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 = 9.56.5 hectares

KAUNDAMPALAYAM ROUGHSTONE AND GRAVEL QUARRY

At
Kaundampalayam Village, Gobichettipalayam Taluk, Erode District

ToR letter No. SEIAA-TN/F.No.9860/ToR-1455/2023 dated 10.05.2023.

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.
Thiru.T.M.Manoharan, S/o.Marannan, **Thiru.K.Subramaniam, S/o.Kolanthaigounder,** **Thiru.R.P.Jaganathan, S/o.Palanigounder** Kaundampalayam Village, T.N.Palayam, Gobichettipalayam, Erode-638506.	**1.99.0 ha &** **49/2, 49/3 & 49/4A**

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

ToR issued vide Letter No. SEIAA-TN/F.No.9860/SEAC/ToR-1455/2023 dated 10.05.2023 for l. Thiru T. M. Manoharan, 2. Thiru. K. Subramaniam. 3.Thiru.R.P.Jaganathan Rough Stone & Gravel Quarry

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.	It is a fresh quarry lease. Hence, it does not require the previous lease document from competent authority.
2	The proponent is requested to carry out a survey and enumerate on the structures located within 100m, 200m, 300m from the boundary of the mine lease area.	The report about the structures within the radius of 100m, 200m, 300m will be attached with final EIA report.
3	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Photographs of adequate fencing, green belt along the periphery of the project area and the photographs showing nearby water bodies will be included in final EIA report.
4	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.	A detailed hydrogeological study involving measurement of water table level of open wells and potentiometric surface level of borewells was conducted over the area of more than 1 km radius around the proposed project site during the periods of both post monsoon and pre monsoon. The results of the study are provided in Section 3.2.3, Chapter III, pp.42-52.

5	The proponent shall submit the details regarding the nature of blasting activity which will be carried out.	NONEL blasting is proposed for this project. A conceptual design of blasting has been given in Section 2.6 under Chapter II, pp.19-21.
6	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.	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 Erode. The document will be attached annexure VI
7	The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.	As per the suggestion made in the ToR, the project proponent will be advised to issue notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.
8	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.	It is fresh quarry lease.
9	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	It is a newly proposed lease; a conceptual slope stability plan is not provided in this report.

	below ground level.		
10	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-induced Ground Vibration levels in the proposed quarry as stipulated by the DGMS Circular No.7 of 1997, during the EIA proposal.		NONEL blasting is proposed for this project. A conceptual design of blasting has been given in Section 2.6 under Chapter II, pp.19-21.
11	Details of Green belt & fencing shall be included in the EIA Report		Details of existing green belt and fencing will be provided in the final EIA report.
12	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.
13	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?	It is fresh quarry lease. Does not require this document.
	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.	
14	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).		All corner coordinates of the mine lease area are shown in Table 2.2, p.13, Figures 2.4 and 2.5, respectively, pp.14 and 15.
15	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,		Drone video coverage will be submitted in the final EIA report.
16	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 details of mineral reserves have been discussed in Section 2.5 under chapter II, p.16. The anticipated impact of mining on land, air, noise, water, soil, biology, and socio-economy is discussed under Chapter IV, pp.110-137.
17	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.		Employment details of the proposed project are provided in Table 2.14 under Chapter II, p.28.
18	The proponent shall furnish the baseline		The baseline data were collected for the

	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.	environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed under Chapter III, pp. 29-109.
19	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. 152-160.
20	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	The rainwater harvesting management plan will be submitted along with the final EIA report.
21	Land use of the study area delineating forest area, agricultural land, gazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, 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 3.1.1, p.30 under Chapter III. The details of surrounding sensitive ecological features are provided in Table 3.42 under chapter III, p.107. 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.22.

22	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease. such as extent of land area, distance from mine lease' its land use, R&R issues. If any, should be provided.	Not Applicable. No dumps have been proposed outside the lease area.
23	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 mining plan.
24	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.	Not Applicable. The proposed project area does not involve any water conservation.
25	Impact on local transport infrastructure due to the Project should be indicated.	Details regarding the impact of the project on traffic are given in Section 3.7 under Chapter III, pp.104-106.
26	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 caried out within 300 m radius and the results have been discussed in Section 3.5 under Chapter III, pp.70-98.
27	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure IV. The budget details for the progressive mine closure plan are shown in Table 2.9 under Chapter II, p.22.

28	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 comments made in public hearing meeting will be updated in the final EIA report after public hearing meeting.
29	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	Details of advertisement will be updated in the final EIA report.
30	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 EIA report, executive summary and other related information will be incorporated in this report.
31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	The EIA coordinator and the FAE for ecology and biodiversity visited the study area and educated the local students about the importance of protecting the biological environment.
32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of	A detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV, pp.128-131.

	small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	
33	Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities, botanist/Horticulture with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-friendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.
34	A Disaster management plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	A disaster management plan for the project has been provided in Section 7.3 under Chapter VII, pp.148-152.
35	A Risk Assessment and management plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	A risk assessment plan for the project has been provided in Section 7.2 under Chapter VII, pp.145-148.
36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV, pp. 136-137.
37	Public health implications of the Project and related activities for the population in the impact zone should be systematically	No public health implications are anticipated due to this project. Details of CSR and CER activities have been

	evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	discussed in Sections 8.6 and 8.7 under Chapter VIII, pp.162-163.
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1 under Chapter VIII, p.161.
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given under Chapter VIII, pp.161-163.
41	If any quarrying operation 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.	This condition is not applicable to this project because the project is a green field project.
42	The PP Shall prepare the EMP for the entire life/lease period of mine and also Furnish the sworn affidavit starting to Abide the EMP for the entire life of mine.	A detailed environment management plan has been prepared following the suggestion made by SEAC, as shown in Chapter X, pp.165-181. The sworn affidavit stating to abide the EMP for the

		entire life of mine will be submitted along with final EIA.
43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act' 1986.	The EIA report has been prepared keeping in mind the fact that concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.
	The proposal was placed in the 616th Authority meeting herd on 10.05.2023. the authority noted that this proposal was placed for appraisal in the 369th meeting of SEAC held on 20.04.2023. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR)** subject to the conditions as recommended by SEAC in addition to the following conditions and conditions stated there in vide '**Annexure B':**	
1	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.	The information will be included in the final EIA report.
2	The proponent shall submit the impact of mining activity on Agricultural lands nearby, drainage pattern and underground water flow along with EIA Report	The information will be included in the final EIA report.
3	The proponent shall submit the details regarding the impact of mining activity on Climate change, Temperature, Biodiversity, CO_2 Emission, Green House Gas Emission along with EIA Report.	The information will be included in the final EIA report.
	Annexure 'B'	
1	Cluster Management Committee shall be framed which must include all the	A cluster management committee including all the proponents of the rough

	proponents in the cluster as members including the existing as well as proposed quarry.	stone quarrying projects within the cluster of 500m 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 & 2.7 under Chapter II, pp.19-28.
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	It will be advised to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy

	devised shall be given in detail.		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 as discussed in Section 7.3 under Chapter VII, pp.147-151.
	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.	The study is under process. The results will be updated in the final EIA report.
	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)	Possibi1ities 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.		There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly, as shown in Section 4.6 under Chapter IV, pp.128-133.
14	Impact on soil flora & vegetation around the project site.		The details on flora have been provided in Section 3.5 under Chapter III, pp.70-98. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area shall be given and if so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.		Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III, pp.70-98. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV, pp.127-133.
16	The Environmental Impact Assessment should study the biodiversity, the natural		The ecological details have been provided in Section 3.5 under Chapter

	ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	III, pp.68-96 and measures have been provided in Section 4.6 under Chapter IV, pp.128-135.
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV, pp.107-135.
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. 110 - 111.
	Forests	
19	The project proponent shall study on impact of mining on Reserve forests free ranging wildlife.	The project proponent shall do barbed wire fencing work and develop a green belt around the lease area to prevent wildlife from entering the site.
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV, pp.128-135.
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The impacts of the project on standing trees and the existing trees have been discussed in Section 4.6 under Chapter IV, pp.128-133.
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National parks, corridors and wildlife pathways, near project site.	The list of environmentally sensitive areas within 10 km radius has been provided in Table 3.42 under Chapter III, pp.107.
	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	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.41-52.

	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.	Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 under Chapter IV, pp.96 & 97.
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby villages, waterbodies/rivers & any ecological fragile areas.	The matter has been discussed under Chapter IV, pp.96-113.
26	The project proponent shall study impact on fish habitats and the food WEB/food chain in the water body and Reservoir.	An analysis for food chain in aquatic ecosystem is under process and report will be added to the final EIA report.
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV, pp.94-124.
28	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sits possible land form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV, pp.128-133.
29.	The Terms of Reference should	The impact of mining on soil

	specifically study impact on soil health, soil erosion, the soil physical, chemical components.	environment has been discussed in Section 4.2 under Chapter IV, pp.111 & 112.
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.96 & 97.
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.112-127.
Climate Change		
32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV, pp.128.133.
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 communication order issued.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.9 under Chapter II, p.23.
	EMP	
35	Detailed Environment Management plan along with adaptation, mitigation & remedial strategies covering the entire mine	A detailed Environment Management plan has been given under Chapter X, pp.165-181.

	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.	A detailed Environment Management plan has been given in Tables 10.9 & 10.10 under Chapter X, pp.180-181.
	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.145-148.
	Disaster Management Plan	
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII, pp.148-152.
	Others	
39.	The project proponent shall furnish VAO certificate with reference to 300 m radius regard to approved habitations, schools, Archaeological sites, structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, river, lake pond, tank etc.	The VAO certificate of 300 m radius will be attached with Annexure -V
40	As per the MoEF & CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the	The concerns raised during the public consultation and all the activities proposed will be updated in the final EIA report.

	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.	The matter on plastic waste management has been given in Section 7.5 under Chapter VII, p.158.
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 private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexure IV.
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All the documents related to mining plan, EIA and public hearing are compatible to each other and have been provided in the annexure part.
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet,	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown

	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).	in Figure 2.2, p.11under Chapter II.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, as shown in Chapter III.
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The lease area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or	The proponent has framed Environmental Policy and the same has been discussed in Section 10.1 under chapter X, p.165 & 166.

	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.	The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1, pp.30-38 under Chapter III. The details of surrounding sensitive ecological features have been provided in Table 3.42 under Chapter III, p.107. 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.22.
11.	Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given	It is not applicable as no dumps have been proposed outside the lease area. The entire quarried out rough stone will be transported to the needy customers.
12.	Certificate from the Competent Authority in the 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.	It is not applicable as there is no forest land involved within the proposed project area. The details have been discussed in Table 3.42under Chapter III, p.107.
13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	It is not applicable as the proposed project area does not involve any forest land.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest

	should be indicated.	dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is found within the study area. The matter has been discussed Table 3.42 under Chapter III, pp.107.
16.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.42 under Chapter III, p.107.
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.42 under Chapter III, p.107.
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	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section

	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.	3.5 under Chapter III, pp.70-98.
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable The project doesn't attract the C.R.Z. Notification, 2018.
21.	R&R Plan/compensation details for the	Not Applicable.

	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.	There are no approved habitations of SCs/STs and other weaker sections in the lease area. Therefore, R&R Plan / Compensation Plan for the Project Affected People (PAP) are not provided.
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	Baseline data were collected for the period of October 2021 - December 2021 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.8 under Chapter III, pp. 30-107.

	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 11.2.0. The model results have been given in Section 4.4 under the Chapter IV, pp.113-123.
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.26.
25.	Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for

	proposed in the Project, if any, should be provided.	greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV, pp. 112 & 113.
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Not Applicable. The ground water table is found at the depth of 60 m below ground level. The ultimate depth of quarry is 32 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.41-52.
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
30.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A	The highest elevation of the project area is 241 m AMSL. Ultimate depth of the mine is 47 m BGL. Depth to the water

	schematic diagram may also be provided for the same.	level in the area is 60 m BGL.
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Greenbelt development plan has been given in Section 4.6.2 under Chapter IV, pp.129-135.
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Section 3.7 under Chapter III, p.104 & 106.

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 2.6.6 under Chapter II, p.26.
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Progressive mine closure plan has been prepared for this project and is given in Section 2.6.4 under Chapter II, p.22-25.
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.136 & 137.
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.163 & 164.
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 20 people directly as discussed in Section 8.1 under Chapter VIII, p.161.
38.	Detailed environmental management plan	A detailed Environment Management

	(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.	Plan has been prepared and provided in Tables 10.9 & 10.10 under Chapter X, pp.180-181.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	The outcome of public hearing will be updated in the final EIA/EMP report.
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 6998000/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs. 3903367 as capital cost and recurring cost as Rs.1934760 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. 14467015, as shown in Tables 10.9 & 10.10 under Chapter X, pp.180-181.
42	A disaster management Plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII, pp.148-152.

43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given under Chapter VIII, pp.161-163.
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 included in the final EIA report.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided here are in English language.
f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be enclosed along with final EIA/EMP report.
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August,	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4th August, 2009 have been followed while preparing the EIA report.

	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.	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 report of the status of compliance of the conditions will be submitted along with final EIA report.
j)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III.

TABLE OF CONTENTS

S No.	TITLE	PAGE No.
I	**Introduction**	**1-8**
1.0	Preamble	1
1.1	Purpose of the report	2
1.2	Environmental clearance	3
1.3	Terms of reference (Tor)	5
1.4	Post environment Clearance Monitoring	5
1.5	Transferability of Environmental Clearance	5
1.6	Generic Structure of EIA Document	5
1.7	Identification of the project proponent	6
1.8	Brief description of the project	6
1.9	Scope of the study	7
1.10	References	8
II	**PROJECT DESCRIPTION**	**9-28**
2.0	General Introduction	9
2.1	Description of the project	9
2.2	Location and Accessibility	10
2.3	Leasehold area	13
2.3.1	Corner Coordinates	13
2.4	Geology	13
2.5	Quantity of Reserves	16
2.6	Mining Method	19
2.6.1	Magnitude of Operation	21
2.6.2	Extent of Mechanization	21
2.6.3	Progressive Quarry Closure Plan	22
2.6.4	Progressive Quarry Closure Budget	22
2.6.5	Conceptual Mining Plan	26
2.6.6	Infrastructures	26
2.6.6.1	Other Infrastructure Requirement	26
2.6.7	Water Requirement	26
2.6.8	Energy Requirement	26
2.6.9	Capital Requirement	27
2.7	Manpower Requirement	28
2.8	Project Implementation Schedule	28
III	**DESCRIPTION OF THE ENVIRONMENT**	**29 - 110**

3.0	General	29
3.1	Land environment	30
3.1.1	Geology and Geomorphology	30
3.1.2	Land use/Land cover	33
3.1.3	Topography	33
3.1.4	Drainage pattern	33
3.1.5	Seismic sensitivity	33
3.1.6	Soil	36
3.2	Water Environment	41
3.2.1	Surface Water Resources and Quality	41
3.2.2	Ground water Resources and Quality	41
3.2.3	Hydrogeological Studies	42
3.2.3.1	Groundwater level and flow direction	42
3.2.3.2	Electrical resistivity investigation	53
3.3	Air Environment	54
3.3.1	Meteorology	54
3.3.1.1	Climatic Variables	54
3.3.1.2	Wind Pattern	56
3.3.2	Ambient Air Quality Study	60
3.4	Noise Environment	66
3.5	Biological Environment	70
3.5.1	Flora	72
3.5.2	Fauna	92
3.6	Socio-Economic environment	98
3.6.1	Introduction	98
3.6.2	Objectives of the Study	99
3.6.3	Scope of work	99
3.6.4	Socio – Economic Status of Study area	99
3.6.5	Recommendation and Suggestion	104
3.6.6	Summary & Conclusion	104
3.7	Traffic Density	104
3.8	Site Specific Features	107
IV	**ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**	**110 - 138**
4.0	General	110
4.1	Land Environment	110

4.1.1	Anticipated Impact	110
4.1.2	Common Mitigation Measures from Proposed Project	111
4.2	Soil Environment	111
4.2.1	Anticipated Impact on soil Environment	111
4.2.2	Common Mitigation Measures from Proposed Project	112
4.3	Water Environment	112
4.3.1	Anticipated Impact	112
4.3.2	Common Mitigation Measures from Proposed Project	113
4.4	Air Environment	113
4.4.1	Anticipated impact from Proposed Project	114
4.4.2	Emission Estimation	114
4.4.2.1	Frame work of Computation and Model Details	115
4.4.2.2	Modelling of Incremental Concentration	115
4.4.2.3	Model Results	116
4.4.3	Common Mitigation Measures	122
4.5	Noise Environment	123
4.5.1	Anticipated Impact	124
4.5.2	Common Mitigation Measures	125
4.5.3	Ground Vibrations	126
4.5.3.1	Common Mitigation Measures	127
4.6	Ecology And Biodiversity	128
4.6.1	Impact on Ecology and Biodiversity	128
4.6.2	Mitigation Measures on Flora	129
4.6.3	Anticipated Impact on Fauna	131
4.6.4	Measures for Protection and Conservation of Wildlife Species	132
4.7	Socio Economic Environment	135
4.7.1	Anticipated Impact from proposed and Existing Projects	135
4.7.2	Common Mitigation Measures for proposed project	135
4.8	Occupational Health and Safety	136
4.8.1	Respiratory Hazards	136
4.8.2	Noise	136
4.8.3	Physical Hazards	136
4.8.4	Occupational Health Survey	136
4.9	Mine Waste Management	137
4.10	Mine Closure	137

4.10.1	Mine Closure Criteria	137
4.10.1.1	Physical Stability	137
4.10.1.2	Chemical Stability	138
4.10.1.3	Biological Stability	138
V	**ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)**	**139**
5.0	Introduction	139
5.1	Factors behind the Selection of Project Site	139
5.2	Analysis of Alternative Site	139
5.3	Factors behind Selection of Proposed Technology	139
5.4	Analysis of Alternative Technology	139
VI	**ENVIRONMENTAL MONITORING PROGRAM**	**140 - 144**
6.0	General	140
6.1	Methodology of Monitoring Mechanism	140
6.2	Implementation Schedule of Mitigation Measures	142
6.3	Monitoring Schedule and Frequency	142
6.4	Budgetary provision for Environment Monitoring Program	144
6.5	Reporting schedules of monitored data	144
VII	**ADDITIONAL STUDIES**	**145 - 159**
7.0	General	145
7.1	Public Consultation for proposed project	145
7.2	Risk Assessment for proposed project	145
7.3	Disaster Management plan for proposed project	148
7.3.1	Roles and Responsibilities of Emergency Team	150
7.3.2	Emergency Control Procedure	150
7.3.3	Proposed Fire Extinguishers	151
7.3.4	Alarm System	151
7.4	Cumulative Impact study	152
7.4.1	Air Environment	154
7.4.1.1	Cumulative Impact of Air Pollutants	155
7.4.2	Noise Environment	155
7.4.3	Socio Economic Environment	157
7.4.4	Ecological Environment	157
7.5	Plastic waste management plan for proposed project Project	158
7.5.1	Objective	158
7.6	Post COVID Health Management plan for proposed project	159

7.6.1	Post-COVID Follow up Protocol	159
VIII	**PROJECTS BENEFITS**	**161 - 164**
8.0	General	161
8.1	Employment Potential	161
8.2	Socio-Economic Welfare Measures Proposed	161
8.3	Improvement in Physical Infrastructure	161
8.4	Improvement in Social Infrastructure	161
8.5	Other Tangible Benefits	162
8.6	Corporate Social Responsibility	162
8.7	Corporate Environment Responsibility	163
8.8	Summary of project benefits	163
IX	**ENVIRONMENTAL COST BENEFIT ANALYSIS**	**164**
X	**ENVIRONMENTAL MANAGEMENT PLAN**	**165 - 181**
10.0	General	165
10.1	Environmental Policy	165
10.1.1	Description of the Administration and Technical setup	165
10.2	Land Environment Management	166
10.3	Soil Management	167
10.4	Water Management	167
10.5	Air Quality Management	168
10.6	Noise Pollution Control	168
10.7	Ground Vibrations and Fly Rock Control	169
10.8	Biological Environment Management	170
10.8.1	Green Belt Development Plan	170
10.9	Occupational Safety & Health Management	171
10.9.1	Medical Surveillance and Examinations	171
10.9.2	Proposed Occupational Health and Safety Measures	172
10.9.3	Health and Safety Training Program	174
10.9.4	Budgetary Provision for Environmental Management	175
10.10	Conclusion	181
XI	**SUMMARY AND CONCLUSION**	**182 - 193**
11.0	Introduction	182
11.1	Project Description	182
11.2	Description of the Environment	182
11.2.1	Land Environment	183
11.2.2	Soil Characteristics	183

11.2.3	Water Environment	183
11.3	Air Environment	184
11.4	Noise Environment	184
11.5	Biological Environment	185
11.6	Socio-Economic Environment	185
11.7	Anticipated Environmental Impacts and Mitigation Measures for Proposed Project	185
11.8	Analysis of Alternatives	190
11.9	Environmental Monitoring Program	191
11.10	Additional Studies	191
11.11	Project Benefits for Proposed Project	192
11.12	Environment Management Plan	193
11.13	Conclusion	193
XII	**DISCLOSURE OF CONSULTANT**	**194 - 199**

LIST OF TABLES

TABLE No.	CONTENTS	PAGE No.
1.1	Details of Quarries within the cluster area of 500 m Radius	2
1.2	Details of project proponent	6
1.3	Salient Features of the Proposed project	6
2.1	Site connectivity to the project area	13
2.2	Corner coordinates of proposed project	13
2.3	Estimated resources and reserves of the project	16
2.4	Year-wise production details	16
2.5	Conceptual Blasting Design	20
2.6	Operational Details for Proposed Project	21
2.7	Machinery Details	21
2.8	Land use data at present, during scheme of mining, and at the end of mine life	22
2.9	Mine closure budget	22
2.10	Ultimate Pit Dimension	26
2.11	Water requirement for the project	26
2.12	Fuel Requirement Details	27

2.13	Capital Requirement Details	27
2.14	Employment Potential for the Proposed Project	28
2.15	Expected Time Schedule	28
3.1	Monitoring attributes and frequency of monitoring	29
3.2	LULC statistics of the study area	33
3.3	Soil sampling locations	36
3.4	Soil quality of the study area	39
3.4a	Assigning Scores to Soil Quality Indicators	40
3.5	Water sampling locations	41
3.6	Ground Water Quality Result	44
3.7	Surface Water Sampling Quality Results	46
3.8	Pre-monsoon water level of Open wells within 2 km radius	47
3.9	Post-monsoon water level of Open wells within 2 km radius	47
3.10	Pre-monsoon water level of bore wells within 2 km radius	48
3.11	Post-monsoon water level of bore wells within 2 km radius	48
3.12	Vertical electrical sounding data	53
3.13	Onsite Meteorological Data	55
3.14	Methodology and instrument used for AAQ analysis	60
3.15	National ambient air quality standards	60
3.16	Ambient air quality (AAQ) monitoring locations	61
3.17	Summary of AAQ result	63
3.18	Noise Monitoring Locations	66
3.19	Ambient Noise Quality Result	67
3.20	Calculation of density, frequency (%), dominance, relative density, relative frequency, relative dominance & important value index	71
3.21	Calculation of Species Diversity by Shannon – Wiener Index, Evenness and Richness	71
3.22	Flora in Mine Lease Area	73
3.23	Flora in 300-m Radius	74
3.24	Calculation of Species Diversity in 300 m Radius	77
3.25	Species Richness (Index) in 300 m radius	77

3.26	Flora in Buffer Zone	78
3.27	Calculation of Species Diversity in Buffer Zone	81
3.28	Species Richness (Index) in Buffer Zone	82
3.29	Aquatic Vegetation	89
3.30	Sathyamangalam Tiger Reserve Forest Vegetation	90
3.31	Fauna in Core Zone	94
3.32	Fauna in Buffer Zone	95
3.33	Fauna species in Satheyamangalam Reserve Forest	97
3.34	Kavundampalayam Village Population Facts	99
3.35	Population and Literacy Data of Study Area	100
3.36	Details on Educational Facilities, Water, and Drainage & Health Facilities	101
3.37	Workers' Profile of Study Area	102
3.38	Traffic Survey Locations	105
3.39	Existing Traffic Volume	105
3.40	Rough Stone Transportation Requirement	105
3.41	Summary of Traffic Volume	105
3.42	Details of Environmentally Sensitive Ecological Features in the Study Area	107
4.1	Empirical formula for emission rate from overall mine	114
4.2	Estimated emission rate	115
4.3	Incremental & Resultant GLC of $PM_{2.5}$	116
4.4	Incremental & Resultant GLC of PM_{10}	116
4.5	Incremental & Resultant GLC of SO_2	121
4.6	Incremental & Resultant GLC of NO_X	121
4.7	Activity and noise level produced by machinery	124
4.8	Predicted Noise Incremental Values	125
4.9	Predicted PPV Values due to Blasting	127
4.10	Predicted PPV Values due to Blasting at 100-500m Radius	127
4.11	Carbon Released during five years of rough stone and gravel production	128
4.12	CO_2 Sequestration	129

4.13	Recommended Species for Greenbelt Development Plan	130
4.14	Greenbelt development plan	130
4.15	Budget for greenbelt development plan	131
4.16	Ecological Impact Assessments	132
4.17	Anticipated Impact of Ecology and Biodiversity	133
6.1	Implementation schedule for proposed project	142
6.2	Proposed monitoring schedule post EC for the proposed quarry	143
6.3	Environment monitoring budget	144
7.1	Risk assessment& control measures for proposed project	146
7.2	**Proposed teams for Emergency Situation**	149
7.3	Proposed Fire Extinguishers at Different Locations in P1	151
7.4	Salient Features of Proposed Project	152
7.5	Salient Features of the Proposed Project	153
7.6	Cumulative Production Load of Rough Stone	154
7.7	Cumulative impact results from the two proposed project	155
7.8	Cumulative Impact Results from the 3 proposed projects	155
7.9	Cumulative Impact of Noise from 3 Proposed Quarries on T.N. Palayam	156
7.10	Cumulative Effect of Ground Vibrations Resulting from 4 Mines on Habitation of T.N. Palayam	156
7.11	Socio Economic Benefits from 3 Mines	157
7.12	Employment Benefits from 3 Mines	157
7.13	Greenbelt Development Benefits from 3 Mines	157
7.14	Action Plan to Manage Plastic Waste	158
8.1	CER – action plan	163
8.2	Project Benefits to the State Government	163
10.1	Proposed controls for land environment	166
10.2	Proposed controls for Water environment	167
10.3	Proposed controls for Air environment	168
10.4	Proposed controls for Noise Environment	168
10.5	Proposed Controls for Ground Vibrations & Fly Rock	169
10.6	Proposed Greenbelt Development Plan	171
10.7	Medical Examinations Schedule	172

10.8	List of Periodical Trainings Proposed for Employees	174
10.9	EMP Budget for Proposed Project	176
10.10	Estimation of Overall EMP Budget after Adjusting 5% Annual Inflation	181
11.1	Anticipated Impacts & Mitigation Measures	182

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1.1	Location of the proposed and Existing Rough Stone and Gravel Quarries in the Cluster of 500m Radius.	4
2.1	Overall view of proposed project site	10
2.2	Key map showing location of the project site	11
2.3	Site Connectivity to the lease area	12
2.4	Google Earth Showing Lease Area with Pillars	14
2.5	Mine Lease Plan	15
2.6	Surface and Geological Plan and Sections	17
2.7	Yearwise Development Production Plan and Sections	18
2.8	Mine Layout plan and Land Use Pattern	23
2.9	Progressive Mine Closure plan and Sections	24
2.10	Conceptual Plan & Sections	25
3.1	Geology Map of 5Km Radius from the Proposed Project site	31
3.2	Geomorphology Map of 5Km Radius from the Proposed Project site	32
3.3	LULC map of 5km radius from the proposed project site	33
3.4	Drainage map of 5 km radius from the proposed project site	35
3.5	Toposheet showing soil sampling location within 5 km radius around the proposed project site	37
3.6	Soil Erosion Map within 5 km radius around proposed project site	38
3.7	Map showing water sampling locations within 5 km radius around proposed project site	43

3.8	Open well static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season	49
3.9	Open well static groundwater elevation map showing the direction of groundwater flow during post-monsoon season	50
3.10	Borewell static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season	51
3.11	Borewell static groundwater elevation map showing the direction of groundwater flow during post-monsoon season	52
3.12	Graph showing occurrence of water bearing fracture zones at the depth range of 60 m below ground level in proposed project	54
3.13	Long-term monthly average rainfall vs monthly rainfall	56
3.14	Windrose Diagram for 2018-2019 (March to May)	57
3.14 a	Windrose Diagram for 2020 and 2021(March to May)	58
3.15	Onsite Wind Rose Diagram	59
3.16	Toposheet showing ambient air quality monitoring station locations around 5 km radius from the proposed project site	62
3.17	Bar chart showing maximum, minimum, and the average concentrations of $PM_{2.5}$ measured from the 9 air quality monitoring stations within 5 km radius	64
3.18	Bar chart showing maximum, minimum, and the average concentrations of PM_{10}.measured from the 9 air quality monitoring stations within 5km radius	64
3.19	Bar chart showing maximum, minimum, and the average concentrations of SO_2 measured from the 9 air quality monitoring stations within 5 km radius	65
3.20	Bar chart showing maximum, minimum, and the average concentrations of NOx measured from the 9 air quality monitoring stations within 5km radius	65
3.21	Bar chart showing maximum, minimum, and the average concentrations of pollutants in the atmosphere within 5km radius	66

3.22	Toposheet showing noise level monitoring station locations around 5 km radius from the proposed project site	68
3.23	Bar chart showing day time noise levels measured in core and buffer zones	69
3.24	Bar chart showing day time noise levels measured in core and buffer zones	69
3.25	Quadrates sampling methods of flora	70
3.26	Crop Patterns in Kovundapalayam Village	72
3.27	Floral Diversity Species Richness (Index) in Buffer Zone and 300 Radius	83
3.28	Flora in Core and Buffer Area	88
3.29	Traffic Density Map	106
3.30	Field Study Photographs	109
4.1	Predicted incremental concentration of $PM_{2.5}$	117
4.2	Predicted incremental concentration of PM_{10}	118
4.3	Predicted incremental concentration of SO_2	119
4.4	Predicted incremental concentration of NO_X	120
6.1	Proposed environmental monitoring chart	141
7.1	Disaster management team layout for proposed project	149
10.1	Personal protective equipment to the mine workers	173

LIST OF ANNEXURES

Annexure No.	Contents	Page No.
I	Copy of ToR letter	201 - 222
II	Copy of 500 m radius letter	223 - 224
III	Approval Letter	225 - 226
IV	Approved mining plan along with mining plan AD/DD letter/original mining plan plates	227 - 292
V	VAO 300m radius letter	293
VI	DFO Letter	294 - 295
VII	NABET certificate of EIA consultant	296

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.9860/ToR-1455/2023 Dated:10.05.2023. This EIA report has been prepared for the project proponent, Thiru. T.M. Manoharan, S/o. Marannan, Thiru.K.Subramaniam, S/o. Kolanthaigounder, Thiru.R.P.Jaganathan, S/o. Palanigounder applied for rough stone and gravel quarry lease in the Patta land falling in S.F.No.49/2, 49/3 & 49/4A over an extent of 1.99.00 ha in Kaundampalayam Village, Gobichettipalayam Taluk, Erode District and Tamil Nadu. This EIA report takes into account the rough stone quarries within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains three proposed projects, known as P1, P2, P3 and 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 9.56.5 ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

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

Proposed Quarries					
Code	**Name of the Owner**	**S.F. No**	**Village**	**Extent (ha)**	**Status**
P1	Thiru.T.M.Manoharan Thiru.K.Subramaniam Thiru.R.P.Jaganathan	49/2 49/3 49/4A	Kaundampalayam	1.99.0	Applied Area
P2	S. Kandasamy	63/1, 64/1A, 64/3A and 64/5A	Kaundampalayam	2.66.0	Proposed Area
P3	K. Indirani	55/1A (Part), 55/3 (Part) and 58	Kaundampalayam	2.91.5	Proposed Area
Existing Quarry					
--Nil--					
Expired Quarries					
EX1	Thiru M.Seenivasan	70/9 South part	Kaundampalayam	2.00.0	26.04.2010 to 25.04.2020
Total Cluster Extent				9.56.5	

Source:

DD Letter - Rc.No.15255/Mines/2018, Dated:21.02.2023.

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

1.1 PURPOSE OF THE REPORT

The purpose of the report is to study baseline environmental conditions in and around the proposed project area for the period of **October-December 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/419734/2023, dated: 24.02.2023) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on 28.02.2023.

Scoping

The proposal was placed in the 369th meeting of SEAC on 20.04.2023. 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.102/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).

Public Consultation

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

Appraisal

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

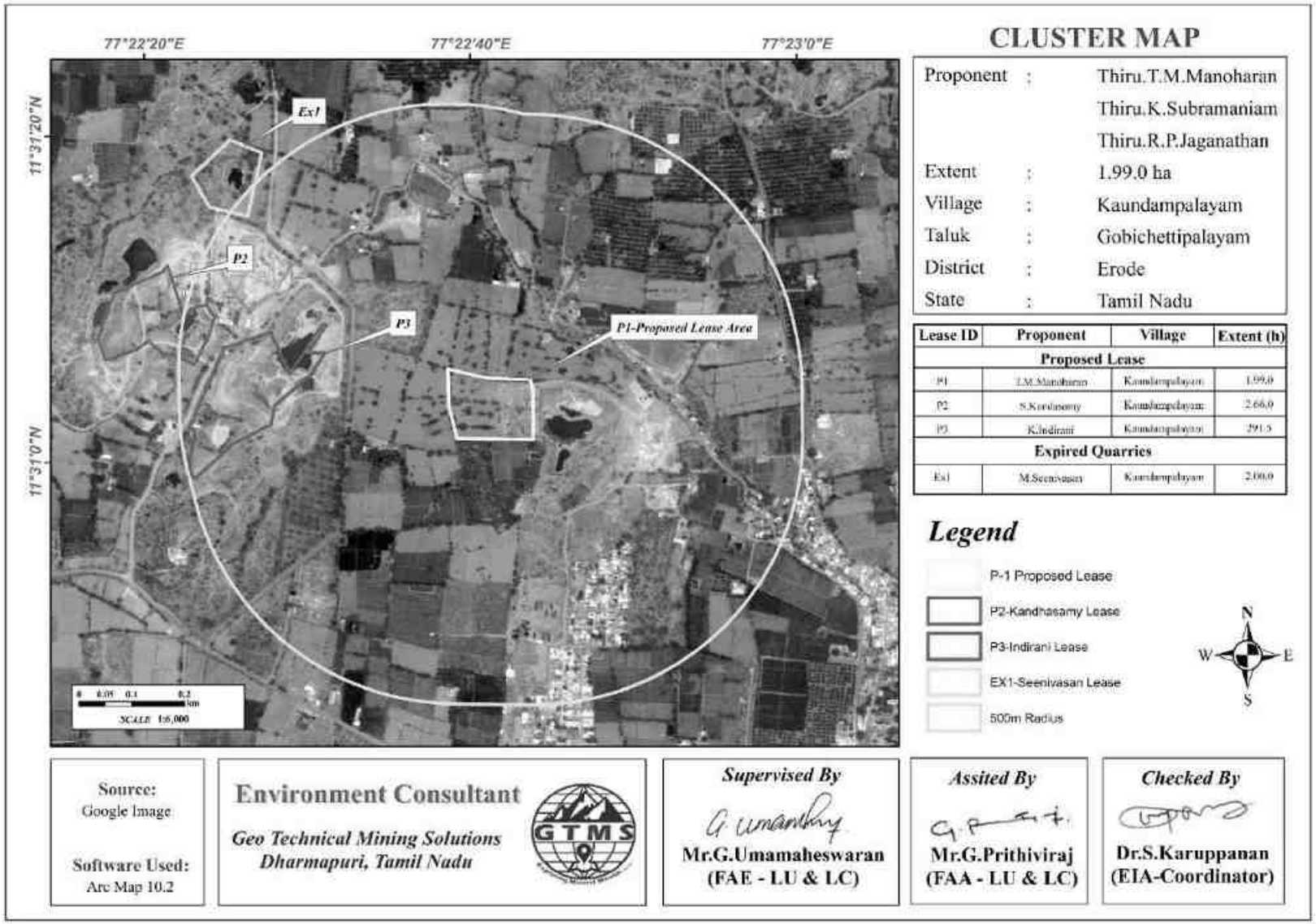


Figure 1.1 Location of the proposed and existing rough stone and gravel quarries in the cluster of 500m radius

1.3 TERMS OF REFERENCE (ToR)

The SEAC framed a comprehensive Terms of Reference (ToR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued ToR to the proponent vide **Letter No: SEIAA-TN/F.No.9860/ToR-1455/2023 Dated:10.05.2023** 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.

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.

Table 1.2 Details of Project Proponent

Name of the Project Proponent	1.Thiru.T.M. Manoharan, S/o. Marannan, 2.Thiru.K. Subramaniam, S/o.Kolanthaigounder, 3.Thiru.R.P. Jaganathan**,** S/o.Palanigounder
Address	Kaundampalayam Village, T.N.Palayam, Gobichettipalayam, Erode – 638506.
Status	Proprietor

1.8 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of rough stone and gravel, which is primarily used, in construction projects. the method adopted for rough stone and gravel excavation is open cast- semi mechanized mining method involving formation of benches with 5 m height and 5 m width. The proposed project site is located in Kaundampalayam Village, Gobichettipalayam Taluk, Erode 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 the Proposed Project

Name of the Quarry	1.Thiru.T.M. Manoharan, 2.Thiru.K. Subramaniam, 3.Thiru.R.P. Jaganathan, Rough Stone and Gravel Quarry
Type of Land	Patta Land
Extent	1.99.0 Ha
S.F. No	49/2, 49/3, & 49/4A
Toposheet No	58-E/06
Latitude	11°31'1.41"N to 11°31'5.74"N
Longitude	77°22'38.63"E to 77°22'44.49"E
Highest Elevation	241 m AMSL

Proposed depth of Mining	32 m BGL	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	895275	39790
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	311730	31200
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3 / 3 years
	278750	31200
Method of Mining	Open-Cast Semi Mechanized mining	
Topography	Flat Terrain	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Tipper	6
	Excavator	1
Blasting Method	The quarrying operation is proposed to carried out by open cost, using jack hammer drilling followed by manual breaking will be adopted to release the rough stone and nonel blasting is proposed in this lease area.	
Proposed Manpower Deployment	20 Nos	
Project Cost	Rs. 69,98,000	
CER Cost	Rs. 5,00,000	
Proposed Water Requirement	3.5 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.

Note: As per the OM vide F.No.IA3-22/10/22-IA.III(E177258), the baseline monitoring data were collected during the period of October-December 2021 and utilized for preparation of this EIA report.

CHAPTER II

PROJECT DESCRIPTION

2.0 GENERAL INTRODUCTION

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

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

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

2.1 DECSCRIPTION OF THE PROJECT

The proponent, **Mr.T.M.Manoharan, Mr.K.Subramaniam, Mr.R.P.Jaganathan** is involved in the undertaking of establishment, construction, development, and closure of opencast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone and gravel. Therefore, the proponent had applied for quarry lease on 04.06.2018 to extract rough stone. The precise area communication letter was issued by Deputy Director, Department of Geology and Mining, Erode vide Rc.No.15255/Mines/2018, dated:10.02.2023. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Erode Rc.No.15255/Mines/2018, dated:21.02.2023. The overall view of the project site is shown in Figure 2.1.

Figure 2.1 Overall View of Proposed Project Site

2.2 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Kaundampalayam Village, Gobichettipalayam Taluk, Erode District, as shown in Figure 2.2 & 2.3. The area lies between Latitudes from 11°31'1.41"N to 11°31'5.74"N and Longitudes from 77°22'38.63"E to 77°22'44.49"E. The maximum altitude of the project area is 241m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

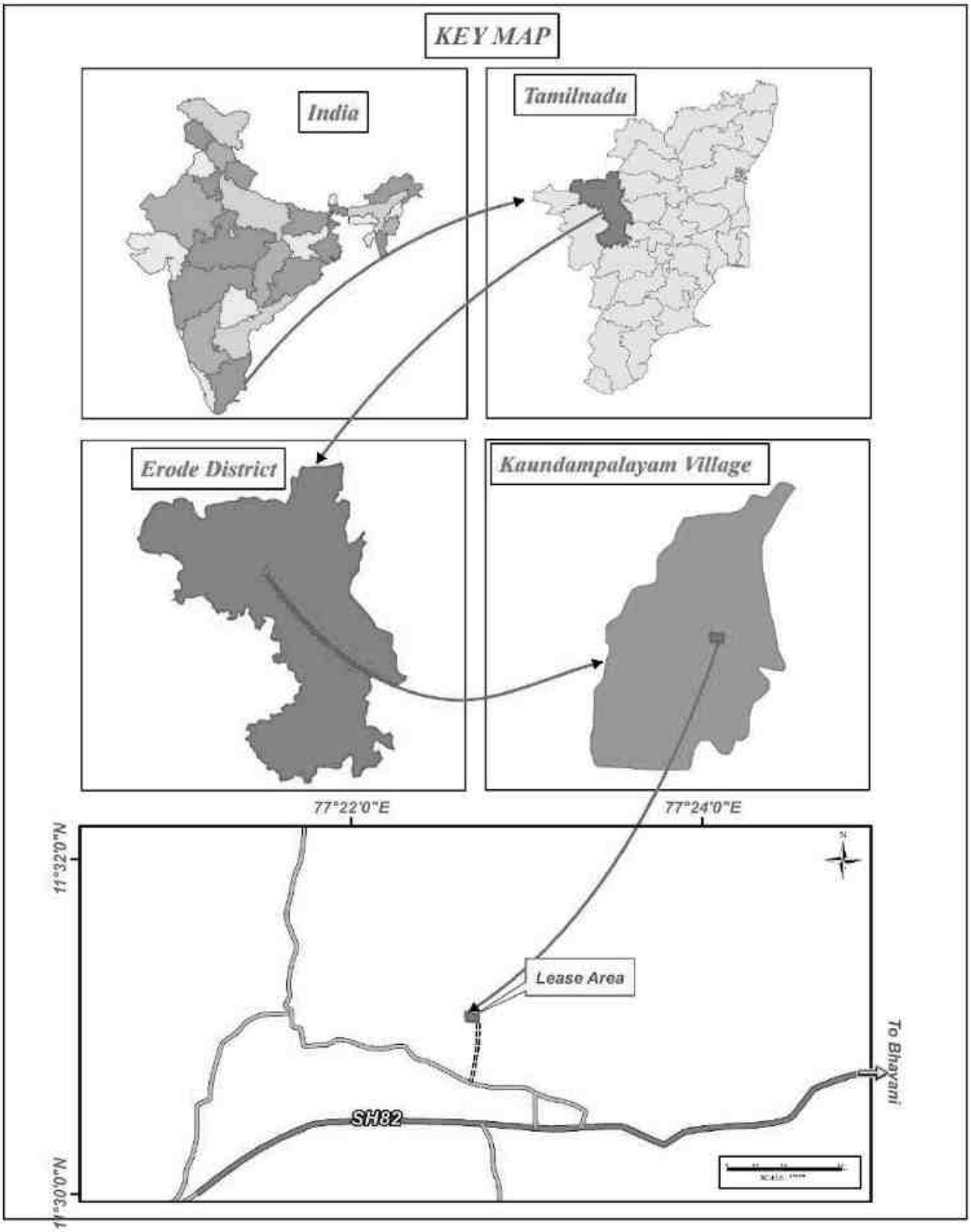


Figure 2.2 Location Map Showing the Project Site

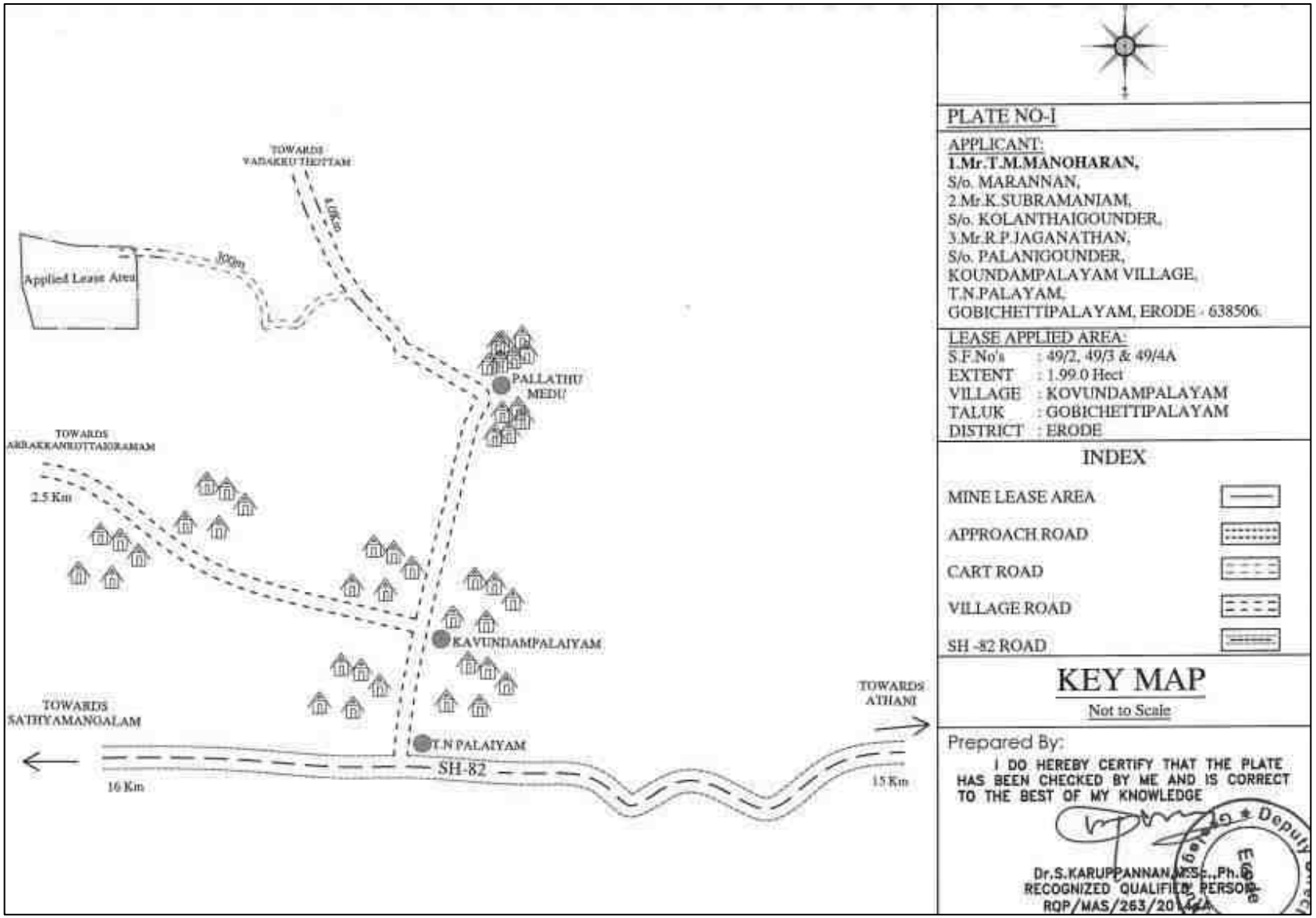


Figure 2.3 Site Connectivity to the Lease Area

Table 2.1 Site Connectivity to the Project Area

Nearest Roadways	SH – 82 Sathyamangalam to Bhavani	1.09 km South
Nearest Town	Bungalowpudur	3.03 km SE
Nearest Railway Station	Vijayamangalam	38.4 km SE
Nearest Airport	Coimbatore	64.5 km SW
Nearest Seaport	Cochin	208 km SW
Nearest Villages	Guthiyalathur R. F	1.26 km N
	Pallathu Medu	0.41 km E
	T.N. Palayam	0.26 km S
	Kongarpalayam	1.45 km W

2.3 LEASEHOLD AREA

- The extent of the proposed project site is 1.99.0 ha.
- The proposed project is site specific.
- There is no mineral beneficiation or processing proposed inside the project area.
- There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

2.3.1 Corner Coordinates

The boundary corner geographic coordinates are given in Table 2.2 and the proposed project site with boundary coordinates has been shown in Figure 2.4 & 2.5.

Table 2.2 Corner Coordinates of Proposed Project

Pillar ID	Latitude	Longitude
1	11°31’5.06’’N	77°22’44.34’’E
2	11°31’4.46’’N	77°22’44.49’’E
3	11°31’1.41’’N	77°22’44.51’’E
4	11°31’1.49’’N	77°22’39.20’’E
5	11°31’2.24’’N	77°22’39.01’’E
6	11°31’3.45’’N	77°22’38.69’’E
7	11°31’5.74’’N	77°22’38.63’’E
8	11°31’5.19’’N	77°22’41.02’’E

2.4 GEOLOGY

The lease area geologically occurs in acid to intermediate charnockite terrain. The Charnockite, commercially called as Roughstone. Also, the lease area geomorphologically occurs over pediment pedipalin complex.

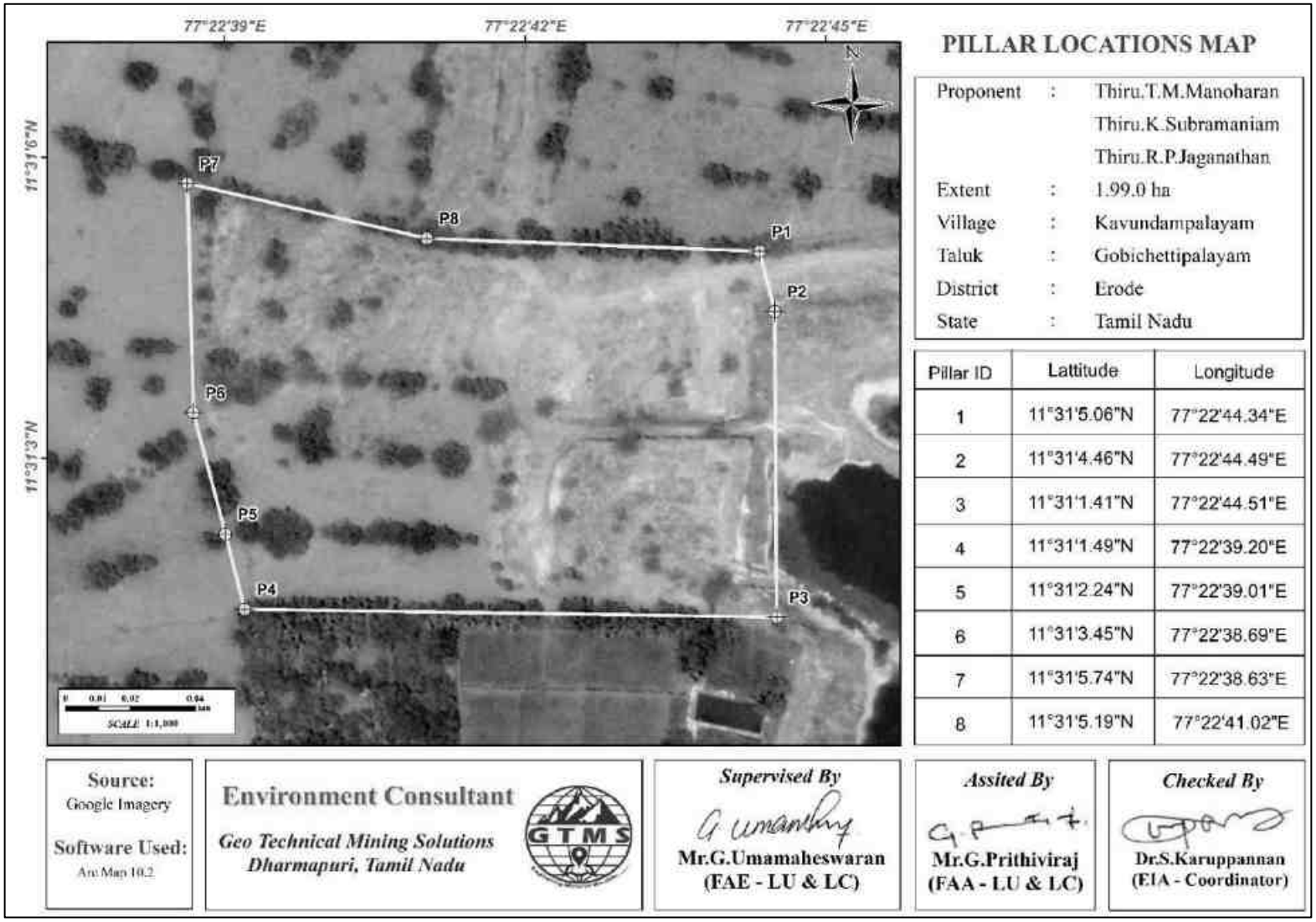
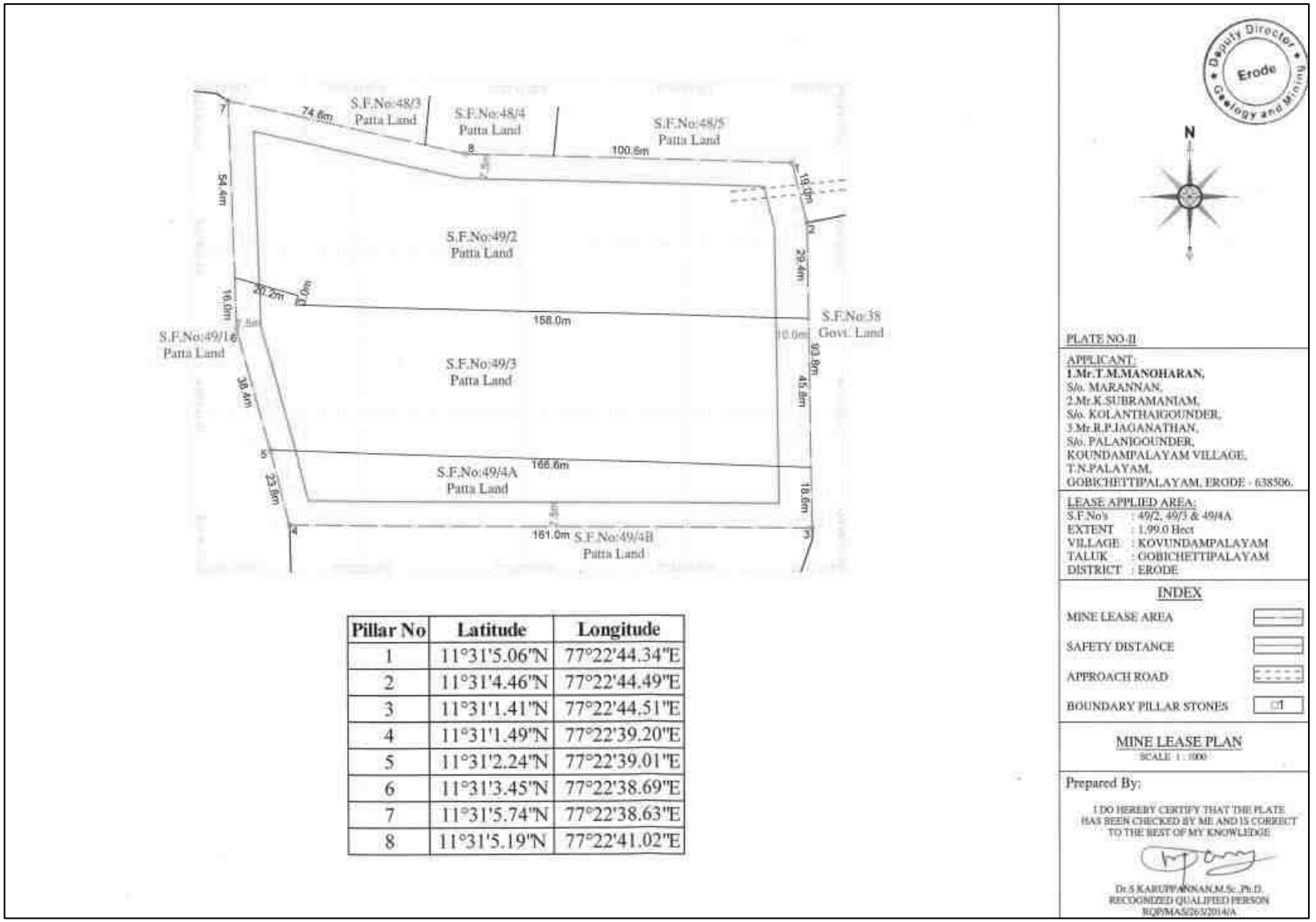


Figure 2.4 Google Earth Image Showing Lease Area with Pillars



Pillar No	Latitude	Longitude
1	11°31'5.06"N	77°22'44.34"E
2	11°31'4.46"N	77°22'44.49"E
3	11°31'1.41"N	77°22'44.51"E
4	11°31'1.49"N	77°22'39.20"E
5	11°31'2.24"N	77°22'39.01"E
6	11°31'3.45"N	77°22'38.69"E
7	11°31'5.74"N	77°22'38.63"E
8	11°31'5.19"N	77°22'41.02"E

Figure 2.5 Mine Lease Plan

2.5 QUANTITY OF RESERVES

The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m and 10m safety distance as per precise area communication letter and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 32 m considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The plate used for reserve estimation has been shown in Figure 2.6 and results of geological resources and reserves have been shown in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m^3	Gravel in m^3
Geological Resource in m^3	895275	39790
Mineable Reserves in m^3	311730	31200
Proposed production for 5 years m^3	278750	31200

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

Table 2.4 Year-Wise Production Details

Year	Rough Stone in (m^3)	Gravel in (m^3) / 3 years
I	52120	13200
II	52780	11600
III	53820	6400
IV	65720	--
V	54310	--
Total	**278750**	**31200**

Source: Approved Mining Plan & Tor

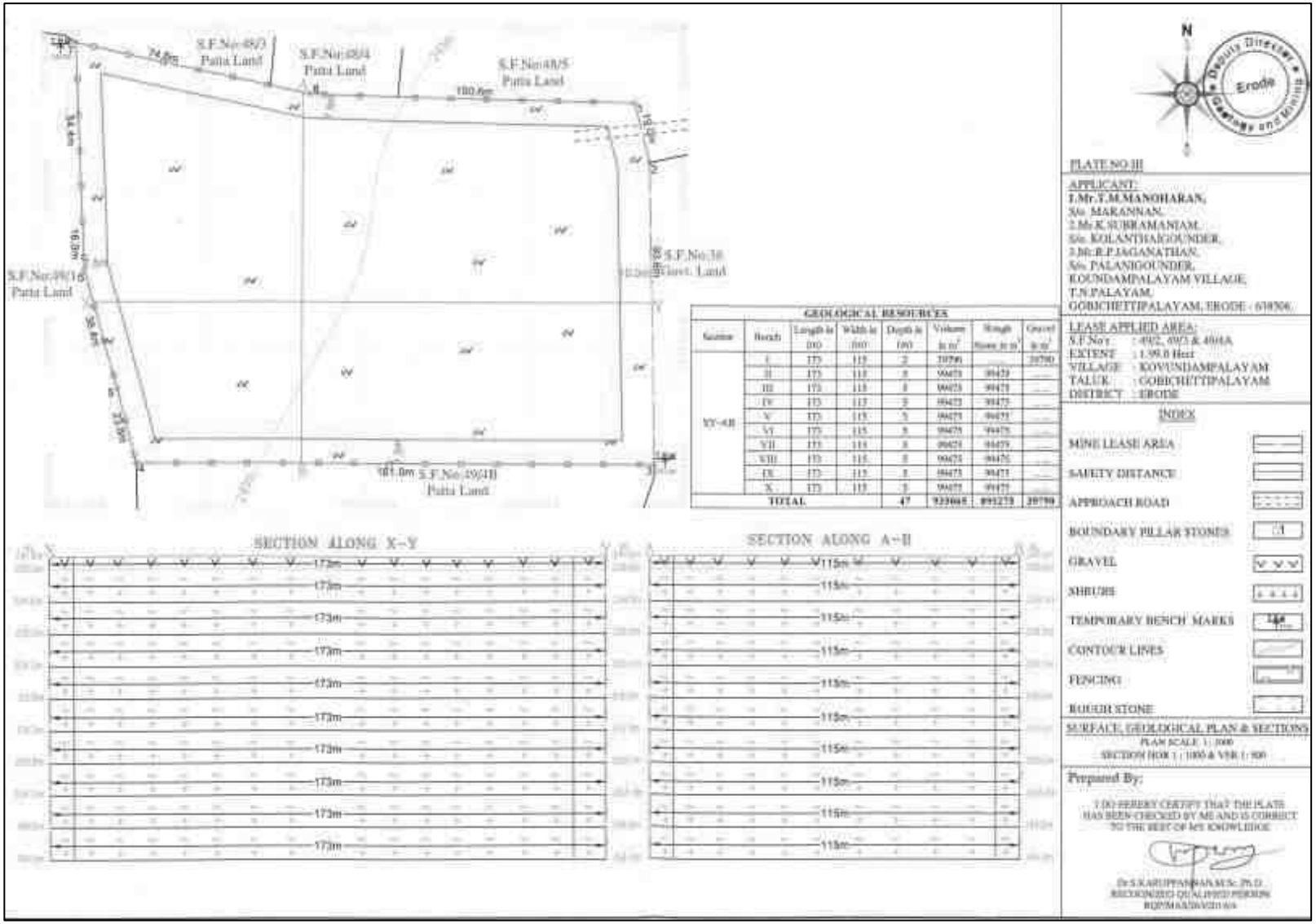


Figure 2.6 Surface Geological Plan and Sections

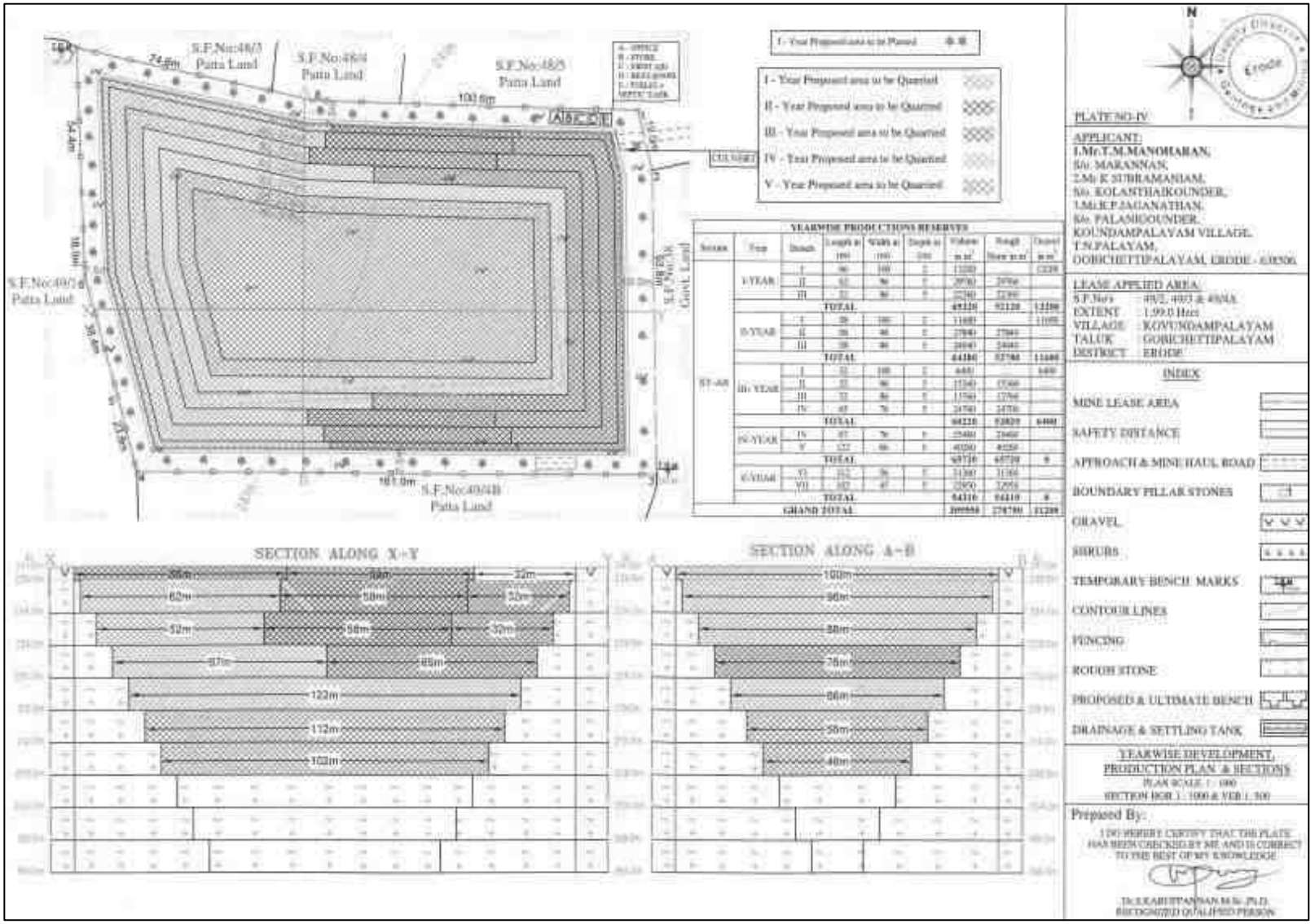


Figure 2.7 Yearwise Development Production Plan & Sections

2.6 MINING METHOD

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

Conceptual Blasting Design

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

Rules of Thumb for Blast Design

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

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

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

Rule 2: Generally, select the densest explosive possible.

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

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

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

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

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

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

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

Rule 6: Stemming should be equal to the burden.

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

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

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

Table 2.5 Conceptual Blasting Design

Blasthole Diameter (D) in mm	32
Burden (B) in m	1.5
Spacing (S) in m	1.30
Subdrill in m	0.45
Charge length (C) in m	0.64
Stemming	1.5
Hole Length (L) in m	2.6
Bench Height (BH) in m	2.1
Mass of explosive/hole in g	400
Stemming material size in mm	3.2

Burden stiffness ratio	1.43
Blast volume/hole in m3	4.16
Production of rough stone/day in m3	206
Number of blastholes/day	50
Blasthole pattern	Staggered
Mass of explosive /day in kg	20
Powder factor in kg/m3	0.10
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL
Fly rock distance in m	19

2.6.1 Magnitude of Operation

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

Table 2.6 Operational Details for Proposed Project

	Rough Stone in m^3 5 years	**Gravel in m^3 3 years**
Proposed production for 5 years	278750	31200
Number of Working Days /Annum	270	270
Production of /Day (m^3)	206	38
No. of Lorry Loads	34	6

2.6.2 Extent of Mechanization

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

Table 2.7 Machinery Details

S. No.	**Type**	**No of Unit**	**Size /Capacity**	**Make**	**Motive Power**
1	Jack Hammers	3	Hand held	-	Diesel Drive
2	Compressor	1	Air	-	Diesel Drive
3	Hydraulic Excavator	1	-	-	Diesel Drive
4	Tipper	6	-	-	Diesel Drive

2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan (Figure 2.9) of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.8 At Present, about 1.99.0 ha of land is unutilized; Whereas, at the end of the mine life, about 1.56.0 ha of land will have been quarried; about 0.30.0 of land is used for green belt and 0.05.0 will be used for roads and 0.02.0 of land is used for infrastructure.

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

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under quarry	Nil	1.56.0
Infrastructure	Nil	0.02.0
Roads	Nil	0.05.0
Green Belt & Dump	Nil	0.30.0
Drainage & Settling Tank	Nil	0.06.0
Unutilized area	1.99.0	Nil
Total	**1.99.0**	**1.99.0**

2.6.4 Progressive Quarry Closure Budget

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

Table 2.9 Mine Closure Budget

Activity	Capital Cost	Recurring Cost/Annum
398 plants inside the lease area	79600	11940
597 plants outside the lease area	179100	17910
Wire Fencing (1.99.0 ha)	398000	19900
Renovation of Garland Drain (1.99.0 ha)	19900	9950
Total	**676600**	**59700**

Source: Environment Management Plan

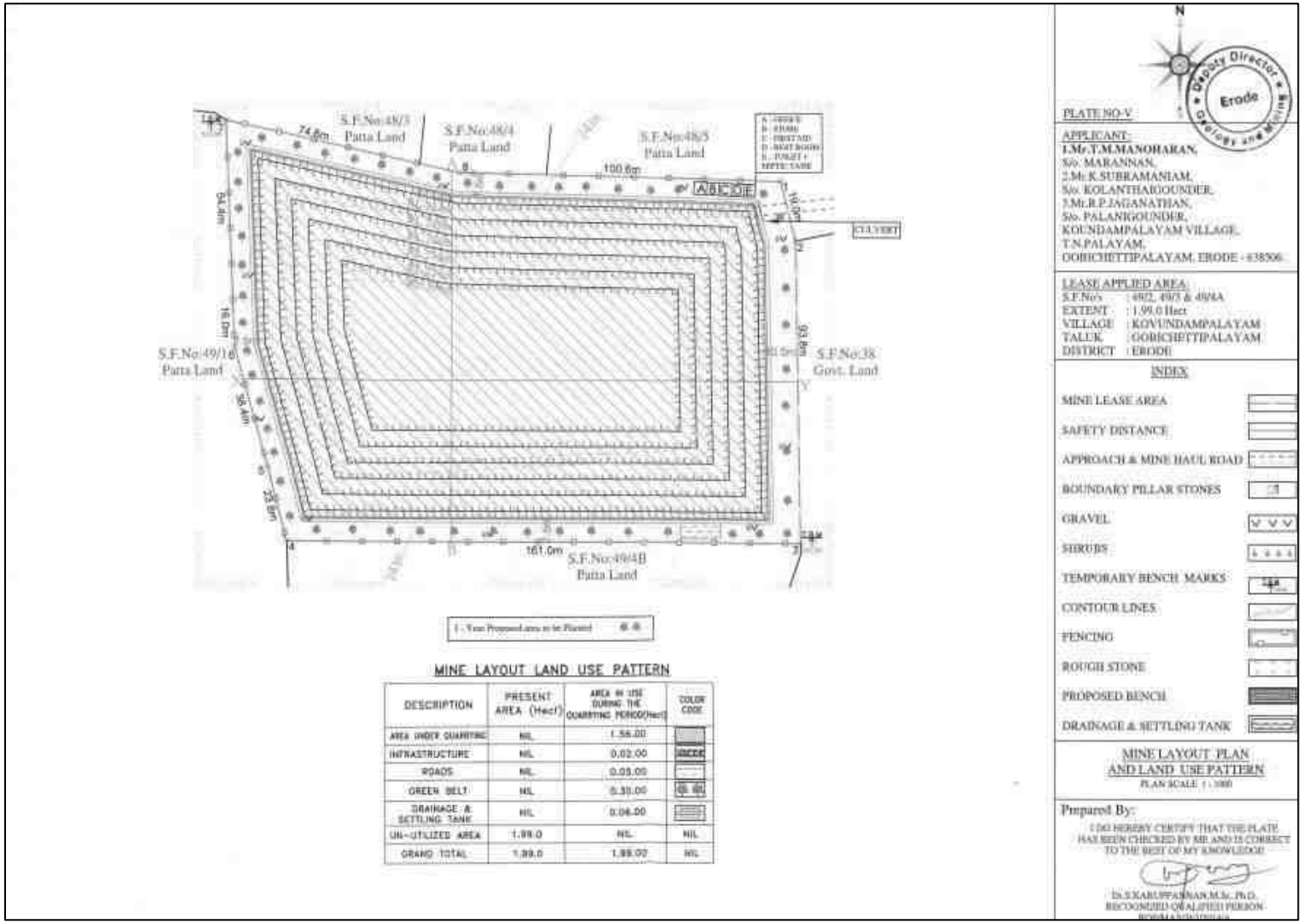
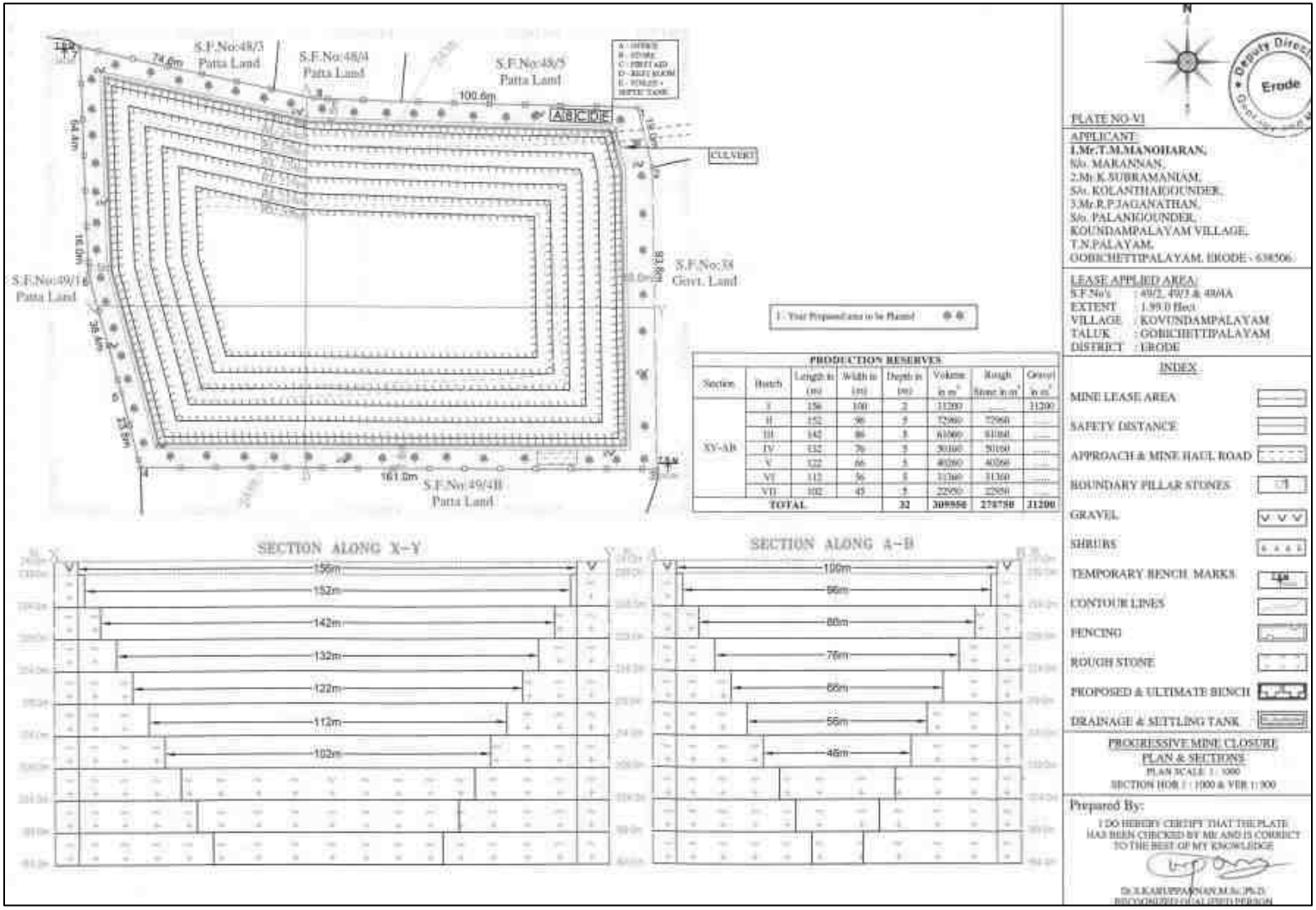
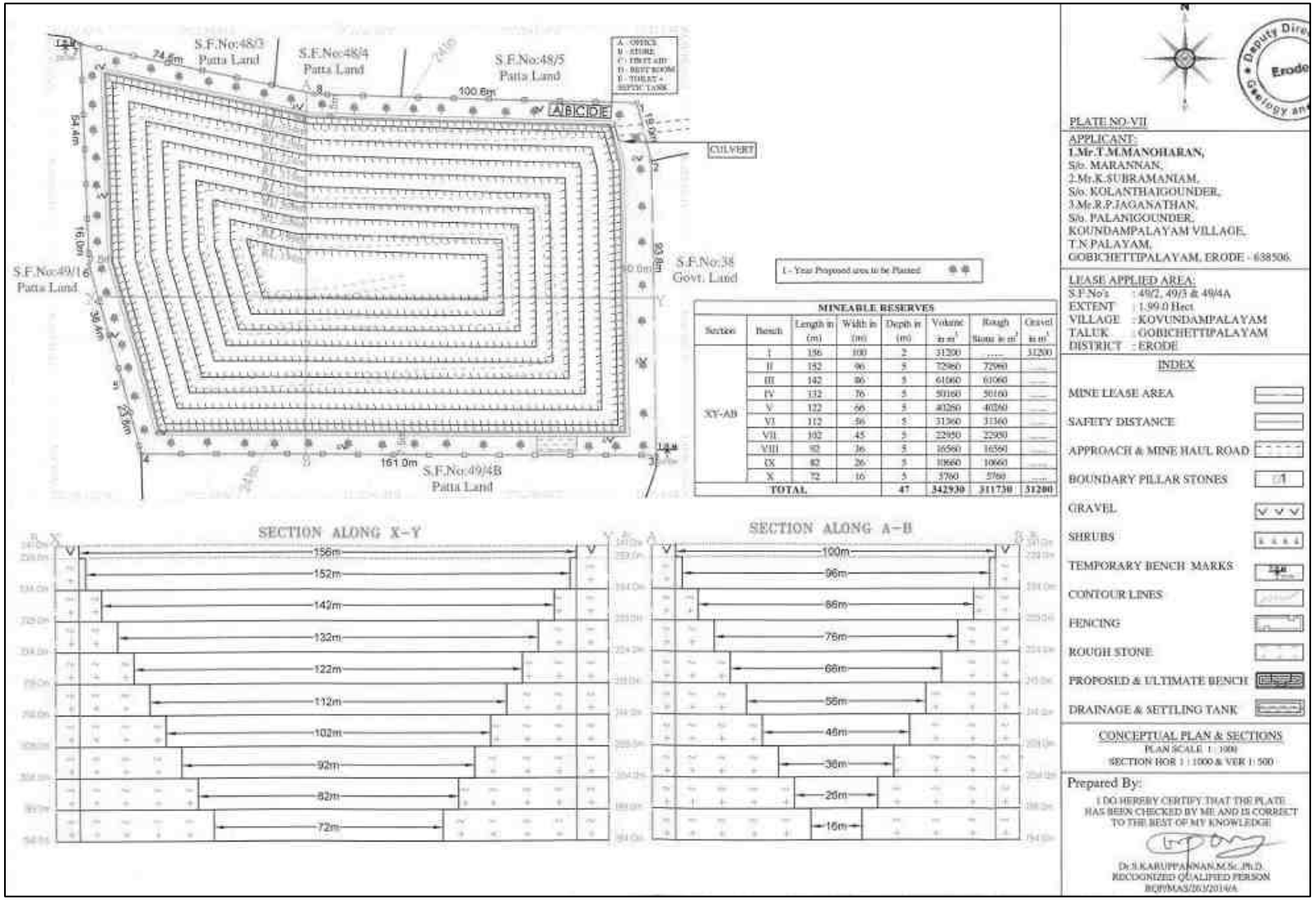


Figure 2.8 Mine Layout Plan and Land Use Pattern



Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m³	Rough Stone in m³	Gravel in m³
XY-AB	I	156	100	2	31200	----	31200
	II	152	90	5	72960	72960	----
	III	142	86	5	61060	61060	----
	IV	132	76	5	50160	50160	----
	V	122	66	5	40260	40260	----
	VI	112	56	5	31360	31360	----
	VII	102	45	5	22950	22950	----
TOTAL				32	309950	278750	31200

Figure 2.9 Progressive Mine Closure Plan & Sections



MINEABLE RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m³	Rough Stone in m³	Gravel in m³
XY-AB	I	156	100	2	31200	.....	31200
	II	152	96	5	72960	72960	.....
	III	142	86	5	61060	61060	.....
	IV	132	76	5	50160	50160	.....
	V	122	66	5	40260	40260	.....
	VI	112	56	5	31360	31360	.....
	VII	102	45	5	22950	22950	.....
	VIII	92	36	5	16560	16560	.....
	IX	82	26	5	10660	10660	.....
	X	72	16	5	5760	5760	.....
TOTAL				47	342930	311730	31200

Figure 2.10 Conceptual Plan & Sections

2.6.5 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. Details of ultimate pit dimensions have been derived from given in Table 2.10 and Figure 2.10.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth(m)
I	156	100	47

Source: Approved Mining Plan & ToR

2.6.6 Infrastructures

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

2.6.6.1 Other Infrastructure Requirement

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

2.6.7 Water Requirement

Detail of water requirement in KLD is given in Table 2.11.

Table 2.11 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	1.0 KLD	Existing bore wells nearby the lease area
Green Belt development	1.0 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.5 KLD	Existing bore wells and approved water vendors
Total	**3.5 KLD**	

Source: Prefeasibility Report

2.6.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12, Around 12,88,367 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 (278750 m^3)**	**Gravel (31200 m^3)**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m^3/hr)	20	60	---
Time Required (hours)	13938	520	---
Total Diesel Consumption for 5 years (litre)	223000	5200	**228200**
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	**---**	**---**
Number of Drillholes/day	50	**---**	**---**
Total Diesel Consumption for 5 years (litre)	27000	**---**	**27000**
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m^3	6	6	---
Number of Trips / days	34	4*	---
Number of Trips / 5 years	46458	5200	---
Total Diesel Consumption for 5 years (litre)	929167	104000	**1033167**
Total Diesel Consumption by Excavator, Compressor and Tipper			**12,88,367**

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

2.6.9 Capital Requirement

The project proponent will invest **Rs. 69,98,000/-** to the project. The breakup summary of the investment has been given in Table 2.13.

Table 2.13 Capital Requirement Details

S. No.	**Description**	**Cost (Rs.)**
1	Fixed Asset Cost	12,25,000/-
2	Machinery cost	25,00,000/-
3	EMP Cost	32,73,000/-
Total Project Cost		**69,98,000/-**

Source: Approved Mining Plan

2.7 MANPOWER REQUIREMENT

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

Table 2.14 Employment Potential for the proposed project

S. No.	Category	Role	Nos.
1.	Highly Skilled	IInd Mines Manager	1
		Blaster	1
		Mine Geologist	1
2	Semi-Skilled	Driver	6
		Hitachi Operator	1
3	Unskilled	Musdoor/ Labours	10
Total			**20**

Source: Prefeasibility Report

2.8 PROJECT IMPLEMENTATION SCHEDULE

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

Table 2.15 Expected Time Schedule

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

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

CHAPTER III
DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering **October through December, 2021** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Ekdant Enviro Services (P) Ltd** for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.

Study Area

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

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 5 km radius of the study area	Once during the study period	Study Area	Satellite Imagery & Primary Survey
*Soil	Physico-Chemical characteristics	Once during the study period	7 (1 in core & 6 in buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi

*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (1 surface water & 5 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	9 (1 core & 8 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	10 (1 core & 9 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing flora and fauna	Through field visit during the study period	Study area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-economic characteristics, Population statistics and existing infrastructure in the study area	Site visit & Census Handbook, 2011	Study area	Primary Survey, census handbook & need based assessments.

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

3.1 LAND ENVIRONMENT

3.1.1 Geology and Geomorphology

Study area is mainly composed of pegmatite and charnockite sediments, as shown in Figure 3.1. The lease area occurs in pegmatite terrain.

Among the geomorphic units, shallow weathered/buried pediplain and pediment dominate the study area, as shown in Figure 3.2. The lease area occurs in shallow weathered/buried pediplain terrain.

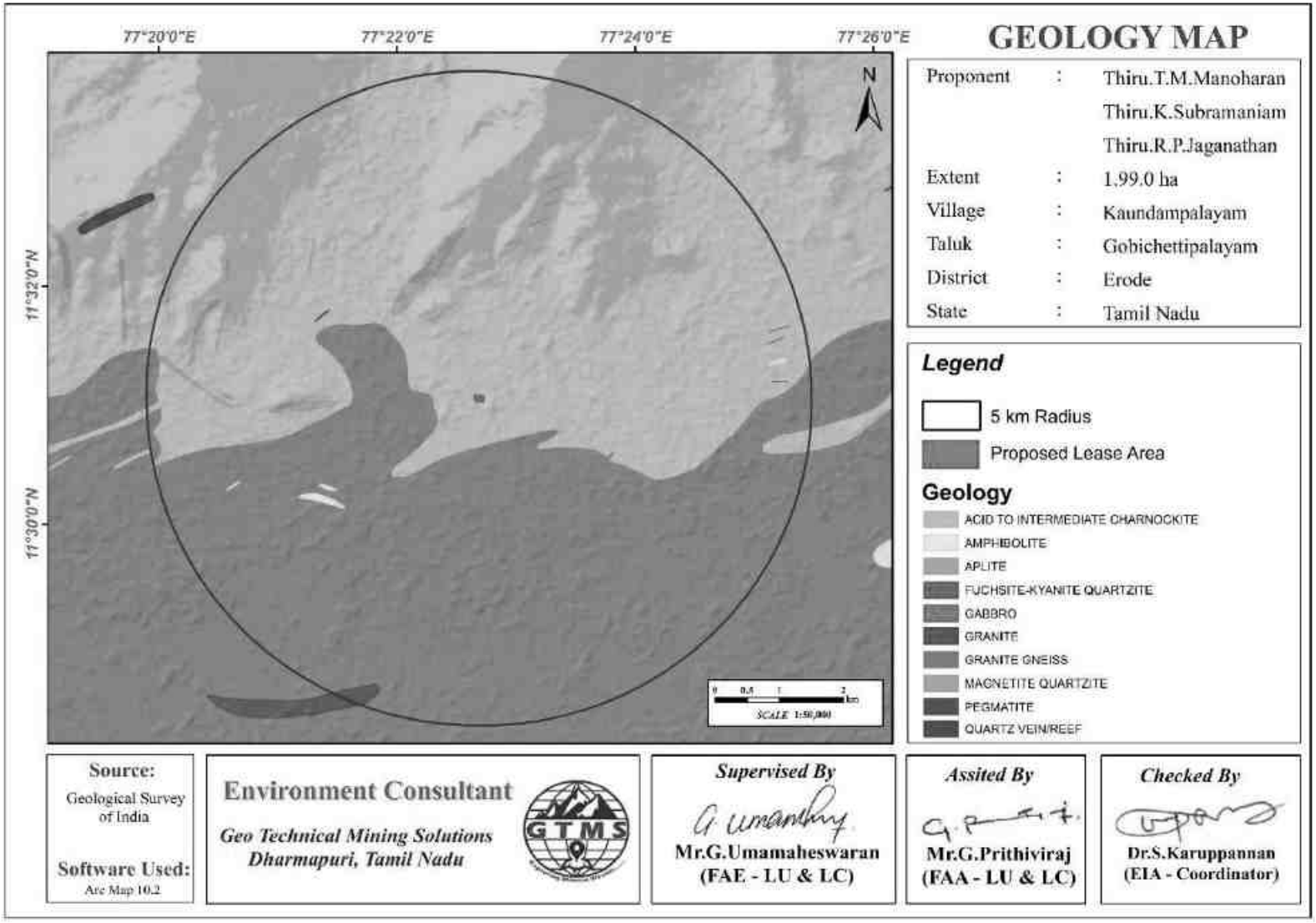


Figure 3.1 Geology Map of 5 km Radius from Proposed Project Site

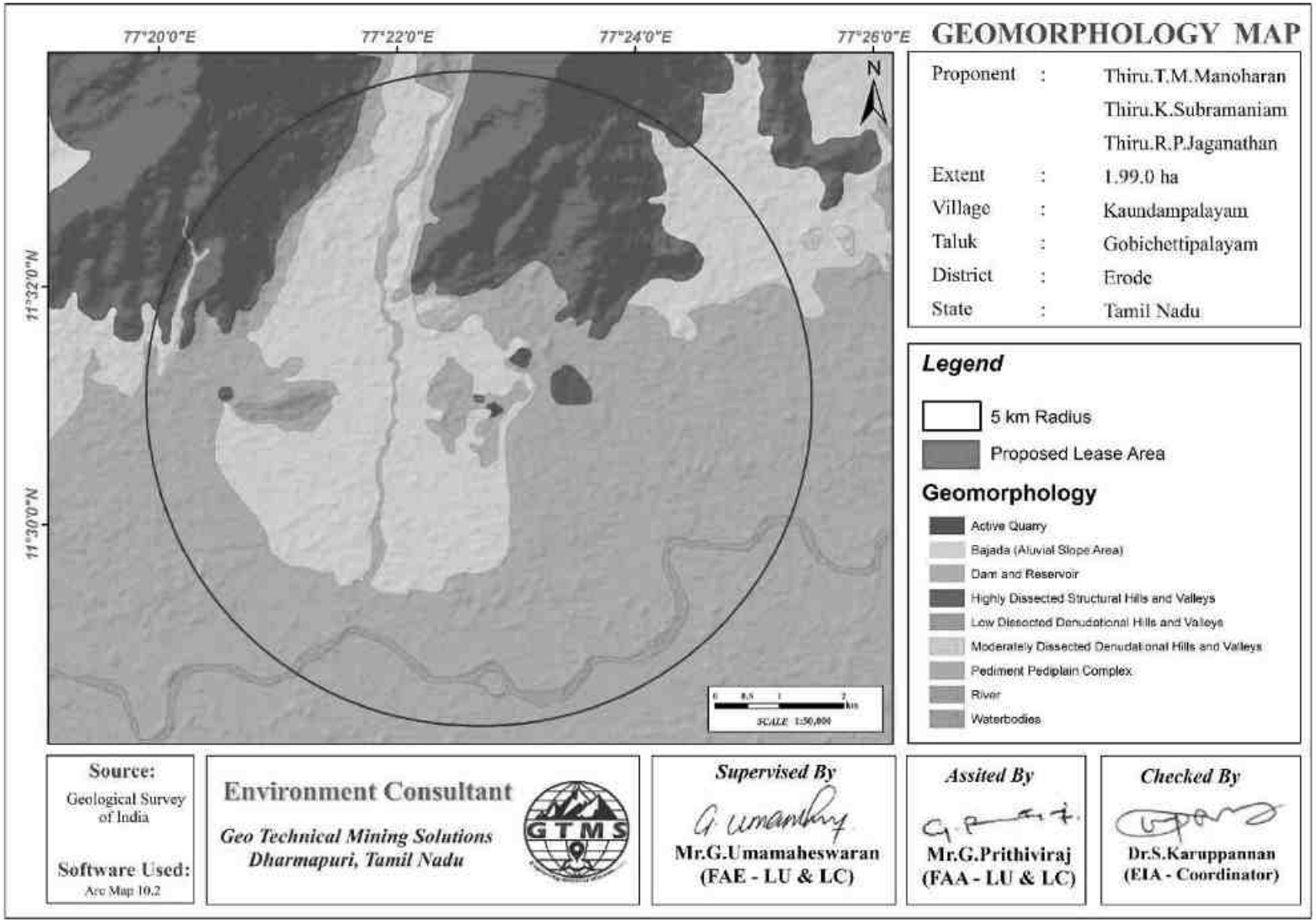


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

3.1.2 Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius to provide a baseline status of the study area covering 5 km radius around the proposed mine site. Totally, 8 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 24.77 ha accounting for 0.33 %, of which lease area of 1.99.0 ha contributes only about 0.026%. This small percentage of mining activities shall not have any significant impact on the land environment.

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky/ Stony Waste	56.55	0.74
2	Crop Land	4134.21	54.29
3	Dense Forest	1099.52	14.44
4	Land with or without scrub	875.18	11.49
5	Mining/Industrial wastelands	24.77	0.33
6	Plantations	1209.87	15.59
7	Settlements	79.65	1.05
8	Water Bodies	134.74	1.77
Total		**7614.5**	**100**

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The proposed lease area is located in a flat terrain with an altitude range of 241m AMSL.

3.1.4 Drainage Pattern

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

3.1.5 Seismic Sensitivity

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

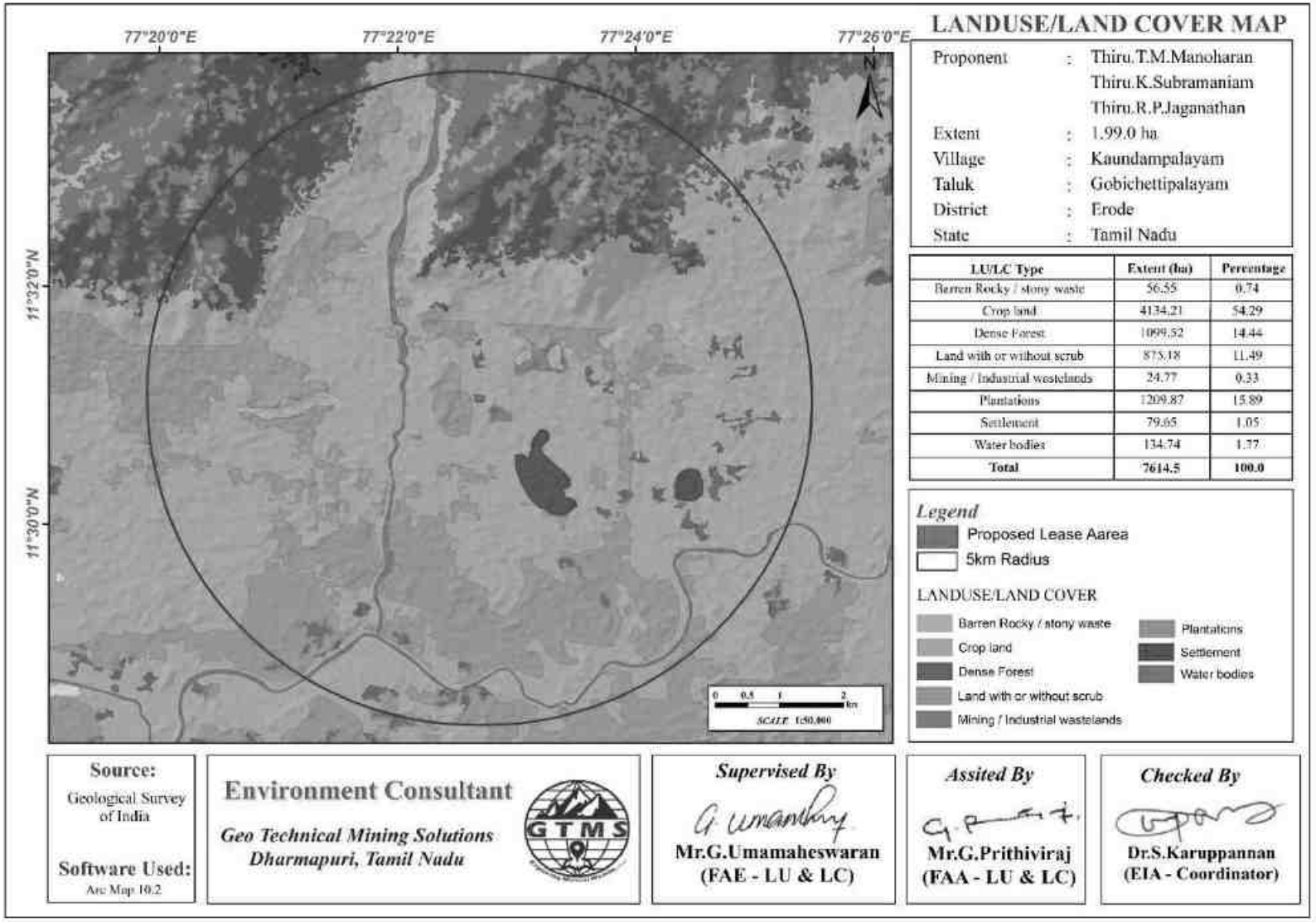


Figure 3.3 LULC Map of 5 km Radius from Proposed Project Site

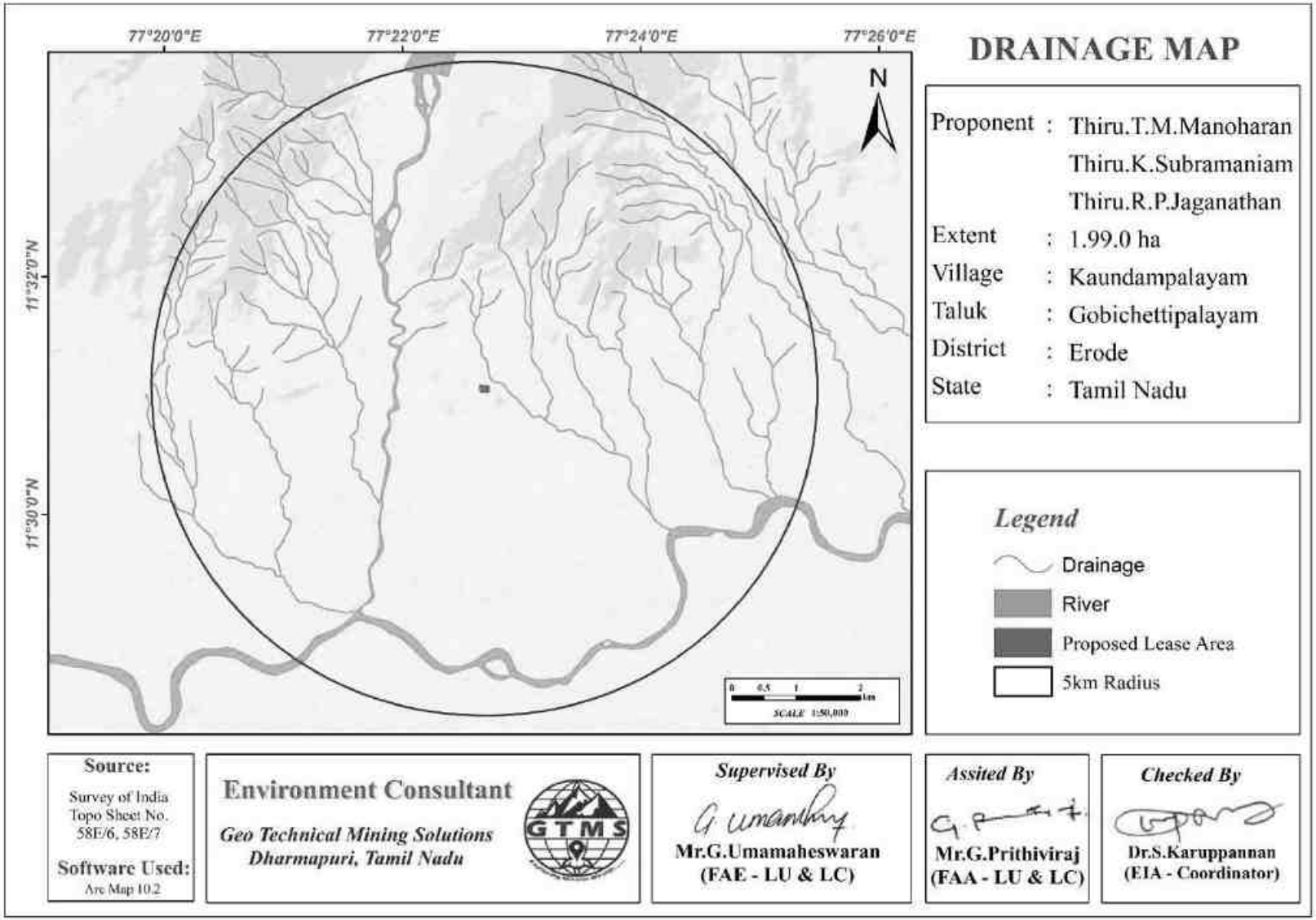


Figure 3.4 Drainage Map of 5 km Radius from Proposed Project Site

3.1.6 Soil

Composite soil samples were collected from 8 locations of the study area to determine the baseline soil characteristics of the soil. The locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.5. The samples thus collected were analysed for physical and chemical characteristics. The physical and chemical characteristic results of soil samples are provided in Table 3.4.

Table 3.3 Soil Sampling Locations

S.No	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
1	S-1	Kandasamy lease	0.467	NW	11°31'6.80"N 77°22'23.18"E
2	S-2	Near Crusher	0.34	NNW	11°31'13.35"N 77°22'30.76"E
3	S-3	Uppupallam	3.34	ESE	11°30'42.24"N 77°24'32.23"E
4	S-4	Sulekal	3.93	SW	11°29'56.42"N 77°20'47.64"E
5	S-5	Vinobanagar	4.01	NNW	11°33'9.37"N 77°21'56.70"E
6	S-6	Pallapalayam	4.24	SSW	11°28'56.73"N 77°21'39.15"E
7	S-7	Core	----	----	11°31'1.96"N 77°22'39.93"E

Source: Ekdant Enviro Services (P) Ltd in association with GTMS Physical Characteristics

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is clay loam. pH of the soil varies from 7.97 to 8.85 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 290 to 460 µs/cm. Bulk density ranges between 0.73 and 1.23 g/cm^3.

Chemical Characteristics

Nitrogen ranges between 115 and 180 kg. Phosphate ranges between 0.55 and 1.24kg. Potassium ranges between 21.5 and 44.5kg. Calcium ranges between 127 and 180 mg/kg. Organic matter content ranges between 1.32 and 2.62%.

Soil Erosion

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

Soil Quality Assessment

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

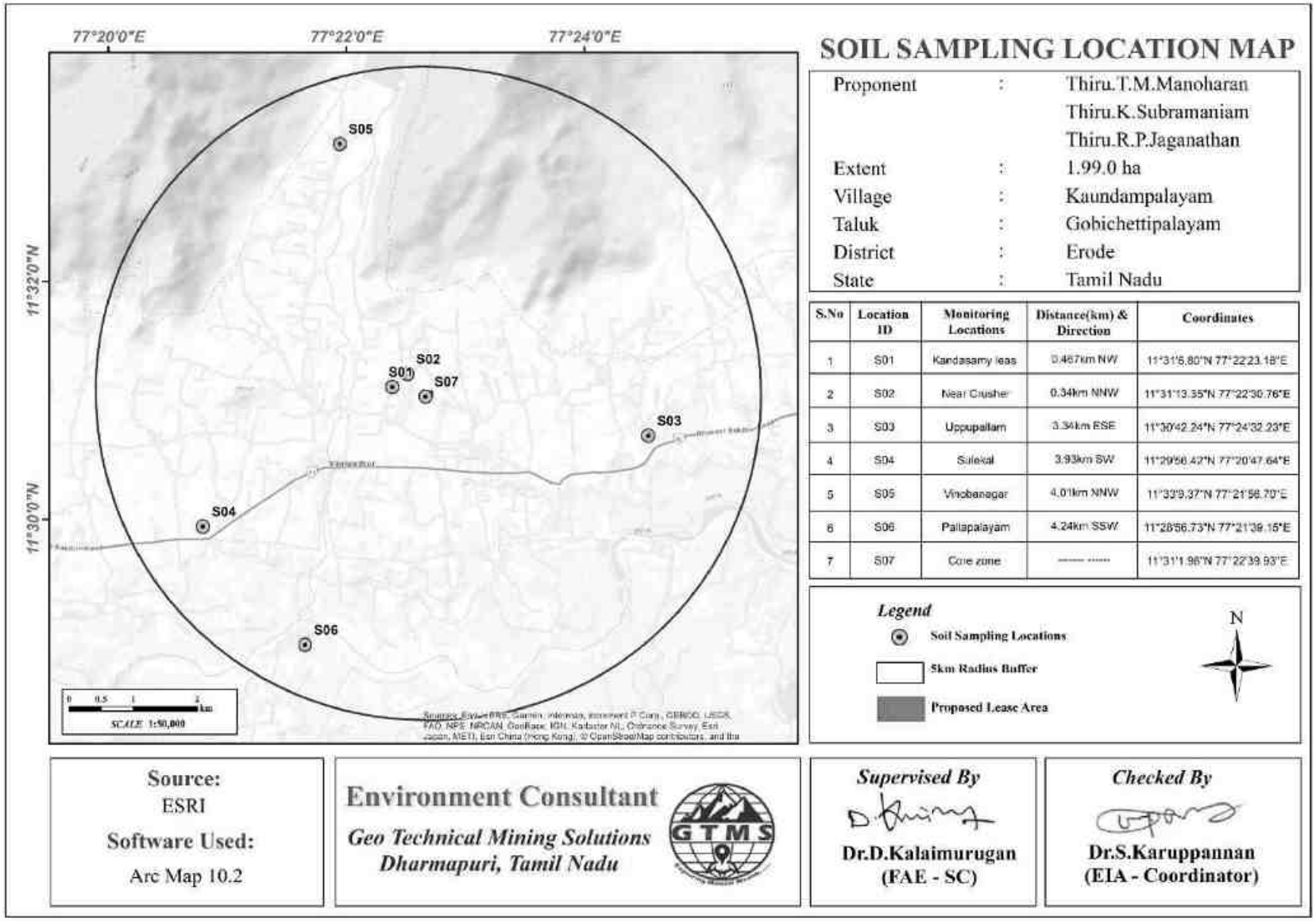


Figure 3.5 Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site

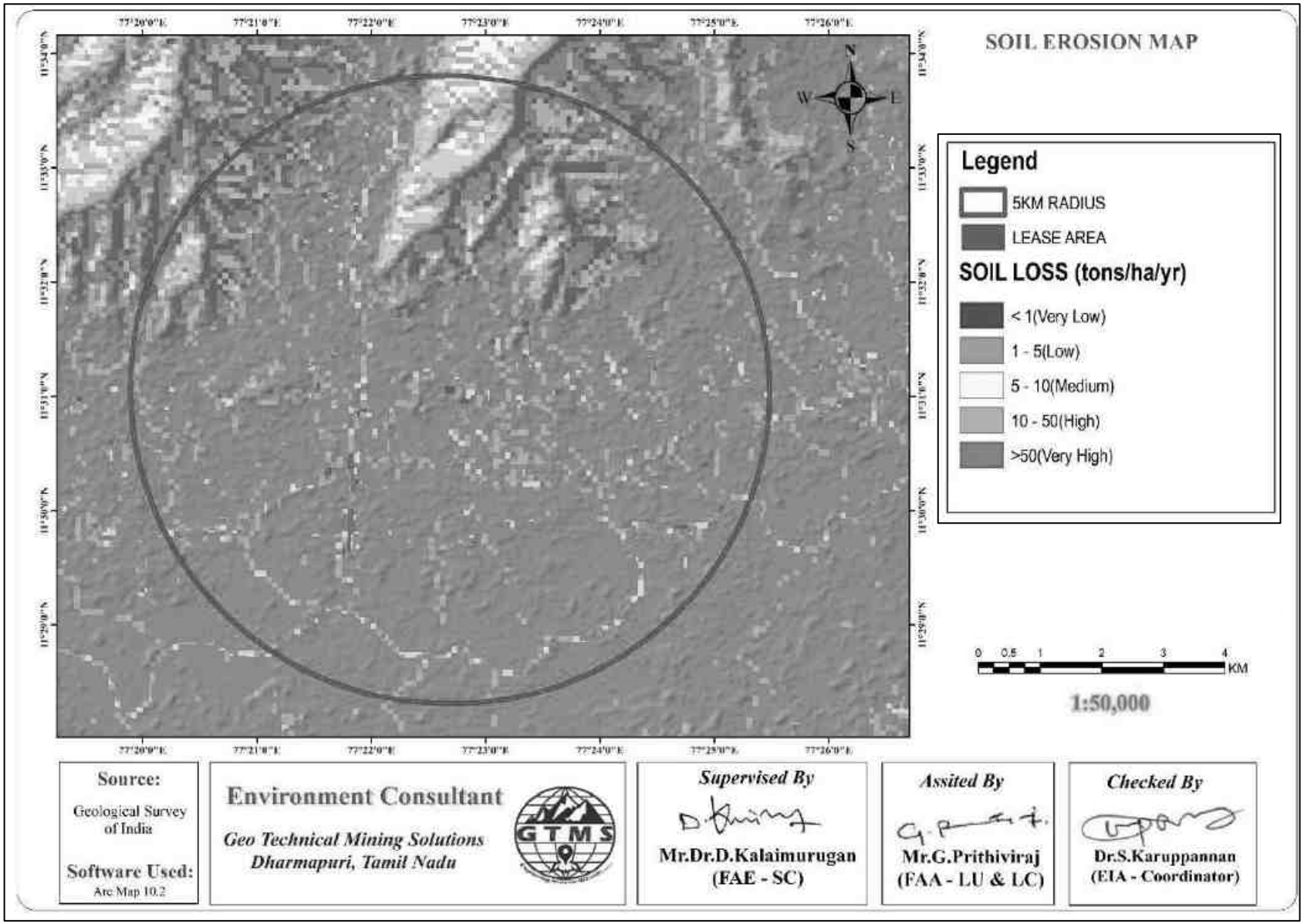


Figure 3.6 Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S.NO.	Parameter	UNIT	Core Zone	Minimum	Maximum	Average
1	pH @ 27°C	-	8.04	7.97	8.85	8.32
2	Electrical Conductivity at 25°C	µs/cm	243	240	460	363.33
3	Texture	-	Clay Loam	Clay Loam	Clay Loam	Clay Loam
4	Sand	%	31.3	32.1	38.8	34.98
5	Slit	%	37.1	31.9	38.9	35.45
6	Clay	%	30.3	26.6	32.6	29.55
7	Water Holding Capacity	%	43.7	41.2	51.9	46.78
8	Bulk Density	g/cc	1.06	0.73	1.23	1.02
9	Porosity	%	32.7	27.7	42	34.48
10	Calcium (as Ca)	mg/Kg	143.3	127	180	148.47
11	Magnesium (as Mg)	mg/Kg	25.1	22.1	40.5	28.65
12	Manganese (as Mn)	mg/Kg	37	22	38.7	29.70
13	Zinc as Zn	mg/Kg	0.53	0.15	1.11	0.63
14	Boron (as B)	mg/Kg	0.53	0.33	0.9	0.59
15	Chloride (as Cl)	mg/Kg	152.1	123.4	170	144.25
16	Sulphate (as S04)	mg/Kg	113	88.2	140	116.12
17	Potassium (as K)	mg/Kg	43.2	21.5	44.5	35.37
18	Phosphorous (as P)	Kg/hec	0.68	0.55	1.24	0.87
19	Nitrogen (as N)	Kg/hec	153	115	180	146.98
20	Cadmium (as Cd)	mg/Kg	BDL(DL:0.003)	BDL (DL:0.003)	BDL (DL:0.003)	BDL(DL:0.003)

21	Chromium (as Cr)	mg/Kg	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
22	Copper (as Cu)	mg/Kg	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
23	Lead (as Pb)	mg/Kg	0.56	0.26	1.22	0.76
24	Total Iron	mg/Kg	2.06	1.17	2.75	2.10
25	Organic Matter	%	2.20	1.32	2.62	2.01
26	Organic Carbon	%	1.12	0.77	1.52	1.17
27	CEC	meq/l00g	40.3	35.5	42	37.92

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

Table 3.4a Assigning Scores to Soil Quality Indicators

Soil Quality Score							
S. No.	OM	BD	PH	CEC	EC	**Total Score**	**Recommendation**
S01	34	6	3	3	5	51	The soil requires major and immediate treatment
S02	30	12	6	6	10	64	
S03	30	12	6	6	10	64	
S04	35	12	12	6	**10**	**75**	
S05	36	12	6	6	10	70	
S06	40	12	6	6	10	74	
S07	35	12	6	6	10	69	

OM (Organic Matter) BD (Bulk Density) PH (Potential of Hydrogen) EC (Electrical Conductivity)

3.2 WATER ENVIRONMENT

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

Table 3.5 Water Sampling Locations

S. No.	Code	Locations	Distance (km)	Direction	Coordinates
Surface Water					
1	SW-1	Bavani river (Near Nanjaipuliampatti)	3.54	SE	11°29'52.62"N 77°24'17.61"E
Ground Water					
2	OW-1	Core Zone	0.18	W	11°31'1.09"N 77°22'33.34"E
3	OW-2	Pallapalayam	4.30	SSW	11°28'30.72"N 77°21'12.81"E
4	OW-3	Vinobanagar	3.96	NNW	11°33'9.17"N 77°22'1.66"E
5	BW-1	Core Zone	0.93	W	11°31'8.09"N 77°22'7.88"E
6	BW-2	Sulekal	3.91	SW	11°28'49.26"N 77°21'52.79"E

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

3.2.1 Surface Water Resources and Quality

Bhavani River is the prominent surface water resources present in the study area. This river was ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 3.54 km SE of Bavani River, as shown in Table 3.5 and Figure 3.7. One surface water sample, known as SW1 were collected from the Bavani River to assess the baseline water quality. Table 3.5 summarizes surface water quality data of the collected sample.

Result for surface water sample in the Table 3.6 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

3.2.2 Ground Water Resources and Quality

Groundwater in the study area occurs in the crystalline rocks of Archaean age and recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose.

Five groundwater samples, known as OW01, OW02, OW03, BW01, and BW02 collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals

and bacteriological contents in order to assess baseline quality of ground water. Ground water sampling locations and their distance and direction from the lease area are provided in Table 3.5 and the spatial occurrence of water sampling locations is shown in Figure 3.7. Table 3.6 summarizes ground water quality data of the Five samples.

Results for ground water samples in the Table 3.6 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

3.2.3 Hydrogeological Studies

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

3.2.3.1 Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 11 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2021 (Pre-Monsoon Season) and from October through December, 2021 (Post Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.7 and 3.8. According to the data, average depths to the static water table in open wells range from 9.76 to 12.16m; average depths to static potentiometric surface in bore wells from 61.03 to 66.03m. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depths to static potentiometric surface in bore wells for the period of October through December 2022 (Post-Monsoon Season) vary from 63.8 to 66.3 m and from 62.3 to 65.8 m for the period of March through May, 2022 (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

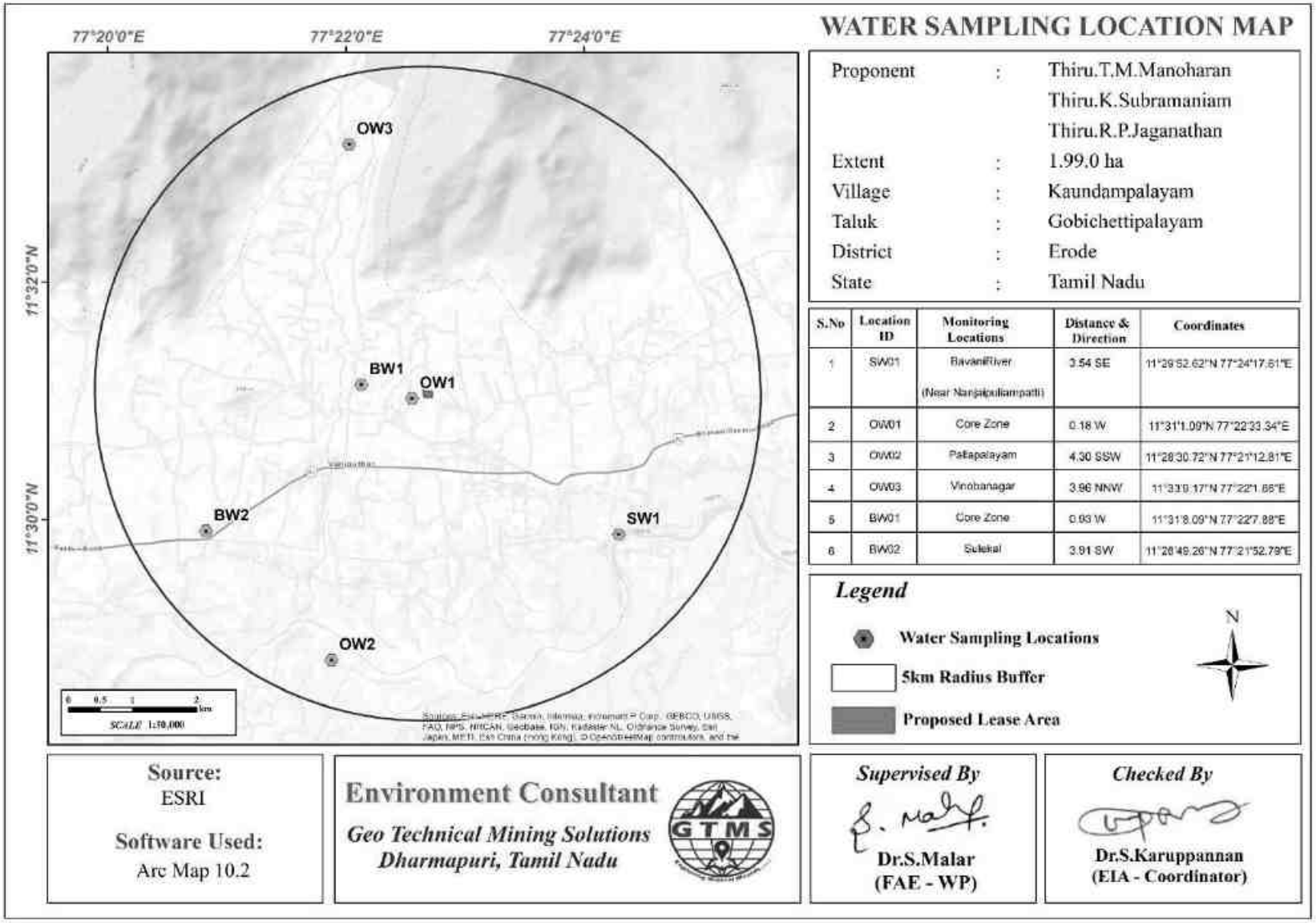


Figure 3.7 Map Showing Water Sampling Locations within 5 km Radius around Proposed Project Site

Table 3.6 Ground Water Quality Result

S.No.	Parameters	Units	RESULTS					Standards as Per IS 10500: 2012	
			WW1 Core Zone	WW2 Pallapalayam	WW3 Vinobanagar	BW1	BW2	Acceptable Limit	Permissible Limit
1	Color	Hazen	< 5	< 5	< 5	< 5	< 5	5	15
2	Odour	-		Agreeable				Agreeable	Agreeable
3	Taste	-		Agreeable				Agreeable	Agreeable
4	pH@ 25°C	-	6.56	7.19	7.01	7.68	7.15	6.5-8.5	No relaxation
5	Electrical Conductivity @ 25°C	µs/cm	900	952	808	776	737	Not specified	Not specified
6	Turbidity	NTU	< 1	< 1	< 1	< 1	< 1	1	5
7	TDS	mg /l	531	562	477	458	435	500	2000
8	Total Hardness	mg/l	163.26	208.3	154.57	182.19	129.39	200	600
9	Calcium as Ca	mg/l	30.5	41.8	28.5	34.3	25	75	200
10	Magnesium as Mg	mg/l	21.2	25.3	20.3	23.5	16.3	30	10°
11	Total Alkalinity	mg/l	175	210	154	170	159	200	600
12	Chloride as Cl-	mg/l	100	87.3	80.6	71.3	93.7	250	10°0
13	Sulphate as SO4-	mg/l	45.6	41.7	35.4	30.1	32.8	200	200
14	Iron as Fe	mg/l	0.11	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.3	No relaxation
15	Free Residual Cl	mg/l		BDL(DL:2.0)				0.2	1
16	Fluoride as F	mg/l	0.14	0.11	0.17	0.25	0.16	1.0	1.5
17	Nitrates as NO3	mg/l	10.2	7.1	6.2	9.4	8.8	45	No relaxation
18	Copper as Cu	mg/l	BDL (DL:0.2)					0.05	1.5
19	Manganese as Mn	mg/l	BDL(DL:0.05)					0.1	0.3
20	Mercury as Hg	mg/l	BDL (DL:0.0005)					0.001	No relaxation

21	Cadmium as Cd	mg/l	BDL(DL:0.01)	0.003	No relaxation
22	Selenium as Se	mg/l	BDL(DL:0.05)	0.01	No relaxation
23	Aluminium as Al	mg/l	BDL(DL:0.03)	0.03	No relaxation
24	Lead as Pb	mg/l	BDL(DL:0.01)	0.01	No relaxation
25	Zinc as Zn	mg/l	BDL(DL:0.02)	5	15
26	Total Chromium	mg/l	BDL(DL:0.05)	0.05	No relaxation
27	Boron as B	mg/l	BDL (DL:0.1)	0.5	1.0
28	Mineral Oil	mg/l	BDL (DL:1.0)	0.5	No relaxation
29	Phenolic Compounds	mg/l	Absent	0.001	No relaxation
30	Anionic Detergents	mg/l	BDL (DL:0.1)	0.2	0.1
31	Cyanide as CN	mg/l	Absent	0.05	No relaxation
32	Total Coliform	MPN/ 100ml	< 2	Shall not be detectable in any100 ml	Shall not be detectable in any100 ml
33	E-Coli		< 2		
34	Barium as Ba	mg/l	BDL (DL:0.5)	0.7	No relaxation
35	Ammonia	mg/l	BDL (DL:0.1)	0.5	No relaxation
36	Sulphide as H_2S	mg/l	BDL(DL:0.05)	0.05	No relaxation
37	Molybdenum	mg/l	BDL (DL:0.5)	0.07	No relaxation
38	Total Arsenic	mg/l	BDL(DL:0.01)	0.01	0.05
39	Total Suspended Solids	Mg/l	BDL(DL:2)	-	-

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

Table 3.7 Surface Water Sampling Quality Results

S.NO.	Parameter	UNIT	SW1	CPCB Designated Best Use
1	Color	Hazen	5	300
2	Odour	-	Agreeable	Not specified
3	pH@ 25°C	-	7.55	6.5 – 8.5
4	Electrical Conductivity @ 25°C	µs/cm	1052	Not specified
5	Turbidity	NTU	7.8	Not specified
6	Total Dissolved Solids	mg /l	621	1500
7	Total Hardness as $CaCO_3$	mg/l	196.7	Not specified
8	Calcium as Ca	mg/l	40.1	Not specified
9	Magnesium as Mg	mg/l	23.5	Not specified
10	Total Alkalinity as $CaCO_3$	mg/l	210	Not specified
11	Chloride as Cl^-	mg/l	112.4	600
12	Sulphate as SO_4^-	mg/l	56	400
13	Iron as Fe	mg/l	0.19	50
14	Free Residual Chlorine	mg/l	BDL (DL: 2.0)	400
15	Fluoride as F	mg/l	0.13	1.5
16	Nitrates as NO_3	mg/l	18	50
17	Copper as Cu	mg/l	BDL (DL:0.2)	1.5
18	Manganese as Mn	mg/l	BDL (DL:0.05)	Not specified
19	Mercury as Hg	mg/l	(BDL(DL:0.0005)	Not specified
20	Cadmium as Cd	mg/l	BDL (DL:0.01)	0.01
21	Selenium as Se	mg/l	BDL (DL: 0.05)	Not specified
22	Aluminium as Al	mg/l	BDL (DL: 0.03)	Not specified
23	Lead as Pb	mg/l	BDL (DL:0.01)	0.1
24	Zinc as Zn	mg/l	BDL (DL:0.02)	15
25	Total Chromium	mg/l	BDL (DL: 0.05)	0.05
26	Boron as B	mg/l	BDL (DL:0.1)	Not specified
27	Mineral Oil	mg/l	BDL (DL:1.0)	Not specified
28	Phenolic Compounds as C_6H_5OH	mg/l	Absent	0.005
29	Anionic Detergents as MBAS	mg/l	BDL (DL:0.1)	Not specified
30	Cyanide as CN	mg/l	Absent	0.05
31	Biological Oxygen Demand, 3 days @ 27°C	-	6.4	3
32	Chemical Oxygen Demand	-	24	Not specified
33	Dissolved Oxygen	-	5.7	4
34	Total Coliform	MPN/ 100ml	present	5000
35	E-Coli		present	Not specified
36	Barium as Ba	mg/l	BDL (DL:0.5)	300

37	Ammonia (as N)	mg/l	2.5	Not specified
38	Sulphide as H_2S	mg/l	BDL (DL:0.05)	Not specified
39	Molybdenum as Mo	mg/l	BDL (DL:0.5)	Not specified
40	Total Arsenic (as As)	mg/l	BDL (DL:0.01)	0.2
41	Total Suspended Solids	mg/l	20.7	-

* 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: SW- Surface Water

From the maps of open well groundwater flow direction shown in Figures 3.8-3.9, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 8 located in Southern direction of the proposed project site. The groundwater flow maps in Figures 3.8-3.9 show that most of the bore well groundwater for the post- and pre-monsoon seasons flow towards the bore well number 1 and 6. It is located in Southeast and northern direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Mar-2022	Apr-2022	May-2022	Average		
DW01	21.5	22.7	23.0	22.4	11° 0'32.45"N	77°56'15.88"E
DW02	22.0	23.5	24.6	23.3	11° 0'6.43"N	77°56'3.20"E
DW03	21.0	22.5	23.5	22.3	11° 1'5.46"N	77°56'31.22"E
DW04	20.5	21.0	22.5	21.3	11° 1'20.56"N	77°56'38.90"E
DW05	22.5	23.7	24.5	23.5	11° 1'9.31"N	77°55'54.57"E
DW06	20.5	21.7	22.5	21.5	11° 0'32.94"N	77°56'57.09"E
DW07	22.0	23.5	24.7	23.4	11° 0'39.89"N	77°57'14.82"E
DW08	19.5	20.5	21.8	20.6	11° 0'6.95"N	77°56'55.96"E
DW09	21.5	22.7	23.5	22.5	11° 0'34.82"N	77°55'44.25"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2022	Nov- 2022	Dec-2022	Average		
DW01	10.4	11.9	12.5	11.6	11° 0'32.45"N	77°56'15.88"E
DW02	11.0	12.5	13.4	12.3	11° 0'6.43"N	77°56'3.20"E
DW03	10.5	11.5	12.7	11.5	11° 1'5.46"N	77°56'31.22"E
DW04	12.0	13.5	14.5	13.3	11° 1'20.56"N	77°56'38.90"E
DW05	11.5	12.4	13.7	12.5	11° 1'9.31"N	77°55'54.57"E
DW06	13.0	14.5	15.5	14.3	11° 0'32.94"N	77°56'57.09"E

DW07	14.0	15.5	16.5	15.3	11° 0'39.89"N	77°57'14.82"E
DW08	15.0	16.5	17.5	16.3	11° 0'6.95"N	77°56'55.96"E
DW09	14.0	15.5	16.5	15.3	11° 0'34.82"N	77°55'44.25"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2022	Apr-2022	May- 2022	Average		
BW01	62.0	63.5	64.5	63.3	11° 0'37.43"N	77°56'47.13"E
BW02	61.0	62.5	63.5	62.3	11° 0'24.89"N	77°57'24.02"E
BW03	63.0	64.0	65.5	64.1	11° 0'37.83"N	77°56'16.07"E
BW04	64.5	66.0	67.0	65.8	11° 0'7.10"N	77°55'42.38"E
BW05	64.0	64.5	66.5	65	11° 0'28.51"N	77°55'47.14"E
BW06	63.0	64.5	66.0	64.5	11° 0'50.33"N	77°56'2.82"E
BW07	61.0	62.5	63.5	62.3	11° 1'24.10"N	77°56'11.59"E
BW08	62.0	63.5	66.0	63.8	11° 0'0.72"N	77°56'48.56"E
BW09	62.5	64.0	65.5	64	11° 1'14.53"N	77°56'48.43"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2022	Nov-2022	Dec-2022	Average		
BW01	64.0	65.5	66.5	65.3	11° 0'37.43"N	77°56'47.13"E
BW02	63.5	64.0	65.5	64.3	11° 0'24.89"N	77°57'24.02"E
BW03	65.0	66.5	67.5	66.3	11° 0'37.83"N	77°56'16.07"E
BW04	66.5	67.5	69.0	67.6	11° 0'7.10"N	77°55'42.38"E
BW05	66.0	67.5	68.5	67.3	11° 0'28.51"N	77°55'47.14"E
BW06	64.0	65.5	66.5	65.3	11° 0'50.33"N	77°56'2.82"E
BW07	62.0	63.5	66.0	63.8	11° 1'24.10"N	77°56'11.59"E
BW08	65.0	66.5	67.5	66.3	11° 0'0.72"N	77°56'48.56"E
BW09	63.5	65.0	67.5	65.3	11° 1'14.53"N	77°56'48.43"E

Source: Onsite monitoring data

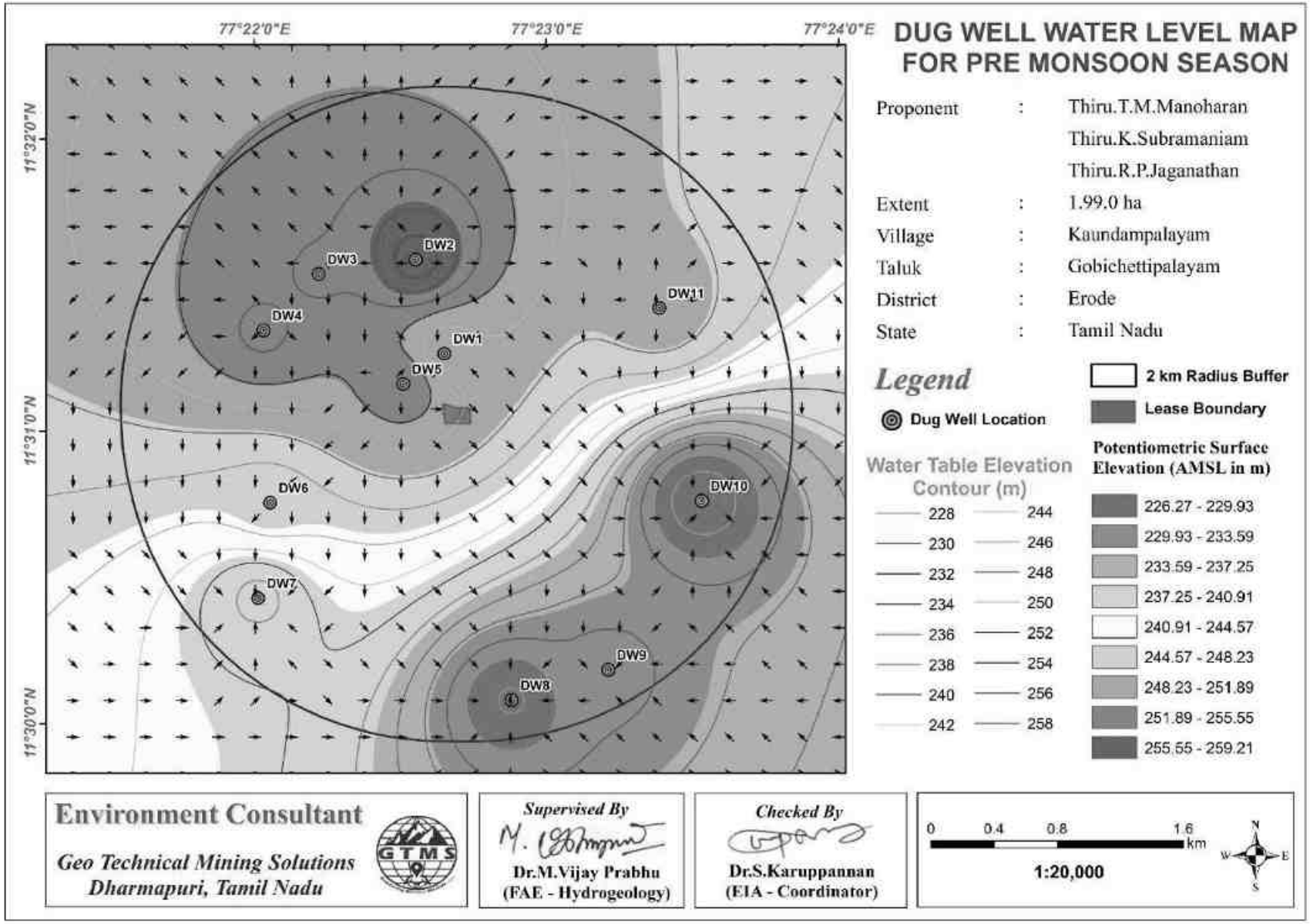


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Pre-Monsoon Season

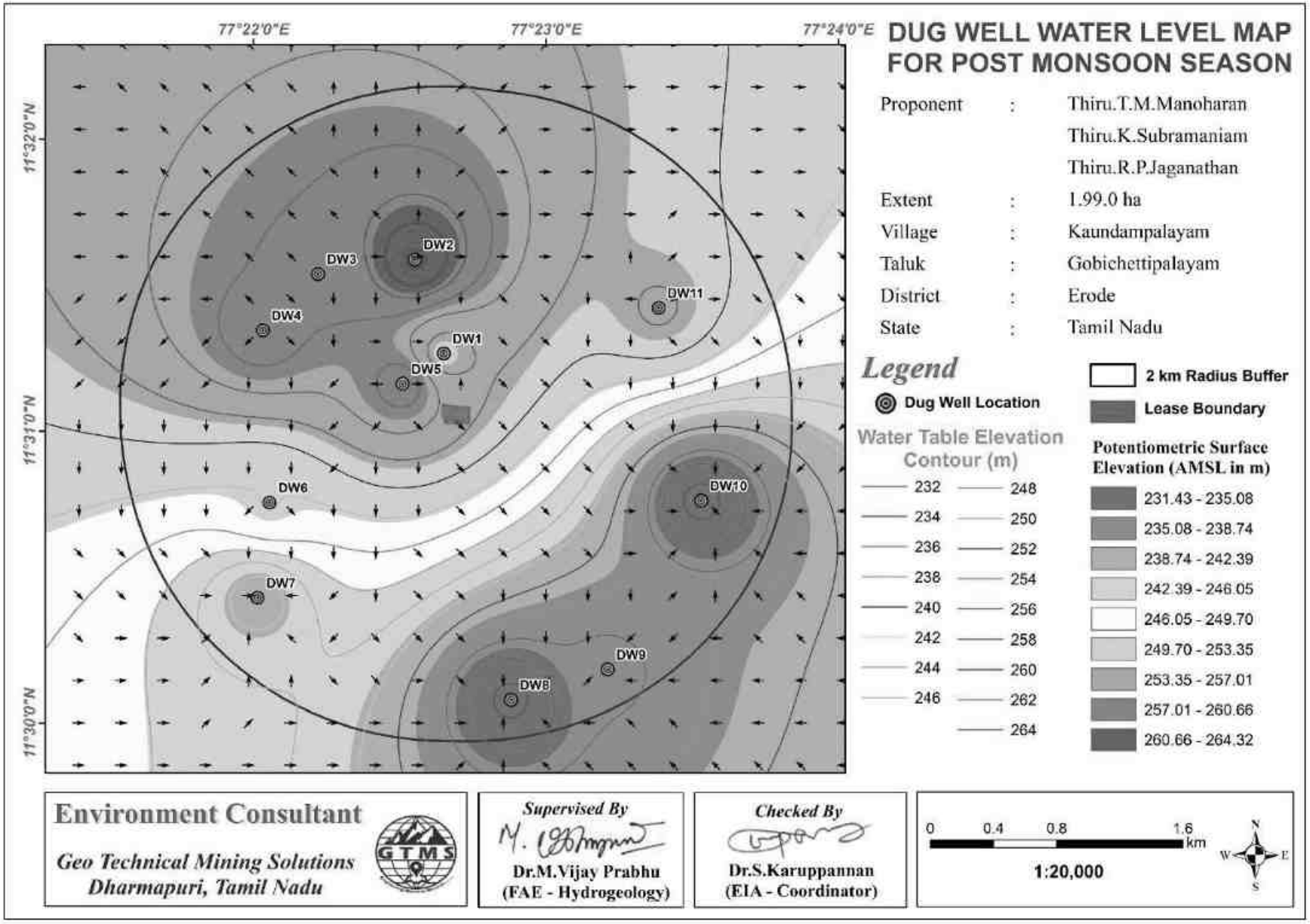


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Post-Monsoon Season

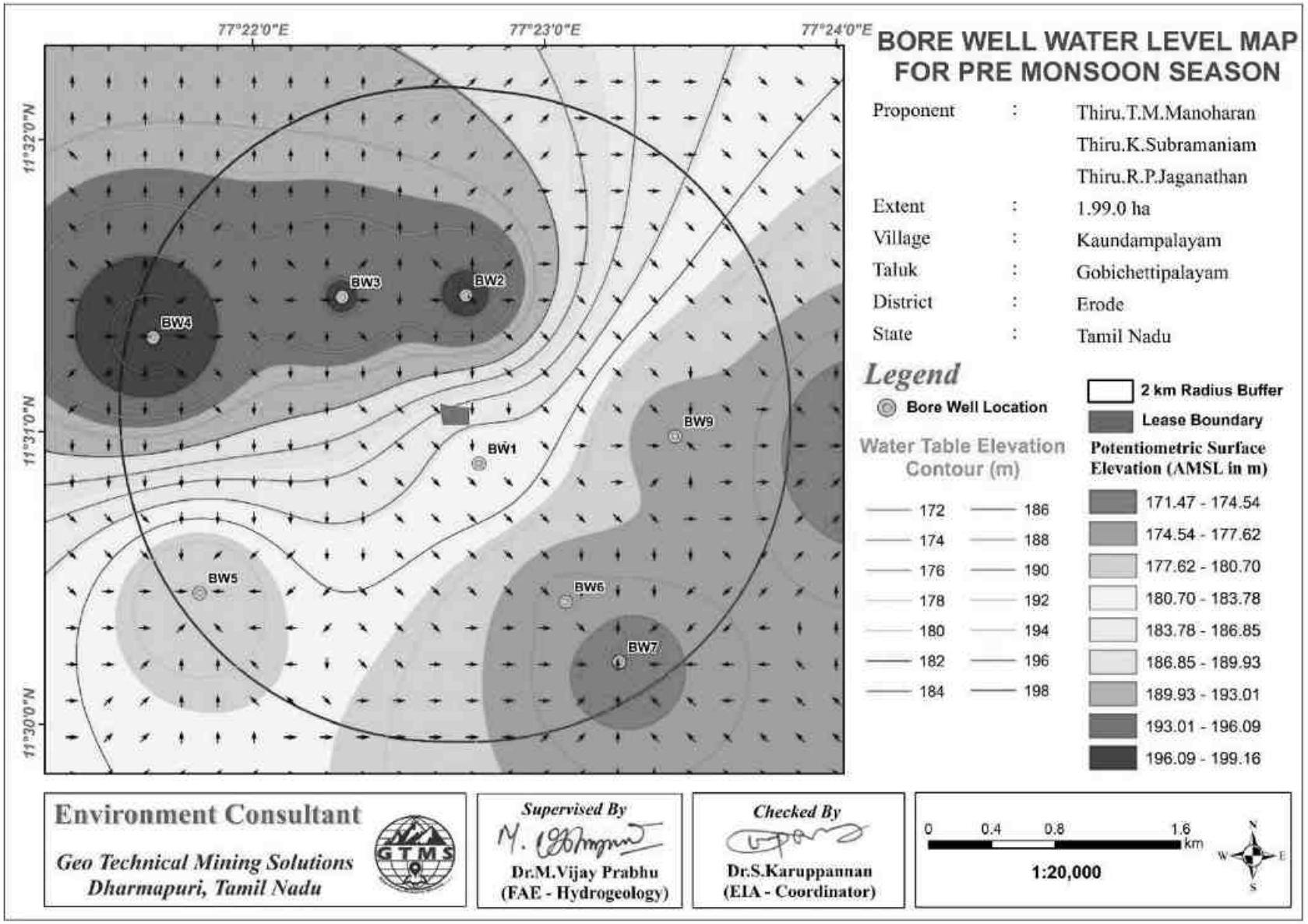


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Pre-Monsoon Season

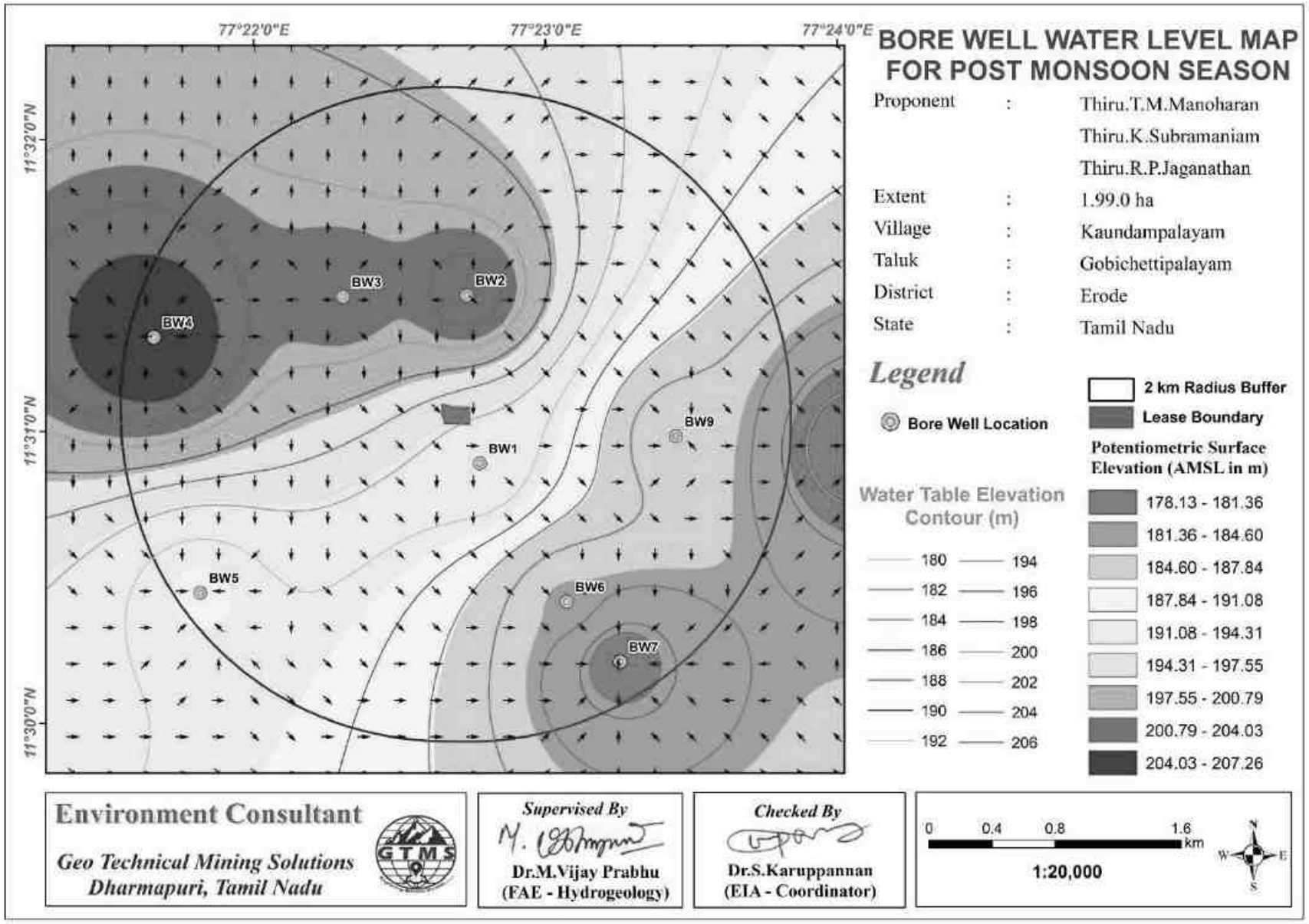


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

3.2.3.2 Electrical Resistivity Investigation

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

Result

The Geophysical VES data obtained from the project site have been shown in Table 3.12. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.12.

Table 3.12 Vertical Electrical Sounding Data

Location Coordinates -					
S. No.	**AB/2 (m)**	**MN/2 (m)**	**Geometrical Factor (G)**	**Resistance in Ω**	**Apparent Resistivity in Ωm**
1	2	2	11.78	13.248	156.06
2	4	2	49.46	6.127	303.04
3	6	5	112.26	3.937	441.97
4	8	5	200.18	2.798	560.10
5	10	5	75.36	8.997	678.01
6	15	10	173.49	5.188	900.07
7	20	10	310.86	3.558	1106.04
8	25	10	487.49	2.603	1268.94
9	30	10	274.75	5.001	1374.02
10	35	10	376.8	3.883	1463.11
11	40	10	494.55	3.16	1562.78
12	45	10	628	2.683	1684.92
13	50	10	777.15	1.943	1510.00
14	65	20	453.6	2.213	1003.82
15	70	20	989.1	2.651	2622.10
16	80	20	1256	2.196	2758.18
17	90	20	1554.3	1.846	2869.24
18	100	20	1653.6	2.213	3659.42

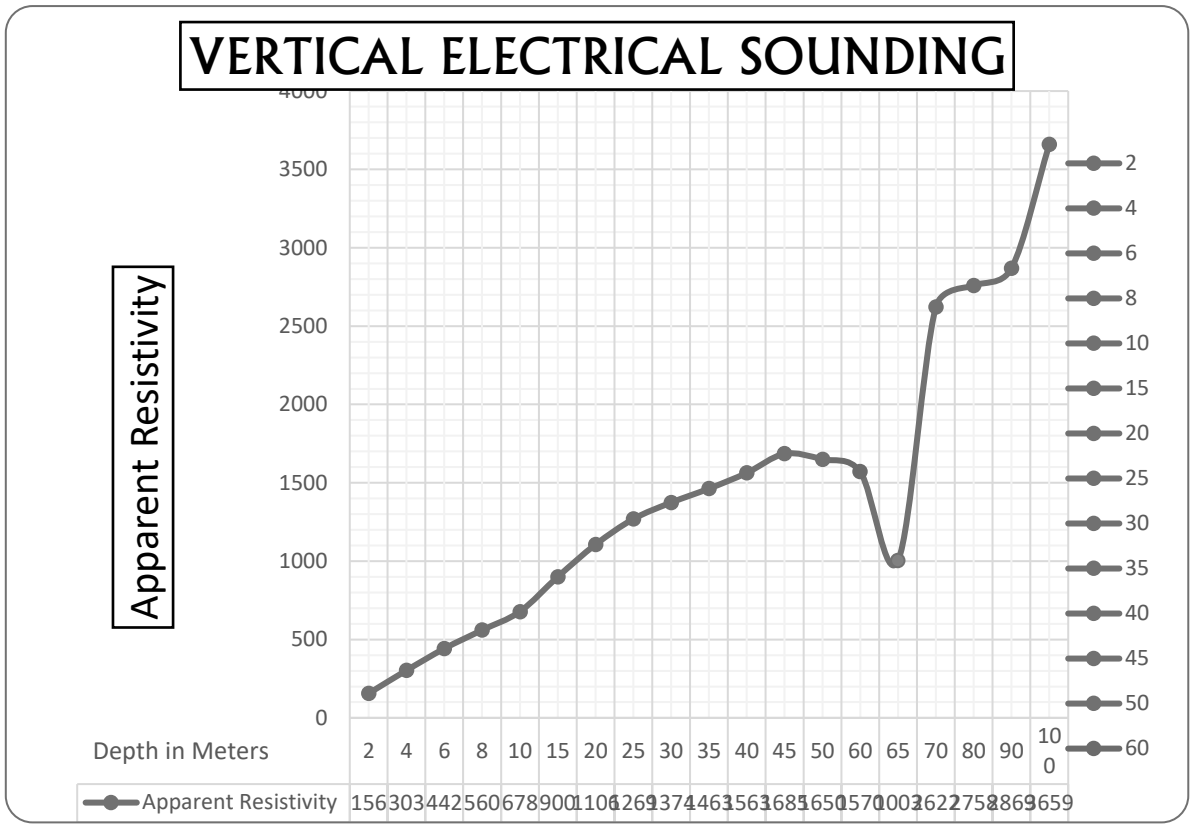


Figure 3.12 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 65 m Below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 65 m below ground level. The maximum depth proposed for the proposed project is 32 m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

3.3 AIR ENVIRONMENT

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

3.3.1 Meteorology

3.3.1.1 Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3 m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.13.

According to the onsite data, the temperature in October, 2021 varied from 20.39 to 32.15^0 C with the average of 24.98^0 C; in November, 2021 from 19.26 to 28.66^0 C with the average of 23.44^0 C; and in December, 2021 from 14.29 to 29.39^0 C with the average of 22.12^0C. In October, 2021, relative humidity ranged from 51.19 to 98.81 % with the average of 85.14%; in November, 2021, from 60.88 to 100 % with the average of 90.21 %; and in December, 2021, from 51.69 to 100 % with the average of 85.07 %. The wind speed in October, 2021 varied from 0.15 to 5.18 m/s with the average of 1.89 m/s; in November, 2021 from 0.07 to 4.66 m/s with the average of 1.97 m/s; and in December, 2021 from 0.26 to 4.68 m/s with the average of 2.07 m/s. In October,2021, wind direction varied from 0.00 to 359.30^0 with the average of 190.82^0; in November, 2021, from 0.17 to 359.80^0 with the average of 169.25^0; and in December, 2021, from 0.00 to 359.27^0 with the average of 92.67^0. In October,2021, surface pressure varied from 95.38 to 96.74 kPa with the average of 96.16 kPa; in November, 2021, from 95.24 to 96.68 kPa with the average of 96.20 kPa; and in December, 2021, from 96.12 to 97.03 kPa with the average of 96.58 kPa**.**

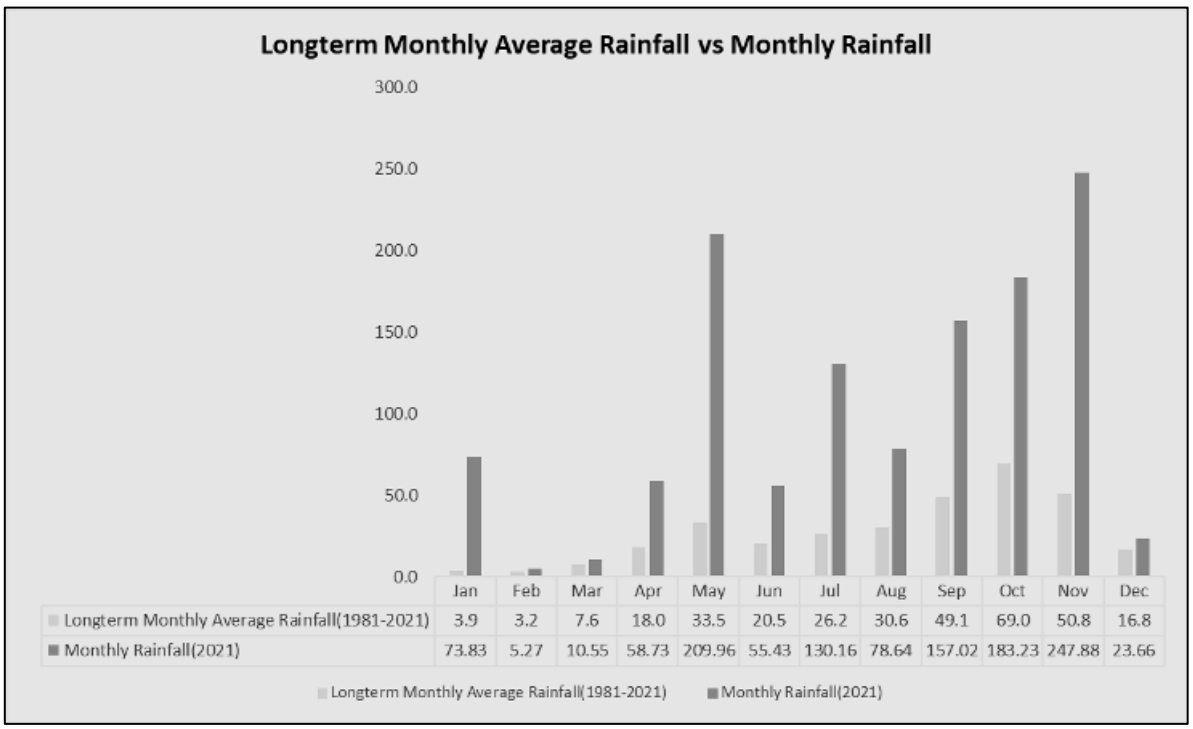
Table 3.13 Onsite Meteorological Data

S. No.	Parameters		Oct,2021	Nov,2022	Dec,2022
1	Temperature (^{0}C)	Min	20.39	19.26	14.29
		Max	32.15	28.66	29.39
		Avg	24.98	23.44	22.12
2	Relative Humidity (%)	Min	51.19	60.88	51.69
		Max	98.81	100.00	100.00
		Avg	85.14	90.21	85.07
3	Wind Speed (m/s)	Min	0.15	0.07	0.26
		Max	5.18	4.66	4.68
		Avg	1.89	1.97	2.07
4	Wind Direction (degree)	Min	0.00	0.17	0.00
		Max	359.30	359.80	359.27
		Avg	190.82	169.25	92.67
5	Surface Pressure(kPa)	Min	95.38	95.24	96.12
		Max	96.74	96.68	97.03
		Avg	96.16	96.20	96.58

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

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 3.10. The Figure 3.13 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.



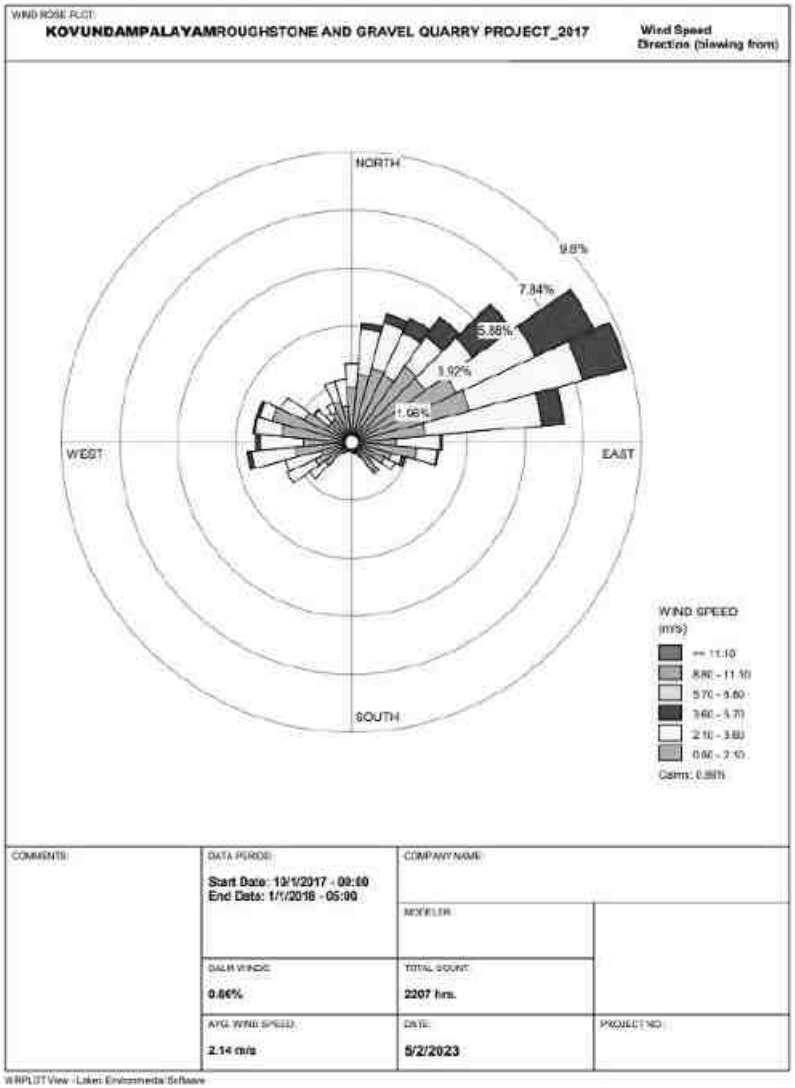
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Longterm Monthly Average Rainfall(1981-2021)	3.9	3.2	7.6	18.0	33.5	20.5	26.2	30.6	49.1	69.0	50.8	16.8
Monthly Rainfall(2021)	73.83	5.27	10.55	58.73	209.96	55.43	130.16	78.64	157.02	183.23	247.88	23.66

Figure 3.13 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 3.14-3.14a. Figure 3.15 reveals that:

- ❖ The measured average wind velocity during the study period is 1.97 m/s.
- ❖ Predominant wind was dominant in the directions ranging from northeast to southwest.



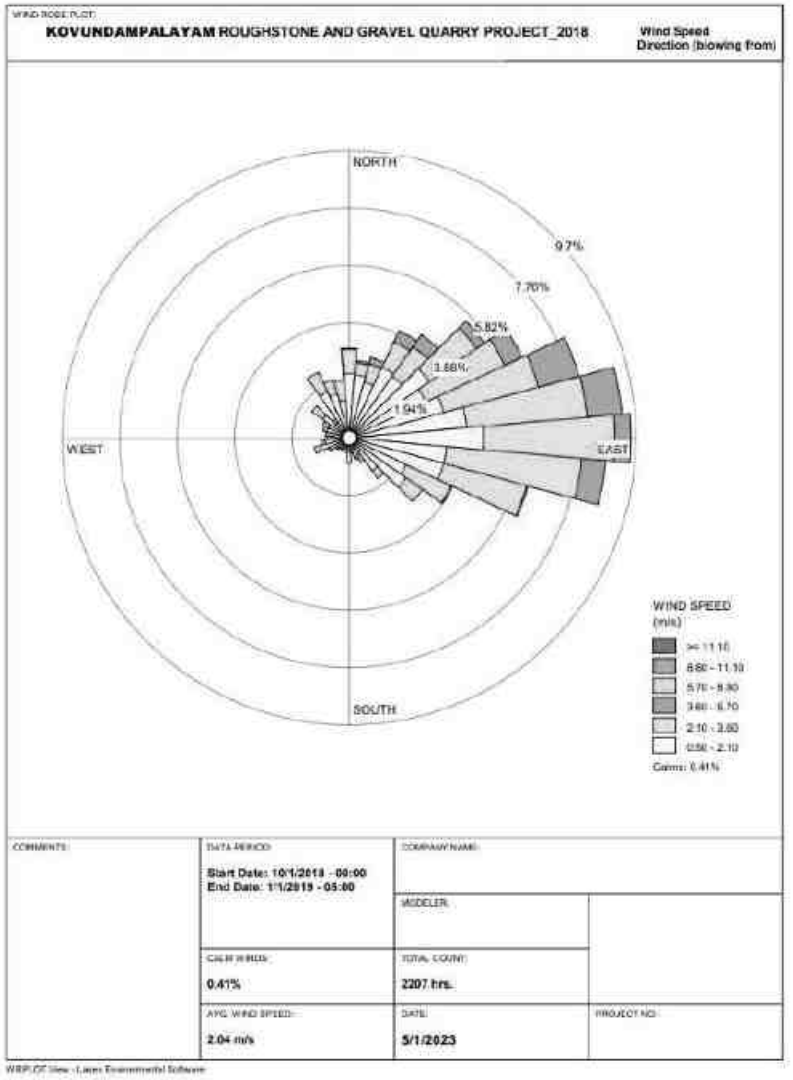
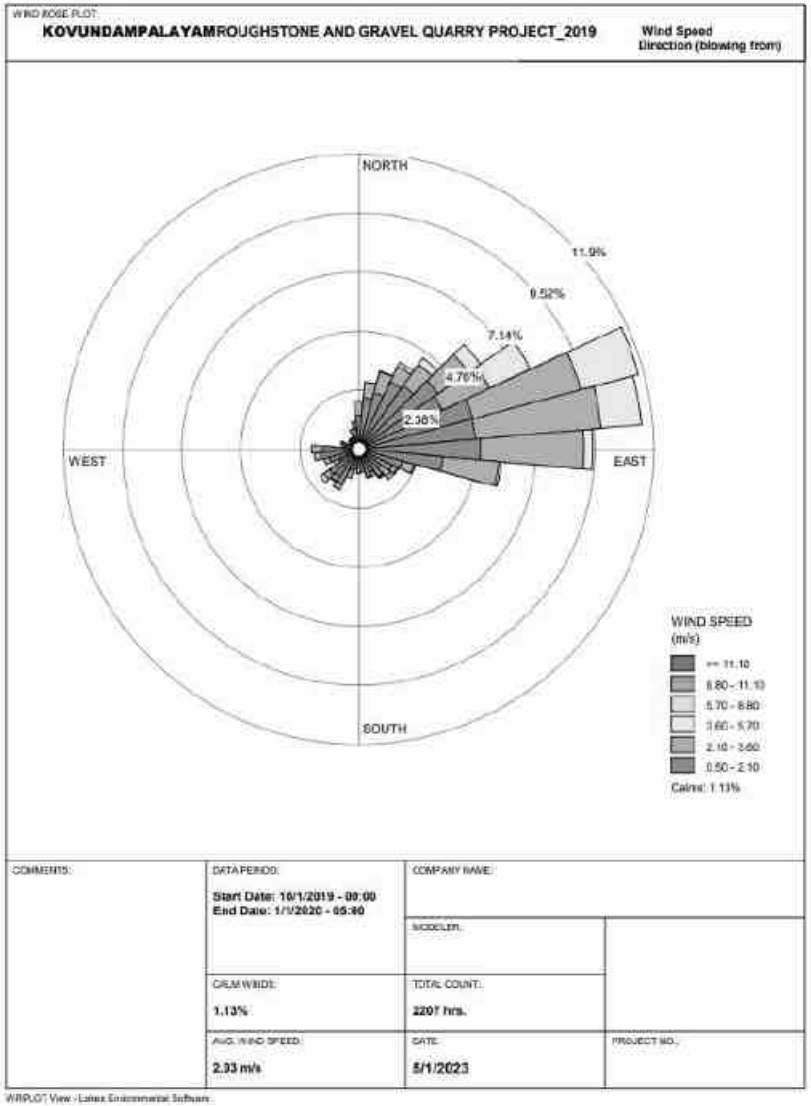


Figure 3.14 Windrose Diagram for 2017 and 2018 (October to December)



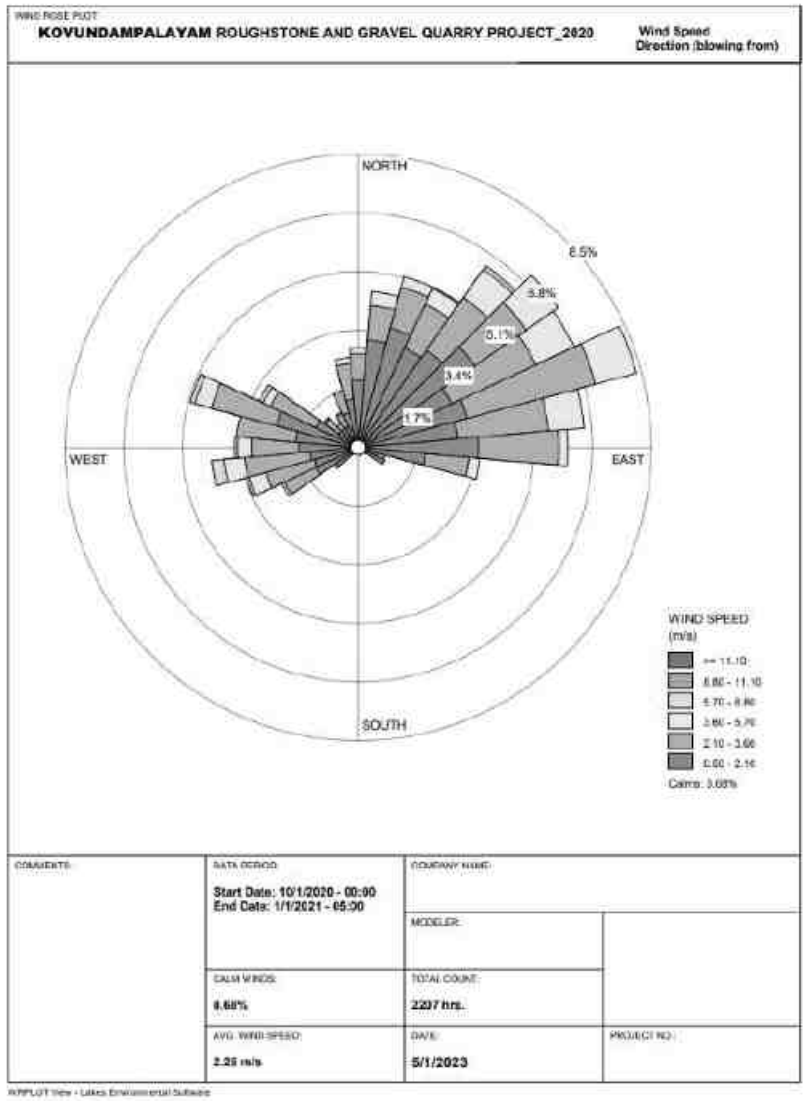


Figure 3.14a Windrose Diagram for 2020 and 2021 (October to December)

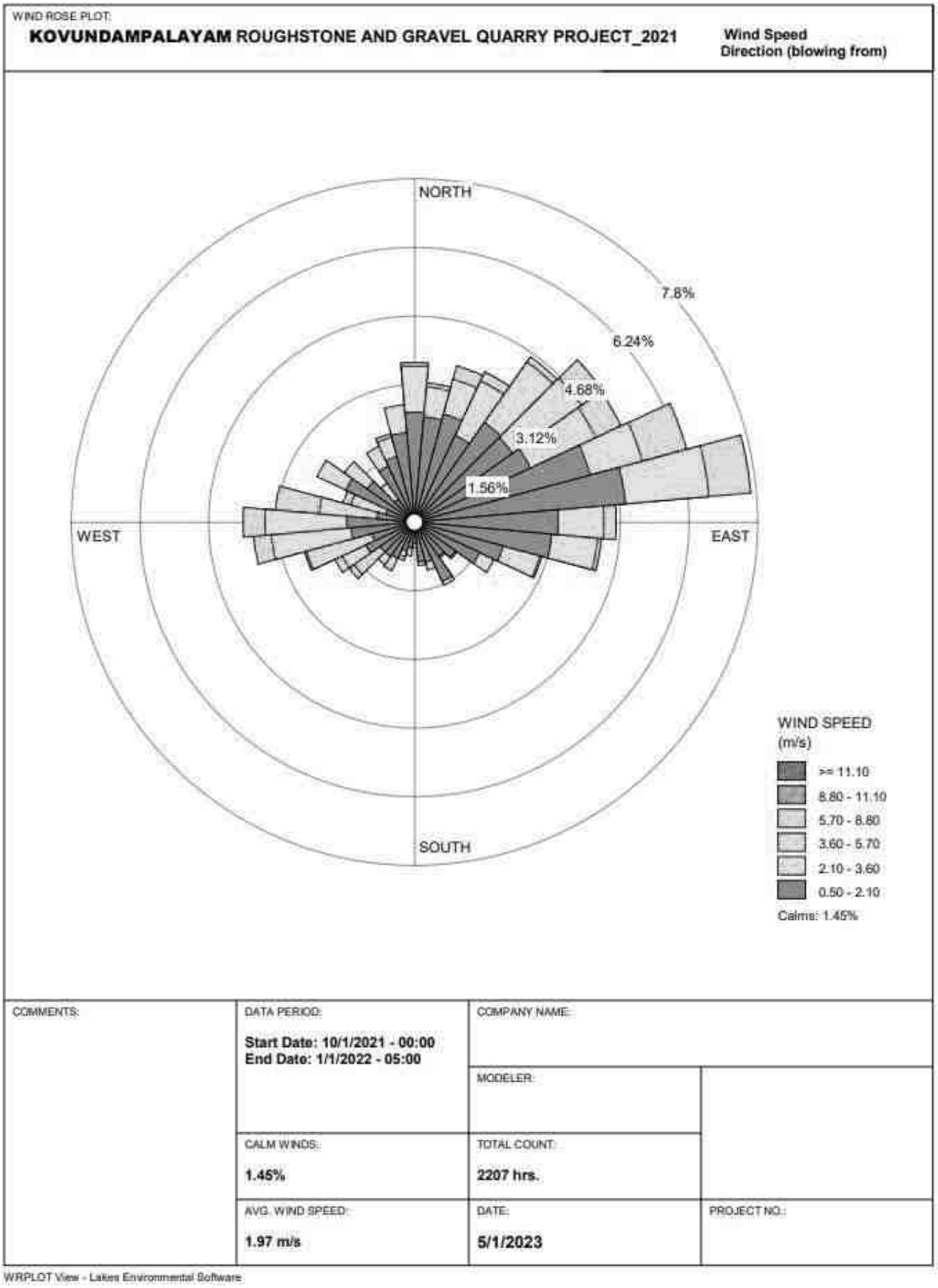


Figure 3.15 Onsite Wind Rose Diagram

3.3.2 Ambient Air Quality Study

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

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

Table 3.14 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
$PM_{2.5}$	Gravimetric method Beta attenuation method	Fine Particulate Sampler
PM_{10}	Gravimetric method Beta attenuation method	Respirable Dust Sampler
SO_2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NOx	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

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

Notification

Table 3.15 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO_2 (µg/m^3)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO_x (µg/m^3)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM_{10} (µg/m^3)	Annual Avg. 24 hours	60.0 10°.0	60.0 10°.0
4	$PM_{2.5}$ (µg/m3)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at Nine (9) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period October-December, 2022 as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5m above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for $PM_{2.5}$, PM_{10}, sulphur dioxide (SO_2) and nitrogen dioxide (NO_x). The sampling locations are shown in Figure 3.16 and average concentrations of air pollutants are summarized in Tables 3.16 and are shown in Figures 3.17-3.21.

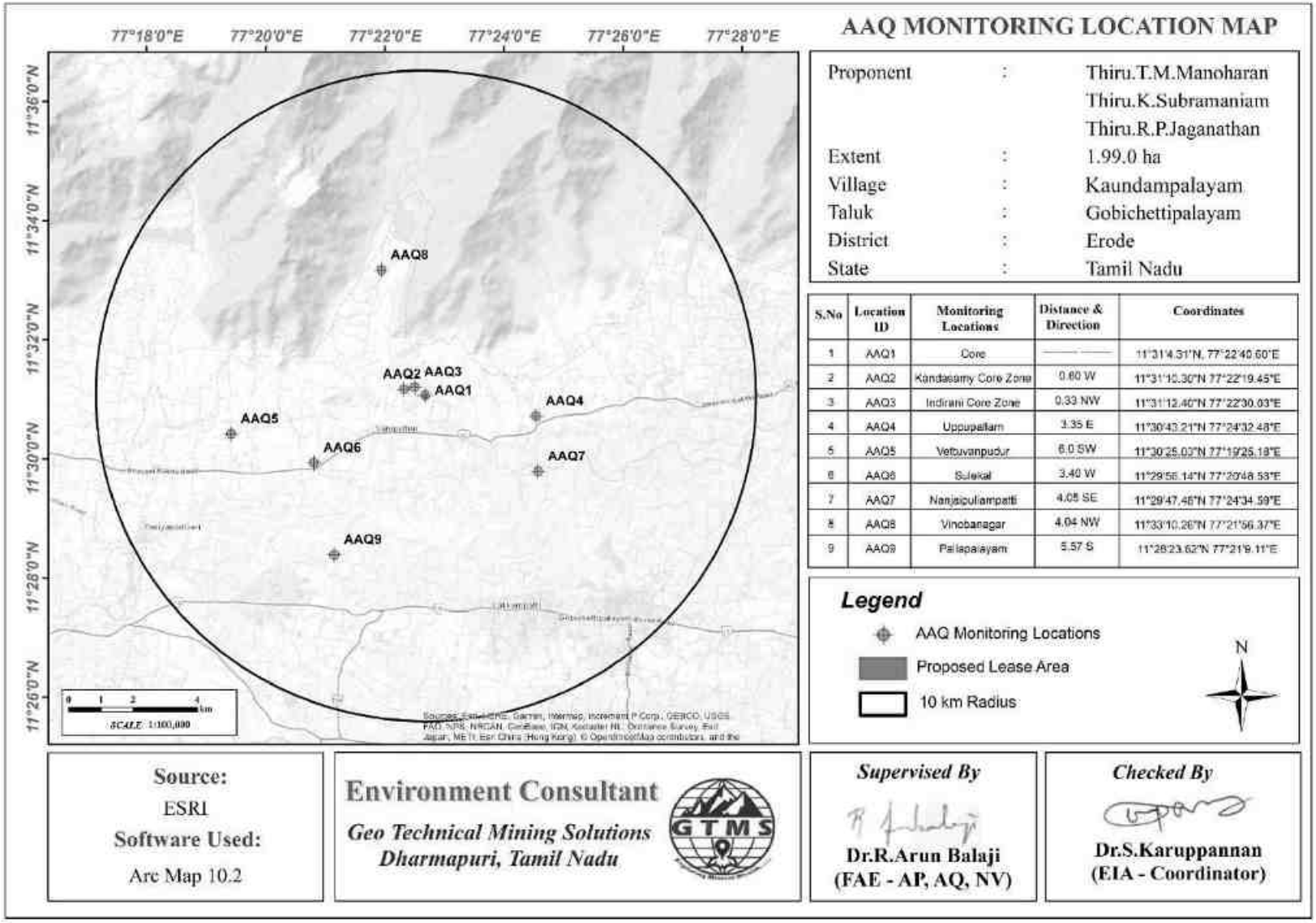
Table 3.16 Ambient Air Quality (AAQ) Monitoring Locations

S. No.	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
1	AAQ1	Core	--	--	11°31'4.31"N, 77°22'40.60"E
2	AAQ2	Kandasamy Core Zon	0.60	W	11°31'10.30"N 77°22'19.45"E
3	AAQ3	Indirani Core Zone	0.33	NW	11°31'12.40"N 77°22'30.03"E
4	AAQ4	Uppupallam	3.35	E	11°30'43.21"N 77°24'32.48"E
5	AAQ5	Vettuvanpudur	6.0	SW	11°30'25.03"N 77°19'25.18"E
6	AAQ6	Sulekal	3.40	W	11°29'56.14"N 77°20'48.53"E
7	AAQ7	Nanjaipuliampatti	4.05	SE	11°29'47.48"N 77°24'34.59"E
8	AAQ8	Vinobanagar	4.04	NW	11°33'10.26"N 77°21'56.37"E
9	AAQ9	Pallapalayam	5.57	S	11°28'23.62"N 77°21'9.11"E

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

Results

As per the monitoring data, $PM_{2.5}$ ranges from 17.4 µg/m^3 to 21.1 µg/m^3; PM_{10} from 33.9 µg/m^3 to 39.8 µg/m^3; SO_2 from 5.2 µg/m^3 to 7.5 µg/m^3; NO_2 from 20.3 µg/m^3 to 23.4 g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

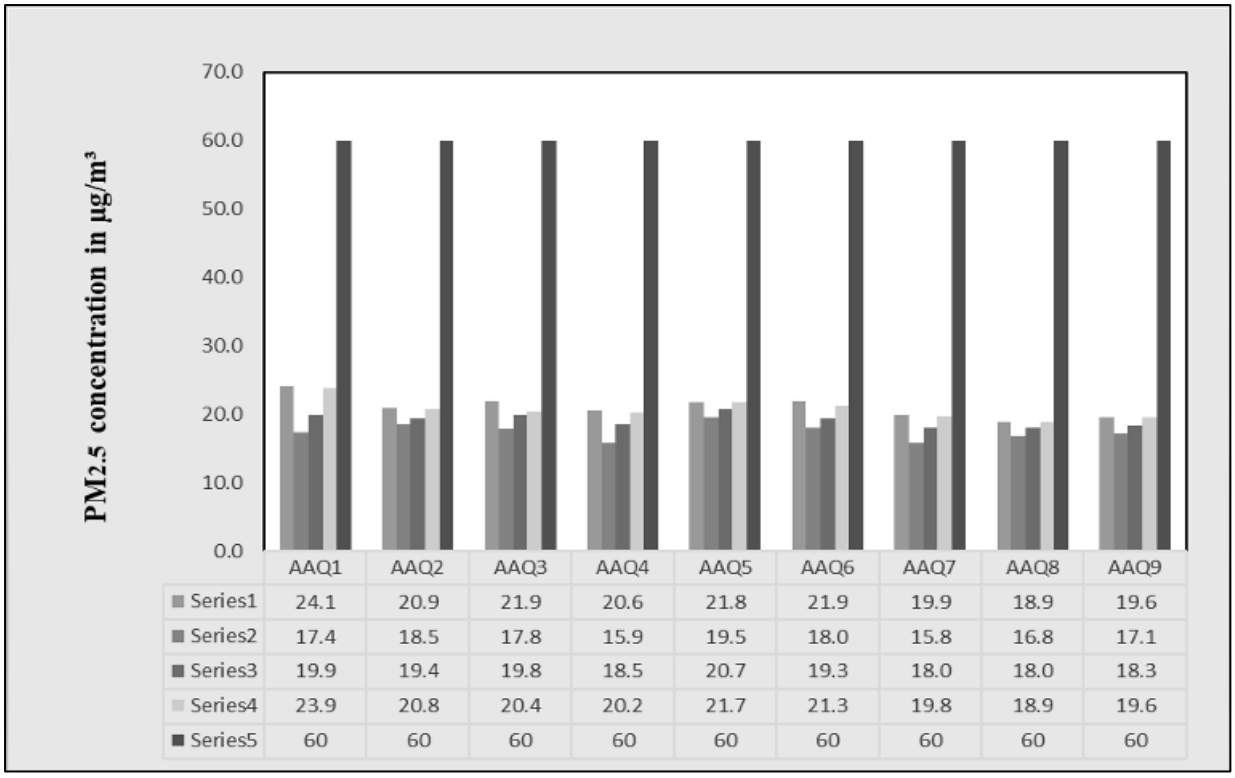


S.No	Location ID	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ1	Core	———	11°31'4.31"N, 77°22'40.60"E
2	AAQ2	Kandasamy Core Zone	0.60 W	11°31'10.30"N 77°22'19.45"E
3	AAQ3	Indirani Core Zone	0.33 NW	11°31'12.40"N 77°22'30.03"E
4	AAQ4	Uppupallam	3.35 E	11°30'43.21"N 77°24'32.48"E
5	AAQ5	Vettuvanpudur	6.0 SW	11°30'25.03"N 77°19'25.18"E
6	AAQ6	Sulekal	3.40 W	11°29'56.14"N 77°20'48.53"E
7	AAQ7	Nanjsiculiampatti	4.05 SE	11°29'47.46"N 77°24'34.59"E
8	AAQ8	Vinobanagar	4.04 NW	11°33'10.26"N 77°21'56.37"E
9	AAQ9	Pallapalayam	5.57 S	11°28'23.62"N 77°21'9.11"E

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

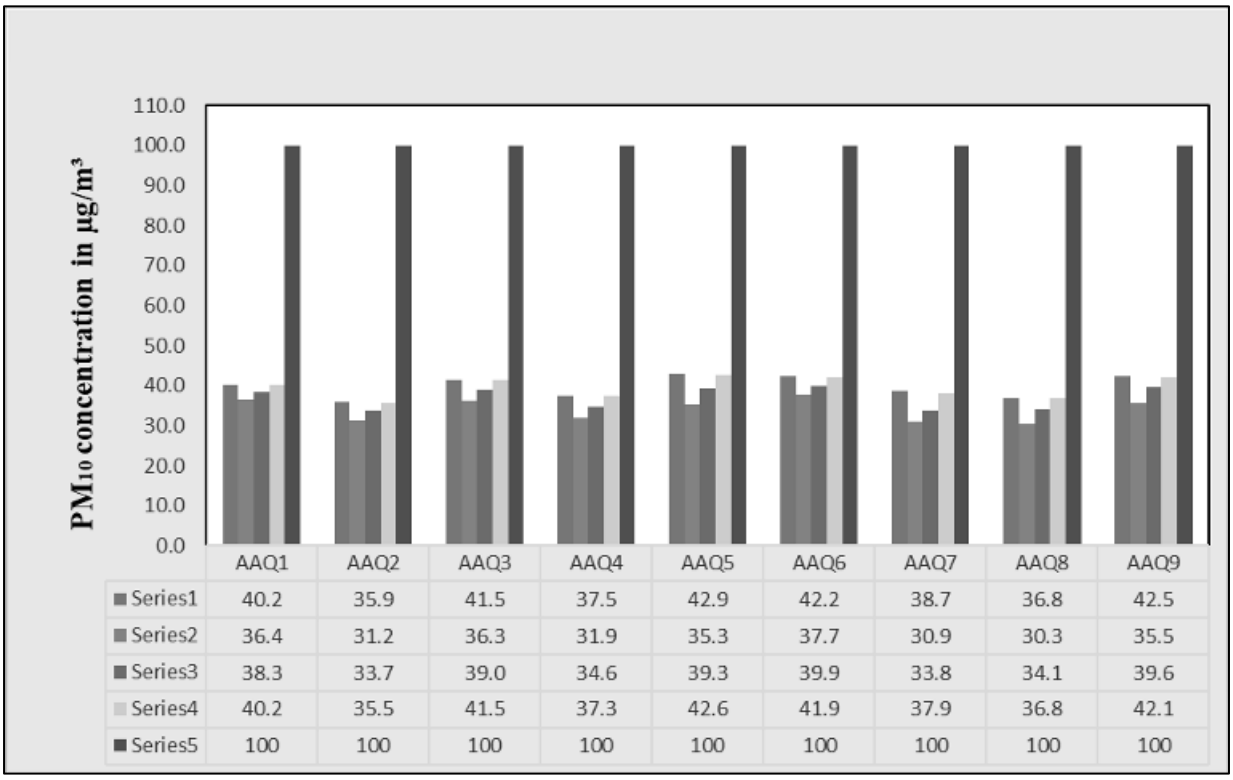
Table 3.17 Summary of AAQ Result

$PM_{2.5}$					PM_{10}			
Station ID	**Max**	**Min**	**Mean**	**98^{th} Percentile**	**Max**	**Min**	**Mean**	**98^{th} Percentile**
AAQ1	24.1	17.4	19.9	23.9	40.2	36.4	38.3	40.2
AAQ2	20.9	18.5	19.4	20.8	35.9	31.2	33.7	35.5
AAQ3	21.9	17.8	19.8	20.4	41.5	36.3	39.0	41.5
AAQ4	20.6	15.9	18.5	20.2	37.5	31.9	34.6	37.3
AAQ5	21.8	19.5	20.7	21.7	42.9	35.3	39.3	42.6
AAQ6	21.9	18.0	19.3	21.3	42.2	37.7	39.9	41.9
AAQ7	19.9	15.8	18.0	19.8	38.7	30.9	33.8	37.9
AAQ8	18.9	16.8	18.0	18.9	36.8	30.3	34.1	36.8
AAQ9	19.6	17.1	18.3	19.6	42.5	35.5	39.6	42.1
SO_2					NO_x			
AAQ1	10.4	6.9	8.4	10.2	18.7	12.2	16.3	18.6
AAQ2	11	6.9	8.9	11.0	20.1	14.2	16.9	19.9
AAQ3	10.8	8	9.5	10.4	20	13.5	16.6	19.6
AAQ4	17.1	5.2	7.4	13.7	15.1	8.6	11.0	14.4
AAQ5	10.8	5.6	8.4	10.7	20.6	12.8	17.0	20.5
AAQ6	11.9	8.8	10.0	11.6	21.8	17.3	19.1	21.8
AAQ7	17.4	5.5	7.7	14.0	18.1	11.6	14.0	15.7
AAQ8	9.8	8.3	9.1	9.8	27.6	25.3	26.6	27.6
AAQ9	10.9	7.7	9.2	10.9	22.1	15	18.2	22.1



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8	AAQ9
Series1	24.1	20.9	21.9	20.6	21.8	21.9	19.9	18.9	19.6
Series2	17.4	18.5	17.8	15.9	19.5	18.0	15.8	16.8	17.1
Series3	19.9	19.4	19.8	18.5	20.7	19.3	18.0	18.0	18.3
Series4	23.9	20.8	20.4	20.2	21.7	21.3	19.8	18.9	19.6
Series5	60	60	60	60	60	60	60	60	60

Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of $PM_{2.5}$ Measured from 9 Air Quality Monitoring Stations within 5 km Radius



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8	AAQ9
Series1	40.2	35.9	41.5	37.5	42.9	42.2	38.7	36.8	42.5
Series2	36.4	31.2	36.3	31.9	35.3	37.7	30.9	30.3	35.5
Series3	38.3	33.7	39.0	34.6	39.3	39.9	33.8	34.1	39.6
Series4	40.2	35.5	41.5	37.3	42.6	41.9	37.9	36.8	42.1
Series5	100	100	100	100	100	100	100	100	100

Figure 3.18 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM_{10} Measured from 9 Air Quality Monitoring Stations within 5 km Radius

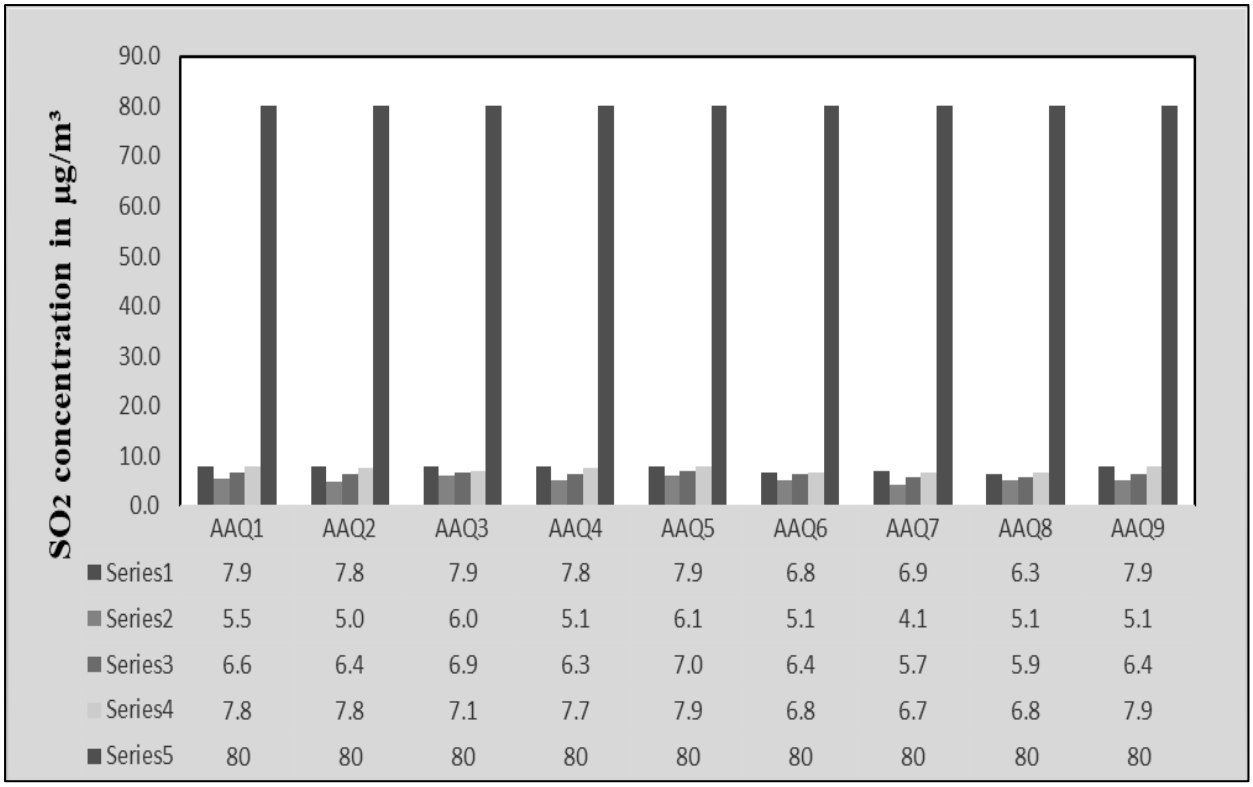


Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO_2 Measured from 9 Air Quality Monitoring Stations within 5 km Radius

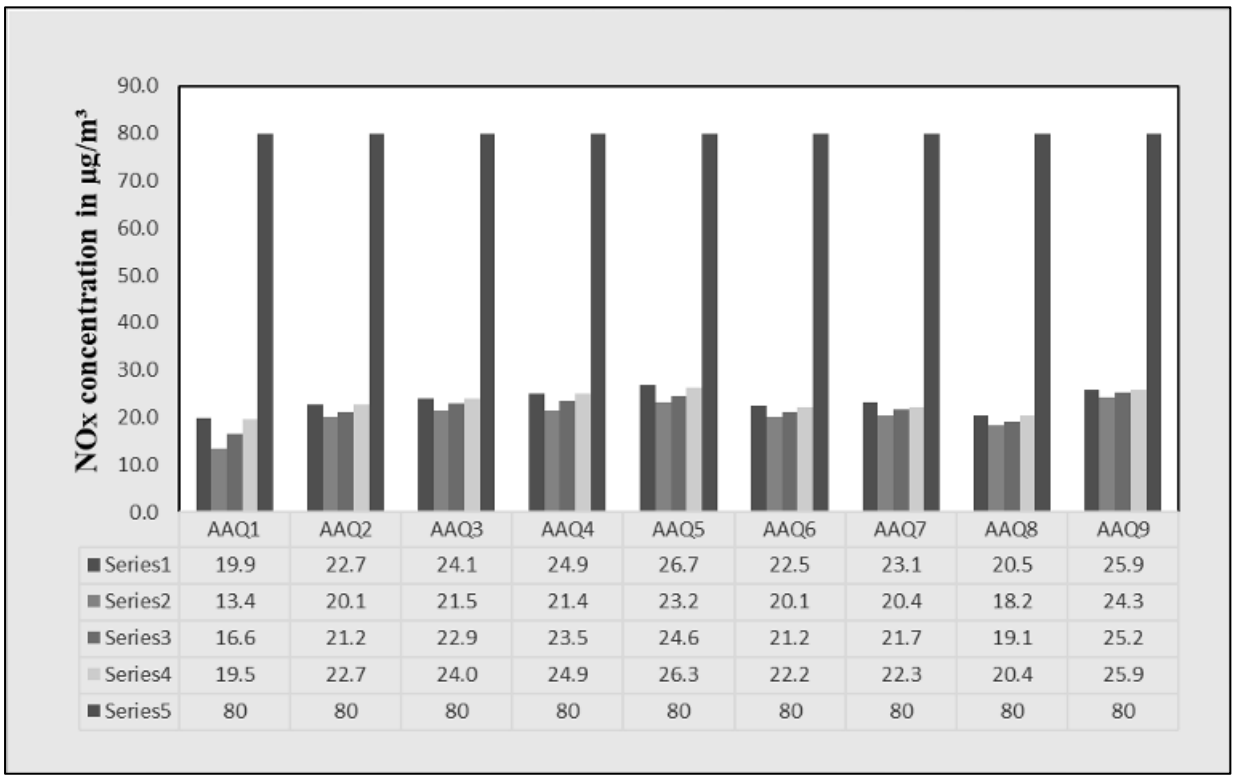


Figure 3.20 Bar Chart Showing Maximum, Minimum, and Average Concentrations of No_x Measured from 9 Air Quality Monitoring Stations within 5km Radius

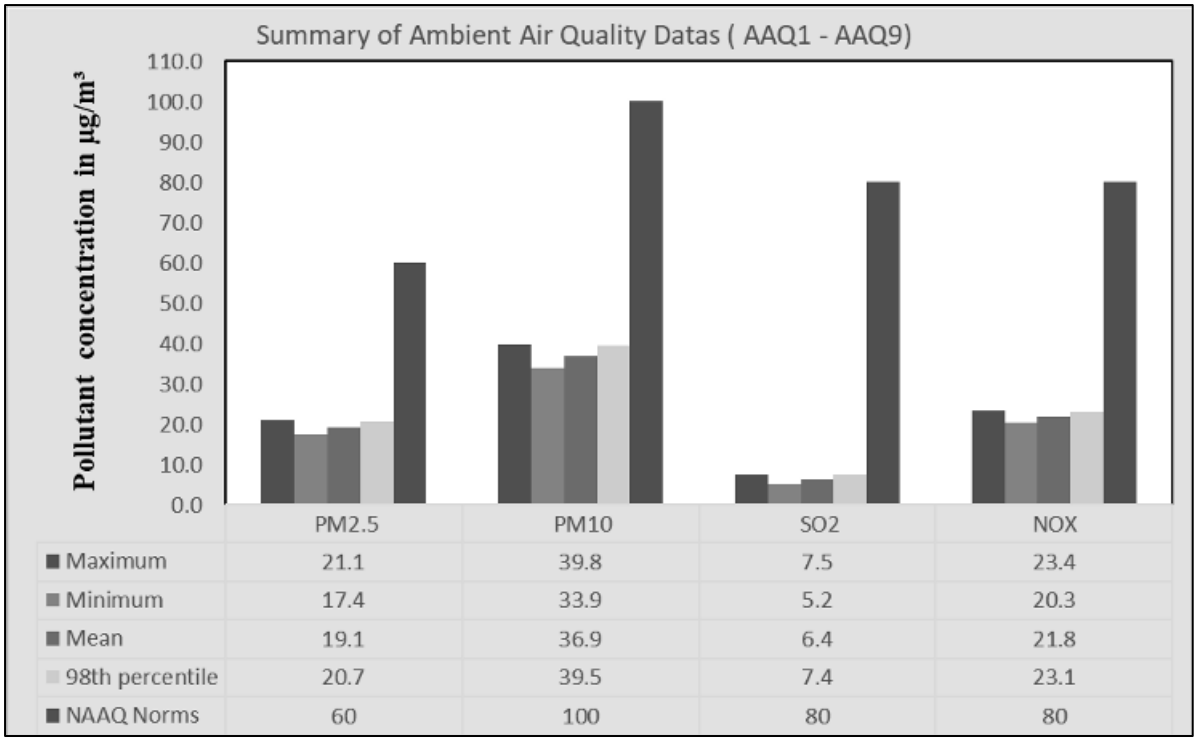


Figure 3.21 Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5 km Radius

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at ten (10) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.18 and spatial occurrence of the locations are shown in Figure 3.22.

Table 3.18 Noise Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance in km	Direction	Coordinates
1	N1	Core Zone	--	--	11°31'4.98"N, 77°22'43.93"E
2	N2	Core Zone	0.60	W	11°31'9.94"N 77°22'19.22"E
3	N3	Core Zone	0.32	NW	11°31'4.92"N, 77°22'44.11"E
4	N4	T.N.Palayam	0.26	SE	11°30'54.47"N, 77°22'48.72"E
5	N5	Uppupallam	3.36	E	11°30'43.04"N 77°24'32.65"E
6	N6	Vettuvanpudur	5.99	W	11°30'24.75"N 77°19'25.03"E

7	N7	Sulekal	3.90	SW	11°29'55.92"N 77°20'48.66"E
8	N8	Nanjaipuliampatti	4.06	SE	11°29'47.29"N 77°24'34.61"E
9	N9	Vinobanagar	4.03	NE	11°33'10.16"N 77°21'56.36"E
10	N10	Pallapalayam	5.55	S	11°28'23.60"N 77°21'9.24"E

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

Table 3.19 Ambient Noise Quality Result

Station ID	**Location**	**Environmental setting**	**Average day noise level (dB(A))**	**Average night noise level (dB(A))**	**Day time (6.00 AM – 10.00 PM)**	**Night time (10.00 PM – 6.00 AM)**
					Standard (L_{eq} in dB (A))	
N1	Core Zone	Industrial Area	37.6	34.4	75	70
N2	Core Zone		38.5	36.2	75	70
N3	Core Zone		38.9	35.8	75	70
N4	T.N.Palayam	Residential Area	38.6	34.8	55	45
N5	Uppupallam		37.8	35.4	55	45
N6	Vettuvanpudur		39.7	37.1	55	45
N7	Sulekal		41.0	38.2	55	45
N8	Nanjaipuliampatti		38.0	36.4	55	45
N9	Vinobanagar		40.8	36.4	55	45
N10	Pallapalayam		39.3	36.6	55	45

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

The Table 3.18 shows that noise level in core zone was 37.6 dB (A) Leq during day time and 34.4 dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 38.0 to 41.0dB (A) Leq and during night time from 34.8 to 38.2dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.23 and 3.24.

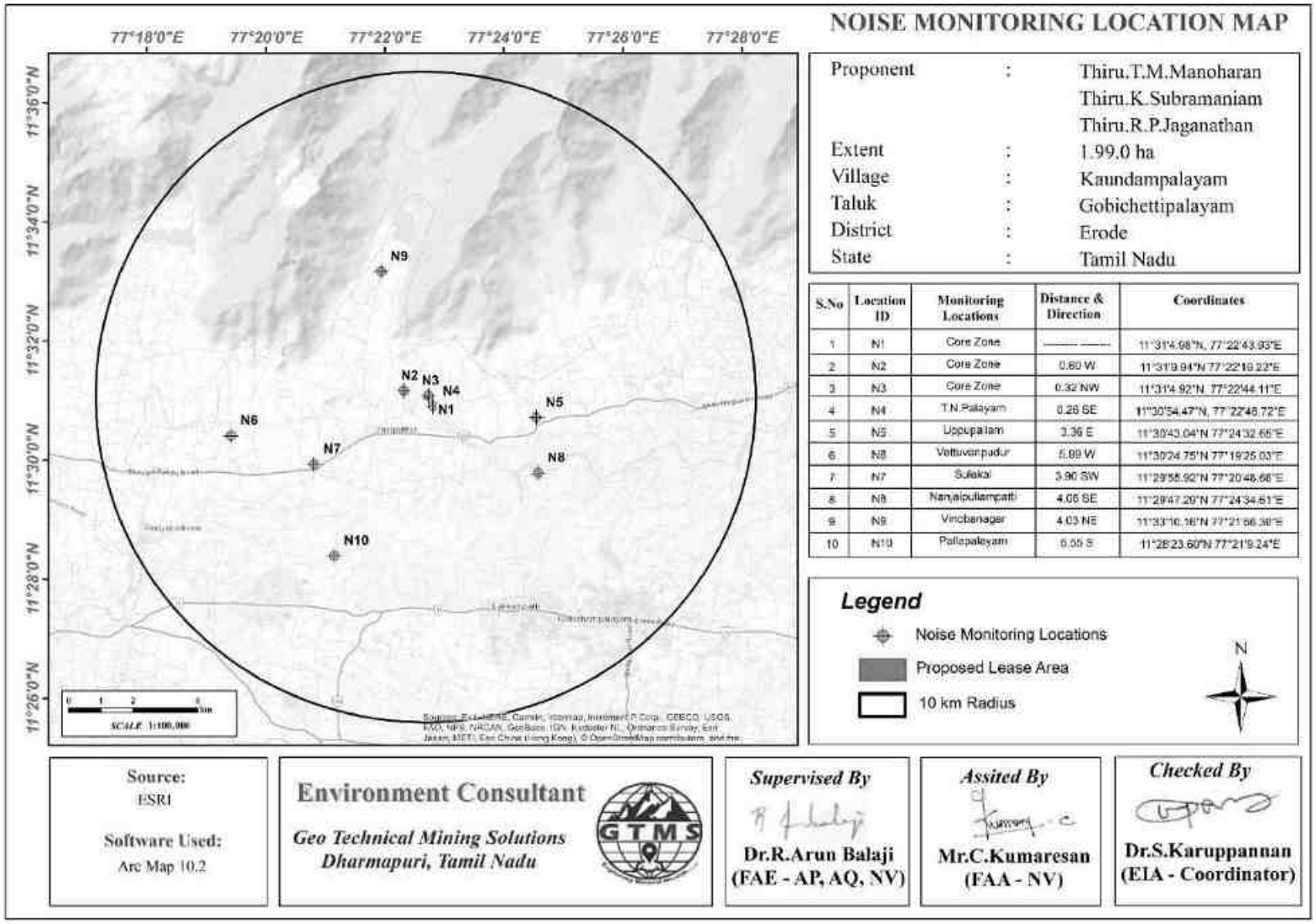


Figure 3.22 Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

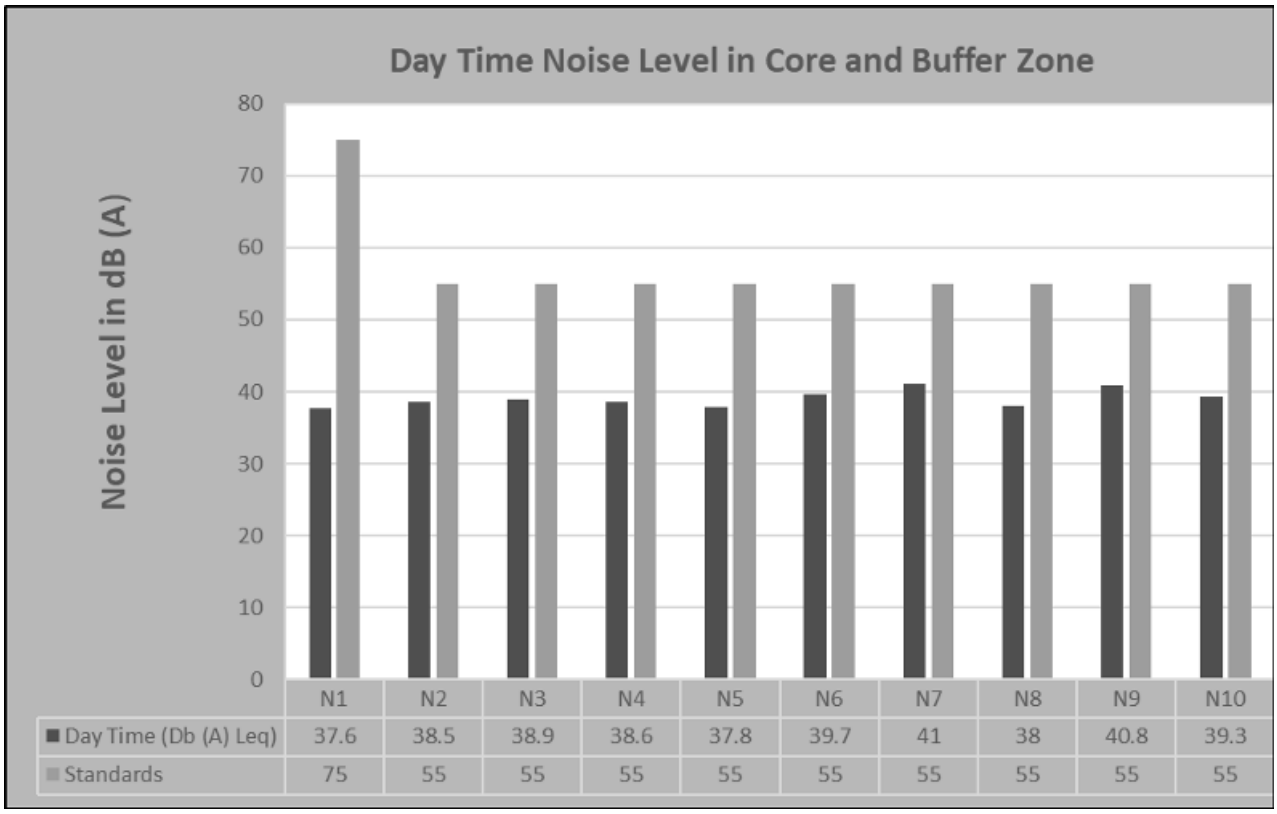


Figure 3.23 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

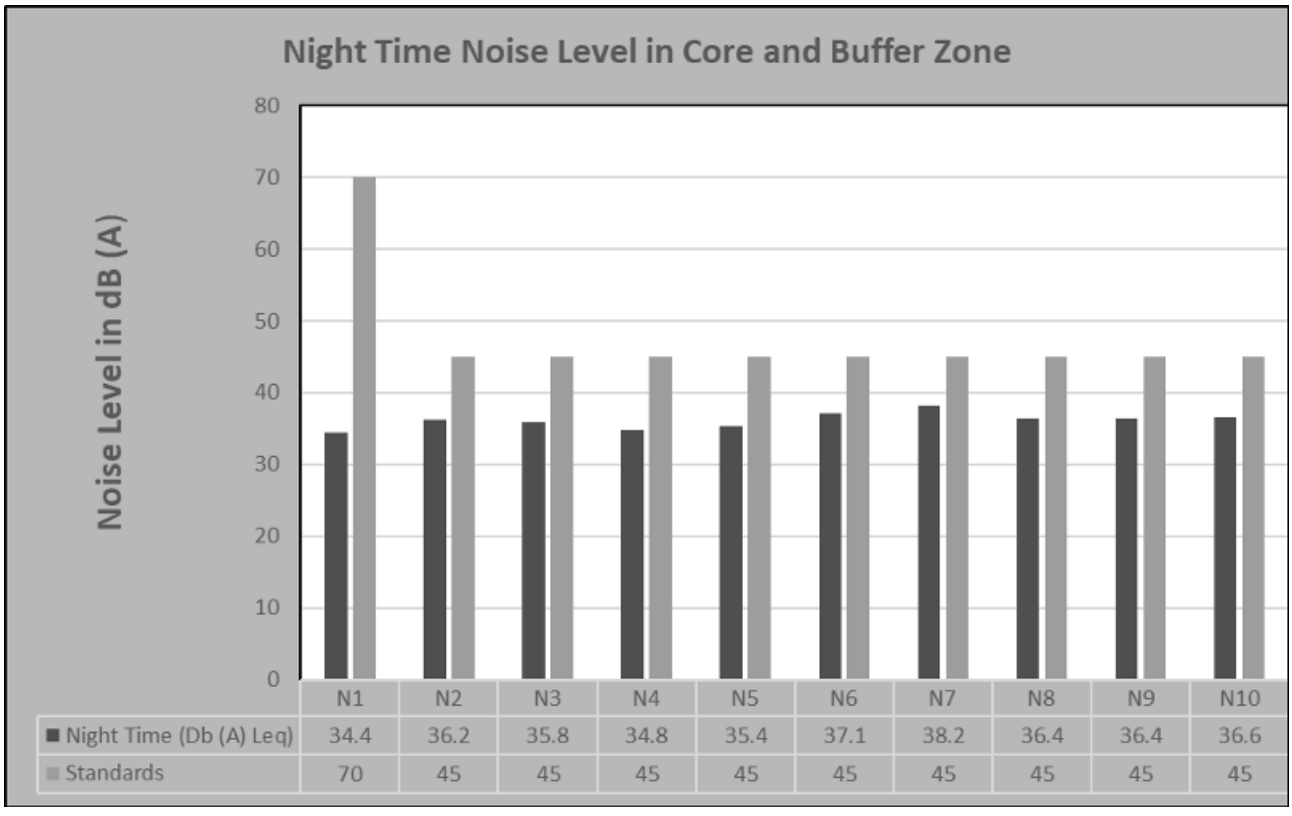


Figure 3.24 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

3.5 BIOLOGICAL ENVIRONMENT

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

Methodology

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

Figure 3.25 Quadrates Sampling Methods of Flora

Phyto-Sociological Studies

Phyto sociological parameters, such as ***Density, Frequency, Abundance and Importance Value Index*** of individual species were determined in randomly placed quadrat of different sizes in the study area, as shown in Table 3.20. Relative frequency, and relative density were calculated and the sum of these three represented Importance Value Index (IVI) for various species. For shrubs, herbs and grasses, ***Density, Frequency, Relative Density & Relative Frequency were found***. Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the study area of 10 km radius. Analysis of the vegetation will help in determining the relative importance of each species in the study area and to reveal if any economically valuable species is threatened in the process.

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

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

Shannon – Wiener Index, Evenness and Richness

Biodiversity index is a quantitative measure that reflects how many different types of species, there are in a dataset, and simultaneously takes into account how evenly the basic entities (such as individuals) are distributed among those types of species. The value of biodiversity index increases both when the number of types increases and when evenness increases. For a given number of type of species, the value of a biodiversity index is maximized when all type of species is equally abundant. The corresponding formulas are given in Table 3.21.

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

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

3.5.1 Flora

Flora study was conducted using the above said methodology to inventory the existing terrestrial plants in both core and buffer zones. Details of plants have been described in the succeeding sections. Photographs showing various species are provided in Figure 3.26.

Crop Patterns in Kaundapalayam

The principal crops of the district are paddy, millets, pulses, oilseeds, sugarcane and banana. The major paddy area is in Kaundapalayam village and Gobichettipalayam 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 Tobacco are grown both under irrigated and rain fed conditions.

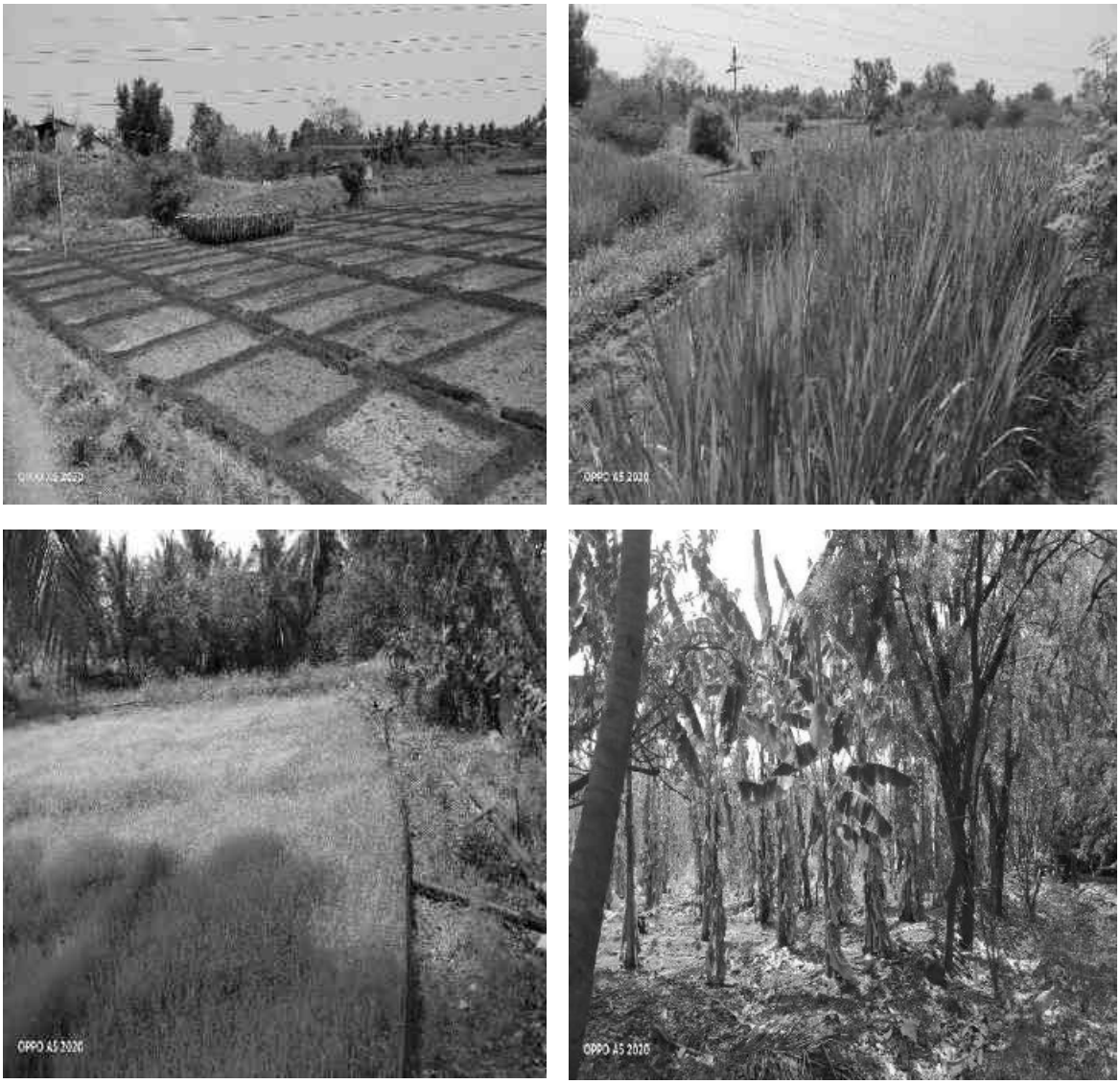


Figure 3.26 Crop Patterns in Kaundapalayam village

Flora in mine lease area (core zone)

Taxonomically a total of 8 species belonging to 6 families have been recorded from the core zone area. The lease applied area is exhibit plain topography. The floral (8) varieties among them 2 Trees (25%), 3 Shrubs (37.5%), and Herbs 3 (37.5%) were identified and the details of flora name and family mention table 3.22

Table 3.22 Flora in mine lease area

Local name	Scientific name	Family name	No of Trees
Trees			
Karuvealan	*Prosopis juliflora*	Fabaceae	14
Vembu	*Azadirachta indica*	Meliaceae	3
Shrubs			
Avaram chadi	*Senna auriculata*	Fabaceae	5
Earuku	*Calotropis gigantea*	Apocynaceae	7
Unichadi	*Lantana camara*	Verbenaceae	8
Herbs /climber			
Perandai	*Cissus quadrangularis*	Vitaceae	6
Thathapondu	*Tridax procumbens*	Asteraceae	17
Kolunji chadi	*Tephrosia purpurea*	Fabaceae	35

The Flora in lease area and 300 m radius

Taxonomically a total of 26 species belonging to 19 families have been recorded from the 300m radius area. The lease applied area is exhibit plain topography. Based on habitat classification of the enumerated plants the majority of species were Trees 13 (35%) followed by Herb& Climbers &Grass 12 (31%), Shrub5 (23%) and Details of flora with the scientific name were mentioned in Table No. 3.23. The result of core zone of flora studies shows that Fabaceae and Lamiaceae, Amaranthaceae are the main dominating species in the study area it mentioned in Table 3.24 and the details of diversity of flora family's pattern are given in Figure No 3.27. species found as threatened category.

Flora in 10 km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land 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 83 species belonging to 43 families have been recorded from the buffer zone. The floral (92) varieties among them 35 Trees (46%), 15 Shrubs (12%), and 23 Herbs 22 (24%) and 12 Climbers, Creeper, Grass & Cactus ,25 (1%) were identified. The result of buffer zone of flora studies shows that Fabaceae and Poaceae, Euphorbiaceae are the main dominating species in the study area.

There is no Rare, Endangered and Threatened Flora species in mining area and their surrounding area. The flora found in the buffer zone including the Sathyamangalam Forest details mention in Tables 3.26 and 3.27. The diversity of flora families is given in Figure 3.27.

Table 3.23 Flora in 300 m Radius

S. No	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
TREES													
1	Karuvelam maram	*Vachellia nilotica*	Fabaceae	4	3	5	0.8	60.0	1.3	8.0	8.1	16.1	Not Listed
2	Thennai maram	*Cocos nucifera*	Arecaceae	3	2	5	0.6	40.0	1.5	6.0	5.4	11.4	Not Listed
3	Velikathan maram	*Prosopis juliflora*	Fabaceae	4	3	5	0.8	60.0	1.3	8.0	8.1	16.1	Not Listed
4	Nuna maram	*Morinda citrifolia*	Rubiaceae	3	2	5	0.6	40.0	1.5	6.0	5.4	11.4	Not Listed
5	Manga	*Mangifera indica*	Anacardiaceae	5	4	5	1.0	80.0	1.3	10.0	10.8	20.8	Not Listed
6	Vembu	*Azadirachta indica*	Meliaceae	3	2	5	0.6	40.0	1.5	6.0	5.4	11.4	Not Listed

7	Panai maram	*Borassus flabellifer*	Arecaceae	4	3	5	0.8	60.0	1.3	8.0	8.1	16.1	Not Listed
8	Pongam oiltree	*Pongamia pinnata*	Fabaceae	3	2	5	0.6	40.0	1.5	6.0	5.4	11.4	Not Listed
9	Puliyamaram	*Tamarindus indica*	Legumes	4	3	5	0.8	60.0	1.3	8.0	8.1	16.1	Not Listed
10	koiya	*Psidium guajava*	Myrtaceae	5	4	5	1.0	80.0	1.3	10.0	10.8	20.8	Not Listed
11	valai	*Musa×paradisiaca*	Musaceae	3	2	5	0.6	40.0	1.5	6.0	5.4	11.4	Not Listed
12	Murungai maram	*Moringa oleifera*	Moringaceae	4	3	5	0.8	60.0	1.3	8.0	8.1	16.1	Not Listed
13	Sappotta	*Manilkara zapota*	Sapotaceae	5	4	5	1.0	80.0	1.3	10.0	10.8	20.8	Not Listed
SHRUBS													
1	Erukku	*Calotropis gigantea*	Apocynaceae	7	6	15	0.5	40.0	1.2	18.9	18.8	37.7	Not Listed
2	Unichedi	*Lantana camara*	Verbenaceae	6	5	15	0.4	33.3	1.2	16.2	15.6	31.8	Not Listed
3	Katu-kolingi	*Tephrosia purpurea*	Fabaceae	8	7	15	0.5	46.7	1.1	21.6	21.9	43.5	Not Listed
4	Avarai	*Senna auriculata*	Fabaceae	9	8	15	0.6	53.3	1.1	24.3	25.0	49.3	Not Listed
5	Thuththi	*Abutilon indicum*	Malvaceae	7	6	15	0.5	40.0	1.2	18.9	18.8	37.7	Not Listed

HERBS & CLIMBERS													
1	Thumbai	*Leucas aspera*	Lamiaceae	6	5	25	0.2	20.0	1.2	6.9	6.7	13.6	Not Listed
2	Nerunji	*Tribulus terrestris*	Zygophyllales	7	6	25	0.3	24.0	1.2	8.0	8.0	16.0	Not Listed
3	Kantang kathrikai	*Solanum virginianum*	Solanaceae	8	7	25	0.3	28.0	1.1	9.2	9.3	18.5	Not Listed
4	Poolai poondu	*Aerva lanata*	Amaranthacea e	7	6	25	0.3	24.0	1.2	8.0	8.0	16.0	Not Listed
5	Korai	*Cyperus rotundus*	Cyperaceae	6	5	25	0.2	20.0	1.2	6.9	6.7	13.6	Not Listed
6	Arugampul	*Cynodon dactylon*	Poaceae	7	6	25	0.3	24.0	1.2	8.0	8.0	16.0	Not Listed
7	Nayuruvi	*Achyranthes aspera*	Amaranthacea e	8	7	25	0.3	28.0	1.1	9.2	9.3	18.5	Not Listed
8	Karunthulasi	*Ocimum basilicum*	Lamiaceae	9	8	25	0.4	32.0	1.1	10.3	10.7	21.0	Not Listed
9	Vishnukrandi	*Evolvulus alsinoides*	Convolvulacea e	7	6	25	0.3	24.0	1.2	8.0	8.0	16.0	Not Listed
10	Sirupunaikkali	*Passiflora foetida*	Passifloraceae	6	5	25	0.2	20.0	1.2	6.9	6.7	13.6	Not Listed
11	Perandai	*Cissus quadrangularis*	Vitaceae	9	8	25	0.4	32.0	1.1	10.3	10.7	21.0	Not Listed
12	Thottalchinungi	*Mimosa pudica*	Mimosaceae	7	6	25	0.3	24.0	1.2	8.0	8.0	16.0	Not Listed

Table 3.24 Calculation of Species Diversity in 300 m Radius

S.No.	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Karuvelam maram	*Vachellia nilotica*	4	0.08	-2.53	-0.20
2	Thennai maram	*Cocos nucifera*	3	0.06	-2.81	-0.17
3	Velikathan maram	*Prosopis juliflora*	4	0.08	-2.53	-0.20
4	Nuna maram	*Morinda citrifolia*	3	0.06	-2.81	-0.17
5	Manga	*Mangifera indica*	5	0.10	-2.30	-0.23
6	Vembu	*Azadirachta indica*	3	0.06	-2.81	-0.17
7	Panai maram	*Borassus flabellifer*	4	0.08	-2.53	-0.20
8	Pongam oiltree	*Pongamia pinnata*	3	0.06	-2.81	-0.17
9	Puliyamaram	*Tamarindus indica*	4	0.08	-2.53	-0.20
10	koiya	*Psidium*	5	0.10	-2.30	-0.23
11	valai	*Musa acuminata*	3	0.06	-2.81	-0.17
12	Murungai maram	*Moringa oleifera*	4	0.08	-2.53	-0.20
13	Sappotta	*Manikara zapota*	5	0.10	-2.30	-0.23
H (Shannon Diversity Index) =2.55						
Shrubs						
1	Erukku	*Calotropis gigantea*	7	0.19	-1.67	-0.32
2	Unichedi	*Lantana camara*	6	0.16	-1.82	-0.29
3	Katu-kolingi	*Tephrosia purpurea*	8	0.22	-1.53	-0.33
4	Avarai	*Senna auriculata*	9	0.24	-1.41	-0.34
5	Thuththi	*Abutilon indicum*	7	0.19	-1.67	-0.32
H (Shannon Diversity Index) =1.60						
Herbs						
1	Thumbai	Leucas aspera	6	0.07	-2.67	-0.18
2	Nerunji	Tribulus terrestris	7	0.08	-2.52	-0.20
3	Kantang kathrikai	Solanum virginianum	8	0.09	-2.39	-0.22
4	Poolai poondu	Aerva lanata	7	0.08	-2.52	-0.20
5	Korai	Cyperus rotundus	6	0.07	-2.67	-0.18
6	Arugampul	Cynodon dactylon	7	0.08	-2.52	-0.20
7	Nayuruvi	Achyranthes aspera	8	0.09	-2.39	-0.22
8	Karunthulasi	Ocimum basilicum	9	0.10	-2.27	-0.23
9	Vishnukrandi	Evolvulus alsinoides	7	0.08	-2.52	-0.20
10	Sirupunaikkali	Passiflora foetida	6	0.07	-2.67	-0.18
11	Perandai	Cissus quadrangularis	9	0.10	-2.27	-0.23
12	Thottalchinungi	*Mimosa pudica*	7	0.08	-2.52	-0.20
H (Shannon Diversity Index) =2.48						

Table 3.25 Species Richness (Index) in 300 m radius

Details	H	H max	Evenness	Species Richness
Trees	2.55	2.56	0.99	3.07
Shrubs	1.60	1.61	0.99	1.11
Herbs	2.48	2.48	1.00	2.46

Table 3.26 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	*Azadirachta indica*	Meliaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
2	Thekku	*Tectona grandis*	Verbenaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
3	Pongam oiltree	*Pongamia pinnata*	Fabaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
4	Thennai maram	*Cocos nucifera*	Arecaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
5	Manga	*Mangifera indica*	Anacardiaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
6	Puliyamaram	*Tamarindus indica*	Legumes	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
7	Vadanarayani	*Delonix elata*	Fabaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
8	Thenpazham	*Muntingia calabura*	Tiliaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
9	Punnai	*Calophyllu inophyllum*	Calophyllaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
10	Ilanthai	*Ziziphus jujubha*	Rhamnaceae	7	6	10	0.7	60.0	1.2	4.1	4.5	8.6	Not Listed
11	Karuvelam	*Acacia nilotica*	Mimosaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
12	Nettilinkam	*Polylathia longifolia*	Annonaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
13	Arai nelli	*Phyllanthus acidus*	Euphorbiaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
14	Panai maram	*Borassus flabellifer*	Arecaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
15	Sapota	*Manilkara zapota*	Sapotaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
16	Navalmaram	*Sygygium cumini*	Myrtaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
17	Alamaram	*Ficus benghalensis*	Moraceae	3	2	10	0.3	20.0	1.5	1.8	1.5	3.3	Not Listed
18	Vazhaimaram	*Musa*	Musaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
19	Karuvelam maram	*Vachellia nilotica*	Fabaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
20	Nelli	*Emblica officinalis*	Phyllanthaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
21	Eucalyptus	*Eucalyptus globules*	Myrtaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed

22	Maramalli	*Millingtonia hortensis*	Bignoniaceae	3	2	10	0.3	20.0	1.5	1.8	1.5	3.3	Not Listed
23	Kuduka puli	*Pithecellobium dulce*	Mimosaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
24	Karungali	*Acacia sundra*	Legumes	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
25	Nochi	*Vitex negundo*	Lamiaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
26	Karimurungai	*Moringa olefera*	Moraginaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
27	Pappali maram	*Carica papaya L*	Caricaceae	7	6	10	0.7	60.0	1.2	4.1	4.5	8.6	Not Listed
28	Poovarasu	*Thespesia populnea*	Malvaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
29	Arasanmaram	*Ficus religiosa*	Moraceae	3	2	10	0.3	20.0	1.5	1.8	1.5	3.3	Not Listed
30	Vilvam	*Aegle marmelos*	Rutaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
31	Nuna maram	*Morinda citrifolia*	Rubiaceae	3	2	10	0.3	20.0	1.5	1.8	1.5	3.3	Not Listed
32	Nettilingam	*Polyalthia longifolia*	Annonaceae	4	3	10	0.4	30.0	1.3	2.4	2.2	4.6	Not Listed
33	Koyya	*Psidium guajava*	Myrtaceae	6	5	10	0.6	50.0	1.2	3.6	3.7	7.3	Not Listed
34	Seethapazham	*Annona reticulata*	Annonaceae	7	6	10	0.7	60.0	1.2	4.1	4.5	8.6	Not Listed
35	Savukku	*Casuarina L.*	Casuarinaceae	5	4	10	0.5	40.0	1.3	3.0	3.0	5.9	Not Listed
SHRUBS													
1	Avarai	*Senna auriculata*	Fabaceae	8	7	15	0.5	46.7	1.1	7.1	7.1	14.2	Not Listed
2	Sundaika	*Solanum torvum*	Solanaceae	9	8	15	0.6	53.3	1.1	8.0	8.2	16.1	Not Listed
3	Puramuttai	*Chrozophora rottleri*	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.3	5.1	10.4	Not Listed
4	Arali	*Nerium indicum*	Apocynaceae	8	7	15	0.5	46.7	1.1	7.1	7.1	14.2	Not Listed
5	Seemaiagaththi	*Cassia alata*	Caesalpinaceae	6	5	15	0.4	33.3	1.2	5.3	5.1	10.4	Not Listed
6	Chemparuthi	*Hibiscu rosa-sinensis*	Malvaceae	7	6	15	0.5	40.0	1.2	6.2	6.1	12.3	Not Listed
7	Kattamanakku	*Jatropha curcas*	Euphorbiaceae	8	7	15	0.5	46.7	1.1	7.1	7.1	14.2	Not Listed
8	Chaturakalli	*Euphorbia antiquorum*	Euphorbiaceae	9	8	15	0.6	53.3	1.1	8.0	8.2	16.1	Not Listed
9	Idlipoo	*xoracoc cinea*	Rubiaceae	8	7	15	0.5	46.7	1.1	7.1	7.1	14.2	Not Listed
10	Thuthi	*Abutilon indicum*	Meliaceae	7	6	15	0.5	40.0	1.2	6.2	6.1	12.3	Not Listed
11	Nithyakalyani	*Cathranthus roseus*	Apocynaceae	6	5	15	0.4	33.3	1.2	5.3	5.1	10.4	Not Listed
12	Uumaththai	*Datura metel*	Solanaceae	7	6	15	0.5	40.0	1.2	6.2	6.1	12.3	Not Listed
13	Kundumani	*Abrus precatorius*	Fabaceae	8	7	15	0.5	46.7	1.1	7.1	7.1	14.2	Not Listed
14	Erukku	*Calotropis gigantea*	Apocynaceae	9	8	15	0.6	53.3	1.1	8.0	8.2	16.1	Not Listed
15	Neermulli	*Hydrophila auriculata*	Acanthaceae	7	6	15	0.5	40.0	1.2	6.2	6.1	12.3	Not Listed

Herbs, Climber, Creeper & Grasses													
1	Nayuruv	*Achyranthes aspera*	Amaranthaceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed
2	Veetukaayapoondu	*Tridax procumbens*	Asteraceae	7	6	25	0.3	24.0	1.2	3.7	3.6	7.3	Not Listed
3	Mukkirattai	*Boerhaavia diffusa*	Nyctaginaceae	8	7	25	0.3	28.0	1.1	4.2	4.2	8.4	Not Listed
4	Kuppaimeni	*Acalypha indica*	Euphorbiaceae	9	8	25	0.4	32.0	1.1	4.7	4.8	9.5	Not Listed
5	Karisilanganni	*Eclipta prostata*	Asteraceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed
6	Korai	*Cyperus rotundus*	Cyperaceae	7	6	25	0.3	24.0	1.2	3.7	3.6	7.3	Not Listed
7	Thumbai	*Leucas aspera*	Lamiaceae	8	7	25	0.3	28.0	1.1	4.2	4.2	8.4	Not Listed
8	Nai kadugu	*Celome viscosa*	Capparidaceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed
9	Parttiniyam	*Parthenium hysterophorus*	Asteraceae	7	6	25	0.3	24.0	1.2	3.7	3.6	7.3	Not Listed
10	Thulasi	*Ocimum tenuiflorum*	Lamiaceae	11	10	25	0.4	40.0	1.1	5.8	6.0	11.8	Not Listed
11	Arugampul	*Cynodon dactylon*	Poaceae	12	11	25	0.5	44.0	1.1	6.3	6.6	12.9	Not Listed
12	Thoiya keerai	*Digeria muricata*	Amarantheceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed
13	Kovai	*Coccinia grandis*	Cucurbitaceae	7	6	25	0.3	24.0	1.2	3.7	3.6	7.3	Not Listed
14	Perandai	*Cissus quadrangularis*	Vitaceae	9	8	25	0.4	32.0	1.1	4.7	4.8	9.5	Not Listed
15	Mudakkotan	*Cardiospermum helicacabum*	Sapindaceae	8	7	25	0.3	28.0	1.1	4.2	4.2	8.4	Not Listed
16	Karkakartum	*Clitoria ternatea*	Fabaceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed
17	Kovakkai	*Trichosanthes dioica*	Cucurbitaceae	8	7	25	0.3	28.0	1.1	4.2	4.2	8.4	Not Listed
18	Sangupoo	*Clitoriaternatia*	Fabaceae	9	8	25	0.4	32.0	1.1	4.7	4.8	9.5	Not Listed
19	Siru puladi	*Desmodium triflorum*	Fabaceae	7	6	25	0.3	24.0	1.2	3.7	3.6	7.3	Not Listed
20	Sithrapaalavi	*Euphorbia prostrata*	Euphorbiaceae	9	8	25	0.4	32.0	1.1	4.7	4.8	9.5	Not Listed
21	Thumattikai	*Cucumis callosus*	Cucurbitaceae	8	7	25	0.3	28.0	1.1	4.2	4.2	8.4	Not Listed
22	mookuthi poondu	*Wedelia trilobata*	Asteraceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed
23	Kattu kanchippul	*Apluda mutica*	Poaceae	7	6	25	0.3	24.0	1.2	3.7	3.6	7.3	Not Listed
24	Musthakasu	*Kyllinga brevifolia*	Cyperaceae	8	7	25	0.3	28.0	1.1	4.2	4.2	8.4	Not Listed
25	Nagathali	*Opuntia dillenii*	Cactaceae	6	5	25	0.2	20.0	1.2	3.1	3.0	6.2	Not Listed

Table 3.27 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	*Azadirachta indica*	5	0.03	-3.52	-0.10
2	Thekku	*Tectona grandis*	6	0.04	-3.34	-0.12
3	Pongam oiltree	*Pongamia pinnata*	5	0.03	-3.52	-0.10
4	Thennai maram	*Cocos nucifera*	4	0.02	-3.74	-0.09
5	Manga	*Mangifera indica*	6	0.04	-3.34	-0.12
6	Puliyamaram	*Tamarindus indica*	4	0.02	-3.74	-0.09
7	Vadanarayani	*Delonix elata*	5	0.03	-3.52	-0.10
8	Thenpazham	*Muntingia calabura*	4	0.02	-3.74	-0.09
9	Punnai	*Calophyllu inophyllum*	6	0.04	-3.34	-0.12
10	Ilanthai	*Ziziphus jujubha*	7	0.04	-3.18	-0.13
11	Karuvelam	*Acacia nilotica*	5	0.03	-3.52	-0.10
12	Nettilinkam	*Polylathia longifolia*	4	0.02	-3.74	-0.09
13	Arai nelli	*Phyllanthus acidus*	5	0.03	-3.52	-0.10
14	Panai maram	*Borassus flabellifer*	6	0.04	-3.34	-0.12
15	Sapota	*Manilkara zapota*	5	0.03	-3.52	-0.10
16	Navalmaram	*Sygygium cumini*	4	0.02	-3.74	-0.09
17	Alamaram	*Ficus benghalensis*	3	0.02	-4.03	-0.07
18	Vazhaimaram	*Musa*	4	0.02	-3.74	-0.09
19	Karuvelam maram	*Vachellia nilotica*	5	0.03	-3.52	-0.10
20	Nelli	*Emblica officinalis*	6	0.04	-3.34	-0.12
21	Eucalyptus	*Eucalyptus globules*	4	0.02	-3.74	-0.09
22	Maramalli	*Millingtonia hortensis*	3	0.02	-4.03	-0.07
23	Kuduka puli	*Pithecellobium dulce*	4	0.02	-3.74	-0.09
24	Karungali	*Acacia sundra*	5	0.03	-3.52	-0.10
25	Nochi	*Vitex negundo*	4	0.02	-3.74	-0.09
26	Karimurungai	*Moringa olefera*	6	0.04	-3.34	-0.12
27	Pappali maram	*Carica papaya L*	7	0.04	-3.18	-0.13
28	Poovarasu	*Thespesia populnea*	5	0.03	-3.52	-0.10
29	Arasanmaram	*Ficus religiosa*	3	0.02	-4.03	-0.07
30	Vilvam	*Aegle marmelos*	4	0.02	-3.74	-0.09
31	Nuna maram	*Morinda citrifolia*	3	0.02	-4.03	-0.07
32	Nettilingam	*Polyalthia longifolia*	4	0.02	-3.74	-0.09
33	Koyya	*Psidium guajava*	6	0.04	-3.34	-0.12
34	Seethapazham	*Annona reticulata*	7	0.04	-3.18	-0.13
35	Savukku	*Casuarina L.*	5	0.03	-3.52	-0.10
H (Shannon Diversity Index) =3.53						
Shrubs						
1	Avarai	*Senna auriculata*	8	0.07	-2.65	-0.19
2	Sundaika	*Solanum torvum*	9	0.08	-2.53	-0.20
3	Puramuttai	*Chrozophora rottleri*	6	0.05	-2.94	-0.16
4	Arali	*Nerium indicum*	8	0.07	-2.65	-0.19
5	Seemaiagaththi	*Cassia alata*	6	0.05	-2.94	-0.16
6	Chemparuthi	*Hibiscu rosa-sinensis*	7	0.06	-2.78	-0.17

7	Kattamanakku	*Jatropha curcas*	8	0.07	-2.65	-0.19
8	Chaturakalli	*Euphorbia antiquorum*	9	0.08	-2.53	-0.20
9	Idlipoo	*xoracoc cinea*	8	0.07	-2.65	-0.19
10	Thuthi	*Abutilon indicum*	7	0.06	-2.78	-0.17
11	Nithyakalyani	*Cathranthus roseus*	6	0.05	-2.94	-0.16
12	Uumaththai	*Datura metel*	7	0.06	-2.78	-0.17
13	Kundumani	*Abrus precatorius*	8	0.07	-2.65	-0.19
14	Erukku	*Calotropis gigantea*	9	0.08	-2.53	-0.20
15	Neermulli	*Hydrophila auriculata*	7	0.06	-2.78	-0.17
H (Shannon Diversity Index) =2.70						
Herbs, Climber, Creeper & Grasses						
1	Nayuruv	*Achyranthes aspera*	6	0.03	-3.46	-0.11
2	Veetukaayapoondu	*Tridax procumbens*	7	0.04	-3.31	-0.12
3	Mukkirattai	*Boerhaavia diffusa*	8	0.04	-3.17	-0.13
4	Kuppaimeni	*Acalypha indica*	9	0.05	-3.06	-0.14
5	Karisilanganni	*Eclipta prostata*	6	0.03	-3.46	-0.11
6	Korai	*Cyperus rotundus*	7	0.04	-3.31	-0.12
7	Thumbai	*Leucas aspera*	8	0.04	-3.17	-0.13
8	Nai kadugu	*Celome viscosa*	6	0.03	-3.46	-0.11
9	Parttiniyam	*Parthenium hysterophorus*	7	0.04	-3.31	-0.12
10	Thulasi	*Ocimum tenuiflorum*	11	0.06	-2.85	-0.16
11	Arugampul	*Cynodon dactylon*	12	0.06	-2.77	-0.17
12	Thoiya keerai	*Digeria muricata*	6	0.03	-3.46	-0.11
13	Kovai	*Coccinia grandis*	7	0.04	-3.31	-0.12
14	Perandai	*Cissus quadrangularis*	9	0.05	-3.06	-0.14
15	Mudakkotan	*Cardiospermum helicacabum*	8	0.04	-3.17	-0.13
16	Karkakartum	*Clitoria ternatea*	6	0.03	-3.46	-0.11
17	Kovakkai	*Trichosanthes dioica*	8	0.04	-3.17	-0.13
18	Sangupoo	*Clitoriaternatia*	9	0.05	-3.06	-0.14
19	Siru puladi	*Desmodium triflorum*	7	0.04	-3.31	-0.12
20	Sithrapaalavi	*Euphorbia prostrata*	9	0.05	-3.06	-0.14
21	Thumattikai	*Cucumis callosus*	8	0.04	-3.17	-0.13
22	mookuthi poondu	*Wedelia trilobata*	6	0.03	-3.46	-0.11
23	Kattu kanchippul	*Apluda mutica*	7	0.04	-3.31	-0.12
24	Musthakasu	*Kyllinga brevifolia*	8	0.04	-3.17	-0.13
25	Nagathali	*Opuntia dillenii*	6	0.03	-3.46	-0.11
H (Shannon Diversity Index) =3.20						

Table 3.28 Species Richness (Index) in Buffer Zone

Details	H	H max	Evenness	Species Richness
Trees	3.53	3.56	0.99	6.63
Shrubs	2.70	2.71	1.00	2.96
Herbs	3.20	3.22	0.99	4.57

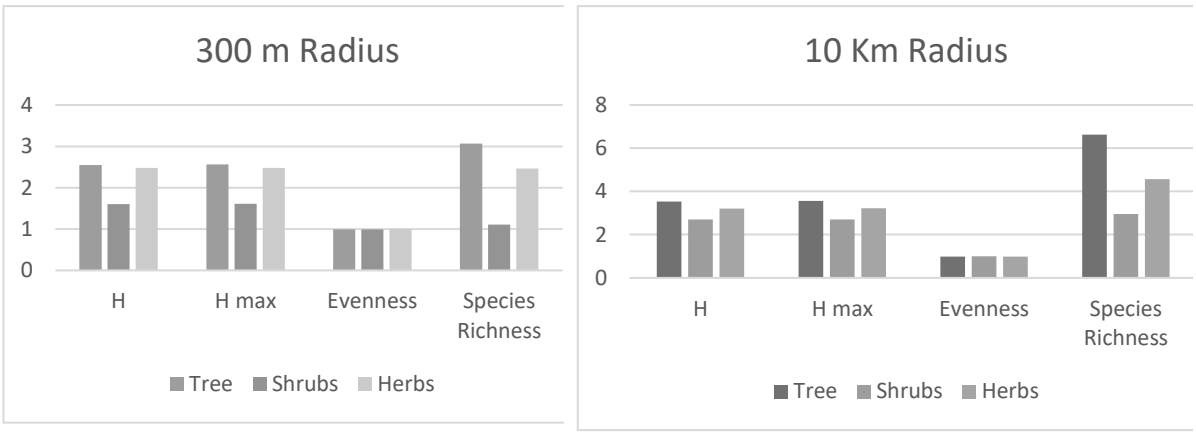


Figure 3.27 Floral Diversity Species Richness (Index) in Buffer Zone and 300 m Radius

Prosopis juliflora

Datura metel

Hyptis suaveolens (L.)

Pergularia daemia

Albizia Amara

Phaseolus vulgaris L.

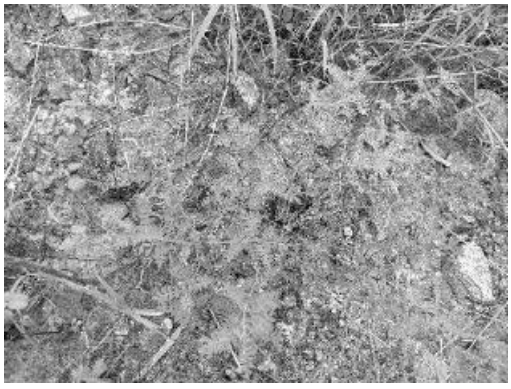
Acacia nilotica

Tridax procumbens

Euphorbia hirta

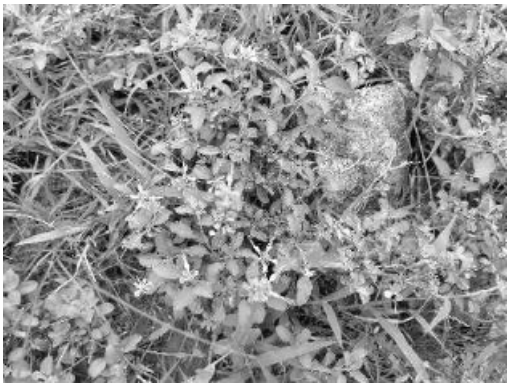
Spermacoce hispida L.

Tectona grandis



Tephrosia villosa

Urena lobata L.



Ocimum filamentosum

Barleria prionitis L.

Aerva lanata

Wrightia tinctoria

Passiflora foetida

Carex acuta L.

Typha shuttleworthii

Tephrosia purpurea

Cissus Quadrangularis

Ipomoea obscura

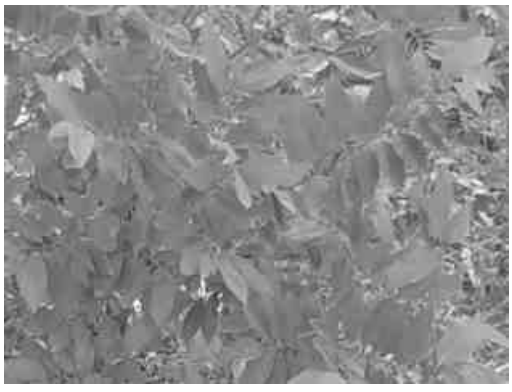
Bauhinia blakeana Dunn

Calotropis gigantea

Ficus Benghalensis

Bambusoideae

Pithecellobium dulce

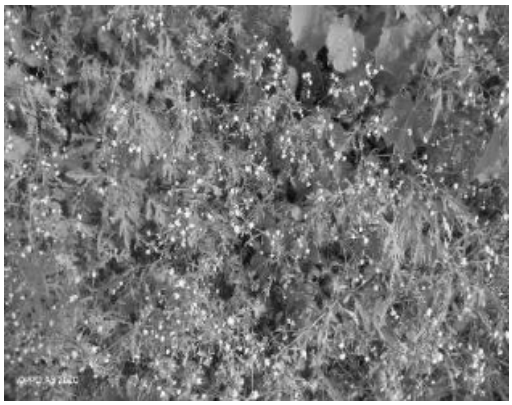


Annona squamosa

Abrus precatorius L

Hyptis suaveolens

Abutilon Indicum



Parthenium hysterophorus

Delonix regia

Martynia annua L

Phlomis fruticosa

Tecoma stans

Cleome viscosa

Bothriochloa bladhii

Clerodendrum phlomidis L.f.

Borassus flabellifer

Azadirachta indica

Delonix regia

Lantana camara

Alysicarpus vaginalis (L.) DC.

Solanum Xanthocarpum

Figure 3.28 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 3.29.

Table 3.29 Aquatic Vegetation

Sl. No	Scientific name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1	*Eichornia crassipe*	Water hyacinth	Agayatamarai	NA
2	*Aponogetonnatans*	Floating laceplant	Kottikizhnagu	NA
3	*Nymphaea nouchali*	Blue waterlily	Nellambal	LC
4	*Carex cruciata*	Cross Grass	Koraipullu	NA
5	*Colocassia esculenta*	Taro	Seppakizhangu	LC
6	*Cynodon dactylon*	Scutch grass	Arugampul	LC
7	*Cyperus exaltatus*	Tall Flat Sedge	Koraikizhangu	LC
8	*Nymphaea nauchali*	Blue lotus	Alli	LC
9	*Marsilea quadrifolia*	Water clover	Aaraikeerai	LC

*LC- Least Concern, NA-Not yet assessed

Forest Vegetation

There are neither Reserved Forests (RF) nor Protected Forests (PF) in the study area. Sathya Mangalam Tiger Reserve is located at 1.26km North of the lease area. The vegetation survey was conducted in the Sathyamangalam Tiger Reserve Forest. Details of the vegetation found in the forest have been given below.

Vegetation in Sathyamangalam Tiger Reserve Forest

Sathyamangalam Tiger Reserve, the largest Tiger reserve of Tamil Nadu, This reserve was established in 2013. The soil types include red soil, black cotton soil, and alluvial soil. The topography of the reserve is highly variable with plains, slopes, hills, streams and rivers. The elevation ranges between 250 m and 1450 m above mean sea level. It receives a mean annual rainfall of 850 mm, and the mean minimum and mean maximum temperatures were 21°C and 28°C.Bhavani and Moyar are the two perennial rivers that run through the reserve area. The sanctuary is rich in flora and fauna, known for sandal wood (Santalum album) and Asian elephants (Elephas maximus). It is predominantly a tropical dry forest, which includes dry thorn, dry deciduous, semi evergreen, savanna forest types. There are a number of tribal settlements inside the sanctuary that depend on forests and forest products for their livelihoods. They also practice agriculture alongside the streams, rivers and plains. A total of 107 species of invasive alien species belonging to 82 genera and 39 families were recorded in the Sathyamanagalam Tiger Reserve (Table 3.30). Herbs (73.83%) formed the predominant life-form followed by shrubs (10.28%), climbers (8.41%), trees (4.67%) and grasses (2.80%). Five invasive alien tree species are reported in the present study.

Table 3.30 Sathyamangalam Tiger Reserve Forest Vegetation

S.NO.	Species Name	Family	Habitat	Uses
1	*Acacia auriculiformis L.*	Mimosaceae	Tree	Fuel wood, Timber
2	*Acanthospermum hispidum DC*	Asteraceae	Herb	Medicinal
3	*Aerva javanica (Burm. f.)*	Amaranthaceae	Herb	Medicina
4	*Ageratina adenophora (Spreng.*	Asteraceae	Herb	Fodder
5	*Ageratum conyzoides L*	Asteraceae	Herb	Medicinal
6	*Alternanthera pungens Humb*	Amaranthaceae	Herb	Fodder
7	*Alternanthera sessilis (L.) DC*	Amaranthaceae	Herb	Medicinal
8	*Alternanthera tenella Colla.*	Amaranthaceae	Herb	Fodder, Vegetable
9	*Amaranthus spinosus L.*	Amaranthaceae	Herb	Vegetable, Medicinal
10	*Antigonon leptopus*	Polygonaceae	Climber	Ornamental
11	*Argemone mexicana L.*	Papaveraceae	Herb	Medicinal
12	*Asclepias curassavica L.*	Asclepiadaceae	Herb	Medicinal
13	*Bidens pilosa L.*	Asteraceae	Herb	Fodder
14	*Blainvillea acmella (L.) Philipson*	Asteraceae	Herb	None
15	*Borassus flabellifer L.*	Arecaceae	Tree	Fruit edible, Timber
16	*Calotropis gigantea (L.) R. Br.*	Asclepiadaceae	Shrub	Medicinal, Ornamental
17	*Cassia alata L.*	Caesalpiniaceae	Shrub	Medicinal
18	*Cassia hirsuta L.*	Caesalpiniaceae	Herb	Medicinal
19	*Cassia obtusifolia L.*	Caesalpiniaceae	Herb	Medicinal
20	*Cassia occidentalis L.*	Caesalpiniaceae	Herb	Medicinal
21	*Cassia tora L.*	Caesalpiniaceae	Herb	Medicinal
22	*Cassia uniflora Miller*	Caesalpiniaceae	Herb	Medicinal
23	*Catharanthus pusillus*	Apocynaceae	Herb	Fodder
24	*Catharanthus roseus L.*	Apocynaceae	Herb	Medicinal, Ornamental
25	*Celosia argentea L.*	Amaranthaceae	Herb	Fodder, Vegetable
26	*Chenopodium ambrosioides L.*	Chenopodiaceae	Herb	Fodder
27	*Chloris barbata (L.) Sw.*	Poaceae	Grass	Fodder, Medicinal
28	*Chromolaena odorata L*	Asteraceae	Shrub	Fuel wood
29	*Chrozophora rottleri (Geis.) Spreng*	Euphorbiaceae	Herb	Fodder
30	*Cleome gynandra L.*	Cleomaceae	Herb	Medicinal
31	*Cleome monophylla L.*	Cleomaceae	Herb	Vegetable
32	*Cleome rutidosperma DC.*	Cleomaceae	Herb	Fodder
33	*Cleome viscosa L.*	Cleomaceae	Herb	Medicinal
34	*Corchorus aestuans L.*	Tiliaceae	Herb	Medicinal
35	*Corchorus tridens L.*	Tiliaceae	Herb	Fodder, Fibre
36	*Corchorus trilocularis L.*	Tiliaceae	Herb	Fibre, Fodder
37	*Crotalaria pallida Dryand*	Fabaceae	Herb	Fodder
38	*Crotalaria retusa L.*	Fabaceae	Herb	Ornamental
39	*Croton bonplandianum Baill.*	Euphorbiaceae	Herb	Fodder, Medicinal
40	*Cuscuta reflexa Roxb.*	Cuscutaceae	Climber	None
41	*Cyperus difformis L.*	Cyperaceae	Herb	Fodder
42	*Datura innoxia Mill.*	Solanaceae	Herb	Medicinal
43	*Datura metel L.*	Solanaceae	Shrub	Medicinal

44	*Digera muricata (L.) Mart*	Amaranthaceae	Herb	Medicinal, Vegetable
45	*Echinochloa colona (L.) Link.*	Poaceae	Grass	Fodder
46	*Eclipta prostrata (L.) Mant.*	Asteraceae	Herb	Medicinal
47	*Eichornia crassipes (C. Martius)*	Pontederiaceae	Herb	Medicinal
48	*Emilia sonchifolia (L.) DC.*	Asteraceae	Herb	Medicinal
49	*Euphorbia cyathophora Murray*	Euphorbiaceae	Herb	Ornamental
50	*Euphorbia heterophylla L.*	Euphorbiaceae	Herb	Ornamental
51	*Euphorbia hirta L*	Euphorbiaceae	Herb	Medicinal
52	*Gnaphalium polycaulon Pers.*	Asteraceae	Herb	Fodder
53	*Gomphrena serrata L.*	Amaranthaceae	Herb	Fodder
54	*Hyptis suaveolens (L.) Poit.*	Lamiaceae	Herb	Medicinal
55	*Imperata cylindrica (L.) Raeusch*	Poaceae	Grass	Fodder
56	*Indigofera linifolia (L.f.) Retz.*	Fabaceae	Herb	Fodder
57	*Indigofera linnaei Ali*	Fabaceae	Herb	Fodder
58	*Indigofera trita L.*	Fabaceae	Shrub	Fodder
59	*Ipomoea carnea Jacq*	Convolvulaceae	Shrub	Manure
60	*Ipomoea hederifolia L.*	Convolvulaceae	Climber	Medicinal
61	*Ipomoea obscura (L.) Ker. - Gawal.*	Convolvulaceae	Climber	Fodder
62	*Ipomoea pes-tigridis L*	Convolvulaceae	Climber	Medicinal
63	*Ipomoea quamoclit L.*	Convolvulaceae	Climber	Ornamental
64	*Ipomoea staphylina Roem. & Schult*	Convolvulaceae	Climber	Fodder
65	*Lagascea mollis Cav.*	Asteraceae	Herb	Medicinal
66	*Lantana camara L.*	Verbenaceae	Shrub	Ornamental
67	*Leonotis nepetiifolia (L.) R.Br.*	Lamiaceae	Herb	Medicinal
68	*Leucaena leucocephala (L.) de Wit*	Mimosaceae	Tree	Fodder, Fuel wood
69	*Ludwigia adscendens (L.) Hara*	Onagraceae	Herb	Medicinal
70	*Malvastrum coromandelianum (L.)*	Malvaceae	Herb	Fibre
71	*Martynia annua L.*	Pedaliaceae	Herb	Medicinal
72	*Mikania micrantha Kunth*	Asteraceae	Climber	None
73	*Mimosa pudica L.*	Mimosaceae	Herb	Medicinal
74	*Mirabilis jalapa L.*	Nyctaginaceae	Herb	Ornamental
75	*Monochoria vaginalis Burm. f.*	Pontederiaceae	Herb	None
76	*Ocimum americanum L.*	Lamiaceae	Herb	Medicinal
77	*Opuntia stricta Haw.*	Cactaceae	Shrub	Fruit edible
78	*Oxalis corniculata L.*	Oxalidaceae	Herb	Vegetable
79	*Parthenium hysterophorus L.*	Asteraceae	Herb	Fodder
80	*Passiflora foetida L.*	Passifloraceae	Climber	Medicinal
81	*Pedalium murex L.*	Pedaliaceae	Herb	Medicinal
82	*Peperomia pellucida (L.) Kunth*	Piperaceae	Herb	None
83	*Peristrophe paniculata (Forssk.)*	Acanthaceae	Herb	Fodder
84	*Physalis minima L.*	Solanaceae	Herb	Medicinal
85	*Pilea microphylla (L.) Liebm.*	Urticaceae	Herb	Medicinal
86	*Pistia stratiotes L.*	Araceae	Herb	Medicinal
87	*Portulaca oleracea L.*	Portulacaceae	Herb	Vegetable
88	*Prosopis juliflora (Sw.) DC.*	Mimosaceae	Tree	Fuel wood
89	*Ruellia tuberosa L.*	Acanthaceae	Herb	Ornamental

90	*Scoparia dulcis L.*	Scrophulariaceae	Herb	Medicinal
91	*Sesbania bispinosa (Jacq.) Wight.*	Fabaceae	Shrub	Fibre
92	*Sida acuta Burm. f.*	Malvaceae	Herb	Medicinal
93	*Solanum nigrum L.*	Solanaceae	Herb	Vegetable
94	*Solanum torvum Sw.*	Solanaceae	Shrub	Vegetable
95	*Spermacoce hispida L.*	Rubiaceae	Herb	Medicinal
96	*Spilanthes acmella (L.) Murr.*	Asteraceae	Herb	Fodder
97	*Stachytarpheta jamaicensis (L.) Vahl*	Verbenaceae	Herb	Ornamental
98	*Stylosanthes hamata L.*	Fabaceae	Herb	Fodder
99	*Synadenium grantii Hook. f.*	Euphorbiaceae	Shrub	Ornamental
100	*Synedrella nodiflora (L.) Gaertn.*	Asteraceae	Herb	Ornamental
101	*Tamarindus indica L.*	Caesalpiniaceae	Tree	Vegetable
102	*Tribulus terrestris L.*	Zygophyllaceae	Herb	Medicinal
103	*Tridax procumbens L.*	Asteraceae	Herb	Medicina
104	*Triumfetta rhomboidea Jacq.*	Tiliaceae	Herb	Medicinal
105	*Typha angustata Bory & Chaup.*	Typhaceae	Herb	Ornamental
106	*Waltheria indica L.*	Sterculiaceae	Herb	Medicinal
107	*Xanthium indicum Koeing*	Asteraceae	Herb	Medicinal

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) and Zoological Survey of India (ZSI). Detailed fauna is mentioned in the Table 3.31 and 3.32

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 30 m 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 22 varieties of species observed in the Core zone of Kaundampalayam Village, Rough stone and Gravel quarry (Figure No.3.24) among them numbers of Insects 7 (30%), Reptiles 5 (22%), Mammals 3 (13%) and Avian 8 (35%). A total of 23 species belonging to 18 families have been recorded from the core mining lease area. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species and 6 species are under schedule IV according to Indian wild life Act 1972. A total 7 species of bird 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 3.31.

Table 3.31 Fauna in Core Zone

SI. No	Common name/English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	IUCN Red List data
Insects					
1	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
2	Striped tiger	Nymphalidae	*Danaus plexippus*	Schedule IV	LC
3	Common Tiger	Nymphalidae	*Danaus genutia*	NL	NL
4	Mottled emigrant	Peridae	*Catopsilia pyranthe*	NL	LC
5	Praying mantis	Mantidae	*mantis religiosa*	NL	NL
6	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	NL	LC
7	Stick insect	Lonchodidae	*carausius morosus*	NL	LC
Reptiles					
1	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
2	Brahminy skink	Scincidae	*Eutropis carinata*	NL	LC
3	Common skink	Scincidae	*Mabuya carinatus*	NL	LC
4	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC
5	Fan-Throated Lizard	Agamidae	*Sitanaponticeriana*	NL	LC
Mammals					
1	Indian Field Mouse	Muridae	*Mus booduga*	Schedule IV	NL
2	Asian Small Mongoose	Herpestidae	*Herpestes javanicus*	Schedule II	LC
3	Common rat	Muridae	*Rattus rattus*	Schedule IV	LC
Aves					
1	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
2	Two-tailed Sparrow	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
3	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
4	common quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
5	House crow	Corvidae	*Corvussplendens*	NL	LC
6	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
7	Koel	Cucalidae	*Eudynamys*	Schedule IV	LC
8	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
9	Small blue Kingfisher	Alcedinidae	*Alcedo atthis*	Schedule IV	LC
10	Rose-ringed parkeet	Psittaculidae	*Psittacula krameri*	NL	LC
11	Black drongo	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC

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

Fauna in Buffer Zone

Taxonomically a total of 48 species belonging to 34 families have been recorded from the buffer zone area. Based on habitat classification the majority of species were Birds 19 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), Mammals 4 (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 schedule IV species according to Indian wild life Act 1972. Totally, 19 species of bird were sighted in the study area.

Faunal Diversity of Sathyamangalam Tiger Reserve

The Sathyamangalam Tiger Reserve Located In 1.28 North Side. Recorded In Sathyamangalam Tiger Reserve, Through Direct and Indirect Evidences. 21 Mammal Species, Reptiles 13 Species and 4 Amphibians Species, have been Recorded in Sathyamangalam Tiger Reserve. The Sathyamangalam Reserve Forest Fauna List Mention in Table 3.32

Table 3.32 Fauna in Buffer Zone

S. No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
INSECTS					
1	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	*Danainae*	NL	LC
3	Tawny coster	Nymphalidae	*Danaus chrysippus*	Schedule IV	LC
4	Indian honey bee	Apidae	*Apis cerana*	Schedule IV	LC
5	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
6	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	NL	LC
7	Lime butterfly	Papilionidae	*Papilio demoleus*	Schedule IV	LC
8	Ant	Formicidae	*Camponotus Vicinus*	NL	NL
9	Dragonfly	Gomphidae	*Ceratogomphus pictus*	Schedule IV	LC
10	Common Tiger	Nymphalidae	*Danaus genutia*	Schedule IV	LC
11	Common Indian crow	Nymphalidae	*Euploea core*	Schedule IV	LC
12	Praying mantis	Mantidae	*mantis religiosa*	NL	NL
13	Striped tiger	Nymphalidae	*Danaus plexippus*	Schedule IV	LC
14	Lesser grass blue	Lycaenidae	*Zizina Otis indica*	Schedule IV	LC
15	Jewel beetle	Buprestidae	*Eurythyrea austriaca*	Schedule IV	NA
REPTILES					
16	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
17	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC
18	Indian chameleon	Chamaeleonidae	*Chamaeleo zeylanicus*	Sch II (Part I)	LC

19	Olive keelback water snake	Natricidae	*Atretium schistosum*	Sch II (Part II)	LC
20	Brahminy skink	Scincidae	*Eutropis carinata*	NL	LC
21	Rat snake	Colubridae	*Ptyas mucosa*	Sch II (Part II)	LC
22	Common skink	Scincidae	*Mabuya carinatus*	NL	LC
MAMMALS					
23	Indian palm squirrel	Sciuridae	*Funambulus palmarum*	Schedule IV	LC
24	Indian hare	Leporidae	*Lepus nigricollis*	Schedule IV	LC
25	Indian Field Mouse	Muridae	*Mus booduga*	Schedule IV	LC
26	Asian Small Mongoose	Herpestidae	*Herpestes javanicus*	Schedule (Part II)	LC
AVES					
27	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
28	Black drongo	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
29	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
30	Red-breasted parakeet	Psittaculidae	*Psittacula alexandri*	NL	LC
31	Common Coot	Rallidae	*Fulica atra*	Schedule IV	LC
32	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
33	Shikra	Accipitridae	*Accipiter badius*	NL	LC
34	Koel	Cucalidae	*Eudynamys*	Schedule IV	LC
35	Common Quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
36	Red-vented Bulbul	Pycnonotidae	*Pycnonotuscafer*	Schedule IV	LC
37	Brahminy starling	Sturnidae	*Sturnia pagodarum*	Schedule IV	LC
38	Indian golden oriole	Oriolidae	*Oriolus kundoo*	Schedule IV	LC
39	Rose-ringed parkeet	Psittaculidae	*Psittacula krameri*	NL	LC
40	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
41	Common quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
42	White-breasted waterhen	Rallidae	*Amaurornis phoenicurus*	NL	LC
43	Two-tailed Sparrow	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
44	Grey Francolin	Phasianidae	*Francolinus pondicerianus*	Schedule IV	LC
45	House crow	Corvidae	*Corvussplendens*	NL	LC
AMPHIBIANS					
46	Indian Burrowing frog	Dicroglossidae	*Sphaerotheca breviceps*	Schedule IV	LC
47	Green Pond Frog	Ranidae	*Rana hexadactyla*	Schedule IV	LC
48	Tiger Frog	Chordata	*Hoplobatrachus tigerinus (Rana tigerina)*	Schedule IV	LC

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

Table 3.33 Fauna species in Sathyamangalam Reserve Forest

Mammals			
S.No	**Name of the species**	**Scientific Name**	**IUCN**
1	Spotted Deer	*Axis axis*	Least Concern
2	Sambar Deer	*Cervus unicolor*	Vulnerable
3	Asiatic Elephant	*Elephus maximus*	Endangered
4	Indian Gaur	*Bos gaurus*	Vulnerable
5	Barking Deer	*Muntiacus muntjak*	Least Concern
6	Blackbuck	*Antilope cervicapra*	Near Threatened
7	Mouse Deer	*Tragulus meminna*	Least Concern
8	Wild Boar	*Sus scrofa*	Least Concern
9	Indian porcupine	*Hysteris indica*	Least Concern
10	Sloth Bear	*Melursus ursinus*	Vulnerable
11	Tiger	*Panthera tigris*	Endangered
12	Leopard	*Panthera pardus*	Near Threatened
13	Wild Dog	*Cuon alpinus*	Endangered
14	Striped hyena	*Hyaena hyaena*	Near Threatened
15	Malabar Giant squirrel	*Ratufa indica*	Least Concern
16	Common mongoose	*Herpestes edwardsi*	Least Concern
17	Three striped Palm squirrel	*Funambulus palmarum*	Least Concern
18	Hanuman Langur	*Semnopithecus entellus*	Least Concern
19	Bonnet Macaque	*Macaca radiata*	Least Concern
20	Pangolin	*Manis crassicaudata*	Near Threatened
21	Black naped hare	*Lepus nigricollis*	Least Concern
Reptiles			
	Name of the species	**Scientific Name**	**IUCN**
1	Skink	*Sphenomorphus indicus*	Not Assessed
2	Garden Lizard	*Calotes versicolour*	Not Assessed
3	Monitor Lizard	*Varanus bengalensis*	Least Concern
4	Agama	*Psammophilus dorsalis*	Least Concern
5	Chameleon	*Chamaeleo zeylanicus*	Not Assessed
6	Crocodile (Mugger)	*Crocodylus palustris*	Vulnerable
7	Cobra	*Naja naja*	Not Assessed

8	Saw scaled viper	*Echis carinatus*	Not Assessed
9	Striped Keel Back	*Amphiesma stolatum*	Not Assessed
10	Common Trinket	*Coelognathus helena*	Not Assessed
11	Rat Snake	*Ptyas mucosa*	Not Assessed
12	Vine Snake	*Ahaetulla nasuta*	Not Assessed
13	Indian Rock Python	*Python molurus*	Near Threatened
Amphibians			
	Name of the species	**Scientific Name**	**IUCN**
1	Common Indian frog	*Rana trigrina*	Least Concern
2	Common Indian toad	*Bufomelano stictus*	Least Concern
3	Indian Skipper Frog	*Polypedates leucomystax*	Least Concern
4	Common Indian frog	*Euphlyctis cyanophlyctis*	Least Concern

Sours: Journal homepage: www.jakraya.com/journal/jwr

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 ECONOMICS ENVIRONMENT

3.6.1 Introduction

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

3.6.2 Objectives of the Study

The main objectives of the study are as follows:

- ❖ To know the current socio-economic condition in the region to cover the sub sectors education, health, sanitation, and water & food security.
- ❖ To recommend practical strategic interventions in the sector.
- ❖ To help in providing better living standards.
- ❖ To understand skill sets and plan for employment opportunities which shall be created.

3.6.3 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

3.6.4 Socio-Economic Status of Study area

The study area covers 23 villages. Around 5km radius. As Kaundampalayam is the village in which the proposed project site is located, the summary of population facts for the village is exclusively provided in Table 3.34 and for other 22 villages papulation details in Tables 3.35-3.37

Table 3.34 Kaundampalayam Village Population Facts

Kaundampalayam Village	
Number of Households	921
Population	3103
Male Population	1548
Female Population	1555
Children Population	253
Sex-ratio	1005
Literacy	56.28%
Male Literacy	63.23%
Female Literacy	49.41%
Scheduled Tribes (ST) %	10
Scheduled Caste (SC) %	815
Total Workers	2079
Main Worker	1890
Marginal Worker	189

https://www.census2011.co.in/data/village/635015-kaundampalayam-tamil-nadu.html

Table 3.35 Population and Literacy Data of Study Area

Village	No of Households	Total Population Person	Total Population Male	Total Population Female	Literates Population Person	Literates Population Male	Literates Population Female	Illiterate Persons	Illiterate Male	Illiterate Female
Savandapur	1125	3743	1875	1868	2251	1300	951	1492	575	917
Ammapalayam	344	1102	544	558	672	362	310	430	182	248
Mevani	681	2089	1037	1052	1214	670	544	875	367	508
Perundalaiyur	1017	3387	1667	1720	2440	1301	1139	947	366	581
Kugalur	1867	5746	2859	2887	3700	2049	1651	2046	810	1236
Puthukkarai	440	1473	748	725	811	459	352	662	289	373
Alukuli	2163	6974	3508	3466	3989	2263	1726	2985	1245	1740
Pariyur	742	2265	1126	1139	1352	767	585	913	359	554
Vellalapalayam	1743	5596	2747	2849	3717	2047	1670	1879	700	1179
Nanjaigopi	549	1758	905	853	1037	598	439	721	307	414
Pulavakalipalayam	1715	5125	2586	2539	3405	1929	1476	1720	657	1063
Kullampalayam	975	3089	1521	1568	2156	1180	976	933	341	592
Nathipalayam	430	1385	702	683	821	483	338	564	219	345
Modachur	2339	7666	3846	3820	5115	2880	2235	2551	966	1585
Kalingiyam	2994	9722	4844	4878	6101	3433	2668	3621	1411	2210
Kottupullampalayam	1910	6083	3060	3023	3674	2124	1550	2409	936	1473
Ayalur	1850	5980	3050	2930	3349	1991	1358	2631	1059	1572
Nagadevampalayam	1526	4873	2456	2417	2742	1567	1175	2131	889	1242
Kadukkampalayam	804	2467	1229	1238	1452	851	601	1015	378	637
Chandrapuram	511	1597	826	771	937	574	363	660	252	408
Vellankovil	1931	6144	3075	3069	3825	2197	1628	2319	878	1441
Siruvalur	2576	7923	3982	3941	4839	2784	2055	3084	1198	1886

Table 3.36 Details on Educational Facilities, Water, and Drainage & Health Facilities

Village	Private Primary School (Numbers)	Govt Vocational Training School/ITI (Numbers)	Primary Health Centre (Numbers)	Tap Water Untreated	River/Canal	Is the Area Covered under Total Sanitation Campaign	Telephone (landlines)	Public Bus Service	Gravel (kutcha) Roads	Commercial Bank	Agricultural Credit Societies	Self - Help Group (SHG)	Nutritional Centres-Anganwadi Centre	Community Centre with/without TV	Power Supply for Domestic Use
Savandapur	0	0	0	1	1	1	1	1	2	2	1	1	1	1	1
Ammapalayam	0	0	0	1	2	1	1	2	1	2	2	1	1	1	1
Mevani	0	0	0	1	2	1	1	1	1	2	1	1	1	1	1
Perundalaiyur	0	0	0	1	2	1	1	1	1	2	2	1	1	2	1
Kugalur	0	0	0	1	1	2	1	1	1	2	1	1	1	1	1
Puthukkarai	0	0	0	1	1	2	1	1	2	2	1	2	1	2	1
Alukuli	0	0	0	1	2	2	1	1	1	2	1	1	1	1	1
Pariyur	1	0	0	1	1	1	1	1	1	2	1	1	1	1	1
Vellalapalayam	0	0	0	1	2	1	1	1	1	2	1	1	1	1	1
Nanjaigopi	0	0	0	1	2	2	1	1	1	2	1	1	1	2	1
Pulavakalipalayam	1	0	0	1	2	1	1	1	1	2	1	1	1	2	1
Kullampalayam	0	0	0	1	2	1	1	1	2	2	2	1	1	2	1
Nathipalayam	0	0	0	1	2	1	1	1	2	2	2	1	1	2	1

Modachur	0	0	0	1	2	1	1	2	1	2	2	1	1	1	1
Kalingiyam	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Kottupullampalayam	0	0	1	1	2	1	1	1	1	2	1	1	1	2	1
Ayalur	0	0	1	1	1	2	1	1	1	2	2	1	1	2	1
Nagadevampalayam	0	0	0	1	2	2	1	1	1	2	1	1	1	1	1
Kadukkampalayam	1	0	0	1	2	1	1	1	1	2	2	1	1	2	1
Chandrapuram	0	0	0	1	2	1	1	1	1	2	1	1	1	1	1
Vellankovil	1	0	0	1	2	2	1	1	1	1	1	1	1	1	1
Siruvalur	0	0	1	1	1	2	1	1	1	2	1	1	1	1	1

Table 3.37 Workers' Profile of Study Area

Village	Total Worker Population Person	Total Worker Population Male	Total Worker Population Female	Main Working Population Person	Main Working Population Male	Main Working Population Female	Main Cultivator Population Person	Main Agricultural Labourers Population Person	Main Other Workers Population Person	Non-Working Population Person
Savandapur	2208	1238	970	1980	1123	857	106	1438	407	1535
Ammapalayam	827	403	424	393	203	190	25	280	78	275
Mevani	1146	700	446	1127	691	436	122	740	249	943
Perundalaiyur	1867	1080	787	1811	1058	753	159	879	685	1520

Kugalur	3433	1966	1467	2499	1513	986	595	789	940	2313
Puthukkarai	840	468	372	833	464	369	62	630	138	633
Alukuli	4016	2361	1655	3712	2217	1495	296	2175	1065	2958
Pariyur	1159	718	441	871	579	292	34	311	490	1106
Vellalapalayam	3039	1852	1187	2664	1685	979	403	752	1456	2557
Nanjaigopi	1088	616	472	887	511	376	229	547	100	670
Pulavakalipalayam	3125	1745	1380	2895	1641	1254	647	1479	689	2000
Kullampalayam	1753	1041	712	1654	1001	653	471	412	718	1336
Nathipalayam	795	487	308	787	484	303	213	236	307	590
Modachur	4211	2622	1589	4128	2600	1528	409	1235	2181	3455
Kalingiyam	5716	3321	2395	5435	3240	2195	1060	2305	1987	4006
Kottupullampalayam	3754	2168	1586	3384	1978	1406	759	1605	979	2329
Ayalur	3850	2104	1746	3671	2041	1630	943	1196	1187	2130
Nagadevampalayam	3320	1712	1608	3126	1657	1469	854	1594	551	1553
Kadukkampalayam	1533	843	690	1498	832	666	425	675	369	934
Chandrapuram	1095	586	509	1085	580	505	468	399	193	502
Vellankovil	3501	2057	1444	3296	1997	1299	763	1086	1199	2643
Siruvalur	4775	2733	2042	4265	2526	1739	1018	1600	1516	3148

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

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. 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 traffic survey conducted based on the transportation route of material, the Rough Stone and gravel is proposed to be transported mainly through Village Road and Sathyamangalam to Bhavani (SH-82) as shown in Table 3.38 and in Figure 3.29. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Table 3.38 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.67 Km-S	Village Road
TS2	Sathyamangalam to Bhavani (SH-82)	1.29 Km-SSE	Sathyamangalam to Bhavani (SH-82)

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	37	111	30	30	59	30	171
TS2	95	285	50	50	90	45	380

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		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	40	120

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 – 1960guidelines
Village Road	171	120	291	1200
Sathyamangalam to Bhavani(SH-82)	380	120	500	1200

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

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

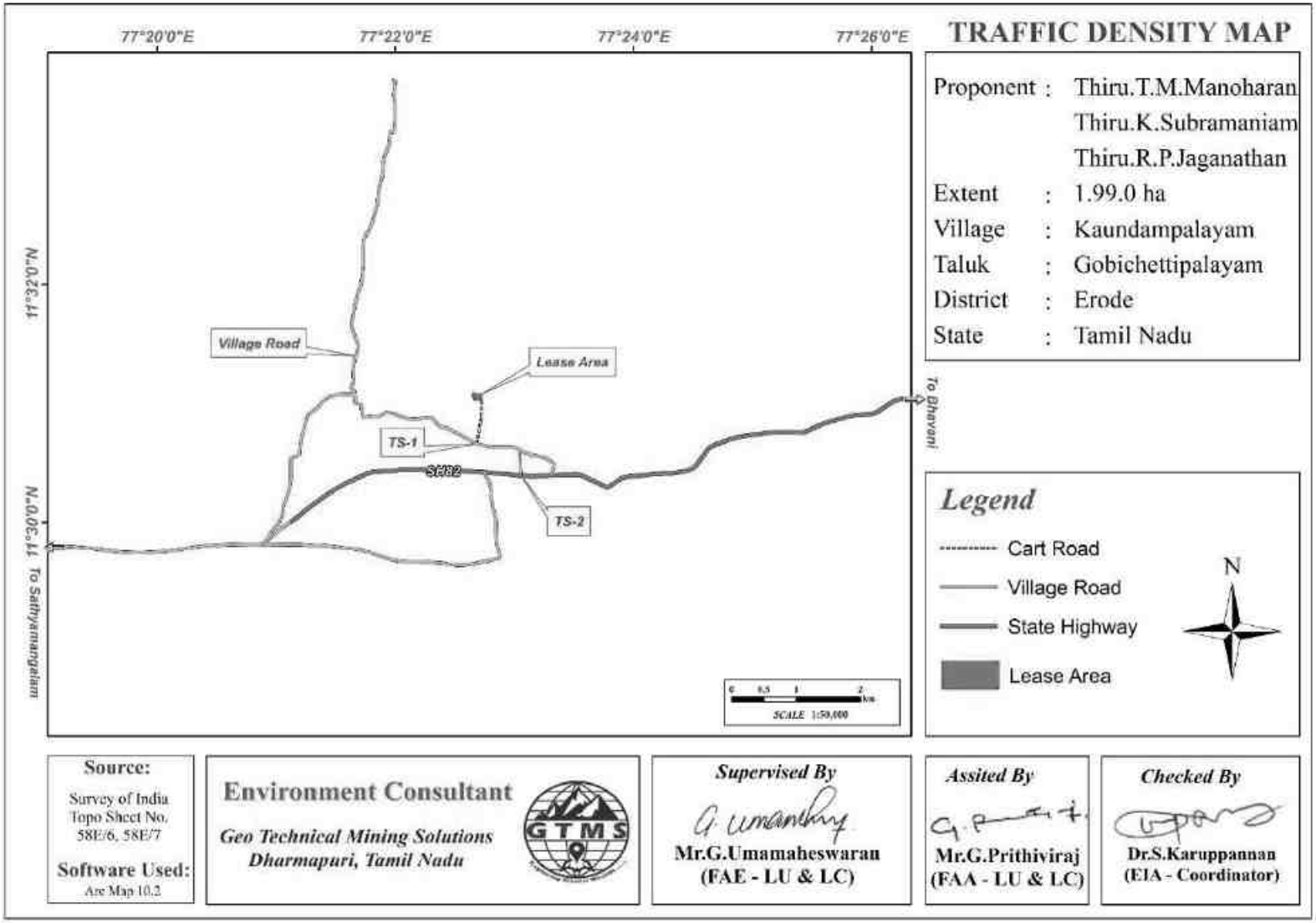


Figure 3.29 Traffic Density Map

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries, Reserve Forest and National Park within 10 km radius. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environmentally sensitive areas around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Table 3.42.

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

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius
		None	Nil within 10 km radius
2	Reserve Forest	Guthiyalathur Reserve Forest	1.26 km North
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Odai	1.26 km W
		Gunderipallam Reservoir	4.74 km NW
		Bhavani River	3.45 km SE
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	Sathyamangalam Tiger Reserve – 1.26km North	1.26 km North
5	Critically Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet







ஊராட்சி ஒன்றியதொடக்கப்

Figure 3.30 Field Study Photographs

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

No top soil will be removed in this project. However, some of the common mitigation measures is discussed in the following sections.

4.2.1 Anticipated Impact on Soil Environment

Following impacts are anticipated due to mining operations:

- Removal of protective vegetation cover
- Exposure of subsurface materials which are unsuitable for vegetation establishment
- Soil health is poor in core zone.
- the soil requires major and immediate treatment.

4.2.2 Common Mitigation Measures from proposed project

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

4.3 WATER ENVIRONMENT

The total water requirement for this project will be 3.5 KLD. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The domestic effluent to be generated from the project will be collected in septic tank with soak pits arrangements. There are no waste dumps in this quarry. Based on the available information and the geophysical investigations the study concluded that the project area is considered to have poor groundwater potential. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected.

4.3.1 Anticipated Impact

The major sources of water pollution normally associated due to mining and allied operations are:

- Generation of waste water from vehicle washing.
- Washouts from surface exposure or working areas
- Domestic sewage
- Disturbance to drainage course in the project area
- Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining

- As the proposed project acquires 3.5 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not deplete aquifer beneath the lease area.

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 10 m x 3 m 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

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by jack hammer drilling, excavation, loading and transportation.

4.4.1 Anticipated Impact from proposed project

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

4.4.2 Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chaulya et al.,2001. The equations used for SPM, SO_2, and NO_X emission estimation have been given in Table 4.1.

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	E= [u0.4a0.2{9.7+ 0.01p+b/(4+0.3b)}]	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm^3/yr); a = Lease area(km^2); E = Emission rate(g/s).
Overall Mine	SO_2	Area	E=a0.14{u/(1.83+0.93u)} [{p/(0.48+0.57p)} +{b/(14.37+1.15b)}]	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm^3/yr); a = Lease area(km^2); E = Emission rate(g/s).
Overall Mine	NO_X	Area	E=a0.25{u/(4.3+32.5u)} [1.5p+{b/(0.06+0.08b)}]	u = Wind speed(m/s); p = Mineral production (Mt/yr); b= Overburden handling (Mm^3/yr); a = Lease area(km^2); E = Emission rate(g/s).

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. 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 PM_{10} keeping in mind that proper control measures are followed. It is important to note that PM_{10} emission rate is derived from the SPM estimation in the background that PM_{10} constitutes 52% of SPM emission. The $PM_{2.5}$, PM_{10}, SO_2 and NO_X emission results have been given in Table 4.2.

Table 4.2 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m^2	Calculated Value ($g/s/m^2$)
Overall Mine	$PM_{2.5}$	0.0101271270	19900	5.08901E-07
Overall Mine	PM_{10}	0.0161128117	19900	8.09689E-07
Overall Mine	SO_2	0.0075292180	19900	3.78353E-07
Overall Mine	NO_X	0.0055301170	19900	2.77895E-07

4.4.2.1 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 effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere.

Air quality modelling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce impact caused by quarrying activities. Suspended Particulate Matter (SPM) is the major pollutant occurred during quarrying activities. The prediction includes the impacts of excavation, drilling, loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and cloud cover.

The model was used to predict the impact on the ambient air environment at each receptor at various localities within 10km 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 $PM_{2.5}$, PM_{10}, SO_2 and NO_X close to the proposed project site due to low to moderate wind speeds.

4.4.2.2 Modelling of Incremental Concentration

The air borne particulate matter such as PM_{10} and $PM_{2.5}$ generated by quarrying operation, transportation, and wind erosion of the exposed areas and emissions of sulphur dioxide (SO_2) and oxides of nitrogen (NOx) due to excavation and loading equipment's 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 within 500 m around the project area is predicted by open pit source modelling using AERMOD Software and the incremental values of the air pollutants were added to the base line data monitored at the proposed site to predict total GLC of the pollutants, as shown in Tables 4.3-4.6.

4.4.2.3 Model Results

The post project resultant concentrations of PM_{10}, $PM_{2.5}$, SO_2 & NO_X (GLC) is given in Tables 4.3-4.6.

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

Station ID	Distance to core area (km)	Direction	PM 2.5 concentrations(µg/m³)			Comparison against air quality standard (60 µg/m³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	--	--	19.9	6.51	26.41	Below standard	32.71	Not significant
AAQ2	0.60	W	19.4	5	24.4		25.77	
AAQ3	0.33	NW	19.8	5	24.8		25.25	
AAQ4	3.35	E	18.5	0	18.5		0.00	
AAQ5	6.0	SW	20.7	0.5	21.2		2.42	
AAQ6	3.40	W	19.3	1	20.3		5.18	
AAQ7	4.05	SE	18.0	0	18		0.00	
AAQ8	4.04	NW	18.0	0.5	18.5		2.78	
AAQ9	5.57	S	18.3	0.5	18.8		2.73	

Table 4.4 Incremental & Resultant GLC of PM_{10}

Station ID	Distance to core area (km)	Direction	PM_{10} concentrations(µg/m³)			Comparison against air quality standard (100 µg/m³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	--	--	38.3	10.36	48.66	Below standard	27.05	Not significant
AAQ2	0.60	W	33.7	5	38.7		14.84	
AAQ3	0.33	NW	39.0	5	44		12.82	
AAQ4	3.35	E	34.6	0.5	35.1		1.45	
AAQ5	6.0	SW	39.3	1	40.3		2.54	
AAQ6	3.40	W	39.9	5	44.9		12.53	
AAQ7	4.05	SE	33.8	0	33.8		0.00	
AAQ8	4.04	NW	34.1	0.5	34.6		1.47	
AAQ9	5.57	S	39.6	1	40.6		2.53	

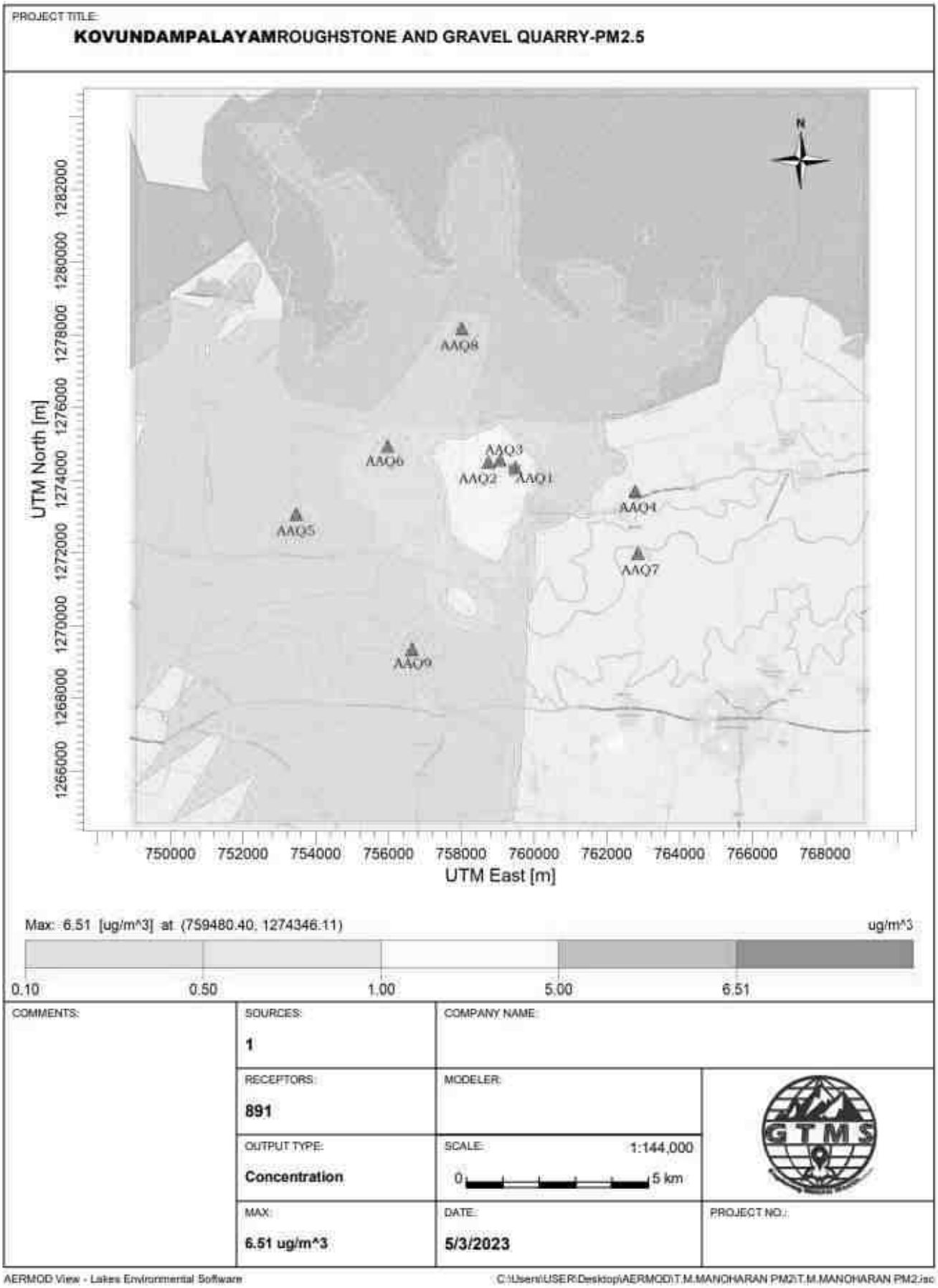


Figure 4.1 Predicted Incremental Concentration of $PM_{2.5}$

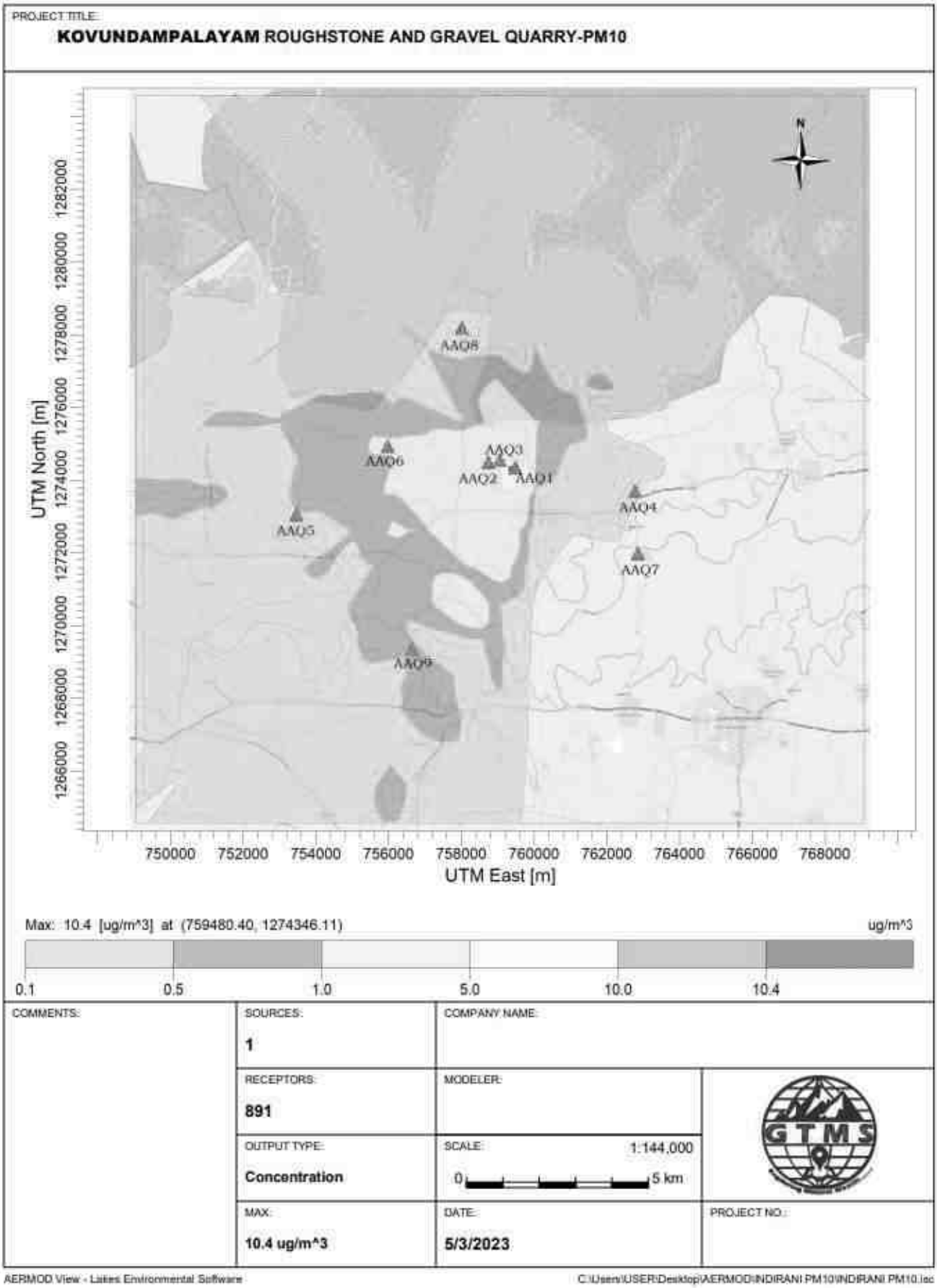


Figure 4.2 Predicted Incremental Concentration of PM_{10}

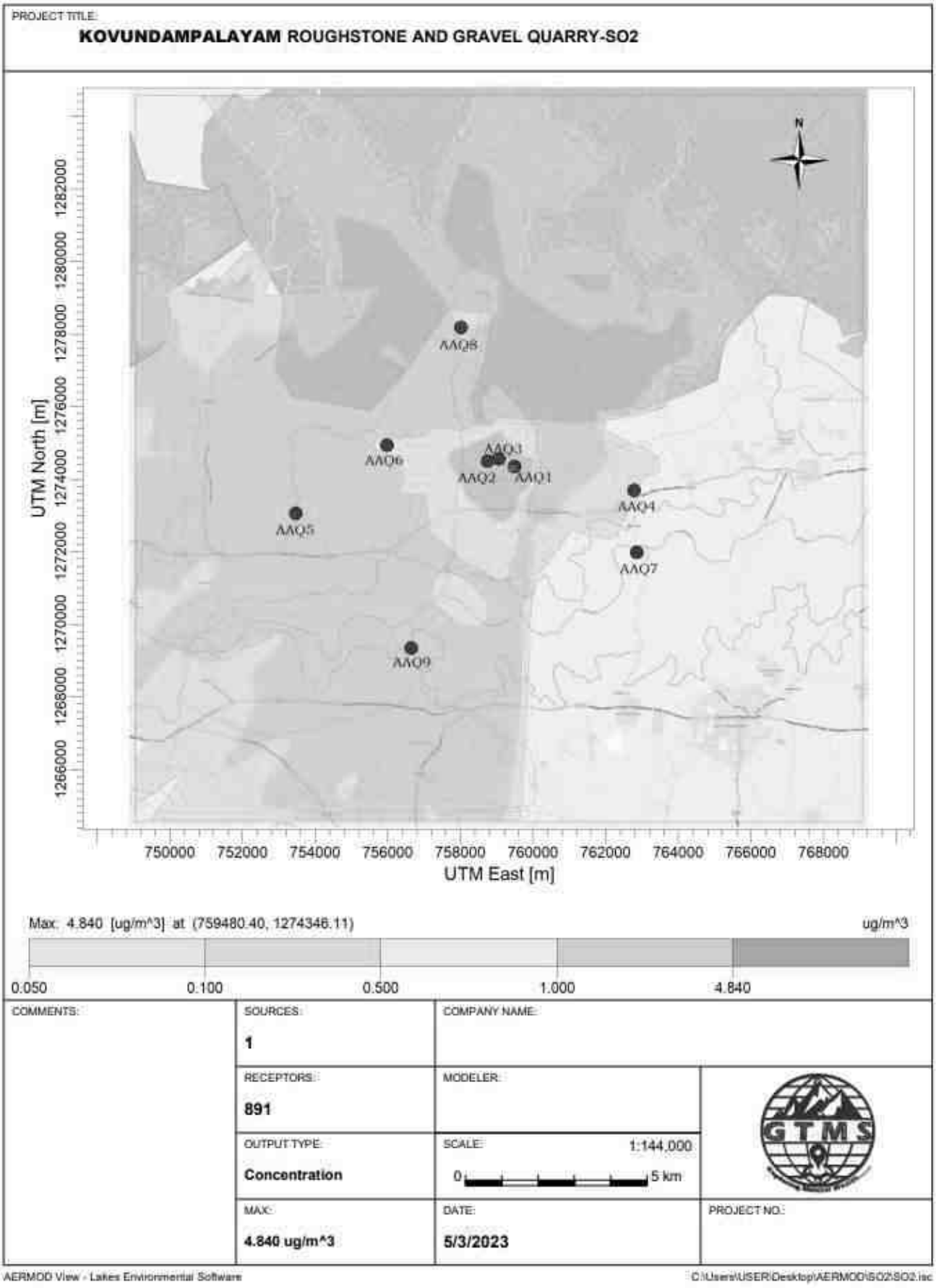


Figure 4.3 Predicted Incremental Concentration of SO_2

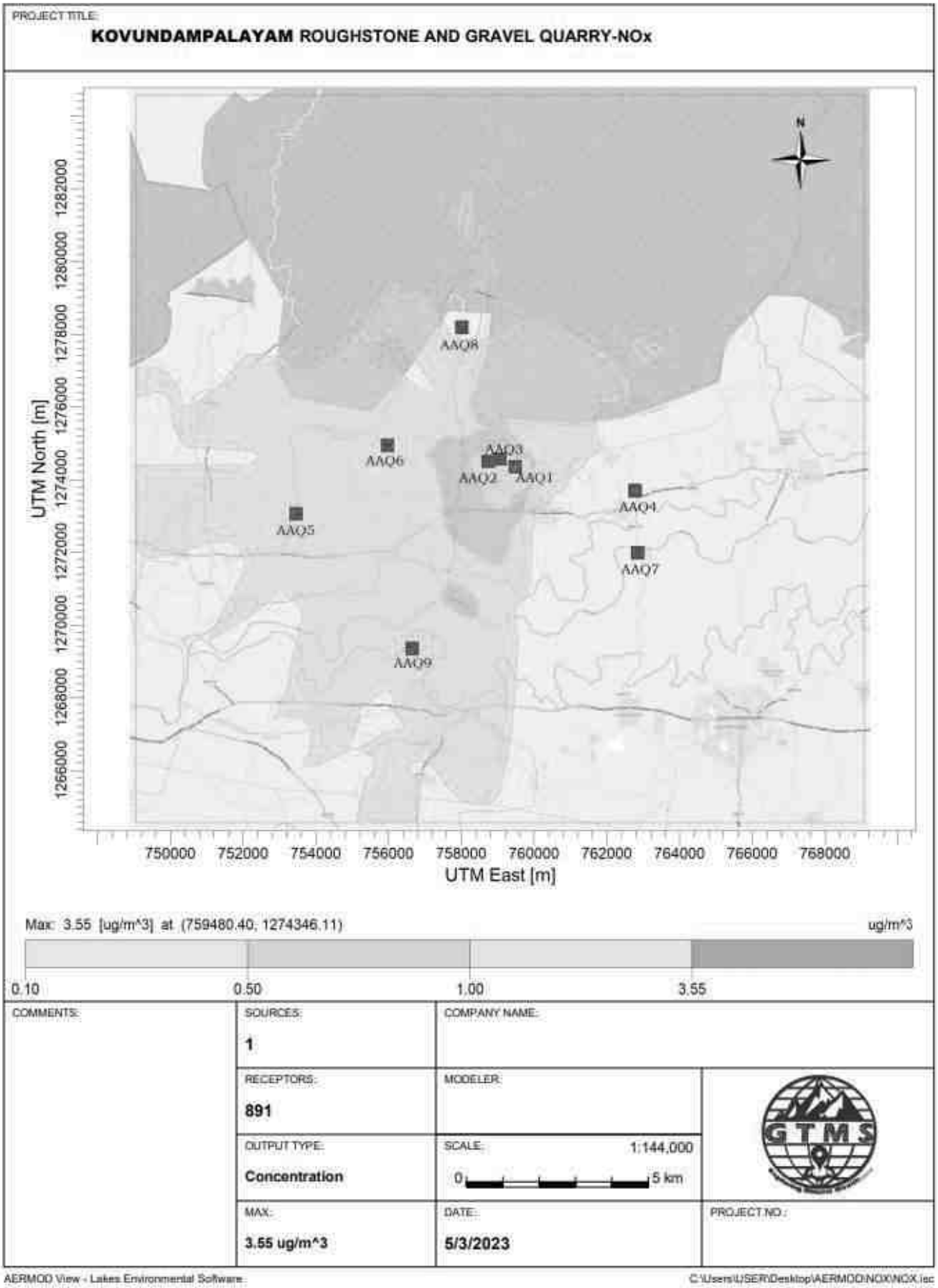


Figure 4.4 Predicted Incremental Concentration of NOx

Table 4.5 Incremental & Resultant GLC of SO_2

Station ID	Distance to core area (km)	Direction	SO_2 concentrations($\mu g/m^3$)			Comparison against air quality standard (80 $\mu g/m^3$)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	--	--	10.2	4.84	15.04	Below standard	47.45	Not significant
AAQ2	0.60	W	11.0	4.84	15.84		44.00	
AAQ3	0.33	NW	10.4	4.84	15.24		46.54	
AAQ4	3.35	E	13.7	0.1	13.8		0.73	
AAQ5	6.0	SW	10.7	0.5	11.2		4.67	
AAQ6	3.40	W	11.6	1	12.6		8.62	
AAQ7	4.05	SE	14.0	0	14		0.00	
AAQ8	4.04	NW	9.8	0.5	10.3		5.10	
AAQ9	5.57	S	10.9	0.1	11		0.92	

Table 4.6 Incremental & Resultant GLC of NO_X

Station ID	Distance to core area (km)	Direction	NO_X concentrations($\mu g/m^3$)			Comparison against air quality standard (80 $\mu g/m^3$)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	--	--	16.3	3.55	19.85	Below standard	21.78	Not significant
AAQ2	0.60	W	16.9	3.55	20.45		21.01	
AAQ3	0.33	NW	16.6	3.55	20.15		21.39	
AAQ4	3.35	E	11.0	0	11		0.00	
AAQ5	6.0	SW	17.0	0.5	17.5		2.94	
AAQ6	3.40	W	19.1	0.5	19.6		2.62	
AAQ7	4.05	SE	14.0	0	14		0.00	
AAQ8	4.04	NW	26.6	0	26.6		0.00	
AAQ9	5.57	S	18.2	0.5	18.7		2.75	

The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective

mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further.

4.4.3 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.

Advantages of Wet Drilling

- In this system dust gets suppressed close to its formation. Dust suppression becomes very effective and the work environment will be improved from the point of view of occupational comfort and health
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased
- The life of drill bit will be increased
- The rate of penetration of drill will be increased. Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting

- Suitable time of blasting will be chosen according to the local conditions and water will be sprinkled on blasting face.
- Blasting will be avoided when temperature inversion is likely to occur and strong wind blows towards residential areas.
- Controlled blasting will be carried out using suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone.
- Blasting will be restricted to a particular time of the day i.e., at the time of lunch hours.
- Before loading of material water will be sprayed on blasted material.
- Dust mask will be provided to the workers and their use will be strictly monitored.

Haul Road and Transportation

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

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

Green Belt

- ❖ Planting of trees all along 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, 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.

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

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	Blasting	Yes	94
2	Jack hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total			**95.8**

**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 95.8 dB (A). Generally, most mining operations produce noise between 100-109 dB (A). We have considered equipment and operation noise levels (max) to be approx. 109 dB (A) for noise prediction modelling.

Table 4.8 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level (dBA)	Total (dBA)
Core Zone	100	37.6	57.16	57.21
Core Zone	600	38.5	41.60	43.33
Core Zone	320	38.9	47.06	47.67
T.N.Palayam	260	38.6	48.86	49.25
Uppupallam	3360	37.8	26.63	38.12
Vettuvanpudur	5990	39.7	21.61	39.77
Sulekal	3900	41.0	25.34	41.12
Nanjaipuliampatti	4060	38.0	24.99	38.21
Vinobanagar	4030	40.8	25.05	40.91
Pallapalayam	5550	39.3	22.27	39.39
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 57.16 dB (A) in core zone and ranges between 21.61 and 48.86dB (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

- ❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- ❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- ❖ Silencers / mufflers will be installed in all machineries
- ❖ Greenbelt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness
- ❖ Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects

4.5.3 Ground Vibrations

Ground vibrations due to the proposed mining activities are anticipated due to operation of mining machines like excavators, drilling and blasting, transportation vehicles, etc., however, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The 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	20	260	0.85	19	0.15	138

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	20	100	3.46	19	0.47	148
		200	1.14		0.21	140
		300	0.59		0.13	136
		400	0.37		0.09	133
		500	0.26		0.07	131

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
- The species in the lease area include them 2 Trees (25%), 3 Shrubs (37.5%), and Herbs 3 (37.5%) were identified Quarry lease area has the highest abundance of Prosophis juliflora followed by Azadirachta indica. Trees are few and shrubs and herbs are more than trees.
- 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 2558 kg per day, 690565 kg per year and 228200 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	169	45640	228200
Fuel consumption of compressor	20	5400	27000
Fuel consumption of tipper	765	206633	1033167
Total fuel consumption in liters	954	257673	1288367
Co_2 emission in kg	2558	690565	3452823

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.
- The floral (8) varieties among them 2 Trees (25%), 3 Shrubs (37.5%), and Herbs 3 (37.5%) were identified. As the survival rate due to uprooting was only 30%, 20 seedlings were procured at 10 seedlings per tree. Seedlings are planted and protected in a 7.5- -meter safety zone.
- 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 995 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 88 kg of the total carbon, as provided in Table 4.12.

Table 4.12 CO_2 Sequestration

CO_2 sequestration in kg	88	23856	119281
Remaining CO_2 not sequestered in kg	2469	666708	3333542
Trees required for environmental compensation	27780		
Area required for environmental compensation in hectares	56		

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 4.14-4.15. For greenbelt development, species are recommended, as shown in Table 4.12 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	*Azadirachta indica*	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	*Techtona grandis*	Lamiaceae	Teak	Tree	
3	*Polyalthia longifolia*	Annonaceae	Nettilingam	Tree	
4	*Albizia lebbeck*	Fabaceae	Vagai	Tree	
5	*Delonix regia*	Fabaceae	Cemmayir-konrai	Tree	
6	*Bauhinia racemosa*	Fabaceae	Aathi	Tree	
7	*Cassia fistula*	Fabaceae	Sarakondrai	Tree	
8	*Aegle marmelos*	Rutaceae	Vilvam	Tree	
9	*Pongamia pinnata*	Fabaceae	Pungam	Tree	
10	*Thespesia populnea*	Malvaceae	Puvarasu	Tree	

Table 4.14 Greenbelt Development Plan

	No. of trees proposed for plantation	**No. of trees expected to survive @ 80%**	**Area to be covered(m^2)**
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	398	318	3582
	Number of plants outside the mine lease area		
	597	478	5373
Total	**995**	**796**	**8955**

Table 4.15 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recuring Cost-per annum
Plantation inside the mine lease area (in safety margins)	398	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))"	79600	11940
Plantation outside the area	597	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	179100	17910
Total			**2,58,700**	**29,850**

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.

4.6.3. Anticipated Impact on Fauna

- No rare, endemic & endangered species are reported in the core 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.

- ❖ Sathyamangalam Tiger Reserve is located 1.26 km north of IUCN Red Listed Animal Species. As mentioned in Chapter-III Table 3.33. Animal behaviour is affected by noise during quarrying.

4.6.4 Measures for Protection and Conservation of Wildlife Species

- ❖ 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.
- ❖ Undertaking mitigation 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.

Aquatic Biodiversity

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

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	Guthiyalathur reserve forest is located in 1.26km North.
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.	Less severe	No immediate action required. However, Greenbelt

			Clearance of these species will not result in loss of flora		/plantation will be developed in project site and in periphery of the project boundary, which will improve flora and fauna diversity of the project area.
		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.		
		-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.

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 Anticipated Impact from Proposed and Existing Projects

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

4.7.2 Common Mitigation Measures for Proposed Project

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

4.8 OCCUPATIONAL HEALTH AND SAFETY

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

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

4.8.1 Respiratory Hazards

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

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

4.8.2 Noise

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

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

4.8.3 Physical Hazards

The following measures are proposed for control of physical hazards

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

4.8.4 Occupational Health Survey

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

- General physical tests

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

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

4.9 MINE WASTE MANAGEMENT

No waste is anticipated from any of the proposed quarries.

4.10 MINE CLOSURE

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

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

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

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.10.1.1 Physical Stability

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

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

4.10.1.2 Chemical Stability

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

4.10.1.3 Biological Stability

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

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

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

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

CHAPTER V
ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

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

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

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

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

5.2 ANALYSIS OF ALTERNATIVE SITE

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

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

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

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

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

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

CHAPTER VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

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

6.1 METHODOLOGY OF MONITORING MECHANISM

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

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

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

❖ Seeking expert's advice when needed.

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

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

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

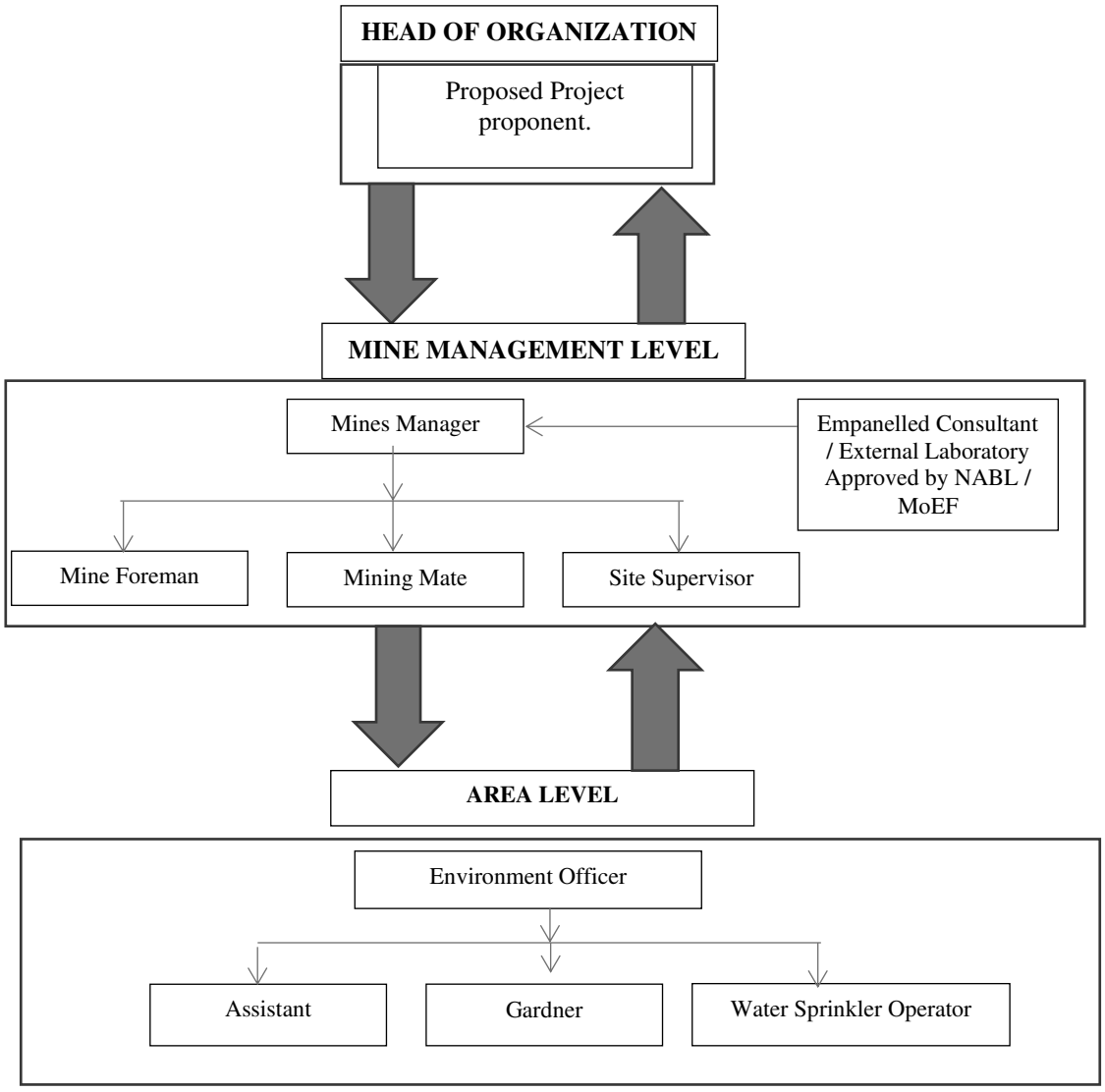


Figure 6.1 Proposed environmental monitoring chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

Table 6.1 Implementation Schedule for Proposed Project

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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

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

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels

- ❖ Soil quality and
- ❖ Greenbelt development

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

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

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

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

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

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

Table 6.3 Environment Monitoring Budget

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

Source: Field Data

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

CHAPTER VII

ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

- 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	✓ 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	✓ 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

		air, hoses may burst; Drill Rod may break;	blaster/blasting foreman has made a thorough Examination of all places, ✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other. ✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ✓ Operator shall regularly use all the personal protective equipment.
3	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material While reversal & overtaking of vehicle Operator of truck leaving	✓ 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

		his cabin when it is loaded.	
4	Natural calamities	Unexpected happenings	✓ Escape Routes will be provided to prevent inundation of storm water ✓ Fire Extinguishers & Sand buckets
5	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and Proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

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

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

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

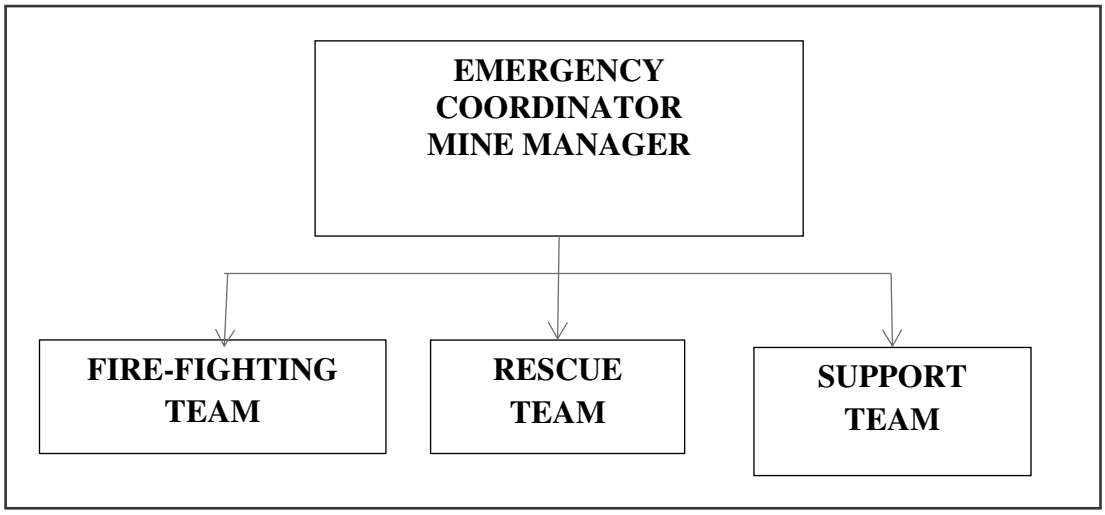


Figure 7.1 Disaster management team layout for proposed project

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 carryout 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 in P1

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.
- ❖ Regular maintenance and testing of all mining equipment were carried out as per manufacturer's guidelines.

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, 3 proposed projects known as P1, P2, P3 is taken into consideration. The details of P1 have been given in Table 1.2 and the details of P2 and P3 are given in the Table 7.4 and 7.5.

Table 7.4 Salient Features of the Proposed Project

Name of the Quarry	Thiru.S.Kandasamy Rough Stone and Gravel Quarry		
Type of Land	Patta Land		
Extent	2.66.0		
S.F.No	63/1, 64/1A, 64/3A and 64/5A		
Toposheet No	58-E/06		
Latitude	11° 31' 05.96"N to 11° 31' 12.03"N		
Longitude	77° 22' 17.19"E to 77° 22' 24.38"E		
Highest Elevation	240m ASML		
Existing Pit Dimensions	Length (m)	Width (m)	Depth (m)
	100	50	12
Ultimate depth of Mining	131m (L) x 137m (W) x 40m (D)		
Geological Resources	Rough Stone in m^3	Gravel in m^3	
	7,56,610	33,846	

Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	2,83,295	25,380
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3 / 3 years
	2,83,295	25,380
Method of Mining	Open-Cast Semi Mechanized mining	
Topography	Flat Terrain	
Machinery proposed	Jack Hammer	8
	Compressor	2
	Tipper	2
	Excavator	4
Blasting Method	Controlled blasting method by shot hole drilling and small dia. of 25mm slurry explosives are proposed to be used for shattering heaping effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	36 Nos	
Project Cost	Rs.63,91,000/-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	3.0 KLD	

Table 7.5 Salient Features of the Proposed Project

Name of the Quarry	K. Indirani Roughstone Quarry	
Type of Land	Patta land	
Extent	2.91.5 ha	
S.F. No.	55/1A(P), 55/3(P), and 58	
Toposheet No.	58-E/06	
Latitude	11°30'59.07"N to 11°31'08.46"N	
Longitude	77°22'22.79"E to 77°22'31.18"E	
Ultimate Depth of Mining	41 m (16 m AGL and 25 m BGL)	
Existing Pit Dimension	Pit 1: 230 m (L) X 112 m (W) X 30 m (D) Pit 2: 105 m (L) X 37 m (W) X 36 m (D)	
Ultimate Pit Dimension as per ToR	Pit 1: 123 m (L) X 85 m (W) X 41 m (D)	
Geological Resources	Rough stone (m^3)	Topsoil (m^3)

	1162270	5560
Mineable Reserves	Rough stone (m^3)	Topsoil (m^3)
	298200	2006
Proposed production for 5 years	Rough stone (m^3)	Topsoil (m^3)
	298200	2006
Method of Mining	Open cast mining method	
Topography	Undulated	
Machinery proposed	Jack hammer	10
	Compressor	3
	Excavator	2
	Tipper	4
Blasting Method	Controlled blasting involving shot-holes and slurry explosives of 25 mm diameter.	
Proposed Manpower Deployment	40 persons	
Project Cost	Rs. 69,97,000	
CER Cost	Rs. 5.00,000	
Proposed Water Requirement	3.5 KLD	

7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from three proposed projects have been given in Tables 7.6 and 7.7.

Table 7.6 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	**5 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	278750	55750	206	34
P2	283295	56659	210	35
P3	298200	59640	221	37
Grand Total	**860245**	**172049**	**637**	**106**

Table 7.7 Cumulative Production Load of Gravel

Quarry	Production for 3 Year (m^3)	Yearly Production (m^3)	Daily Production (m^3)	Number of Lorry Loads Per Day
P1	31200	10400	38	6
P2	25,380	8460	31	5
P3	--	--	--	--
Grand Total	**56580**	**18860**	**69**	**11**

The cumulative study shows that the overall production of rough stone from the quarry is 637 m^3 per day with a capacity of 106 trips of rough stone per day and that production of gravel from the proposed quarry is 56580 m^3 per day accounting for 11 trips/day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the 3 proposed projects on air environment of the cluster have been provided in Table 7.8. The cumulative values resulting from the 3 projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.8 Cumulative Impact Results from the 3 proposed projects

Pollutants	Baseline Data (µg/m^3)	Incremental Values (µg/m^3)			Cumulative Value (µg/m^3)
		P1	P2	P3	
$PM_{2.5}$	19.9	6.51	15.8	11.87	54.08
PM_{10}	38.3	10.36	22.8	24.90	96.36
SO_2	8.4	4.85	8.08	6.82	28.15
NO_2	16.3	3.55	7.88	13.67	41.4

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.7.9 Cumulative Impact of Noise from 3 Proposed Quarries on T.N. Palayam Habitation

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	260	SE	38.6	48.86	49.25	55
Habitation Near P2	850	SE	38.6	38.57	41.60	
Habitation Near P3	680	SE	38.6	40.51	42.67	
Cumulative Noise (dB (A))					**50.70**	

Source: Lab Monitoring Data

The cumulative analysis of noise due to 3 proposed projects shows that habitation of T.N. Palayam will receive about 50.70dB (A), respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for day time.

Ground Vibrations

Cumulative results of ground vibrations due to mining activities in the all the 4 mines have been shown in Table 7.10.

Table 7.10 Cumulative Effect of Ground Vibrations Resulting from 4 Mines on Habitation of T.N. Palayam

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	20	260	0.75
P2	20	850	0.11
P3	21	680	0.16
E1	17	960	0.08
Total			**1.1**

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

7.4.3 Socio Economic Environment

Socio Economic benefits of the 3 proposed projects were calculated and the results have been shown in Table 7.11 the project together will contribute Rs. 1,63,66,100/- towards CER fund.

Table 7.11 Socio Economic Benefits from 3 Mines

Location ID	Project Cost	CER Cost @ 2%
P1	69,98,000	Rs. 5,00,000
P2	63,91,000	Rs. 5,00,000
P3	63,97,000	Rs. 5,00,000
Grand Total	**1,34,87,800**	**Rs. 15,00,000**

Table 7.12 Employment Benefits from 3 Mines

Location ID	Employment
P1	20
P2	36
P3	40
Grand Total	**96**

A total of 96 people will get employment due to 3 proposed mines in cluster

7.4.4 Ecological Environment

Table 7.13 Greenbelt Development Benefits from 3 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	995	8955	796	*Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis,* etc.,
P2	1330	11970	1064	
P3	1458	13118	1166	
Total	**3783**	**34043**	**3026**	

Cumulative studies show that the 3 proposed projects will plant about 3783 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Techtona grandis,* etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 3026 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 7.14.

Table 7.14 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 sequalae 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 0_2 < 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 Kaundampalayam Village aims to produce **309950 m^3** of rough stone and **31200 m^3** of gravel over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 20 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

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

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

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

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the

labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.5 OTHER TANGIBLE BENEFITS

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

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

8.6 CORPORATE SOCIAL RESPONSIBILITY

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

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

- Health Services
- Social Development
- Infrastructure Development
- Education & Sports
- Self-Employment
- CSR Cost Estimation
- CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Kaundampalayam Village. 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 ≤ 100 crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 5,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

Table 8.1 CER Action Plan

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

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

8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs. 2,36,79,980** 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	1,83,92,070	10,29,600
District Mineral Foundation Tax @ 10% of Seigniorage	18,39,207	1,02,960
Green Tax @ 10% of Seigniorage	18,39,207	1,02,960
Total	**2,25,70,484**	**12,35,520**

CHAPTER IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

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

10.1 ENVIRONMENTAL POLICY

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance. The Proponent Mr.T.M.Manoharan, Mr.K.Subramaniam, Mr.R.P.Jaganathan will:

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

10.1.1 Description of the Administration and Technical Setup

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

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

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

10.2 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 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 32 m. The water table in the area is at 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 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
Conduct 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 access 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 access 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 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(m^2)**
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	398	318	3582
	Number of plants outside the mine lease area		
	597	478	5373
Total	**995**	**796**	**8955**

Source: Proposed by FAEs & EIA Coordinator

About 995 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	1st Year	2nd Year	3rd Year	4th Year	5th 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	✓ 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,	Employees assigned to new work tasks	Before new Assignments	Variable	✓ Task-specific health &safety procedures and SOP for various mining activity

Dewatering, Haul Road maintenance.				✓ Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	✓ 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	✓ 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 (Rs.)	Recurring Cost/annum (Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare (Proposed Project Area = 1.99.0 ha)	19900	19900
	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	75000	7500
	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	30000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	7500
	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	39800
	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	780500
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum (1.99.0 ha X 10000)	19900	9950
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	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	80000	20000
and Safety	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	20000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	7960
	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 (1.99.0 hectare)	398000	19900
	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	99500	19900
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1st Class / 2nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000

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))"	79600	11940
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	179100	17910
Mine Closure	Closure includes 10% of the ammount alloted 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	67660
	G.O.(Ms). No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Roughstone = Rs.59 and for Gravel= Rs.33)	1942167	0
TOTAL			**3903367**	**1934760 (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
1934760	2031498	2133073	2239727	2419373	10758430	14467015

In order to implement the environmental protection measures, an amount of **Rs. 3903367** as capital cost and recurring cost as **Rs.1934760** 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. 14467015** 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

11.1 PROJECT DESCRIPTION

The proposed project deals with excavation of rough stone and gravel which is primarily used in construction projects. The method adopted for rough stone and gravel excavation is an open cast semi-mechanized mining method involving drilling, blasting and formation of benches with 5 m height and 5 m width and secondary blasting. The proposed project area is located between latitudes from 11°31'1.41"N to 11°31'5.74"N and from longitudes from 77°22'38.63"E to 77°22'44.49"E in Kaundampalayam Village, Gobichettipalayam Taluk, Erode District, and Tamilnadu. The project site is a Patta land with the extent of 1.99.0 ha owned by the project proponent. The proponent had applied for quarry lease on 04.06.2018 to extract rough stone and gravel and obtained the precise area communication letter issued by Department of Geology and Mining, Erode vide Rc.No.15255/Mines/2018, dated:10.02.2023. 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, Erode Rc.No.15255/Mines/2018, dated:21.02.2023.

According to the approved mining plan, about 278750 m^3 of rough stone and about 31200 m^3 of gravel will be mined up to the depth of 32 m BGL in the first five years.

To achieve the estimated production, 3 jack hammers, 1 compressor, 1 excavator with bucket/rock breaker, and 6 tippers will be deployed. To operate the machineries and to break the rough stone to preferred dimension, about 20 persons will be employed. At the end of the quarry life, the dimension of the ultimate pit will be 156 m*100 m*47 m and At Present, about 1.99.0 ha of land is unutilized; Whereas, at the end of the mine life, about 1.56.0 ha of land will have been quarried; about 0.30.0 of land is used for green belt and 0.05.0 will be used for roads and 0.02.0 of land is used for infrastructure. The final mine closure plan shows that about Rs**. 676600** with the annual recurring cost of Rs. **59700** will be spent towards mine closure.

11.2 DESCRIPTION OF THE ENVIRONMENT

The baseline monitoring studies were carried out during October through December, 2021 to assess the existing environmental conditions in the study area. For the purpose of the 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 for land, water, air, noise, ecology, socio-economy, and traffic.

11.2.1 Land Environment

Land Use and Land Cover (LULC) map was prepared using Sentinel II image for the study area of 5 km radius to provide a baseline status of the study area covering 5 km radius around the proposed mine site. Totally, 8 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 24.77 ha accounting for 0.33 %, of which lease area of 1.99.0 ha contributes only about 0.026%. This small percentage of mining activities shall not have any significant impact on the land environment.

11.2.2 Soil Characteristics

Seven soil samples were obtained from the study area and sent to laboratory for analysing physical and chemical characteristics of soil.

Physical Characteristics

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is clay loam. pH of the soil varies from 7.97 to 8.85 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 290 to 460 µs/cm. Bulk density ranges between 0.73 and 1.23 g/cm^3.

Chemical Characteristics

Nitrogen ranges between 115 and 180 kg. Phosphate ranges between 0.55 and 1.24kg. Potassium ranges between 21.5 and 44.5kg. Calcium ranges between 127 and 180 mg/kg. Organic matter content ranges between 1.32 and 2.62%.

11.2.3 Water Environment

Surface Water Resources

Bavani River is the prominent surface water resources present in the study area. This river was ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 4.8 km SE of Bavani River, as shown in Table 3.6 and Figure 3.7. One surface water sample, known as SW1 were collected from the Bavani River to assess the baseline water quality. Table 3.6 summarizes surface water quality data of the collected sample. Result for surface water sample in the Table 3.6 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

Ground Water Resources

Dug wells and bore wells are the most common ground water abstraction structures in the area. Five groundwater samples, known as OW01, OW02, OW03, BW01, and BW02

collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water. Ground water sampling locations and their distance and direction from the lease area are provided in Table 3.5 and the spatial occurrence of water sampling locations is shown in Figure 3.7. Table 3.6 summarizes ground water quality data of the five samples. Results for ground water samples in the Table 3.7 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

11.3 AIR ENVIRONMENT

Site Specific Meteorology

Site specific meteorology during the study period was recorded by an automated weather station. According to the onsite data, the temperature in October, 2021 varied from 20.39 to 32.15^0 C with the average of 24.98^0 C; in November, 2021 from 19.26 to 28.66^0 C with the average of 23.44^0 C; and in December, 2021 from 14.29 to 29.39^0 C with the average of 22.12^0C. In October, 2021, relative humidity ranged from 51.19 to 98.81 % with the average of 85.14%; in November, 2021, from 60.88 to 100 % with the average of 90.21 %; and in December, 2021, from 51.69 to 100 % with the average of 85.07 %. The wind speed in October, 2021 varied from 0.15 to 5.18 m/s with the average of 1.89 m/s; in November, 2021 from 0.07 to 4.66 m/s with the average of 1.97 m/s; and in December, 2021 from 0.26 to 4.68 m/s with the average of 2.07 m/s. In October, 2021, wind direction varied from 0.00 to 359.30^0 with the average of 190.82^0; in November, 2021, from 0.17 to 359.80^0 with the average of 169.25^0; and in December, 2021, from 0.00 to 359.27^0 with the average of 92.67^0. In October,2021, surface pressure varied from 95.38 to 96.74 kPa with the average of 96.16 kPa; in November, 2021, from 95.24 to 96.68 kPa with the average of 96.20 kPa; and in December, 2021, from 96.12 to 97.03 kPa with the average of 96.58 kPa**.**

Ambient Air Quality Results

As per the monitoring data, $PM_{2.5}$ ranges from 17.4 µg/m^3 to 21.1 µg/m^3; PM_{10} from 33.9 µg/m^3 to 39.8 µg/m^3; SO_2 from 5.2 µg/m^3 to 7.5 µg/m^3; NO_2 from 20.3 µg/m^3 to 23.4 g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

11.4 NOISE ENVIRONMENT

Noise level in core zone was 37.6 dB (A) Leq during day time and 34.4 dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 38.0 to 41.0dB (A) Leq and during night time from 34.8 to 38.2dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.5 BIOLOGICAL ENVIRONMENT

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is 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.

11.6 SOCIO-ECONOMIC ENVIRONMENT

An attempt has been made to assess the impact of the proposed mining project on Socio-economic aspect of the study area. The various attributes that have been taken into account are population composition, employment generation, occupational shift, household income and consumption pattern. Implementation of the Proposed Mine Project will generate both direct and indirect employment. Besides, mining operation will be legally valid and it will bring income to the state exchequer. At present seasonal agriculture is the main occupation of the people as more than half of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in mining-based activities rather in seasonal agriculture.

11.7 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES FOR PROPOSED PROJECT

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

Table 11.1 Anticipated Impacts & Mitigation Measures

Impact	Mitigation Measure
Land Environment	
❖ Destruction of natural landscapes ❖ Changes in soil characteristics ❖ Soil erosion and slope instability	❖ 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	
❖ 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.	❖ 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.
Air Environment	
❖ Generation of Fugitive Dust ❖ Dust will be generated mainly during excavation, loading &unloading activities.	❖ 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.

❖ Gaseous pollutants will by 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. ❖ 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.	❖ 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 action will be taken to address any potholes or damage to the road surface. ❖ 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 10°0 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 defects immediately to the site manager to enable repairs to be carried out promptly.
Noise & Vibration	
❖ Annoyance and deterioration of the quality of life; ❖ Propelling of rocks fragments by blasting. ❖ Shaking of buildings and people due to blasting;	❖ Usage of sharp drill bits while drilling which will help in reducing noise; ❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders; ❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained; ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system; ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;

	❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise; ❖ Silencers / mufflers will be installed in all machineries; ❖ 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 though training and awareness.
Biological Environment	
❖ 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.	❖ 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	
❖ 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;	❖ 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.
Occupational Health & Safety	
❖ Exposure to Dust ❖ Noise and Vibration Exposure ❖ Physical Hazards ❖ Respiratory hazards due to Dust exposure	❖ 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

11.8 ANALYSIS OF ALTERNATIVES

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

- ❖ The mineral deposit occurs in a non-forest area.
- ❖ There is no habitation within the applied lease area; hence no R & R issues exist.
- ❖ There is no river, stream, nallas and water bodies in the or passing through 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 accessible.
- ❖ Mine connectivity through road and rail is good.
- ❖ The proposed mining operations do not intersect the ground water level. Hence, no impact on ground water environment.

11.9 ENVIRONMENTAL MONITORING PROGRAM

Environmental Monitoring program will be conducted for various environmental components such as air quality, meteorology, water quality, water level monitoring, soil quality, noise level, vibration, and greenbelt as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB. For this environmental monitoring program, Rs **2,95,000** /- per annum will spent by the project proponent. 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 and 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.

11.10 ADDITIONAL STUDIES

Public Consultation

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.

Risk Analysis & Disaster Management Plan

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.

Cumulative Impact Studies

- The results on the cumulative impact of the three proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.
- PPV resulting from three proposed projects is well below the permissible limit of Peak Particle Velocity of 8 mm/s.
- The three proposed projects will allocate Rs.15,00,000/- towards CER as recommended by SEAC.
- The three proposed projects will directly provide jobs to about 96 local people.
- The three proposed projects will plant about 3783 saplings in and around the lease area.
- The three proposed projects will add 637 PCU per day to the nearby roads.

11.11 PROJECT BENEFITS FOR PROPOSED PROJECT

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

- ❖ Direct employment to 20 local people
- ❖ 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.,
- CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Kaundampalayam Village. CSR budget is allocated as 2.5% of the profit.
- Rs. 5,00,000 will be allocated for CER.

11.12 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs.3708585** as capital cost and recurring cost as **Rs.1934760** 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. 14467015.**

11.13 CONCLUSION

EIA study was performed as per the approved 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, 1. Thiru.T.M.Manoharan, S/o. Marannan, 2. Thiru .K.Subramaniam, S/o. Kolanthaigounder 3. Thiru.R.P. Jaganathan, S/o. Palanigounder 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 :

Name : **Dr. S. Karuppannan**

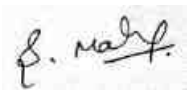
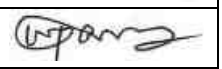
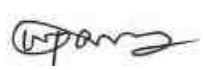
Designation : EIA Coordinator

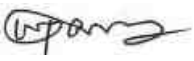
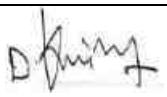
Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for 1. Thiru.T.M.Manoharan,S/o.Marannan,2. Thiru.K.Subramaniam, S/o. Kolanthaigounder 3. Thiru.R.P. Jaganathan, S/o. Palanigounder rough stone and gravel quarry project with the extent of 1.99.00 ha situated in the cluster with the extent of **9.56.5** ha in Kaundampalayam Village of Gobichettipalayam Taluk, Erode District of Tamil Nadu is true and correct to the best of our knowledge.

List of Functional Area Experts Engaged in this Project

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

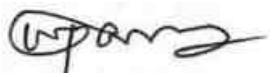
		fauna. o Suggesting species for greenbelt development.		
7	RH	o Identification of hazards and hazardous substances o Risks and consequences analysis o Vulnerability assessment o Preparation of Emergency Preparedness Plan o Management plan for safety.	J.N. Manikandan	
8	LU	o Construction of Land use Map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

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	G. Prithiviraj	LU, HG	○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU and HG	
2	C. Kumaresan	NV	○ Assistance to FAE in both primary and secondary data collection ○ Assistance in noise prediction modelling	
3	P. Vellaiyan	HG & GEO	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
4	S.Vasugi	AQ	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
5	P. Dhatchayini	AQ	○ Site visit with FAE ○ Assistance to FAE in collection of both primary and secondary data	
6	V. Malavika	NV, SHW	○ Site visit along with FAE ○ Assistance in report preparation	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, **Dr. S. KARUPPANNAN,** Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for 1.Thiru.T.M.Manoharan,S/o.Marannan,2. Thiru.K.Subramaniam, S/o. Kolanthaigounder 3. Thiru.R.P. Jaganathan, S/o. Palanigounder rough stone and gravel quarry project with the extent of 1.99.00 ha located within the cluster of **9.56.5** ha in Kaundampalayam Village of Gobichettipalayam Taluk, Erode District of Tamil Nadu is true and correct to the best of my knowledge.

Signature	:	
Date	:	
Name	:	**Dr. S. Karuppannan**
Designation	:	Managing Partner
Name of the EIA Consultant Organization	:	Geo Technical Mining Solutions
NABET Certificate No & Issue Date	:	NABET/EIA/2124/SA0184
Validity	:	Till 31.12.2023

ANNEXURE-I

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.9860/ToR- 1455/2023 Dated: 10.05.2023.

To

1. Thiru.T.M.Manoharan, S/o.Marannan,
2. Thiru.K. Subramaniam, S/o.Kolanthaigounder
3. Thiru.R.P. Jaganathan, S/o.Palanigounder

Kovundampalayam Village,
T.N.Palayam,
Gobichettipalayam,
Erode- 638506.

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference with public Hearing (ToR) for the Proposed Rough Stone and Gravel quarry over an extent of 1.99.00 Ha in S.F.No. 49/2, 49/3 & 49/4A of Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu by 1. Thiru. T. M. Manoharan, 2. Thiru. K. Subramaniam, 3. Thiru. R.P. Jaganathan- under project category – "B1" and Schedule S.No.1 (a) – ToR issued along with Public Hearing - preparation of EIA report – Regarding.

Ref:
1. Online proposal No. SIA/TN/MIN/419734/2023, dated: 24.02.2023.
2. Your application submitted for Terms of Reference dated: 28.02.2023.
3. Minutes of the 366th SEAC meeting held on 30.03.2023.
4. Minutes of the 613th Authority meeting held on 21.04.2023.

MEMBER SECRETARY
SEIAA-TN

5. Minutes of the 369th SEAC meeting held on 20.04.2023.
6. Minutes of the 616th Authority meeting held on 10.05.2023.

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

The proponent, 1. Thiru. T. M. Manoharan, 2. Thiru. K. Subramaniam, 3. Thiru. R.P. Jaganathan has submitted application for Terms of Reference (ToR), for the proposed Rough Stone and Gravel quarry over an extent of 1.99.00 Ha in S.F.No. 49/2, 49/3 & 49/4A of Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu.

SEAC Remarks: -

The proposal was placed in the 366th Meeting of SEAC held on 30.03.2023. The project proponent gave detailed presentation. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

The SEAC noted the following:

1. The project proponent, 1. Thiru. T. M. Manoharan, 2. Thiru. K. Subramaniam, 3. Thiru. R.P. Jaganathan has applied for Terms of Reference for the proposed Rough Stone and Gravel quarry over an extent of 1.99.00 Ha in S.F.No. 49/2, 49/3 & 49/4A of Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining of Mineral Projects" of the Schedule to the EIA Notification, 2006.
3. As per mining plan, the lease period is 10 years. The mining plan is for 5 years & production should not exceed 2,78,750 cu.m of Rough Stone and 31,200cu.m of Gravel. The annual peak production 65,720cu.m of Rough Stone & 13,200cu.m of Gravel. The depth of mining would be 32m BGL.
4. Earlier the proposal was placed in 366th SEAC meeting held on 30.03.2023. SEAC decided to defer the subject and this subject will be taken up in ensuing meeting for further discussion.

Subsequently, the proposal was placed in the 369th SEAC meeting held on 20.04.2023. Based on the presentation made by the proponent SEAC decided to recommend for grant of Terms of Reference (TOR) with Public Hearing, subject to the following TORs, in addition to the standard

MEMBER SECRETARY
SEIAA-TN

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 located within 100m, 200m, 300m from the boundary of the mine lease area.
3. 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.
4. 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.
5. The proponent shall submit the details regarding the nature of blasting activity which will be carried out.
6. 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.
7. The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.
8. 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.

MEMBER SECRETARY
SEIAA-TN

9. 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.
10. **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-induced Ground Vibration levels in the proposed quarry as stipulated by the DGMS Circular No.7 of 1997, during the EIA Proposal.**
11. Details of Green belt & fencing shall be included in the EIA Report.
12. 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.
13. 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.
14. 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).
15. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,

MEMBER SECRETARY
SEIAA-TN

16. 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.
17. 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.
18. 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.
19. 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.
20. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
21. 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.
22. 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.
23. 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

MEMBER SECRETARY
SEIAA-TN

proposed mining activities could be considered.

24. 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.
25. Impact on local transport infrastructure due to the Project should be indicated.
26. 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.
27. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
28. 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.
29. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
30. The PP shall produce/display the EIA report, Executive summery and other related information with respect to public hearing in Tamil Language also.
31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I**in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
33. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent

MEMBER SECRETARY
SEIAA-TN

shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner

34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
43. Concealing any factual information or submission of false/fabricated data and failure to

MEMBER SECRETARY
SEIAA-TN

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 616th Authority meeting held on 10.05.2023. The proposal was placed in the 369th SEAC Meeting held on 20.04.2023.

Based on the presentation made by the proponent SEAC recommended 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':

1. The proponent shall submit the impact of mining activity on straying animals and migratory wildlife shall be submitted along with EIA Report.
2. The proponent shall submit the impact of mining activity on Agricultural lands nearby, drainage pattern and underground water flow along with EIA Report.
3. The proponent shall submit the details regarding the impact of mining activity on Climate change, Temperature, Biodiversity, CO_2 Emission, Green House Gas Emission along with EIA Report.

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.

MEMBER SECRETARY
SEIAA-TN

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.

MEMBER SECRETARY
SEIAA-TN

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.

MEMBER SECRETARY
SEIAA-TN

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.

MEMBER SECRETARY
SEIAA-TN

Risk Assessment

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

Disaster Management Plan

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

Others

39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.
40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.
41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

A. STANDARD TERMS OF REFERENCE

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

MEMBER SECRETARY
SEIAA-TN

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.

MEMBER SECRETARY
SEIAA-TN

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

13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

MEMBER SECRETARY
SEIAA-TN

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

MEMBER SECRETARY
SEIAA-TN

transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.

31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have

MEMBER SECRETARY
SEIAA-TN

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.

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SEIAA-TN

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

41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

44) Besides the above, the below mentioned general points are also to be followed: -

a) Executive Summary of the EIA/EMP Report

b) All documents to be properly referenced with index and continuous page numbering.

c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.

d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.

e) Where the documents provided are in a language other than English, an English translation should be provided.

f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.

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

i) As per the circular no. J-11011/618/2010-IA. II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of

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SEIAA-TN

Ministry of Environment, Forest and Climate Change, as may be applicable.

j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.

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16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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SEIAA-TN

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

MEMBER SECRETARY
SEIAA-TN

Copy to:

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board,76, Mount Salai, Guindy, Chennai-600 032.
4. 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, Erode District.
7. Stock File.

From

Thiru. K. Ramesh, M.Sc.,
Deputy Director,
Geology and Mining,
Erode

To

1.Thiru. T.M.Manoharan,
S/o. Marannan,
2.Thiru.K.Subramaniam,
S/o.Kolanthaigounder,
3.Thiru.R.P.Jaganathan,
S/o.Palanigounder,
Koundampalayam Village,
T.N.Palayam,
Gobichettipalayam, Erode - 638506

R.c. No. 15255/ Mines / 2018 dated: 21.02.2023.

Sub: Mines and Minerals – Minor Mineral – Rough Stone and Gravel- Erode District - Gobichettipalayam Taluk - Kovundampalayam Village- S.F.Nos. 49/2 (0.83.5), 49/3 (0.81.0) and 49/4A (0.34.5) - Over an Extent of 1.99.0 Hectares of patta land- Quarry lease for Rough Stone and Gravel- Application preferred by Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan - Precise area communicated - further details requested - furnished regarding.

Ref:
1. Application for Rough Stone and Gravel quarry permission preferred by Thiru. T.M.Manoharan, S/o. Marannan, Thiru.K.Subramaniam, S/o.Kolanthaigounder, Thiru.R.P.Jaganathan, S/o.Palanigounder dated: 04.06.2018.
2. G.O. Ms. No. 79 / Industries (MMC 1) Department dated 06.04.2015.
3. The Deputy Director, Geology and Mining, Erode letter R.C. No. 15255/Mines/2018 dated 10.02.2023.
4. Mining Plan submitted by Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan letter dated 16.02.2023.
5. This office letter even no. dated. 21.02.2023 (Mining Plan approved)
6. Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan letter dated 21.02.2023.

****

In the reference 6th cited above, the applicant Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan has requested to furnish details of other quarry leases of expired, existing and proposed within 500mtr radius from the proposed rough stone and gravel lease over an extent of 1.99.0 Hect in S.F. Nos 49/2 (0.83.5), 49/3 (0.81.0) and 49/4A (0.34.5) Kovundampalayam Village of Gobichettipalayam Taluk, Erode District.

As requested by the applicant, the details of existing, proposed and expired quarries situated within the radius of 500 meters from the subject area are furnished as follows:-

1. Existing quarries:

SNo	Name of the Applicant	S.F.Nos	Extent(Hect)	Lease Period
1.	-------- NIL------			

2. Proposed quarries :

Sl.No	Name of the Applicant	S.F.Nos	Extent (Hect)	Remarks
1.	T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan	49/2, 49/3 and 49/4A	1.99.0 Hect	Fresh lease
2.	S. Kandasamy	63/1, 64/1A, 64/3A and 64/5A	2.66.0 Hect	Previously held under quarrying lease. Lastly held under quarrying lease for the period from 09.03.2009 to 08.03.2014 granted vide District Collector proceeding R.C.No.9557/2009/X-2 dated 09.03.2009. After expiry of the lease period, afresh application has been received on 26.06.2018 and the same is under process.
3.	K. Indirani	55/1A (part), 55/3 (part), and 58	2.91.5 Hect	Previously held under quarrying lease. Lastly held under quarrying lease for the period from 09.03.2009 to 08.03.2014 in S.F. No. 55/3, 55/4A, 58 granted vide District Collector proceeding R.C.No.71408/2007/X-2 dated 09.03.2009. After expiry of the lease period, afresh application has been received on 05.08.2013 and the same is under process.

3. Lease expired and abandoned quarries:

SNo	Name of the Applicant	S.F.Nos	Extent(Hect)	Lease Period
1.	K.Kuppuraj	52/2C	1.27.0 Hect	02.12.2014 to 01.12.2019
2.	Thiru. S. Kandasamy	70/9 part	5.00.0	09.01.2011 to 08.01.2016
3.	Thiru. M. Seenivasan	70/9 south part	2.00.0	26.04.2010 to 25.04.2020

Deputy Director, 21/02/23
Geology and Mining,
Erode

21.02.23

From

Thiru. K. Ramesh, M.Sc.,
Deputy Director,
Geology and Mining,
Erode

To

1.Thiru. T.M.Manoharan,
S/o. Marannan,
2.Thiru.K.Subramaniam,
S/o.Kolanthaigounder,
3.Thiru.R.P.Jaganathan,
S/o.Palanigounder,
Koundampalayam Village,
T.N.Palayam,
Gobichettipalayam, Erode - 638506

R.c. No. 15255 / Mines / 2018 dated: 21.02.2023.

Sub: Mines and Minerals – Minor Mineral – Rough Stone and Gravel- Erode District - Gobichettipalayam Taluk - Kovundampalayam Village- S.F.Nos. 49/2 (0.83.5), 49/3 (0.81.0) and 49/4A (0.34.5) - Over an Extent of 1.99.0 Hectares of patta land- Quarry lease for Rough Stone and Gravel- Application preferred by Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan- Precise area communicated for the proposed grant of quarry lease - Mining Plan Submitted for approval - Approved - regarding.

Ref:
1. Application for Rough Stone and Gravel quarry permission preferred by Thiru. T.M.Manoharan, S/o. Marannan, Thiru.K.Subramaniam, S/o.Kolanthaigounder, Thiru.R.P.Jaganathan, S/o.Palanigounder dated: 04.06.2018.
2. G.O. Ms. No. 79 / Industries (MMC 1) Department dated 06.04.2015.
3. The Deputy Director, Geology and Mining, Erode letter R.C. No. 15255/Mines/2018 dated 10.02.2023.
4. Mining Plan submitted by Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan letter dated 16.02.2023.

****

Thiru. T.M.Manoharan, Thiru.K.Subramaniam, Thiru.R.P.Jaganathan has preferred an application for the grant of Rough Stone and Gravel quarry lease over an extent of 1.99.0 Hectare of Patta land in S.F.Nos 49/2 (0.83.5), 49/3 (0.81.0) and 49/4A (0.34.5) of Kovundampalayam Village, Gobichettipalayam Taluk, Erode District vide the reference 1st cited and the precise area has been communicated to the applicant vide the reference 3rd cited with a direction to submit the approved mining plan and Environmental Clearance.

As directed, the applicant has submitted three copies of mining plan for approval vide the reference 4th cited. The Mining Plan has been verified in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, read with G.O. (Ms). No.79 / Industries (MMC 1) Department dated 06.04.2015, the mining plan is hereby approved, subject to the following conditions:

(i) The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.

(ii) This approval of the mining plan does not in any way convey the approval of the Government in terms or any other provisions of the Mines and Minerals (Development and Regulation) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

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

(iv) The validity of the mining plan is co-terminus with the lease period.

(v) Quarrying shall be done in accordance with 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.

(vi) 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.

(vii) A safety distance of 7.5 meters shall be provided for the patta lands situated adjacent to the applied area.

(viii) A safety distance of 10 meters shall be provided for the Government quarry in S.F.No.38 situated on the Eastern side of the lease applied area.

Encl.: Approved Mining Plan.

21/02/23

Deputy Director,
Geology and Mining,
Erode

21.02.23

Deputy Director * Geology and Mining * Erode

MINING PLAN

FOR KOVUNDAMPALAYAM VILLAGE 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

(Mine plan prepared for first five years)

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

LOCATION OF THE LEASE AREA

STATE	:	**TAMILNADU**
DISTRICT	:	**ERODE**
TALUK	:	**GOBICHETTIPALAYAM**
VILLAGE	:	**KOVUNDAMPALAYAM**
S.F. NO'S	:	**49/2, 49/3 & 49/4A**
EXTENT	:	**1.99.0HECTARES**

ADDRESS OF THE APPLICANT

1.Mr.T.M.Manoharan,
S/o. Marannan,
2.Mr.K.Subramaniam,
S/o. Kolanthaigounder,
3.Mr.R.P.Jaganathan,
S/o. Palanigounder,
Kovundampalayam Village,
T.N.Palayam,
Gobichettipalayam, Erode – 638506.

PREPARED BY

Dr.S.KARUPPANNAN.M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
No: 1/213 -B, Ground Floor, Natesan Complex,
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Website: www.gtmsind.com

Deputy Director * Geology and Mining * Erode

CONTENTS

S. No	Description	Page No.
-	Certificates	5-8
-	Introductory notes	9
1.0	General	11
2.0	Location and Accessibility	12
	PART-A	
3.0	Geology and Mineral reserves	16
4.0	Mining	19
5.0	Blasting	25
6.0	Mine drainage	27
7.0	Stacking of mineral rejects and disposal of waste	27
8.0	Uses of mineral	28
9.0	Others	28
10.0	Mineral processing/Beneficiations	28
	PART-B	
11.0	Environmental management plan	31
12.0	Progressive quarry closure plan	36
13.0	Financial assurance	39
14.0	Certificates	39
15.0	Plan and section, etc	39
16.0	Any other details intend to furnish by the applicant	39
17.0	CSR expenditure	40

Deputy Director Erode Geology and Mining

ANNEXURES

Sl. No.	Description	Annexure No.
1.	Copy of precise area communication letter	I
2.	Copy of **FMB** (Field Measurement book)	II
3.	Copy of Village Map	III
4.	Copy of "A" registered	IV
5.	Copy of computer chitta	V
6.	Photocopy of the proposed lease area	VI
7.	Copy of explosive willing letter, agreement from explosive license holder & explosive license	VII
8.	Copy of ID Proof of the authorized signature	VIII
9.	Copy of RQP Certificate	IX

Deputy Director * Geology and Mining * Erode

LIST OF PLATES

S. No	Description	Plate No.	Scale
1	Key map	I	Not to scale
2	Location plan	I-A	Not to scale
3	Toposheet map	I-B	Scale 1:1,00,000
4.	Satellite imagery map	I-C	Scale 1: 5,000
5.	Environmental plan	I-D	Scale 1: 5,000
6.	Mine lease plan	II	Plan Scale: 1:1000
7.	Surface, Geological plan and sections	III	Plan scale: 1:1000 **Section:** HOR 1:1000 VER 1:500
8.	Year wise development, production plan and sections	IV	Plan scale: 1:1000 **Section:** HOR 1:1000 VER 1:500
9.	Mine layout plan and land use pattern	V	Plan scale: 1:1000
10.	Progressive Mine closure plan and Sections	VI	Plan scale: 1:1000 **Section:** HOR 1:1000 VER 1:500
11.	Conceptual plan & sections	VII	Plan scale: 1:1000 Section: HOR 1:1000 VER 1:500

1.Mr.T.M.Manoharan,
S/o. Marannan,
2.Mr.K.Subramaniam,
S/o. Kolanthaigounder,
3.Mr.R.P.Jaganathan,
S/o. Palanigounder,
Koundampalayam Village,
T.N.Palayam,
Gobichettipalayam, Erode – 638506.

Deputy Director ★ Geology and Mining ★ Erode

CONSENT LETTER FROM THE APPLICANT

The Mining Plan for rough stone and gravel quarry lease in S.F.No: 49/2, 49/3 & 49/4A, over an extent of 1.99.0hectares, Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu State has been prepared by

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

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

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(A NABET Accredited & ISO certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841,7010076633.
E-mail: info.gtmsdpi@gmail.com
Website: www.gtmsind.com

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

Place: Erode, TN

Date:

Signature of the applicant
(T.M.Manoharan)

Deputy Director * Geology and Mining * Erode

1.Mr.T.M.Manoharan,
S/o. Marannan,
2.Mr.K.Subramaniam,
S/o. Kolanthaigounder,
3.Mr.R.P.Jaganathan,
S/o. Palanigounder,
Koundampalayam Village,
T.N.Palayam,
Gobichettipalayam, Erode – 638506.

DECLARATION

The Mining Plan of rough stone and gravel quarry lease in S.F.No: 49/2, 49/3 & 49/4A, over an extent of 1.99.0hectares, Kovundampalayam Village, Gobichettipalayam Taluk, Erode 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: Erode, TN

Date:

Signature of the applicant
(T.M.Manoharan)

Deputy Director * Geology and Mining * Erode

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

CERTIFICATE

This is to certify that the provisions of 19(1), 20 and 22 of Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the mining plan for the grant of rough stone and gravel quarry lease in S.F.No: 49/2, 49/3 & 49/4A, over an extent of 1.99.0hectares, Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu State applied to **1.Mr. T.M.Manoharan**, 2. Mr.K.Subramaniam, 3.Mr.R.P.Jaganathan, Erode District, Tamil Nadu.

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: 16/02/23

Signature of the Recognized Qualified Person

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post Office,
Dharmapuri - 636 705. Tamil Nadu, India.
E-mail : info.gtmsdpi@gmail.com
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Deputy Director ★ Geology and Mining ★ Erode

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
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Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841,7010076633.
E-mail: info.gtmsdpi@gmail.com
Website: www.gtmsind.com

CERTIFICATE

I certified that the preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No: 49/2, 49/3 & 49/4A over an extent of 1.99.0hectares, Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu prepared to **1.Mr. T.M.Manoharan**, 2. Mr.K.Subramaniam, 3.Mr.R.P.Jaganathan, Erode District,, Tamil Nadu, covers all the provisions of Mines Act, Rules and Regulations etc. made there in and if any specific permission is required the applicant will approach **"The Director General of Mines Safety"**, Chennai. The standards prescribed by DGMS regarding Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date: 16/02/23

Signature of the Recognized Qualified Person

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
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MINING PLAN

Deputy Director * Geology and Mining * Erode

FOR KOVUNDAMPALAYAM VILLAGE 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

(Mine plan prepared for 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:** The applicant 1.Mr.T.M.Manoharan S/o. Marannan, 2.Mr.K.Subramaniam, S/o. Kolanthaigounder, 3.Mr.R.P.Jaganathan, S/o. Palanigounder, Koundampalayam Village, T.N.Palayam, Gobichettipalayam, Erode District, Tamil Nadu State – 638506 and filed with application for new proposal has requested to grant the quarrying lease for rough stone and gravel in S.F.No. 49/2, 49/3 & 49/4A over an extent of 1.99.0hectare of Kovundampalayam Village, Gobichettipalayam Taluk, Erode District, Tamil Nadu State for a period of 10 years.

b) **Precise area communication letter particulars:** The Deputy Director, Department of Geology and Mining, Erode has directed to the applicant 1.Mr.T.M.Manoharan, 2.Mr.K.Subramaniam, 3.Mr.R.P.Jaganathan through his precise area communication letter **Rc.No. 15255/Mines/2018, Dated 10.02.2023,** has recommended quarrying lease for rough stone and gravel quarry lease at Tamil Nadu State, Erode District, Gobichettipalayam Taluk, Kovundampalayam Village in S.F.No: 49/2, 49/3 & 49/4A, over an area of 1.99.0hectares and should be submitted draft mining plan for approval for the period of 90 days the following conditions for a period of ten (10) years under Rule 19 (1), 20 & 22 of Tamil Nadu Minor Mineral Concession Rules, 1959.

1. To provide quarrying rough stone and gravel lease at Erode District, Gobichettipalayam Taluk, Kovundampalayam Village in S.F.No: 49/2, 49/3 & 49/4A, over an area of 1.99.0hectares should be submit approved mining plan and Environmental Clearance certificate

2. Quarrying should be done leaving a 10 meter safety distance for poromboke land in S.F.No.38 on the eastern side of the applied lease area.
3. A safety distance 7.5meters should be left out nearby the patta land from the applied lease area and while quarrying operation.

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, for mining lease as per conditions mentioned in the precise area communication letter **Rc.No. 15255/Mines/2018, dated 10.02.2023.**

d) **Geological resources and Mineable reserves:** Geological resource of estimated as **935065m^3** including the resources of safety zone, and gravel. Of which, rough stone resources of about **895275m^3** and gravel is about **39790m^3**. The total mineable reserve is estimated to be **342930m^3** by deducting the reserve safety zone, block in benches from the total Geological resources. Of which, rough stone is about **311730m^3** and gravel is about **31200m^3** up to a depth of 47m below the ground level (R.L.241m-194m) (Refer Plate No. VI).

e) **Proposed production schedule:** Total proposed production of **309950m^3**. Of which, rough stone is **278750m^3** and gravel is **31200m^3** up to a depth of 32m below the ground level (R.L.241m-209m) for first five years plan period. Average production is **55750m^3** of rough stone and gravel is **10400m^3** per year (Refer Plate No. IV).

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

i. **Interstate boundary:** There is no interstate boundary around 10Km radius periphery of proposed lease area.

ii. **Wildlife Protection Act, 1972:** The Sathyamangalam Wildlife sanctuary is 1.15km away on the northern side of the proposed lease area.

iii. **Indian Reserve Forest Act, 1980:** No reserved forest situated within radius of 1Km periphery of the proposed site. The Nearest reserve forest is

1.Guttiyalattur R.F -1.15km - North

iv. **CRZ Notification, 1991:** There is no sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 1991.

Deputy Director Geology and Mining Erode

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

a) Usage of sharp drill bits while drilling which will help in reducing noise.

b) Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.

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

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

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

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

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

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

1.0 GENERAL:

a.	Name of the Applicant	:	**1.Mr.T.M.Manoharan** 2.Mr.K.Subramaniam 3.Mr.R.P.Jaganathan
	Applicant address	:	Koundampalayam Village, T.N.Palayam, Gobichettipalayam
	District	:	Erode
	State	:	TamilNadu
	Pin code	:	638506
	Phone	:	--
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	.....
b.	Status of the Applicant		
	Private individual	:	Private individual
	Cooperative Association	:	---
	Private company	:	---
	Public Company	:	---
	Public Sector Undertaking	:	---
	Joint Sector Undertaking	:	---
	Other (pl. specify)	:	---

c.	Mineral(s) Which are occurring in the area and which the applicant intends to mine	:	Rough stone and gravel quarry lease
d.	Period for which the mining lease granted /renewed/ proposed to be applied	:	The precise area has been communicated to the applicant for quarrying period of Ten (10) years.
e.	Name of the RQP preparing the Mining Plan	:	Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,
	Address	:	**Geo Technical Mining Solutions** (A NABET Accredited & ISO certified Company) No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
	Fax	:	Nil
	e-mail	:	info.gtmsdpi@gmail.com
	Telex	:	Nil
	Registration Number	:	RQP/MAS/263/2014/A
	Date of grant/renewal	:	16.12.2014
	Valid upto	:	15.12.2024
f.	Name of the prospecting agency	:	Geo Technical Mining Solutions
	Address	:	No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	----
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, Erode Vide **Rc.No. 15255/Mines/2018 Dated 10.02.2023.**

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB
	District & State	:	Erode, Tamil Nadu
	Taluk	:	Gobichettipalayam
	Village	:	Kovundampalayam
	Khasra No./ Plot No./ Block Range/ Felling Series etc.		

Survey No.	Sub division	Total Extent in Hect	Patta No.	Name of the Land Owner	Mine lease Applied S.F. No.	Mine lease Applied Area out of total area in hect.
49	2	0.83.5	40	Mr.T.M.Manoharan Mr.K.Subramaniyam	49/2	0.83.5
49	3	0.81.0	39	Mr.T.M.Manoharan Mr.K.Subramaniyam Mr.N.Palanigounder	49/3	0.81.0
49	4A	0.34.5	179	Mr.T.M.Manoharan Mr.N.Palanigounder	49/4A	0.34.5
Total Extent		**1.99.0**		**Applied lease area extent**		**1.99.0**

Lease area (hectares)	:	1.99.0 hectare
Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	No, forest is involved. This is recorded patta Land.
Ownership / Occupancy	:	This is a patta land S.F.No. 49/2, 49/3 & 49/4A is registered in the name of Mr.T.M.Manoharan, Mr.K.Subramaniyam Mr.N.Palanigounder vides Patta No.40, 39 & 179. The pattadhar given consent to the applicant. (Ref. Annex. No:V).
Existence of Public Road / Railway line if any nearby and approximate distance	:	✓ Excavated materials will be transported through the approach road on the northeast side of the lease applied area. ✓ The SH-82 road is situated about 1.09km away on the southern side of the applied lease area. ✓ There is no NH road situated around 5km radius from the site. ✓ Nothing to any railway line is situated within radius of 5.0km periphery of the proposed lease area
Toposheet No. with latitude and longitude	:	Toposheet No. **58 E/06** Latitude : From 11°31'1.41"N to 11°31'5.74"N Longitude: From 77°22'38.63"E to 77°22'44.49"E

Geo-Coordinates of the lease boundary:

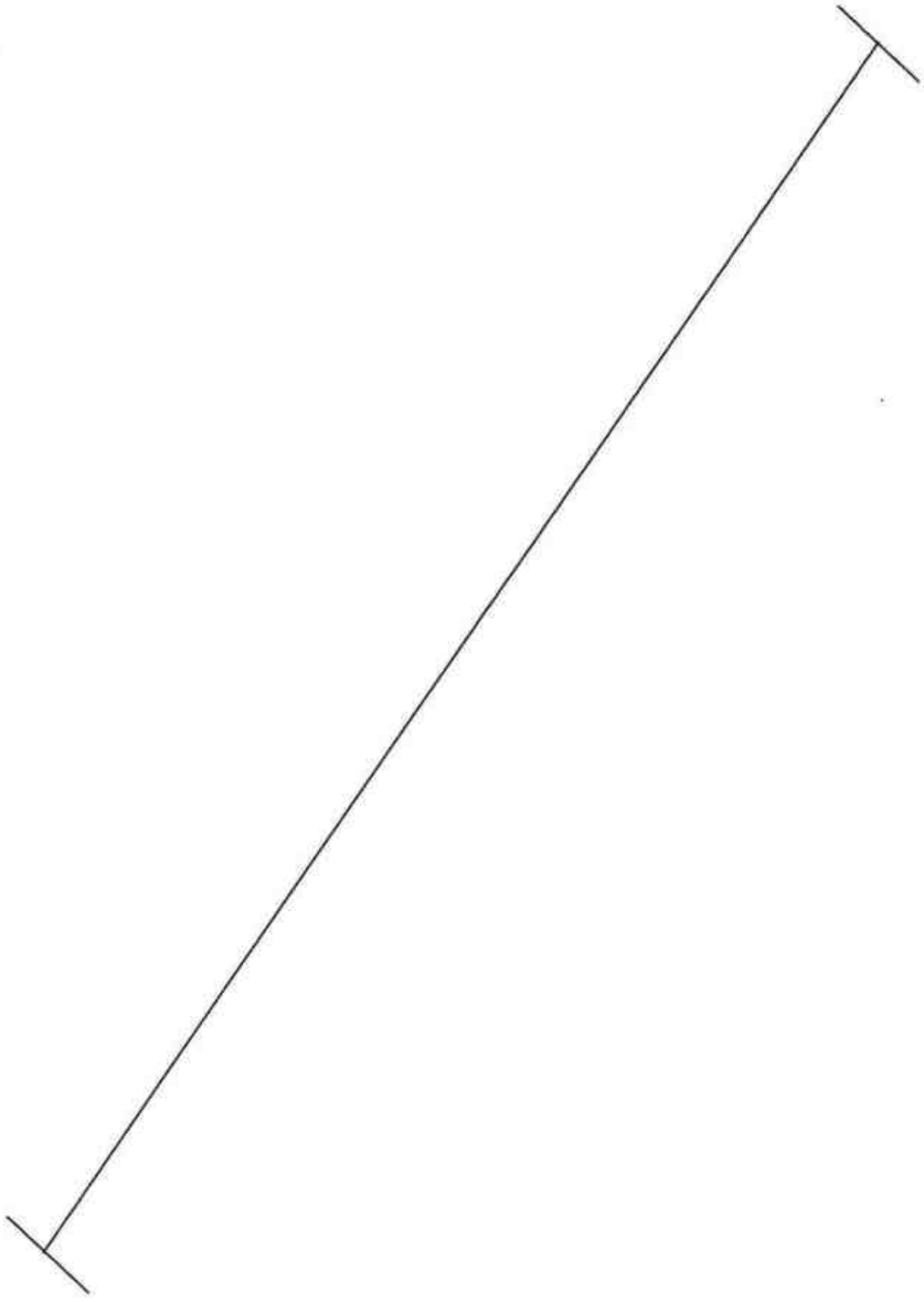
Pillar No	Latitude	Longitude
1	11°31'5.06"N	77°22'44.34"E
2	11°31'4.46"N	77°22'44.49"E
3	11°31'1.41"N	77°22'44.51"E
4	11°31'1.49"N	77°22'39.20"E
5	11°31'2.24"N	77°22'39.01"E
6	11°31'3.45"N	77°22'38.69"E
7	11°31'5.74"N	77°22'38.63"E
8	11°31'5.19"N	77°22'41.02"E

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

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	N Palayam	1.37Km	SE
b.	Nearest police station	Bungalowpudur	3.03km	SE
c.	Nearest fire station	Sathyamangalam	15.2km	East
d.	Nearest medical facility	Thuckanaickenpalayam	1.12Km	SE
e.	Nearest school	Pallathu Medu	0.76Km	SE
f.	Nearest railway station	Vijayamangalam	38.4km	SE

g.	Nearest port facility	Cochin	208km	SW
h.	Nearest airport	Coimbatore	64.5km	SW
i.	Nearest DSP office	Sathyamangalam	14.4km	West
j.	Nearest villages	Guthiyalathur R.F	1.15km	North
		Pallathu Medu	0.41km	East
		T.N Palayam	0.26km	South
		Kongarpalayam	1.45km	West



PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

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

(i)	Topography	:	The proposed lease area exhibits flat topography. The proposed site shows the maximum elevation (241m) was observed in N-S side of the site. The slope is towards South side and falls in Toposheet no. 58- E/06.

(ii) **a) Geology of the District**:

The Erode district forms part of the Archean complex of peninsular gneiss. Generally the entire area of the district is traversed by metamorphosed Gneissic rocks of Arechaean age. The northern parts of the district i.e. Thalamalai Reserved Forest and Bargur Reserved forest of the district are occupied by Charnockite. Similarly in the southern part of the district, the Charnockite is noticed in Dharapuram and Vellakoil areas.

In the central part, the country rock is intruded by intrusive rock like dolerite. The pegmatite intrusions are also observed here and there in the northern part of the district. The important rock types encountered in this area are Granitic gneiss, mica gneiss, hornblende gneiss, charnockite and pink granite.

Order of superposition of the proposed lease area,

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 area:

a) Topography of the proposed lease area:

The proposed lease area exhibits flat topography. The proposed site shows the maximum elevation (241m) was observed in N-S side of the site. The slope is towards Southern side. The applied lease area covered with 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.

b) Mode of origin:

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

c) 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.

d) Chemical composition of rocks:

The compositional characteristics of coexisting orthopyroxene, garnet and biotite have established several petrographic varieties within the Charnockites–Enderbites such as the granulite's and gneisses. Plagioclase feldspars, alkali feldspars and quartz are the salic minerals present in this series of rocks.

Order of superposition of rocks in the proposed site:

Age	Group	Rock Formation
Recent to Sub recent	----	Lateritic soil (gravel)
Archaean	Charnockite Group	Charnockite.

(iv)	Drainage Pattern		There is no major river located within 50m radius. The drainage in the area is dendritic in nature.

(b)	***The topographic plan of the lease area prepared on a scale of 1 :1000 or 1: 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:***		
	a. Present status		The RQP examined the surface features during survey. It is a fresh quarry lease covered with red soil in this lease area. No exploration carried out.
	b. Surface Plan		Surface plan showing elevation contour, rock exposure, 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) ***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:***

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 homogeneous parent rock. Hence exploration proposal is not required to this mining project.

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

The geological resources were computed by cross section method with respect to the boundaries of the lease area. In this method, the lease area was one sections (longitudinal and transverse) to calculate the volume of material up to the depth of 47m below ground level. The longitudinal and transverse cross sections were assigned XY-AB. Using the cross-sectional method, total reserve is estimated to be **935065m^3** including the resources of safety zone, and gravel. Of which, rough stone is about **895275m^3** and gravel resource of about **39790m^3**.

The gravel is obtained about 2m (R.L.241-239m) from below the surface and a rough stone starts from 3 to 25m (R.L.239-194m) 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	173	115	2	39790	.....	39790
	II	173	115	5	99475	99475	.....
	III	173	115	5	99475	99475	.....
	IV	173	115	5	99475	99475	.....
	V	173	115	5	99475	99475	.....
	VI	173	115	5	99475	99475	.....
	VII	173	115	5	99475	99475	.....
	VIII	173	115	5	99475	99475	.....
	IX	173	115	5	99475	99475	.....
	X	173	115	5	99475	99475	.....
TOTAL				**47**	**935065**	**895275**	**39790**

(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 **342930m³** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 47m (R.L.241-194m) below ground level. Of which, rough stone is about **311730m³** and gravel is about **31200m³**. The commercially viable rough stone has been prepared on 1: 1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no. VI).

MINEABLE RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m³	Rough Stone in m³	Gravel in m³
XY-AB	I	156	100	2	31200	.....	31200
	II	152	96	5	72960	72960	.....
	III	142	86	5	61060	61060	.....
	IV	132	76	5	50160	50160	.....
	V	122	66	5	40260	40260	.....
	VI	112	56	5	31360	31360	.....
	VII	102	45	5	22950	22950	.....
	VIII	92	36	5	16560	16560	.....
	IX	82	26	5	10660	10660	.....
	X	72	16	5	5760	5760	.....
TOTAL				**47**	**342930**	**311730**	**31200**

4.0 MINING:

a.	Briefly describe the existing / proposed method for developing / working the deposit with all design parameters. (Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)	:	It is a fresh grant lease. The mining operation is opencast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 5m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal

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

Total proposed production **36500m³**. Of which, rough stone is **33420m³** and gravel is **3080m³** up to a depth of 25m below the ground level (R.L.305m-280m) for five years plan period. Average production is **6684m³** of rough stone and **1540m³** of gravel per year (Refer Plate No. IV).

Year	Pit No.(s)	Topsoil/Over burden (m³)	ROM (m³)	Saleable rough stone (m³) @ 100%	Rough stone rejects(m³)	Sub grade/ Weathered rock in (m³)	Saleable Gravel (m³)	Rough stone to topsoil ratio
First	I	---	65320	52120	...	....	13200	....
Second	I	---	64380	52780	...	....	11600	....
Third	I	---	60220	53820	...	....	6400	....
Fourth	I	---	65720	65720	...	....	....	....
Fifth	I	---	54310	54310	...	....	....	....
Total	**---**	**---**	**309950**	**278750**	**...**	....	**31200**	**....**

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

Composite plans and year wise sections (In case of 'B' class mines):

YEARWISE PRODUCTIONS RESERVES								
Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M³	Rough Stone in M³	Gravel in M³
XY-AB	I-YEAR	I	66	100	2	13200	.....	13200
		II	62	96	5	29760	29760	.....
		III	52	86	5	22360	22360	.....
	TOTAL					**65320**	**52120**	**13200**
	II-YEAR	I	58	100	2	11600	.....	11600
		II	58	96	5	27840	27840	.....
		III	58	86	5	24940	24940	.....
	TOTAL					**64380**	**52780**	**11600**
	III- YEAR	I	32	100	2	6400	.....	6400
		II	32	96	5	15360	15360	.....
		III	32	86	5	13760	13760	.....
		IV	65	76	5	24700	24700	.....
	TOTAL					**60220**	**53820**	**6400**
	IV-YEAR	IV	67	76	5	25460	25460	.....
		V	122	66	5	40260	40260	.....
	TOTAL					**65720**	**65720**	**0**

	V-YEAR	VI	112	56	5	31360	31360	.....
		VII	102	45	5	22950	22950	.....
	TOTAL					54310	54310	0
GRAND TOTAL						309950	278750	31200

d.	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	:	Composite plan not prepared in this proposed lease area. It is "B_2" category of mine.

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

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

Rough stone:

Mineable reserves of rough stone	=	**311730m^3**
Five years production of rough stone	=	**278750m^3**
Monthly production of rough stone	=	**4646m^3**
Remaining mineable Reserves	=	**32980m^3**

Gravel:

Mineable reserves of gravel	=	**31200m^3**
Year wise production of gravel	=	**10400m^3**
Monthly production of gravel	=	**867m^3**

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.

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

i)	Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame:	:	Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about up to a depth of 47m below ground level (R.L.241m-194m) from the petrogenetic character of the 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.

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

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

ULTIMATE PIT LIMIT-(XY-AB)

Bench	Bench R.L	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	R.L.241-239m	First 5 years	Gravel	156	100	2
II	R.L.239-234m		Rough stone	152	96	5
III	R.L.234-229m		Rough stone	142	86	5
IV	R.L.229-224m		Rough stone	132	76	5
V	R.L.224-219m		Rough stone	122	66	5
VI	R.L.219-214m		Rough stone	112	56	5
VII	R.L.214-209m		Rough stone	102	45	5
VIII	R.L.209-204m	Remaining five years	Rough stone	92	36	5
IX	R.L.204-199m		Rough stone	82	26	5
X	R.L.199-194m		Rough stone	72	16	5
					Total	**47m**

iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long-term use in the event of continuation of mining activity: -	:	The recovery of rough stone and gravel in this quarry is 100%. There is no waste rock will be proposed in this lease area.
iv)	Whether back filling of pits after recovery of mineral up to techno-economically feasible depth envisaged. If so, describe the broad features of the proposal: -	:	As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.
v)	Whether post mining land use envisaged: -	:	At the end of mining activities over the quarry pit may be utilized 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-	:	It is a fresh quarry lease. The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only. Under

	mechanized, manual)		the regulation 106 of the Metalliferous Mines Regulations, 1961 in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 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.
	ii) Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden /waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice	:	The rough stone is proposed to quarry at 5m bench height & width conventional opencast semi mechanized quarrying operation using drilling with the help of tractor mounted compressor attached with jack hammers, nonel blasting and waste and are removal using Hydraulic excavator and loaded directly to the tippers. Bench height = 5mts. Bench width = 5mts.
	a. Details of topsoil/ overburden	:	No separate of topsoil will be removed.
	b. Rough stone waste and side burden waste:-	:	The recovery of rough stone in this quarry is 100%. Any other waste or side burden dumps are doesn't proposed.
h.	***Underground Mines:***	:	Not applicable
i.	***Extent of mechanization:*** Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations. ***(1) Drilling Machines:*** Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Details of drilling equipment's are given below.		

Details of drilling equipment's are given below.

Type	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P
Jack Hammer	3	32 mm	Hand held	---	Diesel	--
Compressor	1	---	Air	--	Diesel	--

(2) Loading Equipment:

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

(3) Haulage and Transport Equipment

(a) Haulage within the mining leasehold:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	6	--	--	Diesel	--

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

The dumpers are not used in this quarry; hence it's a small B2 category quarry.

a) Transport from mine head to the destination	:	Tipper will be used for transport rough stone and gravel from the mine head to needy customer.
c. Describe briefly the transport system (please specify)	:	Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customer's area.
d. Ore transported by : own trucks / hired trucks	:	Hired trucks for initially production purposes.
e. Main destination to which ore is transported (giving to and from distance)	:	Excavated rough stone minerals directly will be used by the applicant in his own crusher for required size (i.e 1/4", 1/2", 1/3" and 1") The recovery of rough stone and gravel in this quarry is 100%.

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

5. BLASTING:

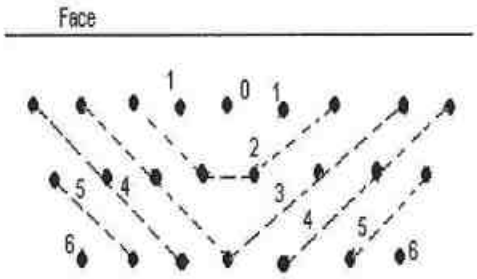
a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.

Blasting pattern:

The quarrying operation is proposed to carried out by open cost, using jack hammer drilling followed by manual breaking will be adopted to release the rough stone and nonel blasting is proposed in this lease area.

Drilling and Blasting parameters are as follows,

1	Diameter of the hole	32 mm
2	Spacing between hole	1.2m
3	Burden for hole	1.0m
4	Depth of each hole	1.5m
5	Output per hole = Spacing × Burden × depth 1.2 × 1.0 × 1.5 = 1.8 x 2.8	5.04 T
6	Output per hole = 1.8 x 2.8 = 5 T	5 T
7	Production per annum 55750m^3 * 2.8 = 156100 T	156100 T
8	Total handling per day (280 working day)	557T
9	Nos. of holes per day (557/5.04 = 110)	110 holes.
10	Meterage required per day (110× 5.5 = 605)	605meters
11	Charge per hole	0.5 kg
12	Powder factor (110holes X 0.5 kg = 55	55 kg
13	Sequence of blasting = Cord relay with electric detonators / Nonel	--



Stagged method of mining

b) Type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

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

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

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

Delay detonators:

Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals.

The major advantages of delay blasting are:

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

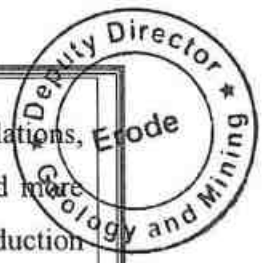
Blasting program for the production per day

No of holes	:	110holes
Yield per day	:	557 tons
Total explosive required	:	55kg-Slurry explosives
Charge per hole	:	0.5kg
Blasting at day time only	:	12.0p.m-1.0p.m

d) Powder factor in ore and overburden / waste / development heading / stope	:	Powder factor is proposed as 0.5 kg per holes of explosives

	e) Whether secondary blasting is needed, if so describe it briefly	:	Irrespective of the method of primary blasting employed, it may be necessary to re-blast a proportion of the rock on the quarry floor so as to reduce it to a size suitable for handling by the excavators and rock breakers.
	f) Storage of explosives (like capacity and type of explosive magazine)	:	1. The applicant is advised to engage an authorized explosive agency to carry out blasting. 2. First Aid Box will be keeping ready at all the time.
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 rainy season and 55m in summer from the below ground level in the adjacent bore wells of the area.
	b) Workings expected to be _____ m. above / reach below water table by the year _____ .	:	Proposed ultimate depth of mining is 32m bgl. Now, the present Mining lease will be proposed above the water table and hence, quarrying may not affect the ground water.
	c) Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged	:	The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage will be less than 300 Lpm and it will be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and doesn't contaminate with any hazardous things.
7. (a)	***STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:*** Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the next five years: No separate of topsoil will be removed and any other waste or side burden		

	dumps are doesn't proposed.		
(b)	Land chosen for disposal of waste with proposed justification	:	There is no waste are proposed.
(c)	Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated year wise.	:	There is no waste or any other mineral dumps are proposed. If rough stone may be unsold will be keep within the lease boundary.
8.	***USE OF MINERAL:***		
(a)	Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc
(b)	Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone and the same are used for building stone, sized stone materials only, so there are no chemical specifications are specified. Only physical specifications are involved.
(c)	Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.	:	Not blending process is involved, after blasting the rough stone will be directly loaded to the needy customer.
9.	***OTHERS***		
(a)	**Describe briefly the following** Site services	:	Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and booth rooms have been provided as per the Metalliferous Mines Regulations, 1961 as a welfare amenity for our quarry laborers.



(b) Employment potential :

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

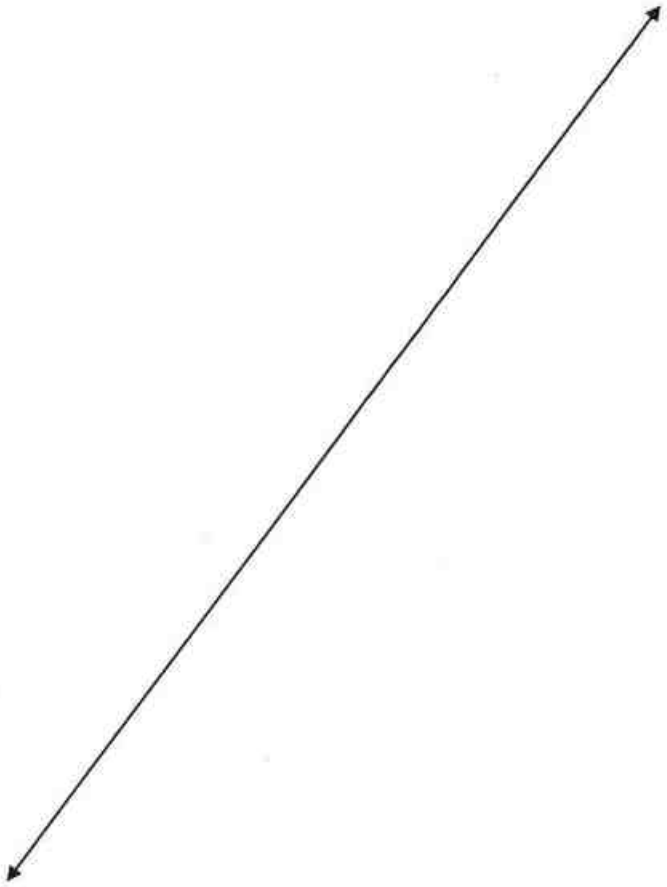
The following man power is proposed for quarrying stone material during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of as per the MMR, 1961 norms.

1.	Highly Skilled	IInd class Mines Manager	1No.
		Mine Geologist	1No.
		Blaster	1No.
2.	Semi-skilled	Driver	6 No's
		Hitachi Operator	1No.
3.	Unskilled	Musdoor / Labours	10 No's
		Total =	**20 No's**

10 MINERAL PROCESSING/BENEFICIATIONS:

(a)	If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.	:	Excavated rough stone minerals directly will be used by the applicant in his own crusher for required size ½, ¾ and 1½ inches Jelly which are mainly used in road and building construction purpose. The recovery of rough stone and gravel in this quarry is 100%.
(b)	Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	:	No water 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)	A flow sheet or schematic diagram of the processing procedure should be attached.	:	Not applicable.

(d)	Specify quantity and type of chemicals to be used in the processing plant.	:	Not applicable
(e)	Specify quantity and type of chemicals to be stored on site / plant.	:	Not applicable
(f)	Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.	:	Drinking is 0.5KLD, utilized water is 1.0KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 3.5KLD per day. 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) **Attach a note on the statuts of Baseline information with regard to the Following :**

11.1 Existing land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.

Sl. No.	Land Use	Present area (Hect.)
1.	Area under mining	Nil
2	Infrastructure	Nil
3	Road	Nil
4	Green belt & Dump	Nil
5	Drainage & Settling Tank	Nil
6	Un-utilized area	1.99.0
	Grand total	**1.99.0**

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 up to a depth of 47m bgl. Hence, it will not affect the ground water depletion of this area. 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.
11.3	Flora and Fauna	:	There is no major flora observed in this area and no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.
11.4	Quality of air, ambient noise level and water	:	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc.., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence,

			noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.

11.5 Climatic conditions:

Climate:

In Erode, the wet season is oppressive and overcast, the dry season is humid and partly cloudy, and it is hot year-round. Over the course of the year, the temperature typically varies from 69°F to 100°F and is rarely below 65°F or above 105°F.

Based on the beach/pool score, the best time of year to visit Erode for hot-weather activities is from mid December to mid March.

Rainfall:

To show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-day period centered around each day of the year. Erode experiences extreme seasonal variation in monthly rainfall.

The rainy period of the year lasts for 9.6 months, from March 18 to January 6, with a sliding 31-day rainfall of at least 0.5 inches. The month with the most rain in Erode is October, with an average rainfall of 4.3 inches.

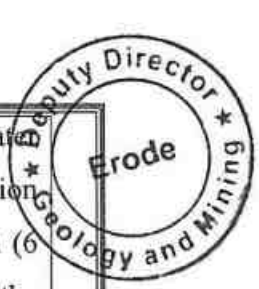
The rainless period of the year lasts for 2.4 months, from January 6 to March 18. The month with the least rain in Erode is February, with an average rainfall of 0.3 inches.

11.6 Human Settlement:

The nearest villages are found in the buffer zone with population as per 2011 census.

S.No	Village	Direction	Distance in Kms	Population
1	Guttiyalattur R.F	North	1.15km	---
2	Pallathu Medu	East	0.41km	1778
3	T.N Palayam	South	0.26km	3103
4	Kongarpalayam	West	1.45km	5346

11.7	Public buildings, places of worship and monuments	:	No infrastructure like residential building, places of special interest like archeological monuments, sanctuaries etc., are found around 10km radius.



11.8	Attach plans showing the locations of sampling stations	:	The proposed ambient air quality, water quality ambient noise level and vibration are periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA notification 2006 and also covering DGMS norms.
11.9	Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974	:	The proposed area not fall under notified area under water (Prevention & Control of Pollution), Act, 1974

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

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

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

Sl. No.	Land Use	Area in use during the quarrying period (Hect)
1.	Area under mining	1.56.0
2	Infrastructure	0.02.0
3	Road	0.05.0
4	Green belt & Dump	0.30.0
5	Drainage & Settling Tank	0.06.0
6	Un-utilized area	Nil
	Grand total	**1.99.0**

ii).	Air Quality		Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc.., will be suppressed by periodical wetting of land by water spraying.
iii).	Water quality		A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.

iv).	Noise levels		Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)		No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity will be recoded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
vi).	Water regime		No major water bodies like rivers, pond, lake etc., located within a radius of 50m.
vii).	Socio-economics		1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.		There are no historical monuments, etc found around 10km radius.

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

i).	Temporary storage and utilization of topsoil	:	No separate of topsoil will be removed.
ii).	Year wise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road	:	The present mining is proposed to an average depth of 32m 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. No immediate proposals for closure of pit as the rough stone persist still at deeper level.

	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.		

iii) ***Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares.***

Green Belt Development:

Safety barrier, school and nearest panchayat roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below.

Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	3000	330	80%	@100 Rs Per sapling	33,000/-
Second	Approach road and Nearby Village Road	--	300	80%		30,000/-
Third	Schools	--	200	80%		20,000/-
					Total	**83,000/-**

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 removed in this lease area.
v).	Measures to control erosion / sedimentation of water courses.	:	Not applicable. There are no major dumps are stabilized in this quarry area.
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses.

vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry. 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 small B2 category opencast, semi mechanized method of mining is adopted 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

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 47m 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. Green belt development at the rate of 330 trees will be proposed in the quarry lease area. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	The quarry lease is a fresh mining lease. No mitigation measures adopted.
12.4	Mine closure activity	:	The present mining plan is proposed to depth of 32m 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. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS being a mechanized operation.
12.6	Disaster management and Risk Assessment	:	Open cast semi mechanized/ manual method of mining is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches

			etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.
12.7	Care and maintenance during temporary discontinuance	:	A board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.
12.8	Economic repercussions of closure of quarry and man power entrenchments	:	During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 20 labors will be improved.

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

A	**Fixed Asset Cost:**		
	1. Land Cost	:	Rs. 6,00,000/-
	2. Labour Shed		Rs. 1,00,000/-
	3. Sanitary Facility	:	Rs. 1,00,000/-
	4. Fencing	:	Rs. 2,50,000/-
	5. Other expenses (Security guard, dust bin, etc)	:	Rs. 3,00,000/-
	Total	:	**Rs. 12,25,000/-**
B	**B. Machinery cost**	:	**Rs. 25,00,000/-** (Hire Basis)
C	**Total Expenditure of EMP cost** (for five years)		
	1. Drinking Water Facility	:	Rs. 1,00,000/-
	2. Sanitary facility & Maintenance	:	Rs. 1,00,000/-
	3. Permanent water sprinkler	:	Rs. 1,50,000/-

	4. Afforestation and its maintenance	:	Rs. 83,000/-
	5. Safety Kits	:	Rs. 50,000/-
	6. Provision of tyre washing facility	:	Rs. 50,000/-
	7. Surface runoff management structures like garland drain, settling pond & Bund (0.06.0Hect or 600Sq.m X 400	:	Rs. 2,40,000/-
	8. Blasting materials with blast mat cost	:	Rs. 20,00,000/-
	9. Environment monitoring	:	Rs. 5,00,000/-
	Total	:	**Rs. 32,73,000/-**
D	**Total Project Cost (A+B+C)**	:	**Rs. 35,78,100/-**

13.0 FINANCIAL ASSURANCE:

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

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT:

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

(ii) The applicant will endeavor every attempt to quarry the rough stone and gravel economically without any wastage and to improve the environment and ecology.

(iii)The mining plan is prepared by incorporating the conditions stipulated in the precise area communication issued by the Deputy Director of Geology and Mining, Erode vide letter **Rc.No.15255/Mines/2018 Dated: 10.02.2023.**

(iv)Total proposed production of **309950m^3**. Of which, rough stone is about **278750m^3** and gravel is about **31200m^3** up to a depth of 32m below the ground level (R.L.241m-194m) for first five years plan period. Average production is **55750m^3** of rough stone and **10400m^3** of gravel per year.

Deputy Director Erode Geology and Mining

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: 16/02/23

Signature of the Recognized Qualified Person

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

This Mining Plan is approved subject to the conditions indicated in the Mining Plan approved letter in
R.C. No.15255/Mines/2018
Dated: 21.02.2023.

This Mining Plan is approved as per the Powers conferred under Rule 41 (2) of Tamil Nadu Minor Mineral Concession Rules, 1959

21/02/23
Deputy Director,
Geology and Mining,
Erode

21.02.23

Deputy Director * Geology and Mining * Erode

ANNEXURE -1

துணை இயக்குநர் அலுவலகம்,
புவியியல் மற்றும் சுரங்கத்துறை,
ஈரோடு

Deputy Director * Erode * Geology and Mining

நா.க. 15255/கனிமம்/2018

நாள்: 10.02.2023.

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - ஈரோடு மாவட்டம் - சிறுகனிமம் - சாதாரணக்கற்கள் - கோபிசெட்டிபாளையம் வட்டம் - கவுண்டம்பாளையம் கிராமம் - புல எண்கள் 49/2, 49/3, 49/4ஏ-இல் 1.99.0 ஹெக்டர் பரப்பில் சாதாரணக்கற்கள் மற்றும் கிராவல் மண் வெட்டி எடுக்க குவாரி குத்தகை உரிமம் கோரி திரு. டி.எம். மனோகரன், திரு. கே. சுப்பிரமணியம் மற்றும் திரு. பழனிக்கவுண்டர் ஆகியோர் விண்ணப்பம் அளித்தது - அங்கீகரிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் சுற்றுச் சூழல் ஒப்புதல் பெற்று அளிக்க கோருதல் - தொடர்பாக.

பார்வை:

1. திரு. டி.எம். மனோகரன், திரு. கே. சுப்பிரமணியம் மற்றும் திரு. பழனிக்கவுண்டர் ஆகியோரின் மனு நாள் 4.6.2018.
2. கோபிசெட்டிபாளையம் சார் ஆட்சியர் அவர்களின் நடவடிக்கைகள் ந.க. 9679/2014 ஆ3 நாள் 14.3.2015.
3. ஈரோடு மாவட்ட ஆட்சியர் அவர்களின் செயல்முறை ஆணைகள் ந.க. 5900/2015/எக்ஸ்-1 நாள் 17.04.2018
4. திரு. டி.எம். மனோகரன் என்பவரால் சமர்ப்பிக்கப்பட்ட சலான் எண் 88 நாள் 24.04.2018.
5. கோபிசெட்டிபாளையம் வருவாய் கோட்டாட்சியர் அவர்களின் அறிக்கை ந.க. 4506/2018/ஆ3 நாள் 05.07.2018.
6. நகர் ஊரமைப்பு துணை இயக்குநர் (பொ), ஈரோடு கடித ந.க. 885/2020 ஈமா-2 நாள். 16.09.2020.
7. வட்டார வளர்ச்சி அலுவலர் (கி.ஊ), தூக்கநாயக்கன்பாளையம் கடித ந.க. 1857/2020/ஆ1 நாள் 29.10.2020.
8. திரு. டி.எம். மனோகரன், திரு. கே. சுப்பிரமணியம் ஆகியோரின் மனு நாள் 12.07.2021.
9. துணை இயக்குநர், சத்தியமங்கலம் வனக்கோட்டம். சத்தியமங்கலம் புலிகள் காப்பகம் கடிதம் ந.க. 4883/2021 /வ நாள் 05.05.2022.
10. ஈரோடு புவியியல் மற்றும் சுரங்கத்துறை உதவி புவியியலாளர் அவர்களின் தணிக்கை குறிப்பு நாள்: 10.12.2022.
11. துணை இயக்குநர், சத்தியமங்கலம் வனக்கோட்டம். சத்தியமங்கலம் புலிகள் காப்பகம் கடிதம் ந.க. 4883/2021 /வ நாள் 30.01.2023
12. அரசு அணை எண் 169 தொழில் (எம்எம்சி1) துறை நாள் 04.08.2020.

ஈரோடு மாவட்டம், கோபிசெட்டிபாளையம் வட்டம், கவுண்டம்பாளையம் கிராமம், புல எண்கள் 49/2, 49/3, 49/4A -இல் மொத்தம் 1.99.0 ஹெக்டர் பரப்பில் சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க திரு. டி.எம். மனோகரன், திரு. கே. சுப்பிரமணியம் மற்றும் திரு.

ஆர்.பி. ஜெகநாதன் ஆகியோர் விண்ணப்பித்ததன் பேரில் குவாரிக் குத்தகை உரிமம் வழங்குவது தொடர்பாக, கோபிசெட்டிபாளையம் வருவாய் கோட்டாட்சியர், ஈரோடு புவியியல் மற்றும் சுரங்கத்துறை உதவி புவியியலாளர், ஈரோடு நகர் ஊராமைப்பு துணை இயக்குநர் (பொ), பெருந்துறை வட்டார வளர்ச்சி அலுவலர் மற்றும் சத்தியமங்கலம் வனக்கோட்ட துணை இயக்குநர் ஆகியோர் மேற்காணும் விண்ணப்பப் புல எண்கள் 49/2, 49/3, 49/4A -இல் மொத்தம் 1.99.0 ஹெக்டர் பரப்பில் தமிழ்நாடு சிறுகனிம சலுகை விதிகள், 1959-ன் விதி எண். 19 (1), 20, 22 ஆகியவற்றின் கீழ் சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க குவாரி குத்தகை உரிம அனுமதி சில நிபந்தனைக்குட்பட்டு வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

Deputy Director Geology and Mining Erode

எனவே, மேற்காணும் பரிந்துரைகளின் அடிப்படையில் திரு. டி.எம். மனோகரன், திரு. கே. சுப்பிரமணியம் மற்றும் திரு. ஆர்.பி. ஜெகநாதன் ஆகியோாருக்கு குவாரி குத்தகை ஒப்பந்த ஆவணம் நிறைவேற்றப்பட்ட நாளிலிருந்து 10 ஆண்டுகளுக்கு சாதாரணக்கற்கள் மற்றும் கிராவல் மண் வெட்டி எடுக்க குவாரி குத்தகை உரிமம் வழங்குவது தொடர்பாக கீழ்க்காணும் நிபந்தனைகளுக்கு உட்பட்டு ஈரோடு துணை இயக்குநரால் ஏற்பளிக்கப்பட்ட சுரங்கத் திட்டம் மற்றும் மாநில சுற்றுச் சூழல் அமைப்பிடம் இருந்து பெறப்பட்ட சுற்றுச்சூழல் ஒப்புதல் ஆகியன உரிய காலத்திற்குள் விண்ணப்பதாரால் பெற்றளிக்கப்பட வேண்டும் என தெரிவிக்கப்படுகிறது.

1. கோபிசெட்டிபாளையம் வட்டம், கவுண்டம்பாளையம் கிராமம், புல எண்கள் 49/2, 49/3, 49/4A -இல் மொத்தம் 1.99.0 ஹெக்டர் பரப்பளவுள்ள பூமியிலிருந்து சாதாரண கற்கள் மற்றும் கிரவல் மண் வெட்டி எடுக்க குவாரி குத்தகை உரிமம் வழங்குவது தொடர்பாக ஏற்பளிக்கப்பட்ட சுரங்கத் திட்டம் மற்றும் சுற்றுச் சூழல் ஒப்புதல் ஆகியன பெற்றளிக்கப்பட வேண்டும்.
2. புலத்தின் கிழக்கு பகுதியில் புல எண் 38-இல் உள்ள புறம்போக்கு குவாரிக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு குவாரி பணிபுரிய வேண்டும்.
3. விண்ணப்ப புலங்களை சுற்றி உள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.

10/03/23

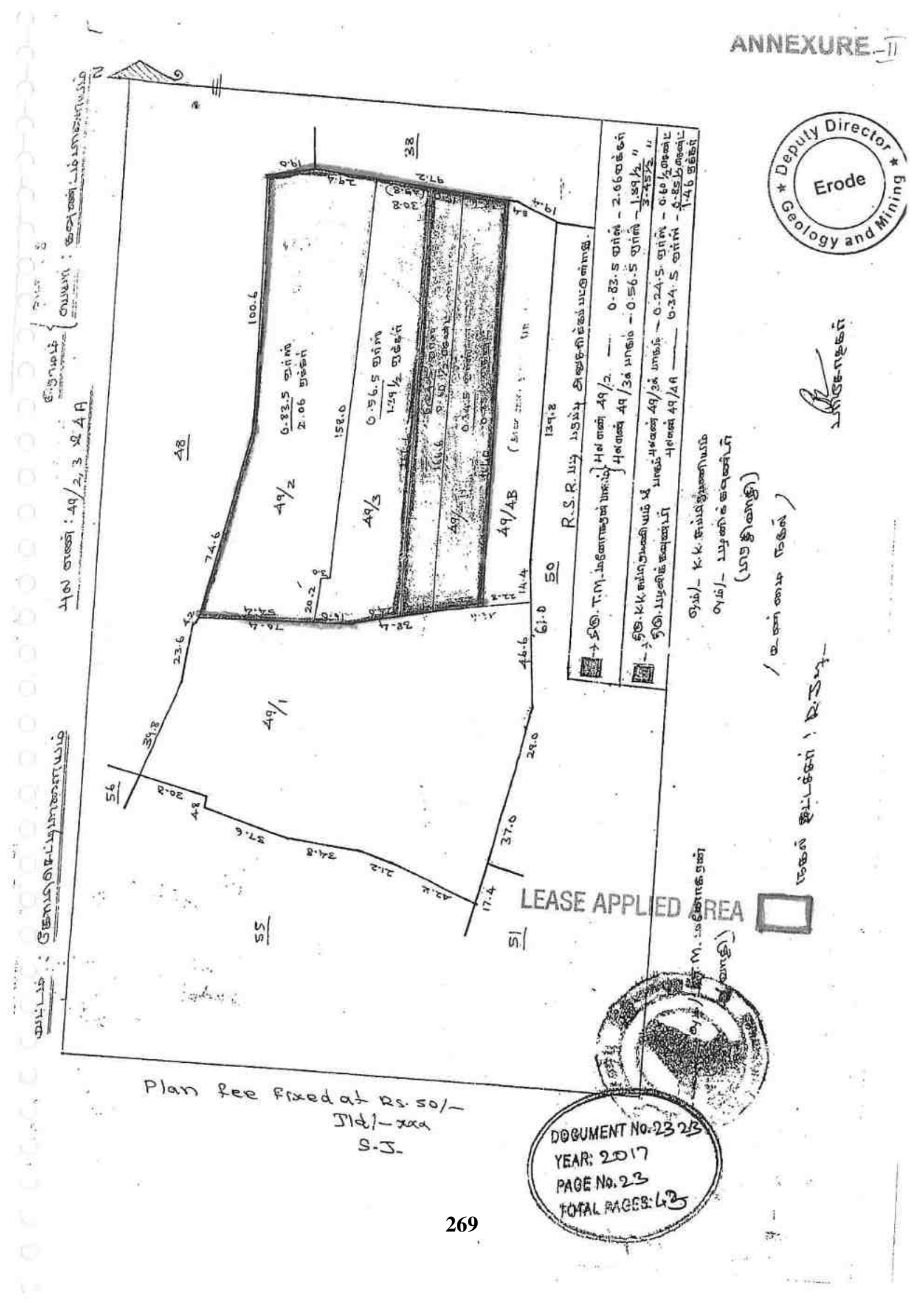
துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
ஈரோடு.

பெறுநர்

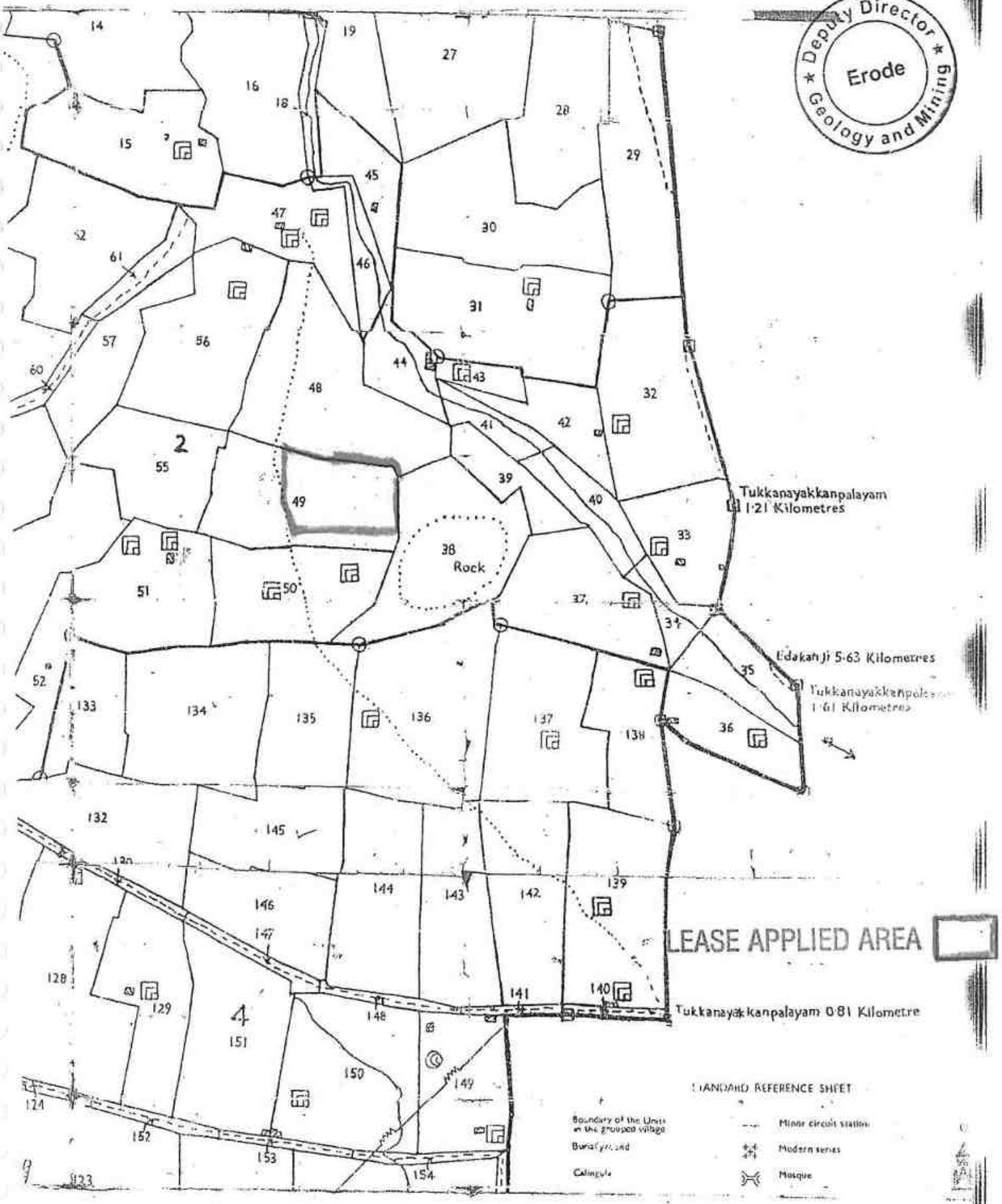
10.02.23

1. திரு. டி.எம். மனோகரன், த/பெ. மாரண்ணன்,
2. திரு. கே. சுப்பிரமணியம், த/பெ. கொளந்தகவுண்டர்,
3. திரு. ஆர்.பி. ஜெயநாதன், கவுண்டம்பாளையம் கிராமம்,
   டி.என்.பாளையம் - 638506, கோபி

ANNEXURE-II


Deputy Director
Erode
Geology and Mining
49/2
49/3
49/4B
49/1
48
50
55
51
56
38
100.6
74.6
158.0
139.2
61.0
46.6
29.0
37.0
17.4
LEASE APPLIED AREA
Plan fee fixed at Rs. 50/-
S.J.
DOCUMENT No. 2323
YEAR: 2017
PAGE No. 23
TOTAL PAGES: 43

ANNEXURE - III



ANNEXURE -IV

Deputy Director Geology and Mining Erode

அ-பதிவேடு விவரங்கள்

மாவட்டம் : ஈரோடு

வட்டம் : கோபிசெட்டிபாளையம்

கிராமம் : கவுண்டம்பாளையம்

1. புல எண்	49	9. மண் வயனமும் ரகமும்	8 - 4
2. உட்பிரிவு எண்	2	10. மண் தரம்	6
3. பழைய புல உட்பிரிவு எண்	173-3	11. தீர்வை (ரூ - ஹெ)	1.38
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 83.50
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	1.16
6. நிலத்தின் வகை	புஞ்சை	14. பட்டா எண்	40
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	1.டி.எம்.மனோகரன் 2.சுப்பிரமணியம்

குறிப்பு 1:

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **http://eservices.tn.gov.in** என்ற இணைய தளத்தில் 140814 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

அ-பதிவேடு விவரங்கள்

Deputy Director * Geology and Mining * Erode

மாவட்டம் : ஈரோடு

வட்டம் : கோபிசெட்டிபாளையம்

கிராமம் : கவுண்டம்பாளையம்

1. புல எண்	49	9. மண் வயனமும் ரகமும்	8 - 4
2. உட்பிரிவு எண்	3	10. மண் தரம்	6
3. பழைய புல உட்பிரிவு எண்	173-3	11. தீர்வை (ரூ - ஹெ)	1.38
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 81.00
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	1.12
6. நிலத்தின் வகை	புஞ்சை	14. பட்டா எண்	39
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	டி எம். மனோகரன்மற்றும 2பேர்

குறிப்பு 1:

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **http://eservices.tn.gov.in** என்ற இணைய தளத்தில் **140802** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

Deputy Director Geology and Mining Erode

அ-பதிவேடு விவரங்கள்

மாவட்டம் : ஈரோடு

வட்டம் : கோபிசெட்டிபாளையம்

கிராமம் : கவுண்டம்பாளையம்

1. புல எண்	49	9. மண் வயனமும் ரகமும்	8 - 4
2. உட்பிரிவு எண்	4A	10. மண் தரம்	6
3. பழைய புல உட்பிரிவு எண்	173-4 173-5	11. தீர்வை (ரூ - ஹெ)	1.38
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 34.50
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	0.48
6. நிலத்தின் வகை	புஞ்சை	14. பட்டா எண்	179
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	1.மனோகரன் 2.பழனிக்கவுண்டர்

குறிப்பு 1:

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **http://eservices.tn.gov.in** என்ற இணைய தளத்தில் **140807** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

ANNEXURE-V

Deputy Director Erode Geology and Mining

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : ஈரோடு வட்டம் : கோபிசெட்டிபாளையம்

வருவாய் கிராமம் : கவுண்டம்பாளையம் பட்டா எண் : 40

உரிமையாளர்கள் பெயர்

1. டி.ஆர்.மாரண்ணன் மகன் டி.எம்.மனோகரன்

2. கொழந்தே கவுண்டர் மகன் சுப்பிரமணியம்

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	
49	2	0 - 83.50	1.16	--	--	--	--	---- -- 02-08-2001
		0 - 83.50	1.16					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் 10/31/008/00040/140814 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 07-08-2021 அன்று 10:25:35 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : ஈரோடு வட்டம் : கோபிசெட்டிபாளையம்

வருவாய் கிராமம் : கவுண்டம்பாளையம் பட்டா எண் : 39

உரிமையாளர்கள் பெயர்

1. மாரண்ணன் மகன் டி எம். மனோகரன்
2. கொளந்தேகவுண்டர் மகன் சுப்பிரமணியம்
3. நஞ்சப்பகவுண்டர் மகன் பழனிக்கவுண்டர்

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	
49	3	0 - 81.00	1.12	--	--	--	--	2021/0103/10/245490-- -- 02-08-2021
		0 - 81.00	1.12					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **10/31/008/00039/130802** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 07-08-2021 அன்று 10:25:57 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

Deputy Director Geology and Mining Erode

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : ஈரோடு வட்டம் : கோபிசெட்டிபாளையம்

வருவாய் கிராமம் : கவுண்டம்பாளையம் பட்டா எண் : 179

உரிமையாளர்கள் பெயர்

1. மாரண்ணகவுண்டர் மகன் மனோகரன்

2. நஞ்சப்பகவுண்டர் மகன் பழனிக்கவுண்டர்

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	
49	4A	0 - 34.50	0.48	--	--	--	--	---- -- 11-09-2002
		0 - 34.50	0.48					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **10/31/008/00179/110807** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 07-08-2021 அன்று 10:26:20 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

ANNEXURE-VI

Deputy Director Geology and Mining Erode

PHOTOCOPY OF THE APPLIED LEASE AREA

Field photos in respect of rough stone and gravel quarry lease in S.F.No: 49/2, 49/3 & 49/4A Patta land – over an extent of 1.99.0 hectares – Kovundampalayam Village – Gobichettipalayam Taluk – Erode District - Tamil Nadu State belongs to

Mr. T.M. Manoharan, Mr. K. Subramaniam & Mr. R.P. Jaganathan.

ANNEXURE - VIII

Deputy Director
Erode
Geology and Mining

भारत सरकार

आधार

இந்திய அரசாங்கம்
Unique Identification Authority of India
Government of India

பதிவேட்டு எண்/ Enrolment No.: 0000/00360/65492

To
மனோகரன் மாரண்ணன்
Manoharan Marannan
S/O,Marannan
288/144
Sathy Athani Main Road
T N Palayam
Vaniputhur(tp)
THUCKANAICKENPALAYAM
Erode Tamil Nadu - 638506
9994477252

Download Date: 02/02/2018

Generation Date: 24/02/2017

Signature Not Verified
Digitally signed by UNIQUE IDENTIFICATION AUTHORITY OF INDIA
Date: 2014.03.07 19:06:08 IST

QR Code with Photograph

உங்கள் ஆதார் எண் / Your Aadhaar No. :

7494 4646 9752

எனது ஆதார், எனது அடையாளம்

Government of India

AADHAAR

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று, குடியுரிமைக்கு அல்ல.
- அடையாள சான்றை ஆன்லைன் ஆதன்டிகேஷன் 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 அரசாங்கம்
Government of India

மனோகரன் மாரண்ணன்
Manoharan Marannan
பிறந்த நாள்/DOB: 18/04/1955
ஆண்/ MALE

7494 4646 9752

எனது ஆதார், எனது அடையாளம்

Unique Identification Authority of India

முகவரி:
மாரண்ணன், 288/144, சத்தி அத்தானி மெயின் ரோடு, தா நா பாளையம், வாணிப்புத்தூர், ஈரோடு,
தமிழ் நாடு - 638506

Address:
S/O,Marannan, 288/144, Sathy Athani Main Road, T N Palayam, Vaniputhur(tp), Erode, Tamil Nadu - 638506

QR Code with Photograph

7494 4646 9752

help@uidai.gov.in

www.uidai.gov.in

Deputy Director
Erode
Geology and Mining

இந்திய அரசாங்கம்
Government of India

இந்திய தனித்துவ அடையாள ஆணையம்
Unique Identification Authority of India

பதிவு அடையாளம் / Enrollment No. : 0000/00326/09230

To
Jaganathan R P
ஜெகநாதன் ர் பி
S/o Palanigounder,
501,
Sampooraniyammal Thottam,
Gobichettipalayam-Tk,
VTC: Arrakkankottaigramam, PO: Arakkankottai,
District: Erode,
State: Tamil Nadu, PIN Code: 638506.
Mobile: 9842160235

10122814

KC101228145FL

Government of India

AADHAAR

தகவல் / INFORMATION

- ஆதார் என்பது அடையாளச் சான்று, குடியுரிமைக்கான சான்று அல்ல
- ஆதார் தனித்துவமானது மற்றும் பாதுகாப்பானது
- பாதுகாப்பான QR குறியீடு/ஆப்லைன் XML/ஆன்லைன் அங்கீகாரத்தைப் பயன்படுத்தி அடையாளத்தைச் சரிபார்க்கவும்
- ஆதார் கடிதம், பிவிசி கார்டுகள், இ ஆதார் மற்றும் எம் ஆதார் போன்ற அனைத்து வகையான ஆதார்களும் சமமாக செல்லுபடியாகும். 12 இலக்க ஆதார் என்றுக்கு பதிலாக மெய்நிகர் ஆதார் அடையாளத்தை (VID) பயன்படுத்தலாம்.
- 10 ஆண்டுகளுக்கு ஒரு முறையாவது ஆதார் புதுப்பிக்கவும்
- பல்வேறு அரசு மற்றும் அரசு சாரா பலன்கள் / சேவைகளைப் பெற ஆதார் உங்களுக்கு உதவுகிறது
- உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடியை ஆதாரில் புதுப்பிக்கவும்
- ஆதார் சேவைகளைப் பெற உங்கள் ஸ்மார்ட் போன்களில் எம் ஆதார் செயலியைப் பதிவிறக்கவும்
- பாதுகாப்பை உறுதிப்படுத்த ஆதார் / பயோமெட்ரிக்ஸ் லாக் / அன்லாக் அம்சத்தைப் பயன்படுத்தவும்
- ஆதார் கோரும் நிறுவனங்கள் உரிய ஒப்புதலைப் பெற வேண்டும்
- Aadhaar is a proof of identity, not of citizenship.
- Aadhaar is unique and secure.
- Verify identity using secure QR code/offline XML/online Authentication.
- All forms of Aadhaar like Aadhaar letter, PVC Cards, eAadhaar and mAadhaar are equally valid. Virtual Aadhaar Identity (VID) can also be used in place of 12 digit Aadhaar number.
- Update Aadhaar at least once in 10 years.
- Aadhaar helps you avail various Government and Non-Government benefits/services.
- Keep your mobile number and email id updated in Aadhaar.
- Download mAadhaar app on smart phones to avail Aadhaar Services.
- Use the feature of lock/unlock Aadhaar/biometrics to ensure security.
- Entities seeking Aadhaar are obligated to seek due consent.

உங்கள் ஆதார் எண் / Your Aadhaar No. :

5853 9884 1587

எனது ஆதார், எனது அடையாளம்

இந்திய அரசாங்கம்
Government of India

Issue Date: 24/08/2013

ஜெகநாதன் ர் பி
Jaganathan R P
பிறந்த நாள் / DOB: 29/09/1973
ஆண்பால் / Male

5853 9884 1587

எனது ஆதார், எனது அடையாளம்

இந்திய தனித்துவ அடையாள ஆணையம்
Unique Identification Authority of India

Print Date: 01/02/2023

முகவரி: த/பெ பழனிக்கவுண்டர், 501, சம்பூரணியம்மன் தோட்டம், கோபிசெட்டிபாளையம்-வ, அரக்கன்கோட்டை ராரோடு, தமிழ் நாடு, 638506

Address: S/o Palanigounder, 501, Sampooraniyammal Thottam, Gobichettipalayam-Tk, Arrakkankottaigramam, Erode, Tamil Nadu, 638506

5853 9884 1587

1947 help@uidai.gov.in www.uidai.gov.in

Deputy Director
Geology and Mining
Erode

இந்திய அரசாங்கம்
Government of India

சுப்பிரமணியம் கொளந்தையகவுண்டர்
Subramaniam Kolanthaya Gounder
தந்தை : கொளந்தைகவுண்டர்
Father : KOLANTHAIKOUNDER
பிறந்த நாள் / DOB : 19/06/1958
ஆண்பால் / Male

2489 2269 3799

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

ஆதார்
முகவரி:
S/O: கொளந்தைய கவுண்டர், 59
நாயக்கன் தோட்டம்,
கள்ளியங்காட்டுபுதூர்,
வாணிபுத்தூர், வாணிபுதூர்,
தக்கநாய்க்கன்பாளையம்,
ஈரோடு, தமிழ் நாடு, 638506

Address:
S/O: Kolanthaya Gounder, 59
NAYAKAN THOTTAM,
KALLIYANGATTUPUTHUR,
VANIPUTHUR, Vaniputhur (p),
Thuckanaickenpaleyam, Erode,
Tamil Nadu, 638506

2489 2269 3799

1947
1800 300 1947
help@uidai.gov.in
www.uidai.gov.in

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

ANNEXURE

Deputy Director (Geology and Mining) Erode

ON WITH THE JOB

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

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

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

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

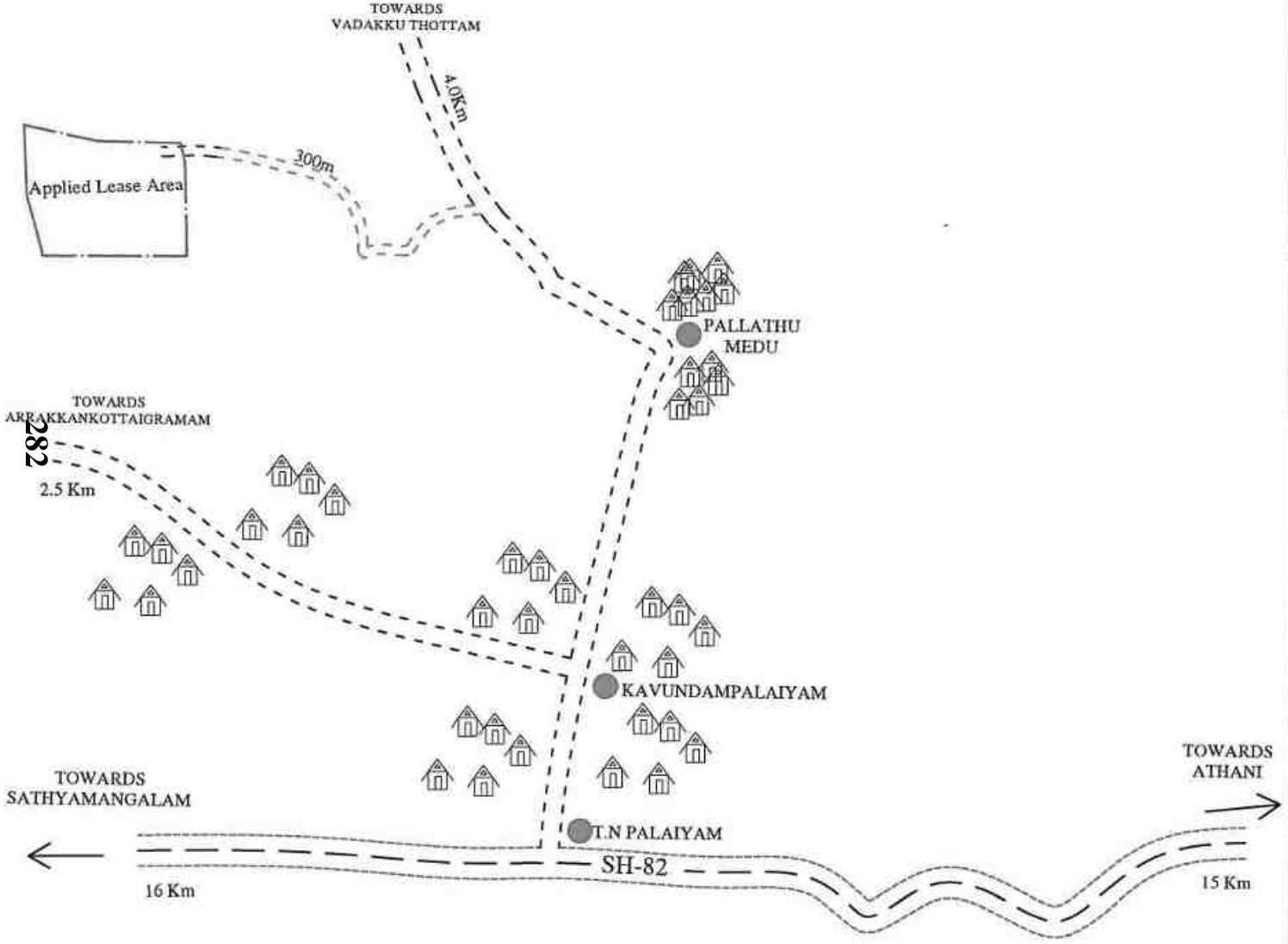
उनकीपंजीयन संख्या है
His registration number is **RQP /MAS/263/2014/A**

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

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

स्थान/ Place : Chennai
दिनांक/ Date : 16.12.2014.

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



N

PLATE NO-I

APPLICANT:

1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:

S.F.No's	: 49/2, 49/3 & 49/4A
EXTENT	: 1.99.0 Hect
VILLAGE	: KOVUNDAMPALAYAM
TALUK	: GOBICHETTIPALAYAM
DISTRICT	: ERODE

INDEX

- MINE LEASE AREA
- APPROACH ROAD
- CART ROAD
- VILLAGE ROAD
- SH -82 ROAD

KEY MAP

Not to Scale

Prepared By:

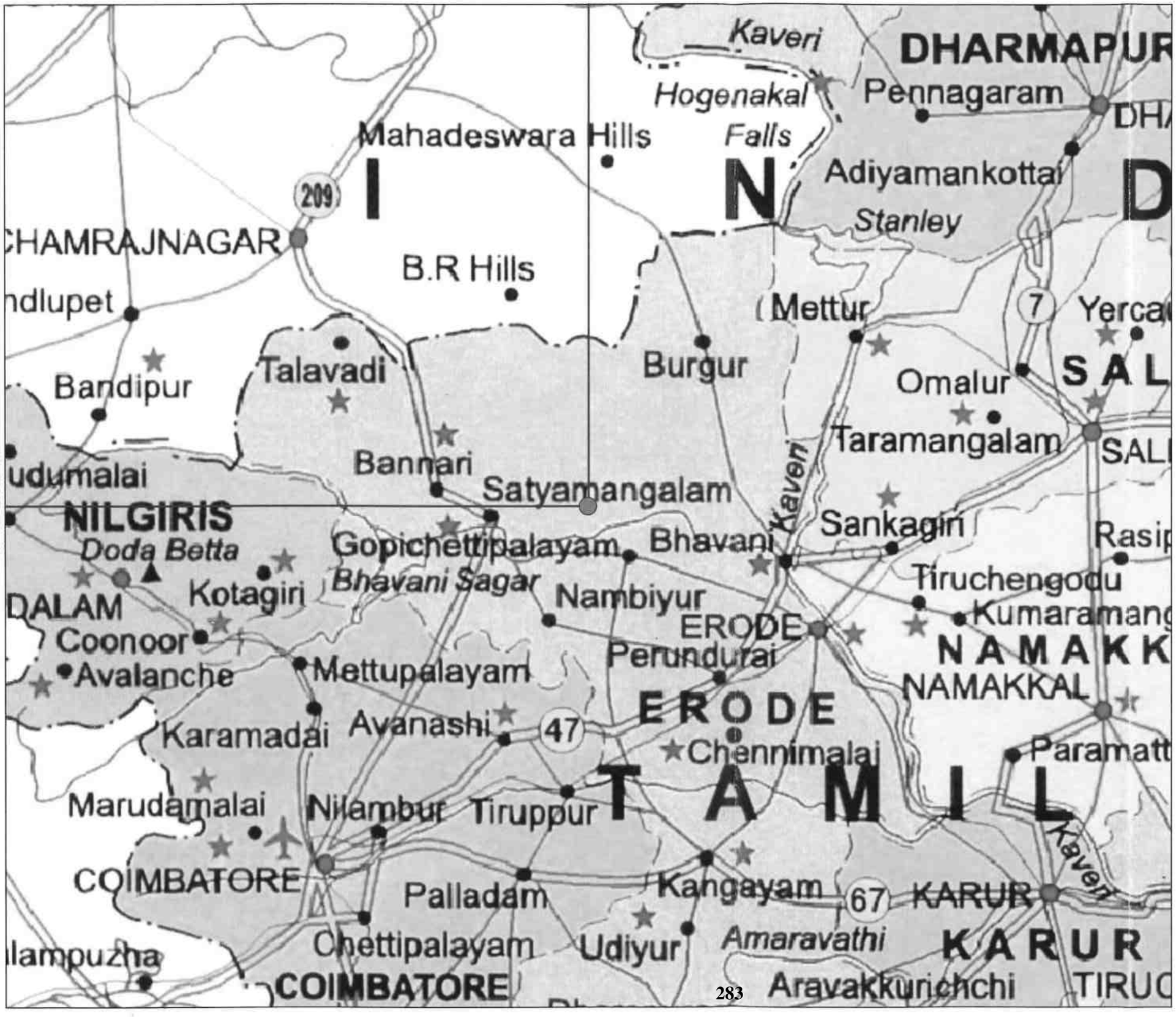
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

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

Deputy Director Geology & Mining Erode

11°31'5.74"N

77°22'38.63"E



Deputy Director
Erode
Geology and Mining

N

PLATE NO-IA

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
EXTENT : 1.99.0 Hect
VILLAGE : KOVUNDAMPALAYAM
TALUK : GOBICHETTIPALAYAM
DISTRICT : ERODE

INDEX

MINE LEASE AREA :

TOPO SHEET NO : 58-E/06

LATITUDE : 11°31'1.41"N to 11°31'5.74"N

LONGITUDE: 77°22'38.63"E to 77°22'44.51"E

LOCATION PLAN
NOT TO SCALE

Prepared By:

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

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

11°31'5.74"N

77°22'38.63"E

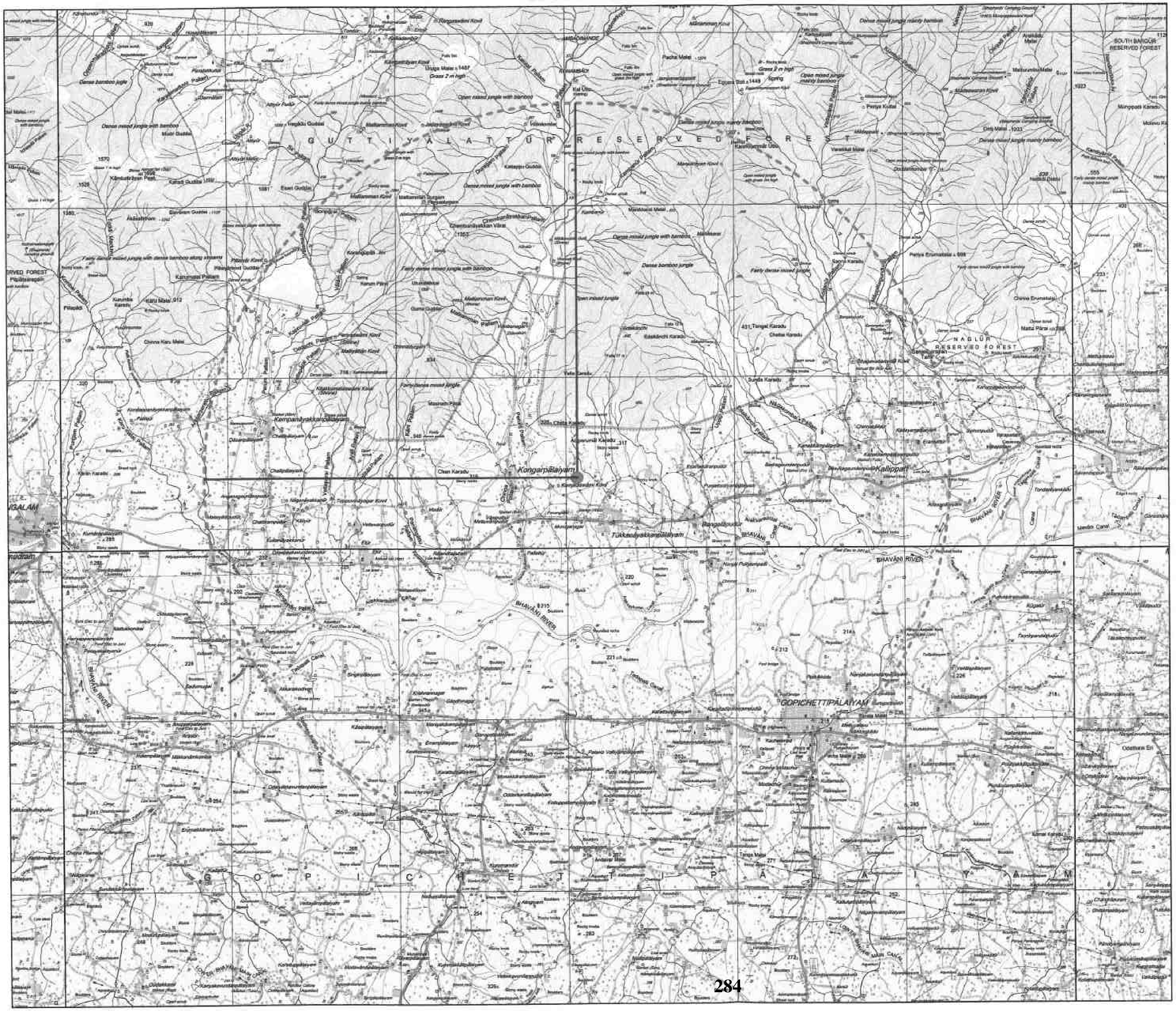


PLATE NO-IB

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:

S.F.No's	: 49/2, 49/3 & 49/4A
EXTENT	: 1.99.0 Hect
VILLAGE	: KOVUNDAMPALAYAM
TALUK	: GOBICHETTIPALAYAM
DISTRICT	: ERODE

TOPO SHEET NO : 58-E/06

LATITUDE : 11°31'1.41"N to 11°31'5.74"N

LONGITUDE: 77°22'38.63"E to 77°22'44.51"E

MINE LEASE AREA

10KM RADIUS

TOPOSHEET MAP

SCALE– 1:1,00,000

Prepared By:

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

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

11°31'5.74"N

77°22'38.63"E

N

Deputy Director ★ Geology and Mining ★ Erode

PLATE NO-IC

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:

S.F.No's	: 49/2, 49/3 & 49/4A
EXTENT	: 1.99.0 Hect
VILLAGE	: KOVUNDAMPALAYAM
TALUK	: GOBICHETTIPALAYAM
DISTRICT	: ERODE

INDEX

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

TOPO SHEET NO : 58-E/06

LATITUDE : 11°31'1.41"N to 11°31'5.74"N

LONGITUDE: 77°22'38.63"E to 77°22'44.51"E

SATELLITE IMAGERY MAP

SCALE– 1:5000

Prepared By:

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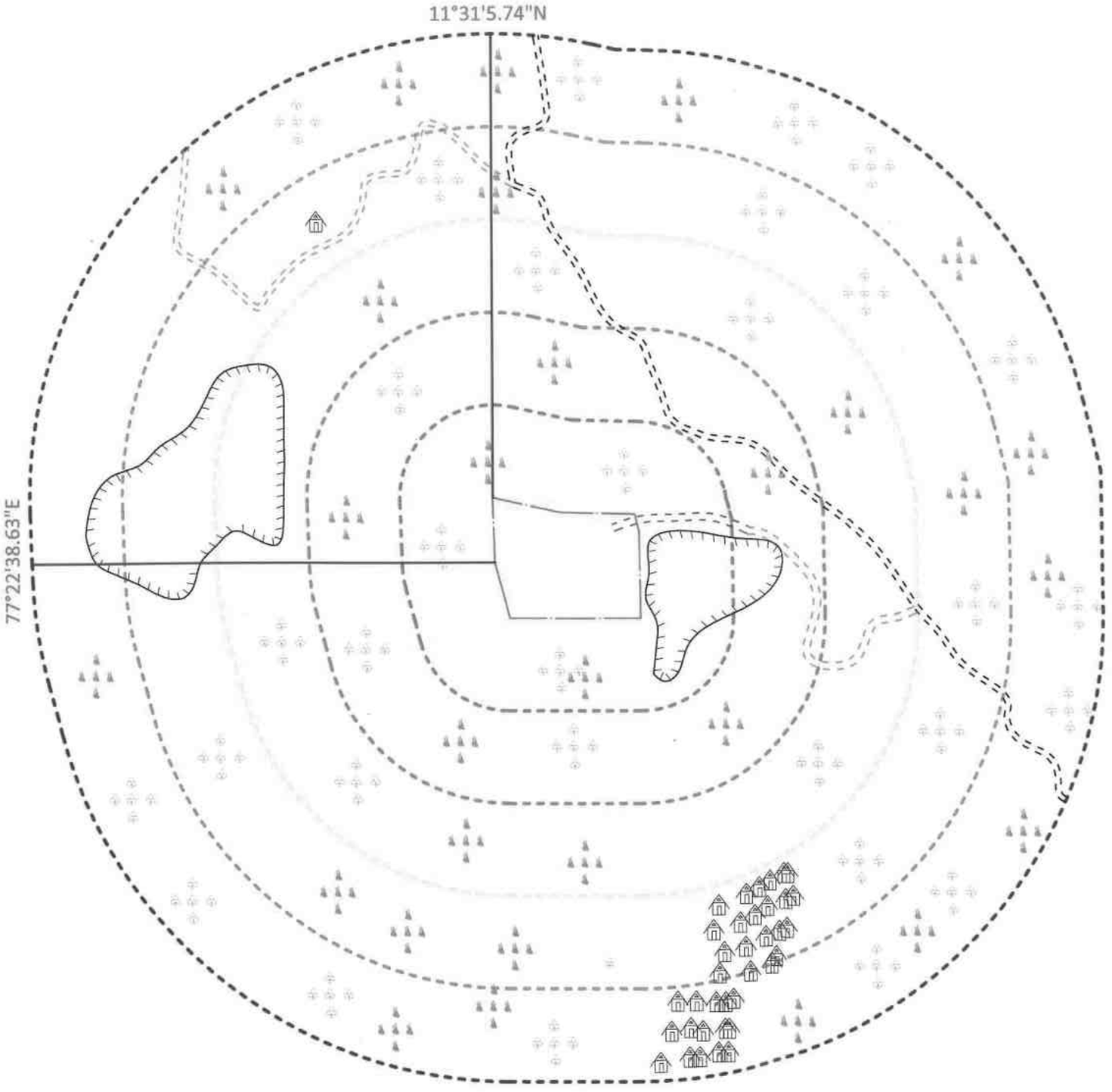
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

OCTOBER TO DECEMBER



JULY TO SEPTEMBER

N

Deputy Director ★ Geology and Mining ★ Erode

PLATE NO-ID

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
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TALUK : GOBICHETTIPALAYAM
DISTRICT : ERODE

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- MINE LEASE AREA
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- CART & VILLAGE ROAD
- 100m RADIUS
- 200m RADIUS
- 300m RADIUS
- 400m RADIUS
- 500m RADIUS
- SHRUBS & TREES
- EXISTING QUARRY PIT
- HABITATIONS

TOPO SHEET NO : 58-E/06

LATITUDE : 11°31'1.41"N to 11°31'5.74"N

LONGITUDE: 77°22'38.63"E to 77°22'44.51"E

ENVIRONMENTAL MAP

SCALE– 1:5000

Prepared By:

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

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

Pillar No	Latitude	Longitude
1	11°31'5.06"N	77°22'44.34"E
2	11°31'4.46"N	77°22'44.49"E
3	11°31'1.41"N	77°22'44.51"E
4	11°31'1.49"N	77°22'39.20"E
5	11°31'2.24"N	77°22'39.01"E
6	11°31'3.45"N	77°22'38.69"E
7	11°31'5.74"N	77°22'38.63"E
8	11°31'5.19"N	77°22'41.02"E

Deputy Director ★ Geology and Mining ★ Erode

N

PLATE NO-II

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
EXTENT : 1.99.0 Hect
VILLAGE : KOVUNDAMPALAYAM
TALUK : GOBICHETTIPALAYAM
DISTRICT : ERODE

INDEX

MINE LEASE AREA

SAFETY DISTANCE

APPROACH ROAD

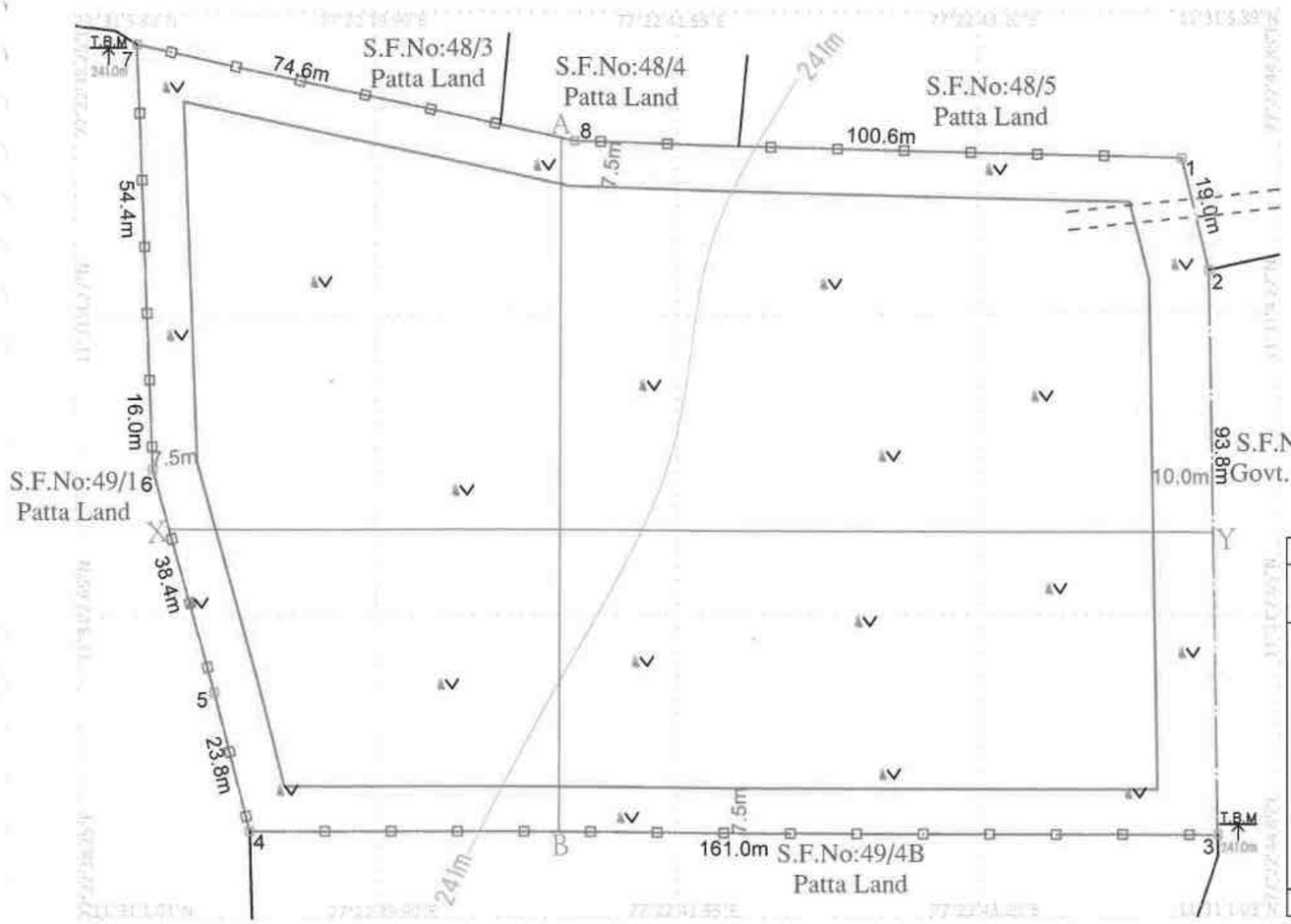
BOUNDARY PILLAR STONES □1

MINE LEASE PLAN
SCALE 1 : 1000

Prepared By:

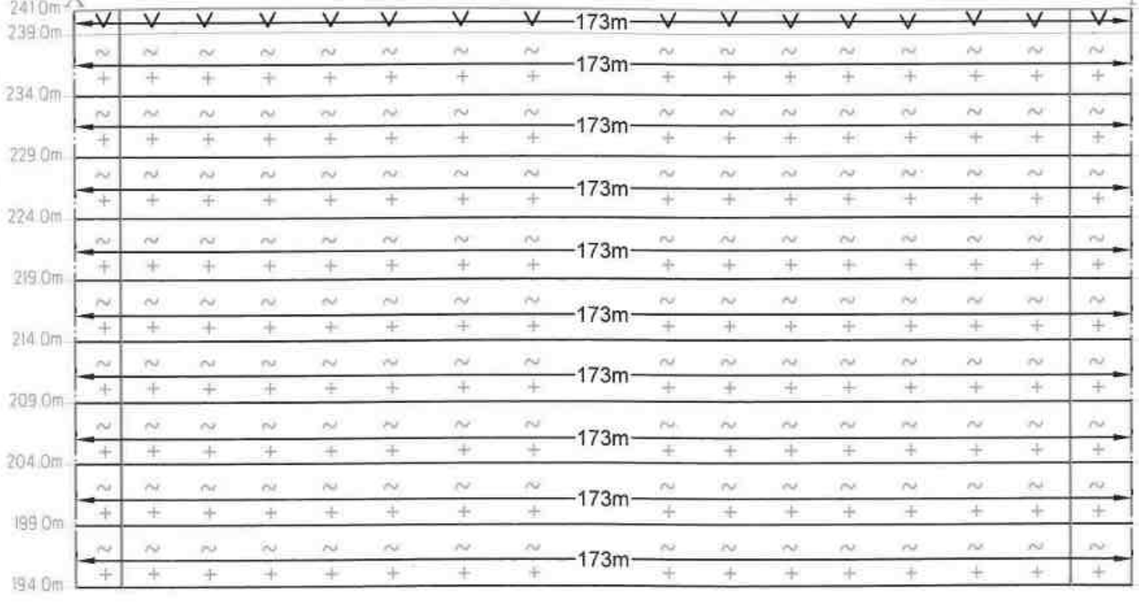
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

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

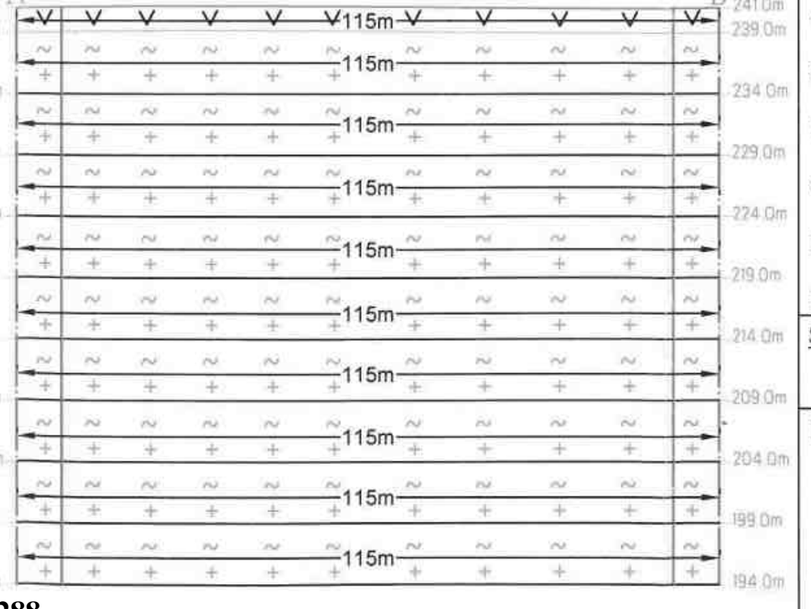


GEOLOGICAL RESOURCES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m^3	Rough Stone in m^3	Gravel in m^3
XY-AB	I	173	115	2	39790	.....	39790
	II	173	115	5	99475	99475	.....
	III	173	115	5	99475	99475	.....
	IV	173	115	5	99475	99475	.....
	V	173	115	5	99475	99475	.....
	VI	173	115	5	99475	99475	.....
	VII	173	115	5	99475	99475	.....
	VIII	173	115	5	99475	99475	.....
	IX	173	115	5	99475	99475	.....
	X	173	115	5	99475	99475	.....
TOTAL				47	935065	895275	39790

SECTION ALONG X–Y



SECTION ALONG A–B



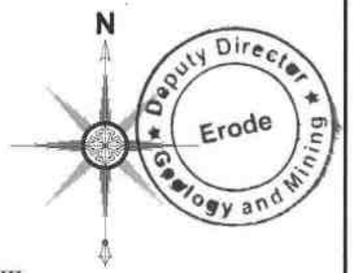


PLATE NO-III

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
EXTENT : 1.99.0 Hect
VILLAGE : KOVUNDAMPALAYAM
TALUK : GOBICHETTIPALAYAM
DISTRICT : ERODE

INDEX

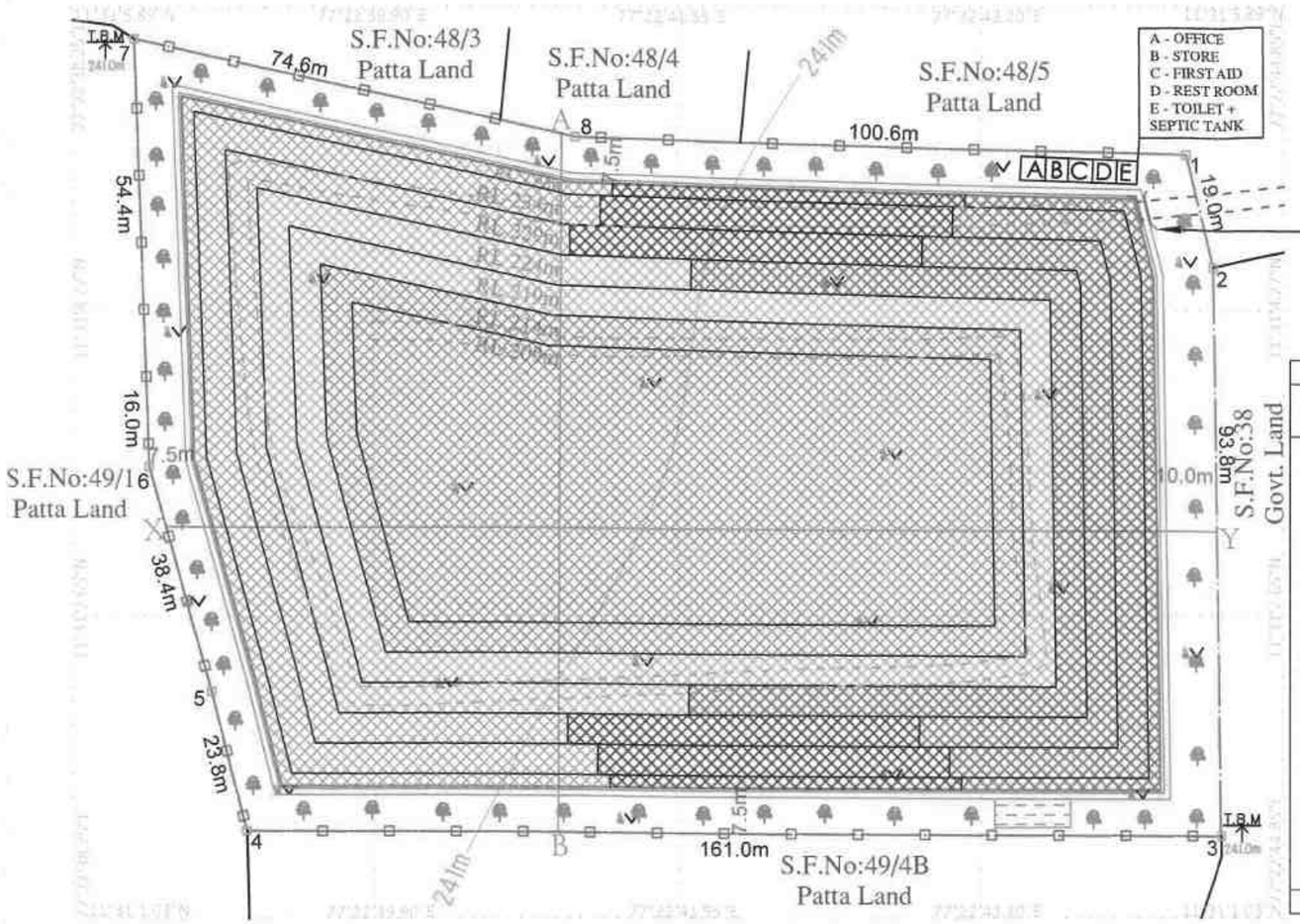
MINE LEASE AREA
SAFETY DISTANCE
APPROACH ROAD
BOUNDARY PILLAR STONES
GRAVEL
SHRUBS
TEMPORARY BENCH MARKS
CONTOUR LINES
FENCING
ROUGH STONE

SURFACE, GEOLOGICAL 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

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



I - Year Proposed area to be Planted

I - Year Proposed area to be Quarried

II - Year Proposed area to be Quarried

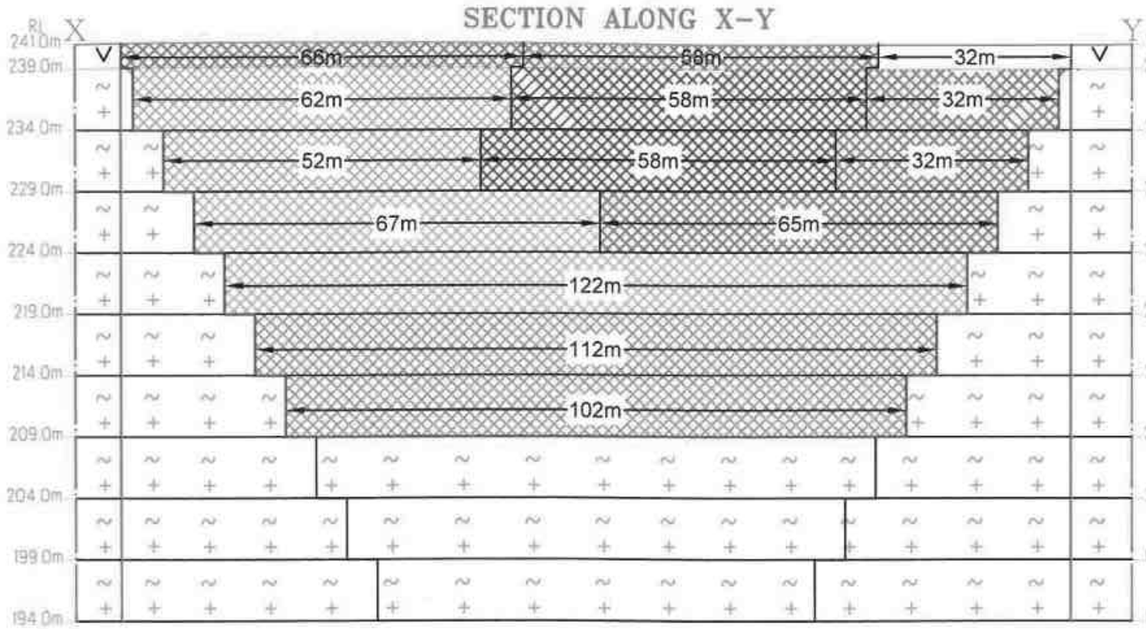
III - Year Proposed area to be Quarried

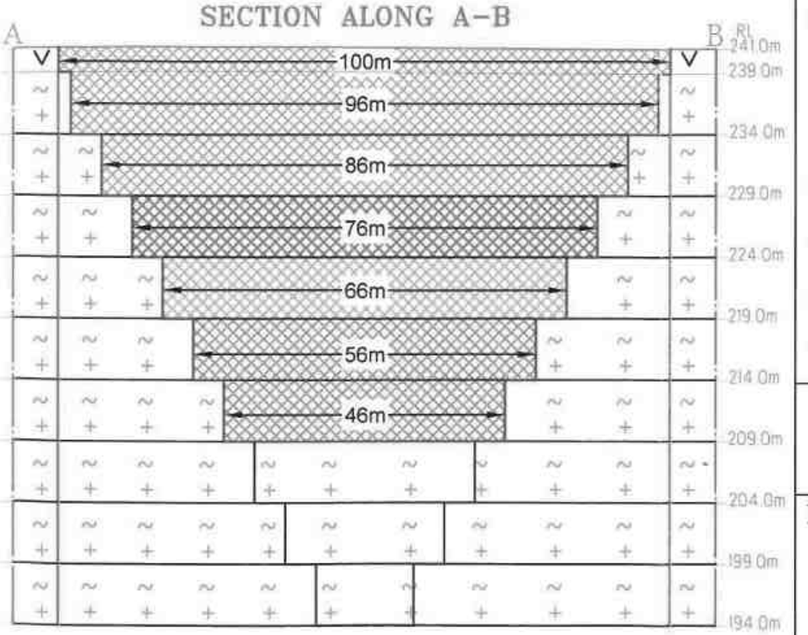
IV - Year Proposed area to be Quarried

V - Year Proposed area to be Quarried

YEARWISE PRODUCTIONS RESERVES

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	66	100	2	13200	.....	13200
		II	62	96	5	29760	29760	.....
		III	52	86	5	22360	22360	.....
		TOTAL				**65320**	**52120**	**13200**
	II-YEAR	I	58	100	2	11600	.....	11600
		II	58	96	5	27840	27840	.....
		III	58	86	5	24940	24940	.....
		TOTAL				**64380**	**52780**	**11600**
	III- YEAR	I	32	100	2	6400	.....	6400
		II	32	96	5	15360	15360	.....
		III	32	86	5	13760	13760	.....
		IV	65	76	5	24700	24700	.....
		TOTAL				**60220**	**53820**	**6400**
	IV-YEAR	IV	67	76	5	25460	25460	.....
		V	122	66	5	40260	40260	.....
		TOTAL				**65720**	**65720**	**0**
	V-YEAR	VI	112	56	5	31360	31360	.....
		VII	102	45	5	22950	22950	.....
		TOTAL				**54310**	**54310**	**0**
GRAND TOTAL						**309950**	**278750**	**31200**





N

Deputy Director Geology and Mining Erode

PLATE NO-IV

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIKOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
EXTENT : 1.99.0 Hect
VILLAGE : KOVUNDAMPALAYAM
TALUK : GOBICHETTIPALAYAM
DISTRICT : ERODE

INDEX

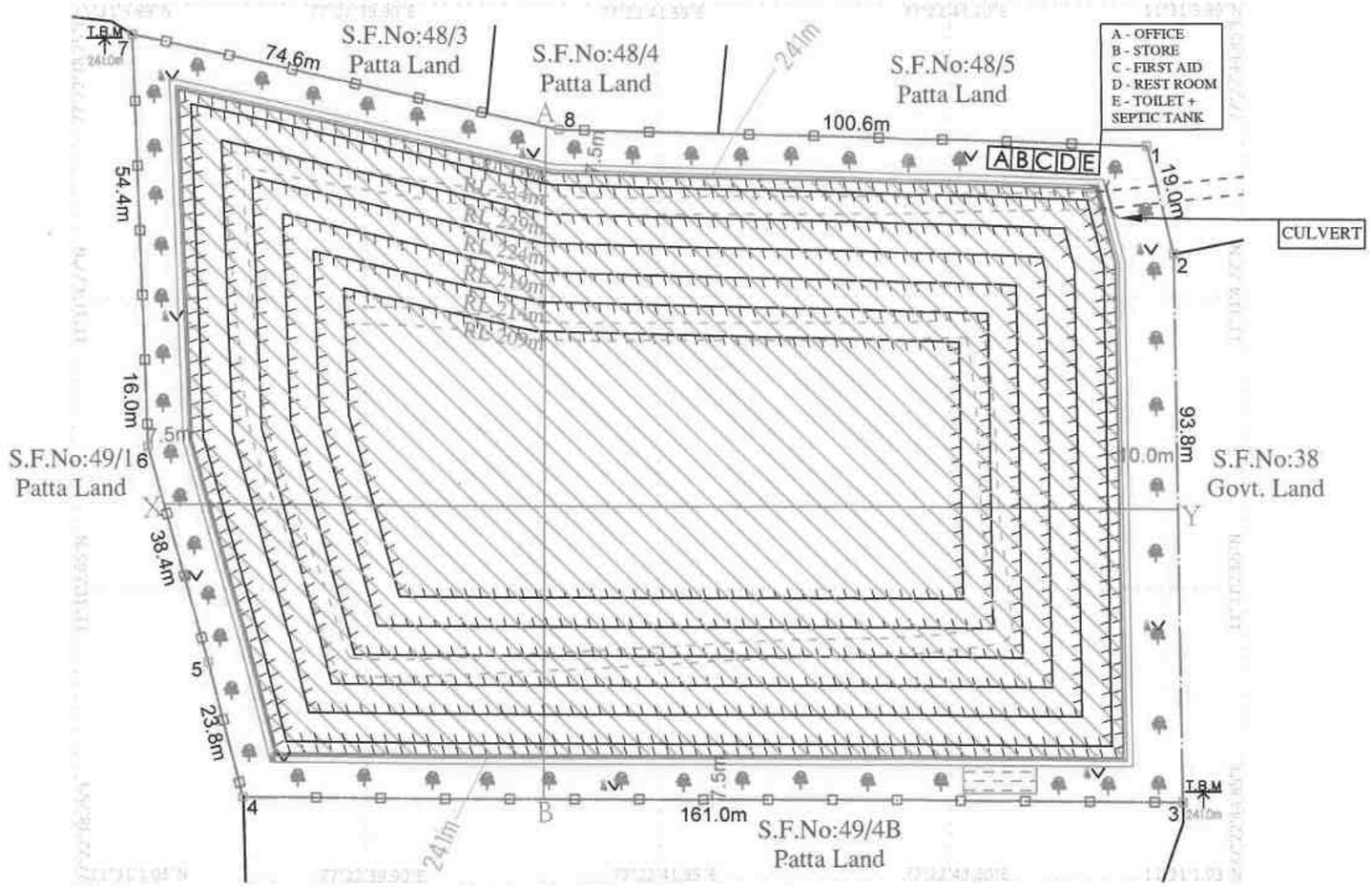
- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES □1
- GRAVEL
- SHRUBS
- TEMPORARY BENCH MARKS I.B.M
- CONTOUR LINES 241m
- FENCING
- ROUGH STONE
- PROPOSED & ULTIMATE BENCH
- DRAINAGE & SETTLING TANK

YEARWISE DEVELOPMENT, PRODUCTION 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

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



MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	1.56.00	
INFRASTRUCTURE	NIL	0.02.00	A B C D E
ROADS	NIL	0.05.00	
GREEN BELT	NIL	0.30.00	
DRAINAGE & SETTLING TANK	NIL	0.06.00	
UN-UTILIZED AREA	1.99.0	NIL	NIL
GRAND TOTAL	1.99.0	1.99.00	NIL

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
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S.F.No's : 49/2, 49/3 & 49/4A
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INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
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- BOUNDARY PILLAR STONES
- GRAVEL
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- TEMPORARY BENCH MARKS
- CONTOUR LINES
- FENCING
- ROUGH STONE
- PROPOSED BENCH
- DRAINAGE & SETTLING TANK

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

Prepared By:

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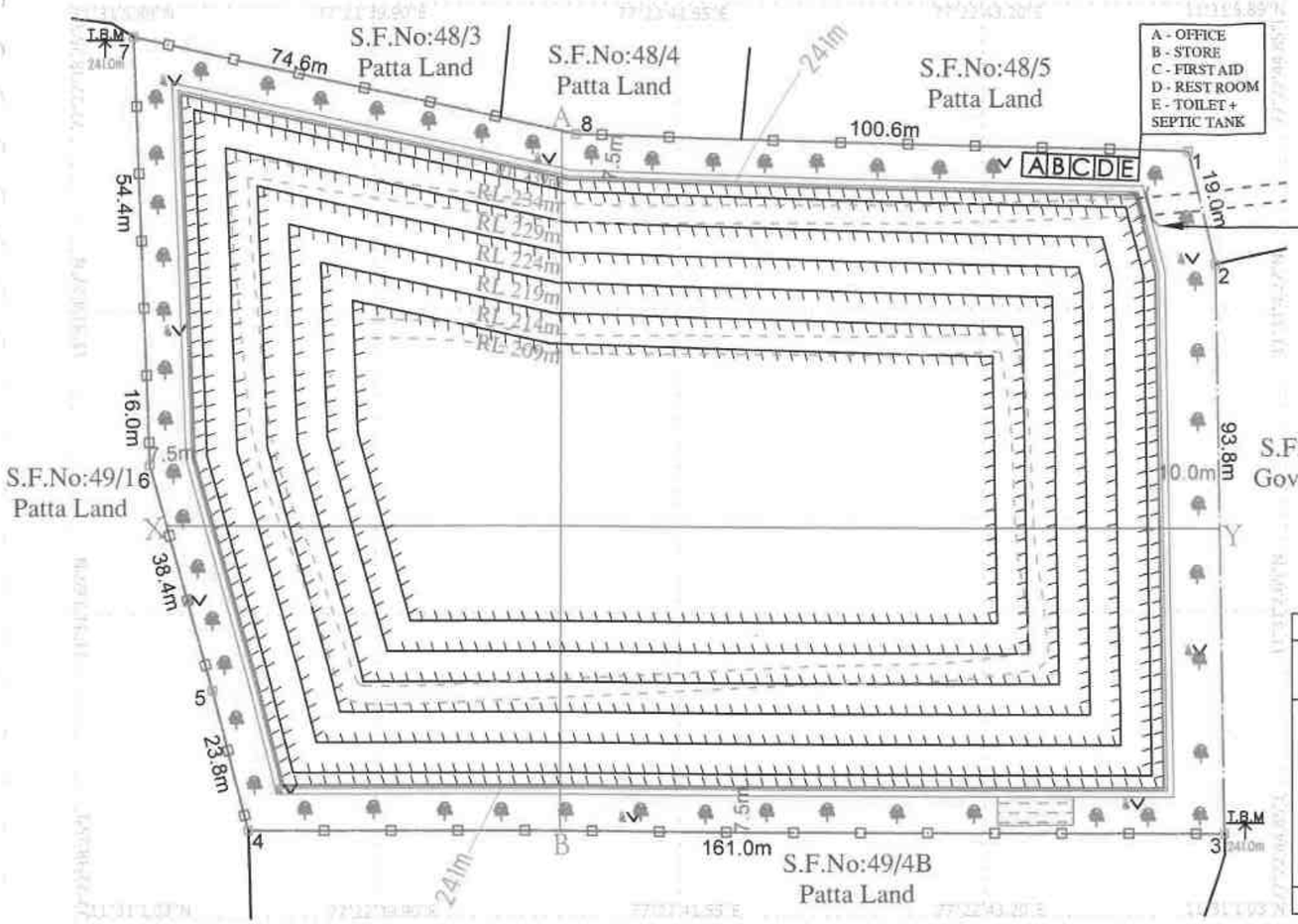
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

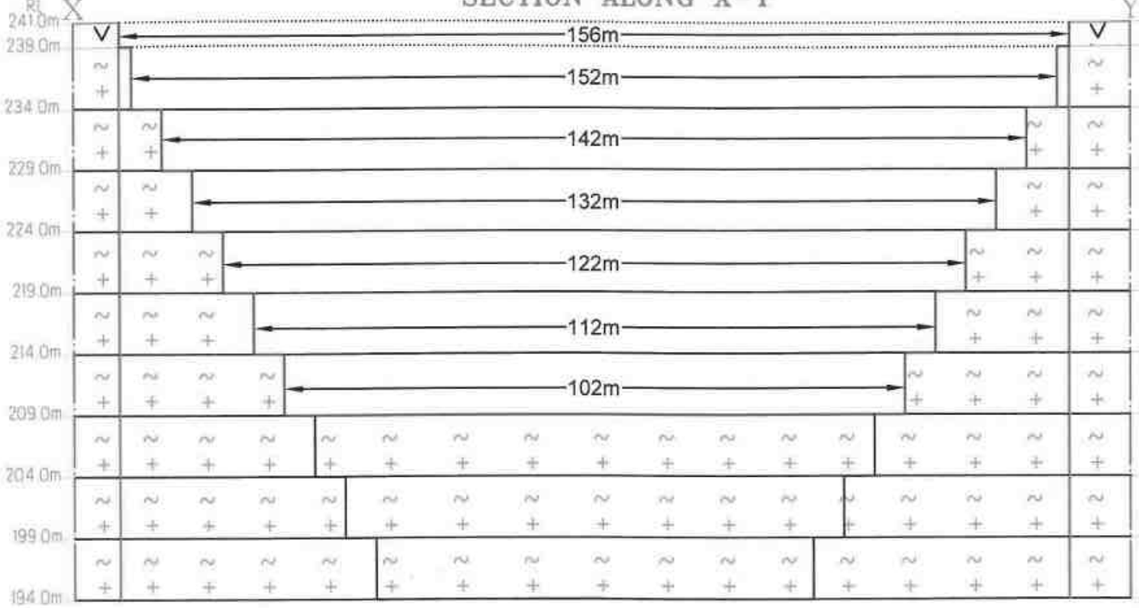


I - Year Proposed area to be Planted

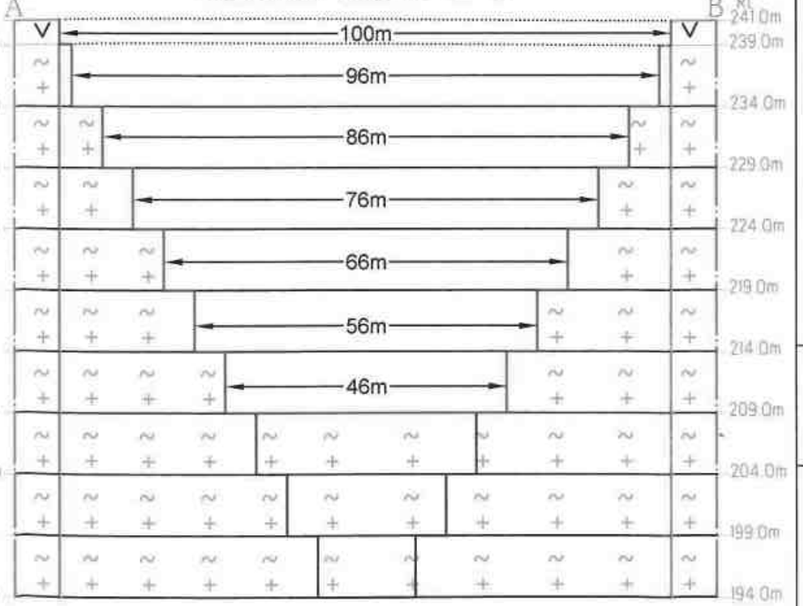
PRODUCTION RESERVES

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	156	100	2	31200	.....	31200
	II	152	96	5	72960	72960	.....
	III	142	86	5	61060	61060	.....
	IV	132	76	5	50160	50160	.....
	V	122	66	5	40260	40260	.....
	VI	112	56	5	31360	31360	.....
	VII	102	45	5	22950	22950	.....
TOTAL				**32**	**309950**	**278750**	**31200**

SECTION ALONG X-Y



SECTION ALONG A-B



N

Deputy Director
Geology and Mining
Erode

PLATE NO-VI

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
S/o. KOLANTHAIGOUNDER,
3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
GOBICHETTIPALAYAM, ERODE - 638506.

LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
EXTENT : 1.99.0 Hect
VILLAGE : KOVUNDAMPALAYAM
TALUK : GOBICHETTIPALAYAM
DISTRICT : ERODE

INDEX

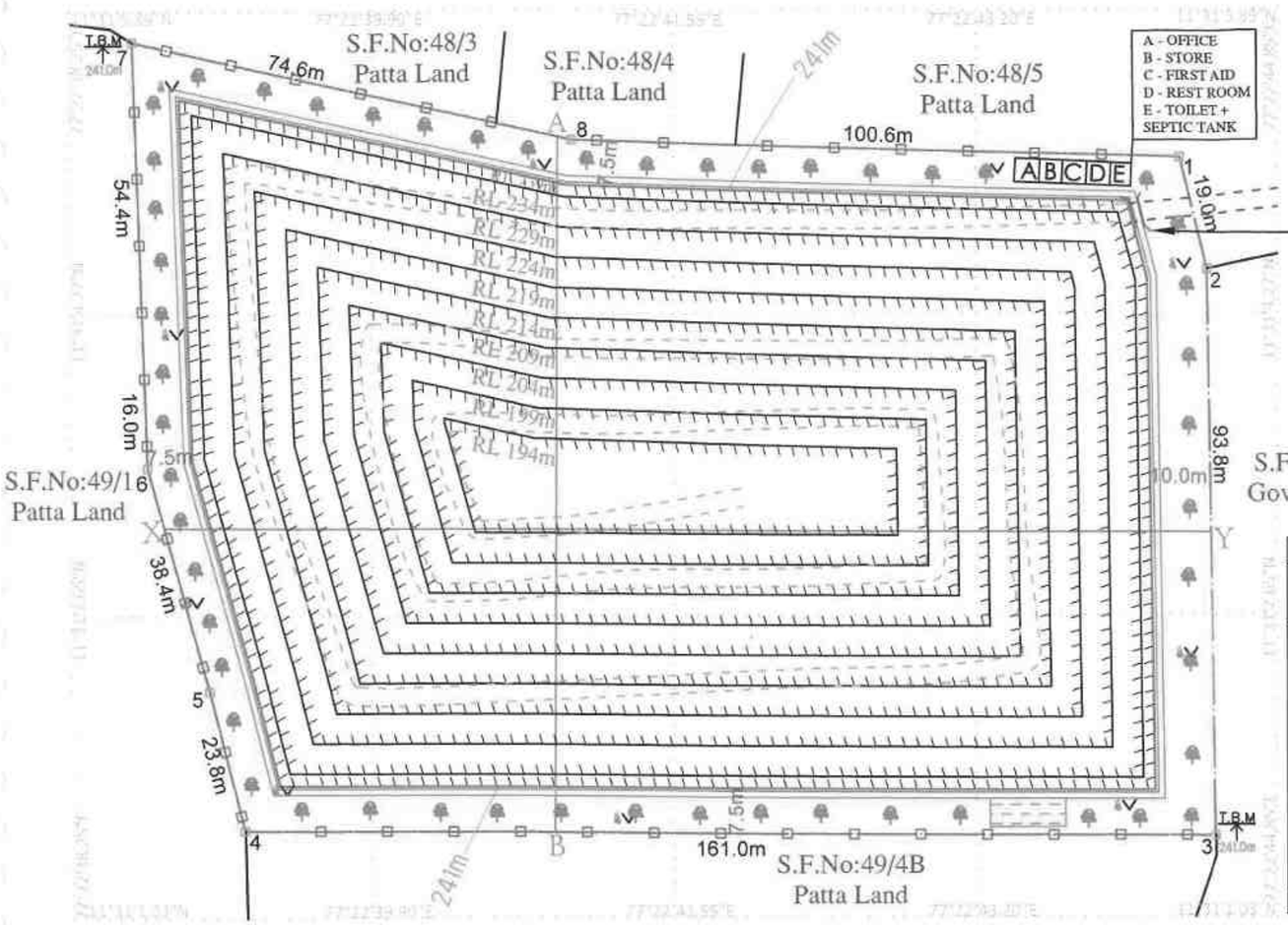
- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- GRAVEL
- SHRUBS
- TEMPORARY BENCH MARKS
- CONTOUR LINES
- FENCING
- ROUGH STONE
- PROPOSED & ULTIMATE BENCH
- DRAINAGE & SETTLING TANK

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

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

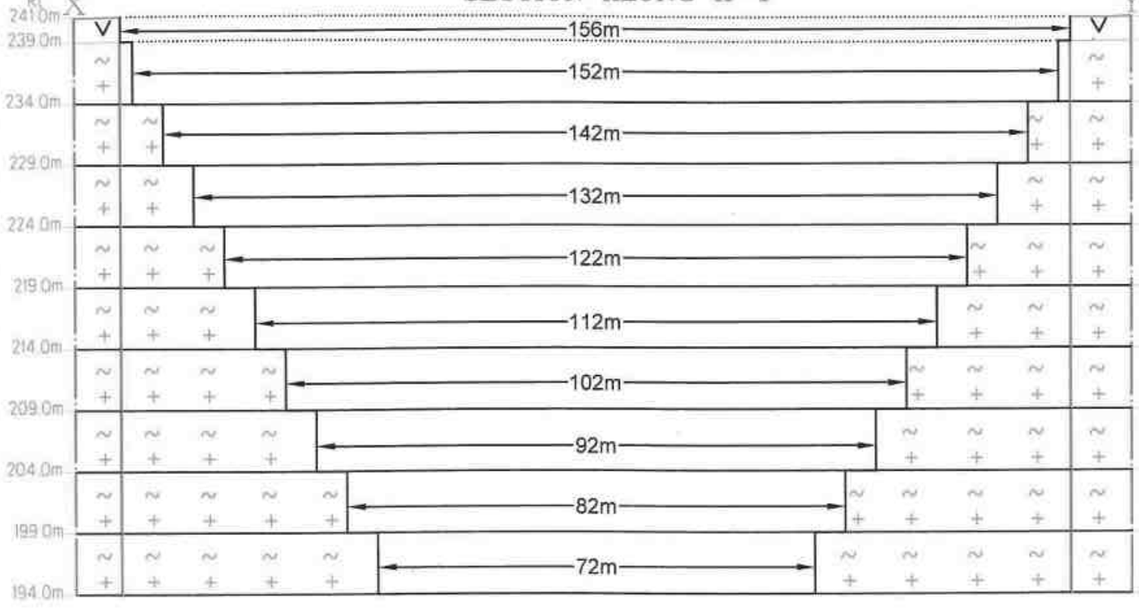


I - Year Proposed area to be Planted

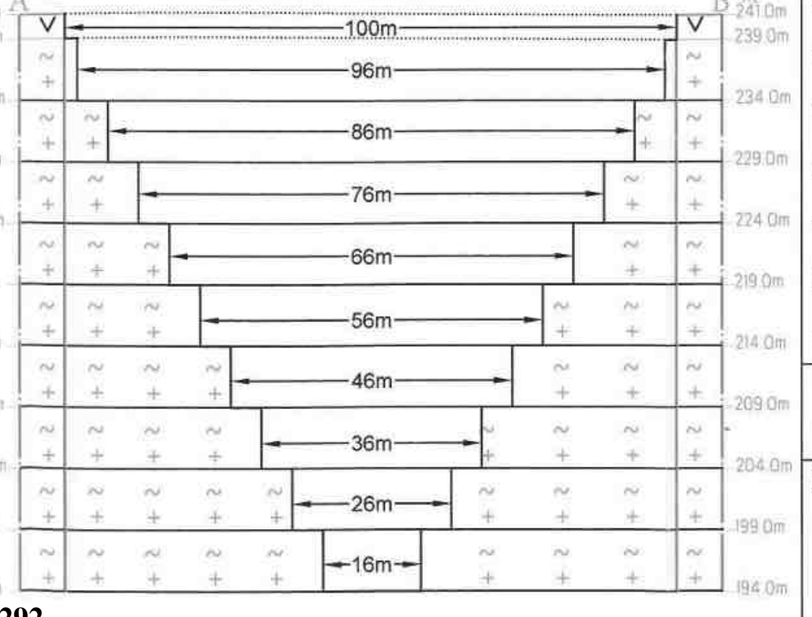
MINEABLE RESERVES

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	156	100	2	31200	.....	31200
	II	152	96	5	72960	72960	.....
	III	142	86	5	61060	61060	.....
	IV	132	76	5	50160	50160	.....
	V	122	66	5	40260	40260	.....
	VI	112	56	5	31360	31360	.....
	VII	102	45	5	22950	22950	.....
	VIII	92	36	5	16560	16560	.....
	IX	82	26	5	10660	10660	.....
	X	72	16	5	5760	5760	.....
TOTAL				**47**	**342930**	**311730**	**31200**

SECTION ALONG X–Y



SECTION ALONG A–B



N

Deputy Director Geology and Mining Erode

PLATE NO-VII

APPLICANT:
1.Mr.T.M.MANOHARAN,
S/o. MARANNAN,
2.Mr.K.SUBRAMANIAM,
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3.Mr.R.P.JAGANATHAN,
S/o. PALANIGOUNDER,
KOUNDAMPALAYAM VILLAGE,
T.N.PALAYAM,
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LEASE APPLIED AREA:
S.F.No's : 49/2, 49/3 & 49/4A
EXTENT : 1.99.0 Hect
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- PROPOSED & ULTIMATE BENCH
- DRAINAGE & SETTLING TANK

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

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

சான்று

ஈரோடு மாவட்டம் கோபி வட்டம் ....வாணிப்புத்தூர்....

கிராமம் ....கிளிபர.... மஜரா ...சி.தீ.நி – அத்தாணி....

மெயின் ரோடு.... என்னும் முகவரியில் வசித்து வரும்

(லேட்) மாரண்ண கவுண்டர் மகன் T.M. மனோகரன் (1)
(லேட்) கொளந்தேகவுண்டர் மகன் சுப்ரமணியம் (2) பழனிச்சகவுண்டர் மகன் R.P. ஜெகநாதன் (3)
என்பவருக்கு கோபி வட்டம், 08. கவுண்டம்பாளையம்.... கிராமம்,

ரீ.ச. எண். 49/2, 49/3, 49/4A.... நஞ்சை /புஞ்சை (ஹெக்டர். .... ஏர்ஸ்)

1.99.0 ஏர்ஸ் ஹெக்டர் 4.02, 1.99.0 ஏர்ஸ்.... விவசாய சாகுபடி நிலம்

....கிராம ஆவணத்தின்.... படி பாத்தியம். நிலவரி ஏதும்

பாக்கியில்லை என்பதையும் இதன் மூலம் சான்று அளிக்கப்படுகிறது.

மேற்காணும் புலஎண்கள் 49/2, 49/3, 49/4A ஆகிய பூமியை ஒட்டியுள்ள பகுதியில் 300 மீட்டர் சுற்றளவில் குடியிருப்புகளோ அரசு அங்கீகரிக்கப்பட்ட மனைப்பிரிவுகளோ புராதான சின்னங்கள், வழிபாட்டுதலங்கள் என ஏதும் இல்லை என்பதனை புலத்தணிக்கை விசாரணையின்படி சான்றளிக்கப்படுகிறது.

22/02/2023

கிராம நிர்வாக அலுவலர்
07B, கொங்கர்பாளையம் கிராமம்
08, கவுண்டம்பாளையம் கிராமம்
கோபி வட்டம்

ANNEXURE-VI

தமிழ்நாடு வனத்துறை

அனுப்புதல்

திரு.ரா.கிருபாசங்கர், இ.வ.ப.,
துணை இயக்குநர்,
சத்தியமங்கலம் வனக்கோட்டம்,
சத்தியமங்கலம் புலிகள் காப்பகம்,
சத்தியமங்கலம் – 638 402.

பெறுதல்

உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
ஈரோடு.

ந.க.எண்.4883/2021/வ, நாள்:30–01–2023

ஐயா,

பொருள் : கனிமங்களும் குவாரிகளும் – ஈரோடு மாவட்டம் – கனிமங்களும் சுரங்கங்களும் – சிறுகனிமம் – சாதாரணக் கற்கள் – ஈரோடு மாவட்டம் – கோபிசெட்டிபாளையம் வட்டம் – கவுண்டம்பாளையம் கிராமம் – புல எண்கள் 49/2, 49/3, 49/4A இல் 1.99.0 ஹெக்டர் பரப்பில் சாதாரணக்கற்கள் மற்றும் கிராவல் மண்வெட்டி எடுக்க 5 ஆண்டுகளுக்கு குவாரி குத்தகை உரிமம் கோரி திரு.டி.எம்.மனோகரன், திரு.கே.சுப்பிரமணியம் மற்றும் திரு.பழனிகவுண்டர் ஆகியோரால் குவாரி அமைக்க தடையின்மை சான்று கோரி வரப்பெற்ற மனு – மேல் விபரங்கள் சமர்ப்பித்தல் – தொடர்பாக.

பார்வை :

1. மாவட்ட ஆட்சித் தலைவர், ஈரோடு மாவட்டம் அவர்களின் ந.க.எண். 15255/2018/எக்ஸ்–1, நாள்: 23.04.2021
2. உதவி இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, ஈரோடு. ந.க.எண்.15255/2018/எக்ஸ்–1 நாள்.08.04.2022

----***----

மேற்காண் பொருள் தொடர்பாக, பார்வை –1 மற்றும் 2–ல் கண்ட கடிதத்தின்படி சத்தியமங்கலம் வனக்கோட்டம், தூ.ந.பாளையம் வனச்சரகம், கவுண்டம்பாளையம் கிராமம் – புல எண்கள் 49/2, 49/3, 49/4A இல் 1.99.0 ஹெக்டர் பரப்பில் சாதாரணக்கற்கள் மற்றும் கிராவல் மண்வெட்டி எடுக்க 5 ஆண்டுகளுக்கு குவாரி குத்தகை உரிமம் கோரி திரு.டி.எம்.மனோகரன், திரு.கே.சுப்பிரமணியம் மற்றும் திரு.பழனிகவுண்டர் ஆகியோரால் குவாரி அமைக்க தடையின்மைச் சான்று கோரியது தொடர்பாக, மேற்படி பகுதிகளை களத்தணிக்கை மேற்கொண்டு பின்வரும் விபரங்கள் தெரிவிக்கப்படுகிறது.

விபரங்கள்:

குவாரி அமைக்கப்படவுள்ள இடமானது சத்தியமங்கலம் வனக்கோட்டம் தூக்கநாயக்கன்பாளையம் வனச்சரகம், கொங்கர்பளையம் காவல்சுற்று, குத்தியாலத்தூர் காப்புக்காடு புலிகள் காப்பக வன எல்லையிலிருந்து முறையே சர்வே எண்.49/2 – 1.26 கி.மீ தூரத்திலும், 49/3 – 1.31 கி.மீ தூரத்திலும், 49/4A – 1.34 கி.மீ தூரத்திலும்

அமைந்துள்ளது. மேலும் கல்குவாரி குத்தகை உரிமம் கோரும் இடமானது, சத்தியமங்கலம் புலிகள் காப்பகம் சூழல் உணர்திறன் மண்டலத்திலிருந்து (ECO Sensitive Zone) வெளியில் உள்ளது. எனவே வனத்துறை தடையின்மை சான்று பெற அவசியமேதுமில்லை என்பதை தெரிவித்துக்கொள்கிறேன்.

ஒம்/–ரா.கிருபாசங்கர்,
துணை இயக்குநர்,
சத்தியமங்கலம் வனக்கோட்டம்.

நகல்: வனச்சரக அலுவலர், தூ.நா.பாளையம் வனச்சரகம்

// உண்மை நகல் // உத்திரவுப்படி //

30/01/2023
கண்காணிப்பாளர்

30/1/23

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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.