

**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 = 16.03 hectares**

**K. SHANMUGAM ROUGH STONE AND GRAVEL QUARRY
At
Kuppam Village, Pugalur Taluk, Karur District**

ToR letter No. SEIAA-TN/F.No.9483/ToR-1419/2023 dated 30.03.2023.

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

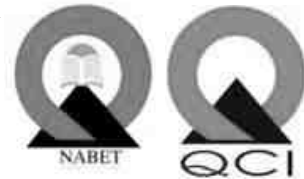
Name and Address	Extent & S.F.No.
Mr.K.Shanmugam S/o.Karumanagounder, Opp to V.S.T.Petrol Bunk, Punnamchathiram, Pugalur Taluk, Karur -639136.	0.73.5 Ha & 76/2

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS



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NABET ACC. NO: NABET/EIA/2124/SA 0184
Valid till: Dec 31, 2023

ENVIRONMENTAL LAB

EKDANT ENVIRO SERVICES (P) LIMITED

NABL Accredited & Recognised Laboratory

**No.R7/1, AVK Tower, North Main Road,
Anna Nagar, West Exten.**

Chennai-600 101

Baseline Study Period – October through December 2021

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. K. Shanmugam

“ToR issued vide Letter No. SEIAA-TN/F.No.9483/ToR-1419/2023 dated 30.03.2023”

SPECIFIC CONDITIONS		
1	The proponent is requested to submit the valid registered lease document during the EIA appraisal after the previous lease granted for the mining operations is legally surrendered (or) lapsed with the consent of the competent authority.	The valid registered lease document has been attached with the approved mining plan report.
2	The proponent is requested to carry out a survey and enumerate on the structures including the crematory shed located within 100m, 200m, 300m from the boundary of the mine lease area.	Survey on the structures and crematory shed was conducted up to 300 m radius from the proposed project site. The field study showed that there is a Veerakumara Swamy Temple at about 198 m in W of the proposed project site. There are 5 houses are found at around 300 m in the east of the proposed project site. Any crematory shed is not found within 300 m radius, but at 567 m in E of the proposed project there is a crematory shed under construction. A map (Figure 3.32) showing location of the temple and the crematory shed has been provided under Chapter III.
3	The proponent must conduct a survey and furnish the details of habitations which is located within 300 m radius (Nochikattur village) from the proposed mine lease area and impact of the proposed quarrying operations on the above habitations/structures.	A habitation of Nochikkattur is located at about 310 m in NNE of the project site. The habitation contains about 17 families. Location of the habitation and some of the houses in the habitation have been shown in Figure 3.32 under Chapter III, p.102 The mining projects have positive impacts on the habitation because those families

		depend on the nearby rough stone quarries for their livelihood.
4	The proponent must submit certified compliance report obtained from IRO of MoEF & CC as per OM IA3-22/10/2022.1A. III Dated 08 06.2022.	The application to CCR is under process. The CCR will be submitted with the final EIA report.
5	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Photographs showing fencing, green belt will be included in the final EIA report.
6	The Project Proponent shall conduct the hydrogeological 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 activity. Necessary data and documentation in this regard may be provided.	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.39-51.
7	The proponent shall submit the details regarding the nature of blasting activity which will be carried out.	This proposed project involves the open cast semi-mechanized mining method with bench height and width of 5m each. The open cast semi-mechanized method involved drilling and blasting is proposed to extract rough stone and gravel.
8	The PP shall furnish 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.	With respect to the suggestion made in the ToR, an application seeking details on distance of reserve forest & protected areas / Wild life sanctuaries & wild life corridors etc., within 25 km radius has been made to

		DFO at Kancheepuram. The document will be submitted along with the final EIA report.
9	The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.	The individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site will be submitted in the final EIA report.
10	In the case of proposed lease in an existing (or old) quarry where the benches are non-existent (or) partially formed critical of the bench geometry approved in the Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the 'highwall' benches to ensure slope stability in the proposed quarry lease which shall be vetted by the concerned Asst. Director of Geology and Mining, during the time of appraisal for obtaining the EC.	The action plan for realignment of benches for this proposed project will be submitted during presentation
11	The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry indicating the proposed stabilizing measures during the appraisal while obtaining the EC. as the depth of the proposed working is extended beyond 30 m below ground level.	With respect to the suggestion made in the ToR, Details about the 'Slope Stability Plan' have been given in Section 2.5 under Chapter II, pp.15-17 following the approved mining plan.
12	The PP shall furnish the affidavit stating that no blasting operation in the proposed quarry is carried out as it involves only manual means of rock breaking.	An agreement between the proponent and the blaster has been attached with the approved mining plan.
13	If the blasting operation is to be carried out, the PP shall present a conceptual design for carrying out the NONEL initiation based controlled blasting operation involving line drilling & muffle	This proposed project mainly involves a manual open cast mining method. The aim of the project is to excavate rough stone in a preferred dimension. To achieve the

	blasting and Simulation Model indicating the anticipated Blast-induced Ground Vibration levels in the proposed quarry as stipulated by the DGMS Circular No.7 of 1997, during the EIA Proposal.	preferred dimension, the project will use a negligible quantity of explosives and NONEL fuse to create cracks in the massive rock in day-to-day operations. Therefore, the blasting operation will produce feeble ground vibrations. For more information, see the conceptual blasting design in Section 2.6 under Chapter II, pp.18-24.
14	Details of Green belt & fencing shall be included in the EIA Report.	The green belt development has been discussed in Section 4.6 under Chapter IV, pp.120-123. Also, the photographs showing existing green belt have been provided in Figure 4.5 under Chapter IV, p.123. The project proponent will cover the project area with barbed wire fencing to prevent wildlife from entering the site among other environmental protection measures.
15	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	The video and photographic evidences will be attached in the final EIA/EMP report if the proponent has already involved in the mining project.
16	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:	
a)	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 green field project, the conditions are not applicable to this project.
b)	Quantity of minerals mined out.	
c)	Highest production achieved in any one year	

d)	Detail of approved depth of mining	
e)	Actual depth of the mining achieved earlier	
f)	Name of the person already mined in that leases area.	
g)	If EC and CTO already obtained, the copy of the same shall be submitted.	
h)	Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
17	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
18	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	Drone video coverage will be submitted at the time of presentation.
19	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 mineral reserves of the project have been discussed in Section 2.5 under Chapter II, p.15. The anticipated impact of mining on land, air, noise, water, soil, biology, and socio economy is discussed under Chapter IV, pp.103-130.
20	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	Employment details of the proposed project are provided in Table 2.14 under Chapter II, p.27.

	protect the environment.	
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. 28-102.
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.143-149.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	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.
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 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, pp.30-40 under Chapter III. The details of surrounding sensitive ecological features

	land use should be given.	are provided in Table 3.42 under Chapter III, pp.97 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 over burden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any. Should be provided.	Not Applicable. 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. This project area is involved in the production of rough stone and gravel materials as per the approved mine plan.
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.	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.
28	Impact on local transport infrastructure due to the Project should be indicated.	Impact on local traffic due to the project is within the permissible limit. Details are provided in Section 3.7 under Chapter III, pp.94-94.

29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.5 under Chapter III, pp.70-83.
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Progressive mine closure plan has been prepared for this project and is given in Section 2.6 under Chapter II, pp.18-25.
31	Public Hearing points raised and commitments 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 and to be submitted to SEIAA-/SEAC with regard to the Office Memorandum of MoEF & CC accordingly.	The project proponent addressed the concerns from the public during public hearing will be submitted in the final EIA report.
32	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	The Public hearing advertisement will be updated in the final EIA report.
33	The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.	The Tamil version of draft EIA report and executive summary was submitted to TNPCB for public hearing.
34	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 instructed the local people about the importance of protecting the biological environment.
35	The purpose of green belt around the project is to	A detailed Greenbelt Development Plan

	capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	dealing with carbon sequestration has been provided in Section 4.6 under Chapter IV, pp.120-127.
36	Taller/one year old Saplings raised in appropriate size of bags preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-friendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist. Saplings used for greenbelt development have been shown in Section 4.6 under Chapter IV, pp.121.
37	A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	The details about disaster management Plan have been provided in Section 7.2 under Chapter VII, pp.140-143.
38	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.	The details about risk assessment and management plan have been provided in Section 7.2 under Chapter VII, pp.137-139.
39	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	Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV, pp.128 & 129.

	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.	
40	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.155-156.
41	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the Socio-Economic environment by offering employment for 14 people directly and 5 people indirectly as discussed in Section 8.1 and 8.2 under Chapter VIII, p.154.
42	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.
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given in under Chapter VIII., pp.154-156.
44	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF & CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	The certified compliance is attached with this report in Annexure.
45	The PP shall prepare the EMP for the entire life of	A detailed EMP is provided in Table 10.9

	mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	under Chapter X, pp.169-176.
46	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	The EIA report has been prepared keeping in mind the fact that concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.
Discussion by SEIAA and the Remarks		
The proposal was placed in the 606 th Authority meeting held on 30.03.2023. The authority noted that the subject was appraised in 360 th SEAC meeting held on 03.03.2023. After detailed deliberations, the Authority accepted the recommendations of SEAC and decided to grant Terms of Reference subject to the conditions as recommended by SEAC in addition to the following conditions.		
1	The proponent shall submit a letter obtained from AD/ Mines regarding the working methodology of the proposed mine	The letter obtained from AD/ Mines regarding the working methodology of the proposed mine will be submitted in the final EIA report
2	The proponent shall submit the details regarding the working efficiency of the individual labours and per day quantity that will be achieved shall be submitted.	The details regarding the working efficiency of the individual labours have been given in Table 2.14 under Chapter II, p.27 and per day quantity that will be achieved by the labours is estimated to be 1.7 m ³ of rough stone.
3	The proponent shall submit the number of labours employed in the mining activity including male and female.	The number of labours employed in the mining activity including male and female is 10, as provided in Table 2.14 under Chapter II, p.27.
4	The proponent shall submit the list of Labours to be employed.	The list of labours has been given in Table 2.14 under Chapter II, p.27

5	The proponent shall submit the details regarding the project cost which shall include the cost for Health measurements for the labours.	The details regarding the cost for the health measurements for the labours in Table 10.9 under Chapter X, pp.169-176.
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.	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.18-26.
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.	The cluster management will be advised to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall furnish the Emergency 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 is discussed in Section 7.3 under Chapter VII, pp.140-143.
Impact Study of Mining		
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following.	
a)	Soil health & Soil biological, physical land chemical features.	
b)	Climate change leading to Droughts, Floods etc.	

c)	Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.	The Study is under process. The results will be updated in the final EIA report.
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	As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present will be low. With proper mitigation measures, the project will be carried out to reduce the impact further to the level of negligence.
14	Impact on soil flora & vegetation around the project site.	Impact of the project on the ecology and biodiversity has been discussed in Section 4.2 and Section 4.6 under Chapter IV, pp.104-105 and pp.120 – 127.
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.	Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III, pp.68-88. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV, pp. 120 – 127.
16	The Environmental Impact Assessment should	The ecological details have been provided

	study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	in Section 3.5 under Chapter III, pp.68-88 and measures have been provided in Section 4.6 under Chapter IV, pp. 120 – 127.
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	The FAE of ecology and biodiversity has advised the project proponent that replantation work, particularly for the project area where plants of 4 years old exist should be carried out in the vacant areas available.
18	The project Proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV, pp.103-104.
Forests		
19	The Project proponent shall detail study on Impact of mining on Reserve Forests free ranging wildlife.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV, pp.110-138.
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.120-127.
21	The Environmental Impact Assessment Should 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.120-127.
22	The Environmental Impact Assessment should study Impact on protected areas, Reserve Forests, National Parks, Corridors and wildlife pathways, near project site.	There are no protected areas, National Parks, Corridors and Wildlife pathways near project site. The list of environmentally sensitive areas within 10 km radius has been provided in Table 3.41 under Chapter III, p.97

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 ground water, Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	A detailed hydrogeological study was carried out. The results have been discussed in Section 3.2 under Chapter III, pp.39-51.
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, pp.105 & 106.
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.	A detailed study was carried out regarding the impact of mining on the environment. The results have been included in Chapter IV, pp.103-130.
26	The Project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	As there are no water bodies near to the proposed project site during study period, a study about the impact of mining on fish habitats was not conducted.
27	The Project proponent shall study and furnish the details on potential fragmentation impact on natural environment by the activities.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV, pp.103 & 104.
28	The Project proponent shall study and furnish the	The impacts of the proposed project on the

	impact on aquatic plants and animals in water bodies and possible scars on the landscape, damagers to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	surrounding environment have discussed in Chapter IV, pp.103-130.
29	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV, pp.104 & 105.
30	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV, pp.105 & 106.
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.103-130.
Climate Change		
32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	Greenbelt development plan as discussed in Section 4.6 under Chapter IV has been designed to reduce the impact of carbon emission on the environment, pp.120 - 127.
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The information will be included in the final EIA report.
Mine Closure Plan		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area	A progressive mine closure plan has been attached with the approved mining plan

	communication order issued.	report in Annexure III. The budget details for the mine closure are shown in Table 2.9 under Chapter II, p.23.
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 in Table 10.9 under Chapter X, pp.169-176.
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 prepared and provided in Table 10.9 under Chapter X, pp.169-176.
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.137-139.
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.	A detailed Environment Management Plan has been given under Chapter X, pp.158-177.
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	The VAO certificate of 300 m radius have been given in the annexure.

	such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.,	
40	As per the MoEF & CC office memorandum F.NO.22-65/2017-IA.III dated:30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	The project proponent addressed the concerns from the public during public hearing will be given 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 7.5 under Chapter VII, pp.151 & 152
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.	Not applicable. This is not a violation category project. This proposal falls 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 patta land. A copy of the ownership document 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	The following will approve mine plan, EIA and public hearing will submitted in the final EIA report.

	be in the name of the lessee.	
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.2, under Chapter II, p-10
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The baseline data sampling locations for all the environmental components are shown in Survey of India Toposheet under 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 applied 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-	The proponent has framed Environmental Policy and the same has been discussed in Section 10.1 under Chapter X, pp.158 & 159.

	compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	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.	All the 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.30-38. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.6, under Chapter II,

		p.20.
11.	Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Not Applicable. There is no waste anticipated during this quarry operation. The entire quarried out rough stone will be transported to the need customers. Hence, no dumps are proposed outside the lease area.
12.	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not Applicable. There is no forest land involved within the proposed project area and the proposed project area is a patta land.
13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not Applicable. There are neither forests nor forest dwellers/forest dependent communities in the mine lease area. There is no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither

	Forest Rights) Act, 2006 should be indicated.	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.	Details about forest vegetation have been provided in Section 3.5, under Chapter III, pp.68-88.
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.	A study was done on wildlife within the study area, as shown in Section 3.5 under Chapter III, pp.68-88. The impact on wild life has been discussed in Section 4.6 under Chapter IV, pp.120 - 127.
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	Information regarding the same has been given in Table 3.41 under Chapter III, pp.97.
18.	A detailed biological study of the study area [core	A detailed biological study was carried out

	<p>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.</p>	<p>in both core and buffer zones and the results have been discussed in Section 3.5 under Chapter III, pp. 68-88. 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.</p>
19.	<p>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.</p>	<p>Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.</p>
20.	<p>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</p>	<p>Not Applicable The project doesn't attract The C. R. Z. Notification, 2018.</p>

	Coastal Zone Management Authority).	
21.	<p>R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker Sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.</p>	<p>Not Applicable.</p> <p>There are no approved habitations within a radius of 300 meters. Therefore, R&R plan / compensation details for the Project Affected People (PAP) is not anticipated.</p>
22.	<p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and</p>	<p>Baseline data were collected for the period of October 2022 - December 2022 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.7 under Chapter III, pp. 30-96.</p>

	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 modelling 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 modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view. The model results have been given in Section 4.4 under the Chapter IV, pp.106-115.
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.25.
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	Part of the working pit will be allowed to

	<p>proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.</p>	<p>collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression.</p> <p>The mine closure plan will be prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.</p>
27.	<p>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.</p>	<p>Impact studies and mitigation measures of water environment including surface water and ground water were conducted and the results have been discussed in Section 4.3, under the Chapter IV, pp. 105-106.</p>
28.	<p>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.</p>	<p>Not Applicable.</p> <p>The ground water table is found at the depth of 60 m below ground level. The ultimate depth of quarry is 20 m BGL. Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2 under Chapter III, pp.39-51.</p>
29.	<p>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.</p>	<p>Not Applicable.</p> <p>There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or</p>

		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 165 m AMSL. Ultimate depth of the mine is 20 m BGL. Depth to the water level in the area is 50-60 m BGL.
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	A detailed Greenbelt Development Plan has been provided in Tables 4.14 and 4.15 in Section 4.6 under Chapter IV, pp.120-127.
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	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, pp.94-96.

	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.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.7 under Chapter II, pp.25.
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 under Chapter II, pp.18-26.
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.128 & 129.
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.155 & 156.
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 14 people directly and 5 people indirectly, as discussed in Section

		8.1 under Chapter VIII, p.154.
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.	Detailed environment management plan for the project to mitigate the anticipated impacts has been provided under Chapter X, pp.158-177.
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 same will be updated in the final EIA report after public hearing meeting.
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. 42,99,500/- In order to implement the environmental protection measures, an amount of Rs.1549434 as capital cost and recurring cost/annum is Rs.1104088 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.7675207, as shown in Tables 10.9 &10.10 under Chapter X, pp.158-177.
42	A disaster management Plan shall be prepared and	The details have been provided in Section

	included in the EIA/EMP Report.	7.2 under Chapter VII, pp.137-139.
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project have been discussed under Chapter VIII, pp.154-156.
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 reports will be submitted in the final EIA report during appraisal.
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 enclosed along with final EIA/EMP report.
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4th

	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.	August, 2009 have been followed while preparing the EIA report.
h)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	No changes are made in the basic scope and the project parameters.
i)	As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	The certified compliance report is provided in Annexure.
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 related to mining have been included along with the approved mining plan report in Annexure.

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CHAPTER I

INTRODUCTION

1.0 PREAMBLE

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14th August 2018, all the mining projects are broadly classified into two categories, i.e., category A and category B, based on the spatial extent of the projects. The category B projects are further divided in to B1 and B2 on the basis of the guidelines issued of the Ministry of Environment and Forests. All mining projects included in category B1 require an EIA report for obtaining environmental clearance from the State Environment Impact Assessment Authority (SEIAA). As the proposed project falls within the cluster of quarries of overall extent of greater than 5 ha and less than 50 ha in the case of non-coal mine lease, the proposed project falls under the category B1 and the project requires preparation and submission of an EIA report after public consultation to SEIAA for obtaining environmental clearance as per the order dated 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

In compliance with ToR obtained vide Letter No. SEIAA-TN/F.No.9483/ToR-1419/2023 dated 30.03.2023. This EIA report has been prepared for the project proponent, Mr.K.Shanmugam applied for rough stone and gravel quarry lease in the patta land falling in S. F. No.76/2 over an extent of 0.73.5 ha in Kuppam Village, Pugalur Taluk, Karur District and Tamil Nadu. This EIA report takes into account the rough stone and gravel quarries within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains six proposed projects, known as P1, P2, P3, P4, P5 and P6, one Existing project E1, one expired project 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 16.03.0 ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

Table 1.1 Details of Quarries within the Cluster Area of 500 m Radius

Proposed Quarries				
Code	Name of the Owner	S.F. Nos/Village	Extent (ha)	Lease Period/Remarks
P1	K. Shanmugam	76/2 Kuppam	0.73.5	Proposed Area
P2	Tvl. NTC Blue Metals LLP	76/1(p) Kuppam	0.63.0	
P3	Thiru. S. Sadhasivam	211/1, 211/2 Kuppam	1.54.0	
P4	K. Nallasamy	226/1(P) Kuppam	2.89.0	
P5	V. Kavitha	75/1A,75/1B & 75/2 Kuppam	1.88.0	
P6	Tvl. NTC Blue Metals LLP	362/2(p) Kuppam	2.19.0	
Existing Quarries				
E1	Tvl. Venkatachalapathi	213/1,214/2A, 214/2B,214/2C, 220/3P,221/P Kuppam	4.05.0	23.06.2017 To 22.06.2022
Expired Quarries				
EX1	Thiru. P. Marappan	74,75/3B Kuppam	2.11.5	14.10.2016 To 13.10.2021
Total Cluster Extent			16.03.0	

Source:

DD Letter: Rc.No.311/Mines/2021, Dated:16.09.2022.

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 2021** 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/401527/2022, dated 28.09.2022) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on 29.09.2022.

Scoping

The proposal was placed in the 360th meeting of SEAC on 03.03.2023. 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.

1.3 TERMS OF REFERENCE (ToR)

The SEAC framed a comprehensive Terms of Reference (TOR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued TOR to the proponent vide **Letter No: SEIAA-TN/F.No.9483/ToR-1419/2023 Dated :30.03.2023 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 GENERIC STRUCTURE OF EIA DOCUMENT

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC. The generic structure of the EIA document should be as under:

- ❖ Introduction
- ❖ Project Description
- ❖ Description of the Environment
- ❖ Anticipated Environmental Impact & Mitigation Measures
- ❖ Analysis of Alternatives (Technology & Site)
- ❖ Environmental Monitoring Program
- ❖ Additional Studies
- ❖ Project Benefits
- ❖ Environmental Cost Benefit Analysis
- ❖ Environmental Management Plan (EMP)
- ❖ Summary & Conclusion
- ❖ Disclosure of Consultants engaged.

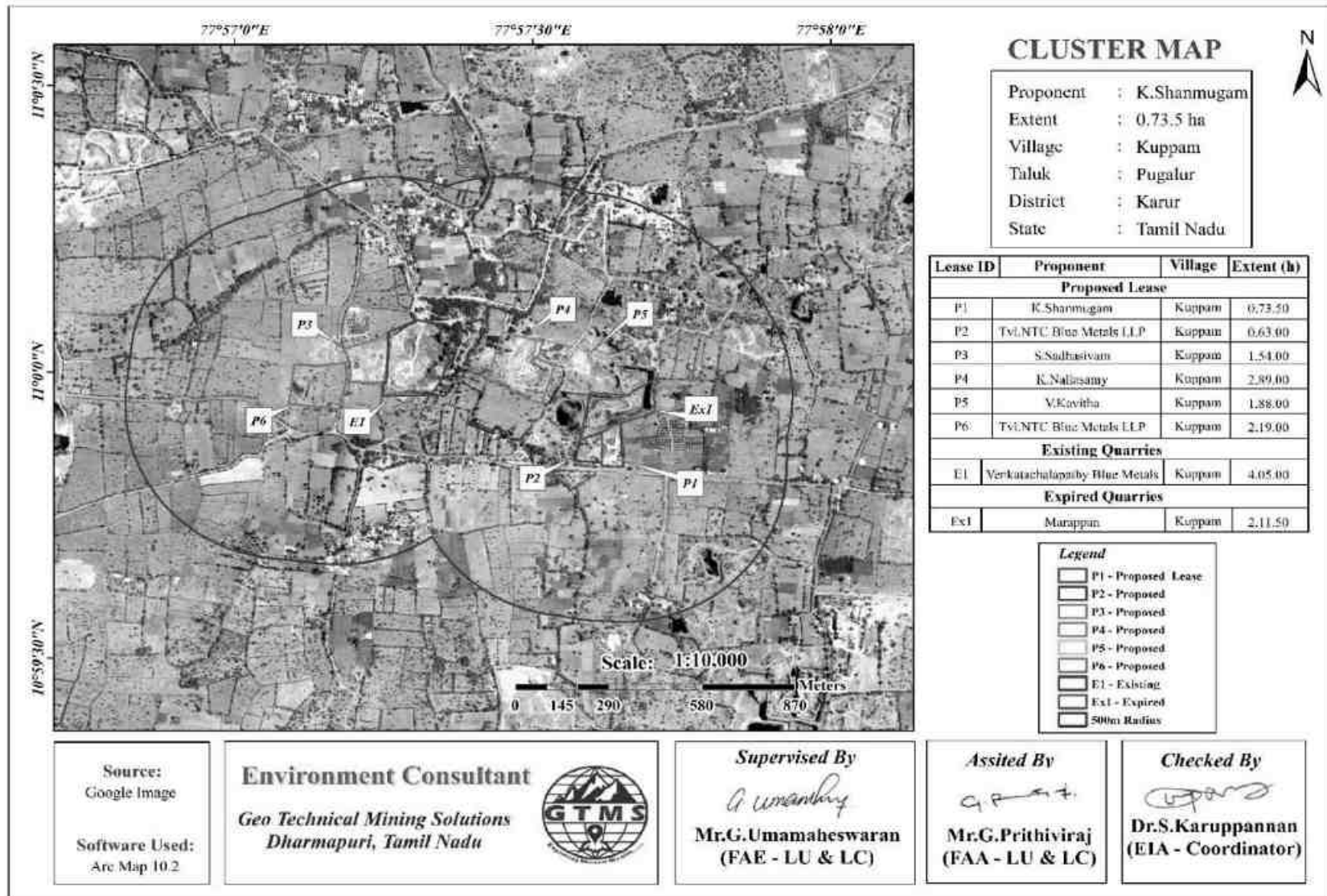


Figure 1.1 Location of The Proposed and Existing Rough Stone Quarries in the Cluster of 500 m Radius

1.7 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.

1.2 Details of Project Proponent

Name of the Project Proponent	Mr.K.Shanmugam
Address	S/o.Karumanagounder, Opp to V.S.T.Petrol Bunk, Punnamchathiram, Pugalur Taluk, Karur -639136.
Status	Proprietor

1.8 BRIEF DESCRIPTION OF THE PROJECT

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

Table 1.3 Salient Features of Proposed Project

Name of the Quarry	Mr.K.Shanmugam Rough stone and Gravel Quarry	
Toposheet No	58 F/13	
Latitude between	10°59'50.08" N to 10°59'54.61" N	
Longitude between	77°57'36.96" E to 77°57'39.16" E	
Highest Elevation	165m AMSL	
Proposed Depth of Mining	20m BGL	
Geological Resources	Rough Stone in m ³	Gravel in m ³
	1,24,440	21,960
Mineable Reserves	Rough Stone in m ³	Gravel in m ³
	25,585	9,315
Proposed production for 5 years	Rough Stone in m ³	Gravel in m ³
	22,660	9,315
Ultimate Pit Dimension (Proposed)	69m (L) x 45m (W) x 20m (D)	
Method of Mining	Opencast Semi mechanized method of mining	
Topography	Undulated topography	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Hydraulic Excavator	1
	Tipper	1

Blasting Method	The quarrying operation is proposed to be carried by open cast semi mechanized mining in conjunction with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.
Proposed Manpower Development	14 Nos
Project Cost	Rs.42,99,500/-
CER Cost @ 2% of Project Cost	Rs.5,00,000/-
Proposed Water Requirement	2.7 KLD

1.9 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 2021** 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.

1.10 REFERENCES

The report has been prepared using the following references:

- ❖ Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, February, 2010
- ❖ EIA Notification, 14th September, 2006
- ❖ Terms of Reference (ToR) issued by SEIAA.
- ❖ Approved Mining Plan of this Project.
- ❖ The Water (Prevention and Control of Pollution) Act, 1974
- ❖ The Air (Prevention and Control of Pollution) Act, 1981
- ❖ The Environment (Protection) Act, 1986
- ❖ The Forest (Conservation) Act, 1988
- ❖ The Wildlife (Protection) Act, 1972.

CHAPTER II

PROJECT DESCRIPTION

2.0 GENERAL INTRODUCTION

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

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

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

2.1 DESCRIPTION OF THE PROJECT

The proponent, Mr.K.Shanmugam is involved in the undertaking of establishment, construction, development, and closure of open cast 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 29.07.2021 to extract rough stone and gravel. The precise area communication letter was issued by Department of Geology and Mining, Karur vide (Rc.No.311/Mines/2021, Dated:12.08.2022). Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director of Geology and Mining, Karur (Rc.No.311/Mines/2021, Dated:01.09.2022). The overall view of the project site is shown in Figure 2.1.



Figure 2.1 Overall View of Proposed Project

2.2 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Kuppam Village, Pugalur Taluk and Karur District, as shown in Figure 2.2. The area lies between Latitudes from $10^{\circ}59'50.08''\text{N}$ to $10^{\circ}59'54.61''\text{N}$ and Longitudes from $77^{\circ}57'36.96''\text{E}$ to $77^{\circ}57'39.16''\text{E}$. The maximum altitude of the project area is 165 m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

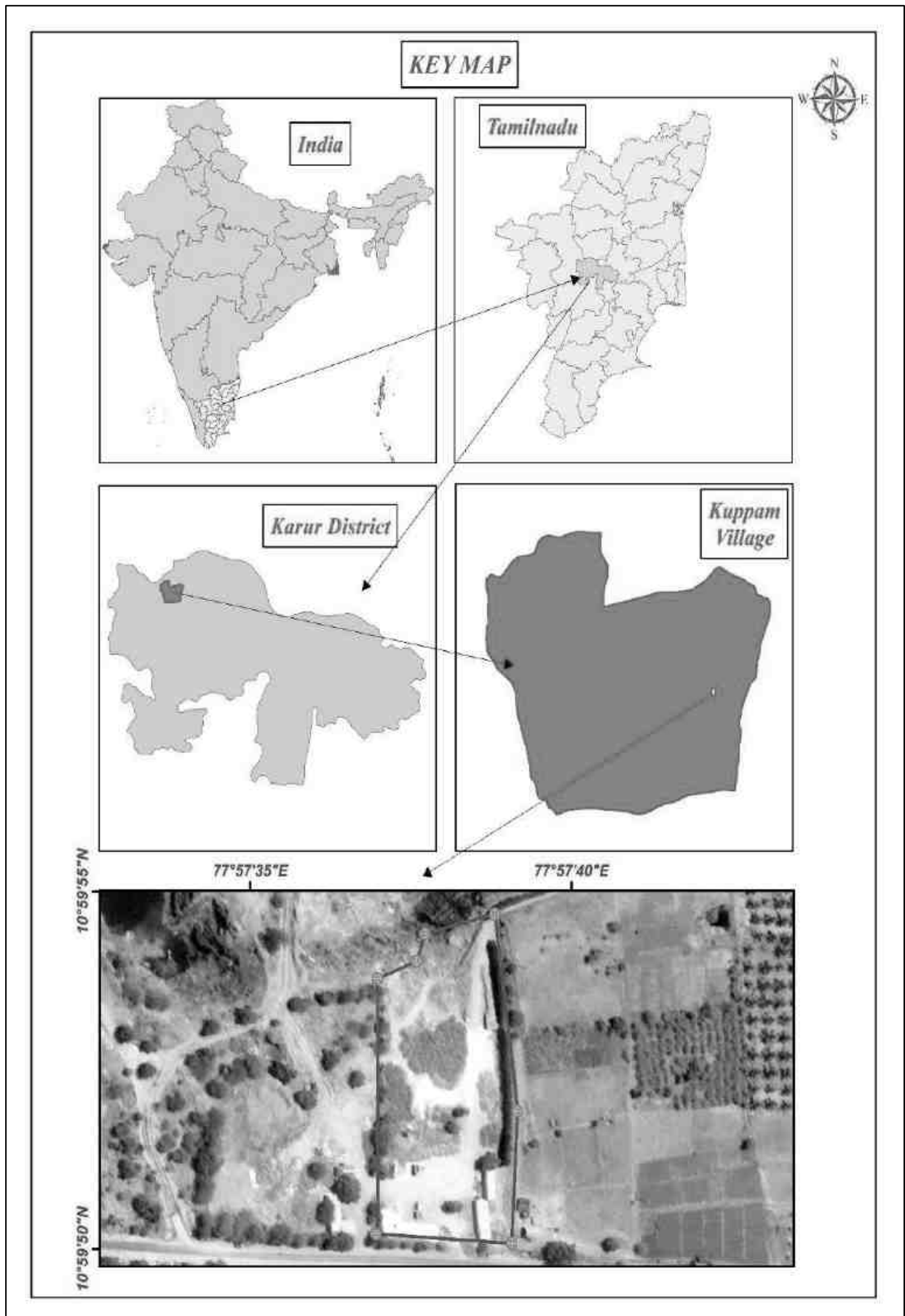


Figure 2.2 Key Map Showing Location of the Project Site

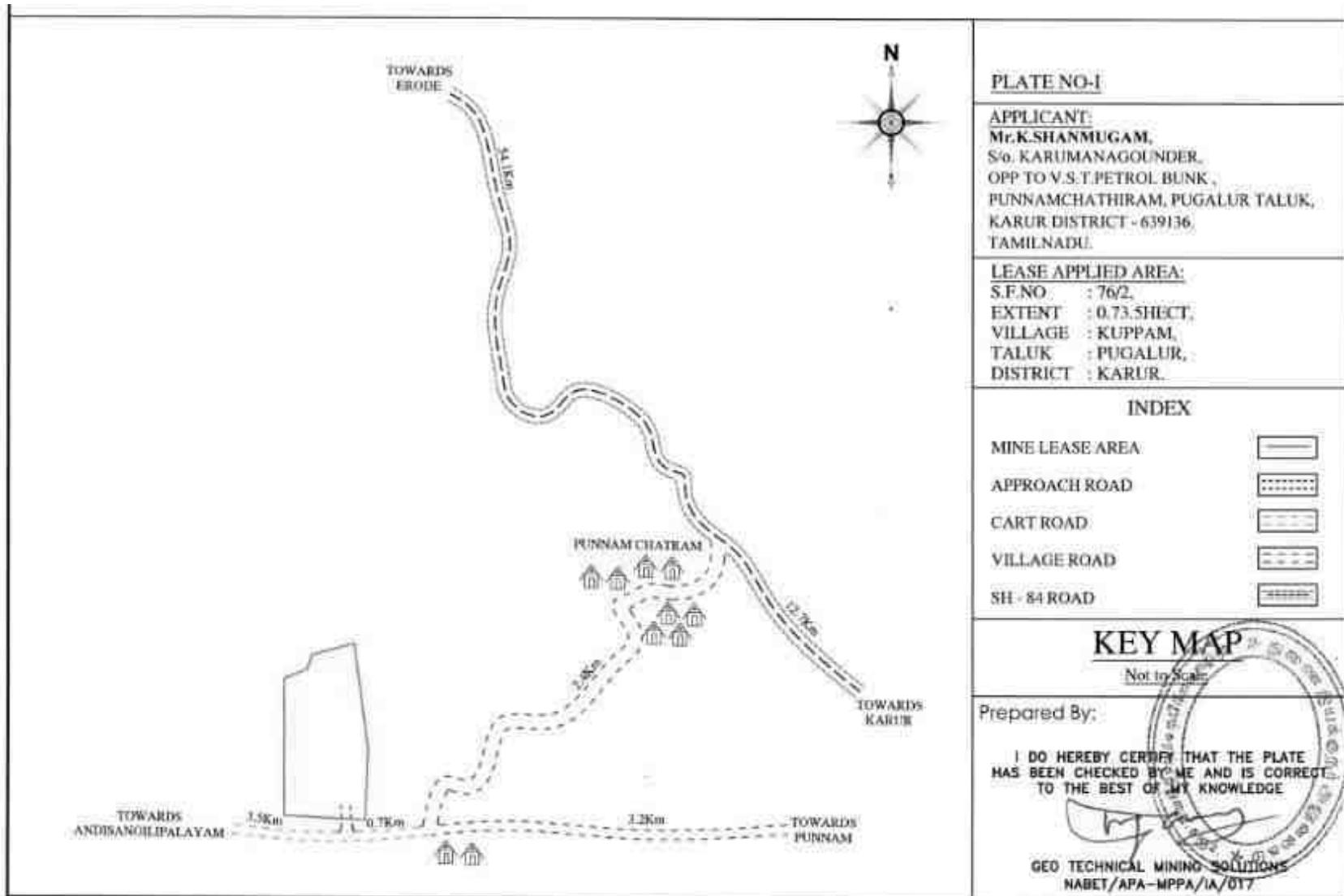


Figure 2.3. Site Connectivity to the Lease Area

Table 2.1 Site Connectivity to the Project Area

Nearest Roadway	SH-84 Karur-Erode	4.78Km E
Nearest Rail Head	Karur	14.0 Km E
Nearest Port Facility	Tuticorin	253.0 Km S
Nearest Airport	Coimbatore	100 Km NW
Nearest Town	K. Paramathi	7.0 Km SW
Nearest Villages	Nochikattur	0.310 km NE
	Talaiyuttupatti	0.66 km SW
	Pullaiyampalayam	1.12 km NE
	Kuppam	4.0km W

2.3 LEASEHOLD AREA

- ❖ The extent of the proposed project site is 0.73.5ha.
- ❖ 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
1	10° 59'54.61"N	77°57'38.81"E
2	10° 59'51.90"N	77°57'39.16"E
3	10° 59'50.08"N	77°57'39.07"E
4	10° 59'50.21"N	77°57'36.96"E
5	10°59'53.72"N	77°57'36.98"E
6	10°59'53.96"N	77°57'37.59"E
7	10°59'54.34"N	77°57'37.72"E

2.4 GEOLOGY AND GEOMORPHOLOGY

The lease area geologically occurs in migmatite terrain. The Charnockite, commercially called as Roughstone occurs within the migmatite rock, as shown in Figure 3.1 & 3.2. Also, the lease area geomorphologically occurs over pediplain.

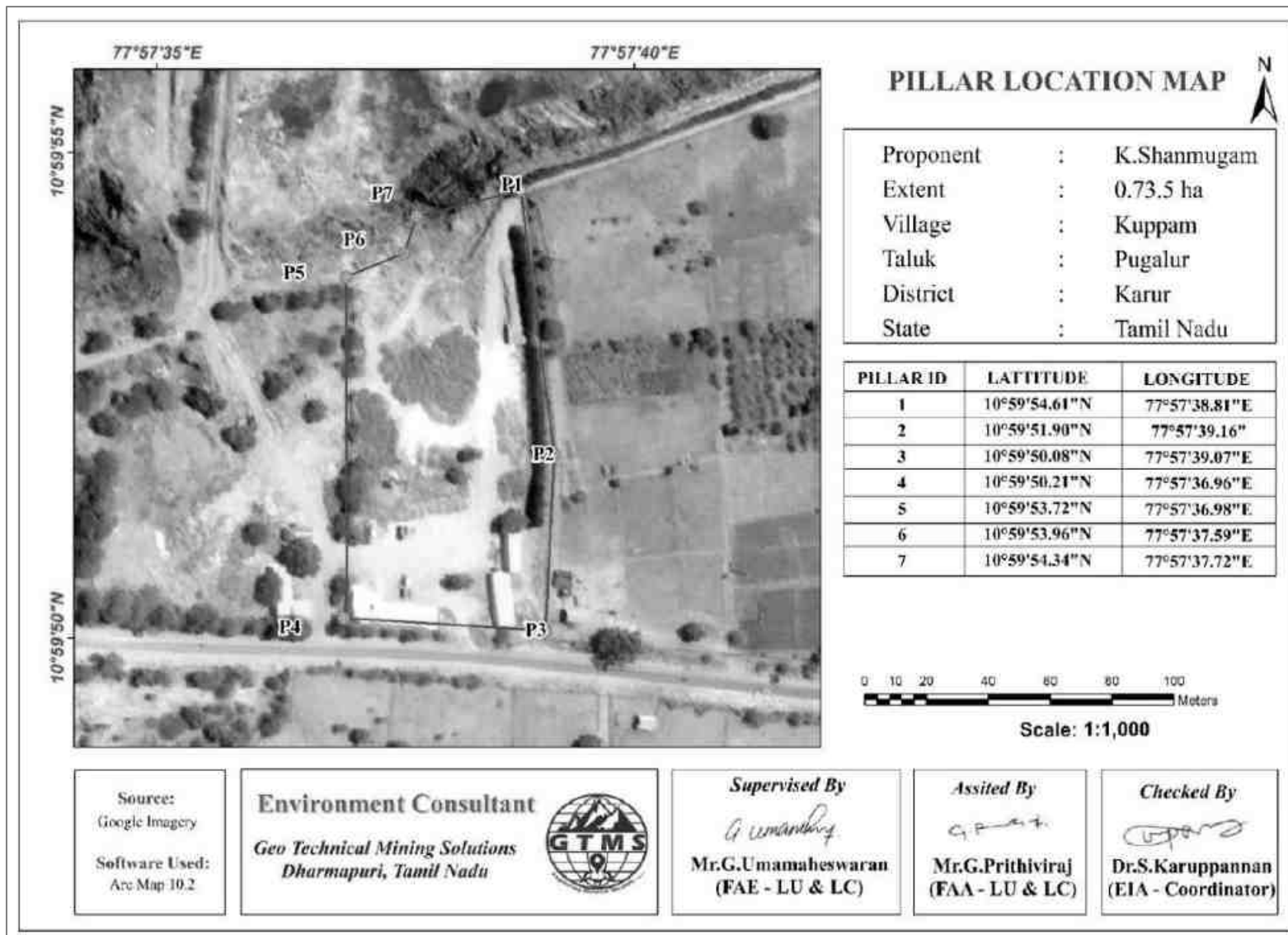


Figure 2.4 Google Earth Image Showing Lease Area with Pillars

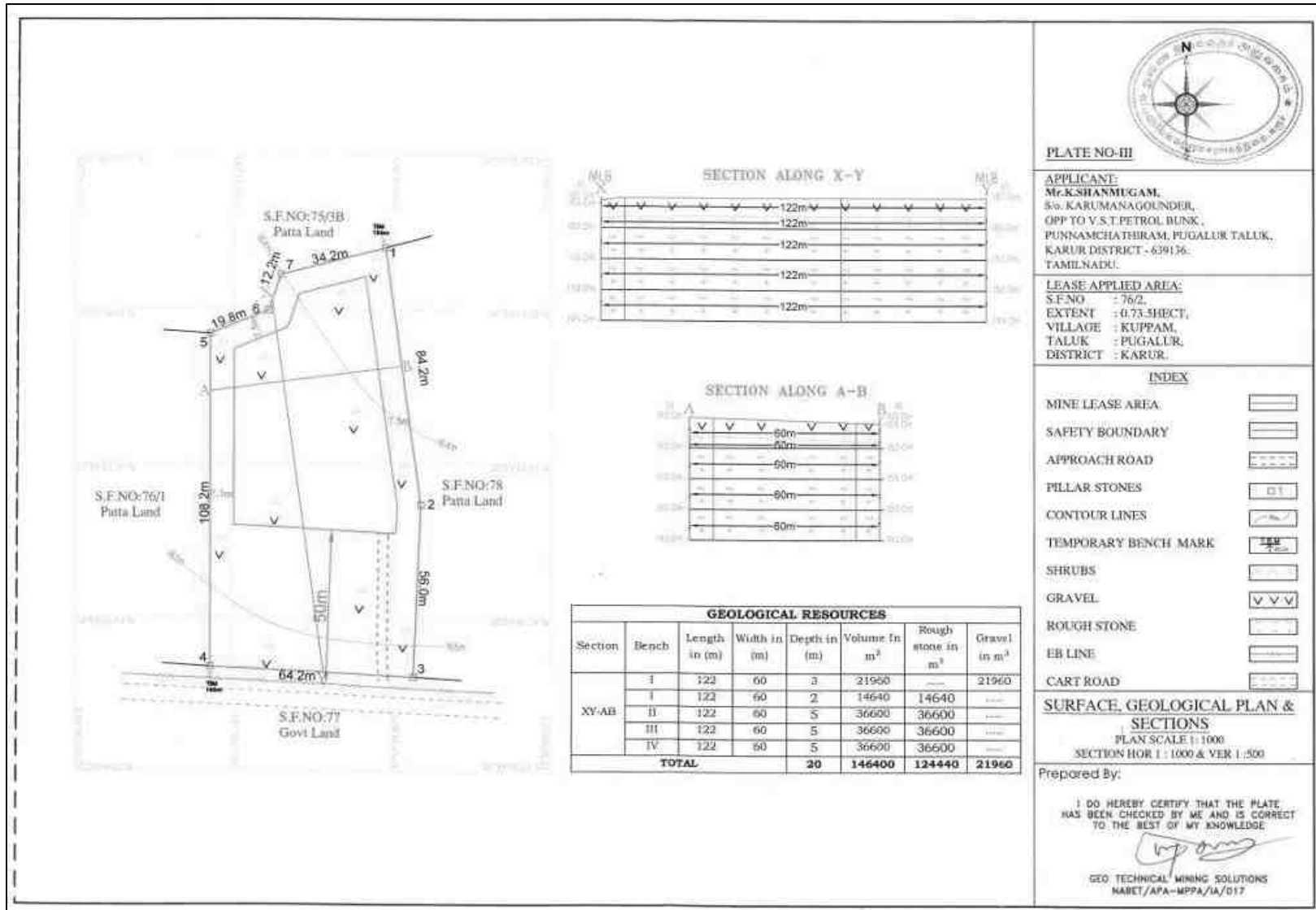


Figure:2.5 Surface and Geological Plan and Sections

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 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 20m 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 2.5 results of geological resources and reserves have been shown in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m ³	Top Soil in m ³
Geological Resource in m ³	124440	21960
Mineable Reserves in m ³	25585	9315
Proposed Production for 5 Years in in m ³	22660	9315

Based on the year wise development and production plan and sections, the year wise production results are given in Table 2.4 and Figure 2.7.

Table 2.4 Year-Wise Production Details

Year	Rough Stone (m ³)	Gravel (m ³)
I	4500	9315
II	4335	...
III	4375	...
IV	6450	...
V	3000	...
Total	22660	9315

Source: Approved Mining Plan & ToR

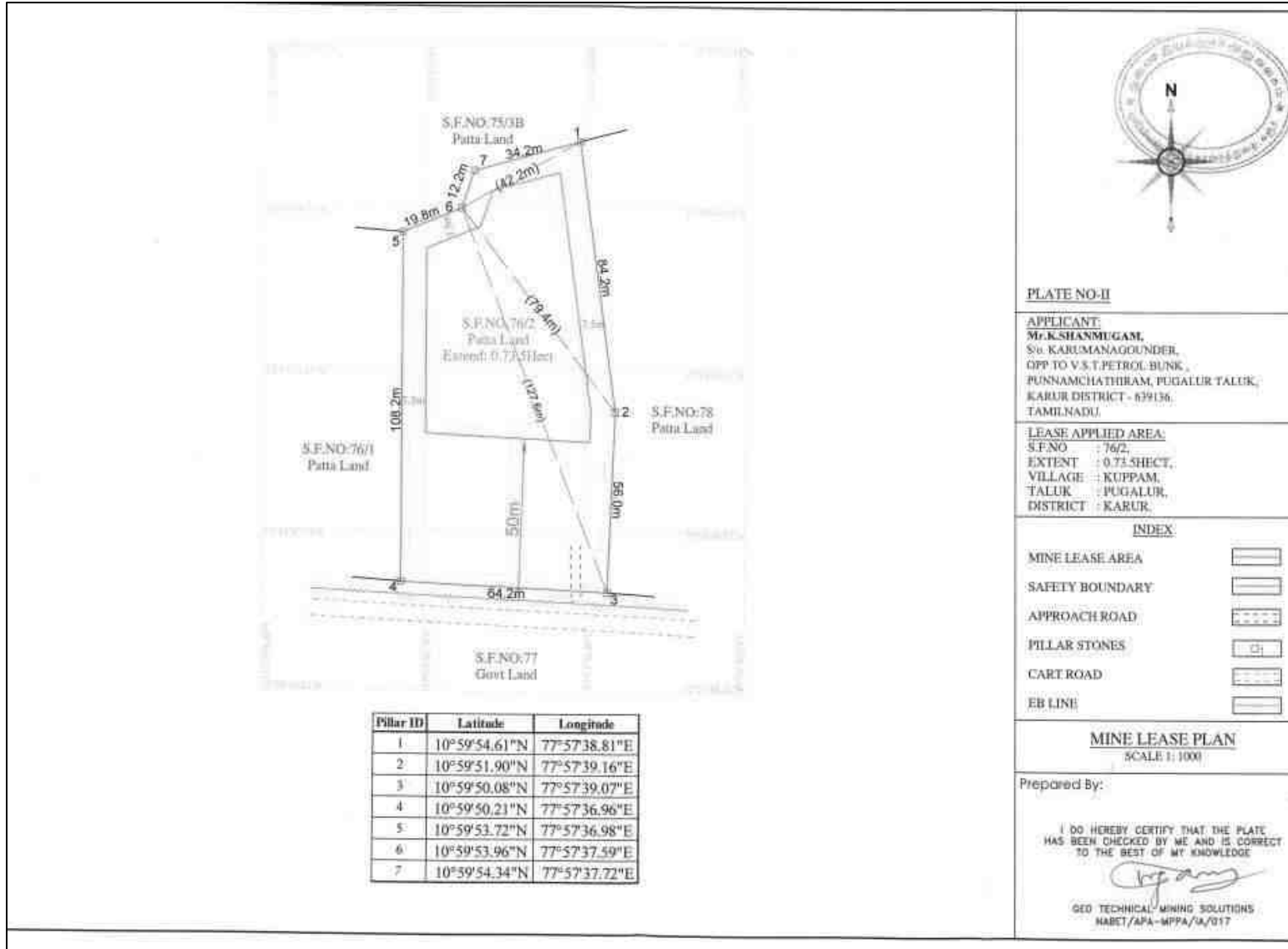


Figure 2.6 Mine Lease Plan

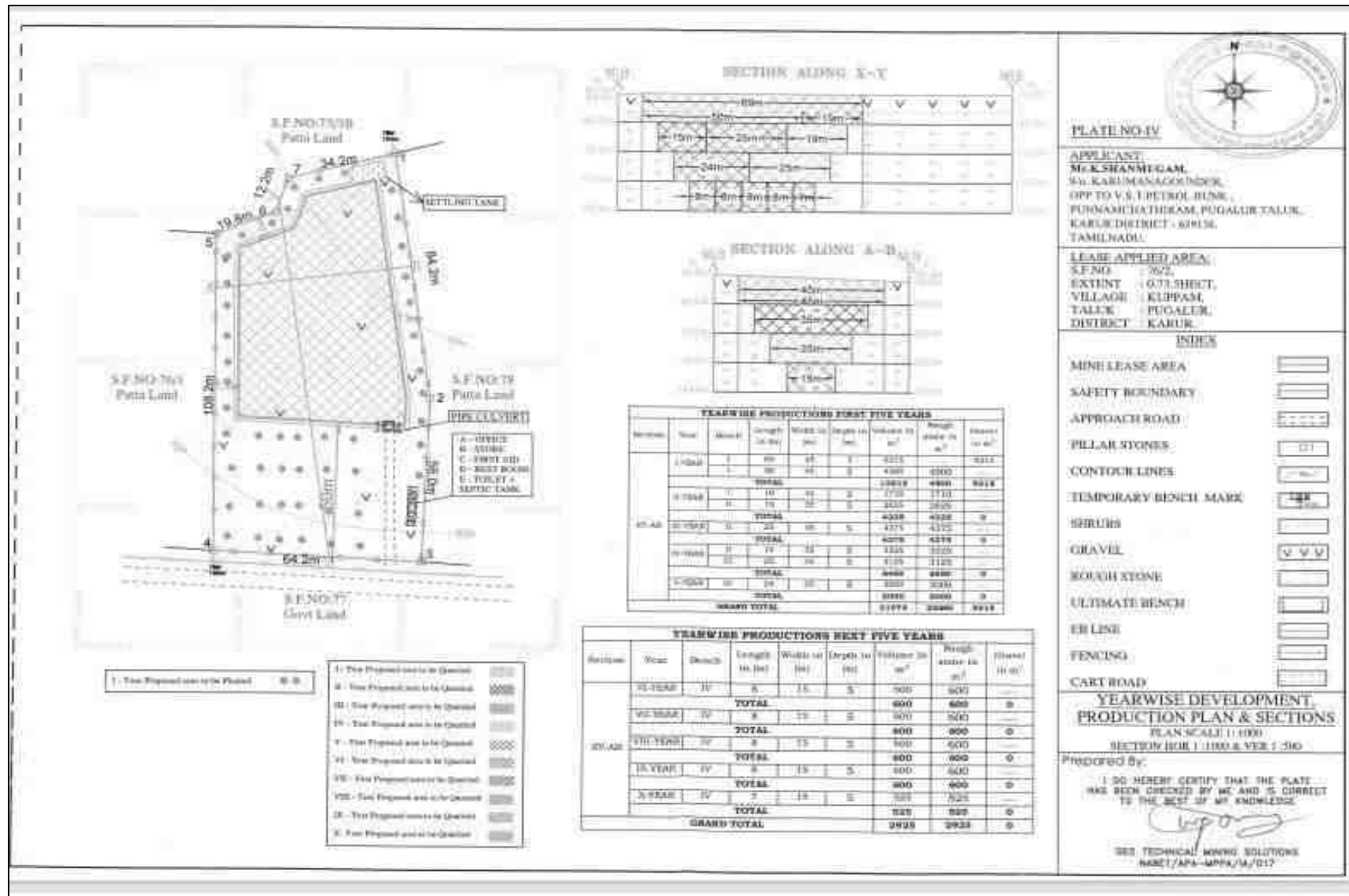


Figure 2.7 Yearwise Development and Production Plan and Sections

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.

2.6.1 Conceptual Blasting Design

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

Rules of Thumb for Blast Design

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

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

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

Rule 2: Generally, select the densest explosive possible.

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

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

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

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

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

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

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

Rule 6: Stemming should be equal to the burden.

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

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

Subdrill should be equal to 0.3 of burden. It will work when there is row-for-row delay. In blasts where the delay system is both row-for-row and hole-for-hole, the subdrill should be determined by the largest dimension, which can be the spacing or the burden. An average subdrill of 0.4 of spacing is best to use for planning purposes. Based on the above-mentioned rules, blasting design has been conceptualized and has been provided in Table 2.5.

Table 2.5 Conceptual Blasting Design

Blasthole Diameter (D) in mm	32
Burden (B) in m	2
Spacing (S) in m	1.45
Subdrill in m	0.6
Charge length (C) in m	0.30
Stemming	2
Hole Length (L) in m	2.9
Bench Height (BH) in m	2.3
Mass of explosive/hole in g	187.5
Stemming material size in mm	3.2
Burden stiffness ratio	1.15
Blast volume/hole in m ³	6.67
Production of rough stone/day in m ³	17
Number of blastholes/day	3

Blasthole pattern	Staggered / Rectangular
Mass of explosive /day in kg	0.47
Powder factor in kg/m ³	0.03
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL
Fly rock distance in m	18

2.6.2 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 / 1 year
Quantity of Material to be Quarried out in five Years in	22660	9315
Number of Working Days /Annum	270	270
Production of /Day (m ³)	17	34
No. of Lorry Loads	3	6

2.6.3 Extent of Mechanization

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

Table 2.7 Machinery Details

S. No.	Type	No. of Unit	Size/Capacity	Make	Motive Power
1	Jack Hammer	2	Hand held	-	Diesel
2	Excavator	1	--	-	Diesel Drive
3	Compressor	1	Air	--	Diesel Drive
4	Tipper	1	30 MT	TATA	Diesel Drive

2.6.4 Progressive Quarry Closure Plan

The progressive quarry closure plan of the proposed project shows present and future land use statistics, as shown in Figure 2.8 and 2.9. According to the land use results, as shown in Table 2.8, about 0.73.50 ha of land is unutilized. Whereas, at the end of the mine life, about 0.34.10ha of land will have been quarried; about 0.30.10 ha of land will be used for green belt development; about 0.03.00 ha of land will be used for infrastructure; and the rest will be used for roads.

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	0.34.10
Infrastructure	Nil	0.03.00
Roads	Nil	0.02.00
Drainage, Settling Tank	Nil	0.03.10
Green Belt area	Nil	0.30.10
Unutilized area	0.73.50	0.01.20
Total	0.73.50	0.73.50

2.6.5 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	Recurring Cost/Annum
147 plants inside the lease area	29400	4410
221 plants outside the lease area	66150	6615
Wire Fencing	147000	7350
Renovation of Garland Drain	7350	3675
Total	249900	22050

Source: Environment Management Plan

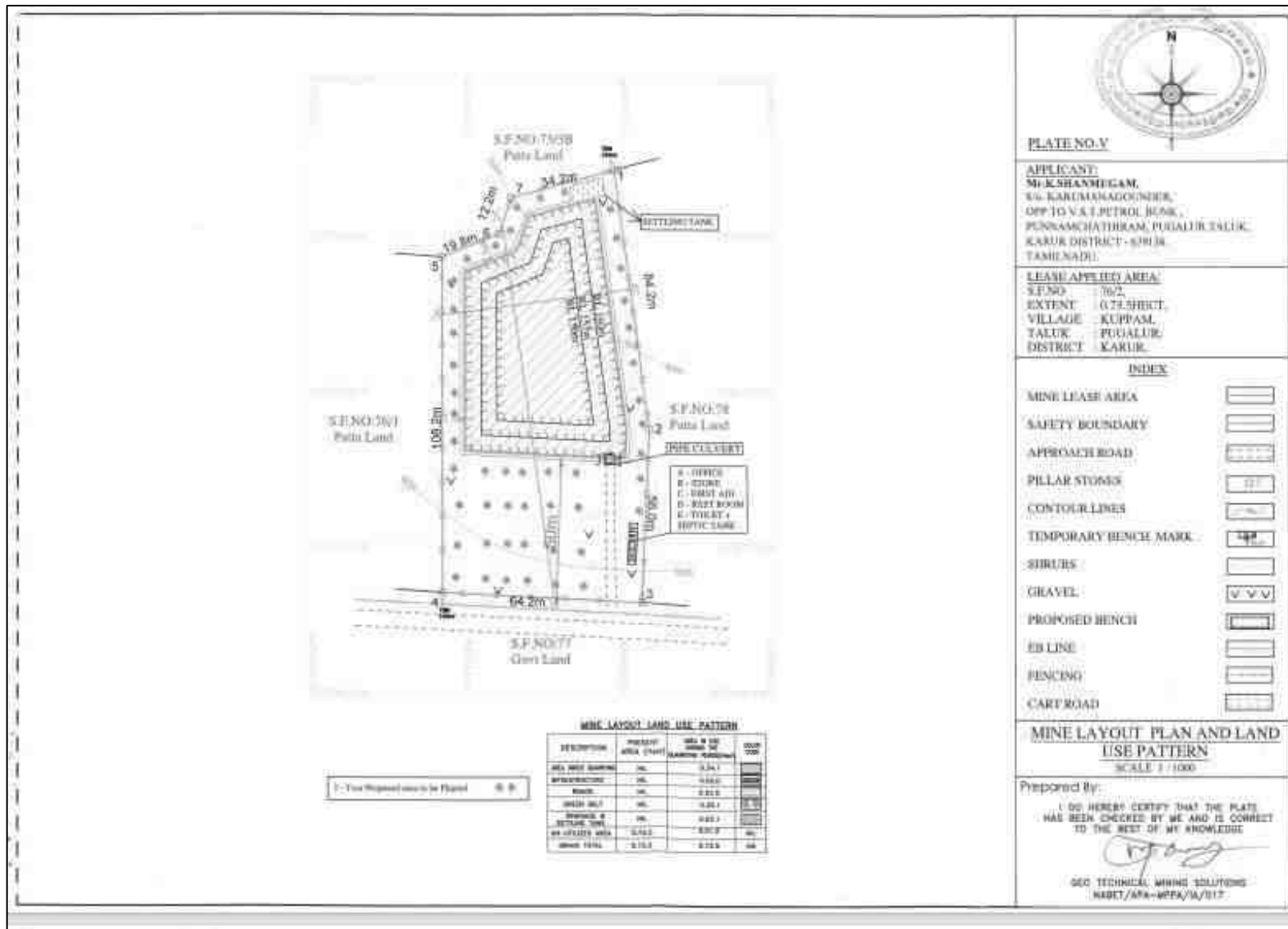


Figure 2.8 Mine Layout Plan and Land Use Pattern

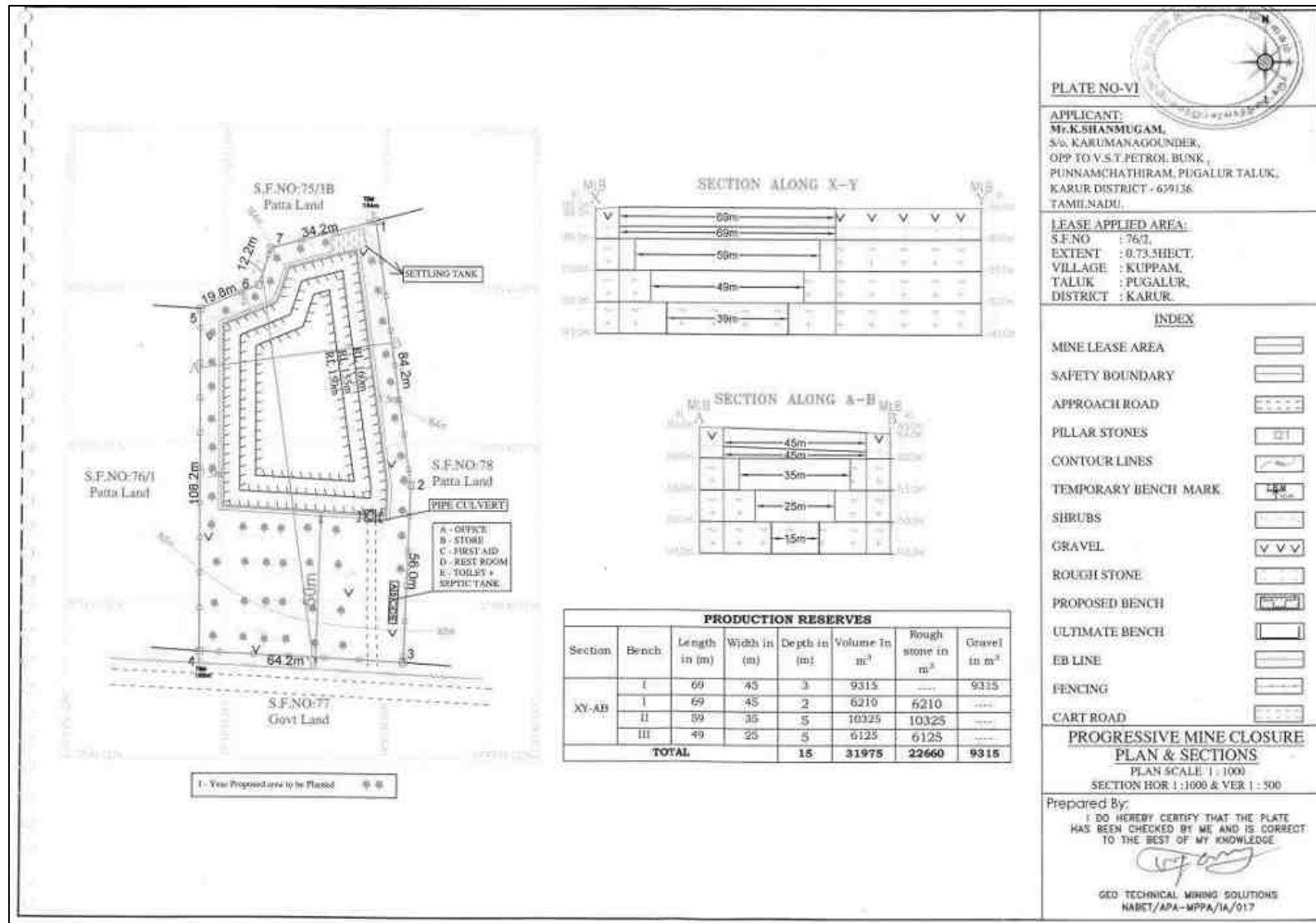


Figure 2.9 Progressive Mine Closure Plan & Sections

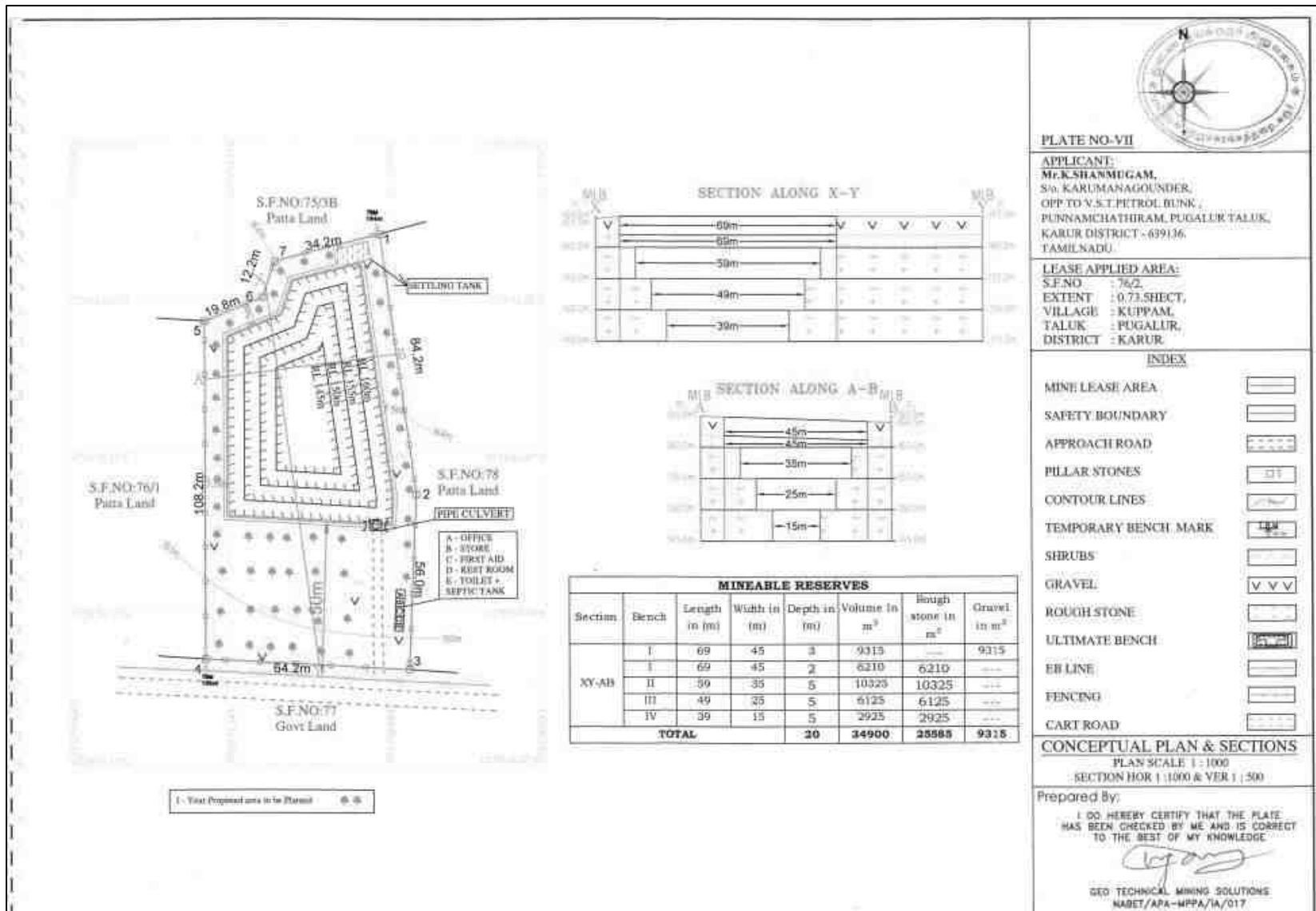


Figure 2.10 Conceptual Plan and Sections

2.6.6 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 Figure 2.10 and given in Table 2.10.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth(m)
I	69	45	20

Source: Approved Mining Plan & ToR

2.6.7 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 beneficiation plants in this project.

Other Infrastructure Requirement

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

2.6.8 Water Requirement

Detail of water requirement in 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	0.7 KLD	Existing bore wells and approved water vendors
Total	2.7 KLD	

Source: Prefeasibility Report

2.6.9 Energy Requirement

As per the data shown in Table 2.12, High speed Diesel (HSD) will be used for quarrying machineries. Around 127884 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 (22660 m³)	Gravel (9315 m³)	Total Diesel in liters
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m ³ /hr)	20	60	---
Time Required (hours)	1133	155	---
Total Diesel Consumption for 5 years (litre)	18128	1553	19681
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	3	---	---
Total Diesel Consumption for 5 years (litre)	1620	---	1620
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m ³	6	6	---
Number of Trips / days	3	1*	---
Number of Trips / 5 years	3777	1553	---
Total Diesel Consumption for 5 years (litre)	75533	31050	106583
Total Diesel Consumption by Excavator, Compressor and Tipper			127884

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

2.6.10 Capital Requirement

The project proponent will invest **Rs. 42,99,500/-** to the project. The breakup summary of the investment has been given in Table 2.13.

Table 2.13 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset Cost	10,67,100
2	Machinery Cost	10,00,000
3	EMP Cost	22,32,400
Total Project Cost		42,99,500/-

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

1.	Highly Skilled	Quarry Manger	1
		Mines Forman	--
		Mechanical Engineer	-
		Account cum & admin	1
2.	Skilled	Earth moving Operator	--
		Driver	1
		Mechanic	--
		Blaster/Mat	--
3.	Semi – skilled	Helpers, Greaser's	--
4.	Unskilled	Musdoor / Labours	10
		Cleaners	--
		Attendant's	1
Total			14

Source: Approved Mining Plan

2.8 PROJECT IMPLEMENTATION SCHEDULE

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

Table 2.15 Expected Time Schedule

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

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

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering October, November, and December 2021 with CPCB guidelines. Environmental data have been collected with reference to cluster quarries by **Ekdant Enviro Services (P) Ltd**, ISO 9001: 2015 and OHSAS 18001: 2007 certified & MoEF notified laboratory for the below attributes:

- ❖ Land
- ❖ Water
- ❖ Air
- ❖ Noise
- ❖ Biological
- ❖ Socio-economic status

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 land use and land cover, and ecological studies, which consider 10 km as buffer zone. 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	10 (1 core & 9 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	8 (8 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 (October – December 2021)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	8 (1 core & 7 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 Quadrant & 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

The main objective of this section is to provide a baseline status of the study area covering 5 km radius around the proposed mine site so temporal changes in the surroundings due to the mining activities can be assessed in future.

3.1.1 Geology and Geomorphology

Study area is mainly composed of Migmatite, as shown in Figure 3.1. Charnockite of the lease area occurs within the migmatite. Among the geomorphic units, Pediment Pediplain Complex dominates the study area, as shown in Figure 3.2.

3.1.2 Land Use/ Land Cover

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Crop Land	6790.2	89.8
2	Dense Forest	79	1.0
3	Fallow Land	176.0	2.3
4	Mining/Industrial lands	236.4	3.1
5	Plantations	275.1	3.6
6	Settlements	5.3	0.1
Total		7562	100

Source: Sentinel II Satellite Imagery

From the land use/land cover analysis, it is known that the majority of the land in the study area is crop land covering 89.8% of the total land area, followed by plantations (3.6%), dense forest (1.0%), fallow land (2.3%) and settlement (0.1%). The total mining area within the study area is 236.4 ha (3.1%) among other LULC types. The cluster area of 16.03.0 ha contributes only 0.109 % to the LULCs in study area. This small percentage of mining activities shall not have any significant impact on the environment.

3.1.3 Topography

The proposed project area is situated over a terrain of undulated nature.

3.1.4 Drainage Pattern of the Area

The project site falls within the area showing dendritic pattern, as shown in Figure 3.4.

3.1.5 Seismic Sensitivity

The proposed project site falls in the seismic zone II, low damage risk zone as per BMTPC, as shown in vulnerability atlas of seismic zone of India IS: 1893 – 2002 as the project area falls in the hard rock terrain on the peninsular shield of south India which is highly stable (Source: https://moes.gov.in/writereaddata/files/LS_EN_20032020_385.pdf).

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.

3.1.5.1 Methodology

Ten 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 3.4 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 3.5.

Table 3.3 Details of Soil Sampling Methodology

Particulars	Details
Frequency	One grab sample from each station-once during the study period
Methodology	Composite grab samples of the topsoil were collected from 3 depth levels and mixed to provide a representative sample for analysis. They were stored in airtight polythene bags and analysed at the laboratory.

Table 3.4 Soil Sampling Locations

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	S01	NTC Lease (0.63.0ha)	0.02	W	10°59'52.45"N,77°57'36.40"E
2	S02	NTC Lease (2.89.0ha)	0.82	NW	10°59'57.54"N 77°57'10.31"E
3	S03	Suriyampalayam	4.44	S	10°57'25.64"N,77°57'47.86"E
4	S04	Ponnayakavundannpudur	4.05	NE	11° 1'26.20"N, 77°59'14.56"E
5	S05	Kuppam	4.35	NW	11° 0'45.84"N 77°55'23.83"E
6	S06	Panaippalaiyam	4.26	SW	10°58'1.34"N 77°56'9.91"E
7	S07	Ayyanur	4.99	SE	10°59'20.30" N 78° 0'9.3" E
8	S08	Nallasasmy Lease	0.42	NW	11° 0'3.60"N 77°57'27.66"E
9	S09	Core Zone	-----	---	10°59'53.75"N 77°57'38.55"E
10	S10	Kavitha Lease	0.20	NNW	10°59'59.38"N 77°57'33.65"E

Source: On-site monitoring/sampling by Ekdant Enviro Services (P) Ltd in association with GTMS

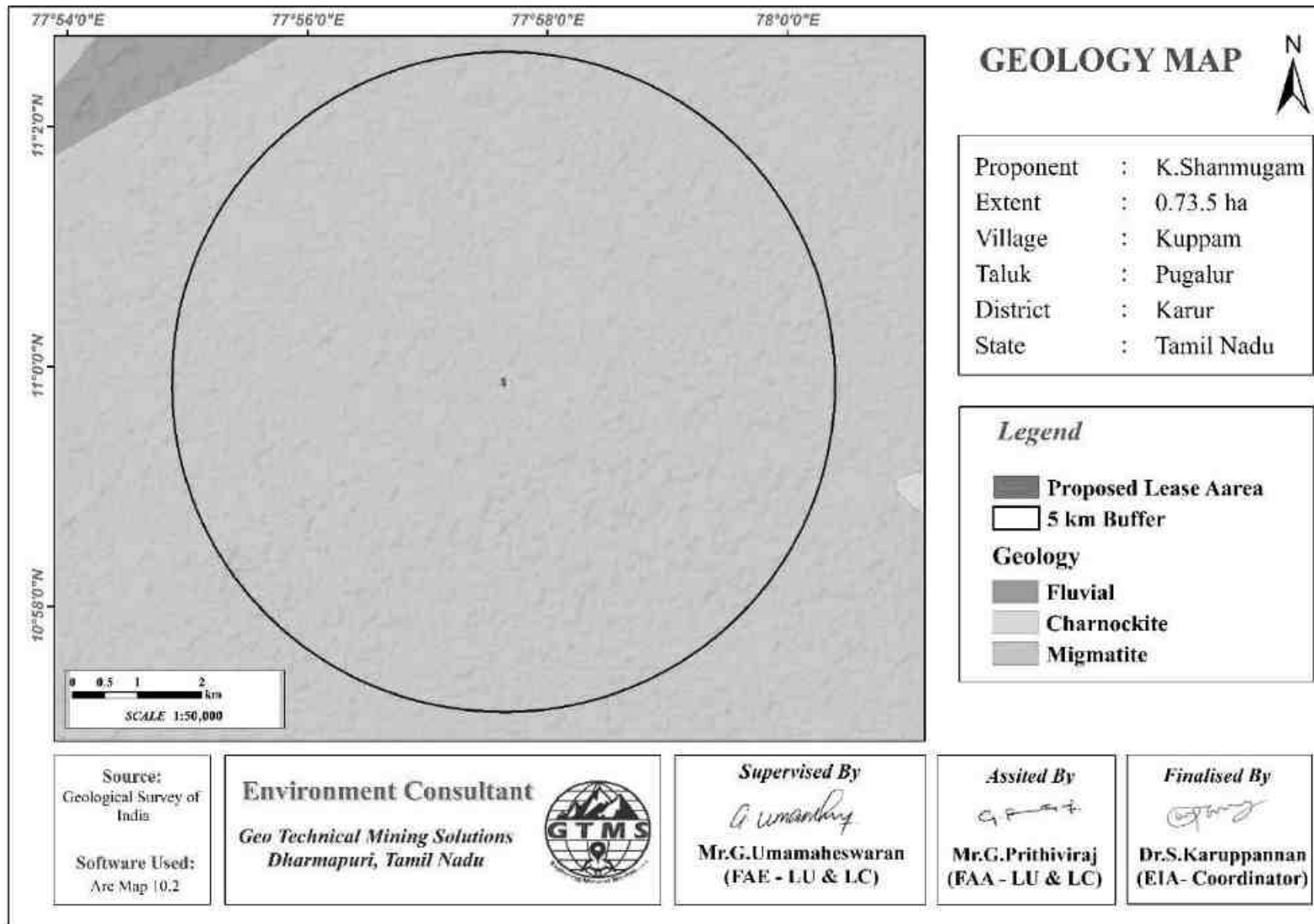


Figure 3.1 Geology Map of the Proposed Project Site

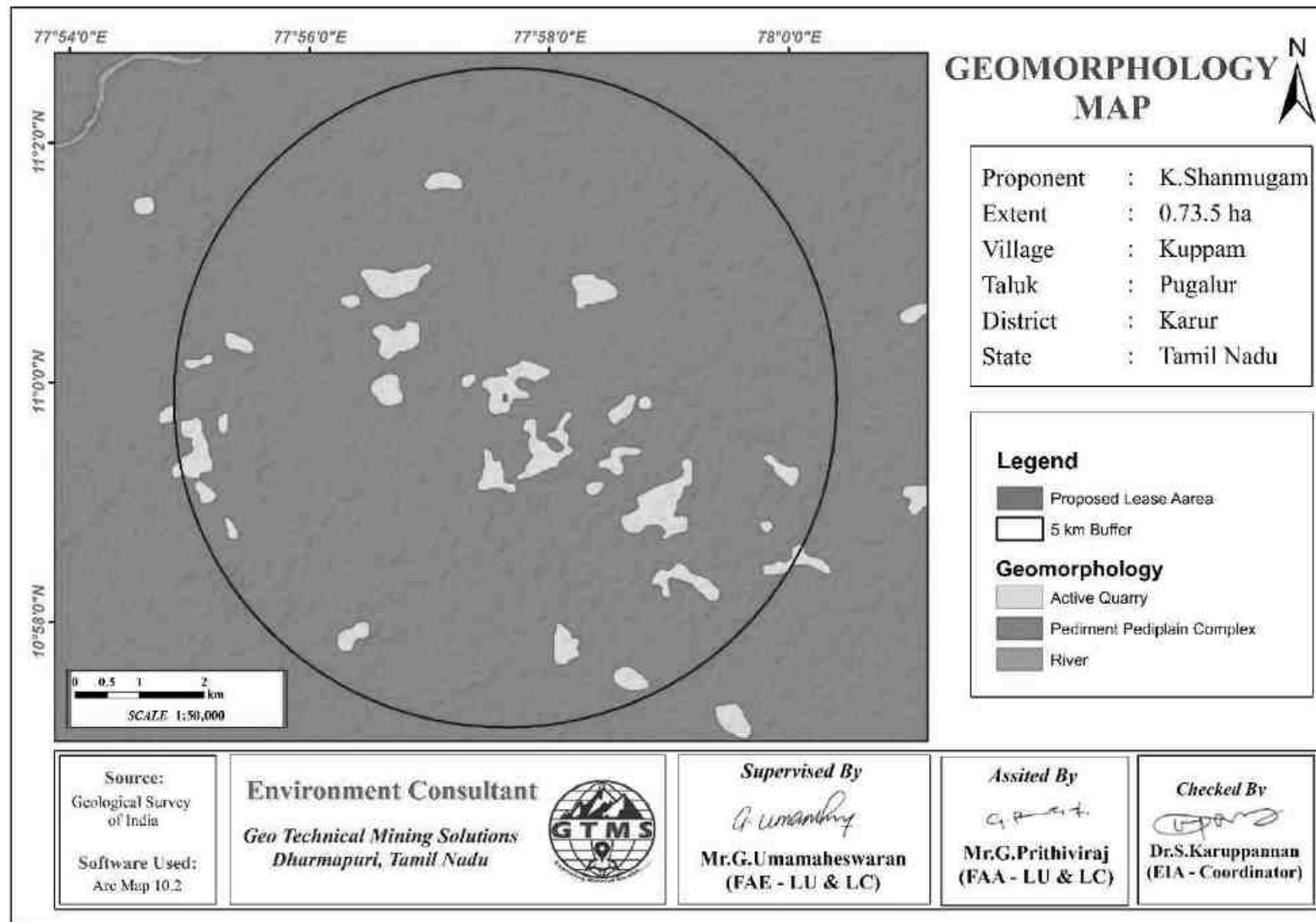


Figure 3.2 Geomorphology Map of the Proposed Project Site

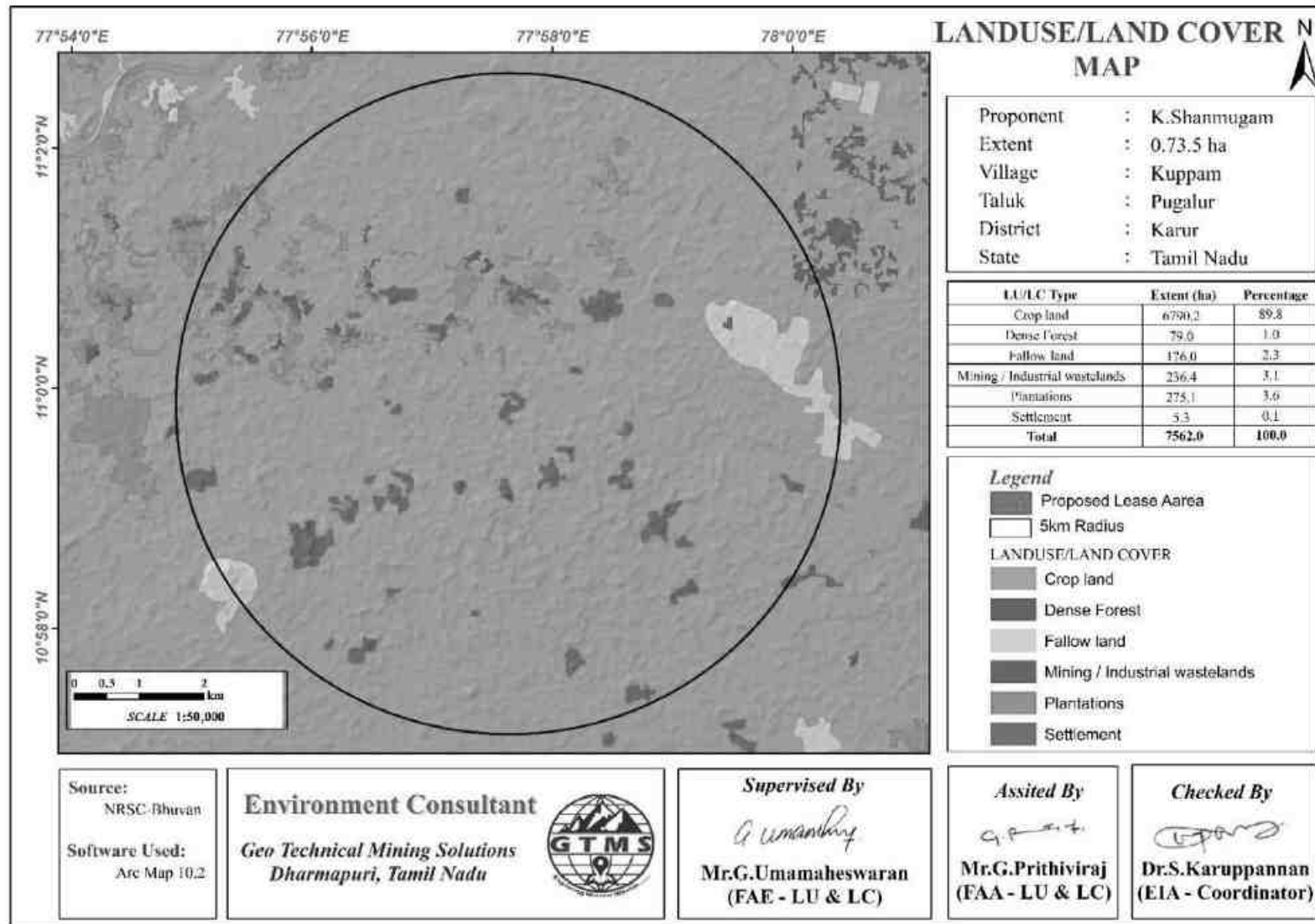


Figure 3.3 LULC Map of 5 km Radius from the Proposed Project Site

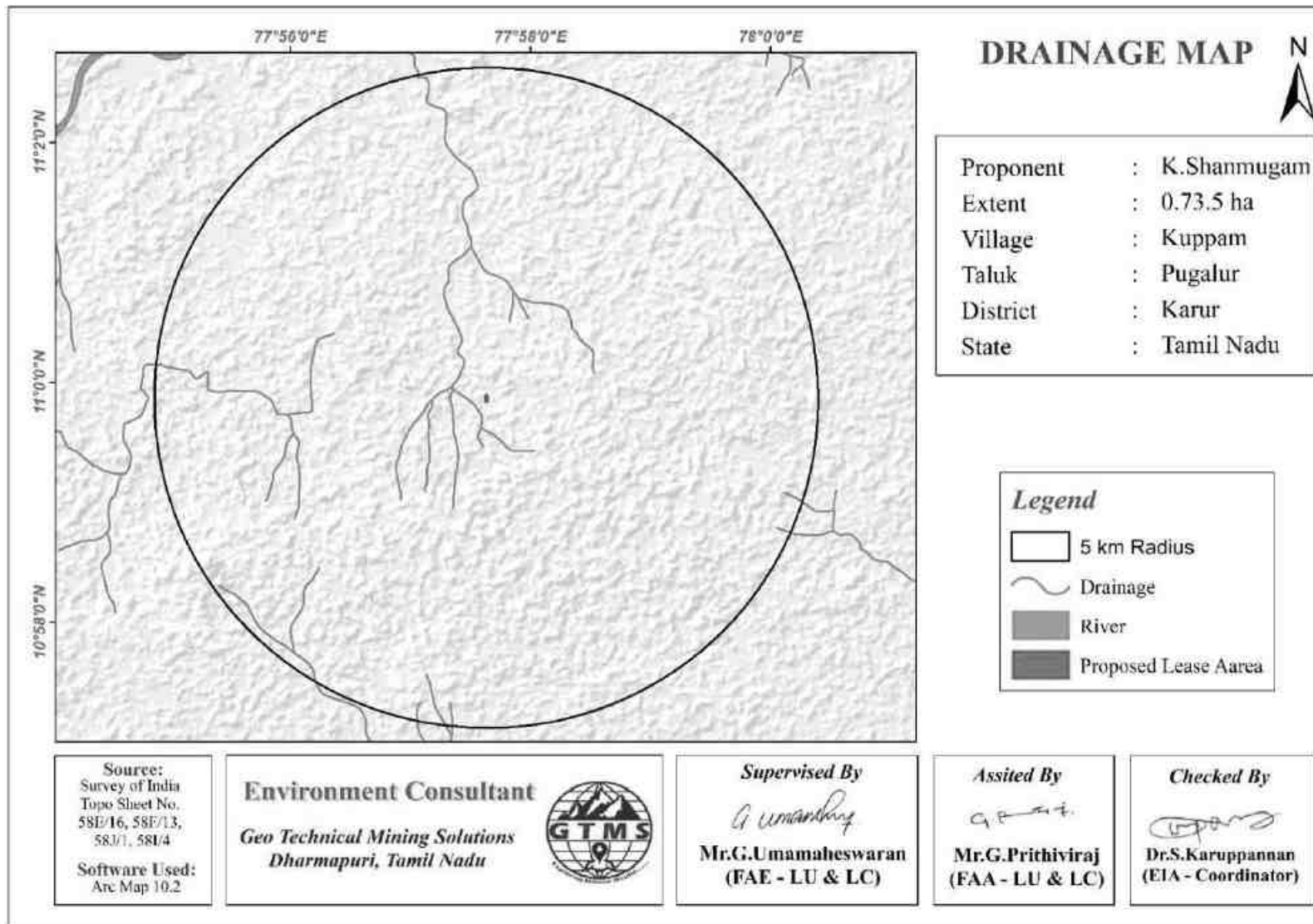


Figure 3.4 Drainage Map of 5 km Radius from the Proposed Project Sit

3.1.5.2 Results and Discussion

Physical Characteristics

- ❖ The soil texture found in the study area is clay loam and sandy loam.
- ❖ pH of the soil varies from 6.98 to 8.01 indicating slightly alkaline nature.
- ❖ Electrical conductivity of the soil varies from 399 to 432 $\mu\text{s}/\text{cm}$ and
- ❖ The water content varies from 2.18 to 3.8 %.

Chemical Characteristics

- ❖ Nitrogen ranges between 76 and 136 mg/kg.
- ❖ Phosphorus ranges between 0.89 and 1.9 mg/kg.
- ❖ Potassium ranges between 240.3 and 334.9 mg/kg.
- ❖ Calcium ranges between 124 and 182 mg/kg; Magnesium ranges between 20.7 and 34.0 mg/kg.
- ❖ Sodium ranges between 322 and 538 mg/kg.
- ❖ Organic Matter content ranges between 1.01 and 9.8.

Soil Erosion

Soil erosion map (Figure 3.6) was prepared to evaluate the degree of soil erosion in the study area of 5 km radius. The map shows that:

- ❖ Soil erosion is very low inside the lease area, whereas low to moderate soil erosion occurs along the northern boundary of the lease area.

Table 3.5 Soil Quality of the Study Area

S.No.	Parameters	Units	Core zone	Buffer Zone		
				Minimum	Maximum	Average
1	pH@27°C	-	8.03	6.98	8.01	7.44
2	Electrical Conductivity@25°C	$\mu\text{s}/\text{cm}$	476	399	432	417.33
3	Texture	-	Clay Loam	sandy Loam, Clay Loam		
4	Sand	%	37.53	31.5	65.3	52.20
5	Slit	%	25.51	18.2	42.9	28.65
6	Clay	%	36.96	7.1	36.4	19.15
7	Water Content	%	2.84	2.18	3.8	3.06
8	Bulk Density	g/cc	1.75	0.96	1.56	1.36
9	Alkalinity	mg/kg	89.23	56.79	98.13	80.86
10	Nitrogen	mg/kg	141	76	136	116.11
11	Phosphorus	mg/Kg	1.12	0.89	1.9	1.22
12	Calcium (as Ca)	mg/Kg	147	124	182	145.67
13	Magnesium (as Mg)	mg/Kg	23.69	20.7	34	29.28
14	Sodium as Na	mg/Kg	478	322	538	399.22
15	Water Holding Capacity	%	56.13	23.12	44.9	33.87
16	Chloride (as Cl)	mg/Kg	144	128.3	169	144.37
17	Potassium (as K)	mg/Kg	332.1	240.3	334.9	287.21
18	Total Iron	mg/Kg	9745	4678	23687	10568.33
19	Organic Matter	%	2.97	1.01	9.8	2.69

Source: Sampling Results by Ekdant Enviro Services (P) Ltd.

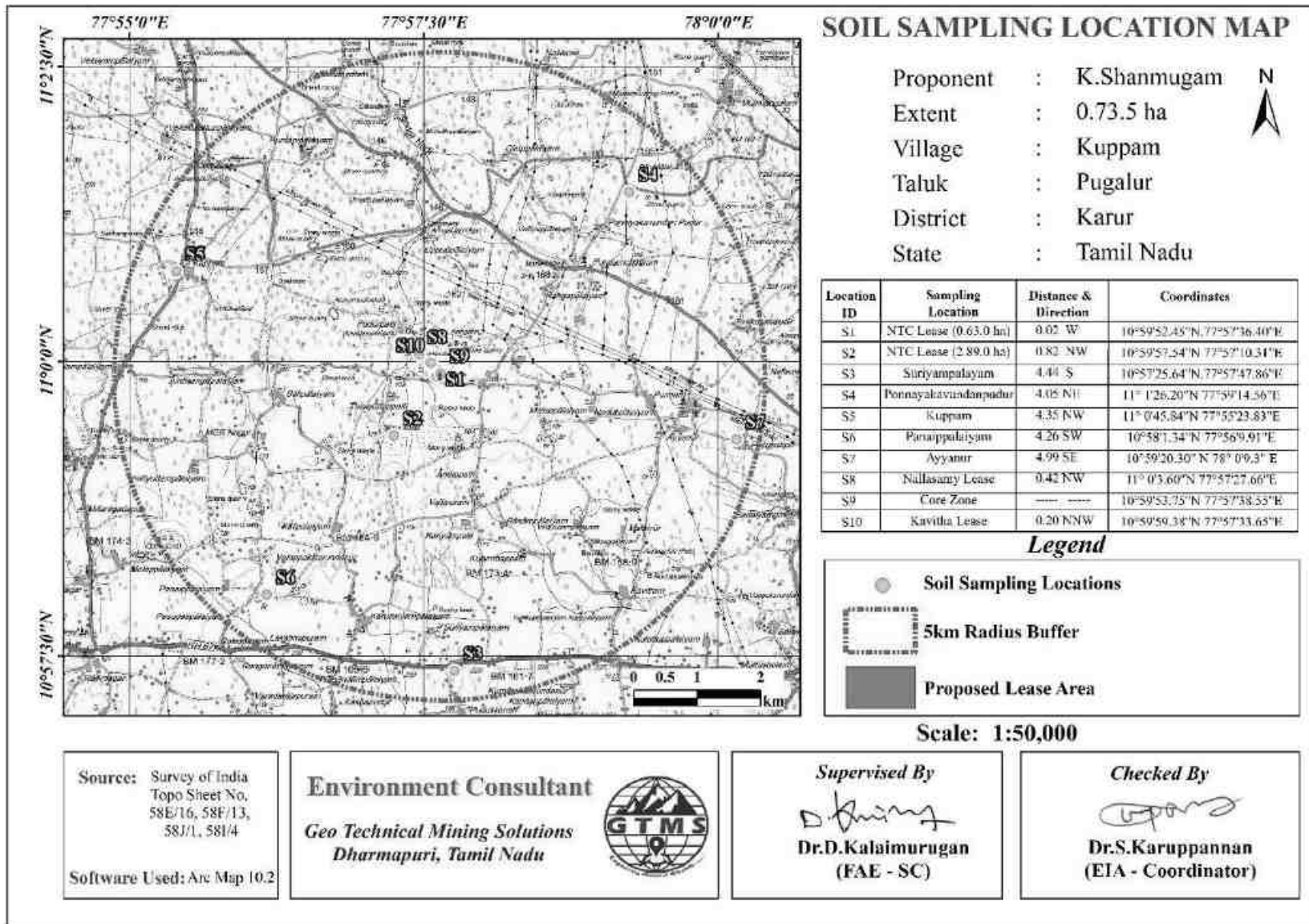


Figure 3.5 Toposheet Showing Soil Sampling Locations within 5 km Radius around the Proposed Project Site

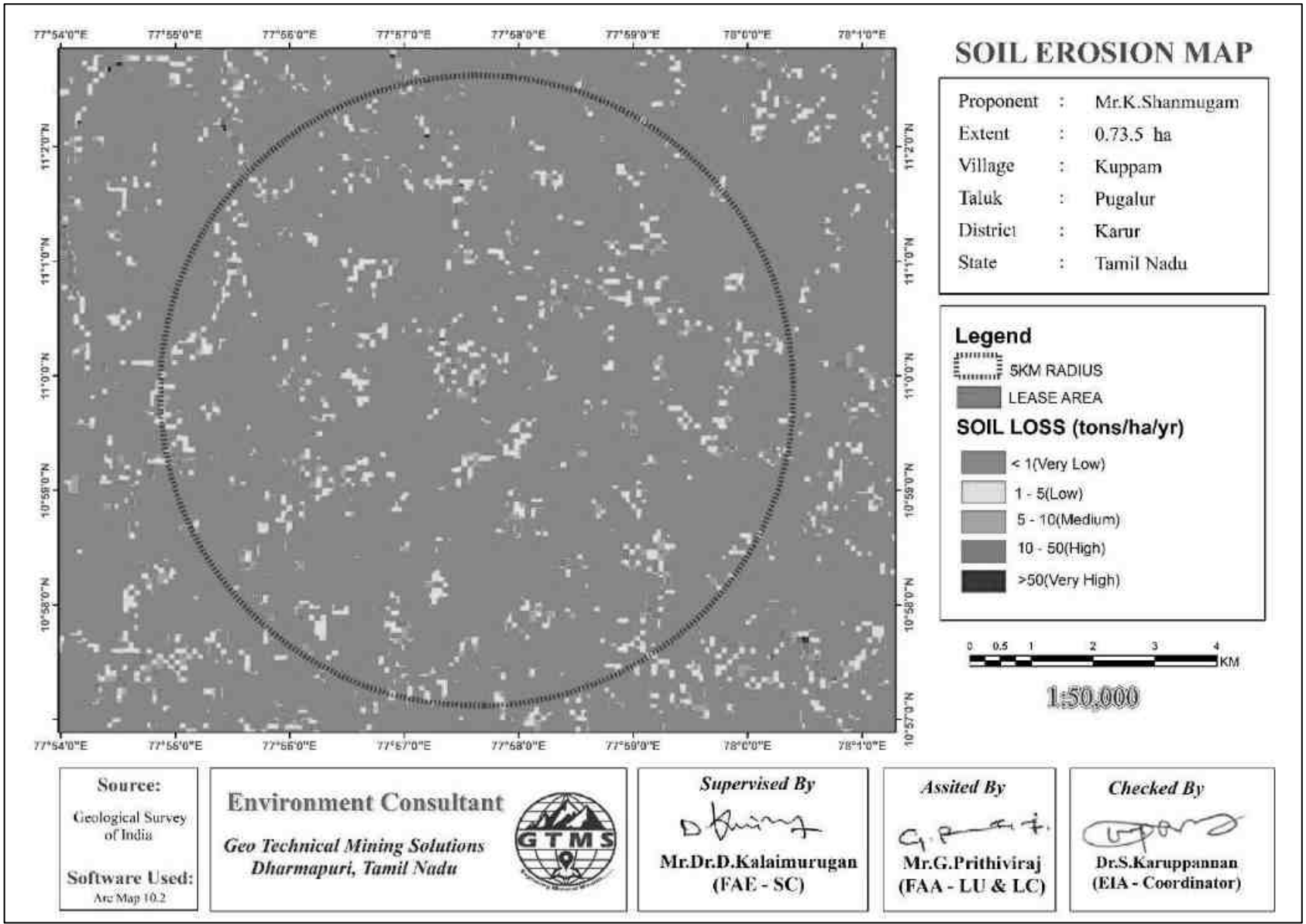


Figure 3.6 Soil Erosion map within 5 km Radius around the Proposed Project Site

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 critical water quality parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity.

3.2.1 Surface Water

There are no surface water bodies present within the study area. Hence, data on surface water bodies are not collected for this project.

3.2.2 Ground Water

The occurrence and behaviour of groundwater are controlled by rainfall, topography, geomorphology, geology, structures etc. Groundwater occurs in the crystalline rocks of Achaean age and recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. The diameter of the dug well is in the range of 7 to 10 m and depths of dug wells range from 9 to 15 m below ground level. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigating one or two crops in the monsoon period.

3.2.3 Methodology

Reconnaissance survey was undertaken and monitoring locations were finalized based on:

- ❖ Drainage pattern
- ❖ Location of residential areas /likely impact areas
- ❖ Likely areas which can represent baseline conditions

Eight bore well water samples were collected from the study area and the samples are analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess the effect of mining and other activities on ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA). The list of water sampling locations has been given in Table 3.6 and the spatial occurrence of water sampling locations in Figure 3.7.

Table 3.6 Water Sampling Locations

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	BW01	Thalaiyeettupatti	0.68	SW	10°59'43.91"N,77°57'15.01"E
2	BW02	Velayuthampalayam	3.63	SW	10°58'50.44"N,77°55'53.77"E
3	BW03	Sankarampalayam	1.18	E	11° 0'0.62"N, 77°58'16.77"E
4	BW04	Karudaiyampalaiyam	3.93	SSW	10°57'48.19"N,77°56'57.89"E
5	BW05	Velayuthampalaiyam	2.71	SE	10°58'57.13"N,77°58'50.47"E
6	BW06	Kuppam	4.23	NW	11° 0'46.79"N, 77°55'28.05"E
7	BW07	Vadugapatti	4.12	N	11° 2'5.46"N, 77°57'11.21"E
8	BW08	Punnamchattram	2.70	NE	11° 0'49.51"N, 77°58'47.71"E

Source: On-site monitoring/sampling by **Ekdant Enviro Services** in association with GTMS.

3.2.4 Results and Discussion

Results of important ground water quality parameters have been shown in Tables 3.7 and the results are discussed below

Ground Water

- ❖ The pH of the water samples ranges from 7.1 to 8.1.
- ❖ TDS are found in the range between 176 and 469 mg/l.
- ❖ The total hardness varies between 176 and 370 mg/l.
- ❖ Calcium varies from 34 to 63 mg/l and magnesium from 16 to 44 mg/l.
- ❖ Sodium varies from 111 to 265 mg/l.
- ❖ Potassium from 01 to 10 mg/l.
- ❖ Bicarbonate varies from 156 to 360 mg/l.
- ❖ Nitrate varies from 10 to 39 mg/l.
- ❖ Chloride varies from 123 to 405 mg/l; sulphate from 66 to 107 mg/l; and fluoride from 0.2 to 1.0 mg/l.
- ❖ When speaking about microbiological parameters, the water samples from all the locations meet the requirement. When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits.

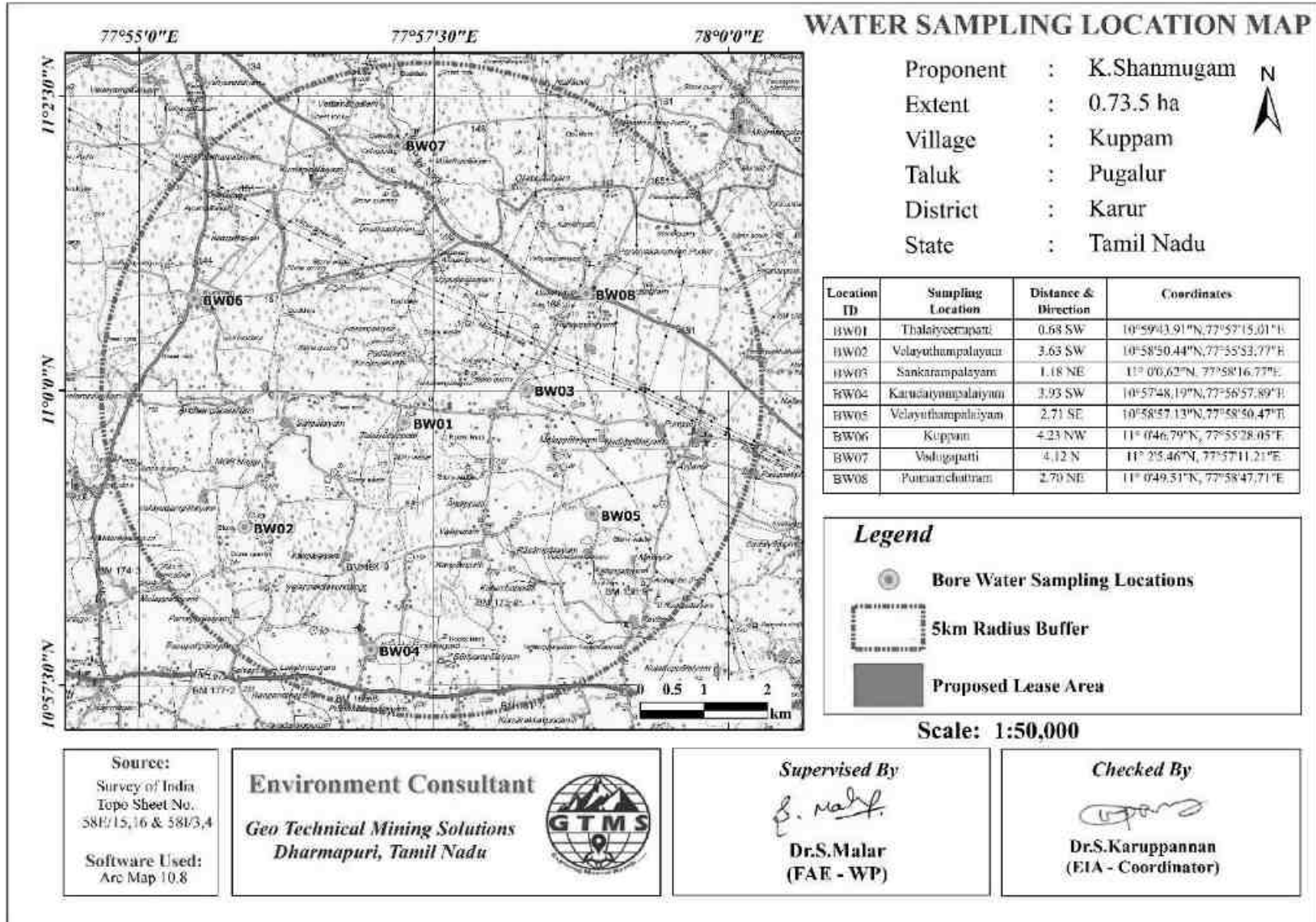


Figure 3.7 Toposheet Showing Water Sampling Locations within 5 km Radius around the Proposed Project Site

Table 3.7 Ground Water Sampling Quality Results

S. No.	Parameters	Units	Minimum	Maximum	Average	Standards as Per IS 10500: 2012*	
						Acceptable limit	Permissible limit
I	Physical Parameters						
1	Colour	Hazen	≤ 5	≤ 5	≤ 5	5	15
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	≤ 1	≤ 1	≤ 1	1	5
4	EC @ 25°C	μs/cm	648	1553	1216	Not specified	Not specified
5	TDS	mg/l	314	548	448.625	500	2000
II	Chemical parameters						
6	pH@ 25°C	-	7.1	8.1	7.65	6.5 – 8.5	6.5 – 8.5
7	Total Hardness	mg/l	176	370	291.125	200	600
8	Calcium (Ca)	mg/l	34	63	46.25	75	200
9	Magnesium (Mg)	mg/l	16	44	29.25	30	100
10	Sodium (Na)	mg/l	111	265	169.875	50(WHO)	200
11	Potassium (K)	mg/l	1	10	5.75	12(WHO)	12
12	Bicarbonate (HCO ₃)	mg/l	156	360	279	50(WHO)	400
13	Sulphate (SO ₄)	mg/l	66	107	84	200	200
14	Chloride (Cl)	mg/l	123	405	292.5	250	1000
15	Nitrates (NO ₃)	mg/l	10	39	21.25	45	45
16	Fluoride (F)	mg/l	0.2	1	0.6375	1	1.5
III	Biological Parameters						
17	Total Coliform	MPN/100ml	-	-	-	Shall not be detectable in any 100 ml water	Shall not be detectable in any 100 ml water
18	E-Coli	MPN/100ml	-	-	-	Shall not be detectable in any 100 ml water	Shall not be detectable in any 100 ml water

* IS: 10500:2012-Drinking Water Standards; # within the permissible limit as per the WHO Standard. The water can be used for drinking purpose in the absence of alternate sources. Note: WW- Open well Water, BW – Bore well Water

3.2.5 Hydrogeological Studies

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

3.2.5.1 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, 2021 (Post-Monsoon) and March through May, 2022 (Pre-Monsoon) season. The dug well data thus collected onsite are provided in Tables 3.8 and 3.8a. According to the data, average depths to the static water table in open wells range from 14.4 to 17.2 m BGL in post monsoon and from 10.6 to 14.1 m BGL in pre monsoon.

The bore well data thus collected onsite are provided in Tables 3.9 and 3.9a. The average depths to static potentiometric surface in borewells for the period of October through December 2021 (Post Monsoon Season) is 63.4 to 70.7 m and for the period of March through May, 2022 (Pre-Monsoon Season) is 62.3 to 67.3 m. The depths to static water table and potentiometric surface data 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 3.9-3.12. 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 7 located in NW of the proposed project sites and that most of the borewell groundwater for the two monsoon seasons flows towards the bore well number 2 located in NNW 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 Post-Monsoon Water Level of Dug Wells within 2 km Radius

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2021	Nov-2021	Dec-2021	Average		
DW01	10.4	11.9	12.5	15.7	11°00'09.19"N	77°57'21.43"E
DW02	11.5	12.8	13.4	15.7	11°00'05.12"N	77°57'12.82"E
DW03	10.2	11.5	12.2	17.1	10°59'37.58"N	77°57'22.04"E
DW04	12.4	13.5	14.5	15.8	10°59'47.33"N	77°57'54.37"E
DW05	11.5	12.4	13.7	14.4	10°59'59.19"N	77°58'11.10"E
DW06	13.7	14.5	15.5	16	11°00'38.56"N	77°58'11.58"E
DW07	14.7	15.5	16.7	17.2	11°00'39.89"N	77°57'14.82"E
DW08	15.6	16.9	17.4	16.7	11°00'06.95"N	77°56'55.96"E
DW09	14.7	15.5	16.9	16.9	10°59'10.03"N	77°57'21.46"E

Source: Onsite monitoring data

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

Station Code	Depth to Static Water Table BGL(m)				Latitude	Longitude
	March - 2022	April-2022	May-2022	Average		
DW01	9.5	10.9	11.5	10.6	11° 0'9.19"N	77°57'21.43"E
DW02	10.5	11.7	12.5	11.5	11° 0'5.12"N	77°57'12.82"E
DW03	9.7	10.9	11.5	10.7	10°59'37.58"N	77°57'22.04"E
DW04	11.0	12.5	13.5	12.3	10°59'47.33"N	77°57'54.37"E
DW05	10.5	11.7	12.9	11.7	10°59'59.19"N	77°58'11.10"E
DW06	12.7	13.0	13.5	13.0	11° 0'38.56"N	77°58'11.58"E
DW07	13.0	14.5	15.0	14.1	11° 0'39.89"N	77°57'14.82"E
DW08	10.6	11.9	12.4	11.6	11° 0'6.95"N	77°56'55.96"E
DW09	12.7	13.5	14.5	13.5	10°59'10.03"N	77°57'21.46"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2021	Nov-2021	Dec-2021	Average		
BW01	67.2	68.5	69.7	68.4	11° 0'7.86"N	77°57'44.93"E
BW02	65.5	66.7	67.5	66.5	11° 0'24.89"N	77°57'24.02"E
BW03	66.2	77.2	68.9	70.7	11° 0'52.29"N	77°57'39.58"E
BW04	67.2	68.2	69.7	68.3	10°59'40.40"N	77°57'9.97"E
BW05	67	68	69.5	68.1	10°59'19.29"N	77°56'48.66"E
BW06	62.2	63.5	64.7	63.4	10°59'37.06"N	77°57'41.18"E
BW07	65.5	66.7	67.9	66.7	10°59'30.07"N	77°58'17.41"E
BW08	66.3	67.5	68.7	67.5	11° 0'0.72"N	77°56'48.56"E
BW09	67.5	68.9	69.7	68.7	10°59'2.18"N	77°57'43.38"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	March -2022	April-2022	May- 2022	Average		
BW01	65.0	66.5	67.0	66.1	11° 0'7.86"N	77°57'44.93"E
BW02	64.5	65.7	66.5	65.6	11° 0'24.89"N	77°57'24.02"E
BW03	65.0	66.2	67.5	66.2	11° 0'52.29"N	77°57'39.58"E
BW04	66.2	67.0	68.0	67.0	10°59'40.40"N	77°57'9.97"E
BW05	66.0	67.5	68.5	67.3	10°59'19.29"N	77°56'48.66"E
BW06	61.0	62.5	63.5	62.3	10°59'37.06"N	77°57'41.18"E
BW07	64.5	65.0	66.0	65.1	10°59'30.07"N	77°58'17.41"E
BW08	65.3	66.5	67.5	66.4	11° 0'0.72"N	77°56'48.56"E
BW09	66.5	67.0	68.5	67.3	10°59'2.18"N	77°57'43.38"E

3.2.5.2 Electrical Resistivity Investigation

For understanding subsurface hydrogeological conditions geophysical investigation is carried out. The geophysical investigation is especially useful in the areas where there are no adequate exploratory well data about the aquifer conditions. Electric resistivity method is one of the well-known geophysical methods for delineating lateral as well vertical discontinuities in the resistivities of the earth’s subsurface layers. It is mainly applied to locate aquifers in the field of hydrogeology. The present study makes use of vertical electric sounding (VES) to delineate earth’s subsurface layers. The electrical resistivity investigation used four electrodes collinear set up where current is sent through outer electrodes into the ground and the inner electrodes measure the potential difference, as shown in Figures 3.8

3.2.5.3 Methodology and Data Acquisition

The present study uses Schlumberger array for making vertical electrical sounding measurements since it is least influenced by lateral inhomogeneities and is capable of providing higher depth of investigation. The main goal of the present study is to search the vertical inhomogeneities that is consistent with the measured data.

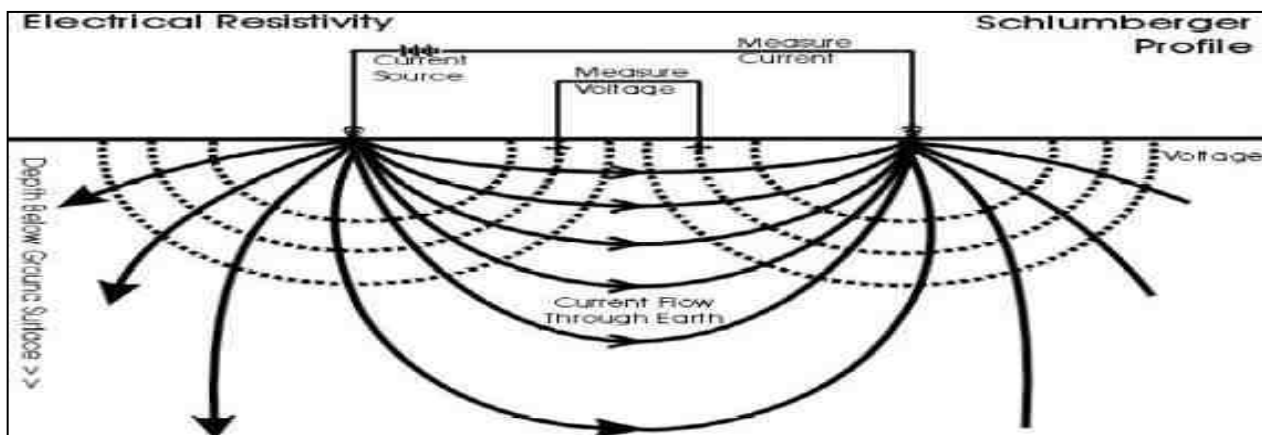


Figure 3.8 Principle of Electrical Resistivity Investigation

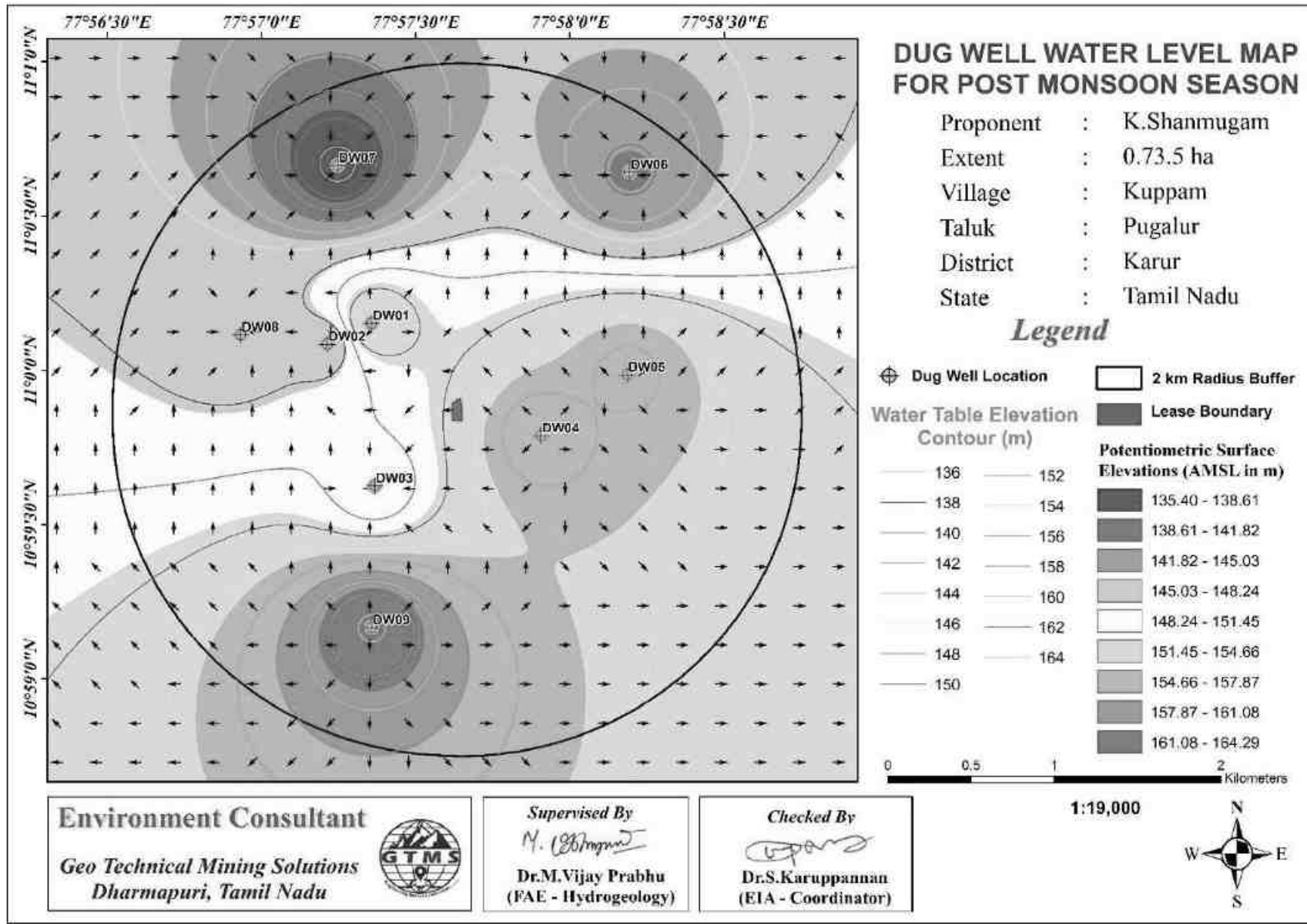


Figure 3.9 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Post-Monsoon Season

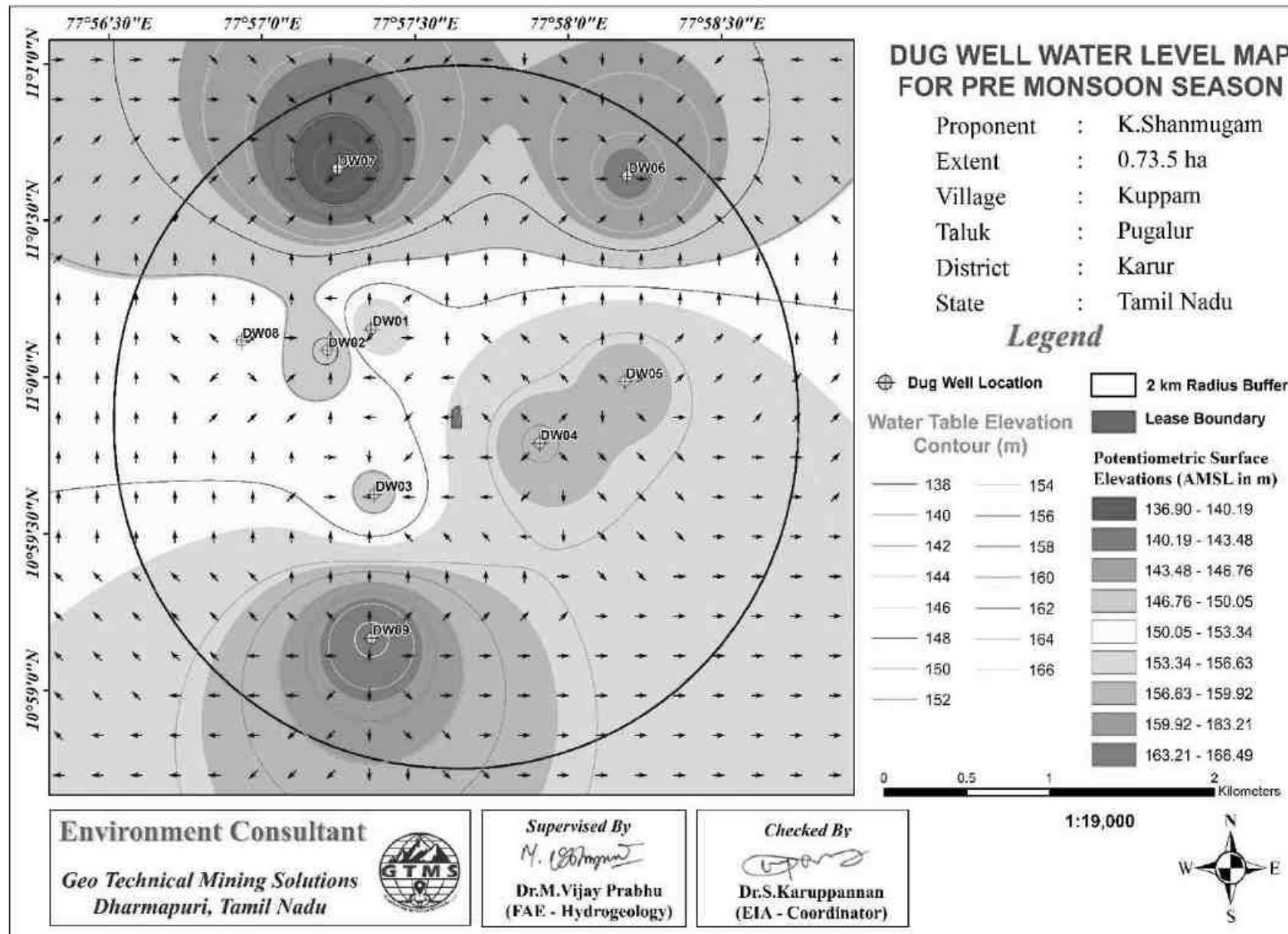


Figure 3.10 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Pre-Monsoon Season

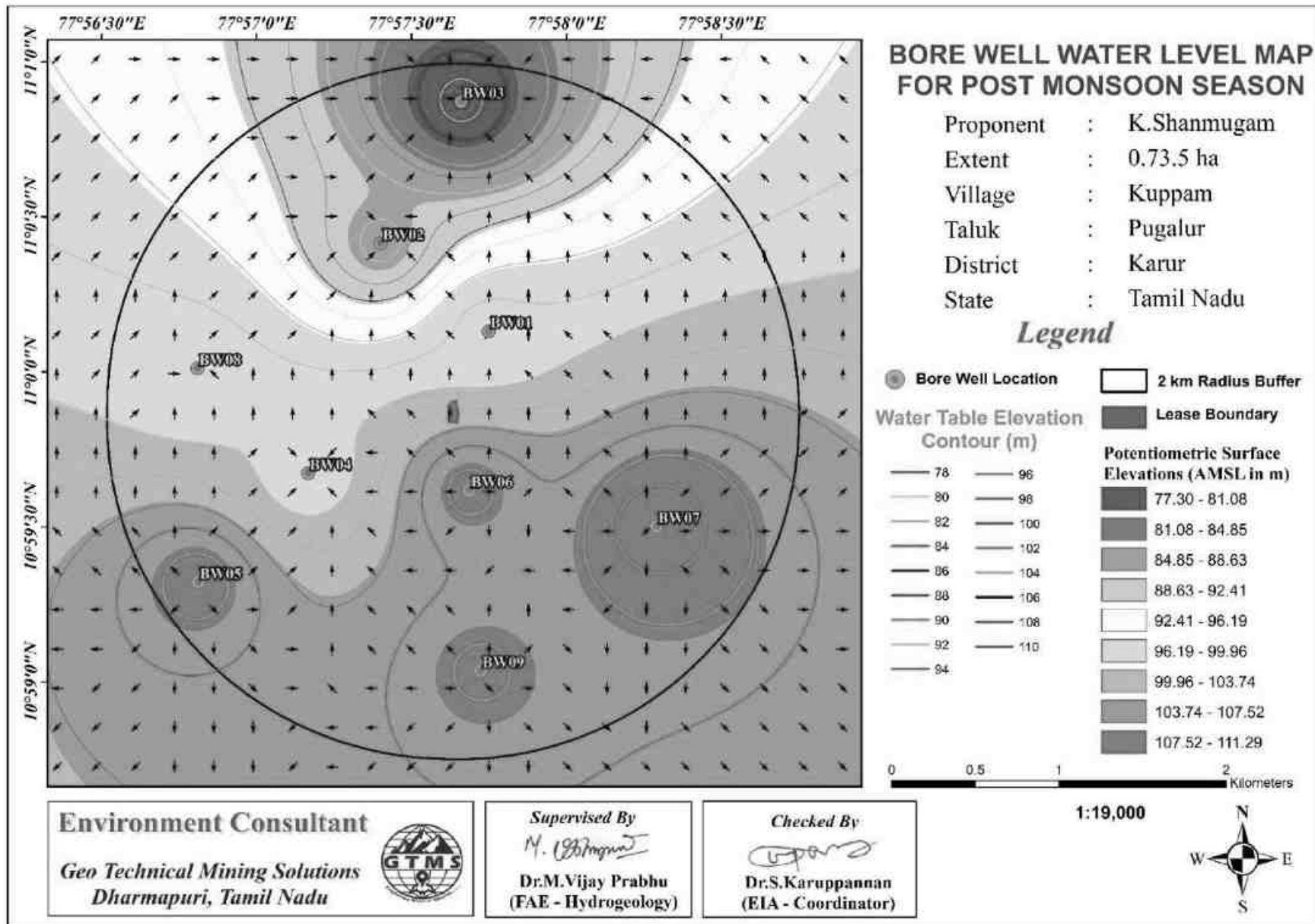


Figure 3.11 Bore Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Post-Monsoon Season

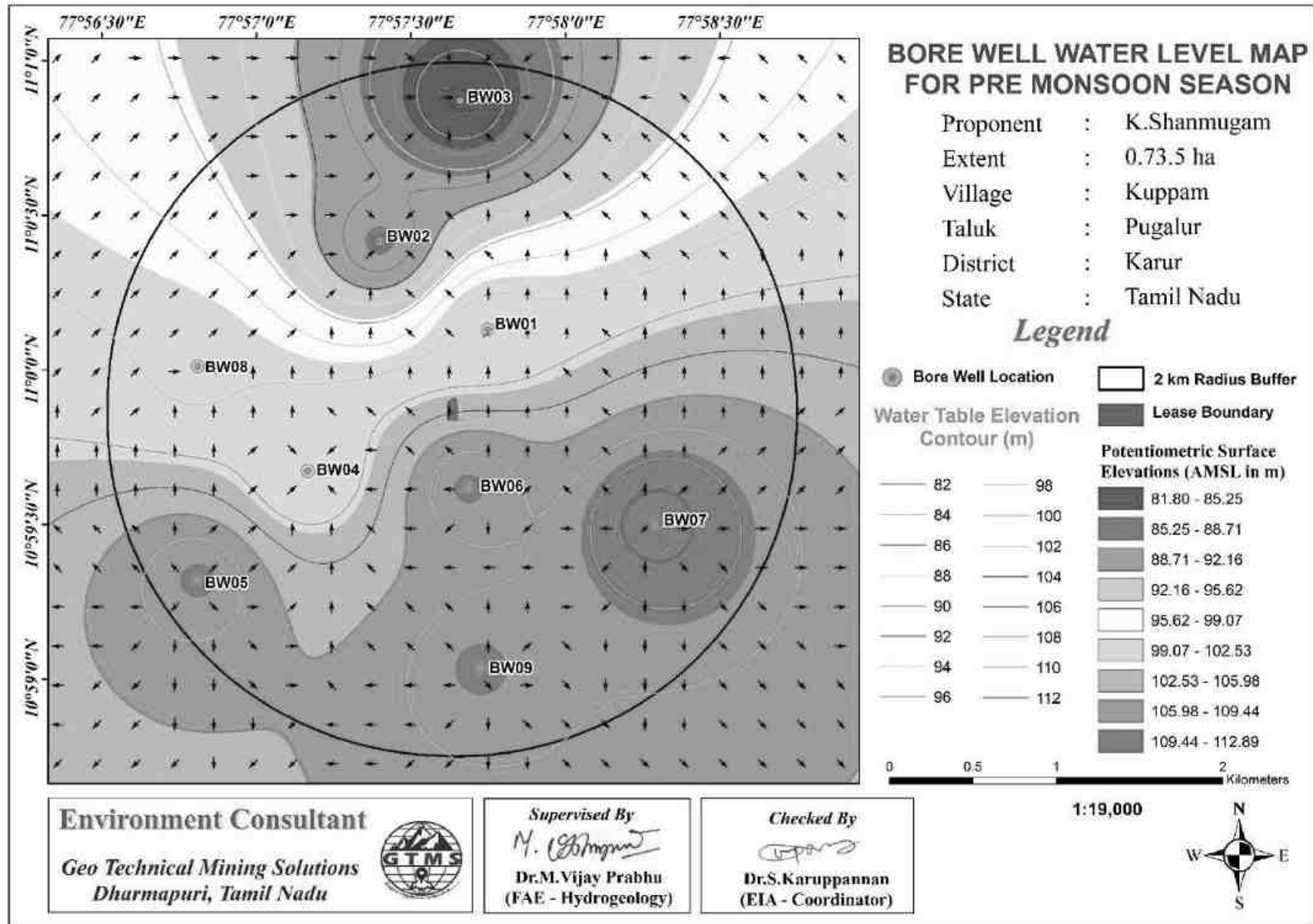


Figure 3.12 Bore Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Pre-Monsoon Season

The field equipment deployed for the study is a deep resistivity meter with a model of SSR – MP – ATS. This Signal Stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation features for earth resistivity measurements. For more information about the instrument, refer to the manufacturer’s manual.

3.2.5.4 Data Presentation

The Geophysical VES data obtained from the project site have been shown in Table 3.10. 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 3.10 Vertical Electrical Sounding Data

Location Coordinates - 10°59'58.08"N 77°57'28.56"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in Ω	Apparent Resistivity in Ωm
1	2	0.5	11.78	13.248	156
2	4	0.5	49.46	6.127	303
3	6	0.5	112.26	3.937	442
4	8	0.5	200.18	2.798	560
5	10	2	75.36	8.997	678
6	15	2	173.49	5.188	900
7	20	2	310.86	3.558	1106
8	25	2	487.49	2.603	1269
9	30	5	274.75	5.001	1374
10	35	5	376.80	3.883	1463
11	40	5	494.55	3.160	1563
12	45	5	628.00	2.683	1685
13	50	5	777.15	1.943	1510
14	60	10	549.50	2.915	1602
15	70	10	753.60	3.213	2421
16	80	10	989.10	2.651	2622
17	90	10	1256.00	2.196	2758
18	100	10	1554.30	1.846	2870

3.2.5.5 Geophysical Data Interpretation

The rock formation of low resistivity values indicates occurrence of water at the depth of about 50-60 m below ground level. The maximum depth proposed for the proposed project is 18 m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

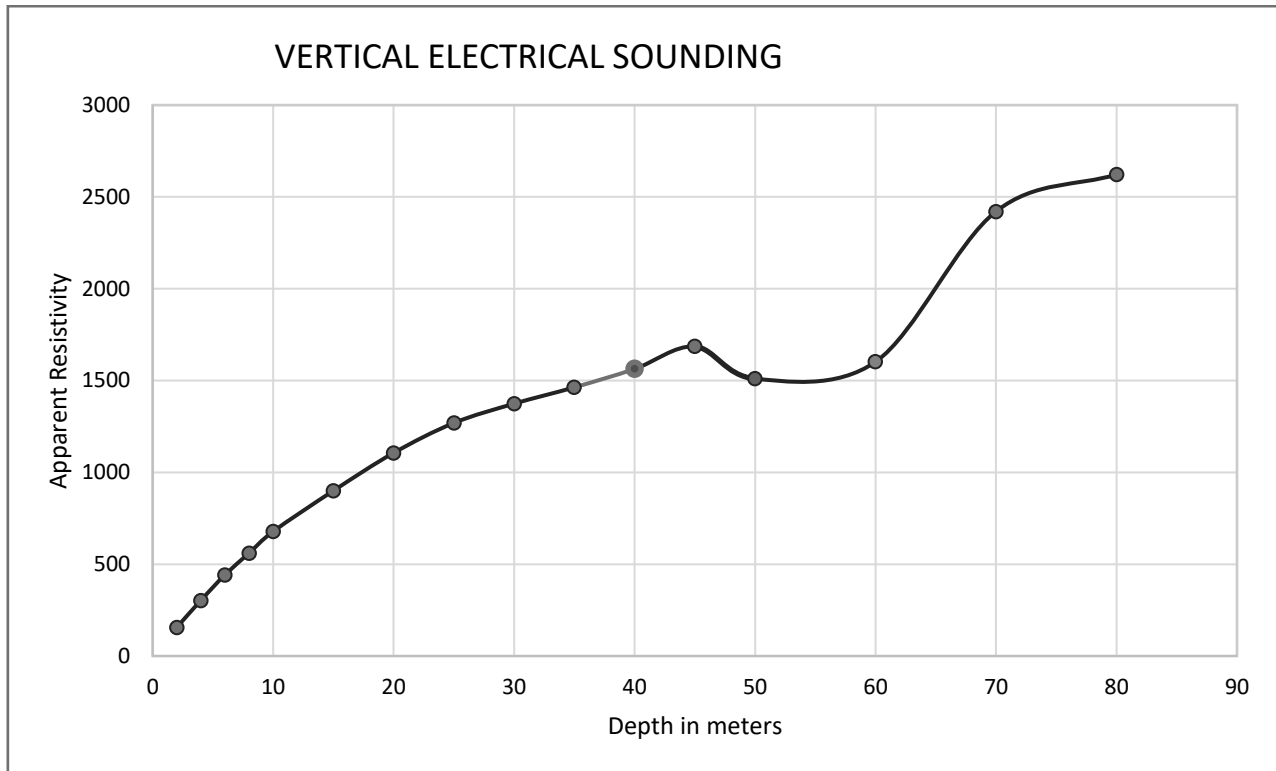


Figure 3.13 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth Range of 50-60 m below Ground Level in Proposed Project

3.3 AIR ENVIRONMENT

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality.

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 5 km radius around the cluster forms the baseline information. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. The prime objective of the baseline air quality study was to establish the existing ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed project in cluster.

This section describes the identification of sampling locations, methodology adopted during the monitoring period and sampling frequency.

3.3.1 Meteorology

Meteorology is the key to understand the air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time accomplish dispersion and strongly influence other processes associated with them. 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 3.11.

According to the onsite data, the temperature in October, 2021 varied from 21.48 to 32.81⁰C with the average of 26.21⁰C; in November, 2021 from 20.62 to 30.03⁰C with the average of 24.53⁰C; and in December, 2021 from 14.0 to 30.33⁰C with the average of 23.14⁰C. In October, 2021, relative humidity ranged from 52.12 to 98.31 % with the average of 83.78%; in November, 2021, from 60.25 to 99.88 % with the average of 89.74 %; and in December,2021, from 54.94 to 100 % with the average of 85.44 %. The wind speed in October, 2021 varied from 0.05 to 7.05 m/s with the average of 2.31 m/s; in November, 2021 from 0.08 to 7.75 m/s with the average of 2.52 m/s; and in December, 2021 from 0.07 to 6.66 m/s with the average of 2.75 m/s. In October,2021, wind direction varied from 0.07 to 358.30⁰ with the average of 183.04⁰; in November, 2021, from 0.70 to 359.62⁰ with the average of 168.01⁰; and in December, 2021, from 1.50 to 359.63⁰ with the average of 86.37⁰. In October,2021, surface pressure varied from 97.51 to 98.97 kPa with the average of 98.35 kPa; in November, 2021, from 97.53 to 98.88 kPa with the average of 98.39 kPa; and in December, 2021, from 98.30 to 99.26 kPa with the average of 98.80 kPa.

Table 3.11 Onsite Meteorological Data

S. No.	Parameters		OCT, 2021	NOV, 2021	DEC, 2021
1	Temperature (⁰ C)	Min	21.48	20.62	14.00
		Max	32.81	30.03	30.33
		Avg	26.21	24.53	23.14
2	Relative Humidity (%)	Min	52.12	60.25	54.94
		Max	98.31	99.88	100.00
		Avg	83.78	89.74	85.44
3	Wind Speed (m/s)	Min	0.05	0.08	0.07
		Max	7.05	7.75	6.66
		Avg	2.31	2.52	2.75

4	Wind	Min	0.00	0.70	1.50
	Direction (degree)	Max	358.30	359.62	359.63
		Avg	183.04	168.01	86.37
5	Surface	Min	97.51	97.53	98.30
	Pressure (kPa)	Max	98.97	98.88	99.26
		Avg	98.35	98.39	98.80

Source: On-site monitoring/sampling by Ekdant Enviro Services in association with GTMS.

3.3.1.1 Climate

The Karur has a tropical climate. In winter, there is much less rainfall in summer in Karur. In Karur, the average annual temperature is 28.2 °C, 82.7 °F.

Rainfall

Rainfall data for the study area were collected for the period of 1981-2021 (POWER | Data Access Viewer (nasa.gov)). Long term monthly average rainfall was estimated from the data of 1981-2021 and compared with the monthly rainfall for the year 2021, shown in Figure 3.11. The Figure 3.14 shows that rainfall is generally high in the months of September through November in every year. Particularly, rainfall in September through November of 2021 is higher than the previous years.

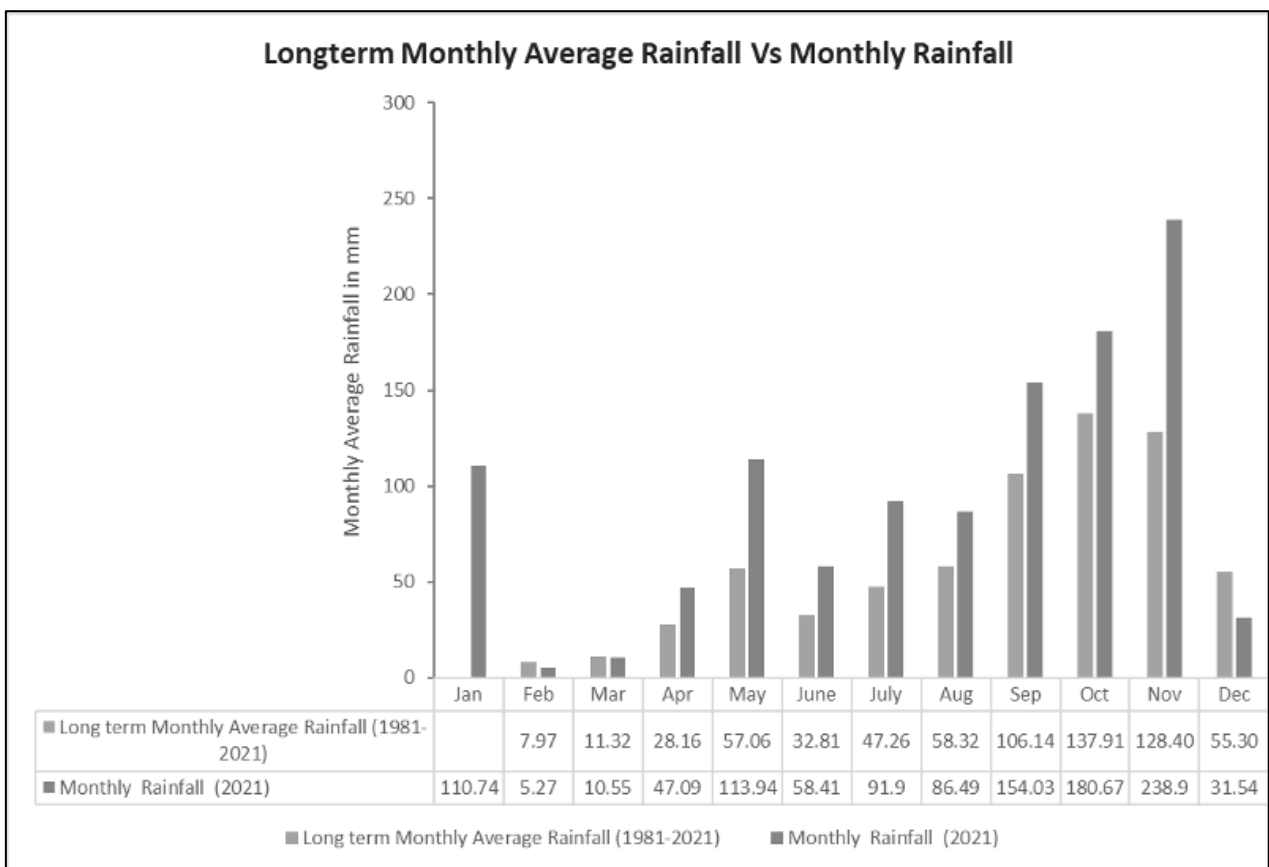


Figure 3.14 Long-Term Monthly Average Rainfall Vs Monthly Rainfall

3.3.1.2 Wind Pattern

Wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction. Two types of wind rose were generated: historical seasonal wind rose for the period of October through December of the years from 2017 to 2020 and the seasonal wind rose for the study period of October through December 2021. The wind rose diagrams thus produced are shown in Figures 3.15-3.15a. Figure 3.16 reveals that:

- ❖ The measured average wind velocity during the study period is 2.52m/s
- ❖ Predominant wind was dominant in the directions ranging from northeast to southwest.
- ❖ Representatives of regional background air quality for obtaining baseline status
- ❖ Location of residential areas representing different activities
- ❖ Accessibility and power availability

3.3.2 Methodology and Objectives

The prime objective of the ambient air quality study is to assess the existing air quality of the study area and its conformity to NAAQS. The observed sources of air pollution in the study area are industrial, traffic and domestic activities. The baseline status of the ambient air quality has been established through a scientifically designed ambient air quality monitoring network considering the followings:

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

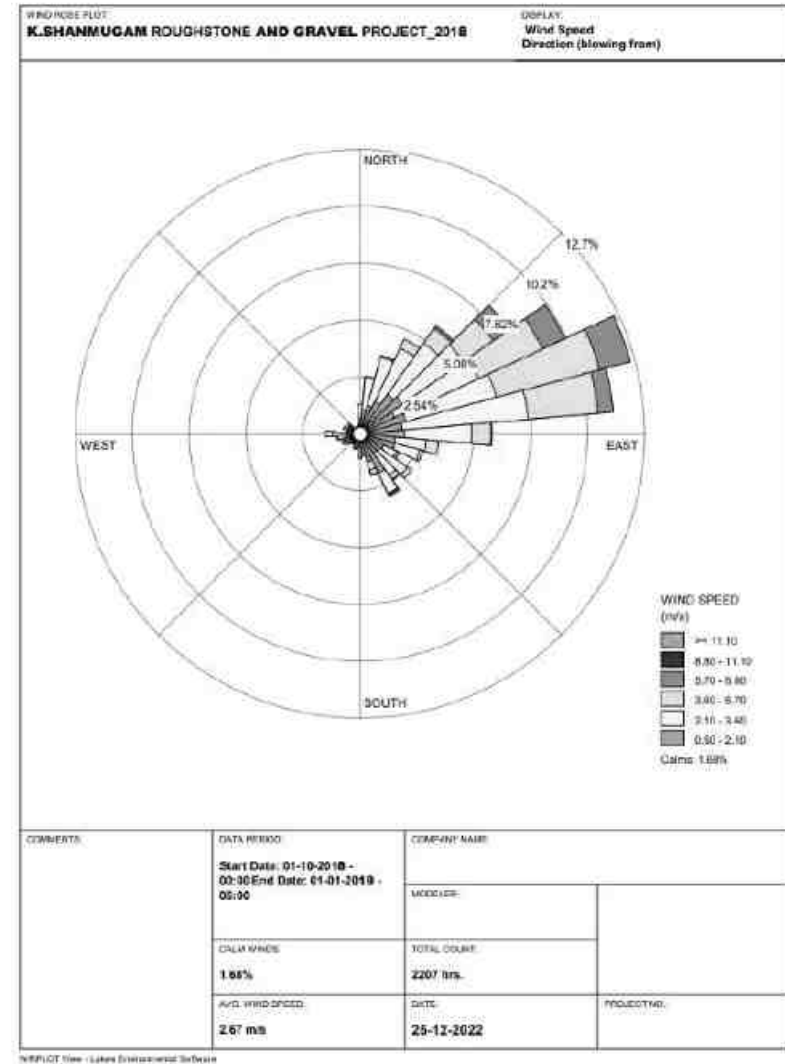
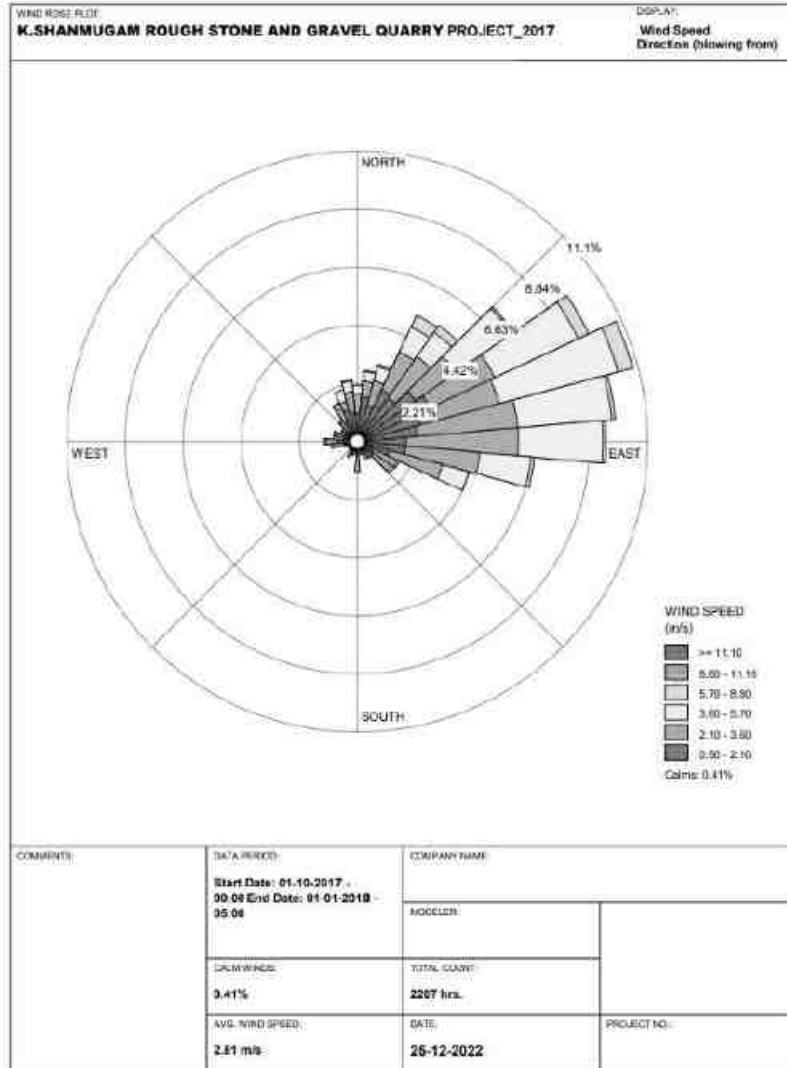


Figure 3.15 Windrose Diagram for 2017 and 2018 (October to December)

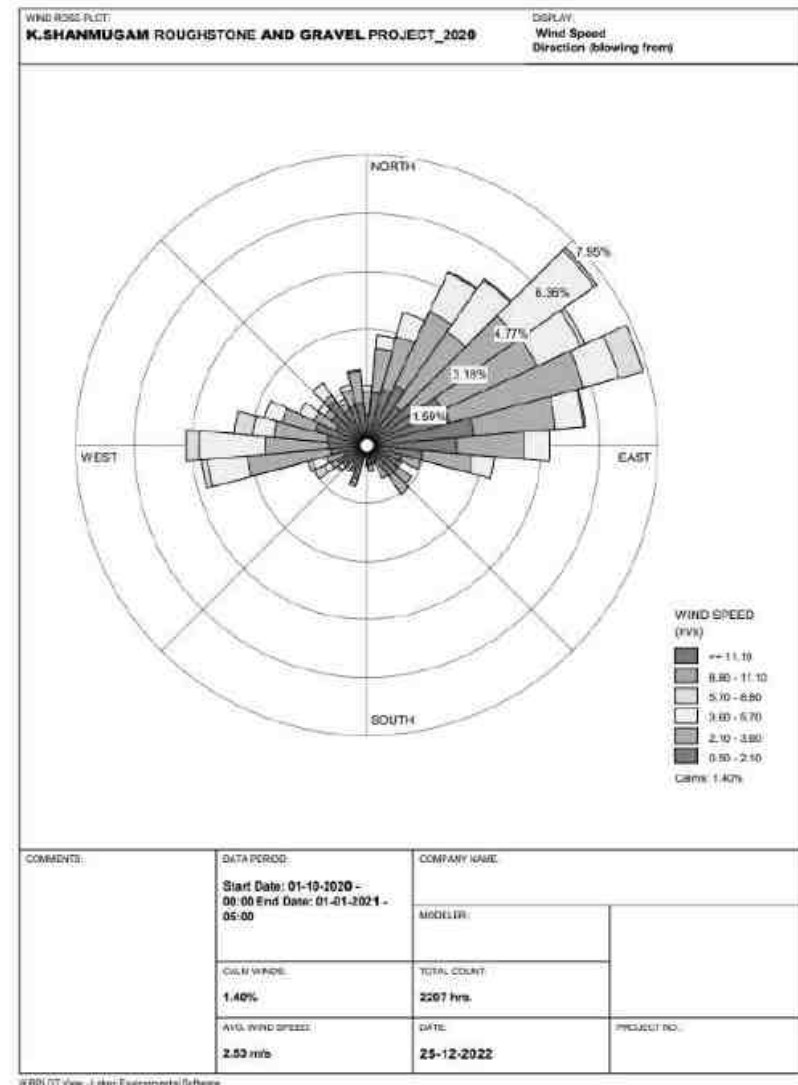
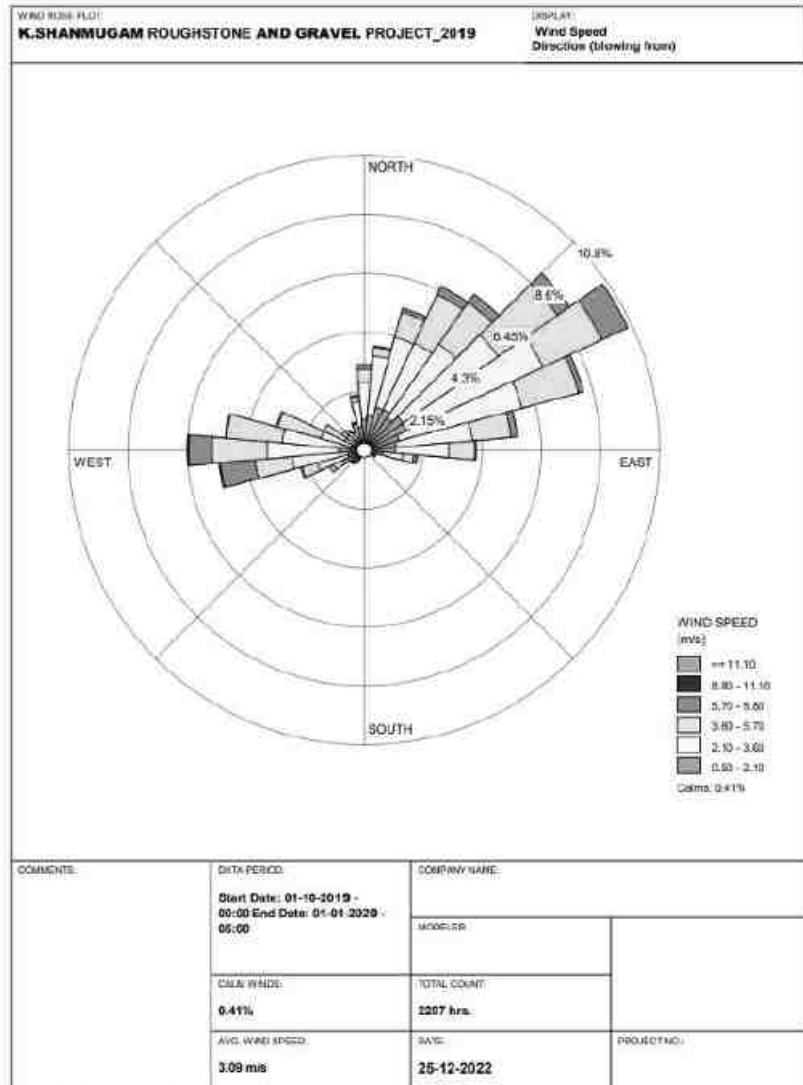
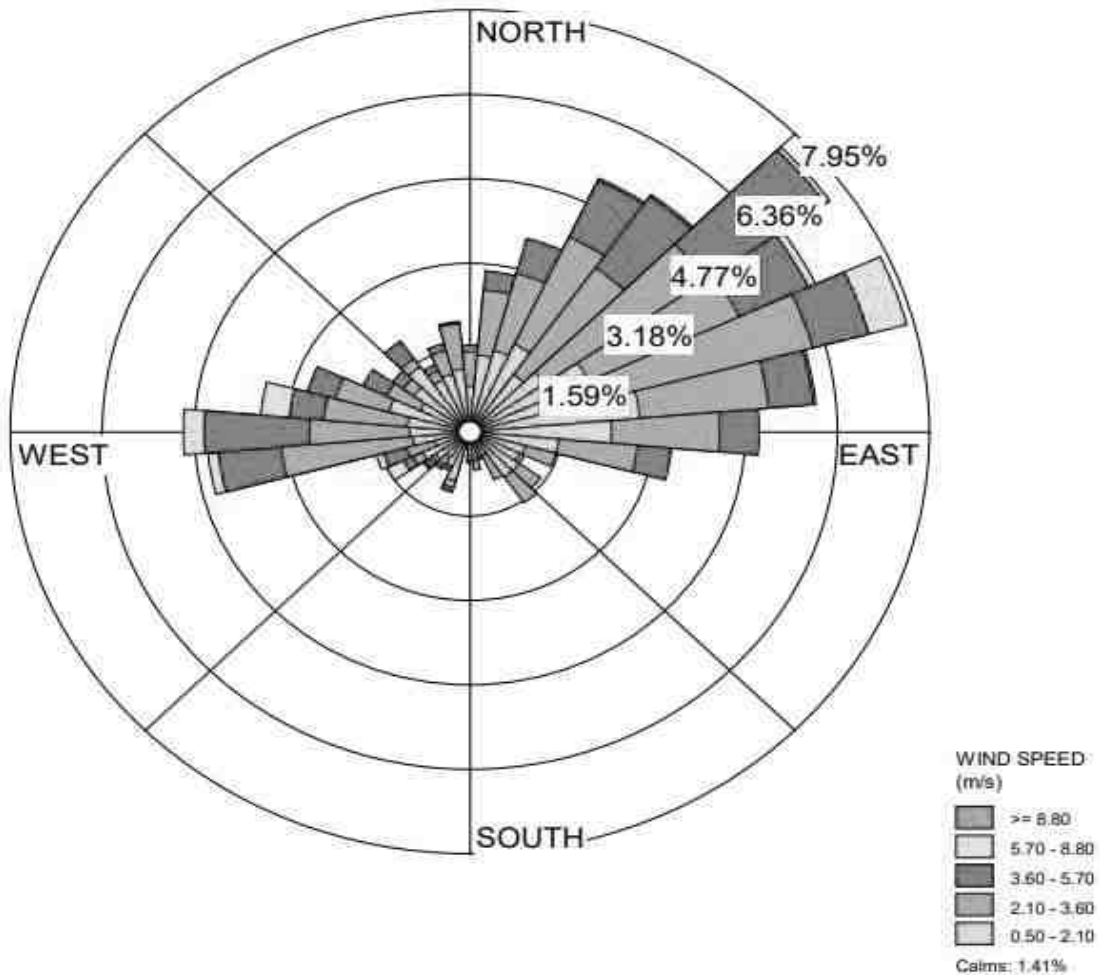


Figure 3.15(A) Windrose Diagram for 2019 and 2020 (October to December)

WIND ROSE PLOT
K.SHANMUGAM ROUGHSTONE AND GRAVEL QUARRY



COMMENTS:	DATA PERIOD: Start Date: 01-10-2021 - 00:00 End Date: 31-12-2021 - 23:00	COMPANY NAME: GEOTECHNICAL MINING SOLUTIONS	
	CALM WIND: 1.41%	TOTAL COUNT: 2202 hrs.	
	AVG. WIND SPEED: 2.52 m/s	PROJECT NO.:	

WRPLOT View - Lataas Environmental Software

Figure 3.16 Onsite Wind Rose Diagram

3.3.3 Sampling and Analytical Techniques

Table 3.12 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
NO _x	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment

Source: Sampling methodology based on *Ekdant Enviro Services (P) Ltd & CPCB Notification*.

Table 3.13 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	Sulphur Dioxide (µg/m ³)	Annual Avg.*	50.0	20.0
		24 hours**	80.0	80.0
2	Nitrogen Dioxide (µg/m ³)	Annual Avg.	40.0	30.0
		24 hours	80.0	80.0
3	Particulate matter (size less than 10µm) PM ₁₀ (µg/m ³)	Annual Avg.	60.0	60.0
		24 hours	100.0	10 ⁰ .0
4	Particulate matter (size less than 2.5 µm) PM _{2.5} (µg/m ³)	Annual Avg.	40.0	40.0
		24 hours	60.0	60.0

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

3.3.4 Frequency and Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at eight locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period October – December 2022. Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least $3 \pm 0.5\text{m}$ above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at dug space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results.

3.3.5 Ambient Air Quality Monitoring Stations

Eight monitoring stations were set up in the study area as depicted in Figure 3.17 for the assessment of the existing ambient air quality. The sampling locations and concentrations of air pollutants measured from the proposed project site have been given in Tables 3.14-3.16

Table 3.14 Ambient Air Quality (AAQ) Monitoring Locations

S. No.	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
1	AAQ-1	Core Zone	0.29	W	10°59'52.87"N 77°57'27.50"E
2	AAQ-2	Kuppam	4.20	NW	11°00'45.46"N 77°55'29.07"E
3	AAQ-3	Punnam Chatram	2.73	NE	11°00'49.36"N 77°58'49.56"E
4	AAQ-4	Thalaiyeethupatti	0.78	SW	10°59'43.30"N 77°57'11.78"E
5	AAQ-5	Salipalaiyam	2.49	SW	10°59'41.05"N 77°56'15.55"E
6	AAQ-6	Velayudampalayam	3.99	SW	10°59'05.85"N 77°55'33.22"E
7	AAQ-7	Karudaiyampalayam	3.97	S	10°57'46.42"N 77°56'59.02"E
8	AAQ-8	Punnam	3.75	E	10°59'37.59"N 77°59'41.83"E

Source: Sampling methodology based on Ekdant Enviro Services (P) Ltd & CPCB Notification.

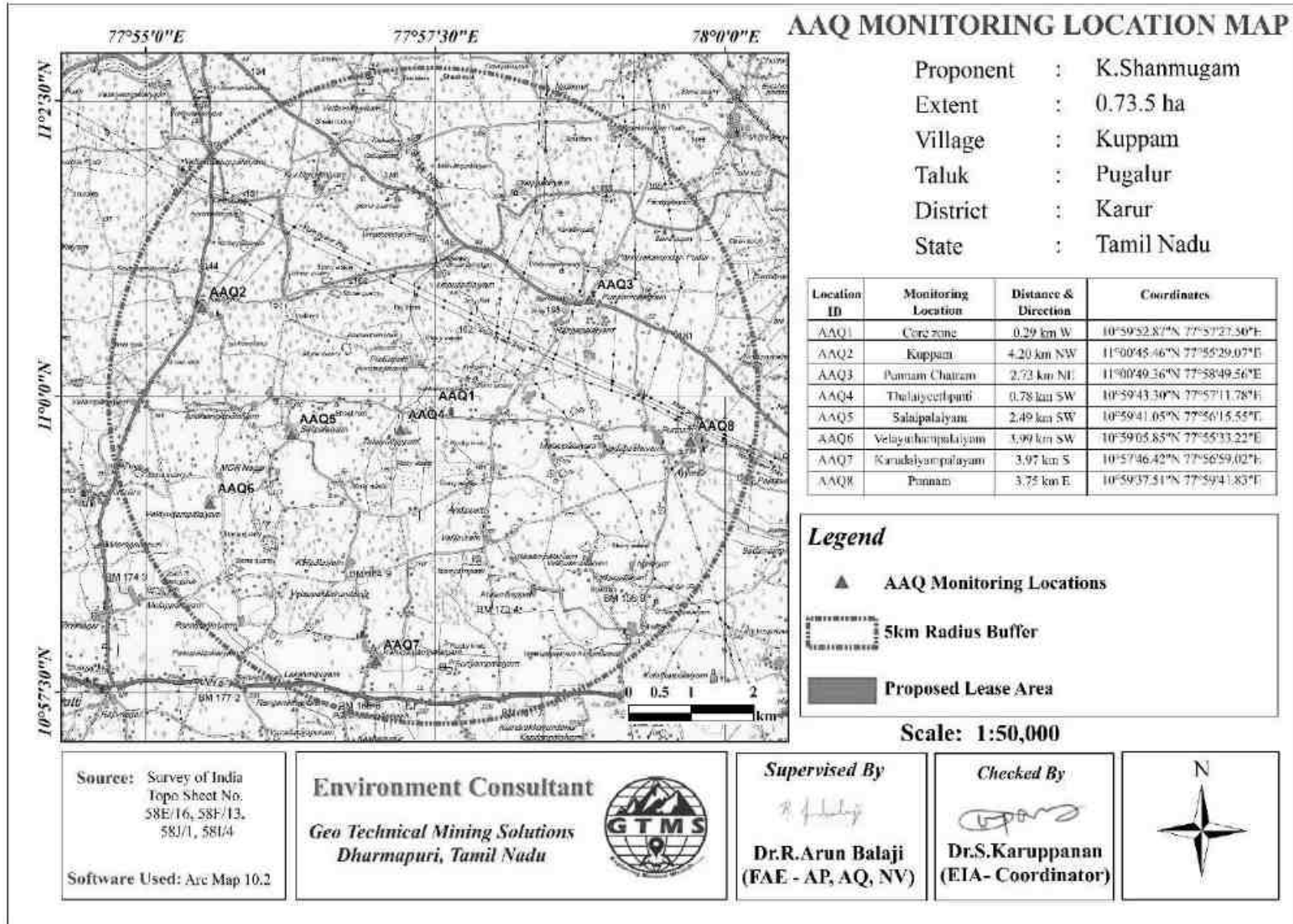


Figure 3.17 Toposheet Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from the Proposed Project Site

Table 3.15 Summary of AAQ Result

PM _{2.5}					PM ₁₀			
Station ID	Max	Min	Mean	98 th Percentile	Max	Min	Mean	98 th Percentile
AAQ1	25.6	22.5	23.95	25.55	47.9	43.1	45.19	47.85
AAQ2	21.9	18.2	20.02	21.55	41.7	38.2	40.00	41.60
AAQ3	26.7	24.1	25.25	26.65	47.9	45.2	46.74	47.80
AAQ4	22.9	19.8	20.96	22.60	43.9	40.2	41.98	43.40
AAQ5	23.7	21	22.14	23.65	45.8	42.2	43.74	45.71
AAQ6	21.6	18.1	19.34	21.23	42.8	38.7	41.02	42.75
AAQ7	24.3	22.1	23.07	24.08	45.9	43.2	44.98	45.90
AAQ8	21.9	19.5	20.67	21.86	43.9	40.1	41.50	43.75
SO ₂					NO _x			
AAQ1	9.9	7.5	8.57	9.80	26.9	24.2	25.88	26.90
AAQ2	9.7	7.3	8.40	9.65	26.8	24.7	25.86	26.80
AAQ3	9.8	8.3	9.07	9.75	27.6	25.3	26.58	27.60
AAQ4	7.9	5.7	6.97	7.90	26.8	24.1	25.61	26.75
AAQ5	6.8	5.1	5.69	6.60	27.9	25.1	26.43	27.70
AAQ6	6.8	5.1	5.74	6.75	27.9	24.1	25.76	27.75
AAQ7	6.9	4.2	5.73	6.85	26.4	23.1	24.72	25.50
AAQ8	5.9	5.1	5.49	5.90	26.8	22.3	25.10	26.75

Table 3.16 Maximum, Minimum, Average and 98th Percentile of Average Air Pollutant Concentrations over the Study Area

S. No.	Parameter	Pollutant Concentration, µg/m ³			
		PM _{2.5}	PM ₁₀	SO ₂	NO _x
1	Maximum	23.58	44.98	7.96	27.14
2	Minimum	20.66	41.36	6.04	24.11
3	Average	21.93	43.14	6.96	25.74
4	98 th percentile	23.40	44.85	7.90	26.97
5	NAAQ Norms	60	100	80	80

3.3.6 Results & Discussion

As per the monitoring data, PM_{2.5} ranges from 20.66 µg/m³ to 23.58 µg/m³; PM₁₀ from 41.36 µg/m³ to 44.98 µg/m³; SO₂ from 6.04 µg/m³ to 7.96 µg/m³; NO_x from 24.11 µg/m³ to 27.14 µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

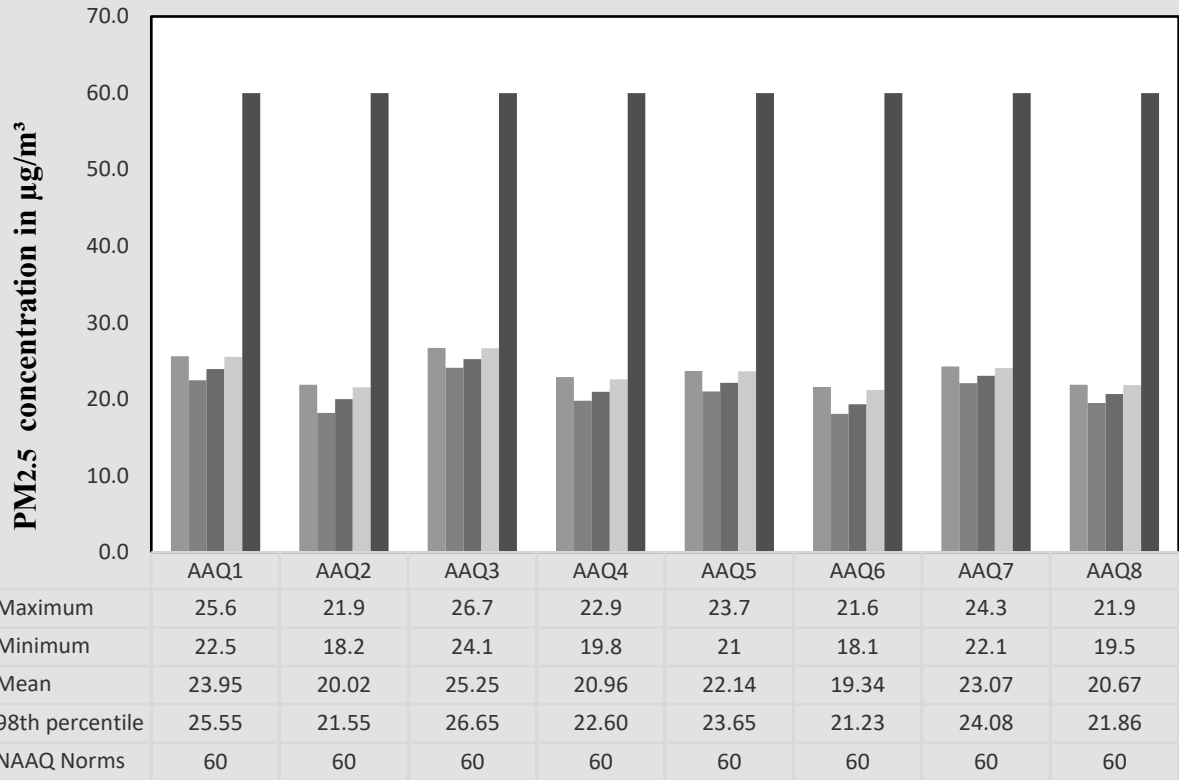


Figure 3.18 Maximum, Minimum, and the Average Concentrations of PM_{2.5} Measured from the Eight Air Quality Monitoring Stations within 5 km Radius

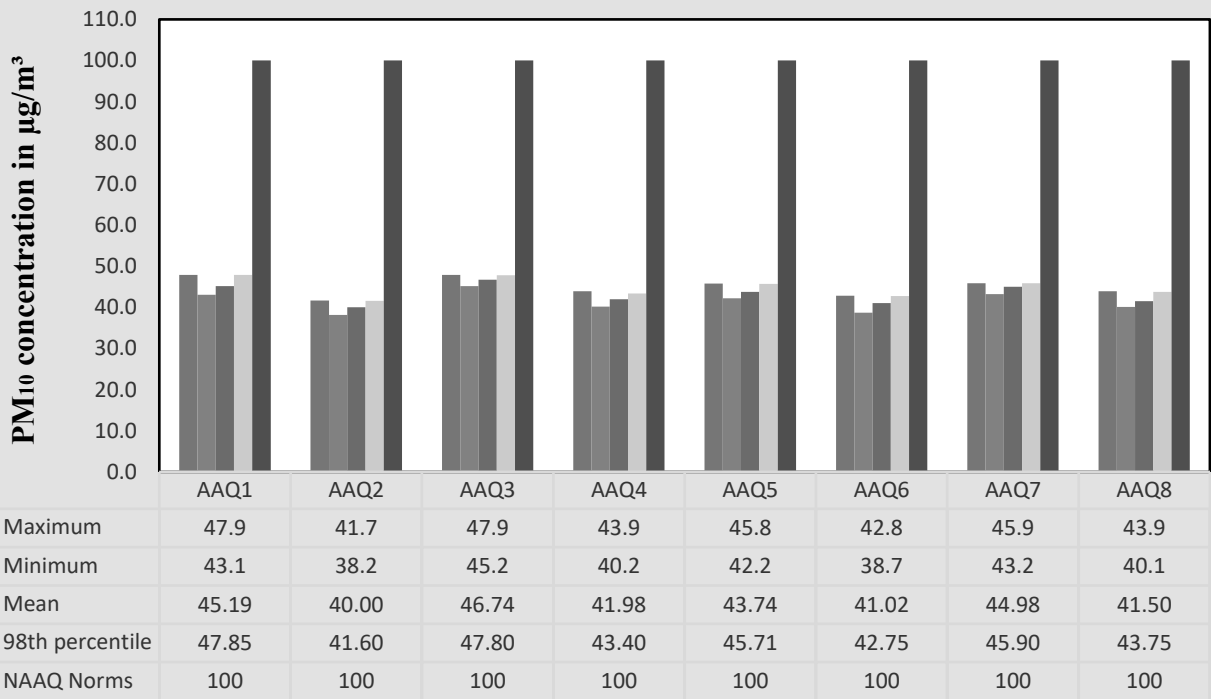


Figure 3.19 Maximum, Minimum, and the Average Concentrations of PM₁₀ Measured from the Eight Air Quality Monitoring Stations within 5 km Radius

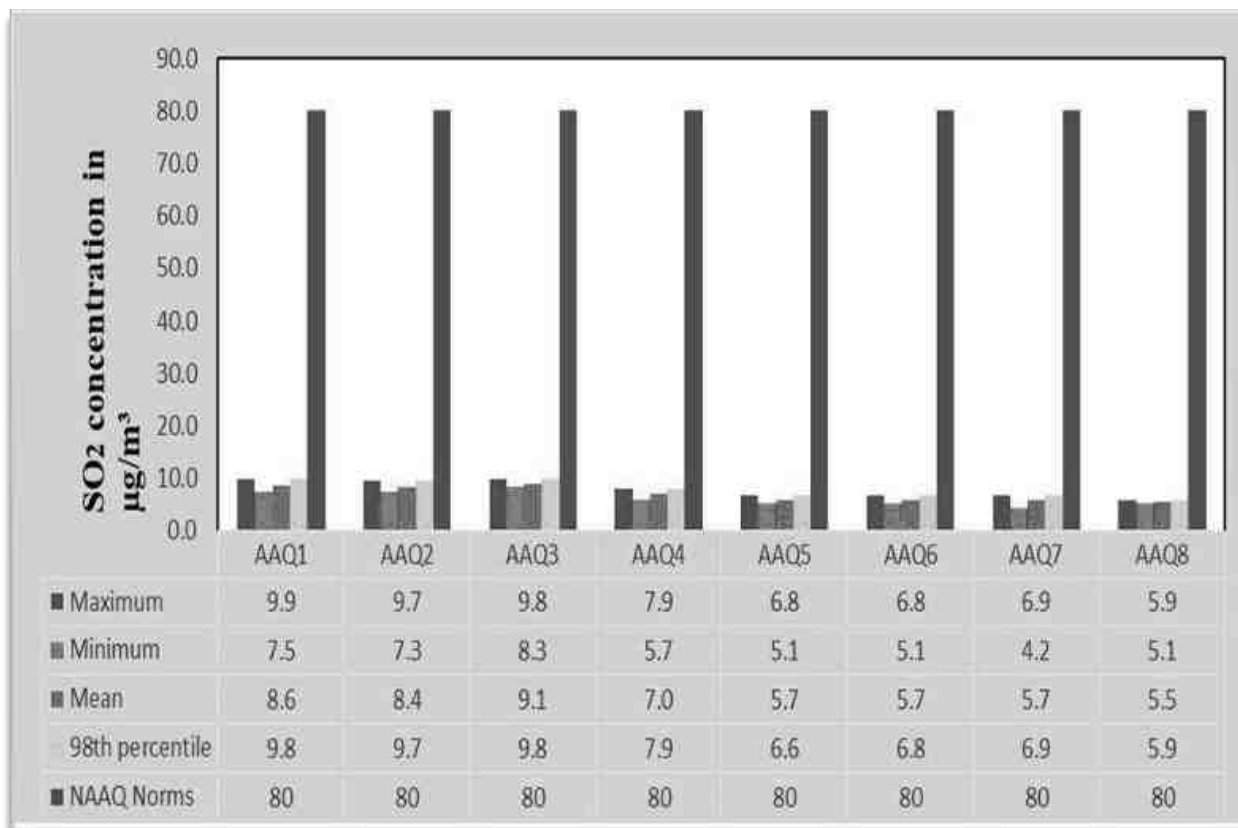


Figure 3.20 Maximum, Minimum, and the Average Concentrations of SO₂ Measured from the Eight Air Quality Monitoring Stations within 5 km Radius

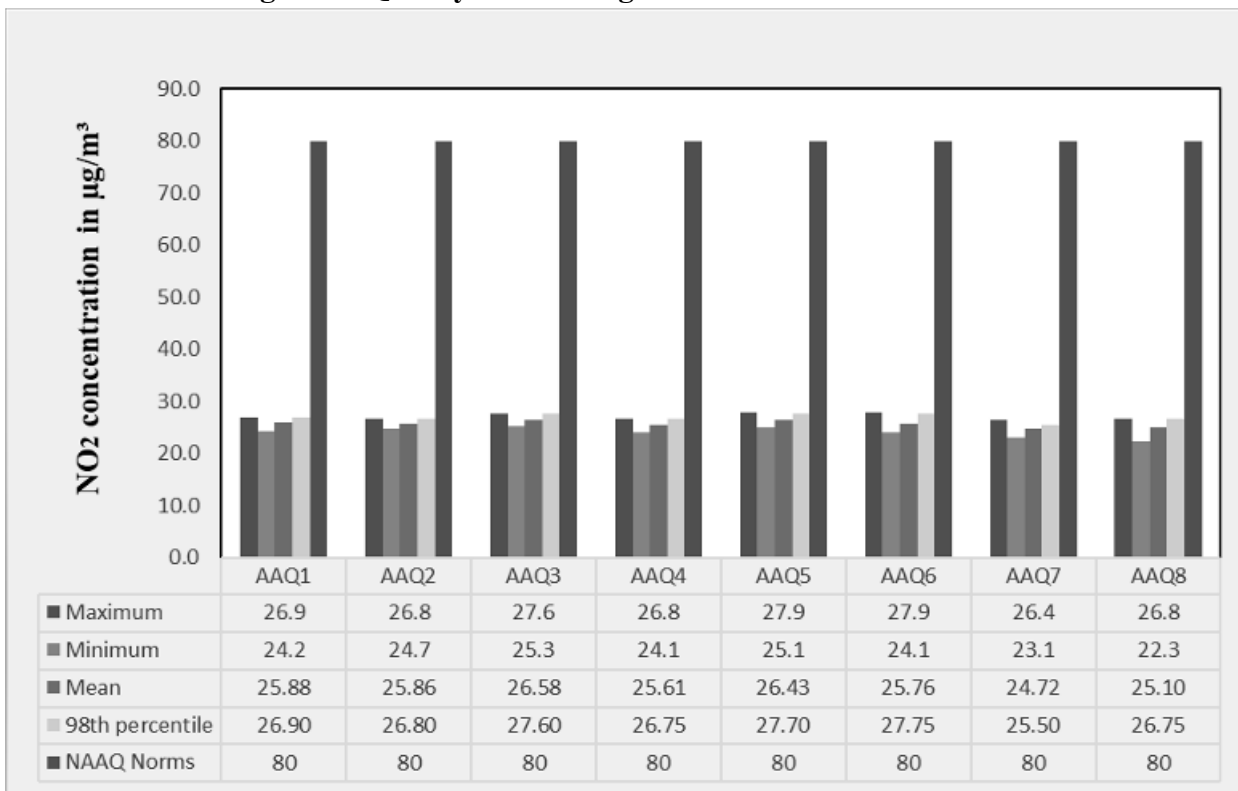


Figure 3.21 Maximum, Minimum, and the Average Concentrations of NO_x Measured from the Eight Air Quality Monitoring Stations within 5 km Radius

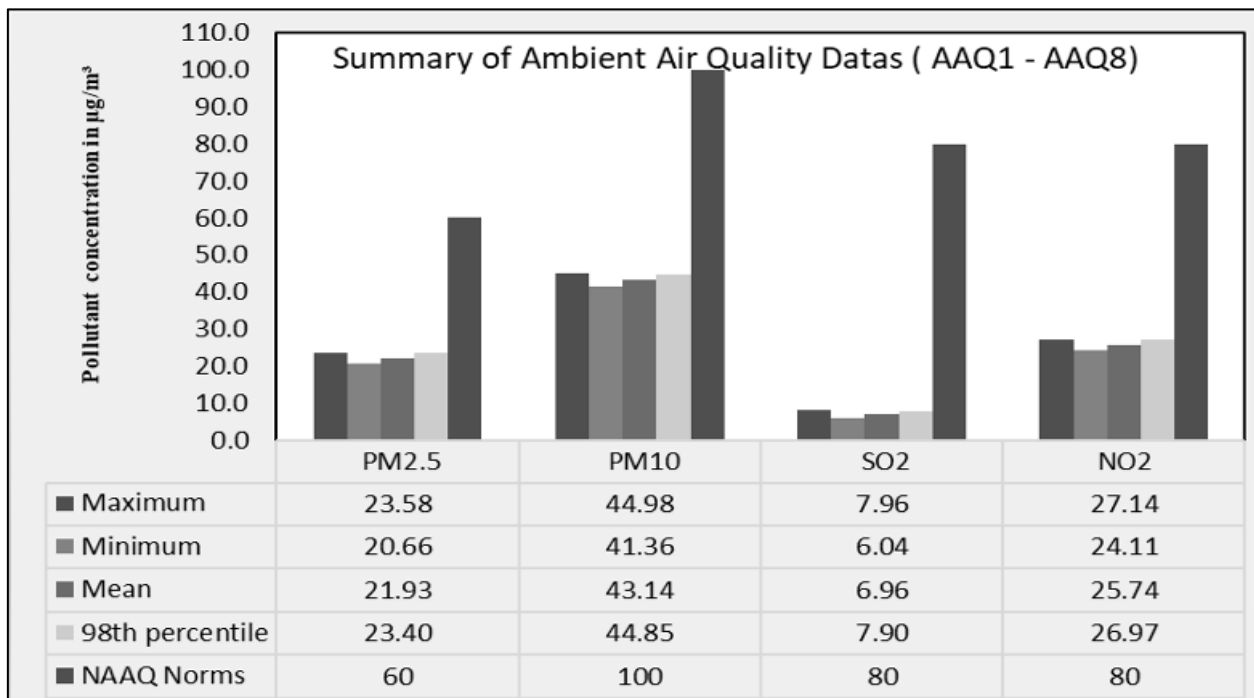


Figure 3.22 Maximum, Minimum, and the Average Concentrations of Pollutants in the Atmosphere within 5km Radius

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area, the environmental assessment of noise from the mining activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses.

The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at eight (08) locations covering commercial, residential, rural areas within the radius of 5 km. A suitable noise monitoring methodology was chosen to meet the purpose and objectives of the study.

Table 3.17 Details of Noise Monitoring Locations

S. No.	Location ID	Monitoring Locations	Distance (km)	Direction	Coordinates
1	N-1	Core Zone	0.22	W	10°59'58.70"N 77°57'32.53"E
2	N-2	Nochikattur	0.46	NE	11° 00'8.51"N 77°57'44.28"E
3	N-3	Punnam Chatram	2.65	NE	11° 0'47.20"N 77°58'47.43"E
4	N-4	Thalaiyeethupatti	0.83	SW	10°59'40.57"N 77°57'11.05"E
5	N-5	Salipalayam	2.54	SW	10°59'38.75"N 77°56'14.16"E

6	N-6	Velayudampalaiyam	4.02	SW	10°59'04.38"N77°55'32.94"E
7	N-7	Karudaiyampalaiyam	4.01	S	10°57'45.36"N77°56'57.76"E
8	N-8	Pavitram	4.45	SW	10°57'58.81"N77°59'12.69"E

Source: On-site monitoring/sampling by Ekdant Enviro Services (P) Ltd in association with GTMS

3.4.2 Method of Monitoring

Digital Sound Level Meter was used for the study. All reading was taken on the 'A-Weighting' frequency network at a height of 1.5 meters from ground level. The sound level meter does not give a steady and consistent reading and it is quite difficult to assess the actual sound level over the entire monitoring period. To mitigate this shortcoming, the Continuous Equivalent Sound level indicated by Leq, is used. Equivalent sound level, 'Leq', can be obtained from variable sound pressure level, 'L', over a time period by using following equation. The equivalent noise level is defined mathematically as below:

$$Leq = 10 \text{ Log } L / T \sum (10L_n/10)$$

Where L = Sound pressure level at function of time dB (A), T = Time interval of observation

Measured noise levels, displayed as a function of time, is useful for describing the acoustical climate of the community. Noise levels recorded at each station with a time interval of about 60 minutes are computed for equivalent noise levels. Equivalent noise level is a single number descriptor for describing time varying noise levels.

3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352). An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.18.

Table 3.18 Ambient Noise Quality Result

S. No.	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time (6AM-10 PM)	Night Time (10 PM-6 AM)	
1	Core Zone	46.0	39.1	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
2	Nochikattur	40.2	38.9	Residential Day Time- 55 dB (A) Night Time- 45 dB (A)
3	Punnam Chatram	46.8	36.9	
4	Thalaiyeethupatti	47.0	36.5	
5	Salipalaiyam	46.8	36.9	
6	Velayudampalaiyam	47.2	39.3	
7	Karudaiyampalaiyam	40.1	38.6	
8	Pavitram	46.3	38.5	

Source: On-site monitoring/sampling by Ekdant Enviro Services (P) Ltd in association with GTMS

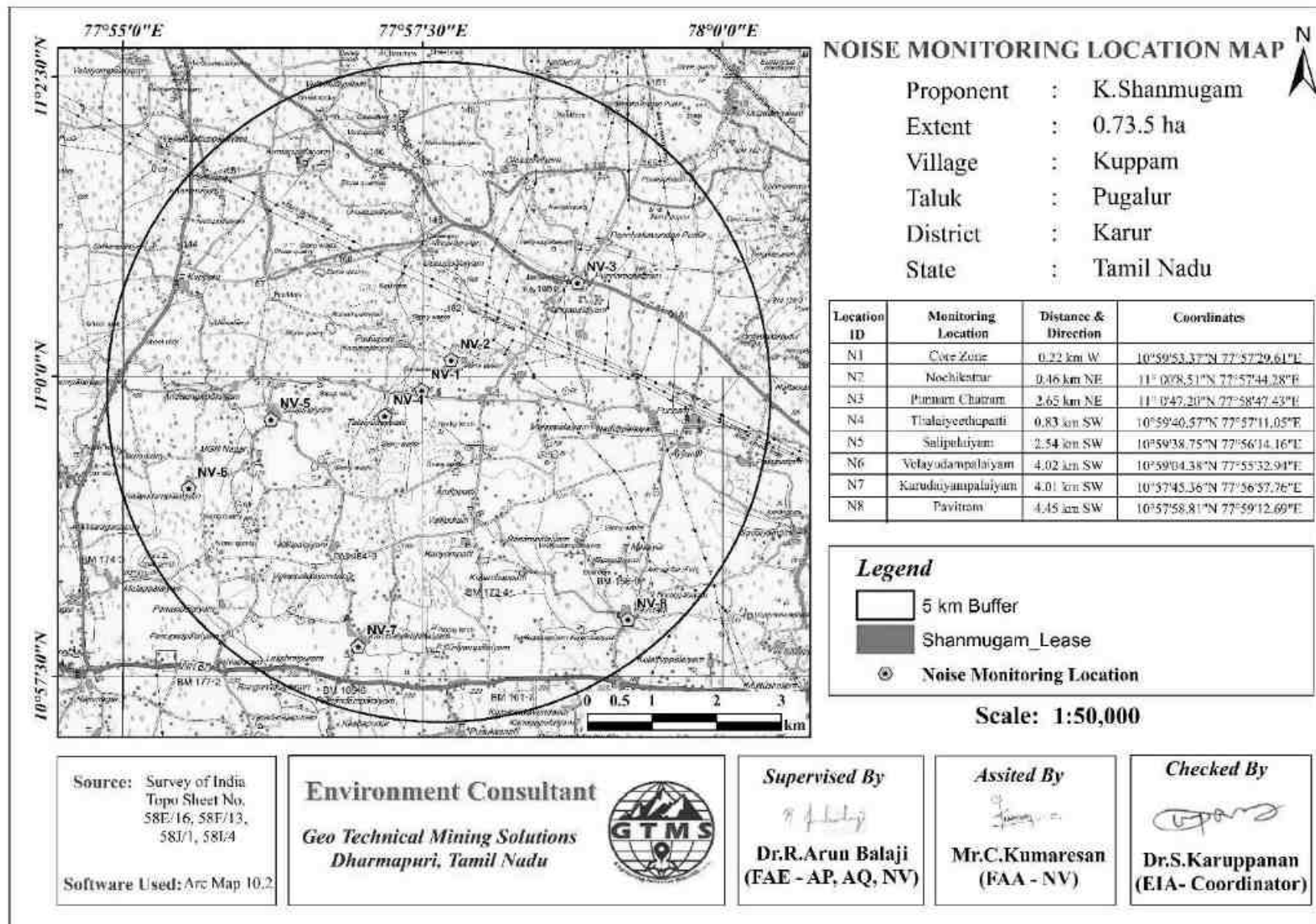


Figure 3.23 Toposheet Showing Noise Level Monitoring Station Locations around 5 km Radius from the Proposed Project Site

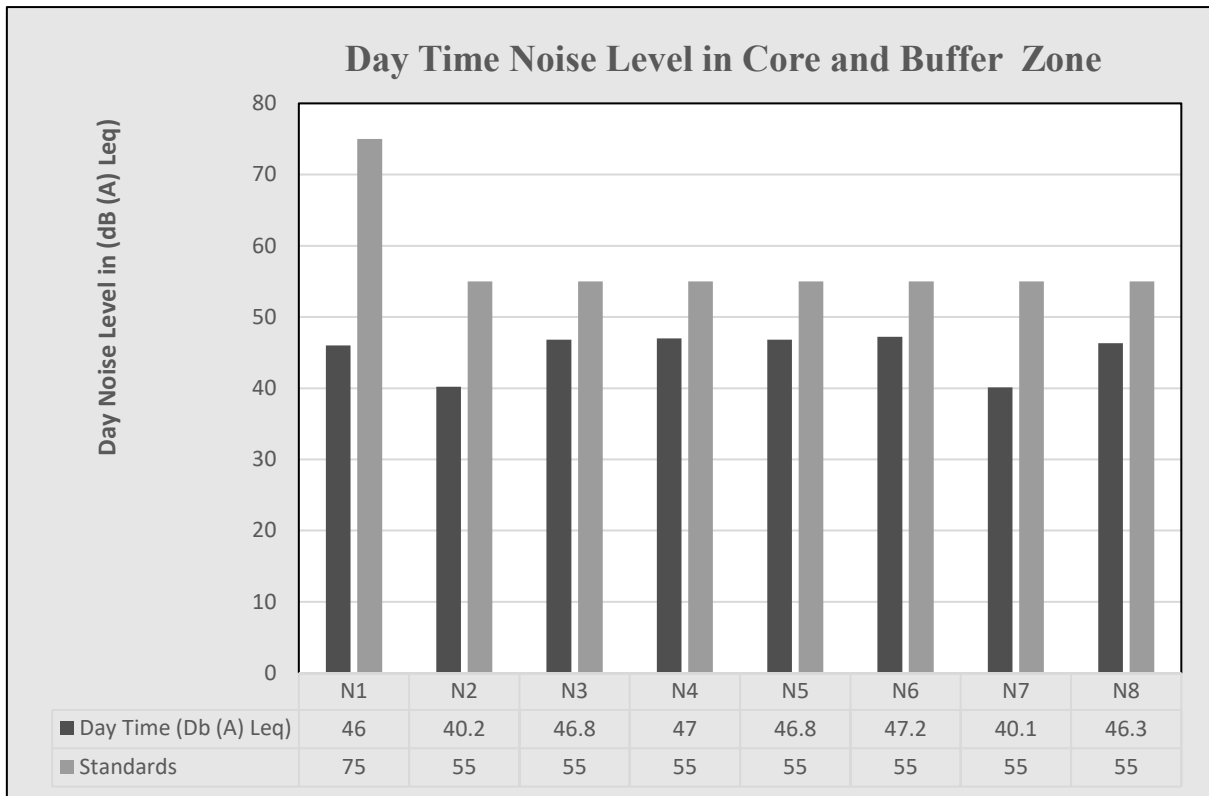


Figure 3.24 Day Time Noise Levels Measured in Core and Buffer Zones

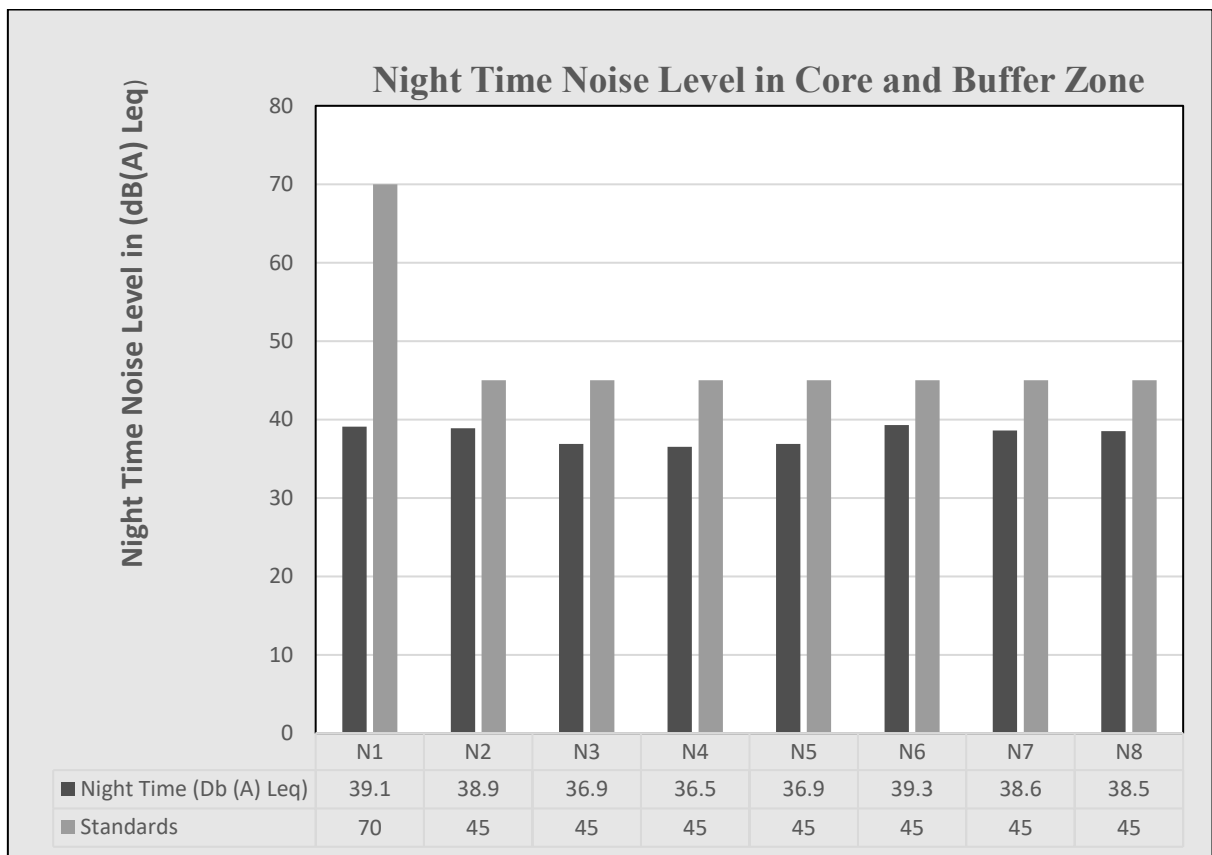


Figure 3.25 Night Time Noise Levels Measured in Core and Buffer Zones

3.4.4 Results & Discussion

Ambient noise levels were measured at 08 locations around the proposed project area. The noise level results in Table 3.18 show that noise levels in core zone was 46.0 dB (A) Leq. during day time and 39.1 dB (A) Leq. during night time and that noise levels in buffer zone varied from 40.1 to 47.2 dB (A) Leq. during day time and from 36.5 to 39.3 dB (A) Leq. during night time. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

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 × 10m were laid down for shrubs.



Figure 3.26 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 3.19. 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 3.19 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 3.20.

Table 3.20 Calculation of Species Diversity by Shannon – Wiener Index, Evenness and Richness

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

3.5.1 Flora

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

Crop Patterns in Pugalur taluk

The principal crops of the district are paddy, millets, pulses, oilseeds, sugarcane and banana. The major paddy area is in kuppam village and Pugalur taluk. Pulses are grown in rice fallow areas. In uplands millets like sorghum, pearl millet pulses such as red gram, horse gram oilseeds such as groundnut, gingelly and sunflower are grown both under irrigated and rain fed conditions.

Flora in mine lease area

There are no trees in the quarry lease area. In the 7.5 m conservation area there are three species of *Albizia amara*, *Casuarina equisetifolia* and *Wrightia tinctoria*. They are protected from any impact during quarrying.

The Flora in 300 m radius zone

Vegetation species within mine lease area and 300 meters radius around the lease area. It is an arid landscape. There is no agricultural land nearby. It contains a total of 34 species belonging to 21 families have been recorded from the buffer zone. Among them are 6 Trees (18%), 6 Shrubs (18%), 22 Herbs (64%). Details of flora with the scientific name and diversity of species, Richness index were mentioned in Tables 3.21-3.23 and figure 3.24. There is no threat to the Flora species in 300-meter radius.

Flora in 10 km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land was found to dominate mostly in all the directions. Majority of the flat landscape around project unit is occupied by agriculture fields. It contains a total of species belonging to 38 families have been recorded from the buffer zone. Totally, 75 floral species were identified during the survey. Among them are 35 Trees (46%), 15 Shrubs (15%), 25 Herbs, Climbers, Creeper, Grass & Cactus (39%). Details of flora with the scientific name details of diversity species Rich ness index were mentioned in Tables 3.24-3.26 and Figure 3.26.

Table 3.21 Details of Flora within 300 m Radius

S.No.	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Karuvealan	<i>Prosopis juliflora</i>	Fabaceae	4	3	5	0.8	60.0	1.3	17.4	15.8	33.2	Not Listed
2	Palm tree	<i>Borassus flabellifer</i>	Fabaceae	2	2	5	0.4	40.0	1.0	8.7	10.5	19.2	Not Listed
3	Vembu	<i>Azadirachta indica</i>	Meliaceae	4	4	5	0.8	80.0	1.0	17.4	21.1	38.4	Not Listed
4	Vealli vealan	<i>Vachellia leucophloea</i>	Babesiae	4	3	5	0.8	60.0	1.3	17.4	15.8	33.2	Not Listed
5	Unjai maram	<i>Albizia amara</i>	Fabaceae	5	4	5	1.0	80.0	1.3	21.7	21.1	42.8	Not Listed
6	Vetpalai	<i>Wrightia tinctoria</i>	Apocynaceae	4	3	5	0.8	60.0	1.3	17.4	15.8	33.2	Not Listed
Shrubs													
1	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	6	5	10	0.6	50.0	1.2	15.8	15.6	31.4	Not Listed
2	Uumaththai	<i>Datura metel</i>	Solanaceae	7	6	10	0.7	60.0	1.2	18.4	18.8	37.2	Not Listed
3	Thuthi	<i>Abutilon indicum</i>	Meliaceae	5	4	10	0.5	40.0	1.3	13.2	12.5	25.7	Not Listed
4	Avarai	<i>Senna auriculata</i>	Fabaceae	8	7	10	0.8	70.0	1.1	21.1	21.9	42.9	Not Listed
5	Unichadi	<i>Lantana camara</i>	Verbenaceae	7	6	10	0.7	60.0	1.2	18.4	18.8	37.2	Not Listed
6	Suraimullu	<i>Zizyphus Oenoplia</i>	Rhamnaceae	5	4	10	0.5	40.0	1.3	13.2	12.5	25.7	Not Listed
Herbs													

1	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	5	4	15	0.3	26.7	1.3	3.4	3.1	6.5	Not Listed
2	Nearunji mull	<i>Tribulus zeyheri</i> Sond	Zygophyllaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	
3	pill	<i>Cenchrus ciliaris</i>	Poaceae	6	5	15	0.4	33.3	1.2	4.0	3.9	8.0	Not Listed
4	pulapoo	<i>Aerva lanata</i>	Amaranthaceae	8	7	15	0.5	46.7	1.1	5.4	5.5	10.9	Not Listed
5	kapok bush	<i>Aerva javani</i>	Amaranthaceae	5	4	15	0.3	26.7	1.3	3.4	3.1	6.5	Not Listed
6	Rail poondu	<i>Croton bonplandianus</i>	Euphorbiaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	Not Listed
7	Yanai neariji	<i>pedalium murex</i>	Pedaliaceae	6	5	15	0.4	33.3	1.2	4.0	3.9	8.0	Not Listed
8	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	8	7	15	0.5	46.7	1.1	5.4	5.5	10.9	Not Listed
9	Thumbai chadi	<i>Leucas aspera</i>	Lamiaceae	6	5	15	0.4	33.3	1.2	4.0	3.9	8.0	Not Listed
10	Umathai	<i>Datura metel</i>	Solanaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	Not Listed
11	Sethamutti	<i>Sida cordata</i>	Malvaceae	5	4	15	0.3	26.7	1.3	3.4	3.1	6.5	Not Listed
12	Annam	<i>Iva annua</i>	Asteraceae	8	7	15	0.5	46.7	1.1	5.4	5.5	10.9	Not Listed
13	Kolunji	<i>Tephrosia purpurea</i>	Fabaceae	6	5	15	0.4	33.3	1.2	4.0	3.9	8.0	Not Listed
14	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	Not Listed
15	Ishappukol Vitai	<i>Plantago coronopus</i>	Plantaginaceae	8	7	15	0.5	46.7	1.1	5.4	5.5	10.9	Not Listed
16	vealiparuthi	<i>Pergularia daemia</i>	Apocynaceae	9	8	15	0.6	53.3	1.1	6.0	6.3	12.3	Not Listed
17	Seppu nerinji	<i>Indigofera linnaei</i> Ali	Fabaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	Not Listed
18	Sapathikalli	<i>Opuntia ficus-indica</i>	Cactaceae	6	5	15	0.4	33.3	1.2	4.0	3.9	8.0	Not Listed
19	Pal kodi	<i>Cynanchum viminalis</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	Not Listed
20	Ilia perandai	<i>Cissus rotundifolia</i>	Vitaceae	8	7	15	0.5	46.7	1.1	5.4	5.5	10.9	Not Listed
21	Katralai	<i>Aloe vera</i>	Asphodelaceae	6	5	15	0.4	33.3	1.2	4.0	3.9	8.0	Not Listed
22	Seammulli	<i>Barleria prionitis</i>	Acanthaceae	7	6	15	0.5	40.0	1.2	4.7	4.7	9.4	Not Listed

Table 3.22 Calculation of Species Diversity in 300 m radius

S. No	Common Name	Scientific Name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Karuvealan	<i>Prosopis juliflora</i>	4	0.17	-1.75	-0.30
2	Palm tree	<i>Borassus flabellifer</i>	2	0.09	-2.44	-0.21
3	Vembu	<i>Azadirachta indica</i>	4	0.17	-1.75	-0.30
4	Vealli vealan	<i>Vachellia leucophloea</i>	4	0.17	-1.75	-0.30
5	Unjai maram	<i>Albizia amara</i>	5	0.22	-1.53	-0.33
6	Vetpalai	<i>Wrightia tinctoria</i>	4	0.17	-1.75	-0.30
H (Shannon Diversity Index) =1.76						
Shrubs						
1	Erukku	<i>Calotropis gigantea</i>	6	0.16	-1.85	-0.29
2	Umaththai	<i>Datura metel</i>	7	0.18	-1.69	-0.31
3	Thuthi	<i>Abutilon indicum</i>	5	0.13	-2.03	-0.27
4	Avarai	<i>Senna auriculata</i>	8	0.21	-1.56	-0.33
5	Unichadi	<i>Lantana camara</i>	7	0.18	-1.69	-0.31
6	Suraimullu	<i>Zizyphus Oenopia</i>	5	0.13	-2.03	-0.27
H (Shannon Diversity Index) =1.78						
Herbs						
1	Nayuruv	<i>Achyranthes aspera</i>	5	0.03	-3.43	-0.11
2	Nearunji mull	<i>Tribulus zeyheri Sond</i>	7	0.05	-3.09	-0.14
3	Pill	<i>Cenchrus ciliaris</i>	6	0.04	-3.25	-0.13
4	Pulapoo	<i>Aerva lanata</i>	8	0.05	-2.96	-0.15
5	Kapok bush	<i>Aerva javani</i>	5	0.03	-3.43	-0.11
6	Rail poondu	<i>Croton bonplandianus</i>	7	0.05	-3.09	-0.14
7	Mookuthi poondu	<i>pedalium murex</i>	6	0.04	-3.25	-0.13
8	Perandai	<i>Cissus quadrangularis</i>	8	0.05	-2.96	-0.15
9	Thumbai chadi	<i>Leucas aspera</i>	6	0.04	-3.25	-0.13
10	Umathai	<i>Datura metel</i>	7	0.05	-3.09	-0.14
11	Sethamutti	<i>Sida cordata</i>	5	0.03	-3.43	-0.11
12	Annanm	<i>Iva annua</i>	8	0.05	-2.96	-0.15
13	Kolunji	<i>Tephrosia purpurea</i>	6	0.04	-3.25	-0.13
14	Nayuruvi	<i>Achyranthes aspera</i>	7	0.05	-3.09	-0.14
15	Ishappukol Vitai	<i>Plantago coronopus</i>	8	0.05	-2.96	-0.15
16	Vealiparuthi	<i>Pergularia daemia</i>	9	0.06	-2.84	-0.17
17	Seppu nerinji	<i>Indigofera linnaei Ali</i>	7	0.05	-3.09	-0.14
18	Sapathikalli	<i>Opuntia ficus-indica</i>	6	0.04	-3.25	-0.13
19	Pal kodi	<i>Cynanchum viminale</i>	7	0.05	-3.09	-0.14
20	Ilia perandai	<i>Cissus rotundifolia</i>	8	0.05	-2.96	-0.15
21	Katralai	<i>Aloe vera</i>	6	0.04	-3.25	-0.13
22	Seammulli	<i>Barleria prionitis</i>	7	0.05	-3.09	-0.14
H (Shannon Diversity Index) =3.12						

Table 3.23 Species Richness (Index) in 300 m radius

Details	H	H max	Evenness	Species Richness
Trees	1.76	1.79	0.98	1.59
Shrubs	1.78	1.79	0.99	1.37
Herbs	3.12	3.09	1.01	4.17

Table 3.24 Flora in Buffer Zone

S.No.	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Vembu	<i>Azadirachta indica</i>	Meliaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
2	Thekku	<i>Tectona grandis</i>	Verbenaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
3	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
4	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
5	Manga	<i>Mangifera indica</i>	Anacardiaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
6	Puliyamaram	<i>Tamarindus indica</i>	Legumes	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
7	Vadanarayani	<i>Delonix elata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
8	Thenpazham	<i>Muntingia calabura</i>	Tiliaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
9	Punnai	<i>Calophyllum inophyllum</i>	Calophyllaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
10	Ilanthai	<i>Ziziphus jujubha</i>	Rhamnaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
11	Karuvelam	<i>Acacia nilotica</i>	Mimosaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
12	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
13	Arai nelli	<i>Phyllanthus acidus</i>	Euphorbiaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
14	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
15	Sapota	<i>Manilkara zapota</i>	Sapotaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
16	Navalmaram	<i>Syzygium cumini</i>	Myrtaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
17	Alamaram	<i>Ficus benghalensis</i>	Moraceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
18	Vazhaimaram	<i>Musa paradisiaca</i>	Musaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
19	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
20	Nelli	<i>Embllica officinalis</i>	Phyllanthaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed

21	Eucalyptus	<i>Eucalyptus globules</i>	Myrtaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
22	Maramalli	<i>Millingtonia hortensis</i>	Bignoniaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
23	Kuduka puli	<i>Pithecellobium dulce</i>	Mimosaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
24	Karungali	<i>Acacia sundra</i>	Legumes	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
25	Nochi	<i>Vitex negundo</i>	Lamiaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
26	Karimurungai	<i>Moringa olefera</i>	Moraginaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
27	Pappali maram	<i>Carica papaya L</i>	Caricaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
28	Poovarasu	<i>Thespesia populnea</i>	Malvaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
29	Arasanmaram	<i>Ficus religiosa</i>	Moraceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
30	Vilvam	<i>Aegle marmelos</i>	Rutaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
31	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
32	Nettilingam	<i>Polyalthia longifolia</i>	Annonaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
33	Koyya	<i>Psidium guajava</i>	Myrtaceae	4	3	10	0.4	30.0	1.3	2.9	2.9	5.7	Not Listed
34	Seethapazham	<i>Annona reticulata</i>	Annonaceae	5	4	10	0.5	40.0	1.3	3.6	3.8	7.4	Not Listed
35	Savukku	<i>Casuarina L.</i>	Casuarinaceae	3	2	10	0.3	20.0	1.5	2.1	1.9	4.0	Not Listed
Shrubs													
1	Avarai	<i>Senna auriculata</i>	Fabaceae	8	7	15	0.5	46.7	1.1	7.1	7.2	14.4	Not Listed
2	Sundaika	<i>Solanum torvum</i>	Solanaceae	9	8	15	0.6	53.3	1.1	8.0	8.2	16.3	Not Listed
3	Puramuttai	<i>Chrozophora rottleri</i>	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.4	5.2	10.5	Not Listed
4	Arali	<i>Nerium indicum</i>	Apocynaceae	9	8	15	0.6	53.3	1.1	8.0	8.2	16.3	Not Listed
5	Seemaigaththi	<i>Cassia alata</i>	Caesalpinaceae	7	6	15	0.5	40.0	1.2	6.3	6.2	12.4	Not Listed
6	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	8	7	15	0.5	46.7	1.1	7.1	7.2	14.4	Not Listed
7	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.4	5.2	10.5	Not Listed
8	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	7	6	15	0.5	40.0	1.2	6.3	6.2	12.4	Not Listed
9	Idlipoo	<i>xoracoc cinea</i>	Rubiaceae	8	7	15	0.5	46.7	1.1	7.1	7.2	14.4	Not Listed
10	Thuthi	<i>Abutilon indicum</i>	Meliaceae	7	6	15	0.5	40.0	1.2	6.3	6.2	12.4	Not Listed
11	Nithyakalyani	<i>Cathranthus roseus</i>	Apocynaceae	6	5	15	0.4	33.3	1.2	5.4	5.2	10.5	Not Listed
12	Uumaththai	<i>Datura metel</i>	Solanaceae	8	7	15	0.5	46.7	1.1	7.1	7.2	14.4	Not Listed
13	Kundumani	<i>Abrus precatorius</i>	Fabaceae	7	6	15	0.5	40.0	1.2	6.3	6.2	12.4	Not Listed
14	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	9	8	15	0.6	53.3	1.1	8.0	8.2	16.3	Not Listed

15	Neermulli	<i>Hydrophila auriculata</i>	Acanthaceae	7	6	15	0.5	40.0	1.2	6.3	6.2	12.4	Not Listed
Herbs, Climber, Creeper & Grasses													
1	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	7	6	25	0.3	24.0	1.2	3.7	3.7	7.4	Not Listed
2	Veetukaayapoondur	<i>Tridax procumbens</i>	Asteraceae	6	5	25	0.2	20.0	1.2	3.2	3.1	6.3	Not Listed
3	Mukkirattai	<i>Boerhaavia diffusa</i>	Nyctaginaceae	5	4	25	0.2	16.0	1.3	2.7	2.5	5.1	Not Listed
4	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	9	8	25	0.4	32.0	1.1	4.8	4.9	9.7	Not Listed
5	Karisilanganni	<i>Eclipta prostrata</i>	Asteraceae	8	7	25	0.3	28.0	1.1	4.3	4.3	8.5	Not Listed
6	Korai	<i>Cyperus rotundus</i>	Cyperaceae	6	5	25	0.2	20.0	1.2	3.2	3.1	6.3	Not Listed
7	Thumbai	<i>Leucas aspera</i>	Lamiaceae	7	6	25	0.3	24.0	1.2	3.7	3.7	7.4	Not Listed
8	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	8	7	25	0.3	28.0	1.1	4.3	4.3	8.5	Not Listed
9	Partiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	6	5	25	0.2	20.0	1.2	3.2	3.1	6.3	Not Listed
10	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	10	9	25	0.4	36.0	1.1	5.3	5.5	10.8	Not Listed
11	Arugampul	<i>Cynodon dactylon</i>	Poaceae	11	10	25	0.4	40.0	1.1	5.9	6.1	12.0	Not Listed
12	Thoiya keerai	<i>Digeria muricata</i>	Amaranthaceae	6	5	25	0.2	20.0	1.2	3.2	3.1	6.3	Not Listed
13	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	7	6	25	0.3	24.0	1.2	3.7	3.7	7.4	Not Listed
14	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	9	8	25	0.4	32.0	1.1	4.8	4.9	9.7	Not Listed
15	Mudakkotan	<i>Cardiospermum helicacabum</i>	Sapindaceae	7	6	25	0.3	24.0	1.2	3.7	3.7	7.4	Not Listed
16	Karkakartum	<i>Clitoria ternatea</i>	Fabaceae	8	7	25	0.3	28.0	1.1	4.3	4.3	8.5	Not Listed
17	Kovakkai	<i>Trichosanthes dioica</i>	Cucurbitaceae	9	8	25	0.4	32.0	1.1	4.8	4.9	9.7	Not Listed
18	Sangupoo	<i>Clitoria ternatea</i>	Fabaceae	8	7	25	0.3	28.0	1.1	4.3	4.3	8.5	Not Listed
19	Siru puladi	<i>Desmodium triflorum</i>	Fabaceae	6	5	25	0.2	20.0	1.2	3.2	3.1	6.3	Not Listed
20	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	9	8	25	0.4	32.0	1.1	4.8	4.9	9.7	Not Listed
21	Thumattikai	<i>Cucumis callosus</i>	Cucurbitaceae	7	6	25	0.3	24.0	1.2	3.7	3.7	7.4	Not Listed
22	Mookuthi poondur	<i>Wedelia trilobata</i>	Asteraceae	8	7	25	0.3	28.0	1.1	4.3	4.3	8.5	Not Listed
23	Kattu kanchippul	<i>Apluda mutica</i>	Poaceae	6	5	25	0.2	20.0	1.2	3.2	3.1	6.3	Not Listed
24	Musthakasu	<i>Kyllinga brevifolia</i>	Cyperaceae	8	7	25	0.3	28.0	1.1	4.3	4.3	8.5	Not Listed
25	Nagathali	<i>Opuntia dillenii</i>	Cactaceae	7	6	25	0.3	24.0	1.2	3.7	3.7	7.4	Not Listed

Table 3.25 Calculation of Species Diversity in Buffer Zone

S.No.	Common Name	Scientific Name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Vembu	<i>Azadirachta indica</i>	4	0.03	-3.56	-0.10
2	Thekku	<i>Tectona grandis</i>	3	0.02	-3.84	-0.08
3	Pongam oiltree	<i>Pongamia pinnata</i>	4	0.03	-3.56	-0.10
4	Thennai maram	<i>Cocos nucifera</i>	5	0.04	-3.33	-0.12
5	Manga	<i>Mangifera indica</i>	4	0.03	-3.56	-0.10
6	Puliyamaram	<i>Tamarindus indica</i>	3	0.02	-3.84	-0.08
7	Vadanarayani	<i>Delonix elata</i>	4	0.03	-3.56	-0.10
8	Thenpazham	<i>Muntingia calabura</i>	5	0.04	-3.33	-0.12
9	Punnai	<i>Calophyllu inophyllum</i>	3	0.02	-3.84	-0.08
10	Ilanthai	<i>Ziziphus jujubha</i>	4	0.03	-3.56	-0.10
11	Karuvelam	<i>Acacia nilotica</i>	5	0.04	-3.33	-0.12
12	Nettilinkam	<i>Polyalthia longifolia</i>	4	0.03	-3.56	-0.10
13	Arai nelli	<i>Phyllanthus acidus</i>	3	0.02	-3.84	-0.08
14	Panai maram	<i>Borassus flabellifer</i>	4	0.03	-3.56	-0.10
15	Sapota	<i>Manilkara zapota</i>	5	0.04	-3.33	-0.12
16	Navalmaram	<i>Sygygium cumini</i>	4	0.03	-3.56	-0.10
17	Alamaram	<i>Ficus benghalensis</i>	3	0.02	-3.84	-0.08
18	Vazhaimaram	<i>Musa</i>	5	0.04	-3.33	-0.12
19	Karuvelam maram	<i>Vachellia nilotica</i>	4	0.03	-3.56	-0.10
20	Nelli	<i>Emblica officinalis</i>	3	0.02	-3.84	-0.08
21	Eucalyptus	<i>Eucalyptus globules</i>	5	0.04	-3.33	-0.12
22	Maramalli	<i>Millingtonia hortensis</i>	4	0.03	-3.56	-0.10
23	Kuduka puli	<i>Pithecellobium dulce</i>	5	0.04	-3.33	-0.12
24	Karungali	<i>Acacia sundra</i>	4	0.03	-3.56	-0.10
25	Nochi	<i>Vitex negundo</i>	3	0.02	-3.84	-0.08
26	Karimurungai	<i>Moringa olefera</i>	5	0.04	-3.33	-0.12
27	Pappali maram	<i>Carica papaya L</i>	4	0.03	-3.56	-0.10
28	Poovarasu	<i>Thespesia populnea</i>	3	0.02	-3.84	-0.08
29	Arasanmaram	<i>Ficus religiosa</i>	4	0.03	-3.56	-0.10
30	Vilvam	<i>Aegle marmelos</i>	3	0.02	-3.84	-0.08
31	Nuna maram	<i>Morinda citrifolia</i>	4	0.03	-3.56	-0.10
32	Nettilingam	<i>Polyalthia longifolia</i>	5	0.04	-3.33	-0.12
33	Koyya	<i>Psidium guajava</i>	4	0.03	-3.56	-0.10
34	Seethapazham	<i>Annona reticulata</i>	5	0.04	-3.33	-0.12
35	Savukku	<i>Casuarina L.</i>	3	0.02	-3.84	-0.08
H (Shannon Diversity Index) =3.54						
Shrubs						
1	Avarai	<i>Senna auriculata</i>	8	0.07	-2.64	-0.19
2	Sundaika	<i>Solanum torvum</i>	9	0.08	-2.52	-0.20

3	Puramuttai	<i>Chrozophora rottleri</i>	6	0.05	-2.93	-0.16
4	Arali	<i>Nerium indicum</i>	9	0.08	-2.52	-0.20
5	Seemaigaththi	<i>Cassia alata</i>	7	0.06	-2.77	-0.17
6	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	8	0.07	-2.64	-0.19
7	Kattamanakku	<i>Jatropha curcas</i>	6	0.05	-2.93	-0.16
8	Chaturakalli	<i>Euphorbia antiquorum</i>	7	0.06	-2.77	-0.17
9	Idlipoo	<i>xoracoc cineia</i>	8	0.07	-2.64	-0.19
10	Thuthi	<i>Abutilon indicum</i>	7	0.06	-2.77	-0.17
11	Nithyakalyani	<i>Cathranthus roseus</i>	6	0.05	-2.93	-0.16
12	Uumaththai	<i>Datura metel</i>	8	0.07	-2.64	-0.19
13	Kundumani	<i>Abrus precatorius</i>	7	0.06	-2.77	-0.17
14	Erukku	<i>Calotropis gigantea</i>	9	0.08	-2.52	-0.20
15	Neermulli	<i>Hydrophila auriculata</i>	7	0.06	-2.77	-0.17
H (Shannon Diversity Index) =2.70						
Herbs, Climber, Creeper & Grasses						
1	Nayuruv	<i>Achyranthes aspera</i>	7	0.04	-3.29	-0.12
2	Veetukaayapoondu	<i>Tridax procumbens</i>	6	0.03	-3.44	-0.11
3	Mukkirattai	<i>Boerhaavia diffusa</i>	5	0.03	-3.63	-0.10
4	Kuppaimeni	<i>Acalypha indica</i>	9	0.05	-3.04	-0.15
5	Karisilanganni	<i>Eclipta prostrata</i>	8	0.04	-3.16	-0.13
6	Korai	<i>Cyperus rotundus</i>	6	0.03	-3.44	-0.11
7	Thumbai	<i>Leucas aspera</i>	7	0.04	-3.29	-0.12
8	Nai kadugu	<i>Celome viscosa</i>	8	0.04	-3.16	-0.13
9	Parttiniyam	<i>Parthenium hysterophorus</i>	6	0.03	-3.44	-0.11
10	Thulasi	<i>Ocimum tenuiflorum</i>	10	0.05	-2.93	-0.16
11	Arugampul	<i>Cynodon dactylon</i>	11	0.06	-2.84	-0.17
12	Thoiya keerai	<i>Digeria muricata</i>	6	0.03	-3.44	-0.11
13	Kovai	<i>Coccinia grandis</i>	7	0.04	-3.29	-0.12
14	Perandai	<i>Cissus quadrangularis</i>	9	0.05	-3.04	-0.15
15	Mudakkotan	<i>Cardiospermum helicacabum</i>	7	0.04	-3.29	-0.12
16	Karkakartum	<i>Clitoria ternatea</i>	8	0.04	-3.16	-0.13
17	Kovakkai	<i>Trichosanthes dioica</i>	9	0.05	-3.04	-0.15
18	Sangupoo	<i>Clitoriaternatia</i>	8	0.04	-3.16	-0.13
19	Siru puladi	<i>Desmodium triflorum</i>	6	0.03	-3.44	-0.11
20	Sithrapaalavi	<i>Euphorbia prostrata</i>	9	0.05	-3.04	-0.15
21	Thumattikai	<i>Cucumis callosus</i>	7	0.04	-3.29	-0.12
22	mookuthi poondu	<i>Wedelia trilobata</i>	8	0.04	-3.16	-0.13
23	Kattu kanchippul	<i>Apluda mutica</i>	6	0.03	-3.44	-0.11
24	Musthakasu	<i>Kyllinga brevifolia</i>	8	0.04	-3.16	-0.13
25	Nagathali	<i>Opuntia dillenii</i>	7	0.04	-3.29	-0.12
H (Shannon Diversity Index) =3.20						

Table 3.26 Species Richness (Index) in Buffer Zone

Details	H	H max	Evenness	Species Richness
Trees	3.54	3.56	0.99	6.88
Shrubs	2.70	2.71	1.00	2.97
Herbs	3.20	3.22	0.99	4.58

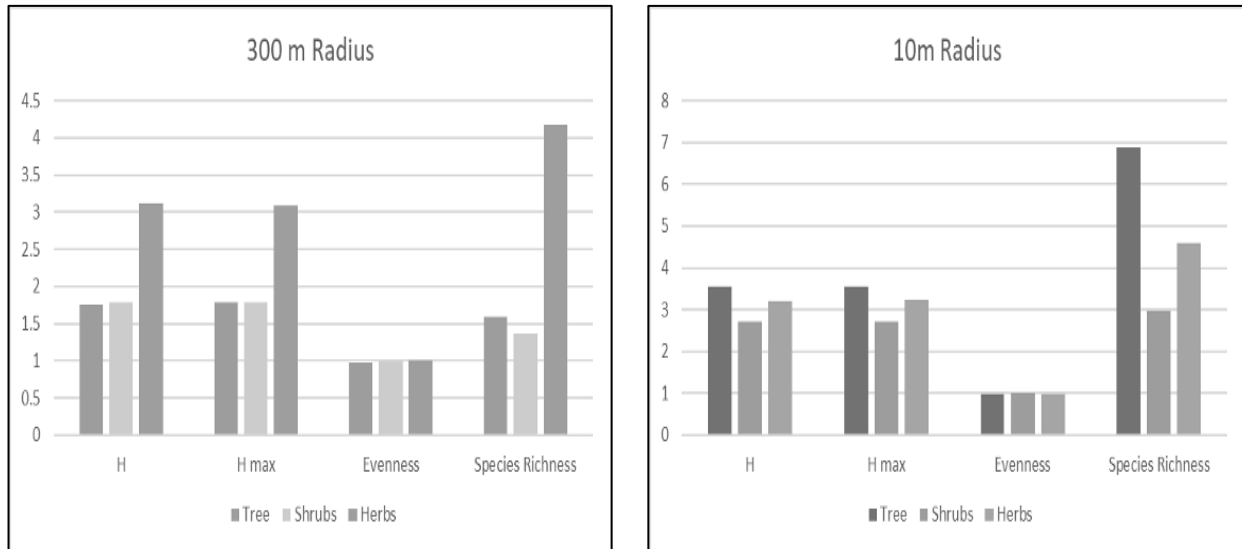


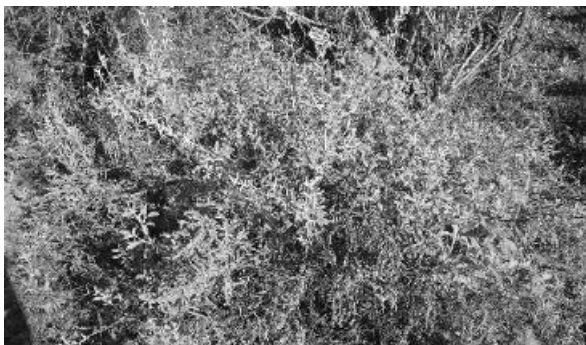
Figure 3.27 Floral Species Diversity and Richness (Index) in 300 m Radius Buffer Zone



Albizia amara



Aerva lanata



Aerva javanica



Escontria chiotilla



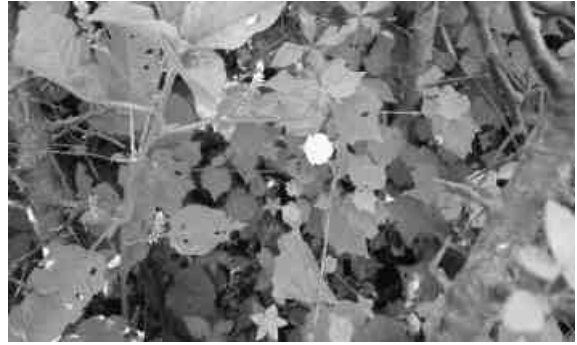
Datura metel



Leucas aspera



Calotropis gigantea



Sida cordata



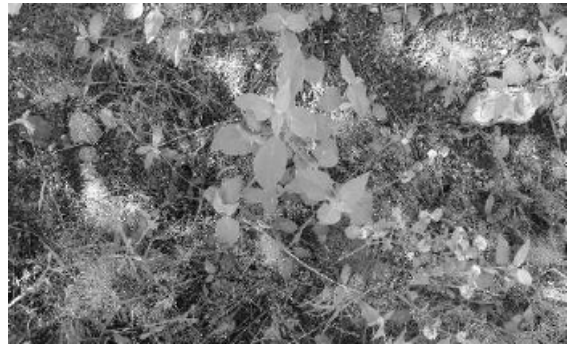
Iva annua



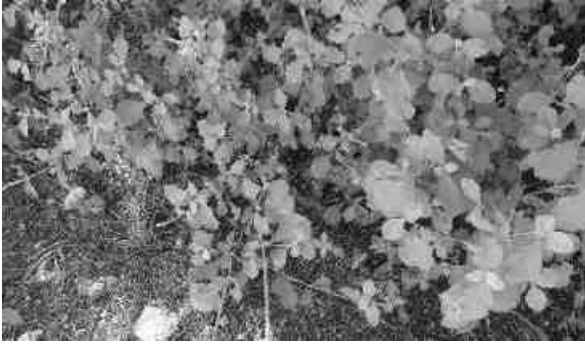
Cyanthillium cinereum



Tephrosia purpurea



Acalypha indica



Achyranthes aspera



Prosopis juliflora



Pergularia daemia



Plantago coronopus



Cenchrus polystachios



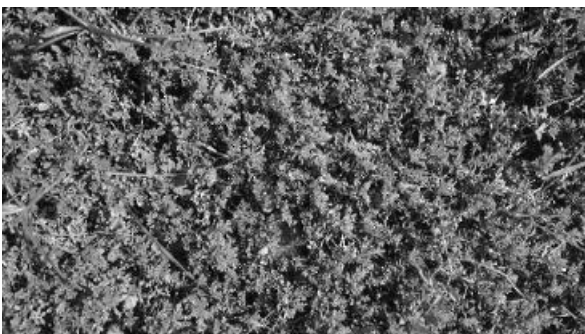
Vachellia leucophloea



Azadirachta indica



Flueggea leucopyrus Willd



Indigofera linnaei Ali



Pedalium murex



Opuntia ficus-indica



Wrightia tinctoria



Cynanchum viminalis



Cissus rotundifolia



Borassus flabellifer



Casuarina



Zizyphus Oenoplia



Eucalyptus obliqua



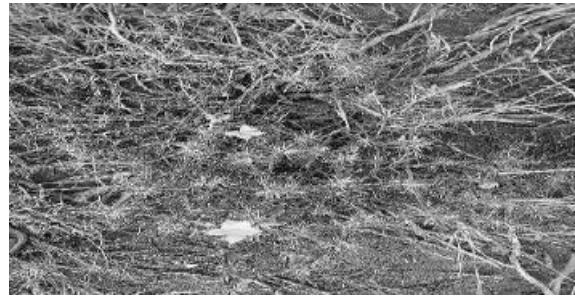
Ailanthus excelsa



Aloe vera



Croton bonplandianus



Barleria prionitis

Figure 3.28 Photographs Showing Flora in Core and buffer Area

Aquatic Vegetation

The field survey for assessing the aquatic vegetation was also undertaken during the study period. The list of aquatic plants observed in the study area is given in Table 3.27

Table 3.27 Aquatic Vegetation

S.No.	Scientific name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1	<i>Eichornia crassipe</i>	Water hyacinth	Agayatamarai	NA
2	<i>Aponogeton natans</i>	Floating lace plant	Kottikizhnagu	NA
3	<i>Carex cruciata</i>	Cross Grass	Koraipullu	NA
4	<i>Cynodon dactylon</i>	Scutch grass	Arugampul	LC

*LC- Least Concern, NA-Not yet assessed

Forest Vegetation

There are no biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thathampalayam R.F. located on 7.79 km South-eastern side of the lease area. There are few plants and no endangered species in Thampalayam reserve forest. the *Azadirachta indica*, *Vachellia leucophloea*, *albizia amara* these three types of plants are abundant in thampalayam reserve forest. the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive.

Endangered and endemic species as per the IUCN Red List

There are no rare, endangered and endemic species found in the study area. There are no biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), ecologically sensitive zone.

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.

Survey Methodology

The assessment of fauna was done on the basis of primary data collected from the lease area. The presence was also confirmed from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area. In addition, officials, local people were another source of information for studying the fauna of the area. Field activities are physical/active search, covering rocks, burrows, hollow inspection and location of nesting sites and habitat assessment etc. Taxonomical identification was done by the field guide book and wildlife ENVIS data base ([wiienvis.nic.in/Database/Schedule Species Database](http://wiienvis.nic.in/Database/Schedule%20Species%20Database)) and Zoological Survey of India (ZSI). Detailed fauna is mentioned in the Table 3.28 and 3.29.

Survey and Monitoring of Mammals

Intensive survey has been done by line transect methods (Walking and in vehicle) for all major habitats for surveying of mammals by direct and indirect evidence. Indirect methods such as faecal matter (i.e., scat) and pug mark by establishing 10 × 100 m linear transects depending on the habitat (i.e., existing wildlife game routes/forest trails used). Direct observation technique has been used for surveying large and medium sized mammals. But this technique is perfectly suitable for surveying of diurnal mammals; however, good photographs were also taken for species identification.

Survey and Monitoring of Birds

Birds are sampled by using point count methods, and opportunistic bird sightings. By the bird vocal sounds and photographs, the species were identified in consultation with village local people. Point count: in these methods, the observer will stand in a randomly chosen point and birds seen or heard in 50 m radius are recorded for 5 min. This observation is repeated in another point at least 30m from the first point. We have enumerated 20-point counts in each quartile, which constitute a total of 80-point counts (20 x 4) within 10 km radius area. Opportunistic bird sightings: while traveling in study area, many bird species will be detected in survey time. Such species are recoded by their appearance or by their call.

Survey and monitoring of reptiles

Several survey techniques such as standard walk transect visual encounter survey methods were used to sampling reptiles in each and every habitat of the study area. While doing this survey, photographs were taken for identification of species. Species identification was done by using standard field guides in consultation with village people expert. The butterfly was enumerated by 2 linear transects of 10 × 100 m were laid within each quartile at minimum interval of 1 km. Further, amphibians and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts.

Fauna in Core Zone

A total of 21 varieties of species observed in the Core zone Among them numbers of Insects 8 (41%), Reptiles 3 (14%), Mammals 1 (4%) and Avian 9 (41%). A total of 21 species belonging to 15 families have been recorded from the core zone. Number of species decreases towards the mining area this might be due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and eight species are under schedule IV according to Indian wild life Act 1972. Eight bird species were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna in core zone with the scientific name were mentioned in Table 3.28.

Table 3.28 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	<i>Danaus genutia</i>	NL	NL
2	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
3	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
4	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
5	Stick insect	Lonchodidae	<i>carausius morosus</i>	NL	LC
6	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
7	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
8	Acraea violae	Nymphalidae	<i>Acraea violae</i>	NL	LC
Reptiles					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
2	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
3	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
Mammals					
1	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	NL
Aves					
1	green bee-eater	Meropidae	<i>Meropsorientalis</i>	NL	LC
2	Koel	Cucalidae	<i>Eudynamys</i>	Schedule IV	LC
3	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
4	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
5	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
6	Koel	Cucalidae	<i>Eudynamys scolopaceus</i>	Schedule IV	LC
7	Crow Pheasant	Cucalidae	<i>Centropus sinensis</i>	Schedule IV	LC
8	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
9	Grey drongo	Dicruridae	<i>Dicrurus leucophaeus</i>	Schedule IV	LC

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

Fauna in Buffer Zone

A total of 47 species belonging to 34 families were recorded in the buffer zone. Based on habitat classification the majority of species were Birds 18 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), 4 Mammals (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 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 3.29.

Table 3.29 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	<i>Tirumala limniace</i>	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
3	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
4	Indian honey bee	Apidae	<i>Apis cerana</i>	Schedule IV	LC
5	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
6	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
7	Lime butterfly	Papilionidae	<i>Papilio demoleus</i>	Schedule IV	LC
8	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
9	Dragonfly	Gomphidae	<i>Ceratogomphus pictus</i>	Schedule IV	LC
10	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
11	Common Indian crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
12	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
13	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
14	Lesser grass blue	Lycaenidae	<i>Zizina Otis indica</i>	Schedule IV	LC
15	Jewel beetle	Buprestidae	<i>Eurythyrea austriaca</i>	Schedule IV	NA
Reptiles					
16	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
17	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
18	Indian chameleon	Chamaeleonidae	<i>Chamaeleo zeylanicus</i>	Sch II (Part I)	LC
19	Olive keelback water snake	Natricidae	<i>Aretium schistosum</i>	Sch II (Part II)	LC
20	Brahminy skink	Scincidae	<i>Eutropis carinata</i>	NL	LC
21	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC

22	Common skink	Scincidae	<i>Mabuya carinatus</i>	NL	LC
Mammals					
23	Indian palm squirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
24	Indian hare	Leporidae	<i>Lepus nigricollis</i>	Schedule IV	LC
25	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
26	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule (Part II)	LC
Aves					
27	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
28	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
29	Asian green bee-eater	Meropidae	<i>Meropsorientalis</i>	NL	LC
30	Red-breasted parakeet	Psittaculidae	<i>Psittacula alexandri</i>	NL	LC
31	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC
32	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
33	Shikra	Accipitridae	<i>Accipiter badius</i>	NL	LC
34	Koel	Cucalidae	<i>Eudynamys</i>	Schedule IV	LC
35	Common Quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
36	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotuscafer</i>	Schedule IV	LC
37	Brahminy starling	Sturnidae	<i>Sturnia pagodarum</i>	Schedule IV	LC
38	Indian golden oriole	Oriolidae	<i>Oriolus kundoo</i>	Schedule IV	LC
39	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameria</i>	NL	LC
40	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
41	White-breasted waterhen	Rallidae	<i>Amaurornis phoenicurus</i>	NL	LC
42	Two-tailed Sparrow	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
43	Grey Francolin	Phasianidae	<i>Francolinus pondicerianus</i>	Schedule IV	LC
44	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
Amphibians					
45	Indian Burrowing frog	Dicroglossidae	<i>Sphaerotheca breviceps</i>	Schedule IV	LC
46	Green Pond Frog	Ranidae	<i>Rana hexadactyla</i>	Schedule IV	LC
47	Tiger Frog	Chordata	<i>Hoplobatrachus tigerinus (Rana tigerina)</i>	Schedule IV	LC

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

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 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 features like temples, historical monuments etc., at the baseline level. 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 objectives of the socio-economic study are as follows:

- ❖ To study the socio-economic status of the people living in the study area of the proposed mining project
- ❖ To assess the impact of the project on quality of life of the people in the study area
- ❖ To recommend community development measures to be taken up in the study area

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 District Profile

Karur District consists of two Revenue Divisions viz., Karur and Kulithalai, Seven Taluks viz., Karur, Aravakurichi, Manmangalam, Pugalur, Kulithalai, Krishnarayapuram and Kadavur, comprising of 203 Revenue Villages. The District has eight blocks viz. Karur, Thanthoni,

Aravakurichi, K.Paramathi, Kulithalai, Krishnarayapuram, Kadavur, and Thogamalai comprising of 157 Village Panchayats. There are two municipalities viz. Karur & Kulithalai and eleven Town Panchayats viz. Aravakurichi, Krishnarayapuram, Marudur, Nangavaram, Palaya Jeyamkonda Cholapuram, Pallappatty, Puliur, Punjai Thottakurichi, Punjai Pugalur, TNPL Pugalur, Uppidamangalam.

3.6.4 Socio-Economic Status of Study Area

Kuppam is a large village located in Aravakurichi Taluk of Karur district, Tamil Nadu with total 1120 families residing. The Kuppam village has population of 3503 of which 1697 are males while 1806 are females as per Population Census 2011. In Kuppam village population of children with age 0-6 is 264 which makes up 7.54 % of total population of village. Average Sex Ratio of Kuppam village is 1064 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Kuppam as per census is 1079, higher than Tamil Nadu average of 943. Kuppam Village with Census of India Village-code 635497 is located in Aravakurichi Taluk of Karur district in Tamil Nadu, India.

Table 3.30 Kuppam village Population Facts

Kuppam Village	
Number of Households	1,120
Population	3,503
Male Population	1,697
Female Population	1,806
Children Population	264
Sex-ratio	1064
Literacy	60.11%
Male Literacy	72.80%
Female Literacy	48.17%
Scheduled Tribes (ST) %	0
Scheduled Caste (SC) %	17.13%

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

Table 3.31 Demographics Population of Kuppam village

Kuppam Village		
Total Population	Male Population	Female Population
3503	1697	1806

Source: <https://villageinfo.in/tamil-nadu/karur/aravakurichi/kuppam.html>

Sex Ratio According to Census 2011

Average Sex Ratio of Kuppam village is 1064 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Kuppam as per census is 1079 higher than Tamil Nadu average of 943.

3.6.4.1 Literacy of Kuppam Village

Kuppam village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Kuppam village was 60.11 % compared to 80.09 % of Tamil Nadu. In Kuppam Male literacy stands at 72.80 % while female literacy rate was 48.17 %.

3.6.4.2 Worker's Profile of Kuppam Village

In Kuppam village out of total population, 2246 were engaged in work activities. 86.42 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 13.58 % were involved in Marginal activity providing livelihood for less than 6 months. Of 2246 workers engaged in Main Work, 822 were cultivators (owner or co-owner) while 529 were Agricultural labourers.

Table 3.32 Kuppam Village Working Population

Kuppam Village	Total	Male	Female
Total Workers	2246	1198	1048
Main Workers	1941	1049	892
Main Workers Cultivators	822	452	370
Agriculture Laborer	529	227	302
Household Workers	18	6	12
Other Workers	35	18	17
Marginal Workers	305	149	156
Non-Working Persons	1257	499	758

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

Table 3.33 Population and Literacy Data of Study Area

S.No.	Village Name	No of House Holds	Total Population	Male	Female	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate
1	Athipalayam	730	2062	1014	1048	1271	757	514	791	257	534
2	K.Paramathi	1093	3488	1709	1779	2554	1380	1174	934	329	605
3	Karudayampalayam	577	2347	1211	1136	1614	977	637	733	234	499
4	Kuppam	1120	3503	1697	1806	1947	1143	804	1556	554	1002
5	Munnur	826	2582	1289	1293	1649	980	669	933	309	624
6	Nedungur	403	1190	586	604	800	469	331	390	117	273
7	Pavithiram	1799	5881	2862	3019	3738	2165	1573	2143	697	1446
8	Punnam	1452	5446	2839	2607	3679	2208	1471	1767	631	1136
9	Vettamangalam (East)	807	2657	1310	1347	1521	900	621	1136	410	726
10	Vettamangalam (west)	1827	5882	2887	2995	3953	2225	1728	1929	662	1267

Table 3.34 Workers Profile of Study Area

S.No.	Village Name	Total Workers Population	Male Workers	Female Workers	Total Main Workers	Main Workers Male	Main Workers Female	Main Cultivation Workers	Main Agriculture Workers	Main Other Workers	Non-Worker Population
1	Athipalayam	1372	713	659	1309	701	608	442	551	281	690
2	K.Paramathi	1782	1118	664	1723	1108	615	315	448	938	1706
3	Karudayampalayam	1176	646	530	847	501	346	301	265	251	1171
4	Kuppam	2246	1198	1048	1941	1049	892	822	529	565	1257
5	Munnur	1577	882	695	1434	805	629	420	638	355	1005
6	Nedungur	753	432	321	734	418	316	409	241	81	437

7	Punnam	2718	1531	1187	2665	1504	1161	731	632	1269	2728
8	Vettamangalam (East)	1609	894	715	1593	886	707	419	940	210	1048
9	Vettamangalam (west)	3541	1966	1575	3455	1920	1535	1268	1410	729	2341
10	Pavithiram	3293	1875	1418	2879	1682	1197	747	829	1242	2588

Table 3.35 Communication & Transport Facilities in the Study Area

S.No.	Village Name	PO	SPO	PTO	T	PCO	MP	IC /CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Athipalayam	2	1	2	1	1	1	2	2	2	1	2	2	2	1	1	1	2	1
2	K.Paramathi	2	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
3	Karudayampalayam	2	1	2	1	1	1	2	2	1	1	2	1	2	2	1	1	2	1
4	Kuppam	2	1	2	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
5	Munnur	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
6	Nedungur	2	2	2	1	2	1	2	2	1	1	2	1	2	2	1	1	2	1
7	Pavithiram	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
8	Punnam	2	2	2	1	1	1	2	2	1	1	2	2	1	2	1	1	2	1
9	Vettamangalam (East)	2	2	2	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
10	Vettamangalam (west)	2	1	2	1	1	1	2	2	1	2	2	1	1	1	1	1	2	1

Source: www.censusindia.gov.in - Tamil Nādu Census of India – 2011

Abbreviations: PO - Post Office; MP - Mobile Phone Coverage; RS - Railway Station; GR - Gravel Roads; SPO - Sub Post Office; IC / CSC - Internet Cafe/Common Service Centre; NH - National Highways; NWR - Navigate waterways River; PTO - Post & Telegraph office; PCF - Private Courier Facility; SH - State Highways; FP - Foot path; T- Telephone (Landline); BS - Public Bus Service; MDR - Major District Road; PCO - Public call office / Mobile; PBS - Private Bus Service; BTR - Black Topped (Pucca Roads). Note: 1 - Available within the village 2 - Not available

Table 3.36 Water & Drainage Facilities in the Study Area

S.No.	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1	Athipalayam	1	2	1	2	1	2	2	2	1	1	1
2	K.Paramathi	1	1	1	1	1	2	2	2	1	1	2
3	Karudayampalayam	1	2	1	2	1	2	2	2	1	1	2
4	Kuppam	1	1	1	1	1	2	2	2	1	1	1
5	Munnur	1	1	1	2	1	2	2	2	1	1	1
6	Nedungur	1	2	1	1	1	2	2	2	1	1	1
7	Pavithiram	1	1	1	1	1	2	1	2	1	1	1
8	Punnam	1	1	1	1	1	1	1	1	1	1	1
9	Vettamangalam (East)	1	1	1	1	1	2	1	2	1	1	2
10	Vettamangalam (west)	1	1	1	1	1	2	1	2	1	1	1

Table 3.37 Other Facilities in the Study Area

S.No.	Village Name	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	APS	BDRO	PS
1	Athipalayam	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1
2	K.Paramathi	2	1	1	1	1	1	2	1	1	1	2	2	1	1	1	1
3	Karudayampalayam	1	2	1	2	1	1	2	2	1	1	1	1	2	1	1	1
4	Kuppam	2	2	1	2	1	1	2	2	1	1	1	1	2	1	1	1
5	Munnur	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1
6	Nedungur	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1
7	Pavithiram	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1
8	Punnam	2	2	2	1	1	1	2	2	1	1	1	1	2	1	1	1
9	Vettamangalam (East)	2	2	2	1	1	1	2	2	1	1	1	1	2	1	1	1
10	Vettamangalam (west)	2	1	2	1	1	1	2	2	1	1	1	1	1	1	1	1

Abbreviations: ATM - Automatic Teller Machine; PDS - Public Distribution System (Shop); CB - Commerical Bank; RM - Regular Market; COB - Co-operative Bank; AMS - Agricultural Market Society; ACS - Agricultural Credit Societies; NC - Nutritional Centres; SHG - Self Help Group; NC-AC - Nutritional Centres - Anganwadi Centre; DBRO - Birth & Death Registration Office; PS - Power Supply Note – 1 - Available within the village; 2 - Not available

3.6.5 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. Maternity facility should be made available at the place to avoid going to distant places for treatment which involves risks. 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.

3.6.6 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 Rough Stone is proposed to be transported mainly through a Village Road connecting Erode to Karur Road (SH) in NE and a state highway joining Vellakoil to Karur Road (NH) in SW of the lease area. The traffic survey was conducted in the Village Road, Erode to Karur Road (SH), and Vellakoil to Karur Road (NH), as shown in Figure 3.29. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction was employed for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. The results have been shown in Tables 3.38-3.41.

Table 3.38 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.1 km-S	Village Road
TS2	Erode to Karur Road (SH)	2.44 km-NE	Erode to Karur Road (SH84)
TS3	Vellakoil to Karur Road (NH)	6.76 km-SW	Vellakoil to Karur Road (NH67)

Source: On-site monitoring by GTMS FAE & TM

Table 3.39 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	35	105	38	38	68	34	177
TS2	114	342	45	45	101	51	438
TS3	181	543	55	55	117	59	657

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 3.40 Rough Stone Transportation Requirement

Transportation of Rough and Gravel per day for the first year		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	4	12

Source: Approved Mining Plan

Table 3.41 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
Village Road	177	12	189	1200
Erode to Karur Road (SH)	438	12	450	1200
Vellakoil to Karur Road (NH)	657	12	669	1500

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

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

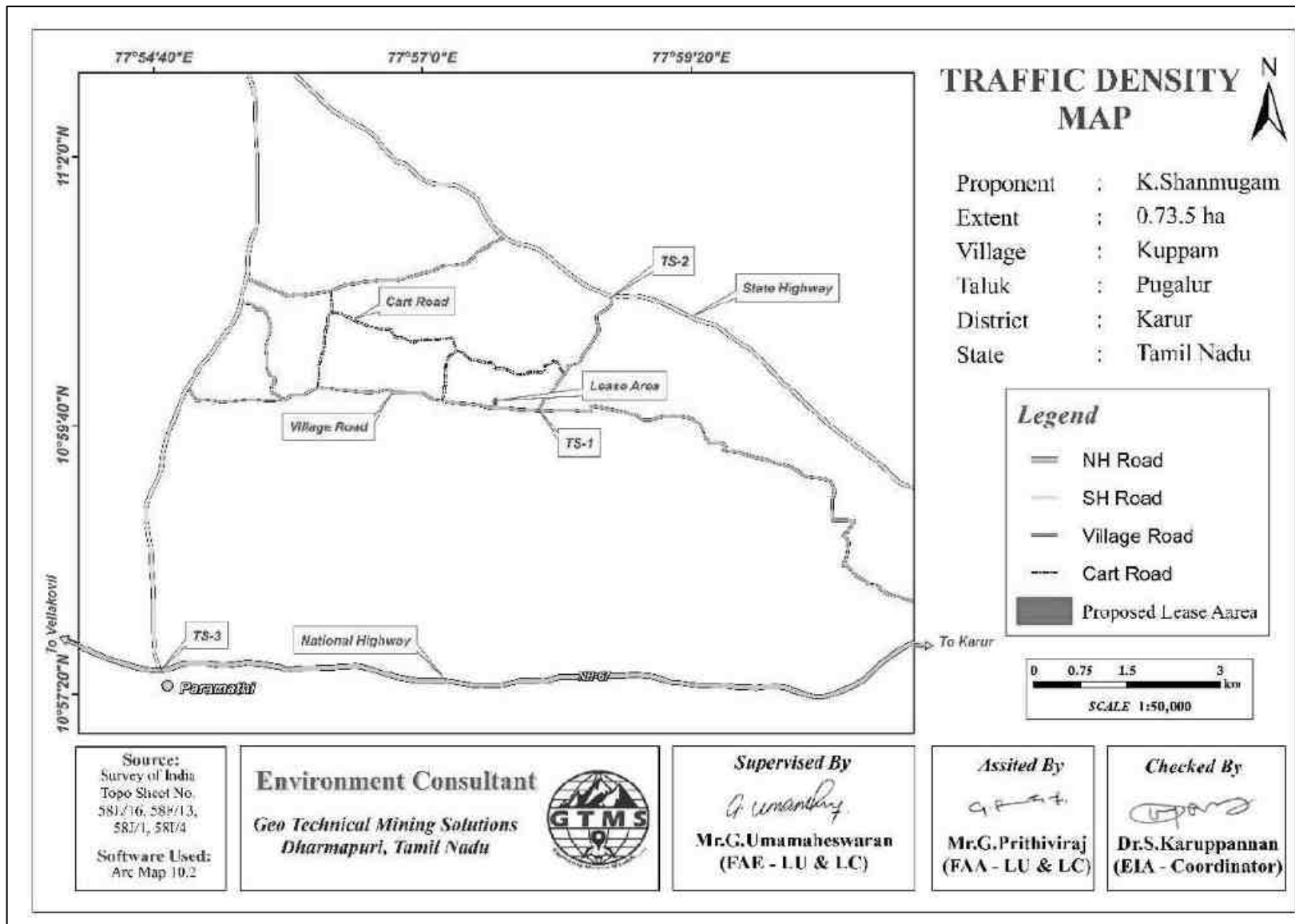


Figure 3.29 Traffic Density Map

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries, National Park and Archaeological monuments within the project area. No Protected and Reserved Forest area is located within the 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 3.42.

Table 3.42 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km	Direction
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius	--
2	Reserve Forest	Thathampalayam R.F.	7.79 km	SE
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Cauvery river	7.21 km	N
		Noyyal river	8.84 km	NW
		Amaravathi river	9.1 km	SE
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	TNPL Paper Mill	7.2 km NE	NE
10	Defence Installation	None	Nil within 10 km radius	--

Source: Survey of India Toposheet







Figure 3.30 Baseline Study Photographs

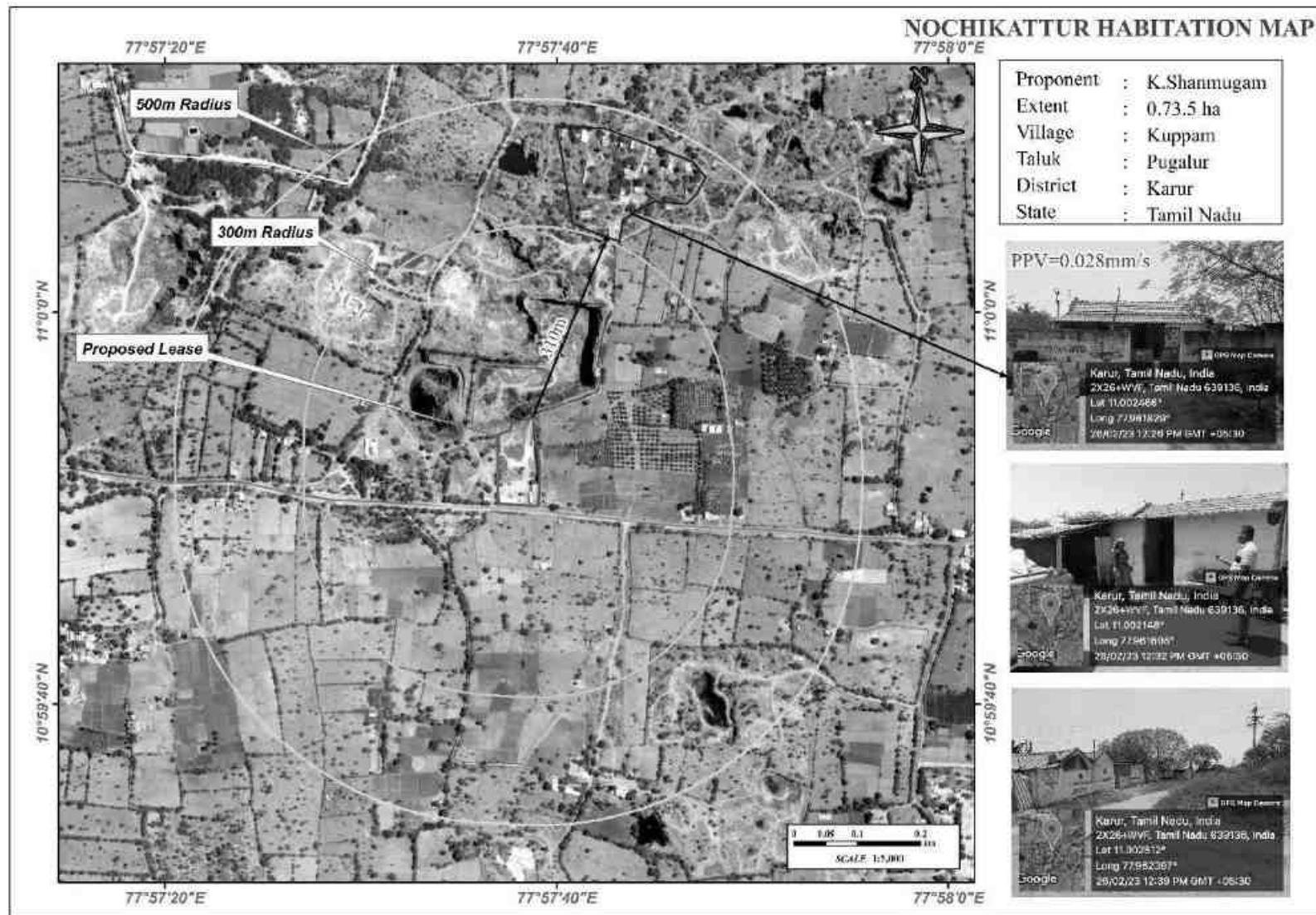


Figure 3.31 Nochikattur Habitation Map

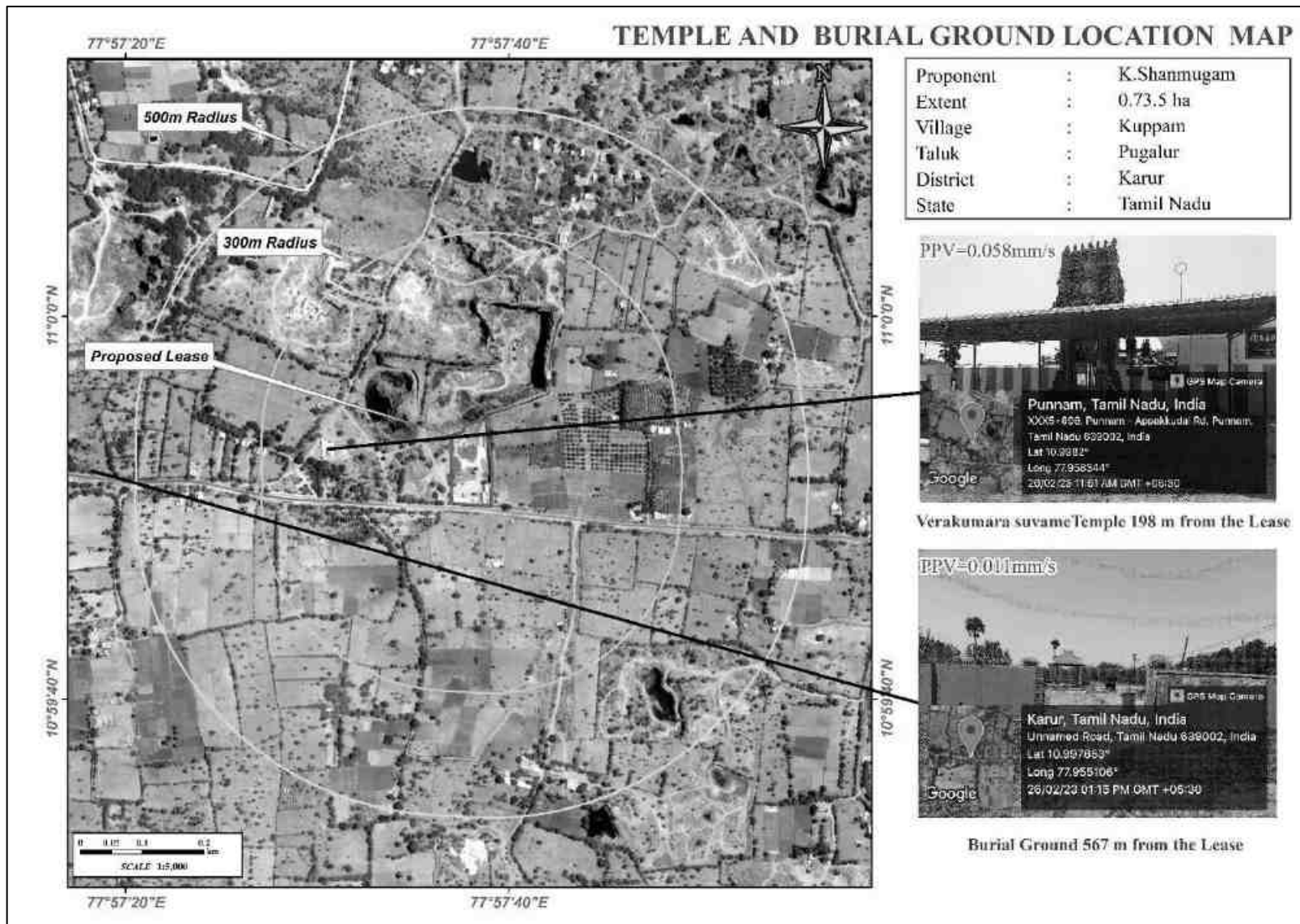


Figure 3.32 Temple and Burial Ground Location Map

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

Environmental impacts both direct and indirect on various environmental attributes due to proposed mining activity will be created in the surrounding environment, during the operational and post-operational phases. The occurrence of mineral deposits, being site specific, their exploitation, often, does not allow for any choice except adoption of eco-friendly operation. The methods are required to be selected in such a manner, so as to maintain environmental equilibrium ensuring sustainable development.

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.

Several scientific techniques and methodologies are available to predict impacts of physical environment. Mathematical models are the best tools to quantitatively describe the cause-and-effect relationships between sources of pollution and different components of environment. In cases where it is not possible to identify and validate a model for a particular situation, predictions have been arrived at based on logical reasoning / consultation / extrapolation.

The following parameters are of significance in the Environmental Impact Assessment and are being discussed in detail:

- ❖ Land environment
- ❖ Soil environment
- ❖ Water Environment
- ❖ Air Environment
- ❖ Noise Environment
- ❖ Socio economic environment
- ❖ Biological Environment

Based on the baseline environmental status at the project site, the environmental factors that are likely to be affected are identified, quantified and assessed.

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

- ❖ Permanent impact on mineral resources due to removal of 22500 m³ of rough stone.
- ❖ Permanent or temporary change on land use and land cover.
- ❖ Change in topography of the mine lease area will change at the end of the life of the mine.

- ❖ Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- ❖ Degradation of the aesthetic environment of the core zone due to quarrying
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- ❖ Siltation of water course due to wash off from the exposed working area

4.1.2 Common Mitigation Measures from Proposed Project

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

This project does not result in any impact on the soil of the project site, as topsoil is neither removed from the project site nor preserved in the safety margin area. However, some of the common mitigation measures have been discussed in the following sections to protect the immediate soil environment surrounding the lease area.

Soil Erosion

- ❖ Soil erosion is very low inside the lease area, whereas low to moderate soil erosion occurs along the northern boundary of the lease area.

4.2.2 Common Mitigation Measures from proposed project

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

4.3 WATER ENVIRONMENT

4.3.1 Anticipated Impact

- ❖ As the water required for the mining operations, as given in Table 2.10 is obtained from the approved water supplying agency, the project does not develop any abstraction structures in the lease area. Therefore, no impact responsible for the water table declination is anticipated.
- ❖ Surface and ground water resources may be contaminated due to mine pit water discharge, domestic sewage, waste water from vehicle washing, washouts from surface exposure or working areas, discharge of oil & grease, and suspended solids due to waste from washing of machineries. To address this impact, some of the important mitigation measures is provided as below.

4.3.2 Common Mitigation Measures for the Proposed Project

- ❖ Garland drainage system and settling tank will be constructed along the proposed mining lease area. 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
- ❖ Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system
- ❖ Benches will be provided with inner slopes and through a system of drains and channels, rain water will be allowed to descent into surrounding drains to minimize the effects of erosion and water logging arising out of uncontrolled descent of water

- ❖ The water collected will be reused during storm for dust suppression and greenbelt development within the mines
- ❖ Interceptor traps/oil separators will be installed to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- ❖ Flocculating or coagulating agents will be used to assist in the settling of suspended solids during monsoon seasons
- ❖ Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted.
- ❖ Domestic sewage from site office and urinals/latrines provided in ML is discharged in septic tank followed by soak pits
- ❖ Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- ❖ De-silting will be carried out before and immediately after the monsoon season
- ❖ Regular monitoring (once every 6 months) and analysing the quality of water in open well, bore wells and surface water

4.4 AIR ENVIRONMENT

4.4.1 Anticipated Impact from proposed project

- ❖ Emission of air pollutants such as particular matter (PM), gases such as sulphur dioxide, oxides of nitrogen at various stages of activities such as excavation, drilling, blasting and transportation of materials. The rate of emission and the incremental concentration of pollutants is estimated in the following sections before providing mitigation measures.

4.4.1.1 Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chauhya et al.,2001. The equations used for SPM, SO₂, and NO_x emission estimation have been given in Table 4.1.

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	$E = [u^{0.4} a^{0.2} \{9.7 + 0.01p + b / (4 + 0.3b)\}]$	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	$E = a \cdot 0.14 \left\{ \frac{u}{1.83 + 0.93u} \right\} \left[\frac{p}{0.48 + 0.57p} + \frac{b}{14.37 + 1.15b} \right]$	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	$E = a \cdot 0.25 \left\{ \frac{u}{4.3 + 32.5u} \right\} \left[1.5p + \frac{b}{0.06 + 0.08b} \right]$	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm ³ /yr); a = Lease area(km ²); E = Emission rate(g/s).

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. As the SPM emission calculation for overall mine is not considering pollution control measures, one-third of the SPM value is taken for derivation of PM₁₀ keeping in mind that proper control measures are followed. It is important to note that PM₁₀ emission rate is derived from the SPM estimation in the background that PM₁₀ constitutes 52% of SPM emission. The PM₁₀, SO₂ and NO_x emission results have been given in Table 4.2.

Table 4.2 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m ²	Calculated Value (g/s/m ²)
Overall Mine	PM _{2.5}	0.00983553	7350	1.33817E-06
Overall Mine	PM ₁₀	0.00497766	7350	6.77233E-07
Overall Mine	SO ₂	0.00652123	7350	8.87242E-07
Overall Mine	NO _x	0.00702123	7350	9.55269E-07

4.4.1.2 Frame work of Computation and Model Details

By using the above-mentioned inputs, Ground Level Concentrations (GLC) due to the quarrying activities have been estimated to know the incremental concentration in ambient air quality and impact in the study area. The model was used to predict the impact on the ambient air environment at each receptor at various localities within 5 km radius around the project site and the maximum incremental GLC at the project site. All the prediction models in Figures 4.1- 4.4 shows the maximum concentrations of PM_{2.5}, PM₁₀, SO₂ and NO_x, close to the proposed project site due to low to moderate wind speeds.

4.4.1.3 Modelling of Incremental Concentration

The air borne particulate matter such as PM_{2.5} and PM₁₀ generated by quarrying operation, transportation, and wind erosion of the exposed areas and emissions of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) due to excavation and loading equipment and vehicles plying on haul roads are the significant air pollutants arising from mining operation, leading to an adverse impact on the ambient air environment in and around the project area. Anticipated incremental concentration and net increase in emissions due to quarrying activities is predicted by 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.

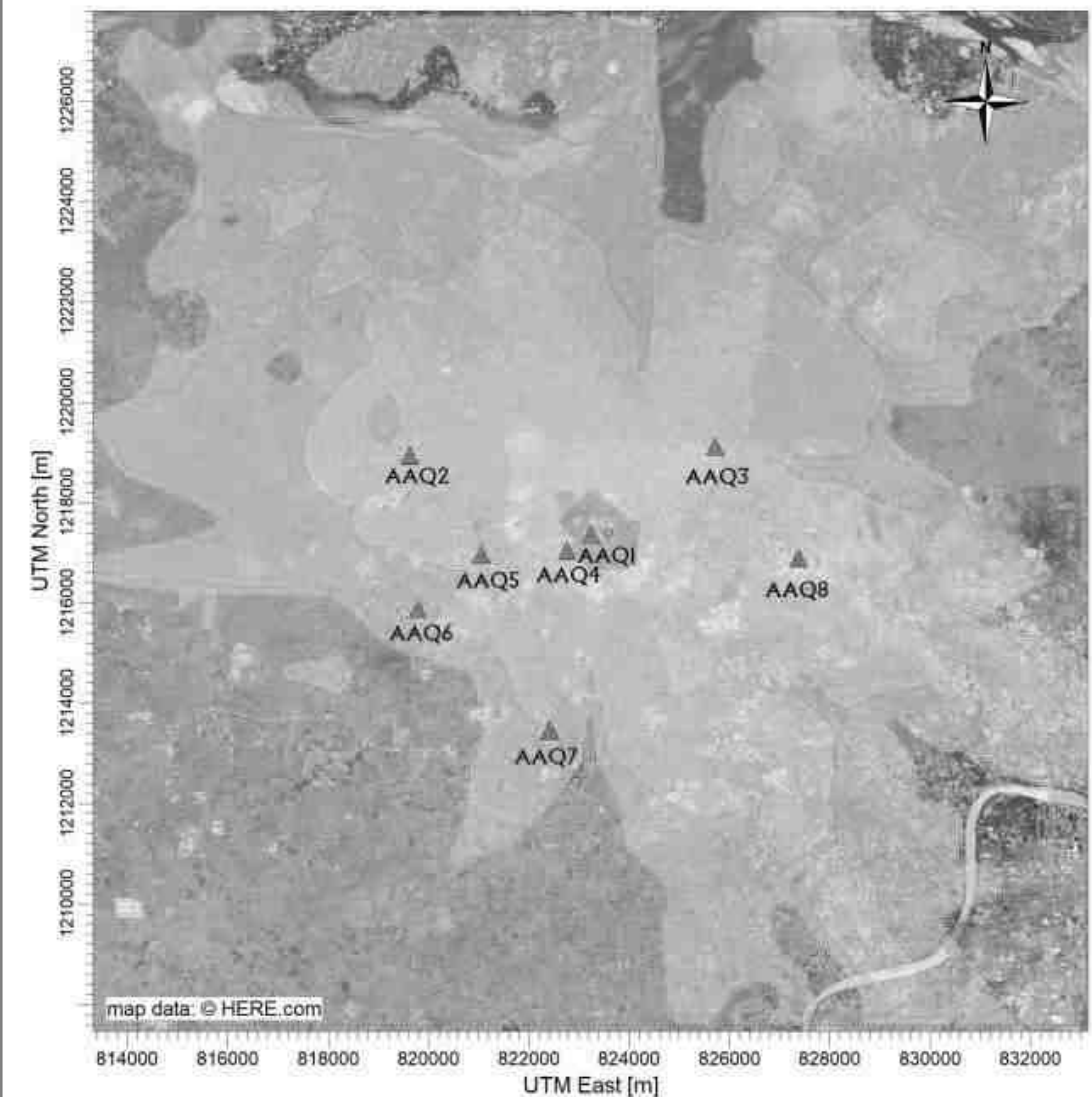
4.4.1.4 Model Results

The post project resultant concentrations of PM₁₀, PM_{2.5}, SO₂& NO_x (GLC) is given in Tables 4.3 - 4.6 and in Figures 4.1-4.4.

Table 4.3 Incremental & Resultant GLC of PM_{2.5}

Station ID	Distance to core area (km)	Direction	PM _{2.5} concentrations (µg/m ³)			Comparison against air quality standard (60 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.29	W	23.95	3.83	27.78	Below standard	15.99	Not significant
AAQ2	4.20	NW	20.02	0.5	20.52		2.50	
AAQ3	2.73	NE	25.25	1	26.25		3.96	
AAQ4	0.78	SW	20.96	1	21.96		4.77	
AAQ5	2.49	SW	22.14	0.5	22.64		2.26	
AAQ6	3.99	SW	19.34	0.1	19.44		0.52	
AAQ7	3.97	S	23.07	0.5	23.57		2.17	
AAQ8	3.75	E	20.67	0.5	21.17		2.42	

PROJECT TITLE:
Mr.K.SHANMUGAM ROUGHSTONE AND GRAVEL -PM2.5



Max: 3.83 [ug/m³] at (823237.90, 1217361.05)

ug/m³



COMMENTS:	SOURCES:	COMPANY NAME:	
	1		
	RECEPTORS:	MODELER:	
	449		
OUTPUT TYPE:	SCALE: 1:128,000		
Concentration	0 5 km		
MAX:	DATE:		PROJECT NO.:
3.83 ug/m ³	30-01-2023		

AERMOD View - Lakes Environmental Software

C:\Users\G.T.M\Desktop\shamugam\airmod\SHANMUGAM PM2.5\SHANMUGAM PM2.5.a

Figure 4.1 Predicted Incremental Concentration of PM_{2.5}

PROJECT TITLE
Mr.K.SHANMUGAM ROUGHSTONE AND GRAVEL -PM10

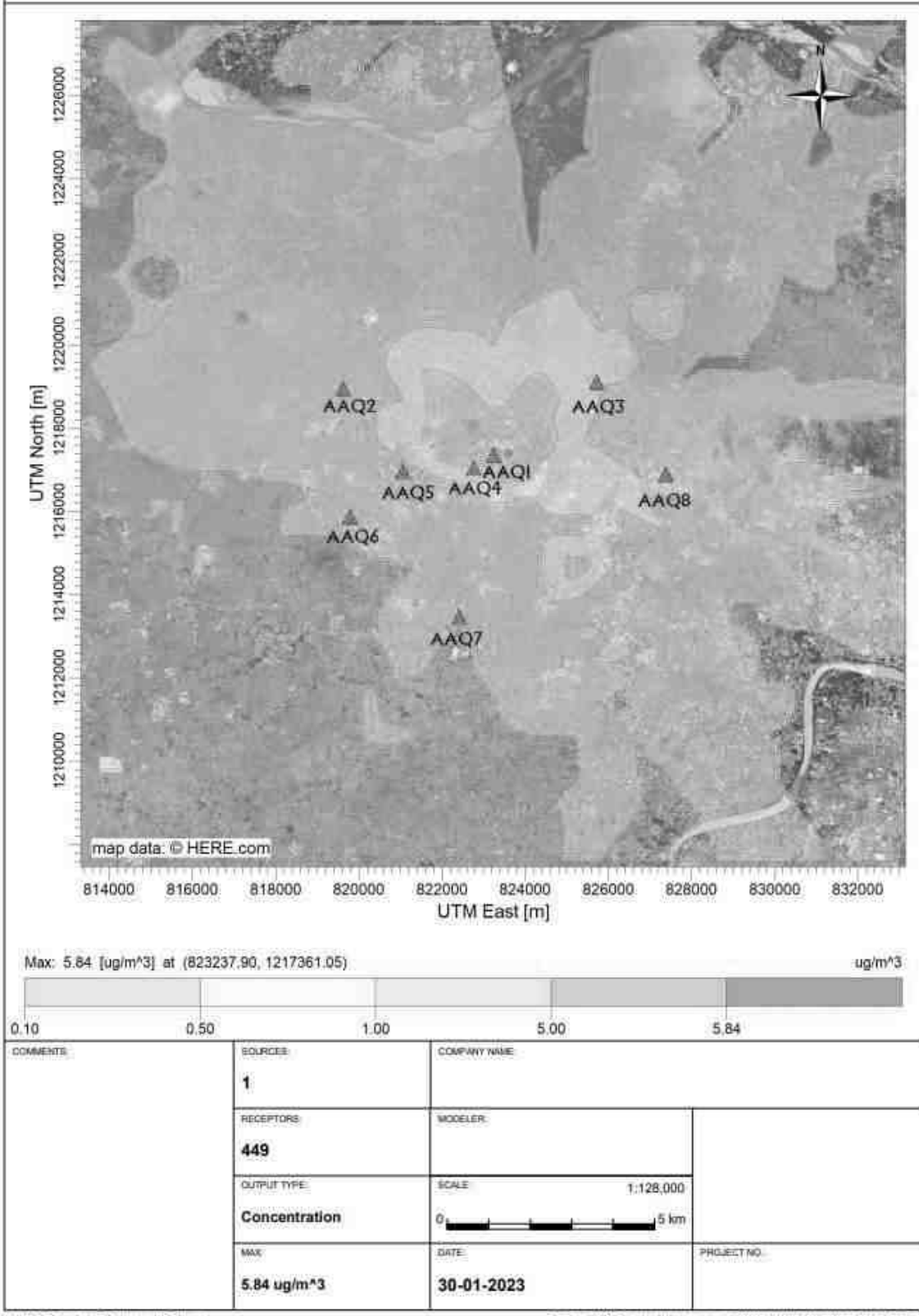
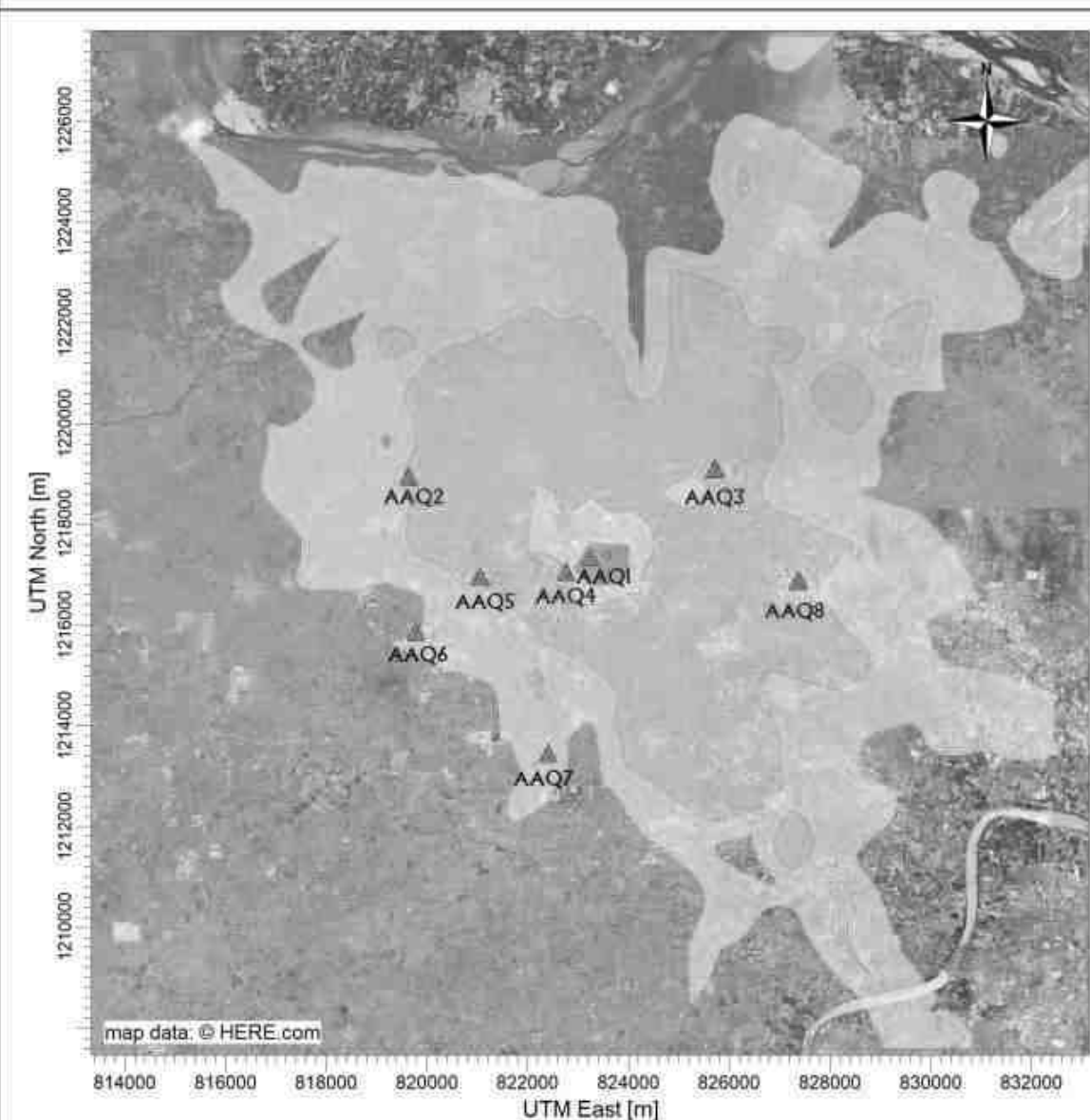
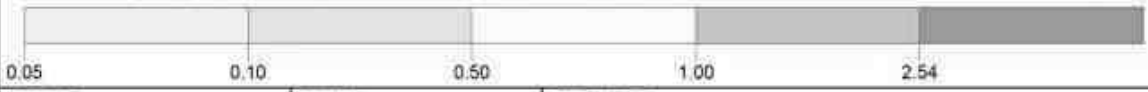



Figure 4.2 Predicted Incremental Concentration of PM₁₀

PROJECT TITLE
Mr.K.SHANMUGAM ROUGHSTONE AND GRAVEL -SO2



Max: 2.54 [ug/m³] at (823237.90, 1217361.05) ug/m³

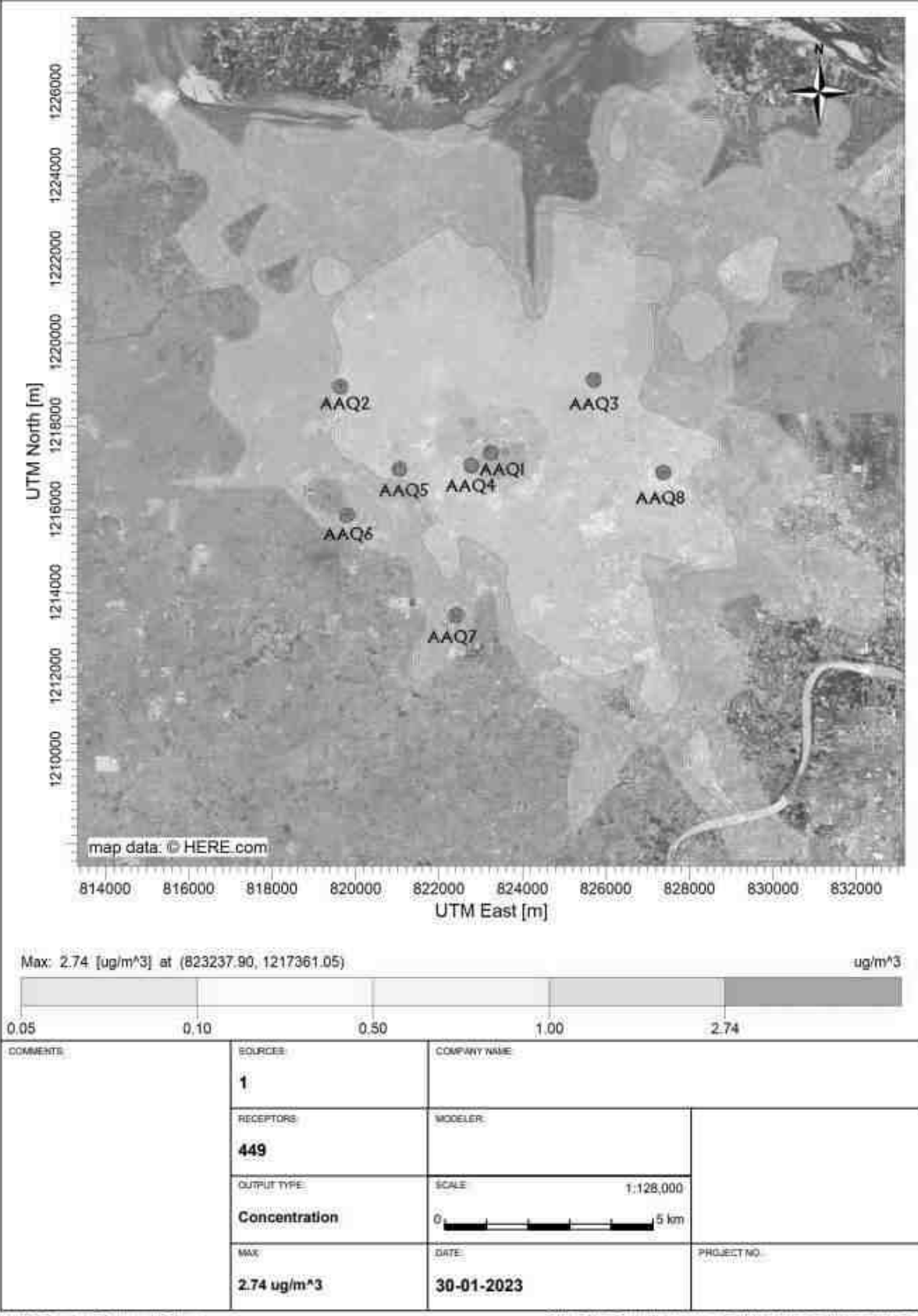


COMMENTS:	SOURCES:	COMPANY NAME:	
	RECEPTORS:	MODELER:	
	OUTPUT TYPE:	SCALE:	1:128.000
	MAX:	DATE:	PROJECT NO.:
	1		
	449		
	Concentration	0  5 km	
	2.54 ug/m ³	30-01-2023	

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Figure 4.3 Predicted Incremental Concentration of SO₂

PROJECT TITLE:
Mr.K.SHANMUGAM ROUGHSTONE AND GRAVEL -NOx



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Figure 4.4 Predicted Incremental Concentration of NOx

Table 4.4 Incremental & Resultant GLC of PM₁₀

Station ID	Distance to core area (km)	Direction	PM ₁₀ concentrations(µg/m ³)			Comparison against air quality standard (100 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.29	W	45.19	5.84	51.03	Below standard	12.92	Not significant
AAQ2	4.20	NW	40.00	0.5	40.5		1.25	
AAQ3	2.73	NE	46.74	0.5	47.24		1.07	
AAQ4	0.78	SW	41.98	5	46.98		11.91	
AAQ5	2.49	SW	43.74	0.5	44.24		1.14	
AAQ6	3.99	SW	41.02	0.5	41.52		1.22	
AAQ7	3.97	S	44.98	0.5	45.48		1.11	
AAQ8	3.75	E	41.50	0.5	42		1.20	

Table 4.5 Incremental & Resultant GLC of SO₂

Station ID	Distance to core area (km)	Direction	SO ₂ concentrations (µg/m ³)			Comparison against air quality standard (80 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.29	W	8.57	2.54	11.11	Below standard	29.64	Not significant
AAQ2	4.20	NW	8.40	0.5	8.9		5.95	
AAQ3	2.73	NE	9.07	0.5	9.57		5.51	
AAQ4	0.78	SW	6.97	0.5	7.47		7.17	
AAQ5	2.49	SW	5.69	0.5	6.19		8.79	
AAQ6	3.99	SW	5.74	0	5.74		0.00	
AAQ7	3.97	S	5.73	0.1	5.83		1.75	
AAQ8	3.75	E	5.49	0.5	5.99		9.11	

Table 4.6 Incremental & Resultant GLC of NO_x

Station ID	Distance to core area (km)	Direction	NO _x concentrations (µg/m ³)			Comparison against air quality standard (80 µg/m ³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.29	W	25.88	2.74	28.62	Below standard	10.59	Not significant
AAQ2	4.20	NW	25.86	0.5	26.36		1.93	
AAQ3	2.73	NE	26.58	0.5	27.08		1.88	
AAQ4	0.78	SW	25.61	0.5	26.11		1.95	
AAQ5	2.49	SW	26.43	0.5	26.93		1.89	
AAQ6	3.99	SW	25.76	0.1	25.86		0.39	
AAQ7	3.97	S	24.72	0.1	24.82		0.40	
AAQ8	3.75	E	25.10	0.5	25.6		1.99	

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.

Common Mitigation Measures

Drilling

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

Haul Road and Transportation

- ❖ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- ❖ Water sprinkling on haul roads and loading points will be carried out twice a day

- ❖ Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process and reduces pollution.
- ❖ The un-metalled haul roads will be compacted weekly before being put into use.
- ❖ Overloading of tippers will be avoided to prevent spillage.
- ❖ It will be ensured that all transportation vehicles carry a valid PUC certificate.
- ❖ Haul roads and service roads will be graded to clear accumulation of loose materials.

Green Belt

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

Occupational Health

- ❖ Dust mask will be provided to the workers and their use will be strictly monitored.
- ❖ Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers.
- ❖ Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed.

4.5 NOISE ENVIRONMENT

Noise pollution is mainly due to operation like drilling and plying of trucks & HEMM. These activities will not cause any problem to the inhabitants of this area because there is no human settlement in close proximity to the project area. Noise modelling has been carried out considering compressor operation (drilling) and transportation activities.

Predictions have been carried out to compute the noise level at various distances around the working pit due to these major noise-generating sources. 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.

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

4.5.1 Anticipated Impact

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
- 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	Jack Hammer	Yes	88
2	Compressor	No	81
3	Excavator	No	85
4	Tipper	No	84
Total Noise Produced			91.22

*50 feet from source = 15.24 meters

Source: U.S. Department of Transportation (Federal Highway Administration) – Construction Noise Handbook

The total noise to be produced by mining activity is calculated to be 91.22 dB (A). Therefore, we have considered equipment and operation noise levels (max) to be approx. 91.22 dB (A) for noise prediction modelling. The results of noise prediction modelling are shown in Table 4.8.

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 Zone	220	46.0	32.53	46.19
Nochikattur	460	40.2	26.12	40.37
Punnam Chatram	2650	46.8	10.91	46.80
Thalaiyeethupatti	830	47.0	21.00	47.01
Salipalaiyam	2540	46.8	11.28	46.80
Velayudampalaiyam	4020	47.2	7.30	47.20
Karudaiyampalaiyam	4010	40.1	7.32	40.10
Pavitrham	4450	46.3	6.41	46.30
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

The incremental noise level is found to be 32.53 dB (A) in core zone and ranges between 6.41 and 26.12 dB (A) in buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. 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(The Principal Rules were published in the Gazette of India, vide S.O.123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E),dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment(Protection) Act, 1986.).

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
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- ❖ Silencers / mufflers will be installed in all machineries

- ❖ Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness
- ❖ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

4.5.3 Ground Vibrations

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

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

The empirical equation for assessment of peak particle velocity (PPV) is given below:

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

Where,

V = peak particle velocity (mm/s)

K = site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

Table 4.9 Predicted PPV Values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	0.5	460	0.015	18	0.009	93

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	0.47	100	0.173	18	0.0057	109
		200	0.057		0.0025	102
		300	0.03		0.0015	98
		400	0.019		0.0011	95
		500	0.013		0.0008	92

The peak particle velocity produced by the charge of 0.47 kg is well below that of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But the project proponent ensures that the charge per blast shall be less than 0.6 kg and that the proponent shall carry out blasting twice or thrice a day based on the onsite conditions under the supervision of competent person employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.5.3.1 Common Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ Blasting shelter will be provided as per DGMS guidelines
- ❖ Blasting operations will be carried out only during day time
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ❖ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed
- ❖ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire

- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251mm/s
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 ECOLOGY AND BIODIVERSITY

4.6.1 Impact on Ecology and Biodiversity

- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region.
- Carbon released from quarrying machineries and tippers during quarrying would be 254kg per day, 68546 kg per year and 342729 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	15	3936	19681
Fuel consumption of compressor	1.2	324	1620
Fuel consumption of tipper	79	21317	106583
Total fuel consumption in liters	95	25577	127884
Co ₂ emission in kg	254	68546	342729

4.6.2 Mitigation Measures on Flora

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ Existing roads will be used; new roads will not be constructed to reduce impact on flora.

Carbon Sequestration

- ❖ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 24 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 2501 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 33 kg of the total carbon, as provided in Table 4.12.

Table 4.12 CO₂ Sequestration

CO ₂ sequestration in kg	33	8811	44056
Remaining CO ₂ not sequestered in kg	221	59735	298673
Trees required for environmental compensation	2489		
area required for environmental compensation in hectares	5		

Greenbelt Development

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. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone. Greenbelt development plan and budget required for green belt development plan are given in Tables 4.13-4.14. For greenbelt development, species are recommended, as shown in Table 4.13 on the basis of:

- ❖ Natural growth of existing species and survival rate of various species.
- ❖ Suitability of a particular plant species for a particular type of area.
- ❖ Creating of biodiversity.
- ❖ Fast growing, thick canopy copy, perennial and evergreen large leaf area.
- ❖ Efficient in absorbing pollutants without major effects of natural growth.

Table 4.13 Recommended Species for Greenbelt Development Plan

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

The 7.5m safety distance along the boundary has been identified to be utilized for subsequent Afforestation. However, the afforestation should always be carried out in a systematic and scientific manner. Regional trees like *Azadirachta indica*, *Albizia lebbek* and *Tectona grandis* will be planted along the lease boundary and avenue plantation will be carried out in respective proposed project. The rate of survival expected to be 80% in this area. Afforestation Plan is given in Table 4.14 and budget of green belt development plan are given in Table 4.15.

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		
	147	118	1323
	Number of plants outside the mine lease area		
	221	176	1985
Total	368	294	3308

Table 4.15 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recurring Cost/ annum
Plantation inside the mine lease area (in safety margins)	147	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))"	29400	4410
Plantation outside the area	221	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	66150	6615
Total			95550	11025

Source: EMP budget

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



Figure 4.5 Greenbelt Development Photos

4.6.3. Anticipated Impact on Fauna

- ❖ There is no Wildlife Sanctuary and Biosphere Reserve within 10 km radius of the project site.
- ❖ No rare, endemic & endangered species are reported in the buffer zone. However, during the course of mining, the management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.
- ❖ Fencing around all the proposed mine lease areas will be constructed to restrict the entry of stray animals
- ❖ Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

4.6.3.1. Measures for Protection and Conservation of Wildlife Species

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

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

4.6.3.2. Mitigation Measures

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

4.6.4. Impact on Aquatic Biodiversity

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

4.6.5. Impact Assessment on Biological Environment

Details of impact and assessments was mentioned in Tables 4.16 and 4.17.

Table 4.16 Ecological Impact Assessments

S. No	Attributes	Assessment
1	Activities of the project affects the breeding/nesting sites of birds and animals	No breeding and nesting sites were identified in the lease area.
2	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species were sighted in core area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	Thathampalayam reserve forest is located in 7.79 km southeast. There are no national parks or eco-sensitive zones around 10 km radius.
4	Proposed project restricts access to waterholes for wildlife	No. The proposed project does not restrict access to water holes for wildlife.
5	Proposed mining project impact surface water quality that also provide water to wildlife	No scheduled or threatened wildlife animal were sighted in core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management system will be developed properly. So, there will be no siltation in nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	Barbed wire fencing will be installed around the lease area. Therefore, wild animals will not fall

		into the quarry pit.
8	The project release effluents into a water body that also supplies water to a wildlife	No water bodies were found close to core zone so chances of water becoming polluted will be low.
9	Mining project effect the forest-based livelihood/ any specific forest product on which local livelihood depended	No. The proposed project does not involve any forestland. Therefore, it will not affect the livelihood of people depending the forest product.
10	Project likely to affect migration routes	No migration routes were found crossing the lease area.
11	Project likely to affect flora of an area, which have medicinal value	No flora with medicinal values were found in the study area.
12	Forestland is to be diverted, has carbon high sequestration	As the proposed project does not involve any forestland, there will be no need for diversion.
13	The project likely to affect wetlands, fish breeding grounds, marine ecology	Wetland was not present in and around mining lease area. No fish breeding grounds were present in core area.

Table 4.17 Anticipated Impact of Ecology and Biodiversity

S. No	Aspect Description	Likely Impacts on Ecology and Biodiversity (EB)	Impact Consequence - Probability Description / Justification	Significance	Mitigation Measures
Pre-Mining Phase					
1	Uprooting of vegetation of lease area	Site specific loss of common floral diversity (Direct impact)	Site possesses common floral (not trees) species. Clearance of these species will not result in loss of flora	Less severe	No immediate action required. However, Greenbelt /plantation will be developed in project site and in periphery of the project boundary,

		Site specific loss of associated faunal diversity (Partial impact)	Site supports only common species, which use wide variety of habitats of the buffer zone reserve forest area. So, there is no threat of faunal diversity.		which will improve flora and fauna diversity of the project area.
		-Loss of Habitat (Direct impact)	Site does not form Unique / critical habitat structure for unique flora or fauna.		
Mining Phase					
2	Excavation of mineral using machine and labours, Transportation activities will generate noise.	Site-specific disturbance to normal faunal movements at the site due to noise. (Partial impact)	Site does not form unique / critical habitat structure for unique flora or fauna.	Less severe	Mining activity should not be operated after 5PM. Excavation of dump and transportation work should stop before 7PM.

3	Vehicular Movement for transportation of materials will result in generation of dust (SPM) due to haul roads and emission of SO ₂ , NO ₂ , CO etc.	Impact on surrounding agriculture and associated fauna due to deposition of dust and Emission of CO. (Indirect impact)	Impact is less as the agricultural land far from core area.	Less severe	All vehicles will be certified for appropriate Emission levels. More plantation has been suggested Upgrade the vehicles with alternative fuel such biodiesel, methanol and biofuel around the mining area.
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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.
- ❖ Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide.
- ❖ Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level.
- ❖ Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up.

4.8.4 Occupational Health Survey

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests

- ❖ General physical tests

- ❖ Audiometric tests
- ❖ Full chest, X-ray, Lung function tests, Spirometric tests
- ❖ Periodic medical examination – yearly
- ❖ Lung function test – yearly, those who are exposed to dust
- ❖ Eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment.

First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

4.9 MINE WASTE MANAGEMENT

No waste is anticipated from any of the proposed quarries.

4.10 MINE CLOSURE

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

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

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

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.10.1.1 Physical Stability

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to

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

4.10.1.2 Chemical Stability

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

4.10.1.3 Biological Stability

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc.,

A vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilizing the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful under three situations.

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

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

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

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

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

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

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

5.2 ANALYSIS OF ALTERNATIVE SITE

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

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

Mechanized open cast mining operation with drilling and blasting method will be used to extract rough stone in the area. The proposed mining lease areas have following advantages:

- ❖ As the mineral deposition is homogeneous and batholith formation, therefore 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.
- ❖ Blasting and availability of drills along with controlled blasting technology gives desired fragmentation so that the mineral is handled safely and used without secondary blasting.
- ❖ Semi-skilled labours fit for quarrying operations are easily available around the nearby villages.

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

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

CHAPTER VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

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

6.1 METHODOLOGY OF MONITORING MECHANISM

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

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

The responsibilities of this cell will be:

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

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

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

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

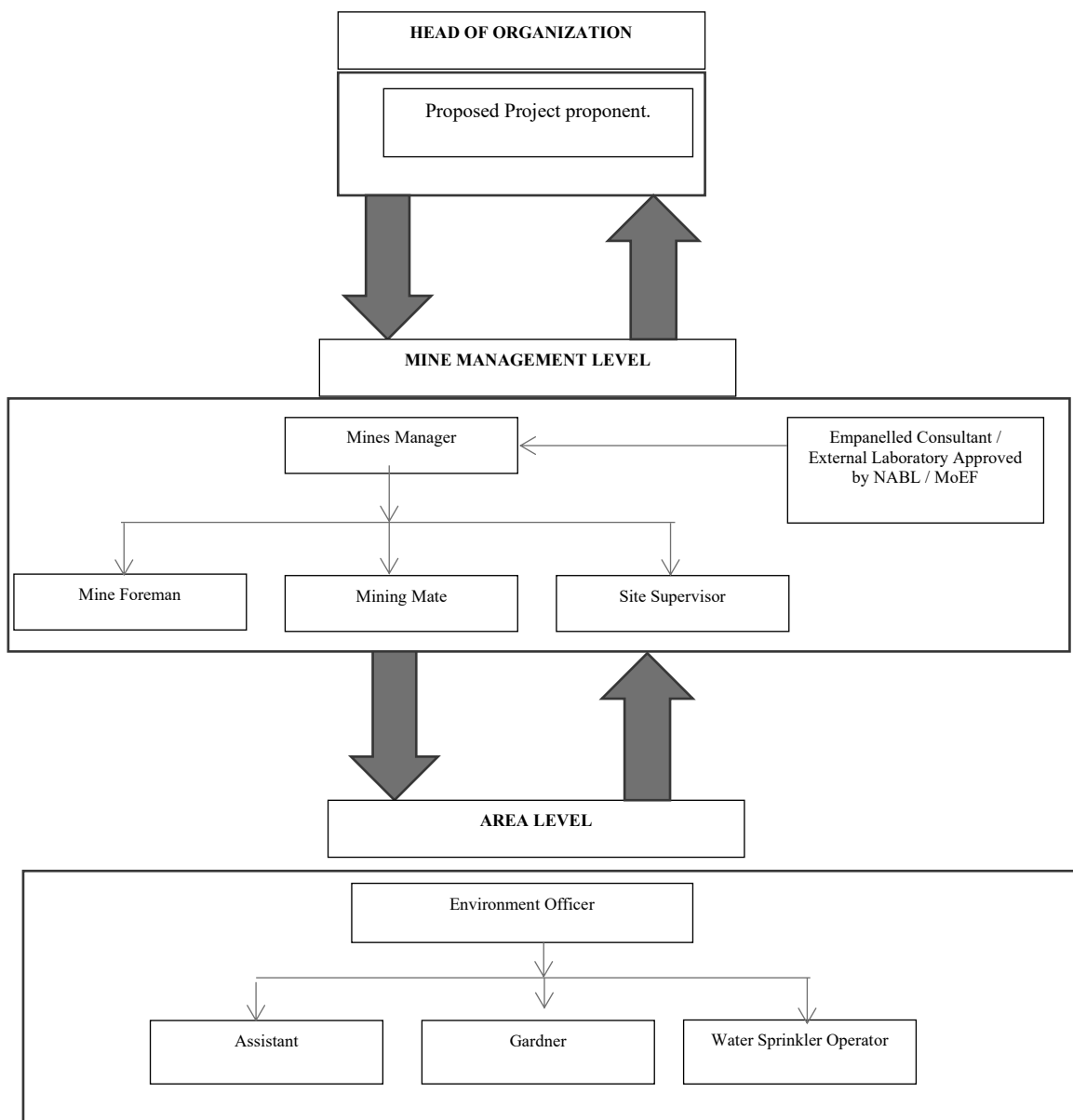


Figure 6.1 Proposed environmental monitoring chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

Table 6.1 Implementation Schedule for Proposed Project

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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

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

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

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

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

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

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

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

Table 6.3 Environment Monitoring Budget

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

Source: Field Data

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

CHAPTER VII

ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

- ❖ Risk Assessment
- ❖ Disaster Management Plan
- ❖ Cumulative Impact Study
- ❖ Plastic Waste Management
- ❖ Post-COVID Health Management Plan

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

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

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

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

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

Table 7.1 Risk Assessment& Control Measures for Proposed Project

S. No.	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	<ul style="list-style-type: none"> ✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. ✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited. ✓ Fire-fighting and first-aid provisions in the mine office complex and mining area. ✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use. ✓ Working of quarry, as per approved plans and regularly updating the mine plans. ✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut. ✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager. ✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.
2	Drilling	Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst; Drill Rod may break;	<ul style="list-style-type: none"> ✓ Safe operating procedure established for drilling (SOP) will be strictly followed. ✓ Only trained operators will be deployed. ✓ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places, ✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other.

			<ul style="list-style-type: none"> ✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ✓ Operator shall regularly use all the personal protective equipment.
3	Transportation	<p>Potential hazards and unsafe workings contributing to accident and injuries</p> <p>Overloading of material</p> <p>While reversal & overtaking of vehicle</p> <p>Operator of truck leaving his cabin when it is loaded.</p>	<ul style="list-style-type: none"> ✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. ✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. ✓ Concave mirrors should be kept at all corners ✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point ✓ Loading according to the vehicle capacity ✓ Periodical maintenance of vehicles as per operator manual
4	Natural calamities	Unexpected happenings	<ul style="list-style-type: none"> ✓ Escape Routes will be provided to prevent inundation of storm water ✓ Fire Extinguishers & Sand Buckets
5	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	<ul style="list-style-type: none"> ✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and Proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

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

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

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

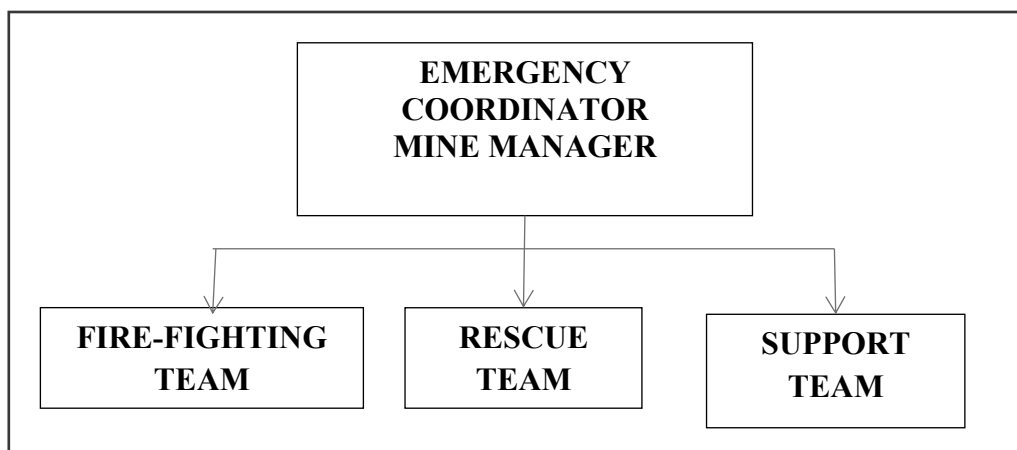


Figure 7.1 Disaster management team layout for proposed project

The emergency organization shall be headed by emergency coordinator who will be qualified competent mines manager. In his absence senior most people available at the mine shall be emergency coordinator till arrival of mines manager. There would be three teams for taking care of emergency situations – Fire-Fighting Team, Rescue Team and Support Team. The proposed composition of the teams is given in Table 7.2.

Table 7.2 Proposed Teams for Emergency Situation

Designation	Qualification
Fire-Fighting Team	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
Rescue Team	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
Support Team	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Assistant Team Leader	Environment Officer
Team Member	Mining Mate
Security Team Leader/ Emergency Security Controller	Mines Foreman

Once the mine becomes operational, the above table along with names of personnel will be prepared and made easily available to workers for respective proposed quarries. A mobile communication network and wireless shall connect Mine Emergency Control Room (MECR) to control various departments of the mine, fire station and neighbouring industrial units/mines.

7.3.1 Roles and Responsibilities of Emergency Team

(a) Emergency coordinator (EC)

The emergency coordinator shall assume absolute control of site and shall be located at MECR.

(b) Incident controller (IC)

Incident controller shall be a person who shall go to the scene of emergency and supervise the action plan to overcome or contain the emergency. Shift supervisor or Environmental Officer shall assume the charge of IC.

(c) Communication and advisory team

The advisory and communication team shall consist of heads of Mining Departments i.e., Mines Manager

(d) Roll call coordinator

The Mine Foreman shall be Roll Call Coordinator. The roll call coordinator will conduct the roll call and will evacuate the mine personnel to assembly point. His prime function shall be to account for all personnel on duty.

(e) Search and rescue team

There shall be a group of people trained and equipped to carry out rescue operation of trapped personnel. The people trained in first aid and fire-fighting shall be included in search and rescue team.

(f) Emergency security controller

Emergency Security Controller shall be senior most security person located at main gate office and directing the outside agencies e.g., fire brigade, police, doctor and media men etc.,

7.3.2 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

7.3.3 Proposed Fire Extinguishers

The following type of fire extinguishers has been proposed at strategic locations within the mine, as shown in Table 7.3.

Table 7.3 Proposed Fire Extinguishers at Different Locations

Location	Type of Fire Extinguishers
Electrical Equipment	CO ₂ type, foam type, dry chemical powder type
Fuel Storage Area	CO ₂ type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

7.3.4 Alarm System

On receiving the message of disaster from Site Controller, fire-fighting team, the mine control room attendant will sound siren wailing for 5 minutes. Incident controller will arrange to broadcast disaster message through public address system. On receiving the message of "Emergency Over" from Incident Controller the emergency control room attendant will give "All Clear Signal", by sounding alarm straight for 2 minutes.

The features of alarm system will be explained to one and all to avoid panic or misunderstanding during disaster. In order to prevent or take care of hazard / disasters if any the following control measures have been adopted.

- ❖ Fire-fighting and first-aid provisions in the mines office complex and mining area are provided.
- ❖ Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees and the use of same is strictly adhered to through regular monitoring.
- ❖ Training and refresher courses for all the employees working in hazardous premises.
- ❖ Working of mine, as per approved plans and regularly updating the mine plans.
- ❖ Cleaning of mine faces is regularly done.
- ❖ Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- ❖ Provision of high-capacity standby pumps with generator sets with enough quantity of diesel for emergency pumping especially during monsoon.

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, six proposed projects, known as P1, P2 P3, P4, P5 and P6 were taken into consideration. The details of P1 have been given in Table 1.3 and the details of P2 to P6 in Table 7.4.&7.8.

Table 7.4 Salient Features of Proposed Project Site “P2”

Name of the Quarry	Tvl. NTC Blue Metals LLP Rough stone and gravel Quarry	
Toposheet No	58E/06	
Latitude between	10°59'50.56” N to 10°59'53.69” N	
Longitude between	77°57'34.30” E to 77°57'36.99” E	
Highest Elevation	165 m AMSL	
Proposed Depth of Mining	25 m BGL	
Geological Resources	Roughstone in m ³	gravel in m ³
	1,45,084	12,616
Mineable Reserves	Roughstone in m ³	gravel in m ³
	42,712	7,888
Existing Pit Dimension	100 m (L) x 50 m (W) x 12 m (D)	
Ultimate Pit Dimension (Proposed)	68 m (L) x 58 m (W) x 25 m (D)	
Water Level in the surrounding area	60 m BGL	
Method of Mining	Opencast Semi mechanized mining	
Topography	The lease applied area is a slightly elevated terrain. The area has gentle slope towards South-eastern side. The altitude of the area is 165-163m (max) from mean sea level.	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Hydraulic Excavator	2
	Tippers	2
Blasting Method	Controlled blasting involving shot-holes and slurry explosives of 25 mm diameter.	
Proposed Water Requirement	5.0 KLD	

Source: Approved Mining Plan & obtained ToR

Table 7.5 Salient Features of Proposed Project Site “P3”

Name of the Quarry	Thiru S. Sadhasivam Roughstone and Gravel Quarry	
Toposheet No	58E/06	
Latitude between	10°59'58.89” N to 11°00'04.13” N	
Longitude between	77°57'11.01” E to 77°57'15.51” E	
Highest Elevation	172 m AMSL	
Proposed Depth of Mining	7 m BGL	
Geological Resources	Roughstone in m ³	Gravel in m ³

	77,000	30,800
Mineable Reserves	Roughstone in m ³	Gravel in m ³
	35,230	16,270
Production	28,430	16,270
Ultimate Pit Dimension (Proposed)	121m (L) x 76m (W) x 7m (D)	
Water Level in the surrounding area	60 m BGL	
Method of Mining	Opencast manual method of mining	
Topography	The lease applied area is exhibits plain topography. The area has gentle slope towards South-eastern side. The altitude of the area is 172m (max) from mean sea level.	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Hydraulic Excavator	2
	Tippers	1
Blasting Method	As the proposed project is intended for producing dimension stone, the project will use a small quantity of slurry explosives and NONEL fuse to create fractures in the massive rock.	
Proposed Water Requirement	3.0 KLD	

Table 7.6 Salient Features of Proposed Project Site “P4”

Name of the Quarry	K. Nallasamy Rough Stone and Gravel quarry	
Type of Land	Patta land	
Extent	2.89.0 ha	
S.F. No.	226/1(part)	
Toposheet No.	58-E/16 & 58-F/13	
Highest Elevation	162m AMSL	
Latitude	10°59'56.71"N to 11°0'4.19"N	
Longitude	77°57'25.46"E to 77°57'32.25"E	
Ultimate Depth of Mining	12 m BGL	
Existing Pit Dimension	Pit 1: 50 m(L) X 19 m(W) X 1 m(D) Pit 2: 48 m(L) X 25 m(W) X 3 m(D) Pit 3: 112 m(L) X 90 m(W) X 9 m(D)	
Geological Resources	Rough stone (m ³)	Gravel (m ³)
	2,17,506	3,870
Mineable Reserves	41,392	292

Proposed production for 5 years	41,392	292
Total No. of Lorry Loads	28 loads of rough stone/day	
Method of Mining	Open cast manual method	
Topography	Undulated	
Machinery proposed	Hand Jack hammer	2
	Compressor	1
	Excavator	1
	Shovel	10
	Picas	10
Blasting Method	As the proposed project is intended for producing dimension stone, the project will use a small quantity of slurry explosives and NONEL fuse to create fractures in the massive rock.	
Proposed Water Requirement	1.7 KLD	

Table 7.7 Salient Features of Proposed Project Site “P5”

Name of the Quarry	V. Kavitha Roughstone Quarry	
Type of Land	Patta land	
Extent	1.88.0 ha	
S.F. No.	75/1A, 75/1B, 75/2	
Toposheet No.	58-E/16 & 58-F/13	
Latitude	10°59'57.47"N to 11°00'02'56"N	
Longitude	77°57'32.82"E to 77°57'39.69"E	
Ultimate Depth	18 m BGL	
Existing Pit Dimension	Pit 1: 124 m (L) X 43 m (W) X 13 m (D) Pit 2: 108 m (L) X 81 m (W) X 5 m (D)	
Geological Resources	Rough stone (m ³)	Top soil(m ³)
	3,37,160	1,697
Mineable Reserves	1,58,939	1,697
Proposed production for 5 years	22,500	1,697
Method of Mining	Open cast manual method	
Topography	Undulated	
Machinery proposed	Hand Jack hammer	3
	Compressor	1
	Tipper	1
Blasting Method	As the proposed project is intended for producing dimension stone, the project will use a small quantity of slurry	

	explosives and NONEL fuse to create fractures in the massive rock.
Proposed Manpower Deployment	14 persons
Project Cost	Rs. 46,30,000/-

Table 7.8 Salient Features of Proposed Project Site “P6”

Name of the Quarry	TVL.NTC Blue metal Rough stone and Gravel Quarry	
Toposheet No	58F/13, 58E/16	
Latitude between	10°59'56.13” N to 11°00'95” N	
Longitude between	77°57'05.47” E to 77°57'11.31” E	
Highest Elevation	166 m AMSL	
Proposed Depth of Mining	40 m BGL	
Geological Resources	Rough Stone in m ³	Gravel in m ³
	7,99,516	19,836
Mineable Reserves	Rough Stone in m ³	Gravel in m ³
	2,14,845	8,064
Production	2,14,845	8,064
Ultimate Pit Dimension (Proposed)	99 m (L) x 107 m (W) x 40 m (D)	
Water Level in the surrounding area	55-60 m BGL	
Method of Mining	Opencast Semi mechanized method of mining	
Topography	The lease applied area is exhibits flat topography. The area has gentle slope towards eastern side. The altitude of the area is 166m (max) from mean sea level.	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Hydraulic Excavator	1
	Tippers	4
Blasting Method	Controlled blasting involving shot-holes and slurry explosives of 25 mm diameter.	
Proposed Water Requirement	5 KLD	

7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from the 6 proposed projects have been given in Tables 7.4 and 7.8.

Table 7.9 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	5 Years in m³	Per Year in m³	Per Day in m³	Number of Lorry Load Per Day
P1	22660	4532	17	3
P2	42712	8542	31	5
P3	28430	5686	21	3
P4	41392	8278	31	5
P5	22500	4500	17	3
P6	214845	42969	159	26
Grand Total	372539	74507	276	45

Table 7.10 Cumulative Production Load of Gravel

Quarry	Production for 3 Years (m³)	Yearly Production (m³)	Daily Production (m³)	Number of Lorry Loads Per Day
P1	9315	9315	34	6
P2	7888	7888	29	5
P3	16270	5423	20	3
P4	292	292	1	1
P5	--	--	--	--
P6	8064	8064	30	5
Grand Total	41829	30982	114	20

The cumulative study shows that the overall production of rough stone from the six quarries is 276 m³ per day with a capacity of 45 trips of rough stone per day and that production of gravel from the 6proposed quarry is 114 m³ per day accounting for 20 trips/day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the 6 proposed projects on air environment of the cluster have been provided in Table 7.8. The cumulative values resulting from the 6 projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.11 Cumulative Impact Results from the 6 Proposed Projects

Pollutants	Baseline Data($\mu\text{g}/\text{m}^3$)	Incremental Values ($\mu\text{g}/\text{m}^3$)						Cumulative Value ($\mu\text{g}/\text{m}^3$)
		P1	P2	P3	P4	P5	P6	
PM _{2.5}	23.95	3.83	6.10	3.81	7.00	3.81	9.54	58.04
PM ₁₀	45.19	5.84	9.64	6.28	12.18	5.32	12.24	96.69
SO ₂	8.57	2.54	4.79	3.19	4.64	2.52	6.60	32.85
NO ₂	25.88	2.74	5.16	3.43	5.00	2.72	11.56	56.49

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 7.12 Predicted Noise Incremental Values from Cluster

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	560 m	N	40.2	42.1	44.3	55
Habitation Near P2	530 m	N	40.2	42.6	44.6	
Habitation Near P3	880 m	E	40.2	20.4	40.2	
Habitation Near P4	440 m	NE	40.2	26.5	45.7	
Habitation Near P5	310 m	NE	40.2	29.5	40.5	
Habitation Near P6	1120 m	NE	40.2	36.1	41.6	
Cumulative Noise (dB(A))					49.4	

The cumulative analysis of noise due to 6 proposed projects shows that habitation near P1, P2, P3, P4, P5, and P6 will receive about 49.4 dB (A), as shown in Table 7.8. The cumulative results for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.

Ground Vibrations

Cumulative results of ground vibrations due to mining activities in the all the 6 mines have been shown in Table 7.13.

Table 7.13 Ground Vibrations at 6 Mines

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	0.5	560	0.012
P2	3	530	0.048
P3	0.6	880	0.006
P4	0.9	440	0.027
P5	0.5	310	0.03
P6	15	1120	0.058
Total Vibration			0.181

Source: Blasting Calculations

From the above table, the charge per blast is considered as maximum in each mine and the resultant cumulative PPV 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 6 proposed projects were calculated and the results have been shown in Table 7.14 the six projects together will contribute Rs.2,69,61,500 towards CER fund.

Table 7.14 Socio Economic Benefits from 6 Mines

Location ID	Project Cost	CER
P1	Rs.42,99,500/-	Rs. 5,00,000
P2	Rs.31,94,000/-	Rs. 5,00,000
P3	Rs.25,78,000/-	Rs. 5,00,000
P4	Rs. 56,65,000	Rs. 5,00,000
P5	Rs.46,30,000/-	Rs. 5,00,000
P6	Rs.65,95,000/-	Rs. 5,00,000
Grand Total	Rs. 2,69,61,500/-	Rs. 30,00,000

Table 7.15 Employment Benefits from 6 Mines

Location ID	Employment
P1	14
P2	27
P3	23
P4	25
P5	14
P6	27
Grand Total	130

A total of 130 people will get employment due to 6 proposed mines in cluster

7.4.4 Ecological Environment

Table 7.16 Greenbelt Development Benefits From 6 Mines

Code	Number of Trees proposed	Area to be covered (m ²)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	368	3300	294	<i>Azadirachta indica, Albizia lebbeck, Delonix regia, Tectona grandis, etc.,</i>
P2	315	2900	252	
P3	770	7000	616	
P4	1445	13000	1156	
P5	940	8460	752	
P6	1095	9900	876	
Total	4933	44560	3946	

Cumulative studies show that the six proposed projects will plant about 4933 native tree species like Neem, Teak, etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 3946 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 7.17.

Table 7.17 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

7.6 POST COVID HEALTH MANAGEMENT PLAN FOR PROPOSED PROJECT

COVID – 19 diseases caused by SARS-CoV-2 Coronavirus is relatively a new disease, with fresh information being known on a dynamic basis about the natural history of the disease, especially in terms of post-recovery events.

After acute COVID-19 illness, recovered patients may continue to report wide variety of signs and symptoms including fatigue, body ache, cough, sore throat, difficulty in breathing, etc. As of now there is limited evidence of post-COVID sequelae and further research is required and is being actively pursued. A holistic approach is required for follow up care and well-being of all post COVID recovering patients.

7.6.1 Post-COVID Follow Up Protocol

- ❖ Continue COVID appropriate behaviour (use of mask, hand & respiratory hygiene, physical distancing).
- ❖ Drink adequate amount of warm water (if not contra-indicated).
- ❖ Make sure your workplaces are clean and hygienic
- ❖ Surfaces (e.g., desks and tables) and objects (e.g., telephones, helmet) need to be wiped with disinfectant regularly

- ❖ Put sanitizing hand rub dispensers in prominent places around the workplace. Make sure these dispensers are regularly refilled
- ❖ Display posters promoting hand-washing
- ❖ Make sure that staff, contractors and customers have access to places where they can wash their hands with soap and water
- ❖ Display posters promoting respiratory hygiene.
- ❖ Brief your employees, contractors and customers that if COVID-19 starts spreading in your community anyone with even a mild cough or low-grade fever (37.3°C or more) need to stay at home. They should also stay home (or work from home) if they have had to take simple medications, such as paracetamol/acetaminophen, ibuprofen or aspirin, which may mask symptoms of infection
- ❖ Keep communicating and promoting the message that people need to stay at home even if they have just mild symptoms of COVID-19.
- ❖ Consider whether a face-to-face meeting or event is needed. Could it be replaced by a teleconference or online event?
- ❖ Could the meeting or event be scaled down so that fewer people attend?
- ❖ Pre-order sufficient supplies and materials, including tissues and hand sanitizer for all employees. Have surgical masks available to offer anyone who develops respiratory symptoms.
- ❖ It is also suggested by the Ministry of AYUSH that the use of Chyawanprash in the morning (1 teaspoonful) with Luke warm water/milk is highly recommended (under the direction of Registered Ayurveda physician) as in the clinical practice Chyawanprash is believed to be effective in post-recovery period.
- ❖ If there is persistent dry cough / sore throat, do saline gargles and take steam inhalation. The addition of herbs/spices for gargling/steam inhalation. Cough medications, should be taken on advice of medical doctor or qualified practitioner of Ayush.
- ❖ Look for early warning signs like high grade fever, breathlessness, Sp O₂ < 95%, unexplained chest pain, new onset of confusion, focal weakness.
- ❖ Avoid smoking and consumption of alcohol.
- ❖ Communicate to your employees and contractors about the plan and make sure they are aware of what they need to do – or not do – under the plan. Emphasize key points such as the importance of staying away from work even if they have only mild symptoms or have had to take simple medications (e.g., paracetamol, ibuprofen) which may mask the symptoms
- ❖ The plan should address how to keep your business running even if a significant number of employees, contractors and suppliers cannot come to your place of business - either due to local restrictions on travel or due to illness.

CHAPTER VIII

PROJECT BENEFITS

8.0 GENERAL

The proposed project at Kuppam Village aims to produce **22660 m³** of rough stone and **9315 m³** 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 14 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 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 Kuppam Village, Pugalur Taluk and Karur District of Tamil Nadu and the area have communications, roads and other facilities already 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 Kuppam village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.

8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is \leq 100 crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund 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. 24,73,203** 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.59/m ³ of rough stone Rs.33/m ³ of Gravel	13,36,940	3,07,395
District Mineral Foundation Tax @ 10% of Seigniorage	1,33,694	30,740
Green Tax @ 10% of Seigniorage	1,33,694	30,740
Total	21,04,328	3,68,875

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, **K. Shanmugam** 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:

- ❖ Collection of the water/ waste water, ambient air and solid waste samples.
- ❖ Analysis of the water, air and solid waste samples through external laboratory.

- ❖ Implementation and monitoring of the pollution control and protective measures which shall include installation of air pollution control equipment, wastewater treatment plant, etc.
- ❖ Coordination 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 and maintenance of the green belt.
- ❖ 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 LAND ENVIRONMENT MANAGEMENT

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (unutilized areas, infrastructure, haul roads) will be utilized for greenbelt development. Aesthetic of the environment will not be affected. There is no major vegetation in the project area. During the course of quarrying operation and after completion of the quarrying operation thick plantation will be developed under greenbelt development program. A detailed land environment management plan has been provided in Table 10.1.

Table 10.1 Proposed Controls for Land Environment

Control	Responsibility
Design vehicle wash-down areas so that all runoff water is captured and passed through oil water separators and sediment catchment devices.	Mines Manager
Refueling to be undertaken in a safe location away from vehicle movement pathways & 100m away of any watercourse. Refueling activity to be under visual observation at all times. Drainage of refueling areas to sumps with oil/water separation.	Mine Foreman & Mining Mate
Soil and groundwater testing as required following up a particular incident of contamination.	Mines Manager
At conceptual stage, the mining pits will be converted into Rain Water Harvesting. Remaining area will be converted into greenbelt area.	Mines Manager
No external dumping i.e., outside the project area.	Mine Foreman
Garland drains with catch pits / settlement traps to be provided all around the project area to prevent run off affecting the surrounding lands.	Mines Manager
The periphery of project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

10.3 SOIL MANAGEMENT

No top soil will be removed and stored during the mining operation. Therefore, topsoil management plan is not provided here.

10.4 WATER MANAGEMENT

In the proposed quarrying project, no process is involved for the effluent generation, only oil & grease from the machinery wash and domestic sewage from mines office is anticipated. The quarrying operation is proposed up to a depth of 20 m. The water table in the area is at 55-60 m below ground level. Hence, the proposed project will not intersect the ground water table during entire quarry period. A detailed water environment management plan has been provided in Table 10.2.

Table 10.2 Proposed Controls for Water Environment

Control	Responsibility
To maximize the reuse of pit water for water supply	Mines Foreman
Temporary and permanent garland drain will be constructed to contain the catchments of the mining area and to divert runoff from undisturbed areas through the mining areas	Mines Manager
Natural drains/nallahs/brooklets outside the project area should not be disturbed at any point of mining operations	Mines Manager
Ensure there is no process of effluent generation or discharge from the project area into water bodies	Mines Foreman
Domestic sewage generated from the project area will be disposed in septic tank and soak pit system	Mines Foreman
Monthly or after rainfall inspection for performance of water management structures and systems	Mines Manager
Ground water and surface water monitoring for parameters specified by CPCB	Manager Mines

Source: Proposed by FAEs & EIA Coordinator

10.5 AIR QUALITY MANAGEMENT

The proposed quarrying activity would result in the increase of particulate matter concentrations in the ambient air. Daily water sprinkling on the haul roads, approach roads in the vicinity will be undertaken and will be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements. A detailed ambient air environment management plan is provided in Table 10.3.

Table 10.3 Proposed Controls for Air Environment

Control	Responsibility
Generation of dust during excavation is minimized by daily (twice) water sprinkling on working face and daily (twice) water sprinkling on haul road	Mines Manager
Wet drilling procedure /drills with dust extractor system to control dust generation during drilling at source itself is implemented	Mines Manager
Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution	Mines Manager
Ambient air quality Monitoring carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted air pollution control measures	Mines Manager
Provision of dust mask to all workers	Mines Manager
Greenbelt development all along the periphery of the project area	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

10.6 NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time. A detailed noise environment management plan has been provided in Table 10.4.

Table 10.4 Proposed Controls for Noise Environment

Control	Responsibility
Development of thick greenbelt all along the buffer zone (7.5 meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman
Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager

Annual ambient noise level monitoring is carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

10.7 GROUND VIBRATION AND FLY ROCK CONTROL

The rough stone and gravel quarry operation creates vibration due to the blasting and movement of heavy earth moving machineries, fly rocks due to the blasting. A detailed ground vibration management plan has been provided in Table 10.5.

Table 10.5 Proposed Controls for Ground Vibrations & Fly Rock

Control	Responsibility
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAEs & EIA Coordinator

10.8 BIOLOGICAL ENVIRONMENT MANAGEMENT

The proponent will take all necessary steps to avoid the impact on the ecology of the area by adopting suitable management measures in the planning and implementation stage. During mining, thick plantation will be carried out around the project periphery, on safety barrier zone, on top benches

of quarried out area etc. Following control measures are proposed for its management and will be the responsibility of the mines manager.

- ❖ Greenbelt development all along the safety barrier of the project area.
- ❖ It is also proposed to implement the greenbelt development program and post plantation status will be regularly checked for every season.
- ❖ The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- ❖ Year wise greenbelt development will be recorded and monitored based on the area of plantation, period of plantation, type of plantation, spacing between the plants, type of manuring and fertilizers and its periods, lopping period, interval of watering, survival rate and density of plantation.
- ❖ The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.8.1 Green Belt Development Plan

The main objectives of the greenbelt development plan are to:

- ❖ Combat the dispersal of dust in the adjoining areas.
- ❖ Protect the erosion of the soil and conserve moisture of the soil.
- ❖ Increase the rate of recharge of ground water.
- ❖ Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community. The proposed green belt development plan is given in Table 10.6.

Table 10.6 Proposed Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered(m²)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	147	118	1323
	Number of plants outside the mine lease area		
	221	176	1985
Total	368	294	3308

Source: Proposed by FAEs & EIA Coordinator

About 368 saplings will be planted in and around the lease area with the survival rate of 80%. A well-planned green belt of trees with long canopy leaves shall be developed with dense plantations around the boundary and along the haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

10.9 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

Occupational safety and health are very closely related to productivity and good employer-employee relationship. The main factors of occupational health impact in quarries are fugitive dust and noise. Safety of employees during quarrying operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and Rule 29 of Mines Rules 1955. To avoid any adverse effect on the health of workers due to dust, noise and vibration sufficient measures have been provided.

10.9.1 Medical Surveillance and Examinations

- ❖ Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.
- ❖ Evaluating the effect of noise on workers.
- ❖ Enabling corrective actions to be taken when necessary.
- ❖ Providing health education.

The health status of workers in the mine shall be regularly monitored under an occupational surveillance program. Under this program, all the employees are subjected to a detail medical examination at the time of employment. The medical examination covers the following tests under mines act 1952.

- ❖ General Physical Examination and Blood Pressure.
- ❖ X-ray Chest and ECG.
- ❖ Sputum Test, Sperm Count Test.
- ❖ Detailed Routine Blood and Urine Examination.

The medical histories of all employees will be maintained in a standard format annually. Thereafter, the employees will be subject to medical examination annually. The below tests (Table 10.7) keep upgrading the database of medical history of the employees.

Table 10.7 Medical Examination Schedule

S. No.	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check – up					
B	Audiometric Test					
C	Eye Check – up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					
Medical Follow ups: Work force will be divided into three targeted groups age wise as follows:						
Age Group		PME as per Mines Rules 1955		Special Examination		
Less than 25 years		Once in a Three Years		In case of emergencies		
Between 25 to 40 Years		Once in a Three Years		In case of emergencies		
Above 40 Years		Once in a Three Years		In case of emergencies		
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.						

10.9.2 Proposed Occupational Health and Safety Measures

- ❖ The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- ❖ Lightweight and loose-fitting clothes having light color will be preferred to wear.
- ❖ Noise exposure measurements will be taken to determine the need for noise control strategies.
- ❖ The personal protective equipment will be provided for mine workers.
- ❖ Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
- ❖ At noisy working activity, exposure time will be minimized.
- ❖ Dust generating sources will be identified and proper control measure will be adopted.
- ❖ Periodic medical examinations will be provided for all workers.

- ❖ Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
- ❖ The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- ❖ In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centers. All personal protective equipment's will be provided to them.
- ❖ A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
- ❖ Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.



Figure 10.1 Personal Protective Equipment to the Mine Workers

10.9.3 Health and Safety Training Program

The Proponents will provide special induction program along with machinery manufacturers for the operators and co-operators to run and maintain the machinery effectively and efficiently. The training program for the supervisors and office staffs will be arranged in the Group Vocational Training Centers in the State and engage Environmental Consultants to provide periodical training to all the employees to carry out the mining operation in and eco-friendly manner, as shown in Table 10.8.

Table 10.8 List of Periodical Trainings Proposed for Employees

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	<ul style="list-style-type: none"> ✓ Employee rights, ✓ Supervisor responsibilities ✓ Self-rescue ✓ Respiratory devices ✓ Transportation controls ✓ Communication systems ✓ Escape and emergency evacuation ✓ Ground control hazards ✓ Occupational health hazards ✓ Electrical hazards and First aid Explosives
Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul Road maintenance.	Employees assigned to new work tasks	Before new Assignments	Variable	<ul style="list-style-type: none"> ✓ Task-specific health & safety procedures and SOP for various mining activity ✓ Supervised practice in assigned work tasks.

Refresher Training	All employees who received new-hire training	Yearly	One week	<ul style="list-style-type: none"> ✓ Required health and safety standards ✓ Transportation controls ✓ Communication systems ✓ Escape ways, emergency evacuations ✓ Fire warning ✓ Ground control hazards ✓ First aid on electrical hazards ✓ Accident prevention ✓ Explosives ✓ Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	<ul style="list-style-type: none"> ✓ Hazard recognition and avoidance ✓ Emergency evacuation procedures ✓ Health standards ✓ Safety rules ✓ Respiratory devices

Source: Proposed by FAEs & EIA Coordinator as per DGMS Norms

10.9.4 Budgetary Provision for Environmental Management

Adequate budgetary provision has been made by the company for execution of Environmental Management Plan. The Table 10.9 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

Table 10.9 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	7350	7350

	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring	800000	50000
	Air quality will be regularly monitored as per norms within ML area & ambient area	Yearly compliance as per CPCB norms	0	50000
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance	50000	5000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000

	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed	5000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	1250
	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	14700
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0

Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0
Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
Provision for Portable blaster shed	Installation of portable blasting shelter	50000	2000

	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	63448
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum (2.91.5 ha X 10000)	7350	3675
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
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed display board at the quarry entrance as permanent structure	10000	1000

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)	56000	14000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	14000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	2940
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum (2.91.5 hectare)	147000	7350
	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	36750	7350
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000

	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
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))"	29400	4410
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	66150	6615

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	24990
	G.O.(Ms)No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Rough stone = Rs.59 and for Gravel= Rs.33)	164434	0
Total			1549434	1104088 (Excel. Mine Closure)

Table 10.10 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
1104088	1159292	1217257	1278120	1367016	6125773	7675207

In order to implement the environmental protection measures, an amount of Rs. 1549434 as capital cost and recurring cost as Rs. 1104088 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. 7675207 as shown in Table 10.10.

10.10 CONCLUSION

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

CHAPTER XI
SUMMARY AND CONCLUSION

11.0 INTRODUCTION

This EIA report is prepared by considering cumulative load of six proposed quarries, one expired project and one existing project with the total extent of 16.03.0 hectares in Kuppam Village, Pugalur Taluk, Karur District and Tamil Nadu State, calculated as per MoEF & CC Notification S.O. 2269 (E) Dated 1st July 2016. This EIA Report was prepared in compliance with ToR obtained vide Letter No. SEIAA-TN/F.No.9483/ToR-1419/2023 dated 30.03.2023 and the baseline monitoring study was carried out during the period of October – December 2021.

11.1 PROJECT DESCRIPTION

Table 11.1 Salient Features – Proposed Quarry (P1)

Name of the Quarry	Mr. K. Shanmugam Rough Stone and Gravel Quarry	
Type of Land	Patta land	
Extent	0.73.5 ha	
S.F. No.	76/2	
Toposheet No.	58-F/13	
Highest Elevation	165 m AMSL	
Latitude	10°59'50.08"N to 10°59'54.61"N	
Longitude	77°57'36.96"E to 77°57'39.16"E	
Ultimate Depth	20 m BGL	
Geological Resources	Rough stone (m ³)	Gravel (m ³)
	124440	21960
Mineable Reserves	25585	9315
Proposed production for 5 years	22660	9315
Method of Mining	Open cast semi-mechanized method	
Topography	Plain	
Machinery proposed	Jack hammer	2
	Compressor	1
	Tipper	1
	Excavator	1
Proposed Manpower Deployment	14 Persons	
Project Cost	Rs.42,99,500/-	

Source: Approved Mining Plan and Survey of India Toposheet

Table 11.2 Land Use Pattern of the Proposed Project

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under quarry	Nil	0.34.10
Infrastructure	Nil	0.03.00
Roads	Nil	0.02.00
Drainage, Settling Tank	Nil	0.03.10
Green Belt area	Nil	0.30.10
Unutilized area	0.73.50	0.01.20
Total	0.73.50	0.73.50

Source: Approved Mining plan

Table 11.3 Resources and Reserves of Proposed Project

Resource Type	Rough Stone in m ³	Top Soil in m ³
Geological Resource in m ³	124440	21960
Mineable Reserves in m ³	25585	9315
Proposed Production for 5 Years in in m ³	22660	9315

Source: ToR

Table 11.4 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth(m)
I	69	45	20

Source: ToR

Table 11.5 Water Requirement of the Proposed 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	0.7 KLD	Existing bore wells and approved water vendors
Total	2.7 KLD	

Source: Prefeasibility report

11.2 DESCRIPTION OF THE ENVIRONMENT

The baseline monitoring study was carried out during October 2021– December 2021 to assess the existing environmental scenario in the area. For the purpose of EIA studies, project area was considered as the core zone and area outside the project area up to 5 km radius from the periphery of the project site was considered as buffer zone.

Baseline Environmental data has been collected with reference to proposed mines for:

- a) Land
- b) Water
- c) Air
- d) Noise
- e) Biological
- f) Socio-economic status

11.2.1 Land Environment

Land use pattern of the study area was studied using Sentinel II image. Six LULC types are given in Table 11.6.

Table 11.6 Land Use / Land Cover Statistics for 5 Km Radius

S. No.	Classification	Area (ha)	Area in %
1	Crop land	6790.2	89.8
2	Dense Forest	79.0	1.0
3	Fallow land	176.0	2.3
4	Mining / Industrial wastelands	236.4	3.1
5	Plantations	275.1	3.6
6	Settlement	5.3	0.1
	Total	7562	100

Source: Sentinel II Satellite Imagery

From the land use/land cover analysis, it is known that the majority of the land in the study area is crop land covering 89.8% of the total land area, followed by plantations (3.6%), dense forest (1.0%), fallow land (2.3%) and settlement (0.1%). The total mining area within the study area is 236.4 ha (3.1%) among other LULC types. The cluster area of 16.03 ha contributes only 0.109 % to the study area. This small percentage of mining activities shall not have any significant impact on the environment.

11.3 SOIL CHARACTERISTICS

11.3.1 Physical Characteristics

- ❖ The soil texture found in the study area is clay loam and sandy loam.
- ❖ pH of the soil varies from 6.98 to 8.03 indicating slightly alkaline nature.
- ❖ Electrical conductivity of the soil varies from 399 to 476 $\mu\text{s}/\text{cm}$ and
- ❖ The water content varies from 2.18 to 3.80 %.

11.3.2 Chemical Characteristics

- ❖ Nitrogen ranges between 76 and 141 mg/kg.
- ❖ Phosphorus ranges between 0.89 and 1.90 mg/kg.
- ❖ Potassium ranges between 240.3 and 334.9 mg/kg.
- ❖ Calcium ranges between 124 and 182 mg/kg;
- ❖ Magnesium ranges between 20.7 and 34.0 mg/kg.
- ❖ Sodium ranges between 322 and 538 mg/kg.
- ❖ Dry matter content ranges between 1.01 and 9.80.

11.4 WATER ENVIRONMENT

11.4.1 Ground Water

- ❖ The pH of the water samples ranges from 7.10 to 8.10.
- ❖ TDS are found in the range between 314 and 548 mg/l.
- ❖ The total hardness varies between 176 and 370 mg/l.
- ❖ Calcium varies from 34 to 63 mg/l and magnesium from 16 to 44 mg/l.
- ❖ Sodium varies from 111 to 265 mg/l.
- ❖ Potassium from 01 to 10 mg/l.
- ❖ Bicarbonate varies from 156 to 360 mg/l.
- ❖ Nitrate varies from 10 to 39 mg/l.
- ❖ Chloride varies from 123 to 405 mg/l; sulphate from 66 to 107 mg/l; and fluoride from 0.2 to 1.0 mg/l.
- ❖ When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits.

11.5 AIR ENVIRONMENT

11.5.1 Site Specific Meteorology

Site specific meteorology during the study period was recorded by an automated weather station.

Table 11.7 Meteorological Data Recorded at Site

S. No.	Parameters		OCT, 2021	NOV,2021	DEC,2021
1	Temperature (⁰ C)	Min	21.48	20.62	14.00
		Max	32.81	30.03	30.33
		Avg	26.21	24.53	23.14
2	Relative Humidity (%)	Min	52.12	60.25	54.94
		Max	98.31	99.88	100.00

		Avg	83.78	89.74	85.44
3	Wind Speed (m/s)	Min	0.05	0.08	0.07
		Max	7.05	7.75	6.66
		Avg	2.31	2.52	2.75
4	Wind Direction (degree)	Min	0.00	0.70	1.50
		Max	358.30	359.62	359.63
		Avg	183.04	168.01	86.37
5	Surface Pressure(kPa)	Min	97.51	97.53	98.30
		Max	98.97	98.88	99.26
		Avg	98.35	98.39	98.80

Source: On-site monitoring/sampling by Ekdant Enviro Services (P) Limited in association with GTMS

11.5.2 Ambient Air Quality Results

As per the monitoring data, PM_{2.5} ranges from 20.66 µg/m³ to 23.58 µg/m³; PM₁₀ from 41.36 µg/m³ to 44.98 µg/m³; SO₂ from 6.04 µg/m³ to 7.96 µg/m³; NO_x from 24.11 µg/m³ to 27.14 µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

11.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 08 locations around the proposed project area. The noise level in core zone was 46.0 dB (A) Leq. during day time and 39.1 dB (A) Leq. during night time and that noise levels in buffer zone varied from 40.1 to 47.2 dB (A) Leq. during day time and from 36.5 to 39.3 dB (A) Leq. during night time. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.7 BIOLOGICAL ENVIRONMENT

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 and no species in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna. The study involved assessment of general habitat type, vegetation pattern, preparation of inventory of flora and fauna of terrestrial ecosystem within 10 km radius from the boundary of the proposed quarry site. Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. 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.

11.8 SOCIO-ECONOMIC ENVIRONMENT

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.

11.9 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The summary of anticipated adverse environmental impacts due to the proposed project and mitigation measures are given below:

Table 11.8 Anticipated Impacts & Mitigation Measures

Impact	Mitigation Measure
Land Environment	
<ul style="list-style-type: none"> ❖ Destruction of natural landscapes ❖ Changes in soil characteristics ❖ Soil erosion and slope instability 	<ul style="list-style-type: none"> ❖ Mining will be carried out as per approved mine plan in scientific and systematic way ❖ Safety Zone or Buffer area will be maintained and will not be mined and instead plantation will be carried out in the safety zone ❖ Barbed wire fencing will be provided all along the proposed mine boundary ❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir ❖ Construction of garland ❖ Construction of garland drains all around the quarry pit and construction of settling traps at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
Water Environment	

<ul style="list-style-type: none"> ❖ Decrease in aquifer recharge and increase in surface runoff; ❖ Disturbance to land drainage, overload and erosion of watercourses; ❖ Changes to the surface over which water flows; ❖ Changes to surface and groundwater resources quantity and quality due to stream blockage and contamination by particulate matter or waste; ❖ Contamination of aquifers due to removal of the natural filter medium. 	<ul style="list-style-type: none"> ❖ Construction of garland drains all around the quarry pit and construction of settling traps at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area ❖ De-silting will be carried out before and immediately after the monsoon season and the settling tank and drains will be cleaned weekly, especially during monsoons ❖ Domestic sewage from site office & urinals/latrines provided in project area will be discharged through septic tank followed by soak pit system. ❖ Tippers & HEMM will be washed in a designated area and the washed water will be routed through drains to a settling tank, which has an oil & grease trap, only clear water will be reused for greenbelt development.
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Air Environment

<ul style="list-style-type: none"> ❖ Generation of Fugitive Dust ❖ Dust will be generated mainly during excavation, loading & unloading activities. ❖ Gaseous pollutants will be generated mostly by the traffic. ❖ Reduction in visibility due to dust plumes. ❖ Coating of surfaces leading to annoyance and loss of amenity. ❖ Physical and/or chemical contamination and corrosion. 	<ul style="list-style-type: none"> ❖ Haul roads will be well maintained by sprinkling water twice a day ❖ The access road will be cleaned and brushed to ensure that mud and dust deposits do not accumulate. ❖ To ensure that dust and debris is minimised on the access road, all the tipper drivers will be instructed to use water spray system on all the tyres and spray water on the loaded material that is provided at the compound area before leaving the site ❖ Speed restrictions will be imposed to avoid spillage of loaded materials upon the road and to reduce wear and tear of the road. ❖ Weekly inspections of the condition of the access road by competent person employed, and immediate
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<ul style="list-style-type: none"> ❖ Increase in the concentration of suspended particles in runoff water. ❖ Coating of vegetation leading to reduced photosynthesis, ❖ Inhibited growth, destroying of foliage, degradation of crops; ❖ Increase in health hazards due to inhalation of dust. 	<p>action will be taken to address any potholes or damage to the road surface.</p> <ul style="list-style-type: none"> ❖ Dust wetting agents can be mixed with the water applied to haul roads during hot, dry weather conditions to increase the duration that the road surface remains damp. ❖ Personal Protective Equipment's will be provided to all workers ❖ All drilling rods used will have dust suppression systems fitted which injects water into the hole. ❖ Wet gunny bags will be used as a cover while drilling. ❖ The blast zone will be kept damp by the application of water from the rain gun fitted to the water tanker prior to each blast to control any fugitive dust emissions that could arise from the surface during detonation. ❖ A daily visual inspection shall be conducted by the site manager who will keep a daily log of all process operations and site activities and note any malfunctions which could lead to abnormal emissions from the quarry operations. ❖ A site speed limit of 20 km/h will be set to minimise the potential for dust generation ❖ Weekly maintenance programme to identify machinery due for maintenance, based on the number of hours it has been in operation. ❖ Air filters are renewed after every 10⁰ hours of use, unless otherwise indicated by an on-board computer system. ❖ All site machineries & tippers will be serviced and maintained 6 months once and drivers will report any
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	defects immediately to the site manager to enable repairs to be carried out promptly.
Noise & Vibration	
❖ Annoyance and deterioration of the quality of life;	<ul style="list-style-type: none"> ❖ Usage of sharp drill bits while drilling which will help in reducing noise; ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise; ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise; ❖ Silencers / mufflers will be installed in all machineries; ❖ Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise; ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
Biological Environment	
<ul style="list-style-type: none"> ❖ Direct impacts include land clearance and excavation causing destruction of flora and fauna and loss of habitats; ❖ Indirect impacts include habitat degradation due to noise, dust, and human activity. 	<ul style="list-style-type: none"> ❖ Only some common herbs, shrubs and grass will be cleared. So, there will be no impact on the biodiversity. ❖ Green belt development with suitable species will enhance the biodiversity of the project area. ❖ The core zone or buffer zone does not encompass any threatened flora or fauna species.
Socio-Economic Environment	

<ul style="list-style-type: none"> ❖ Health and safety of workers and the general public; ❖ Increase in traffic volumes and sizes of road vehicles; ❖ Economic issues, including the increase in employment opportunities; 	<ul style="list-style-type: none"> ❖ The mining activity puts negligible change in the socio-economic profile. ❖ Around 88 local workers will get employment opportunities along with periodical training to generate local skills. ❖ New patterns of indirect employment/ income will generate. ❖ Regular health check-up camp. ❖ Assistance to schools and scholarship to children will be provided.
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Occupational Health & Safety

<ul style="list-style-type: none"> ❖ Exposure to Dust ❖ Noise and Vibration Exposure ❖ Physical Hazards ❖ Respiratory hazards due to Dust exposure 	<ul style="list-style-type: none"> ❖ Provision of rest shelters for mine workers with amenities like drinking water etc. ❖ All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc. ❖ Training of employees for use of safety appliances and first aid in vocational training centre. ❖ Weekly maintenance and testing of all equipment as per manufacturers' guidelines. ❖ Pre placement and Yearly Medical Examination of all workers by a medical Officer ❖ First Aid facility will be provided at the mine site. ❖ Close surveillance of the factors in working environment and work practices which may affect environment and worker's health by the mine's manager employed. ❖ Working of mine as per approved mining plan and environmental plans
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11.10 ANALYSIS OF ALTERNATIVES

There are no alternatives suggested as the proposed mining area has the following advantages:

11.11 ENVIRONMENTAL MONITORING PROGRAM

Environmental Monitoring program will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

Table 11.9 Post Project Monitoring Program for Proposed Project

S. No.	Activity	Schedule
Air Pollution Monitoring		
1	Ambient Air Monitoring of parameters specified by TNPCB/SEIAA in their CTO/EC Order within the Applied Area	Once in every Six Months
2	Ambient Air Monitoring of parameters specified by TNPCB/SEIAA in their CTO/EC Order outside the Applied Area	Once in every Six Months
Water Quality Monitoring		
3	Monitoring water quality of rain water collected in mine pit area. Rain water will be used for plantation purpose.	Once in every Six Months
4	Monitoring of samples of tube well and open well or Surface Water bodies in nearby location. Parameters as per IS: 10500:1991	Once in every Six Months
5	Monitoring of water spray units	Log-sheet of water spray will be maintained on daily basis
Noise Quality Monitoring		
6	Noise in the ambient atmosphere within and outside the applied area	Once in every Six Months
Greenbelt Maintenance		
7	Monitor schedule for Greenbelt development as per approved mining plan	Once in every Six Months
Soil Quality Monitoring		
8	Grab Samples within and around the applied area	Once in every Six Months

11.12 ADDITIONAL STUDIES

11.12.1 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 is submitted along with this Draft EIA / EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

11.12.2 Risk Analysis & Disaster Management Plan for proposed project

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, and 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 time table are recorded along with pinpointed responsibilities. In the unlikely event that a consequence has occurred, disaster management kicks in. This includes instituting procedures pertaining to a number of issues such as communication, rescue, and rehabilitation. These are addressed in the disaster management plan. Both, the RA and DMP, are living documents and need to be updated whenever there are changes in operations, equipment, or procedures Assessment is all about preventing accidents and taking necessary steps to prevent it from happening. The Disaster Management Plan (DMP) is a guide, giving general considerations, directions, and procedures for handling emergencies likely to arise from planned operations. The DMP has been prepared on the basis of the Risk Assessment and related findings covered in the report.

11.13 PROJECT BENEFITS FOR PROPOSED PROJECT

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

- ❖ Improved road communication
- ❖ Rain water harvesting structures to augment the water availability for irrigation and plantation and ground water recharge
- ❖ 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 Programme
- ❖ Skill development & capacity building like vocational training
- ❖ Awareness program and community activities, like health camps, medical aids, sports & cultural activities, plantation etc.,

11.14 ENVIRONMENTAL MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs. 1549434** as capital cost and recurring cost as **Rs.1104088** 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.7675207** as shown in Table 10.10.

11.15 CONCLUSION

EIA study was performed as per the approved ToR and Standard ToR. Various environmental attributes were studied relating with aspects of mining activities. The related impacts were identified and evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and accordingly fund was allocated. The EMP has been dynamic, flexible and subject to periodic review. CER activities were identified and for its time bound implementation, fund has been allocated.

The project will increase the revenue of the State Govt. as well as it will help in the social upliftment of the local community. The green belt development programme will help in increasing the green cover in the area. Thus, the proposed project is not likely to affect the environment or adjacent ecosystem in an adverse way.

The Mines Management will be responsible for the project 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 XII

DISCLOSURES OF CONSULTANT

The Project Proponent, **Mr. K. Shanmugam** 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.

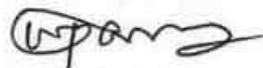
The accredited experts and associated members who were engaged in this EIA study are given below:

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. Vijayprabhu	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.	S.Vasugi	FAA	1(a)(i)	AQ	B
16.	P. Dhatchayini	FAA	1(a)(i)	AQ	B
17.	V.Malavika	FAA	1(a)(i)	NV, SHW	B

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

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

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

Signature : 

Date : 02.05.2023

Name : **Dr. S. Karuppannan**




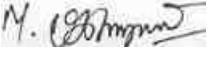

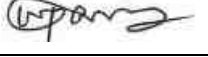



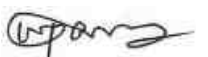

Designation : EIA Coordinator



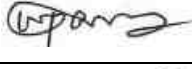




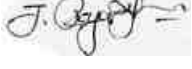

Name of the EIA Consultant Organization : Geo Technical Mining Solutions


Period of Involvement : Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for **Mr. K. Shanmugam** rough stone and gravel quarry project with the extent of 0.73.5 ha situated in the cluster with the extent of **16.03.0** ha in Kuppam Village of Pugalur Taluk, Karur District of Tamil Nadu is true and correct to the best of our knowledge.







List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity	J.N. Manikandan	
		○ Prediction of air pollution and propose mitigation measures / control measures	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	
			G. Uma Maheswaran	
			Dr.S. Karuppannan	
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	
			G.Uma Maheswaran	
			Dr.M. Vijay Prabhu	
			Dr.S. Karuppannan	
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	<ul style="list-style-type: none"> ○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna. ○ Suggesting species for greenbelt development. 	Dr.J. Rajarajeshwari	
7	RH	<ul style="list-style-type: none"> ○ Identification of hazards and hazardous substances ○ Risks and consequences analysis ○ Vulnerability assessment ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety. 	J.N. Manikandan	
8	LU	<ul style="list-style-type: none"> ○ Construction of Land use Map ○ Impact of project on surrounding land use ○ Suggesting post closure sustainable land use and mitigative measures. 	Dr.S. Karuppannan	
			G.Uma Maheswaran	
			Dr.M. Vijay Prabhu	
9	NV	<ul style="list-style-type: none"> ○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP. 	Dr.R. Arun Balaji	
10	AQ	<ul style="list-style-type: none"> ○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ Recommending mitigations measures for EMP 	Dr.R. Arun Balaji	
11	SC	<ul style="list-style-type: none"> ○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation 	Dr.J. Rajarajeshwari	
			Dr. D.Kalaimurugan	

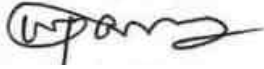
12	SHW	<ul style="list-style-type: none"> ○ Identify source of generation of non-hazardous solid waste and hazardous waste. ○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled. 	J.N. Manikandan	
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List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	G. Prithiviraj	LU, HG	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU and HG 	
2	C. Kumaresan	NV	<ul style="list-style-type: none"> ○ Assistance to FAE in both primary and secondary data collection ○ Assistance in noise prediction modelling 	
3	P. Vellaiyan	HG & GEO	<ul style="list-style-type: none"> ○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection 	
4	S.Vasugi	AQ	<ul style="list-style-type: none"> ○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection 	
5	P. Dhatchayini	AQ	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Assistance to FAE in collection of both primary and secondary data 	
6	V. Malavika	NV, SHW	<ul style="list-style-type: none"> ○ Site visit along with FAE ○ Assistance in report preparation 	

**DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT
ORGANIZATION**

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for **Mr. K.Shanmugam** rough stone and gravel quarry project with the extent of 0.73.5 ha located within the cluster of **16.03.0** ha in Kuppam Village of Pugalur Taluk, Karur District of Tamil Nadu is true and correct to the best of my knowledge.

Signature : 

Date : 02.05.2023

Name : **Dr. S. Karuppannan**

Designation : Managing Partner

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

NABET Certificate No & Issue Date : NABET/EIA/2023/SA0067

Validity : Till 31.12.2023



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

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/F.No.9483/ToR- 1419/2023 Dated: 30.03.2023.

To

Thiru. K. Shanmugam
S/o Karumanagounder
Opp To V.S.T Petrol Bank
Punnamechathiram, Pugalur Taluk
Karur District 639136.

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference with public Hearing (ToR) for the proposed Rough stone Quarry lease over an extent of 0.73.5 Ha at S.F.Nos. 76/2 of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu by Thiru K. Shanmugam - under project category – “BI” 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/ 401527 /2022, dated: 28.09.2022.
 2. Your application submitted for Terms of Reference dated: 29.09.2022.
 3. Minutes of the 360th SEAC meeting held on 03.03.2023.
 4. Minutes of the 606th Authority meeting held on 29.03.2023 & 30.03.2023.

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

The proponent, Thiru K. Shanmugam has submitted application for Terms of Reference (ToR), for the proposed Rough stone Quarry lease over an extent of 0.73.5 Ha at S.F.Nos. 76/2 of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu.


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SEIAA-TN

SEAC Remarks:-

Proposed Rough stone Quarry lease over an extent of 0.73.5 Ha at S.F.Nos. 76/2 of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu by Thiru K. Shanmugam - For Terms of Reference. (SIA/TN/MIN/401527/2022, dated: 28.09.2022)

The proposal was placed in 360th SEAC meeting held on 03.03.2023. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, Thiru K. Shanmugam has applied for Terms of Reference for the Proposed Rough stone Quarry lease over an extent of 0.73.5 Ha at S.F.Nos. 76/2 of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. The lease period is for 10 years and the mining for the entire period of first five years should not exceed 22,660 cu. m of Rough Stone & 9,315 cu. m of Gravel and 2,925 cu. m for second five years. The annual peak production is 6,450 cu. m of Rough Stone. The ultimate depth of mining is 20m (3m – Gravel and 17m – Rough Stone).
4. The proponent is proposing to carry out hand quarrying of stone.

Based on the presentation made by the proponent SEAC recommended 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 proponent is requested to submit the valid registered lease document during the EIA appraisal after the previous lease granted for the mining operations is legally surrendered (or) lapsed with the consent of the competent authority.
2. The proponent is requested to carry out a survey and enumerate on the structures including the crematory shed located within 100m, 200m, 300m from the boundary of the mine lease area.
3. The proponent must conduct a survey and furnish the details of habitations which is located within 300m radius (Nochikattur village) from the proposed mine lease area and impact of the proposed quarrying operations on the above habitations/structures.
4. The proponent must submit certified compliance report obtained from IRO of MoEF&CC as

per OM IA3-22/10/2022-IA.III Dated 08.06.2022.

5. 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.
6. 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 activity. Necessary data and documentation in this regard may be provided.
7. The proponent shall submit the details regarding the nature of blasting activity which will be carried out.
8. The PP shall furnish DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., upto a radius of 25 km from the proposed site.
9. The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.
10. In the case of proposed lease in an existing (or old) quarry where the benches are non-existent (or) partially formed critical of the bench geometry approved in the Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the 'highwall' benches to ensure slope stability in the proposed quarry lease which shall be vetted by the concerned Asst. Director of Geology and Mining, during the time of appraisal for obtaining the EC.
11. The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry indicating the proposed stabilizing measures during the appraisal while obtaining the EC, as the depth of the proposed working is extended beyond 30 m below ground level.
12. The PP shall furnish the affidavit stating that no blasting operation in the proposed quarry is carried out as it involves only manual means of rock breaking.
13. **If the blasting operation is to be carried out, the PP shall present a conceptual design for carrying out the NONEL initiation based controlled blasting operation involving line drilling & muffle blasting and Simulation Model indicating the anticipated Blast-**


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induced Ground Vibration levels in the proposed quarry as stipulated by the DGMS Circular No.7 of 1997, during the EIA Proposal.

14. Details of Green belt & fencing shall be included in the EIA Report.
15. 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.
16. 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,
 - a) What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
 - b) Quantity of minerals mined out.
 - c) Highest production achieved in any one year
 - d) Detail of approved depth of mining.
 - e) Actual depth of the mining achieved earlier.
 - f) Name of the person already mined in that leases area.
 - g) If EC and CTO already obtained, the copy of the same shall be submitted.
 - h) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
17. 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).
18. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,
19. 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.
20. 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.
21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
 22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
 23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
 24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
 25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
 26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
 27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
 28. Impact on local transport infrastructure due to the Project should be indicated.
 29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
 30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report.


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which should be site-specific.

31. Public Hearing points raised and commitments 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 and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.
32. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
33. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
34. 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.
35. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
36. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
37. 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.
38. 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.
39. 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.

40. 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.
41. 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.
42. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
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. 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.
45. 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.
46. 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.

SEIAA Remarks:-

The proposal was placed in the 606th Authority meeting held on 30.03.2023. The authority noted that the subject was appraised in 360th SEAC meeting held on 03.03.2023.

Based on the presentation made by the proponent SEAC decided to recommend for grant of Terms of Reference (TOR) with Public Hearing.

After detailed deliberations, the Authority accepted the recommendations of SEAC and decided to grant Terms of Reference subject to the conditions as recommended by SEAC in addition to the following conditions and conditions stated therein vide Annexure 'B':


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1. The proponent shall submit a letter obtained from AD/Mines regarding the working methodology of the proposed mine.
2. The proponent shall submit the details regarding the working efficiency of the individual labours and per day quantity that will be achieved shall be submitted.
3. The proponent shall submit the number of labours employed in the mining activity including male and female.
4. The proponent shall submit the list of Labours to be employed.
5. The proponent shall submit the details regarding the project cost which shall include the cost for Health measurements for the labours.

Annexure 'B'

Cluster Management Committee

1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.
2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,
3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.
4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.
5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.
6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.
7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.
8. The committee shall furnish the Emergency Management plan within the cluster.

9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.
10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.
11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.

Impact study of mining

12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
 - a) Soil health & soil biological, physical land chemical features.
 - b) Climate change leading to Droughts, Floods etc.
 - c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
 - d) Possibilities of water contamination and impact on aquatic ecosystem health.
 - e) Agriculture, Forestry & Traditional practices.
 - f) Hydrothermal/Geothermal effect due to destruction in the Environment.
 - g) Bio-geochemical processes and its foot prints including environmental stress.
 - h) Sediment geochemistry in the surface streams.

Agriculture & Agro-Biodiversity

13. Impact on surrounding agricultural fields around the proposed mining Area.
14. Impact on soil flora & vegetation around the project site.
15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.
16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

Forests

19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.
20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.

Water Environment

23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
24. Erosion Control measures.
25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.
28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.
29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.

Energy

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

Climate Change

32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.

Mine Closure Plan

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

EMP

35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.

Risk Assessment

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

Disaster Management Plan

38. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.

Others

39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.


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40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.

41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

A. STANDARD TERMS OF REFERENCE

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

hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

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


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- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society

in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

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


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- and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
 - 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
 - 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
 - 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
 - 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
 - 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
 - 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
 - a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise


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

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.

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


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

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

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

approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.

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


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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, Karur District.
7. Stock File.

From
Dr.P.Jayapal M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Karur.

To
Thiru.K.Shanmugam,
S/o.Karumanagounder,
Opp To V.S.T. Petrol Bunk,
Punnamchathiram,
Pugalur Taluk,
Karur District 639 136.

Rc.No.311/Mines/2021, Dated:16.09.2022

Sir,

Sub: Mines and Minerals – Minor Mineral – Karur District – Pugalur Taluk – Kuppam Village - S.F.No.76/2 Over an extant 0.73.50 hectares - Quarry lease application – Rough stone and Gravel – preferred by Thiru.K.Shanmugam – Mining Plan approved - Existing/ proposed/ abandoned quarries situated within 500 mts radial distance - details furnished – Regarding.

- Ref: 1. Quarry lease application for Rough stone and Gravel preferred by Thiru.K.Shanmugam, S/o.Karumanagounder, Opp To V.S.T. Petrol Bunk, Punnamchathiram, Pugalur Taluk, Karur District - 639 136, dated: 29.07.2021.
2. Pricise Area Communication Notice Rc.No.311/Mines/2021, Dated: 12.08.2022.
- 3 Mining Plan submitted by Thiru.K.Shanmugam, Letter dated: 22.08.2022.
4. The Deputy Director, Geology and Mining, Karur Mining Plan approved letter No. 311/Mines/2021, dated: 01.09.2022
5. Thiru.K.Shanmugam letter dated: 02.09.2022

In the reference 1st cited, Thiru.K.Shanmugam have applied quarry lease for quarrying Rough stone and Gravel lease in patta land of S.F.No.76/2 Over an extant 0.73.50 hectares in Kuppam Village, Pugalur Taluk, Karur District. The Deputy Director of Geology and Mining, Karur have issued precise area for the applied area vide ref. 2nd cited.

Accordingly, the applicant has submitted Mining Plan and it was approved by the Deputy Director, Geology and Mining, Karur vide ref. 4th cited.

2. Details of Existing, Proposed and abandoned quarries located within 500 meters radial distance from subject area is furnished below as requested by the applicant for want of Environmental Clearance vide reference 5th cited.

I. Existing Other Quarries: -

Sl No.	Name of the Owner	S.F.No.	Extent (hect)	Lease Period	Remarks.
1			---- Nil---		

II. Proposed Area: -

Sl No.	Name of the Owner	S.F.No.	Extent (hect)	Lease Period	Remarks.
1	Thiru.K.Shanmugam, S/o.Karumanagounder, Opp To V.S.T. Petrol Bunk, Punnamchathiram, Pugalur Taluk, Karur District	76/2	0.73.50		Proposed Area
2	Thiru.K.Nallasamy, S/o.Krishnan, Door No.4/71, R.G.Nagar, VTC Punnam Post, Punnamchatram, Pugalur Taluk, Karur District	226/1(P)	2.89.0		Applied Area
3	Tvl.NTC Blue Metals LLP, Prop.of.Mr.S.Muthusamy, Rasampalayam, Keelsathambur village, Namakkal District - 637 207	76/1(P)	0.63.0		
4	Tmt.V.Kavitha, W/o.Vadivel, Nochikattur, Kuppam Village, Karur District	75/1A 75/1B 75/2	1.88.0		

III. Lease Expired and abandoned Area: -

Sl No.	Name of the Owner	S.F.No.	Extent (hect)	Lease Period	Remarks.
1	Thiru.P.Marappan S/o.Palaniyappan Andipatti Kuppam Village AravkurichiTlauk Karur District.	74 75/3B	2.11.5	14.10.2016 to 13.10.2021	----
2	V.K.Subramani, S/o.Karuppanna Gounder, Velliyampalayam, Punnam Chadram, Karur.	99/2(P)	0.63.0	21.10.2010 to 20.10.2015	----

M. S. S. S.
16/5/22

Deputy Director,
Geology and Mining,
Karur.

S. S. S.
16/09/22

MINING PLAN

FOR KUPPAM ROUGH STONE AND GRAVEL MINING LEASE WITH
PROGRESSIVE QUARRY CLOSURE PLAN

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

Lease period 10 Years from the date of lease execution

(For the ensuring mining plan prepared for the period of first five years)

(Prepared under rule 41 (3) (i) and submitted under rule 41 (8) (i) of Tamil Nadu Minor Mineral
Concession Rules, 1959 Amendments, 2019)

LOCATION OF THE LEASE AREA

STATE : TAMILNADU
DISTRICT : KARUR
TALUK : PUGALUR
VILLAGE : KUPPAM
S.F.NO : 76/2
EXTENT : 0.73.5 HECTARES

ADDRESS OF THE APPLICANT

Mr.K.SHANMUGAM,

S/o. Karumanagounder,

Opp To V.S.T.Petrol Bunk

Punnamechathiram, Pugalur Taluk,

Karur District – 639136, Tamil Nadu State., India.

Mob.No.+918940003470

This Mining Plan is approved subject
to the conditions/stipulations
indicated in the Mining Plan approval

Letter No: 211/mine/2021
Dated: 01/09/2022

PREPARED BY

GEO TECHNICAL MINING SOLUTIONS

NABET/APA-MPPA/IA/017

(A NABET Accredited & ISO Certified Company)

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

Oddapatti, Collectorate Post office,

Dharmapuri-636705. Tamil Nadu.

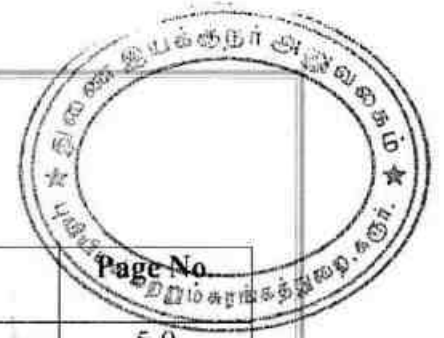
Mob. : +91 9443937841, +917010076633,

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

Website: www.gtmsind.com



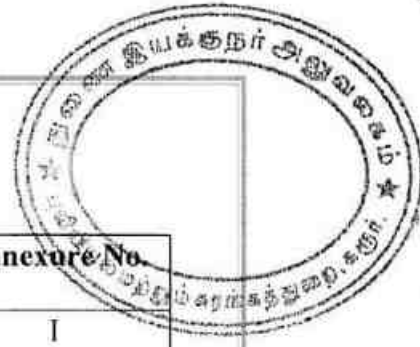
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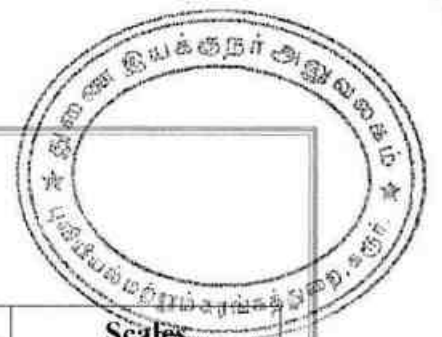
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6.	Photo copy of the applied lease area	VI
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8.	Copy of ID Proof of the authorized signatory	VIII
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LIST OF PLATES



Sl. No.	Description	Plate No.	Scales
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6.	Mine lease plan	II	Plan scale : 1:1000
7.	Surface, Geological plan and section	III	Plan scale: 1:1000 Section: HOR 1:1000 VER 1:500
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10.	Progressive Mine closure plan and Sections	VI	Plan scale: 1:1000 Section: HOR 1:1000 VER 1:500
11.	Conceptual plan & section	VII	Plan scale: 1:1000 Section: HOR 1:1000 VER 1:500

K.SHANMUGAM,
S/o. Mr.Karumanagounder,
Opp To V.S.T.Petrol Bunk,
Punnamchathiram, Pugalur Taluk,
Karur District – 639136,
Tamil Nadu State.



CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry lease in S.F.No: 76/2, over an extent of 0.73.5 hectares of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State has been prepared by

Geo Technical Mining Solutions, Certificate No. NABET/APA-MPPA/IA/017

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

GEO TECHNICAL MINING SOLUTIONS
Certificate No.NABET/APA-MPPA/IA/017
(A NABET accredited & ISO certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841, +91 7010076633
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

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

Place: Karur, TN

Date:

Signature of the applicant
(K. SHANMUGAM)

K.SHANMUGAM,
S/o. Mr.Karumanagounder,
Opp To V.S.T.Petrol Bunk,
Punnamchathiram, Pugalur Taluk,
Karur District – 639136,
Tamil Nadu State.



DECLARATION

The Mining Plan in respect of rough stone and gravel quarry lease in S.F.No: 76/2, over an extent of 0.73.5 hectares of Kuppam Village, Pugalur Taluk, Karur 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: Karur, TN

Date:

Signature of the applicant
(K. SHANMUGAM)

CERTIFICATE



Geo Technical Mining Solutions, Dharmapuri is the NABET accredited **Prospecting/ Exploration & Mining Plan Preparation Agency** to prepare mining plan have an office at No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705, Tamil Nadu.

Geo Technical Mining Solutions prepared this Mining plan and progressive Quarry Closure plan in respect of rough stone and gravel quarry lease in S.F.No: 76/2, over an extent of 0.73.5 hectares of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State. Since the mining plan is prepared as per the provisions contained in Rule 15(1)(a) and (1)(b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Place: Dharmapuri, TN

Date: 19/8/2022

Geo Technical Mining Solutions

NABET/APA-MPPA/IA/017

GEO TECHNICAL MINING SOLUTIONS

A NABET Accredited and ISO Certified Company

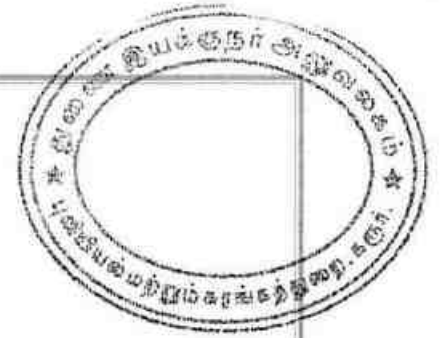
1/213-B, Ground Floor, Natesan Complex,

Collectorate Post Office, Oddapatti,

Dharmapuri - 636 705, Tamil Nadu, India.

Ph: 04342-232777, 94439 37841

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



CERTIFICATE

This is to certify that, the provisions of 19(1), 20 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 S.F.No: 76/2, over an extent of 0.73.5 hectares of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State applied for **Mr.K.Shanmugam**, Karur - 639136.

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: 19/8/22

Geo Technical Mining Solutions
NABET/APA-MPPA/IA/017
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
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E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

This is to certify that the preparation of mining plan for rough stone and gravel quarry lease S.F.No: 76/2, over an extent of 0.73.5 hectares of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State prepared to **Mr.K.Shanmugam**, Karur - 639136. 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: 19/8/22

Geo Technical Mining Solutions
NABET/APA-MPPA/IA/017
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri - 636 705, Tamil Nadu, India.
Ph: 04342-232777, 94439 37841

This Mining Plan is approved subject
to the conditions/stipulations
indicated in the Mining Plan approval
Letter No:
Dated:

MINING PLAN

FOR KUPPAM ROUGH STONE AND GRAVEL MINING LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

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

Lease period 10 Years from the date of lease execution

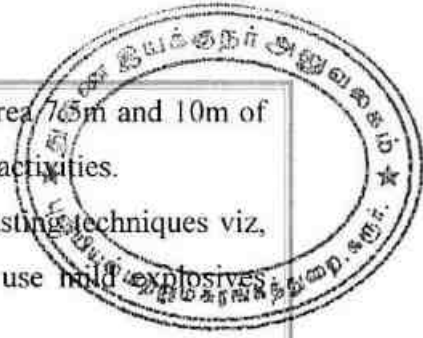
(For the ensuring mining plan prepared for the period of first five years)

(Prepared under rule 41 (3) (i) and submitted under rule 41 (8) (i) of Tamil Nadu Minor Mineral
Concession Rules, 1959 Amendments, 2019)

INTRODUCTORY NOTES:-

- a) **Introduction:** Mr.K.Shanmugam S/o. Mr.Karumanagounder have residing at V.S.T.Petrol Bunk (Opp), Punnamchathiram -Post, Pugalur Taluk, Karur District, Tamil Nadu State and had with new proposal requested to the Deputy Director, Department of Geology and Mining, Karur grant the quarrying lease in S.F.No: 76/2, over an extent of 0.73.5 hectares of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State for rough stone and gravel for a period of ten (10) years.
- b) **Lease area particulars:** The Deputy Director, Department of Geology and Mining, Karur had directed to the applicant Mr.K.Shanmugam, through precise area communication letter Roc.No.311/Mines/2021 Dated 12.08.2022 for quarrying lease rough stone and gravel at Tamil Nadu State, Karur District, Pugalur Taluk, Kuppam Village in S.F.No: 76/2, over an extent of 0.73.5 hectares has recommended as following conditions for a period of 10 years under Rule 19 (1), 20 and 22 of Tamil Nadu Minor Mineral Concession Rules, 1959.
1. A 10metres safety distance should be left out cart track project situated on southern side of the applied area and should not cause any damage while quarrying.
 2. The 15 form houses are situated on 300m radius of periphery of proposed site and all the form house owners gave consent to the project proponent should not cause any damage while quarrying operation period.
 3. There is a low-tension power line passing on south eastern side over the cart track and a 50meters safety distance should be left out while quarrying operation.

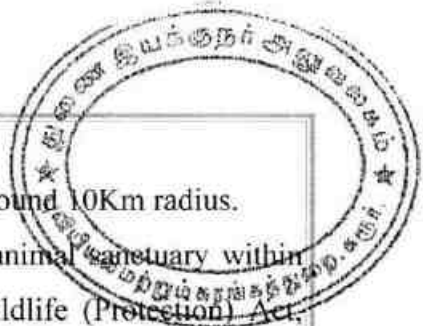
(This Mining Plan is approved subject
to the conditions/stipulations
indicated in the Mining Plan approval
Letter No: 311/mines/2021
Dated: 01/09/2022

- 
4. A safety distance should be left out nearby the applied area 75m and 10m of patta and poramboke land as respectively while quarrying activities.
 5. Quarrying operation to be carried out with controlled blasting techniques viz, hand-hack-Hammer, Driller for drilling shot holes and use mild explosives substance for blasting the rocks.
 6. To ensure the safety of quarry workers as per Metalliferous Mines acts should formed wide, safe benches. Inside the quarry in safe manner vehicles come and go, do the quarry work ensuring the safety of the quarry workers.
 7. To provide quarrying lease by the deputy director, Karur, approved mining plan, obtain Environmental Clearance from the State Level Environment Impact Assessment Authority-Tamil Nadu (SEIAA) and no objection certificate for Tamil Nadu Pollution Control Board (TNPCB) should be submitted.

c) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 (3) (i) and submitted under rule 41 (8) (i) of Tamil Nadu Minor Mineral Concession Rules, 1959 Amendments, 2019 for a fresh mining lease as per conditions mentioned in the precise area communication letter **Roc.No.311/Mines/2021 Dated 12.08.2022.**

d) **Geological resources and Mineable reserves:** Geological resource of estimated as **146400m³** including the resources of safety zone, and gravel. Of which, rough stone resources of about **124440m³** including the gravel resource of about **21960m³** up to a depth of 20m below the ground level (R.L.165m-145m) (Refer Plate No. III). The total mineable reserve is estimated to be **34900m³** by deducting the reserve safety zone, block in benches from the total Geological resources. Of which, rough stone is **25585m³** and gravel is **9315m³** up to a depth of 20m below the ground level (R.L.165m-145m) (Refer Plate No. VII).

e) **Proposed Production Schedule:** Total proposed production **31975m³**. Of which, rough stone is **22660m³** and gravel is **9315m³** up to a depth of 15m which is 0-3m of gravel (R.L.165m-162m) and rough stone starts with 3-12m below the ground level (R.L.162m-150m) for five years plan period. Average production is **4532m³** of rough stone and **9315m³** of gravel per year (Refer Plate No. IV).



f) **Environmental Sensitivity of the applied lease area: -**

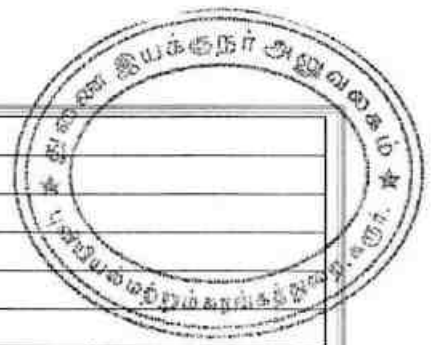
- i). **Interstate boundary:** No inter-state boundary situated around 10Km radius.
- ii). **Wildlife Protection Act, 1972:** There is no wild life animal sanctuary within 10Km radius from the project site area under the Wildlife (Protection) Act, 1972.
- iii). **Indian Reserve Forest Act, 1980:** There is no reserve forest within the 1km radius. The nearest Reserve Forest is
 - 1. Thathampalayam R.F. = 7.73km - SE
 - 2. Vangal R.F = 18.49km - NE
 - 3. Kattalai R.F = 23.40km - East
- iv). **CRZ Notification, 1991/2011:** There is no sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 1991/2011.

i) **Environmental measures to be adopted during the ongoing activity period:-**

- 1. Usage of sharp drill bits while drilling which will help in reducing noise.
- 2. Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.
- 3. Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.
- 4. Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.
- 5. Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- 6. Transportation of material will be carried out during day time and material will be covered with tarpaulin.
- 7. The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- 8. And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

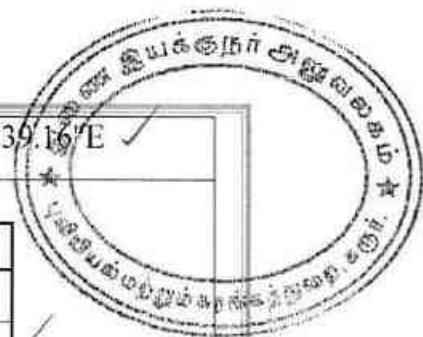
a.	Name of the Applicant	:	Mr.K.SHANMUGAM
	Applicant address	:	Mr.K.SHANMUGAM, S/o. Mr.Karumanagounder, Opp To V.S.T.Petrol Bunk, Punnamchathiram, Pugalur Taluk,
	District	:	Karur



	State	:	Tamil Nadu
	Pin code	:	639136
	Phone	:	+918940003470
	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 rough stone and gravel quarry lease period of 10 years.
e.	Name of the RQP preparing the Mining Plan	:	Geo Technical Mining Solutions GSR 286(E) No:272, Ministry of Mines Notification 7th April 2022.
	Address	:	No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
	Fax	:	Nil
	e-mail	:	info.gtmsdpi@gmail.com
	Telex	:	Nil
	Registration Number	:	NABET/APA-MPPA/IA/017
	Date of grant/renewal	:	28.03.2022
	Valid up to	:	27.03.2025
f.	Name of the prospecting agency	:	Geo Technical Mining Solutions GSR 286(E) No:272, Ministry of Mines Notification 7th April 2022.
	Address	:	No: 1/213-B, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705. web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
g.	Reference No. and date of consent letter from the state government	:	The precise area communication letter was received from the Deputy Director, Department of Geology and Mining, District collectorate, Karur vide Roc.No.311/ Mines /2021 Dated 12.08.2022.

2.0 LOCATION AND ACCESSIBILITY:

Details of the Area:	: Refer plate no: IA & IB
District & State	: Karur, Tamil Nadu
Taluk	: Pugalur
Village	: Kuppam
Khasra No./ Plot No./ Block Range/ Felling Series etc.	76/2
Lease area (hectares)	: 0.73.5hectares
Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	: No. This is a patta land.
Ownership / Occupancy	: This is a patta land S.F.No. 76/2 is registered on the name of Mr. Sanmugam S/o. Mr. Mr.Karumana Gounder, vide Patta No 3982. (Ref. Annex. no:V).
Existence of Public Road / Railway line if any nearby and approximate distance	: ✓ Exploited materials will be transported through engaged the village metals road is situated on south side. ✓ The SH-84 road is situated about 4.78km away from the east side which is connecting Karur-Erode Road. ✓ There is no NH-road found within radius of 5km. ✓ No Railway line is found within the radius of 5km.
Toposheet No. with latitude and longitude	: Toposheet No. 58 F/13 Latitude : From 10°59'50.08"N to 10°59'54.61"N longitude: From 77°57'36.96"E to ✓



77°57'39.16"E ✓

Geo-Coordinates of the lease boundary:

Pillar ID	Latitude	Longitude
1	10°59'54.61"N ✓	77°57'38.81"E
2	10°59'51.90"N	77°57'39.16"E ✓
3	10°59'50.08"N ✓	77°57'39.07"E
4	10°59'50.21"N	77°57'36.96"E ✓
5	10°59'53.72"N	77°57'36.98"E
6	10°59'53.96"N	77°57'37.59"E
7	10°59'54.34"N	77°57'37.72"E

Land use pattern (Forest, Agricultural, Grazing, Barren etc.) : It is a barren and vrigin 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 IN AERIAL DISTANCE:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Kuppam	4.0Km	West
b.	Nearest police station	K.Paramathi	7.0km	SW
c.	Nearest fire station	Karur	14.0km	SE
d.	Nearest medical facility	Punnam	4.0Km	SE
e.	Nearest school	Salipalayam	2.5Km	SW
f.	Nearest railway station	Karur	14.0km	East
g.	Nearest port facility	Tuticorin	253.0km	South
h.	Nearest airport	Coimbatore	100km	NW
i.	Nearest DSP office	Karur	15.0km	East
j.	Nearest villages	Nochikattur	0.360km	North
		Talaiyuttuppatti	0.66km	SW
		Pullaiyampalayam	1.12km	NE
		Kuppam	4.0km	West

PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

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

(i)	Topography	: The lease area exhibits a plain topography and the relief of 1m. The highest elevation observed in southwestern of the lease area is 165m AMSL, whereas the lowest elevation in northeastern side is 164m AMSL. The slope is towards northeastern side and falls in Toposheet no. 58-F/13.
(ii)	<p>a) Geology of the District :</p> <p>The Karur district forms part of the Archean complex of peninsular gneiss. The general rock types of this area are Biotite gneiss. Karur District is blessed with good reserves of crystalline limestone known as “Palayam belt” in Varavanai, Thennilai, Gudalur etc., villages in Kulithalai Taluk and the occurrences of good quality of pegmatite veins constituting with glassy quartz and potash feldspar in lensoid patches in Nagampalli and Pungambadi areas in Aravakurichi Taluk. The major mineral such as limestone, quartz and feldspar are exploited in Karur district and utilized in the mineral based industries.</p> <p>The Granite gneiss rocks are found to occur in K.Paramathi, Athur, Thennilai, Punnam, Kuppam, Munnur, Karudayampalayam, Anjur villages in Karur and Aravakurichi Taluk are exploited to produce building materials and road metal (Jelly) and over burden soil appear as gray to reddish in colour called as gravel. The commercially known “Coloumbo Zubrana” the unique type in the Multi coloured granite / Granite gneiss category is occurring in Thogamalai, Naganur and Kazhugur Villages in Kulithalai Taluk. These rock type belong to minor mineral category. The arrangement of alternate layers of felsic and mafic minerals in linear pattern and exhibits wavy pattern in the rock and giving very good structure for the rock type. The well-developed gneissic pattern with linear arrangement, the rock type have attracted the granite market and found to be suitable for the exploitation of granite blocks. But in this area the banded gneissic rock has many fractures and foliation in it. So, this is not viable for dimensional stone. Order of superposition of the proposed lease area,</p>	

Age	Group	Rock Formation
Recent to Sub recent	----	Topsoil (1-2m thick)
Proterozoic	Acid intrusive	Pink medium grained granite/ Granite gneiss
Archaean	Charnockite Group	Pyroxene Granulite, Charnockite (acid to intermediate) / Crystalline limestone / Quartzite

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

i) Topography of the proposed lease area:

The lease area exhibits a plain topography and the relief of 1m. The highest elevation observed in southwestern of the lease area is 165m AMSL, whereas the lowest elevation in northeastern side is 164m AMSL. The applied lease area is fresh, with covered lateritic (gravel) soil and beneath the charnockite rocks found based on existing pit nearby the lease area. Surface plan preparing for contour lines, surface features and Geological mapped the applied lease area.

ii) Mode of origin:

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

iii) 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.

iv) Chemical composition of rocks:

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

Age	Group	Rock Formation
Recent to Sub recent	----	Red soil
Archaean	Charnockite Group	Charnockites.

(iv)	Drainage Pattern	: There are no major water bodies like rivers, pond, etc., located within a radius of 300m. The drainage is dendritic in nature.																																
(b)	<i>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:</i>																																	
	a. Present status:	: The RQP examined the surface features during survey. It is a fresh quarry lease covered with lateritic (gravel) soil and beneath the charnockite rocks found based on existing pit nearby the 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.III.																																
(d)	<i>Broadly indicate the Year wise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below:-</i>																																	
<table border="1"> <thead> <tr> <th>Year</th> <th>No.of boreholes</th> <th>Total meterage</th> <th>No.of Pits and Dimensions</th> <th>No.of Trenches and Dimensions</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>N.A</td> <td>---</td> <td>---</td> <td>N.A</td> </tr> <tr> <td>Second</td> <td>N.A</td> <td>---</td> <td>---</td> <td>N.A</td> </tr> <tr> <td>Third</td> <td>N.A</td> <td>---</td> <td>---</td> <td>N.A</td> </tr> <tr> <td>Fourth</td> <td>N.A</td> <td>---</td> <td>---</td> <td>N.A</td> </tr> <tr> <td>Fifth</td> <td>N.A</td> <td>---</td> <td>---</td> <td>N.A</td> </tr> </tbody> </table>					Year	No.of boreholes	Total meterage	No.of Pits and Dimensions	No.of Trenches and Dimensions	First	N.A	---	---	N.A	Second	N.A	---	---	N.A	Third	N.A	---	---	N.A	Fourth	N.A	---	---	N.A	Fifth	N.A	---	---	N.A
Year	No.of boreholes	Total meterage	No.of Pits and Dimensions	No.of Trenches and Dimensions																														
First	N.A	---	---	N.A																														
Second	N.A	---	---	N.A																														
Third	N.A	---	---	N.A																														
Fourth	N.A	---	---	N.A																														
Fifth	N.A	---	---	N.A																														
No future programmed proposed in this area. Its massive charnockite homogeneous parent rock. Hence exploration proposal is not required to this mining project.																																		





(c) *Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.*

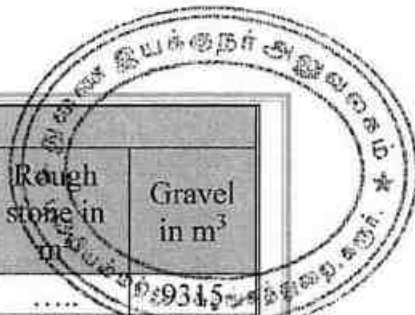
The geological resources were computed by cross section method with respect to the boundaries of the lease area. In this method, the lease area was divided into two sections (longitudinal and transverse) to calculate the volume of material up to the depth of 20m below ground level. The longitudinal and transverse cross sections were assigned X-Y and A-B as respectively. Using the cross-sectional method, total resources are estimated to be **146400m³** including the resources of safety zone, and gravel. Of which, rough stone is about **124440m³** and gravel resource of about **21960m³**.

The gravel obtained from 0-3m (R.L.165m-162m) surface level and a rough stone starts from 3 to 20m (R.L.162m-145m) below ground level. (Refer plate no.III).

GEOLOGICAL RESOURCES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Rough stone in m ³	Gravel in m ³
XY-AB	I	122	60	3	21960	.....	21960
	I	122	60	2	14640	14640	.....
	II	122	60	5	36600	36600	.....
	III	122	60	5	36600	36600	.....
	IV	122	60	5	36600	36600	.....
TOTAL				20	146400	124440	21960

(f) *Indicate mineable reserves by slice plan / level plan method, as applicable, as per the proposed mining parameters.*

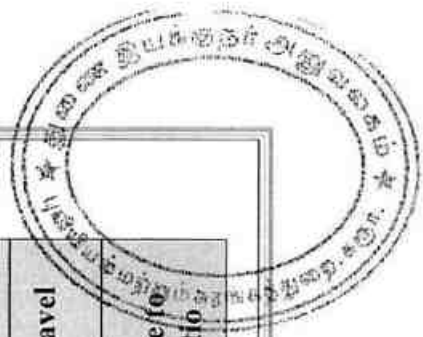
The total mineable reserve is estimated to be **34900m³** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 20m which is 0-3m of gravel (R.L.165m-162m) and 3-20m (R.L.162m-145m) below ground level. Of which, rough stone is about **25585m³** and gravel is **9315m³**. The commercially viable rough stone and gravel 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.VII).



MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Rough stone in m ³	Gravel in m ³
XY-AB	I	69	45	3	9315	.....	9315
	I	69	45	2	6210	6210	.....
	II	59	35	5	10325	10325	.....
	III	49	25	5	6125	6125	.....
	IV	39	15	5	2925	2925	.....
TOTAL				20	34900	25585	9315

4.0 MINING:

a.	<p>Briefly describe the existing / proposed method for developing / working the deposit with all design parameters. (Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)</p>	:	<p>It is a fresh quarry lease. The mining operation is open-cast, semi-mechanized method is adopted and on single shift basis only. Under the regulation 116 (5) of the Metalliferous Mines Regulations Act, 2021 in all open cast 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.</p>
b.	<p><i>Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.</i></p> <p>Total proposed production 31975m³. Of which, rough stone is 22660m³ and gravel is 9315m³ up to a depth of 15m which is 0-3m of gravel (R.L.165m-162m) and rough stone starts with 3-15m below the ground level (R.L.162m-150m) for five years plan period. Average production is 4532m³ of rough stone and 9315m³ of gravel per year (Refer Plate No. IV).</p>		



The production of first five years

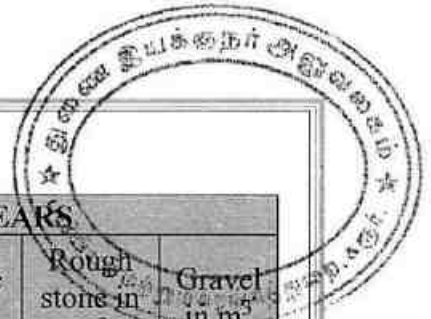
Year	Pit No.(s)	Topsoil/ Overburden (m ³)	ROM (m ³)	Saleable rough stone (m ³) @ 100%	Rough stone rejects(m ³)	Sub grade/ Weathered rock in (m ³)	Saleable Gravel (m ³)	Rough stone to rejects ratio
First	I	--	13815	4500	..	...	9315	...
Second	I	--	4335	4335	..	...	...	...
Third	I	--	4375	4375	..	...	...	...
Fourth	I	--	6450	6450	..	...	...	...
Fifth	I	--	3000	3000	..	...	...	...
Total	--	..	31975	22660	..	...	9315	...

The production of remaning five years

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 in (m ³)	Saleable Gravel (m ³)	Rough stone to rejects ratio
Sixth	I	--	600	600	..	...	...	...
Seventh	I	--	600	600	..	...	...	...
Eighth	I	--	600	600	..	...	...	...
Nineth	I	--	600	600	..	...	...	...
Tenth	I	--	525	525	..	...	...	...
Total	--	..	2925	2925	..	...	...	...

c. *Composite plans and Year wise sections (In case of 'A' class mines):* : Not applicable. It is a "B2" class, individual quarry lease

The production of first five years



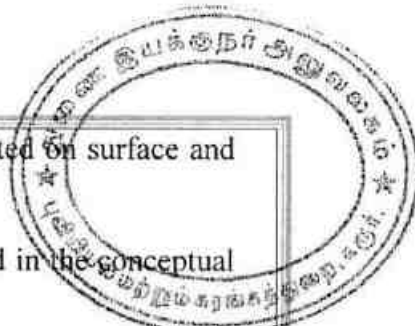
YEARWISE PRODUCTIONS FIRST FIVE YEARS									
Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³	
XY-AB	First	I	69	45	3	9315	.....	9315
		I	50	45	2	4500	4500	.....
	TOTAL						13815	4500	9315
	Second	I	19	45	2	1710	1710	.....
		II	15	35	5	2625	2625	.....
	TOTAL						4335	4335	0
	Third	II	25	35	5	4375	4375	.....
	TOTAL						4375	4375	0
	Fourth	II	19	35	5	3325	3325	.....
		III	25	25	5	3125	3125	.....
	TOTAL						6450	6450	0
	Fifth	III	24	25	5	3000	3000	.....
	TOTAL						3000	3000	0
	GRAND TOTAL						31975	22660	9315

The production of remaning five years

YEARWISE PRODUCTIONS NEXT FIVE YEARS									
Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³	
XY-AB	Sixth	IV	8	15	5	600	600	.....
	TOTAL						600	600	0
	Seventh	IV	8	15	5	600	600	.....
	TOTAL						600	600	0
	Eight	IV	8	15	5	600	600	.....
	TOTAL						600	600	0
	Nineth	IV	8	15	5	600	600	.....
	TOTAL						600	600	0
	Tenth	IV	7	15	5	525	525	.....
	TOTAL						525	525	0
GRAND TOTAL						2925	2925	0	

d. Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	: It is fresh quarry lease. The composite plan not prepared														
<p>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:</p> <p>The proposed production is 378m³/month. At this rate of production, the expected life of quarry is calculated as given below: -</p> <p><u>Rough stone:</u></p> <table border="0" style="width: 100%;"> <tr> <td>Mineable reserves of rough stone</td> <td style="text-align: right;">= 25585m³</td> </tr> <tr> <td>Five years production</td> <td style="text-align: right;">= 22660m³</td> </tr> <tr> <td>Monthly production of rough stone</td> <td style="text-align: right;">= 378m³</td> </tr> <tr> <td>Remaining mineable reserves for next five years</td> <td style="text-align: right;">= 2925m³</td> </tr> </table> <p><u>Gravel:</u></p> <table border="0" style="width: 100%;"> <tr> <td>Mineable reserves of gravel</td> <td style="text-align: right;">= 9315m³</td> </tr> <tr> <td>The production of gravel</td> <td style="text-align: right;">= 9315m³</td> </tr> <tr> <td>Monthly production of gravel</td> <td style="text-align: right;">= 776m³</td> </tr> </table> <p>The regular working of the quarry and its production depends upon the demand from the market. The market is always fluctuating and flexible one. Accordingly, there is a possibility to increase or decrease the production. The year wise production, anticipated life of quarry etc., are only a tentative figure.</p>		Mineable reserves of rough stone	= 25585m ³	Five years production	= 22660m ³	Monthly production of rough stone	= 378m ³	Remaining mineable reserves for next five years	= 2925m ³	Mineable reserves of gravel	= 9315m ³	The production of gravel	= 9315m ³	Monthly production of gravel	= 776m ³
Mineable reserves of rough stone	= 25585m ³														
Five years production	= 22660m ³														
Monthly production of rough stone	= 378m ³														
Remaining mineable reserves for next five years	= 2925m ³														
Mineable reserves of gravel	= 9315m ³														
The production of gravel	= 9315m ³														
Monthly production of gravel	= 776m ³														
<p>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:</p>															
<p>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:</p>	<p>: Considering the indefinite depth persistence of the rough stone and gravel deposit is proved beyond the workable limits about up to a depth of 20m below ground level (R.L.165m-145m) 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 10 years.</p>														





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 mining plan

ULTIMATE PIT LIMIT-(XY-AB)						
Bench	Bench R.L	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	R.L.165-162m	First 5 years	Gravel	69	45	3
	R.L.162-160m		Rough stone	69	45	2
II	R.L.160-155m		Rough stone	59	35	5
III	R.L.155-150m		Rough stone	49	25	5
IV	R.L.150-145m	Remaining 5 years plan periods	Rough stone	39	25	5
					Total	20m

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 upto techno - economically feasible depth envisaged. If so, describe the broad features of the proposal:-

: As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.

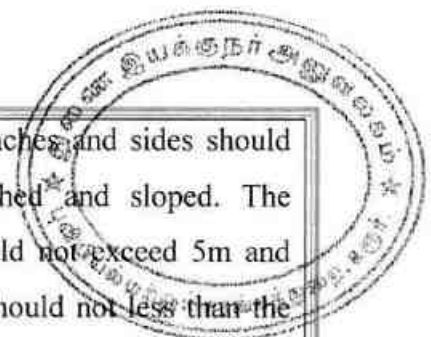
v) Whether post mining land use envisaged:-

: At the end of mining activities over the quarry pit may be utilized fish culture or storage of rain water reservoir used for irrigation purposes.

g. Open cast Mines:

i) Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)

: It is a fresh quarry lease. The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 116 (5) of the Metalliferous Mines Regulations Act, 2021 in all open cast workings in



	<p>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. Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Excavators and tipper combination are adapted.</p>
<p>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</p>	<p>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.</p> <p>Bench height = 5mts. Bench width = 5mts.</p>
<p>a. Details of Topsoil/ Overburden</p>	<p>: No separate of topsoil will be removed.</p>
<p>b. Rough Stone waste and side burden waste:-</p>	<p>: The recovery of rough stone in this quarry is 100%. Any waste or side burden dumps are doesn't proposed.</p>
<p>h. <i>Underground Mines:</i></p>	<p>: Not applicable</p>
<p>i. <i>Extent of mechanization:</i> Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.</p>	



(1) Drilling Machines:

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

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

(2) Loading Equipment:

Excavator and tippers combination utilized for internal transport sizeable rough stone lumps and deliver to the consumer area.

(3) Haulage and Transport Equipment

(a) Haulage within the mining leasehold:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	1	--	--	Diesel	--

Whether the dumpers are fitted with exhaust conditioner should be indicated:

The dump is not used in this quarry area, hence it's a small B2 category of project.

(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) : Excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customer's area.

d. Ore transported by: own trucks / hired trucks : Hired tipper and excavator will be utilized.

e. Main destination to which ore is transported (giving to and from distance) : The excavated lumps stone materials road metal will be supplied to the crusher.

f. Details of hauling / transport equipment:

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

(4).Miscellaneous:

Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.



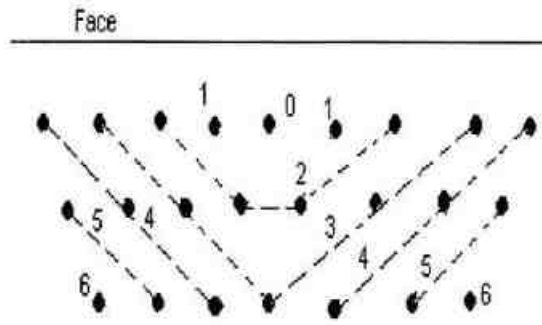
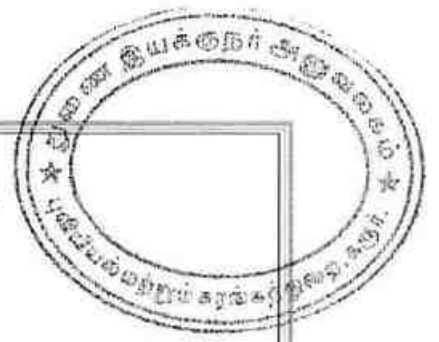
(A) Operations	:	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.
(B) Machineries deployed	:	Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Excavators and tipper combination are adapted. (refer Part-A- 4 (i))

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

Blasting pattern:

The quarrying operation is proposed to carried by open cast, Semi Mechanized mining in conjunction with conventional method of mining 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 T
7	Production per annum 4532m ³ * 2.8= 12690T	12690T
8	Total handling per day (300 working day)	42T
9	Nos. of holes per day (42/5.04 = 8.33)	8 holes.
10	Meterage required per day (8 × 5.5 = 44)	44meters
11	Charge per hole	0.5kg
12	Powder factor (8 X 0.5 kg = 4)	4.0 kg
13	Sequence of blasting = Cord relay with electric detonators / Nonel	--



Staged method of mining

b) Type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

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

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

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

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

Delay detonators:

Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals. The major advantages of delay blasting are:

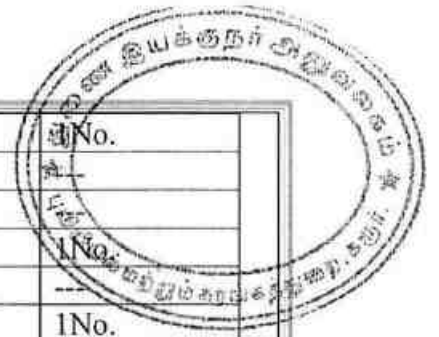
- ❖ Reduction of ground vibration
- ❖ Reduction in air blast
- ❖ Reduction in over break
- ❖ Improved fragmentation
- ❖ Better control of fly rock

Blasting program for the production per day

No of holes	:	8 holes
Yield	:	42tons
Powder factor	:	0.5Kg per hole of explosives
Total explosive required	:	4.0kg-Slurry explosives per day
Blasting at day time only	:	12.00 p.m - 2.00p.m

c) Powder factor in ore and overburden / waste / development heading / stope	:	Powder factor is proposed as 0.5kg 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 crushers.
e) Storage of explosives (like capacity and type of explosive magazine)	:	<ol style="list-style-type: none"> 1. The applicant is advised to engage an authorized explosive agency to carry out blasting. 2. The blasting time at a day is proposed to be 12.00 PM to 2.00 PM. 3. First Aid Box will be keeping ready at all the time. 4. 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 60m in summer and 55m in rainy season from the general ground level observed in the adjacent bore well.
b) Workings expected to be _____ m. above / reach below water table by the year _____.	:	Proposed mining depth is 20m below ground level. Now, the present Mining lease will be proposed above the water table and hence, quarrying may not affect the ground water.

			reduced in to ½ and 1½ inches Jelly which are mainly used in road and building construction purpose.
b).	Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone (charnockite) and 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.
9. OTHERS			
(a)	Describe briefly the following Site services	:	Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provided as per rule 44 of Metalliferous Mines Regulations Act, 2021 as a welfare amenity for quarry laborers. No manual mining will be proposed. Approach road is available from nearby the site.
(b)	<p>Employment potential: As per Mines safety under the provisions of Metalliferous Mines Regulations Acts, 2021 & under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision.</p> <p>The following man power is proposed for quarrying rough stone during the five years period the same manpower will be utilize for this Mining Plan period to achieve the proposed production and to comply the provisions of the DGMS norms.</p>		

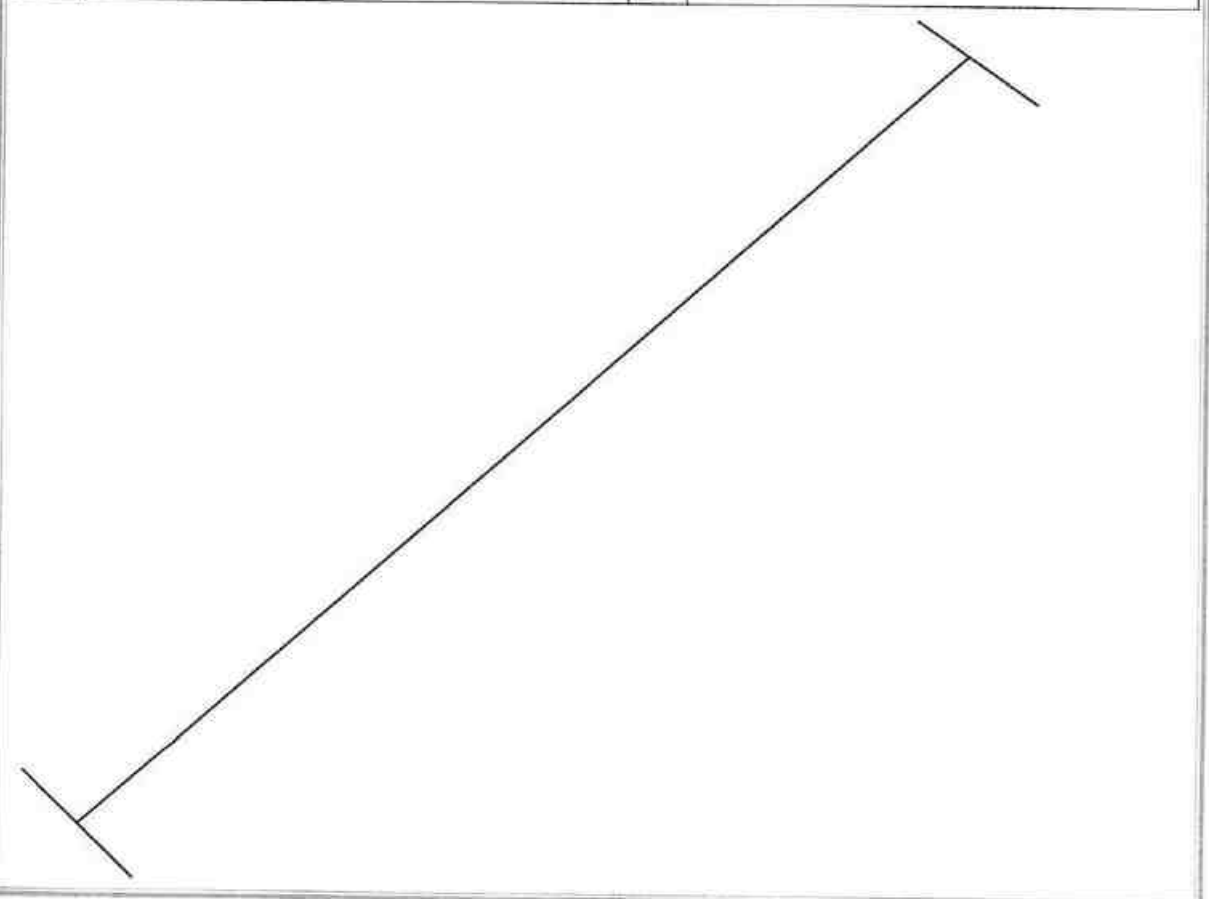


	1.	Highly Skilled	Quarry Manger	1No.
			Mines Forman	---
			Mechanical Engineer	---
			Account cum & admin	1No.
	2.	Skilled	Earth moving Operator	---
			Driver	1No.
			Mechanic	---
			Blaster/Mat	---
	3.	Semi – skilled	Helpers, Greaser's	---
	4.	Unskilled	Musdoor / Labours	10Nos
Cleaners			---	
Attendant's			1No	
			Total =	14 Nos

10 MINERAL PROCESSING/BENEFICIATIONS:		
(a)	<p>If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.</p>	: Excavated rough stone materials will be directly sale to the needy customer. The recovery of rough stone in this quarry is 100%.
(b)	<p>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).</p>	: No water will 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 will 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)	<p>A flow sheet or schematic diagram of the processing procedure should be attached.</p>	: ---
(d)	<p>Specify quantity and type of chemicals to be used in the processing plant.</p>	: ---



(e) Specify quantity and type of chemicals to be stored on site / plant.	: ----
(f) Indicate quantity (KLD. per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.	: Drinking is 0.2KLD. utilized water is 0.5KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 2.7KLD per day has to be maintained as per the Mines Rules, 1952. Drinking water will be bought to authorized vendor of the nearby the village. The dust suppression and green belt development will be bought to water tanker. The sewage water to a tune of 0.5KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit.



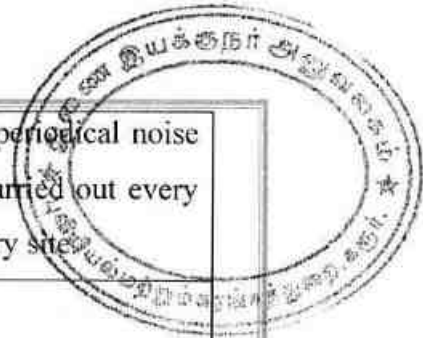
PART – B



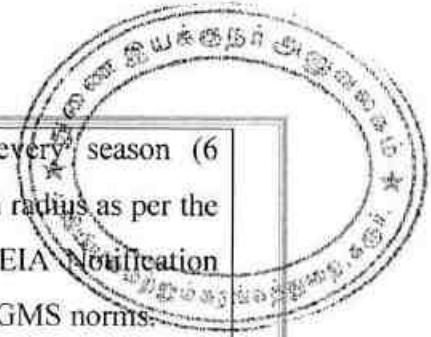
11.0 ENVIRONMENTAL MANAGEMENT PLAN:

a) Attache a note on the status of Baseline information with regard to the Following :

11.1	Existing land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.																						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Sl. No.</th> <th style="width: 55%;">Land Use</th> <th style="width: 30%;">Present area (Hect.)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.</td> <td>Area under quarrying</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Infrastructure</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Roads</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Green Belt</td> <td style="text-align: center;">Nil</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Unutilized</td> <td style="text-align: center;">0.73.50</td> </tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td style="text-align: center;">0.73.50</td> </tr> </tbody> </table>		Sl. No.	Land Use	Present area (Hect.)	1.	Area under quarrying	Nil	2	Infrastructure	Nil	3	Roads	Nil	4	Green Belt	Nil	5	Unutilized	0.73.50	Total		0.73.50
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11.2	Water Regime	: Water table in this area is noticed at a depth of 60m in summer and 55m in rainy season from the general ground level and presently the quarrying of rough stone and gravel is proposed ultimate depth is 20m bgl. Hence, it will not affect the ground water depletion of this area.																					
11.3	Flora and Fauna	: There is no major flora found in this area and except acacia bushes, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.																					
11.4	Quality of air, ambient noise level and water	: Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be																					



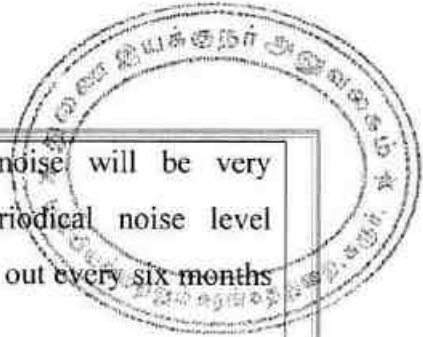
		very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.																									
11.5	<p>Climatic conditions :</p> <p>Climate:</p> <p>The district receives the rain under the influence of both Southwest and Northeast monsoons. The Northeast monsoon chiefly contributes to the rainfall in the district. Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal. The Southwest monsoon rainfall is highly erratic and summer rains are negligible. The average annual rainfall over the district varies from about 620 mm to 745 mm.</p> <p>Rainfall:</p> <p>The annual rainfall normal (1970-2000) of Karur district is 742 mm.4 Projections of rainfall over Karur for the periods 2010-2040 (2020s), 2040- 2070 (2050s) and 2070-2100 (2080s) with reference to the baseline (1970-2000) indicate a general decrease of 4.0%, 3.0% and 11.0% respectively</p>																										
11.6	<p>Human Settlement:</p> <p>The nearest villages are found in the buffer zone with population as per 2011 census. The Kuppam village of 1120 houses 3503 peoples both Male (1697) and Female (1806).</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Village</th> <th>Direction</th> <th>Distance in Kms</th> <th>Population</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Nochikattur</td> <td>North</td> <td>0.360km</td> <td>2086</td> </tr> <tr> <td>2</td> <td>Talaiyuttupatti</td> <td>SW</td> <td>0.66km</td> <td>1863</td> </tr> <tr> <td>3</td> <td>Pullaiyampalayam</td> <td>NE</td> <td>1.12km</td> <td>1976</td> </tr> <tr> <td>4</td> <td>Kuppam</td> <td>West</td> <td>4.0km</td> <td>3503</td> </tr> </tbody> </table>	S.No	Village	Direction	Distance in Kms	Population	1	Nochikattur	North	0.360km	2086	2	Talaiyuttupatti	SW	0.66km	1863	3	Pullaiyampalayam	NE	1.12km	1976	4	Kuppam	West	4.0km	3503	
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11.7	Public buildings, places of worship and monuments	: No infrastructure like residential building, places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.																									
11.8	Attach plans showing the locations of sampling stations	: It is fresh quarry lease. The proposed Ambient air quality, Water quality Ambient noise level and vibration are																									



		periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
11.9	Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974	: The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974

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

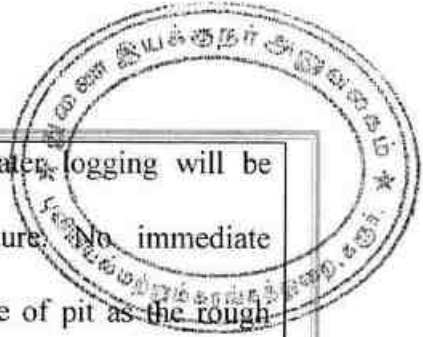
i)	<p>Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc:</p> <p>Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:</p> <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Land use</th> <th>Area in use during the quarrying period (Hect.)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Area under quarrying</td> <td>0.34.10</td> </tr> <tr> <td>2.</td> <td>Infrastructure</td> <td>0.03.00</td> </tr> <tr> <td>3.</td> <td>Roads</td> <td>0.02.00</td> </tr> <tr> <td>4.</td> <td>Drainage, Settling tank</td> <td>0.03.10</td> </tr> <tr> <td>5.</td> <td>Green belt area</td> <td>0.30.10</td> </tr> <tr> <td>6.</td> <td>Un-utilized area</td> <td>0.01.20</td> </tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td>0.73.50</td> </tr> </tbody> </table>		Sl. No.	Land use	Area in use during the quarrying period (Hect.)	1.	Area under quarrying	0.34.10	2.	Infrastructure	0.03.00	3.	Roads	0.02.00	4.	Drainage, Settling tank	0.03.10	5.	Green belt area	0.30.10	6.	Un-utilized area	0.01.20	Total		0.73.50
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ii).	Air Quality	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc..., will be suppressed by periodical wetting of land by water spraying.																								
iii).	Water quality	A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, salinity, colour, Specific gravity, etc.																								
iv).	Noise levels	Quarrying of rough stone will be carried out by drilling and blasting by using low power																								



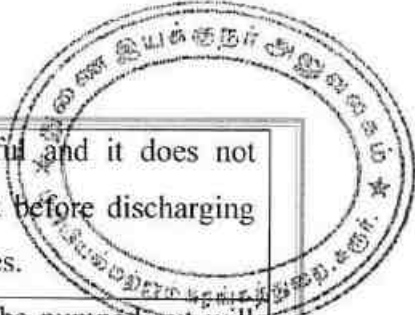
		explosives and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)	No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity will be recorded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
vi).	Water regime	No major river or any odai track are found around 50m radius. It is proposed to make an own borewell for providing uninterrupted supply of RO drinking water, dust suppression and Green belt development.
vii).	Socio-economics	1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.	There are no historical monuments, etc found around 10km radius.

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

i).	temporary storage and utilization of topsoil	:	No separate of topsoil will be removed.
ii).	Year wise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and up to conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-	:	The present mining is proposed to an average depth of 15m bgl has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. Low



	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.	lying areas with water logging will be used for fish culture. No immediate proposals for closure of pit as the rough stone persist still at deeper level.																																	
iii).	<p>Programme of afforestation, Year wise 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.</p> <p>Green Belt Development:</p> <p>7.5m safety barrier, school and Nearest Panchayat Roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Place</th> <th>Area in Sq.m</th> <th>No.of Plants</th> <th>Rate of survival</th> <th>Rate</th> <th>Amount in Rs</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>Lease Boundary</td> <td>3010</td> <td>334</td> <td>80%</td> <td rowspan="3">@100 Rs Per sapling</td> <td>33400/-</td> </tr> <tr> <td>Second</td> <td>Haul road and Nearby Village Road</td> <td>--</td> <td>300</td> <td>80%</td> <td>30000/-</td> </tr> <tr> <td>Third</td> <td>Schools</td> <td>--</td> <td>200</td> <td>80%</td> <td>20000/-</td> </tr> <tr> <td colspan="6" style="text-align: right;">Total</td> <td>83,400/-</td> </tr> </tbody> </table>		Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs	First	Lease Boundary	3010	334	80%	@100 Rs Per sapling	33400/-	Second	Haul road and Nearby Village Road	--	300	80%	30000/-	Third	Schools	--	200	80%	20000/-	Total						83,400/-
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Total						83,400/-																													
iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the first five years (and up to conceptual plan period for 'A' category mines).	: No waste or rejects will be removed.																																	
v).	Measures to control erosion / sedimentation of water courses.	: Not applicable. There are no major dumps are stabilized in this lease area.																																	



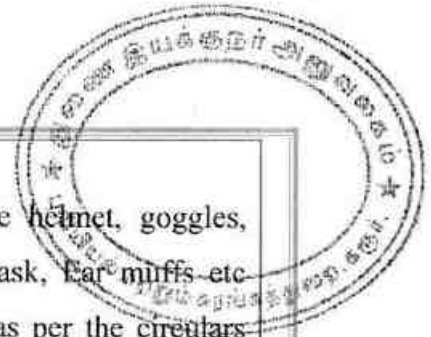
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses.
vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry. The worked-out pit will be protected with barbed wire and the mined-out pit will be used as storage rain water pit. The open pit will be used as rain water storage structure to augment groundwater levels which improve the mine environment.
viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	It is a B2 category open cast, semi mechanized mining and no heavy machinery will 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 lease

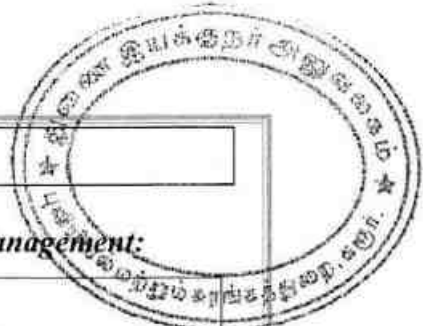
12.0 PROGRESSIVE QUARRY CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The Ultimate mining is proposed to an average depth of 20m bgl. 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 834 trees of first three years plan period will proposed approximately distance of 3m X 3m. 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. It is proposed to formation of bench design
12.4	Mine closure activity	:	The present mining plan is proposed to an average depth of 15m bgl has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. Low lying areas with water logging will be used for fish culture. 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 mines Regulations Act, 2021, it is a small open cast mining



		<p>method adopted.</p> <p>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.</p>
12.6	Disaster management and Risk Assessment	<p>: Open cast mining method is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.</p>
12.7	Care and maintenance during temporary discontinuance	<p>: During temporary discontinuance the working place will be fenced completely and a board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.</p>
12.8	Economic repercussions of closure of quarry and man power entrenchments	<p>: During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 14 labors</p>

will be improved.



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

A	Fixed Asset Cost:	
	1. Land Cost	: Rs. 3,67,100/-
	2. Labour Shed	: Rs. 1,00,000/-
	3. Sanitary Facility	: Rs. 1,00,000/-
	4. Fencing	: Rs. 2,00,000/-
	5. Other expenses (Security guard, etc)	: Rs. 3,00,000/-
	Total	: Rs. 10,67,100/-
B	B. Machinery cost	: Rs. 10,00,000/- (Hire Basis)
C	Total Expenditure of EMP cost (for five years)	
	1. Drinking Water Facility	: Rs. 1,00,000/-
	2. Sanitary facility & Maintenance	: Rs. 50,000/-
	3. Permanent water sprinkler	: Rs. 50,000/-
	4. Afforestation and its maintenance	: Rs. 83,400/-
	5. Safety Kits	: Rs. 50,000/-
	6. Provision of tyre washing facility	: Rs. 75,000/-
	7. Surface runoff management structures like garland drain, settling pond & Bund (0.03.10Hect or 310Sq.m X 400	: Rs. 1,24,000/-
	8. Blasting materials with blast mat cost	: Rs. 12,00,000/-
	9. Environment monitoring	: Rs. 5,00,000/-
	Total	: Rs. 22,32,400/-
D	Total Project Cost (A+B+C)	: Rs. 42,99,500/-

13.0 FINANCIAL ASSURANCE:

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

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 with progressive quarry closure plan has prepared by incorporating the conditions stipulated in the precise area communication issued

by the Deputy Director, Department of Geology and Mining, District collectorate, Karur vide letter no **Roc.No.311/Mines/2021 Dated 12.08.2022.**

(iv) Total proposed production **31975m³**. Of which, rough stone is **22660m³** and gravel is **9315m³** up to a depth of 15m which is 0-3m of gravel (R.L.165m-162m) and rough stone starts with 3-15m below the ground level (R.L.162m-150m) for five years plan period. Average production is **4532m³** of rough stone and **9315m³** of gravel per year.

17.0 CSR Expenditure:

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

Place: Dharmapuri, TN

Date: 19/08/22

Geo Technical Mining Solutions
NABET/APA-MPPA/IA/017

GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri - 636 705, Tamil Nadu, India.
Ph: 04342-232777, 94439 37841

This Mining Plan is approved based on incorporation of the particulars specified in clause 7 (iv) of the Commissioner of Geology and Mining General Lr No 3868 / LC / 2012 dt 19-11-2012 and Draft Minor Mineral Conservation & Development Rules 2010

Deputy Director of Geology and Mining
Karur District

This Mining Plan is approved subject to the conditions/stipulations indicated in the Mining Plan approval Letter No: 311 / mines / 2021 Dated: 01/09/2022

01/09/22



ந.க.எண். 311/கனிமம்/2021

மாவட்ட ஆட்சியர் அலுவலகம்,
புவியியல் மற்றும் சுரங்கத்துறை,
கரூர்
நாள். .08.2022.

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - கரூர் மாவட்டம் - புகளூர் வட்டம் - குப்பம் கிராமம் - பட்டா புல எண்.76/2-இல் 0.73.50 ஹெக்டேர்ஸில் - சாதாரணகல் மற்றும் கிராவல் குவாரி குத்தகை உரிமம் வேண்டி திரு.க.சண்முகம் என்பவர் விண்ணப்பம் செய்தது - உரிமம் வழங்க பரிந்துரை செய்யப்பட்டது - தகுதியான நிலப்பரப்பாக கருதி ஏற்பளிக்கப்பட்ட சுரங்க திட்டம் மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய இசைவினை பெற்று சமர்ப்பிக்கக் கோருதல் - தொடர்பாக.

- பார்வை:**
1. திரு.க.சண்முகம், த/பெ.கருமணகவுண்டர், V.S.T பெட்ரோல் பங்க் எதிரில், புன்னம்சத்திரம், புகளூர் வட்டம், கரூர் மாவட்டம் என்பவரின் விண்ணப்ப நாள்: 29.07.2021.
 2. வருவாய் கோட்டாட்சியர், கரூர் அவர்களின் கடிதம் ந.க.எண். அ1/3046/2021, நாள்:16.12.2021
 3. உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை கரூர் என்பவரது புலத்தணிக்கை அறிக்கை நாள்:02.08.2022.
 4. அரசாணை (பல்வகை) எண். 169, தொழில் (எம்.எம்.சி-1) துறை நாள்: 04.08.2020 இணைத்து வரப்பெற்றுள்ளது. (தமிழ்நாடு அரசிதழ் சிறப்பு வெளியீடு எண். 315 நாள்: 04.08.2020).

கரூர் மாவட்டம், புகளூர் வட்டம், குப்பம் கிராமம், பட்டா புல எண்.76/2-இல் 0.73.50 ஹெக்டேர்ஸிருந்து பத்து ஆண்டுகளுக்கு சாதாரண கற்கள் மற்றும் கிராவல் வெட்டியெடுக்க கரூர் மாவட்டம், புகளூர் வட்டம், V.S.T பெட்ரோல் பங்க் எதிரில், புன்னம் கிராமம் என்ற முகவரியில் வசிக்கும் திரு.க.சண்முகம், த/பெ.கருமணகவுண்டர் என்பவர் பார்வை 1-இல் கண்டுள்ளவாறு விண்ணப்பம் செய்துள்ளார்.

மேற்படி விண்ணப்பம் தொடர்பாக, வருவாய் கோட்டாட்சியர், கரூர் மற்றும் உதவிப் புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, கரூர் ஆகியோர் புலத்தணிக்கை மேற்கொண்டு கரூர் மாவட்டம், புகளூர் வட்டம், குப்பம் கிராமம், பட்டா புல எண்.76/2-இல் 0.73.50 ஹெக்டேர்ஸ் பரப்பில் தமிழ்நாடு சிறு



கனிமச்சலுகை விதிகளில் விதி எண்கள்.19-(1), 20 மற்றும் 22-இன் கீழ் திரு.க.சண்முகம் என்பவர் சாதாரணக்கல் மற்றும் கிராவல் குவாரி உரிமம் வழங்க கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

1. விண்ணப்ப புலத்திற்கு தெற்கில் புல எண்.77-இல் கிழமேலாக அமைந்துள்ள வண்டிப்பாதைக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
2. விண்ணப்ப புலத்திற்கு தெற்கில் வண்டிப்பாதையில் அமைந்துள்ள கிழமேலாக செல்லும் தாழ்வழுத்த மின்பாதைக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
3. விண்ணப்ப புலத்திற்கு அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் மற்றும் புறம்போக்கு நிலத்திற்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
4. குத்தகைக்காலத்தில் கைத்துளைப்பான் கருவி கொண்டு பாறைகளை துளையிட்டும், மிதமான வெடிபொருள் பயன்படுத்தியும், பொதுமக்களுக்கோ, பொது சொத்துக்களுக்கோ யாதொரு சேதமுமின்றி விதிமுறைகளின்படி குவாரிப்பணி செய்ய வேண்டும்.
5. குவாரித் தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்ய Mettaliiferrous Mines, விதிகளின்படி அகலமானதும், பாதுகாப்பானதுமான Benches அமைத்து பாதுகாப்பான முறையில் குவாரிக்குள் வாகனங்கள் சென்றுவரவும் மற்றும் குவாரி தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்தும் குவாரிப்பணி செய்ய வேண்டும்.
6. குவாரி குத்தகை வழங்க ஏதுவாக துணை இயக்குநர் (சுரங்கம்) அவர்களால் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினையும், மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (SEIAA) அனுமதி பெற்று மாவட்ட நிர்வாகத்திற்கு விண்ணப்பதாரரால் சமர்ப்பிக்கப்பட வேண்டும்.

எனவே, வருவாய் கோட்டாட்சியர், கரூர் மற்றும் உதவிப் புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, கரூர் ஆகியோரின் பரிந்துரைகள் மற்றும் நிபந்தனைகளின் அடிப்படையில் கரூர் மாவட்டம், புகளூர் வட்டம், குப்பம் கிராமம், பட்டா புல எண்.76/2-இல் 0.73.50 ஹெக்டேர்ஸ் பரப்பில் 1959-ம் வருட தமிழ்நாடு சிறுகனிம விதிகள், விதி எண். 19(1), 20 மற்றும் 22-இன்படியும் மேலும் மேற்கண்ட நிபந்தனைகளுக்கும் உட்பட்டு 10 (பத்து) வருட காலத்திற்கு திரு.க.சண்முகம்



என்பவருக்கு சாதாரணக்கற்கள் மற்றும் கிராவல் குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதப்படுகிறது.

அதற்கிணங்க, தமிழ்நாடு சிறு கனிம சலுகை விதிகள்-1959 விதி எண். 41-இன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு திரு.க.சண்முகம் என்பவர் கேட்டுக்கொள்ளப்படுகிறார். மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின் தொடர்ச்சியாக 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.42-இன்படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.

துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
கரூர்.

பெறுநர்
திரு.க.சண்முகம்,
த/பெ.கருமணகவுண்டர்,
V.S.T பெட்ரோல் பங்க் எதிரில்,
புன்னம்சத்திரம்,
புகளூர் வட்டம், கரூர் மாவட்டம்.

நகல்:-

1. மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம், சென்னை.
2. ஆணையர், புவியியல் மற்றும் சுரங்கத்துறை, கிண்டி, சென்னை.

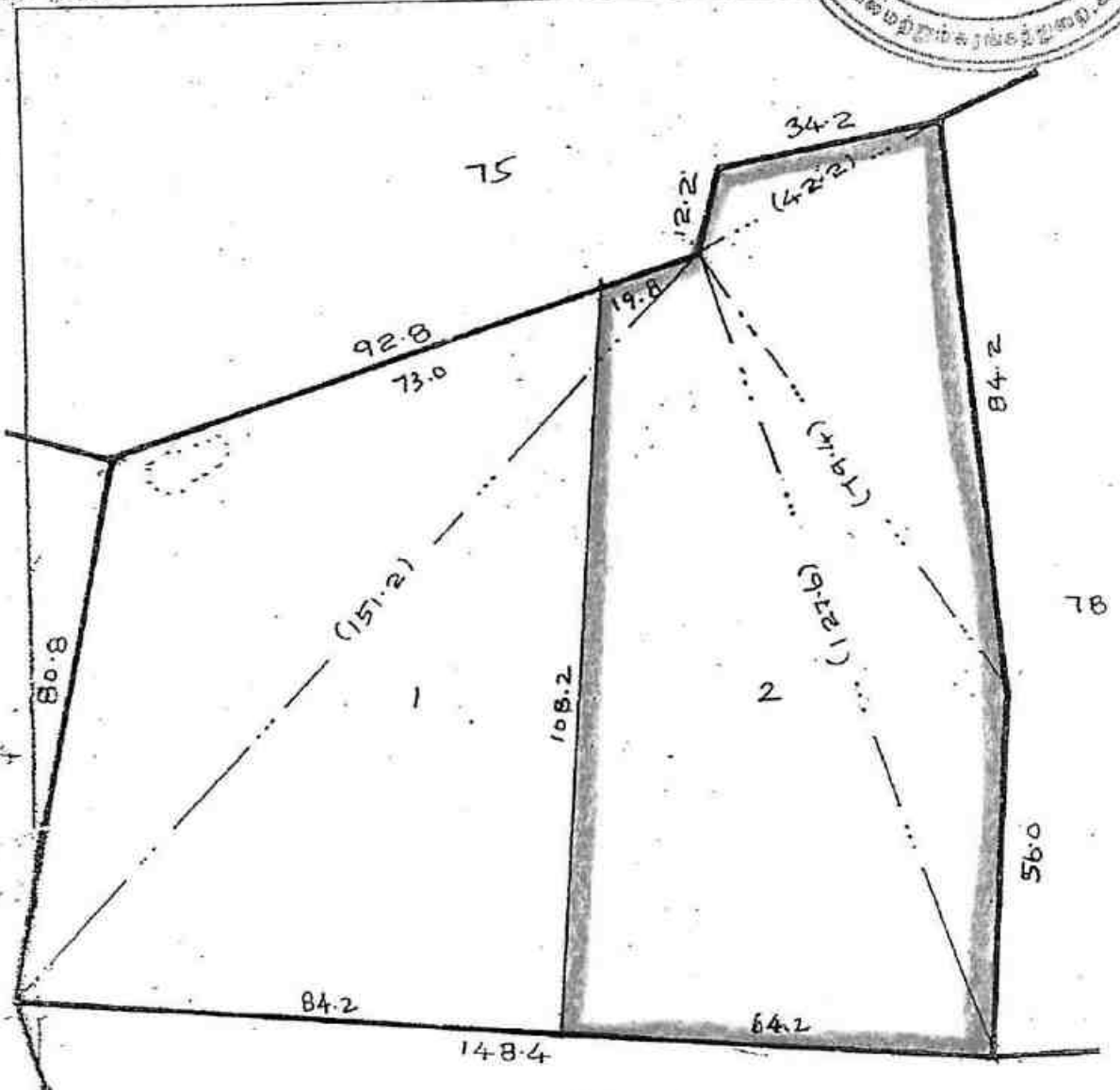
வட்டம். திருச்சிராப்பள்ளி கிராம

வட்டம். கஜேற்குடி கிராம

புல எண்: 16

கிராமம்

பரப்பு: ஒரேக்கட்டு



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இவாடி இத்தக
2 ஏ. 73.5 ஏக்கர்கள்

New Sub Division
by
I.S. plotted AS per
T.E 8A 139/1411 Dt. 1.12.01
P. Selvaraj
(12.01
F.SLP)

2 ஏக்கர்கள்
12/23/2024

கிராம நிர்வாக அலுவலர்

12, குடியம் கிராமம்

புகளூர் வட்டம்
திருச்சிராப்பள்ளி

ஆய்வு செய்தவர்
[Signature]

வா. [Signature]



713
 வி. எண் 9 குப்பம்.

1	2	3	4	5	6	7	8	9	10	11	12
6	69-பா	ர	4	...	8-3	5	2 00	0 04.0	0 08	93 சி. காளியப்ப கவுண்டர்.	
								2 05.0	4 11		
70	70	அ	4	...	...	...	...	0 33.5	...	.....	கால் பாள
71	71-A	ர	4	...	8-3	5	2 00	1 62.0	3 24	214 மு. செல்வராஜ்.	
	71-B	ர	4	...	8-3	5	2 00	1 62.0	3 24	826 ப. பிச்சு முத்து (1), சி. வேலப்ப கவுண்டர் (2), வி. கருமண கவுண்டர் (3).	
								3 24.0	6 48		
72	72	அ-த.ஏ.த	...	...	...	...	...	2 70.5	...	.....	தீர்வை உட்படாத தர்
73	73-A	ர	4	...	8-3	5	2 00	4 67.0	9 35	615 செ. சங்கரப்ப கவுண்டர் (1), செ. வேலப்ப கவுண்டர் (2).	சதுரக் கிணறு.
	73-B	ர	4	...	8-3	5	2 00	0 71.0	1 43	615 செ. சங்கரப்ப கவுண்டர் (1), செ. வேலப்ப கவுண்டர் (2).	
								3 38.0	10 78		
	74	ர	4	...	8-2	4	2 77	0 74.5	2 06	615 செ. சங்கரப்ப கவுண்டர் (1), செ. வேலப்ப கவுண்டர் (2).	
	75	ர	4	...	8-2	4	2 77	4 68.0	12 95	615 செ. சங்கரப்ப கவுண்டர் (1), செ. வேலப்ப கவுண்டர் (2).	
		ர	4	...	8-2	4	2 77	1 47.5	4 09	616 ர. வீரப்ப கவுண்டர் (1), ர. முத்துசாமி கவுண்டர் (2).	
		அ	4	...	...	...	...	0 56.5	...	.....	வண்டிப் பாளத்.
		ர	4	...	8-2	4	2 77	1 88.5	5 22	617 த. கருமண கவுண்டர் (1), த. அங்கம் மார் (2).	சதுரக் கிணறு.

268
 சிராம நீர்வாக அலுவலர்

/அலுவலக இணைய சேவை - நில...

<https://eservices.tn.gov.in/eservicesnew/land/chittaExtra>

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : கரூர்

வட்டம் : புகளூர்

வருவாய் கிராமம் : குப்பம்

பட்டா எண் : 3982

உரிமையாளர்கள் பெயர்

1. கருமணகவுண்டர்

மகன்

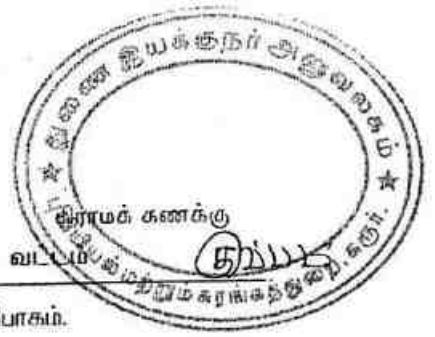
சண்முகம்

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	
76	2	0 - 73.50	2.04	--	--	--	--	2021/0103 /14/169810--- -- 20-07-2021
		0 - 73.50	2.04					

குறிப்பு2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/07/018/03982/30892 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 20-07-2021 அன்று 08:29:41 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



ஆம் பசுவியில் கிராம மாவட்டம் ஹரி வட்டம்

நில வரித் திட்டத்தின்படி புலன்களின் விபரம்.					கைப்பற்று தாரகூடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரகூடைய பெயர்.	சாகுபடி யாளரின் பெயர்.	முதல் போகம்.					
(1) நில அளவை எண்.	(2) உட்பிரிவு எண்.	(3) பரப்பு.	(4) தீர்வை.	(5) ஒரு போகம் அல்லது இரு போகம்.			(7) நிலத்தின் எந்த பகுதி யாகவு் சாகுபடியாளரால் பயிரிடப்பட்டுள்ளது.	(8) எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	(9) பயிரின் பெயர்.	(10) பயிரான அறுவடையான பெயர்.	(11) உண்மைநாள் பாய்ச்சல் ஆதாரம்.	(12) விளைச்சல் அளவு விழுக்காடு.
76	2	0.35	2.043982	5	கண்காணம்	ஓசா						
					/ 2 ஸ்தம்பம் /							
					கிராம நிர்வாக அலுவலர் 18, சூப்பம் கிராமம் புகளூர் வட்டம் கரூர் மாவட்டம்							

1527/2021



தமிழ்நாடு தமிழ்நாடு TAMILNADU ரூ. 20000

B 733246

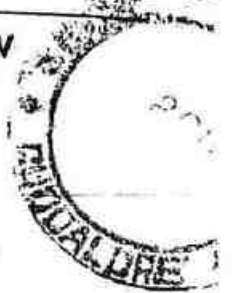


13 JUL 2021

S. Ramamurthy, S.V.

S.RAMAMURTHY, S.V.
L.No:05/1992
KARUR.

K. Sankar...
க. சண்முகம்



Scanned

கிரையப் பத்திரம்

2021-ம் வருடம் ஜூலை மாதம் 14-ம் தேதிக்கு, தமிழ் பிலவ வருடம் ஆனி மாதம் 30-ம் தேதி,

கரூர் மாவட்டம், புகளூர் வட்டம், புன்மகிராமம், வள்ளிபுரத்தில் வசிக்கும் கருமணகவுண்டர் குமாரர் K.சண்முகம் அவர்களுக்கு, (ஆதார் அட்டை எண். 8508 4484 7996) (Mobile No.89400 03470)

எழுதி வாங்குபவர்:

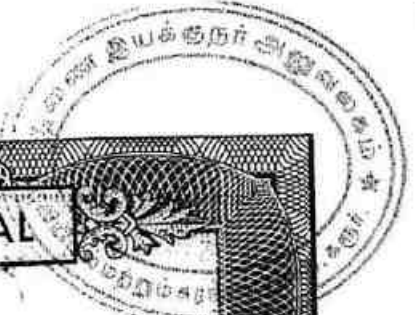
எழுதிக் கொடுப்பவர்கள்:

K. Sankar...

R. net...

புத்தகம் 2021
வருடத்திய 1527
ஆணை...
கொண்டது...
பதிவு...

P. Sankar...



தமிழ்நாடு தமில்நாடு TAMILNADU ரூ.5000

S 176343

S.V.

S.RAMAMURTHY, S.V
L.No:05/1992
KARUR.

13 JUL 2021

K. Sankaranarayanan
வந்தியத்தேவராயர்



2.

கரூர் மாவட்டம், புகளூர் வட்டம், பவித்திரம் கிராமம், நொச்சிபாளையத்தில் வசிக்கும் மருதையப்ப கவுண்டர் குமாரர் M,சுப்பிரமணியன்-1 (ஆதார் அட்டை எண். 5829 1952 0774)

கரூர் மாவட்டம், புகளூர் வட்டம், பவித்திரம் கிராமம், ராசாம்பாளையத்தில் வசிக்கும் ராமசாமி குமாரர் R.நடராஜன்-2 (ஆதார் அட்டை எண். 5463 9898 4712)

எழுதி வாங்குபவர்:

எழுதிக் கொடுப்பவர்கள்:

K. Sankaranarayanan

M. Sankaranarayanan
R. Sankaranarayanan
P. Sankaranarayanan

புத்தகம் 1527
வருடத்திய 1527
ஆவணம் 17
கொண்டலு 17

புதிவு



தமிழ்நாடு தமில்நாடு TAMILNADU ரூ.500

AK 186680

11 3 JUL 2021

K. சண்முகம்
வாங்கியவர்

S.RAMAMURTHY, S.V
L.No:05/1992
KARUR.

.3.

மேற்கூடி வட்டம், ஷை பவுத்திரம் கிராமம், மேற்படி வட்டம், குப்பம் கிராமம், ஆண்டிப்பட்டியில் வசிக்கும் பழனியப்பகவுண்டர் குமாரர் P.மாரப்பன்-3 (ஆதார் அட்டை எண்.4322 1208 2852) ஆகிய நாங்கள் எழுதிக் கொடுத்த சுத்தக் கிரைய சாசனம்,

எழுதி வாங்குபவர்:

எழுதிக் கொடுப்பவர்கள்:

K. S. S. S.

M. S. S. S.
R. S. S. S.
P. S. S. S.

.....புத்தகம்.....ம்
வருடத்திய.....ம்
ஆவணம்.....ம்
கொண்டது.....ம்
பதிவு.....ம்



தமிழ்நாடு தமிழ்நாடு TAMILNADU

ரூ.100

CF 126739

13 JUL 2021

K. S. Ramamurthy
ச. ச. ராமமூர்த்தி

S.RAMAMURTHY, S.V
L.No:05/1992
KARUR.

4.

என்னவென்றால், தங்களுக்கும், எங்களுக்கும் சேர்ந்து சென்ற 13.09.2000 தேதிய கிரையப் பத்திரப்படி (ப.எண்.1-732/2000, 2நெ இணை சார்பதிவகம், கரூர்)-யும் பின்னிட்டு கூட்டுப் பட்டா எண்.10(1) பிரிவின்படி பட்டா எண்.1410-ன்படி பட்டா ஏற்பட்டும் தாங்களும் நாங்களும் பொதுவாக அனுபவித்து வருகிற இதனடியில் கண்ட பூமியில் தங்கள் வீதம் உண்டான பொதுவில் 1/4 பங்கு எழுதி வாங்குபவர்:

எழுதிக் கொடுப்பவர்கள்:

K. S. Ramamurthy

ச. ச. ராமமூர்த்தி

பத்தகம் 2021
வருத்திய 1529
ஆவணம் 17
கொண்டது 4

R. S. Ramamurthy
P. S. Ramamurthy

பதிவு செய்தவர்



தமிழ்நாடு தமில்நாடு TAMILNADU ரூ.100

ரூ.100

CF 126740

13 JUL 2021

K. Srinivas
சு. சீவசாமி

S.RAMAMURTHY, S.W
L.No:05/1992
KARUR.



.5.

தங்களுக்கு இருக்களங்கள் வீதம் உண்டான பொதுவில் 3/4 பங்கு பூமியை தங்களுக்கே நாங்கள் சுத்தக் கிரையமும், சுவாதீனமும் செய்து கொடுத்துப் பெற்றுக் கொண்டது ரூ.3,67,100

இந்த ரூபாய் முன்று இலட்சத்து அறுபத்தி ஏழாயிரத்து ஒரு நூறு மட்டும் நாளது தேதியில் கீழ்க்கண்ட சாட்சிகள் முன்னிலையில் தங்களிடமிருந்து நாங்கள் ரொக்கமாய் பெற்றுக் கொண்டு விட்டபடியால் இனி இதனடியில் கண்ட பூமியை நாளது எழுதி வாங்குபவர்: எழுதிக் கொடுப்பவர்கள்:

[Handwritten signature]

[Handwritten signature]

பத்தகம்...
வருத்திய...
சுவசாம்...
கொண்டது...

[Handwritten signature]
P. L. Srinivas

[Handwritten signature]
பதிவுகாரர்

தேதி முதல் தாங்களே புத்திர பெளத்திர பாரம்பரியமாய்,
தானாதி, வினிமய விற்கிரையங்களுக்கு யோக்கியமாய், சாக்கார்
தீர்வை முதலியவை செலுத்திக் கொண்டு சர்வ சுதந்திர
பாத்தியங்களுடன் ஆண்டு அனுபவித்துக் கொள்ள வேண்டியது.

இதனடியில் கண்ட பூமியின் போரில் எவ்வித வில்லங்க
விவகாரமும் இல்லை என்று உறுதியாகச் சொல்லுகிறோம். அப்படி
ஏதேனும் வில்லங்க விவாகரம் இருந்து பின்னிட்டு வெளியாகி
அதனால் தங்களுக்கு நஷ்டம் உண்டானால் அவ்வித நஷ்டத்தை
நாங்களும், எங்களுடைய வாரிசுகளும் எங்களுடைய இதர
சொத்துக்களைக் கொண்டு கட்டுப்பட்டு முன்னின்று தீர்த்துக்
கொடுப்போமாகவும்.

இனி இதனடியில் கண்ட பூமியைப் பொருத்து
எங்களுக்காவது எங்களுடைய உள்ளிட்ட வாரிசுகளுக்காவது
எவ்வித பாத்தியமும், யாதொரு பின்தொடர்ச்சியும் கிடையாது.

இதனடியில் கண்ட பூமியில் பொதுவில் 1/4 பங்கு தங்களுக்கு
இருக்க, எங்கள் வீதம் உண்டான பொதுவில் 3/4 பங்கு பூமியை
நாளது தேதியில் தங்களுடைய அனுபோக சுவாதீனத்தில் விட்டு
விட்டோம்.

மேற்படி 13.09.2000-ந் தேதிய அசல் ஆவணம் காணாமல்
போய் விட்டதால் வேலாயுதம்பாளையம் சாவல் நிலையத்தில்
புகார் அளித்தும் 25.05.2020-ம் தேதி நிலைய சமுதாய பணி
எழுதி வாங்குபவர்:

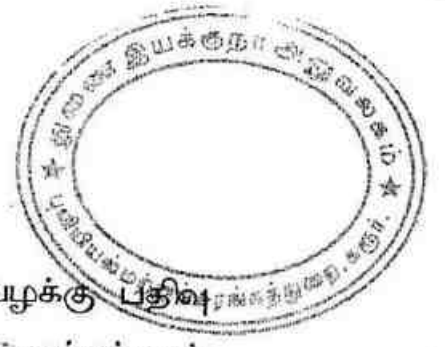
எழுதிக் கொடுப்பவர்கள்:

K. S. S. S.

M. S. S. S.

புத்தகம் 1537
வகுத்திய 17
ஆவணம் 17
கொண்டது 6
பதிவு

R. S. S. S.
L. S. S. S.



7.

பதிவேடு எண்.(CSR NO : 111/2020) படி வழக்கு பதிவு செய்து மாவட்ட குற்ற ஆவண காப்பகத்தின் முலம் குற்றத்தால் எண்.(C&O.NO.24/19 Dt:10,06,2020) வழங்கி விசாரணை மேற்கொண்டதில் மனுதாரரின் காணமல்போன ஆவணங்கள் தற்சமயம் வரை கிடைக்கப் பெறவில்லை என்று சான்று வழங்கியுள்ளதில் இத்துடன் இணைத்துள்ளோம்.

சொத்துவிபரம்

கூரூர் பதிவு மாவட்டம், 2நெ இணை சார்பதிவகம், புகளூர் வட்டம், குப்பம் கிராமம், அ.ப.ச.76 நெ.ஹெக்.1.47.5-க்கு ஏக்.3.65 இதில் காளியம்மாள் கிரையம் பெற்ற பூமிக்கு கிழக்கு, மேற்படி சர்வேயில் நம் பாத்திய பூமிக்கும் தெற்கு, தங்கள் பூமிக்கும், நல்லப்ப கவுண்டர்பூமிக்கு மேற்கு, கீழமேல் பஞ்சாயத்து ரோட்டுக்கும் வடக்கு. இதன் மத்தியில் ஏக்.1.82-1/2 செண்ட் -க்கு ஹெக்.0.73.50 இந்த விஸ்தீரணமுள்ள பூமியில் பொதுவில் 1/4 பங்கு தங்களுக்கு இருக்க எங்கள் வீதம் உண்டான பொதுவில் 3/4 பங்குக்கு ஏக்.1.36.875 க்கு ஹெக்.0.55.41 உள்ள பூமியும் மேற்படி பூமிக்கு மேற்படி எல்லையில் கண்ட கிழமேல் பஞ்சாயத்து ரோட்டில் சகல தட்பாத்தியங்கள் சகிதம்.

எழுதி வாங்குபவர்:

எழுதிக் கொடுப்பவர்கள்:

1x

m. சப்பாஜி
R. ராஜ்
P. லக்ஷ்மீ

புத்தகம்...
வருத்திய...
ஆவணம்...
கொண்டது...
பதிவு...



8.

மேற்படி பூமி தற்கால சட்டிவிஷன்படி அ.பு.ச.76/2
நெ.ஹெக்.73.50 ஆகும்.

மேற்படி சொத்தின் மதிப்பு --- ரூ.3,67,100-00

எழுதி வாங்குபவர்:

எழுதிக் கொடுப்பவர்கள்:

K. Suresh

M. அன்பழகன்
R. ராஜ்
P. மறியன்

சாட்சிகள்:-

1. V. Thevar (தங்கராசு) த/பெ.வேலுசாமி, நெ.2,
மசகவுண்டன்புதூர், புஞ்சைபுகலூர் தெற்கு, நஞ்சைபுகளூர், கரூர்
2. M. Karunanidhi (காளியப்பன்) முத்துசாமிசுவண்டர்
நெ.56, ஆத்தூர் ரோடு, வெங்கமேடு அஞ்சல், வாங்கப்பாளையம் கரூர்

ஆவண அமைப்பு:

S.KAMALAKANNAN,
Licence No.A1177/KUR/93
9J-Ramakrishnapuram, KARUR-1

பத்தகம் 2021
வருடத்திய 1527
ஆவணம் 17
கொட்பு: 8
பதிவு செய்யப்பட்டது
பதிவு செய்யப்பட்டது



TAMILNADU POLICE

மனு ரசீது



காவல் நிலையம் : VELAYUTHAMPALAYAM

மாவட்டம் : KARUR

மனு எண். 111/2020

1. மனு பெறப்பட்ட தேதி & நேரம் 25-05-2020 09:30
2. சம்பவ இடம் : புன்னம்சத்திரம்
3. மனுதாரர் : SHANMUGAM [56]
(S/O) KARUMANAGOUNDAR, ERODE MAIN ROAD, PUNNAMSATHIRAM,
PUGALUR TK., KARUR DT.
4. எதிர் மனுதாரர் :
5. Counter-Petitioner Description :
6. மனுவின் தன்மை : DOCUMENT MISSING
7. Mode of information : WRITTEN
8. மனுவின் சாராம்சம் :

மனுதாரர் மேற்கண்ட முகவரியில் வசித்து வருவதாகவும் மனுதாரர் சண்முகம் மற்றும் சுப்பிரமணி நடராஜன் மாரப்பன் ஆகியோர் குப்பம் கிராமம் சாவே எண்.76ல் கண்ட நிலத்தை கரூர் இலண்டன் சார்பதிவாளர் எண்.2 ஆணவ எண்.732/2000-ன் படி 13.09.2000ம் தேதி கிரையம் பெற்றதாகவும் மேற்படி நிலத்தின் அசல் கிரையப்பத்திரத்தை மனுதாரர் தனது வசம் வைத்திருந்ததாகவும் மேற்படி அசல் கிரையப்பத்திரத்தை ஜெராக்ஸ் எடுப்பதற்காக கடந்த 20.01.2020ம் தேதி காலை சுமார் 10.00 மணியளவில் மஞ்சல் பையில் போட்டு எடுத்துக்கொண்டு இருசக்கர வாகனத்தில் புன்னம்சத்திரம் பாரத் பெட்ரோலியம் பங்க் அருகில் உள்ள ஜெராக்ஸ் கடைக்கு வந்து பார்த்தபோது தான் கொண்டு வந்த அசல் கிரையப்பத்திரம் தொலைந்துவிட்டதாகவும் பல இடங்களில் தேடியும் இது நாள் வரை கிடைக்கவில்லை என்றும் கானாமல்போன அசல் கிரையப்பத்திரத்தை கண்டுபிடித்து தருமாறு கொடுத்த புகாரின் பேரில் மனு

K. Shanmugam
மனுதாரர் கையொப்பம்

Jeyaraman S.
ரீதியுடைய அலுவலர்
கையொப்பம்

JEYARAMAN S-INSPECTOR OF POLICE

Note

Please Visit <http://eservices.inpolice.gov.in> to know the latest status of your petition using CSR 111/2020

.....புத்தகம்.....
வருடத்திய.....
ஆவணம்.....
கொண்டது.....

பதிவு செய்யுமா

280



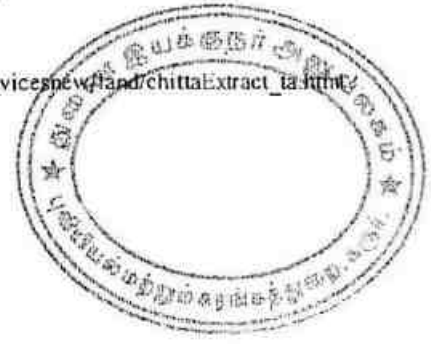
**வேலாயுதம்பாளையம் காவல் நிலையம்-கரூர் மாவட்டம்
சான்று**

கரூர் மாவட்டம், புகரூர் தாலுகா, புன்னம்சத்திரம், ஈரோடு மெயின் ரோடு என்ற முகவரியில் வசிக்கும் கருப்பண்ணன் மகன் சண்முகம் என்பவர் 25.05.2020 ம் தேதி வேலாயுதம்பாளையம் காவல் நிலையம் ஆஜராகி கொடுத்த புகாரில் தான் மேற்கண்ட முகவரியில் வசித்து வருவதாகவும் மனுதாரர் சண்முகம் மற்றும் சுப்பிரமணி நடராஜன் மாரப்பன் ஆகியோர் குப்பம் கிராமம் சர்வே எண்.76ல் கண்ட நிலத்தை கரூர் இணை சார்பதிவாளர் எண்.2 ஆணவ எண்.732/2000-ன் படி 13.09.2000 ம் தேதி கிரையம் பெற்றதாகவும் மேற்படி நிலத்தின் அசல் கிரையப்பத்திரத்தை மனுதாரர் தனது வசம் வைத்திருந்ததாகவும் மேற்படி அசல் கிரையப்பத்திரத்தை ஜெராக்ஸ் எடுப்பதற்காக கடந்த 20.01.2020 ம் தேதி காலை சுமார் 10.00 மணியளவில் மஞ்சல் பையில் போட்டு எடுத்துக்கொண்டு இருசக்கர வாகனத்தில் புன்னம்சத்திரம் பாரத் பெட்ரோலியம் பங்க் அருகில் உள்ள ஜெராக்ஸ் கடைக்கு வந்து பாத்தபோது தான் கொண்டு வந்த அசல் கிரையப்பத்திரம் தொலைந்துவிட்டதாகவும் பல இடங்களில் தேடியும் இது நாள் வரை கிடைக்கவில்லை என்றும் காணாமல்போன அசல் கிரையப்பத்திரத்தை கண்டுபிடித்து தருமாறு கொடுத்த புகார் மனுவின் பேரில் இன்று 25.05.2020 ந் தேதி நிலைய சமுதாய பணி பதிவேடு எண் (CSR NO : 111/2020)-ன் படி பதிவு செய்து சம்பவயிடம் சென்று விசாரணை மேற்கொண்டு மேற்படி மனுதாரரின் மனு மற்றும் அவரது சம்மந்தப்பட்ட ஆவணங்களின் நகல்களை கரூர் மாவட்ட குற்ற ஆவண காப்பகத்திற்கு அனுப்பியும் மாவட்ட குற்ற ஆவண காப்பகத்தின் மூலம் குற்றத்தாள் எண். (C&O.NO.24/19 Dt: 10.06.2020) வழங்கி விசாரணை மேற்கொண்டதில் மனுதாரரின் காணாமல் போன ஆவணங்கள் தற்சயம் வரை கிடைக்க பெறவில்லை என்று சான்று வழங்கப்படுகிறது.

.....புத்தகம்.....
வருடத்திய்.....
ஆவணம்.....
கொண்டது.....

பதிவு...

.....
காவல் அலுவலர்
வேலாயுதம்பாளையம் காவல் நிலையம்
கரூர் மாவட்டம்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : கரூர்

வட்டம் : புகளூர்

வருவாய் கிராமம் : குப்பம்

பட்டா எண் : 1410

உரிமையாளர்கள் பெயர்

- | | | | | |
|----|--------------------|------|------------|---|
| 1. | ராமசாமி கவுண்டர் | மகன் | நடராஜன் | - |
| 2. | மருதையப்ப கவுண்டர் | மகன் | சுப்பிரமணி | - |
| 3. | பழனியப்ப கவுண்டர் | மகன் | மாரப்பன் | - |
| 4. | கருமணகவுண்டர் | மகன் | சண்முகம் | - |

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	
76	2	0 - 73.50	2.04	--	--	--	--	2021/0103 /14/167797 -- 06-07-2021
75	3B	1 - 37.00	3.79	--	--	--	--	----- 11-10-2014
		2 - 10.50	5.83					

குறிப்பு 2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/07/018/01410/10876 என்ற குறிப்பு எண்ணை உள்ளிடு செய்து உறுதி செய்துகொள்ளவும்.

2. இத் தகவல்கள் 12-07-2021 அன்று 12:50:00 PM நேரத்தில் அச்சடிக்கப்பட்டது.

3. கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

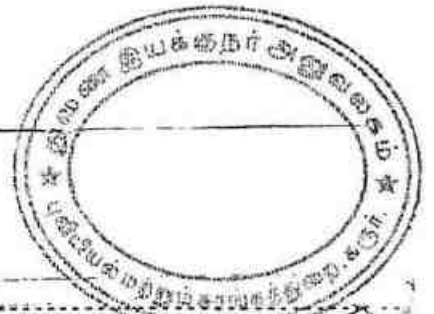
.....புத்தகம் 0103.....ம்

வருத்திய 1527.....ம்

ஆவணம் 17.....தாள்கள்

கொண்டது 11.....

பதிவு



भारत सरकार
GOVERNMENT OF INDIA

க. சண்முகம்
K Shanmugam
பிறந்ததேதி / Year of Birth : 1967
ஆண்பால் / Male



8508 4484 7996

भारत सरकार
GOVERNMENT OF INDIA

ஆதார்
UIDAI
UNIQUE IDENTIFICATION AUTHORITY OF INDIA

முகவரி:
S/O கருமண கவுண்டர், வி
எஸ் டி பெட்டகோல் பங்க
எதிர், புன்மணத்திரம்,
அரவக்குறிச்சி,
புன்மணத்திரம், கரூர், தமிழ்
நாடு. 639138

Address:
S/O Karumana Goundar, V-S
T
Petrolbunkopp, Punnamchatharan,
Aravakurichi,
Punnamchattram, Karur,
Tamil Nadu, 639138

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

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

K Shanmugam

भारत सरकार
GOVERNMENT OF INDIA

சுப்பிரமணி M
Subiraman M
தந்தை : மருதையப்பன்
Father : MARUTHAYAPPAN
பிறந்ததேதி / Year of Birth : 1956
ஆண்பால் / Male



5829 1952 0774

भारत सरकार
GOVERNMENT OF INDIA

ஆதார்
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UNIQUE IDENTIFICATION AUTHORITY OF INDIA

முகவரி:
S/O மருதையப்பன், என்
7-82, மெட்டுகடை,
பவித்திரம், பவித்திரம், கரூர்,
தமிழ்நாடு, 639002

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S/O Maruthaiyappan, NO
7-82, METTU KADA,
Pavithram, Pavithram,
Karur, Tamil Nadu, 639002

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

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

M. Subiraman

புத்தகம்.....ம்
வருடத்திய.....ம்
ஆவணம்.....17.....தாள்களைக்
கொண்டது.....

பதிவு இலாகாவார்



சர்க்கார்
GOVERNMENT OF INDIA



நடராஜன் ரா
Natarajan R
தந்தை: ராமசாமி
Father: RAMASAMY

பிறப்பு: 12/04/1959
ஆண் / Male



5463 9898 4712

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

R. Natarajan



United Arab Emirates Authority of India

முகவரி: 50 ராமசாமி, ராமசாமி-1
ராமசாமி பஸ்டா, பதிவிரம் கரூர்.
பதிவிரம், பதிவிரம், கரூர்
தமிழ்நாடு, 639002

Address: S/O Ramasamy,
4/57-1, RAMAM PALAIYAM,
PAVITHIRAM POST,
Pavithram, Pavithram,
Karur, Tamil Nadu, 639002

5463 9898 4712



1847
1800 300 1947



help@uae.gov.in



www.uae.gov.in



சர்க்கார்
GOVERNMENT OF INDIA



பி. மரப்பன்
P Marappan
பிறந்தநாள் / Year of Birth : 1964
ஆண் / Male



4322 1208 2852

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

P Marappan



United Arab Emirates Authority of India

முகவரி:
S/O பழனிப்பன், 8/4
ஆண்டிப்பட்டி கும்பம்,
அரவக்குறிச்சி, கும்பம், கரூர்,
தமிழ்நாடு, 639111

Address:
S/O Palaniappan, 8/4
andipatti kuppam,
ARAVAKURICHI, Kuppam,
Karur, Tamil Nadu, 639111



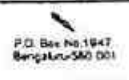
1847
1800 180 1347



help@uae.gov.in



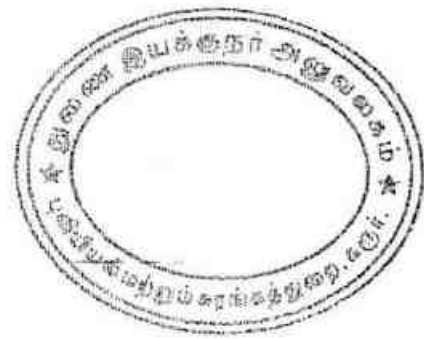
www.uae.gov.in



P.O. Box No.1947,
Bengaluru-560 001

புத்தகம் 2081
வருடத்திய 1597
ஆவணம் 17
கொண்டது 13

[Signature]
பதிவு அலுவலர்



GOVERNMENT OF INDIA

கலியாப்பன் கு
Kaliyappan M
தந்தை : முத்துசாமி கவுண்டர்
Father : MUTHUSAMY GOUNDAR
பிறந்தவருடம் / Year of Birth : 1956
ஆண்பால் / Male

6584 4647 7104




முகவரி:
S/O முத்துசாமி கவுண்டர்,
எண் 55, ஆத்தூர் ரோடு
வெங்கமேடு அஞ்சல்,
வங்கப்பலையம், கரூர்,
வெங்கமேடு, தமிழ்நாடு.
639006

Address:
S/O Muthusamy Goundar,
55, ATHUR ROAD
VENGAMEDU POST,
VANGAPALAYAM, Karur,
Vengamedu, Tamil Nadu.
639006

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

1847 1800 180 1847 helo @ uidai.gov.in www.uidai.gov.in P.O. Box No. 1561, Bengaluru 560 001

M. சாணியப்பன்

புத்தகம் 2001
வகுப்ப 1587
ஆவணம் 17 தாள்களைக்
கொண்டது 44 வகுப்புகள்
பரிசீலனை செய்யப்பட்டு
பரிசீலனை செய்யப்பட்டு





இந்திய அரசாங்கம்
Identification Authority of India

பதிவேட்டு எண்/Enrolment No.: 2189/80577/00091

To
வே தங்கராசு
V Thangarasu
S/O Velusamy .
2
Masagoundanpudhur
P Pugalur South
Nanjai Pugalur
Karur Moolimangalam
Tamil Nadu - 639136
9443208096

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உங்கள் ஆதார் எண் / Your Aadhaar No. :

7087 9042 8163

எனது ஆதார், எனது அடையாளம்



இந்திய அடையாள அமைச்சு
Government of India



வே தங்கராசு
V Thangarasu
பிறந்த நாள்/ DOB: 26/03/1979
ஆண் / MALE



7087 9042 8163

எனது ஆதார், எனது அடையாளம்



தகவல்

- ஆதார் அடையாளத்திற்கான சான்று, ரூபியரிமைக்கு அல்ல.
- அடையாள சான்றை ஆன்லைன் ஆதர்ப்புகேஷன் மூலமாகப் பெறவும்.
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

INFORMATION

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

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்
- வருங்காலத்தில் அரசு மற்றும் அரசு சாரா சேவைகளை பயன்படுத்திக் கொள்ள ஆதார் உதவிகரமாக இருக்கும்.

- Aadhaar is valid throughout the country.
- Aadhaar will be helpful in availing Government and Non-Government services in future.



இந்திய அடையாள அமைச்சு
Government of India

முகவரி:
S/O வேலுசாமி, 2,
மசகவுண்டன்புதூர்,
புள்ளைபுகளூர் தெற்கு,
நஞ்சைபுகளூர், கரூர்,
தமிழ் நாடு - 639136

Address:
S/O Velusamy, 2,
Masagoundanpudhur, P Pugalur
South, Nanjai Pugalur, Karur,
Tamil Nadu - 639136

7087 9042 8163



help@uidai.gov.in

www.uidai.gov.in

V. Thangarasu

பதிவேட்டு எண் 2189/80577/00091
ஆண்
பிறந்த நாள் 26/03/1979
பதிவு செய்த நாள் 25/03/2017

R/2 எண் இணை சார்பதிவாளர் கருர்புத்தகம்-171527/2021



2021 ஆம் ஆண்டு ஜூலை மாதம் 14ம் தேதி பி.பி. 03:54 மணியளவில் 2 எண் இணை சார்பதிவாளர் கருர சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 15,375/- செலுத்தியவர்

இடது பெருவிரல்



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கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



[Handwritten signature]

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



[Handwritten signature]

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



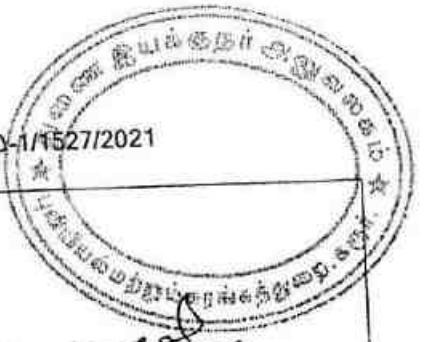
[Handwritten signature]

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

.....புத்தகம் 2081.....ம்
கருர்புத்தகம் 1527.....ம்
ஆவணம் 17.....தாள்களைக்
கொண்டது 16.....வது தாள்

பதிவு அலுவலர்
T 12

R/2 எண் இணை சார்பதிவாளர் கருர்/புத்தகம்-1/1527/2021



எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



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கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

இன்னொரு என்று நிரூபித்தவர்கள்

1. *[Handwritten signature]*
2. *[Handwritten signature]*

திரு காளியப்பன் தபெ முத்துசாமிசுவாமிநாதர் கதவு எண்.55, ஆத்தூர் ரோடு
வெங்கமேடு, வாங்கப்பாளையம், கருர், கருர், கருர், தமிழ்நாடு, இந்தியா, 639006

திரு தங்கராசு தபெ வேலுச்சாமி கதவு எண்.2 மச்சகவுண்டன்புதூர், புஞ்சைபுகளூர்
தெற்கு, நஞ்சை புகளூர், கருர், தமிழ்நாடு, இந்தியா, 639136

2021 ஆம் ஆண்டு ஜூலை மாதம் 14ம் நாள்



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லதா சுகராடன்
சார்பதிவாளர்
2 எண் இணை சார்பதிவாளர் கருர்

R/2 எண் இணை சார்பதிவாளர் கருர்/புத்தகம்-1/1527/2021 எண்ணாகப் பதிவு செய்யப்பட்டது

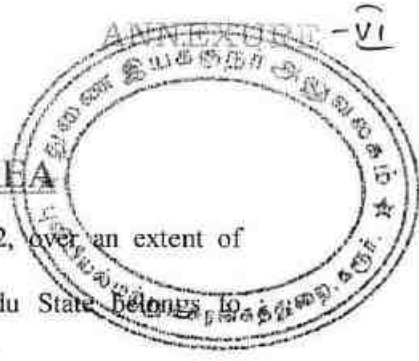
நாள் 14/07/2021
2 எண் இணை சார்பதிவாளர் கருர்

[Handwritten signature]
லதா சுகராடன்
சார்பதிவாளர்

.....புத்தகம் 2021.....ம்
வகுத்திய 1507.....ம்
ஆவணம் 17.....நாள்களைக்
செய்யப்பட்டு 17.....வது நாள்

பதிவு செய்வவர்





PHOTOCOPY OF THE APPLIED LEASE AREA

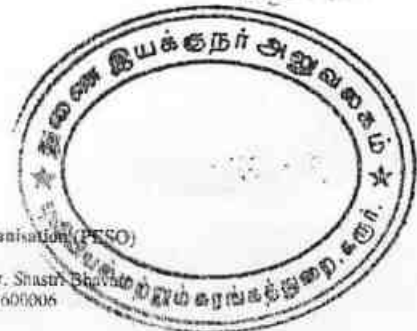
Field photos in respect of rough stone and gravel quarry lease in S.F.No. 76/2, over an extent of 0.73.5hectares of Kuppam Village, Pugalur Taluk, Karur District, Tamil Nadu State.

Mr.K.Shanmugam,





भारत सरकार Government of India
 वाणिज्य और उद्योग मंत्रालय Ministry of Commerce & Industry
 पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो) Petroleum & Explosives Safety Organisation (PESO)
 पूर्व नाम- विस्फोटक विभाग Formerly- Department of Explosives
 A और D- विंग ब्लॉक 1-8, दूसरा तल, शास्त्री भवन A & D - Wing, Block 1-8, 2nd Floor, Shastri Bhavan
 26 हद्दोस रोड, नंगम्बकम चेन्नै 600006 26 Haddos Road, Nanganbakkam Chennai 600006
 फोन (Phone)- 38281021 | फक्स (Fax) - 28284818



संख्या (No.) E/SC/TN/22/711(E102787)

दिनांक (Date) 29/09/2021

प्रति (To)

30 SEP 2021

M/s.Prabhu A Mining Service,
 No. 100/88/17 Haera Avenue, NR&P Street, Covai Road, Covripuram, Town Village - Karur East
 District-KARUR, State-Tamil Nadu, Pincode - 639022

विषय: Survey No.SF No.1006/1, ग्राम Uppidimangalam West Village, जिला KARUR, राज्य Tamil Nadu में मेसर्स M/s.Prabhu A Mining Service द्वारा
 विस्फोटक के मैगजीन में उपयोग के लिए कब्जा हेतु विस्फोटक नियम, 2008 के अंतर्गत LE-3 में जारी अनुज्ञापि सं E/SC/TN/22/711(E102787) के संशोधन संदर्भ
 में।
 (विस्फोटक की मात्रा / मासिक खरीद सीमा में परिवर्तन)
 Subject: Possession for use of Explosives from magazine situated at Survey No.:SF No.1006/1, Uppidimangalam West Village, Dist. KARUR, Tamil
 Nadu -Licence No.: E/SC/TN/22/711(E102787) granted in Form LE-3 of Explosives Rules, 2008 -
 (Amendment of Quantity of Explosives/Monthly Purchase Limit).

महोदय Sir,

आपका उपर्युक्त विषय पर पत्र संख्या X दिनांक 24/09/2021 का संदर्भ प्रेषण करें।
 Please refer to your letter no. X dated 24/09/2021.

अनुज्ञापि संख्या E/SC/TN/22/711(E102787) विस्फोटक की मात्रा / मासिक खरीद सीमा में परिवर्तन
 है।

The Licence No.: E/SC/TN/22/711(E102787) is forwarded herewith duly amended in respect of followings:
Quantity of Explosives/Monthly Purchase Limit

किसी भी एक समय में क्षमता निर्धारित की गई तथा मात्रा से अधिक नहीं होगी।
 The licence capacity at any one time shall not exceed the kinds and quantities mentioned below:

संख्या No	विस्फोटक Explosive(s)	वर्ग Class	प्रभाग Div	उप-प्रभाग Sub Div	क्षमता Capacity	इकाई Unit
1	Nitrate Mixture	2	0	0	1700	Kg.
2	Detonating Fuse	6	2	0	10000	Mtrs
3	Electric and/or Ordinary Detonators	6	3	0	44000	No.
4	Safety Fuse	6	1	0	10000	Mtrs

किसी एक कैलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा (अनुच्छेद 3 (ख) और (ग) के अधीन अनुज्ञापि के लिए लागू) 15 गुना
 quantity of explosives to be purchased in a calendar month (applicable for licence under article 3(b) and (c)) 15 times as above.

यह अनुज्ञापि दिनांक 31 मार्च 2025 तक प्रवृत्त रहेगा।
 This Licence shall remain valid till 31st day of March 2025.

अनुज्ञापि के आगामी नवीकरण हेतु कृपया विस्फोटक नियम, 2008 के नियम 112 के अंतर्गत प्रक्रिया का पालन करें। कृपया पत्रवादी दें।
 For further revalidation (if required), please follow the procedure under Rule 112 of Explosives Rules, 2008. Receipt of this letter may please be acknowledged.

भवदीय / Yours faithfully

डा. टी. एल. थानुलिंगम | Dr. T. L. THANULINGAM
 उप मुख्य विस्फोटक नियंत्रक | Deputy Chief Controller of Explosives
 संयुक्त मुख्य विस्फोटक नियंत्रक | For Joint Chief Controller of Explosives
 दक्षिणांचल, चेन्नै | South Circle, Chennai

प्रतिलिपि प्राप्त / Copy Forwarded to:

1. District Magistrate, KARUR, Tamil Nadu with reference to his Noc No. RC NG D2 107/82918 Dated: 28/06/2019
2. Superintendent of Police, KARUR, Tamil Nadu.

संयुक्त मुख्य विस्फोटक नियंत्रक | For Joint Chief Controller of Explosives
 दक्षिणांचल, चेन्नै | South Circle, Chennai

(अधिक जानकारी के लिए आवेदन की स्थिति, शुल्क आदि के लिए हमारा वेबसाइट <http://peso.gov.in> देखें।)
 (For more information regarding status, fee, and other details please visit our website <http://peso.gov.in>)

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

290

अनुज्ञापन प्रारूप एल. ई.-3 | LICENCE FORM LE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (घ) देखिए।)
(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 मोज़ेज में वर्ग 6 के विस्फोटक रखने के लिए
Licence to possess : (c) for use/explosives of class 1, 2, 3, 4, 5 or 7 or in a mofuzine

अनुज्ञापन सं. (Licence No.) : E/SC/TN/22/711(E102787)
वार्षिक फीस रूप (Annual Fee Rs): 5600/-



1. Licence is hereby granted to

M/S.Prabh A Mining Service (अधिभोगी / Occupier : M.PRABHU), No.1008,88/17 Heera Avenue, NRMP Street, Covva Road, Govvipuram, Town/Village - Karur Town, District-KARUR, State-Tamil Nadu, Pincode - 639102

को अनुज्ञापन अनुदत्त की जाती है।

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

3. अनुज्ञापन निम्नलिखित प्रयोजनों के लिए विधिमान्य है।
Licence is valid only for the following purpose.

4. अनुज्ञापन 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. सं. 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	Nitrate Mixture	2.0	0	1700 kg.
2	Detonating Fuse	6.2	0	10000 Mtrs
3	Electric and/or Ordinary Detonators	6.3	0	44000 Nos.
4	Safety Fuse	6.1	0	10000 Mtrs

(ख) किसी एक कैलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा (अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञापन के लिए)
(b) Quantity of explosives to be purchased in a calendar month (applicable for licensee under article 3(b) and (c))

15 times as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञापन परिसर की पृष्टि होती है।
The licensed premises shall conform to the following drawing(s).

रेखाचित्र क्र. (Drawing No.) E/SC/TN/22/711(E102787)
दिनांक (Dated) 29/09/2021

6. अनुज्ञापन परिसर निम्नलिखित पते पर स्थित है। The licensed premises are situated at following address:
Survey No. SF No.1006/1, ग्राम (Town/Village) : Uppilimangalam West Village
जिला (District) : KARUR राज्य (State) : Tamil Nadu
दूरभाष (Phone) : ई. मेल (E-Mail) : पिनकोड (Pincode) : 624802
फैक्स (Fax) :

पुलिस थाना (Police Station) : Villupuram

7. अनुज्ञापन परिसर में निम्नलिखित सुविधाएं अंतर्विष्ट हैं।
The licensed premises consist of following facilities.

RCC Building

8. अनुज्ञापन समय - समय पर वंशांशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2004 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपबंधों 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, 2004 framed there under and the conditions, additional conditions and the following Annexures.

- उपरोक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण संबंधी और अन्य विवरण दर्शित करते हुए)
Drawings (showing site, constructional and other details) as stated in serial No. 5 above.
- अनुज्ञापन प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञापन की शर्तों और अतिरिक्त शर्तों।
Conditions and Additional Conditions of this licence signed by the licensing authority.
- दूसरी प्रारूप DE-2 | Distance Form DE-2.

9. यह अनुज्ञापन तारीख 31 मार्च 2020 तक विधिमान्य रहेगा। This licence shall remain valid till 31st day of March 2020.

यह अनुज्ञापन, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VII के अधीन तथा उपरोक्त इस अनुज्ञापन की शर्तों का अधिकतम पालन या यदि अनुज्ञापन परिसर योजना या उससे संलग्न उपबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिरुद्ध की जा सकती है, जहां वह 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 VII, 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 Annexures attached hereto.

तारीख | The Date - 28/08/2017

संयुक्त मुख्य विस्फोटक नियंत्रक / Joint Chief Controller of Explosives
South Circle, Chennai

Amendments :

- Change in Authorized Signatory/Occupier/Partners/Directors dated : 04/03/2020
- Change in Postal Address dated : 21/09/2020
- Change in Authorized Signatory/Occupier/Partners/Directors dated : 21/09/2020
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 02/02/2021
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 29/09/2021

Transfers :

- Change in Licensee Name/Address/Status dated : 23/07/2021

नवीनीकरण के पृष्ठांकन के लिए स्थान
Space for Endorsement of Renewal

नवीनीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
09/07/2020	31/03/2025	Sd- Jt. Chief Controller of Explosives, South Circle, Chennai

कानूनी चेतावनी : विस्फोटकों का गलत ढंग से चयन या उनका दुरुपयोग विधेय के अधीन गंभीर दंडनीय 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 printout for their records.



தமிழ்நாடு தமில்நாடு TAMIL NADU

7 SEP 2022

₹.20

02AC 367917

S.RAMAMURTHY, S.V
L.No:05/1992
KARUR.

BLASTING OR CONTRACT AGREEMENT

M.PRABHU m/s PRABHU-A-MINING SERVICE, Uppidamangalam West Village, having Explosive License No. E/SC/TN/22/711(E102787) and Explosive Magazine Situated at Uppidamangalam west Village here in after referred as part 1 entered into an Blasting agreement with

K.SHANUMUGAM
W/o KARUMANAGOUNDER,
VST PETROL BUNK OPP,
PUNNAMCHATIRAM
PUGALUR (Tk)
Karur- Dt.

Having their mines/ quarry in S.F.No: **76/2 (0.73.50Hects)**, Kuppam Village, Pugalur taluk, Karur District herein after referred as party 2 on and both the parties agreed for the followings:

For K.SHANUMUGAM

For PRABHU-A-MINING SERVICE

K. Shanumugam

Prabhu



-2-

- a) Party 1 has to use his Explosives and he has to do the Blasting work, in the mines/quarry with an authorized shot firer permit holder which is issued by the Explosives Department, Madras.
- b) Party 2 has to pay the cost of Explosives, transport Charges, and other expenses incidental to blasting to party 1 as agreed by both the parties 1 and 2.
- c) Party 2 has to make his own arrangement to remove all the broken materials at his own cost.
- d) This agreement is valid from the date of signing by both the parties till the Completion of Blasting contract work from party 2 by giving in writing for clearing the agreement.

PARTY - 1

M.PRABHU M/S PRABHU-A-MINING SERVICE
EXPLOSIVES DEALERS
KARUR.

PARTY-2

For K.SHANUMUGAM
KARUR.

WITNESS:

1. R. Sainanar s/o K. Raja, Gandhi Nagar 2nd cross,
Anugampalayam, (Karur LD1).
2. R. Selvam s/o Ramabany, Punnam chattram (LD), Pugalur (TL)
(Karur LD1).




भारत सरकार
GOVERNMENT OF INDIA

க. சண்முகம்
K Shanmugam
புள்ளிப்பிட்டி - Year of Birth 1967
ஆண்பால் / Male



8508 4484 7996

ஆண்பால் - சாதாரண பஸ்தினின் அதிகாரம்

இந்திய தனிப்பட்ட அடையாள ஆணையம்
UNIQUE IDENTIFICATION AUTHORITY OF INDIA

முகவரி:
S/O கருமண கவுண்டர், வி
எஸ் டி பெட்டேரல் பஸ்தி
நதிர், புள்ளிப்பிட்டி,
அரவக்குறிச்சி,
புள்ளிப்பிட்டி, கரூர், தமிழ்
நாடு, 639136

Address:
S/O Karumana Goundar, V. S
T
Petrobunkopp, Punnamchathir,
Aravakunchi,
Punnamchatram, Karur,
Tamil Nadu, 639136





आयकर विभाग
INCOME TAX DEPARTMENT



भारत सरकार
GOVT. OF INDIA

(SHANMUGAM
SARUMANA GOUNDER
7/01/1967

Permanent Account Number

UUPS9245E

[Signature]

Signature



Please show card to host / foreign identity in form of return to :
Income Tax PAN Services Unit, UTITD,
Sector 11, Chandigarh.
Tel: 91-172-2614141 - 490 614.
இலாபம் அல்லது இழப்பைக் குறிப்பிட்டு அறிவிக்க வேண்டும்.
தொழில்நுட்ப அலுவலகம், டி.டி.சி. கட்டிடம், டி.டி.சி. கட்டிடம்,
செக்டர் 11, சாண்டி கரூர்.
தொலைபேசி - 490 614.



NABET National Accreditation Board for Education and Training NABET

ITPI Building, 6th Floor, 4 - A, Ring Road, I P Estate, New Delhi - 110002

CERTIFICATE OF ACCREDITATION

Under the QCI-NABET Scheme
for
Prospecting/Exploration & Mining Plan Preparing Agency

Geo Technical Mining Solution

Address: Ground Floor, 1/213-B, Natesan Complex, Oddapatti TAMIL NADU DHARMAPURI-636705

SCOPE COVERAGE	
APA	Preparation of Comprehensive Geological Report (GR)
MPPA	Preparation of Comprehensive Mining Plan/Mining Project Report (PR), Pre-feasibility Report (PFR) / Feasibility Report Preparation

Note: Names of approved Project Coordinators and Technical Area Experts are mentioned in IA AC Minutes dated Mar 28, 2022 on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no.QCI/NABET/APA&MPPA/ACO/22/017 dated Mar 30, 2022.

The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solution following due process of assessment.

Sr. Director, NABET
Issue Date: Mar 30, 2022



Certificate No.
NABET/APA-MPPA/IA/017

Valid Upto
Mar 27, 2025

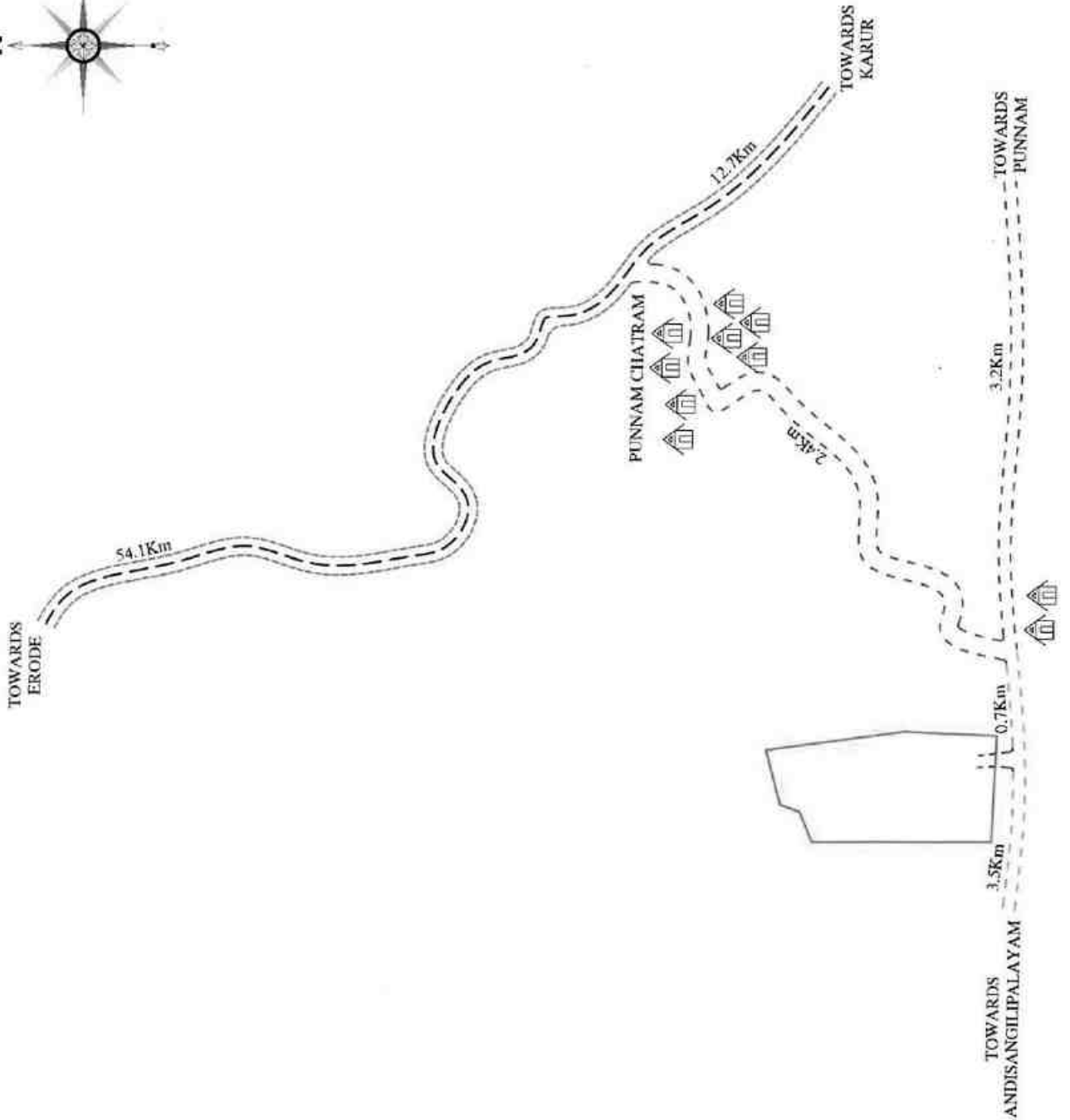
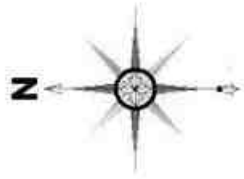


PLATE NO-I

APPLICANT:

Mr.K.SHANMUGAM,
S/o. KARUMANAGOUNDER,
OPP TO V.S.T.PETROL BUNK,
PUNNAMCHATHIRAM, PUGALUR TALUK,
KARUR DISTRICT - 639136,
TAMILNADU.

LEASE APPLIED AREA:

S.F.NO : 76/2,
EXTENT : 0.73.5HECT,
VILLAGE : KUPPAM,
TALUK : PUGALUR,
DISTRICT : KARUR.

INDEX

- MINE LEASE AREA
- APPROACH ROAD
- CART ROAD
- VILLAGE ROAD
- SH - 84 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

GEO TECHNICAL MINING SOLUTIONS
NABET/APA-MPPA/1A/017

10°59'54.61"N

77°57'36.98"E

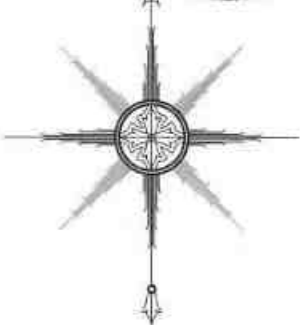
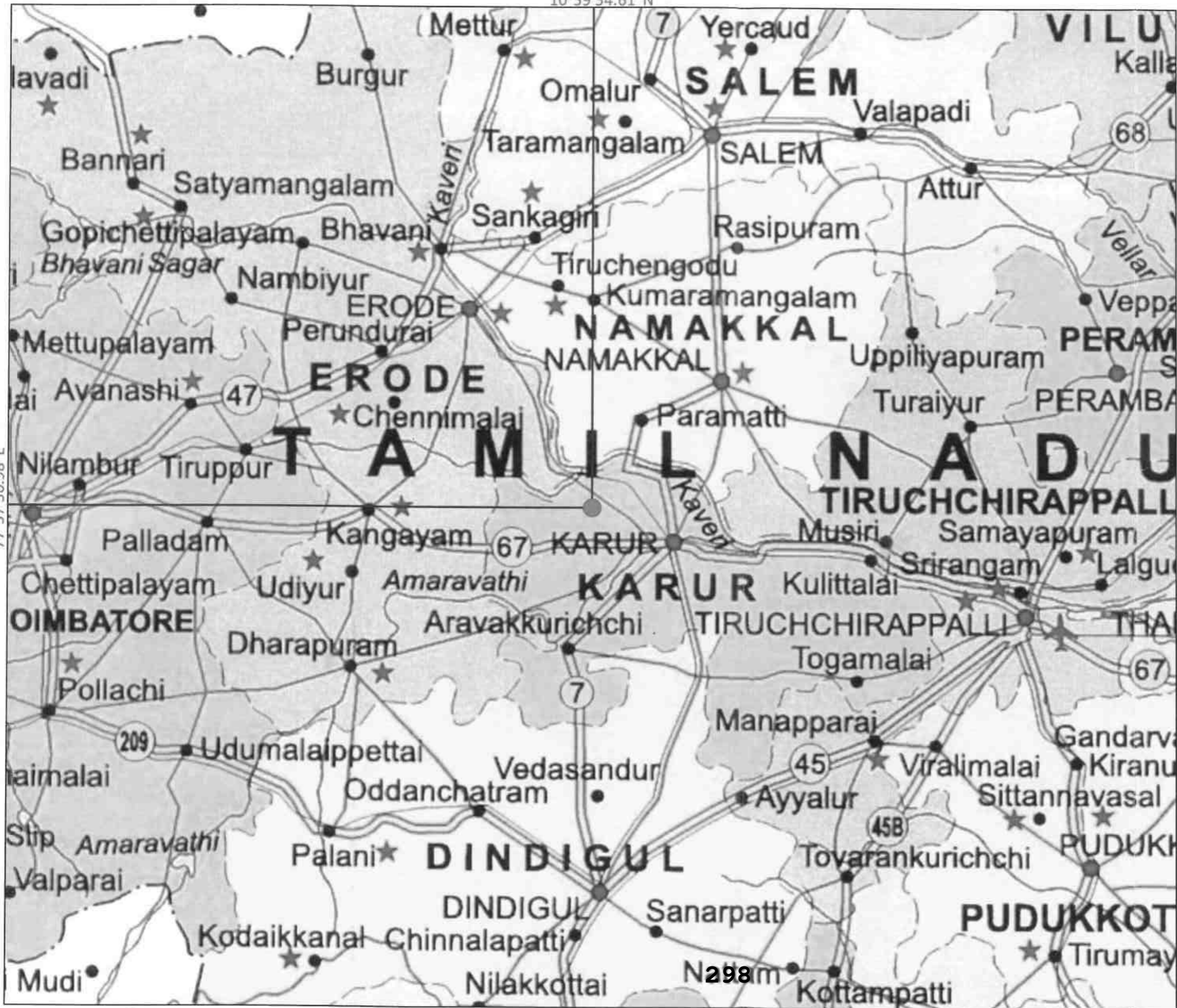


PLATE NO-IA

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

MINE LEASE AREA: ●
TOPO SHEET NO : 58-F/13
LATITUDE : 10°59'50.08"N to 10°59'54.61"N
LONGITUDE: 77°57'36.96"E to 77°57'39.16"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

GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017

Towards
Punnam Chatram



Towards
Andisangilpalayam

Towards
Punnam Chatram

Towards
Punnam Chatram

Towards
Pavitrarnadu



PLATE NO-IC

APPLICANT:

Mr.K.SHANMUGAM,
S/o. KARUMANAGOUNDER,
OPP TO V.S.T.PETROL BUNK ,
PUNNAMCHATHIRAM, PUGALUR TALUK,
KARUR DISTRICT - 639136.
TAMILNADU.

LEASE APPLIED AREA:

S.F.NO : 76/2,
EXTENT : 0.73.5HECT,
VILLAGE : KUPPAM,
TALUK : PUGALUR,
DISTRICT : KARUR.

INDEX

MINE LEASE AREA	
SAFETY DISTANCE	
APPROACH ROAD	
CART ROAD	
VILLAGE ROAD	
300m RADIUS	
500m RADIUS	
EXISTING QUARRY PIT	
ODAI	

TOPO SHEET NO : 58-F/13

LATITUDE : 10[59'50.08"N to 10[59'54.61"N

LONGITUDE: 77[57'36.96"E to 77[57'39.16"E

SATELLITE IMAGERY MAP

SCALE- 1:5000

Prepared By:

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TO THE BEST OF MY KNOWLEDGE

GEO TECHNICAL MINING SOLUTIONS
NABET/APA-MPPA/IA/017

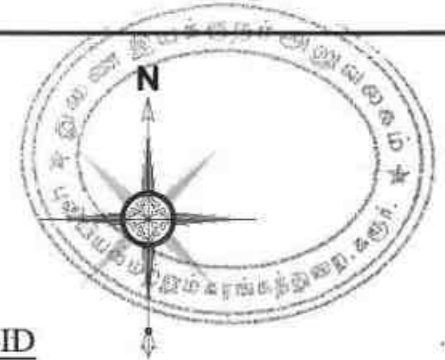


PLATE NO-ID

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK ,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

MINE LEASE AREA	
SAFETY DISTANCE	
APPROACH ROAD	
CART ROAD	
300m RADIUS	
500m RADIUS	
EXISTING QUARRY PIT	
VILLAGE ROAD	
SHRUB AND TREE	
EB LINE	
WIND DIRECTION	
ODAI	

TOPO SHEET NO : 58-F/13
 LATITUDE : 10°59'50.08"N to 10°59'54.61"N
 LONGITUDE: 77°57'36.96"E to 77°57'39.16"E

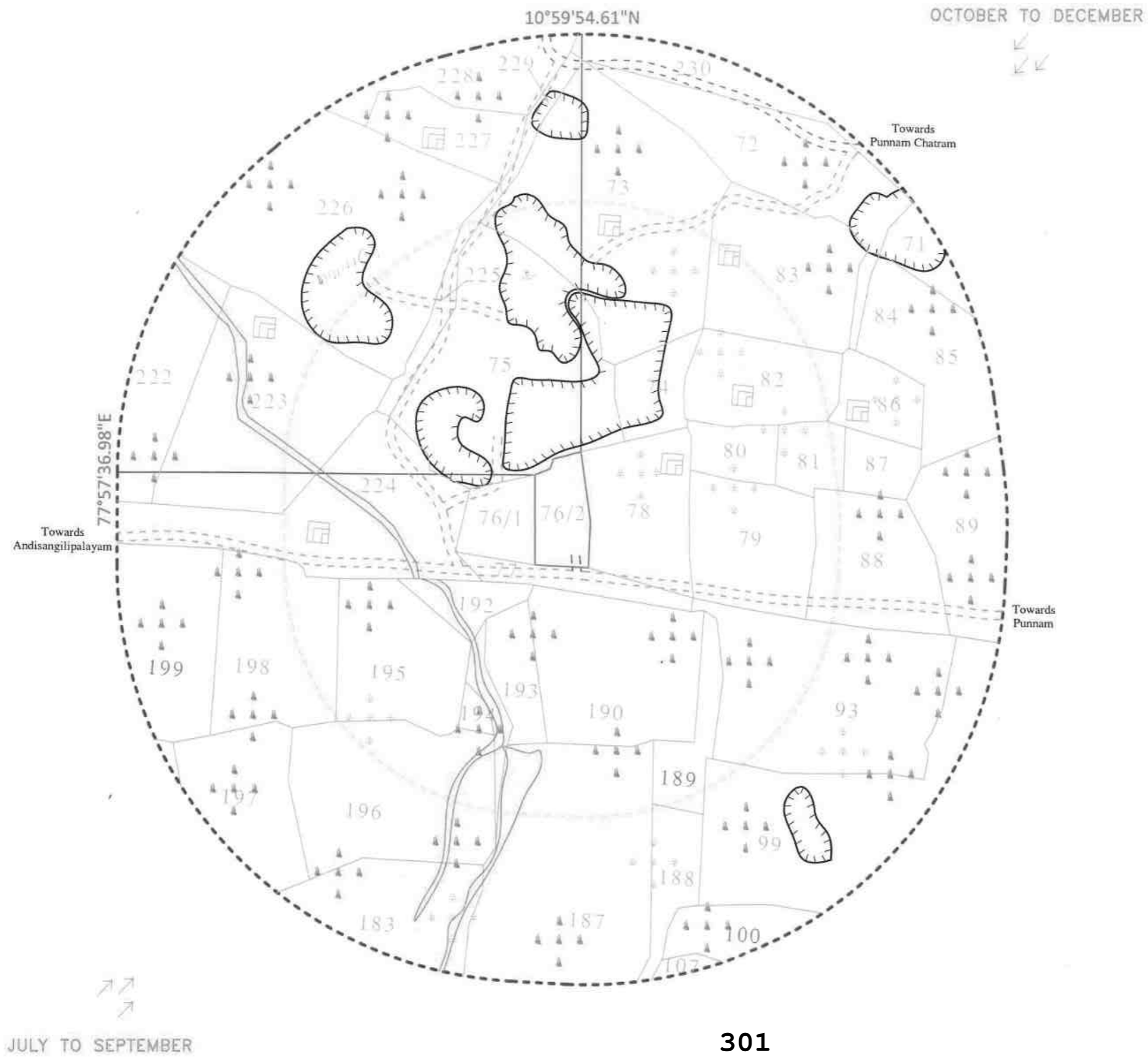
ENVIRONMENTAL PLAN

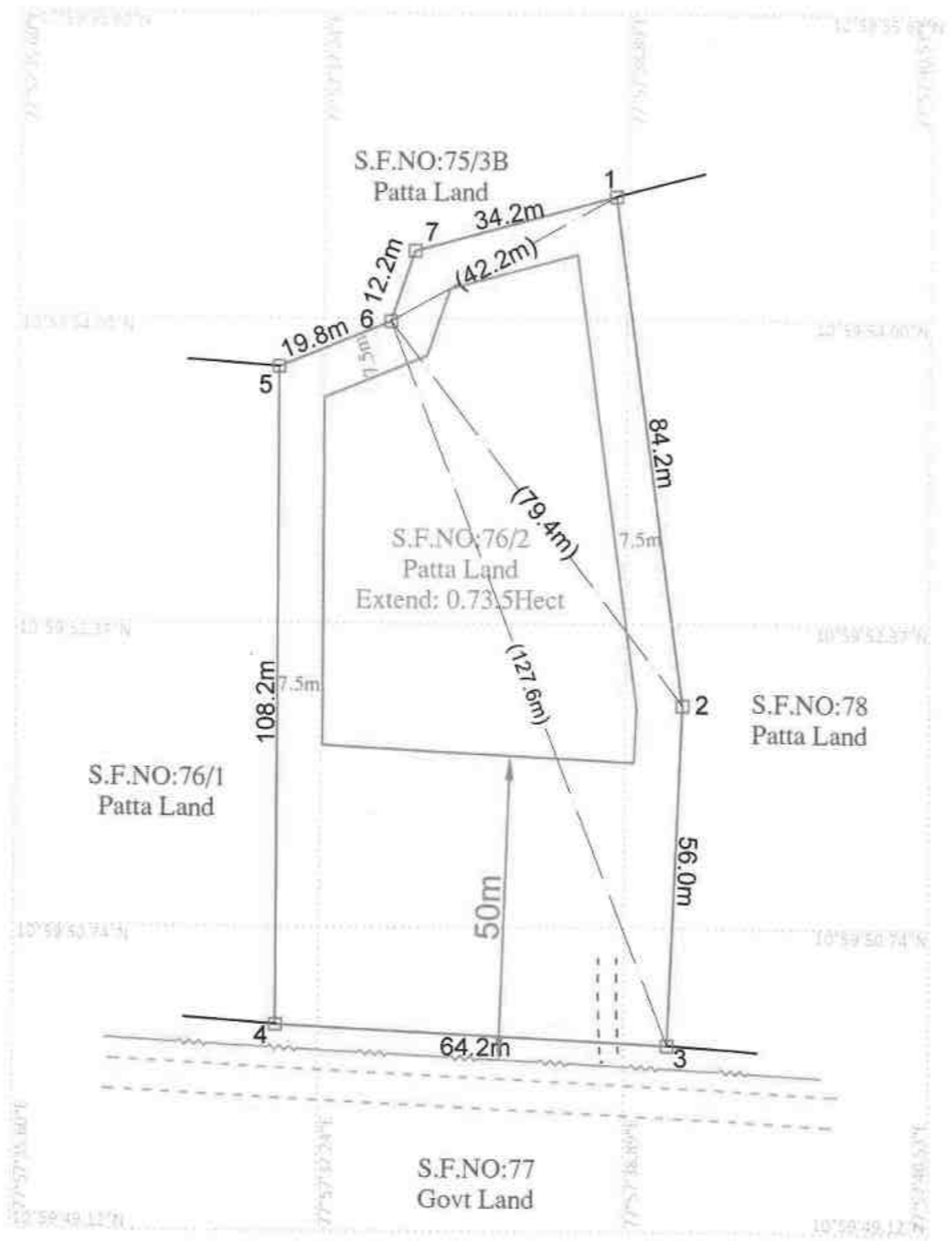
SCALE- 1:5000

Prepared By:

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 TO THE BEST OF MY KNOWLEDGE

GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017





Pillar ID	Latitude	Longitude
1	10°59'54.61"N	77°57'38.81"E
2	10°59'51.90"N	77°57'39.16"E
3	10°59'50.08"N	77°57'39.07"E
4	10°59'50.21"N	77°57'36.96"E
5	10°59'53.72"N	77°57'36.98"E
6	10°59'53.96"N	77°57'37.59"E
7	10°59'54.34"N	77°57'37.72"E

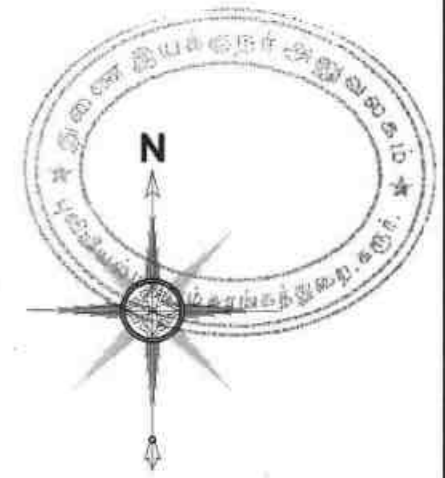

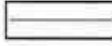

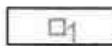




PLATE NO-II

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

- MINE LEASE AREA 
- SAFETY BOUNDARY 
- APPROACH ROAD 
- PILLAR STONES 
- CART ROAD 
- EB LINE 

MINE LEASE PLAN
 SCALE 1: 1000

Prepared By:

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 HAS BEEN CHECKED BY ME AND IS CORRECT
 TO THE BEST OF MY KNOWLEDGE

GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017



PLATE NO-III

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK ,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARK
- SHRUBS
- GRAVEL
- ROUGH STONE
- EB LINE
- CART ROAD

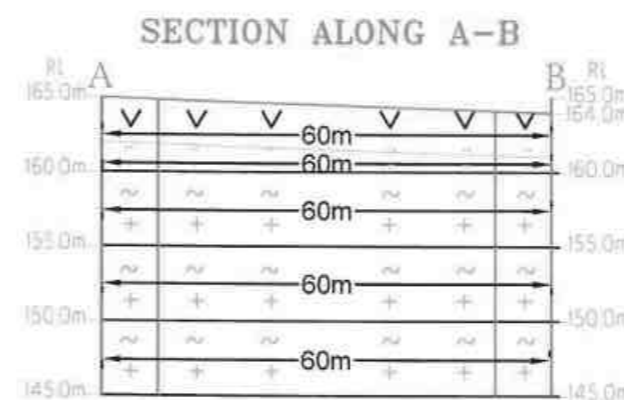
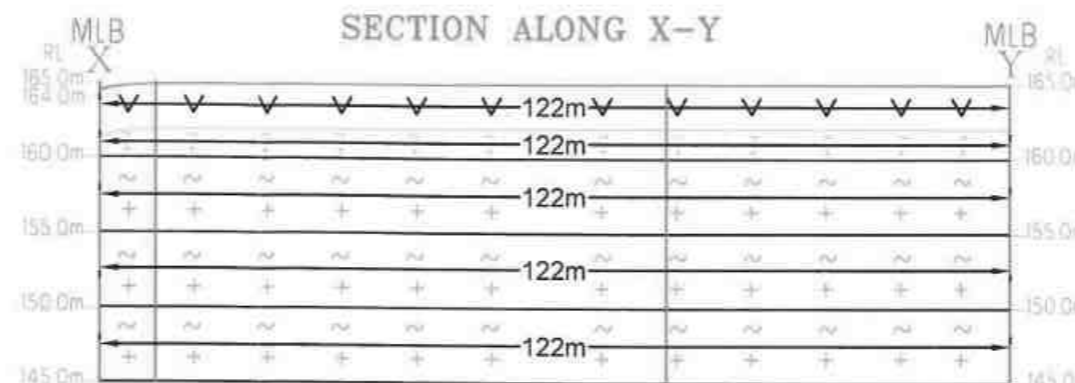
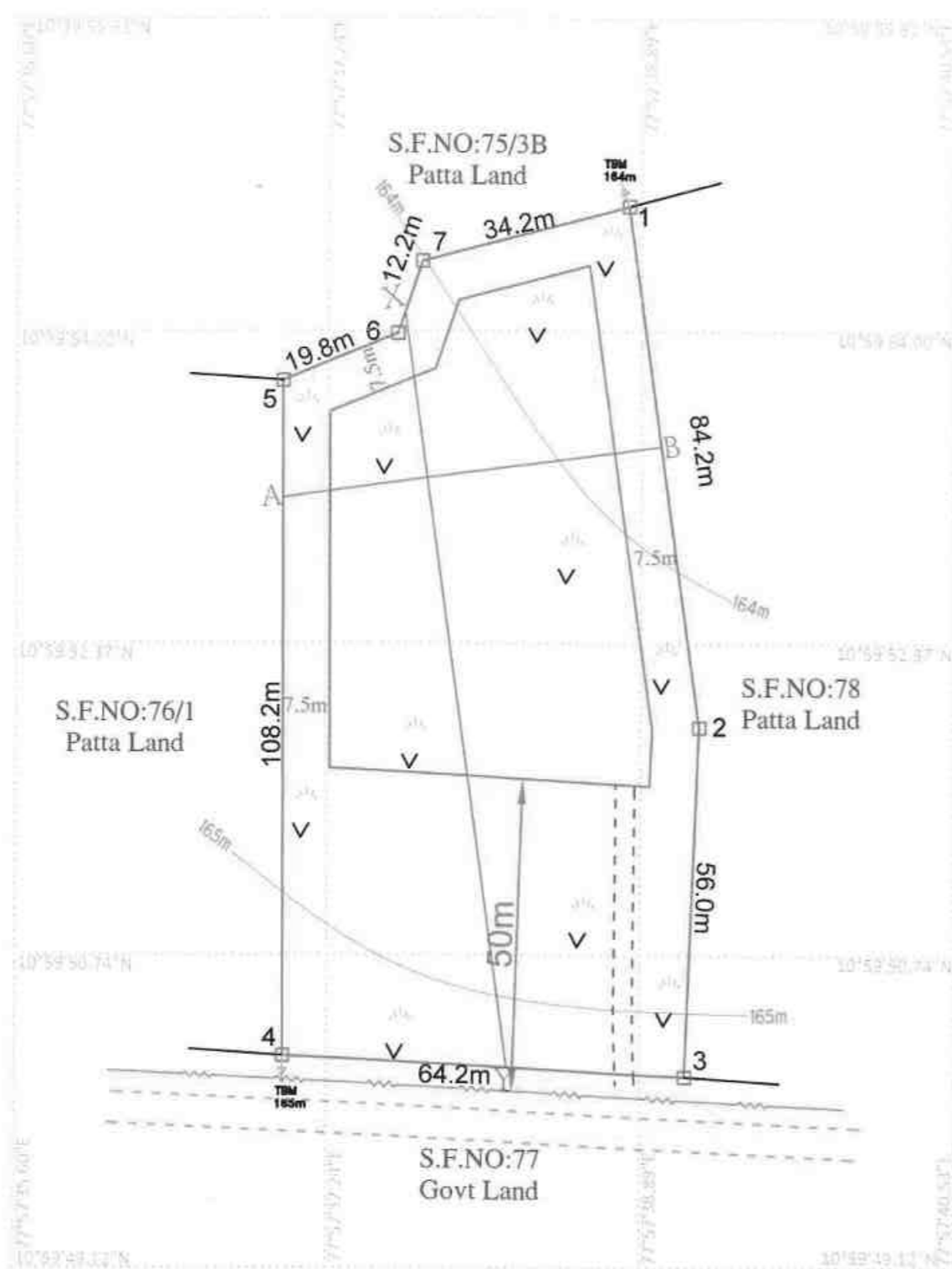
SURFACE, GEOLOGICAL PLAN & SECTIONS

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

Prepared By:

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GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017



GEOLOGICAL RESOURCES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³
XY-AB	I	122	60	3	21960	.....	21960
	I	122	60	2	14640	14640	.....
	II	122	60	5	36600	36600	.....
	III	122	60	5	36600	36600	.....
IV	122	60	5	36600	36600	.....
TOTAL				20	146400	124440	21960

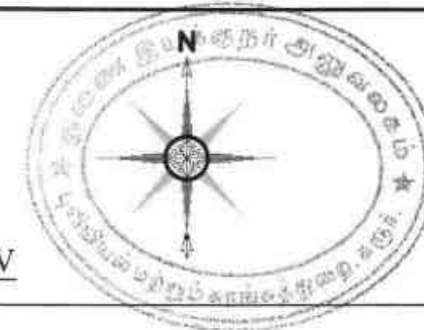


PLATE NO-IV

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

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TEMPORARY BENCH MARK	
SHRUBS	
GRAVEL	
ROUGH STONE	
ULTIMATE BENCH	
EB LINE	
FENCING	
CART ROAD	

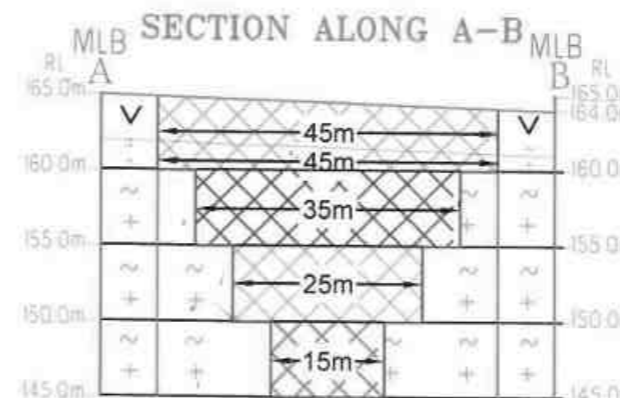
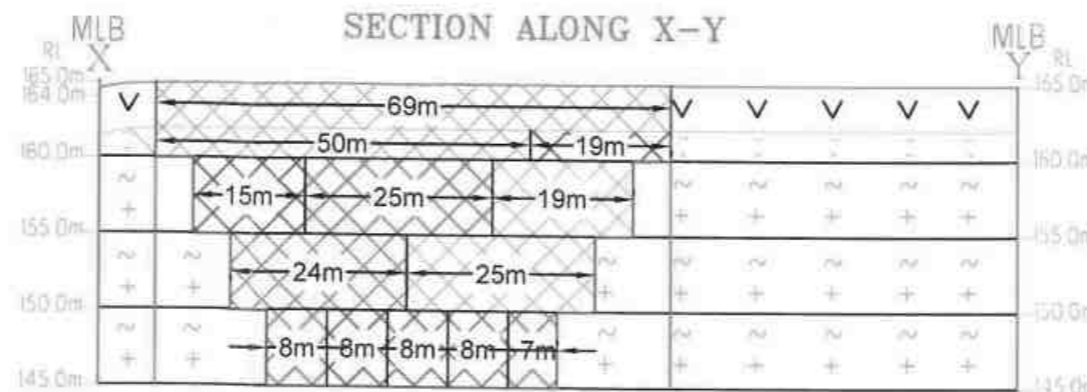
YEARWISE DEVELOPMENT, PRODUCTION PLAN & SECTIONS

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

Prepared By:

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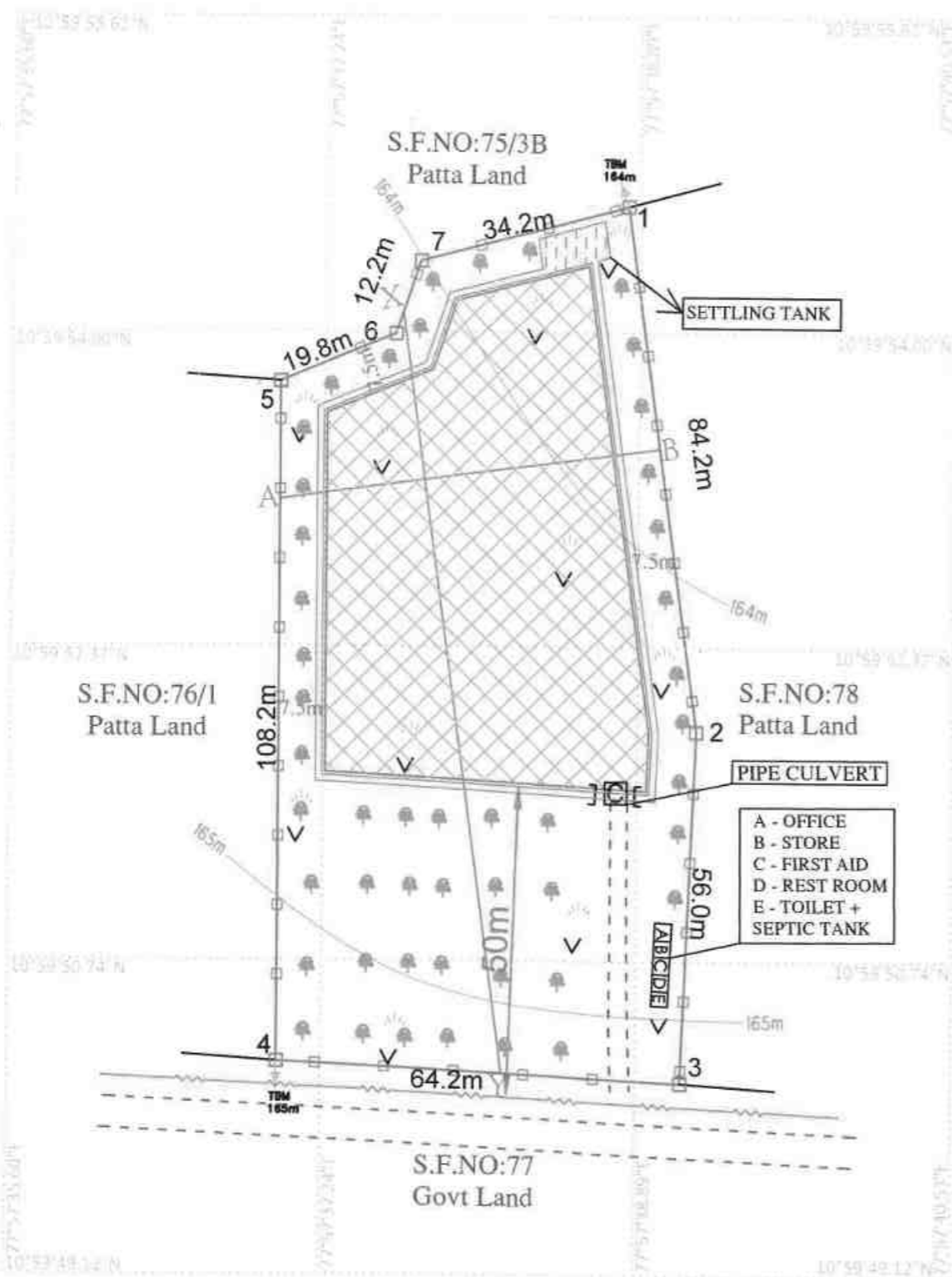
GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017



Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³
XY-AB	I-YEAR	I	69	45	3	9315	.....	9315
		I	50	45	2	4500	4500	.....
TOTAL						13815	4500	9315
XY-AB	II-YEAR	I	19	45	2	1710	1710	.....
		II	15	35	5	2625	2625	.....
TOTAL						4335	4335	0
XY-AB	III-YEAR	II	25	35	5	4375	4375	.....
		TOTAL						4375	4375	0
XY-AB	IV-YEAR	II	19	35	5	3325	3325	.....
		III	25	25	5	3125	3125	.....
TOTAL						6450	6450	0
XY-AB	V-YEAR	III	24	25	5	3000	3000	.....
		TOTAL						3000	3000	0
GRAND TOTAL						31975	22660	9315

Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³
XY-AB	VI-YEAR	IV	8	15	5	600	600	.....
		TOTAL						600
XY-AB	VII-YEAR	IV	8	15	5	600	600	.....
		TOTAL						600
XY-AB	VIII-YEAR	IV	8	15	5	600	600	.....
		TOTAL						600
XY-AB	IX-YEAR	IV	8	15	5	600	600	.....
		TOTAL						600
XY-AB	X-YEAR	IV	7	15	5	525	525	.....
		TOTAL						525	525	0
GRAND TOTAL						2925	2925	0

304



I - Year Proposed area to be Planted

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	
VI - Year Proposed area to be Quarried	
VII - Year Proposed area to be Quarried	
VIII - Year Proposed area to be Quarried	
IX - Year Proposed area to be Quarried	
X - Year Proposed area to be Quarried	

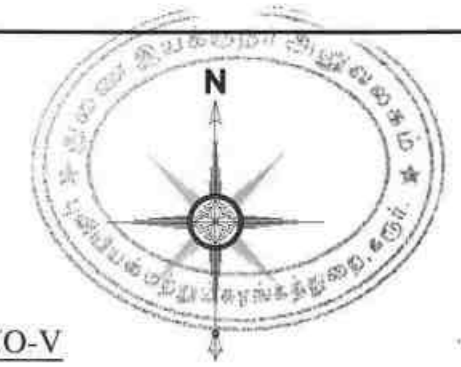


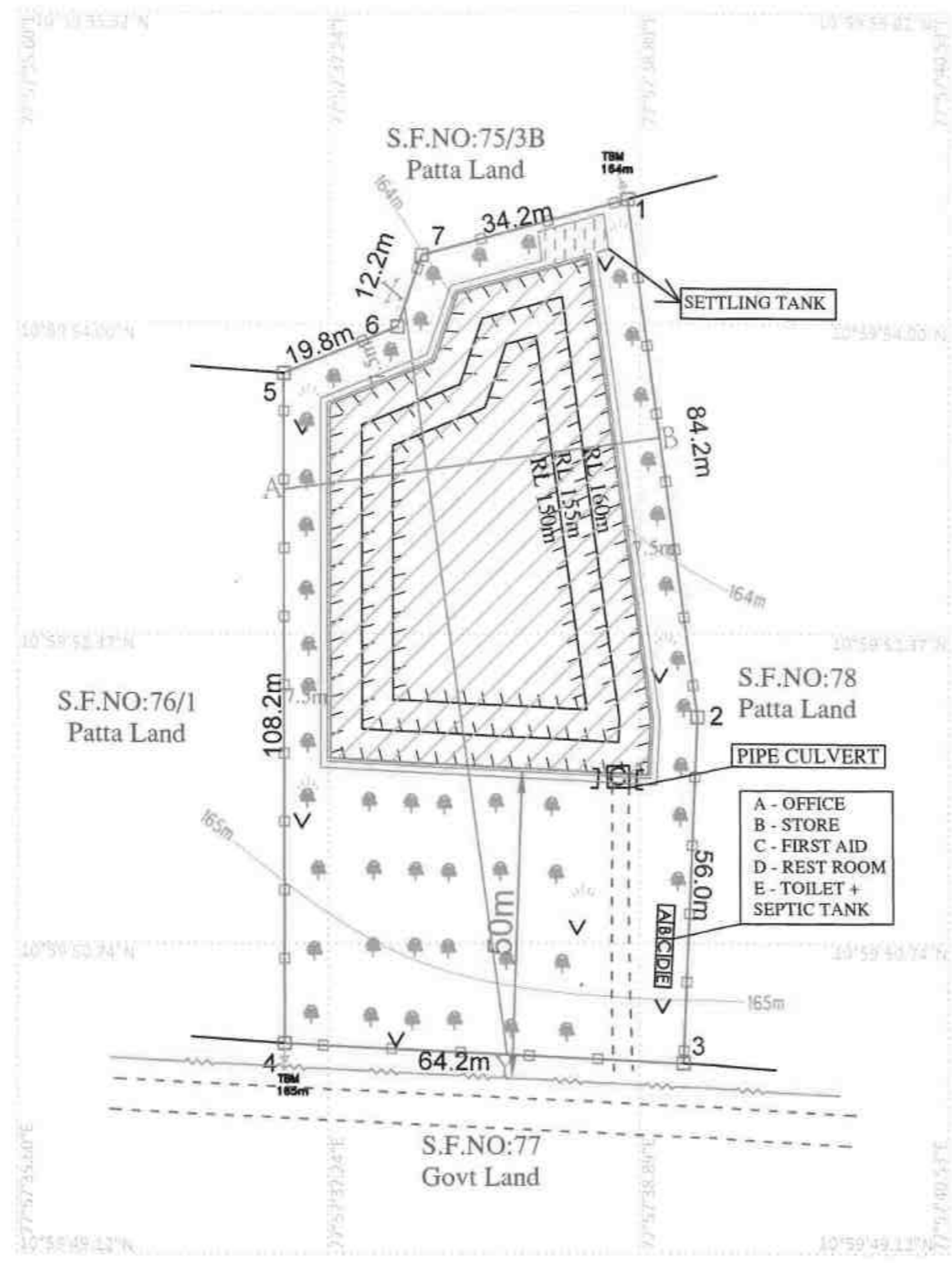
PLATE NO-V

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

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APPROACH ROAD	
PILLAR STONES	
CONTOUR LINES	
TEMPORARY BENCH MARK	
SHRUBS	
GRAVEL	
PROPOSED BENCH	
EB LINE	
FENCING	
CART ROAD	



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

MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	0.34.1	
INFRASTRUCTURE	NIL	0.03.0	
ROADS	NIL	0.02.0	
GREEN BELT	NIL	0.30.1	
DRAINAGE & SETTLING TANK	NIL	0.03.1	
UN-UTILIZED AREA	0.73.5	0.01.2	NIL
GRAND TOTAL	0.73.5	0.73.5	NIL

1- Year Proposed area to be Planted

305

MINE LAYOUT PLAN AND LAND USE PATTERN
 SCALE 1 : 1000

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

 GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017

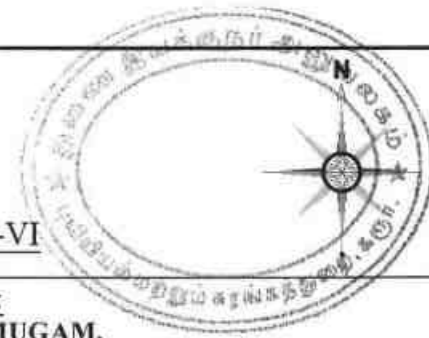


PLATE NO-VI

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.735HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

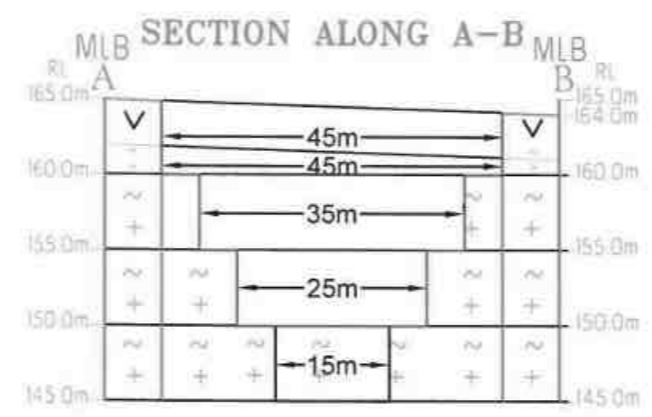
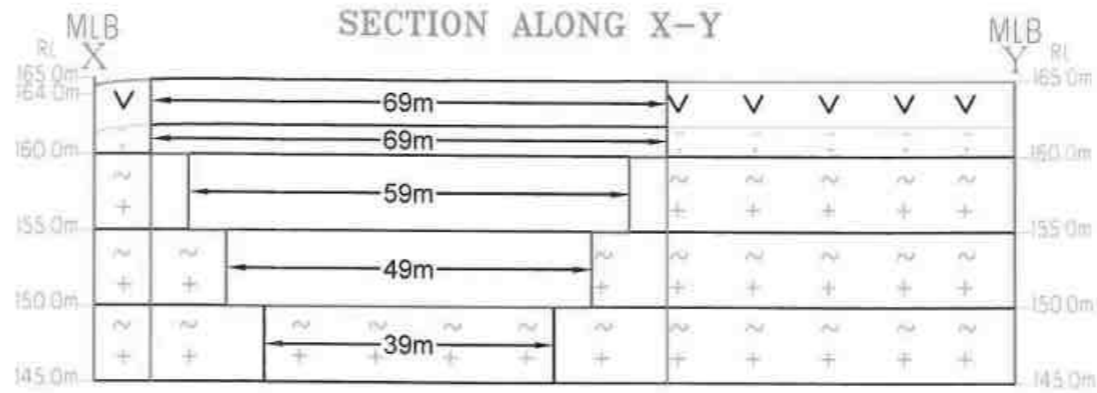
- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARK
- SHRUBS
- GRAVEL
- ROUGH STONE
- PROPOSED BENCH
- ULTIMATE BENCH
- EB LINE
- FENCING
- CART ROAD

**PROGRESSIVE MINE CLOSURE
 PLAN & SECTIONS**

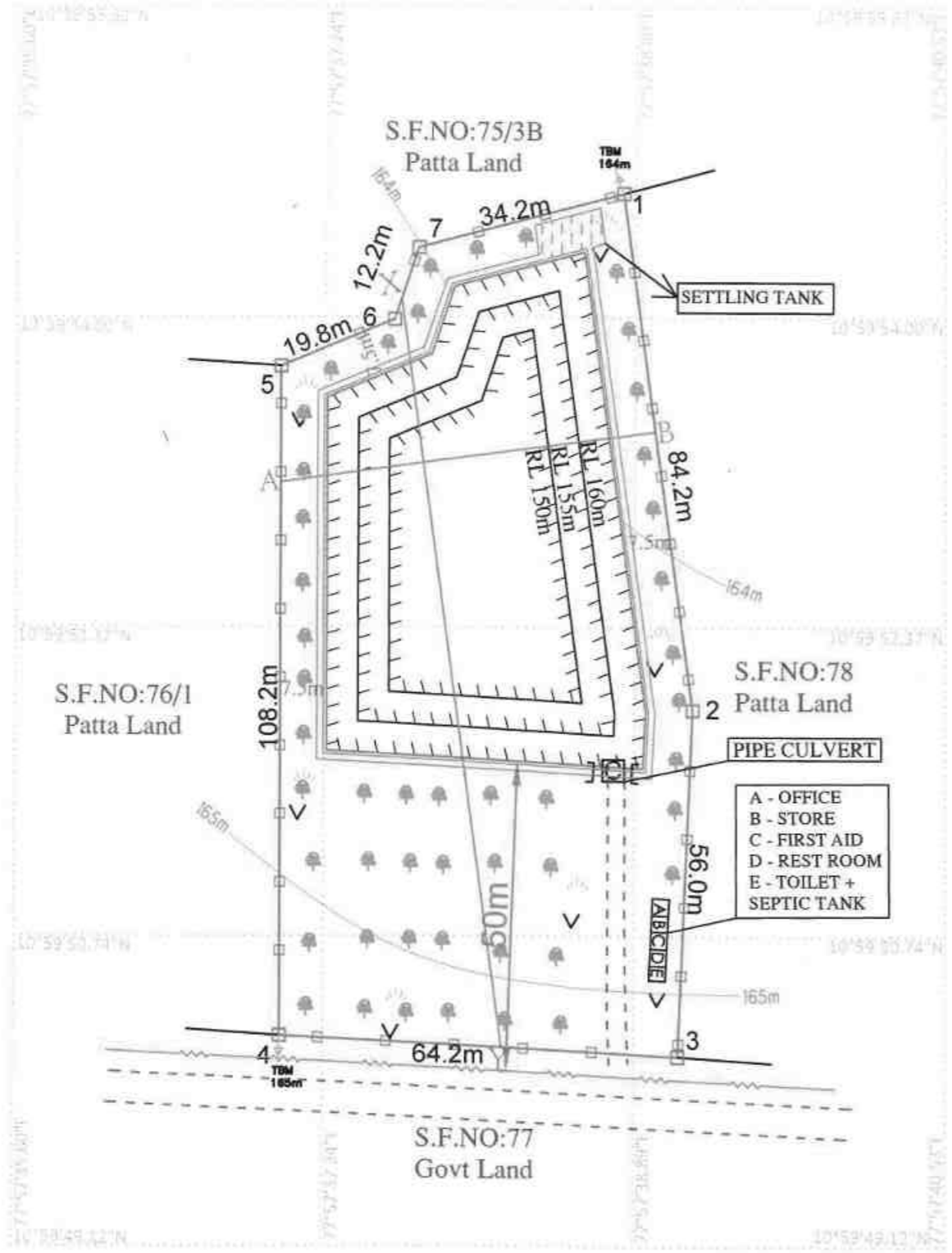
PLAN SCALE 1 : 1000
 SECTION HOR 1 : 1000 & VER 1 : 500

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

GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017



PRODUCTION RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³
XY-AB	I	69	45	3	9315	.....	9315
	I	69	45	2	6210	6210	.....
	II	59	35	5	10325	10325	.....
	III	49	25	5	6125	6125	.....
TOTAL				15	31975	22660	9315



I - Year Proposed area to be Planted

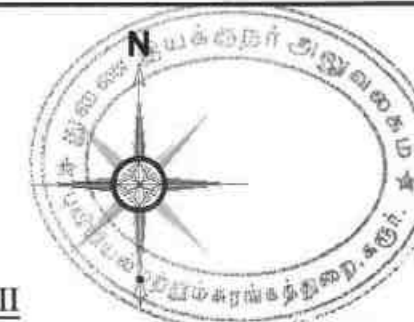


PLATE NO-VII

APPLICANT:
Mr.K.SHANMUGAM,
 S/o. KARUMANAGOUNDER,
 OPP TO V.S.T.PETROL BUNK,
 PUNNAMCHATHIRAM, PUGALUR TALUK,
 KARUR DISTRICT - 639136.
 TAMILNADU.

LEASE APPLIED AREA:
 S.F.NO : 76/2,
 EXTENT : 0.73.5HECT,
 VILLAGE : KUPPAM,
 TALUK : PUGALUR,
 DISTRICT : KARUR.

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARK
- SHRUBS
- GRAVEL
- ROUGH STONE
- ULTIMATE BENCH
- EB LINE
- FENCING
- CART ROAD

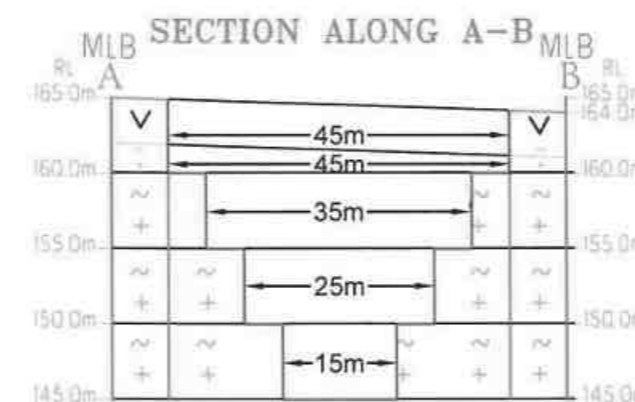
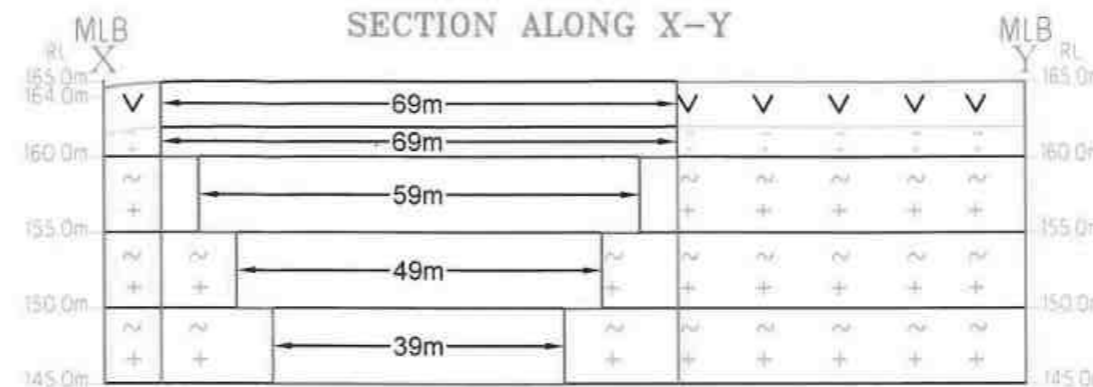
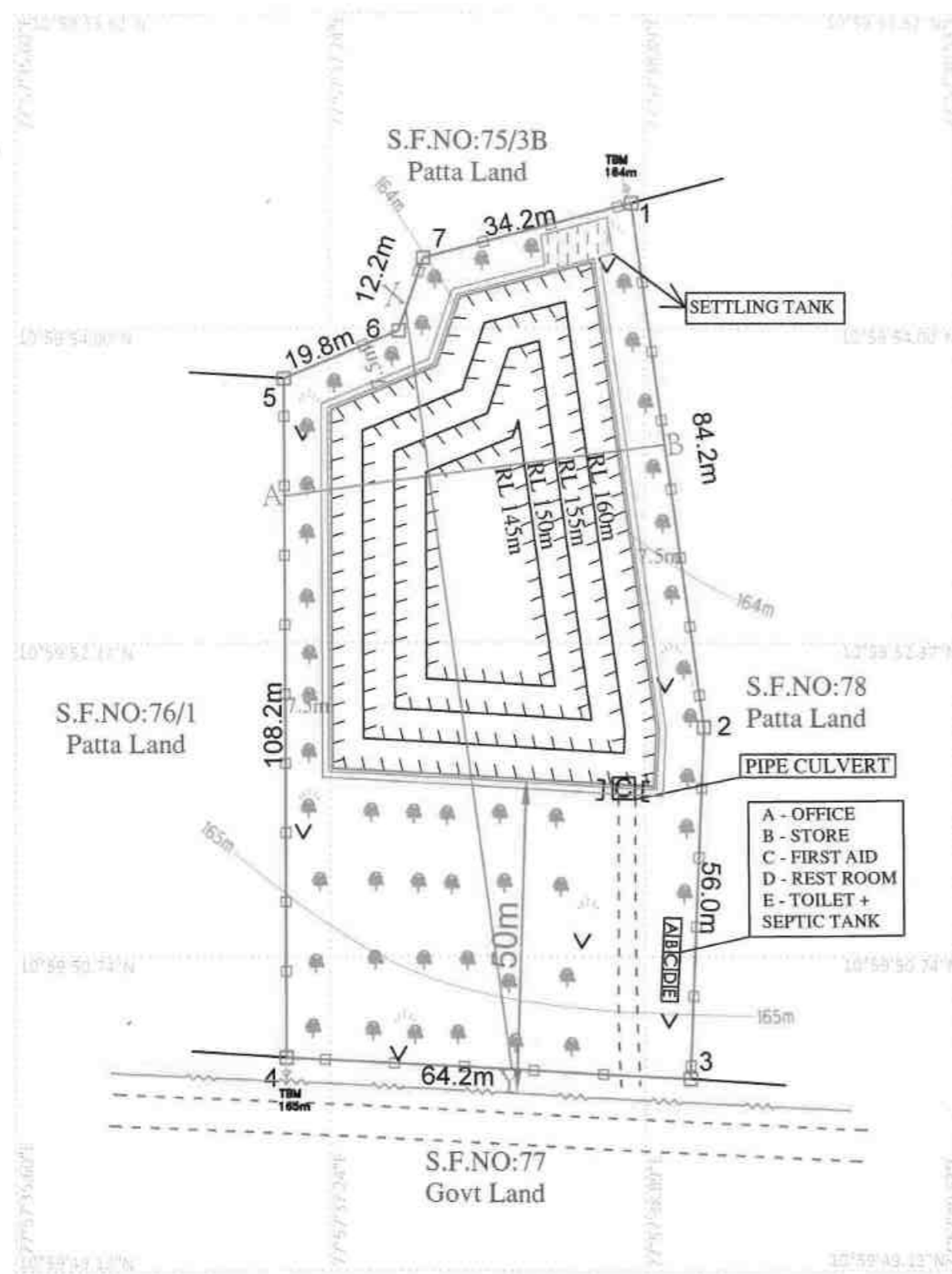
CONCEPTUAL PLAN & SECTIONS

PLAN SCALE 1 : 1000
 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

GEO TECHNICAL MINING SOLUTIONS
 NABET/APA-MPPA/IA/017



MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough stone in m ³	Gravel in m ³
XY-AB	I	69	45	3	9315	.....	9315
	I	69	45	2	6210	6210	.....
	II	59	35	5	10325	10325	.....
	III	49	25	5	6125	6125	.....
	IV	39	15	5	2925	2925	.....
TOTAL				20	34900	25585	9315

I - Year Proposed area to be Planted

From
Dr.P.Jayapal M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Karur.

To
Thiru.K.Shanmugam,
S/o.Karumanagounder,
Opp To V.S.T. Petrol Bunk,
Punnamchathiram,
Pugalur Taluk,
Karur District 639 136.

Rc.No.311/Mines/2021, Dated:01.09.2022

Sir,

Sub: Mines and Minerals - Minor Mineral - Karur District - Pugalur Taluk - Kuppam Village - S.F.No.76/2 Over an extant 0.73.50 hectares - Quarry lease application for Rough Stone and Gravel - Preferred by Thiru.K.Shanmugam - Precise area communicated - mining plan submitted for approval - Approved - Regarding.

- Ref: 1. Quarry lease application for Rough stone and Gravel preferred by Thiru.K.Shanmugam, S/o.Karumanagounder, Opp To V.S.T. Petrol Bunk, Punnamchathiram, Pugalur Taluk, Karur District - 639 136, dated: 29.07.2021.
2. Order of the Hon'ble Supreme Court of India in I.A.Nos.12-13/2011 in SLP (C) No.19628-19629/2009, dt: 27.02.2012.
3. Government of India, Ministry of Environment and Forest Office Memorandum, Dated:18.05.2012.
4. The Chairman, State Level Environment Impact Assessment Authority, Tamil Nadu D.O.Lr.No.SEIAA-TN/Minor Minerals/2012, Dated: 17.09.2012.
5. The Commissioner of Geology and Mining, Chennai letter Rc.No.3868/LC/2012, dt: 19.11.2012.
6. Deputy Director, Geology and Mining, Karur Notice Rc.No.311/Mines/2021, Dated: 12.08.2022.
7. Mining Plan submitted by Thiru.K.Shanmugam, letter Dated: 22.08.2022.

Thiru.K.Shanmugam applied for quarry lease to quarry Rough Stone and Gravel vide in the reference 1st cited and Precise area communicated to the applicant regarding to submit the mining plan for approval as per rule 41 and also submit the Environmental Clearance as per Rule 42 of Tamil Nadu Minor Mineral Concession Rules

Accordingly Thiru.K.Shanmugam have submitted three copies of draft mining plan for approval in respect of Rough stone and Gravel quarry lease applied areas, over an extent of 0.73.5 hectares of patta land in S.F.No.76/2 of Kuppam Village, Pugalur Taluk, Karur District in the reference 7th cited.

The above submitted mining plan for the grant of Rough stone and Gravel quarry lease in S.F.No.76/2 Over an extant 0.73.5 hectares of patta land in Kuppam Village, Pugalur Taluk, Karur District has been examined in detail.

As per the guidelines/ instructions issued by the Commissioner of Geology and Mining, Chennai vide letter Rc.No.3868/LC/2012, date: 19.11.2012., the mining plan submitted by the applicant 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) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.
- (III) The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (IV) The approval is valid up to five years from the date of execution of lease deed and the applicant should submit scheme of mining at lease 180 days before the expiry of the mining plan period.
- (V) As per the Deputy Director, Geology and Mining, Karur notice in Rc.No.311/Mines/2021, Dated:12.08.2022 the following conditions are incorporated in the Mining Plan plates.

1. விண்ணப்ப புலத்திற்கு தெற்கில் புல எண்.77-இல் கிழமேலாக அமைந்துள்ள வண்டிப்பாதைக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.

2. விண்ணப்ப புலத்திற்கு தெற்கில் வண்டிபாதையில் அமைந்துள்ள கிழமேலாக செல்லும் தாழ்வழுத்த மின்பாதைக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
3. விண்ணப்ப புலத்திற்கு அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் மற்றும் புறம்போக்கு நிலத்திற்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
4. குத்தகைக்காலத்தில் கைத்துளைப்பான் கருவி கொண்டு பாறைகளை துளையிட்டும், மிதமான வெடிபொருள் பயன்படுத்தியும், பொதுமக்களுக்கோ, பொது சொத்துக்களுக்கோ யாதொரு சேதமுமின்றி விதிமுறைகளின்படி குவாரிப்பணி செய்ய வேண்டும்.
5. குவாரித் தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்ய Mettaliferrous Mines, விதிகளின்படி அகலமானதும், பாதுகாப்பானதுமான Benches அமைத்து பாதுகாப்பான முறையில் குவாரிக்குள் வாகனங்கள் சென்றுவரவும் மற்றும் குவாரி தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்தும் குவாரிப்பணி செய்ய வேண்டும்.
6. குவாரி குத்தகை வழங்க ஏதுவாக துணை இயக்குநர் (சுரங்கம்) அவர்களால் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினையும், மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (SEIAA) அனுமதி பெற்று மாவட்ட நிர்வாகத்திற்கு விண்ணப்பதாரரால் சமர்ப்பிக்கப்பட வேண்டும்.

(VI) 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.

(VII) If anything is found to be concealed as required by the Mines Act in the contents of the Mining Plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

Encl: Two copies of Approved Mining Plan.

[Handwritten Signature]
01/19/22

Deputy Director,
Geology and Mining,
Karur.

[Handwritten Signature]
01/09/22

Copy to:

Tvl.Geo Technical Mining Solutions,
NABET/APA-MPPA/IA/017,
(A NABET Accredited & ISO Certified Company),
NO:1/213-B, Ground Floor, Natesan Complex,
Oddapatti, collectorate Post Office,
Dharmapuri - 63 705.

சீரணி

கூடர் மாவட்டம், புகளூர் வட்டம், சூப்பம் கிராமம், புகளூர் 76/2வ் தொ 0.73.5 ஏர்ஸ் அங்கீகரிக்கப்பட்டிருக்கிற புகளூர் மாவட்டம், புகளூர் வட்டம், புகளூர் கிராமம், புகளூர் வட்டம் என்ற கையாணைசெய்து கட்டுமானத்திற்கு மகன் சிவசிகரன் என்பவருக்கு ஒதுக்கப்பட்டிருக்கிறது என்பது குறித்து 3000 ரூபாய் சந்தர்ப்பத்தில் கிராம நலத்துறை, அங்கீகரிக்கப்பட்ட கட்டுமானத்துறை, மற்றும் புகளூர் சிவசிகரன் குடும்ப இலாப உள்ளது சீரணி வழங்கப்படுகிறது.


27/9/22
கிராம நிர்வாக அலுவலர்
சூப்பம் கிராமம்
புகளூர் வட்டம்
கூடர் மாவட்டம்

பொருள் : கனிமம் - கல்குவாரி - கரூர் மாவட்டம், புகளூர் வட்டம், குப்பம் கிராமத்தில் உள்ள கல்குவாரிக்கும் காப்புக்காடு பகுதிக்கும் இடைப்பட்ட தூர விபரங்களை தெரிவித்தல் - தொடர்பாக.

பார்வை : 1. திரு.க.சண்முகம் த/பெ.கருமணக்கவுண்டர். கரூர் கடித எண்.இல்லை நாள்.26.09.2022
2. வனச்சரக அலுவலர், கரூர் வனச்சரகம் கடித எண்.142/2022 நாள்.28.09.2022

பார்வை 1-ல் காணும் கடிதத்தில் கரூர் மாவட்டம், புகளூர் வட்டம், குப்பம் புல எண்கள்.76/2-ல் 0.73.50 எக்டேர் பரப்பளவில் திரு.க.சண்முகம் த/பெ.கருமணக்கவுண்டர் என்பவரின் கல்குவாரியை அமைக்க மாநில சுற்றுச்சூழல் ஆணையத்திற்கு விண்ணப்பித்துள்ளதால், மேற்படி கல்குவாரியின் புலத்திலிருந்து 25 கி.மீ சுற்றளவுக்குள் உள்ள காப்புக்காடுகளின் விபரங்களை தெரிவிக்குமாறும் கோரப்பட்டது.

அதன்படி மேற்படி இடமானது கரூர் வனச்சரக அலுவலரால் களத்தணிக்கை செய்யப்பட்டு பார்வை 2-ல் கண்டவாறு சமர்ப்பித்த அறிக்கையின் படி கரூர் மாவட்டம், புகளூர் வட்டம், குப்பம் புல எண்கள்.76/2-ல் 0.73.50 எக்டேர் பரப்பளவில் திரு.க.சண்முகம் த/பெ.கருமணக்கவுண்டர் என்பவரின் மூலம் அமைக்கப்படவுள்ள கல்குவாரியிலிருந்து 7.79 கிலோமீட்டர் தூரத்தில் தாதம்பாளையம் காப்புக்காடு அமைந்துள்ளது. மேலும் கல்குவாரியின் புலத்திலிருந்து 25 கி.மீ சுற்றளவுக்குள் பாதுகாக்கப்பட்ட வனப்பகுதி, புலிகள் காப்பகம் மற்றும் சரணாலயங்கள் ஏதுமில்லை என தெரிவிக்கப்படுகிறது.

ஓம்/- வி.ஏ.சரவணன்,
மாவட்ட வன அலுவலர்,
கரூர் வனக்கோட்டம்,
கரூர்.

பெறுநர்

திரு.க.சண்முகம்,
த/பெ. கருமணக்கவுண்டர்,
புன்னம் சத்திரம்,
புகளூர் வட்டம்,
கரூர் மாவட்டம்.

// உ.ந.உ.ப //

கண்காணிப்பாளர்
30/9/2022 30.9.22



**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.

