5
6	Iron (Fe)	mg/kg	48411	45631	51162	47861.8
7	Lead (Pb)	mg/kg	<1.0	<1.0	<1.0	<1.0
8	Manganese (Mn)	mg/kg	229	236	411	319.7
9	Nitrogen (N)	%	1	1.1	1.5	1.3
10	Organic Matter @ 155°C	%	0.81	1	2.3	1.6
11	pH value @ 25°C	--	8	7.9	8.2	8.0
12	Phosphate (P)	%	0.75	0.74	1.5	1.0
13	Potassium (K)	%	0.066	0.084	0.162	0.1
14	EC @ 25°C	µS/Cm	426	272	340	306.0
15	Total Carbon	%	1.9	1.8	4.3	3.4
16	Sulphates (SO_4)	%	0.31	0.2	0.68	0.4
17	Zinc (Zn)	mg/kg	56	63	79	68.2
18	Boron (B)	mg/kg	<0.1	<1.0	<1.0	<1.0
19	Calcium (Ca)	mg/kg	155	156	192	177.0
20	Chlorides (Cl)	mg/kg	492	353	573	458.3
21	Texture	-	Sandy Clay Loam	Silty Clay Loom, Sandy Loam, Sandy Loam		
22	Sand	%	58.30	9.5	65.3	45.21
23	Clay	%	22.50	12.8	38.3	25.05
24	Silt	%	19.20	3.1	54.3	29.74

*Source: Sampling Results by **Excellence Laboratory (P) Limited,** in association with GTMS.*

Table 3.5 Assigning Scores to Soil Quality Indicators

S. No.	OM	BD	PH	CEC	EC	Total Score	Recommendation
1	30	12	12	6	10	70	The soil requires major and immediate treatment
2	30	12	12	6	10	70	
3	30	12	12	6	10	70	
4	30	12	12	10	10	74	
5	30	12	12	10	10	74	
6	30	12	6	6	10	64	
7	30	12	6	10	10	68	

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 3.6 Water Sampling Locations

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	SW 1	Panappatti	1.55	SE	10°53'0.11"N 77° 5'32.51"E
2	BW 1	Ponakani	1.92	E	10°53'22.37"N 77° 5'54.14"E
3	BW 2	Panapatti	2.58	SE	10°52'35.35"N 77° 6'0.20"E
4	BW 3	Karachery	3.07	SW	10°52'11.33"N 77° 3'37.14"E
5	BW 4	Thekani	2.15	SW	10°53'5.90"N 77° 3'35.33"E
6	BW 5	Pachapalayam	0.93	NW	10°53'58.86"N 77° 4'28.75"E
7	BW 6	Edayapalayam	4.30	NE	10°55'22.75"N 77° 6'17.42"E

*Source: Sampling Results by **Excellence Laboratory (P) Limited,** in association with GTMS.*

3.2.1 Surface Water Resources and Quality

Panappatti Lake are the prominent surface water resources present in the study area. This lake is ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 1.55 km SE Panappatti Lake, as shown in Table 3.6 and Figure 3.8. Surface water sample, known as SW01 are collected from the surface water body to assess the baseline water quality. Table 3.7 summarizes surface water quality data of the sample. Results for surface water

samples in the Table 3.7 indicate that the physical and chemical parameters, and heavy metals are within permissible limits. Of the two biological parameters, *Coliform* and *E-coli* bacteria is present in the water sample.

3.2.2 Ground Water Resources and Quality

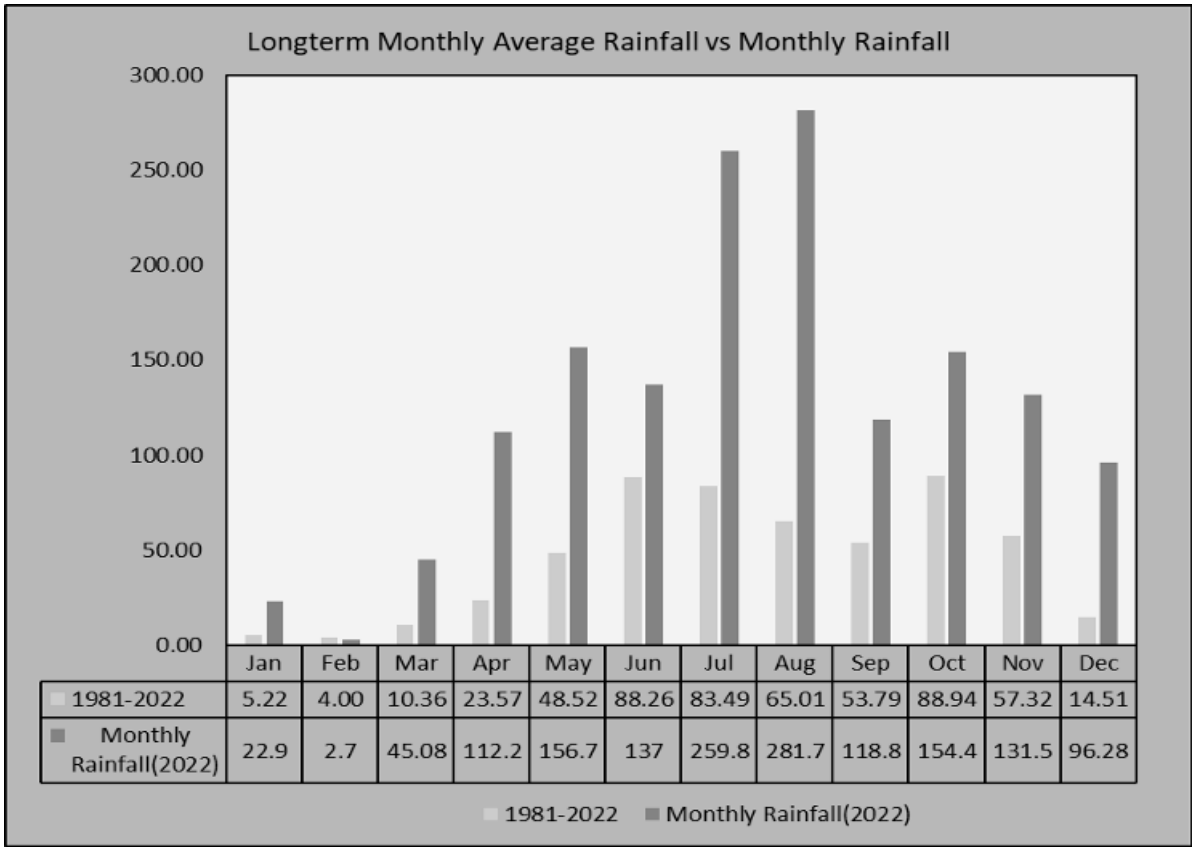
Groundwater in the study area occurs in the crystalline rocks of Archaean age and Recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose. Six groundwater samples, known as BW1, BW2, BW3, BW4, BW5 and BW6 were collected from bore wells and 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 3.6 and the spatial occurrence of water sampling locations is shown in Figure 3.8. Table 3.7 summarizes ground water quality data of the six samples. Results for ground water samples 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.

3.2.3 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. 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 3.11 shows that rainfall is generally high in the months of June, July and October in every year. Particularly, rainfall in July, August and October of 2022 is higher than the previous years.

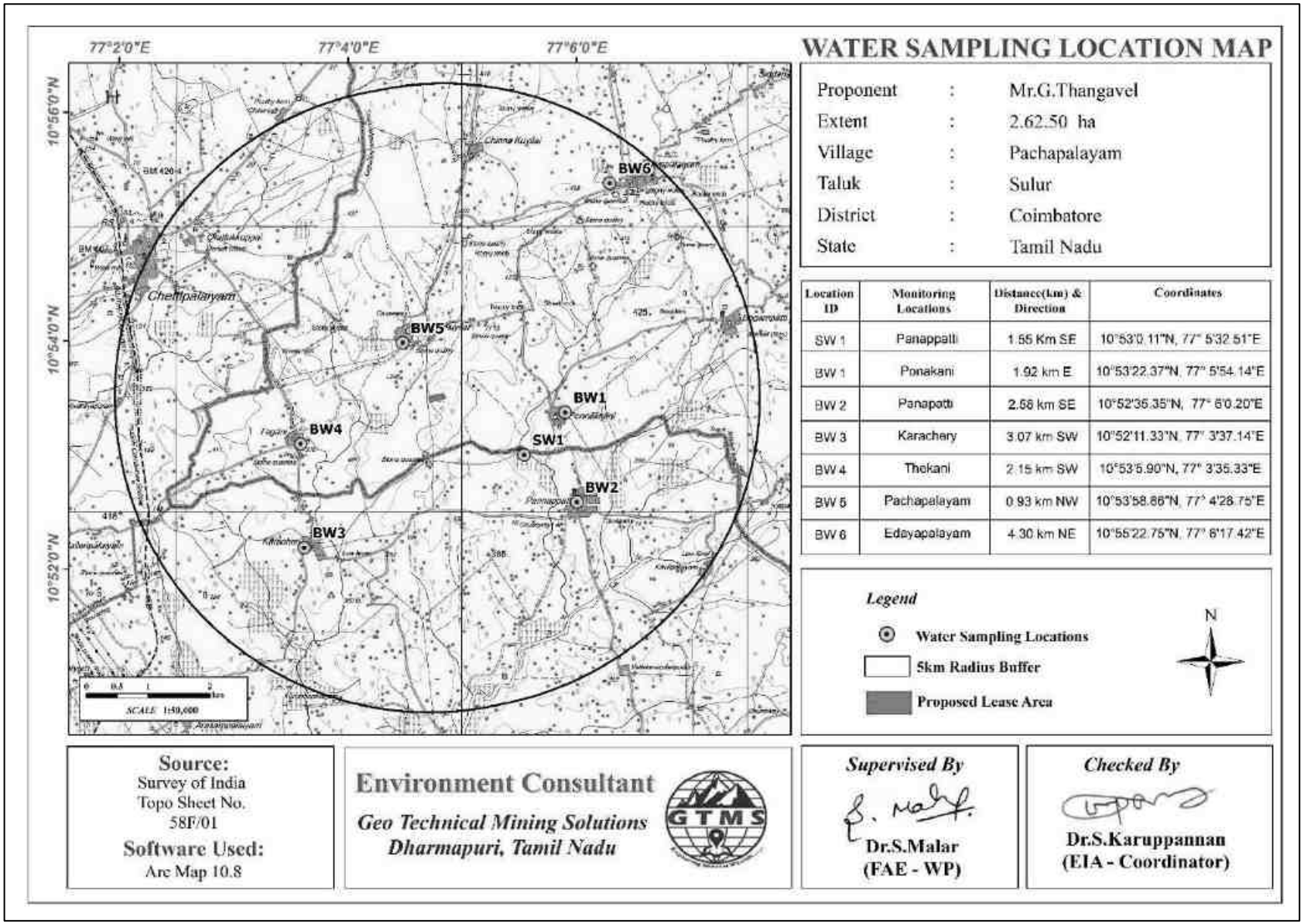


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981-2022	5.22	4.00	10.36	23.57	48.52	88.26	83.49	65.01	53.79	88.94	57.32	14.51
Monthly Rainfall(2022)	22.9	2.7	45.08	112.2	156.7	137	259.8	281.7	118.8	154.4	131.5	96.28

Figure 3.7 Long-Term Monthly Average Rainfall vs Monthly Rainfall

3.2.3.2 Groundwater Levels and Flow Direction

As the groundwater moves from the points of highest static groundwater elevation to the points of lowest static groundwater elevation under the influence of gravity, 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 October through December, 2022 (Post Monsoon Season) and from March through May, 2023 (Pre-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 19.10 to 21.50 m BGL in post monsoon and from 20.4 to 22.6 m BGL in pre 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 2022 (Post-Monsoon Season) vary from 70.53 to 75.03 m and from 72.80 to 75.50 m for the period of March through May, 2023 (Pre-Monsoon Season).



Location ID	Monitoring Locations	Distance(km) & Direction	Coordinates
SW 1	Panappatti	1.55 Km SE	10°53'0.11"N, 77° 5'32.51"E
BW 1	Ponakani	1.92 km E	10°53'22.37"N, 77° 5'54.14"E
BW 2	Panapatti	2.68 km SE	10°52'35.35"N, 77° 6'0.20"E
BW 3	Karachery	3.07 km SW	10°52'11.33"N, 77° 3'37.14"E
BW 4	Thekani	2.15 km SW	10°53'5.90"N, 77° 3'35.33"E
BW 5	Pachapalayam	0.93 km NW	10°53'58.86"N, 77° 4'28.75"E
BW 6	Edayapalayam	4.30 km NE	10°55'22.75"N, 77° 6'17.42"E

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

Table 3.7 Ground & Surface Water Quality Result

S. No.	Parameters	Units	Result				10500:2012 (Acceptable)	10500:2012 (Permissible)
			SW1	Minimum	Maximum	Average		
1	*Coliforms Bacteria*	MPN	Present	Present	Present	Present	Shall not be detectable in any 100 ml sample	Shall not be detectable in any 100 ml sample
2	*E. Coli*	MPN	Present	Present	Present	Present	Shall not be detectable in any 100 ml sample	Shall not be detectable in any 100 ml sample
3	Aluminium (Al)	mg /l	<0.02	<0.02	<0.02	<0.02	0.03	0.2
4	Ammonia (NH_3)	mg /l	<0.1	<0.1	<0.1	<0.1	0.5	No relaxation
5	Anionic Detergents	mg /l	<0.01	<0.01	<0.01	<0.01	0.2	1.0
6	Barium (Ba)	mg /l	<0.1	<0.1	<0.1	<0.1	0.5	No relaxation
7	Boron (B)	mg /l	<0.1	<0.1	<0.1	<0.1	0.5	1.0
8	Cadmium (Cd)	mg /l	<0.003	<0.003	<0.003	<0.003	0.003	No relaxation
9	Calcium (Ca)	mg /l	191	105	572	227	75	200
10	Chloride (Cl)	mg /l	548	106	730	436	250	1000
11	Colour	Hazen	<1.0	<1.0	<1.0	<1.0	5	15
12	Copper (Cu)	mg/l	<0.02	<0.02	<0.02	<0.02	0.05	1.5
13	Cyanide (CN)	mg/l	<0.02	<0.02	<0.02	<0.02	0.05	No relaxation
14	Fluoride (F)	mg/l	00	1.1	1.4	1.3	1.0	1.5
15	Free Residual Chlorine (RFC)	mg/l	<0.1	<0.1	<0.1	<0.1	0.2	1.0
16	Iron (Fe)	mg/l	<0.05	<0.05	<0.05	<0.05	0.3	No relaxation

17	Lead (Pb)	mg/l	<0.01	<0.01	<0.01	<0.01	0.01	No relaxation
18	Magnesium (Mg)	mg/l	18	27	37	31	30	100
19	Manganese (Mn)	mg/l	<0.01	<0.01	<0.01	<0.01	0.1	0.3
20	Mercury (Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	0.001	No relaxation
21	Molybdenum	mg/l	<0.05	<0.05	<0.05	<0.05	0.07	No relaxation
22	Nitrate (NO_3)	mg/l	43	11	35	28	45	No relaxation
23	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
24	pH value @ 25°C	--	7.8	7.2	8.5	7.75	6.5-8.5	No relaxation
25	Phenolic Compounds	mg/l	<0.001	<0.001	<0.001	<0.001	0.001	0.002
26	Selenium (Se)	mg/l	<0.01	<0.01	<0.01	<0.01	0.01	No relaxation
27	EC @ 25°C	µS/Cm	1220	1039	1960	1425	-	-
28	Sulphates (SO_4)	mg/l	230	37	210	134	200	400
29	Sulphide (H_2S)	mg/l	<0.05	<0.05	<0.05	<0.05	0.05	No relaxation
30	Total Alkalinity	mg/l	449	144	474	305	200	600
31	Arsenic (As)	mg/l	<0.005	<0.005	<0.005	<0.005	0.01	0.05
32	Chromium (Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	0.05	No relaxation
33	TDS	mg/l	732	675	1176	980	500	2000
34	TH ($CaCO_3$)	mg/l	320	390	535	482	200	600
35	TSS @ 105°C	mg/l	<5.0	<5.0	<5.0	<5.0	-	-
36	Turbidity	NTU	<0.1	<0.1	<0.1	<0.1	1	5
37	Zinc (Zn)	mg/l	<0.05	<0.05	<0.05	<0.05	5	15

*Source: Sampling Results by **Excellence Laboratory (P) Limited,** in association with GTMS.*

Data on the depths to static water table and potentiometric surface were used to calculate static groundwater table and potentiometric surface elevations for open wells and borewells, respectively to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines. The maps thus produced are shown in Figures 3.9-3.10. From the maps of groundwater flow direction, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 5 located in Southeast direction and open well number 6 located in Southwest direction of the proposed project site respectively. The maps thus produced in bore wells are shown in Figures 3.11-3.12. From the groundwater flow map in fare that two monsoon seasons groundwater flows towards the bore well number 5 located in Southwest direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

Table 3.8 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	20.5	21.4	22.7	21.5	10°53'4.25"N	77° 5'10.68"E
DW02	21.5	21.7	22.4	21.8	10°53'12.15"N	77° 4'15.02"E
DW03	21	22.5	23.2	22.2	10°53'50.35"N	77° 4'45.49"E
DW04	19.5	20.4	21.5	20.4	10°53'38.51"N	77° 5'34.12"E
DW05	20.1	21.5	22.7	21.4	10°52'50.78"N	77° 5'20.77"E
DW06	19.7	20.4	21.7	20.6	10°52'44.48"N	77° 4'24.09"E
DW07	20.2	21.5	22.2	21.3	10°53'32.17"N	77° 3'54.49"E
DW08	20.5	21.8	22.5	21.6	10°53'58.52"N	77° 4'14.46"E
DW09	21.7	22.5	23.7	22.6	10°54'16.22"N	77° 5'27.14"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	21.9	20.2	19.7	20.60	10°53'4.25"N	77° 5'10.68"E
DW02	21.6	20.8	19.6	20.67	10°53'12.15"N	77° 4'15.02"E
DW03	20.7	19.6	19.1	19.80	10°53'50.35"N	77° 4'45.49"E
DW04	19.7	19.1	18.5	19.10	10°53'38.51"N	77° 5'34.12"E

DW05	20.6	19.7	19.3	19.87	10°52'50.78"N	77° 5'20.77"E
DW06	20.8	19.5	18.9	19.73	10°52'44.48"N	77° 4'24.09"E
DW07	21.5	19.8	19.4	20.23	10°53'32.17"N	77° 3'54.49"E
DW08	21.5	19.9	18.7	20.03	10°53'58.52"N	77° 4'14.46"E
DW09	22	21.7	20.8	21.50	10°54'16.22"N	77° 5'27.14"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	74.6	75.8	76.1	75.50	10°53'58.89"N	77° 4'28.73"E
BW02	74.9	73.2	75.8	74.63	10°54'0.18"N	77° 4'45.19"E
BW03	73.1	73.4	75.9	74.13	10°53'22.36"N	77° 5'54.09"E
BW04	74.5	74.8	76.1	75.13	10°53'4.72"N	77° 4'58.33"E
BW05	71.3	74.4	76.5	74.07	10°52'58.47"N	77° 4'5.89"E
BW06	72.8	73.1	76.3	74.07	10°53'25.69"N	77° 3'42.02"E
BW07	71.2	71.5	75.7	72.80	10°53'49.88"N	77° 3'50.08"E
BW08	70.6	71.9	76.5	73.00	10°52'22.84"N	77° 4'55.87"E
BW09	72.8	73.1	75.6	73.83	10°53'58.07"N	77° 5'29.73"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	73.1	72.9	72.8	72.93	10°53'58.89"N	77° 4'28.73"E
BW02	73.6	73.4	73.2	73.40	10°54'0.18"N	77° 4'45.19"E
BW03	72.9	72.7	72.5	72.70	10°53'22.36"N	77° 5'54.09"E
BW04	74.2	73.9	73.6	73.90	10°53'4.72"N	77° 4'58.33"E
BW05	75.2	75.1	74.8	75.03	10°52'58.47"N	77° 4'5.89"E
BW06	72.5	72.3	71.9	72.23	10°53'25.69"N	77° 3'42.02"E
BW07	70.9	70.6	70.1	70.53	10°53'49.88"N	77° 3'50.08"E
BW08	73.2	72.9	72.7	72.93	10°52'22.84"N	77° 4'55.87"E
BW09	72.6	72.4	72.3	72.43	10°53'58.07"N	77° 5'29.73"E

Source: Onsite monitoring data

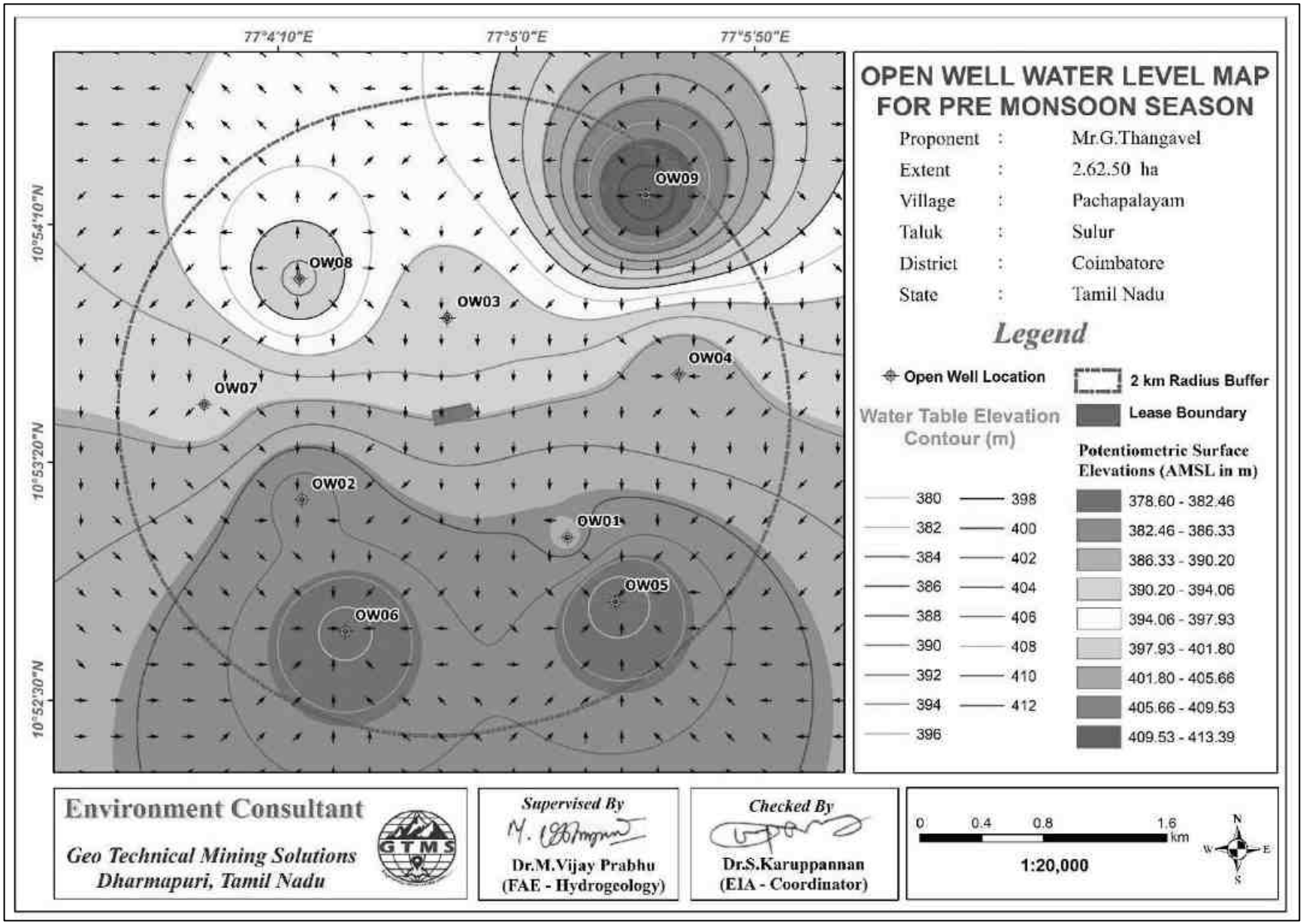


Figure 3.9 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Pre-Monsoon Season

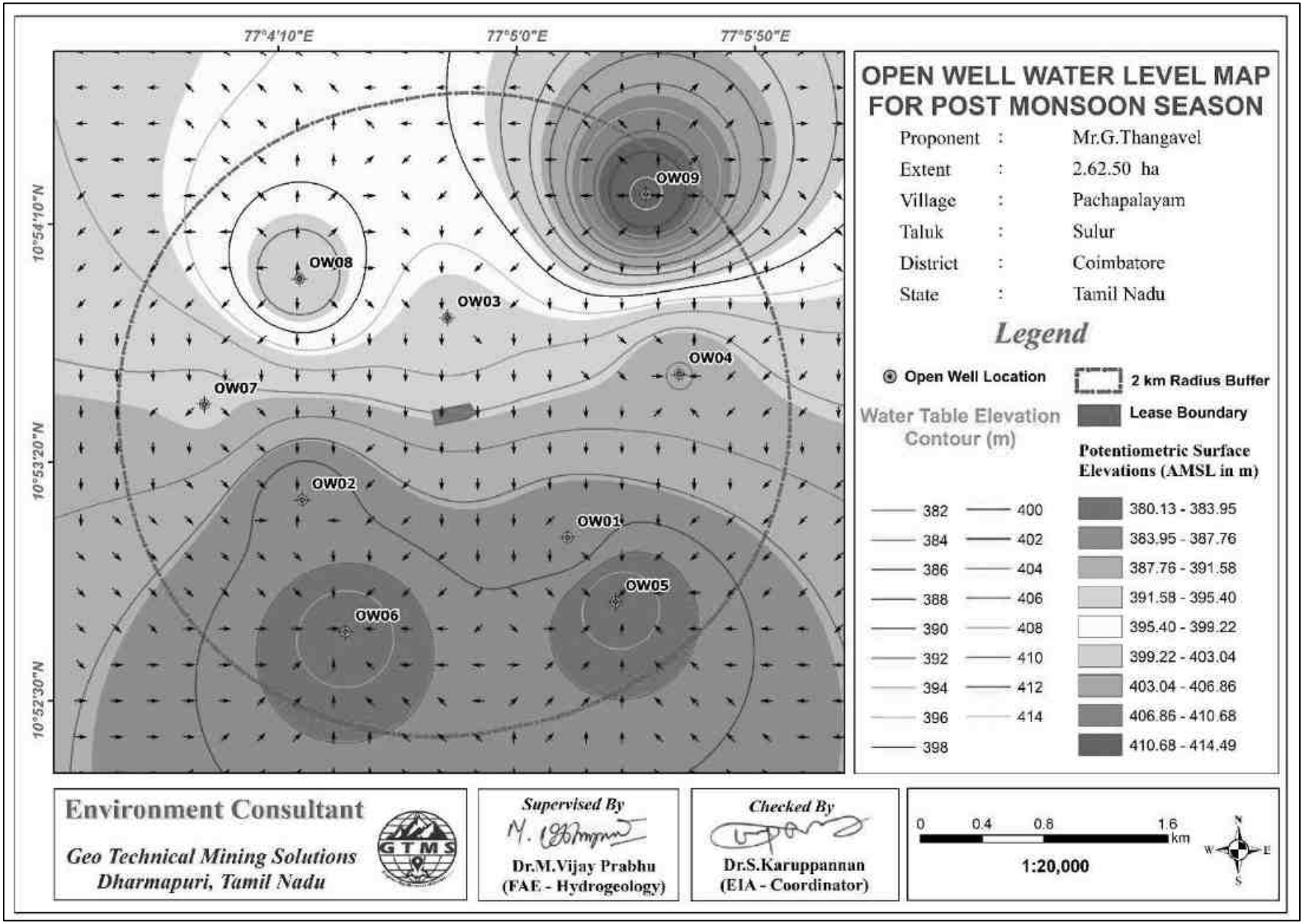


Figure 3.10 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Post-Monsoon Season

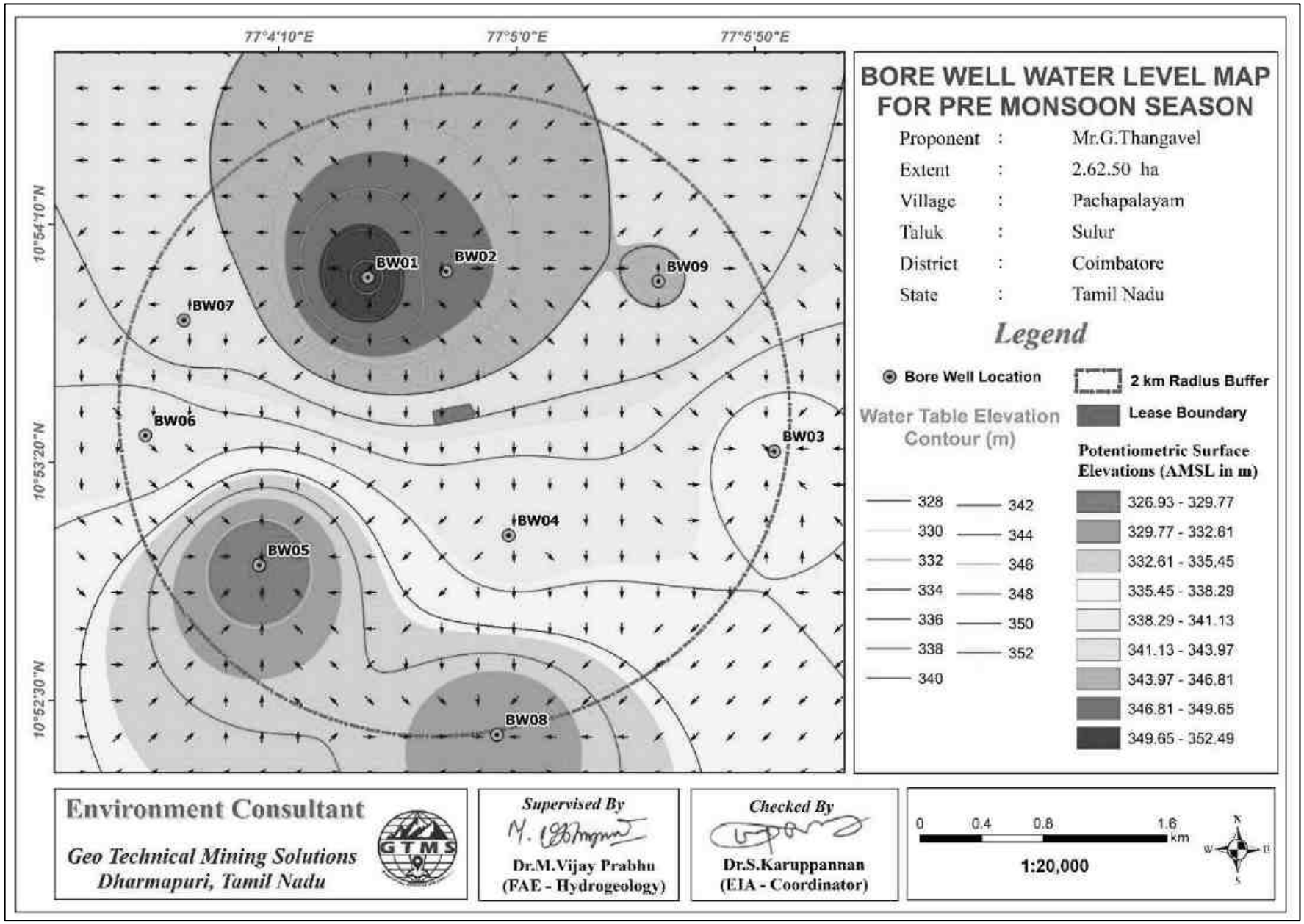


Figure 3.11 Borewell Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Pre-Monsoon Season

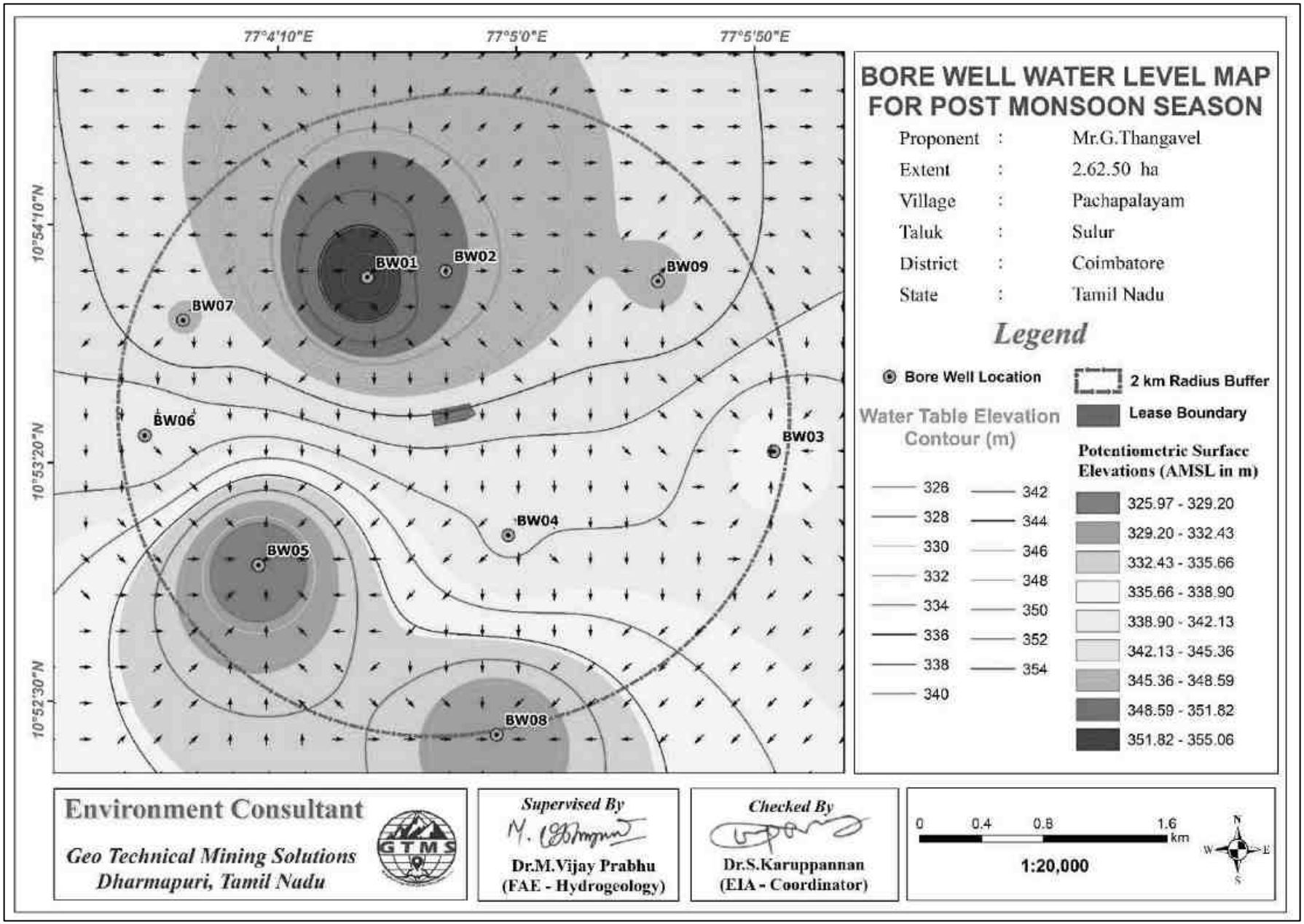


Figure 3.12 Borewell Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Post-Monsoon Season

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 - 10°53'29.94"N 77°4'47.53"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	4.348	1972.2
15	70	20	989.1	1.217	1203.82
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

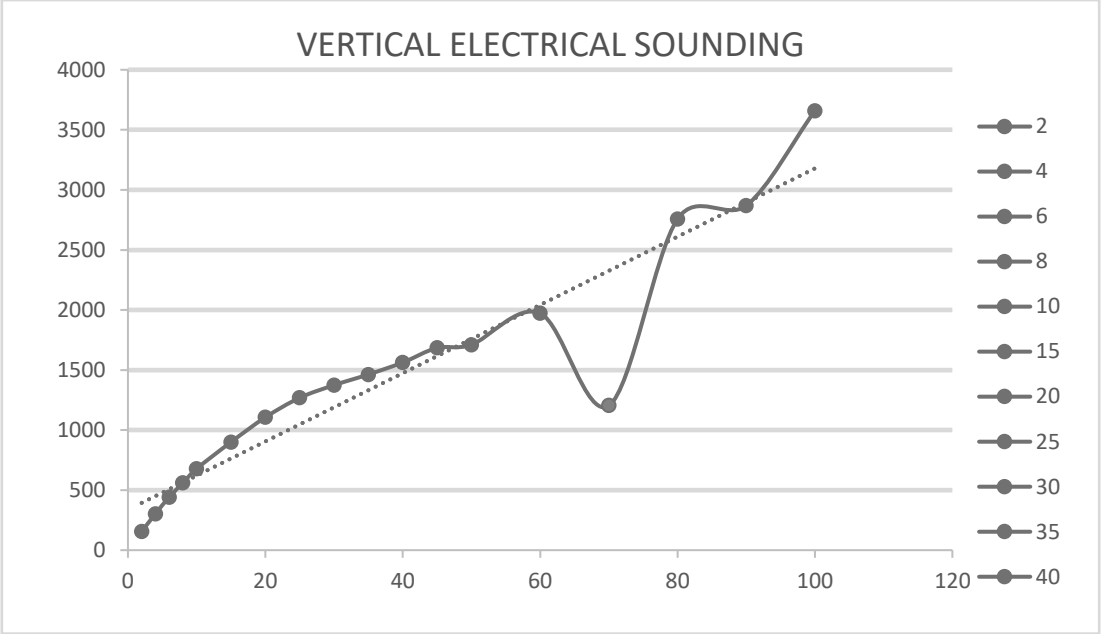


Figure 3.13 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 70m Below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 70 m below ground level. The maximum depth proposed for the proposed project is 30 m (10 m AGL + 20 m BGL) ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

3.3 AIR ENVIRONMENT

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

3.3.1 Meteorology

3.3.1.1 Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 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 18.94 to 33.36^{0}C with the average of 24.76^{0}C; in November, 2023 from 17.54 to 29.55^{0}C with the average of 23.75^{0}C; and in December, 2023 from 15.57 to 28.96^{0}C with the average of 22.50^{0}C. In October, 2023, relative humidity ranged from 34.50 to 100 % with the average of 80.28%; in November, 2023, from 60.12 to 100% with the average of 86.84%; and in December,2023,

from 42.94 to 100% with the average of 85.31%. The wind speed in October, 2023 varied from 0.09 to 7.81m/s with the average of 2.06m/s; in November, 2023 from to 0.13m/s to 6.72 with the average of 2.19m/s; and in December, 2023 from 0.15 to 7.11 m/s with the average of 2.73 m/s. In October,2023, wind direction varied from 0.0 to 319.17^0 with the average of 174.94^0; in November, 2023, from 0.00 to 359.79^0 with the average of 96.44^0; and in December, 2023, from 4.12 to 357.18^0 with the average of 103.68^0. In October,2023, surface pressure varied from 94.64 to 95.43 kPa with the average of 95.09kPa; in November, 2023, from 94.72 to 95.49 kPa with the average of 95.11kPa; and in December, 2023, from 94.28 to 95.76 kPa with the average of 95.09 kPa.

Table 3.13 Onsite Meteorological Data

S. No.	Parameters		OCT,2023	NOV,2023	DEC,2023
1	Temperature (^{0}C)	Min	18.94	17.51	15.57
		Max	33.36	29.55	28.96
		Avg	24.76	23.75	22.50
2	Relative Humidity (%)	Min	34.50	60.12	42.94
		Max	100.00	100.00	100.00
		Avg	80.28	86.84	85.31
3	Wind Speed (m/s)	Min	0.09	0.13	0.15
		Max	7.81	6.72	7.11
		Avg	2.06	2.19	2.73
4	Wind Direction (degree)	Min	0.00	0.00	4.12
		Max	359.17	359.79	357.18
		Avg	174.94	96.44	103.68
5	Surface Pressure(kPa)	Min	94.64	94.72	94.28
		Max	95.43	95.49	95.76
		Avg	95.09	95.11	95.09

*Source: On-site monitoring/sampling by **Excellence Laboratory** 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 2019-2022 and the seasonal wind rose for the study period of October through December of the years 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 3.23m/s.
- Predominant wind was dominant in the directions ranging from Southeast to Northwest.

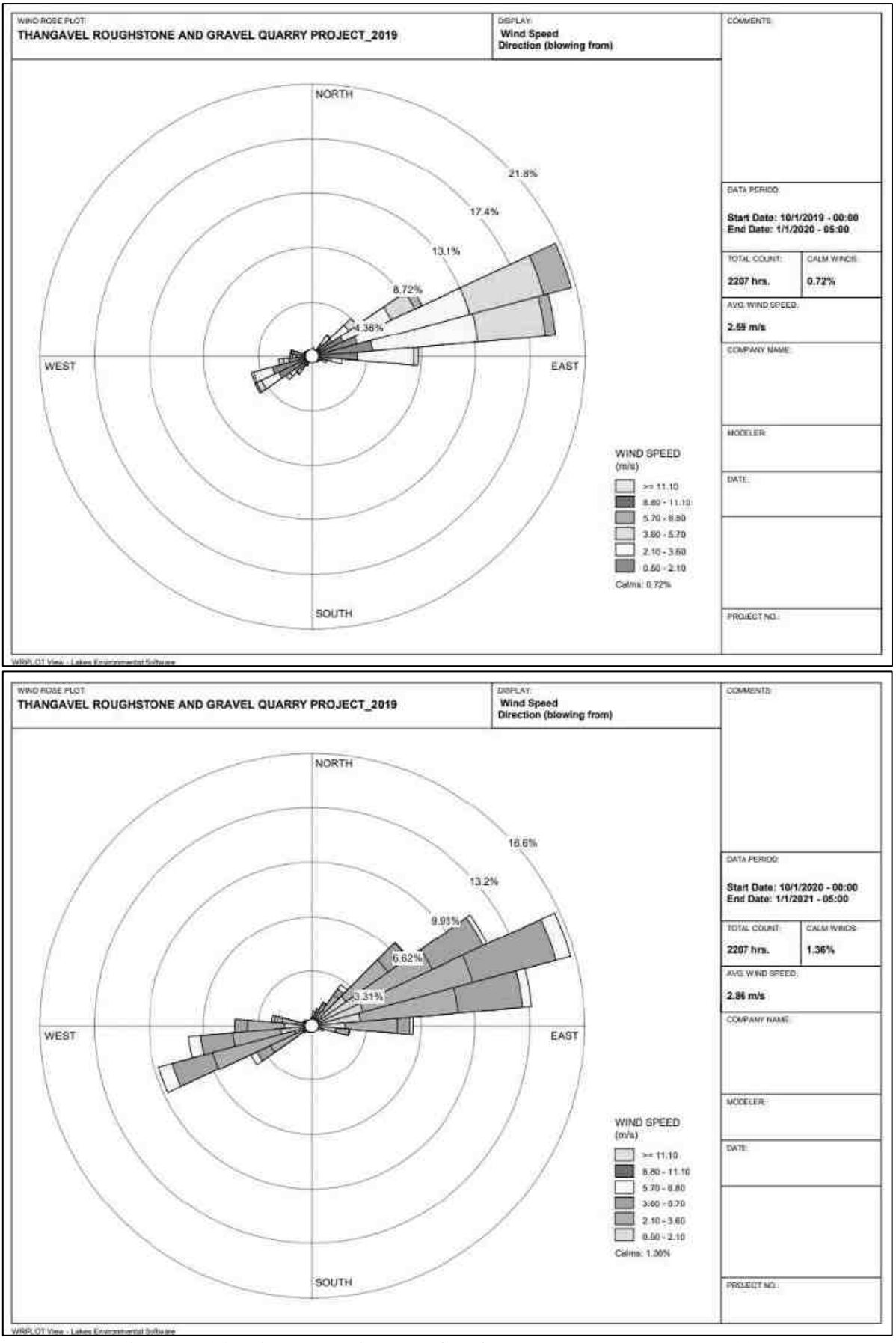
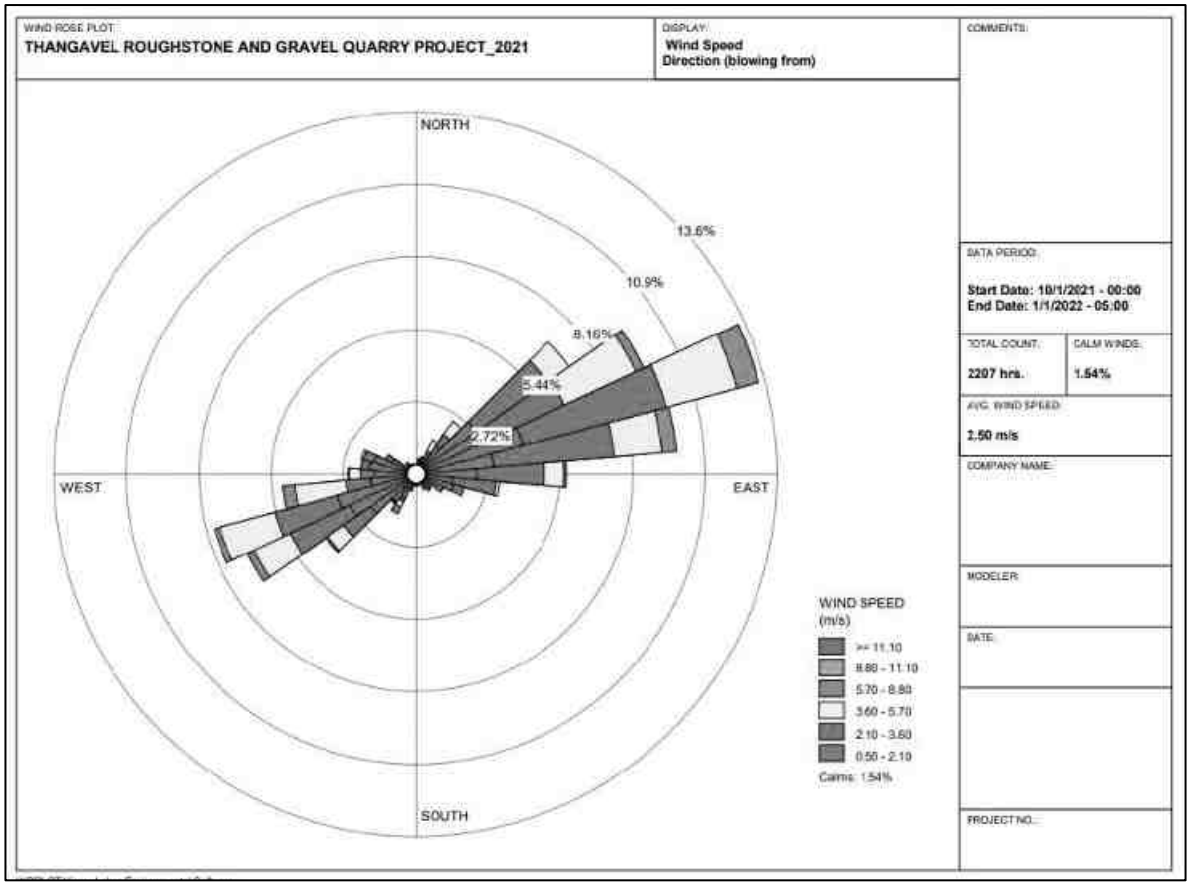


Figure 3.14 Windrose Diagram for October to December -2019-2020



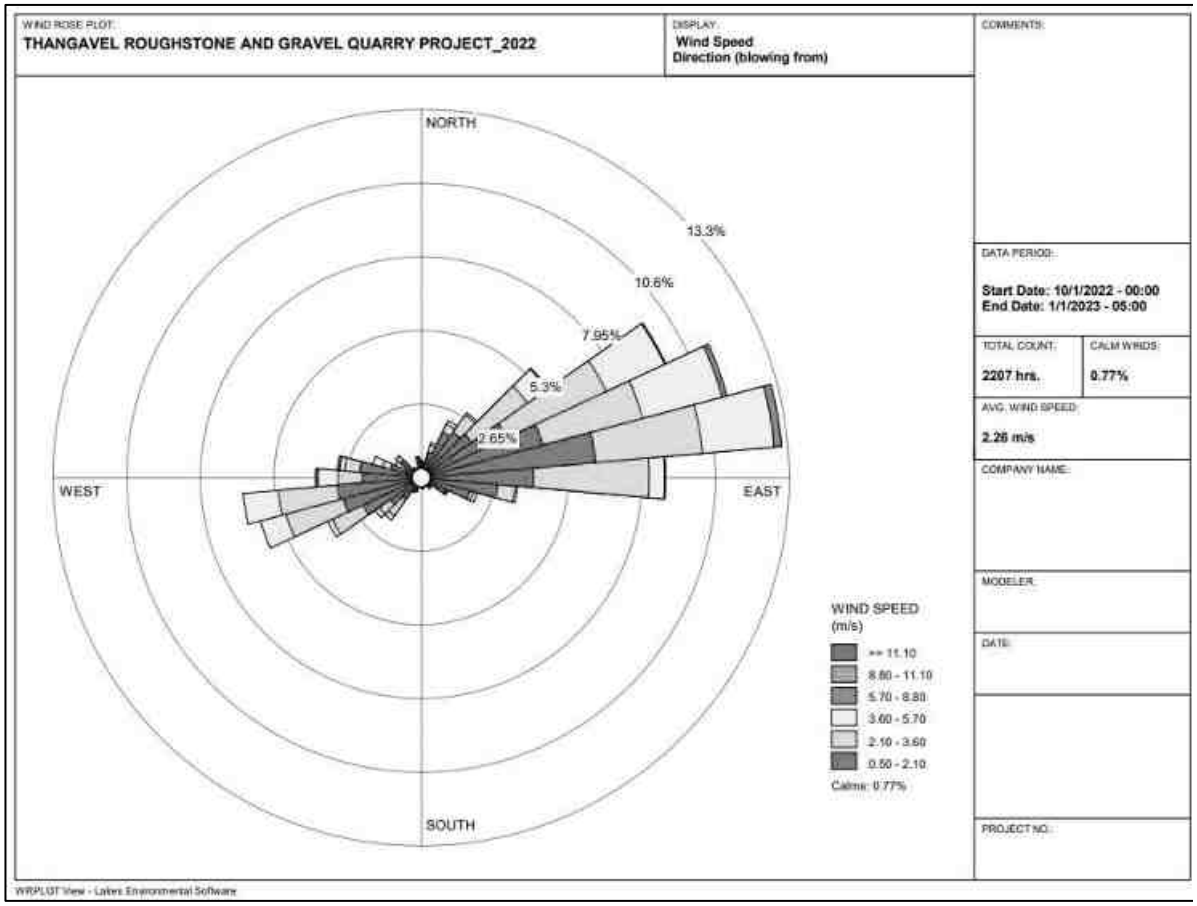


Figure 3.14(A) Windrose Diagram for October to December 2021-2022

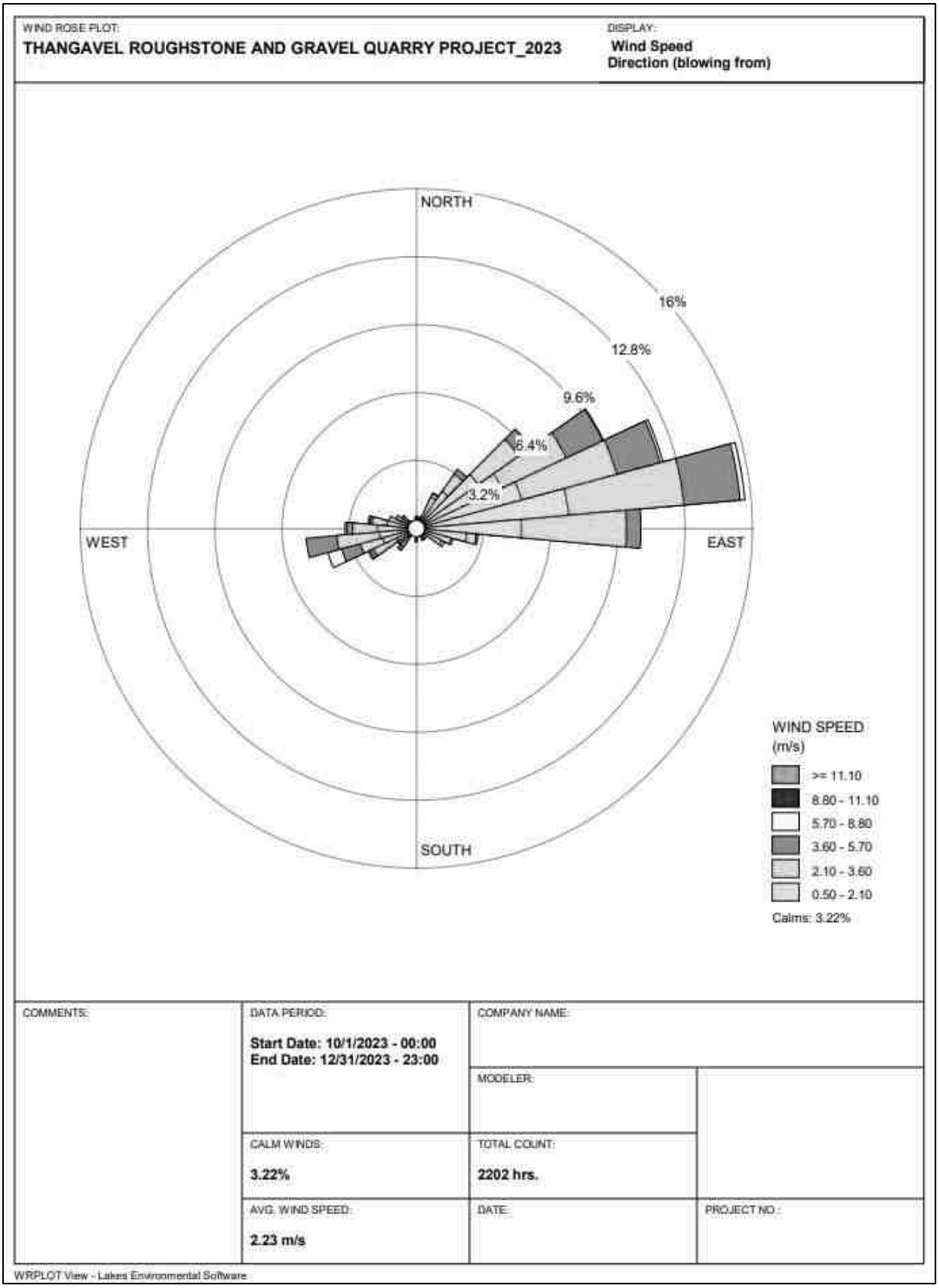


Figure 3.15 Onsite Wind Rose Diagram

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 Make – Thermo Environmental Instruments – TEI 121
PM_{10}	Gravimetric method Beta attenuation method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO_2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NOx	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 **Excellence Laboratory** & 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 ($\mu g/m^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO_X ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM_{10} ($\mu g/m^3$)	Annual Avg. 24 hours	60.0 10°.0	60.0 10°.0
4	$PM_{2.5}$ ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

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

It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5m above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for PM_{10}, $PM_{2.5}$, 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.

Table 3.16 Ambient Air Quality (AAQ) Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
1	AAQ1	Core	--	**--**	10°53'30.72"N, 77° 4'43.41"E
2	AAQ2	Pachapalayam	0.90	NNW	10°53'58.71"N, 77° 4'33.14"E
3	AAQ3	Panappatti	2.62	SE	10°52'35.48"N, 77° 5'58.17"E
4	AAQ4	Thekani	2.18	WSW	10°53'8.45"N, 77° 3'33.57"E
5	AAQ5	Karachery	2.96	SW	10°52'11.61"N, 77° 3'43.06"E
6	AAQ6	Edayampalayam	4.66	NE	10°55'25.14"N, 77° 6'32.89"E
7	AAQ7	Orattukuppai	4.40	NW	10°54'54.25"N, 77° 2'44.25"E

*Source: On-site monitoring/sampling by **Excellence Laboratory** in association with GTMS*

Results

As per the monitoring data, $PM_{2.5}$ ranges from 17.7 µg/m^3 to 19.5µg/m^3; PM_{10} from 41.8µg/m^3 to 46.1µg/m^3; SO_2 3.5 µg/m^3 to 5.0 µg/m^3; NO_x from 11.8 µg/m^3 to 17.0µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

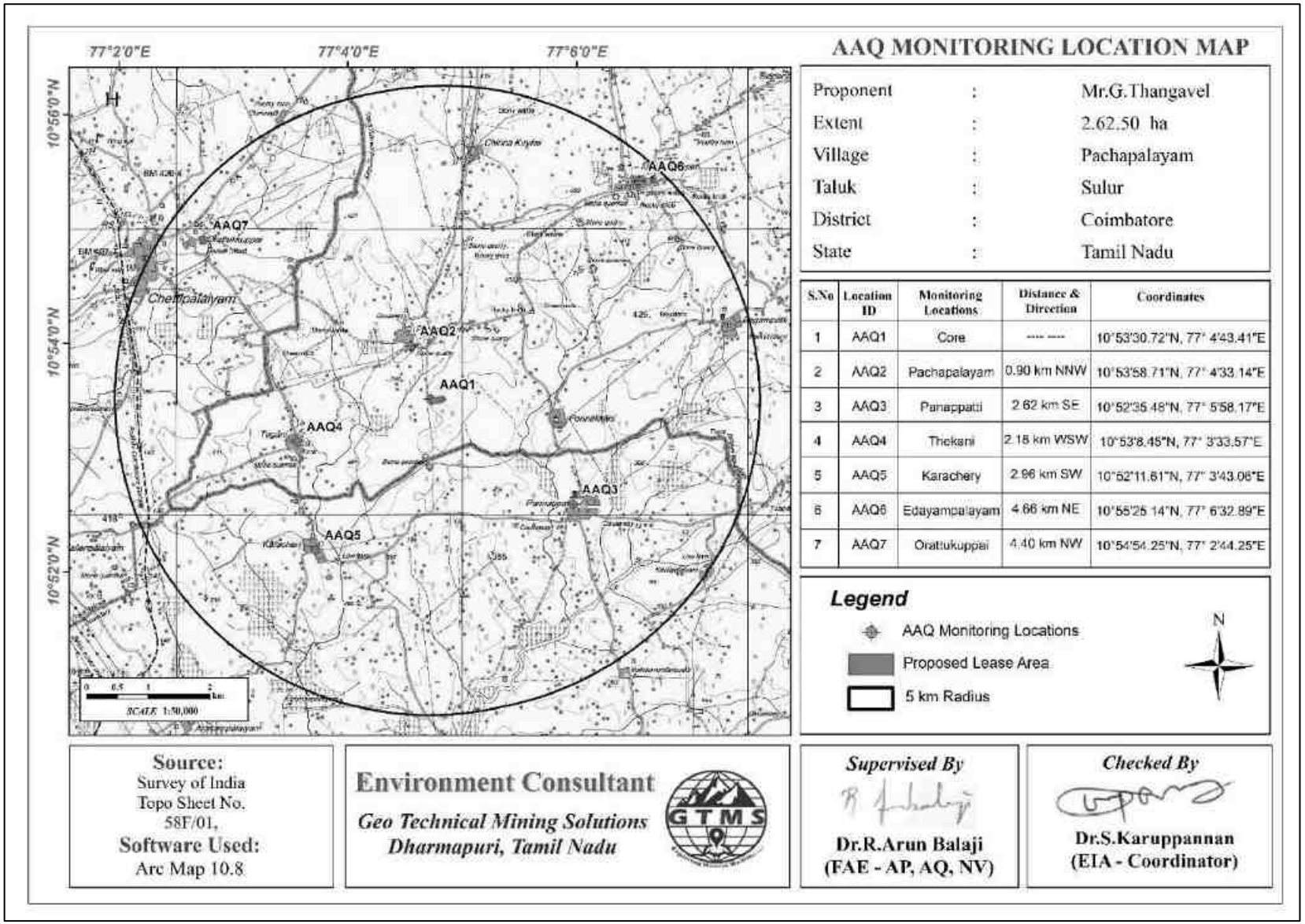


Figure 3.16 Toposheet Showing Ambient Air Quality Monitoring Station Locations Around 5 Km Radius from the Proposed Project Site

Table 3.17 Summary of AAQ Result

	$PM_{2.5}$				PM_{10}			
Station ID	**Max**	**Min**	**Mean**	**98th Percentile**	**Max**	**Min**	**Mean**	**98th Percentile**
AAQ1	22.8	20.0	21.1	22.6	50.7	44.4	47.0	50.1
AAQ2	19.8	18.3	19.2	19.8	43.8	40.4	42.4	43.7
AAQ3	17.6	15.5	16.7	17.2	44.0	38.8	41.8	44.0
AAQ4	16.2	15.1	15.6	16.1	40.6	37.8	39.1	40.4
AAQ5	15.1	13.5	14.3	15.0	37.8	33.8	35.7	37.6
AAQ6	26.6	25.3	25.9	26.5	59.1	56.3	57.6	58.9
AAQ7	18.6	16.4	17.2	18.4	46.5	40.9	43.1	46.0
	SO_2				NO_X			
AAQ1	4.8	3.9	4.3	4.8	18.2	14.8	16.5	18.2
AAQ2	4.8	3.2	4.1	4.7	18.7	12.5	15.8	18.2
AAQ3	5.1	3.8	4.4	4.8	15.8	11.8	13.6	15.5
AAQ4	4.8	2.9	3.7	4.8	14.9	9.0	11.6	14.7
AAQ5	4.0	2.1	2.6	3.8	12.4	6.5	8.2	11.8
AAQ6	6.2	4.4	5.2	5.9	21.7	15.4	18.2	20.6
AAQ7	5.5	4.1	4.7	5.4	17.1	12.7	14.5	15.9

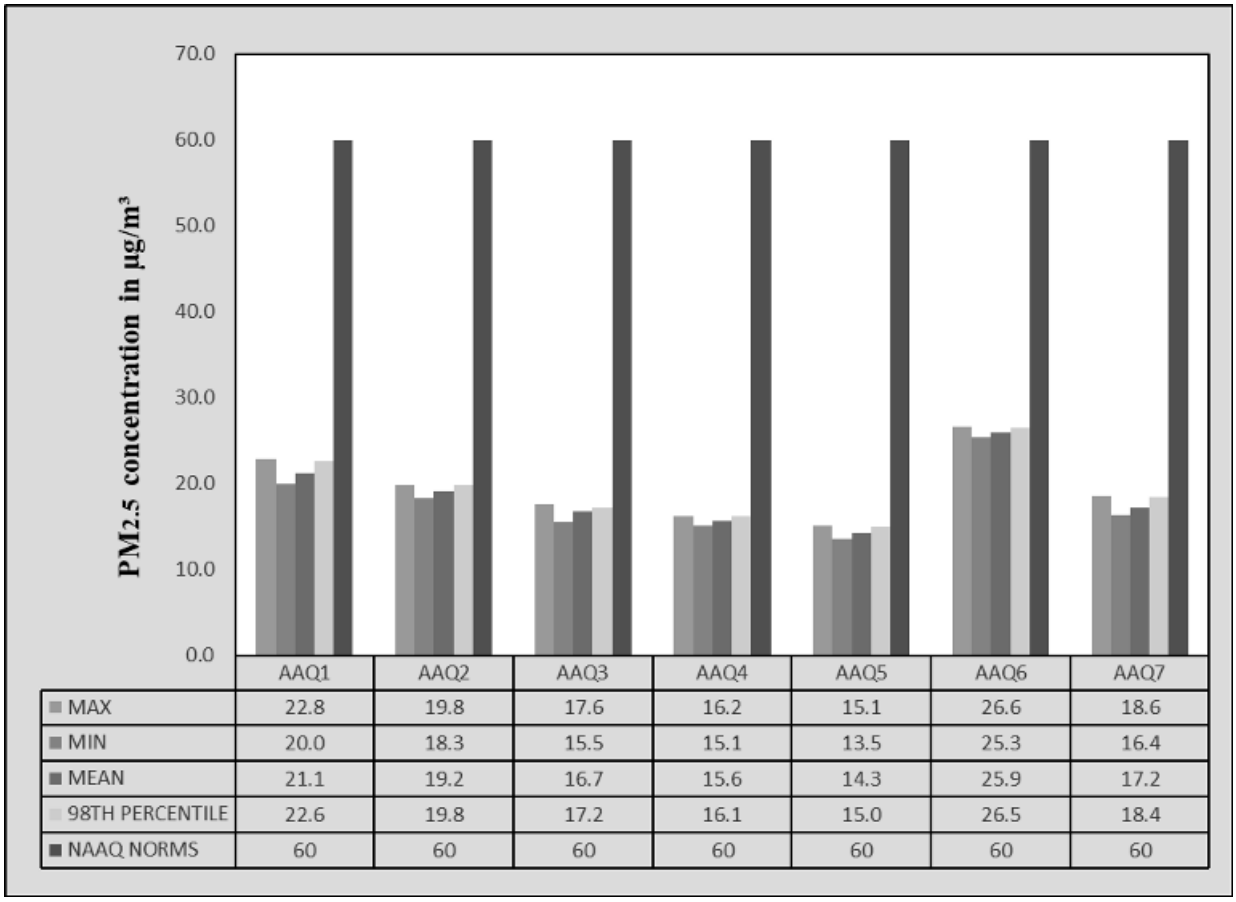
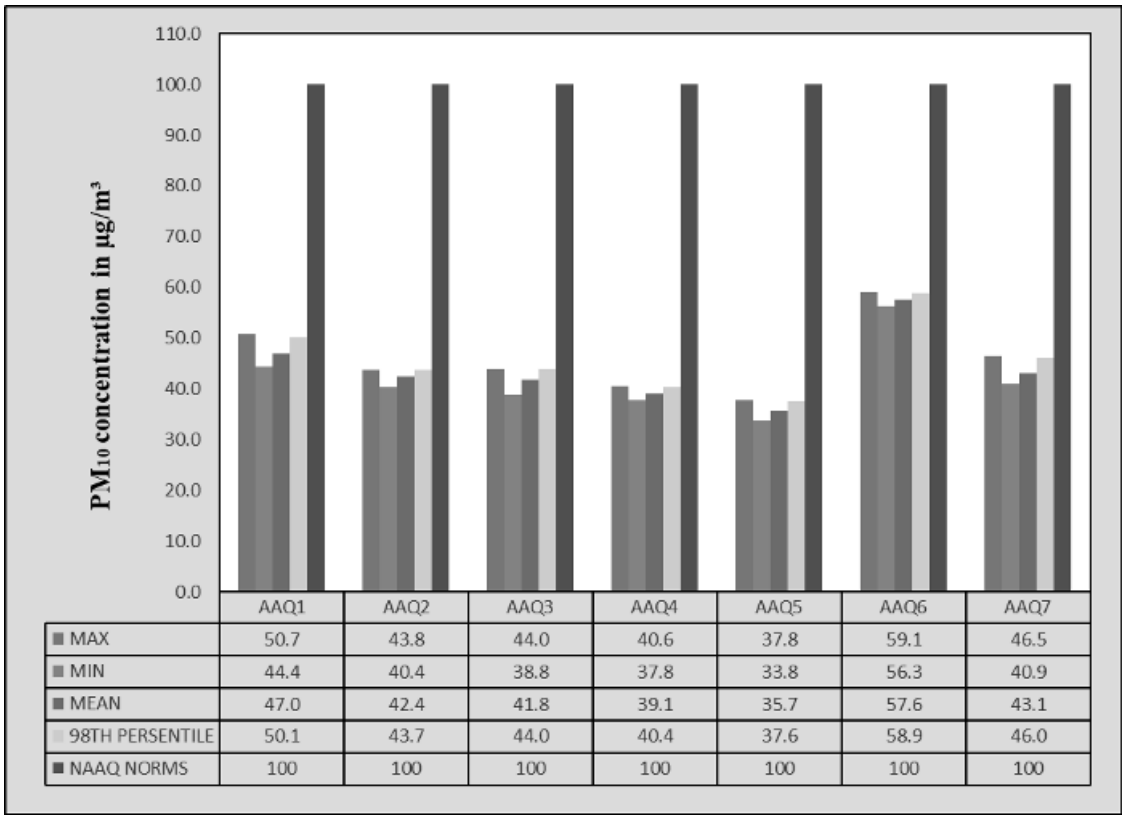
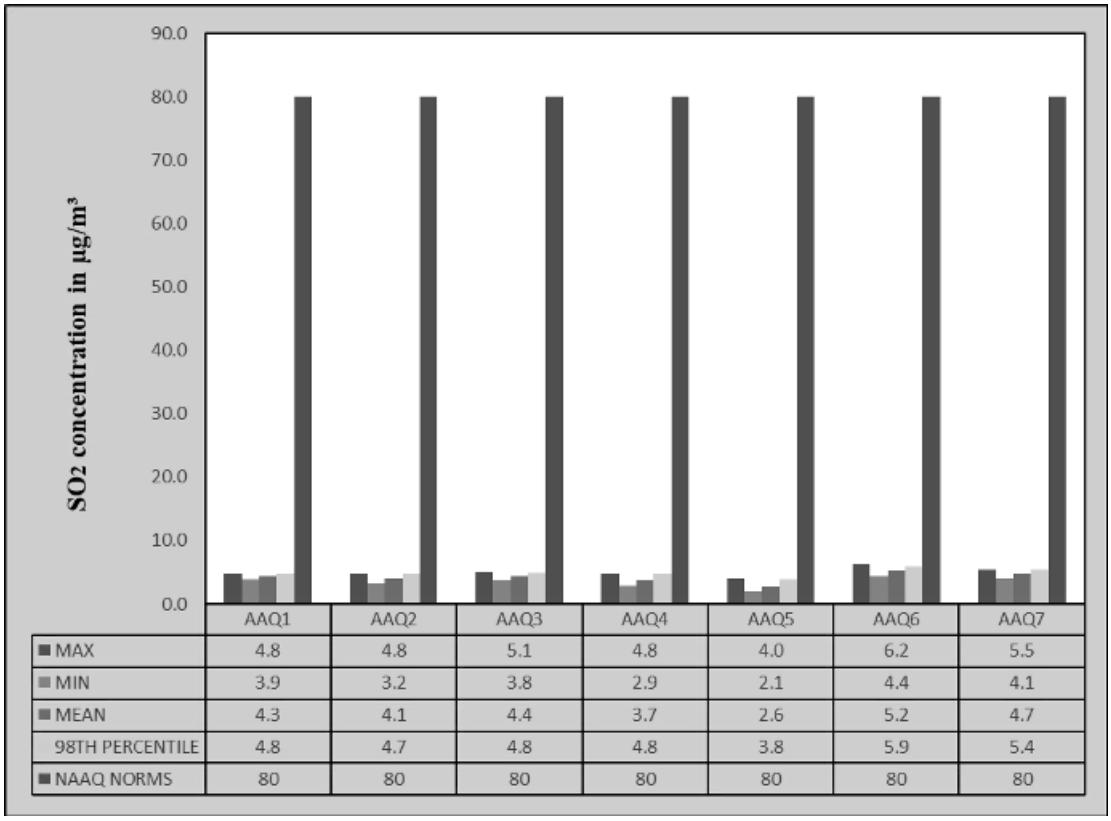


Figure 3.17 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of $PM_{2.5}$ Measured from the 7 Air Quality Monitoring Stations Within 5 km Radius



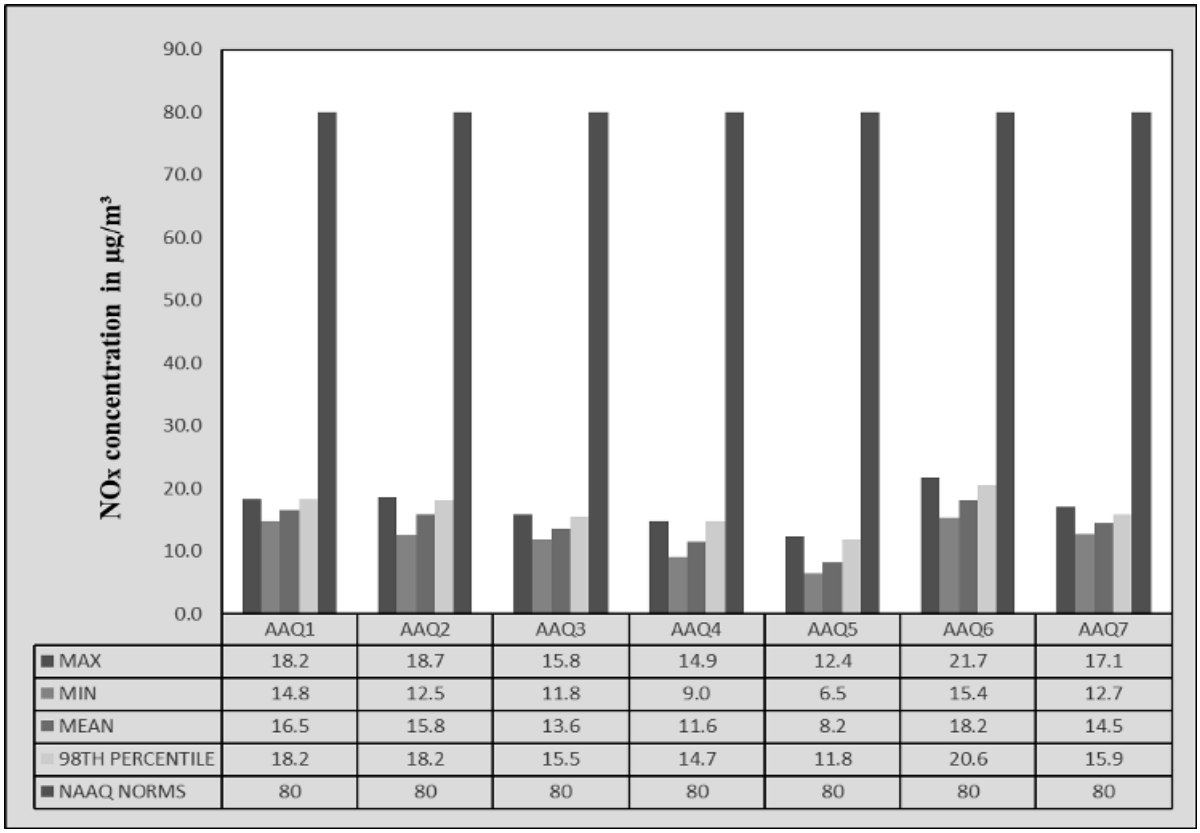
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
MAX	50.7	43.8	44.0	40.6	37.8	59.1	46.5
MIN	44.4	40.4	38.8	37.8	33.8	56.3	40.9
MEAN	47.0	42.4	41.8	39.1	35.7	57.6	43.1
98TH PERSENTILE	50.1	43.7	44.0	40.4	37.6	58.9	46.0
NAAQ NORMS	100	100	100	100	100	100	100

Figure 3.18 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of PM_{10} Measured from the 7 Air Quality Monitoring Stations Within 5km Radius



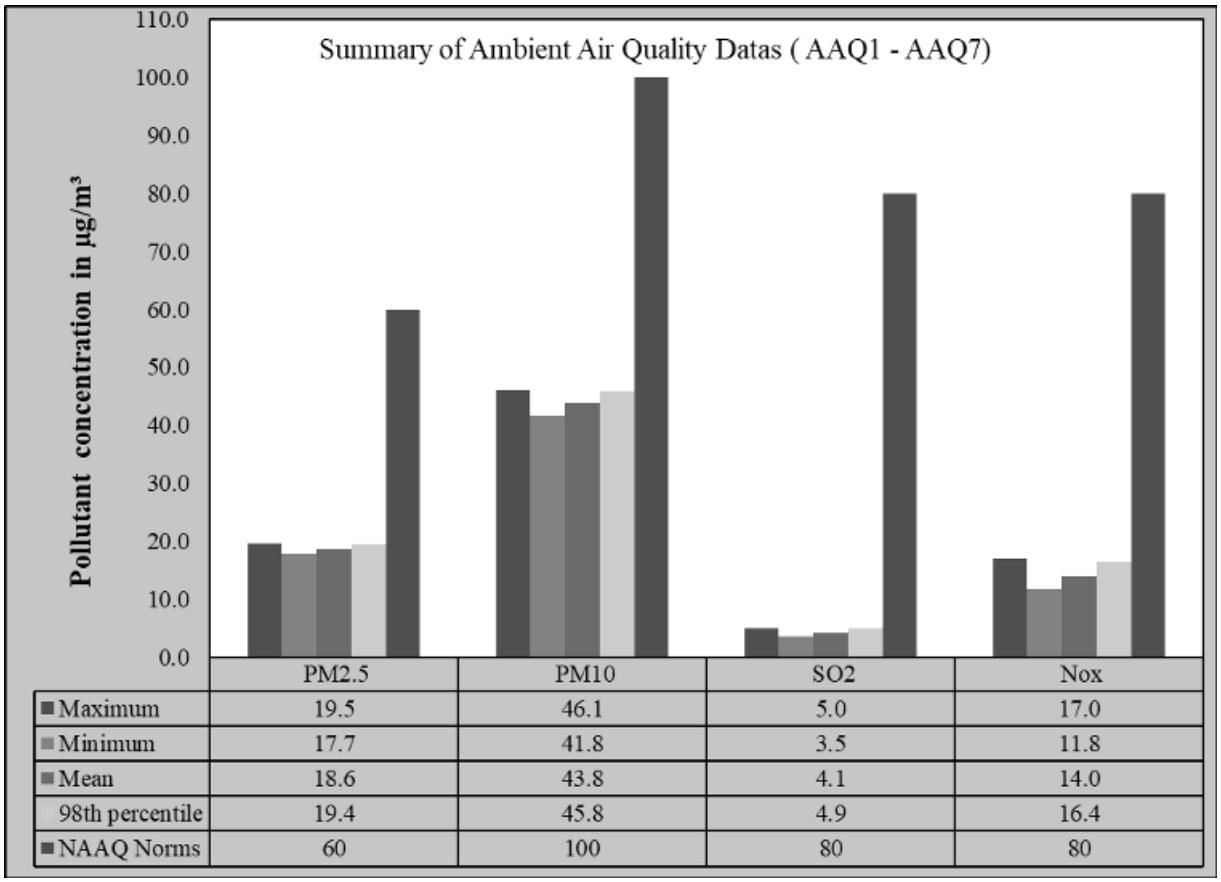
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
MAX	4.8	4.8	5.1	4.8	4.0	6.2	5.5
MIN	3.9	3.2	3.8	2.9	2.1	4.4	4.1
MEAN	4.3	4.1	4.4	3.7	2.6	5.2	4.7
98TH PERCENTILE	4.8	4.7	4.8	4.8	3.8	5.9	5.4
NAAQ NORMS	80	80	80	80	80	80	80

Figure 3.19 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of SO_2 Measured from the 7 Air Quality Monitoring Stations Within 5 km Radius



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
MAX	18.2	18.7	15.8	14.9	12.4	21.7	17.1
MIN	14.8	12.5	11.8	9.0	6.5	15.4	12.7
MEAN	16.5	15.8	13.6	11.6	8.2	18.2	14.5
98TH PERCENTILE	18.2	18.2	15.5	14.7	11.8	20.6	15.9
NAAQ NORMS	80	80	80	80	80	80	80

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



	PM2.5	PM10	SO2	Nox
Maximum	19.5	46.1	5.0	17.0
Minimum	17.7	41.8	3.5	11.8
Mean	18.6	43.8	4.1	14.0
98th percentile	19.4	45.8	4.9	16.4
NAAQ Norms	60	100	80	80

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

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (07) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.18 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	Core	---- ----	--	10°53'27.68"N, 77° 4'42.96"E
2	N2	Pachapalayam	0.74	N	10°53'54.88"N, 77° 4'39.84"E
3	N3	Panappatti	2.73	SE	10°52'33.42"N, 77° 6'0.84"E
4	N4	Thekani	2.14	WSW	10°53'10.28"N, 77° 3'34.48"E
5	N5	Karachery	2.82	SW	10°52'14.97"N, 77° 3'46.07"E
6	N6	Edayampalayam	4.50	NE	10°55'20.95"N, 77° 6'29.51"E
7	N7	Orattukuppai	4.53	NW	10°54'54.87"N, 77° 2'39.57"E

*Source: On-site monitoring/sampling by **Excellence Laboratory** 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	Core	Industrial area	51.2	44.2	75	70
N2	Pachapalayam	Residential area	49.3	40.3	55	45
N3	Panappatti	Residential area	45.7	41.4	55	45
N4	Thekani	Residential area	43.5	40.3	55	45
N5	Karachery	Residential area	52.8	43.9	55	45
N6	Edayampalayam	Residential area	49.2	39.7	55	45
N7	Orattukuppai	Residential area	45.8	35.3	55	45

The Table 3.19 shows that noise level in core zone was 51.2 dB (A) Leq during day time and 44.2dB (A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 43.5 to 49.3dB (A) Leq and during night time from 35.3 to 43.9dB (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.

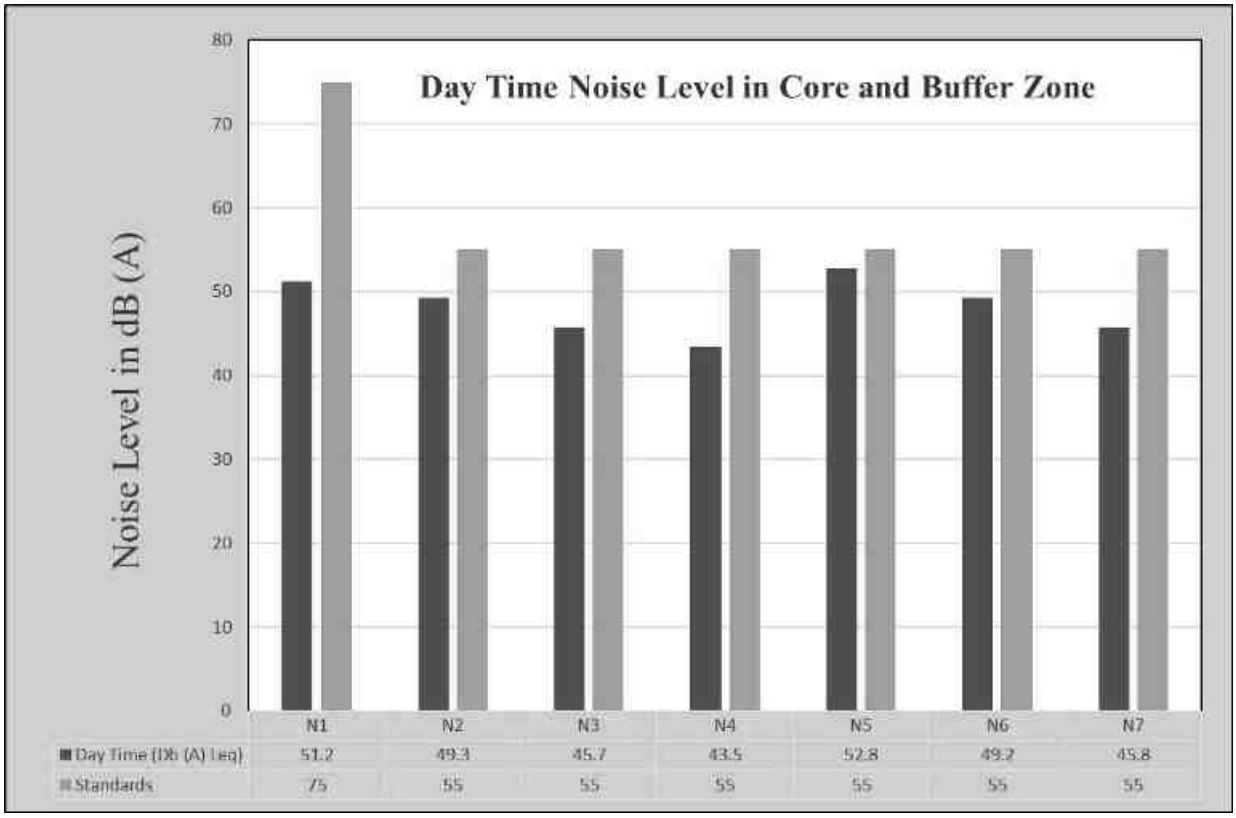


Figure 3.22 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

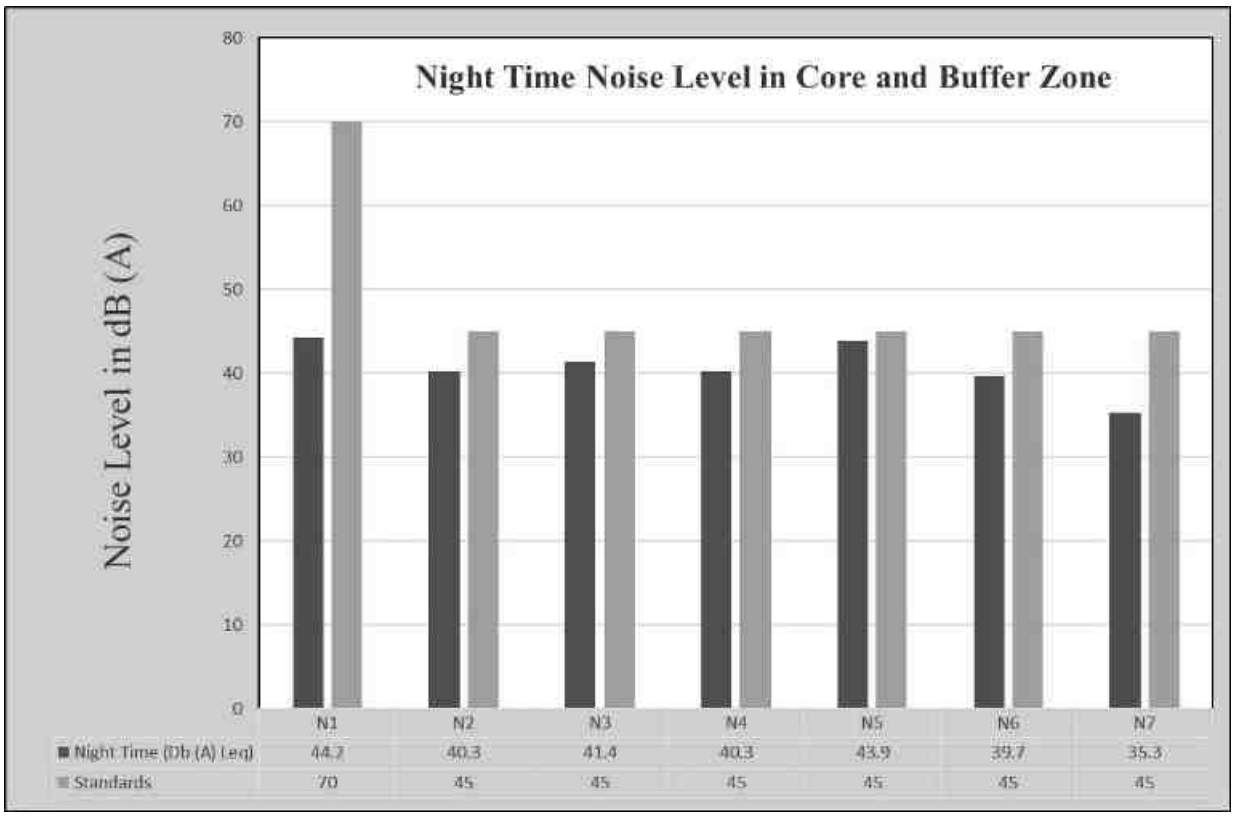


Figure 3.23 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

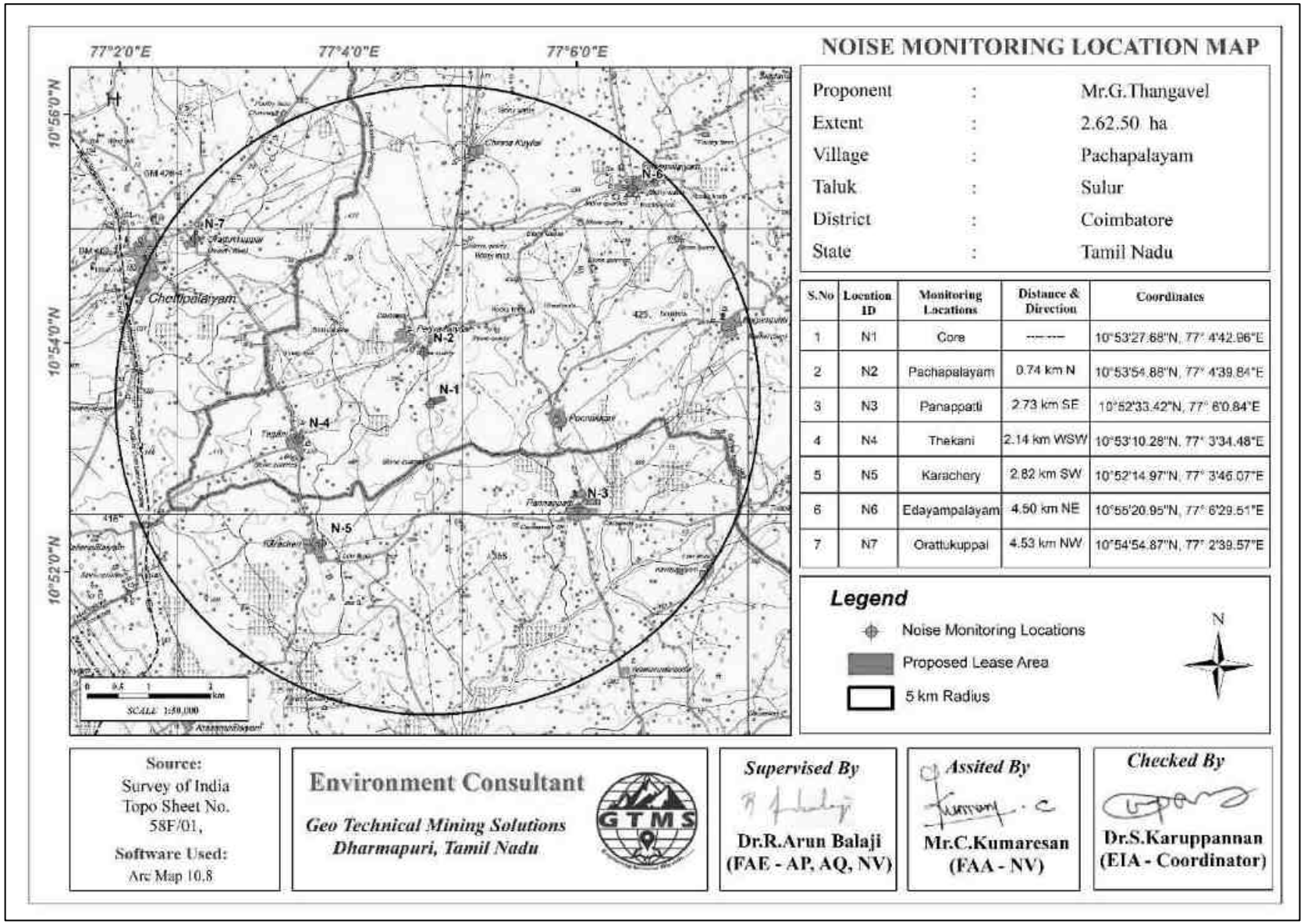


Figure 3.24 Toposheet Showing Noise Level Monitoring Station Locations Around 5 km Radius from the Proposed Project Site

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.

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	**$H = E [(p_i) * In(p_i)]$** 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.

Flora in core zone

There are no plant species in the mining lease area. It is a kind of dry land.

Flora within 300 m radius Zone

A variety of plant species are found within a radius of 300 meters. It is an arid landscape. There is no agricultural land nearby. It contains a total of 37 species belonging to 19 families have been recorded from the buffer zone. 11 Trees (27%), 7 Shrubs (19%) and 19 Herbs and Climbers, Creeper, Grass & Cactus (52%) were identified. Details of flora with the scientific name details and of diversity species Rich ness index were mentioned in Table 3.22-24 and figure 3.26. There is no threat to the Flora species in 300-meter radius.

Flora in 10 km radius zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land was found to dominate mostly in Southeast and Southwest directions. Majority of the flat landscape around project unit is occupied by agriculture fields. It contains a total of 94 species belonging to 43 families have been recorded from the buffer zone. The floral (94) varieties among them Thirty-eight Trees 38 (41%) twenty-one Herbs 21 (22%) and Eighteen Shrubs 18 (19%) and twelve Climbers 12 (13%), two Creepers 2 (2%), two Grass 2 (2%) and one Cactus 1 (1%) were identified. The result of buffer zone of flora studies shows that Fabaceae and Euphorbiaceae, Solanaceae are the main dominating species in the study area it mentioned in Table No.3.25

Table 3.22 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	*Prosopis juliflora*	Fabaceae	5	4	5	1.0	80.0	1.3	14.7	16.0	30.7	Not Listed
2	Palm tree	*Borassus flabellifer*	Fabaceae	3	2	5	0.6	40.0	1.5	8.8	8.0	16.8	Not Listed
3	Vembu	*Azadirachta indica*	Meliaceae	4	3	5	0.8	60.0	1.3	11.8	12.0	23.8	Not Listed
4	Unjai maram	*Albizia amara*	Fabaceae	3	2	5	0.6	40.0	1.5	8.8	8.0	16.8	Not Listed
5	Vetpalai	*Wrightia tinctoria*	Apocynaceae	5	4	5	1.0	80.0	1.3	14.7	16.0	30.7	Not Listed
7	Teak maram	*Tectona grandis*	Lamiaceae	3	2	5	0.6	40.0	1.5	8.8	8.0	16.8	Not Listed
8	Pongam oiltree	*Pongamia pinnata*	Fabaceae	4	3	5	0.8	60.0	1.3	11.8	12.0	23.8	Not Listed
9	Thennai maram	*Cocos nucifera*	Arecaceae	3	2	5	0.6	40.0	1.5	8.8	8.0	16.8	Not Listed
10	Puliyamaram	*Tamarindus indica*	Legumes	4	3	5	0.8	60.0	1.3	11.8	12.0	23.8	Not Listed
11	Nuna	*Morinda citrifolia*	Rubiaceae	3	2	5	0.6	40.0	1.5	8.8	8.0	16.8	Not Listed
Shrubs													
1	Erukku	*Calotropis gigantea*	Apocynaceae	8	7	10	0.8	70.0	1.1	15.7	15.9	31.6	Not Listed
2	Uumaththai	*Datura metel*	Solanaceae	6	5	10	0.6	50.0	1.2	11.8	11.4	23.1	Not Listed

3	Thuthi	*Abutilon indicum*	Meliaceae	7	6	10	0.7	60.0	1.2	13.7	13.6	27.4	Not Listed
4	Avarai	*Senna auriculata*	Fabaceae	9	8	10	0.9	80.0	1.1	17.6	18.2	35.8	Not Listed
5	Unichadi	*Lantana camara*	Verbenaceae	6	5	10	0.6	50.0	1.2	11.8	11.4	23.1	Not Listed
6	Suraimullu	*Zizyphus Oenoplia*	Rhamnaceae	7	6	10	0.7	60.0	1.2	13.7	13.6	27.4	Not Listed
7	Acacia	*Acacia holosecicea*	Fabaceae	8	7	10	0.8	70.0	1.1	15.7	15.9	31.6	Not Listed
Herbs													
1	Nayuruv	*Achyranthes aspera*	Amaranthaceae	6	5	15	0.4	33.3	1.2	4.3	4.2	8.5	Not Listed
2	Nearunji mull	*Tribulus zeyheri*	Zygophyllaceae	7	6	15	0.5	40.0	1.2	5.0	5.0	10.0	
3	Pill	*Cenchrus ciliaris*	Poaceae	8	7	15	0.5	46.7	1.1	5.8	5.8	11.6	Not Listed
4	Pulapoo	*Aerva lanata*	Amaranthaceae	7	6	15	0.5	40.0	1.2	5.0	5.0	10.0	Not Listed
5	kapok bush	*Aerva javani*	Amaranthaceae	6	5	15	0.4	33.3	1.2	4.3	4.2	8.5	Not Listed
6	Rail poondu	*Croton bonplandianus*	Euphorbiaceae	8	7	15	0.5	46.7	1.1	5.8	5.8	11.6	Not Listed
7	Perandai	*Cissus quadrangularis*	Vitaceae	9	8	15	0.6	53.3	1.1	6.5	6.7	13.1	Not Listed
8	Thumbai chadi	*Leucas aspera*	Lamiaceae	7	6	15	0.5	40.0	1.2	5.0	5.0	10.0	Not Listed
9	Umathai	*Datura metel*	Solanaceae	8	7	15	0.5	46.7	1.1	5.8	5.8	11.6	Not Listed
10	Sethamutti	*Sida cordata*	Malvaceae	6	5	15	0.4	33.3	1.2	4.3	4.2	8.5	Not Listed
11	Kolunji	*Tephrosia purpurea*	Fabaceae	9	8	15	0.6	53.3	1.1	6.5	6.7	13.1	Not Listed
12	Vealiparuthi	*Pergularia daemia*	Apocynaceae	7	6	15	0.5	40.0	1.2	5.0	5.0	10.0	Not Listed
13	Seppu nerinji	*Indigofera linnaei Ali*	Fabaceae	8	7	15	0.5	46.7	1.1	5.8	5.8	11.6	Not Listed
14	Sapathikalli	*Opuntia ficus-indica*	Cactaceae	7	6	15	0.5	40.0	1.2	5.0	5.0	10.0	Not Listed
15	Pal kodi	*Cynanchum viminale*	Apocynaceae	6	5	15	0.4	33.3	1.2	4.3	4.2	8.5	Not Listed
16	Ilia perandai	*Cissus rotundifolia*	Vitaceae	9	8	15	0.6	53.3	1.1	6.5	6.7	13.1	Not Listed
17	Katralai	*Aloe vera*	Asphodelaceae	8	7	15	0.5	46.7	1.1	5.8	5.8	11.6	Not Listed
18	Seammulli	*Barleria prionitis*	Acanthaceae	6	5	15	0.4	33.3	1.2	4.3	4.2	8.5	Not Listed
19	Kandakathri	*Solanum virginianum*	Solanaceae	7	6	15	0.5	40.0	1.2	5.0	5.0	10.0	Not Listed

Table 3.23 Calculation of Species Diversity in 300m radius

S.No	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Karuvealan	*Prosopis juliflora*	5	0.13	-2.05	-0.26
2	Palm tree	*Borassus flabellifer*	3	0.08	-2.56	-0.20
3	Vembu	*Azadirachta indica*	4	0.10	-2.28	-0.23
4	Unjai maram	*Albizia amara*	3	0.08	-2.56	-0.20
5	Vetpalai	*Wrightia tinctoria*	5	0.13	-2.05	-0.26
6	Teak maram	*Tectona grandis*	3	0.08	-2.56	-0.20
7	Pongam oiltree	*Pongamia pinnata*	4	0.10	-2.28	-0.23
8	Thennai maram	*Cocos nucifera*	3	0.08	-2.56	-0.20
9	Puliyamaram	*Tamarindus indica*	4	0.10	-2.28	-0.23
10	Karuvealan	*Prosopis juliflora*	5	0.13	-2.05	-0.26
11	Nuna maram	*Morinda citrifolia*	3	3	0.08	-2.56
H (Shannon Diversity Index) =2.28						
Shrubs						
1	Erukku	*Calotropis gigantea*	8	0.16	-1.85	-0.29
2	Uumaththai	*Datura metel*	6	0.12	-2.14	-0.25
3	Thuthi	*Abutilon indicum*	7	0.14	-1.99	-0.27
4	Avarai	*Senna auriculata*	9	0.18	-1.73	-0.31
5	Unichadi	*Lantana camara*	6	0.12	-2.14	-0.25
6	Suraimullu	*Zizyphus Oenoplia*	7	0.14	-1.99	-0.27
7	Acacia	*Acacia holosecicea*	8	0.16	-1.85	-0.29
H (Shannon Diversity Index) =1.94						
Herbs						
1	Nayuruv	*Achyranthes aspera*	6	0.04	-3.14	-0.14
2	Nearunji mull	*Tribulus zeyheri*	7	0.05	-2.99	-0.15
3	Pill	*Cenchrus ciliaris*	8	0.06	-2.86	-0.16
4	Pulapoo	*Aerva lanata*	7	0.05	-2.99	-0.15
5	Kapok bush	*Aerva javani*	6	0.04	-3.14	-0.14
6	Rail poondu	*Croton bonplandianus*	8	0.06	-2.86	-0.16
7	Perandai	*Cissus quadrangularis*	9	0.06	-2.74	-0.18
8	Thumbai chadi	*Leucas aspera*	7	0.05	-2.99	-0.15
9	Umathai	*Datura metel*	8	0.06	-2.86	-0.16

10	Sethamutti	*Sida cordata*	6	0.04	-3.14	-0.14
11	Kolunji	*Tephrosia purpurea*	9	0.06	-2.74	-0.18
12	Vealiparuthi	*Pergularia daemia*	7	0.05	-2.99	-0.15
13	Seppu nerinji	*Indigofera linnaei Ali*	8	0.06	-2.86	-0.16
14	Sapathikalli	*Opuntia ficus-indica*	7	0.05	-2.99	-0.15
15	Pal kodi	*Cynanchum viminale*	6	0.04	-3.14	-0.14
16	Ilia perandai	*Cissus rotundifolia*	9	0.06	-2.74	-0.18
17	Katralai	*Aloe vera*	8	0.06	-2.86	-0.16
18	Seammulli	*Barleria prionitis*	6	0.04	-3.14	-0.14
19	Kandakathri	*Solanum virginianum*	7	0.05	-2.99	-0.15
H (Shannon Diversity Index) =2.93						

Table 3.24 Species Richness (Index) in 300-meter radius

Details	H	H max	Evenness	Species Richness
Tree	2.28	2.30	0.99	2.46
Shrubs	1.94	1.95	0.99	1.53
Herbs	2.93	2.94	1.00	3.65

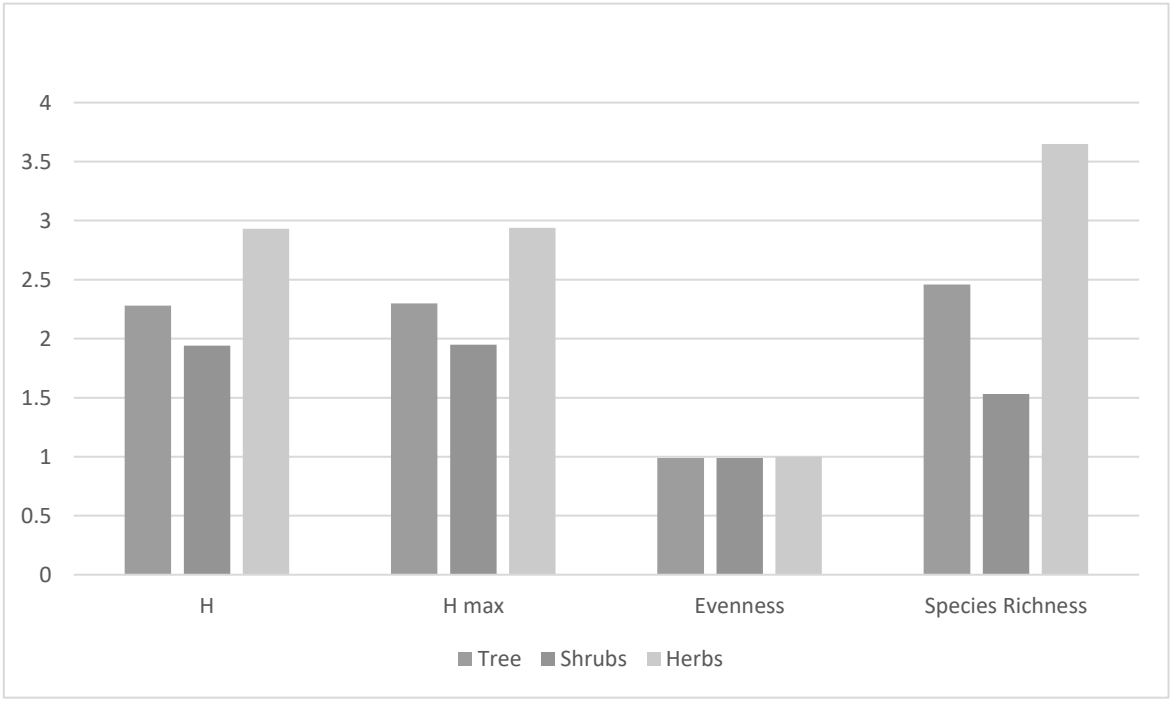


Figure 3.26 Floral diversity species Richness (Index) in 300m radius

Table 3.25 Flora in Buffer Zone

S. No.	English Name	Scientific Name	Family Name	Resource use type *(E, M, EM)
Trees				
1	Millettia pinnata	*Pongamia pinnata*	Fabaceae	E
2	Tamarind	*Tamarindus indica*	Legumes	EM
3	Coconut	*Cocos nucifera*	Arecaceae	EM
4	Noni	*Morinda citrifolia*	Rubiaceae	M
5	Lemon	*Citrus lemon*	Rutaceae	EM
6	Madras Thorn	*Pithecellobium dulce*	Mimosaceae	EM
7	Mango	*Mangifera indica*	Anacardiaceae	E
8	Sesban	*Sesbania sesban*	Fabaceae	M
9	Neem or Indian lilac	*Azadirachta indica*	Meliaceae	M
10	Creamy Peacock Flower	*Delonix elata*	Fabaceae	M
11	Beauty leaf	*Calophyllu inophyllum*	Calophyllaceae	M
12	Castor oil plant	*Ricinus communis*	Euphorbiaceae	M
13	Gum arabic tree	*Acacia nilotica*	Mimosaceae	NE
14	Eucalyptus	*Eucalyptus globules*	Myrtaceae	EM
15	Bitter Albizia	*Albizia amara*	Fabaceae	M
16	Chebulic myrobalan	*Terminalia chebula*	Combretaceae	M
17	Asian Palmyra palm	*Borassus flabellifer*	Arecaceae	E
18	Banana tree	*Musa*	Musaceae	EM
19	Giant thorny bamboo	*Bambusa bambos*	Poaceae	M
20	Black plum	*Sygygium cumini*	Myrtaceae	EM
21	Indian fig tree	*Ficus recemosa*	Moraceae	EM
22	Custard apple	*Annona reticulata*	Annonaceae	E
23	Gooseberry	*Phyllanthus acidus*	Euphorbiaceae	EM
24	Teak	*Tectona grandis*	Verbenaceae	E
25	Indian gooseberry	*Emblica officinalis*	Phyllanthaceae	EM
26	Jack fruit	*Artocarpus heterophyllus*	Moraceae	E
27	Henna	*Lawsonia inermis*	Lythraceae	EM
28	Five leaf chastera	*Vitex negundo*	Lamiaceae	M
29	Papaya	*Carica papaya L*	Caricaceae	EM
30	Acacia Nilotica	*Vachellia nilotica*	Fabaceae	M
31	Indian bael	*Aegle marmelos*	Rutaceae	EM
32	Banyan tree	*Ficus benghalensis*	Moraceae	E
33	Chinese chaste tree	*Vitex negundo*	Verbenaceae	E
34	Peepal	*Ficus religiosa*	Moraceae	M
35	Indian fir tree	*Polylathia longifolia*	Annonaceae	E
36	Guava	*Psidium guajava*	Myrtaceae	EM
37	Curry tree	*Murraya koenigii*	Asclepiadaceae	EM
38	Bamboo	*Bambusa bambo*	Poaceae	E
Shrubs				
39	Avaram	*Senna auriculata*	Fabaceae	M
40	Indian Oleander	*Nerium indicum*	Apocynaceae	M
41	Ceylon Date Palm	*Phoenix pusilla*	Arecaceae	EM
42	Rosy Periwinkle	*Cathranthus roseus*	Apocynaceae	M
43	Wild Caper Bush.	*Capparis sepiaria*	Capparaceae	M
44	Rosary pea	*Abrus precatorius*	Fabaceae	M
45	Ceylon Date Palm	*Phoenix pusilla*	Arecaceae	EM
46	Flame of the Woods	*Xoracoc cinea*	Rubiaceae	M
47	Puriging nut	*Jatropha curcas*	Euphorbiaceae	EM

48	Columnar Cactus	*Cereus pterogonus*	Cactaceae	M
49	Thorn apple	*Datura stramonium*	Solanaceae	E
50	Night shade plan	*Solanum torvum*	Solanaceae	EM
51	Indian mallow	*Abutilon indicum*	Meliaceae	M
52	Triangular spruge	*Euphorbia antiquorum*	Euphorbiaceae	NE
53	Shoe flower	*Hibiscu rosa-sinensis*	Malvaceae	EM
54	Datura metel	*Datura metel*	Solanaceae	NE
55	Milk Weed	*Calotropis gigantea*	Apocynaceae	M
56	Touch-me-not	*Mimosa pudica*	Mimosaceae	M
Herbs				
57	Prickly chaff flower	*Achyranthes aspera*	Amaranthaceae	M
58	Tridax daisy	*Tridax procumbens*	Asteraceae	M
59	Hibiscus hispidissimus	*Hibiscus hispidissimus*	Malvaceae	M
60	Indian Copperleaf	*Acalypha indica*	Euphorbiaceae	M
61	Cleome viscosa	*Celome viscosa*	Capparidaceae	M
62	False daisy	*Eclipta prostata*	Asteraceae	EM
63	Punarnava	*Boerhaavia diffusa*	Nyctaginaceae	EM
64	Node Flower	*Allmania nodiflora*	Amaranthaceae	M
65	Poor land flatsedg	*Cyperus compressus*	Cyperaceae	NE
66	Gale of the wind	*Phyllanthus niruri*	Phyllanthaceae	EM
67	Benghal dayflower	*Commelina benghalensis*	Commelinaceae	M
68	Common leucas	*Leucas aspera*	Lamiaceae	M
69	Carrot grass	*Parthenium hysterophorus*	Asteraceae	NE
70	Turmeric's	*Curcuma longa*	Zingiberaceae	EM
71	Creeping wood sorrel	*Oxalis corniculata*	Oxalidaceae	M
72	Black Mustard Seed	*Brassica juncea*	Brassaceae	EM
73	Red Hogweed	*Boerhavia diffusa*	Nyctaginaceae	M
74	Holy basil	*Ocimum tenuiflorum*	Lamiaceae	M
75	Digeria muricata	*Digeria muricata*	Amarantheceae	EM
76	Indian doab	*Cynodon dactylon*	Poaceae	E
77	European black nightshade	*Solanumnigrum*	Solanaceae	EM
Climber				
78	Ivy gourd	*Coccinia grandis*	Cucurbitaceae	M
79	Stemmed vine	*Cissus quadrangularis*	Vitaceae	M
80	Balloon vine	*Cardiospermum helicacabum*	Sapindaceae	M
81	Betel	*Piper betle*	Piperaceae	EM
82	Butterfly pea	*Clitoria ternatea*	Fabaceae	M
83	Wild bitter	*Momordica charantia*	Cucurbitaceae	EM
84	Purple peaeggplant	*Solanum trilobatum*	Solanaceae	EM
85	Indian sarsparilla	*Hemidesmus indicus*	Asclepiadaceae	M
86	Pointed gourd	*Trichosanthes dioica*	Cucurbitaceae	EM
87	Butterfly-pea	*Clitoriaternatia*	Fabaceae	M
88	Wild jasmine	*Jasminum augustifolium*	Oleaceae	EM
89	Bottle Guard	*Lagenaria siceraria*	Cucurbitaceae	EM
Creeper				
90	Ground Spurge	*Euphorbia prostrata*	Euphorbiaceae	EM
91	Creeping-oxeye	*Wedelia trilobata*	Asteraceae	M
Grass				
92	Jungle rice	*Echinochloa colona*	Poaceae	NE
93	Windmill grass	*Chloris barbata*	Amaranthaceae	NE
Cactus				
94	Prickly pear	*Opuntia dillenii*	Cactaceae	M

3.5.2 Fauna

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

Table 3.26 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 18 varieties of species belonging to 14 families were observed in the core zone. Among them are 6 Insects, 3 Reptiles, 1 Mammal and 8 Avian. Number of species decreases towards the mining area due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and 6 species are under schedule IV according to Indian wild life Act 1972. There are no critically endangered, endangered, vulnerable and endemic species there. Details of fauna in core zone and their scientific name were mentioned in Table. 3.27.

Fauna in Buffer Zone

A total of 48 species belonging to 33 families were recorded in the buffer zone. Based on habitat classification the majority of species were 19 Birds (41%), followed by 15 Insects (31%), 7 Reptiles (15%), 4 Mammals (8%) and 3 Amphibians (6%). There are 4 schedule II species and 27 schedule IV species according to Indian wild life Act 1972. There are no critically endangered, vulnerable and endemic species observed. List of fauna in the buffer zone is provided in Table 3.28.

Table 3.27 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	Common Tiger	Nymphalidae	*Danaus genutia*	NL	NL
2	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	NL	LC

3	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
4	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
5	Stick insect	Lonchodidae	*carausius morosus*	NL	LC
6	Mottled emigrant	Peridae	*Catopsilia pyranthe*	NL	LC
REPTILES					
7	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
8	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC
9	Fan-Throated Lizard	Agamidae	*Sitanaponticeriana*	NL	LC
MAMMALS					
10	Field Mouse	Muridae	*Mus booduga*	Schedule IV	NL
AVES					
11	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
12	Koel	Cucalidae	*Eudynamys*	Schedule IV	LC
13	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
14	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
15	House crow	Corvidae	*Corvus splendens*	NL	LC
16	Crow Pheasant	Cucalidae	*Centropus sinensis*	Schedule IV	LC
17	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
18	Grey drongo	Dicruridae	*Dicrurus leucophaeus*	Schedule IV	LC

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

Table 3.28 Fauna in Buffer Zone

S.No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
INSECTS					
1	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	*Danainae*	NL	LC
3	Tawny coster	Nymphalidae	*Danaus chrysippus*	Schedule IV	LC
4	Indian honey bee	Apidae	*Apis cerana*	Schedule IV	LC
5	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
6	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	NL	LC
7	Lime butterfly	Papilionidae	*Papilio demoleus*	Schedule IV	LC

8	Ant	Formicidae	*Camponotus Vicinus*	NL	NL
9	Dragonfly	Gomphidae	*Ceratogomphus pictus*	Schedule IV	LC
10	Common Tiger	Nymphalidae	*Danaus genutia*	Schedule IV	LC
11	Common Indian crow	Nymphalidae	*Euploea core*	Schedule IV	LC
12	Praying mantis	Mantidae	*mantis religiosa*	NL	NL
13	Striped tiger	Nymphalidae	*Danaus plexippus*	Schedule IV	LC
14	Lesser grass blue	Lycaenidae	*Zizina Otis indica*	Schedule IV	LC
15	Jewel beetle	Buprestidae	*Eurythyrea austriaca*	Schedule IV	NA
REPTILES					
16	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
17	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC
18	Indian chameleon	Chamaeleonidae	*Chamaeleo zeylanicus*	Sch II (Part I)	LC
19	Olive keelback water snake	Natricidae	*Atretium schistosum*	Sch II (Part II)	LC
20	Brahminy skink	Scincidae	*Eutropis carinata*	NL	LC
21	Rat snake	Colubridae	*Ptyas mucosa*	Sch II (Part II)	LC
22	Common skink	Scincidae	*Mabuya carinatus*	NL	LC
MAMMALS					
23	Indian palm squirrel	Sciuridae	*Funambulus palmarum*	Schedule IV	LC
24	Indian hare	Leporidae	*Lepus nigricollis*	Schedule IV	LC
25	Indian Field Mouse	Muridae	*Mus booduga*	Schedule IV	LC
26	Asian Small Mongoose	Herpestidae	*Herpestes javanicus*	Schedule (Part II)	LC
AVES					
27	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
28	Black drongo	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
29	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
30	Red-breasted parakeet	Psittaculidae	*Psittacula alexandri*	NL	LC
31	Common Coot	Rallidae	*Fulica atra*	Schedule IV	LC

32	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
33	Shikra	Accipitridae	*Accipiter badius*	NL	LC
34	Koel	Cucalidae	*Eudynamys*	Schedule IV	LC
35	Common Quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
36	Red-vented Bulbul	Pycnonotidae	*Pycnonotuscafer*	Schedule IV	LC
37	Brahminy starling	Sturnidae	*Sturnia pagodarum*	Schedule IV	LC
38	Indian golden oriole	Oriolidae	*Oriolus kundoo*	Schedule IV	LC
39	Rose-ringed parkeet	Psittaculidae	*Psittacula krameria*	NL	LC
40	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
41	Common quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
42	White-breasted waterhen	Rallidae	*Amaurornis phoenicurus*	NL	LC
43	Two-tailed Sparrow	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
44	Grey Francolin	Phasianidae	*Francolinus pondicerianus*	Schedule IV	LC
45	House crow	Corvidae	*Corvussplendens*	NL	LC
AMPHIBIANS					
46	Indian Burrowing frog	Dicroglossidae	*Sphaerotheca breviceps*	Schedule IV	LC
47	Green Pond Frog	Ranidae	*Rana hexadactyla*	Schedule IV	LC
48	Tiger Frog	Chordata	*Hoplobatrachus tigerinus (Rana tigerina)*	Schedule IV	LC

*NL-Not listed, LC-Least concern, NT-Near threatened.

Aquatic Vegetation

There are no water bodes, tanks, Pand and canals in 1km radius around the mine lease area. so, no aquatic flora and fauna in around the mine lease area.

Forest Vegetation

There are no Reserve Forest or Biosphere Reserves or Wildlife Sanctuaries or National Parks or Important Bird Areas (IBAs), or migratory routes of fauna in 10km Radius.

Endangered and endemic species as per the IUCN Red List

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

3.5.3 Agriculture & Horticulture in 1km radius:

The district has a total Geographical area of 367097 Ha with net cultivated area of about 165260Ha. Coconut is the major plantation crop cultivated in an area of about 85831Ha. The

other Agricultural crops cultivated are Millets, Pulses, Oilseeds, Cotton and Sugarcane. Coimbatore's. horticulture landscape covers an average of 1,25,000 hectares. The district excels in cultivating various crops, with significant acreage dedicated to coconut, tea, arecanut, banana, mango, tomato, small onion, curry leaves, gourds, brinjal, and bhendi.

Major Agricultural Crops

Major horticulture crops cultivated in this district are vegetables crops like tomato, brinjal, chillies, onion and turmeric. Details of major field crops and horticulture in 1km radius is given in Table. 3.29.

Table 3.29 Major Crops in 1km radius

S. No	Major crops	Scientific name	Families
1	Sorghum	*Sorghum bicolor*	Poaceae
2	Gingelly	*Sesamum indicum*	Pedaliaceae
3	Groundnut	*Arachis hypogaea*	Legumes
4	Sugarcane	*Saccharum officinarum*	Poaceae
5	Millets	*Panicum miliaceum L*	Poaceae
6	Sesame	*Sesamum indicum*	Pedaliaceae
7	Cotton	*Gossypium herbaceum*	Malvaceae
8	horse gram	*Macrotyloma uniflorum*	Fabaceae

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

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

S. No	Common Name	Scientific Name	Family
Major Horticultural Crops			
1	Coconut	*Cocos nucifera*	Arecaceae
1	Guava	*Psidium guajava*	Myrtaceae
2	Sapota	*Manilkara zapota*	Sapotaceae
3	Lemon	*Citrus × limon*	Rutaceae

4	Papaya	*Carica papaya*	Caricaceae
Vegetables			
8	Onion	*Allium cepa*	Amaryllidaceae
9	Tapioca	*Manihot esculenta*	Spurges
10	Brinjal	*Solanum melongena*	Nightshade
11	Tomato	*Solanum lycopersicum*	Nightshade
12	Bottle Gourd	*Lagenaria siceraria*	Cucurbits
13	Veandai kai	*Abelmoschus esculentus*	Mallows

Results

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

3.6 SOCIO-ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. It is a measure of an individual's or family's or group of people's economic and social position based on education, income, health, and occupation. Socio-economic most important determinant of livelihoods as levels of knowledge, skill and income conditions which mean for their living. People from one income group to another consumption power is also differ among income groups of population This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project

It is expected that the socio-economic status of the area will substantially improve because of this proposed project. As the proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of their standard of living.

3.6.1 Objectives of the Study

The main objectives of the study are as follows:

- To study the demographic conditions by level of income of sample population in the study area.
- To analyses the level of education among different income groups of population.
- To investigate the housing situation by level of income of the sample population in the study unit

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 10 Villages including Arasampalayam, Bogampatti, Edayapalayam, Kallapalayam, Mettubavi, Myleripalayam, Panappatti, Pappampatti, Vadasithur, Vadavalli. As Pachapalayam 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 Pachapalayam Village Population Facts

Pachapalayam	
Number of Households	1121
Population	3992
Male Population	1998
Female Population	1994
Children Population	337
Sex-ratio	998
Literacy	66.76%
Male Literacy	70.72%
Female Literacy	62.79%
Scheduled Tribes (ST) %	0
Scheduled Caste (SC) %	23.72%
Total Workers	1255
Main Worker	1186
Marginal Worker	69

Source: https://www.census2011.co.in/data/village/635497-kuppam-tamil-nadu.html

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
Arasampalayam	1090	3818	1894	1924	2473	1384	1089	1345	510	835
Bogampatti	686	2415	1254	1161	1515	905	610	900	349	551
Edayapalayam	667	2251	1130	1121	1659	930	729	592	200	392
Kallapalayam	860	3066	1581	1485	2350	1293	1057	716	288	428
Mettubavi	719	2485	1281	1204	1671	971	700	814	310	504
Myleripalayam	1393	4990	2451	2539	3169	1746	1423	1821	705	1116
Panappatti	763	2635	1383	1252	1740	1026	714	895	357	538
Pappampatti	1172	4143	2052	2091	2865	1524	1341	1278	528	750
Vadasithur	1532	5080	2483	2597	3452	1878	1574	1628	605	1023
Vadavalli	1105	3859	1902	1957	2496	1359	1137	1363	543	820

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
Arasampalayam	2	2	0	1	2	2	1	1	1	2	1	1	1	2	1
Bogampatti	2	2	0	1	2	2	1	2	1	2	2	1	1	1	1
Edayapalayam	2	2	0	1	2	1	1	1	1	2	1	1	1	1	1
Kallapalayam	1	2	0	1	2	1	1	1	1	2	1	1	1	1	1
Mettubavi	2	2	0	1	2	2	1	1	1	2	2	1	1	1	1
Myleripalayam	2	2	1	1	2	2	1	1	1	2	2	1	1	1	1
Panappatti	2	2	0	1	2	1	1	1	1	2	2	1	1	2	1
Pappampatti	2	2	0	1	2	1	1	1	1	1	2	1	1	1	1
Vadasithur	2	2	0	1	2	1	1	1	1	2	1	1	1	1	1
Vadavalli	2	2	0	1	2	2	1	1	1	2	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
Arasampalayam	2041	1269	772	1863	1166	697	360	746	734	1777
Bogampatti	1165	813	352	985	731	254	470	278	223	1250
Edayapalayam	1150	748	402	977	676	301	200	178	556	1101
Kallapalayam	1547	979	568	1522	961	561	362	454	662	1519
Mettubavi	1372	891	481	1325	879	446	477	457	383	1113
Myleripalayam	2912	1666	1246	2581	1539	1042	568	584	1343	2078
Panappatti	1579	974	605	1566	969	597	631	604	320	1056
Pappampatti	1977	1341	636	1761	1262	499	143	383	1160	2166
Vadasithur	2512	1671	841	2419	1631	788	548	717	1126	2568
Vadavalli	2519	1395	1124	2420	1357	1063	1029	641	660	1340

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 is proposed to be transported mainly through Periyakuyili - Edayarpalayam and Panapatti to Karacherry Road as shown in Table 3.37 and in Figure 3.28. 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	Periyakuyili - Edayarpalayam	0.81 km-N	Periyakuyili - Edayarpalayam
TS2	Panapatti toKaracherry	1.73 km-S	Panapatti to Karacherry

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	65	195	44	44	80	40	282
TS2	70	210	54	54	91	45	309

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 Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	46	138

Source: Approved Mining Plan

Table 3.38 Summary of Traffic Volume

Station Code	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
TS1	282	138	420	1200
TS2	309	138	447	1200

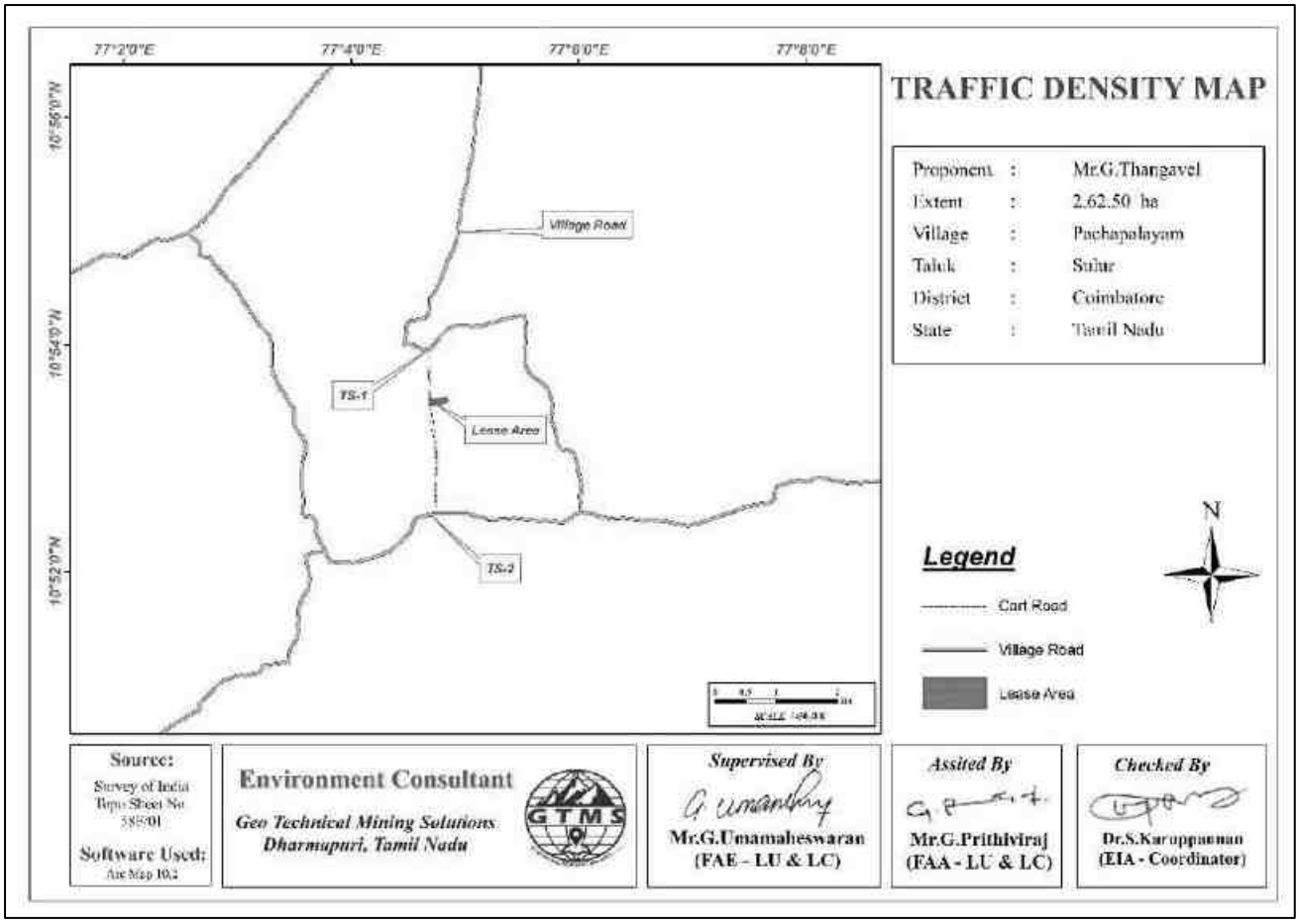


Figure 3.27 Traffic Density Map

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

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries, Reserve Forest, National Park within the project area. There is no Protected area is found within 10 km radius from the proposed project area. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environment sensitivity 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

SI. No	Sensitive Ecological Features	Name	Areal Distance in km from cluster
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius
		None	Nil within 10 km radius

2	Reserve Forest	None	Nil within 10 km radius
3	Lakes/Reservoirs/ Dams/Streams/Rivers	None	Nil within 10 km radius
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	Notified 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 3.28 Field Study & Socio-Economic Study Photographs

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

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

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

- Permanent 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 on Soil Environment

- 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 3.5 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 Chaulya et al.,2001. The equations used for SPM, SO_2, 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. It is important to note that PM_{10} emission rate is derived from the SPM estimation in the background that PM_{10} constitutes 52% of SPM emission. The $PM_{2.5}$, PM_{10}, SO_2 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	$PM_{2.5}$	0.167700028	26250	4.25905E-05
Overall Mine	PM_{10}	1.118000187	26250	6.38857E-06
Overall Mine	SO_2	0.099623555	26250	3.79518E-06
Overall Mine	NO_X	0.012510434	26250	4.76588E-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 PM_{10}, $PM_{2.5}$, SO_2 & 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 area (km)	Direction	PM 2.5 concentrations(µg/m³)			Comparison against air quality standard (60 µg/m³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	--	--	21.1	6.84	27.94	Below standard	32.4	Not significant
AAQ2	0.90	NNW	19.2	0.5	19.7		2.6	
AAQ3	2.62	SE	16.7	0.5	17.2		3.0	
AAQ4	2.18	WSW	15.6	5	20.6		32.1	
AAQ5	2.96	SW	14.3	1	15.3		7.0	
AAQ6	4.66	NE	25.9	0	25.9		0.0	
AAQ7	4.40	NW	17.2	0	17.2		0.0	

Table 4.4 Incremental & Resultant GLC of PM_{10}

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	--	--	47.0	13.3	60.3	Below standard	28.3	Not significant
AAQ2	0.90	NNW	42.4	0.5	42.9		1.2	
AAQ3	2.62	SE	41.8	1	42.8		2.4	
AAQ4	2.18	WSW	39.1	5	44.1		12.8	
AAQ5	2.96	SW	35.7	5	40.7		14.0	
AAQ6	4.66	NE	57.6	0	57.6		0.0	
AAQ7	4.40	NW	43.1	0	43.1		0.0	

Table 4.5 Incremental & Resultant GLC of SO_2

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	--	--	4.3	3.18	7.48	Below standard	74.0	Not significant
AAQ2	0.90	NNW	4.1	0.5	4.6		12.2	
AAQ3	2.62	SE	4.4	0.5	4.9		11.4	
AAQ4	2.18	WSW	3.7	0.5	4.2		13.5	
AAQ5	2.96	SW	2.6	0.5	3.1		19.2	
AAQ6	4.66	NE	5.2	0	5.2		0.0	
AAQ7	4.40	NW	4.7	0	4.7		0.0	

Table 4.6 Incremental & Resultant GLC of NO_X

Station ID	Distance to core area(km)	Direction	NOx concentrations(µg/m^3)			Comparison against air quality standard (80 µg/m^3)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	--	--	16.5	6.74	23.24	Below standard	40.8	Not significant
AAQ2	0.90	NNW	15.8	0.5	16.3		3.2	
AAQ3	2.62	SE	13.6	0.5	14.1		3.7	
AAQ4	2.18	WSW	11.6	1	12.6		8.6	
AAQ5	2.96	SW	8.2	1	9.2		12.2	
AAQ6	4.66	NE	18.2	0	18.2		0.0	
AAQ7	4.40	NW	14.5	0	14.5		0.0	

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

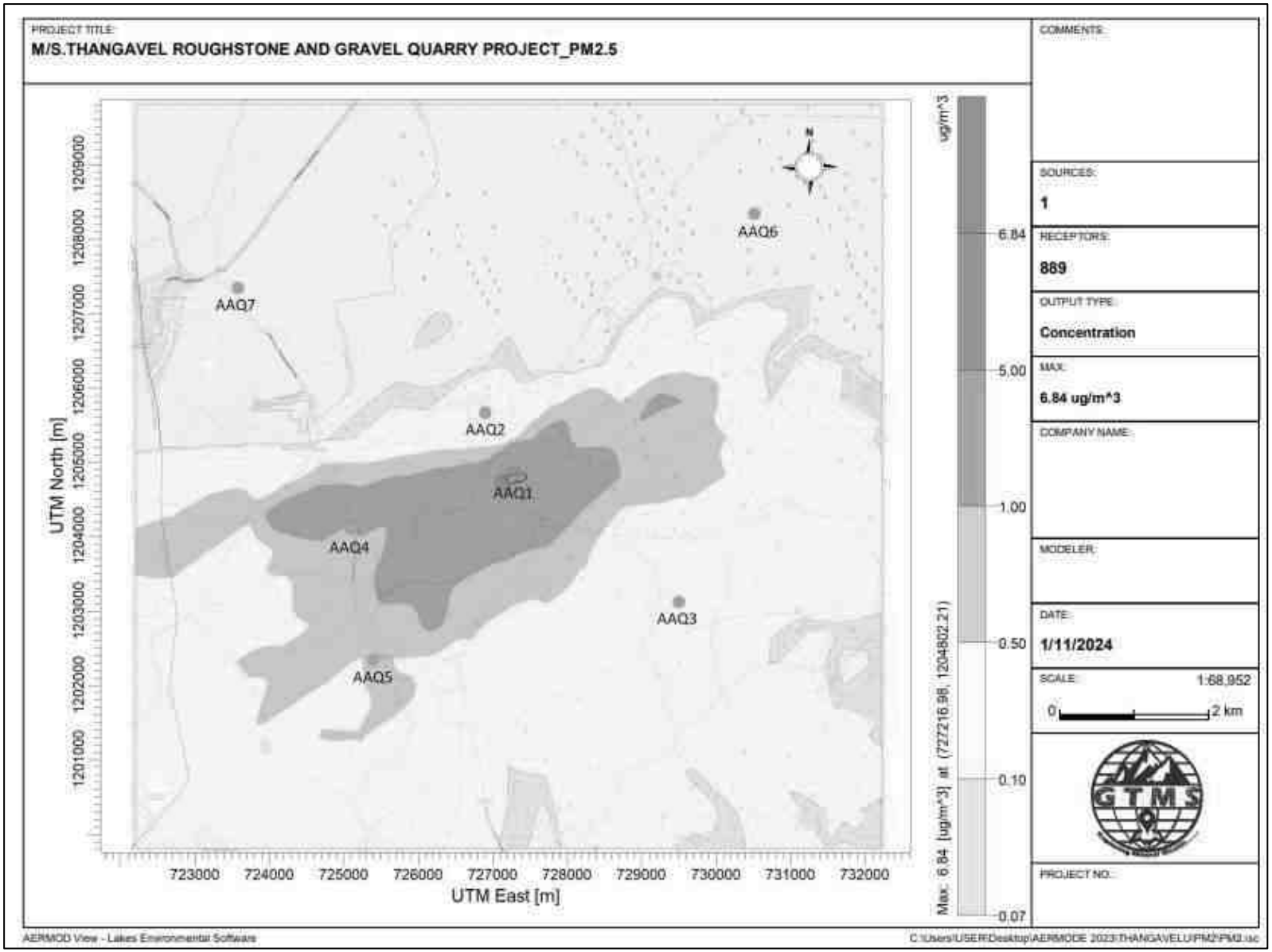


Figure 4.1 Predicted Incremental Concentration of $PM_{2.5}$

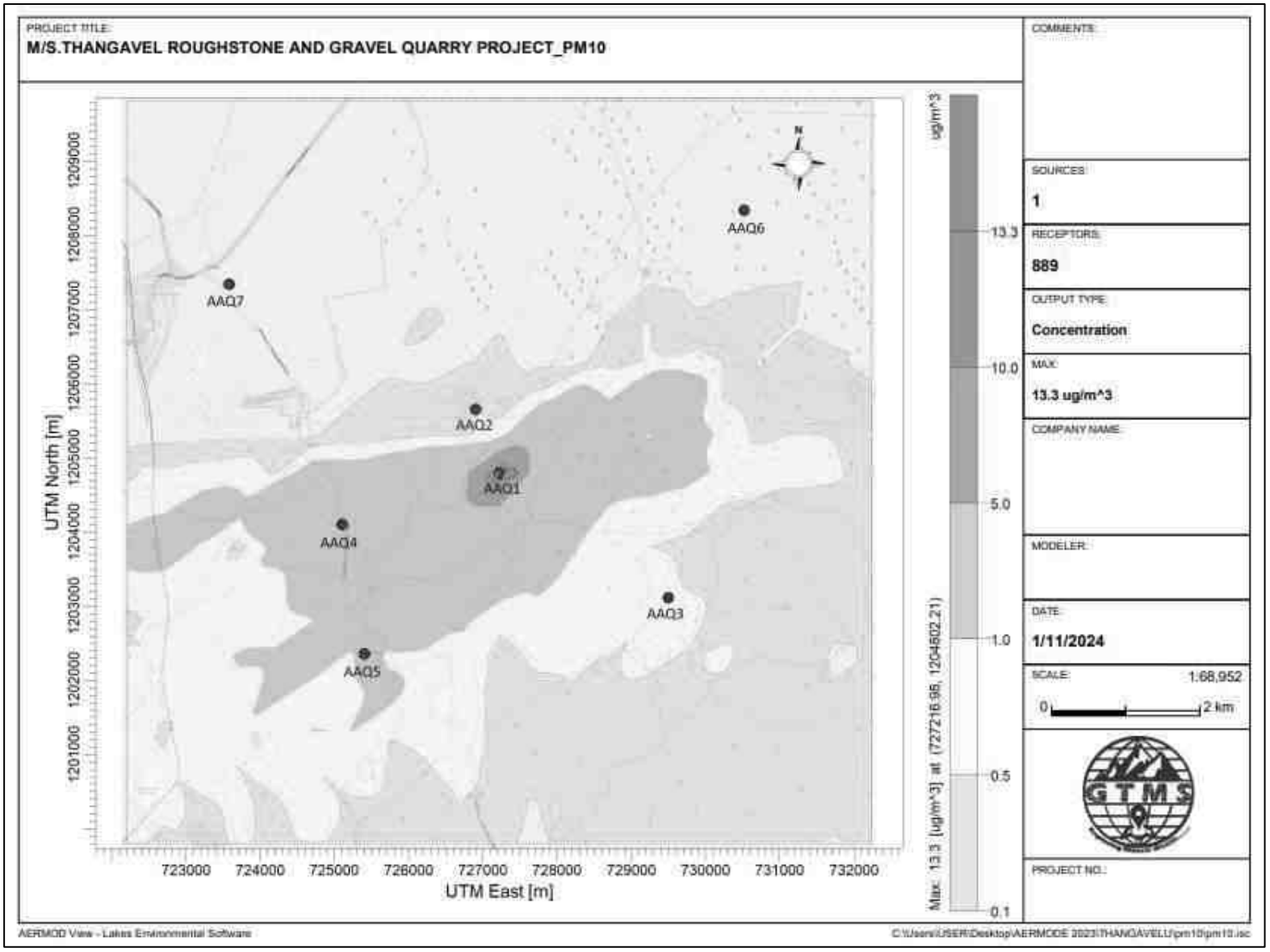


Figure 4.2 Predicted Incremental Concentration of PM_{10}

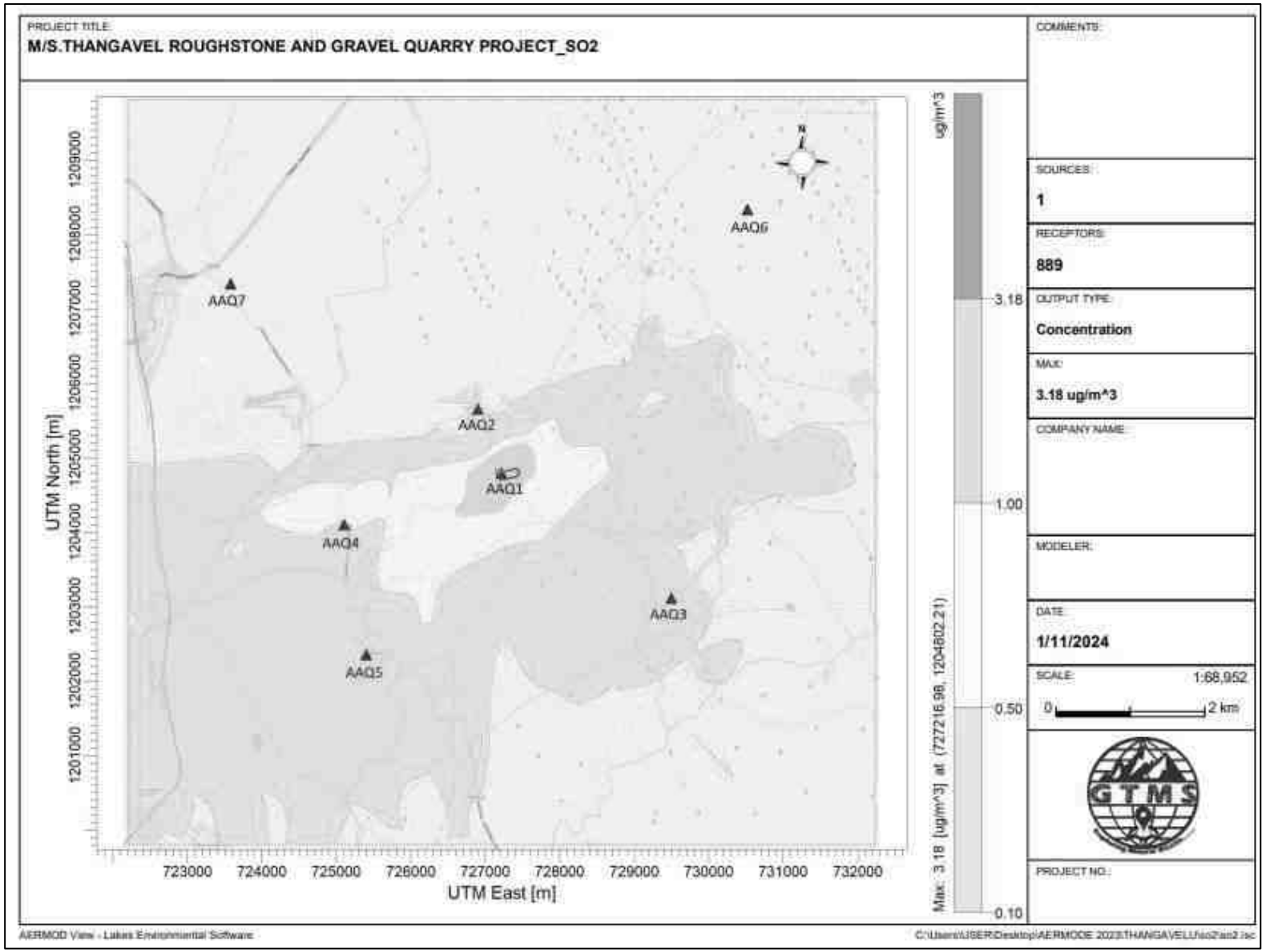


Figure 4.3 Predicted Incremental Concentration of SO_2

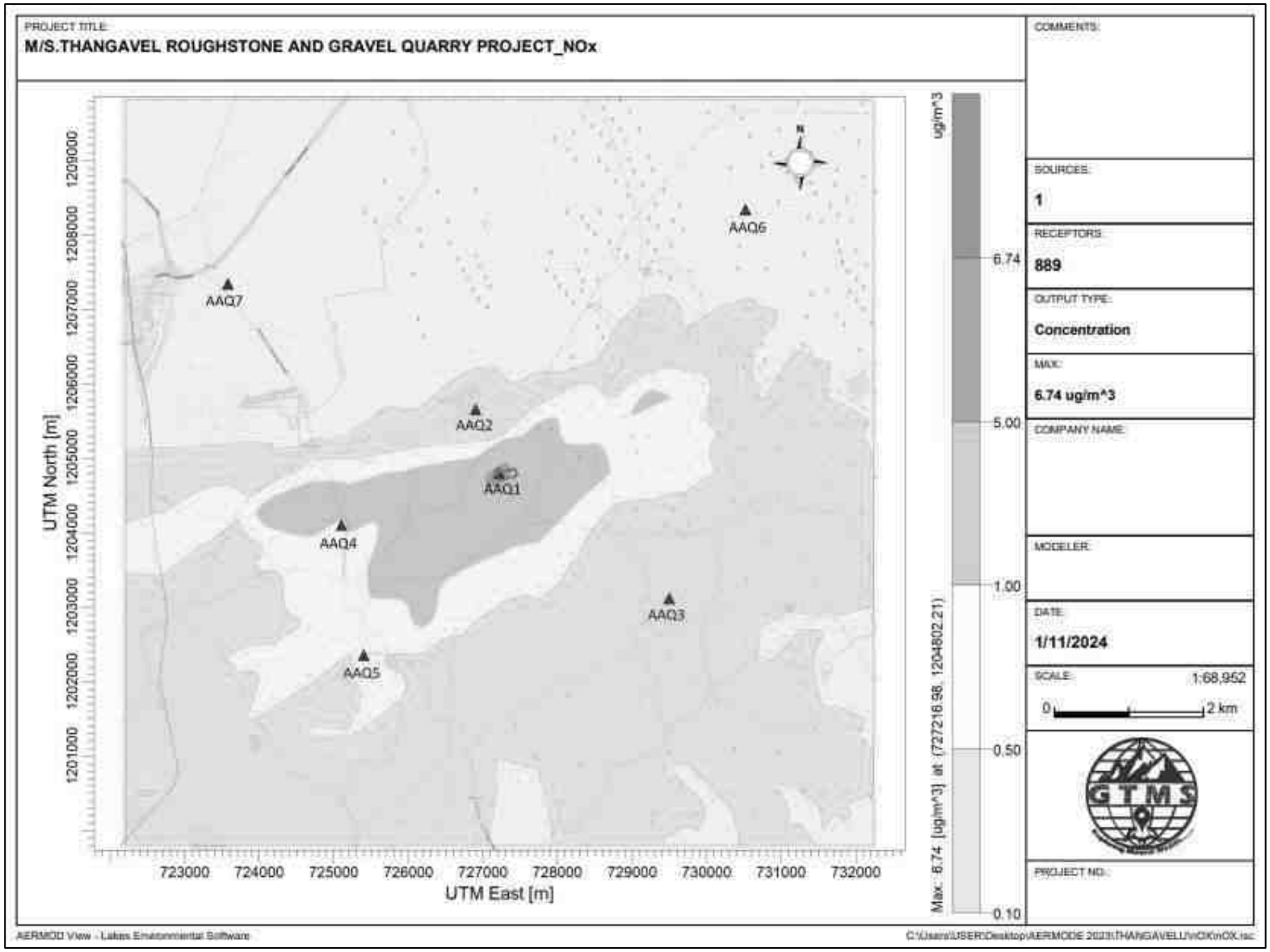


Figure 4.4 Predicted Incremental Concentration of NO_X

4.5 NOISE ENVIRONMENT

Noise modelling has been carried out to assess the impact on surrounding ambient noise levels. Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outwards from the source through the air at a speed of 1, 100 ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A). For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using a mathematical model based on first principle.

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

Where, Lp_1 & Lp_2 are sound levels at points located at distances r_1 and r_2 from the source; $Ae_{1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

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

4.5.1 Anticipated Impact

The attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are: source data, receptor data, and attenuation factor. Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.7.

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). We have considered the total noise to be produced by mining activity to be 95.8 dB (A) for noise prediction modelling.

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)
Core	100	51.2	43.9	51.9
Pachapalayam	740	49.3	26.5	49.3
Panappatti	2730	45.7	15.2	45.7
Thekani	2140	43.5	17.3	43.5
Karachery	2820	52.8	14.9	52.8
Edayampalayam	4500	49.2	10.9	49.2
Orattukuppai	4530	45.8	10.8	45.8
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

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

4.5.2 Common Mitigation Measures

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

- Usage of sharp drill bits while drilling which will help in reducing noise
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- Silencers / mufflers will be installed in all machineries
- Greenbelt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise

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

4.5.3 Ground Vibrations

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. 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	22	740	0.152	19	0.05	128

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	22	100	3.74	19	0.54	149
		200	1.23		0.23	141
		300	0.64		0.14	137
		400	0.40		0.10	134
		500	0.28		0.08	132

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
- 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

- ❖ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ❖ The Number of plants in the mining lease area is given in Chapter III Table 3.21 which vegetation in the lease area may be removed during mining.
- ❖ Carbon released from quarrying machineries and tippers during quarrying would be 2855 kg per day, 770961 kg per year and 3854803 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	187	50458	252289
Fuel consumption of compressor	22	5940	29700
Fuel consumption of tipper	857	231274	1156370
Total fuel consumption in liters	1065	287672	1438359
Co_2 emission in kg	2855	770961	3854803

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 31469 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- As per the greenbelt development plan as recommended by SEAC (Table 4.13), about 1313 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 30812 kg of the total carbon, as provided in Table 4.12.

Table 4.12 CO_2 Sequestration

CO_2 sequestration in kg	117	31469	157343
Remaining CO_2 not sequestered in kg	2739	739492	3697460
Trees required for environmental compensation	30812		
Area required for environmental compensation in hectares	62		

Table 4.13 Recommended Species for Greenbelt Development Plan

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

Table 4.14 Greenbelt Development Plan

	No. of trees proposed for plantation	**No. of trees expected to survive @ 80%**	**Area to be covered(m^2)**
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	525	420	4725
	Number of plants outside the mine lease area		
	788	630	7088
Total	**1313**	**1050**	**11813**

Table 4.15 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recuring Cost-per annum
Plantation inside the mine lease area (in safety margins)	525	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))"	105000	15750
Plantation outside the area	788	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	236250	23625
		Total	**341250**	**39375**

4.6.3. Anticipated Impact on Fauna

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

Mitigation Measures on Flora

- ❖ Fencing will be constructed around the proposed mine lease area to restrict the entry of stray animals
- ❖ The workers shall be trained not to harm any wildlife near the project site

4.6.4 Impact on agriculture and horticulture crops in 1km Radius

- ❖ Problems to agricultural and horticulture land due to dust caused by movement of heavy vehicles.
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season.
- ❖ The fugitive dust released from the mining operations may cause effect on the agricultural and horticulture land who are directly exposed to the fugitive dust.

- ❖ Dust from the quarries is likely to affect reproductive systems in nearby agricultural and horticulture lands.
- ❖ Dust from quarries can affect plant growth and reduce vegetable yields.

4.6.5 Mitigation Measures on agriculture and horticulture crops.

- ❖ The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases.
- ❖ It is a rough stone quarry, 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, spirometry tests, periodic medical examination – yearly, lung function test – yearly, those who are exposed to dust, and eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

4.9 Mine Waste Management

No waste is anticipated from any of the proposed quarries.

4.10 Mine Closure

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

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

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

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.10.1.1 Physical Stability

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The design periods and factors of safety proposed should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

4.10.1.2 Chemical Stability

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

4.10.1.3 Biological Stability

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

- Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor. For example, development of green barriers

The Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

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

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

The proposed project is site specific and has the following advantages:

- The mineral deposit occurs in a non-forest area.
- There is no habitation within the project area; hence no R & R issues exist.
- There is no river, stream, nallah and water bodies in the applied mine lease area.
- Availability of skilled, semi-skilled and unskilled workers in this region.
- All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are well connected and accessible.
- The mining operations will not intersect the ground water level. Hence, no impact on ground water environment.
- As the proposed project area falls in seismic zone III, 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 Semi Mechanized mining method with secondary blasting will be applied to extract rough stone 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 / trippers 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 Semi Mechanized method has been selected for this project. This technology is having least gestation period, economically viable, safest and less labour intensive. The method has inbuilt flexibility for increasing or decreasing the production as per market condition.

CHAPTER VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

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

6.1 METHODOLOGY OF MONITORING MECHANISM

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

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in the proposed quarry. The responsibilities of this cell will be:

- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care
- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment

❖ Seeking expert's advice when needed.

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

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

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

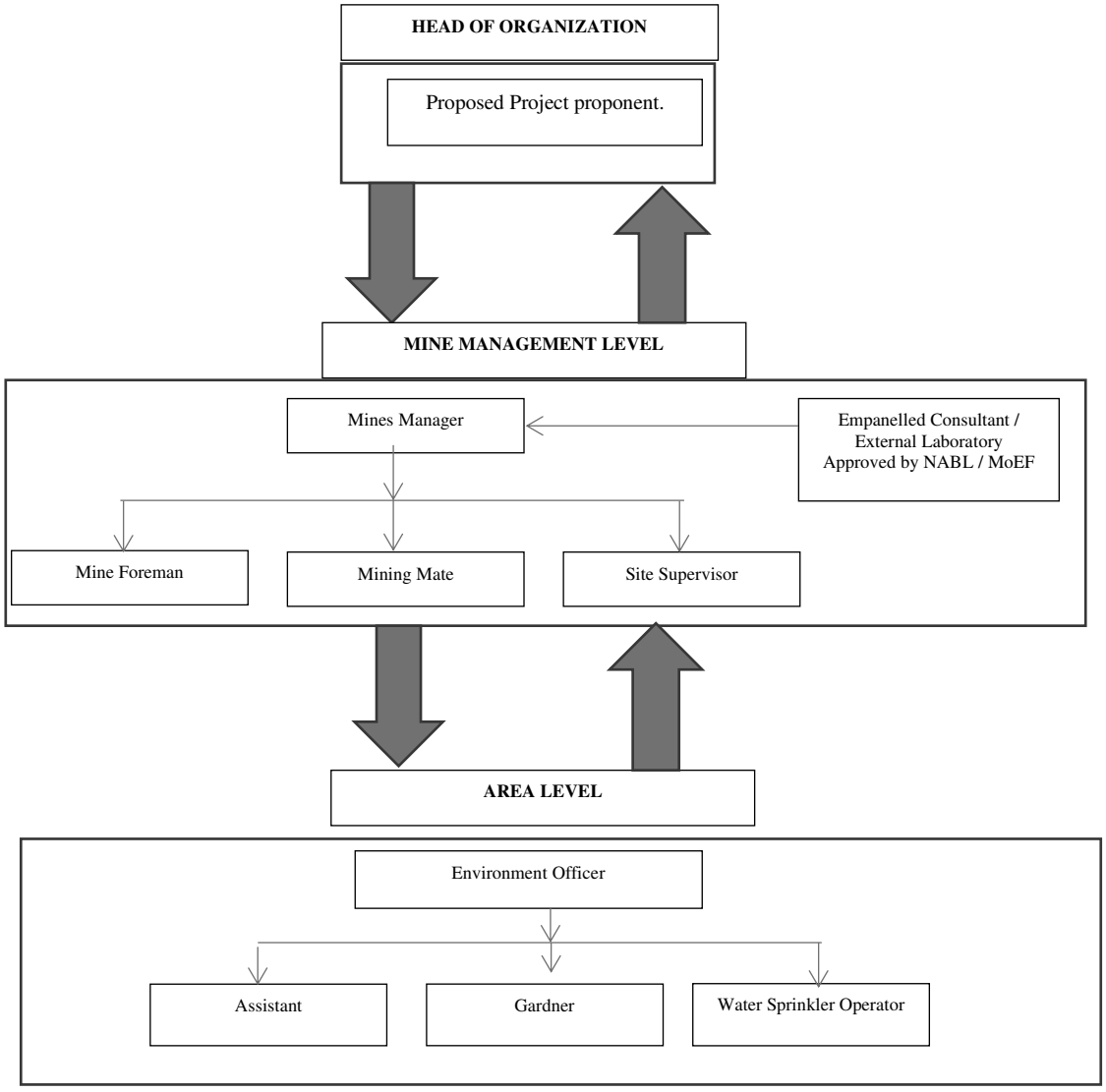


Figure 6.1 Proposed Environmental Monitoring Chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

Table 6.1 Implementation Schedule for Proposed Project

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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

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

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil Quality and
- ❖ Greenbelt Development

The details of proposed monitoring schedule have been provided in Table 6.2.

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in m BGL
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

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

Table 6.3 Environment Monitoring Budget

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

Source: Field Data

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

CHAPTER VII
ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

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

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

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

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project.

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

Table 7.1 Risk Assessment & Control Measures for Proposed Project

S. No.	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. ✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited. ✓ Fire-fighting and first-aid provisions in the mine office complex and mining area. ✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use. ✓ Working of quarry, as per approved plans and regularly updating the mine plans. ✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut. ✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager. ✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.
2	Drilling	Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst; Drill Rod may break;	✓ Safe operating procedure established for drilling (SOP) will be strictly followed. ✓ Only trained operators will be deployed. ✓ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places, ✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other.

			✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ✓ Operator shall regularly use all the personal protective equipment.
3	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. ✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. ✓ Concave mirrors should be kept at all corners ✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point ✓ Loading according to the vehicle capacity ✓ Periodical maintenance of vehicles as per operator manual
4	Natural calamities	Unexpected happenings	✓ 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	✓ 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.

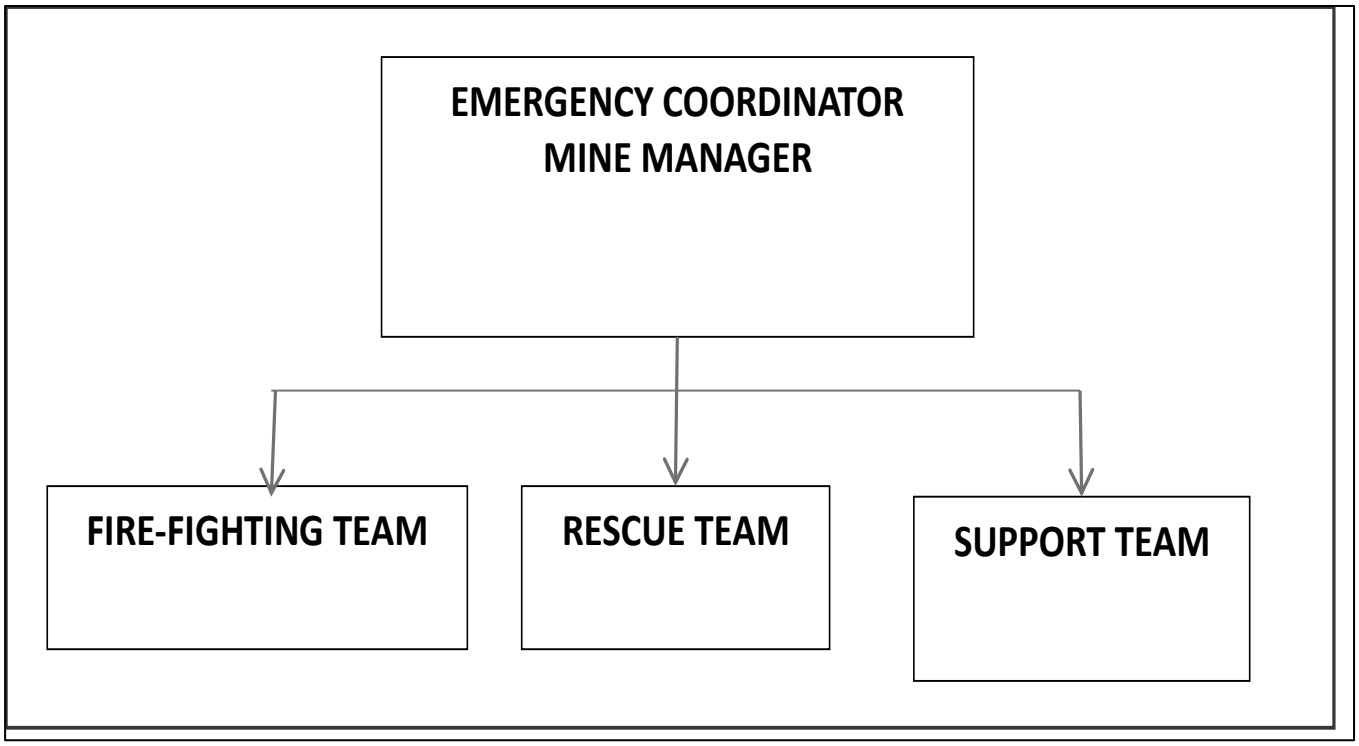


Figure 7.1 Disaster management team layout for proposed project

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, 2 proposed projects, known as P1, P2 are taken into consideration. The details of P1 have been given in Table 1.2 and the details of the Proposed Project P2, Mr.A.Natarajan applied for rough stone and gravel quarry lease in the Patta land falling in S.F.No. 342/7E (Part) over an extent of 1.04.0 ha in Pachapalayam Village, Sulur Taluk, Coimbatore District and Tamil Nadu, the mining plan is under process. The salient features of the proposed project P2 will be updated in the final EIA report.

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 7.2 and 7.3.

Table 7.2 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	**5 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	307059	61412	227	38
Grand Total	**307059**	**61412**	**227**	**38**

Table 7.3 Cumulative Production Load of Gravel

Quarry	Production for 5 Years (m^3)	Yearly Production (m^3)	Daily Production (m^3)	Number of Lorry Loads Per Day
P1	39852	7970	29	5
Grand Total	**39852**	**7970**	**29**	**5**

The cumulative study shows that the overall production of rough stone from the quarry is 227 m^3 per day with a capacity of 38 trips of rough stone per day and that production of gravel from the proposed quarry is 29 m^3 per day accounting for 5 trips/day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the proposed projects on air environment of the cluster have been provided in Table 7.4. The cumulative values resulting from the project for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.4 Cumulative Impact Results from the proposed project

Pollutants	Baseline Data (µg/m^3)	Incremental Values (µg/m^3)	Cumulative Value (µg/m^3)
		P1	
$PM_{2.5}$	18.6	6.84	25.44
PM_{10}	43.80	13.3	57.10
SO_2	4.10	3.18	7.28
NO_x	14.0	6.74	20.74

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.7.5 Cumulative Impact of Noise from the Proposed project

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	740	N	49.3	26.5	49.3	**55**
Cumulative Noise (dB (A))					49.3	

Source: Lab Monitoring Data

The cumulative analysis of noise due to the proposed project shows that habitation will receive about 49.3dB (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 quarry have been shown in Table 7.6.

Table 7.6 Cumulative Effect of Ground Vibrations Resulting from the Proposed Quarry

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	22	740	0.152
Total			**0.152**

Results from the above tables 7.6 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 7.7 the project together will contribute Rs. 5,00,000/-towards CER fund.

Table 7.7 Socio Economic Benefits from the Mine

Location ID	Project Cost	CER Cost
P1	Rs.78,65,900	Rs. 5,00,000
Grand Total	**Rs.78,65,900**	**Rs. 5,00,000**

Table 7.8 Employment Benefits from the Mine

Location ID	Employment
P1	16
Grand Total	**16**

A total of 16 people will get employment due to the proposed mine in cluster

7.4.4 Ecological Environment

Table 7.9 Greenbelt Development Benefits from the 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	1313	11813	1050	*Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis,* etc.,
Total	**1313**	**11813**	**1050**	

Cumulative studies show that the proposed project will plant about 1313 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Techtona grandis,* etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 1050 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 7.10.

Table 7.10 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 Pachapalayam Village aims to produce **307059 m^3** of rough stone and **39852 m^3** of gravel over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 16 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to 10 persons in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

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 is located in Pachapalayam Village, Sulur Taluk and Coimbatore District is well established. The following physical infrastructure facilities will further improve due to proposed mine.

- 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 10 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 will be taken up in the Pachapalayam village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated.

8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated

01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is ≤ 100 crores, the proposed project shall contribute of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund with reference to 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.3,58,40,426** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget for Rough stone (Rs.)	Budget for Gravel (Rs.)
CER	5,00,000	-----
Seigniorage @ Rs.90/m^3 of rough stone Rs.56/m^3 of Gravel	2,76,35,310	22,31,712
District Mineral Foundation Tax @ 10% of Seigniorage	27,63,531	2,23,171
Green Tax @ 10% of Seigniorage	27,63,531	2,23,171
Total	**3,31,62,372**	**26,78,054**

CHAPTER IX
ENVIRONMENTAL COST BENEFIT ANALYSIS

Not Applicable, Since Environmental cost benefit analysis not recommended at the scoping stage.

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

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

10.1 ENVIRONMENTAL POLICY

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance. The Proponent Mr.G.Thangavel will:

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

10.1.1 Description of the Administration and Technical Setup

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

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

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

10.2 Budgetary Provision for Environmental Management

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

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost	Recurring Cost/annum
			(Rs.)	(Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	26250	26250
	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	Yearly compliance as per CPCB norms	0	50000

	per norms within ML area & ambient area			
	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	52500
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			**961250**	**232500**

Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0

	the area before blasting will be ensured.			
	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	859765
Total Noise Environment			**50000**	**861765**
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)	26250	13125
Total Water Environment			**26250**	**13125**
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 &	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

DGMS Condition				
Total Implementation of EC, Mining Plan			**10000**	**1000**
Occupational Health and Safety	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	64000	16000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	16000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	10500
	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)	525000	26250
	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	131250	26250

	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1st Class / 2nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
Total Occupational Health and Safety			**760250**	**882000**
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))"	105000	15750
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	236250	23625
Total Development of Green Belt			**341250**	**39375**
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	89250
	G.O.(Ms)No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage	2986702	0

		Fee) (Seigniorage Fee for rough stone = Rs.90 and for Gravel= Rs.56)		
Total Seigniorage Fee			**2986702**	**0**
TOTAL			**5165702**	**2051765 (Excl. 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**
2051765	2154353	2262071	2375175	2583183	11426548	16592250

In order to implement the environmental protection measures, an amount of **Rs.5165702** as capital cost and recurring cost as **Rs.2051765** 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.16592250** 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 12.25.85 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.333/3 over the extent of 2.62.50 ha is situated in the cluster falling in Pachapalayam Village, Sulur Taluk, Coimbatore District and Tamil Nadu. The quarries involved in the calculation of cluster extent are two proposed quarries, three existing quarries, and the one expired quarry.

11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes from 10°53'27.58015"N to 10°53'32.44183"N and Longitudes from 77°04'42.22100"E to 77°04'51.52142"E in Pachapalayam Village, Sulur Taluk, Coimbatore District and Tamil Nadu. According to the approved mining plan, about 307059 m^3 of rough stone and 39852 m^3 of gravel will be mined up to the ultimate depth of 30 m (10m AGL + 20mBGL) 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 Excellence Laboratory 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 1.

Table.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky / stony waste	86.27	1.13
2	Crop land	5984.53	78.50
3	Dense Forest	62.76	0.82
4	Fallow Land	687.29	9.02
5	Land with or without scrub	25.84	0.34
6	Mining / Industrial wastelands	333.54	4.38
7	Plantations	419.01	5.50
8	Settlement	24.39	0.32
Total		**2623.63**	**100.0**

Source: Sentinel II Satellite Imagery

11.3.2 Soil Environment

Physical Characteristics & Chemical Characteristics

The soil samples in the study area show loamy textures varying between sandy loam, silty loam and Sandy Clay. pH of the soil varies from 7.9 to 8.2 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 272 to 340µs/cm. Bulk density ranges between 1.1 and 1.4 g/cm^3. Figure 3.5 shows the soil composition as calculated based on the laboratory report. Manganese ranges between 236 and 411 mg/kg Chlorides ranges between 353 and 573 mg/kg. Potassium ranges between 0.084 and 0.162%. Calcium ranges between 156 and 192 mg/kg. Organic matter content ranges between 1 and 2.3 %.

11.3.3 Water Environment

Panappatti Lake are the prominent surface water resources present in the study area. This lake is ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 1.55 km SE Panappatti Lake, as shown in Table 3.6 and Figure 3.6. surface water sample, known as SW01 are collected from the surface water body to assess the baseline water quality. Six groundwater samples, known as BW01, BW02, BW03, BW04, BW05 and BW06 were collected from bore wells and 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 3.6. Table 3.6 summarizes ground water quality data of the six samples.

Results for ground water samples in the Table 3.8 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

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 October through December, 2022 (Post Monsoon Season) and from March through May, 2023 (Pre-Monsoon Season). The open well water level data thus collected onsite are provided in Tables 3.9 and 3.10. According to the data, average depths to the static water table in open wells range from 19.10 to 21.50 m BGL in post monsoon and from 20.4 to 22.6 m BGL in pre monsoon. The bore well data thus collected onsite are provided in Tables 3.11 and 3.12. The average depths to static potentiometric surface in bore wells for the period of October through December 2022 (Post-Monsoon Season) vary from 70.53 to 75.03 m and from 72.80 to 75.50 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 17.7 µg/m^3 to 19.5µg/m^3; PM_{10} from 41.8µg/m^3 to 46.1µg/m^3; SO_2 3.5 µg/m^3 to 5.0 µg/m^3; NO_x from 11.8 µg/m^3 to 17.0µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

11.3.5 Noise Environment

Noise level in core zone was 51.2 dB (A) Leq during day time and 44.2dB (A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 43.5 to 49.3dB (A) Leq and during night time from 35.3 to 43.9dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.3.6 Biological Environment

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

Flora in core zone

There are no plant species in the mining lease area. It is a kind of dry land.

Flora within 300 m radius Zone

A variety of plant species are found within a radius of 300 meters. It is an arid landscape. There is no agricultural land nearby. It contains a total of 37 species belonging to 19 families have been recorded from the buffer zone. 11 Trees (27%), 7 Shrubs (19%) and 19 Herbs and Climbers, Creeper, Grass & Cactus (52%) were identified. Details of flora with the scientific name details and of diversity species Rich ness index were mentioned in Table 3.23-25 and figure 3.25. There is no threat to the Flora species in 300-meter radius.

Flora in 10 km radius zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land was found to dominate mostly in Southeast and Southwest directions. Majority of the flat landscape around project unit is occupied by agriculture fields. It contains a total of 94 species belonging to 43 families have been recorded from the buffer zone. The floral (94) varieties among them Thirty-eight Trees 38 (41%) twenty-one Herbs 21 (22%) and Eighteen Shrubs 18 (19%) and twelve Climbers 12 (13%), two Creepers 2 (2%), two Grass 2 (2%) and one Cactus 1 (1%) were identified. The result of buffer zone of flora studies shows that Fabaceae and Euphorbiaceae, Solanaceae are the main dominating species in the study area it mentioned in Table No.3.26

Fauna in Core Zone

A total of 18 varieties of species belonging to 14 families were observed in the core zone. Among them are 6 Insects, 3 Reptiles, 1 Mammal and 8 Avian. Number of species decreases towards the mining area due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and 6 species are under schedule IV according to Indian wild life Act 1972. There are no critically endangered, endangered, vulnerable and endemic species there. Details of fauna in core zone and their scientific name were mentioned in Table. 3.31.

Fauna in Buffer Zone

A total of 48 species belonging to 33 families were recorded in the buffer zone. Based on habitat classification the majority of species were 19 Birds (41%), followed by 15 Insects (31%), 7 Reptiles (15%), 4 Mammals (8%) and 3 Amphibians (6%). There are 4 schedule II species and 27 schedule IV species according to Indian wild life Act 1972. There are no critically endangered, vulnerable and endemic species observed. List of fauna in the buffer zone is provided in Table 3.32.

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

Mitigation Measures

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

11.4.3 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-metaled haul roads will be compacted weekly before being put into use
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Haul roads and service roads will be graded to clear accumulation of loose materials
- Planting of trees all along main mine haul roads and around the project site will be practiced to prevent the generation of dust
- Dust mask will be provided to the workers and their use will be strictly monitored

11.4.4 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 22kg 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

Impact on Ecology and Biodiversity

- During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- The Number of plants in the mining lease area is given in chapter 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 2855 kg per day, 770961 kg per year and 3854803 kg over five years.

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 31469 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- As per the greenbelt development plan as recommended by SEAC (Table 4.13), about 1313 trees will be planted within three months from the beginning of mining. These

trees, when grown up would sequester carbon of about 30812 kg of the total carbon, as provided in Table 4.12.

Anticipated Impact on Fauna

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

Mitigation Measures on Fauna

- Fencing will be constructed around the proposed mine lease area to restrict the entry of stray animals
- The workers shall be trained not to harm any wildlife near the project site

11.4.6 Socio Economic 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.

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, Spiro metric tests, Periodic medical examination – yearly, Lung function test – yearly, those who are exposed to dust and Eye test
- Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost.
- The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

11.5 Environment Monitoring Program

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

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 the proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- The proposed the project will allocate Rs. 5,00,000/- towards CER as recommended by SEAC
- The proposed project will directly provide jobs to 16 local people, in addition to indirect jobs
- The proposed project will plant 1313 about trees in and around the lease area
- The proposed project will add 138 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 16 local people
- Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- Strengthening of existing community facilities through the Community Development Program
- Skill development & capacity building like vocational training.
- Rs. 5,00,000 will be allocated for CER

11.8 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs.5165702** as capital cost and recurring cost as **Rs.2051765** 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.16592250**.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, **Mr.G.Thangavel** 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. Karuppannan	EIA Coordinator (EC) In-house	1(a)(i)	Mining	B
2.	Dr. M. Vijay Prabhu	In-house FAE	1(a)(i)	HG, LU, GEO	B
3.	Dr. J. Rajarajeswari	In-house, FAE	1(a)(i)	EB, SC	B
4.	Dr. G. Prabakaran	In-house, FAE	1(a)(i)	SE	B
5.	Dr. R. Arunbalaji	In-house, FAE	1(a)(i)	AP, AQ, NV	B
6.	J.N. Manikandan	Empanelled FAE	1(a)(i)	RH, SHW, AP	B
7.	Dr. S. Malar	In-house, FAE	1(a)(i)	WP	B
8.	G. Umamaheswaran	In-house, FAE	1(a)(i)	HG, LU, GEO	B
9.	S. Gopalakrishnan	In-house, FAE	1(a)(i)	HG, 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

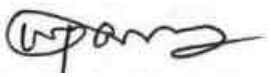
13.	C. Kumaresan	FAA	1(a)(i)	NV	B
14.	P. Vellaiyan	FAA	1(a)(i)	HG, GEO	B
15.	P.Dhatchayini	FAA	1(a)(i)	AQ	B
16.	V. Malavika	FAA	1(a)(i)	NV, SHW	B

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 modeling, 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**

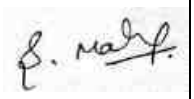
Designation : EIA Coordinator

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

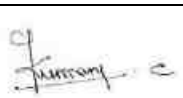
We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for **Mr.G.Thangavel** rough stone and gravel quarry project with the extent of 2.62.50 ha situated in the cluster with the extent of **12.25.85 ha** in Pachapalayam Village, Sulur Taluk, Coimbatore District and Tamil Nadu is true and correct to the best of our knowledge.

List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity ○ Prediction of air pollution and propose mitigation measures / control measures	J. N. Manikandan	
			P.Venkatesh	
2	WP	○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Dr.S. Malar	
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	Dr.M. Vijay Prabhu	
4	GEO	○ Field Survey for assessing the regional and local geology of the area. ○ Preparation of mineral and geological maps. ○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	G.Gopala Krishnan	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility.	Dr. G. Prabhakaran	
6	EB	○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna. ○ Suggesting species for greenbelt	Dr.J. Rajarajeshwari	

		development.		
7	RH	○ Identification of hazards and hazardous substances ○ Risks and consequences analysis ○ Vulnerability assessment ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety.	J.N. Manikandan	
8	LU	○ 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	○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP.	Dr.R. Arun Balaji	
10	AQ	○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ Recommending mitigations measures for EMP	Dr.R. Arun Balaji	
11	SC	○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. D.Kalaimurugan	
12	SHW	○ Identify source of generation of non-hazardous solid waste and hazardous waste. ○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	J.N. Manikandan	

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	G. Prithiviraj	LU, HG	o Site visit with FAE o Provide inputs & Assisting FAE for LU and HG	
2	C. Kumaresan	NV	o Assistance to FAE in both primary and secondary data collection o Assistance in noise prediction modelling	
3	P. Vellaiyan	HG & GEO	o Field visits along with FAE o Assistance to FAE in both primary and secondary data collection	
4	P.Dhatchayini	AQ	o Site visit with FAE o Assistance to FAE in collection of both primary and secondary data	
5	V.Malavika	NV, SHW	o Site visit along with FAE o 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 **Mr.G.Thangavel** rough stone and gravel quarry project with the extent of **2.62.50 ha** located within the cluster of **12.25.85 ha** in Pachapalayam Village, Sulur Taluk, Coimbatore District and 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	:	NABET/EIA/2124/SA0184
Validity	:	Valid till April 02, 2024

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

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY – TAMIL NADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai-15.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/F.No.10366/SEAC/ToR- 1623/2023 Dated:12.12.2023

To

Thiru.G.Thangavel,
S/o.Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuili, Pachapalayam,
Sulur Taluk,
Coimbatore District- 641201

Sir / Madam,

Sub: SEIAA, Tamil Nadu – **Terms of Reference with Public Hearing** (ToR) for the Proposed Rough Stone & Gravel Quarry over an extent of 2.62.50 Ha at S.F. No: 333/3 of Pachapalyam Village, Sulur Taluk, Coimbatore District, Tamil Nadu Mr.G.Thangavel by - under project category – "B1" and Schedule S.No. 1(a) – ToR issued along with Public Hearing- preparation of EIA report – Regarding.

Ref:

1. Online proposal No. SIA/TN/MIN/442308/2023, Dated:30.08.2023.
2. Your application submitted for Terms of Reference dated: 30.08.2023.
3. Minutes of the 416th Meeting of SEAC held on 13.10.2023.
4. Minutes of the 670th Meeting of Authority held on 06.11.2023
5. Proponent's reply dated:07.12.2023.
6. Minutes of the 677th Meeting of Authority held on 11.12.2023&12.12.2023.

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

The proponent, Mr.G.Thangavel has submitted application for ToR, in Form-I, Pre-Feasibility report for the Proposed Rough Stone & Gravel Quarry over an extent of 2.62.50 Ha at S.F. No: 333/3 of Pachapalyam Village, Sulur Taluk, Coimbatore District, Tamil Nadu

Discussion by SEAC and the Remarks:-

Proposed Rough stone & Gravel Quarry over an extent of 2.62.50Ha at S.F.Nos. 333/3 of Pachapalayam Village, Sulur Taluk, Coimbatore District, Tamil Nadu by Thiru. G.Thangavel- For Terms of Reference. (SIA/TN/MIN/442308/2023, Dated:30.08.2023).

The proposal was placed in the 416th Meeting of SEAC held on 13.10.2023. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, Thiru. G.Thangavel has applied for Terms of Reference for the Proposed Rough stone & Gravel Quarry over an extent of 2.62.50Ha at S.F.Nos. 333/3 of Pachapalayam Village, Sulur Taluk, Coimbatore District, Tamil Nadu.
2. The proposed quarry/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. As per the mining plan the lease period is 10 years. The mining plan is for the period of five years & production should not exceed 307059 m^3 of Rough Stone & 39852 m^3 of Gravel with ultimate depth of mining 30m (10m above ground level and 20m below ground level).

Based on the presentation made by the proponent, **SEAC decided to recommend for grant of Terms of Reference (TOR) with Public Hearing,** subject to the following TORs, 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 structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m 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.
2. The PP shall study on impact of the proposed quarrying operations on the surrounding environment and the PP shall furnish mitigation measures/action plan for the same.

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3. The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal.
4. The PP shall furnish registered lease consent document obtained from all the pattadhars of proposed mining area.
5. The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds.
6. The PP shall develop Green belt/plantation all along the mining lease boundary in a safety barrier.
7. The PP shall furnish the total manpower required for the proposed mining project including Statutory officials, Supervisory staff, Skilled, Semi-skilled & Unskilled staff with showing the representation of the local people as per their eligibility and experience.

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.

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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.,

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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.

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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

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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.

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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	*Aegle marmelos*	Vilvam	[illegible]
2	*Adenanthera pavonina*	Manjadi	[illegible]
3	*Albizia lebbeck*	Vaagai	[illegible]
4	*Albizia amara*	Usil	[illegible]
5	*Bauhinia purpurea*	Mandharai	[illegible]
6	*Bauhinia racemosa*	Aathi	[illegible]
7	*Bauhinia tomentosa*	Iruvathi	[illegible]
8	*Buchanania axillaris*	Kattuma	[illegible]
9	*Borassus flabellifer*	Panai	[illegible]
10	*Butea monosperma*	Murukkamaram	[illegible]
11	*Bobax ceiba*	Ilavu, Sevvilavu	[illegible]
12	*Calophyllum inophyllum*	Punnai	[illegible]
13	*Cassia fistula*	Sarakondrai	[illegible]
14	*Cassia roxburghii*	Sengondrai	[illegible]
15	*Chloroxylon sweitenia*	Purasamaram	[illegible]
16	*Cochlospermum religiosum*	Kongu, Manjalilavu	[illegible]
17	*Cordia dichotoma*	Naruvili	[illegible]
18	*Crateva adansonii*	Mavalingum	[illegible]
19	*Dillenia indica*	Uva, Uzha	[illegible]
20	*Dillenia pentagyna*	SiruUva, Sitrutha	[illegible]
21	*Diospyro ebenum*	Karungali	[illegible]
22	*Diospyro chloroxylon*	Vaganai	[illegible]
23	*Ficus amplissima*	Kalltchi	[illegible]
24	*Hibiscus tiliaceus*	Aatrupoovarasu	[illegible]
25	*Hardwickia binata*	Aacha	[illegible]
26	*Holoptelia integrifolia*	Aayili	[illegible]
27	*Lannea coromandelica*	Odhiam	[illegible]
28	*Lagerstroemia speciosa*	Poo Marudhu	[illegible]
29	*Lepisanthus tetraphylla*	Neikottaimaram	[illegible]
30	*Limonia acidissima*	Vila maram	[illegible]
31	*Litsea glutinosa*	Pisinpattai	[illegible]
32	*Madhuca longifolia*	Illuppai	[illegible]
33	*Manilkara hexandra*	UlakkaiPaalai	[illegible]
34	*Mimusops elengi*	Magizhamaram	[illegible]
35	*Mitragyna parvifolia*	Kadambu	[illegible]
36	*Morinda pubescens*	Nuna	[illegible]
37	*Morinda citrifolia*	Vellai Nuna	[illegible]
38	*Phoenix sylvestre*	Eachai	[illegible]
39	*Pongamia pinnata*	Pungam	[illegible]

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40	*Premna mollissima*	Munnai	முன்னை
41	*Premna serratifolia*	Narumunnai	நறு முன்னை
42	*Premna tomentosa*	Malaipoovarasu	மலை பூவரசு
43	*Prosopis cineria*	Vanni maram	வன்னி மரம்
44	*Pterocarpus marsupium*	Vengai	வேங்கை
45	*Pterospermum canescens*	Vennangu, Tada	வெண்ணாங்கு
46	*Pterospermum xylocarpum*	Polavu	புலவு
47	*Putranjiva roxburghi*	Karipala	கரிபாலா
48	*Salvadora persica*	Ugaa Maram	உகா மரம்
49	*Sapotdus emarginatus*	Manipungan, Soapukai	மணிப்புங்கன் சோபுக்காய்
50	*Saraca asoca*	Asoca	அசோகா
51	*Streblus asper*	Pirav maram	பிரவ் மரம்
52	*Strychnos nuxvomic*	Yetti	எட்டி
53	*Strychnos potatorum*	Therthang Kottai	தேத்தாங் கொட்டை
54	*Syzygium cumini*	Naval	நாவல்
55	*Terminalia belleric*	Thandri	தான்றி
56	*Terminalia arjuna*	Ven marudhu	வெண் மருது
57	*Toona ciliate*	Sandhana vembu	சந்தன வேம்பு
58	*Thespesia populnea*	Puvarasu	புவரசு
59	*Walsuratrifoliata*	valsura	வால்சுரா
60	*Wrightia tinctoria*	Veppalai	வெப்பாலை
61	*Pithecellobium dulce*	Kodukkapuli	கொடுக்காப்புளி

Discussion by SEIAA and the Remarks:-

The subject was placed in the 677th Authority meeting held on 11.12.2023 &12.12.2023. The Authority noted that the subject was earlier appraised in the 416th SEAC meeting held on 13.10.2023. Based on the presentation made by the proponent, **SEAC decided to recommend for grant of Terms of Reference (TOR) with Public Hearing,** subject to the TORs stated therein, 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. Subsequently, the subject was placed in the 670th Authority meeting held on 06.11.2023. After detailed discussions, the Authority decided to obtain the following and place before the Authority for further course of action.

1. The PP shall furnish registered lease consent document obtained from all the pattadhars of proposed mining area.

Based on the Proponent's reply, the subject was again placed in the 677th Authority meeting held on 11.12.2023&12.12.2023. 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

of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions and conditions in **Annexure 'B'** of this minutes.

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

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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.

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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

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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.

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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
8) 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

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SEIAA-TN

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.

9) 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.

10) 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.

11) 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.

12) 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.

13) 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.

14) 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.

15) 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

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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

MEMBER SECRETARY
SEIAA-TN

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

MEMBER SECRETARY
SEIAA-TN

(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

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SEIAA-TN

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

MEMBER SECRETARY
SEIAA-TN

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

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SEIAA-TN

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

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SEIAA-TN

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 willtake 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.

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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. The APCCF (C), Regional Office, MoEF& CC (SZ), 34, HEPC Building, 1st& 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai -34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
6. The District Collector, Coimbatore District.
7. Stock File.

From

Thiru.V.Sasikumar, M.Sc.,
Assistant Director,
Dept. of Geology and Mining,
Coimbatore.

To

Thiru.G.Thangavel
S/o. Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuyili,
Sulur Taluk,
Coimbatore District.

Rc.No.423/Mines/2019 Dated: 01.08.2023

Sir,

Sub: Mines & Minerals – Minor Mineral – Coimbatore District – Sulur Taluk – Pachapalayam Village - Survey No.333/3 - over an extent of 2.62.5 hectares of patta land - Application preferred by Thiru.G.Thangavel for quarrying Rough stone and gravel – Precise area communicated - Details of quarries situated within 500 meter radial distance - requested – furnished - reg.

Ref. 1. Assistant Director, Dept. of Geology and Mining, Coimbatore Letter Rc.No.423/Mines/2019, Dated: 10.07.2023.
2. Thiru.G.Thangavel, Coimbatore letter dated: 21.07.2023.

****

I invite kind attention to the reference cited wherein Thiru.G.Thangavel has been issued precise area for the grant of Rough Stone and gravel quarry lease over an extent of 2.62.5 hectares in Survey No.333/3 of Pachapalayam Village, Sulur Taluk, Coimbatore District.

In the reference 2nd cited Thiru.G.Thangavel has requested to furnish the details of quarries situated within 500 meter radial distance from the proposed area.

In this connection the details of abandoned, expired, existing and proposed quarries situated within 500 meter radial distance from the proposed area are furnished below.

i) Existing Quarries

Sl. No.	Name of the Owner	Village &S.F.Nos.	Extent in Hect.	Lease period	Remarks
1.	Thiru.S.Sakthivel	Pachapalayam 334/2B, 334/3B, 334/4A and 334/4B	2.28.5	24.11.2018 to 23.11.2023	

2.	Thiru.A.Selvaraj	Pachapalayam 342/7D	1.33.5	22.01.2019 to 21.01.2024	
3.	Thiru.M.Muralikrishnan	Pachapalayam 343/2A, 343/2B1, 343/3A, 343/4A	2.35.85	13.12.2022 to 12.12.2027	

ii) Expired Quarries

Sl. No.	Name of the Owner	Village & S.F.Nos.	Extent in Hect.	Lease period	Remarks
1	Thiru.Meiyarasu	Pachapalayam 333/1	2.61.5	12.08.2017 to 11.08.2022	

iii) Abandoned quarries

Sl. No.	Name of the Owner	Village & S.F.Nos.	Extent in Hect.	Lease period	Remarks
1.	Tmt.Selvarani	Pachapalayam 331/1	2.18.5		

iv) Proposed quarries

Sl. No.	Name of the Owner	Village & S.F.Nos.	Extent in Hect.	Remarks
1.	Thiru.G.Thangavel	Pachapalayam 333/3	2.65.5	Subject area Precise area communicated
2.	Thiru.A.Natarajan	Pachapalayam 342/7E(Part)	1.04.0	-

v) Future Proposed quarries

Sl. No.	Name of the Owner	Village &S.F.Nos.	Extent in Hect.	Remarks
---NIL---				

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

From

Thiru.V.Sasikumar, M.Sc.,
Assistant Director,
Dept. of Geology and Mining,
Coimbatore.

To

Thiru.G.Thangavel
S/o. Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuili,
Sulur Taluk,
Coimbatore District

Rc.No.423/Mines/2019 Dated: 01.08.2023

Sir,

Sub: Mines & Minerals – Minor Mineral – Coimbatore District – Sulur Taluk – Pachapalayam Village - Survey No.333/3 - over an extent of 2.62.5 hectares of patta land - Application preferred by Thiru.G.Thangavel for quarrying Rough stone and gravel – Submission of mining plan for approval – approved – regarding.

Ref: 1. Quarry lease application dated 19.06.2019 & 05.06.2023 preferred by Thiru.G.Thangavel, Coimbatore.
2. Assistant Director, Dept. of Geology and Mining, Coimbatore Letter Rc.No.423/Mines/2019, Dated: 10.07.2023
3. Mining Plan submitted by Thiru.G.Thangavel dated: 21.07.2023.

****

In response to the precise area communicated by the Assistant Director of Geology and Mining, Coimbatore the applicant Thiru.G.Thangavel has submitted three copies of mining plan vide reference 3rd cited for the grant of Rough stone and gravel quarry lease over an extent of 2.62.50 hectares of patta land in Survey No. 333/3 of Pachapalayam Village, Sulur Taluk, Coimbatore District.

2. The mining plan submitted for the grant of Rough stone and gravel quarry lease over an extent of 2.62.50 hectares of patta land in Survey No. 333/3 of Pachapalayam Village, Sulur Taluk, Coimbatore District has been verified in detail.

3. As per the guidelines/instructions issued by the Commissioner of Geology and Mining, Chennai vide letter Rc.No.3868/LC/2012, dated 19.11.2012, the mining plan is hereby approved, subject to the following conditions:

(i) The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether

such laws are made by the Central Government, State Government or any other authority.

(ii) This approval of the mining plan does not in any way imply the approval of the Government in terms or any other provisions of the Mines and Minerals (Development and Regulation) Amended Act, 2015, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Explosives Act, 1884 (Central Act IV of 1884) and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

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

(iv) As per the Assistant Director, Dept. of Geology and Mining, Coimbatore letter Rc.No. 423/Mines/2019, Dated: 10.07.2023 the following conditions have been incorporated in the Mining Plan.

a) No hindrance should be caused to the adjacent pattadars and public.

b) A safety distance of 7.5 meters should be provided for the adjacent patta lands from the lease applied area.

c) A safety distance of 10 meters should be provided for the footpath situated on the western side of the applied area.

d) DGPS survey should be done by the Government recognized agency and boundary stones should be erected along the entire boundary of the leased out area.

c) Quarrying should be done in are seeking permission along after leaving proper safety distance.

v) Quarrying shall be done as per the approved Mining Plan and that the mining plan is approved without prejudice to any other law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.

Encl: Two copies of Approved Mining Plan.

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

Copy submitted to the Director of Geology and Mining, Chennai-32.

MINING PLAN

FOR

PACHAPALAYAM VILLAGE ROUGH STONE AND GRAVEL MIN[illegible]

PROGRESSIVE QUARRY CLOSURE PLAN

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

Lease period 10 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	:	COIMBATORE
TALUK	:	SULUR
VILLAGE	:	PACHAPALAYAM
S.F. NO'S	:	333/3
EXTENT	:	2.62.50Hectares

ADDRESS OF THE APPLICANT

Mr.G.THANGAVEL,
S/o. Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuili, Pachapalayam,
Sulur Taluk,
Coimbatore District – 641201.

PREPARED BY

Dr.S.KARUPPANNAN.M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(A NABET Accredited & ISO Certified Company)
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E-mail: info.gtmsdpi@gmail.com ,
Website: www.gtmsind.com

CONTENTS

ANNEXURES

Sl. No.	Description	Annexure No.
1.	Copy of precise area communication letter	I
2.	Copy of **FMB** (Field Measurement book)	II
3.	Copy of "A" register	III
4.	Copy of Village map	IV
5.	Copy of Chitta and Adangal	V
6.	Copy of Consent Letter	VI
7.	Photo copy of the applied lease area	VII
8.	Copy of Explosive License, Agreement and Blaster Certificate	VIII
9.	Copy of ID Proof of the authorized signatory	IX
10.	Copy of RQP Certificate	X

LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key map	I	Not to scale
2	Location plan	I-A	Not to scale
3	Toposheet map	I-B	1:1,00,000
4.	Satellite imagery map	I-C	1: 5,000
5.	Environmental plan	I-D	1: 5,000
6.	Mine lease plan	II	1:1500
7.	Surface & Geological plan	III	1:1000
8.	Geological Sections	IIIA	**Sections** Hor 1:1000 Ver 1:500
9.	Year wise Development & Production plan	IV	1:1000
10.	Year wise Development, Production Sections	IVA	**sections** Hor 1:1000 Ver 1:500
11.	Mine layout plan and Land use pattern	V	1:1000
12.	Progressive Mine Closure Plan	VI	1:1000
13.	Progressive Mine Closure Section	VIA	**Sections** Hor 1:1000 Ver 1:500
14.	Conceptual plan	VII	1:1000
15.	Conceptual sections	VIIA	**Sections** Hor 1:1000 Ver 1:500

Mr.G.Thangavel,
S/o. Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuili, Pachapalayam,
Sulur Taluk,
Coimbatore District – 641201.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry lease in S.F.No's: 333/3 over an extent of 2.62.5hectares of Pachapalayam Village, Sulur Taluk, Coimbatore 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, Coimbatore 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: Coimbatore, TN.
Date:

Signature of the applicant
(G.Thangavel)

Mr.G.Thangavel,
S/o. Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuili, Pachapalayam,
Sulur Taluk,
Coimbatore District – 641201.

DECLARATION

The Mining Plan in respect of rough stone and gravel quarry lease in S.F.No's: 333/3, over an extent of 2.62.5hectares of Pachapalayam Village, Sulur Taluk, Coimbatore 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: Coimbatore, TN.

Date:

Signature of the applicant
(G.Thangavel)

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,
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Ph: +91 9443937841,7010076633
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

This is to certify that, the provisions of 19(1) and 22 Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone and gravel quarry lease in S.F.No's: 333/3, over an extent of 2.62.5hectares of Pachapalayam Village, Sulur Taluk, Coimbatore District, Tamil Nadu State applied to **Mr.G.Thangavel,** Coimbatore District – 641201.

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: 19/7/23

Signature of the Recognized Qualified Person.

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
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Ph: +91 9443937841,7010076633
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

I certify that, in preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No's: 333/3 over an extent of 2.62.5hectares of Pachapalayam Village, Sulur Taluk, Coimbatore District, Tamil Nadu State prepared to **Mr.G.Thangavel,** Coimbatore District – 641201, 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: 19/7/23

Signature of the Recognized Qualified Person.

MINING PLAN

FOR PACHAPALAYAM VILLAGE ROUGH STONE AND GR[illegible] MINING LEASE

WITH PROGRESSIVE QUARRY CLOSURE PLA[illegible]

Patta- Ryotwari land / Open cast-Semi-Mechanized mining/Non-forest/Captive Use – "B2' Category

Lease period 10 Years from the date of lease execution

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

INTRODUCTORY NOTES:

a) **Introduction:** The applicant **Mr.G.Thangavel** S/o. Ganapathy Gounder, Residing at Thiyagi Kumaran Street, Periyakuili, Pachapalayam, Sulur Taluk, Coimbatore District, Tamil Nadu State - 641201 and filed an application for new proposals has submitted to the Assistant Director, Department of Geology and Mining (ADG & M), Coimbatore dated 19.06.2019 and 05.06.2023 had requested to grant the quarry lease for rough stone and gravel in S.F.No's: 333/3 over an extent of 2.62.50hectares of Pachapalayam Village, Sulur Taluk, Coimbatore District, Tamil Nadu State.

b) **The Precise area communication letter:** The Assistant Director, Department of Geology and Mining, Coimbatore has directed to the applicant **Mr.G.Thangavel** S/o. Ganapathy Gounder, through his precise area communication letter for quarrying lease rough stone and gravel at Tamil Nadu State, Coimbatore District, Sulur Taluk, Pachapalayam Village in S.F.No's: 333/3, over an extent of 2.62.5hectares has recommended as following conditions for a period of Ten (10) years under Rule 19 (1) and 22 of Tamil Nadu Minor Mineral Concession Rules, 1959.

(i) Safety should be maintained nearby patta lands and peoples without any hindrance while quarrying of rough stone and gravel.

(ii) A safety distance of 7.5meter should be provided to the adjacent patta lands.

(iii) A safety distance of 10meter should be provided to the proposed lease area on the western side Government Patta Road.

(iv) The applied lease area should be Surveyed by the Government Recognized firm using DGPS and Demarcation of boundary pillars.

(v) Child Labourers are not allowed in this quarry operation.

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.423/Mines/2019 Dated 10.07.2023.**

d) **Geological resources and Mineable reserves:** Geological resource of estimated as **920025m³** including the resources of safety zone, gravel etc. Of which, rough stone resources of about **869065m³**, and gravel is **50960m³**. The total mineable reserve is estimated to be **396041m³** by deducting the reserve safety zone, block in benches from the total Geological resources. of which, rough stone is about **356189m³** and gravel is **39852m³** up to a depth of 40m Which is (10m Above ground level and 30m Below ground level) (Refer Plate No. VII & VIIA).

e) **Proposed Production Schedule:** Total proposed production of rough stone is **307059m³** and gravel is **39582m³** up to a depth of 30m Which is (10m Above ground level and 20m Below ground 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 radius of 10Km from the project site area

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

iii). **Indian Reserve Forest Act, 1980:** There is no reserve forest within the 1.0km radius periphery of proposed lease area. The nearest R.F is Bolampatti – I Reserved Forest is 14.2km away from the western side of the lease area.

iv). **CRZ Notification, 2019:** There is no Sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 2019.

h) **Environmental measures to be adopted during the ongoing activity period,**

a. Usage of sharp drill bits while drilling which will help in reducing noise.
b. Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.

c. Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.

d. Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.

e. Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.

f. Transportation of material will be carried out during day time and material will be covered with tarpaulin.

g. The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.

h. And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

a.	Name of the Applicant	:	**Mr.G.Thangavel**
	Applicant address	:	S/o. Ganapathy Gounder, Thiyagi Kumaran Street, Periyakuili, Pachapalayam, Sulur Taluk.
	District	:	Coimbatore
	State	:	Tamil Nadu
	Pin code	:	641201
	Phone	:	+91 9790411222
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	---
b.	Status of the Applicant		
	Private individual	:	Private individual
	Cooperative Association	:	---
	Private company	:	---
	Public Company	:	---
	Public Sector Undertaking	:	---
	Joint Sector Undertaking	:	---
	Other (pl. specify)	:	---
c.	Mineral(s) Which are occurring in the area and which the applicant intends to mine	:	Rough stone and gravel quarry lease
d.	Period for which the mining lease granted /renewed/ proposed to be applied	:	The precise area has been communicated to the applicant for quarrying period of Ten (10) 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, Coimbatore vide **Rc.No. 453/Mines/2019Dated 10.07.2023**

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB
	District & State	:	Coimbatore, Tamil Nadu
	Taluk	:	Sulur
	Village	:	Pachapalayam

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

Survey No.	Sub division	Total Extent in Hect	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F. No.	Mine lease Applied Area out of total area in hect.
333	3	2.62.5	619	1. Tmt.Velumani 2. Mr.Easwaran 3.Mr.Jayakumar 4.Mr.Kalimuthu 5. Mr.Manivasagam 6.Mr.Thangavel	333/3	2.62.5
Total Extent		**2.62.5**		**Applied lease area extent**		**2.62.5**

	Lease area (hectares)	:	2.62.50Hectares
	Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	It is a patta land

Ownership / Occupancy	:	This is a patta land, SF No's. 333/3 is registered in the name of 1. Mr.Thangavel and 5 others as vide patta no- 1366. Hence the pattdhar given consent to the applicant. (Ref. Annex. No: VI).
Existence of Public Road / Railway line if any nearby and approximate distance	:	✓ Exploited quarry materials will be transported through the village road in situated on the Western side. ✓ There is an MDR-522 is situated on the Western side about 2.09km which is connecting Chettipalayam – Vadasithur. ✓ There is an railway line is situated on the Western side about 4.60km which is connecting Coimbatore – Pollachi.
Toposheet No. with latitude and longitude	:	Toposheet No. **58 F/01** Latitude: From 10°53'27.58015" N to 10°53'32.44183"N longitude: From 77°04'42.22100"E to 77° 04' 51.52142"E

Geo-Coordinates of the lease boundary:

DGPS SURVEY WAS CONDUTED IN STATIC METHOD (BASE POINT 2 HOUR DGPS POINT)						
ID	**Latitude (Global)**	**Longitude (Global)**	**Easting (Meter)**	**Northing (Meter)**	**Elevation (Meter)**	**Feature Code**
BS	10° 53' 30.13284"N	77° 04' 51.52142"E	727463.388	1204785.858	413.55	**Base Station**
ROVER POINTS 2 HOURS FOR BOUNDARY PILLAR AND 20 MINUTES FOR INTERMEDIATE PILLAR IN STATIC METHOD						
1	10°53' 32.44183"N	77° 04' 50.20100"E	727422.792	1204856.543	414.981	Boundary Pillar
2	10° 53' 31.02552"N	77° 04' 51.01094"E	727447.693	1204813.185	414.506	Intermediate Pillar
3	10° 53' 30.13284"N	77° 04' 51.52142"E	727463.388	1204785.858	413.55	Boundary Pillar
4	10° 53' 29.29913"N	77° 04' 50.10800"E	727420.629	1204759.94	411.644	Intermediate Pillar
5	10° 53' 28.99231"N	77° 04' 49.58783"E	727404.894	1204750.403	411.34	Boundary Pillar
6	10° 53' 28.65642"N	77° 04' 47.97721"E	727356.044	1204739.743	409.163	Intermediate Pillar
7	10° 53' 28.32053"N	77° 04' 46.36673"E	727307.193	1204729.084	407.197	Intermediate Pillar
8	10° 53' 27.98452"N	77° 04' 44.75613"E	727258.343	1204718.425	404.597	Intermediate Pillar
9	10° 53' 27.64861N	77° 04' 43.14552"E	727209.492	1204707.765	403.868	Intermediate Pillar
10	10° 53' 27.58015" N	77° 04' 42.81700"E	727199.526	1204705.591	404.13	Boundary Pillar
11	10° 53' 29.18242"N	77° 04' 42.53211"E	727190.534	1204754.776	403.926	Intermediate Pillar

	12	10° 53' 30.78483"N	77° 04' 42.24724"E	727181.543	1204803.961	404.039	Intermediate Pillar
	13	10° 53' 30.93221"N	77° 04' 42.22100"E	727180.716	1204808.486	404.525	Boundary Pillar
	14	10° 53' 31.23800"N	77° 04' 43.83773"E	727229.759	1204818.222	404.569	Intermediate Pillar
	15	10° 53' 31.54394"N	77° 04' 45.45442"E	727278.802	1204827.958	406.582	Intermediate Pillar
	16	10° 53' 31.84983"N	77° 04' 47.07111"E	727327.844	1204837.695	408.13	Intermediate Pillar
	17	10° 53' 32.15552"N	77° 04' 48.68783"E	727376.888	1204847.43	411.512	Intermediate Pillar

	Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is an barren Land.
b.	***Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.***	:	Refer plate no-IA & IB

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Bogampatti	5.03Km	NE
b.	Nearest police station	Chettipalayam	5.29km	NW
c.	Nearest fire station	Kinathukadavu	8.6km	SW
d.	Nearest medical facility	Chettipalayam	5.3Km	NW
e.	Nearest school	Ponnakkani	1.86km	East
f.	Nearest railway station	Chettipalayam	5.6km	NW
g.	Nearest port facility	Thoothukudi	261km	SE
h.	Nearest airport	Coimbatore	18.4km	NW
i.	Nearest DSP office	Podanur	13.0km	NW
j.	Nearest villages	Pachapalayam	0.9Km	Northwest
		Ponnakkani	1.72Km	East
		Pannapatti	2.4Km	Southeast
		Thekani	2.15km	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 elevated topography which is elevation difference of 10m. The maximum elevation (414m) was observed in eastern side of the site, while the minimum elevation (404m) was observed western side of the site. The slope is towards western side and falls in Toposheet no. 58- F/01.
(ii)	General Geology of the district: Geologically, the district is covered by rocks belonging to Archean age comprising the khondalite group, Charnockite Group, migmatite group, Sathayamangalam group, Bhavani Group and Alkali complex of Proterozoic age and Recent to Late Plestocene rocks of Cainozoic age. The Charnockite Group of rocks consisting of Charnockite, pyroxene granulites and associated magnetite quartzite, the Knodalite Group comprising gametiferous – sillimanite gneiss, calc-granulite, crystalline limestone, sillimanite quartzites and associated migmatitic gneisses. The rocks are restricted to the central and southern portions of the district, especially around Sulur, Sulur and Sulur taluks. The fissile homblende gneisses (Peninsular gneiss – younger phase) of Bhavani Group with enclaves of schistose, micaceous and amphibolitic rocks, fuchsitge – kyanite quartzites, ferruginous quartzite (Satyamangalam Group) intruded by a number of ultramafic and basic rocks and granites are seen in the Northern portions of the district especially around Mettupalayam and Northern areas of Coimbatore. The granites are Proterozoic age and occupy the Western end and Eastern Part of the District as separate bodies and are recognized as Maruthamalai Granite and Punjapuliyampatti Granites respectively. The quaternary alluvium is seen in the Western areas of Coimbatore town. The alluvium is more than 30m thick in the Chinnathadagam valley northwest of Coimbatore and in the Siruvani valley west of Coimbatore.		

Order of superposition of the depth lease area,

Age	Group	Rock Formation
Recent to Sub recent	----	Block Soil (1-2m thick)
Proterozoic	Acid intrusive	Granite, Granite gneiss
Archaean	Charnockite Group	Charnockite / Crystalline limestone / limekankar

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

Topography of the proposed lease area:

The proposed lease area is elevated topography. The maximum elevation (414m) was observed in eastern side of the site, while the minimum elevation (404m) was observed western side of the site. The slope is towards western side.

Gravel is obtained about 0-2.0m and rough stone starts from 2-40m from the surface level. 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	----	Gravel (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 a fresh quarry lease covered with gravel in this lease area. No exploration carried out.
	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 1:500, as shown in Plate No. IIIA
(d)	***Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below :-*** 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 one sections (longitudinal and transverse) to calculate the volume of material up to the depth of 40m Which is (10m Above ground level and 30m Below ground level) for five years plan period. (Refer Plate No. III & IIIA). The longitudinal and transverse cross sections were assigned XY-AB as respectively. Using the cross-sectional method, total reserve is estimated to be **920025m^3** including the resources of safety zone, and gravel, etc. Of which, rough stone resources of about **869065m^3** and gravel is **50960m^3**

GEOLOGICAL RESOURCES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m^3	Geological Resources in m^3	Gravel in m^3
XY-AB	I	260	98	2	50960		50960
	I	49	65	3	9555	9555	.....
	II	142	101	5	71710	71710	
	III	260	101	5	131300	131300	.....
	IV	260	101	5	131300	131300	.....
	V	260	101	5	131300	131300	.....
	VI	260	101	5	131300	131300	.....
	VII	260	101	5	131300	131300	.....
	VIII	260	101	5	131300	131300	.....
TOTAL					**920025**	**869065**	**50960**

(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 **396041m³** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 40m Which is (10m Above ground level and 30m Below ground level). Of which, rough stone is about **356189m³** and Gravel is **39852m³**. The commercially viable rough stone has been prepared on 1: 1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no's.VII & VIIA).

MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m^3	Mineable Reserve in m^3	Gravel in m^3
XY-AB	I	243	82	2	39852	.....	39852
	I	41	63	3	7749	7749	.....
	II	130	81	5	52650	52650	.....
	III	233	71	5	82715	82715	.....
	IV	223	61	5	68015	68015	.....
	V	213	51	5	54315	54315	.....
	VI	203	41	5	41615	41615	.....
	VII	193	31	5	29915	29915	.....
	VIII	183	21	5	19215	19215	.....
TOTAL					**396041**	**356189**	**39852**

4.0 MINING:

a)	Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.	:	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,

	(Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)		the benches and sides should be properly benched and sloped. The bench height should not exceed 5m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.

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

Total proposed production rough stone is about **307059m³** and gravel is **39852m³** up to a depth of 30m Which is (10m Above ground level and 20m Below ground 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	...	68563	57739	...	...	10824	...
Second	I	...	70462	61770	...	...	8692	...
Third	I	...	82981	62645	...	...	20336	...
Fourth	I	...	62125	62125	...	...	...	...
Fifth	I	...	62780	62780	...	...	...	...
Total	---	**...**	**346911**	**307059**	**...**	**...**	**39852**	**...**

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

YEARWISE PRODUCTIONS

Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m^3	Production in m^3	Gravel in m^3
XY-AB	I-YEAR	I	66	82	2	10824	.....	10824
		I	41	63	3	7749	7749	.....
		II	56	81	5	22680	22680	.....
		III	46	71	5	16330	16330	.....
		IV	36	61	5	10980	10980	.....
	TOTAL					**68563**	**57739**	**10824**
	II-YEAR	I	53	82	2	8692	.....	8692
		II	58	81	5	23490	23490	.....
		III	58	71	5	20590	20590	.....
		IV	58	61	5	17690	17690	.....
	TOTAL					**70462**	**61770**	**8692**
	III-YEAR	I	124	82	2	20336	.....	20336
		II	16	81	5	6480	6480	.....
		III	129	71	5	45795	45795	.....
		IV	34	61	5	10370	10370	.....
	TOTAL					**82981**	**62645**	**20336**

	IV-YEAR	IV	95	61	5	28975	28975	.....
		V	130	51	5	33150	33150	.....
		TOTAL				**62125**	**62125**	
	V-YEAR	V	83	51	5	21165	21165	.....
		VI	203	41	5	41615	41615	.....
		TOTAL				**62780**	**62780**	**0**
	GRAND TOTAL					**346911**	**307059**	**39852**

d)	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	:	Composite plan not prepared in this proposed lease area

e) ***Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:***

At this rate of production, the expected life of quarry is calculated as given below:

Rough stone:

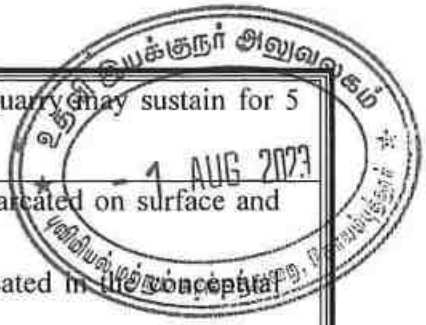
Mineable reserves of rough stone	=	**356189m³**
Five Year Production Reserves	=	**307059m³**
Yearly production	=	**61412m³**
Remaining Mineable Reserves	=	**49130m³**

Gravel:

Mineable reserves of gravel	=	**39852m³**
Yearly production	=	**13284m³**
Monthly production of gravel	=	**1107m³**

f) ***Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:***

i)	Time frame of completion of mineral exploration program 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 40m which is (10m Above ground level and 30m Below ground level) (R.L.414m to 374m) 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	Bench R.L	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	R.L.414-412m	First Five years	Gravel	243	82	2
I	R.L.412-409m		Rough stone	41	63	3
II	R.L.409-404m			130	81	5
III	R.L.404-399m			233	71	5
IV	R.L.399-394m			223	61	5
V	R.L.394-389m			213	51	5
VI	R.L.389-384m			203	41	5
VII	R.L.384-379m	Next Five Years		193	31	5
VIII	R.L.379-374m			183	21	5

iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: -	:	The recovery of rough stone in this quarry is 100%. There is no waste rock will be proposed in this lease area.
iv)	Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal: -	:	As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.
v)	Whether post mining land use envisaged: -	:	At the end of mining activities over the quarry pit may be utilized fish culture or storage of rain water reservoir used for irrigation purposes.
g)	Open cost mining		
i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-	:	The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the

	Mechanized, manual)		regulation 106 of the Metalliferous Mines Regulations, 1961 ★ in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 5m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.
ii)	Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice		The rough stone is proposed to quarry at 5m bench height & width conventional opencast semi mechanized quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste and are removal using Hydraulic excavator and loaded directly to the tippers and transported to the needy customer. Bench height = 5mts. Bench width = 5mts.
	a. Details of Topsoil/ Overburden		There is no topsoil shall be removed.
	b. Rough Stone waste and side burden waste:-		The recovery of rough stone in this quarry is 100%. There is no rough stone waste or side burden will be removed.
H	Underground Mining		Not applicable
i)	***Extent of mechanization:*** Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.		

(1) Drilling Machines:

Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Details of drilling equipment's are given below.

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

(2) Loading Equipment:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Hydraulic Excavator	1	2.9-4.5m^3	--	Diesel	--

(3) Haulage and Transport Equipment

(a) Haulage within the mining leasehold:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	7	--	--	Diesel	--

Whether the dumpers are fitted with exhaust conditioner should be indicated:
The dumpers not used in this quarry area, hence it's a small B2 category mine.

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:

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

4) **(4). Miscellaneous:**
Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.

	(A) Operations		The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.
	(B) Machineries deployed		Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted.

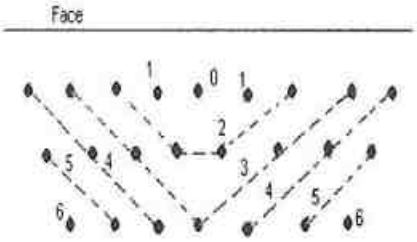
5. **BLASTING:**

a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.

Blasting pattern:

The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.

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 61412m^3 * 2.8= 171953MT	171953MT
8	Total handling per day (280 working day)	614MT
9	Nos. of holes per day (614/5.04 = 122)	122holes.
10	Meterage required per day (122 × 5.5 = 671)	671meters
11	Charge per hole	0.375kg
12	Powder factor 122X 0.375 kg =46	46kg



Stagged method of mining

b) Type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

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

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

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

Shallow depths jackhammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give hearing effect in rough stone for

	easy excavation and to control fly rock. Delay detonators: Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals. The major advantages of delay blasting are: ❖ Reduction of ground vibration ❖ Reduction in air blast ❖ Reduction in over break ❖ Improved fragmentation ❖ Better control of fly rock Blasting program for the production per day		
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)		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 70m in summer and 65m in rainy season from the general ground level observed in the adjacent bore well.
b)	Workings expected to be	:	Proposed mining depth is 30m (which is 10m

No of holes	:	122holes
Yield	:	614MT
Total explosive required	:	46kg-Slurry explosives
Charge per hole	:	0.375kg
Blasting at day time only	:	12.0p.m-1.0p.m

	_____ m. above / reach below water table by the year _____ .		above ground level + 20m below ground level). Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.
c)	Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged	:	The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300 Lpm and it shall be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and it is not contaminated with any hazardous things.
7.	***STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:***		
a).	Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the next five years: No separate of topsoil or any other wastes are removed in this lease area.		
b).	Land chosen for disposal of waste with proposed justification	:	There is no disposal of waste will be proposed in this lease area.
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***		
	Describe briefly the following a) Site services	:	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.

b) Employment potential:

As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision.

The following man power is proposed for quarrying 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.

1.	Highly Skilled	IInd class Mines Manager	1No.
		Mine Geologist	1No.
		Blaster	1No.
2.	Unskilled	Driver	7No's
		Hitachi Operator	2No.
		Musdoor / Labours	4 No's
		Total =	**16 No's**

10	**MINERAL PROCESSING/BENEFICIATIONS:**		
(a)	If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This	:	Excavated rough stone minerals directly will be used by the applicant in his own crusher for required size ½, ¾ and 1½ inches Jelly which are mainly used in road and building construction purpose. The recovery of rough stone in this quarry

	should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.		is 100%.
(b)	Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, 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 0.5KLD, utilized water is 1.5KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 4.0KLD 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.		

Sl. No.	Land Use	Present area (Hect.)
1.	Area under Mining	Nil
2	Infrastructure	Nil
3	Roads	Nil
4	Unutilized	2.62.5
5	Green belt	Nil
6	Settling Tank & Drainage	Nil
	Grand Total	**2.62.5**

11.2	Water Regime	:	Water table in this area is noticed at a depth of 70m in summer and 65m in rainy season from the general ground level and presently the quarrying of rough stone is proposed up to a depth of 40m (which is 10m above ground level + 30m below the ground 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	Climatic conditions: **Rainfall :-** Tamilnadu is exposed to both southwest and northeast monsoons. The Western Ghats acting as a barrier deprives full blast of Southwest monsoon winds. However, Southwest monsoon offers nearly 33 % of the rainfall received by the State, which helps cultivation. The State depends mainly the Northeast monsoon rains which are brought by the troughs of low pressures established in south Bay of Bengal between October and December. However, summer showers are also not uncommon. The average annual rainfall for the basin area is 689.04 mm **Climatic Conditions:** - The rest of the district lies in the rain shadow region of the Western Ghats and experiences salubrious climate most parts of the year. The mean maximum and minimum temperatures for Coimbatore city during summer and winter vary between 35 °C to 18 °C		
11.6	Human Settlement: The nearest villages are found in the buffer zone with population as per 2011 census.		

S.No	Village	Direction	Distance in Kms	Population
1	Pachapalayam	Northwest	0.9Km	2933
2	Ponnakkani	East	1.72Km	1563
3	Pannapatti	Southeast	2.4Km	1182
4	Thekani	Southwest	2.15km	1714

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	:	The proposed area not fall under notified area under Water (Prevention & Control of

	under Water (Prevention & Control of Pollution), Act, 1974		Pollution), Act, 1974

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

i) ***Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc:***

Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:

Sl. No.	Land Use	Area in use during the quarrying period (Hect.)
1.	Area under Mining	2.08.49
2	Infrastructure	0.02.0
3	Roads	0.05.0
4	Green belt	0.43.05
5	Settling Tank & Drainage	0.03.96
6	Un-utilized area	Nil
	Grand Total	**2.62.5**

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	:	There is no topsoil shall be removed.
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 30m (which is 10m above ground level + 20m below ground level) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
iii).	***Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares.*** **Green Belt Development:** Safety barrier, school and nearest panchayat roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other		

	regional trees will be planted in a phased manner as described below: **Year** | **Place** | **Area in Sq.m** | **No.of Plants** | **Rate of survival** | **Rate** | **Amount in Rs** First | Lease Boundary | 4305 | 475 | 80% | @100 Rs Per sapling | 47,500/- Second | Approach road and Nearby Village Road | -- | 300 | 80% | | 30,000/- Third | Schools | -- | 300 | 80% | | 30,000/- **Total** | **1,07,500/-**		
iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the first five years (and upto conceptual plan period for 'A' category mines).	:	No waste or rejects removed in this lease area.
v).	Measures to control erosion / sedimentation of water courses.	:	Not applicable. There is no major dumps are stabilize in this quarry area.
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses.
vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.
viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	It is a small B2 category open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

d). Monitoring schedules for different environmental components after the commencement of mining and other related activities. (for 'A' category mines only)

Not applicable. It is 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 40m (which is 10m above ground level + 30m below ground level). The mined-out area will be fenced on top of working bench with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 475 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 30m (Which is 10m below ground level + 20m below ground level) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the

			circulars and amendments made for Mine labours under the guidance of DGMS being a mechanized operation.
12.6	Disaster management and Risk Assessment	:	Open cast mining method is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.
12.7	Care and maintenance during temporary discontinuance	:	A board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.
12.8	Economic repercussions of closure of quarry and man power entrenchments	:	During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 16 labors will be improved.

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

A	**Fixed Asset Cost:**		
	1. Land Cost (Consent land)	:	Rs. 6,00,000/-
	2. Labour Shed		Rs. 1,50,000/-
	3. Sanitary Facility	:	Rs. 1,50,000/-
	4. Fencing	:	Rs. 3,00,000/-
	5. Other expenses (Security guard, dust bin, etc)	:	Rs. 4,00,000/-
	Total	:	**Rs. 16,00,000/-**

B	**B. Machinery cost**	:	**Rs. 25,00,000/-** (Hire Basis)
C	**Total Expenditure of EMP cost** (for five years)		
	1. Drinking Water Facility	:	Rs. 1,50,000/-
	2. Sanitary facility & Maintenance	:	Rs. 1,50,000/-
	3. Permanent water sprinkler	:	Rs. 5,00,000/-
	4. Afforestation and its maintenance	:	Rs. 1,07,500/-
	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 (0.03.96Ha/ 396 Sq.m X 400 Rs)	:	Rs. 1,58,400/-
	8. Blasting materials with blast mat cost	:	Rs. 20,00,000/-
	9. Environment monitoring	:	Rs. 5, 00,000/-
	Total	:	**Rs. 37,65,900/-**
D	**Total Project Cost (A+B+C)**	:	**Rs. 78,65,900/-**

13.0 FINANCIAL ASSURANCE:

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

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

(i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.

(ii) The applicant will endeavor every attempt to quarry the rough stone 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, Coimbatore vide letter **Rc.No. 423/Mines/2019 Dated 10.07.2023.**

(iv) Total proposed production rough stone is **307059m^3** and gravel is **39852m^3** up to a depth of 30m Which is (10m Above ground level and 20m Below ground level) for five years plan period.

17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the applicant @ 2.0% of average net profit of the company for the last three financial years to the nearby village on the Ministry has notified the amendments in section 135 of the Act as well in the CSR Rules on 22nd January 2021 as circular no. CSR-05/01/2021-CSR-MCA dated 25th August 2021.

- 1 AUG 2023

Place: Dharmapuri, TN
Date: 19/7/23

Signature of the Recognized Qualified Person

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
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Dharmapuri - 636 705. Tamil Nadu, India.
E-mail : info.gtmsdpi@gmail.com
website : www.gtmsind.com

This Mining Plan is Approved subject to the conditions / stipulation & indicated in the Mining Plan Approval Letter No: H23/Mines/2019 dt 1-8-23 office of the A.D, Geology & Mining Coimbatore

This Mining Plan is Approved based on the incorporation of the particulars specified in the letter of the commissioner of Geology and Mining, Chennai ref No: 3863/LC/2012 dated 19.11.2012 and subjected to further fulfilment of the condition laid down under the Minor Mineral Concession Rules 19[illegible]

ASSISTANT DIRECTOR
DEPARTMENT OF GEOLOGY & MINING
COIMBATORE DISTRICT.

ANNEXURE -7

உதவி இயக்குநர் அலுவலகம்,
புவியியல் மற்றும் சுரங்கத்துறை,
மாவட்ட ஆட்சியர் அலுவலக வளாகம்,
கோயம்புத்தூர் - 18.

ந.க.எண்.423/கனிமம்/2019

நாள்: 10.07.2023

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - கோயம்புத்தூர் மாவட்டம் - சூலூர் வட்டம் - பச்சாபாளையம் கிராமம் - புல எண்.333/3-ல் 2.62.5 ஹெக்டேர் பரப்பளவுள்ள பட்டா பூமியில் சாதாரணகற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க திரு.G.தங்கவேல் என்பவருக்கு - குவாரி குத்தகை அனுமதி வழங்குவது - தொடர்பாக.

பார்வை:
1. திரு.G.தங்கவேல், த/பெ.கணபதி கவுண்டர், தியாகி குமரன் வீதி, பெரியகுயிலி, பச்சாபாளையம், சூலூர், கோயம்புத்தூர் மாவட்டம் என்பவரது விண்ணப்பம் நாள்: 19.06.2019 மற்றும் 05.06.2023.
2. இவ்வலுவலக கடிதம் இதே எண். நாள்: 25.06.2019.
3. வருவாய் கோட்டாட்சியர், கோயம்புத்தூர் தெற்கு அவர்களின் கடிதம் மூ.மு.எண்.7118/2022/அ2 நாள்: 30.12.2022.
4. உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, கோயம்புத்தூர் தணிக்கை அறிக்கை நாள்:
5. இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, சென்னை கடிதம் எண். 1870/எம்.எம்-1/2020 நாள்: 12.08.2020.
6. அரசாண எண். 208 தொழில்துறை (எம்எம்.சி.1) நாள்:21.09.2020

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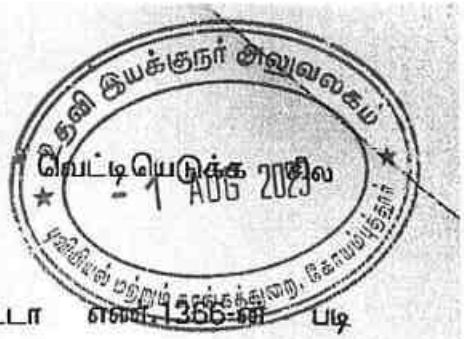
பார்வை 1-ல் கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம், பச்சாபாளையம், பெரியகுயிலை, தியாகி குமரன் வீதி என்ற முகவரியில் வசிக்கும் திரு.கணபதி கவுண்டர் என்பவரின் மகன் திரு.G.தங்கவேல் என்பவர் கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம், பச்சாபாளையம் கிராமம், புல எண்.333/3-ல் 2.62.5 ஹெக்டேர் பரப்பளவுள்ள பட்டா பூமியில் சாதாரணகற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க குவாரி குத்தகை உரிமம் கோரி உரிய ஆவணங்களுடன் விண்ணப்பித்துள்ளனர்.

மேற்படி மனு தொடர்பாக, வருவாய் கோட்டாட்சியர், கோயம்புத்தூர் தெற்கு மற்றும் கோயம்புத்தூர் புவியியல் மற்றும் சுரங்கத்துறை உதவி புவியியலாளர் ஆகியோர் புலத்தணிக்கை மேற்கொண்டு கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம், பச்சாபாளையம், பெரியகுயிலை, தியாகி குமரன் வீதி என்ற முகவரியில் வசிக்கும் திரு.கணபதி கவுண்டர் என்பவரின் மகன் திரு.G.தங்கவேல் என்பவருக்கு கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம், பச்சாபாளையம் கிராமம், புல எண்.333/3-ல் 2.62.5 ஹெக்டேர் பரப்பளவுள்ள



பட்டா பூமியில் சாதாரணகற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க கீழ்கண்ட நிபந்தனைகளுடன் பரிந்துரை செய்துள்ளார்கள்.

அனுமதி கோரும் புல எண்.333/3 ஆனது பட்டா எண்.1366-ன் படி திரு.கணபதிக்கவுண்டர் என்பவரின் மகன் திரு.தங்கவேல், திரு.தங்கவேல் என்பவரின் மனைவி திருமதி.வேலுமணி, திரு.காளியப்பன் என்பவரின் மகன் திரு.மாணிக்கவாசகம், திரு.சாமிநாதகவுண்டர் என்பவரின் மகன் திரு.காளிமுத்து, திரு.கந்தசாமி என்பவரின் மகன் திரு.ஜெயகுமார் மற்றும் திரு.ராமசாமி என்பவரின் மகன் திரு.ஈஸ்வரன் ஆகியோர் பெயரில் கூட்டுப்பட்டாவாக கிராம கணக்கில் தாக்கலாகியுள்ளது. மேற்படி பட்டாதாரர்களான திரு.தங்கவேலு மற்றும் 5 நபர்கள் தனக்கு பாத்தியப்பட்ட புலத்தில் அரசு அனுமதி அளிக்கும் நாளிலிருந்து 10 ஆண்டுகளுக்கு திரு.G.தங்கவேல் என்பவர் சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க தனக்கு எவ்வித ஆட்சேபனையும் இல்லை என சம்மத கடிதம் அளித்துள்ளார். எனவே மேற்படி பூமியில் மனுதாரர் குவாரி குத்தகை உரிமம் பெற தகுதியுடையவர் ஆவார்.

எனவே, வருவாய் கோட்டாட்சியர், கோயம்புத்தூர் தெற்கு மற்றும் உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, கோயம்புத்தூர் ஆகியோரின் பரிந்துரைகளின் அடிப்படையில் கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம், பச்சாபாளையம், பெரியகுயிலை, தியாகி குமரன் வீதி என்ற முகவரியில் வசிக்கும் திரு.கணபதி கவுண்டர் என்பவரின் மகன் திரு.G.தங்கவேல் என்பவருக்கு கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம், பச்சாபாளையம் கிராமம், புல எண்.333/3-ல் 2.62.5 ஹெக்டேர் பரப்பளவுள்ள பட்டா பூமியில் 1959-ஆம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகளில் விதி 19(1) மற்றும் 22-ன் படி குத்தகை ஒப்பந்த பத்திரம் நிறைவேற்றும் நாளிலிருந்து 10 (பத்து) ஆண்டுகளுக்கு சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு குவாரி குத்தகை வழங்குவதற்குரிய நிலப்பரப்பாக (Precise Area Communication) கருதப்படுகிறது.

நிபந்தனைகள்

1. அருகிலுள்ள பட்டா நிலங்களுக்கும் மற்றும் பொது மக்களுக்கும், எவ்வித இடையூறும் இன்றி சாதாரண கல் மற்றும் கிராவல் குவாரி பணி மேற்கொள்ள வேண்டும்.
2. அருகில் உள்ள பட்டா நிலத்திற்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு குவாரிப்பணி மேற்கொள்ள வேண்டும்.
3. அனுமதி கோரும் புலத்தின் மேற்கு பகுதியில் அமைந்துள்ள அரசு புறம்போக்கு பட்டா பாதைக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு குவாரிப்பணி மேற்கொள்ள வேண்டும்.

4. அனுமதி கோரும் புலத்தினை அரசு அங்கீகாரம் பெற்ற நிறுவனத்தினரால் DGPS (Differential Global Positioning System)-ன் படி ஆய்வு செய்யப்பட்டு ஒவ்வொரு எல்லைத் தூண்களும் நடப்படவேண்டும்.

5. குழந்தை தொழிலாளர்களை வேலைக்கு அமர்த்தல் கூடாது.

மேலும், தமிழ்நாடு சிறுகனிம சலுகை விதிகள்-1959 விதி எண். 41 மற்றும் 42-ன் படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறும், மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு அதிகார அமைப்பின் அனுமதியினை பெற்று சமர்ப்பிக்கவும் மனுதாரரை கேட்டுக் கொள்ளப்படுகிறது.

தலையக்குநர் அலுவலகம் புவியியல் மற்றும் சுரங்கத்துறை, கோயம்புத்தூர் - 1 AUG 2023

உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை
கோயம்புத்தூர்.

பெறுநர்:
திரு.G.தங்கவேல்,
த/பெ.கணபதி கவுண்டர்,
தியாகி குமரன் வீதி,
பெரியகுயிலி,
பச்சாபாளையம், சூலூர்,
கோயம்புத்தூர்.

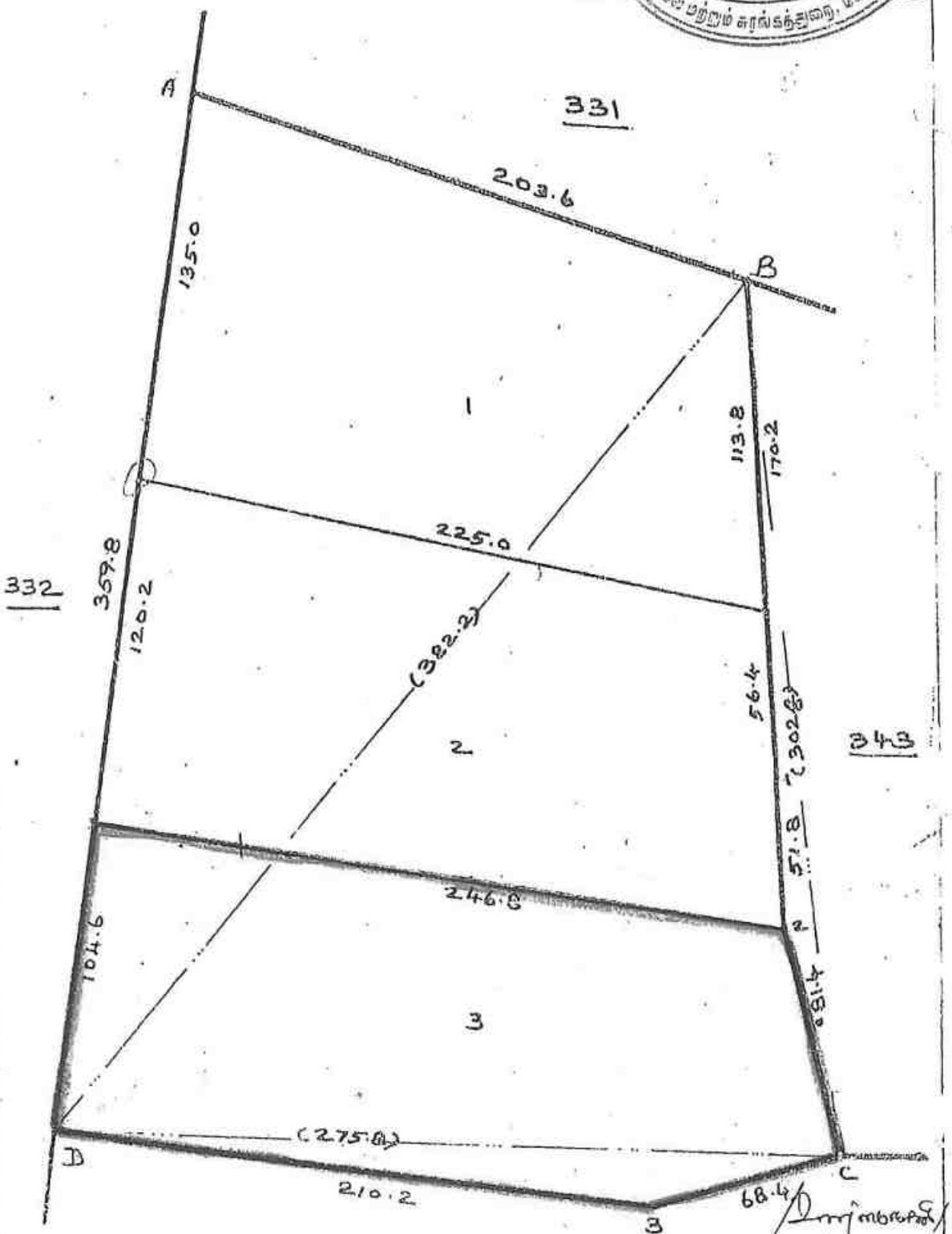
மாவட்டம். தேனி

கிராமம்

வட்டம். பெரியகுளம்

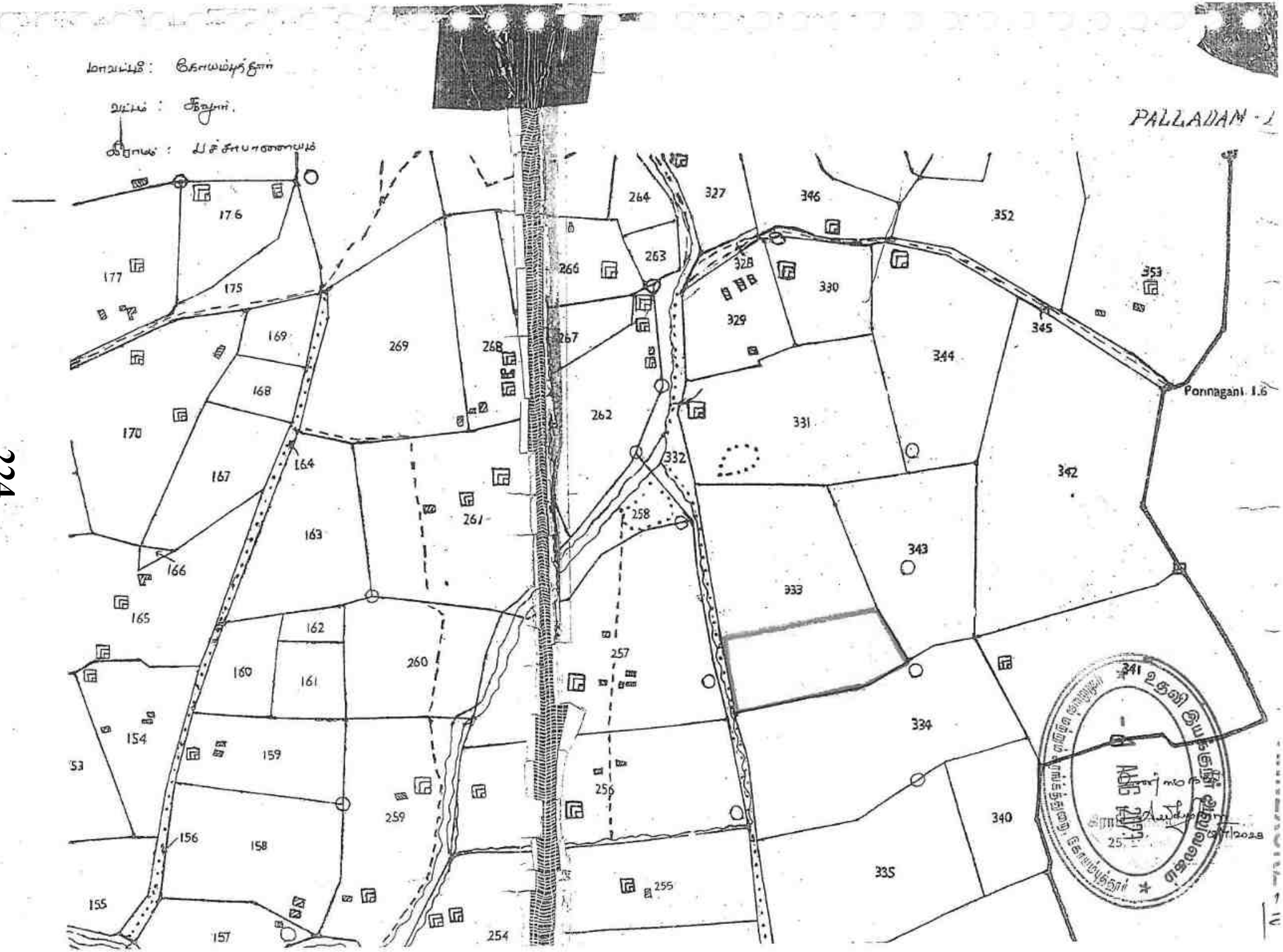
புல எண். 333

பரப்பு: ஹெக்டேர்



அளவு. 1:2000 எனும்

1	2	3	4	5	6	7	8	9	10	11
							ரூ. பை.	ஹெ. ஏர்ஸ்	ரூ. பை.	
4B	331-4டா	ர	ப	1	8-2	4	2 77	1 17.0	3 27	22 வை. அருணாசலக் கவுண்டர்
4C	-4பா	ர	ப	1	8-2	4	2 77	0 52.0	1 44	20 க. அய்யாசாமிக் கவுண்டர்
								6 32.0	16 87	
	332	அ	மை					4 96.0		
1A	333-1	ர	ப	1	8-2	4	2 77	2 61.5	7 25	554 க. சுந்தரக் கவுண்டர் (1) க. சுப்பாத்தாள் (2)
2	-2	ர	ப	1	8-2	4	2 77	2 62.5	7 31	202 ரா. செல்லம்மாள்
3	-3	ர	ப	1	8-2	4	2 77	2 62.5	7 31	202 ரா. செல்லம்மாள்
								7 86.5	21 87	
1A	334-1பா	ர	ப	1	8-2	4	2 77	0 63.0	1 75	555 நாச்சி மாதாரி நா. குயிலாள்
1B	-1பா	ர	ப	1	8-2	4	2 77	1 68.5	4 71	556 ந. நாராயண செட்டியார் (1) பெ. துளசியம்மாள் (2)
1C	-1பா	ர	ப	1	8-2	4	2 77	0 95.0	2 64	253 சி. நடராஜ்
1D	-1பா	ர	ப	1	8-2	4	2 77	0 28.0	0 78	555 நாச்சி மாதாரி (1) நா. குயிலாள் (2)
2A	-2பா	ர	ப	1	8-2	4	2 77	1 36.0	3 80	514 வெ. பெரியக்கான்
2B	-2பா	ர	ப	1	8-2	4	2 77	1 31.5	3 64	447 ரா. வெள்ளியங்கிரி கவுண்டர்
3A	-3பா	ர	ப	1	8-2	4	2 77	0 34.5	0 95	253 சி. நடராஜ்
3B	-3பா	ர	ப	1	8-2	4	2 77	0 38.5	1 05	20 க. அய்யாசாமி


மாவட்டம் : கோயம்புத்தூர்
வட்டம் : கிணத்துக்கடவு.
கிராமம் : பச்சாபாளையம்
PALLADAM - I
Ponnagani I.6
LEASE APPLIED AREA
224

உதவி இயக்குநர் அலுவலகம்
- 1 AUG 2023

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : கோயம்புத்தூர் வட்டம் : சூலூர்

வருவாய் கிராமம் : பச்சாபாளையம் பட்டா எண் : 1366

உரிமையாளர்கள் பெயர்

1.	தங்கவேல்	மனைவி	வேலுமணி
2.	ராமசாமி	மகன்	ஈஸ்வரன்
3.	கந்தசாமி	மகன்	ஜெயகுமார்
4.	சாமிநாதகவுண்டர்	மகன்	காளிமுத்து
5.	காளியப்பன்	மகன்	மாணிக்கவாசகம்
6.	கணபதிக்கவுண்டர்	மகன்	தங்கவேல்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
333	3	2 - 62.50	7.31	--	--	--	--	2019/0103/12/162734- -- -- 10-04-2019
343	2C	0 - 17.50	0.48	--	--	--	--	2019/0103/12/162734- -- -- 10-04-2019
		2 - 80.00	7.79					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **12/10/025/01366/30566** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 19-07-2023 அன்று 10:59:41 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

கிராம கணக்கு

1452 ஆம் பசலியில் கோயம்புத்தூர் மாவட்டம் திருப்பூர் வட்டம் பத்தாம்பாளையம்

நில வரித் திட்டத்தின்படி புலன்களின் விபரம்.						சாகுபடி யாளரின் பெயர்.	முதல் போகம்.				
நில அளவை எண்.	உட்பிரிவு எண்.	பரப்பு.	தீர்வை	ஒரு போகம் அல்லது இரு போகம்.	கைப்பற்று தாரருடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரருடைய பெயர்.	நிலத்தின் எந்த பகுதி யாரால் சாகுபடியாளரால் பயிரிடப்பட்டுள்ளது.	எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	பயிரின் பெயர்.	பயிரான / அறுவடை யான பரப்பு.	உண்மையான பாய்ச்சல் ஆதாரம்.	விளைச்சல் அளவு விழுக்காடு.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
333	3	2.62.5	9.31	1366	தங்கவேல் (ப)						
								உண்மைநகல் J. Aubey Jose கிராம நிர்வாக அலுவலர் 25, ... 31/7/23			

கிராமத்தில் வருடவாரி புலவாரி கைப்பற்று சாகுபடி அடங்கல் கணக்கு

இரண்டாம் போகம்.					கிராம அலுவலரின் குறிப்புரை :- (1) புலன்களின் பகுதிகளில் மட்டும் பயிரிடப்பட்ட இனங்களில் விதைகள் அளவில். (2) கைப்பற்றில் இல்லாத நிலம் - எனின் சாகுபடியின் தன்மையும். (3) முந்தைய மாதத்தில் பாய்ச்சல் உதவியின்றி பயிரிடப்பட்டவை, நிலம் - என்று பதிவாகியுள்ள இதர மாதங்களில் கூடுதல் பாய்ச்சப்பட்ட விவரங்கள்.	கீழ்க்கண்டவகையில் பயிரிடப்படாது உள்ள நிலத்தின் தன்மை மற்றும் பரப்பின் விவரங்கள் ஒவ்வொரு நில அளவை எண் அல்லது அதன் பகுதியில்.	
எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	பயிரின் பெயர்.	பயிரான / அறுவடையான பரப்பு.	உண்மையான பாய்ச்சல் ஆதாரம்.	விளைச்சல் அளவு விழுக்காடு.		(அ) வனம், (ஆ) பயனற்ற பயிர் செய்ய இயலாத நிலம், (இ) விவசாயம் மற்றும் இதர காரியங்களுக்கு பயன் படுத்தப் படும் நிலம், (ஈ) பயிரிடத்தக்க தரிசு (உ) நிலையான புல் தரைகளும் மற்றும் இதர மேய்ச்சல் நிலங்களும், (ஊ) விதைக்கப்பட்ட நிகர பரப்பில் சேர்க்கப்படாத மரவகைப் பயிர்களும் தோப்புகளும், (எ) நடப்புத் தரிசுகள் (ஏ) இதர தரிசு நிலங்கள்.	பயிர் பார்வையிட்டு அலுவலர் குறிப்புரைகள்.
(13)	(14)	(15)	(16)	(17)	(18)	(18அ)	(19)

300/ 1-R.F. III-A-10-20,00,000 Cps.-GBP.-Nov.-7-2023.

बीस रुपये

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INDIA

TWENTY RUPEES

INDIA NON JUDICIAL

1 AUG 2023

தமிழ்நாடு तमिलनाडु TAMIL NADU 68AB 628568

13-06-2019 தங்கவேல் சூலூர்

M. DORAISWAMY
"STAMP VENDOR"
10-A, STATE BANK ROAD,
COIMBATORE - 641 018.
L.No: 733/B1/97/83-3

சம்மதக் கடிதம்

கோவை மாவட்டம், சூலூர் தாலூக்கா, பச்சாபாளையம், பெரியகுமிலி, தியாகிகுமரன் வீதியில் வசிக்கும் திரு.தங்கவேல் அவர்கள் மனைவி வேல்மணி-1, மற்றும் மாணிக்கவாசகம்-2,த/பெ.காளியப்பன்,காளிமுத்து-3,த/பெ.சாமிநாதகவுண்டர், ஜெயகுமார்-4 த/பெ.கந்தசாமி, ஈஸ்வரன்-5 த/பெ. ராமசாமி ஆகிய எங்களுக்கும்,

கோவை மாவட்டம், சூலூர் தாலூக்கா, பச்சாபாளையம், பெரியகுமிலி, தியாகிகுமரன் வீதியில் வசிக்கும் திரு. கணபதி கவுண்டர் அவர்கள் மகன் திரு. ஜி.தங்கவேல் அவர்களுக்கும் கூட்டாக பாத்தியப்பட்ட சூலூர் வட்டம், பச்சாபாளையம் கிராமம், க.ச. 333/3-ல் 2.62.5 ஹெக்டேர் பாத்தியப்பட்டது.(பட்டா எண். 1366)

மேற்காணும் பூமியில், மேலே கூறப்பட்டுள்ள ஜி.தங்கவேல் அவர்கள் கல் உடைக்க அனுமதி கோரி மாவட்ட ஆட்சியருக்கு விண்ணப்பம் செய்துள்ளார். அவர் பெயரில் குத்தகை உரிமம் வழங்குவதில் எங்களுக்கு எவ்வித ஆட்சேபணையும் இல்லை என்பதையும் மாவட்ட ஆட்சியர் அவர்கள் அனுமதி வழங்கிய பின் 5 ஆண்டுகளுக்கு கல் உடைத்துக்கொள்ள சம்மதம் தெரிவித்துக் கொள்கிறோம்.

பிரமாணதாரர்கள்

1. வேலுமணி 2. 3.

5.

19/6/19

NOTARY
S. MAHENDRAN
Reg. No. 325/2015
COIMBATORE DT.
NOTARIAL
GOVERNMENT OF TAMIL NADU

S. MAHENDRAN
ADVOCATE AND NOTARY
26/32, SIDHI VINAYAKAR KOIL STREET
COIMBATORE - 641 001
Cell 98423 17759

PHOTOCOPY OF THE APPLIED LEASE AREA

Site photos in respect of rough stone quarry lease in S.F.No's. 333/3 (Part) - Patta land - over an extent of 2.62.5 hectares - Pachapalayam Village – Sulur Taluk – Coimbatore District, Tamil Nadu State in belongs to Mr.G.Thangavel.

ANNEXURE - VIII

TIN : 33ACIFS0095D1ZC

Phone : 0422-2688029
Cell : 98422 13206
Licence No.EXP/TN/22[illegible](E42667)

SENTHIL EXPLOSIVES

20, PANCHAYAT OFFICE STREET, SULUR, COIMBATORE - 641 402

- 1 AUG 2023

Date 1/8/23

To

G.Thangavel,
S/O. Ganapathy Gounder,
Thiyagi Kumaran Street,
Periyakuyili,
Pachapalayam.
Sulur,
Coimbatore -641201 .

Sir,

Sub: Regarding blasting work using Explosives in your proposed quarry.

We are having explosives license in from 22 holding No.E42667 situate in survey number SF.NO: 126/2(V) NO:80, Sulur village, Sulur Taluk, Coimbatore District, our office functioning at address.

Senthil Explosives ,20, Panchayat office street, Sulur, Coimbatore-641402.

We are enacting 4 explosives vans for transporting detonators and class: 2 separately for our magazine to our work site and well experienced and licensed blasters and mate for safe blasting work since 5 years without untoward incident.

We are willing to undertake blasting work on contract basic at your proposed quarry at SF.No's: 333/3, PachapalayamVillage, sulur Taluk ,Coimbatore District,Tamilnadu.

Enclosure: 1. Licence Copies

For SENTHIL EXPLOSIVES

Partner

अनुज्ञप्ति प्ररूप एल. ई.-3 | LICENCE FORM LE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से 3(घ) देखें)

(See article 3(a) to (d) of Part 1 of Schedule IV of Explosives Rules 2008)

(ग) उपयोग के लिए एक समय पर वर्ग 1,2,3,4,5 या वर्ग 7 के विस्फोटक या किसी विशेष प्रकार के विस्फोटक रखने के लिए

Licence to possess : (c) for use,explosives of class 1, 2,3,4,5, or 7 or a particular

-1 AUG 2023

अनुज्ञप्ति सं. (Licence No.) : E/HQ/TN/22/377(E42667)

वार्षिक फीस रुपए (Annual Fee Rs): 9200/-

1. Licence is hereby granted to

M/s Senthil Explosives. (अधिभोगी / Occupier : S.S. SAKTHIVELU), , 20, PANCHAYAT OFFICE STREET, SULUR, COIMBATORE Dist., Town/Village - , SULUR, District-COIMBATORE, State-Tamil Nadu, Pincode - 641402

को अनुज्ञप्ति अनुदत्त की जाती है।

2. अनुज्ञप्तिधारी की प्रास्थिति | Status of licensee : Partnership Firm

3. अनुज्ञप्ति निम्नलिखित प्रयोजनों के लिए विधिमान्य है।
Licence is valid only for the following purpose. : possess for use of Slurry Explosives, Safety Fuse, Detonating Fuse, Detonators, - के उपयोग के लिए

4. अनुज्ञप्ति विस्फोटकों के निम्नलिखित किस्मों, प्रकार और मात्रा के लिए विधिमान्य है।
Licence is valid for the following kinds and quantity of explosives: – (क) (a)

क्र Sr. No.	नाम और विवरण Name and Description	वर्ग और प्रभाग Class & Division	उप-प्रभाग Sub-division	मात्रा किसी एक समय में Quantity at any one time
1.	Slurry Explosives	2.0	0	4500 Kg.
2.	Safety Fuse	6.1	0	20000 Mtrs
3.	Detonating Fuse	6.2	0	10000 Mtrs
4.	Detonators	6.3	0	40000 Nos

(ख) किसी एक कलैंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञप्ति के लिए]
(b) Quantity of explosives to be purchased in a calendar month[applicable for licence under article 3(b) and (c)] : 20 times as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुरूप परिसर की पुष्टि होती है।
The licensed premises shall conform to the following drawing(s): . रेखाचित्र सं. (Drawing No.) E/HQ/TN/22/377(E42667)
दिनांक (Dated) 20/01/2022

6. अनुज्ञप्ति परिसर निम्नलिखित पते पर स्थित हैं। The licensed premises are situated at following address:
Survey No(s). 126/2,(v) No. 69 , ग्राम (Town/Village) : SULUR पुलिस थाना (Police Station) : COIMBATORE
जिला (District) COIMBATORE राज्य (State) Tamil Nadu पिनकोड (Pincode)
दूरभाष (Phone) ई. मेल (E-Mail) फैक्स (Fax)

7. अनुज्ञप्ति परिसर में निम्नलिखित सुविधाएं अंतर्विष्ट हैं।
The licensed premises consist of following facilities. : a main magazine room, a lobby and a detonator storage room.

8. अनुज्ञप्ति समय – समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2008 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपाबंधों के अधीन रहते हुए अनुदत्त की जाती है।
The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, additional conditions and the following Annexures.

1. उपर्युक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थल, संनिर्माण संबंधी और अन्य विवरण दर्शित करते हुए)।
Drawings (showing site, constructional and other details) as stated in serial No. 5 above
2. अनुज्ञप्ति प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञप्ति की शर्तें और अतिरिक्त शर्तें।
Conditions and Additional Conditions of this licence signed by the licensing authority.
3. दूरी प्ररूप DE-2 | Distance Form DE-2.

9. यह अनुज्ञप्ति तारीख 31 मार्च 1993 तक विधिमान्य रहेगी। This licence shall remain valid till 31st day of March 1993.
यदि अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VIII के अधीन तथा उपवर्णित इस अनुज्ञप्ति की शर्तों का अतिक्रमण करने या यदि अनुज्ञप्त परिसर योजना या उससे संलग्न उपाबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिसंहृत की जा सकती है, जहां यह लागू हो।
This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 23/09/1991

मुख्य विस्फोटक नियंत्रक | Chief Controller of Explosive

Amendments :

- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 27/03/2013
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 29/08/2018
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 07/01/2019
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 20/01/2022

नवीनीकरण के पृष्ठांकन के लिए स्थान

Space for Endorsement of Renewal

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
08/02/2019	31/03/2024	Sd/- Jt. Chief Controller of Explosives, South Circle, Chennai

कानूनी चेतावनी : विस्फोटकों को गलत ढंग से चलाना या दुरुपयोग करना कानून के अधीन गंभीर दाण्डिक अपराध होगा।

Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

Note :- This is system generated document does not require physical signature. Applicant may take printouts for their records.

Digitally signed by Dr T L Thirumingam
Reason: Licence No.: E/HQ/TN/22/377
Location: Chennai (E42667)
Date:2022.01.20

MARIMUTHU N

-1 AUG 2023

Cert No. BR /SZ/0285

सत्यमेव जयते

भारत सरकार/Government of India

खान अधिनियम, 1952/Mines Act, 1952

खनन परीक्षा बोर्ड/Board of Mining Examinations

विस्फोटकर्ता सक्षमता प्रमाण-पत्र

BLASTER'S CERTIFICATE OF COMPETENCY

(केवल ओपनकास्ट खानों तक सीमित)

(Restricted to mines having opencast workings only)

(धात्विकीय खान विनियम, 1961 के अन्तर्गत)

(Under the Metalliferous Mines Regulations, 1961)

श्री एन. मारिमुथु सुपुत्र नल्लप्पन

जिनकी जन्म तिथि 30.05.1966 है, को अपनी आयु, स्वस्थता, सदाचार, साक्षरता और धात्विकीय खानों में काम करने के विहित अनुभव का सन्तोषजनक प्रमाण प्रस्तुत करने एवं दिनांक 24.01.2021 को जीवीटीसी, त्रिची केन्द्र पर आयोजित विहित परीक्षा में उत्तीर्ण होने पर एतद्द्वारा केवल ओपनकास्ट खानों तक सीमित विस्फोटकर्ता सक्षमता प्रमाण-पत्र प्रदान किया जाता है।

Shri N. MARIMUTHU son of NALLAPPAN

born on 30.05.1966 having given satisfactory evidence of his age, medical fitness, good character, literacy and prescribed experience of working in metalliferous mines and having passed the prescribed examination held at GVTC, TRICHY centre on 24.01.2021 is hereby granted BLASTER'S CERTIFICATE OF COMPETENCY restricted to mines having opencast workings only.

बाएं हाथ के अंगूठ का निशान

Left hand thumb impression

अंचल सचिव
खनन परीक्षा बोर्ड
Zonal Secretary
Board of Mining
Examinations

अध्यक्ष
खनन परीक्षा बोर्ड
Chairman
Board of Mining
Examinations

Signed and Sealed
Date 26.07.2021

To

SHRI N. MARIMUTHU S/o SHRI NALLAPPAN

Home Address

Village	CHELLAPILLAKUTTAI
PO	NALLAGOUNDAMPATTI
Thana	OMALUR
District	SALEM
State	TAMILNADU

PIN : 636304

प्रमाणित किया जाता है कि उनकी सक्षम चिकित्सा अधिकारी द्वारा स्वास्थ परीक्षा कर खान में कार्य करने के लिए स्वस्थ घोषित किया जाता है ।

Certified that he has been examined by qualified medical officer and declared fit for employment in mines.

1 _____ को On

2 _____ को On

3 _____ को On

4 _____ को On

5 _____ को On

6 _____ को On

7 _____ को On

8 _____ को On

9 _____ को On

10 _____ को On

Prepared by

Checked by

இந்திய அரசாங்கம்
Government of India

தங்கவேல் கணபதி
Thangavel Ganapathy

பிறந்த நாள்/DOB: 16/07/1968
ஆண்/Male

9053 9194 3531

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

ஆதார்

Unique Identification Authority of India

Address: S/O: Ganapathy,
2/104 A, THIYAGIKUMARAN
STREET, PERIYAKUILI,
SULUR TALUKA,
Pachapalayam,
Periyakuyilai, Coimbatore,
Tamil Nadu, 641201

9053 9194 3531

1947

www

आयकर विभाग
INCOME TAX DEPARTMENT

भारत सरकार
GOVT. OF INDIA

G THANGAVEL
GANAPATHY
16/07/1968
Permanent Account Number
AFLPT3124N

Signature

ANNEXURE – X

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

- 1 AUG 2023

अर्हता प्राप्त व्यक्ति के रुप मेंमान्यता प्रमाण पत्र
(खनिज रियायत नियमावली, 1960 के नियम 22सी के तहत)
CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON
(Under Rule 22C of Mineral Concession Rules, 1960)

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

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

उनकीपंजीयन संख्या है
His registration number is

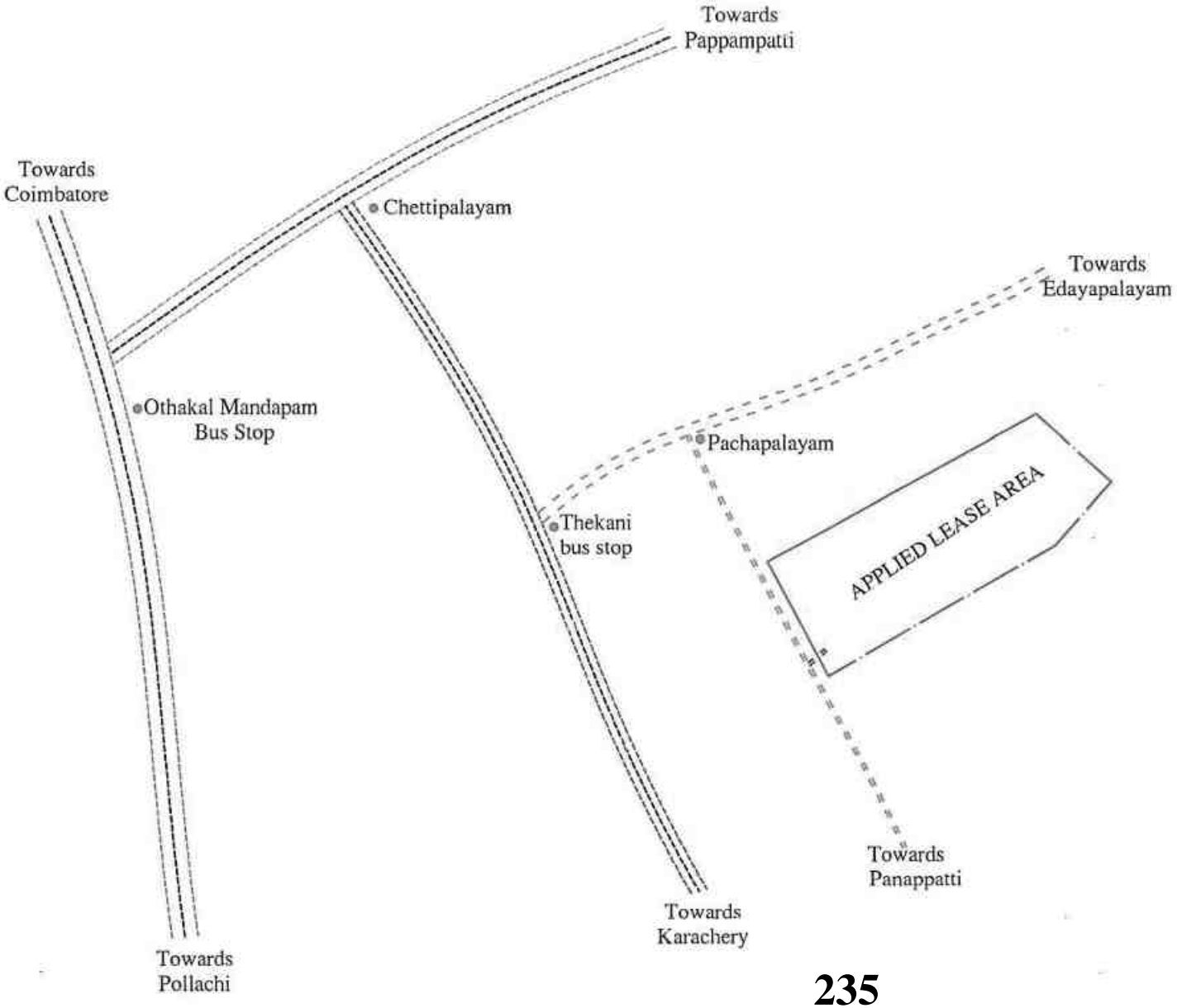
RQP /MAS/263/2014/A

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

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

स्थान/ Place : Chennai
दिनांक/ Date : 16.12.2014.

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



N

PLATE NO-I

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
EXTENT	: 2.62.50Hect
VILLAGE	: PACHAPALAYAM
TALUK	: SULUR
DISTRICT	: COIMBATORE

INDEX

- MINE LEASE AREA
- APPROACH ROAD
- VILLAGE ROAD
- MDR - 522 ROAD
- SH-163 ROAD
- NH - 83 ROAD

KEY MAP

Not to Scale

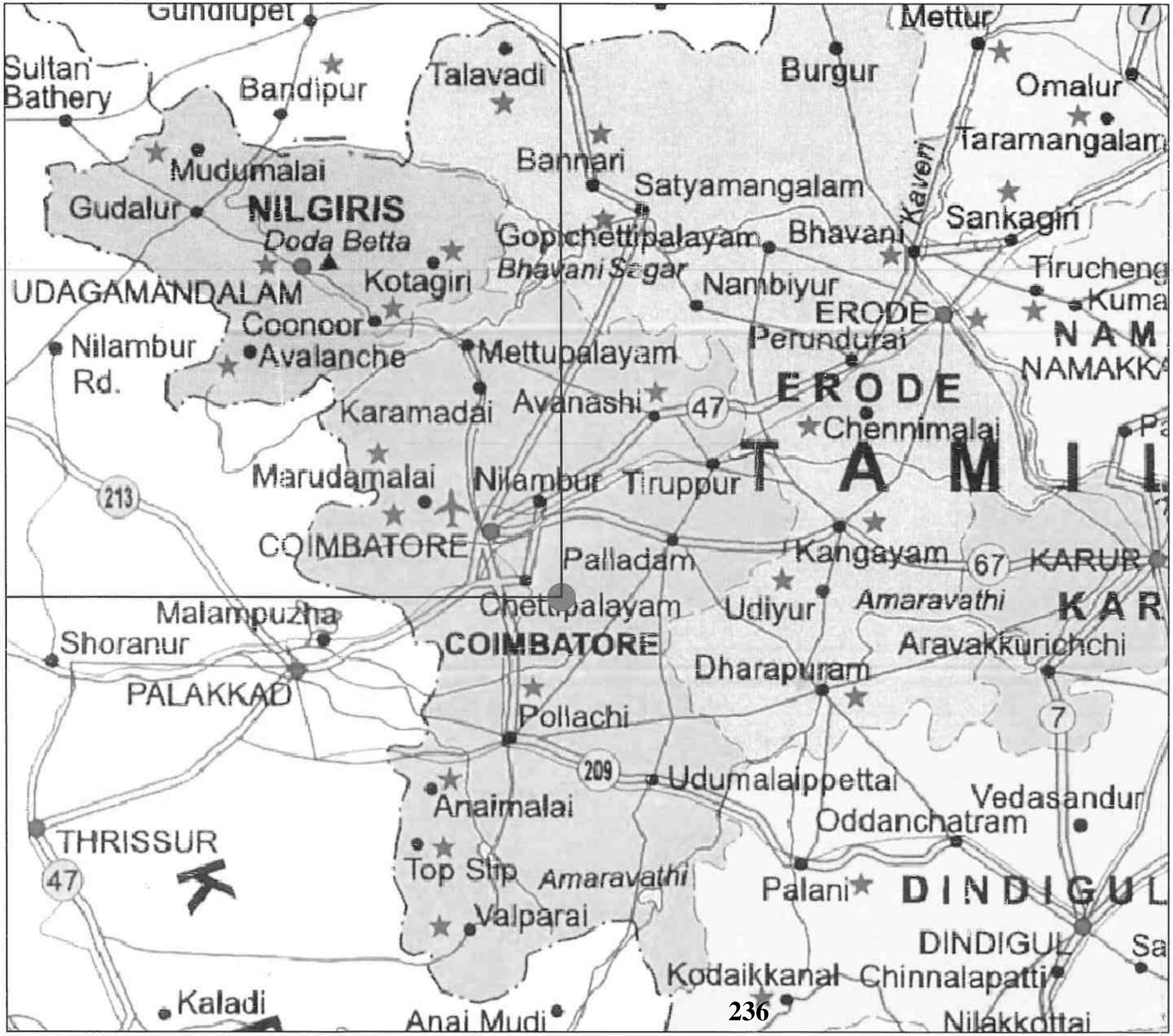
Prepared By:

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

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

10°53'32.44183"N

76°55'26.48411"E



N

PLATE NO-IA

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
EXTENT	: 2.62.50Hect
VILLAGE	: PACHAPALAYAM
TALUK	: SULUR
DISTRICT	: COIMBATORE

INDEX

MINE LEASE AREA :

TOPO SHEET NO : 58-F/1

LATITUDE : 10°53'27.58015"N to 10°53'32.44183"N

LONGITUDE: 76°55'26.48411"E to 76°55'32.69661"E

LOCATION PLAN
NOT TO SCALE

Prepared By:

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

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

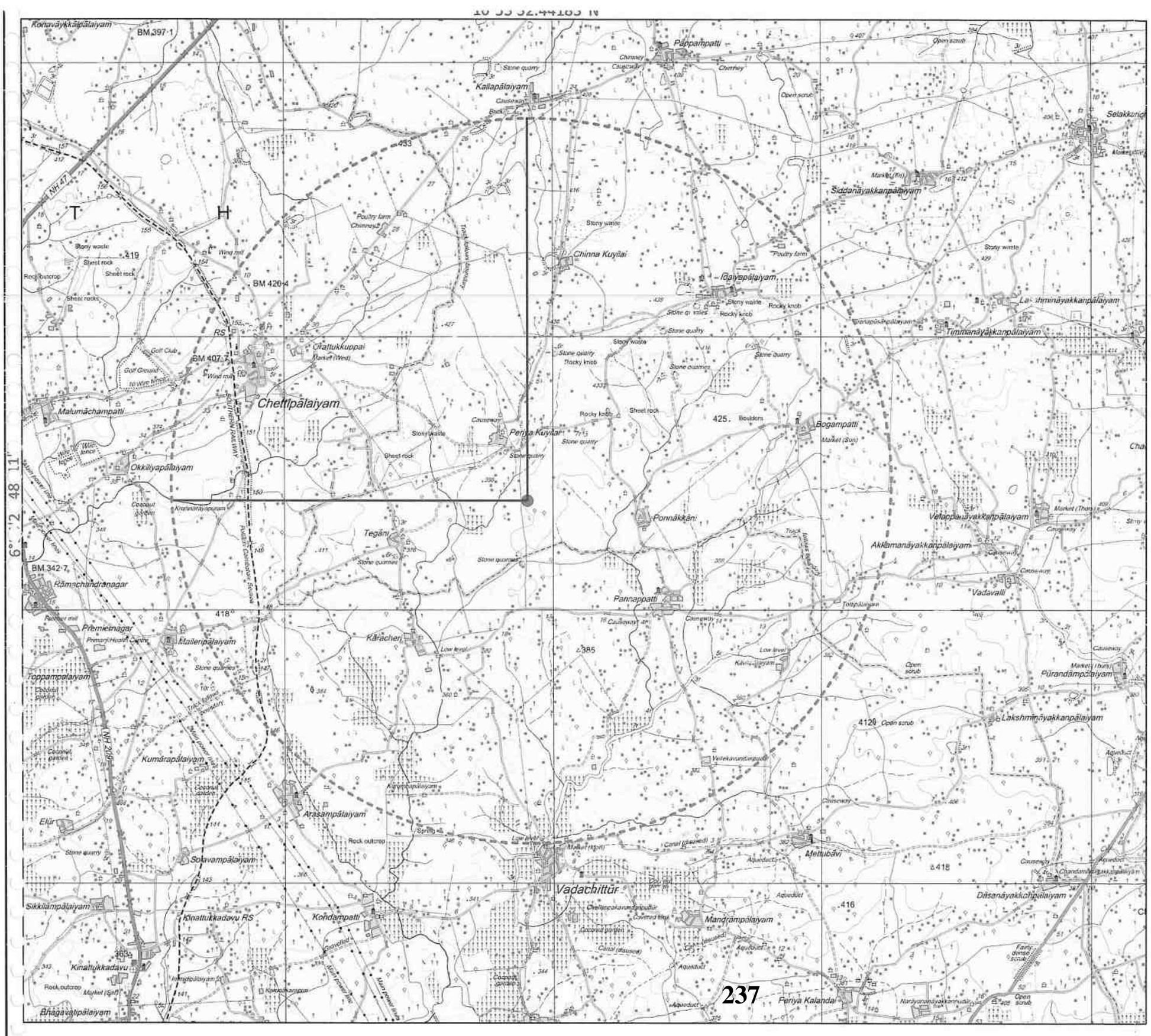


PLATE NO:1B

APPLICANT:

Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
EXTENT	: 2.62.50Hect
VILLAGE	: PACHAPALAYAM
TALUK	: SULUR
DISTRICT	: COIMBATORE

TOPO SHEET NO : 58-F/1

LATITUDE : 10°53'27.58015"N to 10°53'32.44183"N

LONGITUDE: 76°55'26.48411"E to 76°55'32.69661"E

MINE LEASE AREA

10KM RADIUS

CONVENTIONAL SYMBOLS

TOPOSHEET MAP

SCALE– 1:1,00,000

Prepared By:

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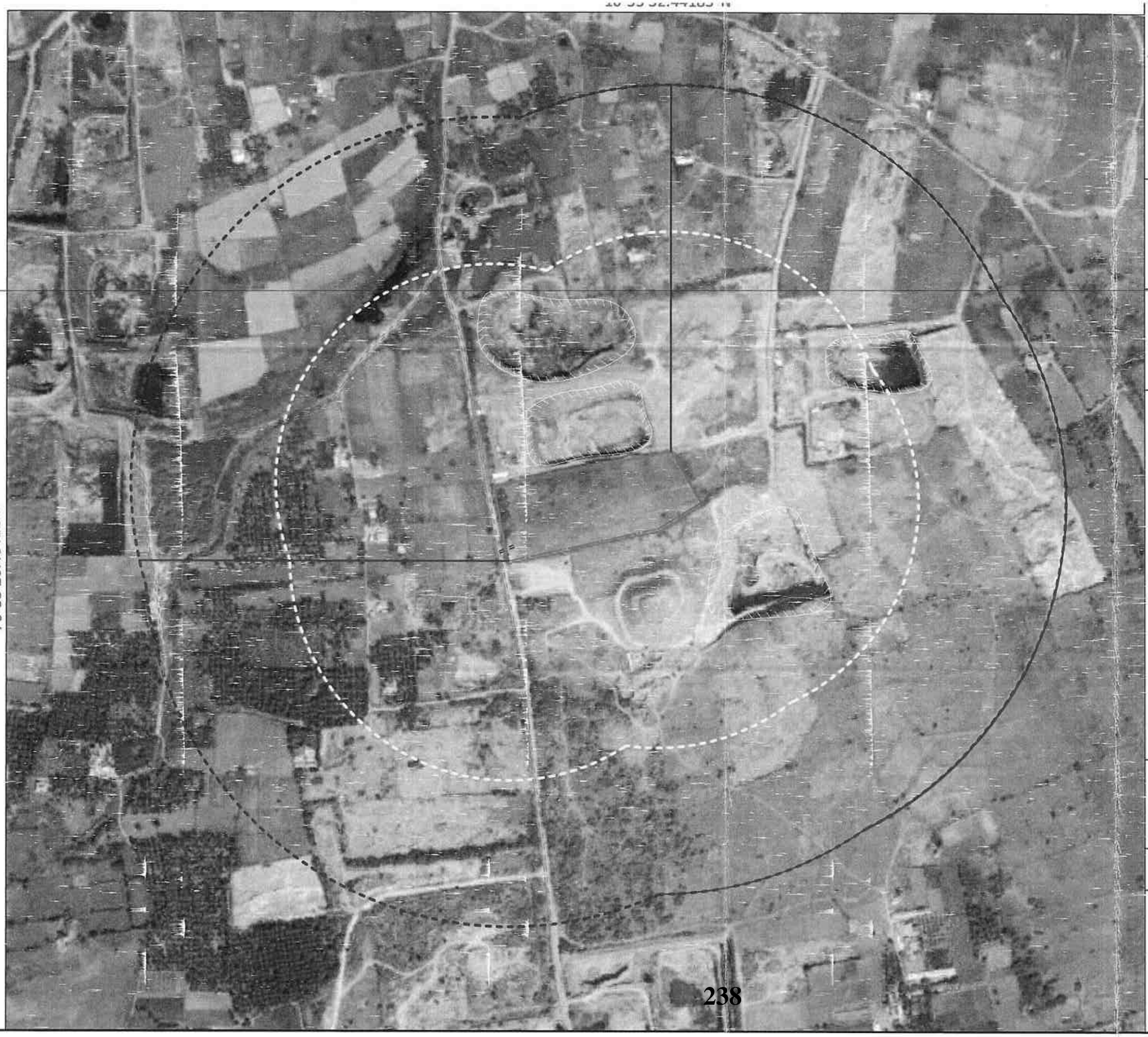
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

10°55'32.44183"N



76°55'26.48411"E

N

உதவி இயக்குநர் அலுவலகம்
- 1 AUG 2017
புவியியல் மற்றும் சுரங்கத்துறை

PLATE NO-I

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
EXTENT	: 2.62.50Hect
VILLAGE	: PACHAPALAYAM
TALUK	: SULUR
DISTRICT	: COIMBATORE

INDEX

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

TOPO SHEET NO : 58-F/1

LATITUDE : 10°53'27.58015"N to 10°53'32.44183"N

LONGITUDE: 76°55'26.48411"E to 76°55'32.69661"E

SATELITE IMAGERY MAP

SCALE– 1:5000

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

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

OCTOBER TO DECEMBER

10°53'32.44183"N

Towards
Pachapalayam

76°55'26.48411"E

Towards
Panappatti

JULY TO SEPTEMBER

PLATE NO-II

APPLICANT:

Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO : 333/3
EXTENT : 2.62.50Hect
VILLAGE : PACHAPALAYAM
TALUK : SULUR
DISTRICT : COIMBATORE

INDEX

MINE LEASE AREA	
SAFETY DISTANCE	
APPROACH ROAD	
CART ROAD	
VILLAGE ROAD	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	
SHRUBS & TREES	
EXISTING QUARRY'S PIT	

TOPO SHEET NO : 58-F/1

LATITUDE : 10°53'27.58015"N to 10°53'32.44183"N

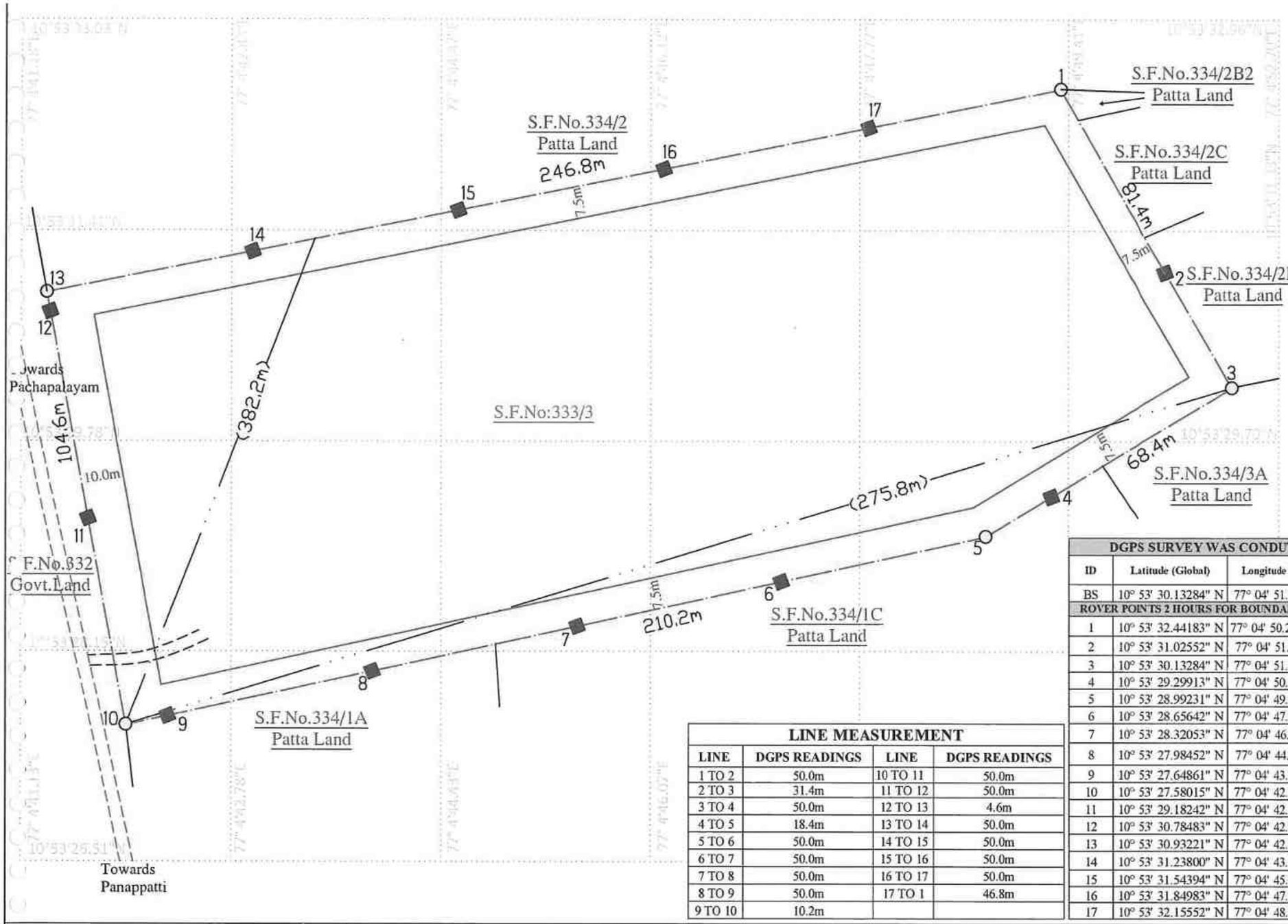
LONGITUDE: 76°55'26.48411"E to 76°55'32.69661"E

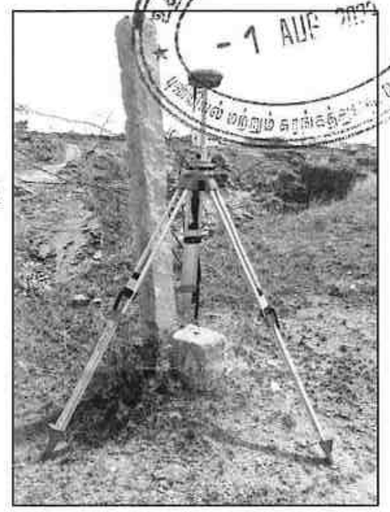
ENVIRONMENTAL PLAN

SCALE– 1:5000

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

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





BASE STATION PHOTO

DGPS SURVEY WAS CONDUTED IN STATIC METHOD (BASE POINT 2 HOUR DGPS POINT)						
ID	Latitude (Global)	Longitude (Global)	Easting (Meter)	Northing (Meter)	Elevation (Meter)	Feature Code
BS	10° 53' 30.13284" N	77° 04' 51.52142" E	727463.388	1204785.858	413.55	Base Station
ROVER POINTS 2 HOURS FOR BOUNDARY PILLAR AND 20 MINUTES FOR INTERMEDIATE PILLAR IN STATIC METHOD						
1	10° 53' 32.44183" N	77° 04' 50.201000" E	727422.792	1204856.543	414.981	Boundary Pillar
2	10° 53' 31.02552" N	77° 04' 51.01094" E	727447.693	1204813.185	414.506	Intermediate Pillar
3	10° 53' 30.13284" N	77° 04' 51.52142" E	727463.388	1204785.858	413.55	Boundary Pillar
4	10° 53' 29.29913" N	77° 04' 50.10800" E	727420.629	1204759.94	411.644	Intermediate Pillar
5	10° 53' 28.99231" N	77° 04' 49.58783" E	727404.894	1204750.403	411.34	Boundary Pillar
6	10° 53' 28.65642" N	77° 04' 47.97721" E	727356.044	1204739.743	409.163	Intermediate Pillar
7	10° 53' 28.32053" N	77° 04' 46.36673" E	727307.193	1204729.084	407.197	Intermediate Pillar
8	10° 53' 27.98452" N	77° 04' 44.75613" E	727258.343	1204718.425	404.597	Intermediate Pillar
9	10° 53' 27.64861" N	77° 04' 43.14552" E	727209.492	1204707.765	403.868	Intermediate Pillar
10	10° 53' 27.58015" N	77° 04' 42.81700" E	727199.526	1204705.591	404.13	Boundary Pillar
11	10° 53' 29.18242" N	77° 04' 42.53211" E	727190.534	1204754.776	403.926	Intermediate Pillar
12	10° 53' 30.78483" N	77° 04' 42.24724" E	727181.543	1204803.961	404.039	Intermediate Pillar
13	10° 53' 30.93221" N	77° 04' 42.22100" E	727180.716	1204808.486	404.525	Boundary Pillar
14	10° 53' 31.23800" N	77° 04' 43.83773" E	727229.759	1204818.222	404.569	Intermediate Pillar
15	10° 53' 31.54394" N	77° 04' 45.45442" E	727278.802	1204827.958	406.552	Intermediate Pillar
16	10° 53' 31.84983" N	77° 04' 47.07111" E	727327.844	1204837.695	408.13	Intermediate Pillar
17	10° 53' 32.15552" N	77° 04' 48.68783" E	727376.888	1204847.43	411.512	Intermediate Pillar

LINE MEASUREMENT			
LINE	DGPS READINGS	LINE	DGPS READINGS
1 TO 2	50.0m	10 TO 11	50.0m
2 TO 3	31.4m	11 TO 12	50.0m
3 TO 4	50.0m	12 TO 13	4.6m
4 TO 5	18.4m	13 TO 14	50.0m
5 TO 6	50.0m	14 TO 15	50.0m
6 TO 7	50.0m	15 TO 16	50.0m
7 TO 8	50.0m	16 TO 17	50.0m
8 TO 9	50.0m	17 TO 1	46.8m
9 TO 10	10.2m		

APPLICANT:

PLATE NO-II

Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO : 333/3
EXTENT : 2.62.50Hect
VILLAGE : PACHAPALAYAM
TALUK : SULUR
DISTRICT : COIMBATORE

DGPS SURVEY COORDINATE SYSTEM			
Name	: World wide/UTM	Datum	: WGS 1984
Receiver Model	: R8s – (Base) & R8s- (Rover)	Zone	: 43 North
Time Zone	: Mountain Standard Time	Geoid	: EGM96 (Global)
Date : 05/05/2023			

BOUNDARY PILLAR = 5 PILLAR
INTERMEDIATE PILLAR = 12 PILLAR
TOTAL = 17 PILLAR

Extent As Per Revenue FMB – 2.62.50 Hecters
Extent As Per DGPS Survey – 2.62.00 Hecters

NOTE:
1. The True North Adopted both for surveyed plan and DGPS Coordinated.
2. The Given Measurements are in Meter.
3. The DGPS Survey for the area is taken up by synchronising nearest survey of India control point, (Near Avinashi Road Govt. Polytechnic College–Coimbatore District).
4. Base is at 16.571 Kilometers from GCP Control Point.

240

INDEX

MINE LEASE AREA
SAFETY DISTANCE
BOUNDARY POINT
INTERMEDIATED POINT
APPROACH & VILLAGE 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

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GEO TECHNICAL MINING SOLUTIONS
(NABET Accreditation & ISO Certified Company)
No.1/213–B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office,
Dharmapuri – 636 705. Tamil Nadu, India.

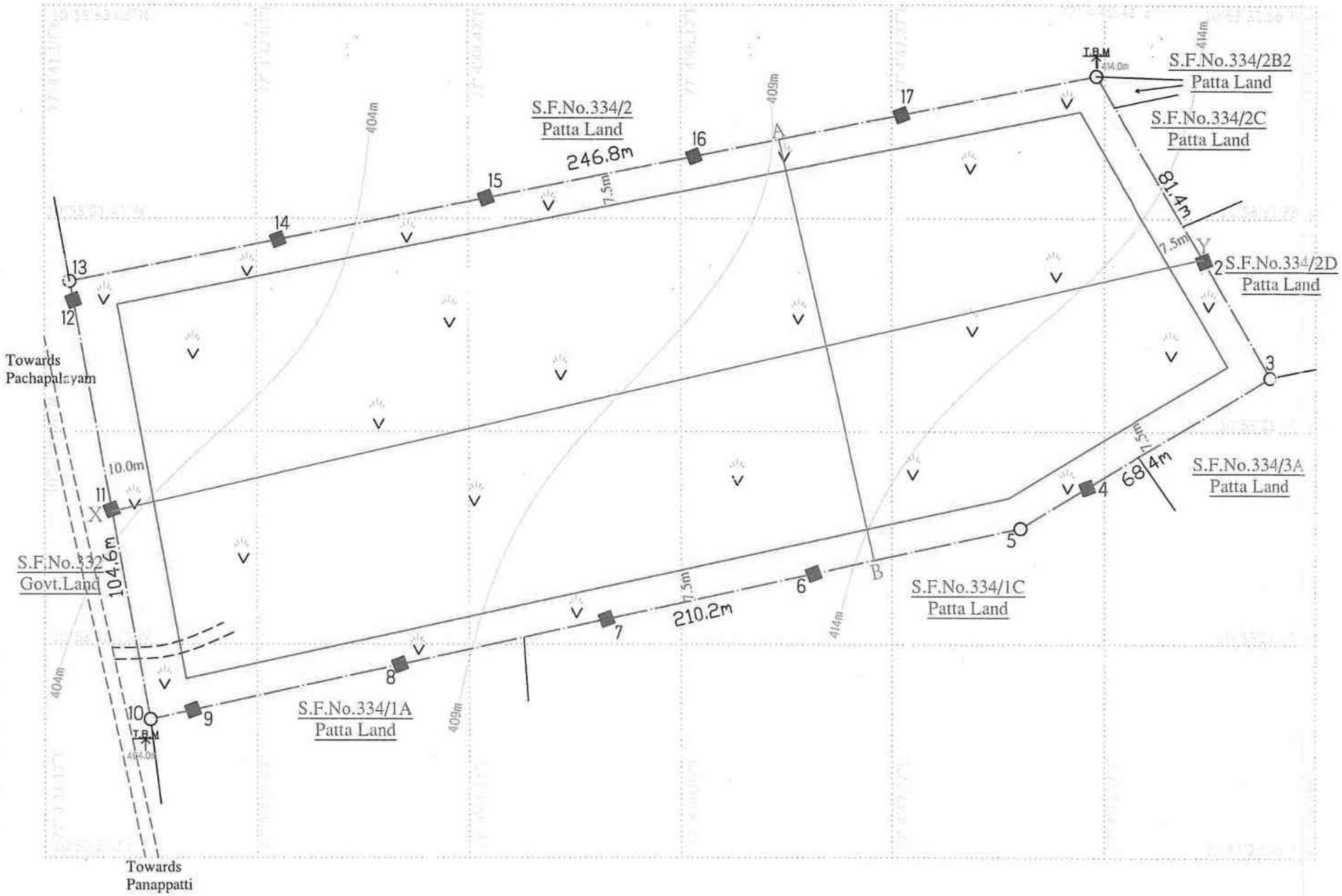

PLATE NO-III

APPLICANT:

Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
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INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- BOUNDARY POINT
- INTERMEDIATE POINT
- APPROACH & VILLAGE ROAD
- TEMPORARY BENCH MARK (TBM 414M)
- CONTOUR LINES
- SHRUBS
- GRAVEL (V V V)

SURFACE, 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.
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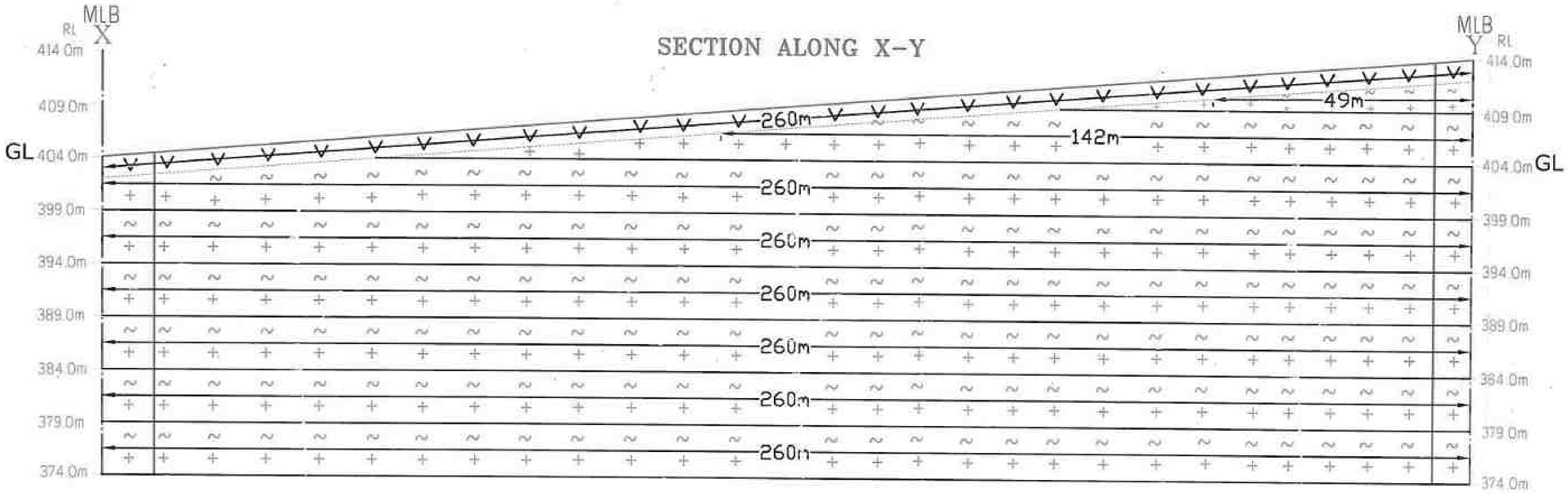
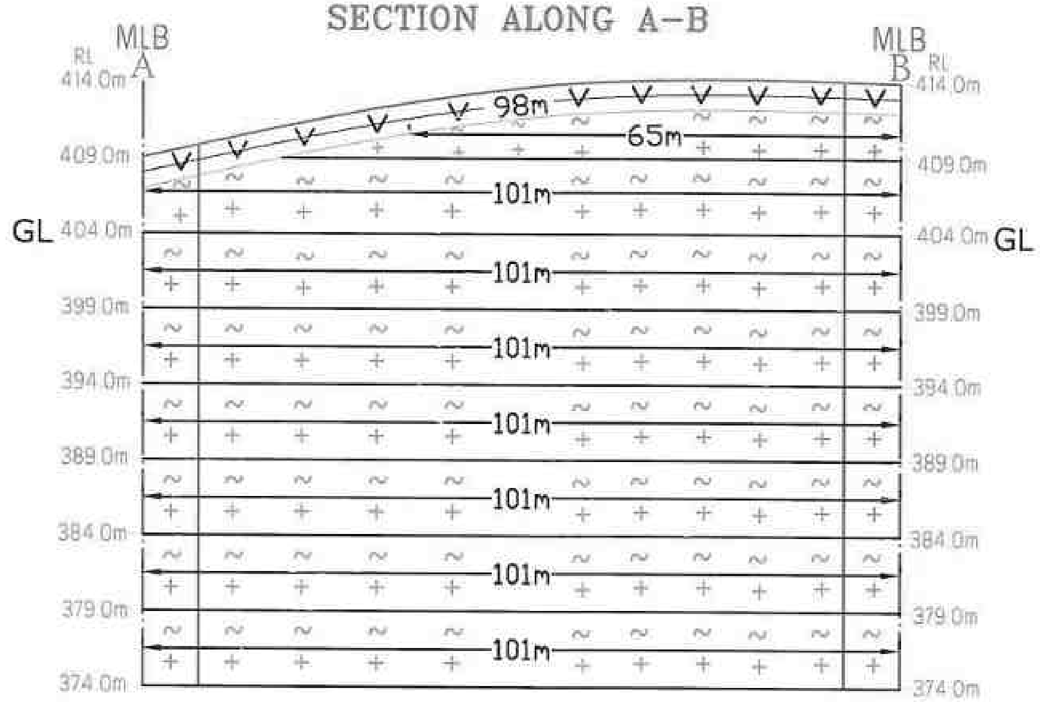
SECTION ALONG X-Y



SECTION ALONG A-B



GL = GROUND LEVEL

GEOLOGICAL RESOURCES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Geological Resources in M^3	Gravel in M^3
XY-AB	I	260	98	2	50960	.....	50960
	I	49	65	3	9555	9555	.....
	II	142	101	5	71710	71710	.....
	III	260	101	5	131300	131300	.....
	IV	260	101	5	131300	131300	.....
	V	260	101	5	131300	131300	.....
	VI	260	101	5	131300	131300	.....
	VII	260	101	5	131300	131300	.....
	VIII	260	101	5	131300	131300	.....
TOTAL					**920025**	**869065**	**50960**

PLATE NO-IIIA

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:
S.F.NO : 333/3
EXTENT : 2.62.50Hect
VILLAGE : PACHAPALAYAM
TALUK : SULUR
DISTRICT : COIMBATORE

INDEX
MINE LEASE AREA
SAFETY DISTANCE
GRAVEL
ROUGH STONE

GEOLOGICAL SECTIONS
SECTION HOR 1 : 1000 & VER 1: 500

Prepared By:
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RECOGNIZED QUALIFIED PERSON
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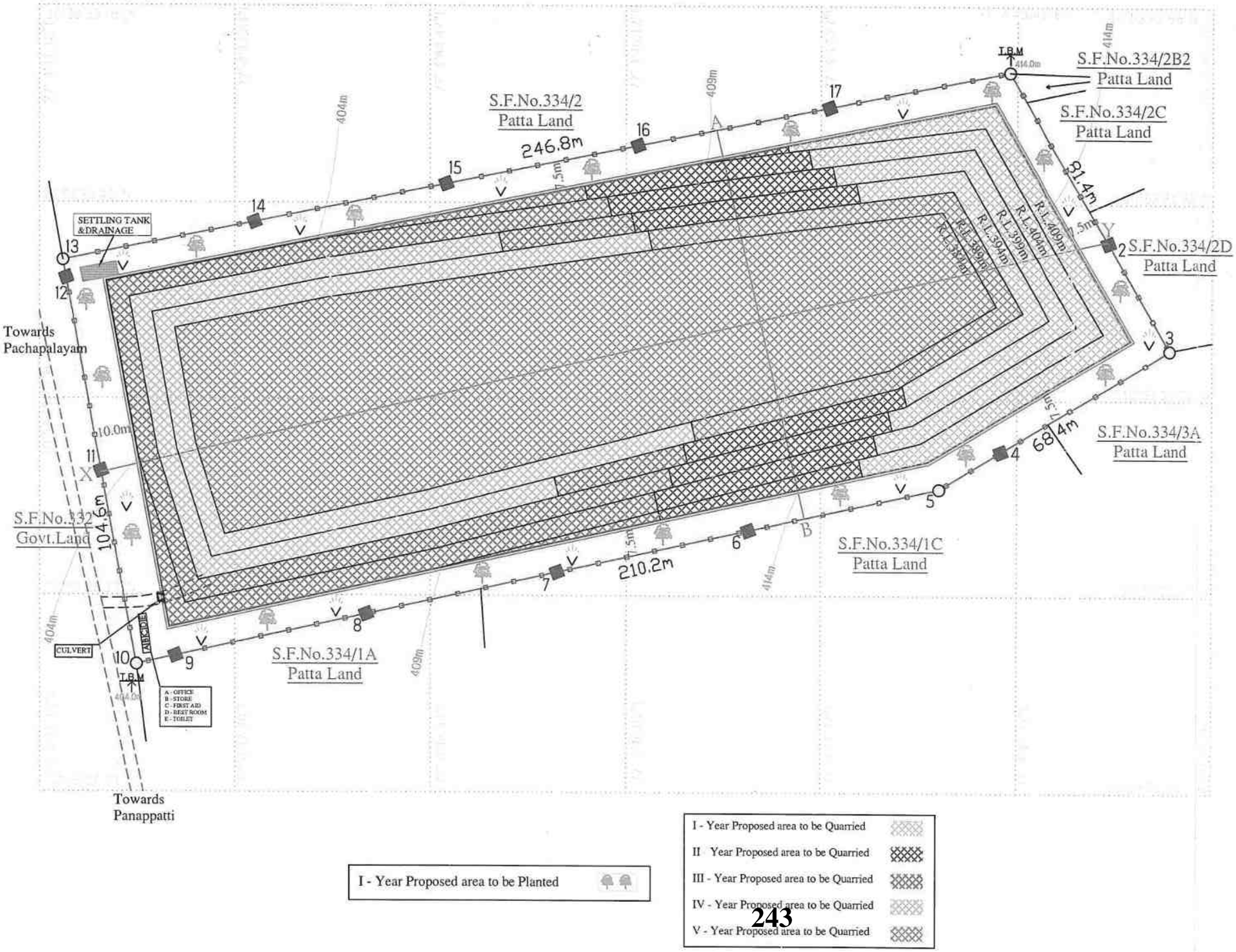

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- 1 AUG 2017

PLATE NO-IV

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
EXTENT	: 2.62.50Hect
VILLAGE	: PACHAPALAYAM
TALUK	: SULUR
DISTRICT	: COIMBATORE

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- BOUNDARY POINT
- INTERMEDIATE POINT
- APPROACH & VILLAGE ROAD
- TEMPORARY BENCH MARK (TBM 414M)
- CONTOUR LINES
- SHRUBS
- GRAVEL
- FENCING
- SETTLING TANK & DRAINAGE
- PROPOSED BENCH

YEARWISE, DEVELOPMENT PLAN
SCALE 1: 1000

Prepared By:

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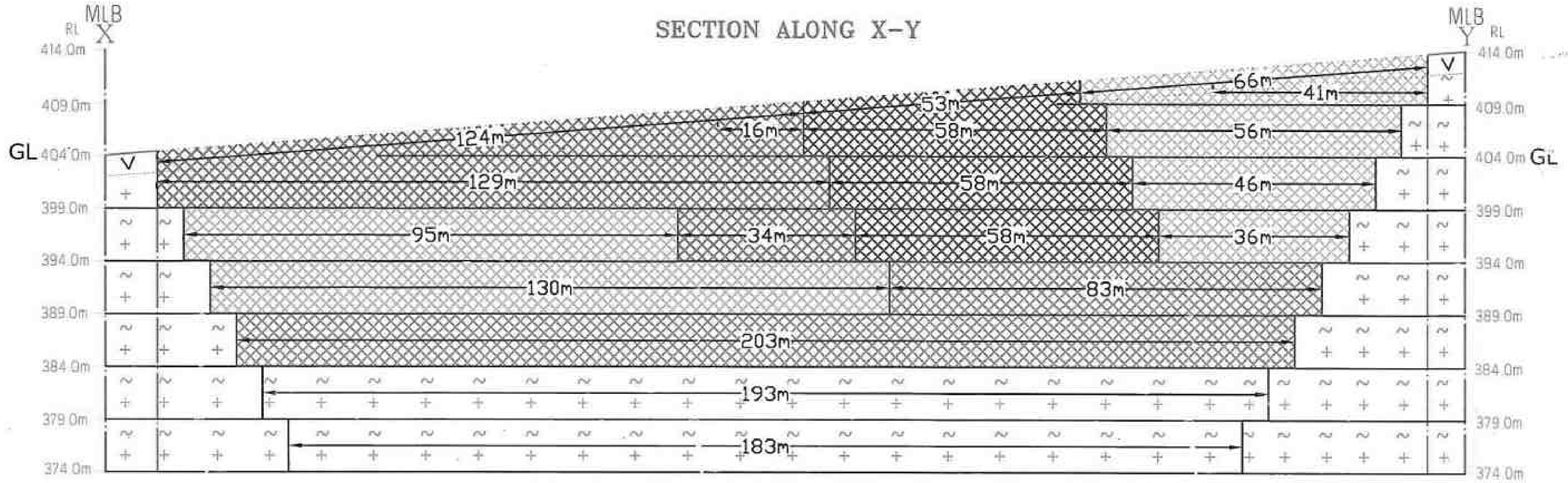
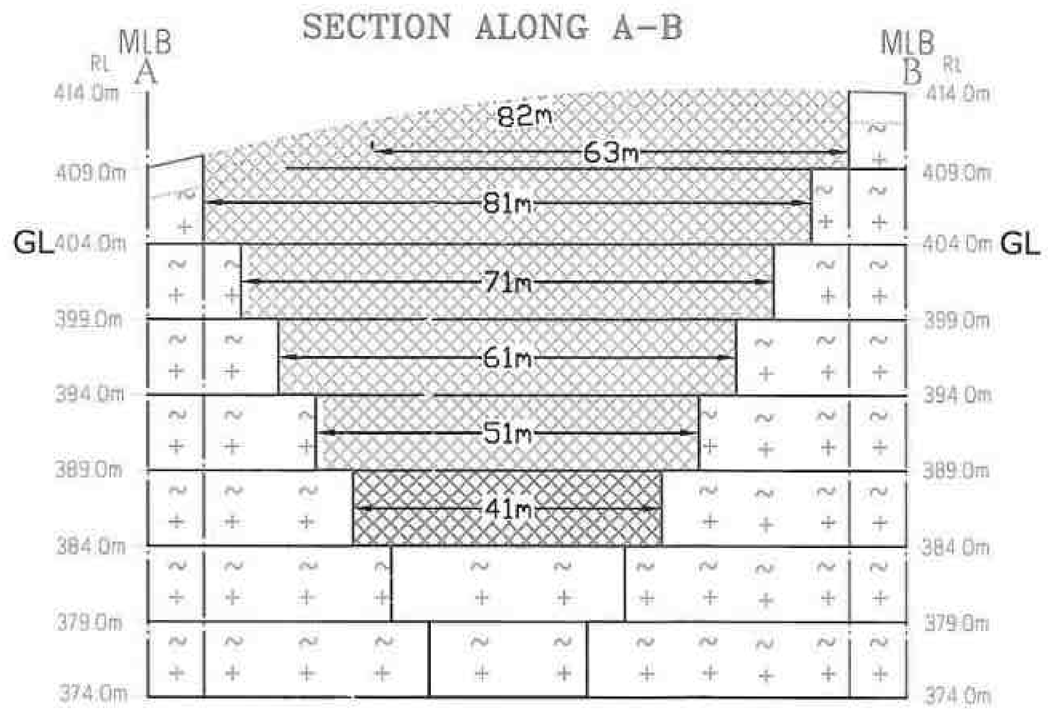
RQP/MAS/263/2014/A



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

GL = GROUND LEVEL



YEARWISE PRODUCTIONS

Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Production in M^3	Gravel in M^3
XY-AB	I-YEAR	I	66	82	2	10824	.....	10824
		I	41	63	3	7749	7749	.....
		II	56	81	5	22680	22680	.....
		III	46	71	5	16330	16330	.....
		IV	36	61	5	10980	10980	.....
	TOTAL					**68563**	**57739**	**10824**
	II-YEAR	I	53	82	2	8692	.....	8692
		II	58	81	5	23490	23490	.....
		III	58	71	5	20590	20590	.....
		IV	58	61	5	17690	17690	.....
	TOTAL					**70462**	**61770**	**8692**
	III-YEAR	I	124	82	2	20336	.....	20336
		II	16	81	5	6480	6480	.....
		III	129	71	5	45795	45795	.....
		IV	34	61	5	10370	10370	.....
	TOTAL					**82981**	**62645**	**20336**
	IV-YEAR	IV	95	61	5	28975	28975	.....
		V	130	51	5	33150	33150	.....
	TOTAL					**62125**	**62125**	**0**
	V-YEAR	V	83	51	5	21165	21165	.....
		VI	203	41	5	41615	41615	.....
	TOTAL					**62780**	**62780**	**0**
GRAND TOTAL						**346911**	**307059**	**39852**

PLATE NO-IVA

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:
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EXTENT : 2.62.50Hect
VILLAGE : PACHAPALAYAM
TALUK : SULUR
DISTRICT : COIMBATORE

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- GRAVEL
- ROUGH STONE
- PROPOSED BENCH
- ULTIMATE BENCH

PRODUCTION SECTIONS
SECTION HOR 1 : 1000 & VER 1: 500

Prepared By:
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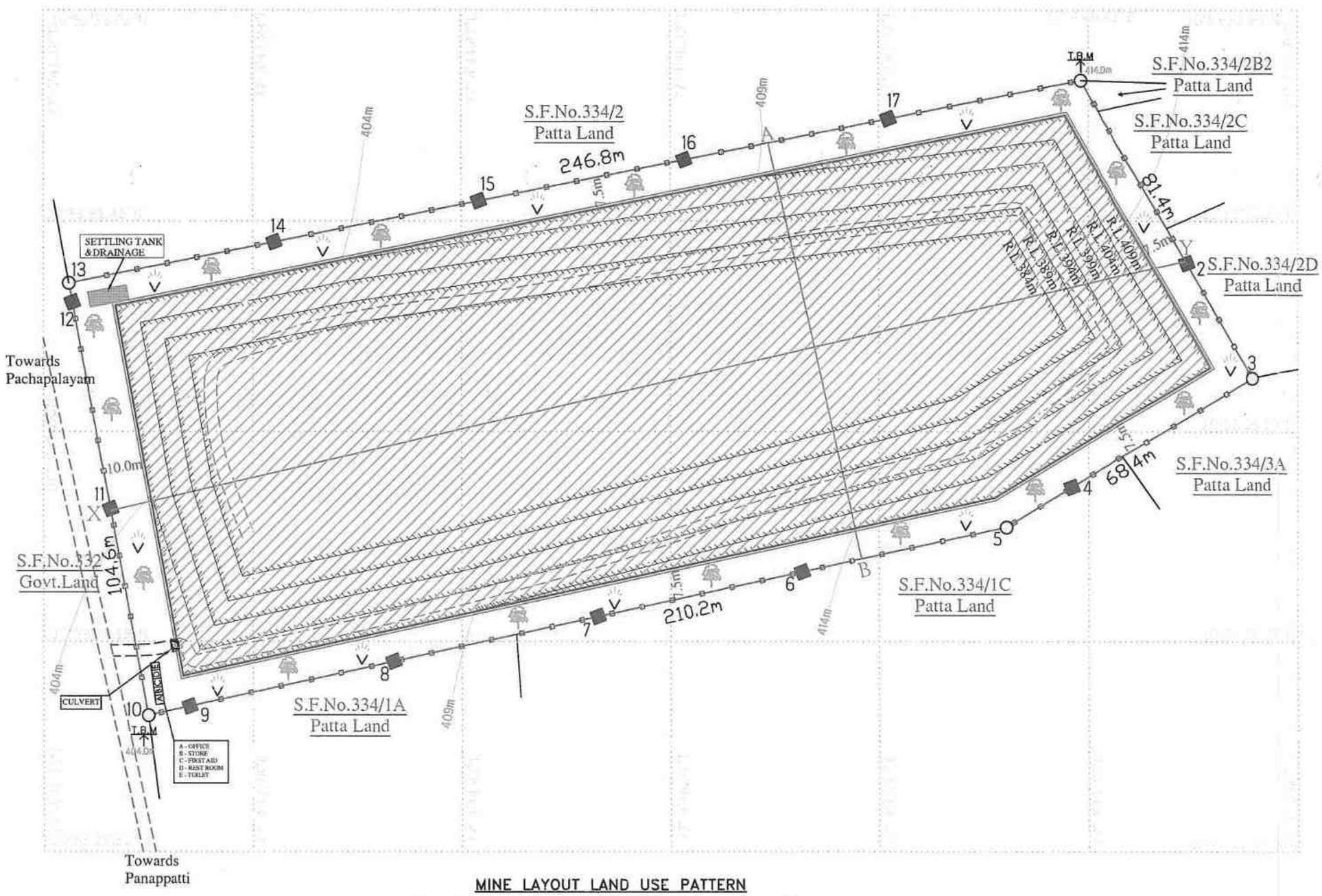

MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIl	2.08.49	
INFRASTRUCTURE	NIL	0.02.00	ANICUT
ROADS	NIL	0.05.00	
GREEN BELT	NIL	0.43.05	
DRAINAGE & SETTLING TANK	NIL	0.03.96	
UN-UTILIZED AREA	2.62.5	NIL	NIL
GRAND TOTAL	2.62.5Hect	2.62.50Hect	NIL

I - Year Proposed area to be Planted

PLATE NO-V

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
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COIMBATORE DISTRICT- 641202

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- INTERMEDIATE POINT
- APPROACH & VILLAGE ROAD
- TEMPORARY BENCH MARK (TBM 414M)
- CONTOUR LINES
- SHRUBS
- GRAVEL
- FENCING
- SETTLING TANK & DRAINAGE
- PROPOSED BENCH

MINE LAYOUT PLAN AND
LAND USE PATTERN
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

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RECOGNIZED QUALIFIED PERSON
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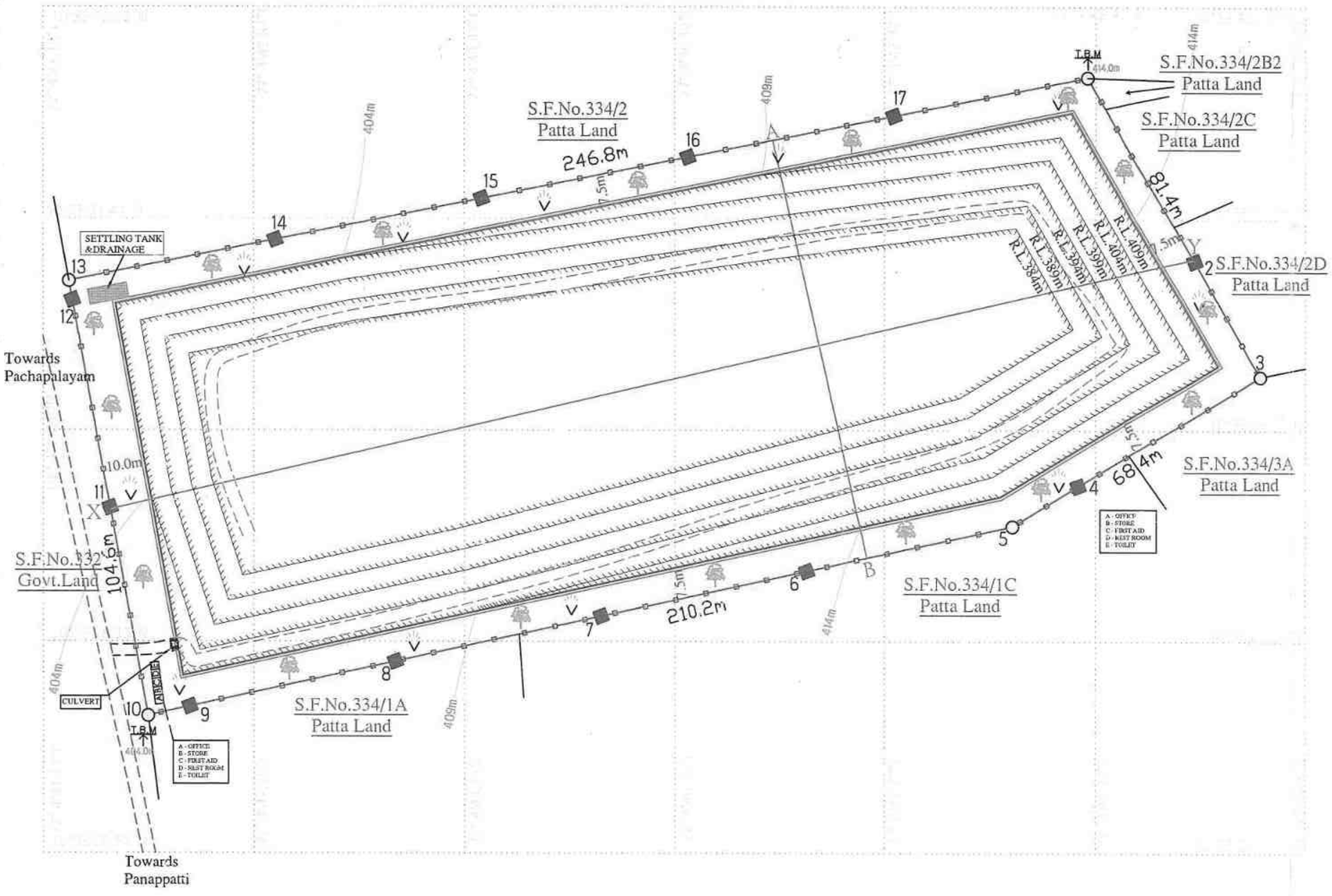

PLATE NO-VI

APPLICANT:

Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
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- FENCING
- SETTLING TANK & DRAINAGE
- PROPOSED BENCH

PROGRESSIVE MINE CLOSURE PLAN
PLAN SCALE 1 : 1000

Prepared By:

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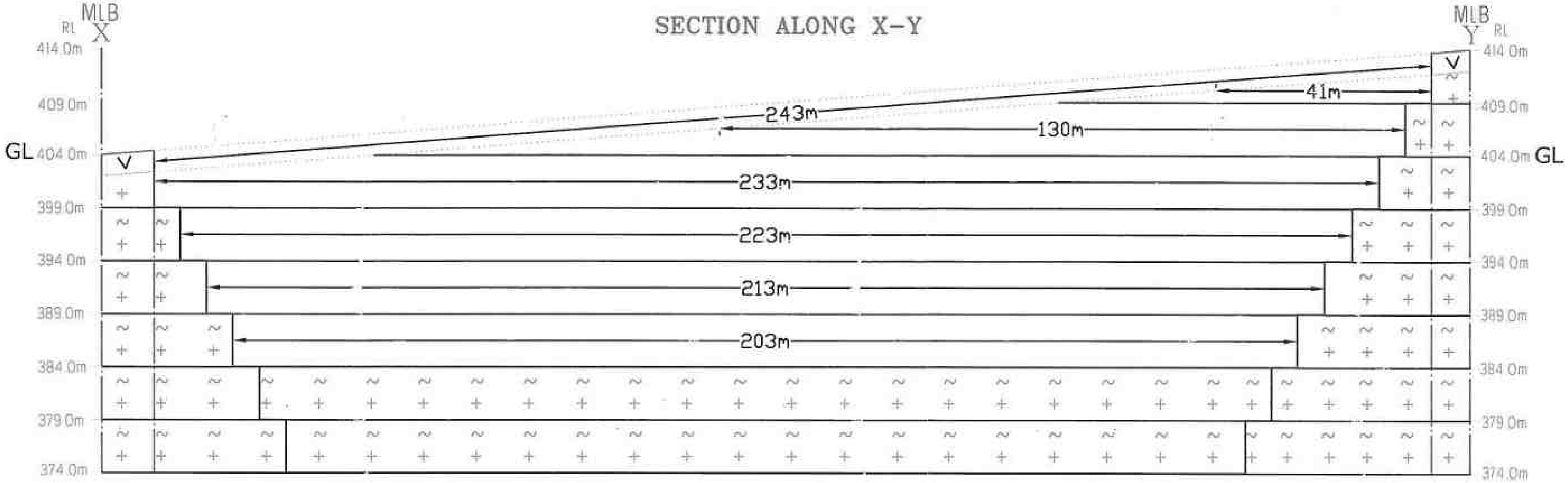
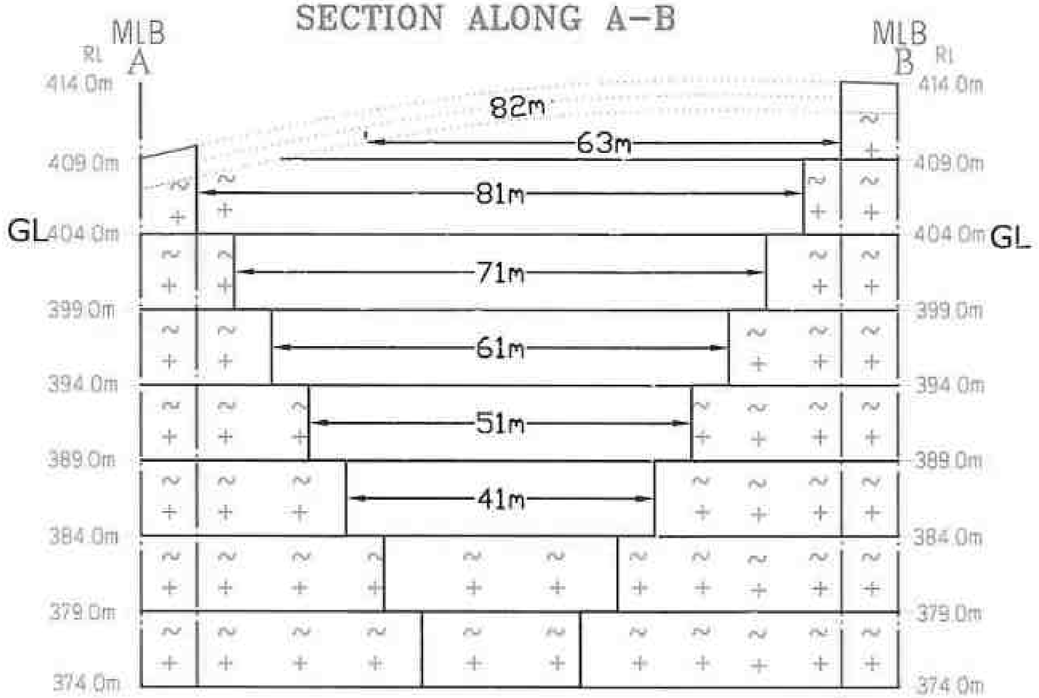
RQP/MAS/263/2014/A





GL = GROUND LEVEL

PRODUCTION RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Mineable Reserve in M^3	Gravel in M^3
XY-AB	I	243	82	2	39852	.....	39852
	I	41	63	3	7749	7749	.....
	II	130	81	5	52650	52650	.....
	III	233	71	5	82715	82715	.....
	IV	223	61	5	68015	68015	.....
	V	213	51	5	54315	54315	.....
	VI	203	41	5	41615	41615	.....
TOTAL					**346911**	**307059**	**39852**

PLATE NO-VIA

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:
S.F.NO : 333/3
EXTENT : 2.62.50Hect
VILLAGE : PACHAPALAYAM
TALUK : SULUR
DISTRICT : COIMBATORE

INDEX

MINE LEASE AREA
SAFETY DISTANCE
GRAVEL
ROUGH STONE
PROPOSED BENCH
ULTIMATE BENCH

PROGRESSIVE MINE CLOSURE SECTIONS
SECTION HOR 1 : 1000 & VER 1: 500

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

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

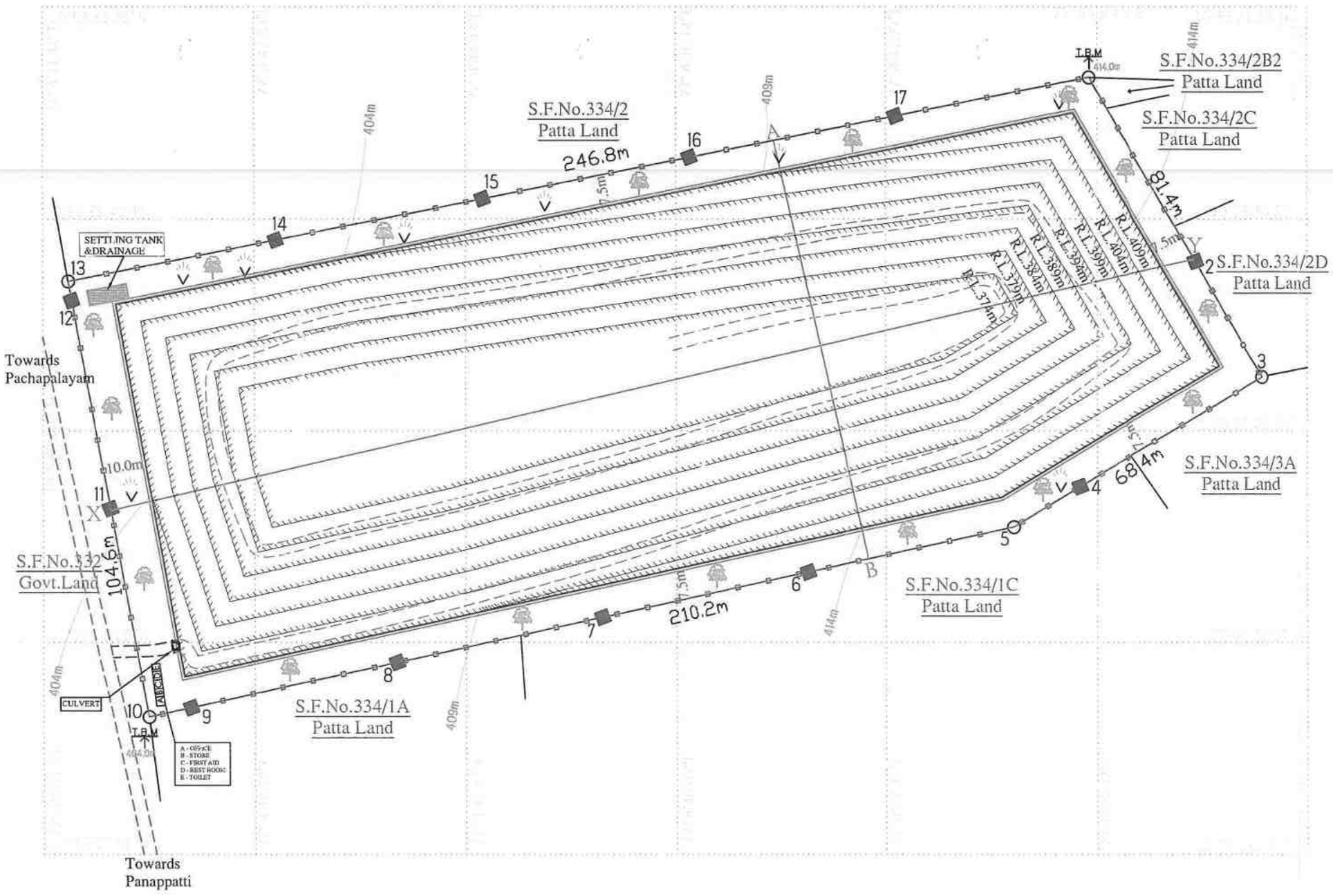


PLATE NO-VII

APPLICANT:

Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:

S.F.NO	: 333/3
EXTENT	: 2.62.50Hect
VILLAGE	: PACHAPALAYAM
TALUK	: SULUR
DISTRICT	: COIMBATORE

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- BOUNDARY POINT
- INTERMEDIATE POINT
- APPROACH,VILLAGE & HAUL ROAD
- TEMPORARY BENCH MARK (TBM 414M)
- CONTOUR LINES
- SHRUBS
- GRAVEL
- FENCING
- SETTLING TANK & DRAINAGE
- ULTIMATE BENCH

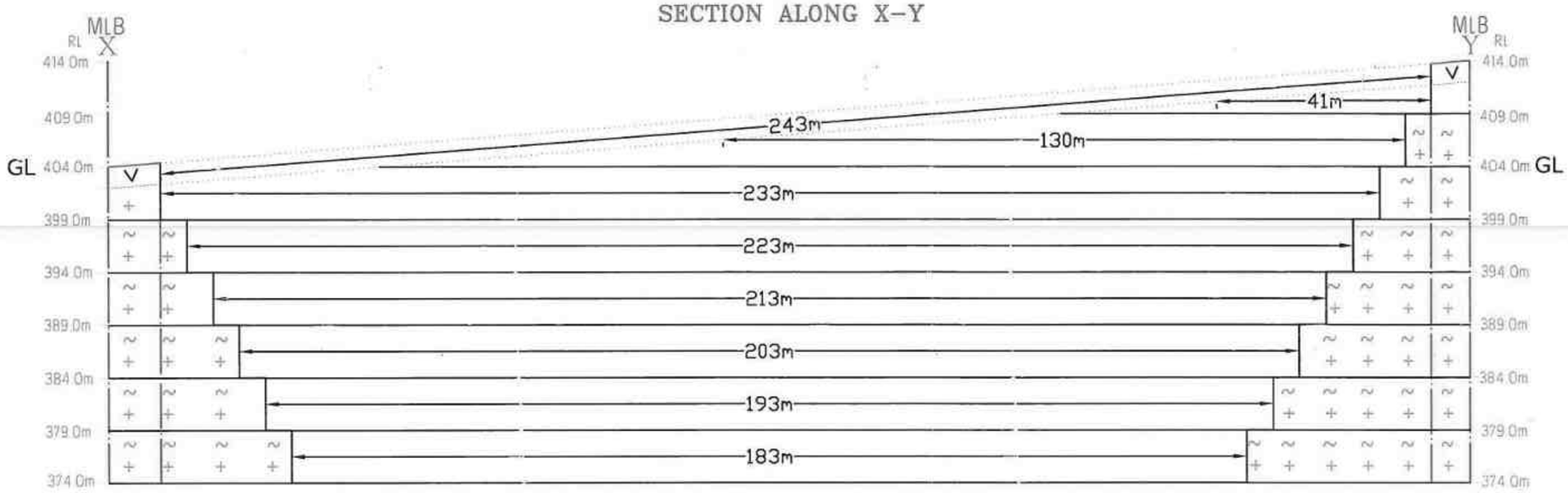
CONCEPTUAL PLAN
PLAN SCALE 1 : 1000

Prepared By:

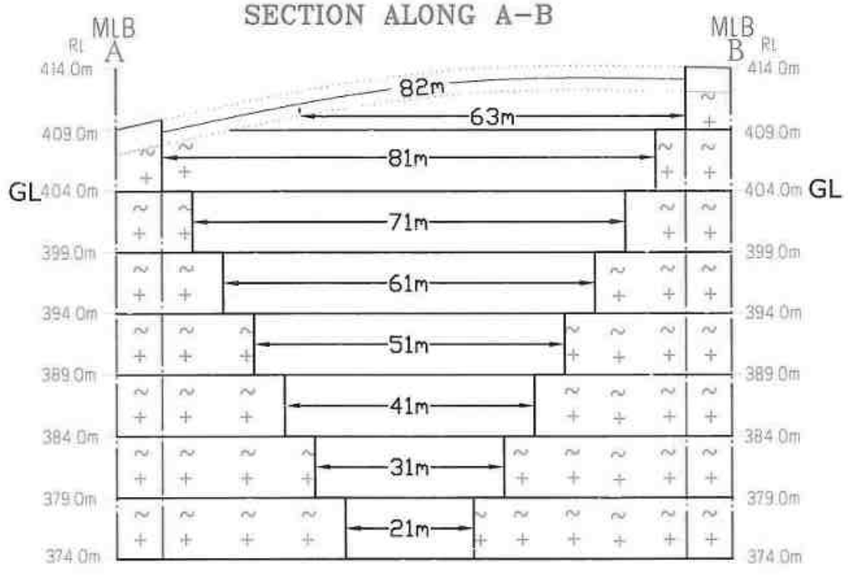
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

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

SECTION ALONG X–Y



SECTION ALONG A–B



GL = GROUND LEVEL

MINEABLE RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M^3	Mineable Reserve in M^3	Gravel in M^3
XY-AB	I	243	82	2	39852	.....	39852
	I	41	63	3	7749	7749	.....
	II	130	81	5	52650	52650	.....
	III	233	71	5	82715	82715	.....
	IV	223	61	5	68015	68015	.....
	V	213	51	5	54315	54315	.....
	VI	203	41	5	41615	41615	.....
	VII	193	31	5	29915	29915	.....
	VIII	183	21	5	19215	19215	.....
TOTAL					**396041**	**356189**	**39852**

PLATE NO-VIIA

APPLICANT:
Mr.G.THANGAVEL,
S/o.Mr.GANAPATHY GOUNDER,
THIYAGI KUMARAN STREET,
PERIYAKUILI, PACHAPALAYAM,
SULUR TALUK,
COIMBATORE DISTRICT- 641202

LEASE APPLIED AREA:
S.F.NO : 333/3
EXTENT : 2.62.50Hect
VILLAGE : PACHAPALAYAM
TALUK : SULUR
DISTRICT : COIMBATORE

INDEX

MINE LEASE AREA

SAFETY DISTANCE

GRAVEL

ROUGH STONE

ULTIMATE BENCH

CONCEPTUAL PLAN
SECTION HOR 1 : 1000 & VER 1: 500

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

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

ப. அ.

கோயம்புத்தூர் மாவட்டம், சூலூர் வட்டம்,

பச்சாபாளையம் கிராமம் வசிக்கும் கணபதி கவுண்டர்

மகன் தங்கவேல் - ① தங்கவேல் மனைவி வேலுமணி - ②

காளியப்பன் மகன் மாணிக்கவாசகம் - ③ சின்னராஜ கவுண்டர்

மகன் கார்த்திக் - ④ சுந்தரம் மகன் ஜெயக்குமார் ⑤

ராமசாமி மகன் எ. சிவராஜ் - ⑥ ஆகியோர்களுக்கு ③

கோவை மாவட்டம் சூலூர் வட்டம் பச்சாபாளையம் கிராம

புல எண் 332/3 ரெ. காலியிடம் உள்ள 2.62.5 ஹெக்

(6.48 ஏ.கு) விஸ்தீரணமுள்ள பூமியை சூலூர்

சார்பதிவாளர் அலுவலக பதிவு எண் 9455/2016

நாள் 1.9.2015 என்ற பாத்தியப்பட்டது. மேலும் ந ...

கூட்டுப்பட்டா எண் 1366 லும் பாத்தியப்பட்டது.

மேலும் மேற்படி கணபதி கவுண்டர் மகன் தங்கவேல்

என்பவர் பெயரில் இவர் உட்பட மற்ற 5 பங்குதாரர்களும்

சேர்ந்து கிரயம் கொடுத்துள்ளனர். மேற்படி க.ச. 332/3, ரெ.

காலியிடத்தில் 300.00 சதுரமீட்டர் அங்கீகரிக்கப்பட்ட

வீட்டு மனைகளை, ரோடு இடங்களை, பொதுவான இடங்களை

விலை பெற்ற முடிவுகளை ஏதும் இல்லை என்று மேற்படி

இந்த பத்திரம் மூலம் அங்கீகரிக்க படுவதற்கு சம்மதிக்கிறோம்.

J. Aathy Priya
7/8/2023.

மேற்படி சொத்து நிலையான செக்குபந்தி விவரங்கள்:

புல எண் 334/1 - ரெ. கணக்கும் - வடக்கு

புல எண் 333/2 ரெ. கணக்கும் - தெற்கு

புல எண் 332 ரெ. கணக்கும் - கிழக்கு

புல எண் 343 ரெ. கணக்கும் - மேற்கு

இந்த மேற்படி புல எண் 333/3 - 2.62.5 ஹெக்

நில அளவைக்கான பூமி இவ்விடம் ஒப்புதல் வழங்கப்படுகிறது.

J. A... 7/8/2022

கிராம நிர்வாக அலுவலர்
25, ...

QUALITY COUNCIL OF INDIA
QCI

NABET

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.