

**DRAFT OF ENVIRONMENTAL IMPACT ASSESSMENT  
AND  
ENVIRONMENT MANAGEMENT PLAN  
FOR OBTAINING**

**Environmental Clearance under EIA Notification – 2006  
Schedule Sl. No. 1 (a) (i): Mining Project**

**“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND  
CLUSTER EXTENT = 10.15.0 hectares**

**K. ILAYARAJA ROUGH STONE QUARRY**

**At**

**Karungalakudi Village, Melur Taluk, Madurai District**

**ToR issued vide Letter No. SEIAA-TN/ENo. 9063/SEAC/ToR-1174/2022  
dated 14.06.2022**

**Name and Address**  
K. Ilayaraja  
S/o. Krishnan,  
W10/215, Pettai, Anna Nagar,  
Karungalakudi, Melur Taluk,  
Madurai-625101

**Extent & S.F.No.**  
2.02.5 ha &  
S.F.No. 619/5 (P)

**ENVIRONMENTAL CONSULTANT**

**GEO TECHNICAL MINING SOLUTIONS**



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**ENVIRONMENTAL LAB**

**EXCELLENCE LABORATORY AND ACCURACY ANALABS**

**NABET ACC. NO: NABET/EIA/2023/IA0067**

**Valid till : 29th Dec. 2023**

**Baseline Study Period – March to May 2022**

## TERMS OF REFERENCE (ToR) COMPLIANCE

**Thiru.K.Iayaraja**

**“ToR issued vide Letter No. SEIAA-TN/F.No.9063/SEAC/ToR-1174/2022 dated  
14.06.2022”**

<b>SPECIFIC CONDITIONS</b>		
1	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining plan, the project proponent (pp) shall prepare and submit an. Action plan for carrying out the realignment of the benches in the proposed quarry lease after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.	This is newly proposed rough stone quarry not yet to start mining operation.
2	The Proponent shall submit a conceptual. ‘Slope Stability Plan’, for the proposed quarry during the appraisal while obtaining the EC, as the depth of the working is extended beyond 30 m below ground level.	Not applicable This is newly proposed rough stone quarry for obtaining EC
3	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	The blaster certificate, II/I Class mines manager and appointed authority details may be attached in final EIA report.
4	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	This proposed project involves secondary blasting, known as dimensional stone blasting. In this kind of blasting, the shot holes will be placed in such a way that the rock will not shatter into useless pieces and a small quantity of explosives will be

	evidences.	used to create cracks and loosen blocks of good size. Then the blocks will be post processed to make them suitable for construction projects. It is discussed in details in the section 2.6. Under the chapter-II, p.18.
5	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?	This is newly proposed area not yet to start mining operation.
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.	
6	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).	The geology, geomorphology, land, water, air, ecology and bio diversity and socio economic and studies were carried out for 10 km buffer zone from proposed project site and the results have been discussed in section 2.4.1 to 2.4.2 under chapter II, pp. 11-14 and land use categories given in section 3.1 to 3.1.5.2 pp,26-32.
7	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	The green belt development proposal has been discussed in the sections 4.6.2.1 under chapter IV, pp,118-123.

		Drone Video coverage may be submitted in the final EIA report.
8	The proponent shall furnish photographs of adequate fencings' 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.	<p>Allocation for Corporate Environment Responsibility (CER) were made as per the Government of India, MoEF &amp; CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018.</p> <p>As the quarry project is a green field project and the capital investment is <math>\leq</math> 100 crores, the project shall contribute 2% of the capital investment towards CER. Therefore, the total CER amount is Rs.5,00,000/-, as shown in section 1.8 under chapter I, pp.6-7.</p>
9	The Project Proponent shall provide the details of mineral reserves and mineral 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 given in section 2.5. under chapter II p.15 and year wise production give in Table 2.4, p-15.
10	The Project Proponent shall provide the Organization chart indicating- the appointment of various statutory officials and other competent person 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.	<p>Standard operating procedures as per DGMS for safety and health aspects of the workers and for surrounding habitants during mining operations should be followed.</p> <p>The safety and the health aspects of workers have been discussed in section 4.4.2 - 4.6.2 under chapter IV, pp.113-118.</p>
11	The Project Proponent shall conduct the hydrogeological study considering the	Yes. The EIA report has been prepared keeping in mind that the recommendation for the issue of

	<p>contour map of the water table detailing the number of ground water pumping &amp; open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.</p>	<p>Terms of Reference is subject to the final outcome of the Hon'ble NGT, Principal bench, New Delhi.</p>
12	<p>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 &amp; flora/fauna including traffic/vehicular movement study.</p>	<p>The baseline data of the core and buffer zone like geology, geomorphology, land, water, air, ecology and bio diversity and socio economic and studies were carried out for 10 km buffer zone from proposed project site and the results have been discussed in section 2.4.1 to 2.4.2 under chapter II, pp. 11-24.</p>
13	<p>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 &amp; health impacts. Accordingly. The Environment Management Plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.</p>	<p>The cumulative impact study due to mining operations and greenbelt development around the lease area has been discussed in chapter VII, pp.141-148.</p>
14	<p>Rain water harvesting management with</p>	<p>The RWH/RS evidences submitted during the</p>

	recharging details along with water balance (both monsoon & non-monsoon) be submitted.	final EIA report.
15	Issues relating to Mine Safety, including slope geometry in case of Granite quarrying, blasting parameters 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 <sup>0</sup> 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.
16	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 3.1-3.5.8 pp.26-88 under chapter III. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 3.2, p.27 under chapter III.
17	Details of the land for storage 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.
18	Since non-saleable waste /OB / intermediate waste etc. is huge in the	This project area is involved in the production of rough stone and gravel materials as per the

	granite quarry, the Proponent shall provide the details pertaining to management of the above material with year wise utilization and average moving inventory be submitted.	approved mine plan. The production stock register and trip sheet are maintained.
19	Proximity to Areas declared as ‘Critically Polluted’ (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. This project area is involved in the production of rough stone and gravel materials as per the approved mine plan.
20	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.
21	Impact on local transport infrastructure due to the Project should be indicated.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in section 2.6.6-2.6.6.1, p.22 under chapter II.
22	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.	The detailed of tree survey study shall be carried out in core and buffer zone of the study area it has been discussed in section 3.5-3.5.8 under chapter-III, pp.61-89.
23	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Yes. It is site specific project. Through is project only production of rough stone and gravel materials as per the approved mine plan.

24	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 same will be updated in the final EIA report after public hearing meeting.
25	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	The same will be updated after complete public hearing meeting and included in the final EIA report.
26	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.
27	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 detailed of tree survey study shall be carried out in core and buffer zone of the study area it has been discussed in section 3.5-3.5.8 under chapter-III, pp.61-89.
28	The recommendation for the issue of "Terms of Reference" is subjected to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in O.A No.186 of2016 (M.A No.350/2016) and O.A. No.200/2016 and o.A.No.580/2016 (M.A.No. 1 1 821201 .A.No.102/2017 and O.A.No.40412016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No. tt22DOt6,	The EIA report has been prepared keeping in mind that the recommendation for the issue of Terms of Reference is subject to the final outcome of the Hon'ble NGT, Principal bench, New Delhi.

	M.A.No.1212017 & M.A. No. 843t2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 98 1/201 6, M.A.No.982/201 6 & M.A.No.384/201 7).	
29	The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University and local school/college authorities The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	The detailed Greenbelt Development Plan has been provided in the section 4.6.2, p.118-120 under chapter IV.
30	Taller/one year old Saplings raised in appropriate size of bags preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the green belt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and In between block in an organized manner.	The recommended saplings are planted in the safety area and also project proponent assured tree plantation in local area higher secondary schools through this project. The details incorporated in final EIA/EMP report.
31	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	The same will be updated in the final EIA/EMP report.
32	A Risk Assessment and management Plan	The same will be updated in the final EIA/EMP

	shall be prepared and included in the EIA/EMP Report.	report.
33	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 4.8-4.8.4, pp.124-125 under chapter IV.
34	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 in pp.150-151 under chapter VIII.
35	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 26 people directly and 15 people indirectly benefitted it is discussed in section 8.1, p.152 under chapter VIII.
36	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.
37	Benefits of the Project if the Project is implemented should be spelt out. The	Benefits of the project details have been given in p.149-151 under chapter VIII.

	benefits of the project shall clearly indicate environmental, social, economic, employment potential, etc.,	
38	If any quarrying operations were carried out in the Proposed quarrying site for which now the EC is sought. the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF & CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	The same will be updated in the final EIA/EMP report.
39	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.	Yes, we assured that all the baseline data and other secondary data's are used in this project was originally collected from the field and concern dept.
<b>DISCUSSION BY SEIAA AND THE REMARKS</b>		
<p>The proposal was placed in the 519<sup>th</sup> meeting of, Authority held on 13.06.2022. The Authority noted that the Proposal was placed in the 274<sup>th</sup> meeting of SEAC held on 19.05.2022. SEAC has furnished its recommendation to the Authority for granting Public Hearing for the project.</p> <p>After detailed discussions, the Authority accepted the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the ToR as recommended by SEAC &amp; standard ToR in addition to the following ToR:</p>		
1	The scientific studies shall be carried out for any proposed quarry over the existing pit/quarry by the reputed Government Scientific Research / Academic institutions such as Anna University, NITs, IITs,	Cluster Management Committee will be constituted in the near future.

	NIRM, CISR laboratories where the depth of the proposed working (or) ultimate depth of working is extended beyond 40 m below ground level (BGL) in case of flat terrain and the excavation extends beyond 30 m above ground level (AGL) in case of outcrops,/hilly terrains for evaluating the stability of slopes. A copy of the report shall be submitted to the SEIAA, the concerned AD/DGM, the concerned DEE/TNPCB and the Director of Mines Safety. Chennai.	
2	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.	The matter has been discussed in section 4.3 under Chapter IV, pp.103-123.
3	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures etc.	The VAO certificate of 300 m radius have been given in the annexure.
4	As per the MoEF & CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	The concerns raised during the public consultation and all the activities proposed will be updated in the final EIA report.
5	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	Greenbelt development plan as discussed in section 4.6.2-4.6.5, pp.118-121 under chapter IV has been designed to reduce the impact of carbon emission on the environment.

	including control of other emission and climate mitigation activities.	
6	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The matter including the results of the soil's micro flora, fauna and soil seed banks and the suitable remedial measures will be included in the final EIA report.
7	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	The FAE of ecology and biodiversity has advised the project proponent that replantation work, particularly for the project area where plants of 4 years old exist should be carried out in the vacant areas available.
8	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.
9	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical chemical components and microbial components.	The impact of mining on soil environment has been discussed in section 4.2, under chapter IV, p.102.
10	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	This report has included studies of ecology and biodiversity covering vegetation, endemic, vulnerable and endangered indigenous flora and fauna in section 3.5.6-3.5.8 under chapter-III, pp. 65-89. According to the ecological report, there is no endemic, vulnerable and endangered indigenous flora and fauna.
11	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The ecological details have been provided in section 3.5.6.1-3.5.8, under chapter-III, pp.65-89 under chapter III.
12	The Environmental Impact Assessment should study on wetlands, water bodies,	All the studies including wetlands, water bodies, river streams, lakes and farmer sites have been

	streams, lakes and farmer sites.	included in Table 3.43 in chapter III, p.98.
13	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	The details have been given in Table 10.9 and section 10.9.4 and pp.163 and 172 under chapter X.
14	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.
15	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	There are no Protected Areas, National Parks, Corridors and Wildlife pathways near project site. The list of reserve forests within 10 km radius has been provided in section 3.5.6.4 p.78-82 and Table 3.43 under chapter III, p.98.
16	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in section 4.1 under chapter IV, p.101.
17	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	The impacts of the proposed project have been discussed in section 4.4 chapter IV, pp.105-117.
18	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	A detailed Environment Management plan has been given in Table 10.9 under Chapter X, pp.163-172.
19	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,	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in sections 4.6.4-4.6.5 under chapter IV, pp.121-123.

	heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	
20	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.146.
21	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 among other environmental protection measures.
22	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 & bio-diversity. b) Climate change leading to Droughts, Floods etc c) Pollution leading to release of Greenhouse gases (GHG), se in Temperature, & Livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health.	All the parameter may be discussed in final EIA/EMP report

	<p>e) Agriculture, Forestry &amp; Traditional Factices</p> <p>f) Hydrothermal/Geothermal effect due to destruction in the Environment.</p> <p>g) Bio-geochemical processes and its foot prints including environmental stress.</p> <p>h) Sediment geochemistry ill the surface streams.</p>	
23	<p>Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping &amp; open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within I 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.</p>	<p>Details on the nearest surface water bodies such as rivers, tanks, canals, ponds etc. have been given in Tables 3.8 &amp; 3.11 pp.41-42. and Figure 3.5-3.9 in pp.40-43. Detailed hydrogeological studies were conducted for the period of 3 months (October-December,2021 for pre monsoon march-May,2022 for post monsoon) and the results have been discussed in sections 3.2.5.2 to 3.2.5.5, pp.44-45 under chapter III.</p>
24	<p>To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards &amp; to cope with disaster/untoward accidents in &amp; around the proposed mine lease area due to the proposed method of mining activity &amp; its related activities covering the entire mine lease period as per precise area communication order issued.</p>	<p>The disaster management plan for this project has been provided in Section 7.3 under Chapter VII, pp.137-141.</p>
25	<p>To furnish risk assessment and management plan including anticipated</p>	<p>The risk assessment and management plan for this project has been provided in Section 7.2 under</p>

	vulnerabilities during operational and post operational phases of Mining.	Chapter VII, pp.134-137.
26	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Detailed mine closure plan has been attached with the approved mining plan report in Annexure III.
<b>STANDARD TERMS OF REFERENCE</b>		
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	Not applicable. This is not a violation category project. This proposal falls under B1 category.
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a patta land. A copy of the ownership document has been enclosed along with the approved mining plan in Annexure III.
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All the documents related to mining plan, EIA and public hearing are compatible to each other and have been provided in the annexure part.
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of	The google earth image showing lease area with all corner coordinates, geology, and geomorphology maps have been given in Figures 2.3, 2.4, and 2.5, respectively in chapter II, p.12,13 and 14 respectively.

	the study area (core and buffer zone).	
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.	Geology and geomorphology maps have been given in Figures 2.4, and 2.5, respectively in chapter II, p.13 and 15 respectively.
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The lease applied area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	The proponent has framed Environmental Policy and the same has been discussed in section 10.1 under chapter X, pp.153.

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.	<p>It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard, compact and homogeneous body.</p> <p>The height and width of the bench will be maintained as 5m with 90<sup>0</sup> bench angles.</p> <p>Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate.</p> <p>Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.</p>
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 10 km radius 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.	<p>Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in section 3.1 under chapter III, pp.26-27.</p> <p>Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.7, under chapter II, p.19.</p>
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	<p>It is not applicable as no dumps have been proposed outside the lease area.</p> <p>The entire quarried out rough stone will be transported to the needy customers.</p>

12.	<p>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.</p>	<p>It is not applicable as there is no forest land involved within the proposed project area and the proposed project area is a patta land.</p>
13.	<p>Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.</p>	<p>It is not applicable as the proposed project area does not involve any forest land.</p>
14.	<p>Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.</p>	<p>Not Applicable.</p> <p>The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project, p.80 under chapter III.</p>

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 given in Fig.3.26, p.80 under chapter III.
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 3.47 pp.99-100 under chapter III.
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 3.47 pp.99-100 under chapter III.
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	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in section 3.5, pp.61-89 under chapter III.

	<p>indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.</p>	
19.	<p>Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.</p>	<p>Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range'.</p>
20.	<p>Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).</p>	<p>The project doesn't attract The C. R. Z. Notification, 2018.</p>
21.	<p>R&amp;R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&amp;R Plan,</p>	<p>There are no approved habitations within a radius of 300 meters.</p>

	<p>the relevant State/National Rehabilitation &amp; 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&amp;R and socio-economic aspects should be discussed in the Report.</p>	<p>Therefore, R&amp;R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.</p>
22.	<p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at</p>	<p>Baseline data were collected for the period of October 2021 - December 2021 post monsoon and March 2022 to May 2022 pre monsoon as per CPCB notification and MoEF &amp; CC Guidelines. Primary baseline data and the results have been included in sections 3.0-3.5, pp.25-89 under chapter III.</p>

	<p>least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p>	
23.	<p>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.</p>	<p>Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 9.6.1. The model results have been given in section 4.4, under the chapter IV, pp.105-114.</p>
24.	<p>The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.</p>	<p>The water requirement for the project, its availability and source have been provided in Table 2.10, p.22 under chapter II.</p>
25.	<p>Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.</p>	<p>Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.</p>
26.	<p>Description of water conservation measures proposed to be adopted in the</p>	<p>Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus</p>

	Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in section 4.3, under the chapter IV, pp. 103-105.
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.	The ground water table is found at the depth of 40m below ground level. The ultimate depth of quarry is 30 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 3.2.5.1-3.2.5.5 under chapter III, pp.38-45.
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.	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	The highest elevation of the project area is 170 m

	depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	AMSL. Ultimate depth of the mine is 30 m BGL. Depth to the water level in the area is 40 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 4.6.2.1, pp.118-123 under chapter IV.
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	Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in section 3.7, under chapter III, pp.97-100.

	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.	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 and 2.6.6.1 under chapter II, p.22.
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 2.6.3 under chapter II, p.19-21.
35.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been explained in detail in section 4.8-4.8.4, pp.124-125 under chapter IV.
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 CER and CSR have been discussed in 8.6-8.7 under the chapter VIII,pp.150-151.
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the Socio-Economic

	Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	environment by offering employment for 26 people directly and 15 people indirectly, as discussed in section 8.1 under chapter VIII,p.149.
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed environment management plan for the project to mitigate the anticipated impacts has been included section 10.0- 10.9.4 under chapter X, pp.153-172.
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. 59,20,000/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs.19.59 lakhs as capital cost and recurring cost as Rs.11.42 lakhs as recurring cost is proposed considering present market scenario for the proposed project in Table 10.9. under chapter X, pp.163-172.
42	A disaster management Plan shall be prepared and included in the EIA/EMP Report.	Details regarding disaster management plan have been provided in section 7.3, pp.137-141 under chapter VII.

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 section 8.0-8.5 under chapter VIII, pp.149 – 151.
44.	<b>Besides the above, the below mentioned general points are also to be followed:</b>	
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	Baseline monitoring reports are enclosed with this report in section 3.1-3.6.6, pp.25-97 under chapter III. Original Baseline monitoring reports will be submitted in the final EIA report during appraisal.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided in English.
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	Not applicable because it is a fresh lease.
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.	Not applicable because it is a fresh lease.
j)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All the plans including surface & geological plans have been included in Annexure III. Progressive closure plan and sections has been included in Annexures III.

## TABLE OF CONTENTS

S No.	TITLE	PAGE No.
<b>I</b>	<b>Introduction</b>	<b>1-7</b>
1.0	Preamble	1
1.1	Purpose of the report	2
1.2	Environmental clearance	3
1.2.1	Screening	3
1.2.2	Scoping	3
1.2.3	Public Consultation	3
1.2.4	Appraisal	5
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 documen	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	7
<b>II</b>	<b>PROJECT DESCRIPTION</b>	<b>8-24</b>
2.0	General introduction	8
2.1	Description of the project	8
2.2	Location and accessibility	9
2.3	Leasehold area	11
2.3.1	Corner Coordinates	11
2.4	Geology and Geomorphology	11
2.4.1	Geology	11
2.4.2	Geomorphology	11
2.5	Quantity of reserves	15
2.6	Mining method	18
2.6.1	Magnitude of operation	18
2.6.2	Extent of mechanization	18
2.6.3	Progressive quarry closure plan	19
2.6.4	Quarry closure budget	19
2.6.5	Conceptual mining plan	22
2.6.6	Infrastructures	22
2.6.6.1	Other infrastructure requirement	22

2.6.7	Water requirement	22
2.6.8	Energy requirement	22
2.6.9	Capital requirement	23
2.7	Manpower requirement	23
2.8	Project Implementation Schedule	24
<b>III</b>	<b>DESCRIPTION OF THE ENVIRONMENT</b>	<b>25-99</b>
3.0	General	25
3.1	Land environment	26
3.1.1	Land use/Land cover	26
3.1.2	Topography	27
3.1.3	Drainage pattern of the area	27
3.1.4	Seismic sensitivity	27
3.1.5	Soil Environment	27
3.1.5.1	Methodology	30
3.1.5.2	Results and discussion	30
3.2	Water Environment	33
3.2.1	Surface water	33
3.2.2	Ground water	33
3.2.3	Methodology	33
3.2.4	Result and discussion	35
3.2.5	Hydrogeological Studies	38
3.2.5.1	Groundwater level and flow direction	38
3.2.5.2	Electrical resistivity investigation	44
3.2.5.3	Methodology and data acquisition	44
3.2.5.4	Data presentation	45
3.2.5.5	Geophysical data interpretation	45
3.3	Air Environment	46
3.3.1	Meteorology	46
3.3.1.1	Rainfall	47
3.3.1.2	Wind Pattern	47
3.3.2	Methodology and Objectives	49
3.3.3	Sampling and Analytical Techniques	50
3.3.4	Frequency and Parameters for Sampling	51
3.3.5	Ambient Air Quality Monitoring Stations	51
3.3.6	Results & Discussion	56

3.4	Noise Environment	56
3.4.1	Identification of Sampling Locations	57
3.4.2	Method of Monitoring	57
3.4.3	Analysis of Ambient Noise Level in the Study Area	58
3.4.4	Results & Discussion	58
3.5	Biological Environment	61
3.5.1	Study area	62
3.5.2	Objectives of Biological Studies	62
3.5.3	Site selection criteria	62
3.5.4	Quadrats Method	63
3.5.5	Phyto-Sociological Survey Method	64
3.5.5.1	Shannon – Wiener Index, Evenness and Richness	64
3.5.6	Flora	65
3.5.6.1	Flora in Core Zone	65
3.5.6.2	Flora in Buffer Zone	65
3.5.6.3	Aquatic Vegetation	78
3.5.6.4	Forest Vegetation	78
3.5.7	Fauna	82
3.5.7.1	Fauna Methodology	83
3.5.7.2	Fauna in Core Zone	84
3.5.7.3	Fauna in Buffer Zone	85
3.5.7.4	Rare and Endangered fauna of the study area	88
3.5.8	Results and Discussion	88
3.6	Socio-Economic environment	89
3.6.1	Objectives of the Study	90
3.6.2	Scope of work	90
3.6.3	District profile	90
3.6.4	Socio-Economic status of Study area	90
3.6.4.1	Literacy of Karungalakudi village	91
3.6.4.2	Worker’s profile of Karungalakudi Village	91
3.6.5	Recommendation and suggestion	97
3.6.6	Summary & conclusion	97
3.7	Traffic density	97
3.8	SITE SPECIFIC FEATURES	99
<b>IV</b>	<b>ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES</b>	<b>101-127</b>

4.0	General	101
4.1	Land Environment	101
4.1.1	Anticipated Impact	102
4.1.2	Common Mitigation Measures from Proposed Project	102
4.2	Soil Environment	102
4.2.1	Anticipated Impact on Soil Environment	103
4.2.2	Common Mitigation Measures from Proposed Project	103
4.3	Water Environment	103
4.3.1	Anticipated Impact	103
4.3.2	Common Mitigation Measures from Proposed Project	104
4.4	Air Environment	105
4.4.1	Anticipated impact from Proposed Project	105
4.4.2	Emission Estimation	105
4.4.2.1	Frame work of Computation and Model Details	106
4.4.2.2	Modelling of Incremental Concentration	107
4.4.2.3	Model Results	107
4.4.3	Common Mitigation Measures	113
4.5	Noise Environment	114
4.5.1	Anticipated Impact	115
4.5.2	Common Mitigation Measures	116
4.5.3	Ground Vibrations	117
4.6	Ecology And Biodiversity	117
4.6.1	Impact on Ecology and Biodiversity	117
4.6.2	Common Mitigation Measures for the Proposed Project	118
4.6.2.1	Species Recommendation for Plantation Granted in the District	118
4.6.3	Anticipated Impact on Fauna	120
4.6.3.1	Measures for Protection and Conservation of Wildlife Species	121
4.6.3.2	Mitigation Measures	121
4.6.4	Impact on Aquatic Biodiversity	121
4.6.5	Impact Assessment on Biological Environment	121
4.7	Socio Economic Environment	124
4.7.1	Anticipated Impact from Proposed and Existing Projects	124

4.7.2	Common Mitigation Measures for Proposed Project	124
4.8	Occupational Health and Safety	124
4.8.1	Respiratory Hazards	124
4.8.2	Noise	125
4.8.3	Physical Hazards	125
4.8.4	Occupational Health Survey	125
4.9	<b>MINE WASTE MANAGEMENT</b>	126
4.10	Mine Closure	126
4.10.1	Mine Closure Criteria	126
4.10.1.1	Physical Stability	126
4.10.1.2	Chemical Stability	126
4.10.1.3	Biological Stability	127
<b>V</b>	<b>ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)</b>	<b>128</b>
5.0	Introduction	128
5.1	Factors behind the Selection of Project Site	128
5.2	Analysis of Alternative Site	128
5.3	Factors behind Selection of Proposed Technology	128
5.4	Analysis of Alternative Technology	128
<b>VI</b>	<b>ENVIRONMENTAL MONITORING PROGRAM</b>	<b>129-133</b>
6.0	General	129
6.1	Methodology of Monitoring Mechanism	129
6.2	Implementation Schedule of Mitigation Measures	131
6.3	Monitoring Schedule and Frequency	131
6.4	Budgetary provision for Environment Monitoring Program	133
6.5	Reporting schedules of monitored data	133
<b>VII</b>	<b>ADDITIONAL STUDIES</b>	<b>134-148</b>
7.0	General	134
7.1	Public Consultation for Proposed Project	134
7.2	Risk Assessment for Proposed Project	134
7.3	Disaster Management Plan for Proposed Project	137
7.3.1	Roles and Responsibilities of Emergency Team	139
7.3.2	Emergency Control Procedure	139
7.3.3	Proposed Fire Extinguishers	140
7.3.4	Alarm System	140

7.4	Cumulative Impact Study	141
7.4.1	Air Environment	143
7.4.1.1	Cumulative Impact of Air Pollutants	143
7.4.2	Noise Environment	144
7.4.3	Socio Economic Environment	145
7.4.4	Ecological Environment	145
7.4.5	Traffic Density	146
7.5	Plastic Waste management Plan for Proposed Project	146
7.5.1	Objective	146
7.6	Post Covid health management Plan for Proposed Project	147
7.6.1	Post-Covid follow-up Protocol	147
<b>VIII</b>	<b>PROJECTS BENEFITS</b>	<b>149-151</b>
8.0	General	149
8.1	Employment Potential	149
8.2	Socio-Economic Welfare Measures Proposed	149
8.3	Improvement in Physical Infrastructure	149
8.4	Improvement in Social Infrastructure	149
8.5	Other Tangible Benefits	150
8.6	Corporate Social Responsibility	150
8.7	Corporate Environment Responsibility	151
<b>IX</b>	<b>ENVIRONMENTAL COST BENEFIT ANALYSIS</b>	<b>152</b>
<b>X</b>	<b>ENVIRONMENTAL MANAGEMENT PLAN</b>	<b>153-172</b>
10.0	General	153
10.1	Environmental Policy	153
10.1.1	Description of the Administration and Technical setup	153
10.2	Land Environment Management	154
10.3	Soil Management	155
10.4	Water Management	155
10.5	Air Quality Management	156
10.6	Noise Pollution Control	157
10.7	Ground Vibration and Fly rock control	158
10.8	Biological Environment Management	158
10.8.1	Green Belt Development Plan	159
10.9	Occupational Safety & Health Management	160
10.9.1	Medical Surveillance and Examinations	160

10.9.2	Proposed Occupational Health and Safety Measures	161
10.9.3	Health and Safety Training Program	162
10.9.4	Budgetary Provision for Environmental Management	164
10.10	Conclusion	172
<b>XI</b>	<b>SUMMARY AND CONCLUSION</b>	<b>173-183</b>
11.0	Introduction	173
11.1	Project Description	173
11.2	Description of the Environment	174
11.2.1	Land Environment	174
11.2.1.1	Soil Characteristics	174
11.2.2	Water Environment	174
11.2.3	Air Environment	175
11.2.4	Noise Environment	176
11.2.5	Biological Environment	176
11.2.6	Socio-Economic Environment	176
11.3	Anticipated Environmental Impacts and Mitigation Measures for Proposed Project	176
11.4	Analysis of Alternatives	180
11.5	Environmental Monitoring Program	181
11.6	Additional Studies	181
11.6.1	Public Consultation for Proposed Project	181
11.6.2	Risk Analysis & Disaster Management Plan for Proposed Project	181
11.6.3	Cumulative Studies	182
11.7	Project Benefits for Proposed Project	182
11.8	Environment Management Plan	183
11.9	Conclusion	183
<b>XII</b>	<b>DISCLOSURE OF CONSULTANT</b>	<b>184-189</b>

## LIST OF TABLES

<b>TABLE No.</b>	<b>CONTENTS</b>	<b>PAGE No.</b>
1.1	Details of Quarries within the cluster area of 500 m radius	<b>2</b>
1.2	Details of project proponent	6
1.3	Brief description of the project	6
2.1	Site connectivity to the project area	9
2.2	Corner coordinates of proposed project	11
2.3	Estimated resources and reserves of the project	15
2.4	Year-wise production details	15
2.5	Operational details for proposed project	18
2.6	Machinery details	18
2.7	Land use data at present, during scheme of mining, and at the end of mine life	19
2.8	Mine closure budget	19
2.9	Ultimate pit dimension	22
2.10	Water requirement for the project	22
2.11	Fuel requirement details	23
2.12	Capital requirement details	23
2.13	Employment potential for the proposed project	23
2.14	Expected time schedule	24
3.1	Monitoring attributes and frequency of monitoring	25
3.2	LULC statistics of the study area	27
3.3	Soil sampling locations	30
3.4	Soil quality of the study area	32
3.5	Water sampling locations	34
3.6	Surface Water Quality Result	34
3.7	Ground Water Quality Result	37
3.8	Post-monsoon water level of dug wells within 2 km radius	39
3.9	Pre-monsoon water level of dug wells within 2 km radius	39
3.10	Post-monsoon water level of bore wells within 2 km radius	39
3.11	Pre-monsoon water level of bore wells within 2 km radius	39

3.12	Vertical electrical sounding data	45
3.13	Onsite Meteorological Data	47
3.14	Rainfall data	47
3.15	Methodology and instrument used for AAQ analysis	50
3.16	National ambient air quality standards	50
3.17	Ambient air quality (AAQ) monitoring locations	51
3.18	Summary of AAQ result	53
3.19	Maximum, Minimum, Average and 98 <sup>th</sup> percentile of average air pollutant concentrations over the study area	53
3.20	Details of noise monitoring locations	57
3.21	Ambient noise quality result	58
3.22	Calculation of density, frequency (%), dominance, relative density, relative frequency, relative dominance & important value index	64
3.23	Flora in core zone	67
3.24	Calculation of species diversity in core zone	67
3.25	Species richness in core zone	67
3.26	Flora in Buffer Zone	68
3.27	Calculation of species diversity in buffer zone	71
3.28	Species richness (index) in buffer zone	72
3.29	Aquatic vegetation	78
3.30	Vegetation details in the Reserve Forest area	78
3.31	Major crops in Madurai District	81
3.32	Major Field crops & horticulture in Madurai District.	82
3.33	Fauna in core zone	84
3.34	Fauna in buffer zone	85
3.35	Karungalakudi village Population Facts	91
3.36	Demographics population of Karungalakudi Village	91
3.37	Karungalakudi Village working population	91
3.38	Population and literacy data of study area	92
3.39	Educational Facilities & Water & Drainage Facilities Data of Study Area	93

3.40	Workers Profile in the Study Area	94
3.41	Other Facilities in the Study Area	95
3.42	Communication & Transport Facilities in the Study Area	96
3.43	Traffic survey locations	98
3.44	Existing traffic volume	98
3.45	Rough stone transportation requirement	98
3.46	Summary of traffic volume	98
3.47	Details of environmentally sensitive ecological features in the study area	100
4.1	Empirical formula for emission rate from overall mine	105
4.2	Estimated emission rate	106
4.3	Incremental & Resultant GLC of PM10	107
4.4	Incremental & Resultant GLC of PM2.5	112
4.5	Incremental & resultant GLC of SO <sub>2</sub>	112
4.6	Incremental & resultant GLC of NO <sub>x</sub>	113
4.7	Activity and noise level produced by machinery	115
4.8	Predicted noise incremental values	116
4.9	Recommended species for greenbelt development plan	119
4.10	Greenbelt development plan	119
4.11	Budget for greenbelt development plan	120
4.12	Ecological impact assessments	121
4.13	Anticipated Impact of Ecology and Biodiversity	122
6.1	Implementation schedule for proposed project	131
6.2	Proposed monitoring schedule post EC for the proposed quarry	132
6.3	Environment monitoring budget	133
7.1	Risk assessment& control measures for proposed project	135-137
7.2	Proposed teams for emergency situation	138
7.3	Proposed fire extinguishers at different locations in (P1)	140
7.4	Salient features of proposed project site (P2)	141
7.5	Salient features of proposed project site (P3)	143
7.6	Cumulative production load of rough stone	143

7.7	Cumulative Impact Results from the 3 proposed projects	144
7.8	Predicted noise incremental values from cluster	144
7.9	Socio Economic Benefits from 3 Mines	145
7.10	Employment Benefits from 3 Mines	145
7.11	Greenbelt Development Benefits From 3Mines	145
7.12	Action plan to manage plastic waste	146
8.1	CER – action plan	151
10.1	Proposed controls for land environment	154
10.2	Proposed Controls for Soil Management	155
10.3	Proposed controls for water management	156
10.4	Proposed controls for air environment	156
10.5	Proposed controls for noise environment	157
10.6	Proposed controls for ground vibrations & fly rock	158
10.7	Proposed greenbelt development plan	159
10.8	Medical examination schedule	160
10.9	List of periodical trainings proposed for employees	163
10.10	EMP budget for proposed project	165
10.11	Estimation of overall EMP budget after adjusting 5% annual inflation	172
11.1	Anticipated impacts & mitigation measures	176

## LIST OF FIGURES

<b>FIGURE NO.</b>	<b>TITLE</b>	<b>PAGE NO.</b>
1.1	Location of the proposed and existing rough stone quarries in the cluster of 500m radius	4
2.1	Overall view of proposed project site	9
2.2	Key map showing location of the project site	10
2.3	Google earth image showing lease area with pillars	12
2.4	Geology map of 10 km radius from the proposed project site	13
2.5	Geomorphology map of 10 km radius from the proposed project site	14
2.6	Mine Lease Plan	16
2.7	Yearwise development and production plan and sections	17
2.8	Conceptual Final Mine Closure Plan	20
2.9	Conceptual Final Mine Closure Plan and Sections	21
3.1	LULC map of 5km radius from the proposed project site	28
3.2	Drainage map of 5 km radius from the proposed project site	29
3.3	Toposheet showing soil sampling location within 5 km radius around the proposed project site	31
3.4	Toposheet showing water sampling locations within 5 km radius around the proposed project site	36
3.5	Open well static groundwater elevation map showing the direction of groundwater flow during post-monsoon season	40
3.6	Open well static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season	41
3.7	Borewell static groundwater elevation map showing the direction of groundwater flow during post-monsoon season	42
3.8	Borewell static groundwater elevation map showing the	43

	direction of groundwater flow during pre-monsoon season	
3.9	Principle of electrical resistivity investigation	44
3.9a	Geophysical survey within the lease area	44
3.10	Graph showing occurrence of water bearing fracture zones at the depth range of 50 m below ground level in proposed project	45
3.11	Windrose Diagram from 2018 to 2021(March to May	48
3.12	Onsite wind rose diagram	49
3.13	Toposheet showing ambient air quality monitoring station locations around 5 km radius from the proposed project site	52
3.14	Bar chart showing maximum, minimum, and the average concentrations of PM2.5 measured from the nine air quality monitoring stations within 5 km radius	54
3.15	Bar chart showing maximum, minimum, and the average concentrations of PM10.measured from the nine air quality monitoring stations within 5km radius	54
3.16	Bar chart showing maximum, minimum, and the average concentrations of NO2 measured from the nine air quality monitoring stations within 5 km radius	54
3.17	Bar chart showing maximum, minimum, and the average concentrations of SO <sub>2</sub> measured from the nine air quality monitoring stations within 5km radius	55
3.18	Bar chart showing maximum, minimum, and the average concentrations of pollutants in the atmosphere within 5km radius	56
3.19	Toposheet showing noise level monitoring station locations around 5 km radius from the proposed project site	59
3.20	Bar chart showing day time noise levels measured in core and buffer zones	60
3.21	Bar chart showing night time noise levels measured in core and buffer zones	60
3.22	A Schematic diagram of random sampling of flora	63

3.23	Ecological Survey Location Map (5km Radius)	66
3.24	Floral diversity species Richness (Index) in core and buffer zone	73
3.25	Flora species observation in the study area	77
3.26	Toposheet showing Reserve Forest around 10km Radius from proposed project site	80
3.27	Baseline Study Field Photographs	89
3.28	Traffic Density Map	99
4.1	Predicted incremental concentration of PM <sub>2.5</sub>	108
4.2	Predicted incremental concentration of PM <sub>10</sub>	109
4.3	Predicted incremental concentration of SO <sub>2</sub>	110
4.4	Predicted incremental concentration of NO <sub>x</sub>	111
6.1	Proposed environmental monitoring chart	130
7.1	Disaster management team layout for proposed project	138
10.1	Personal protective equipment to the mine workers	162

#### LIST OF ANNEXURES

Annexure No.	Contents	Page No.
I	Copy of ToR letter	190-212
II	Copy of 500 m radius letter	213-214
III	Approved mining plan along with mining plan AD/DD letter/original mining plan plates	215-313
IV	NABET certificate of EIA consultant	314

## 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 14<sup>th</sup> September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14<sup>th</sup> 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.9063/SEAC/ToR-1174/2022 dated 14.06.2022, this EIA report has been prepared for the project proponent, Thiru K.Ilayarja applied for rough stone quarry lease in the Government Poramboke land falling in S. F. No. 619/5 (P) over an extent of 2.02.5 ha in Karungalakudi Village, Melur Taluk, Madurai 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 and P3 and one existing project, known as E1, One Expired project known as EX1. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269(E) Dated 1<sup>st</sup> July 2016. The total extent of all the quarries is 10.15.0ha, 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**

<b>Proposed Quarries</b>				
<b>Code</b>	<b>Name of the Owner</b>	<b>S.F. No and Village</b>	<b>Extent (ha)</b>	<b>Status</b>
<b>P1</b>	<b>K.Ilayaraja</b>	619/5(part) Karungalakudi	2.02.5	ToR obtained vide Lr. No. SEIAA- TN/F.No.9063/SE AC/ToR- 1174/2022 dated 14.06.2022
<b>P2</b>	<b>K.Ilayaraja</b>	63, Ayyapatti	0.74.0	ToR obtained vide Lr. No. SEIAA- TN/F.No.8712/To R-1147/2020 dated 23.05.2022
<b>P3</b>	<b>G.Karuppanan</b>	471/1, Chokkalingapuram	2.70.0	Proposed for ToR
<b>Existing Quarry</b>				
<b>E1</b>	<b>J.Mohammed Raja</b>	472/1, etc., Chokkalingapuram	2.40.0	14.10.2020- 13.10.2025 (Active)
<b>Expired Quarry</b>				
<b>EX1</b>	<b>K. Jothi</b>	482/2, etc., Ayyapatti	2.28.5	29.12.2016- 28.12.2021 (Expired)
<b>Total Cluster Extent</b>			<b>10.15.0</b>	---

**Source:**

- i). AD Letter – Rc.No.74/Mines/2021, dated 16.07.2021
- ii) AD Letter – Rc.No.75/Mines/2021, dated 28.07.2021
- iii). AD Letter – Rc.No.85/Mines/2021, dated 18.02.2022

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

### **1.1 PURPOSE OF THE REPORT**

The purpose of the report is to study baseline environmental conditions in and around the proposed project area for the period of **March to May 2022** 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 given below:

- ❖ Screening
- ❖ Scoping
- ❖ Public consultation &
- ❖ Appraisal

### **1.2.1 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/ 72649/2022, dated 26.02.2022) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on 09.03.2022.

### **1.2.2 Scoping**

During scoping, 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.9063/SEAC/ToR-1174/2022 dated 14.06.2022 for the preparation of an EIA report.

### **1.2.3 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.

### **1.2.4 Appraisal**

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

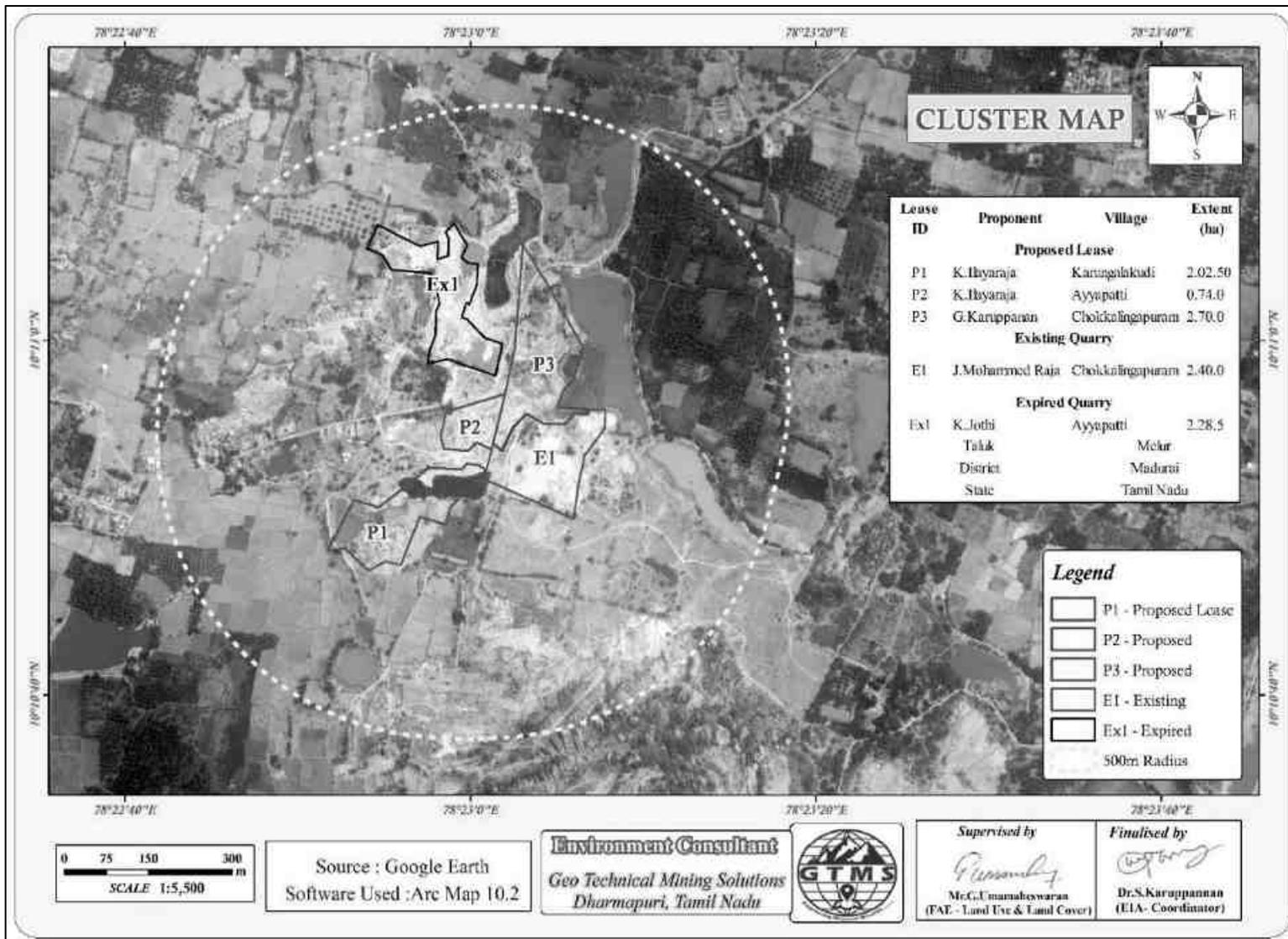


Figure 1.1 Location of the proposed and existing rough stone quarries in the cluster of 500m radius

### **1.3 TERMS OF REFERENCE (ToR)**

- ❖ Compliance to ToR issued vide ToR letter No. SEIAA-TN/F.No.9063/SEAC/ToR-1174/2022 dated 14.06.2022

### **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 1<sup>st</sup> June and 1<sup>st</sup> 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.

### 1.2 Details of Project Proponent

<b>Name of the Project Proponent</b>	<b>Thiru K.Ilayaraja</b>
Address	S/o. Krishnan, W.10/215, Pettai, Anna Nagar, Karungalakudi, Melur Taluk, Madurai-625101
Status	Proprietor

## 1.8 BRIEF DESCRIPTION OF THE PROJECT

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

### 1.3 Brief Description of The Project

Name of the Quarry	K.Ilayaraja Roughstone	
Quarry Type of Land	Government Poramboke land	
Extent	2.02.5 ha	
S.F. No.	619/5(P)	
Toposheet No.	58J/08	
Latitude	10°10'47.02"N to 10°10'53.05"N	
Longitude	78°22'51.72"E to 78°23'00.92"E	
Ultimate Depth of Mining as Per ToR	30 m BGL	
Ultimate Pit Dimension	Pit 1: 207m(L) X 78 m(W) X 30 m(D)	
Geological Resources	Rough stone (m <sup>3</sup> )	Topsoil(m <sup>3</sup> )
	661035	4141
Mineable Reserves	221770	2506
Proposed production for 5 years Asper ToR	215190	2506
Total No. of Lorry Loads	24 loads of rough stone/day	
Method of Mining	Open cast semi mechanized /manual mining method	

Topography	Undulated Terrain	
Machinery proposed	Jack hammer	2
	Compressor	1
	Excavator	1
	Tipper	3
Proposed Manpower Deployment	26 persons	
Project Cost	Rs. 59,20,000/-	
CER Cost @ 2% of Project Cost	Rs.5,00,000/-	
Proposed Water Requirement	3.750 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 **March-May 2022** 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, 14<sup>th</sup> September, 2006
- ❖ Terms of Reference (ToR) issued by SEIAA.
- ❖ Approved Mining Plan of this Project.
- ❖ The Water (Prevention and Control of Pollution) Act, 1974
- ❖ The Air (Prevention and Control of Pollution) Act, 1981
- ❖ The Environment (Protection) Act, 1986
- ❖ The Forest (Conservation) Act, 1988
- ❖ The Wildlife (Protection) Act, 1972

## **CHAPTER II**

### **PROJECT DESCRIPTION**

#### **2.0 GENERAL INTRODUCTION**

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

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

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

#### **2.1 DESCRIPTION OF THE PROJECT**

The proponent, **K.Hayaraja** is involved in the undertaking of establishment, construction, development, and closure of open cast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone. Therefore, the proponent had applied for quarry lease on 20.01.2021 to extract rough stone. The precise area communication letter was issued by Department of Geology and Mining, Madurai vide Rc.No.85//Mines/2021, dated 05.02.2021. 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, Madurai (R.c. No.85/mines/2021 dated 26.04.2021). 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 Karungalakudi Village, Melur Taluk, Madurai District, as shown in Figure 2.2. The project area is located about 35 km Southwest of Madurai, 17km Southwest of Melur and 3.2km Southwest of Karungalakudi Village. The area lies between Latitudes from 10°10'47.02"N to 10°10'53.05"N and Longitudes from 78°22'51.72"E to 78°23'00.92"E. The maximum altitude of the project area is 170 m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

**Table 2.1 Site Connectivity to the Project Area**

Nearest Roadways	Madurai-Tiruchirappallai Road (NH-38)	1.8 km NW
	Dindigul-Karaikudi Road (SH-383)	1.9 km NE
Nearest Town	Melur	16 km SW
Nearest Railway Station	Madurai	41 km SW
Nearest Airport	Madurai	50 km SW
Nearest Seaport	Thoothukudi	160 km SW

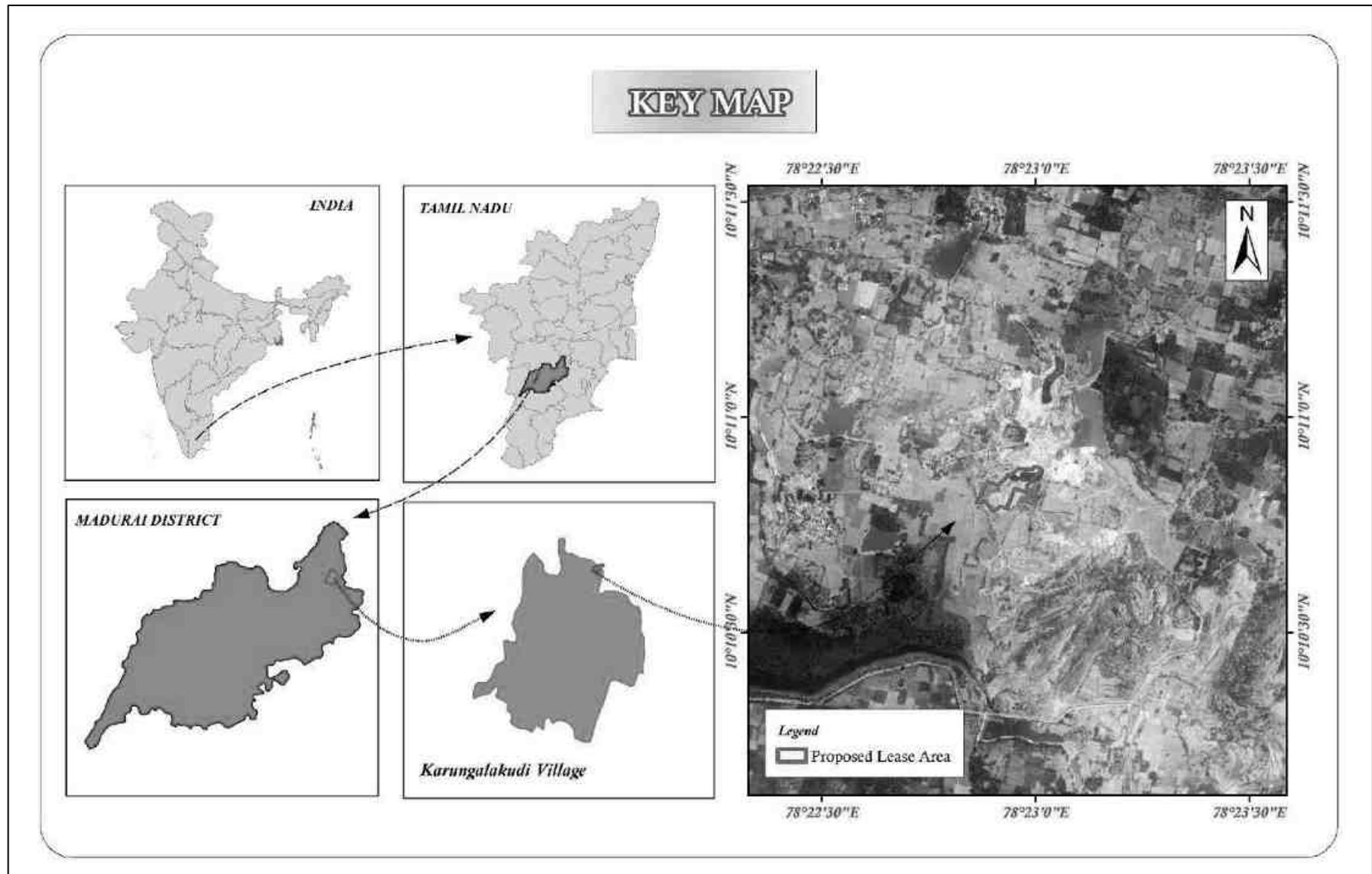


Figure 2.2 Key Map Showing location of the project site

## 2.3 LEASEHOLD AREA

- ❖ The extent of the proposed project site is 2.02.5 ha.
- ❖ The proposed project is site specific.
- ❖ There is no mineral beneficiation or processing proposed inside the project area.
- ❖ There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

### 2.3.1 Corner Coordinates

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

**Table 2.2 Corner Coordinates of Proposed Project**

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	10°10'52.69''N	78°23'00.92''E	9	10°10'48.12''N	78°22'51.72''E
2	10°10'50.56''N	78°22'58.81''E	10	10°10'55.29''N	78°22'53.25''E
3	10°10'49.61''N	78°22'58.57''E	11	10°10'51.01''N	78°22'54.70''E
4	10°10'50.07''N	78°22'57.06''E	12	10°10'52.83''N	78°22'57.59''E
5	10°10'47.35''N	78°22'55.09''E	13	10°10'52.75''N	78°22'59.53''E
6	10°10'47.54''N	78°22'55.06''E	14	10°10'53.05''N	78°22'59.74''E
7	10°10'47.02''N	78°22'54.09''E	15	10°10'53.03''N	78°22'00.37''E
8	10°10'48.29''N	78°22'52.71''E			

## 2.4 GEOLOGY AND GEOMORPHOLOGY

This section discusses about the geology and geomorphology of the study area of 5 km radius, as given below.

### 2.4.1 Geology

Study area is mainly composed of migmatite and charnockite rocks of Archaean age, and khondalite rock in smaller proportion, as shown in Figure 2.4.

### 2.4.2 Geomorphology

Among the geomorphic units, shallow weathered/moderately weathered buried pediplain covers major part of the study area, as shown in Figure 2.5. The lease area occurs in pediment area.

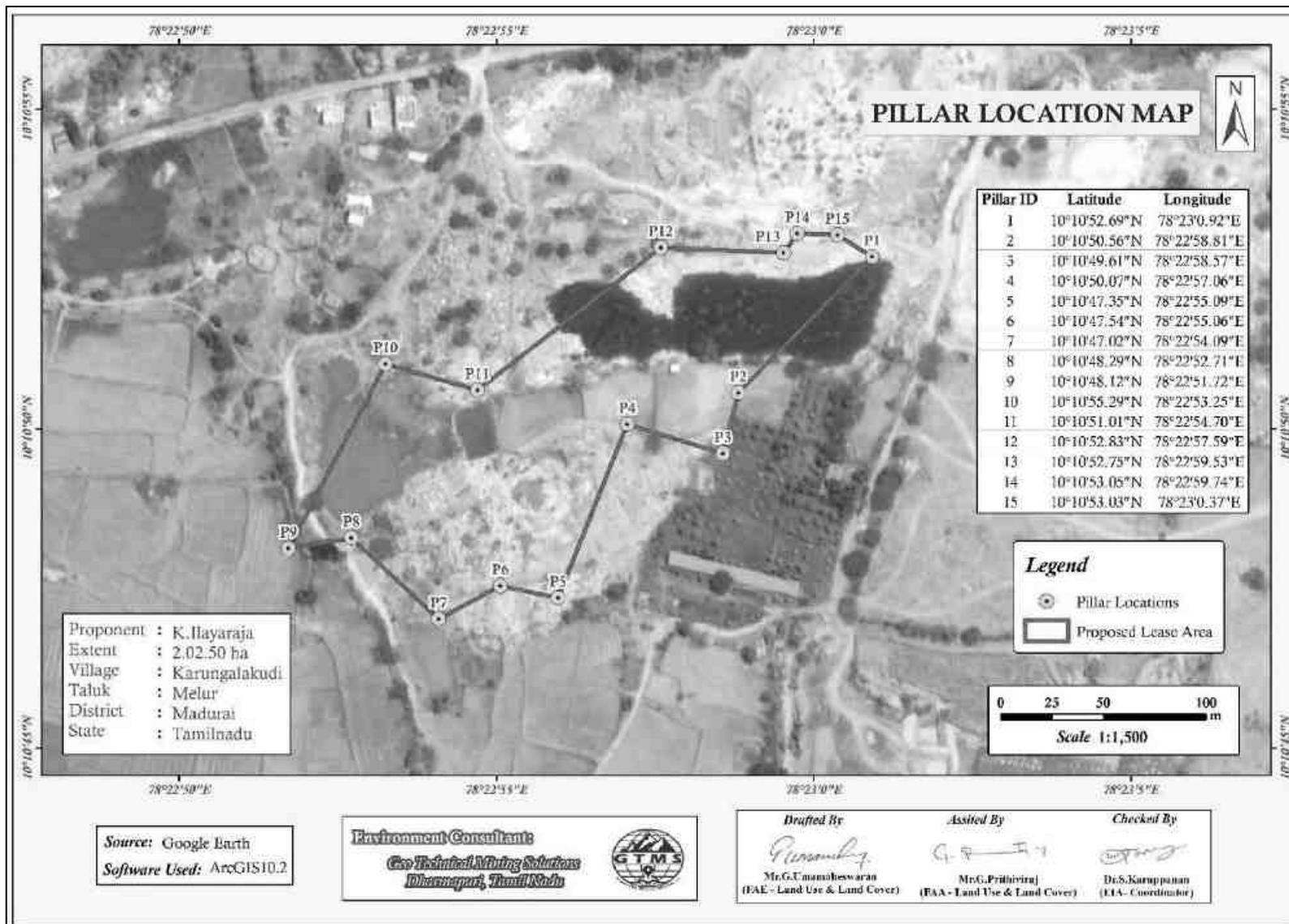
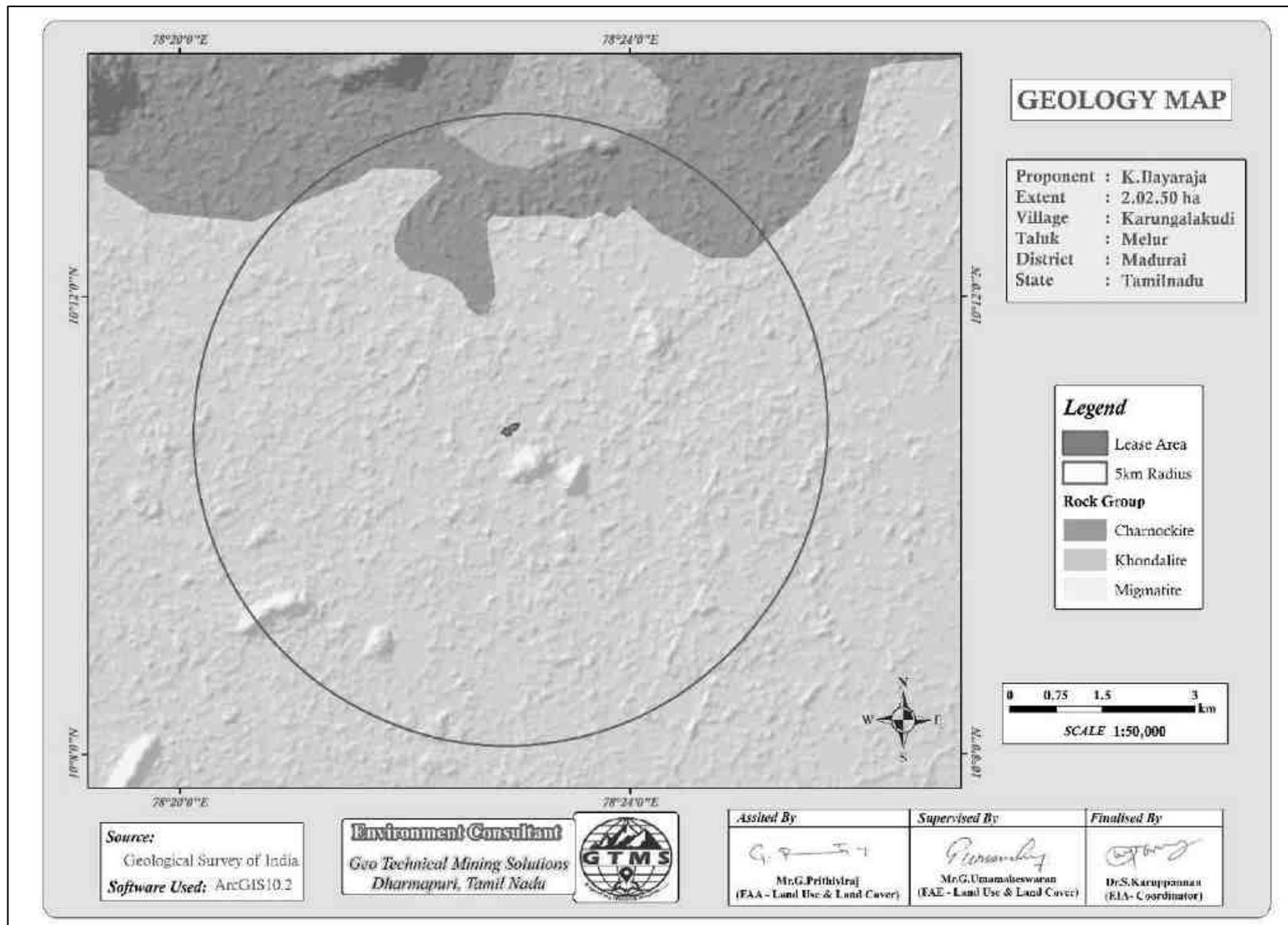


Figure 2.3 Google Earth Image Showing Lease Area with Pillars



**Figure 2.4 Geology Map of 5 km Radius from the Proposed Project Site**

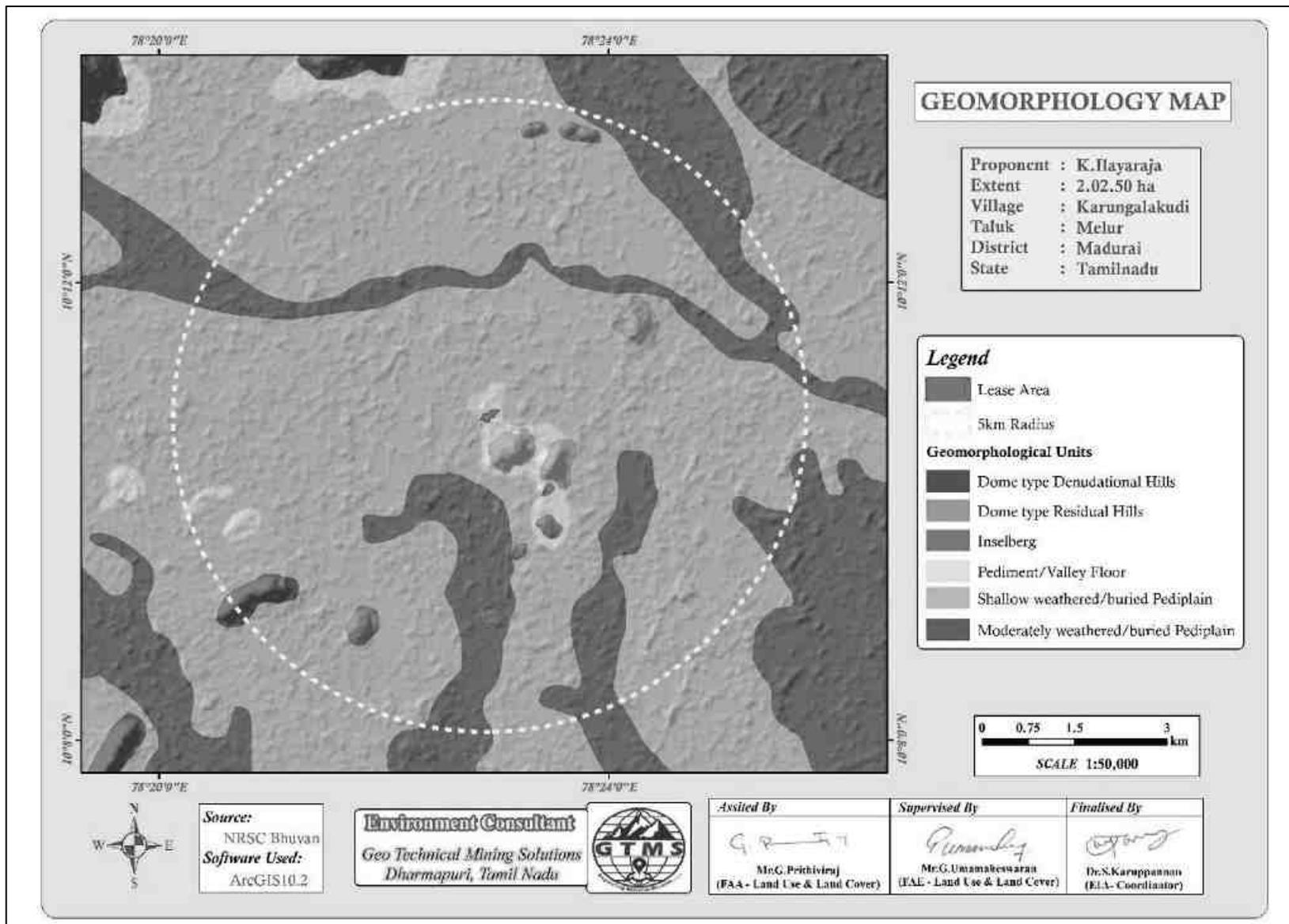


Figure 2.5 Geomorphology Map of 5 km Radius from the Proposed Project Site

## 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 30m considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The plate used for reserve estimation has been shown in Figure 2.6 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 <sup>3</sup>	Topsoil in m <sup>3</sup>
Geological Resource in m <sup>3</sup>	6,61,035	4,141
Mineable Reserves in m <sup>3</sup>	2,21,770	2,506
Proposed production for 5 years	2,15,190	2,506

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

**Table 2.4 Year-Wise Production Details**

Year	Rough Stone (m <sup>3</sup> )	Topsoil in (m <sup>3</sup> )
I	50,420	2,506
II	48,880	-
III	47,605	-
IV	33,470	-
V	34,815	-
<b>Total</b>	<b>2,15,190</b>	<b>2,506</b>

*Source: Approved Mining Plan & ToR*

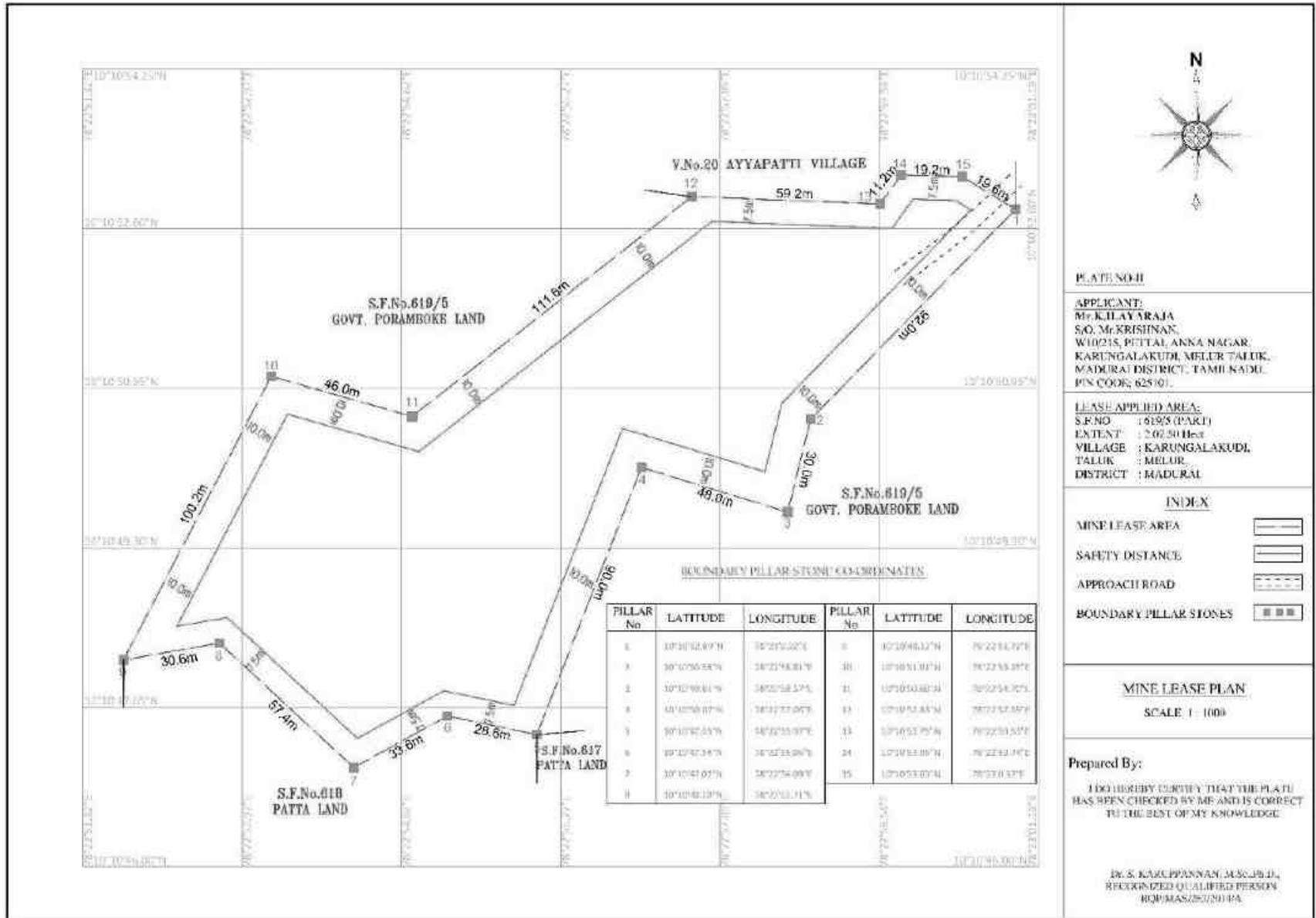


Figure 2.6 Mine Lease Plan

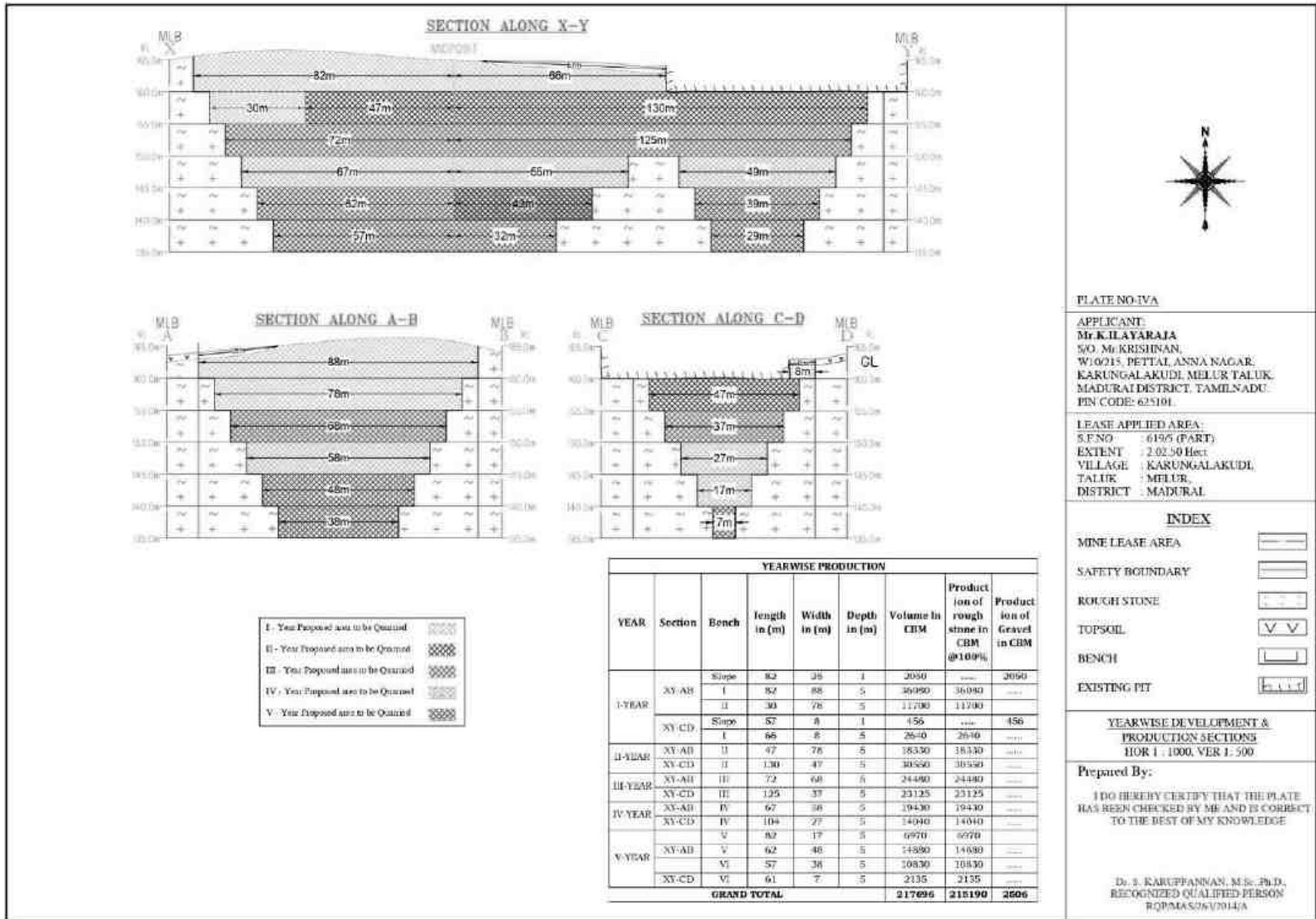


Figure 2.7 Yearwise development and production plan and sections

## 2.6 MINING METHOD

The quarrying operation is proposed to be carried out by opencast semi mechanized/manual mining method with the bench height and width of 5 m each. The open cast mining method offers several benefits to the proponent when compared to the more complex underground mining methods. The most important benefits include relatively smaller capital and operating costs, lesser safety hazards, ease of use for mass production, small closure costs, no restrictions on the use of heavy machinery if required, and easy drainage of subsurface water. Moreover, it provides a reasonable return on investments to the proponent and contributes to the growth of the local economy.

### Blasting

This proposed project involves secondary blasting, known as dimensional stone blasting. In this kind of blasting, the shot holes will be placed in such a way that the rock will not shatter into useless pieces and a small quantity of explosives will be used to create cracks and loosen blocks of good size. Then the blocks will be post processed to make them suitable for construction projects.

#### 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 2.5.

**Table 2.5 Operational Details for Proposed Project**

	Rough Stone	Top Soil
Proposed production for 5 years	2,15,190	2,506
Number of Working Days /Annum	300	300
Production of /Day (m <sup>3</sup> )	144	8
No. of Lorry Loads	24	1

#### 2.6.2 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.6.

**Table 2.6 Machinery Details**

S. No.	Type	No of Unit	Capacity	Make	Motive Power
1	Jack Hammers	2	1.2 m to 2 m	Atlas Copco	Compressed Air
2	Compressor	1	400 psi	Escorts Formtrac	Diesel Drive
3	Excavator	1	300 HP	Tata Hitachi	Diesel Drive
<b>Haulage &amp; Transport Equipment</b>					
4	Tipper	3	15 tons	BMW	Diesel Drive

### 2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan (Figure 2.7) of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.7, about 0.44.84 ha of land is used for quarrying; about 1.57.66 ha of land is unutilized. Whereas, at the end of the mine life, about 1.49.00 ha of land will have been quarried; about 0.26.50 ha of land will be used for green belt development and the rest will be used for road and infrastructures.

**Table 2.7 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	0.44.84	1.49.00
Infrastructure	Nil	0.01.00
Roads	Nil	0.02.00
Green Belt	Nil	0.26.50
Unutilized area	1.57.66	0.24.00
<b>Total</b>	<b>2.02.50</b>	<b>2.02.50</b>

### 2.6.4 Quarry Closure Budget

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, mine closure plan is not proposed for now. Based on the progressive mine closure plan for the scheme period, the mine closure cost is given in Table 2.8.

**Table 2.8 Mine Closure Budget**

Activity	Capital Cost	Recurring Cost/Annum
405 plants inside the lease area	81,000	12,150
608 plants outside the lease area	1,82,250	18,225
Wire Fencing (2.02.5 ha)	4,05,000	20,250
Renovation of Garland Drain (2.02.5 ha)	20,250	10,125
<b>Total</b>	<b>6,88,500</b>	<b>60,750</b>

*Source: Environment Management Plan*

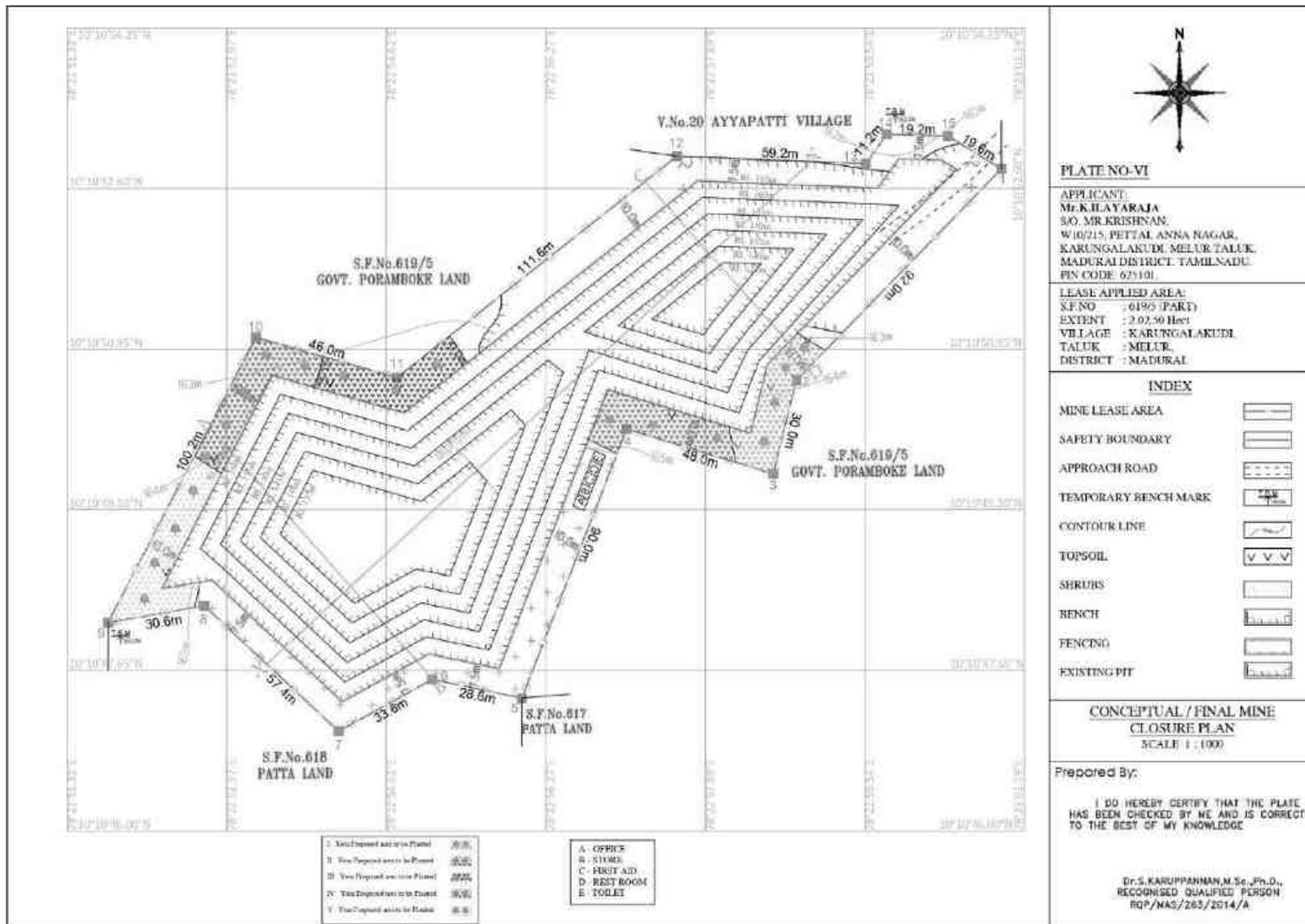


Figure 2.8 Conceptual Final Mine Closure Plan

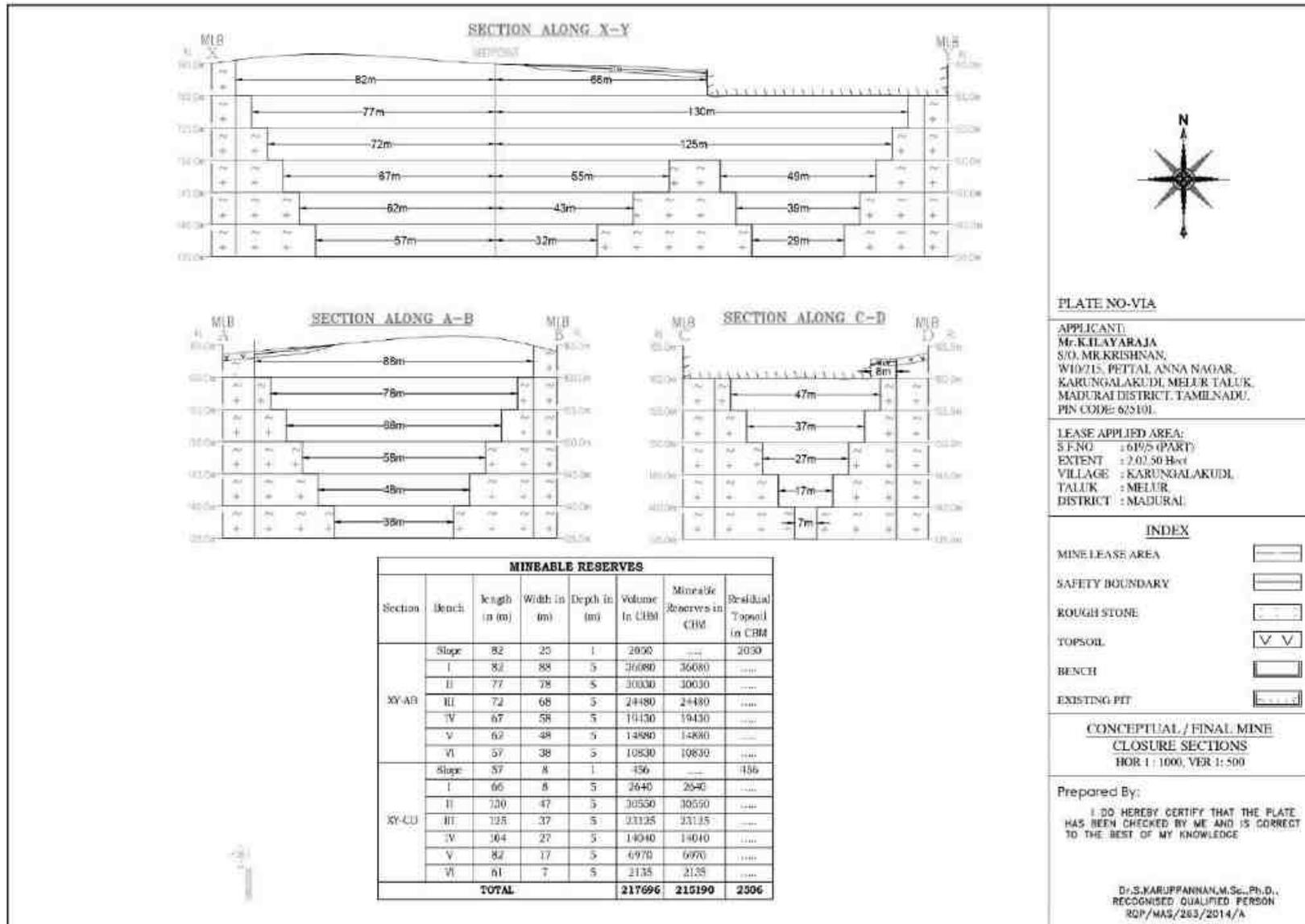


Figure 2.9 Conceptual Final Mine Closure Plan and Sections

## 2.6.5 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. Details of ultimate pit dimensions have been derived from Figure 2.9 and given in Table 2.9.

**Table 2.9 Ultimate Pit Dimension**

Pit	Length (m)	Width (m) (Max)	Depth(m)
I	207	78	30

*Source: Approved Mining Plan & ToR*

## 2.6.6 Infrastructures

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

### 2.6.6.1 Other Infrastructure Requirement

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

## 2.6.7 Water Requirement

Detail of water requirement in KLD is given in Table 2.10.

**Table 2.10 Water Requirement for the Project**

Purpose	Quantity	Source
Dust Suppression	1.0 KLD	Existing bore wells nearby the lease area
Green Belt development	1.5 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.250 KLD	Existing bore wells and approved water vendors
<b>Total</b>	<b>3.750 KLD</b>	

*Source: Prefeasibility Report*

## 2.6.8 Energy Requirement

As per the data shown in Table 2.11, High speed Diesel (HSD) will be used for quarrying machineries. Around 172152 litres of HSD will be used for rough stone extraction and 420 litres of HSD for removal of topsoil during this 5 years plan period. The diesel will be brought to the site from nearby diesel pumps.

**Table 2.11 Fuel Requirement Details**

	<b>Rough Stone</b>	<b>Top Soil</b>
Excavator fuel Consumption	16 litres / hour	10 litres/hour
Capacity of Excavator	20m <sup>3</sup> / hour	60 m <sup>3</sup> /hour
Quantity of material to be quarried out	215190 m <sup>3</sup>	2506m <sup>3</sup>
Hours required	215190/20 = 3508 hours	2506 /60 = 42hours
Total diesel consumption	10759 hours x 16 litres = 172152 litres	42 hours x 10 litres = 420 litres

**2.6.9 Capital Requirement**

The project proponent will invest Rs. 59,20,000 to the project. The breakup summary of the investment has been given in Table 2.12.

**Table 2.12 Capital Requirement Details**

<b>S. No.</b>	<b>Description</b>	<b>Cost (Rs.)</b>
1	Operational Cost	56,000,00
2	EMP Cost	3,20,000
<b>Total Project Cost</b>		<b>59,20,000</b>

*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 2.13.

**Table 2.13 Employment Potential for the proposed project**

<b>S. No.</b>	<b>Category</b>	<b>Role</b>	<b>Nos.</b>
1.	Skilled	Mines Manager/Mines Foreman	1
		Excavator operator	2
		Jack hammer operator	2
		Blaster/Mate	1
		Tipper Driver	4
		Mechanic	1
		Accountant cum & admin	2
2.	Semi – skilled	Security	1
3.	Unskilled	Musdoor/ Labours	10
		Co-operator and Cleaner	2
<b>Total</b>			<b>26</b>

*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 2.14.

**Table 2.14 Expected Time Schedule**

S. No.	Particulars	Time Schedule (in Months)					Remarks if any
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
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 March through May, 2022 with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Excellence Laboratory for the environmental attributes including soil, water, noise, by an NABL accredited and MoEF notified Accuracy Analabs for ambient air 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. 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**

<b>Attribute</b>	<b>Parameters</b>	<b>Frequency of Monitoring</b>	<b>No. of Locations</b>	<b>Protocol</b>
Land Use/ Land Cover	Land-use Pattern within 5 km radius of the study area	Data from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physico-Chemical characteristics	Once during the study period	7 (1 nearby core & 6 in buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and	Once during the study period	10	IS 10500& CPCB Standards

	Bacteriological Parameters		(3 surface water & 7 ground water)	
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 <sub>10</sub> PM <sub>2.5</sub> SO <sub>2</sub> NO <sub>x</sub> Fugitive dust	24 hours, twice a week (February to April 2022.)	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

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

#### 3.1.1 Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.1 was prepared using Sentinel II image for the study area of 5 km radius. Totally, 9 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 70 ha in which cluster area of 10.15 ha contributes about 0.15 %. This small percentage of mining activities shall not have any significant impact on the environment.

**Table 3.2 LULC Statistics of the Study Area**

<b>S. No.</b>	<b>Classification</b>	<b>Area (Hectare)</b>	<b>Area (%)</b>
1	Barren Land	173	2
2	Crop Land	2284	30
3	Dense Forest	500	7
4	Fallow Land	2206	29
5	Scrub Land	701	9
6	Mining lands	70	1
7	Plantations	1495	20
8	Settlements	139	2
9	Water bodies	28	0.4
<b>Total Area</b>		<b>7596</b>	<b>100</b>

Source: Sentinel II Satellite Imagery

### **3.1.2 Topography**

The proposed lease area is located in a rocky terrain with an altitude of 165-166 m from the MSL.

### **3.1.3 Drainage Pattern of the Area**

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 drainage pattern of the proposed area is dendritic indicating uniform lithology beneath the surface, as shown in Figure 3.2.

### **3.1.4 Seismic Sensitivity**

The proposed lease area is situated in a Seismic Zone II, as defined by National Center for Seismology ([Official Website of National Center 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.

### **3.1.5 Soil Environment**

Soil is one of the important components of the land environment. Composite soil samples were collected from the study area and analysed for different parameters. The objectives of the soil sampling are to determine the baseline soil characteristics of the study area, to study the impact of proposed activity on soil characteristics and to study the impact on agriculture production.

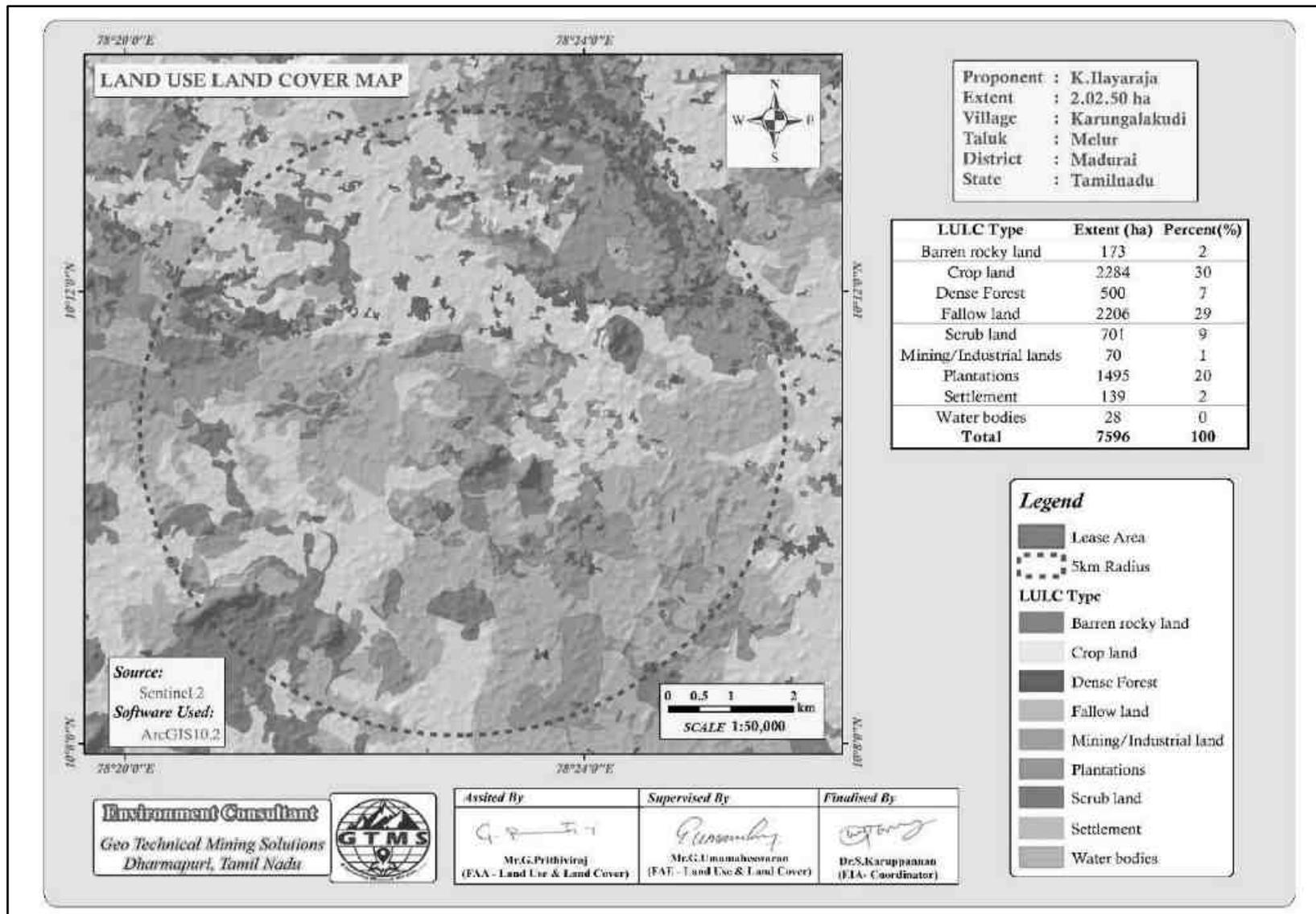


Figure 3.1 LULC map of 5 km radius from the proposed project site

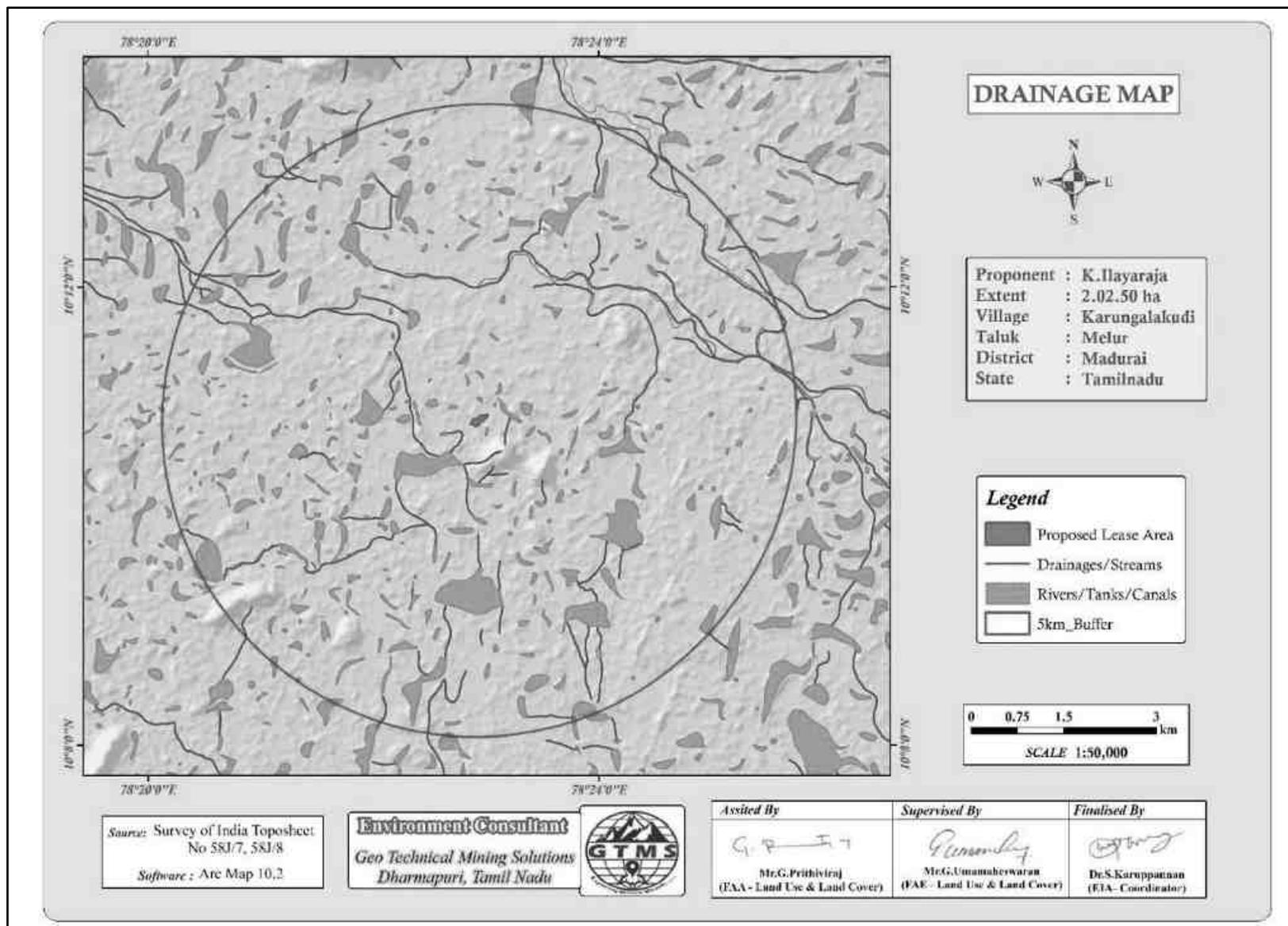


Figure 3.2 Drainage map of 5km radius from the proposed project site

### 3.1.5.1 Methodology

For studying soil quality, seven locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. Soil samples were collected up to 30-cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the monitoring sites are shown in Table 3.3 and Figure 3.3.

The samples thus collected were analysed for physical and chemical characteristics as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The physico-chemical characteristic results of soil samples are provided in Table 3.4.

**Table 3.3 Soil Sampling Locations**

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	S1	Near Core	0.25	NE	10°10'59.85"N78°23'04.24"E
2	S2	Singampunari North	4.08	NE	10°11'54.30"N78°24'59.60"E
3	S3	Karungalakudi	3.16	SW	10° 09'16.10"N 78°22'3.88"E
4	S4	Singampunari South	4.36	ESE	10°10'3.08"N 78°25'13.11"E
5	S5	Ayyapatti	3.16	WNW	10°11'14.50"N78°21'12.54"E
6	S6	Kottampatti	4.56	NNE	10°13'19.67"N78°23'18.44"E
7	S7	Vanjinagaram	4.41	SSE	10°8'32.85"N 78°23'47.16"E

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

### 3.1.5.2 Results and Discussion

#### *Physical Characteristics*

The soil samples in the study area show loamy textures varying between sandy loam and sandy clay loam. PH of the soil varies from 6.1 to 7.4 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 210 to 354  $\mu\text{s}/\text{cm}$ . Bulk density ranges between 1.12 and 1.36 and the moisture content varies from 11.96 to 16.34 %.

#### *Chemical Characteristics*

Nitrogen ranges between 12.1 and 24.0 mg/kg. Phosphorus ranges between 2.9 and 3.9 mg/kg. Potassium ranges between 9.5 and 15.3 mg/kg. Sodium ranges between 110.7 and 143.2 mg/kg. Organic matter content ranges between 0.93 and 1.98.

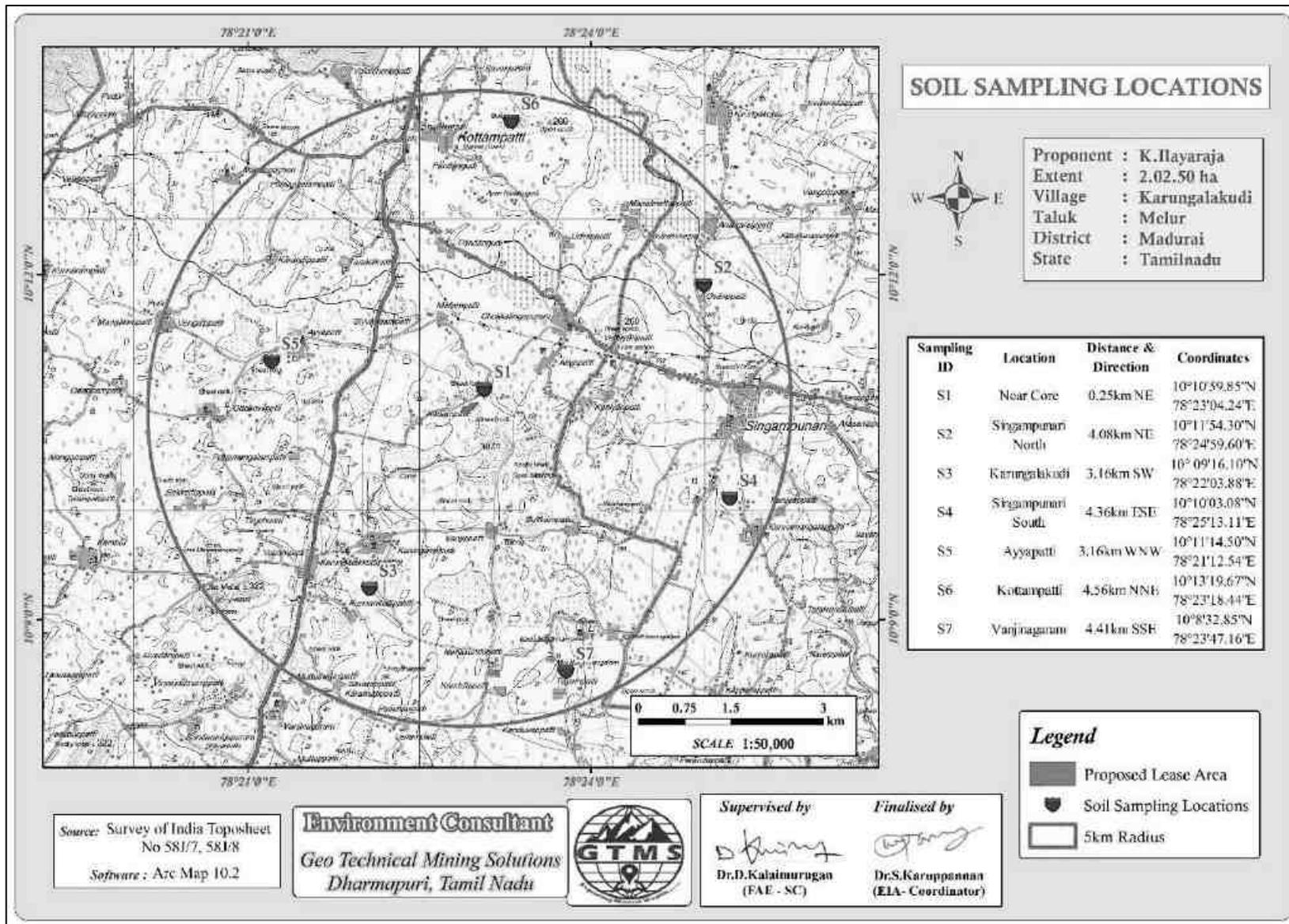


Figure 3.3 Toposheet showing soil sampling locations within 5 km radius around the proposed project site

**Table 3.4 Soil Quality of the Study Area**

S.No.	Parameters	Unit	S-1	S-2	S-3	S-4	S-5	S-6	S-7
1	pH @ 10% solution	-	6.3	6.4	7.3	7.2	7.4	6.2	6.1
2	EC @ 10% solution	µs/cm	254	243	210	294	354	262	250
3	Texture	-	Sandy Clay Loam	Sandy Clay Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Clay Loam	Sandy Clay Loam
4	Moisture	%	13.5	14.36	12.19	11.96	12.56	15.67	16.34
5	Sand	%	65.3	63.2	59.4	60.3	58.4	61.1	66.2
6	Slit	%	16.4	18.3	23.4	27.9	25.4	17.0	18.9
7	Clay	%	18.3	18.5	22.6	24.4	16.2	21.9	14.9
8	Water Holding Capacity	%	18.56	17.56	17.21	10.80	17.82	19.23	18.94
9	Bulk Density	g cm <sup>-3</sup>	1.36	1.31	1.12	1.34	1.32	1.32	1.29
10	Nitrogen (N)	mg kg <sup>-1</sup>	23.7	19.1	21.2	19.7	21.3	24.0	12.1
11	Phosphorus (P)	mg kg <sup>-1</sup>	3.7	2.9	3.7	3.1	3.3	3.9	3.6
12	Potassium (K)	mg kg <sup>-1</sup>	13.5	13.8	09.5	11.8	10.6	14.7	15.3
13	Calcium (Ca)	mg kg <sup>-1</sup>	100.4	106.2	110.6	119.7	125.4	107.2	109.3
14	Magnesium (Mg)	mg kg <sup>-1</sup>	25.7	29.6	21.4	29.5	26.5	29.6	32.4
15	Sodium (Na)	mg kg <sup>-1</sup>	110.7	114.2	136.8	143.2	140.2	128	136
16	Sulfur (S)	mg kg <sup>-1</sup>	18.3	17.1	17.4	16.4	18.3	19.2	18.9
17	Copper (Cu)	mg kg <sup>-1</sup>	0.77	0.54	0.67	0.41	0.57	0.87	0.79
18	Iron (Fe)	mg kg <sup>-1</sup>	3.62	3.49	4.56	5.43	3.92	2.99	3.62
29	Manganese (Mn)	mg kg <sup>-1</sup>	0.92	0.87	0.79	0.94	0.67	0.94	0.87
20	Zinc (Zn)	mg kg <sup>-1</sup>	0.65	0.39	0.84	0.76	0.58	0.62	0.74
21	Boron (B)	mg kg <sup>-1</sup>	0.59	0.76	0.44	0.79	0.71	0.75	0.83
22	Organic carbon	%	0.45	0.39	0.54	0.40	0.49	0.47	0.39
23	Organic matter	%	0.97	1.04	1.98	1.76	0.93	1.24	1.52
24	CEC	meq./100g	11.37	10.45	14.8	14.1.6	13.1	10.2	12.7

Source: Sampling Results by Excellence Laboratory (P) Limited

## **3.2 WATER ENVIRONMENT**

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the critical water quality parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity.

### **3.2.1 Surface Water**

There are numerous water bodies around the lease area. In this study, three surface water samples were collected and analysed for important water quality parameters. The locations of surface water samples and their distance and direction from the lease area are given in Table 3.5 and shown in Figure 3.4.

### **3.2.2 Ground Water**

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

### **3.2.3 Methodology**

Reconnaissance survey was undertaken and monitoring locations were finalized based on drainage pattern, location of residential areas /likely impact areas, and likely areas which can represent baseline conditions.

Three surface water and seven groundwater samples were collected from the study area and were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and ‘Standard Methods for the Examination of Water and Wastewater’ published by American Public Health Association (APHA). 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 in Figure 3.4.

**Table 3.5 Water Sampling Locations**

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	SW01	Near Core Zone	0.29	ENE	10°10'58.98"N78°23'7.96"E
2	SW02	Vanjipatti	2.86	SSW	10°9'13.56"N78°22'42.55"E
3	SW03	Ayyapatti	3.60	WNW	10°11'21.88"N78°20'59.31"E
4	GW01	Pandangudi	3.40	NNW	10°12'36.22"N78°22'28.19"E
5	GW02	Sevakkalam	5.25	NNW	10°13'42.78"N78°23'5.63"E
6	GW03	Chokkalingapuram	2.00	NE	10°11'31.11"N78°23'53.62"E
7	GW04	Keel Natamangalam	4.00	SE	10° 8'59.64"N78°24'9.71"E
8	GW05	Vairampatti	3.50	SW	10°9'31.21"N78°21'25.08"E
9	GW06	Singampunari	4.20	E	10°10'36.72"N78°25'17.58"E
10	GW07	Anaikaraippatti	4.75	NE	10°12'32.97"N78°24'59.68"E

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

**Table 3.6 Surface Water Quality Result**

S. No.	Parameters	Units	Results			CPCB/WHO Standards
			SW01	SW02	SW03	
<b>I</b>	<b>Physical Parameters</b>					
1	Color	Hazen	3	5	4	300
2	Odor	-	Agreeable	Agreeable	Agreeable	Not specified
3	pH@ 25°C	-	7.1	6.8	6.9	6.5-8.5
4	Turbidity	NTU	3.1	2.4	2.3	10
5	EC @ 25°C	µs/cm	326	298	125	Not specified
<b>II</b>	<b>Chemical Parameters</b>					
6	TDS	mg /l	310	281	184	1500
7	Total Hardness	mg/l	156	146	109	Not specified
8	Calcium (Ca)	mg/l	36	26	31	Not specified
9	Magnesium (Mg)	mg/l	21	29	14	Not specified
10	Sodium (Na)	mg/l	42	32	49	200(WHO)
11	Potassium (K)	mg/l	03	01	02	3
12	Bicarbonate (HCO <sub>3</sub> )	mg/l	110	98	76	400(WHO)
13	Sulphate (SO <sub>4</sub> )	mg/l	12	28	23	400
14	Chloride (Cl)	mg/l	128	95	107	600
15	Nitrates (NO <sub>3</sub> )	mg/l	07	17	19	50

16	Fluoride (F)	mg /l	00	00	00	1.5
17	BOD	mg O <sub>2</sub> /l	3	2	3	5
18	COD	mg O <sub>2</sub> /l	11	12	10	20
<b>III</b>	<b>Biological Parameters</b>					
19	Total Coliform	MPN/ 100ml	-	-	-	5000
20	E-Coli	MPN/ 100ml	-	-	-	Not specified

### 3.2.4 Results and Discussion

Results of important surface and ground water quality parameters have been shown in Tables 3.6 and 3.7 and have been discussed in the following sections.

#### *Surface Water*

- ❖ The pH of surface water sample ranges between 6.8 and 7.1.
- ❖ Turbidity varies between 2.3 and 3.1 NTU.
- ❖ TDS varies between 184 and 310 mg/l.
- ❖ TH varies between 109 and 156 mg/l.
- ❖ Calcium varies between 26 and 36 mg/l.
- ❖ Magnesium varies between 14 and 29 mg/l.
- ❖ Chloride varies between 95 and 128 mg/l
- ❖ sulphate varies between 12 and 28 mg/l.

#### *Ground Water*

- ❖ pH of water samples ranges between 7.1 and 8.1.
- ❖ TDS varies between 542 and 960 mg/l.
- ❖ TH varies between 211 and 357 mg/l.
- ❖ Calcium varies between 32 and 63 mg/l.
- ❖ Chloride varies between 101 and 213 mg/l.
- ❖ Sulphate varies between 32 and 53 mg/l and fluoride from 0.19 to 1 mg/l.
- ❖ When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

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

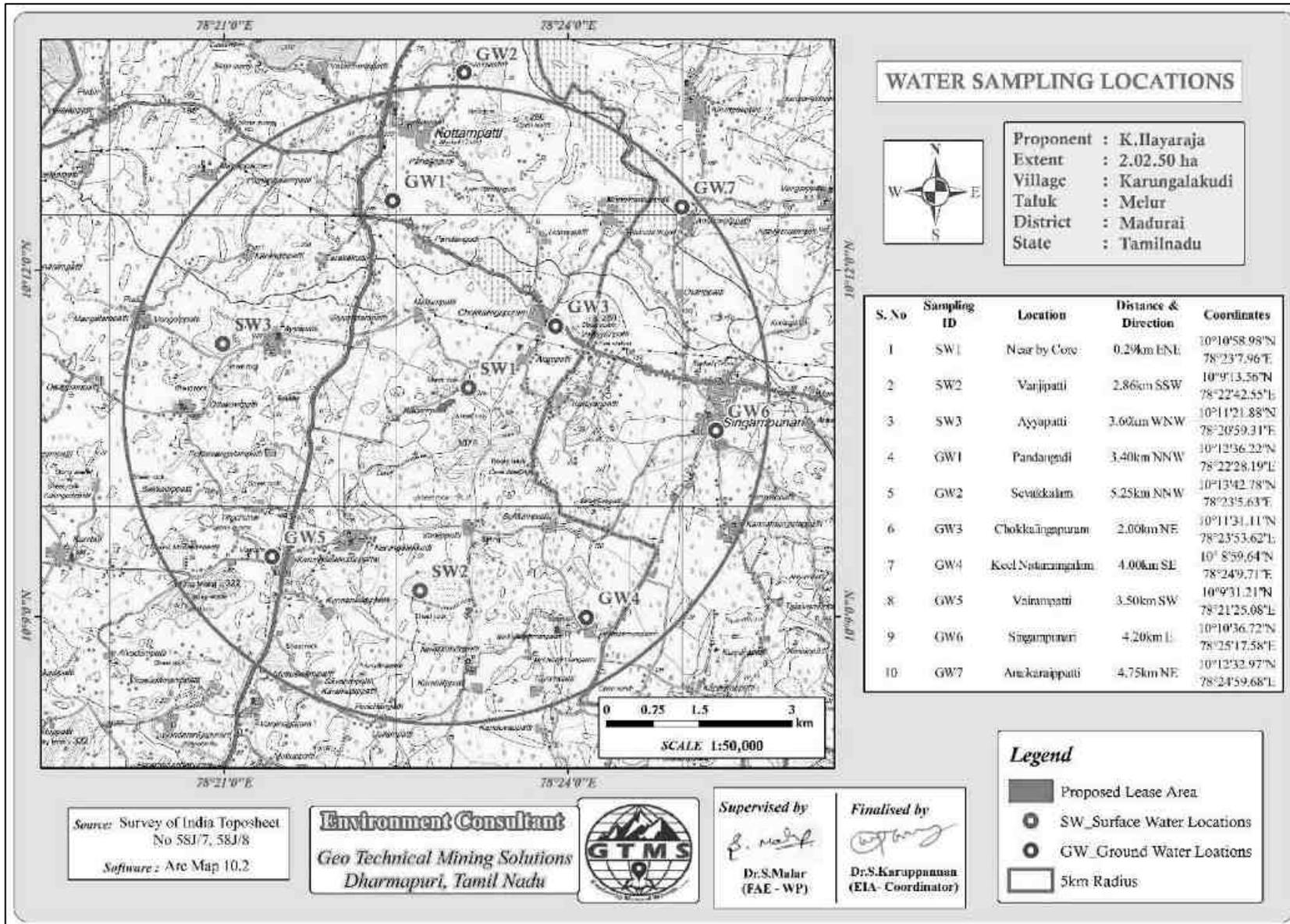


Figure 3.4 Toposheet showing water sampling locations within 5 km radius around the proposed project site

**Table 3.7 Ground Water Quality Result**

S.No.	Parameters	Units	Results							Standards as Per IS 10500: 2012	
			GW1	GW2	GW3	GW4	GW5	GW6	GW7	Acceptable limit	Permissible limit
1	Color	Hazen	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	5	15
2	Odor	-	Agreeable	Agreeable							
3	pH@ 25°C	-	7.3	7.8	7.1	7.7	8.0	8.1	7.6	6.5 – 8.5	6.5 – 8.5
4	Turbidity	NTU	≤1	≤1	≤1	≤1	≤1	≤1	≤1	1	5
5	EC@ 25°C	µs/cm	970	981	595	1064	1127	1053	740	Not specified	Not specified
6	TDS	mg/l	960	767	548	614	669	685	542	500	2000
7	Total Hardness	mg/l	235	357	211	341	261	352	247	200	600
8	Calcium (Ca)	mg/l	40	56	46	32	44	63	49	75	200
9	Magnesium (Mg)	mg/l	39	53	64	47	31	42	34	30	100
10	Sodium (Na)	mg/l	130	94	33	54	92	63	21	50(WHO)	200
11	Potassium (K)	mg/l	03	01	05	04	02	09	03	12(WHO)	12
12	Bicarbonate (HCO <sub>3</sub> )	mg/l	221	231	156	183	206	241	196	50(WHO)	400
13	Sulphate (SO <sub>4</sub> )	mg/l	51	36	38	32	46	53	42	200	200
14	Chloride (Cl)	mg/l	112	173	143	123	203	213	101	250	1000
15	Nitrates (NO <sub>3</sub> )	mg/l	11	19	20	12	24	28	10	45	45
16	Fluoride (F)	mg/l	0.81	1.0	0.25	0.19	0.46	0.92	0.47	1	1.5
17	Total Coliform	MPN/100ml	-	-	-	-	-	-	-	Shall not be detectable in any 100 ml water	Shall not be detectable in any 100 ml water
18	E-Coli	MPN/100ml	-	-	-	-	-	-	-	Shall not be detectable in any 100 ml water	Shall not be detectable in any 100 ml water

### **3.2.5 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.

#### **3.2.5.1 Groundwater Levels and Flow Direction**

As the groundwater moves from the points of highest static groundwater elevation to the points of lowest static groundwater elevation under the influence of gravity, data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from October through December, 2021 (Post Monsoon Season) and from April through June, 2022 (Pre-Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.8 and 3.9. According to the data, average depths to the static water table in open wells range from 5.6 to 6.9 m BGL in post monsoon and from 10.4 to 13.3 m BGL in pre monsoon. The bore well data thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in borewells for the period of October through December, 2021 (Post-Monsoon Season) vary from 57.2 to 58.7 m and from 55.4 to 67.9 m for the period of March through May, 2021 (Pre-Monsoon Season).

Data on the depths to static water table and potentiometric surface were used to calculate static groundwater table and potentiometric surface elevations for open wells and borewells, respectively to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

The maps thus produced are shown in Figures 3.5-3.8. From the maps of groundwater flow direction, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 7 and 9 located in SSE and SSW of the proposed project site, respectively and that most of the borewell groundwater for the two monsoon seasons flows towards the bore well number 6 located in E located in SSE of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2021	Nov-2021	Dec-2021	Average		
DW01	6.5	6.8	7.4	6.9	10°10'51.00"N	78°22'58.68"E
DW02	5.2	5.5	6.2	5.6	10°10'44.11"N	78°22'36.11"E
DW03	5.7	6.4	7.2	6.4	10°10'55.70"N	78°22'30.51"E
DW04	5.5	6.2	7.5	6.4	10°11'22.58"N	78°22'24.19"E
DW05	6.5	6.8	7.4	6.9	10°11'7.46"N	78°23'6.55"E
DW06	5.2	5.5	6.3	5.7	10°10'54.48"N	78°23'38.14"E
DW07	5.2	5.5	6.2	5.6	10°10'12.05"N	78°23'7.46"E
DW08	5.5	6.2	6.9	6.2	10°10'30.62"N	78°22'7.19"E
DW09	6.2	6.8	7.3	6.8	10°10'11.22"N	78°22'46.57"E

Source: Onsite monitoring data

**Table 3.9 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	12.5	12.8	13.5	12.9	10°10'51.00"N	78°22'58.68"E
DW02	10.7	11.5	12.6	11.6	10°10'44.11"N	78°22'36.11"E
DW03	12.4	12.7	13.6	12.9	10°10'55.70"N	78°22'30.51"E
DW04	11.5	12.3	12.8	12.2	10°11'22.58"N	78°22'24.19"E
DW05	12.7	13.5	13.9	13.3	10°11'7.46"N	78°23'6.55"E
DW06	11.5	12.6	13.1	12.4	10°10'54.48"N	78°23'38.14"E
DW07	9.5	10.2	11.6	10.4	10°10'12.05"N	78°23'7.46"E
DW08	11.5	12.8	13.2	12.5	10°10'30.62"N	78°22'7.19"E
DW09	10.7	11.5	12.6	11.6	10°10'11.22"N	78°22'46.57"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2021	Nov-2021	Dec-2021	Average		
BW01	56.7	57.2	58.2	57.3	10°10'58.12"N	78°22'42.14"E
BW02	57.6	58.1	59.4	58.3	10°11'18.26"N	78°22'32.71"E
BW03	56.2	57.6	58.1	57.3	10°11'37.79"N	78°22'44.03"E
BW04	57.1	57.9	58.4	57.8	10°11'21.39"N	78°23'13.40"E
BW05	57.8	58.9	59.5	58.7	10°11'11.87"N	78°23'32.79"E
BW06	56.2	57.4	58	57.2	10°10'8.94"N	78°23'1.62"E
BW07	58.3	58.7	59.2	58.7	10°10'39.86"N	78°23'23.67"E
BW08	56.6	57.4	58.7	57.5	10°10'36.09"N	78°22'56.38"E
BW09	57.3	58.1	59.4	58.2	10°11'27.07"N	78°22'53.87"E

**Table 3.11 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	66.7	67.2	68.2	67.3	10°10'58.12"N	78°22'42.14"E
BW02	65.6	66.1	67.4	66.3	10°11'18.26"N	78°22'32.71"E
BW03	66.7	67.4	68.1	67.4	10°11'37.79"N	78°22'44.03"E
BW04	67.4	67.9	68.6	67.9	10°11'21.39"N	78°23'13.40"E
BW05	65.8	66.9	67.5	66.7	10°11'11.87"N	78°23'32.79"E
BW06	66.2	67.4	68.4	67.3	10°10'8.94"N	78°23'1.62"E
BW07	54.3	55.7	56.2	55.4	10°10'39.86"N	78°23'23.67"E
BW08	65.5	66.7	67.9	66.7	10°10'36.09"N	78°22'56.38"E
BW09	65.6	66.1	67.4	66.3	10°11'27.07"N	78°22'53.87"E

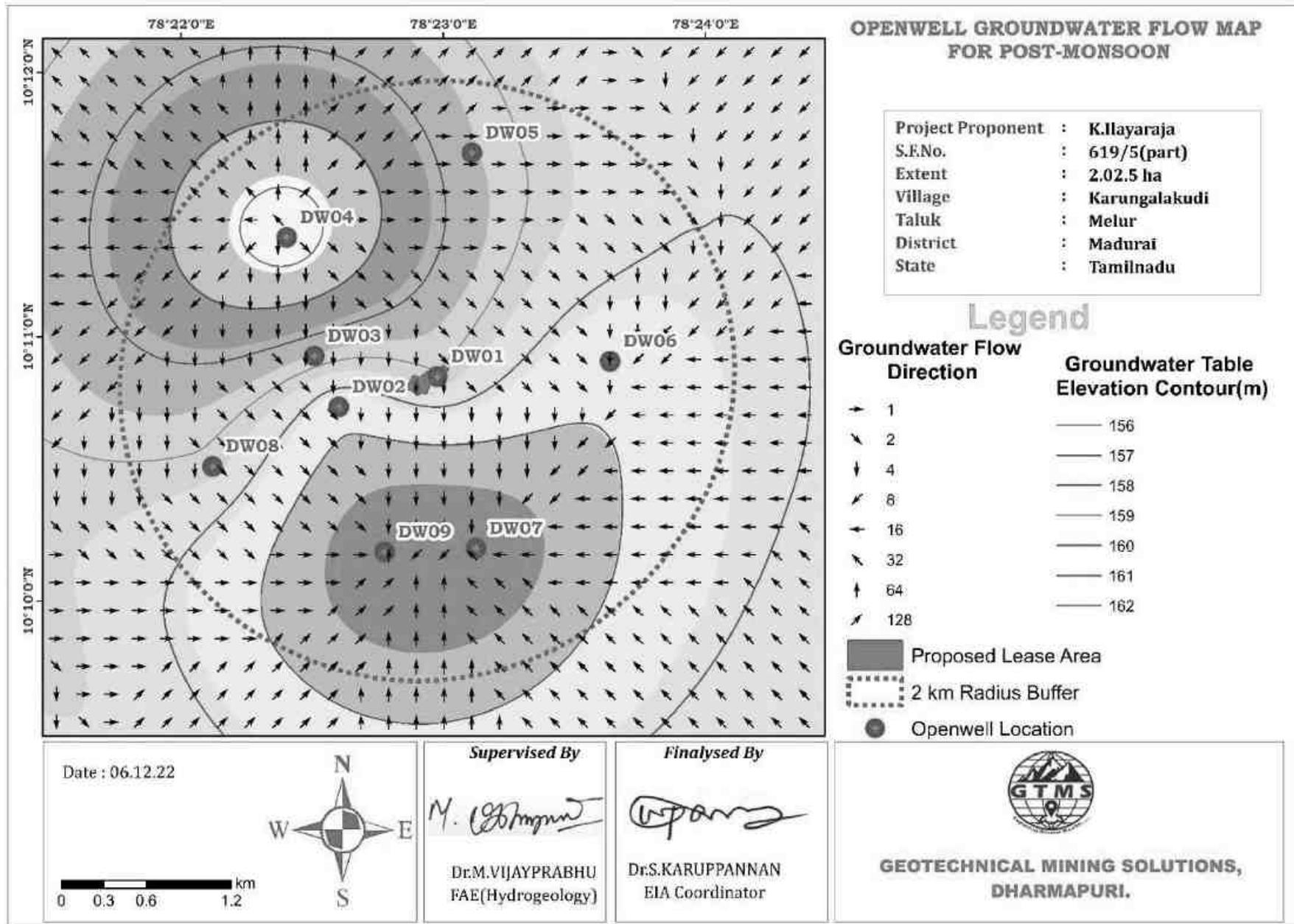


Figure 3.5 Open well static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

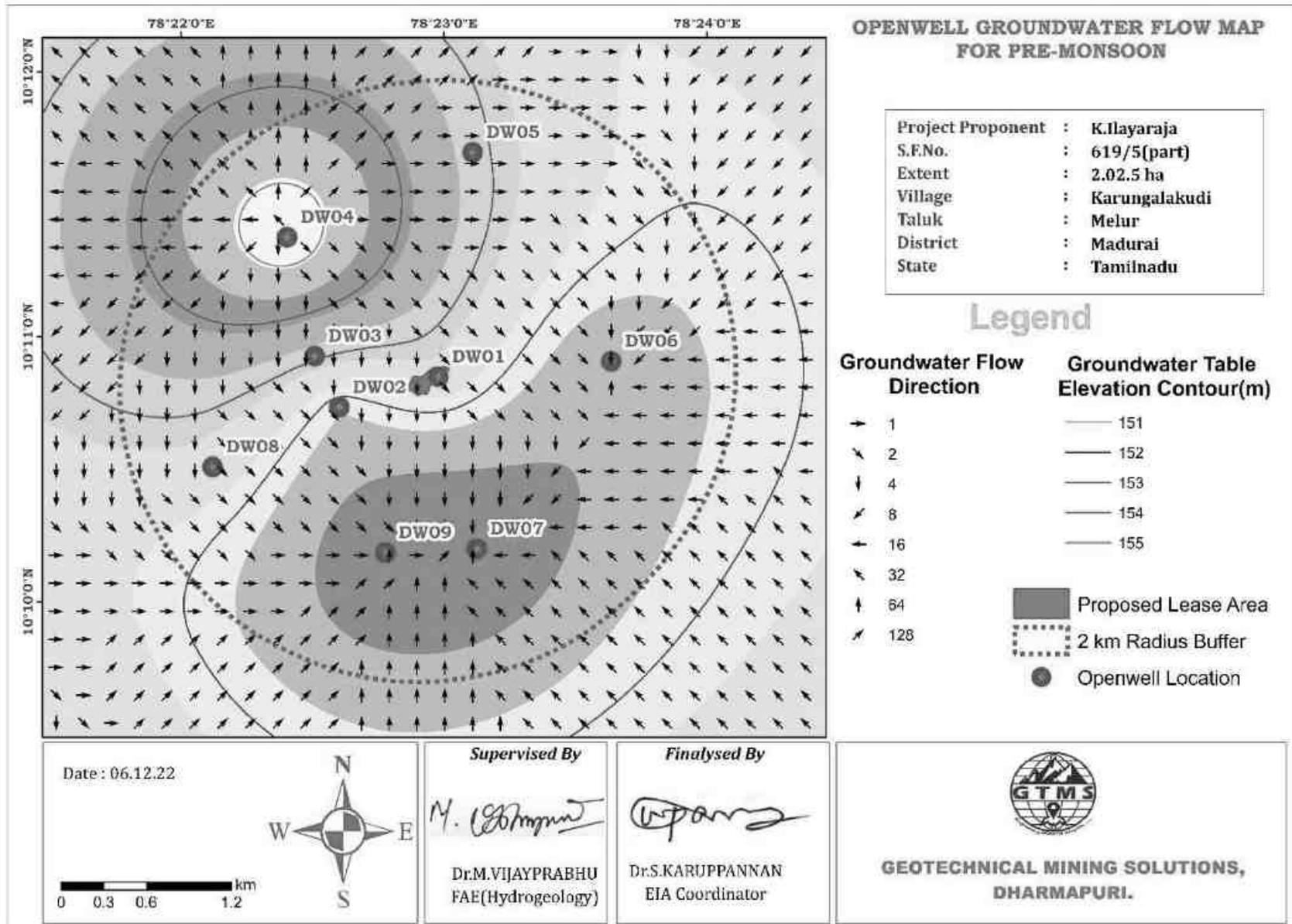


Figure 3.6 Open well static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season

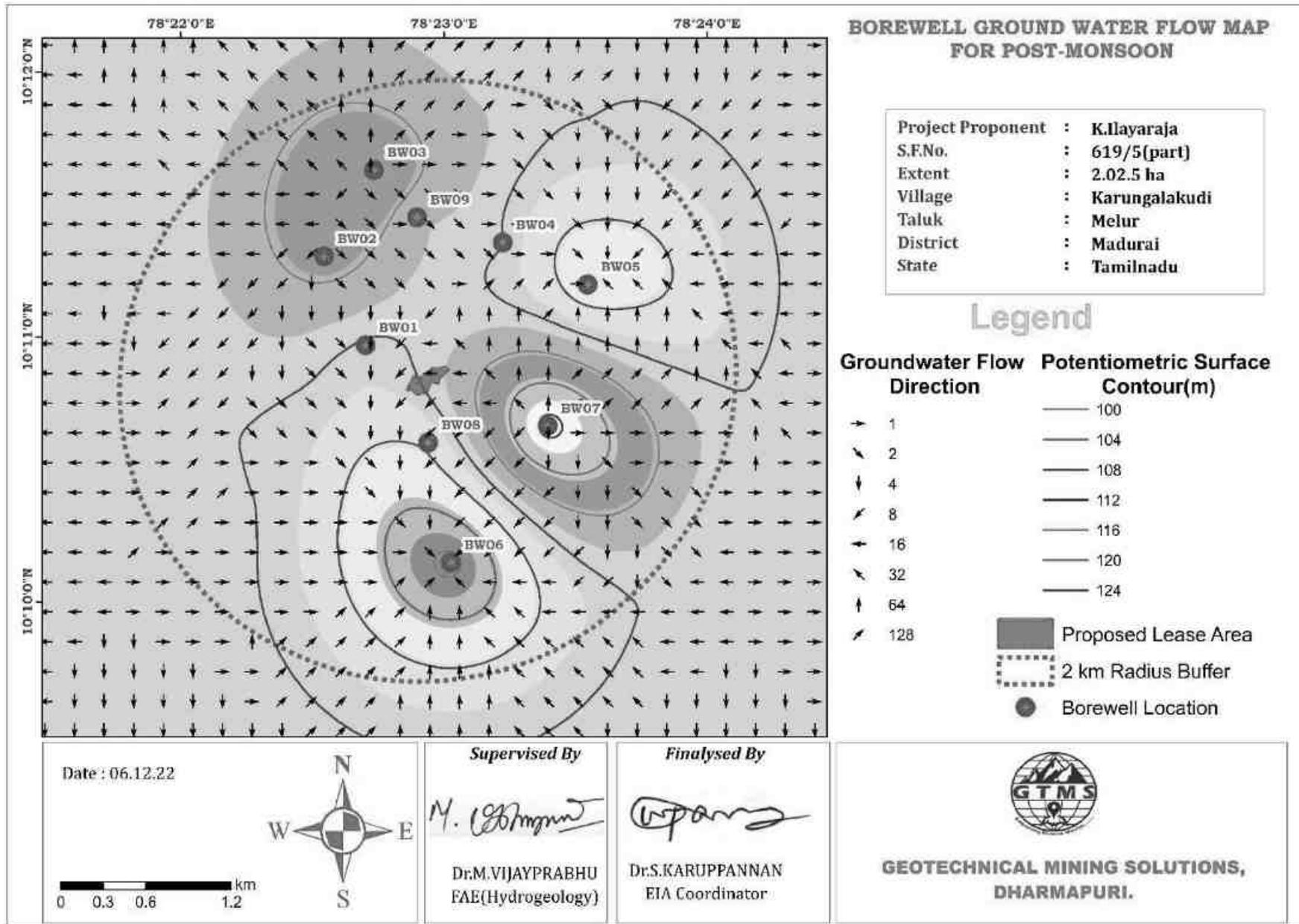


Figure 3.7 Borewell static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

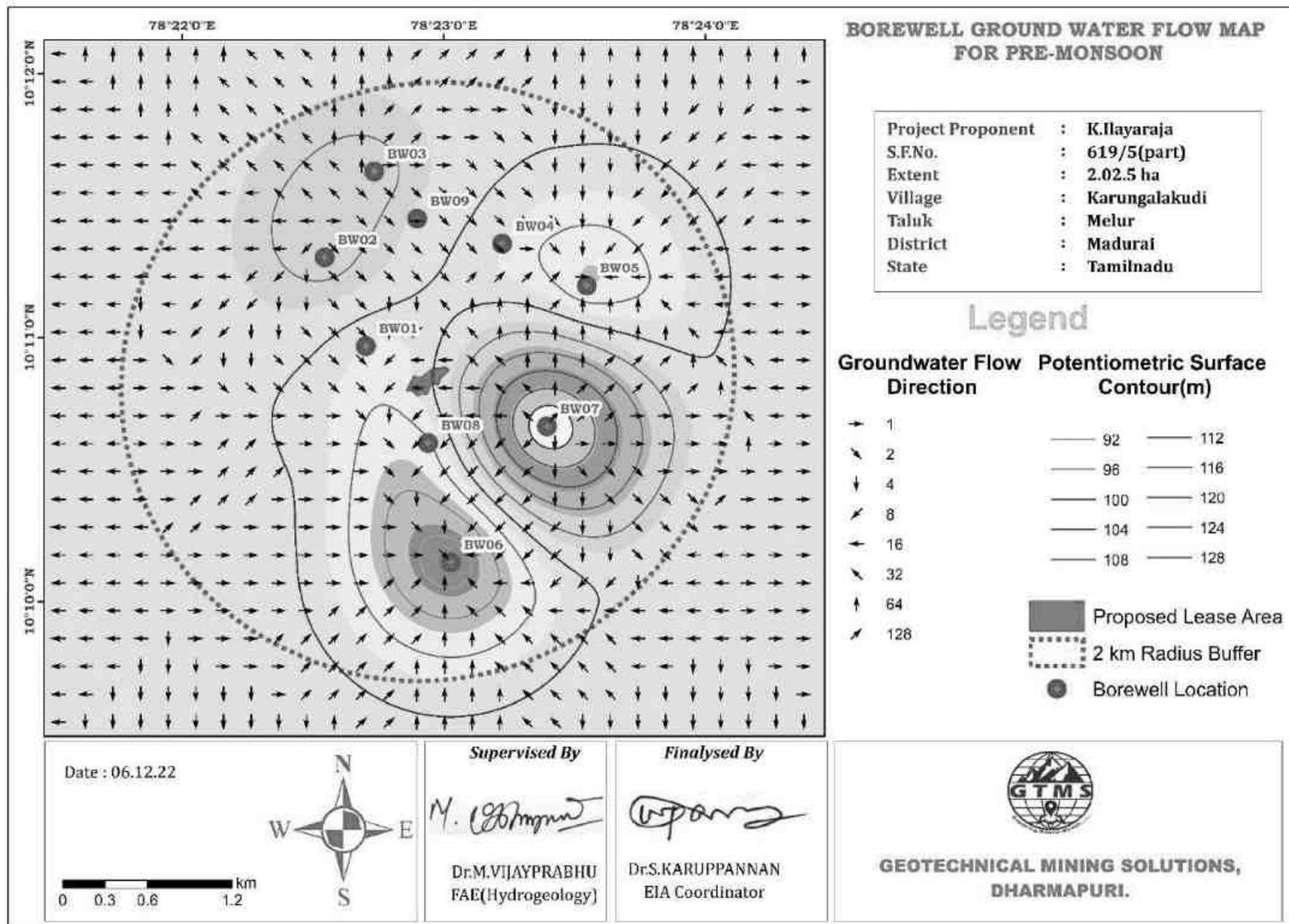


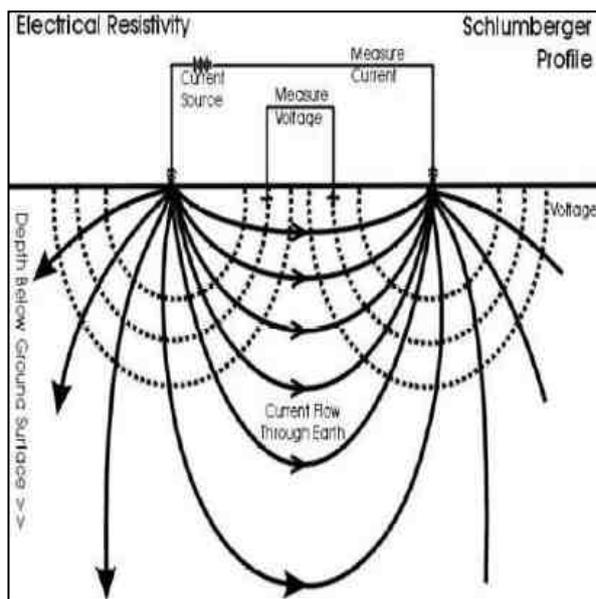
Figure 3.8 Borewell static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season

### 3.2.5.2 Electrical Resistivity Investigation

For understanding subsurface hydrogeological conditions geophysical investigation is carried out. The geophysical investigation is especially useful in the areas where there are no adequate exploratory well data about the aquifer conditions. Electric resistivity method is one of the well-known geophysical methods for delineating lateral as well vertical discontinuities in the resistivities of the earth's subsurface layers. It is mainly applied to locate aquifers in the field of hydrogeology. The present study makes use of vertical electric sounding (VES) to delineate earth's subsurface layers. The electrical resistivity investigation used four electrodes collinear set up where current is sent through outer electrodes into the ground and the inner electrodes measure the potential difference, as shown in Figures 3.9 and 3.9a.

### 3.2.5.3 Methodology and Data Acquisition

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



**Figure 3.9 Principle of electrical resistivity investigation**



**Figure 3.9a Geophysical survey within the lease area**

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

### 3.2.5.4 Data Presentation

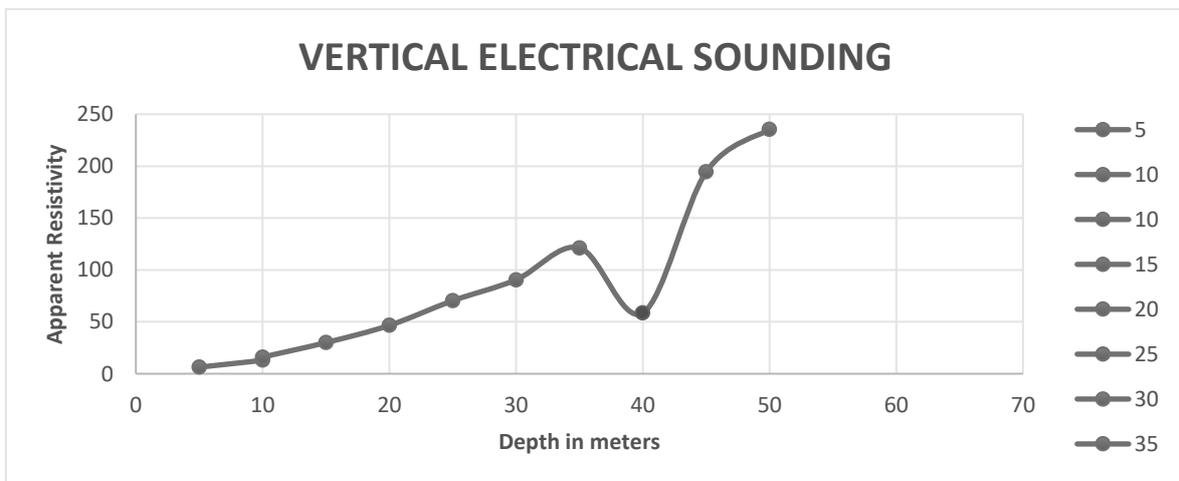
The Geophysical VES data obtained from the project site have been shown in Table 3.12. The field data obtained from a detailed geophysical investigation were plotted using EXCEL spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.10.

**Table 3.12 Vertical Electrical Sounding Data**

Location Coordinates - 10°10'56.66"N 78°22'59.31"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in $\Omega$	Apparent Resistivity in $\Omega m$
1	5	2	16.48	0.381	6.294
2	10	2	75.36	0.174	13.161
3	10	5	23.56	0.672	15.841
4	15	5	62.80	0.4776	30.022
5	20	5	117.75	0.3952	46.586
6	25	5	188.40	0.37311	70.357
7	25	10	82.42	0.7871	18.55
8	30	10	125.60	0.7195	90.5
9	35	10	176.62	0.686	121.307
10	40	10	235.5	0.2485	58.55
11	45	10	302.22	0.642	194.439
12	50	10	376.80	0.623	235.307

### 3.2.5.5 Geophysical Data Interpretation

The rock formation of low resistivity values indicates occurrence of water at the depth of about 40 m below ground level. The maximum depth proposed for the proposed project is 30 m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.



**Figure 3.10 Graph showing occurrence of water bearing fracture zones at the depth range of 40 m below ground level in proposed project**

### **3.3 AIR ENVIRONMENT**

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

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

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

#### **3.3.1 Meteorology**

Meteorology is the key to understand the air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time accomplish dispersion and strongly influence other processes associated with them. A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3 m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.13.

According to the onsite data, the temperature in March, 2022 varied from 21.07 to 39.96<sup>0</sup>C with the average of 29.72<sup>0</sup>C; in April, 2022 from 22.22 to 40.83<sup>0</sup>C with the average of 30.68<sup>0</sup>C; and in May, 2022 from 24.52 to 41.23<sup>0</sup>C with the average of 30.96<sup>0</sup>C. During the period of the three months, relative humidity ranged from 54.30.88 to 60.69 % in average. The highest average humidity was measured in May 2022, whereas the lowest in March 2022. When speaking about wind speed, the wind speed in march, 2022 varied from 0.04 to 7.37 m/s with the average of 3.12m/s; in April, 2022 from 0.16 to 6.70 m/s with the average of 2.79 m/s; and in May, 2022 from 0.12 to 8.72/s with the average of 2.96 m/s.

**Table 3.13 Onsite Meteorological Data**

S. No.	Parameters		March,2022	April,2022	May,2022
1	Temperature (°C)	Min	21.07	22.22	24.52
		Max	39.96	40.83	41.23
		Avg	29.94	30.68	30.96
2	Relative Humidity (%)	Min	13.31	19.69	25.00
		Max	95.25	94.50	95.56
		Avg	54.30	59.21	60.69
3	Wind Speed (m/s)	Min	0.04	0.16	0.12
		Max	7.37	6.70	8.72
		Avg	3.12	2.79	2.96
4	Wind Direction (degree)	Min	1.25	1.91	0.55
		Max	359.20	357.92	357.74
		Avg	110.10	134.71	209.80

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

### 3.3.1.1 Rainfall

**Table 3.14 Rainfall Data**

Actual Rainfall in mm					Normal Rainfall in mm
2017	2018	2019	2020	2021	
904.6	734.1	671.9	915.5	1095.2	985

<https://www.twadboard.tn.gov.in/content/Madurai>,

From the data for the period of 2017-21, the average annual rainfall has been calculated to be 864.26.mm. Of the 5 years, the lowest rainfall (671.9mm) occurred in the year 2019, while the highest rainfall (1095.2mm) in the year 2021.

### 3.3.1.2 Wind Pattern

Local 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 over a period of 3 months. The wind rose thus produced, as shown in Figure 3.12 reveals that:

- ❖ The measured average wind velocity during the study period is 2.58m/s.
- ❖ Predominant wind was dominant in the directions ranging from southwest to northeast.

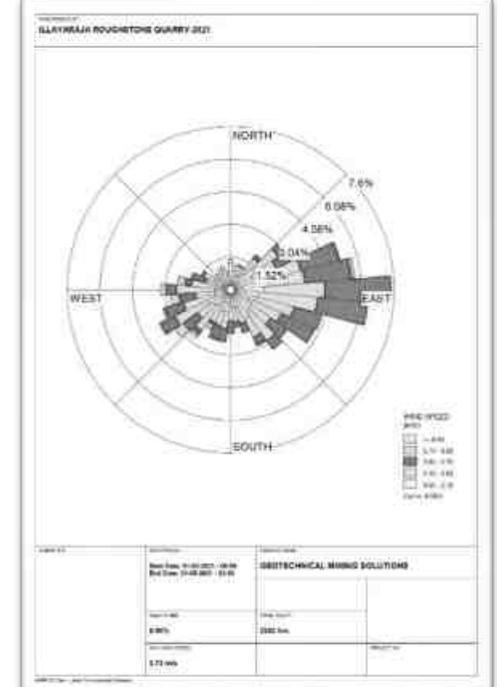
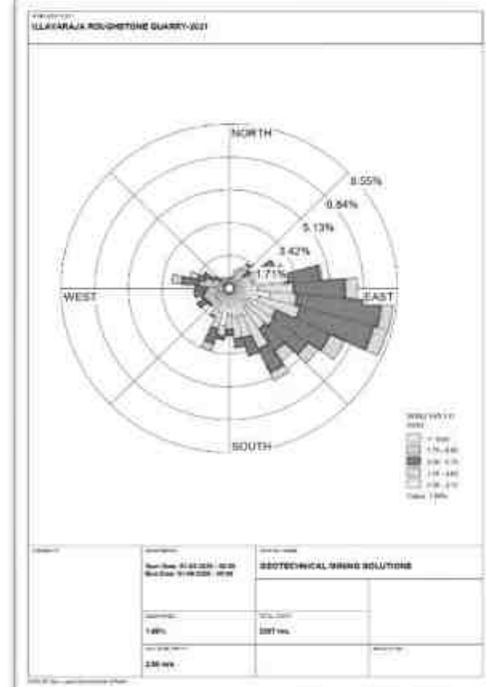
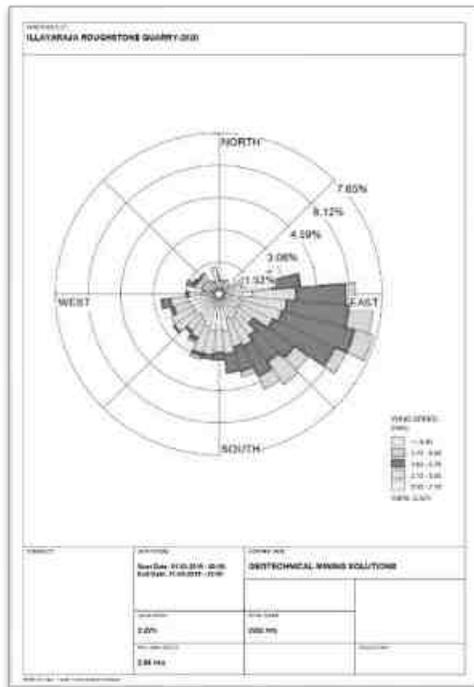
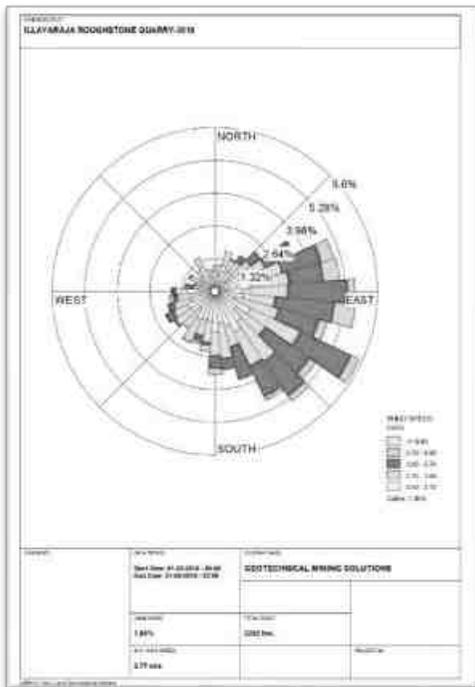
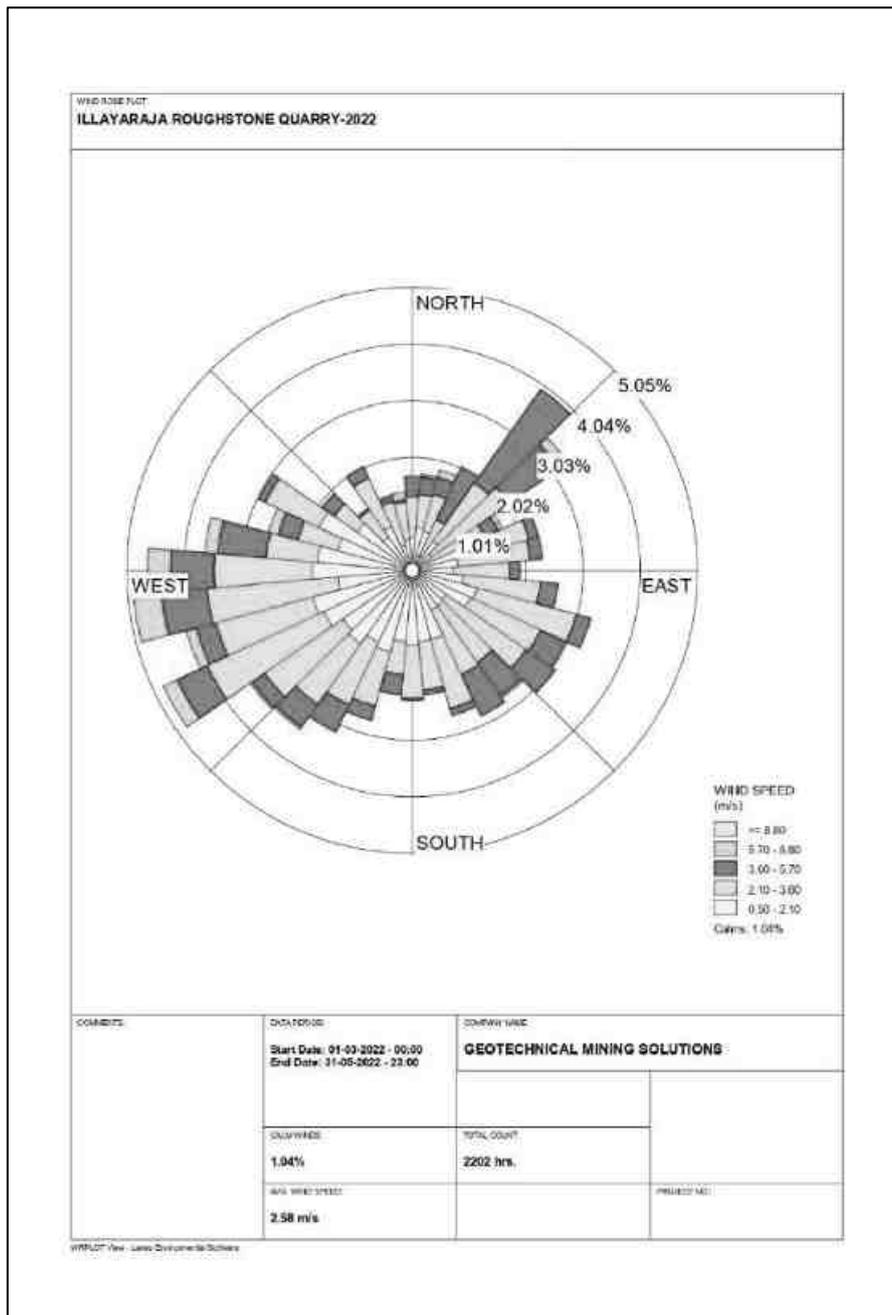


Figure 3.11 Windrose Diagram from 2018 to 2021(March to May)



**Figure 3.12 Onsite Wind Rose Diagram**

### 3.3.2 Methodology and Objectives

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

- ❖ Meteorological condition on synoptic scale

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

### 3.3.3 Sampling and Analytical Techniques

**Table 3.15 Methodology and Instrument Used for AAQ Analysis**

Parameter	Method	Instrument
PM <sub>2.5</sub>	Gravimetric method Beta attenuation method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM <sub>10</sub>	Gravimetric method Beta attenuation method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO <sub>2</sub>	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO <sub>x</sub>	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology based on Accuracy Analabs Laboratory & CPCB Notification

**Table 3.16 National Ambient Air Quality Standards**

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide (µg/m <sup>3</sup> )	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide (µg/m <sup>3</sup> )	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	Particulate matter (size less than 10µm) PM10 (µg/m <sup>3</sup> )	Annual Avg. 24 hours	60.0 10°0	60.0 10°0
4	Particulate matter (size less than 2.5 µm PM2.5 (µg/m <sup>3</sup> ))	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

\*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform Interval.

\*\* 24 hourly / 8 hourly or 1 hourly monitored value as applicable shall be complied with 98 % of the time in a year. However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

### 3.3.4 Frequency and Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at Nine (9) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period March-May 2022. The baseline data of ambient air has been generated for PM<sub>10</sub>, PM<sub>2.5</sub>, sulphur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>2</sub>) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

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

### 3.3.5 Ambient Air Quality Monitoring Stations

Nine monitoring stations were set up in the study area as depicted in Figure 3.13 for the assessment of the existing ambient air quality. The sampling locations and concentrations of air pollutants measured from the proposed project site have been given in Tables 3.17.

**Table 3.17 Ambient Air Quality (AAQ) Monitoring Locations**

S. No	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
1	AAQ1	Core	--	--	10°10'52.90"N78°22'59.25"E
2	AAQ2	Kadampatti	0.95	W	10°10'52.31"N78°22'27.38"E
3	AAQ3	Ayyapatti	3.0	W	10°11'23.16"N78°21'24.28"E
4	AAQ4	Vettayanpatti	4.02	W	10°10'46.92"N78°20'46.91"E
5	AAQ5	Kannamangalapatti	4.66	SE	10° 9'54.20"N 78°25'22.30"E
6	AAQ6	Karandipatti	3.96	NW	10°12'11.02"N78°21'12.75"E
7	AAQ7	Chokkalingapuram	2.14	NE	10°11'29.64"N78°24'03.44"E
8	AAQ8	Karungalakkudi	3.55	SW	10° 9'32.17"N 78°21'35.75"E
9	AAQ9	Karuppannan Lease	0.25	N	10°10'59.53"N 78°23'3.42"E

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

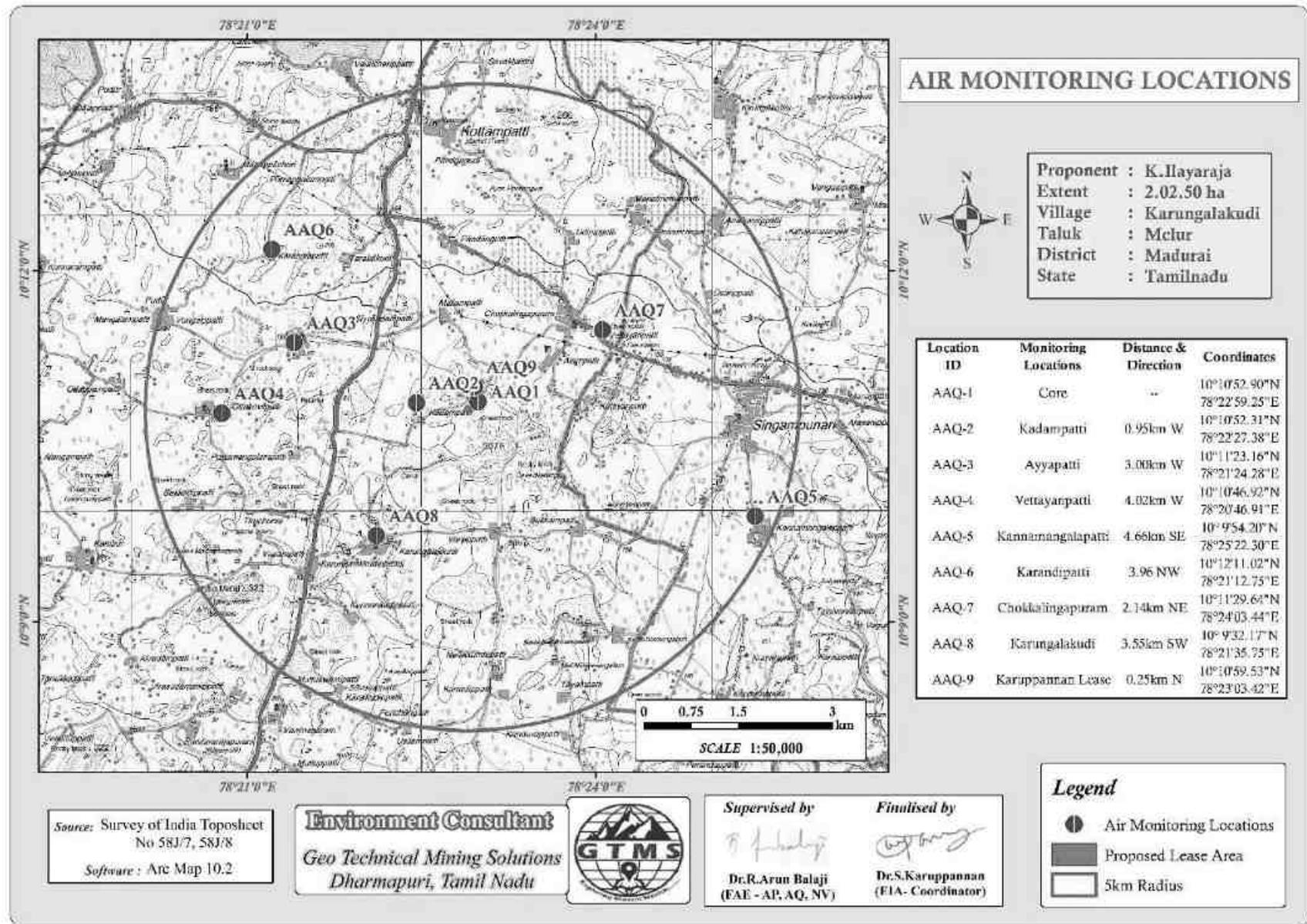


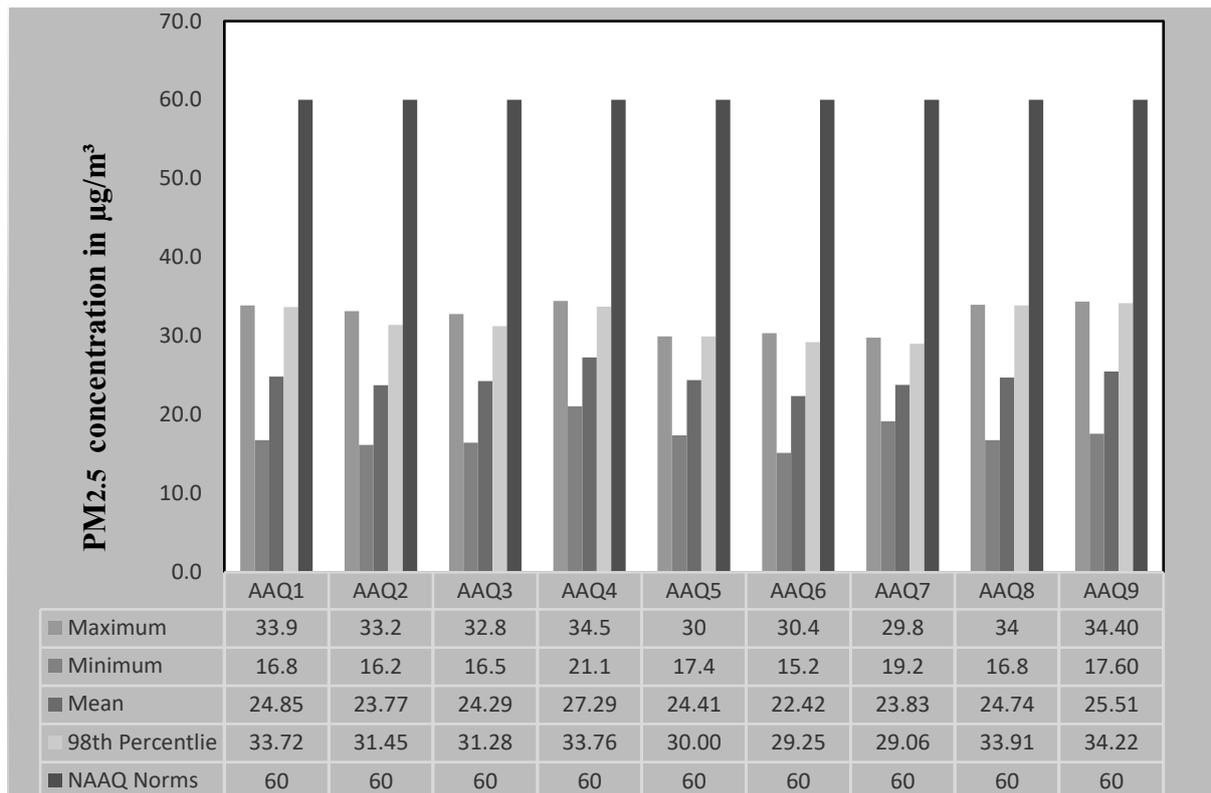
Figure 3.13 Toposheet showing ambient air quality monitoring station locations around 5 km radius from the proposed project site

**Table 3.18 Summary of AAQ Result**

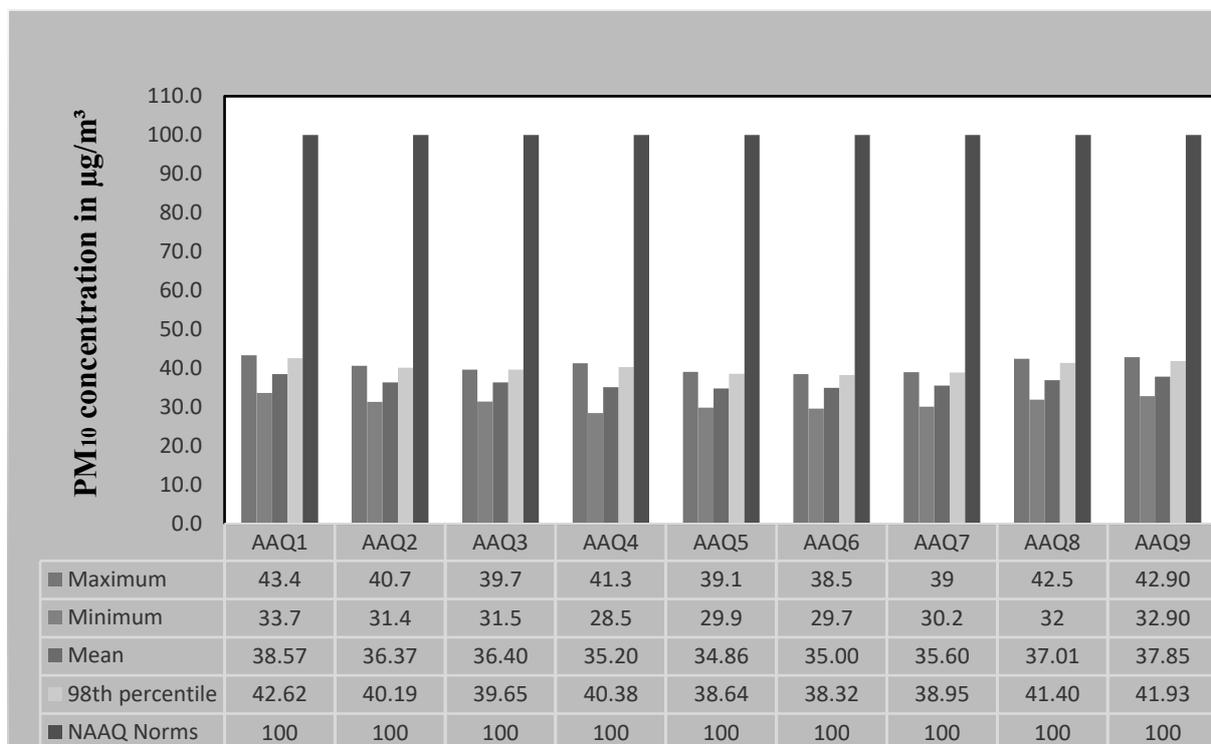
PM <sub>2.5</sub>					PM <sub>10</sub>			
Station ID	Max	Min	Mean	98 <sup>th</sup> Percentile	Max	Min	Mean	98 <sup>th</sup> Percentile
AAQ1	33.90	16.80	24.85	33.72	43.40	33.70	38.57	42.62
AAQ2	33.20	16.20	23.77	31.45	40.70	31.40	36.37	40.19
AAQ3	32.80	16.50	24.29	31.28	39.70	31.50	36.40	39.65
AAQ4	34.50	21.10	27.29	33.76	41.30	28.50	35.20	40.38
AAQ5	30.00	17.40	24.41	30.00	39.10	29.90	34.86	38.64
AAQ6	30.40	15.20	22.42	29.25	38.50	29.70	35.00	38.32
AAQ7	29.80	19.20	23.83	29.06	39.00	30.20	35.60	38.95
AAQ8	34.00	16.80	24.74	33.91	42.50	32.00	37.01	41.40
AAQ9	34.40	17.60	25.51	34.22	42.90	32.90	37.85	41.93
SO <sub>2</sub>					NO <sub>2</sub>			
AAQ1	8.00	4.50	6.14	7.77	23.50	13.80	17.37	23.09
AAQ2	7.30	3.70	5.43	7.07	22.60	12.80	16.22	21.73
AAQ3	7.80	4.70	5.89	7.71	20.50	13.50	16.58	19.67
AAQ4	8.30	5.00	6.56	8.02	23.80	12.80	17.11	21.96
AAQ5	7.20	3.80	5.43	7.11	24.40	14.10	18.30	23.80
AAQ6	7.10	4.40	5.56	6.92	21.00	13.30	16.55	20.63
AAQ7	7.60	3.80	5.24	7.00	21.50	12.90	15.79	17.78
AAQ8	9.00	5.60	7.28	8.82	23.50	13.80	18.86	23.09
AAQ9	7.30	3.70	5.53	7.02	24.30	14.70	18.03	23.79

**Table 3.19 Maximum, Minimum, Average and 98<sup>th</sup> Percentile of Average Air Pollutant Concentrations over the Study Area**

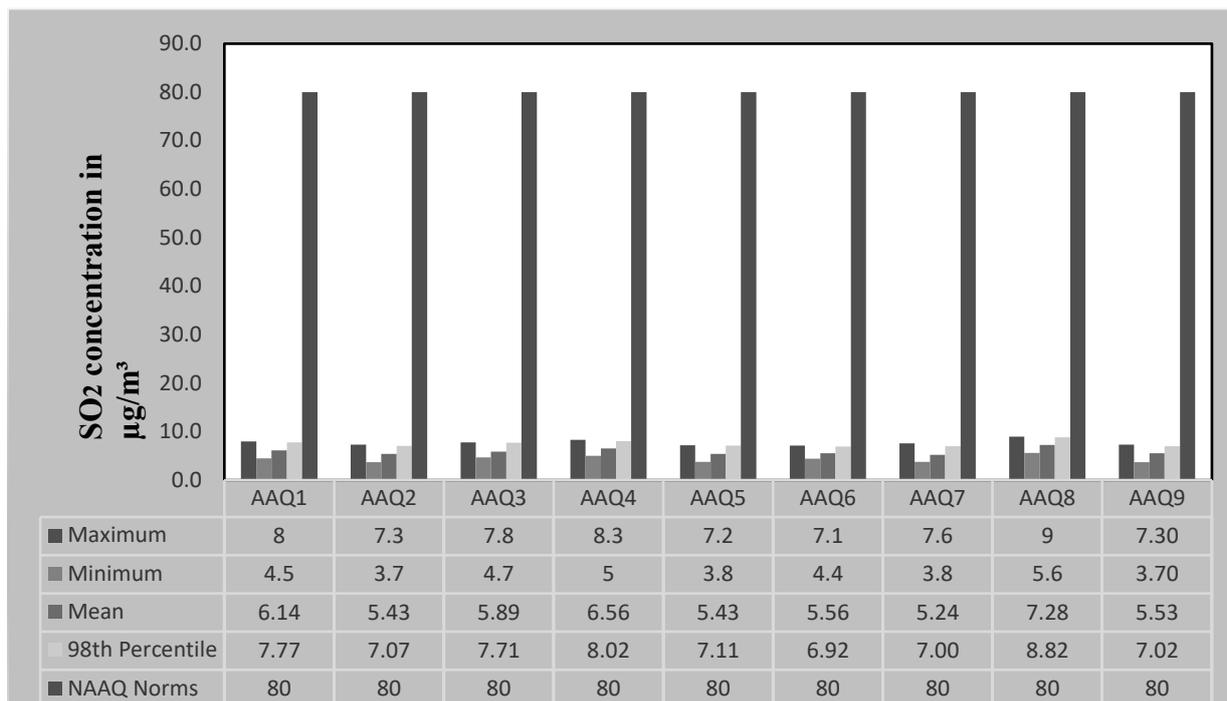
S. No.	Parameter	Pollutant Concentration, µg/m <sup>3</sup>			
		PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>
1	Maximum	32.56	40.79	7.73	22.79
2	Minimum	17.42	31.09	4.36	13.52
3	Average	24.57	36.32	5.90	17.20
4	98 <sup>th</sup> percentile	31.85	40.23	7.49	21.73
5	NAAQ Norms	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>



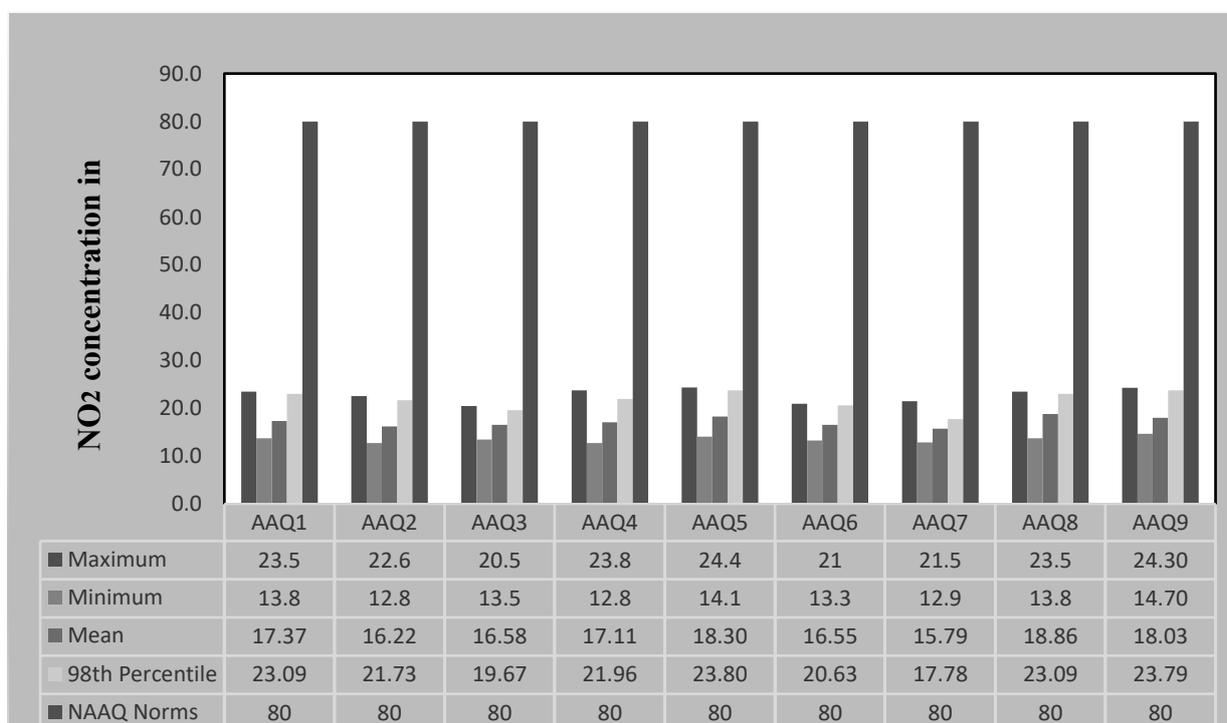
**Figure 3.14** Bar chart showing maximum, minimum, and the average concentrations of PM<sub>2.5</sub> measured from the nine air quality monitoring stations within 5 km radius



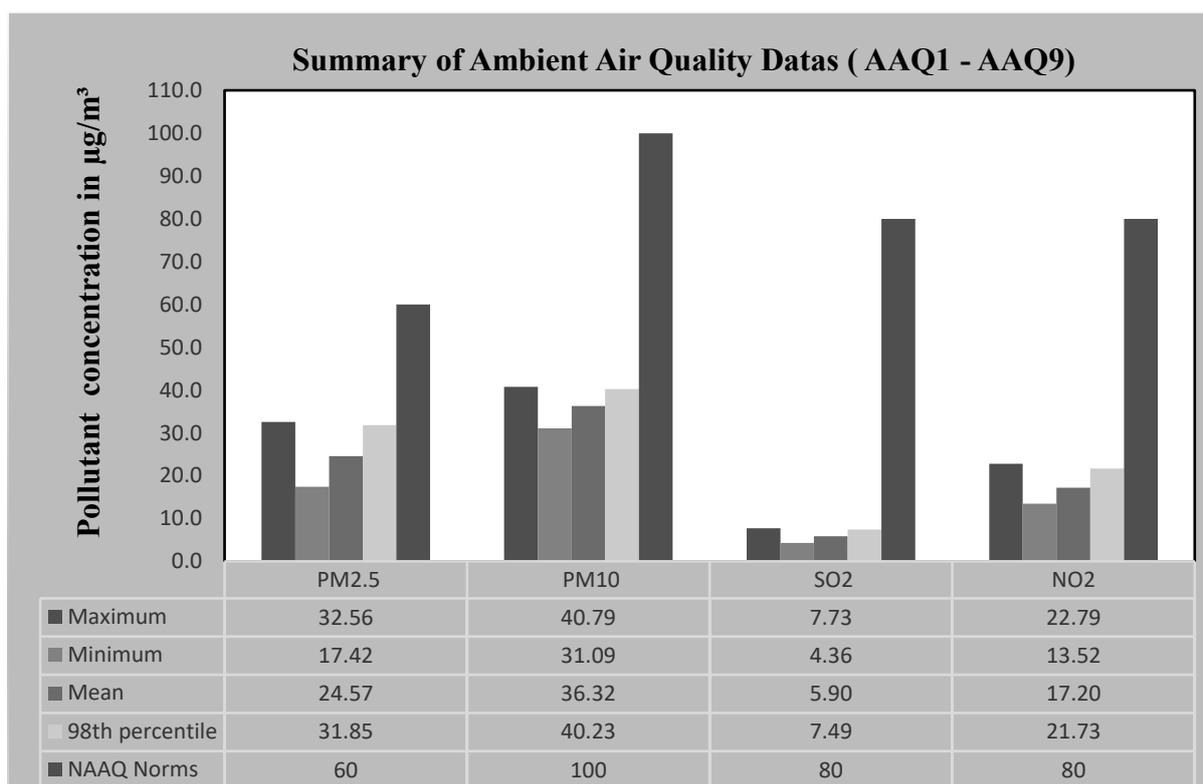
**Figure 3.15** Bar chart showing maximum, minimum, and the average concentrations of PM<sub>10</sub> measured from the nine air quality monitoring stations within 5km radius



**Figure 3.16 Bar chart showing maximum, minimum, and the average concentrations of NO<sub>2</sub> measured from the nine air quality monitoring stations within 5 km radius**



**Figure 3.17 Bar chart showing maximum, minimum, and the average concentrations of SO<sub>2</sub> measured from the nine air quality monitoring stations within 5km radius**



**Figure 3.18 Bar chart showing maximum, minimum, and the average concentrations of pollutants in the atmosphere within 5km radius**

### 3.3.6 Results & Discussion

As per the monitoring data, PM<sub>10</sub> ranges from 31.09 µg/m<sup>3</sup> to 40.79µg/m<sup>3</sup>; PM<sub>2.5</sub> from 17.32µg/m<sup>3</sup> to 32.56 µg/m<sup>3</sup>; SO<sub>2</sub> from 4.36µg/m<sup>3</sup> to 7.73 µg/m<sup>3</sup>; NO<sub>2</sub> from 13.52 µg/m<sup>3</sup> to 22.79µg/m<sup>3</sup>. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

### 3.4 NOISE ENVIRONMENT

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

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

### 3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at ten (10) locations covering commercial, residential, rural areas within the radius of 5 km. A suitable noise monitoring methodology was chosen to meet the purpose and objectives of the study.

**Table 3.20 Details of Noise Monitoring Locations**

S. No	Location Code	Monitoring Locations	Distance in km	Direction	Coordinates
1	N1	Core	--	--	10°10'53.76"N78°22'58.26"E
2	N2	Kadampatti	0.36	W	10°10'53.21"N 78°22'46.60"E
3	N3	Karandipatti	3.98	NW	10°12'11.15"N 78°21'12.34"E
4	N4	Vettayanpatti	2.29	NE	10°11'22.25"N 78°24'07.18"E
5	N5	Kannamangalappatti	4.65	SE	10° 9'54.91"N 78°25'21.72"E
6	N6	Karungalakkudi	3.55	SW	10° 9'33.75"N 78°21'33.98"E
7	N7	Poomangalapatti	3.01	NW	10°11'21.04"N 78°21'22.92"E
8	N8	Kottampatti	4.62	N	10°13'22.71"N 78°22'24.06"E
9	N9	Kilnatramangalam	4.20	SE	10° 8'56.52"N 78°24'12.20"E
10	N10	Karuppannan Lease	0.25	N	10°10'58.31"N 78°23'1.92"E

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

### 3.4.2 Method of Monitoring

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

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

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

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

### 3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352). An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.21.

**Table 3.21 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 (Leq in dB(A))	
N1	Core	Industrial area	40.6	35.5	75	70
N2	Kadampatti	Residential area	38.5	33.4	55	45
N3	Karandipatti	Residential area	41.4	36.8	55	45
N4	Vettayanpatti	Residential area	39.8	34.6	55	45
N5	Kannamangalappatti	Residential area	36.3	31.5	55	45
N6	Karungalakkudi	Residential area	44.5	39.6	55	45
N7	Poomangalapatti	Residential area	40.1	35.8	55	45
N8	Kottampatti	Residential area	43.7	38.5	55	45
N9	Kilnattramangalam	Industrial area	40.4	36.6	55	45
N10	Karuppanan Lease	Industrial area	40.8	35.8	75	70

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

### 3.4.4 Results & Discussion

Ambient noise levels were measured at 10 locations around the proposed project area. Noise levels recorded in core zone during day time was 40.6 dB (A) Leq and during night time was 35.5 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 36.3 to 44.5dB (A) Leq and during night time from 31.5 to 39.6 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

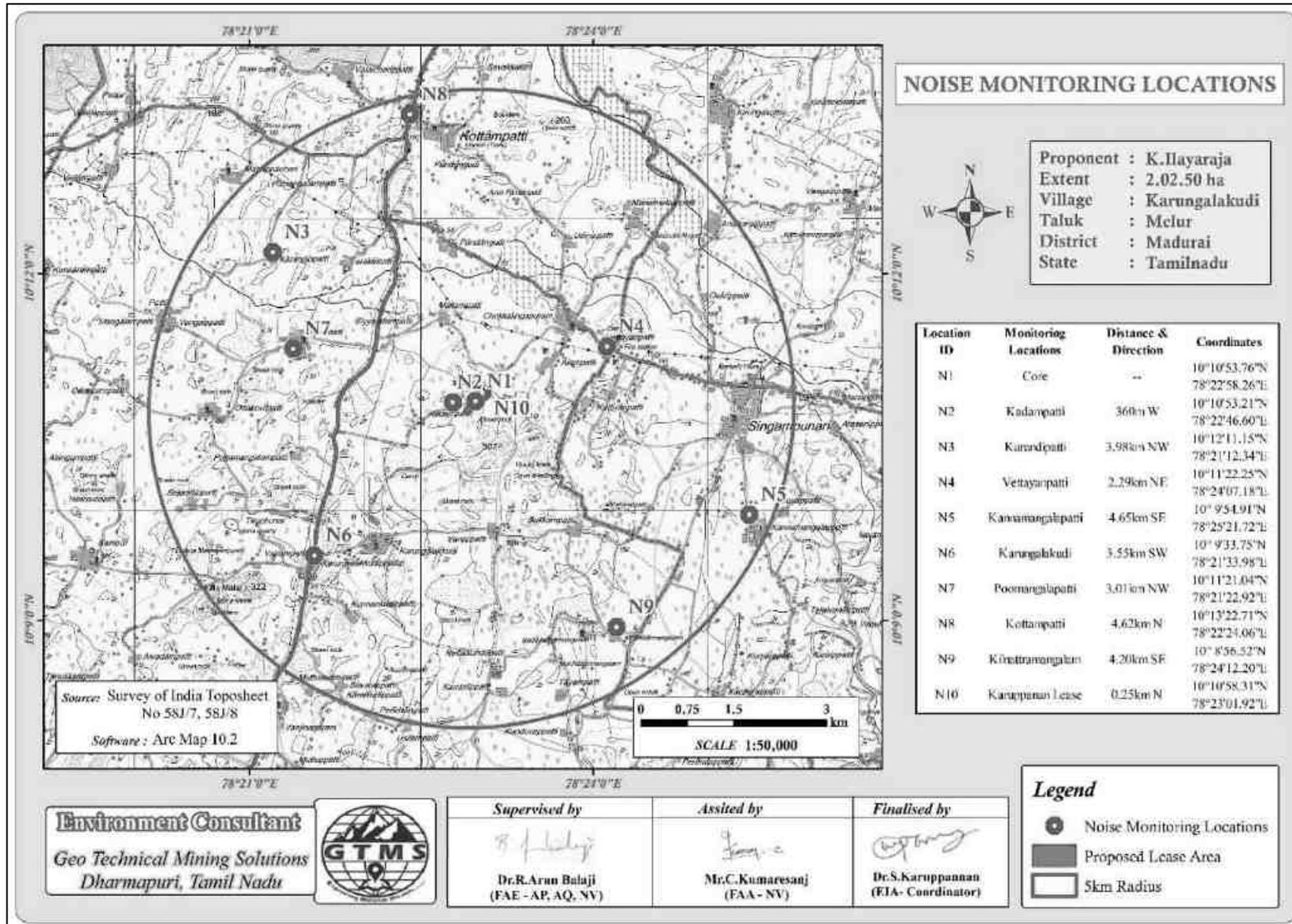
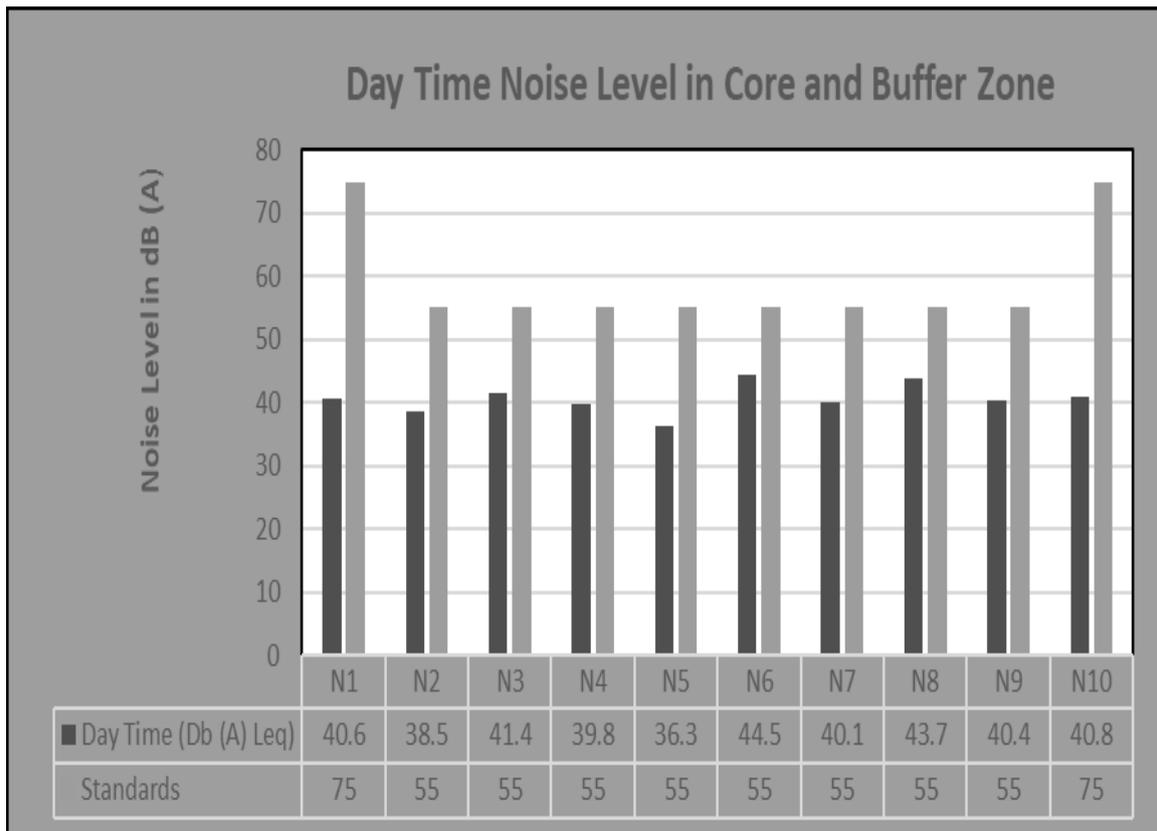
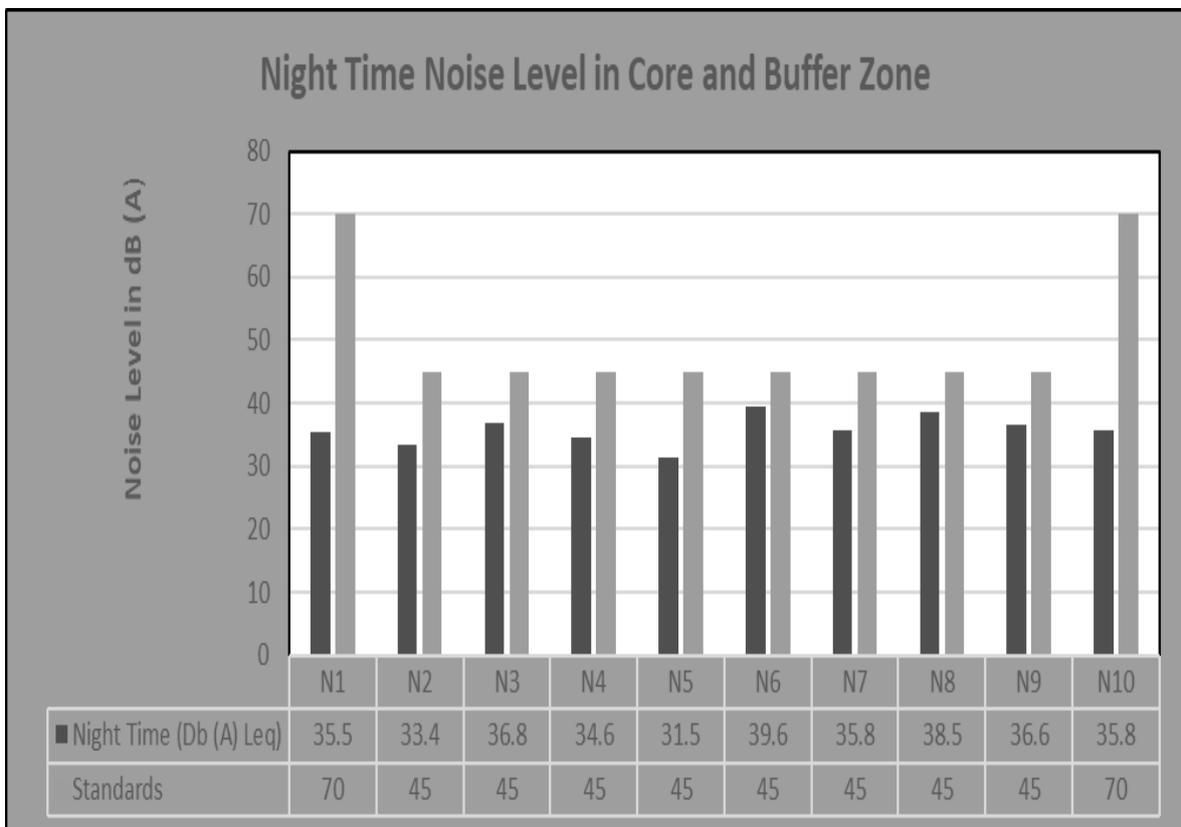


Figure 3.19 Toposheet showing noise level monitoring station locations around 5km radius from the proposed project site



**Figure 3.20** Bar chart showing day time noise levels measured in core and buffer zones



**Figure 3.21** Bar chart showing night time noise levels measured in core and buffer zones

### 3.5 BIOLOGICAL ENVIRONMENT

Ecology is a branch of science which dealing the relations and interactions between organisms and their environment. An ecological survey of the study area was conducted, particularly with reference to listing of species and assessment of the existing baseline ecological conditions in the study area. The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area. Data has been collected through extensive survey of the area with reference to flora and fauna. Information is 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.

Tamil Nadu is the southernmost state of the Indian peninsula, spread over 1, 30, 058Sq.Km. Among the southern states, Tamil Nadu contains the maximum number of 9 of the totals of 16 major forest types recognized in India by Champion and Seth. Within the major types 48 subtypes in the zone in which they are present.

Madurai is the second largest city by area in Tamil Nadu after Chennai and is the 25th populated city in India. Madurai, also called by different names like "City of Jasmine" (Malligai maanagar), "Temple City" (Koil maanagar), "City that never sleeps" (Thoonga nagaram) and "City of four junctions" (Naanmada koodal) is surrounded by several mountains. The Madurai city has 3 hills as its city boundary. Yanaimalai, Nagamalai, Pasumalai named after Elephant, Snake and Cow respectively. It is famous for Jasmine Flowers. Jasmine flowers are transported to other cities of India from Madurai.

The district is situated in the South of Tamil Nadu state. It is bounded on the North by the districts of Dindigul, Thiruchirapalli and on the East by Sivagangai and on the West by Theni and South by Virudhunagar. Geographically Madurai district lies on the North Latitude between 9°30 and 10°16 and on the east latitude between 77°15' and 78°25'. The geographical area of Madurai district is 3,741.73 sq. km.

Total reserve forest area in Madurai Division: 38,000 hectares including 11,000 hectares of the Giant squirrel sanctuary near Sriviliputtur and the eastern and western slopes of Sirumalai hills. Thick forest cover is found on Vasimalaiyan peak (1439 feet) at Elumalai near Usilampatti, the highest in the district and also on Kannadi Parlay at Sirumalai (1390 feet), the second highest peak. Endemic species to the region is Kudhuppi, Kadamba and Marutham. Endangered species are Kongu Ilavam, Kurinji and Kunguliam. Other common trees in the region are Aelampalai, Ala maram, Alingil, Arasa maram, Ayani pala (found only in Alagar

hills), Illupai, kanjaram, konnai, Mamaram, Manjanathi or Nuna maram, Mayirkondrai, Naval, Nirkadambu, Peru maram, Pungamaram and Vedpalai.

### **3.5.1. Study area**

As the proposed project with the extent of 2.02.5 ha has an impact on diversity of flora and fauna of the study area including core area and buffer area of 10 km radius from the periphery of the lease area, a detailed biological study was carried out over the study area. The following methods were applied during the baseline study of flora, fauna and diversity assessment.

### **3.5.2 Objectives of Biological Studies**

The present study was undertaken with the following objectives:

- ❖ To study the likely impact of the proposed mining project on the local biodiversity and to suggest mitigation measures, if required, for vulnerable biota.
- ❖ To assess the nature and distribution of vegetation (Terrestrial and Aquatic) in and around the mining activity.
- ❖ To collect details of flora and fauna, Endemic, Rare, Endangered and Threatened (RET Species) separately from the core and buffer area and to clearly indicate the schedule of fauna present.
- ❖ To prepare the necessary plan along with budgetary provisions for their conservation in consultation with State Forest and Wildlife Department and details furnished, in case of any schedule- I fauna found in the study area.
- ❖ To devise effective management & conservation measures for biodiversity.

### **3.5.3 Site selection criteria**

The core study area is located at Village: Karungalakudi, Taluk: Melur, District: Madurai, Tamil Nadu. The buffer study area comprises of 10 km radius from the proposed rough stone quarry area. Selection of sampling locations was made with the reference to topography, land use, vegetation pattern, etc. The observations were taken on natural vegetation, roadside plantation and non-forest area (agricultural field, in plain areas, village wasteland, etc.) for quantitative representation of different species.

Flora and fauna studies were carried out to assess the list of terrestrial plant and animal species that occur in the core area and the buffer area up to 10 km radius from the project sites. No damage is created to flora and fauna during the sampling. In order to provide representative ecological status for the study area, the 10-km buffer zone has been divided into four quartiles for biodiversity sampling, i.e., NE (Quartile-1), NW (Quartile-2) SW

(Quartile-3) and SE (Quartile-4). Each of the quartiles have been examined for representative flora on randomly sampled quadrats for trees (20x20-m), shrubs (10x10-m) and herbs (2x2-m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

#### **3.5.4 Quadrats Method**

Quadrats of  $20 \times 20\text{m}$  were laid down randomly within core and 5km buffer area; each quadrat was laid to assess the trees ( $>5\text{ cm GBH}$ ) and one,  $10 \times 10\text{m}$  sub-quadrat nested within the quadrat for shrubs. The quadrats were laid randomly to cover the area to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, wildlife areas, natural forest area, avenue plantations, house backyards, etc. In each quadrat individuals belonging to tree ( $20 \times 20\text{m}$ ) and shrub ( $10 \times 10\text{m}$ ) were recorded separately and have been identified on the field. Quadrates sampling methods is given in Figure.3.22. Ecological Survey Location Map (5km Radius) is given in Figure.3.23.



**Figure 3.22 A Schematic diagram of random sampling of flora**

### 3.5.5 Phyto-Sociological Survey Method

Phyto sociological parameters, such as *Density, Frequency, Abundance and Importance Value Index* of individual species (Trees) were determined in randomly placed quadrates of different sizes in the study area. 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 3.22 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

#### 3.5.5.1 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.

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	$H/H_{max}$ $H_{max} = \ln(s) = \text{maximum diversity possible}$ $S = \text{No. of species}$
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

### 3.5.6 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.

#### 3.5.6.1 Flora in Core Zone

As the lease area is entirely composed of massive rock, there are no trees and shrubs around the quarry lease area and there is a low abundance of herbaceous species. The list of herbaceous plants and Diversity Pattern and species richness index it mentioned is given in Table 3.23.to 3.25

#### 3.5.6.2 Flora in Buffer Zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land but presently there are no cultivation. It contains a total of 70 species belonging to 26 families have been recorded from the buffer zone. The floral (70) varieties among them Trees (29), Eleven shrubs (11) and thirty Herbs and Climbers & Creepers & Grasses (30) were identified. The result of buffer zone of flora studies shows that Fabaceae and Poaceae, Cucurbitaceae are the main dominating species in the study area and Diversity Pattern and species richness index it mentioned in Table 3.26. to 3.28

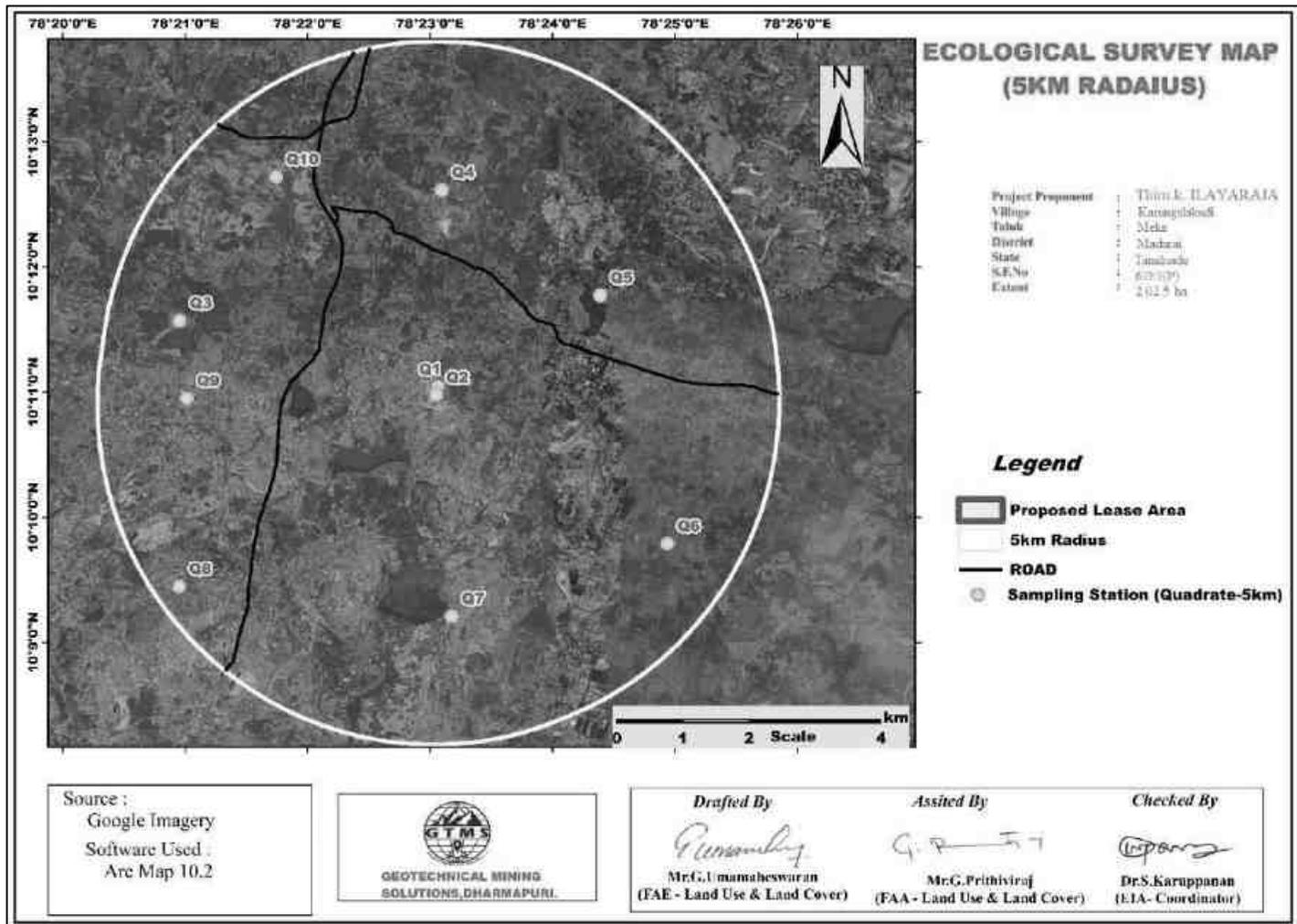


Figure 3.23 Ecological Survey Location Map (5km Radius)

**Table 3.23 Flora in core zone**

HERBS												
S. No	Local Name	Scientific name	Family name									
1	<i>Parttiniyam</i>	<i>Parthenium hysterophorus</i>	<i>Asteraceae</i>	2	1	5	0.4	0.0	0.3	10.0	42.5	52.5
2	<i>Kuppaimeni</i>	<i>Acalypha indica</i>	<i>Euphorbiaceae</i>	3	2	5	0.6	40.0	1.5	17.6	20.0	37.6
3	<i>Kunnakora</i>	<i>Cyperus compressus</i>	<i>Cyperaceae</i>	2	1	5	0.4	20.0	2.0	11.8	10.0	21.8
4	<i>Veetukaayapoond</i>	<i>Tridax procumbens</i>	<i>Asteraceae</i>	3	2	5	0.6	40.0	1.5	17.6	20.0	37.6
5	<i>Nai kadugu</i>	<i>Celome viscosa</i>	<i>Cleomaceae</i>	2	1	5	0.4	20.0	2.0	11.8	10.0	21.8
6	<i>Pullu</i>	<i>Eragrostis ferruginea</i>	<i>Poaceae</i>	3	2	5	0.6	40.0	1.5	17.6	20.0	37.6
7	<i>Korai</i>	<i>Cyperus rotundus</i>	<i>Cyperaceae</i>	2	1	5	0.4	20.0	2.0	11.8	10.0	21.8

**Table 3.24 Calculation of Species Diversity in Core Zone**

S. No	Local Name	Scientific name	Family name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
HERBS							
1	<i>Parttiniyam</i>	<i>Parthenium hysterophorus</i>	Asteraceae	2	0.12	-2.14	-0.25
2	<i>Kuppaimeni</i>	<i>Acalypha indica</i>	Euphorbiaceae	3	0.18	-1.73	-0.31
3	<i>Kunnakora</i>	<i>Cyperus compressus</i>	Cyperaceae	2	0.12	-2.14	-0.25
4	<i>Veetukaayapoond</i>	<i>Tridax procumbens</i>	Asteraceae.	3	0.18	-1.73	-0.31
5	<i>Nai kadugu</i>	<i>Cleome viscosa</i>	Cleomaceae	2	0.12	-2.14	-0.25
6	<i>Pullu</i>	<i>Eragrostis ferruginea</i>	Poaceae	3	0.18	-1.73	-0.31
7	<i>Korai</i>	<i>Cyperus rotundus</i>	Cyperaceae	2	0.12	-2.14	-0.25
H (Shannon Diversity Index) =1.93							

**Table 3.25 Species Richness in (Core Zone)**

Details	H	H max	Evenness	Species Richness (margalef Index)
Herbs	1.93	1.95	0.99	2.12

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
<b>TREE</b>													
1	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	5	4	10	0.50	40.00	1.25	3.88	5.7	9.58	Not Listed
2	Vembu	<i>Azadirachta indica</i>	Meliaceae	5	3	10	0.50	30.00	1.67	3.88	4.3	8.18	Not Listed
3	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	6	4	10	0.60	40.00	1.50	4.65	5.7	10.35	Not Listed
4	Arai nelli	<i>Phyllanthus acidus</i>	Phyllanthaceae	3	1	10	0.30	10.00	3.00	2.33	1.4	3.73	Not Listed
5	Puliyamaram	<i>Tamarindus indica</i>	Fabaceae	6	3	10	0.60	30.00	2.00	4.65	4.3	8.95	Not Listed
6	Nochi	<i>Vitex negundo</i>	Lamiaceae	3	2	10	0.30	20.00	1.50	2.33	2.9	5.23	Not Listed
7	Moonghil	<i>Bambusa bambo</i>	Poaceae	6	4	10	0.60	40.00	1.50	4.65	5.7	10.35	Not Listed
8	Thailam maram	<i>Eucalyptus tereticornis</i>	Myrtaceae	3	2	10	0.30	20.00	1.50	2.33	2.9	5.23	Not Listed
9	Manga	<i>Mangifera indica</i>	Anacardiaceae	4	1	10	0.40	10.00	4.00	3.10	1.4	4.50	Not Listed
10	Athi	<i>Ficus recemosa</i>	Moraceae	5	3	10	0.50	30.00	1.67	3.88	4.3	8.18	Not Listed
11	Thekku	<i>Tectona grandis</i>	Lamiaceae	4	2	10	0.40	20.00	2.00	3.10	2.9	6.00	Not Listed
12	Kadukkai	<i>Terminalia chebula</i>	Combretaceae	3	1	10	0.30	10.00	3.00	2.33	1.4	3.73	Not Listed
13	Navalmaram	<i>Syzygium cumini</i>	Myrtaceae	5	3	10	0.50	30.00	1.67	3.88	4.3	8.18	Not Listed
14	Pappali maram	<i>Carica papaya L</i>	Caricaceae	3	2	10	0.30	20.00	1.50	2.33	2.9	5.23	Not Listed
15	pongam	<i>Millettia pinnata</i>	Fabaceae	2	1	10	0.20	10.00	2.00	1.55	1.4	2.95	Not Listed
16	Alamaram	<i>Ficus benghalensis</i>	Moraceae	4	3	10	0.40	30.00	1.33	3.10	4.3	7.40	Not Listed
17	Koyya	<i>Psidium guajava</i>	Myrtaceae	5	3	10	0.50	30.00	1.67	3.88	4.3	8.18	Not Listed
18	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	4	2	10	0.40	20.00	2.00	3.10	2.9	6.00	Not Listed
19	Murunga maram	<i>Moringa oleifera</i>	Moringaceae	6	4	10	0.60	40.00	1.50	4.65	5.7	10.35	Not Listed
20	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	7	3	10	0.70	30.00	2.33	5.43	4.3	9.73	Not Listed

21	Kattu Nelli	<i>Phyllanthus emblica</i>	Phyllanthaceae	3	2	10	0.30	20.00	1.50	2.33	2.9	5.23	Not Listed
22	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	5	1	10	0.50	10.00	5.00	3.88	1.4	5.28	Not Listed
23	Vaagai	<i>Albizia lebeck</i>	Fabaceae	4	3	10	0.40	30.00	1.33	3.10	4.3	7.40	Not Listed
24	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	2	1	10	0.20	10.00	2.00	1.55	1.4	2.95	Not Listed
25	Sapota	<i>Manilkara zapota</i>	Sapotaceae	5	2	10	0.50	20.00	2.50	3.88	2.9	6.78	Not Listed
26	seethapazham	<i>Annona reticulata</i>	Annonaceae	6	3	10	0.60	30.00	2.00	4.65	4.3	8.95	Not Listed
27	Arasamaram	<i>Ficus religiosa</i>	Moraceae	4	2	10	0.40	20.00	2.00	3.10	2.9	6.00	Not Listed
28	Karivēppilai maram	<i>Murraya koenigii</i>	Rutaceae	6	4	10	0.60	40.00	1.50	4.65	5.7	10.35	Not Listed
29	Vazhaimaram	<i>Musa acuminata</i>	Musaceae	5	1	10	0.50	10.00	5.00	3.88	1.4	5.28	Not Listed
<b>SHRUBS</b>													
1	Avarai	<i>Senna auriculata</i>	Fabaceae	7	6	15	0.47	40.00	1.17	9.21	9.2	18.41	Not Listed
2	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	6	5	15	0.40	33.33	1.20	7.89	7.7	15.59	Not Listed
3	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	5	4	15	0.33	26.67	1.25	6.58	6.2	12.78	Not Listed
4	Thuthi	<i>Abutilon indicum</i>	Meliaceae	8	7	15	0.53	46.67	1.14	10.53	10.8	21.33	Not Listed
5	Sundaika	<i>Solanum torvum</i>	Solanaceae	9	8	15	0.60	53.33	1.13	11.84	12.3	24.14	Not Listed
6	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	6	5	15	0.40	33.33	1.20	7.89	7.7	15.59	Not Listed
7	Neermulli	<i>Hydrophila auriculata</i>	Acanthaceae	5	4	15	0.33	26.67	1.25	6.58	6.2	12.78	Not Listed
8	Thottalchinungi	<i>Mimosa pudica</i>	Fabaceae	7	6	15	0.47	40.00	1.17	9.21	9.2	18.41	Not Listed
9	Kundumani	<i>Abrus precatorius</i>	Apocynaceae	9	8	15	0.60	53.33	1.13	11.84	12.3	24.14	Not Listed
10	Nithyakalyani	<i>Cathranthus roseus</i>	Malvaceae	5	4	15	0.33	26.67	1.25	6.58	6.2	12.78	Not Listed
11	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Apocynaceae	9	8	15	0.60	53.33	1.13	11.84	12.3	24.14	Not Listed
<b>HERBS&amp;CLIMBER &amp;CREEPER &amp;GRASS</b>													
1	Partiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	7	6	20	0.35	30.00	1.17	3.06	3.0	6.06	Not Listed
2	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed
3	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	8	9	20	0.40	45.00	0.89	3.49	4.5	7.99	Not Listed
4	Korai	<i>Cyperus rotundus</i>	Cyperaceae	7	6	20	0.35	30.00	1.17	3.06	3.0	6.06	Not Listed
5	Thumbai	<i>Leucas aspera</i>	Lamiaceae	8	7	20	0.40	35.00	1.14	3.49	3.5	6.99	Not Listed
6	Kunnakora	<i>Cyperus compressus</i>	Cyperaceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed

7	Keelaneeli	<i>Phyllanthus niruri</i>	Phyllanthaceae	4	3	20	0.20	15.00	1.33	1.75	1.5	3.25	Not Listed
8	Kanamvazha	<i>Commelina benghalensis</i>	Commelinaceae	7	6	20	0.35	30.00	1.17	3.06	3.0	6.06	Not Listed
9	Mukurattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed
10	Veetukaayapoondur	<i>Tridax procumbens</i>	Asteraceae	9	8	20	0.45	40.00	1.13	3.93	4.0	7.93	Not Listed
11	Nai kadugu	<i>Celome viscosa</i>	Cleomaceae	7	6	20	0.35	30.00	1.17	3.06	3.0	6.06	Not Listed
12	Manathakkali	<i>Solanumnigrum</i>	Solanaceae	10	9	20	0.50	45.00	1.11	4.37	4.5	8.87	Not Listed
13	umathai	<i>Datura metal</i>	Solanaceae	9	8	20	0.45	40.00	1.13	3.93	4.0	7.93	Not Listed
14	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	7	6	20	0.35	30.00	1.17	3.06	3.0	6.06	Not Listed
15	Kovakkai	<i>Trichosanthes dioica</i>	Cucurbitaceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed
16	Karkakartum	<i>Clitoria ternatea</i>	Fabaceae	9	8	20	0.45	40.00	1.13	3.93	4.0	7.93	Not Listed
17	Sorakkai	<i>Lagenaria siceraria</i>	Cucurbitaceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed
18	Malli	<i>Jasminum augustifolium</i>	Oleaceae	8	7	20	0.40	35.00	1.14	3.49	3.5	6.99	Not Listed
19	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	10	9	20	0.50	45.00	1.11	4.37	4.5	8.87	Not Listed
20	Nannari	<i>Hemidesmus indicus</i>	Apocynaceae	9	8	20	0.45	40.00	1.13	3.93	4.0	7.93	Not Listed
21	Pavarkai	<i>Momordica charantia</i>	Cucurbitaceae	8	7	20	0.40	35.00	1.14	3.49	3.5	6.99	Not Listed
22	Sirupunaikkali	<i>Passiflora foetida</i>	Passifloraceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed
23	Korai	<i>Cyperus rotandus</i>	Cyperaceae	8	7	20	0.40	35.00	1.14	3.49	3.5	6.99	Not Listed
24	Vallikeerai	<i>Ipomoea carnea Jacq</i>	Convolvulaceae	5	4	20	0.25	20.00	1.25	2.18	2.0	4.18	Not Listed
25	Siru puladi	<i>Desmodium triflorum</i>	Fabaceae	7	6	20	0.35	30.00	1.17	3.06	3.0	6.06	Not Listed
26	Elikkathilai	<i>Merremia gangetica</i>	Convolvulaceae	6	5	20	0.30	25.00	1.20	2.62	2.5	5.12	Not Listed
27	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	12	11	20	0.60	55.00	1.09	5.24	5.5	10.74	Not Listed
28	Arugampul	<i>Cynodon dactylon</i>	Poaceae	11	10	20	0.55	50.00	1.10	4.80	5.0	9.80	Not Listed
29	Chevvarakupul	<i>Chloris barbata</i>	Poaceae	8	7	20	0.40	35.00	1.14	3.49	3.5	6.99	Not Listed
30	Korai	<i>Cyperus rotundus</i>	Cyperaceae	9	8	20	0.45	40.00	1.13	3.93	4.0	7.93	Not Listed

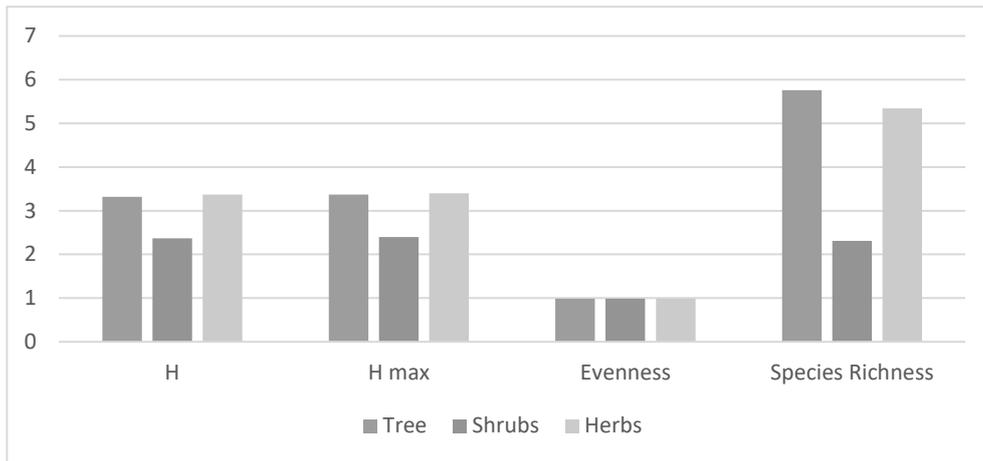
**Table 3.27 Calculation of Species Diversity in Buffer Zone**

S.No	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x In (Pi)
<b>TREE</b>						
1	Thennai maram	<i>Cocos nucifera</i>	5	0.04	-3.25	-0.13
2	Vembu	<i>Azadirachta indica</i>	5	0.04	-3.25	-0.13
3	Karuvelam maram	<i>Vachellia nilotica</i>	6	0.05	-3.07	-0.14
4	Arai nelli	<i>Phyllanthus acidus</i>	3	0.02	-3.76	-0.09
5	Puliyamaram	<i>Tamarindus indica</i>	6	0.05	-3.07	-0.14
6	Nochi	<i>Vitex negundo</i>	3	0.02	-3.76	-0.09
7	Moonghil	<i>Bambusa bambo</i>	6	0.05	-3.07	-0.14
8	Thailam maram	<i>Eucalyptus tereticornis</i>	3	0.02	-3.76	-0.09
9	Manga	<i>Mangifera indica</i>	4	0.03	-3.47	-0.11
10	Athi	<i>Ficus recemosa</i>	5	0.04	-3.25	-0.13
11	Thekku	<i>Tectona grandis</i>	4	0.03	-3.47	-0.11
12	Kadukkai	<i>Terminalia chebula</i>	3	0.02	-3.76	-0.09
13	Navalmaram	<i>Sygygium cumini</i>	5	0.04	-3.25	-0.13
14	Pappali maram	<i>Carica papaya L</i>	3	0.02	-3.76	-0.09
15	pongam	<i>Millettia pinnata</i>	2	0.02	-4.17	-0.06
16	Alamaram	<i>Ficus benghalensis</i>	4	0.03	-3.47	-0.11
17	Koyya	<i>Psidium guajava</i>	5	0.04	-3.25	-0.13
18	Ezhumuchaipalam	<i>Citrus lemon</i>	4	0.03	-3.47	-0.11
19	Murunga maram	<i>Moringa oleifera</i>	6	0.05	-3.07	-0.14
20	Marudaani	<i>Lawsonia inermis</i>	7	0.05	-2.91	-0.16
21	Kattu Nelli	<i>Phyllanthus emblica</i>	3	0.02	-3.76	-0.09
22	Nettilinkam	<i>Polylathia longifolia</i>	5	0.04	-3.25	-0.13
23	Vaagai	<i>Albizia lebbek</i>	4	0.03	-3.47	-0.11
24	Panai maram	<i>Borassus flabellifer</i>	2	0.02	-4.17	-0.06
25	Sapota	<i>Manilkara zapota</i>	5	0.04	-3.25	-0.13
26	seethapazham	<i>Annona reticulata</i>	6	0.05	-3.07	-0.14
27	Arasanmaram	<i>Ficus religiosa</i>	4	0.03	-3.47	-0.11
28	Karivēppilai maram	<i>Murraya koenigii</i>	6	0.05	-3.07	-0.14
29	Vazhaimaram	<i>Musa acuminata</i>	5	0.04	-3.25	-0.13
H (Shannon Diversity Index) =3.32						
<b>SHRUBS</b>						
1	Avarai	<i>Senna auriculata</i>	7	0.09	-2.38	-0.22
2	Erukku	<i>Calotropis gigantea</i>	6	0.08	-2.54	-0.20
3	Kattamanakku	<i>Jatropha curcas</i>	5	0.07	-2.72	-0.18
4	Thuthi	<i>Abutilon indicum</i>	8	0.11	-2.25	-0.24
5	Sundaika	<i>Solanum torvum</i>	9	0.12	-2.13	-0.25
6	Chaturakalli	<i>Euphorbia antiquorum</i>	6	0.08	-2.54	-0.20
7	Neermulli	<i>Hydrophila auriculata</i>	5	0.07	-2.72	-0.18
8	Thottalchinungi	<i>Mimosa pudica</i>	7	0.09	-2.38	-0.22
9	Kundumani	<i>Abrus precatorius</i>	9	0.12	-2.13	-0.25
10	Nithyakalyani	<i>Cathranthus roseus</i>	5	0.07	-2.72	-0.18
11	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	9	0.12	-2.13	-0.25

H (Shannon Diversity Index) =2.37						
HERBS & CLIMBER & CREEPER & GRASS & CATUS						
1	Parttiniyam	<i>Parthenium hysterophorus</i>	7	0.03	-3.49	-0.11
2	Kuppaimeni	<i>Acalypha indica</i>	6	0.03	-3.64	-0.10
3	Thulasi	<i>Ocimum tenuiflorum</i>	8	0.03	-3.35	-0.12
4	Korai	<i>Cyperus rotundus</i>	7	0.03	-3.49	-0.11
5	Thumbai	<i>Leucas aspera</i>	8	0.03	-3.35	-0.12
6	Kunnakora	<i>Cyperus compressus</i>	6	0.03	-3.64	-0.10
7	Keelaneeli	<i>Phyllanthus niruri</i>	4	0.02	-4.05	-0.07
8	Kanamvazha	<i>Commelina benghalensis</i>	7	0.03	-3.49	-0.11
9	Mukurattai	<i>Boerhavia diffusa</i>	6	0.03	-3.64	-0.10
10	Veetukaayapoondur	<i>Tridax procumbens</i>	9	0.04	-3.24	-0.13
11	Nai kadugu	<i>Celome viscosa</i>	7	0.03	-3.49	-0.11
12	Manathakkali	<i>Solanumnigrum</i>	10	0.04	-3.13	-0.14
13	umathai	<i>Datura metal</i>	9	0.04	-3.24	-0.13
14	Kovai	<i>Coccinia grandis</i>	7	0.03	-3.49	-0.11
15	Kovakkai	<i>Trichosanthes dioica</i>	6	0.03	-3.64	-0.10
16	Karkakartum	<i>Clitoria ternatea</i>	9	0.04	-3.24	-0.13
17	Sorakkai	<i>Lagenaria siceraria</i>	6	0.03	-3.64	-0.10
18	Malli	<i>Jasminum augustifolium</i>	8	0.03	-3.35	-0.12
19	Perandai	<i>Cissus quadrangularis</i>	10	0.04	-3.13	-0.14
20	Nannari	<i>Hemidesmus indicus</i>	9	0.04	-3.24	-0.13
21	Pavarkai	<i>Momordica charantia</i>	8	0.03	-3.35	-0.12
22	Sirupunaikkali	<i>Passiflora foetida</i>	6	0.03	-3.64	-0.10
23	Korai	<i>Cyperus rotandus</i>	8	0.03	-3.35	-0.12
24	Vallikeerai	<i>Ipomoea carnea Jacq</i>	5	0.02	-3.82	-0.08
25	Siru puladi	<i>Desmodium triflorum</i>	7	0.03	-3.49	-0.11
26	Elikkathilai	<i>Merremia gangetica</i>	6	0.03	-3.64	-0.10
27	Pullu	<i>Eragrostis ferruginea</i>	12	0.05	-2.95	-0.15
28	Arugampul	<i>Cynodon dactylon</i>	11	0.05	-3.04	-0.15
29	Chevvarakupul	<i>Chloris barbata</i>	8	0.03	-3.35	-0.12
30	Korai	<i>Cyperus rotundus</i>	9	0.04	-3.24	-0.13
H (Shannon Diversity Index) =3.37						

**Table 3.28 Species Richness in (Buffer Zone)**

Details	H	H max	Evenness	Species Richness (margalef Index)
Tree	3.32	3.37	0.99	5.76
Shrubs	2.37	2.40	0.99	2.31
Herbs	3.37	3.40	0.99	5.34



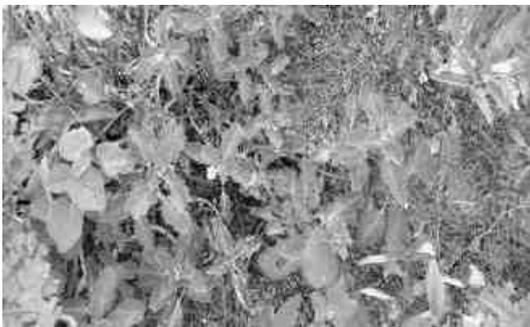
**Figure 3.24 Floral diversity species Richness (Index) in core and buffer zone**



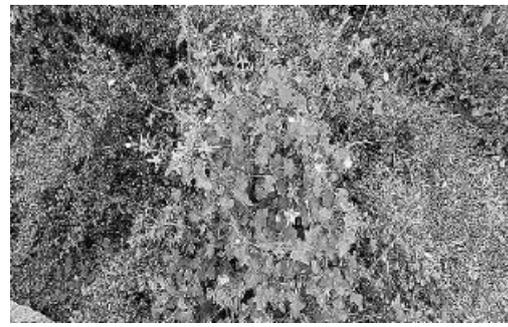
*Cereus hexagonus*



*Tephrosia purpurea*



*Pedalium murex L.*



*Solanum procumbens*



*Azadirachta indica*



*Tamarindus indica*



*Sida acuta* Burm



*Ipomoea carnea* Jacq



*Celosia cristata*



*Hibiscus vitifolius*



*Boerhavia erecta*



*Plectranthus amboinicus*



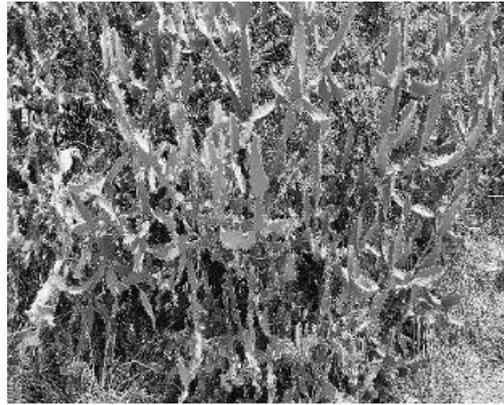
*Cyperus iria* L



*Moringa oleifera*



*Catharanthus roseus*



*Euphorbia cooperi*



*Calotropis gigantea*



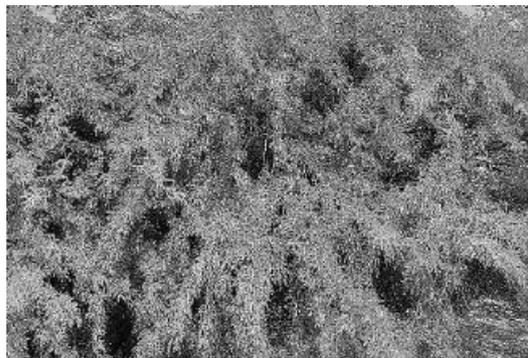
*Thespesia populnea*



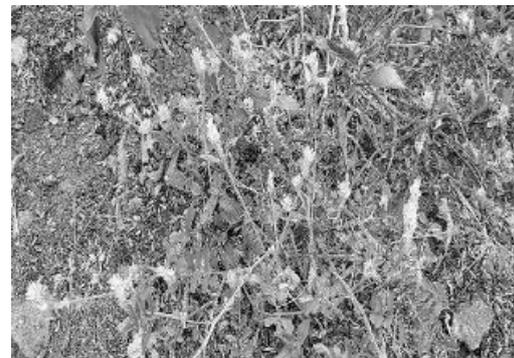
*Hyptis suaveolens*



*Borassus flabellifera*



*Prosopis juliflora*



*Gomphrena celosioides*



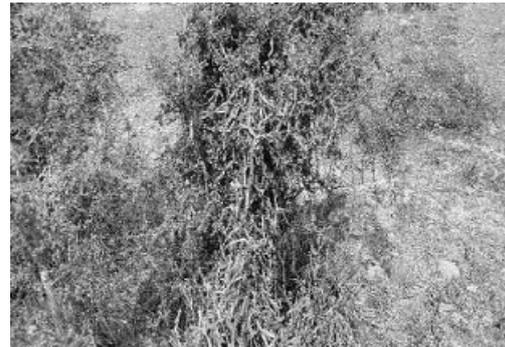
*Faidherbia albida*



*Opuntia dillenii*



*Drimia altissima*



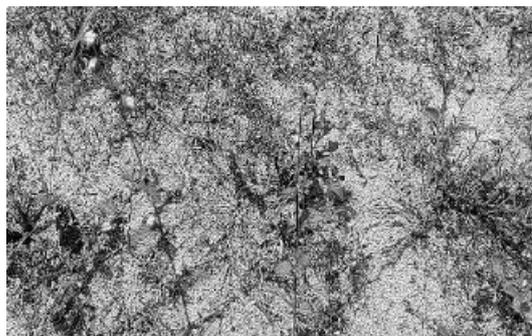
*Cissus quadrangularis*



*Senna sophora*



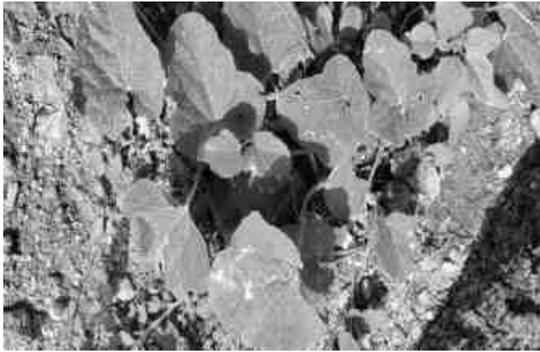
*Cassia roxburghii*



*Waltheria indica*



*Parthenium hysterophorus* L.



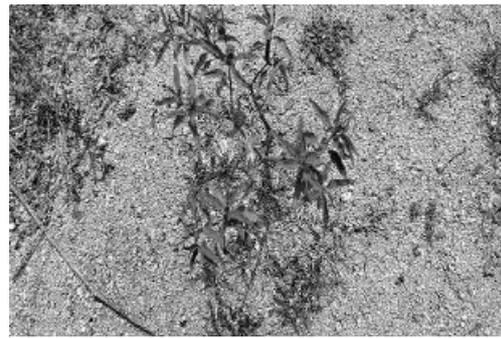
*Cucumis melo*



*Muhlenbergia lindheimeri* Hitchc



*Cissus quadrangularis*



*Croton bonplandianus*



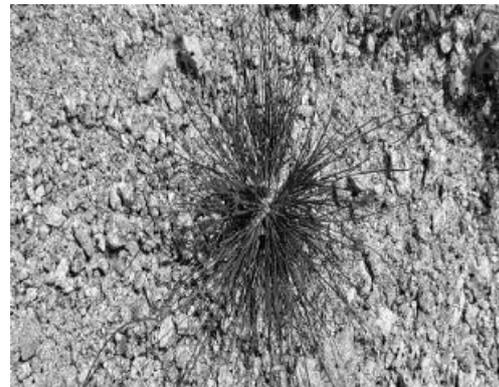
*Phlomis purpurea* L



*Sida cordifolia* L



*tridax procumbens*



*Fimbristylis vahlii*

**Figure 3.25 Flora species observation in the study area**

### 3.5.6.3 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	<i>Eichornia crassipe</i>	Water hyacinth	Agayatamarai	NA
2	<i>Aponogeton natans</i>	Floating lace plant	Kottikizhnagu	NA
3	<i>Carex cruciata</i>	Cross Grass	Koraipullu	NA
4	<i>Cynodon dactylon</i>	Scutch grass	Arugampul	LC
5	<i>Ipomoea carnea</i>	pink morning glory	Alpavardhini	NA

\*LC- Least Concern, NA-Not yet assessed

### 3.5.6.4 Forest Vegetation

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves/ (existing as well as proposed) within 10 km of the mine lease area. Hence submission of clearance from the National Board of Wildlife does not arise. There is no Protected and Reserved Forest area is found within 4km radius from the proposed project area. Eight reserve forests are found in 5 to 10 km radius (Buffer Zone). They are shown in Figure 3.26, List of flora that are commonly found in the forests has been given in Table 3.30.

**Table No.3.30 Vegetation details in the Reserve Forest area**

S.NO	Scientific name	Family Name	RF01	RF02	RF03	RF04	RF05	RF06	RF07	RF08
1	<i>Albizia lebeck</i>	<i>Fabaceae</i>	+	+	+	-	+	+	+	+
2	<i>Albizia amara</i> ,	<i>Fabaceae</i>	+	+	+	+	+	+	+	+
3	<i>Alangium salvifolium</i>	<i>Alangiaceae</i>	+	+	-	+	+	-	+	-
4	<i>Tamarindus indica</i>	<i>Fabaceae</i>	+	+	+	+	+	+	+	+
5	<i>Leucaena leucocephala</i>	<i>Fabaceae</i>	+	+	+	+	+	+	+	+
6	<i>Azadirachta indica</i>	<i>Meliaceae</i>	+	+	+	+	+	+	+	+
7	<i>Diospyros montana</i>	<i>Ebenaceae</i>	+	-	+	+	+	+	-	-
8	<i>Dalbergialanceolaria</i>	<i>Fabaceae</i>	+	+	+	+	+	+	+	+
9	<i>Gyrocarpus americanus</i>	<i>Herandiaceae</i>	+	-	-	+	-	+	+	+
10	<i>Haldina cordifolia</i>	<i>Rubiaceae</i>	+	+	+	-	+	+	-	+
11	<i>Holoptelea integrifolia</i>	<i>Ulmaceae</i>	+	+	+	+	+	+	+	+
12	<i>Lepisanthes tetraphylla</i>	<i>Sapindaceae</i>	+	+	+	+	+	+	+	+
13	<i>Morinda tinctoria</i>	<i>Rubiaceae</i>	+	+	+	+	+	+	+	+
14	<i>Pleiospermium alatum</i>	<i>Rutaceae</i>	+	+	+	+	+	+	+	+
15	<i>Pongamia pinnata</i>	<i>Fabaceae</i>	+	+	+	+	+	+	+	+
16	<i>Prosopis juliflora</i>	<i>Mimosaceae</i>	+	+	+	+	+	+	+	+

17	<i>Strychnos nux-vomica</i>	<i>Loganiaceae</i>	+	+	+	+	+	+	+	+
18	<i>Strychnos potatorum</i>	<i>Loganiaceae</i>	+	+	+	+	+	+	+	+
19	<i>Wrightia tinctoria</i>	<i>Apocyanaceae</i>	+	+	+	+	+	+	+	+
20	<i>Tectonia grandis</i>	<i>Lamiaceae</i>	+	+	+	+	-	+	+	-
21	<i>Peltophorum pterocarpum</i>	<i>Fabaceae</i>	-	+	-	+	+	-	+	-
22	<i>Terminalia Arjuna</i>	<i>Combretaceae</i>	+	+	+	+	-	+	+	-
23	<i>Ziziphus mauritiana</i>	<i>Rhamnaceae</i>	+	-	+	+	+	+	+	+
24	<i>Bambusa arundinacea</i>	<i>Poaceae</i>	+	+	+	+	+	+	+	+
25	<i>Dalbergia lanceolaria</i>	<i>Fabaceae</i>	+	-	+	+	+	-	+	+
26	<i>Syzygium cumini</i>	<i>Myrtaceae</i>	+	+	+	+	+	+	+	+
27	<i>Hardwickia binata</i>	<i>Fabaceae</i>	+	+	+	+	-	+	+	-
28	<i>Lannea coromandelica</i>	<i>Anacardiaceae</i>	-	+	+	+	+	+	+	+
29	<i>Diospyros melanoxylon</i>	<i>Ebenaceae</i>	+	+	+	+	-	+	+	-
30	<i>Trema orientalis</i>	<i>Cannabaceae</i>	+	+	+	+	+	+	+	+
31	<i>Anogeissus latifolia</i>	<i>Combretaceae</i>	+	+	+	-	+	+	+	-
32	<i>Ficus benghalensis</i>	<i>Moraceae</i>	+	-	+	+	+	+	+	+
33	<i>Dalbergia sissoo</i>	<i>Fabaceae</i>	+	+	+	+	-	+	+	+

(+) Present (-) Absent

## List out endangered and endemic species as per the schedule of the Wildlife Protection Act 1972

### 1. Rare and Endangered Flora in the Study Area

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. Among the enumerated flora in the study area, none of them were assigned any threat category.

### 2. Endemic Plants of the Study Area

De Candolle (1855) first used the concept of “**Endemic**”, which is defined as an area of a taxonomic unit, especially a species which has a restricted distribution or habitat, isolated from its surrounding region through geographical, ecological or temporal barriers. Among recorded plant species none are assigned the status of endemic plant of this region.

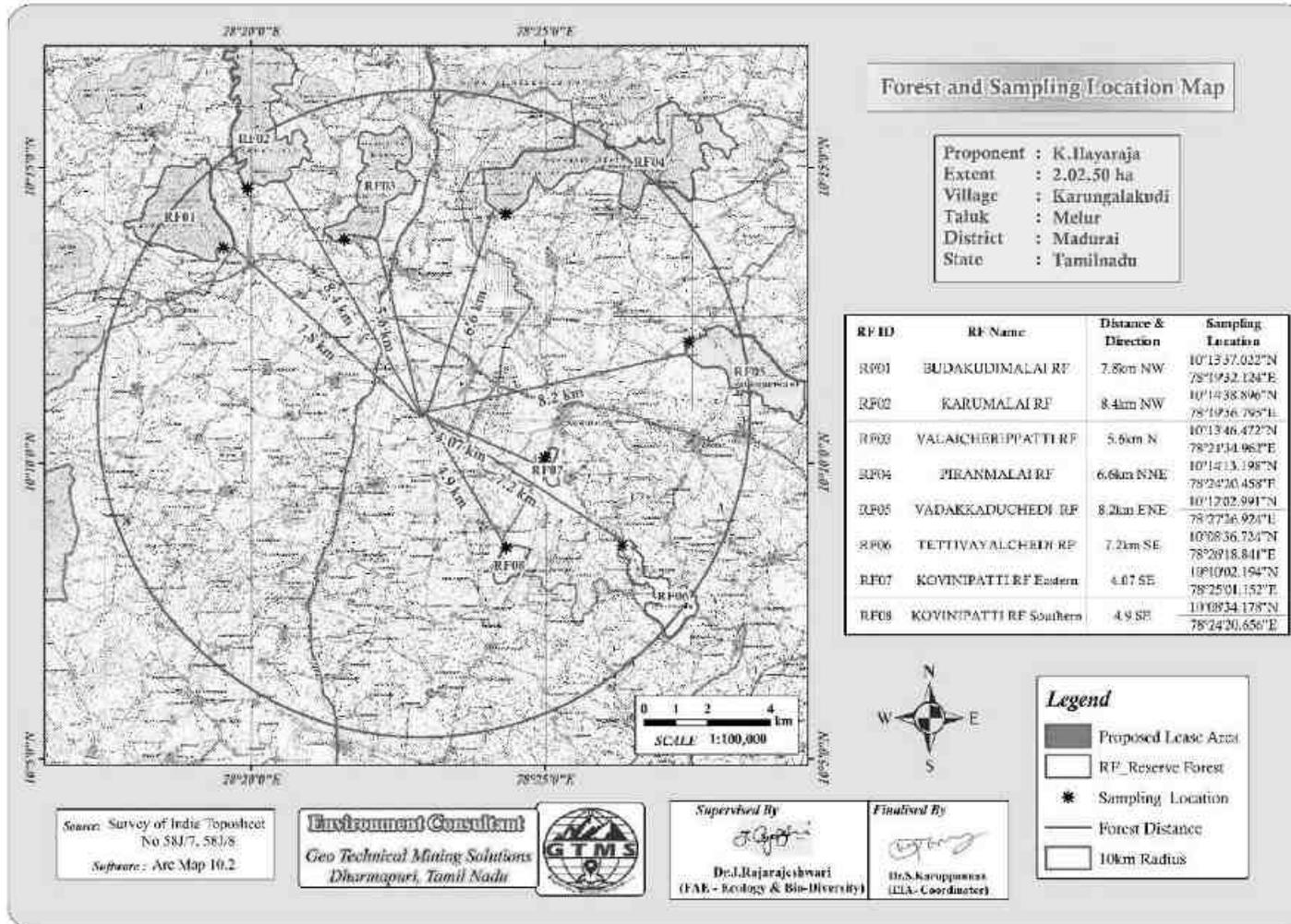


Figure 3.26 Toposheet showing Reserve Forest around 10km Radius from proposed project site

### 3. Enlistment of Vegetation in the buffer zone and core zone

#### 1. Trees:

The species commonly found are *Mangifera indica*, *Madhuca longifolia*, *Tamarindus indica*, *Artocarpus heterophyllus*, *Ficus religiosa*, *Psidium guajava*, *Azadirachta indica*, etc.

#### 2. National Parks/Sanctuaries

As per Ministry of Environment & Forests Notifications there is no wildlife/bird sanctuaries/national parks/ biospheres in 10-km radius from mining lease site. Hence it is not coming under any violation.

#### 3. Biodiversity Hotspots

There is no particular Biodiversity Hotspots in Madurai District. There is no threat to the Flora and Fauna species.

### 4. Agriculture & Horticulture in Madurai District

#### A. Major Agricultural Crops

Major Agricultural Crops cultivated in this district are crops Sorghum, Groundnut, Maize, Cowpea, Rice, Cotton. The most produced crop is Sorghum and the highest productivity is found in Maize. Details of the major crops are given in Table 3.31.

**Table 3.31 Major crops in Madurai District**

S.No	major crops	Scientific name	Families
1	Sorghum	<i>Sorghum bicolor</i>	Grasses
2	Ground nut	<i>Arachis hypogaea</i>	Legumes
3	Sugarcane	<i>Saccharum officinarum</i>	Grasses

#### B. Horticulture

Horticulture includes cultivation of fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. It also includes plant conservation, landscape restoration, landscape and garden design.

#### C. Major Horticulture Crops

Major horticulture crops cultivated in this district are fruit crops like mango, banana, Sapota, and guava, vegetables like tomato, brinjal, bhendi, chillies, onion and tapioca, spices like turmeric, plantation crops like betel vine and medicinal plants like gloriosa. Details of major field crops and horticulture in Madurai district is given in Table 3.32.

**Table 3.32 Major Field crops & horticulture in Madurai District.**

SI.NO	Common Name	Scientific Name	Family
<b>Major Horticultural Crops</b>			
1	Banana	<i>Musa</i>	Musaceae
2	Mango	<i>Mangifera indica</i>	Anacardiaceae
3	Jack	<i>Artocarpus heterophyllus</i>	Mulberry
4	Guava	<i>Psidium guajava</i>	Myrtle
5	Sapota	<i>Manilkara zapota</i>	Sapotaceae
6	Amla	<i>Phyllanthus emblica</i>	Phyllanthaceae
7	Lemon	<i>Citrus × limon</i>	Rutaceae
8	Papaya	<i>Carica papaya</i>	Caricaceae
<b>Vegetables</b>			
9	Onion	<i>Allium cepa</i>	Amaryllidaceae
10	Tapioca	<i>Manihot esculenta</i>	Spurges
11	Brinjal	<i>Solanum melongena</i>	Nightshade
12	Tomato	<i>Solanum lycopersicum</i>	Nightshade
13	Gourds	<i>Lagenaria siceraria</i>	Cucurbits
14	Bhendi	<i>Abelmoschus esculentus</i>	Mallows
15	Moringa	<i>Moringa oleifera</i>	Moringaceae
<b>Flowers</b>			
16	Jasmine	<i>Jasminum</i>	Jasminaceae
17	Crossandra	<i>Crossandra infundibuliformis</i>	
18	Crysanthimum	<i>Asteraceae</i>	Asteraceae
<b>Spices and Condiments</b>			
19	Chillies	<i>Capsicum frutescens</i>	Solanaceae
20	Turmeric	<i>Curcuma longa</i>	Zingiberaceae
21	Tamarind	<i>Tamarindus indica</i>	Legumes
22	Curry leaf	<i>Murraya koenigii</i>	Rutaceae
<b>Plantation Crops</b>			
23	Cashew	<i>Anacardium occidentale</i>	Cashews
24	Cocoa	<i>Theobroma cacao</i>	Mallows

**3. Biodiversity Hotspots**

There are no particular Biodiversity Hotspots in the study area. There is no threat to the Flora and Fauna species.

**3.5.7 Fauna**

The faunal survey has been carried out as per the methodology cited and listed out Mammals, Birds, Reptiles, Amphibians and Butterflies. All the listed species were compared with Red Data Book and Indian Wildlife Protection Act, 1972. There are no rare, endangered, threatened (RET) and endemic species present in core area

### **3.5.7.1 Fauna Methodology**

The study of fauna takes substantial amount of time to understand the specific faunal characteristics of the area. The assessment of fauna has been done on the bases of primary data collected from the lease sites. 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 peoples were another source of information for studying the fauna of the area. Field activities are physical/active search, covering rocks, burrows, hollow inspection and location of nesting sites and habitat assessment etc. Taxonomical identification was done by the field guide book and wildlife ENVIS data base ([wiienvis.nic.in/Database/Schedule Species Database](http://wiienvis.nic.in/Database/ScheduleSpeciesDatabase)) and Zoological Survey of India (ZSI).

#### ***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 50m radius are recorded for 5min. This observation is repeated in another point at least 30m from the first point. We have enumerated 20-point counts in each quartile, which constitute a total of 80-point counts (20 x 4) within 10 km radius area. Opportunistic bird sightings: while traveling in study area, many bird species will be detected in survey time. Such species are recoded by their appearance or by their call.

#### ***Survey and monitoring of reptiles***

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

interval of 1 km. Further, amphibians and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts.

### 3.5.7.2 Fauna in Core Zone

A total of 15 varieties of species observed in the Core zone of Karungalakudi Village, Rough stone (Table 3.33) among them numbers of Insects 6(37%), Reptiles 3 (14%), Avian 6 (38%). A total of 15 species belonging to 12 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 3 species are under schedule IV according to Indian wild life Act 1972. A total six species of bird were sighted in the mining lease area. Dominant species are mostly birds and insects and no amphibians were observed during the field visit. 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. 3.33

**Table 3.33 Fauna in Core Zone**

Sl. No	Common name/English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	IUCN Red List data
<b>INSECTS</b>					
1	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	NL	NL
2	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
3	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
4	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
5	Stick insect	Lonchodidae	<i>carausius morosus</i>	NL	LC
6	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
<b>REPTILES</b>					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
2	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
3	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
<b>AVES</b>					
1	Asian green bee-eater	Meropidae	<i>Meropsorientalis</i>	NL	LC

2	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
3	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
4	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
5	Koel	Cucalidae	<i>Eudynamys scolopaceus</i>	Schedule IV	LC
6	Crow Pheasant	Cucalidae	<i>Centropus sinensis</i>	Schedule IV	LC

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

### 3.5.7.3 Fauna in Buffer Zone

Taxonomically a total of 41 species belonging to 28 families have been recorded from the buffer mining lease area. Based on habitat classification the majority of species were Birds 13(35%) followed by Insects 7 (20%), Reptiles 9 (19%), Mammals 3 (6%) and, Amphibians 3 (6%). Aves 15(40%) There are 2 Schedule II species and 24 are under schedule IV according to Indian wild life Act 1972. A total 15 species of bird were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Dominant species are mostly birds and insects and three amphibians were observed during the extensive field visit (*Hoplobatrachus tigerinus*), (*Rana hexadactyla*), (*Sphaerotheca breviceps*). The result of core & Buffer zone of fauna studies shows that Nymphalidae and Agamidae, are the main dominating species in the study area, it is mentioned in Tables 3.33 and 3.34 There is no schedule I Species in study area. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of faunal diversity in buffer zone are given in Table.3.34

**Table 3.34 Fauna in Buffer Zone**

S. No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
<b>INSECTS</b>					
1	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
3	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
4	Common Indian crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
5	Green marsh hawk	Libellulidae	<i>Orthetrum sabina</i>	NL	LC

6	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
7	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
8	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
9	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
10	Lesser grass blue	Lycaenidae	<i>Zizina Otis indica</i>	Schedule IV	LC
11	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
12	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
13	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
<b>REPTILES</b>					
1	Chameleon	Chamaeleonidae	<i>Chameleon zeylanicus</i>	Sch II (Part II)	LC
2	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
3	Green Vine snake	Colubridae	<i>Ahaetulla nasuta</i>	Schedule IV	LC
4	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
5	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
6	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
7	Indian cobra	Elapidae	<i>Naja naja</i>	Schedule IV	LC
<b>MAMMALS</b>					
1	Indian palm squirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
2	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
3	Home mouse	Muridae	<i>Mus musculus tytleri</i>	NL	LC
<b>AVES</b>					
1	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
2	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
3	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
4	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotuscafer</i>	Schedule IV	LC
5	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
6	Asian green bee-eater	Meropidae	<i>Meropsorientalis</i>	NL	LC
7	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC
8	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
9	Blue Rock Pigeon	Columbidae	<i>Columba livia</i>	Schedule IV	LC
10	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC
11	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
12	Small blue Kingfisher	Alcedinidae	<i>Alcedo atthis</i>	Schedule IV	LC
13	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	NL	LC
14	Grey Francolin	Phasianidae	<i>Francolinus pondicerianus</i>	Schedule IV	LC

15	Two-tailed Sparrow	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
<b>AMPHIBIANS</b>					
1	Indian Burrowing frog	Dicroglossidae	<i>Sphaerotheca breviceps</i>	Schedule IV	LC
2	Green Pond Frog	Ranidae	<i>Rana hexadactyla</i>	Schedule IV	LC
3	Tiger Frog	Chordata	<i>Hoplobatrachus tigerinus</i> ( <i>Rana tigerina</i> )	Schedule IV	LC

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

**As per ToR No. 16,**

Out of the total mine lease area of 2.02.5ha, just about 1.49.00ha is proposed to be used for mining activity during the first five years as per the mining plan. Blasting, noise and vibrations and other disturbances including dust generation are likely to have an adverse impact on wildlife. But these impacts are unlikely to extend beyond 500 m from the actual mine lease area. There are 2 Schedule II species and 24 species are under schedule IV according to Indian wild life Act 1972. A total 15 species of bird were sighted in the buffer zone area. There are no critically endangered, endangered, vulnerable and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

**As per ToR No. 17,**

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves/ (existing as well as proposed) within 10 km of the mine lease area. Hence submission of clearance from the National Board of Wildlife does not arise.

**As per ToR No. 18,**

A detailed biological study of the study area [core zone and buffer zone of 10 km radius of the periphery of the mine lease] has been carried out and the results are presented under ToR point No.15 in Tables 3.33 to 3.34. There are four Schedule II species and 24 species are under schedule IV according to Indian wild life Act 1972. A total 15 species of bird were sighted in the study area. The main threat to the bird is the use of pesticides in agriculture. There is no endangered, endemic and RET Species. There is no Schedule I species in study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] The proposed project is not going to have any direct or indirect adverse impact on the species mentioned above.

#### **3.5.7.4. Rare and Endangered fauna of the study area**

##### **1. As per Indian Wild Life (Protection) Act, 1972,**

Wild Life (Protection) Act, 1972, as amended on 17<sup>th</sup> January 2003, is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country. Some of the sighted faunas were given protection by the Indian Wild Life (Protection) Act, 1972 by including them in different schedules. Here no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species.

##### **2. As per IUCN RED (2013) List,**

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. Among reported species Schedule II and IV in the buffer zone are presented below,

###### **1. Schedule II species**

✚ Chameleon, Rat snake, Saw scaled viper, Russell's viper.

###### **2. Schedule IV species**

✚ Green Pond Frog, Indian Burrowing frog, Black drongo, Red-vented Bulbul, Koel, Indian Field Mouse, Indian palm squirrel, Lesser grass, Common Indian crow, striped tiger, Common Tiger, Blue tiger, Tawny coster, Indian wall lizard, Indian pond heron, Grey Heron etc.,

#### **3.5.8 Results and Discussion**

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 and no species in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory of flora and fauna of terrestrial ecosystem within 10 km radius from the boundary of the proposed quarry site. Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any.



**Figure 3.27 Baseline study field Photographs**

### **3.6 SOCIO-ECONOMIC ENVIRONMENT**

Socio-economic study is an essential part of environmental study. It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and, occupation, water supply, communication, transportation, prevailing diseases pattern as well as features like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

It is expected that the socio-economic status of the area will substantially improve because of this proposed project. As the proposed project will provide direct and indirect

employment and improve the infrastructural facilities in that area, thus leading to the improvement of their standard of living.

### **3.6.1 Objectives of the Study**

The objectives of the socio-economic study are as follows:

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

### **3.6.2 Scope of Work**

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

### **3.6.3 District Profile**

Madurai district of Tamil Nadu has total population of 3,038,252 as per the Census 2011. Out of which 1,526,475 are males while 1,511,777 are females. In 2011 there were total 794,887 families residing in Madurai district. The Average Sex Ratio of Madurai district is 990. As per Census 2011 out of total population, 60.8% people live in urban areas while 39.2% lives in the rural areas. The average literacy rate in urban areas is 89.4% while that in the rural areas is 74.1%. Also, the Sex Ratio of Urban areas in Madurai district is 996 while that of rural areas is 982. The population of Children of age 0-6 years in Madurai district is 313978 which is 10% of the total population. There are 162517 male children and 151461 female children between the ages 0-6 years. Thus, as per the Census 2022 the Child Sex Ratio of Madurai is 932 which is less than Average Sex Ratio (990) of Madurai district. The total literacy rate of Madurai district is 83.45%. The male literacy rate is 80.17% and the female literacy rate is 69.43% in Madurai district.

### **3.6.4 Socio-Economic Status of Study area**

Karungalakudi is a large village located in Melur Taluka of Madurai district, Tamil Nadu with total 1708 families residing. The Karungalakudi village has population of 6842 of which 3475 are males while 3367 are females as per Population Census 2011. In Karungalakudi village population of children with age 0-6 is 738 which makes up 10.79 % of total population of village. Average Sex Ratio of Karungalakudi village is 969 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Karungalakudi as per census is 813, lower than Tamil Nadu average of 943. Karungalakudi village has lower literacy rate compared to Tamil

Nadu. In 2011, literacy rate of Karungalakudi village was 77.79 % compared to 80.09 % of Tamil Nadu. In Karungalakudi Male literacy stands at 85.20 % while female literacy rate was 70.29 %. As per constitution of India and Panchayati Raaj Act, Karungalakudi village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Karungalakudi village.

**Table 3.35 Karungalakudi village Population Facts**

Number of Households	1,708
Population	6,842
Male Population	3,475
Female Population	3,367
Children Population	738
Sex-ratio	813
Literacy	77.79%
Male Literacy	85.20%
Female Literacy	70.29%
Scheduled Tribes (ST)	0
Scheduled Caste (SC)	996

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

**Table 3.36 Demographics Population of Karungalakudi village**

Total Population	Male Population	Female Population
6,842	3,475	3,367

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

#### 3.6.4.1 Literacy of Karungalakudi Village

Karungalakudi village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Karungalakudi village was 77.79 % compared to 80.09 % of Tamil Nadu. In Karungalakudi Male literacy stands at 85.20 % while female literacy rate was 70.29 %.

#### 3.6.4.2 Worker's profile of Karungalakudi village

Karungalakudi village out of total population, 2957 were engaged in work activities. 96.31 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 3.69 % were involved in Marginal activity providing livelihood for less than 6 months. Of 2957 workers engaged in Main Work, 332 were cultivators (owner or co-owner) while 1527 were Agricultural labourer.

**Table 3.37 Karungalakudi Village Working Population**

Type	Total	Male	Female
Main Worker	2,848	-	-
Marginal Workers	109	64	45

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

**Table 3.38 Population and literacy data of study area**

S.No	Village Name	No of Households	Total Population Person	Total Population Male	Total Population Female	Population in the age group 0-6 Person	Population in the age group 0-6 Male	Population in the age group 0-6 Female	Scheduled Castes population Person	Scheduled Castes population Male	Scheduled Castes population Female	Scheduled Tribes population Person	Scheduled Tribes population Male	Scheduled Tribes population Female	Literates Population Person	Literates Population Male	Literates Population Female
1	Ayyapatti	1230	4934	2470	2464	579	294	285	356	170	186	0	0	0	2965	1781	1184
2	Chokkalingapuram	1934	7887	3963	3924	909	459	450	744	356	388	0	0	0	5391	3090	2301
3	Chokkampatti	743	2789	1325	1464	292	146	146	286	138	148	0	0	0	1684	940	744
4	Karungalakudi	1708	6842	3475	3367	738	407	331	995	504	491	0	0	0	4748	2614	2134
5	Kottampatti	1375	5406	2716	2690	531	275	256	1164	608	556	1	0	1	3959	2229	1730
6	Kunnarampatti	803	3163	1575	1588	356	182	174	558	285	273	0	0	0	1961	1136	825
7	Manappachcheri	1438	5441	2716	2725	578	311	267	611	322	289	0	0	0	3557	2073	1484
8	Pandangudi	255	948	459	489	105	52	53	240	119	121	0	0	0	678	381	297
9	Sukkampatti	301	1107	557	550	105	48	57	36	18	18	0	0	0	701	396	305
10	Tarkakudi	96	349	171	178	33	15	18	160	80	80	0	0	0	244	135	109
11	Tiruchchunai	456	1837	946	891	209	105	104	127	70	57	0	0	0	1147	687	460
12	Vanjinagaram	1216	4824	2422	2402	541	295	246	665	340	325	0	0	0	3063	1754	1309

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

Table 3.39 Educational Facilities & Water & Drainage Facilities Data of Study Area

S. No	Village Name	Govt Primary School (Status)	Govt Vocational Training School/ITI	Primary Health Sub Centre (Numbers)	Tap Water Untreated	River/Canal	Is the Area Covered under Total Sanitation	Telephone(landlines)	Public Bus Service (Status)	Gravel (kuchha) Roads	Commercial Bank (Status)	Agricultural Credit Societies	Self - Help Group (SHG)	Nutritional Centres-Anganwadi Centre	Community Centre with/without TV	Power Supply for Domestic Use
1	Kottampatti	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1
2	Chokkampatti	1	2	1	1	2	1	1	1	1	2	2	1	1	1	1
3	Manappachcheri	1	2	1	1	2	1	1	1	1	2	2	1	1	2	1
4	Tarkakudi	2	2	0	1	2	1	1	2	1	2	2	1	2	2	1
5	Pandangudi	1	2	0	1	2	1	1	1	1	2	2	1	1	2	1
6	Chokkalingapuram	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1
7	Ayyapatti	1	2	2	1	2	2	1	2	1	2	2	1	1	1	1
8	Kunnarampatti	1	2	1	1	2	1	1	1	1	2	1	1	1	2	1
9	Tiruchchunai	1	2	0	1	2	2	1	2	1	2	2	1	1	1	1
10	Karungalakudi	1	2	1	1	2	2	1	1	1	1	2	1	1	1	1
11	Sukkampatti	1	2	1	1	2	1	1	1	1	2	2	1	1	1	1
12	Vanjinagaram	1	2	2	1	2	2	1	2	1	2	2	1	1	2	1

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

**Table 3.40 Worker's profile in the Study Area**

Name	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
Ayyapatti	2652	1526	1126	2599	1499	1100	269	1793	504	2282
Chokkalingapuram	3630	2318	1312	2872	1920	952	352	1166	1270	4257
Chokkampatti	1610	807	803	1383	775	608	394	564	382	1179
Karungalakudi	2957	2005	952	2848	1941	907	332	1527	979	3885
Kottampatti	2339	1559	780	1964	1346	618	429	598	697	3067
Kunnarampatti	1709	935	774	850	606	244	220	365	234	1454
Manappachcheri	2743	1626	1117	1852	1185	667	760	610	453	2698
Pandangudi	490	274	216	241	153	88	23	22	193	458
Sukkampatti	675	377	298	585	371	214	146	334	101	432
Tarkakudi	134	111	23	111	40	58	58	215	40	215
Tiruchchunai	1082	615	467	729	454	275	57	331	321	755
Vanjinagaram	2234	1462	772	1531	1063	468	422	642	446	2590

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

**Table 3.41 Other Facilities in the Study Area**

S. No	Village Name	Tractors	Carts Driven by Animals	Black Topped (pucca) Road	ATM	Commercial Bank	Cooperative Bank	Agricultural Credit Societies	Distribution System Public (PDS)	Mandis/Regular Market	Weekly Haat	Agricultural Marketing Society	Power Supply for Agriculture	Power Supply for Commercial Use	Agricultural Commodities (First)	Manufacturers Commodities (First)	Handicrafts Commodities (First)	FOREST AREA IN HECT	NET AREA SOWN IN HECT AREA
1	Ayyapatti	2	2	1	2	1	1	1	1	2	1	1	1	18	paddy		coconut thatch	0	420.16
2	Chokkalingapuram	2	2	1	2	2	2	2	1	2	2	2	1	18	paddy		palm leave products	0	1384.87
3	Chokkampatti	2	2	1	2	2	2	2	1	2	2	2	1	18	paddy			0	218.6
4	Karungalakudi	2	2	1	2	2	2	2	2	2	2	2	2	0				0	613.18
5	Kottampatti	2	2	1	2	2	2	2	1	2	2	2	1	12	coconut			0	474.96
6	Kunnarampatti	2	2	1	2	1	2	1	1	2	2	2	1	15	coconut		palm leave products	0	474.96
7	Manappachcheri	2	2	2	1	2	2	2	2	1	1	1	2	0				0	321.62
8	Pandangudi	2	2	1	2	2	2	2	1	2	2	2	1	20	paddy	bricks		0	388.9
9	Sukkampatti	2	2	1	2	2	2	1	1	2	2	2	1	15	coconut		palm leave products	0	713.3
10	Tarkakudi	2	2	1	2	1	1	2	1	1	1	2	1	18	paddy			0	589.12
11	Tiruchchunai	2	2	1	2	2	2	2	1	2	2	2	1	18	paddy			0	424.04
12	Vanjinagaram	2	2	1	2	2	2	2	1	2	2	2	1	5	paddy			0	630.97

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

**Table 3.42 Communication & Transport Facilities in the Study Area**

S.NO	Village Name	PO	SPO	PTO	T	PCO	MP	IC/CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Ayyapatti	1	1	1	1	2	1	2	2	2	1	2	1	2	1	1	1	2	1
2	Chokkalingapuram	2	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
3	Chokkampatti	2	1	2	1	1	1	1	2	1	1	2	2	2	1	1	1	2	1
4	Karungalakudi	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	2	1
5	Kottampatti	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
6	Kunnarampatti	2	1	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
7	Manappachcheri	2	1	2	1	2	1	1	2	1	2	2	2	1	1	1	1	2	1
8	Pandangudi	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
9	Sukkampatti	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
10	Tarkakudi	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	1	2	1
11	Tiruchchunai	2	2	2	1	2	1	2	2	2	1	2	1	2	1	1	1	2	1
12	Vanjinagaram	2	1	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	1

<https://censusindia.gov.in/2011census/dchb/DCHB.html>

Abbreviations: PO - Post Office; MP - Mobile Phone Coverage; RS - Railway Station; GR - Gravel Roads; SPO - Sub Post Office; IC / CSC - Internet Cafe/Common Service Centre; NH - National Highways; NWR - Navigate waterways River; PTO - Post & Telegraph office; PCF - Private Courier Facility; SH - State Highways; P - Foot path; T-Telephone (Landline); BS - Public Bus Service; MDR - Major District Road; PCO - Public call office / Mobile; PBS - Private Bus Service; BTR - Black Topped (Pucca Roads).

Note: 1 - Available within the village 2 - Not available

### **3.6.5 Recommendation and Suggestion**

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

### **3.6.6 Summary & Conclusion**

The socio-economic study in the study area gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from a lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

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

### **3.7 TRAFFIC DENSITY**

The traffic survey conducted based on the transportation route of material, the rough stone is proposed to be transported mainly through village Road connecting Madurai-Tiruchirappalli Road (NH-45B) and Kottampatti-thirupathur (SH) Road as shown in Table 3.43 and in Figure 3.28. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

**Table 3.43 Traffic Survey Locations**

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village road	50m North	Village road (Single Lane)
TS2	Madurai-Tiruchirappallai Road (NH-45B)	1.8 km NW	Madurai-Tiruchirappallai Road (NH-45B)
TS3	Kottampatti-thirupathur (SH)	1.8 km NE	Kottampatti-thirupathur (SH)

Source: On-site monitoring by GTMS FAE & TM

**Table 3.44 Existing Traffic Volume**

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	50	150	10	10	72	36	196
TS2	142	426	32	32	164	87	545
TS3	108	324	20	20	127	63	407

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 3.45 Rough Stone Transportation Requirement**

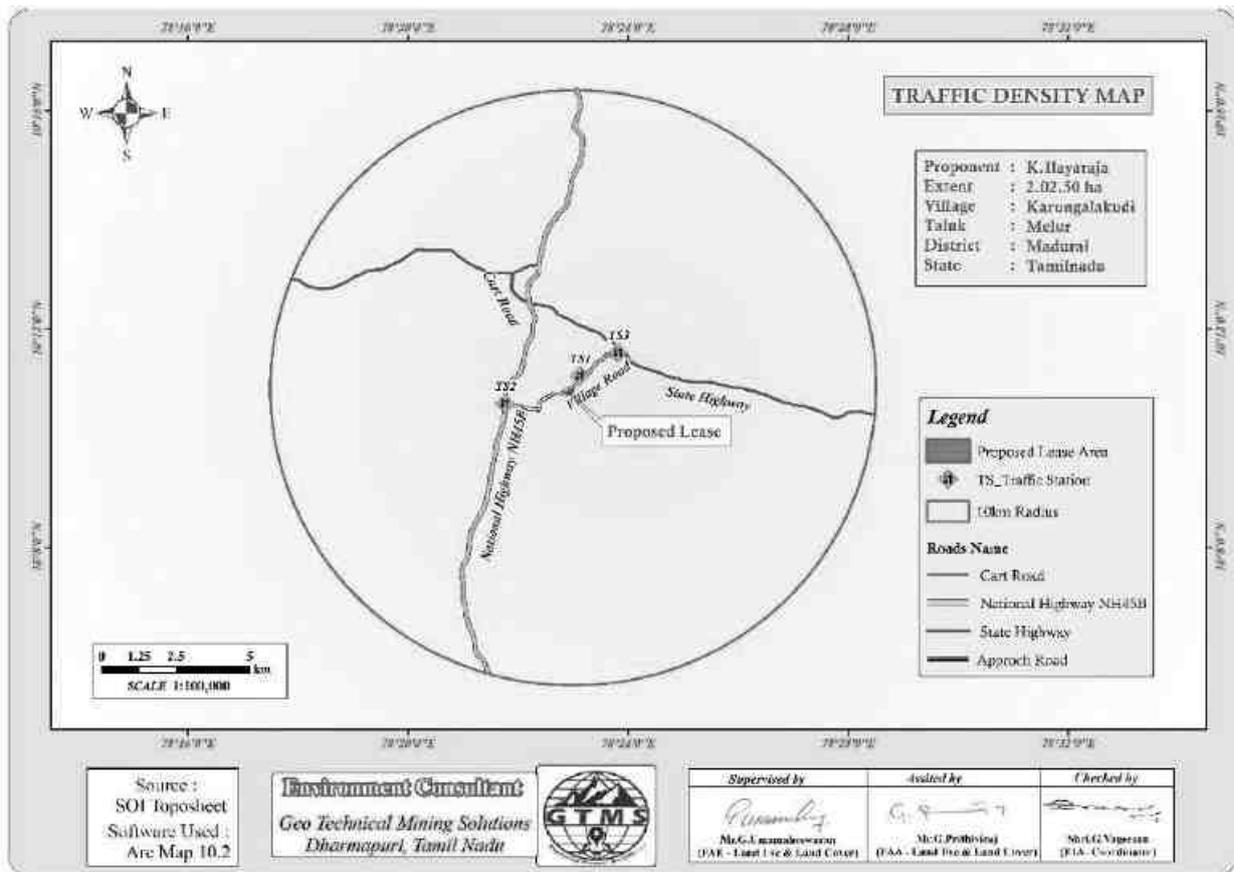
Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	24	72

Source: Approved Mining Plan

**Table 3.46 Summary of Traffic Volume**

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
Village road	196	72	268	1200
Madurai-Tiruchirappallai Road (NH-45 B)	545	72	617	1500
Kottampatti-thirupathur (SH)	407	72	479	1500

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



**Figure 3.28 Traffic Density Map**

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

**3.8 SITE SPECIFIC FEATURES**

There are no Wildlife Sanctuaries, National Park within the project area. There is no Protected and Reserved Forest area is found within 4km radius from the proposed project area. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Table 3.47.

**Table 3.47 Details of Environmentally Sensitive Ecological Features in the Study Area**

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

2	Reserve Forest	Kovinipatti R. F	4.07km SE
		Kovinipatti R. F	4.09km SE
		Valacheripatti R. F	5.6km North
		Piranmalai R. F	6.6km NE
		Budakudimalai R. F	7.8 NW
		Tettivayalchedi RF	7.2km SE
		Vadakkaduchedi R. F	8.2km ENE
		Karumalai R. F	8.4km NW
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Small Pond	0.19km North
		Small Pond	0.13km SW
		Pond	0.23km NE
		Lake	0.57km SW
		Lake	1.43km East
		Odai	0.39km NW
		Odai	0.20km SW
		Odai	0.93km East
		Canal	0.71km SW
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10km radius
5	Critically Polluted Areas	None	Nil within 10km radius
6	Mangroves	None	Nil within 10km radius
7	Mountains/Hills	None	Nil within 10km radius
8	Notified Archaeological Sites	Karungalakudi Jain beds	3.1 km SW
9	Industries/ Thermal Power Plants	None	Nil within 10km radius
10	Defence Installation	None	Nil within 10km radius

Source: Survey of India Toposheet

## 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

Land use pattern study carried out through remote sensing satellite data around the 5km buffer zone shows that 30 % of the study area is crop land and 29 % are fallow land. Scrub Land constitutes 9%, Plantations constitute 20% and Barren land, Dense Forest, Settlements, waterbodies, Mining lands others constitute 12%.

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

#### **4.2 SOIL ENVIRONMENT**

The proposed project centre part of the lease area is covered by thin layer of soil formation and the average thickness is about 0-1m. The soil will be removed during the process of quarrying and preserved in the safety area. The soil thus preserved will be utilized for the purpose of bund construction and afforestation. The impact of mining on the soil environment and the common mitigation measures have been 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 underlying soil horizons that may be less pervious, or more erodible than the surface layers
- ❖ Reduced capacity of soils to absorb rainfall
- ❖ Increased energy in storm-water runoff due to concentration and velocity
- ❖ Exposure of subsurface materials which are unsuitable for vegetation establishment

#### **4.2.2 Common Mitigation Measures from proposed project**

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

### **4.3 WATER ENVIRONMENT**

The total water requirement for this project will be 3.750 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 3.750 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 from Proposed Project**

- ❖ Garland drainage system and settling tank will be constructed along the proposed mining lease area. The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- ❖ Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously 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 Chauhya et al.,2001. The equations used for SPM, SO<sub>2</sub>, and NO<sub>x</sub> emission estimation have been given in Table 4.1.

**Table 4.1 Empirical Formula for Emission Rate from Overall Mine**

	<b>Pollutant</b>	<b>Source Type</b>	<b>Empirical Equation</b>	<b>Parameters</b>
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 <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s).
Overall Mine	SO <sub>2</sub>	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 <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s).

Overall Mine	NO <sub>x</sub>	Area	$E = a \cdot 0.25 \left\{ \frac{u}{4.3 + 32.5u} \right\} [1.5p + \left\{ \frac{b}{0.06 + 0.08b} \right\}]$	u = Wind speed(m/s); p = Mineral production (Mt/yr); b= Overburden handling (Mm <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s).
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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<sub>10</sub> keeping in mind that proper control measures are followed. It is important to note that PM<sub>10</sub> emission rate is derived from the SPM estimation in the background that PM<sub>10</sub> constitutes 52% of SPM emission. The PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub> 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 <sup>2</sup>	Calculated Value (g/s/m <sup>2</sup> )
Overall Mine	PM <sub>10</sub>	0.01110644	20200	5.49824E-07
Overall Mine	PM <sub>2.5</sub>	0.02018784	20200	9.99398E-07
Overall Mine	SO <sub>x</sub>	0.00964282	20200	4.77367E-07
Overall Mine	NO <sub>x</sub>	0.01012673	20200	5.01323E-08

#### 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<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub> 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<sub>10</sub> and PM<sub>2.5</sub> generated by quarrying operation, transportation, and wind erosion of the exposed areas and emissions of sulphur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>) 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 500m 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 4.2-4.5.

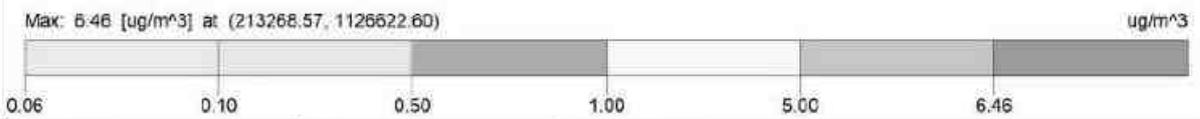
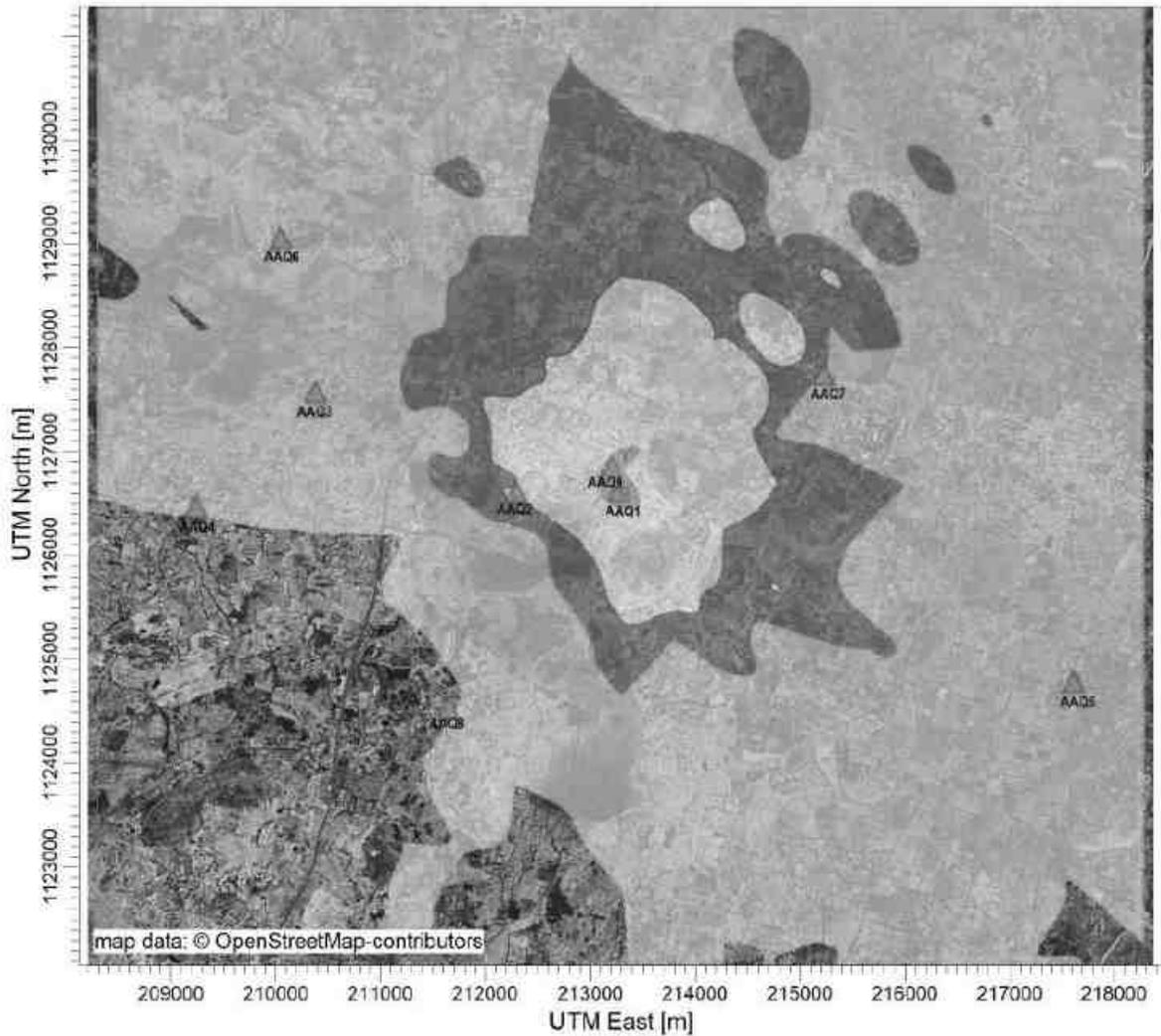
#### 4.4.2.3 Model Results

The post project resultant concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>& NO<sub>x</sub> (GLC) is given in Table 4.5.

**Table 4.3 Incremental & Resultant GLC of PM<sub>10</sub>**

Station ID	Distance to core area (km)	Direction	PM <sub>10</sub> concentrations(µg/m <sup>3</sup> )			Comparison against air quality standard (100 µg/m <sup>3</sup> )	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.1	--	38.57	11.74	50.31	Below standard	30.44	Not significant
AAQ2	0.95	W	36.37	5	41.37	Below standard	13.75	Not significant
AAQ3	3.0	W	36.40	0.5	36.9	Below standard	1.37	Not significant
AAQ4	4.02	W	35.20	0.5	35.7	Below standard	1.42	Not significant
AAQ5	4.66	SE	34.86	0.5	35.36	Below standard	1.43	Not significant
AAQ6	3.96	NW	35.00	1	36	Below standard	2.86	Not significant
AAQ7	2.14	NE	35.60	5	40.6	Below standard	14.04	Not significant
AAQ8	3.55	SW	37.01	0	42.01	Below standard	13.51	Not significant
AAQ9	0.25	N	37.85	11.74	42.85	Below standard	13.21	Not significant

PROJECT TITLE:  
**ILLAYARAJA ROUGHSTONE PROJECT\_PM2.5**

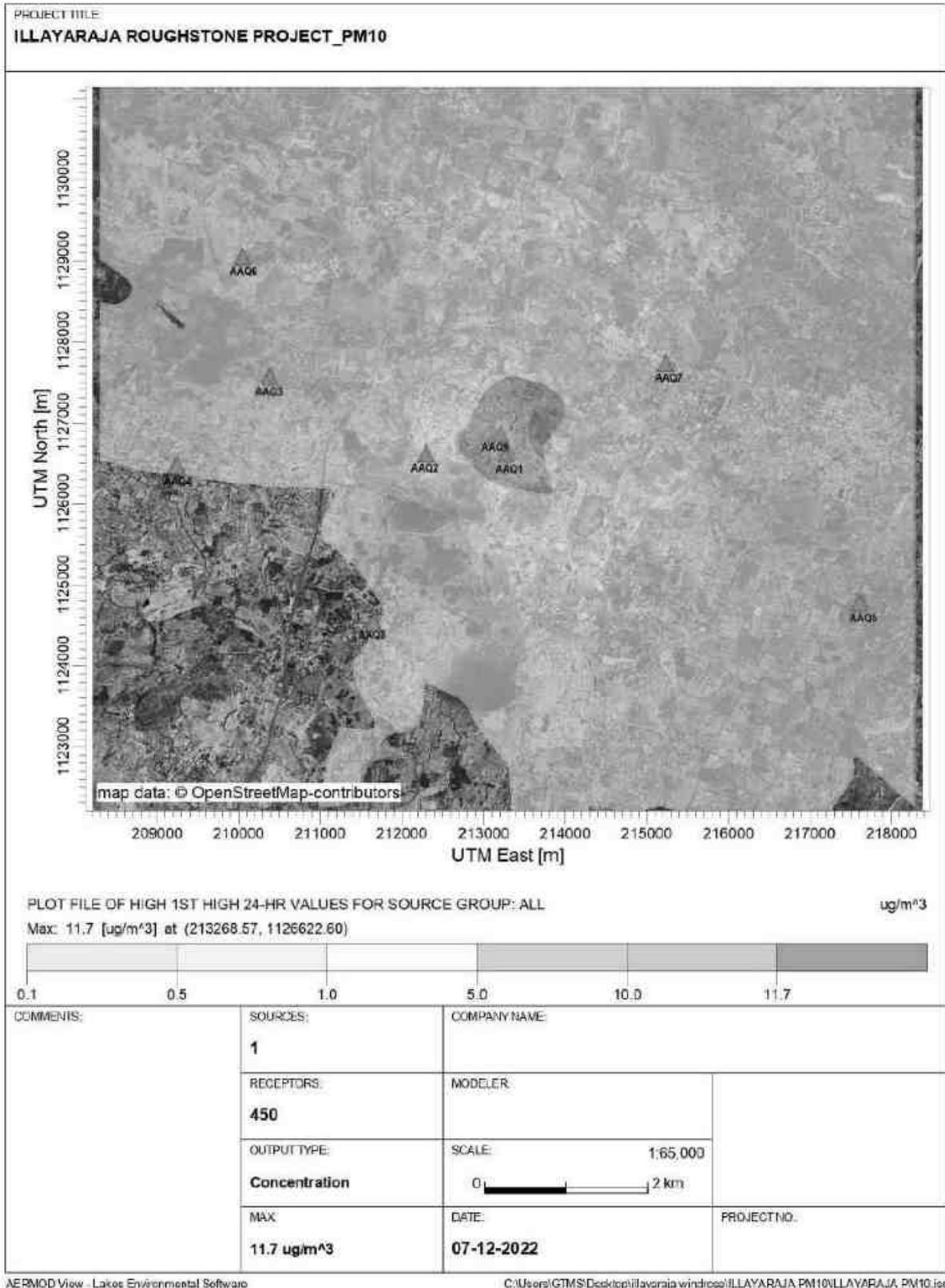


COMMENTS:	SOURCES:	COMPANY NAME:	
	1		
	RECEPTORS:	MODELER:	
	450		
	OUTPUT TYPE:	SCALE:	1:65,000
	Concentration	0  2 km	
	MAX:	DATE:	PROJECT NO.:
	6.46 ug/m <sup>3</sup>	07-12-2022	

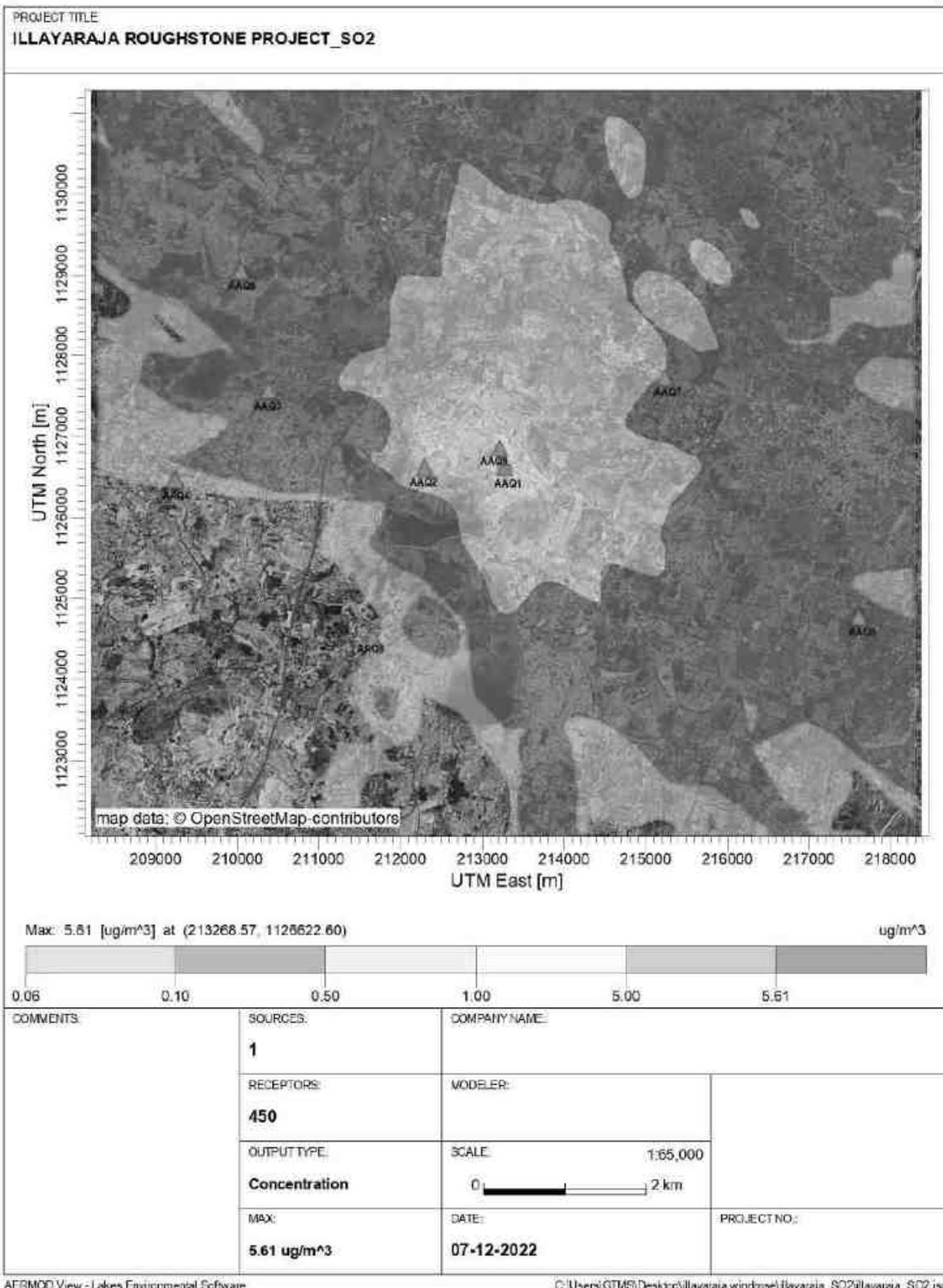
AERMOD View - Lakes Environmental Software

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**Figure 4.1 Predicted Incremental Concentration of PM<sub>2.5</sub>**

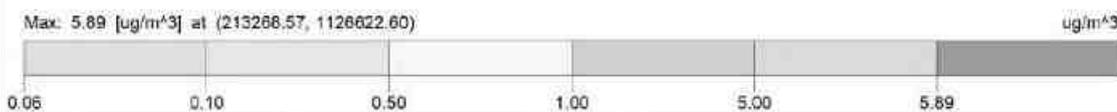
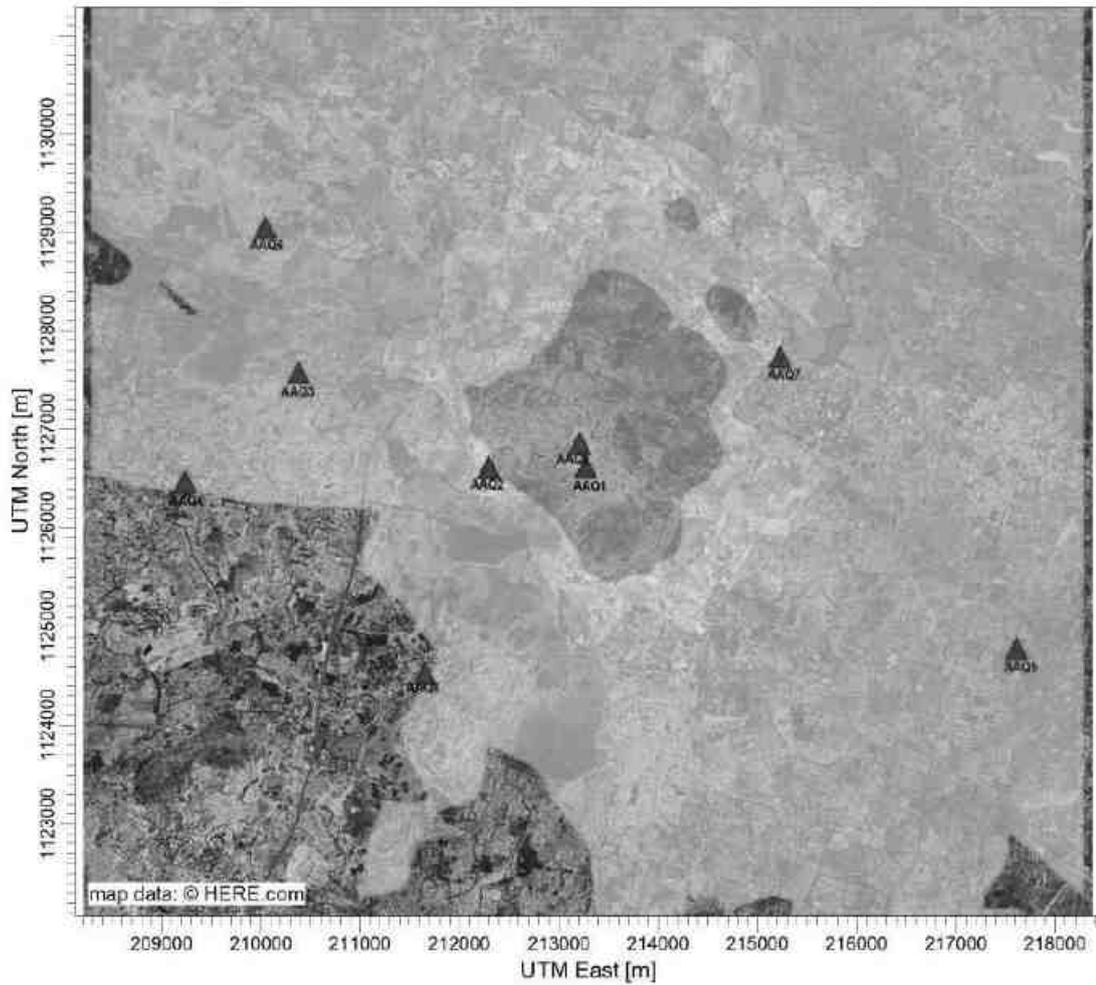


**Figure 4.2 Predicted Incremental Concentration of PM<sub>10</sub>**



**Figure 4.3 Predicted Incremental Concentration of SO<sub>2</sub>**

PROJECT TITLE  
**ILLAYARAJA ROUGHSTONE PROJECT\_NOx**



COMMENTS:	SOURCES:	COMPANY NAME:	
	RECEPTORS:	MODELER:	
	OUTPUT TYPE:	SCALE:	1.65,000
	MAX:	DATE:	PROJECT NO:
	<b>1</b>		
	<b>450</b>		
	<b>Concentration</b>	0  2 km	
	<b>5.89 ug/m<sup>3</sup></b>	<b>07-12-2022</b>	

AERMOD View - Lakes Environmental Software

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**Figure 4.4 Predicted Incremental Concentration of NOx**

**Table 4.4 Incremental and Resultant Glc of Pm<sub>2.5</sub>**

Station ID	Distance to core area (km)	Direction	PM <sub>2.5</sub> concentrations(µg/m <sup>3</sup> )			Comparison against air quality standard (60 µg/m <sup>3</sup> )	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.1	--	24.85	6.46	31.31	Below standard	26.00	Not significant
AAQ2	0.95	W	23.77	5	28.77	Below standard	21.03	Not significant
AAQ3	3.0	W	24.29	0.5	24.79	Below standard	2.06	Not significant
AAQ4	4.02	W	27.29	0.1	27.39	Below standard	0.37	Not significant
AAQ5	4.66	SE	24.41	0.5	24.91	Below standard	2.05	Not significant
AAQ6	3.96	NW	22.42	0.5	22.92	Below standard	2.23	Not significant
AAQ7	2.14	NE	23.83	1	24.83	Below standard	4.20	Not significant
AAQ8	3.55	SW	24.74	0	24.74	Below standard	0.00	Not significant
AAQ9	0.25	N	25.51	6.46	31.97	Below standard	25.32	Not significant

**Table 4.5 Incremental & Resultant GLC of SO<sub>2</sub>**

Station ID	Distance to core area (km)	Direction	SO <sub>2</sub> concentrations(µg/m <sup>3</sup> )			Comparison against air quality standard (80 µg/m <sup>3</sup> )	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.1	--	6.14	5.60	11.74	Below standard	91.21	Not significant
AAQ2	0.95	W	5.43	1	6.43	Below standard	18.42	Not significant
AAQ3	3.0	W	5.89	0.5	6.39	Below standard	8.49	Not significant
AAQ4	4.02	W	6.56	0.1	6.66	Below standard	1.52	Not significant
AAQ5	4.66	SE	5.43	0.5	5.93	Below standard	9.21	Not significant
AAQ6	3.96	NW	5.56	0.5	6.06	Below standard	8.99	Not significant
AAQ7	2.14	NE	5.24	1	6.24	Below standard	19.08	Not significant
AAQ8	3.55	SW	7.28	0	7.28	Below standard	0.00	Not significant
AAQ9	0.25	N	5.53	5	10.53	Below standard	90.42	Not significant

**Table 4.6 Incremental & Resultant GLC of NO<sub>x</sub>**

Station ID	Distance to core area (km)	Direction	NO <sub>x</sub> concentrations(µg/m <sup>3</sup> )			Comparison against air quality standard (80 µg/m <sup>3</sup> )	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.1	--	17.37	5.89	23.26	Below standard	33.91	Not significant
AAQ2	0.95	West	16.22	1	17.22	Below standard	6.17	Not significant
AAQ3	3.0	W	16.58	0.5	17.08	Below standard	3.02	Not significant
AAQ4	4.02	West	17.11	0.1	17.21	Below standard	0.58	Not significant
AAQ5	4.66	SE	18.30	0.5	18.8	Below standard	2.73	Not significant
AAQ6	3.96	NW	16.55	0.5	17.05	Below standard	3.02	Not significant
AAQ7	2.14	NE	15.79	1	16.79	Below standard	6.33	Not significant
AAQ8	3.55	SW	18.86	0	18.86	Below standard	0.00	Not significant
AAQ9	0.25	N	18.03	5.89	23.92	Below standard	32.67	Not significant

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.

### ***Haul Road and Transportation***

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

### ***Green Belt***

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

### ***Occupational Health***

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

## **4.5 NOISE ENVIRONMENT**

Noise pollution is mainly due to operation like drilling, 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.

$$L_{p2} = L_{p1} - 20 \log (r_2/r_1) - A_{e1,2}$$

Where,

$L_{p1}$  &  $L_{p2}$  are sound levels at points located at distances  $r_1$  and  $r_2$  from the source

$A_{e1,2}$  is the excess attenuation due to environmental conditions.

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

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

#### 4.5.1 Anticipated Impact

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 4.6.

**Table 4.7 Activity and Noise Level Produced by Machinery**

S.No.	Machinery / Activity	Impact on Environment	Noise Produced in dB(A) at 50 ft from source*
1	Jack Hammer	Yes	88
2	Compressor	No	81
3	Excavator	No	85
4	Tipper	No	84
<b>Total Noise Produced</b>			<b>91.22</b>

\*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 without blasting is calculated to be 91.22 dB (A). We have considered the value above for noise prediction modelling.

**Table 4.8 Predicted Noise Incremental Values**

<b>Noise Monitoring Location</b>	<b>Distance From Project Site(m)</b>	<b>Baseline Noise Level (dBA)m During Day Time</b>	<b>Predicted Noise Level(dBA)</b>	<b>Total(dBA)</b>
Core	100	40.6	39.38	43.04
Kadampatti	360	38.5	28.25	38.89
Karandipatti	3980	41.4	7.38	41.40
Vettayanpatti	2290	39.8	12.18	39.81
Kannamangalappatti	4650	36.3	6.03	36.30
Karungalakkudi	3550	44.5	8.38	44.50
Poomangalapatti	3010	40.1	9.81	40.10
Kottampatti	4620	43.7	6.09	43.70
Kilnatramangalam	4200	40.4	6.91	40.40
Karuppanan Lease	250	40.8	31.42	41.27
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 39.38 dB (A) in core zone and ranges between 6.03 and 31.42 dB (A) in buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000(The Principal Rules were published in the Gazette of India, vide S.O.123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E),dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment(Protection) Act, 1986.).

**4.5.2 Common Mitigation Measures**

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

- ❖ Usage of sharp drill bits while drilling which will help in reducing noise
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise

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

#### **4.5.3 Ground Vibrations**

As the proposed project is intended for producing dimension stone, the project will use a small quantity of explosives to create fractures in the massive rock and will produce a negligible magnitude of ground vibrations on the surrounding area. Therefore, PPV and its impact and mitigation measures are not discussed for this project.

### **4.6 ECOLOGY AND BIODIVERSITY**

#### **4.6.1 Impact on Ecology and Biodiversity**

The impact on biodiversity is difficult to quantify because of its diverse and dynamic characteristics, mining activities generally result in the deforestation, land degradation, water, air and noise pollution which directly or indirectly affect the faunal and floral status of the project area. However, occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation and technology involved. Impact prediction is the main footstep in impact evaluation and identifies project actions that are likely to bring significant changes in the project environment. The present study was carried out to predict the likely impacts of the proposed project at Karungalakudi village and the surrounding environment with special reference to biological attributes covering habitats/ecosystems and associated biodiversity.

The proposed mining activities include removal of some scattered bushes and other thorny species. Although impacts on key habitat elements will occur on a local scale, but on a regional scale they would not be critical for the life cycle needs of the species observed or expected. Moreover, during conceptual stage, the mined-out areas on the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time. Existing roads will be used; new roads will not be constructed to reduce impact on flora.

Wild life is not commonly found in the project area and its immediate environs because of lack of vegetal cover and surface water. Except few domestic animals, reptiles, hares and some common birds are observed in the study area.

- I. None of the plants will be cut during operational phase of the mine
- II. 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
- III. 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.

#### **4.6.2 Common Mitigation Measures for the Proposed Project**

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested considering the area/site requirements and needed performance of specific species.

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 in the areas falling in the cluster as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

The objectives of the green belt cover will cover the following:

- ❖ Noise abatement
- ❖ Ecological restoration
- ❖ Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

##### **4.6.2.1. Species Recommendation for Plantation Granted in the District**

Following points have been considered while recommending the species for plantation:

- ❖ 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.
- ❖ The following species, as shown in Table 4.9 may be considered primarily for plantation, which are best suited for the prevailing climate condition in the area.

**Table 4.9 Recommended Species for Greenbelt Development Plan**

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

The 7.5m safety distance along the boundary has been identified to be utilized for subsequent Afforestation. However, the afforestation should always be carried out in a systematic and scientific manner. Regional trees like *Azadirachta indica*, *Albizia lebbek* and *Tectona grandis* will be planted along the lease boundary and avenue plantation will be carried out in respective proposed project. The rate of survival expected to be 80% in this area. Afforestation Plan is given in Table 4.10 and budget of green belt development plan are given in Table 4.11.

**Table 4.10 Greenbelt Development Plan**

S. No.	No. of trees proposed for plantation	Survival %	Area to be covered(m <sup>2</sup> )	Name of the species	No. of trees expected to be grown
Plantation in the construction phase (3Months)	Number of plants inside the mine lease area			<i>Azadirachta indica, Albizia lebbek, Delonix regia, Tectona grandis, etc.,</i>	324
	405	80%	3700		
	Number of plants inside the mine lease area			<i>Azadirachta indica, Albizia lebbek, Delonix regia, Tectona grandis, etc.,</i>	486
	608	80%	5500		

**Table 4.11 Budget for Greenbelt Development Plan**

<b>Activity</b>	<b>Plantation in the construction phase(3Months)</b>	<b>Cost</b>	<b>Capital Cost (Rs.)</b>	<b>Recurring Cost-per annum</b>
Plantation inside the mine lease area (in safety margins)	405	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))"	81000	12150
Plantation outside the area	608	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	182250	18225
<b>Total</b>			<b>263250</b>	<b>30375</b>

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**

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

- ❖ Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

#### 4.6.3.1. Measures for Protection and Conservation of Wildlife Species

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

#### 4.6.3.2. Mitigation Measures

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

#### 4.6.4. Impact on Aquatic Biodiversity

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

#### 4.6.5. Impact Assessment on Biological Environment

A detail of impact and assessments was mentioned in Table 4.12.

**Table 4.12 Ecological Impact Assessments**

Sl. No	Attributes	Assessment
1	Activities of the project affects the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in mining lease site. The fauna sighted mostly migrated from buffer area.
2	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species sighted in core mining lease area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	No national park or eco-sensitive zone around 10km radius. A small hill is located about 5.5km on the Northwest side.
4	Proposed project restricts access to waterholes for wildlife	No

5	Proposed mining project impact surface water quality that also provide water to wildlife	No scheduled or threatened wildlife animal sighted regularly core in core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management such as drains is constructed properly so there will be no siltation affect in nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	No
8	The project release effluents into a water body that also supplies water to a wildlife	No water body near to core zone so chances of water become polluted is low.
9	Mining project effect the forest-based livelihood/ any specific forest product on which local livelihood depended	No
10	Project likely to affect migration routes	No migration route observed during monitoring period.
11	Project likely to affect flora of an area, which have medicinal value	No
12	Forestland is to be diverted, has carbon high sequestration	There was no forest land diverted.
13	The project likely to affect wetlands, Fish breeding grounds, marine ecology	Wetland was not present in near core Mining lease area. No breeding and nesting ground present in core mining area.

**Table 4.13 Anticipated Impact of Ecology and Biodiversity**

<b>S. No</b>	<b>Aspect Description</b>	<b>Likely Impacts on Ecology and Biodiversity (EB)</b>	<b>Impact Consequence - Probability Description / Justification</b>	<b>Significance</b>	<b>Mitigation Measures</b>
<b>Pre-Mining Phase</b>					
1	Uprooting of vegetation of lease area	Site specific loss of common floral diversity (Direct impact)	Site possesses common floral (not trees) species. Clearance of these species will not result in loss of flora	Less severe	No immediate action required. However, Greenbelt /plantation will be developed in project site and in periphery of the project
		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.		boundary, which will improve flora and fauna diversity of the project area.
		-Loss of Habitat (Direct impact)	Site does not form Unique / critical habitat structure for unique flora or fauna.		
<b>Mining Phase</b>					
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 <sub>2</sub> , NO <sub>2</sub> , 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 in the area. The proposed mining lease areas have following advantages:

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

#### **5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY**

Open cast 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:

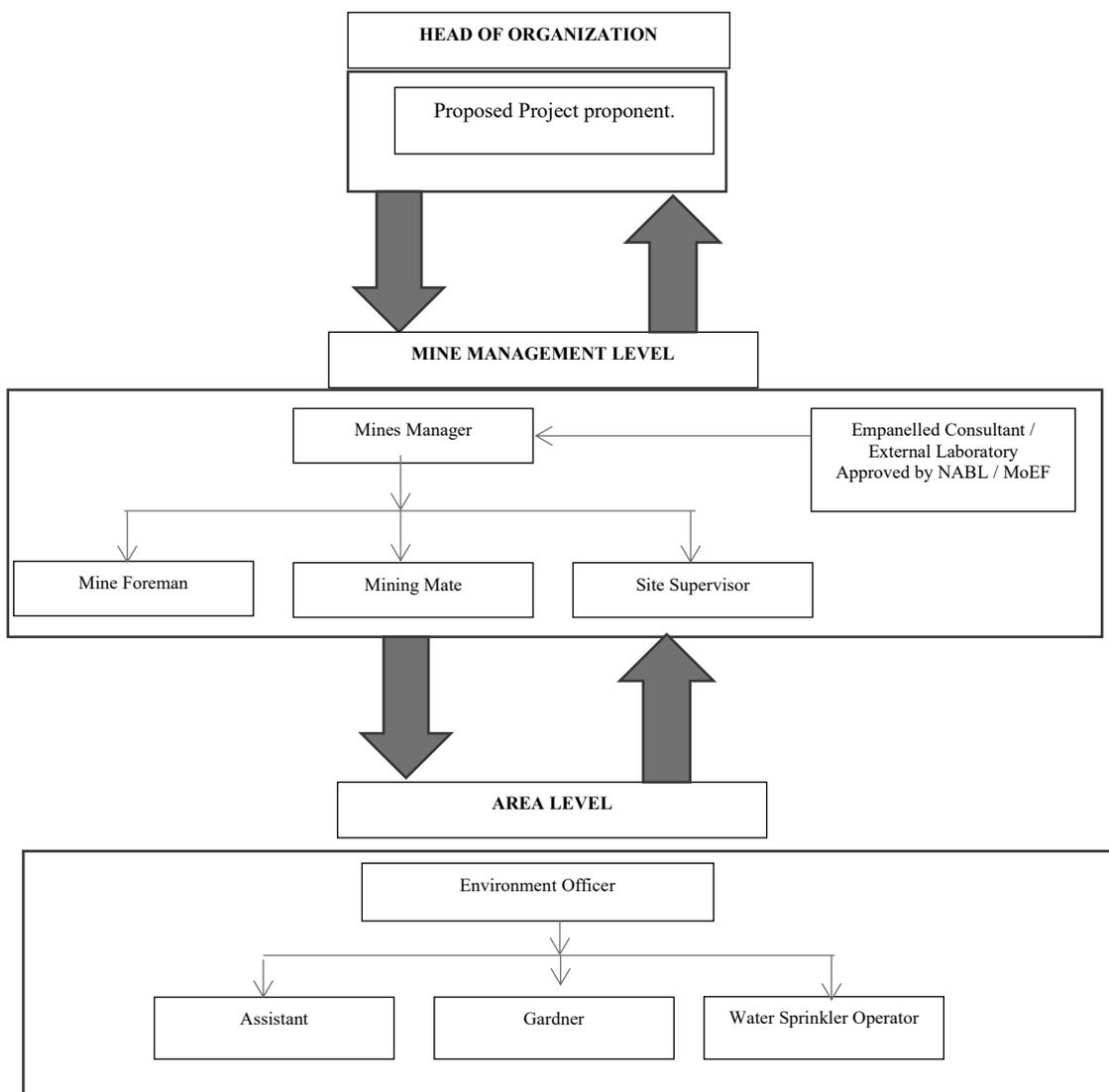
- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care
- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment

- ❖ 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 <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
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/-
<b>Total</b>		-	<b>Rs 2,95,000 /-</b>

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 31<sup>st</sup> 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**

<b>S. No.</b>	<b>Risk factors</b>	<b>Causes of risk</b>	<b>Control measures</b>
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	<ul style="list-style-type: none"> <li>✓ 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.</li> <li>✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited.</li> <li>✓ Fire-fighting and first-aid provisions in the mine office complex and mining area.</li> <li>✓ 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.</li> <li>✓ Working of quarry, as per approved plans and regularly updating the mine plans.</li> <li>✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut.</li> <li>✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager.</li> <li>✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.</li> </ul>
2	Drilling	Improper and unsafe practices; Due to high	<ul style="list-style-type: none"> <li>✓ Safe operating procedure established for drilling (SOP) will be strictly followed.</li> <li>✓ Only trained operators will be deployed.</li> </ul>

		<p>pressure of compressed air, hoses may burst; Drill Rod may break;</p>	<ul style="list-style-type: none"> <li>✓ No drilling shall be commenced in an area where shots have been fired until the blaster foreman has made a thorough Examination of all places,</li> <li>✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other.</li> <li>✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual.</li> <li>✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition.</li> <li>✓ Operator shall regularly use all the personal protective equipment.</li> </ul>
3	Transportation	<p>Potential hazards and unsafe workings contributing to accident and injuries</p> <p>Overloading of material</p> <p>While reversal &amp; overtaking of vehicle</p> <p>Operator of truck leaving his cabin when it is loaded.</p>	<ul style="list-style-type: none"> <li>✓ 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.</li> <li>✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle.</li> <li>✓ Concave mirrors should be kept at all corners</li> </ul>

			<ul style="list-style-type: none"> <li>✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point</li> <li>✓ Loading according to the vehicle capacity</li> <li>✓ Periodical maintenance of vehicles as per operator manual</li> </ul>
4	Natural calamities	Unexpected happenings	<ul style="list-style-type: none"> <li>✓ Escape Routes will be provided to prevent inundation of storm water</li> <li>✓ Fire Extinguishers &amp; Sand Buckets</li> </ul>
5	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	<ul style="list-style-type: none"> <li>✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.</li> </ul>

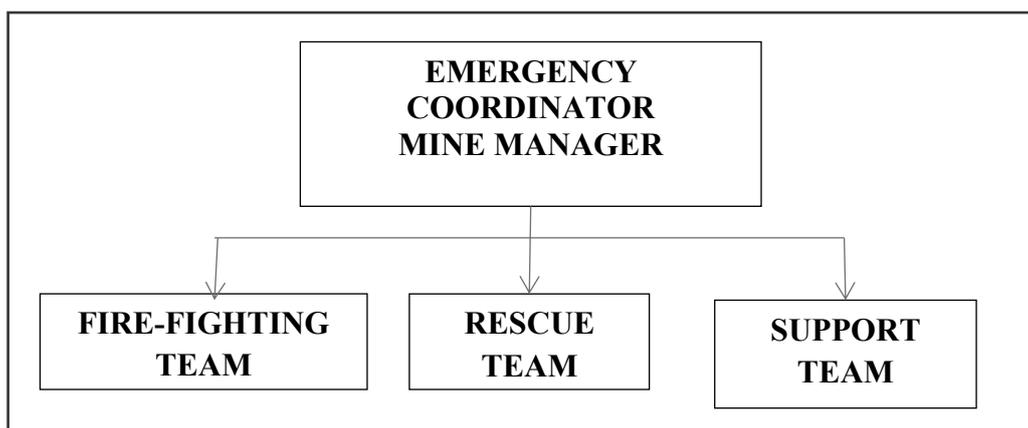
Source: Analysed and Proposed by FAE & EC

### 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 III. 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
<b>FIRE-FIGHTING TEAM</b>	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
<b>RESCUE TEAM</b>	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
<b>SUPPORT TEAM</b>	
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 <sub>2</sub> type, foam type, dry chemical powder type
Fuel Storage Area	CO <sub>2</sub> 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.
- ❖ Handling of explosives, charging are carried out only by qualified persons following SOP.
- ❖ 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 and excavation and transportation activities in all the quarries within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations. For this cumulative study, three proposed projects, known as P1, P2, P3 and one existing quarry project, known as E1 were taken into consideration. Details of P1 have been given in Table 1.2 and the details of P2, P3, in Tables 7.4-7.5.

**Table 7.4 Salient Features of Proposed Project Site “P2”**

Name of the Quarry	K.Ilayaraja Roughstone Quarry
Type of Land	Government Poramboke land
Extent	0.74.0 ha
S.F. No.	63
Toposheet No.	58J/08
Latitude	10°10'53.79"N to 10°10'57.00"N
Longitude	78°22'58.27"E to 78°23'02.00"E
Ultimate Depth of Mining	20 m (10m AGL and 10m BGL)

Ultimate Pit Dimension	Pit 1: 89m(L) X 59 m(W) X 20 m(D)	
Geological Resources	Rough stone (m <sup>3</sup> )	Topsoil(m <sup>3</sup> )
	271160	266
Mineable Reserves	105582	77
Proposed production for 5 years	70165	77
Total No. of Lorry Loads	8 loads of rough stone/day	
Method of Mining	Open cast manual /semi mechanized mining method	
Topography	Undulated Terrain	
Machinery proposed	Jack hammer	2
	Compressor	1
	Excavator	1
	Tipper	3
Proposed Manpower Deployment	26 persons	
Project Cost	Rs. 40,25,000/-	
CER Cost @ 2% of Project Cost	Rs. 500000/-	
Proposed Water Requirement	3.75 KLD	

**Table 7.5 Salient Features of Proposed Project (P3)**

Name of the Quarry	<b>G.Karupapannan Roughstone Quarry</b>	
Toposheet No	58J/08	
Latitude between	10° 10' 53.79"N to 10° 11' 05.41"N	
Longitude between	78° 23' 1.31"E to 78° 23' 6.83"E	
Highest Elevation	174 m AMSL	
Proposed Depth of Mining	21m BGL	
Geological Resources	Rough Stone in m <sup>3</sup>	Top soil in m <sup>3</sup>
	1214510	2952
Mineable Reserves	Rough Stone in m <sup>3</sup>	Top soil in m <sup>3</sup>
	511350	735
Proposed production for 5 years	328975	612
Ultimate Pit Dimension (Proposed)	179m (L) x 105m (W) x 21m (D)	
Water Level in the surrounding area	60 m BGL	

Method of Mining	Opencast semi mechanized mining method	
Topography	The proposed lease area is an elevated terrain with the maximum altitude of 174m AMSL	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Hydraulic Excavator	1
	Tippers	6
Proposed Manpower Deployment	28	
Project Cost	Rs.1,35,54,000/-	
CER Cost @ 2% of Project Cost	Rs 5,00,000/-	
Proposed Water Requirement	3.76 KLD	

Source: Approved Mining Plan & obtained ToR.

#### 7.4.1 Air Environment

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

**Table 7.6 Cumulative Production Load of Rough Stone**

<b>Proposed Production Details</b>				
<b>Quarry</b>	<b>5 Years in m<sup>3</sup></b>	<b>Per Year in m<sup>3</sup></b>	<b>Per Day in m<sup>3</sup></b>	<b>Number of Lorry Load Per Day</b>
P1	215190	43,038	143	24
P2	70165	14,033	47	8
P3	328975	65,795	219	37
<b>Grand Total</b>	<b>614330</b>	<b>122,866</b>	<b>409</b>	<b>69</b>

The cumulative study shows that the overall production of rough stone from the three quarries is 409 m<sup>3</sup> per day with a capacity of 69 trips of rough stone per 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 7.7. The cumulative values resulting from the 3 projects for each pollutant do not exceed the permissible limits set by CPCB.

**Table 7.7 Cumulative Impact Results from the 3 proposed projects**

Pollutants	Baseline Data( $\mu\text{g}/\text{m}^3$ )	Incremental Values( $\mu\text{g}/\text{m}^3$ )			Cumulative Value ( $\mu\text{g}/\text{m}^3$ )
		P1	P2	P3	
PM <sub>2.5</sub>	24.85	6.46	4.06	6.65	42.02
PM <sub>10</sub>	38.57	11.74	6.42	16.06	72.79
SO <sub>2</sub>	6.14	5.60	3.88	6.35	21.97
NO <sub>2</sub>	17.37	5.89	3.83	7.76	34.85

#### 7.4.2 Noise Environment

Noise pollution is mainly due to operation like drilling plying of trucks & HEMM. Cumulative 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 different quarries within the 500 m radius.

**Table 7.8 Predicted Noise Incremental Values from Cluster**

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	210 m	W	38.5	32.94	39.56	55
Habitation Near P2	360 m	W	38.5	28.25	38.89	
Habitation Near P3	450m	W	38.5	26.32	38.75	
<b>Cumulative Noise (dB(A))</b>					<b>43.85</b>	

Source: Lab Monitoring Data

The cumulative analysis of noise due to 3 proposed projects shows that habitation near P1 and P2 will receive about 43.85 dB (A), as shown in Table 7.8. The cumulative results for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.

### 7.4.3 Socio Economic Environment

Socio economic benefits of the three proposed projects were calculated and the results are shown in Tables 7.10 and 7.11. The three projects together will contribute Rs. 15,00,000 towards CER fund.

**Table 7.10 Socio Economic Benefits from 3 Mines**

Location ID	Project Cost	CER as per SEAC Suggestion (Rs.)
P1	Rs. 59,20,000/-	5,00,000
P2	Rs. 40,25,000/-	5,00,000
P3	Rs.1,35,54,000/-	5,00,000
<b>Grand Total</b>	<b>Rs. 2,34,99,000/-</b>	<b>15,00,000</b>

**Table 7.11 Employment Benefits from 3 Mines**

Location ID	Employment
P1	26
P2	26
P3	28
<b>Grand Total</b>	<b>80</b>

A total of 80 people will get employment due to 3 proposed mines in cluster

### 7.4.4 Ecological Environment

**Table 7.12 Greenbelt Development Benefits From 3 Mines**

ID	No of Trees proposed to be planted	Area to be Covered(m <sup>2</sup> )	Name of the Species	No. of Trees expected to be grown @ 80% survival rate
P1	1013	9,112	Neem, Teak	810
P2	370	3330	Neem, Pongamia, Teak	269
P3	1012	9112	Neem, Teak	809
<b>Total</b>	<b>2362</b>	<b>21,555</b>	<b>Neem, Pongamia, Teak</b>	<b>1,888</b>

Cumulative studies show that the three proposed projects will plant about 2362 native tree species like Neem, Teak, etc both inside and outside the lease area. It is expected that 80 % of trees, i.e., 1,888 trees will survive in this green belt development program.

### 7.4.5 Traffic Density

Table 7.6 shows that the three proposed projects will add 69 truck loads per day, accounting for addition of 207 PCUs to the nearby roads.

## 7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

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

### 7.5.1 Objective

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

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

**Table 7.13 Action Plan to Manage Plastic Waste**

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

Source: Proposed by FAEs and EC

## **7.6 POST COVID HEALTH MANAGEMENT PLAN FOR PROPOSED PROJECT**

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

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

### **7.6.1 Post-COVID Follow Up Protocol**

- ❖ Continue COVID appropriate behaviour (use of mask, hand & respiratory hygiene, physical distancing).
- ❖ Drink adequate amount of warm water (if not contra-indicated).
- ❖ Make sure your workplaces are clean and hygienic
- ❖ Surfaces (e.g., desks and tables) and objects (e.g., telephones, helmet) need to be wiped with disinfectant regularly
- ❖ Put sanitizing hand rub dispensers in prominent places around the workplace. Make sure these dispensers are regularly refilled
- ❖ Display posters promoting hand-washing
- ❖ Make sure that staff, contractors and customers have access to places where they can wash their hands with soap and water
- ❖ Display posters promoting respiratory hygiene.
- ❖ Brief your employees, contractors and customers that if COVID-19 starts spreading in your community anyone with even a mild cough or low-grade fever (37.3°C or more) need to stay at home. They should also stay home (or work from home) if they have had to take simple medications, such as paracetamol/acetaminophen, ibuprofen or aspirin, which may mask symptoms of infection
- ❖ Keep communicating and promoting the message that people need to stay at home even if they have just mild symptoms of COVID-19.
- ❖ Consider whether a face-to-face meeting or event is needed. Could it be replaced by a teleconference or online event?
- ❖ Could the meeting or event be scaled down so that fewer people attend?

- ❖ Pre-order sufficient supplies and materials, including tissues and hand sanitizer for all employees. Have surgical masks available to offer anyone who develops respiratory symptoms.
- ❖ It is also suggested by the Ministry of AYUSH that the use of Chyawanprash in the morning (1 teaspoonful) with Luke warm water/milk is highly recommended (under the direction of Registered Ayurveda physician) as in the clinical practice Chyawanprash is believed to be effective in post-recovery period.
- ❖ If there is persistent dry cough / sore throat, do saline gargles and take steam inhalation. The addition of herbs/spices for gargling/steam inhalation. Cough medications, should be taken on advice of medical doctor or qualified practitioner of Ayush.
- ❖ Look for early warning signs like high grade fever, breathlessness, Sp O<sub>2</sub> < 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 Karungalakudi Village aims to produce **215190 m<sup>3</sup>** of rough stone over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

#### **8.1 EMPLOYMENT POTENTIAL**

It is proposed to provide employment to about 26 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 15 persons in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

#### **8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED**

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

#### **8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE**

The proposed quarry is located in Karungalakudi Village, Melur Taluk and Madurai District of Tamil Nadu and the area have communications roads and other facilities already well established. The following physical infrastructure facilities will further improve due to proposed mine.

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

#### **8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE**

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

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

### **8.5 OTHER TANGIBLE BENEFITS**

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

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

### **8.6 CORPORATE SOCIAL RESPONSIBILITY**

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

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 10 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas –

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

**Table 8.1 CER Action Plan**

<b>S. No.</b>	<b>Activity</b>	<b>Budget (Rs.in Lakh)</b>
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
	<b>Total</b>	<b>Rs.5, 00,000</b>

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

## **CHAPTER IX**

### **ENVIRONMENTAL COST BENEFIT ANALYSIS**

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

## **CHAPTER X**

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **10.0 GENERAL**

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

#### **10.1 ENVIRONMENTAL POLICY**

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

The Proponent, **K. Ilayaraja** 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 Table 10.1.

**Table 10.1 Proposed Controls for Land Environment**

<b>Control</b>	<b>Responsibility</b>
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

About 2506 m<sup>3</sup> of top soil will be removed and preserved all along the boundary barrier to facilitate the greenbelt development and construction of bund. A detailed soil environment management plan has been provided in Table 10.2.

**Table 10.2 Proposed Controls for Soil Management**

Control	Responsibility
Surface run-off from the project boundary will be diverted to the mine pits via garland drains.	Mine Foreman & Mining Mate
Haul roads and other access roads will be designed along with drainage systems to minimize concentration of flow and erosion risk	Mines Manager
Sediments from sediment traps will be removed; garland drain system will be maintained periodically.	Mines Manager
Test soils for pH, EC, chloride, size & water holding capacity	Manager Mines

Source: Proposed by FAEs & EIA Coordinator

### 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 30 m. The water table in the area is at 40 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 10.3.

**Table 10.3 Proposed Controls for Water Environment**

<b>Control</b>	<b>Responsibility</b>
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 has been provided in Table 10.4.

**Table 10.4 Proposed Controls for Air Environment**

<b>Control</b>	<b>Responsibility</b>
Generation of dust during excavation is minimized by daily (twice) water sprinkling on working face and daily (twice) water sprinkling on haul road	Mines Manager
Wet drilling procedure /drills with dust extractor system to control dust generation during drilling at source itself is implemented	Mines Manager
Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution	Mines Manager

Ambient air quality Monitoring carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted air pollution control measures	Mines Manager
Provision of dust mask to all workers	Mines Manager
Greenbelt development all along the periphery of the project area	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

## 10.6 NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time. A detailed noise environment management plan has been provided in Table 10.5.

**Table 10.5 Proposed Controls for Noise Environment**

<b>Control</b>	<b>Responsibility</b>
Development of thick greenbelt all along the buffer zone (7.5 meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman
Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring is carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager

Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

## 10.7 GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone 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 10.6 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 has been given in Table 10.7.

**Table 10.7 Proposed Greenbelt Development Plan**

	<b>No. of trees proposed for plantation</b>	<b>No. of trees expected to survive @ 80%</b>	<b>Area to be covered(m<sup>2</sup>)</b>
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	405	324	3645
	Number of plants outside the mine lease area		
	608	486	5468
<b>Total</b>	<b>1013</b>	<b>810</b>	<b>9113</b>

Source: Proposed by FAEs & EIA Coordinator

About 1013 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 10.8) keep upgrading the database of medical history of the employees.

**Table 10.8 Medical Examination Schedule**

<b>S. No.</b>	<b>Activities</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>	<b>4<sup>th</sup> Year</b>	<b>5<sup>th</sup> Year</b>
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:						
<b>Age Group</b>		<b>PME as per Mines Rules 1955</b>			<b>Special Examination</b>	
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 10.9.

**Table 10.9 List of Periodical Trainings Proposed for Employees**

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

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

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 10.10 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

**Table 10.10 EMP Budget for Proposed Project**

<b>Attribute</b>	<b>Mitigation measures</b>	<b>Provision for Implementation</b>	<b>Capital Cost (Rs.)</b>	<b>Recurring Cost/annum (Rs.)</b>
<b>Air Environment</b>	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 = 2.91.5 ha)	20250	20250
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring	800000	50000
	Air quality will be regularly monitored as per norms within ML area & ambient area	Yearly compliance as per CPCB norms	0	50000

	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance	50000	5000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed	15000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	3750

	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual)	0	20000
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
<b>Noise Environment</b>	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	Provision made in OHS part	0	0

	near blasting site at the time of charging.			
	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	0
<b>Water Environment</b>	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum (2.91.5 ha X 10000)	20250	10125

<b>Waste Management</b>	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
<b>Implementation of EC, Mining Plan &amp; DGMS Condition Occupational Health and Safety</b>	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
	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)	104000	26000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	26000

	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	8100
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum (2.91.5 hectare)	405000	20250
	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	101250	20250
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 <sup>st</sup> Class / 2 <sup>nd</sup> Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under	0	780000

		regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate		
<b>Development of Green Belt</b>	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))"	81000	12150
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	182250	18225
<b>Mine Closure Activity</b>	Closure includes Greenbelt development, wire fencing, drains	Provision made in Closure Cost	0	0
<b>Total EMP Budget</b>			<b>1959000</b>	<b>1142100</b>

**Table 10.11 Estimation of Overall EMP Budget after Adjusting 5% Annual Inflation**

<b>I<sup>st</sup> Year</b>	<b>II<sup>nd</sup> Year</b>	<b>III<sup>rd</sup> Year</b>	<b>IV<sup>th</sup> Year</b>	<b>V<sup>th</sup> Year</b>	<b>Total</b>
3101100	1199205	1259165	1322124	1388230	<b>8269823</b>

In order to implement the environmental protection measures, an amount of Rs.19,59,000 as capital cost and recurring cost as Rs. 11,42,100 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. **82,69,823**, as shown in Table 10.11.

#### **10.10 CONCLUSION**

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

## **CHAPTER XI**

### **SUMMARY AND CONCLUSION**

#### **11.0 INTRODUCTION**

This EIA report was prepared in compliance with ToR obtained vide Lr.No. SEIAA-TN/F.No.9063/SEAC/ToR-1174/2022 dated 14.06.2022 by considering 3 proposed quarries, 1 existing quarry, and 1 expired quarry in a cluster with the total extent of 10.15 hectares in Ayyapatti, Karungalakudi, and Chokkalingapuram Villages, Melur Taluk, Madurai District and Tamil Nadu State. Cluster area was calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1<sup>st</sup> July 2016. Baseline Monitoring studies were carried out during the period of March – May, 2022.

#### **11.1 PROJECT DESCRIPTION**

The proposed project deals with excavation of rough stone which is primarily used in construction projects. The method adopted for rough stone excavation is a manual open cast mining method involving formation of benches with 5 m height and 5 m width and secondary blasting. The proposed project area is located between latitudes from 10°10'47.02"N to 10°10'53.05"N and from longitudes from 78°22'51.72"E to 78°23'00.92"E in Karungalakudi Village, Melur Tluk, and Madurai District. The project site is a Government Poramboke land with the extent of 2.02.5 ha leased for the project proponent, K.Ilayaraja. The proponent had applied for quarry lease on 20.01.2021 to extract rough stone and obtained the precise area communication letter issued by Department of Geology and Mining, Madurai vide Rc.No.85//Mines/2021, dated 05.02.2021. 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, Madurai (R.c. No.85/mines/2021 dated 26.04.2021).

According to the approved mining plan, about 215190 m<sup>3</sup> of roughstone and about 2506 m<sup>3</sup> of topsoil will be mined up to the depth of 35 m BGL in the first five years. However, the SEAC advised to restrict the ultimate depth to 30 m BGL considering safety point of view. Accordingly, the roughstone reserves have been adjusted to be 215190 m<sup>3</sup>. It is the quantity that has been mentioned in this EIA report. To achieve the estimated production, 2 Jack Hammers, 1 compressor, 1 excavator with bucket/rock breaker, and 3 tippers will be deployed. To operate the machineries and to break the roughstone to preferred dimension, about 26 persons will be employed. At the end of the quarry life, the dimension of the ultimate pit will be 207 m\*78 m\*30 m and about 1.49.0 ha of land will have been utilized for quarrying, 0.01.0 ha for infrastructures, 0.02.0 ha for roads, 0.26.5 ha for green belt development, and the remaining 0.24.0 ha will have been left as unutilized area. The final mine closure plan shows that about Rs. 688500 with the annual recurring cost of Rs. 60750 will be spent towards mine closure.

## **11.2 DESCRIPTION OF THE ENVIRONMENT**

The baseline monitoring studies were carried out during March through May, 2022 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, 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. Totally, 9 LULCs were mapped. Of the total area, mining area covers only 70 ha in which cluster area of the proposed project contributes only about 0.15 %. This small percentage of mining activities shall not have any significant impact on the 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 soil samples in the study area show loamy textures varying between sandy loam and sandy clay loam. PH of the soil varies from 6.1 to 7.4 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 210 to 354  $\mu\text{s}/\text{cm}$ . Bulk density ranges between 1.12 and 1.36 and the moisture content varies from 11.96 to 16.34 %.

#### ***Chemical Characteristics***

Nitrogen ranges between 12.1 and 24.0 mg/kg. Phosphorus ranges between 2.9 and 3.9 mg/kg. Potassium ranges between 9.5 and 15.3 mg/kg. Sodium ranges between 110.7 and 140.2 mg/kg. Organic matter content ranges between 0.93 and 1.98.

### **11.2.3 Water Environment**

Three surface water and seven groundwater samples were collected from the study area and were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess the effect of mining and other activities on surface and ground water. When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits. Results of important surface and ground water quality parameters have been shown below:

#### ***Surface Water***

- ❖ The pH of surface water sample ranges between 6.8 and 7.1.
- ❖ Turbidity varies between 2.3 and 3.1 NTU.
- ❖ TDS varies between 184 and 310 mg/l.

- ❖ TH varies between 109 and 156 mg/l.
- ❖ Calcium varies between 26 and 36 mg/l.
- ❖ Magnesium varies between 14 and 29 mg/l.
- ❖ Chloride varies between 95 and 128 mg/l and sulphate varies between 12 and 28 mg/l.

### ***Ground Water***

- ❖ pH of water samples ranges between 7.1 and 8.1.
- ❖ TDS varies between 542 and 960 mg/l.
- ❖ TH varies between 211 and 357 mg/l.
- ❖ Calcium varies between 32 and 63 mg/l.
- ❖ Chloride varies between 101 and 213 mg/l.
- ❖ Sulphate varies between 32 and 53 mg/l and fluoride from 0.19 to 1 mg/l.
- ❖ When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

## **11.3 AIR ENVIRONMENT**

### **11.3.1 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 March, 2022 varied from 21.07 to 39.96<sup>0</sup>C with the average of 29.72<sup>0</sup>C; in April, 2022 from 22.22 to 40.83<sup>0</sup>C with the average of 30.68<sup>0</sup>C; and in May, 2022 from 24.52 to 41.23<sup>0</sup>C with the average of 30.96<sup>0</sup>C. During the period of the three months, relative humidity ranged from 54.30.88 to 60.69 % in average. The highest average humidity was measured in May 2022, whereas the lowest in March 2022. When speaking about wind speed, the wind speed in march, 2022 varied from 0.04 to 7.37 m/s with the average of 3.12m/s; in April, 2022 from 0.16 to 6.70 m/s with the average of 2.79 m/s; and in May, 2022 from 0.12 to 8.72/s with the average of 2.96 m/s. Analysis of wind pattern showed that predominant wind was dominant in the directions ranging from southwest to northeast.

### **11.3.2 Ambient Air Quality Results**

As per the monitoring data, PM<sub>10</sub> ranges from 31.09 µg/m<sup>3</sup> to 40.79µg/m<sup>3</sup>; PM<sub>2.5</sub> from 17.32µg/m<sup>3</sup> to 32.56 µg/m<sup>3</sup>; SO<sub>2</sub> from 4.36µg/m<sup>3</sup> to 7.73 µg/m<sup>3</sup>; NO<sub>2</sub> from 13.52 µg/m<sup>3</sup> to 22.79µg/m<sup>3</sup>. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

## 11.4 NOISE ENVIRONMENT

Ambient noise levels were measured at 10 locations around the proposed project area. Noise levels recorded in core zone during day time was 40.6 dB (A) Leq and during night time was 35.5 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 36.3 to 44.5dB (A) Leq and during night time from 31.5 to 39.6 dB (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 at karungalakudi village 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**

<b>Impact</b>	<b>Mitigation Measure</b>
<b>Land Environment</b>	
<ul style="list-style-type: none"><li>❖ Destruction of natural landscapes</li><li>❖ Changes in soil characteristics</li><li>❖ Soil erosion and slope instability</li></ul>	<ul style="list-style-type: none"><li>❖ Mining will be carried out as per approved mine plan in scientific and systematic way</li><li>❖ Safety Zone or Buffer area will be maintained and will not be mined and instead plantation will be carried out in the safety zone</li></ul>

	<ul style="list-style-type: none"> <li>❖ Barbed wire fencing will be provided all along the proposed mine boundary</li> <li>❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir</li> <li>❖ Construction of garland</li> <li>❖ 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</li> </ul>
<b>Water Environment</b>	
<ul style="list-style-type: none"> <li>❖ Decrease in aquifer recharge and increase in surface runoff;</li> <li>❖ Disturbance to land drainage, overload and erosion of watercourses;</li> <li>❖ Changes to the surface over which water flows;</li> <li>❖ Changes to surface and groundwater resources quantity and quality due to stream blockage and contamination by particulate matter or waste;</li> <li>❖ Contamination of aquifers due to removal of the natural filter medium.</li> </ul>	<ul style="list-style-type: none"> <li>❖ 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</li> <li>❖ 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</li> <li>❖ Domestic sewage from site office &amp; urinals/latrines provided in project area will be discharged through septic tank followed by soak pit system.</li> <li>❖ Tippers &amp; 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 &amp; grease trap, only clear water will be reused for greenbelt development.</li> </ul>
<b>Air Environment</b>	
<ul style="list-style-type: none"> <li>❖ Generation of Fugitive Dust</li> <li>❖ Dust will be generated mainly during excavation, loading &amp; unloading activities.</li> <li>❖ Gaseous pollutants will be generated mostly by the traffic.</li> <li>❖ Reduction in visibility due to dust plumes.</li> <li>❖ Coating of surfaces leading to annoyance and loss of amenity.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Haul roads will be well maintained by sprinkling water twice a day</li> <li>❖ The access road will be cleaned and brushed to ensure that mud and dust deposits do not accumulate.</li> <li>❖ 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</li> </ul>

<ul style="list-style-type: none"> <li>❖ Physical and/or chemical contamination and corrosion.</li> <li>❖ Increase in the concentration of suspended particles in runoff water.</li> <li>❖ Coating of vegetation leading to reduced photosynthesis,</li> <li>❖ Inhibited growth, destroying of foliage, degradation of crops;</li> <li>❖ Increase in health hazards due to inhalation of dust.</li> </ul>	<p>is provided at the compound area before leaving the site</p> <ul style="list-style-type: none"> <li>❖ Speed restrictions will be imposed to avoid spillage of loaded materials upon the road and to reduce wear and tear of the road.</li> <li>❖ 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.</li> <li>❖ 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.</li> <li>❖ Personal Protective Equipment's will be provided to all workers</li> <li>❖ All drilling rods used will have dust suppression systems fitted which injects water into the hole.</li> <li>❖ Wet gunny bags will be used as a cover while drilling.</li> <li>❖ 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.</li> <li>❖ 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.</li> <li>❖ A site speed limit of 20 km/h will be set to minimise the potential for dust generation</li> <li>❖ Weekly maintenance programme to identify machinery due for maintenance, based on the number of hours it has been in operation.</li> <li>❖ Air filters are renewed after every 10<sup>0</sup> hours of use, unless otherwise indicated by an on-board computer system.</li> <li>❖ All site machineries &amp; 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.</li> </ul>
<b>Noise &amp; Vibration</b>	

<ul style="list-style-type: none"> <li>❖ Annoyance and deterioration of the quality of life;</li> <li>❖ Propelling of rocks fragments by blasting.</li> <li>❖ Shaking of buildings and people due to blasting;</li> </ul>	<ul style="list-style-type: none"> <li>❖ Usage of sharp drill bits while drilling which will help in reducing noise;</li> <li>❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;</li> <li>❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;</li> <li>❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;</li> <li>❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;</li> <li>❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;</li> <li>❖ Silencers / mufflers will be installed in all machineries;</li> <li>❖ Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;</li> <li>❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.</li> </ul>
<b>Biological Environment</b>	
<ul style="list-style-type: none"> <li>❖ Direct impacts include land clearance and excavation causing destruction of flora and fauna and loss of habitats;</li> <li>❖ Indirect impacts include habitat degradation due to noise, dust, and human activity.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Only some common herbs, shrubs and grass will be cleared. So, there will be no impact on the biodiversity.</li> <li>❖ Green belt development with suitable species will enhance the biodiversity of the project area.</li> <li>❖ The core zone or buffer zone does not encompass any threatened flora or fauna species.</li> </ul>
<b>Socio-Economic Environment</b>	
<ul style="list-style-type: none"> <li>❖ Health and safety of workers and the general public;</li> <li>❖ Increase in traffic volumes and sizes of road vehicles;</li> </ul>	<ul style="list-style-type: none"> <li>❖ The mining activity puts negligible change in the socio-economic profile.</li> <li>❖ Around 88 local workers will get employment opportunities along with periodical training to generate local skills.</li> </ul>

<ul style="list-style-type: none"> <li>❖ Economic issues, including the increase in employment opportunities;</li> </ul>	<ul style="list-style-type: none"> <li>❖ New patterns of indirect employment/ income will generate.</li> <li>❖ Regular health check-up camp.</li> <li>❖ Assistance to schools and scholarship to children will be provided.</li> </ul>
<p><b>Occupational Health &amp; Safety</b></p>	
<ul style="list-style-type: none"> <li>❖ Exposure to Dust</li> <li>❖ Noise and Vibration Exposure</li> <li>❖ Physical Hazards</li> <li>❖ Respiratory hazards due to Dust exposure</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provision of rest shelters for mine workers with amenities like drinking water etc.</li> <li>❖ All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc.</li> <li>❖ Training of employees for use of safety appliances and first aid in vocational training centre.</li> <li>❖ Weekly maintenance and testing of all equipment as per manufacturers' guidelines.</li> <li>❖ Pre placement and Yearly Medical Examination of all workers by a medical Officer</li> <li>❖ First Aid facility will be provided at the mine site.</li> <li>❖ 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.</li> <li>❖ Working of mine as per approved mining plan and environmental plans</li> </ul>

## 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**

### **11.10.1 Public Consultation for proposed project**

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with this Draft EIA / EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

### **11.10.2 Risk Analysis & Disaster Management Plan for proposed project**

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31<sup>st</sup>December, and 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures set to time table are recorded along with pinpointed responsibilities.

In the unlikely event that a consequence has occurred, disaster management kicks in. This includes instituting procedures pertaining to a number of issues such as communication, rescue, and rehabilitation. These are addressed in the disaster management plan. Both, the RA and DMP, are living documents and need to be updated whenever there are changes in

operations, equipment, or procedures Assessment is all about preventing accidents and taking necessary steps to prevent it from happening.

The Disaster Management Plan (DMP) is a guide, giving general considerations, directions, and procedures for handling emergencies likely to arise from planned operations. The DMP has been prepared on the basis of the Risk Assessment and related findings covered in the report.

### **11.10.3 Cumulative 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.
- As all the proposed projects and existing project are intended for producing dimension stone, the projects will use a small quantity of explosives to create fractures in the massive rock and will produce a negligible magnitude of ground vibrations on the surrounding area. Therefore, cumulative PPV was not calculated and added in this report.
- The three proposed projects will allocate Rs. 1500000/- towards CER as recommended by SEAC.
- The three proposed projects will directly provide jobs to 80 local people, in addition to indirect jobs.
- The three proposed projects will plant about 2362 trees in and around the lease area.
- The three proposed projects will add 228 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 26 local people and indirect employment for 15 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 Karungalakudi 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. **19,59,000** as capital cost and recurring cost as Rs. **11,42,100** 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. **82,69,823**.

### **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, **K. ILAYARAJA** has engaged **GeoTechnical 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](mailto:info.gtmsdpi@gmail.com)  
Web: [www.gtmsind.com](http://www.gtmsind.com)  
Phone: 04342 232777.

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

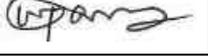
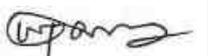
S.No.	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
<b>Approved Functional Area Experts &amp; EC</b>					
1.	Dr.S. Karuppannan	EIA Coordinator (EC) In-house	1(a)(i)	Mining	B
2.	Dr.M. Vijayprabhu	In-house FAE	1(a)(i)	HG, LU, GEO	B
3.	Dr.J. Rajarajeswari	In-house, FAE	1(a)(i)	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
<b>Approved Functional Area Associates</b>					
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

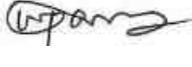
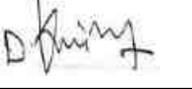
16.	P.Dhatchayini	FAA	1(a)(i)	AQ	B
17.	V.Malavika	FAA	1(a)(i)	NV, SHW	B
<b>Team Members</b>					
18.	G. Umamaheswaran	In-house, FAE	1(a)(i)	TM for EC	B
19.	M.Saravanan	In-house	1(a)(i)	TM for HG & LU	B
20.	R.Revathy	In-house	1(a)(i)	TM for WP, SHW, & RHW	B
21.	M.Jalandar	In-house	1(a)(i)	TM for SE	B
22.	Dr.D.Kalaimurugan	In-house	1(a)(i)	TM for EB	B
<b>Abbreviations</b>					
EC	EIA Coordinator	NV	Noise and Vibration		
FAE	Functional Area Expert	SE	Socio Economics		
FAA	Functional Area Associates	HG	Hydrology, ground water and water conservation		
TM	Team Member	SC	Soil conservation		
GEO	Geology	RH	Risk assessment and hazard management		
WP	Water pollution monitoring, prevention and control	SHW	Solid and hazardous wastes		
AP	Air pollution monitoring, prevention and control	MSW	Municipal Solid Wastes		
LU	Land Use	ISW	Industrial Solid Wastes		
AQ	Meteorology, air quality modeling, and prediction	HW	Hazardous Wastes		
EB	Ecology and bio-diversity	GIS	Geographical Information System		

**DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP**

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for K.Ilayaraja rough stone quarry project with the extent of 2.02.5 ha situated in the cluster with the extent of 10.15 ha in Ayyapatti, Karungalakudi, and Chokkalingapuram Villages of Melur Taluk, Madurai District of Tamil Nadu is true and correct to the best of our knowledge.

**List of Functional Area Experts Engaged in this Project**

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

6	EB	<ul style="list-style-type: none"> <li>○ Collection of Baseline data of Flora and Fauna.</li> <li>○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list.</li> <li>○ Impact of the project on flora and fauna.</li> <li>○ Suggesting species for greenbelt development.</li> </ul>	Dr.J. Rajarajeshwari	
7	RH	<ul style="list-style-type: none"> <li>○ Identification of hazards and hazardous substances</li> <li>○ Risks and consequences analysis</li> <li>○ Vulnerability assessment</li> <li>○ Preparation of Emergency Preparedness Plan</li> <li>○ Management plan for safety.</li> </ul>	J.N. Manikandan	
8	LU	<ul style="list-style-type: none"> <li>○ Construction of Land use Map</li> <li>○ Impact of project on surrounding land use</li> <li>○ Suggesting post closure sustainable land use and mitigative measures.</li> </ul>	Dr.S. Karuppannan	
9	NV	<ul style="list-style-type: none"> <li>○ Identify impacts due to noise and vibrations</li> <li>○ Suggesting appropriate mitigation measures for EMP.</li> </ul>	Dr.R. Arun Balaji	
10	AQ	<ul style="list-style-type: none"> <li>○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD.</li> <li>○ Recommending mitigations measures for EMP</li> </ul>	Dr.R. ArunBalaji	
11	SC	<ul style="list-style-type: none"> <li>○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation</li> </ul>	Dr.J. Rajarajeshwari	
			Dr. D.Kalaimurugan	

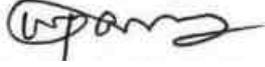
12	SHW	<ul style="list-style-type: none"> <li>○ Identify source of generation of non-hazardous solid waste and hazardous waste.</li> <li>○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.</li> </ul>	J.N. Manikandan	
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####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

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

**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 K.Ilayaraja roughstone quarry project with the extent of 2.02.5 ha located within the cluster of 10.15 ha in Ayyapatti, Karungalakudi, and Chokkalingapuram Villages of Melur Taluk, Madurai District of Tamil Nadu is true and correct to the best of my knowledge.

Signature : 

Date : 14.12.2022

Name : **Dr. S. Karuppannan**

Designation : Managing Partner

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

NABET Certificate No & Issue Date : NABET/EIA/2023/IA0067 & March 30, 2021

Validity : Valid till 29.12.2023



TMT. P. RAJESWARI, I.F.S.,  
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT  
ASSESSMENT AUTHORITY – TAMIL NADU

3rd Floor, Panagal Maaligai,  
No.1 Jeenis Road, Saidapet,  
Chennai-15.  
Phone No.044-24359973  
Fax No. 044-24359975

**TERMS OF REFERENCE (ToR)**

**Lr No.SEIAA-TN/F.No.9063/SEAC/ToR-1174/2022, Dated:14.06.2022**

To

Thiru. K. Ilayaraja  
S/o. Mr.Krishnan,  
W10/215, Pettai,  
Anna Nagar, Karungalakudi,  
Melur Taluk,  
Madurai District- 625101

Sir / Madam,

**Sub:** SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed Rough stone quarry lease over an extent of 2.02.5 Ha in S. F. Nos. 619/5 (P) Karungalakudi Village, Melur Taluk, Madurai District Tamil Nadu by Thiru K. Ilayaraja - under project category – “BI” and Schedule S.No. 1(a) – ToR issued along with Public Hearing- preparation of EIA report – Regarding.

**Ref:** 1. Online proposal No.SIA/TN/MIN/72649/2022, dated: 26.02.2022  
2. Your application seeking Terms of Reference submitted on: 09.03.2022  
3. Minutes of the 274<sup>th</sup> Meeting of SEAC held on 19.05.2022  
4. Minutes of the 519<sup>th</sup> Meeting of SEIAA held on 14.06.2022.

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

190

  
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SEIAA-TN

The project proponent, Thiru. K. Iayaraja, has submitted application seeking ToR for B1 category project in Form-I, for the Proposed Rough stone quarry lease over an extent of 2.02.5 Ha in S. F. Nos. 619/5 (P) Karungalakudi Village, Melur Taluk, Madurai District Tamil Nadu and has furnished Pre-feasibility report.

**Discussion by SEAC and the Remarks:-**

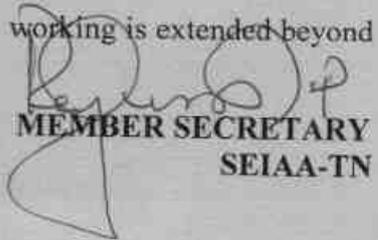
The proposal was placed in 274<sup>th</sup> SEAC meeting held on 19.5.2022. The project proponent has given a detailed presentation. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).

The project proponent gave detailed presentation. SEAC noted the following:

1. The Project Proponent, Thiru K. Iayaraja has applied for Terms for Reference for the proposed Rough stone quarry lease over an extent of 2.02.5 Ha in S. F. Nos. 619/5 (P) Karungalakudi Village, Melur Taluk, Madurai District Tamil Nadu. It is a Govt Poromboke land.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. **As per the mining plan, the lease period is for 10 year. The production as per mining plan for 5 years not to exceed –221770 m<sup>3</sup> of Rough Stone and 2506 m<sup>3</sup> of Top soil. The Annual peak production as per mining plan is 50420 m<sup>3</sup> of Rough Stone (1<sup>st</sup> year) and 2506 m<sup>3</sup> of Top soil (1<sup>st</sup> year) with ultimate depth of 35m BGL.**

Based on the presentation made by the proponent and the documents furnished and considering safety point of view, SEAC decided to recommend the proposal for the grant of Terms of Reference (TOR) with Public Hearing with the depth restricted up to 30m & quantity – 180375 m<sup>3</sup> of Rough stone & 2506 m<sup>3</sup> of Top soil for five years, subject to the following TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

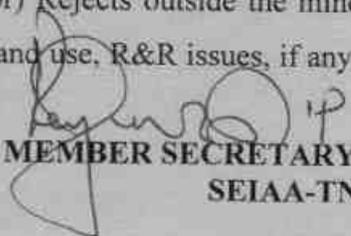
1. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the proposed quarry lease after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.
2. The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, as the depth of the working is extended beyond

  
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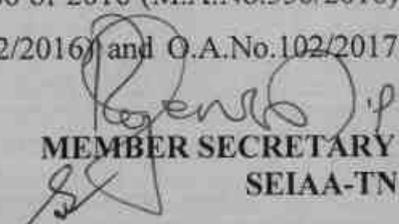
- 30 m below ground level.
3. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
  4. The EIA 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.
  5. 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.
  6. 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).
  7. The PP shall carry out Drone video survey covering the cluster, Green belt , fencing etc.,
  8. 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.
  9. 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.

  
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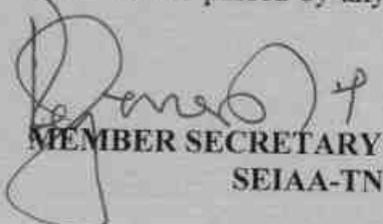
10. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
11. 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. 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.
12. 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.
13. 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 air pollution, water pollution, & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
14. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
15. Issues relating to Mine Safety, including slope geometry in case of Granite quarrying, blasting parameters etc. should be detailed. The proposed safeguard measures in each case should also be provided.
16. 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.
17. 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,

  
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- should be provided.
18. Since non-saleable waste /OB / intermediate waste etc. is huge in the granite quarry, the Proponent shall provide the details pertaining to management of the above material with year wise utilization and average moving inventory be submitted.
  19. 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.
  20. 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.
  21. Impact on local transport infrastructure due to the Project should be indicated.
  22. 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.
  23. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
  24. 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.
  25. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
  26. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
  27. 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.
  28. The recommendation for the issue of "Terms of Reference" is subjected to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in 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

  
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- and O.A.No.404/2016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).
29. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
  30. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
  31. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
  32. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.
  33. 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.
  34. 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.
  35. 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.
  36. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

  
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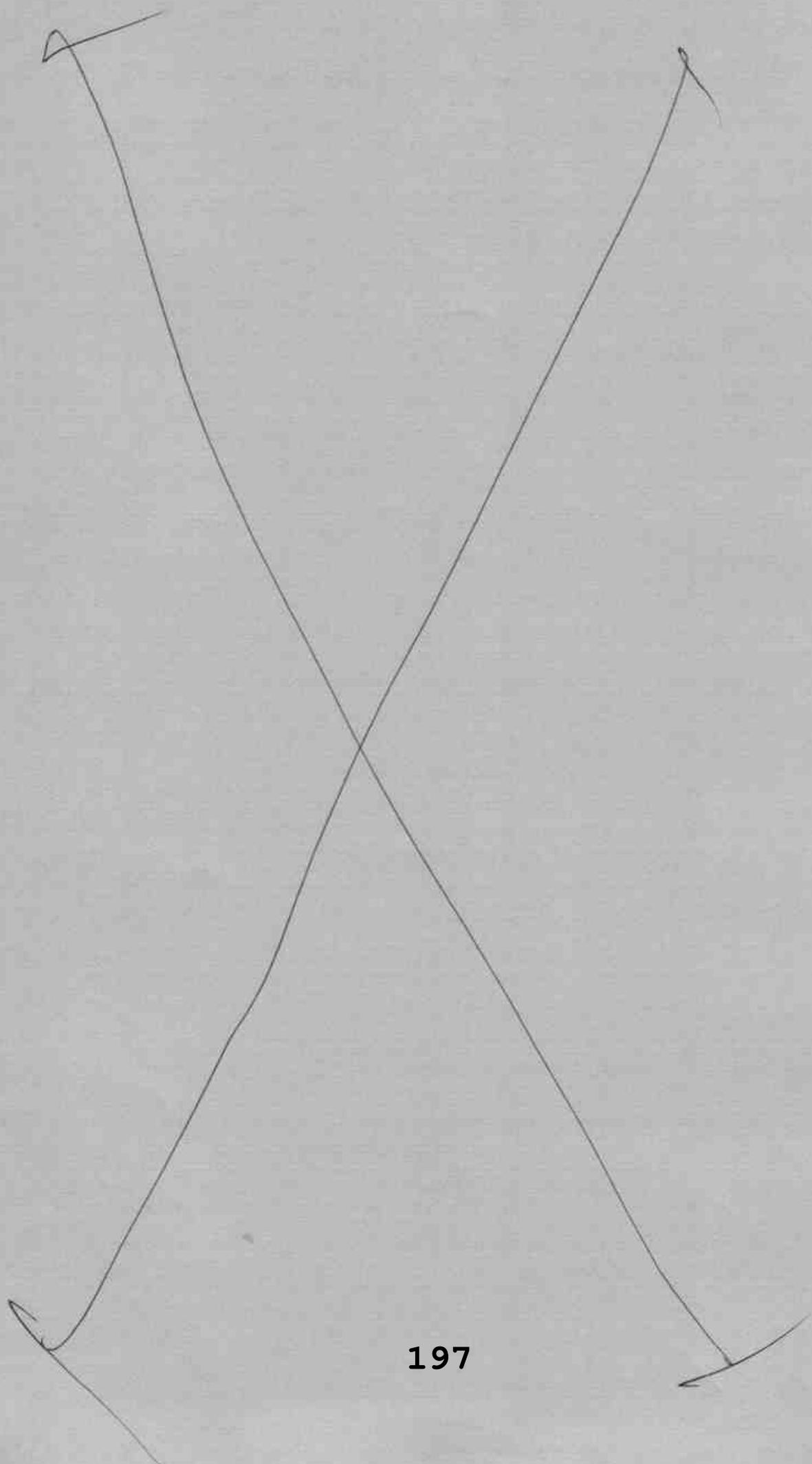
37. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
38. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, 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.
39. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

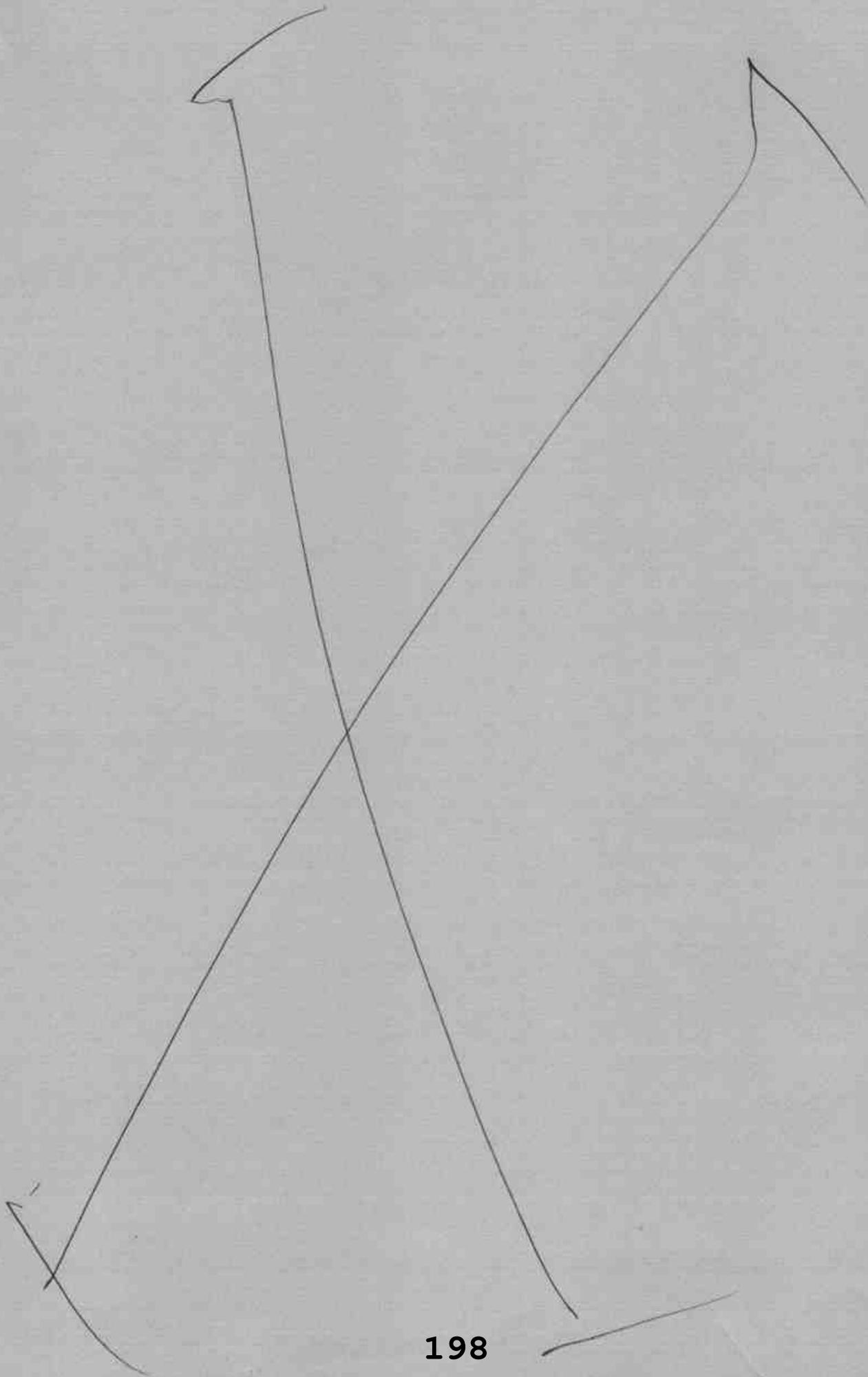
#### Appendix -I

#### List of Native Trees Suggested for Planting

1. *Aeglemarmelos*-Vilvam
2. *Adenaantherapavonina*-Manjadi
3. *Albizialebeck*-Vaagai
4. *Albiziaamara*-Usil
5. *Bauhinia purpurea* - Mantharai
6. *Bauhinia racemosa* - Aathi
7. *Bauhinia tomentosa*-Iruvathi
8. *Buchananiaaillaris*-Kattuma
9. *Borassusflabellifer*- Panai
10. *Buteamonosperma* - Murukkamaram
11. *Bobaxceiba*- Ilavu, Sevvilavu
12. *Calophylluminophyllum* - Punnai
13. *Cassia fistula*- Sarakondrai
14. *Cassia roxburghii*- Sengondrai
15. *Chloroxylonsweitenia* - Purasamaram
16. *Cochlospermumreligiosum*- Kongu, Manjalllavu
17. *Cordiadichotoma*- Mookuchalimaram
18. *Cretevaadansonii*-Mavalingum
19. *Dilleniaindica*- Uva, Uzha
20. *Dilleniapentagyna*- SiruUva, Sitruzha
21. *Diospyrosebenum*- Karungali
22. *Diospyroschloroxylon*- Vaganai
23. *Ficusamplissima*- Kalltchi
24. *Hibiscus tiliaceous*-Aatrupoovarasu
25. *Hardwickiabinata*- Aacha
26. *Holopteliaintegrifolia*-Aayili
27. *Lanneacoromandelic* - Odhiam
28. *Lagerstroemia speciosa* - Poo Marudhu

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29. *Lepisanthustetraphylla*- Neikottaimaram
30. *Limoniaacidissima* - Vila maram
31. *Litseaglutinosa*-Pisinpattai
32. *Madhucalongifolia* - Illuppai
33. *Manilkarahexandra*-UlakkaiPaalai
34. *Mimusopselengi* - Magizhamaram
35. *Mitragynaparvifolia* - Kadambu
36. *Morindapubescens*-Nuna
37. *Morindacitrifolia*- VellaiNuna
38. *Phoenix sylvestre*-Eachai
39. *Pongamiapinnata*-Pungam
40. *Premnamollissima*- Munnai
41. *Premnaserratifolia*- Narumunnai
42. *Premnatomentosa*-PurangaiNaari, PudangaNaari
43. *Prosopiscinerea* - Vannimaram
44. *Pterocarpusmarsupium* - Vengai
45. *Pterospermumcanescens*-Vennangu, Tada
46. *Pterospermumxylocarpum* - Polavu
47. *Puthranjivaroxburghii*-Puthranjivi
48. *Salvadorapersica*- Ugaamaram
49. *Sapindusemarginatus*- Manipungan, Soapukai
50. *Saracaasoca* - Asoca
51. *Streblusasper*- Pirayamaram
52. *Strychnosnuxvomica*-Yetti
53. *Strychnopotatorum* - TherthangKottai
54. *Syzygiumcumini* - Naval
55. *Terminaliabellerica*- Thandri
56. *Terminalia arjuna*- Venmarudhu
57. *Toona ciliate* - Sandhanavembu
58. *Thespesiapopulnea*- Puvarasu
59. *Walsuratrifoliata*-valsura
60. *Wrightiatinctoria*- Vep

**Discussion by SEIAA and the Remarks:-**

The proposal was placed in the 519<sup>th</sup> meeting of Authority held on 13.06.2022. The Authority noted that the proposal was placed in the 274<sup>th</sup> meeting of SEAC held on 19.05.2022. SEAC has furnished its recommendations to the Authority for granting Terms of Reference (ToR) along with Public Hearing for the project.

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

1. The scientific studies shall be carried out for any proposed quarry over the existing pit/quarry by the reputed Government Scientific Research / Academic Institutions such as Anna University, NITs, IITs, NIRM, CISR laboratories where the depth of the proposed working (or) ultimate depth of working is extended beyond 40 m below ground level (BGL) in case of flat terrain and the excavation extends beyond 30 m above ground level (AGL) in case of outcrops/hilly terrains for evaluating the stability of slopes. A copy of the report shall be submitted to the SEIAA, the concerned AD/DGM, the concerned DEE/TNPCB and the Director of Mines Safety, Chennai.
2. Detailed study shall be carried out regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
3. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological structures etc.
4. 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.
5. The Environmental Impact Assessment shall study in detail on 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.
6. 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.
7. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
8. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the nearby water body and Reservoir.
9. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.

  
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10. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
11. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
12. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.
13. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.
14. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.
15. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.
16. The project proponent shall study and furnish the impact of project on plantations in adjoin patta lands, Horticulture, Agriculture and livestock.
17. The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.
18. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
19. 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.
20. The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecological risks and impacts of plastic & micro plastic on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.
21. The project proponent shall study on impact of mining on Reserve forests free ranging wildlife.
22. 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 & bio-diversity.
  - b) Climate change leading to Droughts, Floods etc.

  
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- 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.
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 water bodies 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. 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.
25. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.
26. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.

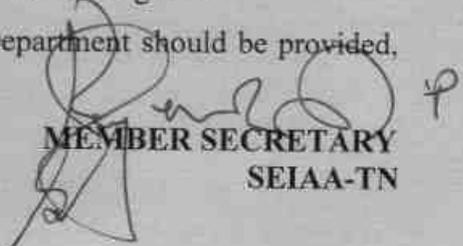
#### **A. STANDARD TERMS OF REFERENCE**

- 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/

  
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SEIAA-TN

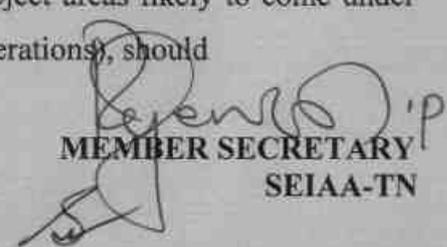
topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

- 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.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided,

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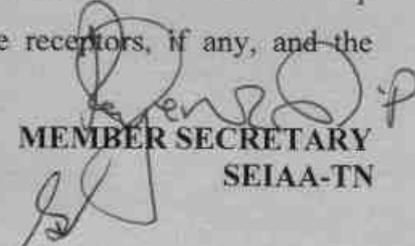
confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests,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

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

  
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SEIAA-TN

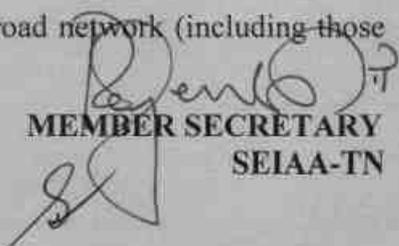
also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

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

  
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habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

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

  
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- outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
  - 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
  - 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
  - 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
  - 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
  - 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
  - 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
  - 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
  - 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
  - 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

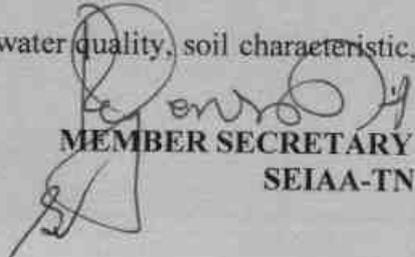
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
- a) Executive Summary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

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

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

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

  
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SEIAA-TN

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

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

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.

- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2<sup>nd</sup> December, 2009, 18<sup>th</sup> March 2010, 28<sup>th</sup> May 2010, 28<sup>th</sup> June 2010, 31<sup>st</sup> December 2010 & 30<sup>th</sup> September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
  - The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
  - The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29<sup>th</sup> August, 2017.

  
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**Copy to:**

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1<sup>st</sup> & 2<sup>nd</sup> 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, Madurai District.
7. Stock File.



From

To

Thiru.L.Sattanathan Sankar, M.Sc.,  
Deputy Director,  
Dept. of Geology and Mining,  
Madurai.

Thiru K.Ilayaraja,  
S/o Krishanan,  
W10/215,Pettai,Anna Nagar,  
Karungalakudi,  
Melur Taluk, Madurai.

Roc. No. 85/Mines/2021, dated.18.02.2022

Sub: Mines and Minerals - Minor Mineral - Rough Stone -  
Madurai District - Melur Taluk - Karungalakudi  
Village - Government land - in S.F. No 619/5(P) -  
Over an extent of 2.02.5 Hects - Tender application  
preferred by Thiru K.Ilayaraja - Declared as highest  
bidder - Precise area communicated - Draft Mining  
Plan submitted - Approval accorded - Details of  
quarries within 500mts radius - Requested -  
Regarding.

- Ref:
1. Madurai District Gazette Notification No.17 dated.28.12.2020.
  2. Tender application preferred by Thiru K.Ilayaraja dated.20.01.2021.
  3. Precise communication letter Roc No.85/2021/Mines, dated.05.02.2021
  4. Mining Plan Approval letter Roc No. 85/ Mines/ 2021, dated.26.04.2021
  5. Requisition letter of the applicant Thiru K.Ilayaraja, dated 22.10.2021

\*\*\*\*\*

In the reference 1st cited above, the District Collector, Madurai has published the Madurai District Gazette Extraordinary Notification No. 17, dated 28.12.2020 wherein the tender cum auction for 27 rough stone quarries on 20.01.2021 were notified.

One Thiru K.Ilayaraja, S/o Krishanan, W10/215, Pettai, Anna Nagar, Karungalakudi, Melur Taluk has declared as highest bidder and precise area was communicated by the Assistant Director to the highest bidder with a direction to submit the mining plan for the S.F. No.619/5(P) over an extent 2.02.5hects of Karungalakudi Village, Melur Taluk, Madurai District as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959. Accordingly, Thiru K.Ilayaraja has submitted the draft Mining Plan and the same have been approved on 12.07.2021.

In this connection the applicant has requested to furnish the details of quarry lease / mining lease situated within 500 mts radius form the subject quarry for obtaining Environment Clearance from the State level Environment Impact Assessment Authority.

In this connection it is stated that, the following existing / abandoned quarries are located within 500m radius distance from the proposed area for clearance.

a. Existing quarries

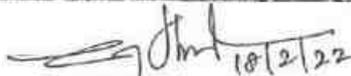
Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecst)	Collector's Proceedings No & date	Lease period
1.	Mohammed Raja.J	Chokkalingapuram	472/1 etc.,	2.40.0	Roc.No.1491/2017, Dt. 06.10.2020	14.10.2020 - 13.10.2025

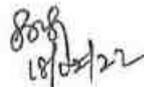
b. Abandoned / expired quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecst)	Collector's Proceedings No & date	Lease period
1.	Gandhiraj.A	Ayyapatti	59/2 (Part)	0.73.5	Rc.No. 659/10 dt.07.01.2011	04.12.2011 - 03.12.2016
2.	Jothi.K	Ayyapatti	48/2 etc.,	2.28.5	Roc.No.572/2013, Dt. 30.11.2016	29.12.2016 - 28.12.2021

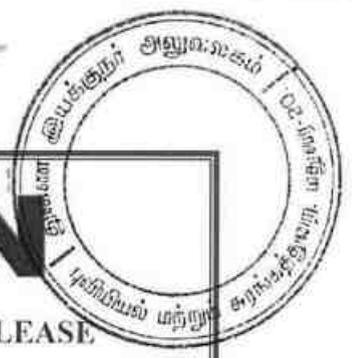
c. Present proposed quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (In hecst)	Collector's Proceedings No & date	Lease period
1.	Thiru.G.Karuppanan,	Chokkalingapuram Village	471/1	2.70.0	Proposed	
2.	Thiru K.Ilayaraja	Ayyapatti	63	0.74.0	Proposed	
3.	Thiru K.Ilayaraja	Karungalakudi	619/5(P)	2.02.5	Proposed	

  
Deputy Director,  
Dept of Geology and Mining,  
Madurai

  
18/02/22

214  
K. Ilayaraja



# MINING PLAN

**FOR KARUNGALAKUDI VILLAGE ROUGH STONE MINING LEASE,  
INCLUDING PROGRESSIVE QUARRY CLOSURE PLAN**

Govt Poramboke land /Opencast, Semi-Mechanized /Manual mining/Non-forest/ Non-captive use  
"B2" Category

Lease period 5 years from the date of lease execution

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

### LOCATION OF THE LEASE AREA

STATE	:	TAMIL NADU
DISTRICT	:	MADURAI
TALUK	:	MELUR
VILLAGE	:	KARUNGALAKUDI
S.F.NO'S	:	619/5 (PART)
EXTENT	:	2.02.50 HECTARES

### ADDRESS OF THE APPLICANT

**Mr.K. ILAYARAJA**

S/o. Mr.Krishnan,

W10/215, Pettai, Anna Nagar,

Karungalakudi, Melur Taluk,

Madurai District. Tamilnadu.

Pin code: 625101.

Mobile No: 99434 24656

### PREPARED BY

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

**RQP/MAS/263/2014/A**



**GEO TECHNICAL MINING SOLUTIONS**

(A NABET Accredited & ISO Certified Company )



**No: 1/213-B, Ground Floor, Natesan Complex,  
Oddapatti, Collectorate Post office, Dharmapuri-636705**

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**E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),**

**Website: [www.gtmsind.com](http://www.gtmsind.com)**

< K. Ilayaraja



**CONTENTS**

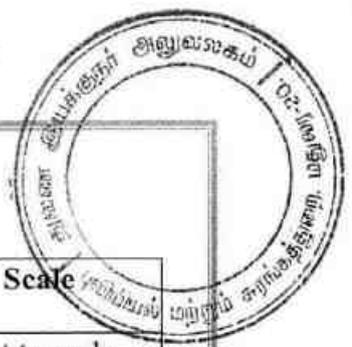
Sl. No.	Description	Page No.
-	Certificates	5-8
-	Introductory notes	9
1.0	General	11
2.0	Location and Accessibility	12
<b><u>PART-A</u></b>		
3.0	Geology and Mineral reserves	15
4.0	Mining	20
5.0	Blasting	25
6.0	Mine Drainage	27
7.0	Stacking of Mineral rejects and disposal of waste	28
8.0	Uses of Mineral	29
9.0	Others	29
10.0	Mineral processing/ Beneficiations	30
<b><u>PART-B</u></b>		
11.0	Environmental Management Plan	32
12.0	Progressive Mine Closure Plan	37
13.0	Financial assurance	39
14.0	Certificates	39
15.0	Plan and sections, etc	40
16.0	Any Other Details Intend to furnish by the Applicant	40
17.0	CSR Expenditure	40

216 *R. Deepa*



**ANNEXURES**

Sl. No.	Description	Annexure No.
1.	Copy of precise area communication letter	I
2.	Copy of Tender Gazette notification for collector order	II
3.	Copy of <b>FMB</b> (Field Measurement book)	III
4.	Copy of Village map	IV
5.	Copy of A-Register	V
6.	Copy of Land Document (Adangal)	VI
7.	Photo copy of the applied lease area	VII
8.	Copy of agreement from explosive license holder, explosive license & Blaster certificate	VIII
9.	Copy of ID Proof of the authorized signature	IX
10.	Copy of RQP Certificate	X



**LIST OF PLATES**

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Topo Sheet Map	I-B	1:1,00,000
4.	Satellite Imagery Map	I-C	1: 5,000
5	Environmental Plan	I-D	1: 5,000
6	Mine Lease Plan	II	1:1000
7	Surface and Geological Plan	III	1:1000
8	Surface and Geological Sections	IIIA	HOR 1:1000 VER 1:500
9	Year wise Development Production Plan	IV	1:1000
10	Year wise Development Production Sections	IVA	HOR 1:1000 VER 1:500
11	Mine Layout Plan and Land Use Pattern	V	1:1000
12	Conceptual Plan /Final Mine Closure Plan	VI	1:1000
13	Conceptual Plan /Final Mine Closure Sections	VIA	HOR 1:1000 VER 1:500

+



**Mr.K.ILAYARAJA,**  
S/o. Mr.Krishnan,  
W10/215, Pettai, Anna Nagar,  
Karungalakudi, Melur Taluk,  
Madurai District. Tamilnadu.  
Pin code: 625101.  
Mobile No: 99434 24656

**CONSENT LETTER FROM THE APPLICANT**

The Mining Plan in respect of Rough Stone/Jelly/Sakkai quarry lease over an extent of 2.02.50 Hectares in S.F.No : 619/5 (Part) of Karungalakudi Village, Melur Taluk, Madurai District, Tamil Nadu State has been prepared by

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

I request the **Deputy Director, Department of Geology and Mining, Madurai 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)  
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E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),  
website: [www.gtmsind.com](http://www.gtmsind.com)

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

Place: Madurai, TN  
Date: 22/04/2021

*K. Ilayaraja*  
Signature of the Applicant  
(K.Ilayaraja)



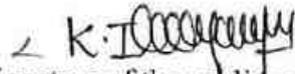
**Mr.K.ILAYARAJA**  
S/o. Mr.Krishnan,  
W10/215, Pettai, Anna Nagar,  
Karungalakudi, Melur Taluk,  
Madurai District. Tamilnadu.  
Pin code: 625101.  
Mobile No: 99434 24656

**DECLARATION**

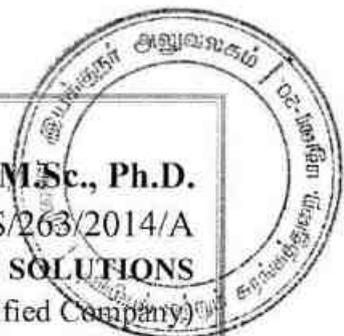
The Mining Plan in respect of Rough Stone/Jelly/Sakkai quarry lease over an extent of 2.02.50 Hectares in S.F.No: 619/5 (Part) of Karungalakudi Village, Melur Taluk, Madurai District, Tamil Nadu State have been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

**Place:** Madurai, TN

**Date:** 22/04/2021

  
Signature of the applicant  
**(K.Ilayaraja)**





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

**RQP/MAS/263/2014/A**

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website: [www.gtmsind.com](http://www.gtmsind.com)

**CERTIFICATE**

This is to certify that, the provisions of 8(8) Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of Rough Stone/Jelly/Sakkai quarry lease, over an extent of 2.02.50 Hectares, Govt Poramboke land in S.F.No: 619/5 (Part), Karungalakudi Village, Melur Taluk, Madurai District, Tamil Nadu State applied to **Mr.K.ILAYARAJA**, Madurai -625101.

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

Place: Dharmapuri, TN

Date: 22/04/2021

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](mailto:info.gtmsdpi@gmail.com)  
website : [www.gtmsind.com](http://www.gtmsind.com)

221



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

**RQP/MAS/263/2014/A**

**GEO TECHNICAL MINING SOLUTIONS**

(A NABET Accredited & ISO Certified Company)

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E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com).

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**CERTIFICATE**

Certified that, in preparation of Mining Plan for Rough Stone/Jelly/Sakkai quarry lease, over an extent of 2.02.50 Hectares of Govt Poramboke land in S.F.No: 619/5 (Part) of Karungalakudi Village, Melur Taluk, Madurai District, Tamil Nadu State prepared to **Mr.K.ILAYARAJA**, Madurai - 625101, Covers all the provisions of Mines Act, Rules, and Regulations etc made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date: 22/04/2021

Signature of the Recognized Qualified Person

**Dr. S. KARUPPANNAN, M.Sc., Ph.D.,**  
RQP/MAS/263/2014/A  
**GEO TECHNICAL MINING SOLUTIONS**  
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222

105

# MINING PLAN

## FOR KARUNGALAKUDI VILLAGE ROUGH STONE/JELLY/SAKKAI MINING LEASE INCLUDING PROGRESSIVE QUARRY CLOSURE PLAN

Govt Poramboke land /Open Cast-Semi mechanized/Manual mining/ Non-forest/  
Non-Captive use – 'B2' Category

*Lease period 5 years from the date of lease execution*

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

### **INTRODUCTORY NOTES:**

- a) **Introduction:** Special publication Roc.No.446/2020-Mines dated: 24.12.2020 and eligible Govt Poramboke lands lease quarries through tender cum action published in the District Gazette on 28.12.2020. The District Collector appointed the direct Officer and conducted tender cum auction dated on 20.01.2021, the auction held on 20.01.2021, **Mr.K.ILAYARAJA**, Madurai has requested the highest bid amount of 40,25,000/-. Therefore, the Precise area was communicated by Deputy Director, Department of Geology and Mining, Madurai vide letter no in **Roc.No.85/2021-Mines Dated 05.02.2021**, in S.F.No. 619/5 (Part) over an extent of 2.02.50 Hectare for period of 5 year as per rule 8 (8) in TNMMCR, 1959.

The Mining Plan with progressive quarry closure plan was prepared for **Mr.K.Ilayaraja** S/o. Mr.Krishnan, W10/215, Pettai, Anna Nagar, Karungalakudi, Melur Taluk, Madurai District, Tamilnadu, Pin code: 625101 of Rough Stone/ Jelly/ Sakkai quarry lease over an extent of 2.02.50Hectare of Govt Poramboke Land in S.F.No: 619/5(Part) of Karungalakudi Village, Melur Taluk, Madurai District, Tamil Nadu State.

- b) **Lease area particulars:** The Deputy Director, Geology and Mining, Madurai has directed to the applicant **Mr.K.Ilayaraja**, through his precise area communication letter **Rc.No.85/2021-Mines Dated 05.02.2021**, before execution of lease deed should submit the mining plan for approval and obtain Environmental Clearance from the competent authority of State Level Environment Impact Assessment Authority- Tamilnadu (SEIAA) and no objection certificate (NOC) from Tamilnadu Pollution Control Board (TNPCCB) as per EIA Notification 2006 and S.O.141 (E) dated 15<sup>th</sup> January, 2016, 1st July 2016 & S.O.3977 (E), dated 14th August 2018 and MoEF & CC office memorandum vide letter no. L-11011/175/2018- IA-II (M) dated: 12th December, 2018. Accordingly, the mining plan prepared for a grant of



quarrying of Rough Stone/ Jelly/ Sakkai, Govt Poramboke land, over an extent of 2.02.5 Hectares in S.F.No: 619/5 (Part) of Karungalakudi Village, Melur Taluk, Madurai District, Tamil Nadu State for a period of 5 years under Rule 8(8) of Tamil Nadu Minor Mineral Concession Rules, 1959 and before granting quarry lease with conditions of safety distance as given below,

1. Must be transported Mineral regularly paid to the seigniorage amount of the mineral as per the Minor Mineral Concession Rules, 1959 table II.
2. Nearby the Patta lands should not disrupted while quarrying and Safety distance of 7.5meters should be left out for the adjacent Patta land.
3. Nearby surrounding Habitation village peoples and Agriculture does not cause any hindrance to then while quarrying.
4. Should submit the Mining plan under the minor Mineral safety and development Concession rules 2010 included
5. Prior Environmental clearance should be obtained by the applicant for the grant of quarry lease.

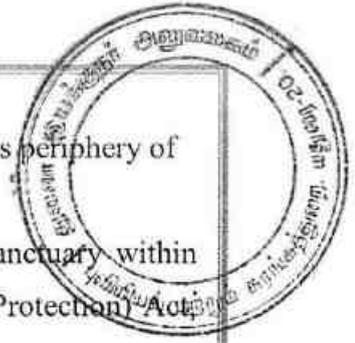
c) **Previous Lease Particulars:** There is a existing pit noticed in the proposed lease area of S.F.No. 619/5 (Part) with an average pit dimension of Pit-1 L76m X W59m X D5m. Hence, the present lease is applied for quarrying rough stone it will be continue from the existing depth. The existing pit levels are marked in the mining plan (Ref Plate No: III).

d) **Preparation and Submission of Mining Plan:** The Mining Plan along with progressive quarry closure plan has been prepared under rule 41 (3) (i) and submission under rule 41, 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for a mining lease as per conditions mentioned in the precise area communication letter Rc.No.85/2021/Mines/ Dated 05.02.2021.

e) **Geological Resources and Mineable Reserves:** Geological resource of rough stone are estimated as 661035Cbm and residual topsoil is 4141Cbm (Refer Plate No's.III & IIIA). Mineable reserves of rough stone are estimated about 221770Cbm and residual topsoil is 2506Cbm upto a depth of 35m below ground level (R.L.165-130) (Refer Plate No's. VI & VIA) after leaving necessary safety distance from the lease boundary.

f) **Proposed Production Schedule:** Total Proposed production of rough stone is 221770Cbm up to depth of 35m below ground level (R.L.165-130) (Refer Plate No's. VI & VIA) for the five years plan period. Average production shall be 44354Cbm of rough stone per year.

224  
K. Jeyapathy



**g) Environmental Sensitivity of the Proposed Lease Area: -**

1. **Interstate Boundary:** No interstate boundary around 10Km radius periphery of proposed lease area.
2. **Wildlife Protection Act, 1972:** There is no wild life animal sanctuary within radius of 10Kms from the project site area under the Wildlife (Protection) Act, 1972.
3. **Indian Reserve Forest Act, 1980:** There is no reserve forest within the 1km radius and nearest reserve forest is Valaicheripatti RF- 5.8km, Budakudimalai RF - 8.4Km are found Northwest side, Piranmalai RF - 6.9Km and Vadakkaduchedi RF-8.4Km are found in Northeast side away from the lease boundary.
4. **CRZ Notification, 1991:** There is no Sea coastal zone found around 10kms radius and this project site doesn't attract CRZ Notification, 1991.

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

- a. Wet drilling method is to be adopted to control dust emissions.
- b. Roads shall be graded to mitigate the dust emission
- c. Unnecessary land degradation should be avoided or damaged land should be reclaimed or rehabilitated.
- d. Dust Control at source while drilling and blasting,
- e. Dust suppression at loading point and transport haul roads,
- f. Noise Control in blasting, control of fly rock missiles and vibration by doing peak particle velocity with in standard as prescribed by the DGMS and MOEF.
- g. And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

**1.0 GENERAL:**

a.	Name of the Applicant	: Mr.K.Ilayaraja
	Applicant address	: S/o. Mr.Krishnan, W10/215, Pettai, Anna Nagar, Karungalakudi, Melur Taluk, Madurai District. Tamilnadu.
	District	: Madurai
	State	: Tamil Nadu
	Pin code	: 625101
	Phone	: +91 99434 24656
	Fax	: Nil
	Gram	: Nil
	Telex	: Nil

*K. Ilayaraja*



	E-mail	:	gainilaya@gmail.com	
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/Jelly/Sakkai quarry lease	
d.	Period for which the mining lease granted /renewed/ proposed to be applied	:	Mining lease were granted for the period of five years from the date of lease execution	
e.	Name of the RQP preparing the Mining Plan	:	<b>Dr. S.Karuppannan, M.Sc.,Ph.D.</b>	
	Address	:	<b>Geo Technical Mining Solutions</b> (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, +917010076633	
	Fax	:	Nil	
	e-mail	:	info.gtmsdpi@gmail.com	
	Telex	:	Nil	
	Registration Number	:	RQP/MAS/263/2014/A	
	Date of grant/renewal	:	16.12.2014	
	Valid upto	:	15.12.2024	
	f.	Reference No. and date of consent letter from the state government	:	The precise area communication letter was received from the Deputy Director, Department of Geology and Mining, District collectorate, Madurai. <b>Rc.No.85/2021-Mines Dated 05.02.2021</b>

**2.0 LOCATION AND ACCESSIBILITY:**

a.	Details of the Area:	:	Refer plate no: IA & IB
	District & State	:	Madurai, Tamil Nadu
	Taluk	:	Melur
	Village	:	Karungalakudi
	Khasra No./ Plot No./ Block Range / Felling Series etc.:	:	S.F.No:619/5(Part)
	Lease area (hectares)	:	2.02.50 Hectares
	Whether the area is recorded to be in	:	The proposed lease area is recorded as Govt

226 *[Signature]*



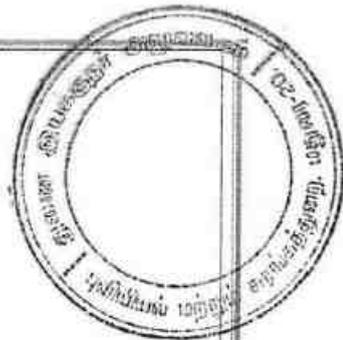
forest (please specify whether protected, reserved, etc)	:	Poramboke Land. Copy of land documents are enclosed. (Ref. Annexure No: V & VI)
Ownership / Occupancy	:	This is a Govt of Tamilnadu (Ref. Annexure No: IV & V).
Existence of Public Road / Railway line if any nearby and approximate distance	:	<ul style="list-style-type: none"> <li>❖ Exploited materials shall be transported to through the cart track is situated on the Northern side.</li> <li>❖ The SH-35 is situated about 2.5km away from the site connecting Kottampatty-Thiruppatur road situated in Northern side.</li> <li>❖ The NH-38 road is situated about 2.4kms away on the Western side which is connecting Madurai – Tiruchirapalli highway.</li> <li>❖ No Railway line situated around 5kms radius.</li> </ul>
Toposheet No. with latitude and longitude	:	Toposheet No. <b>58 J/08</b> Latitude: From 10°10'47.02"N to 10°10'53.05"N longitude: From 78°22'51.72"E to 78°23'0.92"E

Geo-Coordinates of the lease boundary:

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	10°10'52.69"N	78°23'0.92"E	9	10°10'48.12"N	78°22'51.72"E
2	10°10'50.56"N	78°22'58.81"E	10	10°10'55.29"N	78°22'53.25"E
3	10°10'49.61"N	78°22'58.57"E	11	10°10'51.01"N	78°22'54.70"E
4	10°10'50.07"N	78°22'57.06"E	12	10°10'52.83"N	78°22'57.59"E
5	10°10'47.35"N	78°22'55.09"E	13	10°10'52.75"N	78°22'59.53"E
6	10°10'47.54"N	78°22'55.06"E	14	10°10'53.05"N	78°22'59.74"E
7	10°10'47.02"N	78°22'54.09"E	15	10°10'53.03"N	78°23'0.37"E
8	10°10'48.29"N	78°22'52.71"E			

Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is a barren and waste land
b). Attach a general location and vicinity map showing area boundaries and existing and proposed access routes. It	:	Refer plate no-IA & IB

227 *[Handwritten Signature]*



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.

**d) INFRASTRUCTURE AND COMMUNICATION:**

a.	Nearest post office	:	Post office is available at Chokkalingapuram about 1.7kms away from the site towards northwest side.
b.	Nearest police station	:	Police Station is available at Chokkalingapuram about 3.1kms away from the site towards northwest side.
c.	Nearest fire station	:	Fire Station is available at Singampunari about 5.4kms away from the site towards East side.
d.	Nearest Medical facility	:	Primary health center is available at Chokkalingapuram about 1.6kms away from the site towards northwest side.
e.	Nearest school	:	Primary School Education is available at Karungalakudi about 2.4 km away from the site towards South side.
f.	Nearest Taluk road	:	The Taluk Road is situated about 2.1km away from the site connecting Kottampatty- Thiruppatur road situated in Northern side.
g.	Nearest Rail Head	:	The Nearest Railway junction is available at Madurai about 40.1 kms away from Southwest side.
h.	Nearest railway station	:	The Nearest Railway station is available at Madurai about 40 kms away from Southwest side.
i.	Nearest port facility	:	The Nearest Port is available at Tuticorin about 180kms away from Southern side of the lease area.
j.	Nearest Airport	:	The Nearest Airport is available at Madurai about 50kms away from South side of the lease area.
k.	Nearest DSP office	:	The Nearest DSP office is available at Melur about 20 kms away on the South side.
l.	Nearest Villages	:	i. North - Pandangudi - 2.6 Km ii. South - Vanjipatti - 2.3km iii. East - Chokkalingapuram - 1.89km iv. West - Ayyapatti - 1.0km



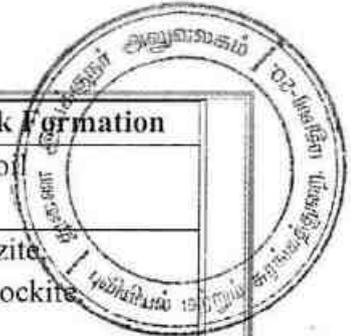
**PART - A**

**3.0 GEOLOGY AND MINERAL RESERVES:**

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

i)	Topography	: The proposed lease area is slightly elevated terrain and altitude of 166m maximum and minimum 165m from the MSL. The slope is towards Southeast side falls in Toposheet no. 58 J/08.
ii)	General Geology	: <p><b>a) Geology:</b> Geologically, the entire district can be classified into hard rock formations. Hard Rock Formation: - More than 90 percent of the district is underlain by hard rock of Archaean age. The gneissic type of formation is the major formation among the various types of hard rocks. (1) Khondalite group, (2) Charnockite group and (3) Migmatite complex. Khondalite group comprises quartzite, crystalline limestone. Charnockite group comprises pyroxene granulite and charnockite. Migmatite complex is represented by hornblende-biotite gneiss, granitic gneiss and pink migmatite.</p> <p><b>b) Soils:</b> The analysis of the soil type reveals that the study area is predominantly covered by loam soil is a mixture of sand, silt and clay.</p> <p><b>c) Lineaments:</b> A lineament may be a fault, fracture, master joint, a long and linear geological formation, vegetation served may be the result of faulting and fracturing and hence it is inferred that they are the areas and zones of increased porosity and permeability in hard rock areas. The data have been checked by field studies and Survey of India topographical maps at the 1: 1,00,000 scale.</p>

K 229



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

iii) Local / Mine Geology of :  
The Mineral Deposit

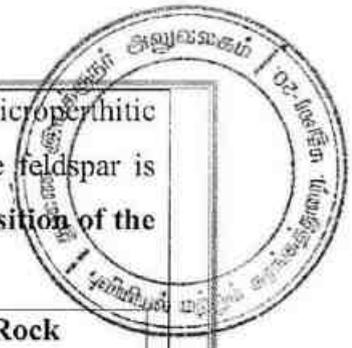
**a). Topography of the proposed lease area:**  
The proposed lease area is undulated terrain and altitude of 166m maximum and minimum 162m from the MSL. The area is sloping towards Southeast side. Charnockite composed mainly of quartz, perthite or antiperthite and orthopyroxene (usually hypersthene) formed at high temperature and pressure, commonly found in granulite facies metamorphic regions, as an end-member of the charnockite series. Charnockite is extensively quarried for rough stone productivity/ which is used as blue metals for construction of building.

**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:**  
Dark colour and clouding of the feldspars are typical features of these rocks as bluish in quartz.

**d). Chemical composition of rocks:**  
Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic ortho pyroxene granite of the series. The alkali feldspar may be intermediate between

K 230 [Signature]



		microcline and orthoclase, the fine microp <sup>er</sup> thitic texture being common; the plagioclase feldspar is usually antiperthitic. <b>Order of superposition of the proposed lease area,</b>									
		<table border="1"> <thead> <tr> <th>Age</th> <th>Group</th> <th>Rock Formation</th> </tr> </thead> <tbody> <tr> <td>Recent to Sub recent</td> <td>----</td> <td>Red soil (0-1m thick)</td> </tr> <tr> <td>Archaean</td> <td>Charnockite Group</td> <td>Charnockite.</td> </tr> </tbody> </table>	Age	Group	Rock Formation	Recent to Sub recent	----	Red soil (0-1m thick)	Archaean	Charnockite Group	Charnockite.
Age	Group	Rock Formation									
Recent to Sub recent	----	Red soil (0-1m thick)									
Archaean	Charnockite Group	Charnockite.									
(iv )	Drainage Pattern	: There are no major water bodies like rivers, etc., located within a radius of 50m and these are also ephemeral in nature and receive flow during monsoon period only. In the major part of the study area, the drainage pattern is sub-dentritic and dentritic. Radial and parallel drainage patterns are also in the study area. Most of the streams are structurally controlled.									

(b)	<i>The topographic plan of the lease area prepared on a scale of 1:1000 or 1: 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:</i>	
	a. Present status:	: No exploration carried out. Being a fresh quarry lease covered with outcrops followed by Charnockite deposit. Hence, RQP personally examined during mining survey.
	b. Surface Plan	: Surface plan is prepared as 1:1000 Scales with ground level at various places in grid pattern with various lithological factors like length, width and depth
(c)	Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:	: Geological plan is prepared as 1:1000 Scales (Plate No.III) with ground level at various places, lithological factors in grid pattern like length, width and depth and sections are prepared boundary to

231



boundary perpendicular to the strike of the rock with proper scale of 1:1000 is horizontal axis, 1:500 as vertical axis. It is given as plate No-III.

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

Year	No.of boreholes	Total meterage	No.of Pits and Dimensions	No.of Trenches and Dimensions
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

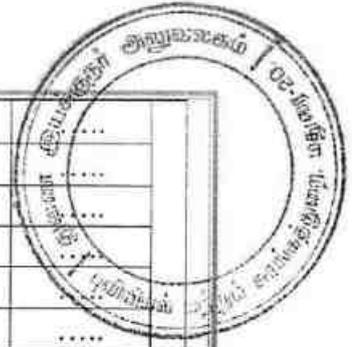
No future programme proposed in this area. Its massive Charnockites homogeneous parent rock. Hence exploration proposal is not required to this mining project.

(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 in cross section method on suitably chosen two-line axis. The longitudinal and horizontal (XY-AB) and (XY-CD) axis of deposit has been drawn. Total Geological resources have been estimated for rough stone are 661035Cbm up to a depth of 35m (Which is 1m residual topsoil+ 35m rough stone) from the terrain of (R.L.165m-130m). (Refer Plate No's. III & IIIA).

GEOLOGICAL RESOURCES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Geological Resources in CBM	Residual Topsoil in CBM
XY-AB	Slope	89	35	1	3115	.....	3115
	I	89	105	5	46725	46725	.....
	II	89	105	5	46725	46725	.....
	III	89	105	5	46725	46725	.....
	IV	89	105	5	46725	46725	.....
	V	89	105	5	46725	46725	.....
	VI	89	105	5	46725	46725	.....
	VII	89	105	5	46725	46725	.....
XY-CD	Slope	57	18	1	1026	.....	1026
	I	66	18	5	5940	5940	.....

K. 232 [Signature]



II	142	77	5	54670	54670	.....
III	142	77	5	54670	54670	.....
IV	142	77	5	54670	54670	.....
V	142	77	5	54670	54670	.....
VI	142	77	5	54670	54670	.....
VII	142	77	5	54670	54670	.....
<b>TOTAL</b>			<b>35</b>	<b>665176</b>	<b>661035</b>	<b>4141</b>

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

The Mineable reserves of rough stone estimated as **221770Cbm** up to depth of 35m (Which is 1m residual topsoil+ 35m rough stone) (R.L. 165m-130m) from surface by deducting the reserves blocked under benches from the total Geological resources and the commercially viable rough stone plan has been prepared on 1:1000 Scales (Refer plate no.VII). Sections are prepared as scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Plate No. VII).

<b>MINEABLE RESERVES</b>							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Mineable Reserves in CBM	Residual Topsoil in CBM
XY-AB	Slope	82	25	1	2050	.....	2050
	I	82	88	5	36080	36080	.....
	II	77	78	5	30030	30030	.....
	III	72	68	5	24480	24480	.....
	IV	67	58	5	19430	19430	.....
	V	62	48	5	14880	14880	.....
	VI	57	38	5	10830	10830	.....
	VII	47	28	5	6580	6580	.....
XY-CD	Slope	57	8	1	456	.....	456
	I	66	8	5	2640	2640	.....
	II	130	47	5	30550	30550	.....
	III	125	37	5	23125	23125	.....
	IV	104	27	5	14040	14040	.....
	V	82	17	5	6970	6970	.....
	VI	61	7	5	2135	2135	.....
<b>TOTAL</b>				<b>35</b>	<b>224276</b>	<b>221770</b>	<b>2506</b>

233 *[Handwritten Signature]*



**4.0 MINING:**

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

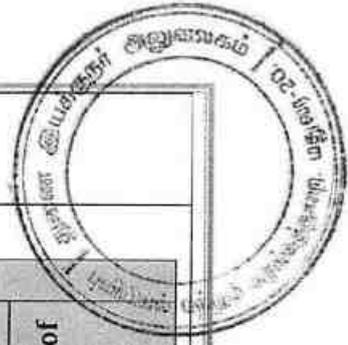
: The mining operation is open-cast, semi-mechanized/Manual Methods are adopted and on single shift basis only. Under the regulation 106 (2) (a) of the Metalliferous Mines Regulations, 1961 in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench 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.*

The proposed production of rough stone estimated as **221770Cbm** and residual topsoil **2506Cbm** up to depth of 35m (Which is 1m residual topsoil+ 35m rough stone R.L. 165m-130m) for the five years plan period. (Refer Plate No. IV & IVA). Average production shall be **44354Cbm** of rough stone per year.

Year	Pit No.(s)	Topsoil/Overburden (Cbm)	ROM (Cbm)	Saleable rough stone (Cbm) @ 100%	Rough stone rejects(Cbm)	Saleable Gravel (Cbm)	Rough stone to Overburden ratio
First	I	2506	50420	50420	---	---	1:0.005
Second	I	---	48880	48880	---	---	---
Third	I	---	47605	47605	---	---	---
Fourth	I	---	33470	33470	---	---	---
Fifth	I	---	41395	41395	---	---	---
<b>Total</b>	---	<b>2506</b>	<b>221770</b>	<b>221770</b>	---	---	<b>1:0.005</b>

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



c Composite plans and Year wise sections : Not applicable  
(In case of 'A' class mines):

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

YEARWISE PRODUCTION								
YEAR	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Production of rough stone in CBM @100%	Production of Residual Topsoil in CBM
I-YEAR	XY-AB	Slope	82	25	1	2050	.....	2050
		I	82	88	5	36080	36080	.....
		II	30	78	5	11700	11700	.....
	XY-CD	Slope	57	8	1	456	.....	456
		I	66	8	5	2640	2640	.....
II-YEAR	XY-AB	II	47	78	5	18330	18330	.....
	XY-CD	II	130	47	5	30550	30550	.....
III-YEAR	XY-AB	III	72	68	5	24480	24480	.....
	XY-CD	III	125	37	5	23125	23125	.....
IV-YEAR	XY-AB	IV	67	58	5	19430	19430	.....
	XY-CD	IV	104	27	5	14040	14040	.....
V-YEAR		V	82	17	5	6970	6970	.....
	XY-AB	V	62	48	5	14880	14880	.....
		VI	57	38	5	10830	10830	.....
		VII	47	28	5	6580	6580	.....
	XY-CD	VI	61	7	5	2135	2135	.....
<b>GRAND TOTAL</b>						<b>224276</b>	<b>221770</b>	<b>2506</b>

d. Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc. : The proposed area is fresh lease 12. (Refer Plate No: IV)

v 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 for periods and production details are given as below: -

**Rough stone:**

- Mineable reserves of rough stone = 221770 Cbm
- Five years production = 221770 Cbm
- Yearly production = 44354 Cbm
- Monthly production of rough stone = 3696 Cbm

The regular working of the quarry and its production depends upon the demand

235 *[Handwritten signature]*



from the market. Accordingly, there is a possibility to increase or decrease the production. The year wise production, anticipated the 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 upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:*

i) Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame: : Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about depth of 35m from the surface level (R.L.165m-130m) for 5-year plan period.

ii) Whether ultimate pit limit has been determined and demarcated on surface and geological plan:-  
The ultimate pit limit has been determined and demarcated at end of five years plan periods as given below

Bench	Bench R.L	Overburden/ Mineral	L (m)	W (m)	D (m)
I	R.L.166-165m	Residual Topsoil	57	33	1
	R.L.165-160m	Rough stone	148	88	5
II	R.L.160-155m	Rough stone	207	78	5
III	R.L.155-150m	Rough stone	197	68	5
IV	R.L.150-145m	Rough stone	171	58	5
V	R.L.145-140m	Rough stone	144	48	5
VI	R.L.140-135m	Rough stone	118	38	5
VII	R.L.135-130m	Rough stone	47	28	5
<b>Total Depth</b>					<b>35m</b>

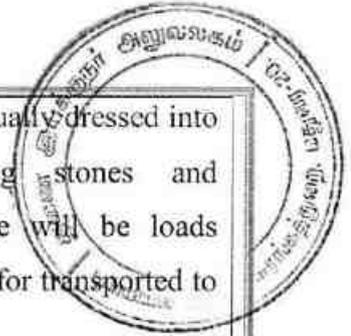
iii) Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long-term use in the event of continuation of mining activity: - : There is no waste rock will be proposed in this lease area.

iv) Whether back filling of pits after recovery of mineral upto techno-economically feasible depth envisaged. If so, describe the broad features of the proposal: - : As the depth of persistence of the deposit may zlikely to continue for further depth, it is proposed not to backfilled the quarry pit.

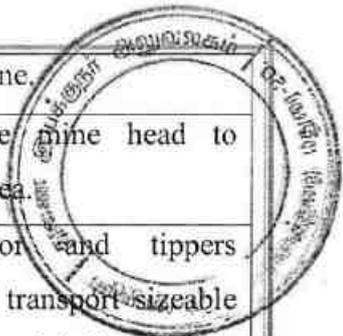


v) Whether post mining land use envisaged: -	: At the end of mining activities over the quarry pit may be utilized for fish culture or storage of rain water reservoir used for irrigation purposes.
g <b>Open cast Mines:</b>	
i). Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	: The mining operation is open-cast, semi-mechanized/ Manual Methods are adopted and on single shift basis only. Under the regulation 106 (2) (a) of the Metalliferous Mines Regulations, 1961 in all open cost 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. Hydraulic 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 & 5m width conventional opencast semi-mechanized/ Manual method. It is a semi mechanized/ Manual Method quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste will be used to liberate large block from the parent rock. The

237 *R. I. [Signature]*



		removed mass is manually dressed into small size building stones and boundary pillar stone will be loads manually into tippers for transported to the needy customer.  Bench height = 5mts. Bench width = 5mts.																					
a. Details of Topsoil/ Overburden	:	The Residual topsoil is <b>2506Cbm</b> shall be removed and shall be stacked for earth bund of lease hold area which will be used for plantation purposes.																					
b. Rough Stone waste and side burden waste: -	:	The recovery of rough stone in this quarry is 100%. There is no waste or side burden shall be proposed.																					
h <b>Underground Mines:</b>	:	Not applicable																					
i. <b>Extent of mechanization:</b> Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.																							
<b>(1) Drilling Machines:</b> Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Depth of holes shall be 1 to 2m bench height and spacing shall be 0.75m and burden shall be 0.60m from the preface. Details of drilling equipments are given below.																							
<table border="1"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Dia of hole (mm)</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Jack Hammer</td> <td>2</td> <td>32 mm</td> <td>Hand held</td> <td>Atlas copco</td> <td>Diesel</td> <td>60</td> </tr> <tr> <td>Compressor</td> <td>1</td> <td>---</td> <td>Air</td> <td>Escorts Formtrac</td> <td>Diesel</td> <td>42</td> </tr> </tbody> </table>			Type	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.	Jack Hammer	2	32 mm	Hand held	Atlas copco	Diesel	60	Compressor	1	---	Air	Escorts Formtrac	Diesel	42
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Jack Hammer	2	32 mm	Hand held	Atlas copco	Diesel	60																	
Compressor	1	---	Air	Escorts Formtrac	Diesel	42																	
<b>(2) Loading Equipment:</b> Manual Loading (Considerable rough stone accumulates the same will be loaded by Hired front end loader like JCB)																							
<b>(3) Haulage and Transport Equipment</b> (a) Haulage within the mining leasehold:																							
<table border="1"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Tipper</td> <td>2</td> <td>15 M.T</td> <td>BMW</td> <td>Diesel</td> <td>110</td> </tr> </tbody> </table>			Type	Nos	Size / Capacity	Make	Motive power	H.P.	Tipper	2	15 M.T	BMW	Diesel	110									
Type	Nos	Size / Capacity	Make	Motive power	H.P.																		
Tipper	2	15 M.T	BMW	Diesel	110																		
<i>Whether the dumpers are fitted with exhaust conditioner should be indicated:</i> The																							



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

(b) Transport from mine head to the destination : Transport from the mine head to customers crusher area.

c. Describe briefly the transport system (please specify) : Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customers crusher area.

d. Ore transported by: own trucks / hired trucks : Hired tippers and hydraulic excavator for initially production purposes.

e. Main destination to which ore is transported (giving to and from distance) : The excavated stone materials road metal will be supplied to the consumers like road laying, earth filling, building construction, etc.

f. Details of hauling / transport equipment:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	1	15 M.T	BMW	Diesel	110

**(4).Miscellaneous:**

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

(A) Operations : The mining operation is open-cast, semi-mechanized/ Manual methods are adopted and on single shift basis only.

(B) Machineries deployed : Machineries like Tractor mounted compressor attached with jack hammers is proposed to drilling and blasting. hydraulic excavators and tipper combination are adapted. refer (Part-A-4 (i))

**5 BLASTING :**

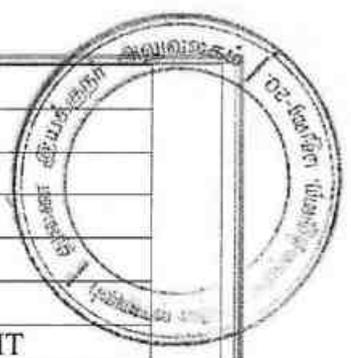
*a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.*

Blasting pattern:

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

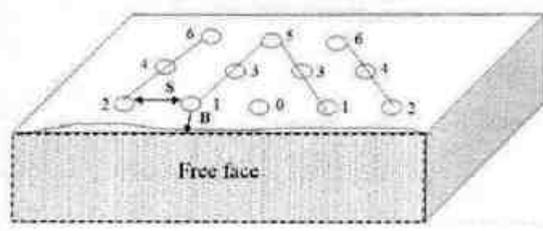
Depth of each hole	:	1.5m
Diameter of hole	:	30-32mm

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Spacing between hole	: 1.2m
Burden for hole	: 1.0m
Pattern of hole	: Zigzag -Multi rows
Inclination of hole	: 80° from horizontal
Use of delay detonators	: 25 millisecond relay
Detonating fuse	: " Detonating" cord
Quantity of rock broken per day	: 148Cbm x 2.8 = 414MT
Blasting efficiency @ 95%	: 1.05MT / hole
Charge per hole	: 140 gms of 25mm dia cartridge
Quantity of rock broken per day	: 414MT per day
Requirement of explosive per day (6M.T per kg of explosives)	: 69kg per day
Number of holes per day	414/1.05= 394 holes per day

**BLASTING PATTERN DRAWING**



**Staggered "V" pattern of blasting design**

Spacing	=	1.2m
Burden	=	1.0m
Depth of hole	=	1.5m
No of holes proposed per day	=	394holes

**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.

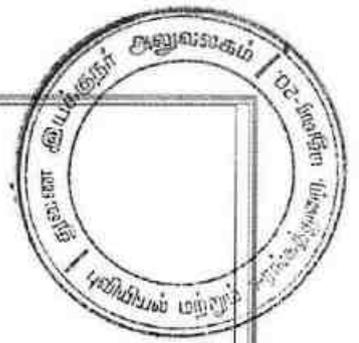
**c) Measures proposed to minimize ground vibration due to blasting:**

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

Shallow depths jack hammer 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	:	394 holes
Yield	:	414 tons
Powder factor	:	6 Tons/Kg of explosives
Total explosive required/day	:	69kg-Slurry explosives
Charge per hole	:	0.5kg
Blasting at day time only	:	12.00-1.00p.m

c) Powder factor in ore and overburden / waste / development heading / stope	:	Powder factor is proposed as 6 tones per kg of explosives
d) Whether secondary blasting is needed, if so describe it briefly	:	Irrespective of the method of primary blasting employed, it may be necessary to re-blast a proportion of the rock on the quarry floor so as to reduce it to a size suitable for handling by the excavators and crushers.
e) Storage of explosives (like capacity and type of explosive magazine)	:	<ol style="list-style-type: none"> <li>1. The applicant will engage an authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory foreman/mines manager.</li> <li>2. The blasting time at a day is proposed to be 12.00 PM to 2 PM.</li> <li>3. First Aid Box will be keeping ready at all the time.</li> <li>4. Necessary precautionary announcement will be carried out before the blasting operation.</li> </ol>

**6 MINE DRAINAGE**

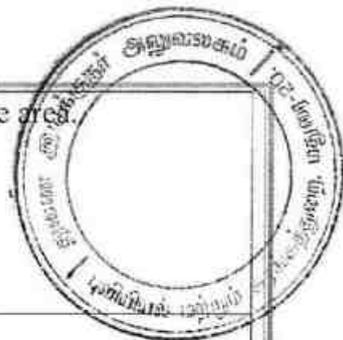
a) Likely depth of water table based on	:	The ground water table is reported as
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K241

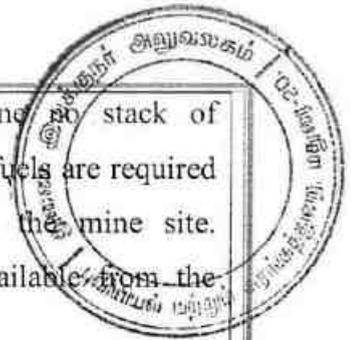


<p>observations from nearby wells and water bodies</p>	<p>of 60m in summer and 55m in rainy season from the general ground level in the adjacent bore wells of the area.</p>																												
<p>b) Workings expected to be _____ m. above / reach below water table by the year _____.</p>	<p>: Proposed mining is 35m from below the ground level. Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.</p>																												
<p>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</p>	<p>: The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300 Lpm and it shall be pumped about periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor.</p>																												
<p><b>7 STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:</b></p>																													
<p>a) Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the next five years:</p>																													
<table border="1"> <thead> <tr> <th>Year</th> <th>Topsoil/ Overburden (Cbm)</th> <th>Weathered rock/ Side burden (Cbm)</th> <th>Mineral rejects/Waste</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>2506</td> <td>---</td> <td>---</td> </tr> <tr> <td>Second</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>Third</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>Fourth</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>Fifth</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td><b>Total</b></td> <td><b>2506</b></td> <td>---</td> <td>---</td> </tr> </tbody> </table>		Year	Topsoil/ Overburden (Cbm)	Weathered rock/ Side burden (Cbm)	Mineral rejects/Waste	First	2506	---	---	Second	---	---	---	Third	---	---	---	Fourth	---	---	---	Fifth	---	---	---	<b>Total</b>	<b>2506</b>	---	---
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<b>Total</b>	<b>2506</b>	---	---																										
<p>b) Land chosen for disposal of waste with proposed justification</p>	<p>: The residual topsoil shall be removed about 2506Cbm and stacked for earth bund of safety area for afforestation and to prevent inherent entry of cattle's and human as per rules 119 (1), Metalliferous Mines Regulations, 1961.</p>																												
<p>c) Attach a note indicating the manner of</p>	<p>: There is no waste rock will be</p>																												

K. 242



<p>disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise.</p>	<p>proposed in this lease area.</p>
<p><b>8 USES OF MINERAL:</b></p>	
<p>a) Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)</p>	<p>: The excavated rough stone materials are one of the most valuable natural building materials, it is important to realize that because of their different compositions and characteristics, different stone types can be used only for specific purposes. For instance, aggregates are mostly used for building roads and footpaths., etc</p>
<p>b) Indicate physical and chemical specifications stipulated by buyers</p>	<p>: Rough stone used for its strong physical properties – crushed and sorted into various sizes for use in concrete, coated with bitumen to make asphalt or used 'dry' as bulk fill in construction. Mostly used in roads, concrete and building products. So there is no chemical specifications are specified.</p>
<p>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.</p>	<p>: Not blending process is involved.</p>
<p><b>9 OTHERS</b></p>	
<p><b>Describe briefly the following</b> a) Site services</p>	<p>: Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provide as per the Metalliferous Mines Rules, 1961 as a welfare amenity for mine laborers.</p>



Being a manual mine, no stack of spares, lubricant and fuels are required to be maintained at the mine site. Approach road is available from the mine road to the site.

b) Employment potential:  
 As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision.  
 The following man power is proposed for quarrying rough stone during the five years period the same manpower will be utilize for this Mining Plan period to achieve the proposed production and to comply the provisions of the plan land norms.

1.	Highly Skilled	Quarry Manager	1No.
		Mines Forman	---
		Mechanical Engineer	---
		Accountant cum & admin	1No.
2.	Skilled	Earth moving Operator	2 No.
		Driver	4 Nos.
		Mechanic	1 No.
		Blaster/Mat	---
3.	Semi - skilled	Helpers, Greaser's	4 Nos
4.	Unskilled	Musdoor / Labours	10Nos
		Cleaners	2Nos
		Attendant's	1No
<b>Total =</b>			<b>26Nos</b>

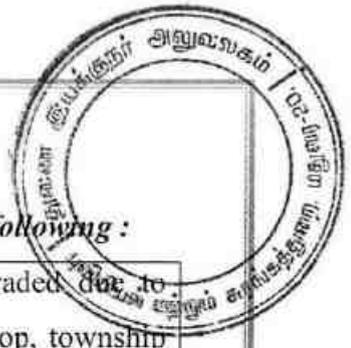
**10 MINERAL PROCESSING/BENEFICIATIONS:**

<p>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.</p>	<p>: Excavated rough stone materials shall be directly sale to the needy customer. The recovery of rough stone in this quarry is 100%.</p>
<p>b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be</p>	<p>: No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources.</p>

2 K244



<p>discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).</p>	<p>Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.</p>
<p>c) A flow sheet or schematic diagram of the processing procedure should be attached.</p>	<p>: Not applicable</p>
<p>d) Specify quantity and type of chemicals to be used in the processing plant.</p>	<p>: Not applicable</p>
<p>e) Specify quantity and type of chemicals to be stored on site / plant.</p>	<p>: Not applicable</p>
<p>f) Indicate quantity (KLD per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.</p>	<p>: Drinking is 0.250KLD, utilized water is 1.0 KLD, Dust suppression is 1.0KLD and Green Belt is 1.5KLD. Minimum quantity of water 3.750KLD per day has to be maintained as per the Mines Rules, 1960. It is proposed to make an own borewell for providing uninterrupted supply of RO drinking water, dust suppression and Green belt development.</p>



**PART - B**

**11.0 ENVIRONMENTAL MANAGEMENT PLAN :**

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

11.1	Existing land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present and proposed land use pattern is given as below.																													
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3	Roads	Nil	0.02.00																											
4	Un utilized Area	1.57.66	0.24.0																											
5	Green Belt	Nil	0.26.5																											
<b>Total =</b>		<b>2.02.50</b>	<b>2.02.50</b>																											
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 is proposed up to a depth of 35m bgl. Hence, it will not affect the ground water depletion of this area. It is proposed to make an own borewell for providing uninterrupted supply of RO drinking water, dust suppression and Green belt development.																												
11.3	Flora and Fauna	: There is no major flora found in this area and except acacia bushes, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.																												
11.4	Quality of air, ambient noise level and water	: Air or dust expected to be generated from drilling process, hauling roads, places of																												

246  
K. I. [Signature]



		excavation etc., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.																									
11.5	Climatic conditions	: The temperature ranges from a maximum of 37 °C to a minimum of 25°C. Like the rest of the state, April to June is the hottest months and December to January are the coldest. Rainfall of this area is southwest monsoon, with an onset in June and lasting up to September, brings rainfall of 517.1 mm, with September being the rainiest month.																									
11.6	<p>Human Settlement:</p> <p>The nearest villages are found in the buffer zone with population as per 2011 census. The Ayyapatti village of 1230 houses 4934 peoples both Male (2470) and Female (2464).</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Village</th> <th>Direction</th> <th>Distance in Kms</th> <th>Population</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Pandangudi</td> <td>North</td> <td>2.5</td> <td>846</td> </tr> <tr> <td>2</td> <td>Vanjipatti</td> <td>South</td> <td>2.3</td> <td>936</td> </tr> <tr> <td>3</td> <td>Chokkalingapuram</td> <td>East</td> <td>1.8</td> <td>7887</td> </tr> <tr> <td>4</td> <td>Ayyapatti</td> <td>West</td> <td>1.0</td> <td>4934</td> </tr> </tbody> </table>		S.No	Village	Direction	Distance in Kms	Population	1	Pandangudi	North	2.5	846	2	Vanjipatti	South	2.3	936	3	Chokkalingapuram	East	1.8	7887	4	Ayyapatti	West	1.0	4934
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11.7	Public buildings, places of worship and monuments	: No infrastructure like residential building, places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.																									
11.8	Attach plans showing the locations of sampling stations	: The proposed Ambient air quality, Water quality Ambient noise level and vibration are periodically tested for every season (6																									

K247



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

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

i)	<p><b>Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc:</b></p> <p>Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:</p> <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Land Use</th> <th>Present Area (Hect)</th> <th>Area in use during the quarrying period (Hect)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Under quarrying area</td> <td>0.44.84</td> <td>1.49.00</td> </tr> <tr> <td>2</td> <td>Infrastructure</td> <td>Nil</td> <td>0.01.00</td> </tr> <tr> <td>3</td> <td>Roads</td> <td>Nil</td> <td>0.02.00</td> </tr> <tr> <td>4</td> <td>Un utilized Area</td> <td>1.57.66</td> <td>0.24.0</td> </tr> <tr> <td>5</td> <td>Green Belt</td> <td>Nil</td> <td>0.26.5</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>Total =</b></td> <td><b>2.02.50</b></td> <td><b>2.02.50</b></td> </tr> </tbody> </table>		Sl. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)	1.	Under quarrying area	0.44.84	1.49.00	2	Infrastructure	Nil	0.01.00	3	Roads	Nil	0.02.00	4	Un utilized Area	1.57.66	0.24.0	5	Green Belt	Nil	0.26.5	<b>Total =</b>		<b>2.02.50</b>	<b>2.02.50</b>
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ii).	Air Quality	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.																												
iii).	Water quality	A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.																												
iv).	Noise levels	Quarrying of rough stone will be carried out by drilling and blasting by using low power																												

2 K248

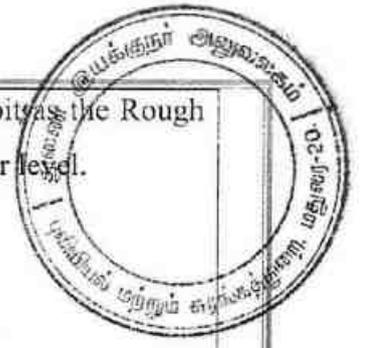


		explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)	No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles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

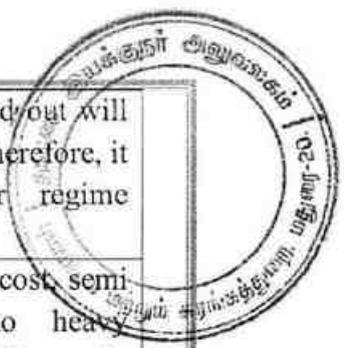
c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

i).	temporary storage and utilization of topsoil	:	There is 2506Cbm of residual topsoil shall be removed.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled	:	The present mining is proposed to an average depth of 35m (Which is 1m residual topsoil + 35m rough stone R.L. 165m-130m) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. Low lying areas with water logging shall be used for fish culture. No immediate

K. [Signature]



	<p>excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.</p>	<p>proposals for closure of pits as the Rough Stone persist still at deeper level.</p>																														
<p>iii).</p>	<p><b>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.</b></p> <p>7.5m, 10m safety barrier, nearby school area and Nearest Panchayat approach Roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Place</th> <th>Type of trees</th> <th>No. of plants</th> <th>Rate of survival</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>Lease boundary &amp; approach road</td> <td>Neem, Pungan and other regional trees</td> <td>80</td> <td>80%</td> </tr> <tr> <td>Second</td> <td>Lease boundary &amp; approach road</td> <td>Neem, Pungan and other regional trees</td> <td>80</td> <td>80%</td> </tr> <tr> <td>Third</td> <td>Lease boundary &amp; approach road</td> <td>Neem, Pungan and other regional trees</td> <td>80</td> <td>80%</td> </tr> <tr> <td>Fourth</td> <td>Lease boundary &amp; approach road</td> <td>Neem, Pungan and other regional trees</td> <td>80</td> <td>80%</td> </tr> <tr> <td>Fifth</td> <td>Lease boundary &amp; approach road</td> <td>Neem, Pungan and other regional trees</td> <td>80</td> <td>80%</td> </tr> </tbody> </table>		Year	Place	Type of trees	No. of plants	Rate of survival	First	Lease boundary & approach road	Neem, Pungan and other regional trees	80	80%	Second	Lease boundary & approach road	Neem, Pungan and other regional trees	80	80%	Third	Lease boundary & approach road	Neem, Pungan and other regional trees	80	80%	Fourth	Lease boundary & approach road	Neem, Pungan and other regional trees	80	80%	Fifth	Lease boundary & approach road	Neem, Pungan and other regional trees	80	80%
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<p>iv).</p>	<p>Stabilization and vegetation of dumps along with waste dump management Year wise for the first five years (and upto conceptual plan period for 'A' category mines).</p>	<p>: No waste or rejects shall be proposed.</p>																														
<p>v).</p>	<p>Measures to control erosion / sedimentation of water courses.</p>	<p>: Not applicable. There are no major dumps are stabilized in this quarry area.</p>																														
<p>vi).</p>	<p>Treatment and disposal of water from mine.</p>	<p>: It will not be harmful and it does not require any treatment before discharging into the natural courses.</p>																														



vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.
viii).	Protective measures for ground vibrations / air blast caused by blasting.	:	It is a small B2 category open cost semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

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

Not applicable. It is B2 category quarry

**12.0 PROGRESSIVE MINE CLOSURE PLAN:**

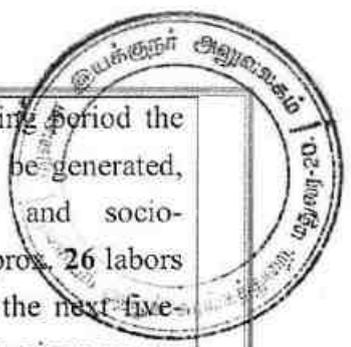
12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The present mining is proposed to an average depth of 35m below ground level (R.L.165-130m). The mined-out area will be fenced on top of open cast working with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 80 trees per year will be proposed. 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 quarry.

K. 251 *[Handwritten Signature]*



12.4	Mine closure activity	: 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 rules, 1960, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS being a mechanized operation.
12.6	Disaster management and Risk Assessment	: Open cast mining method is adopted in this quarry. If the benches are made with proposed height and width 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	: During temporary discontinuance the working place will be fenced completely and a board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.

K-252



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. 26 labors will be improved. During the next five-year compensations will be given as per rules.
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**12.9 Proposed Financial Estimate / Budget for (EMP) Environment Management:**

<b>A</b>	<b>Fixed Asset Cost:</b>	
	1. Land Cost (Tender Cost)	: Rs. 40,25,000/-
	2. Labour Shed	Rs. 1,00,000/-
	3. Sanitary Facility	: Rs. 50,000/-
	4. Fencing	: Rs. 1,00,000/-
	<b>Total</b>	<b>: Rs. 42,75,000/-</b>
<b>B</b>	<b>B. Machinery cost</b>	: <b>Rs. 10,00,000/-</b> (Hire Basis)
<b>C</b>	<b>EMP Cost: per year (Minimum 2 station * 2 season):</b>	
	1. Air quality test	: Rs. 20,000/-
	2. Water quality sampling(2No's)	: Rs. 12,000/-
	3. Noise test	: Rs. 15,200/-
	4. Soil analysis	: Rs. 16,800/-
	<b>Total cost</b>	<b>: Rs. 64,000/- per year</b>
	<b>Total cost for 5 Years</b>	<b>: Rs. 3,20,000</b>
<b>D</b>	<b>Total Expenditure cost (for five years)</b>	
	1. Drinking Water Facility	: Rs. 1,00,000/-
	2. Sanitary Maintenance	: Rs. 75,000/-
	3. Water Sprinkling	: ---
	4. Afforestation etc.,	: Rs. 1,00,000/-
	5. Safety Kits	: Rs. 50,000/-
	<b>Total</b>	<b>: Rs. 3,25,000/-</b>
<b>E</b>	<b>Total Project Cost (A+B+C+D)</b>	<b>: Rs. 59,20,000/-</b>

**13.0 FINANCIAL ASSURANCE:**

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

**14.0 CERTIFICATES:**

All required certificates are enclosed.

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**15.0 PLAN AND SECTIONS, ETC:**

Plan and Sections are submitted along with mining plan.

**16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT**

- (i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (ii) The applicant will endeavor every attempt to quarry the Rough Stone economically without any wastage and to improve the environment and ecology.
- (iii) The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued by Deputy Director, Geology and Mining, District collectorate, Madurai vide letter **Rc.No.85/2021/Mines Dated 05.02.2021.**
- (iv) Total Proposed production of rough stone is **221770Cbm** up to depth of 35m below ground level (R.L.165-130m) (Refer Plate No's. IV) for the five years plan period. Average production shall be **44354Cbm** of rough stone per year.

**17.0 CSR Expenditure:**

CSR (Corporate Social responsibility) shall provide by the lessee @ 2.5% of average net profit of the company for the last three financial years to the neighboring villages on the provisions under section 135(1) of the companies Act, 2013 and Rule 3(2) companies CSR Rules, 2014 as circular no.05/01/2014.

Place: Dharmapuri, TN

Date: 22/4/2021

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/stipulations indicated in the Mining Plan Approval

Roc. No. 85/Mines/2021 Date: 04.2021

This Mining Plan is approved based on incorporation of the particulars specified under sub rule (7) (i) to (7) (vii) & 8 of Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959 and subject to the future fulfillment of the conditions laid down under sub rule (9) of Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

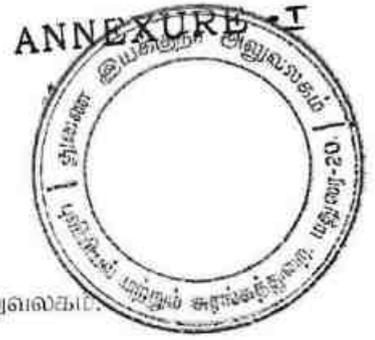
Deputy Director,  
 Geology and Mining,  
 Madurai.

K-Ilalappan

20/4/21

26/4/2021

← 169 -



புவியியல் மற்றும் சுரங்கத்துறை

ந.க.எண். 85/2021 - கனிமம்

மாவட்ட ஆட்சியர் அலுவலகம்,  
மதுரை

நாள்.05.02.2021

குறிப்பாணை

பொருள்: கனிமங்களும், சுரங்கங்களும் - மதுரை மாவட்டம் - மேலூர் வட்டம் - கருங்காலக்குடி கிராமம் - புல எண். 619/5 (Part) - 2.02.5 ஹெக்டேர் பரப்பளவில் கல்குவாரி குத்தகை உரிமம் பெண்பர் இணைந்த ஏலம் முறையில் வழங்குவது 20.01.2021 அன்று நடைபெற்ற பெண்பர் / ஏலத்தில் உயர்ந்தபட்ச ஏலத் தொகையாக ரூ.40,25,000/- திரு. K.இளையராஜா என்பவரால் ஏலம் கோரப்பட்டது - ஏலத்தொகை முழுவதும் செலுத்தப்பட்டது - கல்குவாரி செய்ய தகுதிவாய்ந்த பரப்பாக தெரிவித்தல் - தொப்பாக

- பார்வை: 1. அரசாணை எண். 169, தொழில் (எம்.எம்.சி.1) துறை, நாள். 04.08.2020.
2. வருவாய் கோட்டாட்சியர், மேலூர் அவர்களின் ந.க.எண்.12/2020/ஆ1, நாள்.04.12.2020.
3. மதுரை மாவட்ட அரசிதழ் சிறப்பு வெளியீடு எண்.17, நாள்: 28.12.2020
4. திரு. K.இளையராஜா என்பவரின் ஏல விண்ணப்பம் நாள். 20.01.2021.
5. இவ்வலுவலக குறிப்பாணை எண். 85/2021-கனிமம் நாள். 20.01.2021

திரு. K.இளையராஜா என்பவரின் கடித நாள். 03.02.2021 உடன் செலுத்துச்சீட்டு மற்றும் வங்க வரைவோலைகள்.

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பார்வை 3-ல் கண்ட மதுரை மாவட்ட அரசிதழ் சிறப்பு வெளியீட்டின்படி அரசுப் புறம்போக்கு புலங்களில் அமைந்துள்ள கல்குவாரிகளுக்கு பெண்பர் இணைந்த ஏல முறையில் குத்தகை உரிமம் வழங்கும் பொருட்டு ஆழிவிக்கை செய்யப்பட்டதற்கிணங்க 20.01.2021 அன்று பெண்பர் இணைந்த ஏலம் நடத்தப்பட்டது.

K. Ilayaraja



மாவட்ட அரசிதழ் சிறப்பு வெளியீட்டில் கண்ட வரிசை எண் 27-ல் இடம்பெற்ற குவாரியான மதுரை மாவட்டம், மேலூர் வட்டம், கருங்காலக்குடி கிராமம், புல் எண். 619/5 (Part) -ல் 2.02.5 ஹெக்டேர் பரப்பில் அமைந்துள்ள கல்குவாரிக்கு டெண்டர் இணைந்த ஏலத்தில் கலந்து கொண்ட நபர்களில் மதுரை மாவட்டம், கருங்காலக்குடியைச் சேர்ந்த திரு. K.இளையராஜா என்பவர் உயர்ந்தபட்ச ஏலத்தொகையாக ரூ. 40,25,000/- கோரியிருந்தார்.

பொது ஏலம் முடிந்தவுடன் மேற்படி குவாரிக்கு வரப்பெற்ற ஒரு மூடி முத்திரையிடப்பட்ட டெண்டர் விண்ணப்பம் பிரித்து பரிசீலனை செய்யப்பட்டது. பரிசீலனையில் மதுரை மாவட்டம், கருங்காலக்குடியைச் சேர்ந்த திரு. K.இளையராஜா என்பவர் உயர்ந்தபட்ச டெண்டர் தொகையாக ரூ.10,00,000/- கோரியிருந்தார். மேற்படி குவாரிக்கு அரசின் குறுமத்தொகை ரூ. 40,00,000/- என நிர்ணயிக்கப்பட்டு இருந்தது. திரு. K.இளையராஜா என்பவர் அரசின் குறுமத்தொகையை காட்டிலும் அதிகமாக ஏலத் தொகை ரூ. 40,25,000/- (ரூபாய் நாற்பது இலட்சத்து இருபத்து ஐந்தாயிரம் மட்டும்) கேட்டிருந்ததால் அவரை உயர்ந்தபட்ச ஏலதாரராக அறிவிக்கப்பட்டு தமிழ்நாடு சிறுகனிம சலுகை விதி 1959 - 8(5)(b)(vi)-ன்படி உடன் 10% ஏலத் தொகை ரூ.4,02,500/-ஐ செலுத்துமாறு அறிவுறுத்தப்பட்டது. அதன்படி 10% ஏலத்தொகையில் ரூ.5,02,500/- (ரூ. 4,02,500/- மற்றும் கூடுதலாக செலுத்திய தொகை 1,00,000/-) ஐ வங்கி வரைவோலையாக ரூ.20.01.2021 அன்று நேரடியாக சமர்ப்பித்தார்.

எனவே திரு. K. இளையராஜா என்பவரை தமிழ்நாடு சிறு கனிமச் சலுகை விதிகள் விதி 1959, 8(5)(b)(vii)-ன்படி மீதமுள்ள 90% ஏலத் தொகையில் கூடுதலாக செலுத்திய தொகை ரூ.1,00,000/- மற்றும் பிணை வைப்பு தொகை ரூ.25,000/- நீங்கலாக மீதமுள்ள தொகை ரூ.34,97,500/-ஐ (ரூபாய் ஒரு முப்பத்து நான்கு இலட்சத்து தொன்னூற்று ஏழாயிரத்து ஐநூறு மட்டும்) 15 (பதினைந்து) தினங்களுக்குள் செலுத்தமாறு இவ்வலுவலக குறிப்பாணை ந.க. எண். 85/2021- கனிமம், நாள். 20.01.2021-ன்படி அறிவுறுத்தப்பட்டது.

K. Ilayaraja



அதன்படி 90% ஏலத் தொகையில் கூடுதலாக செலுத்திய தொகை ரூ.1,00,000/- மற்றும் பிணை வைப்பு தொகை ரூ.25,000/- நீங்கலாக மீதமுள்ள தொகை ரூ.34,97,500/-ஐ (ரூபாய் ஒரு முப்பத்து நான்கு இலட்சத்து தொண்ணூற்று ஏழாயிரத்து ஐநூறு மட்டும்) ஐ திரு. K.இளையராஜா என்பவர் 01.02.2021, 03.02.2021 மற்றும் 04.02.2021 ஆகிய தேதிகளில் பாரத ஸ்டீல் லிமிடெட் அரகக் கணக்கில் செலுத்தி அசல் செலாவணை சமர்ப்பித்துள்ளார்.

எனவே, மதுரை மாவட்டம், மேலூர் வட்டம், கருங்காலக்குடி கிராமம், புல எண், 619/5 (Part) -ல் 2.02.5 ஹெக்டேர் பரப்பில் அமைந்துள்ள அரக புறங்கோக்கு கல்குவாரியினை 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதி 8(8)-ன்படி உயர்ந்தபட்ச ஏலதாரரான திரு. K.இளையராஜா என்பவர் பெயரில் ஊர்ஜீதம் செய்து ஐந்து வருட காலத்திற்கு உடைகல் / ஜல்லி / சக்கை குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதி திரு. K.இளையராஜா என்பவருக்கு தெரிவிக்கப்படுகிறது.

**நிபந்தனைகள்:**

1. 1959 ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகள், அட்டவணை IIல் கண்டுள்ளபடி குவாரி செய்யப்படும் கனிமங்களுக்குரிய சீனிபரேஜ் தொகை அவ்வப்போது செலுத்தி கனிமம் கொண்டு செல்லப்பட வேண்டும்.
2. அருகிலுள்ள பாட்டாதாரிகளுக்கு எவ்வித இடையூறும் ஏற்பாத வண்ணம் குவாரிப் பணி மேற்கொள்ள வேண்டும்.
3. அருகிலுள்ள கிராம மக்களின் இருப்பிற்கும் இயக்கத்திற்கும் விவசாய பணிகளுக்கும் எவ்வித இடையூறும் ஏற்பாடவண்ணம் குவாரி பணி மேற்கொள்ள வேண்டும்.
4. சுரங்கத் திட்டமானது அரைடி சிறுகனிம வளங்களை மட்டும் மேம்படுத்துதல் விதிகள் 2010ல் சொல்லப்பட்ட அனைத்து விபரங்களையும் உள்ளடக்கி இருக்க வேண்டும்.
5. சுரங்கத் திட்டத்தில் உள்ள விபரங்கள் மாநில சுற்றுச்சூழல் தாய்க் கமிட்டி ஆணையத்தின் அனைத்து விபரங்களையும் உள்ளடக்கி இருக்க வேண்டும்.

\* K. Illayaraja



மேலும் 1959-ம் வருத்திய தமிழ்நாடு சிறு கனிம சலுகை விதிகள் விதி எண். 41 மற்றும் 42-ன்டி குவாரிப்பணி மேற்கொள்வது தொடர்பாக இக்குறிப்பினை கீடைக்கர் லெற்ற 3 (மூன்று) மாத காலத்திற்குள் வரைவு கரங்கத் திட்டத்தினை சமர்ப்பிக்குமாறும். மதுரை புலியியல் மற்றும் கரங்கத்துறை ச தலி இயக்குநரால் ஏறுபிளகககககக கரங்க வரைவுத் திட்டத்தினை லெற்றும் மாதல் கற்றுக்குறல் தாக்க மதிப்பீடு லுணையத்தின் இசைவினை லெற்றும் சமர்ப்பிக்குமாறு உயர்ந்தமர்ச ஏலதாரர் திரு. K.இளையராஜா ஂன்பவரை கேட்டுக் கொள்ளப்படுகிறது.

  
இணை இயக்குநர் ச தலி இயக்குநர் (பொ).  
புலியியல் மற்றும் கரங்கத்துறை.  
மதுரை

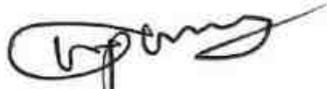
பெறுநர்:

திரு. K. இளையராஜா.  
து/பொ. கிருஷ்ணன்.  
W10, 215, கே. என். சாண்டிராநகர், கருங்காலக்குடி  
மேலும் வி. ம்.  
மதுரை மாவட்டம்.

$\frac{4}{20/10/59}$

பதவுத் தபால் அஞ்சல் அட்டையுடன்

இணைப்பு: குவாரி புல் வரைபடம்.

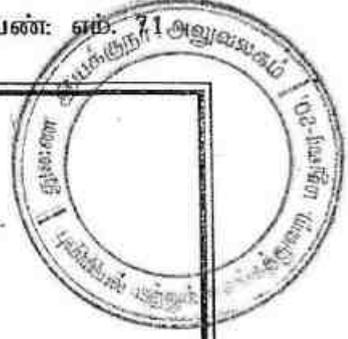
  
Dr. S. KARUPPANNAN, M.Sc., Ph.D.,  
RQP/MAS/263/2014/A



## மதுரை மாவட்ட அரசிதழ்

சிறப்பு வெளியீடு

ஆணையின்படி வெளியிடப்பட்டது

மதுரை, டிசம்பர் 28, 2020  
மார்கழி 13, சார்வரி, திருவள்ளூர் ஆண்டு-2051

[எண் 17]

## மாவட்ட ஆட்சியர் அறிவிக்கை

(ந.க.எண். 446/2020 - கனிமம், நாள். 24.12.2020)

மதுரை மாவட்டத்தில் அரசு புறம்போக்கு நிலங்களில் தேர்வு செய்யப்பட்டுள்ள கல் குவாரியிலிருந்து சாதாரண பொது உபயோக சிறு கனிமங்களைக் குவாரி செய்து எடுத்து செல்வதற்கான குத்தகை உரிமம் வழங்க வேண்டி மூடி முத்திரையிட்ட டெண்டர் விண்ணப்பங்கள் கோருதல் மற்றும் பொது ஏல அறிவிப்பு.

(அ) 1959 ஆம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் விதி 8-ன் உள்விதி (1)-ன்படி இந்த அறிவிக்கையுடன் இணைக்கப்பட்டுள்ள அட்டவணையில் குறிப்பிடப்பட்டுள்ள அரசுப் புறம்போக்கு நிலங்களில் அமைந்துள்ள கல்குவாரிகளிலிருந்து கட்டுமானப் பணிக்குப் பயன்படும் சாதாரண உடைகல், குண்டுக்கல், சக்கைக்கல், ஜல்லி வெட்டி எடுத்துச் செல்ல ஏற்கனவே கல் உடைக்கப்பட்ட குவாரிக்கு ஐந்து ஆண்டு காலத்திற்கும், கல் உடைக்கப்படாத குவாரிக்கு பத்து ஆண்டு காலத்திற்கும் குத்தகை பெற மூடி முத்திரையிடப்பட்ட மறைமுக டெண்டருடன் இணைந்த திறந்த முறை ஏலத்தின் மூலம் குவாரி குத்தகை கோரும் டெண்டர் மனுக்கள் முப்பிரதிகளில் மதுரை மாவட்ட ஆட்சியரால் 19.01.2021 மாலை 5.00 மணி வரையிலும் வரவேற்கப்படுகிறது.

(ஆ) திறந்த முறை ஏலம் மற்றும் மறைமுக டெண்டர் உறைகள் திறப்பது ஆகிய நடைமுறைகள் மதுரை மாவட்ட ஆட்சியர் அலுவலக வளாகத்தில் உள்ள கூட்ட அரங்கில் 20.01.2021 அன்று காலை 11.00 மணிக்கு தொடங்கி நடத்தப்படும்.

[1]



### பகுதி - I மனு செய்வதற்கான நிபந்தனைகள்

1. இவ்வறிக்கை தொடர்பான குவாரி குத்தகை கோரும் டெண்டர் மனுக்கள் 1959-ஆம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகளின் இணைப்பு VI-ல் கண்டுள்ள படிவத்தில் அசல் மற்றும் இரண்டு நகல்களுடன் கொடுக்கப்பட வேண்டும். அதன் மாதிரிப்படிவம் இவ்வறிக்கையின் கடைசியில் இணைக்கப்பட்டுள்ளது. பிற்சேர்க்கையில் பிரசுரிக்கப்பட்டுள்ள படிவம் VI-ன்படி பூர்த்தி செய்து அனுப்பப்படாத விண்ணப்பங்கள் ஏற்றுக்கொள்ளப் படமாட்டாது. மேற்படி படிவம் VI-ன்படி உரிய இணைப்புகளுடன் இல்லாத விண்ணப்பங்கள் மாவட்ட ஆட்சியரால் நிராகரிக்கப்படும்.

2. இந்த அறிவிக்கையின் இறுதியில் கண்டுள்ள அட்டவணையில் கொடுக்கப்பட்ட ஒவ்வொரு இனத்திற்கும் தனித்தனியாக மனுக்கள் கொடுக்கப்பட வேண்டும்.

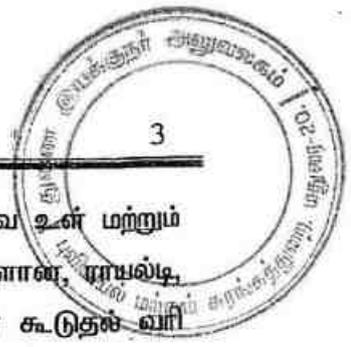
3. டெண்டர் மனுவுடன் கீழ்கண்ட சான்றிதழ்கள் மற்றும் ஆவணங்கள் அசல் மற்றும் இரண்டு நகல்களில் முறையே அசல் மற்றும் நகல் மனுக்களுடன் இணைத்து கொடுக்கப்பட வேண்டும்.

(அ) திரும்பப்பெற இயலாத விண்ணப்ப படிவ கட்டணமான ரூ.1500/-ஐ அரசு கருவூலத்தில் செலுத்திய சலான் மனுவுடன் இணைக்க வேண்டும் அல்லது ஏதேனும் ஒரு தேசியமயமாக்கப்பட்ட வங்கியில், வங்கி வரைவோலை (Demand Draft) "மாவட்ட ஆட்சியர், மதுரை" என்ற பதவி குறிப்பிட்டு எடுத்து இணைக்கப்பட வேண்டும்.

(ஆ) பிணை வைப்புத் தொகையாக (Earnest Money Deposit) ரூ.25,000/- மட்டும் மாவட்ட ஆட்சியர், மதுரை என்ற பெயருக்கு ஏதேனும் ஒரு தேசிய மயமாக்கப்பட்ட வங்கியில் வங்கி வரைவோலை (Demand Draft) பெற்று மனுவுடன் இணைக்கப்பட வேண்டும். தனி நபர் பெயருக்கு எடுத்துக் கொடுக்கப்படும் வங்கி வரைவோலை ஏற்றுக்கொள்ளப்பட மாட்டாது.

(இ) டெண்டர் மனுதாரர், தான் மறைமுகமாக குறிப்பிடும் அதிகபட்ச டெண்டர் தொகையில் 10 சதவீதம் தொகைக்கான வங்கி வரைவோலையை (Demand Draft) ஏதேனும் ஒரு தேசியமயமாக்கப்பட்ட வங்கியில் "மாவட்ட ஆட்சியர், மதுரை" என்ற பெயரில் மனுவுடன் இணைக்க வேண்டும்.

(ஈ) டெண்டர் மனுதாரர் தனியாகவோ அல்லது மற்றவருடன் கூட்டாகவோ இணைந்து தமிழ்நாட்டில் எந்தவொரு மாவட்டத்திலும் (i) ஏற்கனவே காலாவதியான குவாரி குத்தகை விபரம், (ii) நடப்பில் உள்ள குவாரி குத்தகை விபரம், (iii) குத்தகை கோரி மனு செய்யப்பட்டு, நிலுவையில் உள்ள மனுக்கள் விபரம் மற்றும் (iv) தற்போதைய மனுவுடன் ஒரே நேரத்தில் வேறு பகுதியில் குத்தகை கோரும் மனுக்கள் விபரம் ஆகியவைகள் அடங்கிய ஆணை உறுதி ஆவணத்தை, சான்று உறுதி அலுவலரின் ஒப்புதல் பெற்று இணைக்க வேண்டும்.



(உ) டெண்டர் மனுதாரர் நிபந்தனை (ஈ) யில் கண்ட விபரப்படி ஏற்கனவே உள் மற்றும் வெளி மாவட்டங்களில் குவாரி குத்தகை பெற்றிருப்பவராயின் சுரங்க வரியினங்களான, ராயல்டி, சீனியரேஜ் தொகை, முடக்குவரி, பரப்புவரி, ஸ்தலவரி மற்றும் ஸ்தல வரிக்கான கூடுதல் வரி மற்றும் அபராதம் ஏதேனும் விதிக்கப்பட்டிருப்பின் அந்த தொகைகளை செலுத்தியதற்கான "சுரங்க வரி நிலுவையில்லா சான்று" பெற்று ஒப்படைக்க வேண்டும்.

(ஊ) டெண்டர் மனுதாரர், வருமானவரி செலுத்துபவராக இருப்பின், செல்லுபடியாகத்தக்க வருமானவரிச் சான்று பெற்று ஒப்படைப்பதுடன் (i) நாளது தேதிவரை வருமான வரி தொடர்பான கணக்குகளை அத்துறைக்கு சமர்ப்பித்ததாகவும், (ii) 1961-ம் ஆண்டு வருமான வரிச் சட்டத்தின்படி சுய கணக்கீடு செய்து அதன் அடிப்படையில் வருமான வரி செலுத்தியதாகவும் குறிப்பிட்டு, ஆணை உறுதி ஆவணத்தில் ஒப்பமிட்டு சான்று உறுதி அலுவலரின் ஒப்புதல் பெற்று மனுவுடன் இணைக்க வேண்டும்.

(எ) மேற்கண்ட ஆணை உறுதி வாக்குமூலங்கள் (Affidavit) ரூ.20/- மதிப்புள்ள முத்திரைத்தாள்களில் நோட்டரி பப்ளிக் முன்பு கையொப்பமிட்டதாக இருக்க வேண்டும்.

4. மேற்கண்ட இணைப்புகளுடன், அசல் மனு மற்றும் இரண்டு நகல்கள் ஆகியவற்றை எழுத்துக்கள் தெரியாத வகையில் உள்ள காகித உறையிலிட்டு, அதில் வேண்டிய இடங்களில் அரசுக்கு கொண்டு சீல் வைத்து பின்னர் உறையின் மேல் அட்டவணையில் கண்ட குவாரி வரிசை எண், கிராமம் மற்றும் புல எண்ணைக் குறிப்பிட்டு, குத்தகை கோரும் டெண்டர் மனு என்று தலைப்பிட்டும், அதன் கீழ் டெண்டர் மனுதாரரின் பெயர் மற்றும் சரியான முகவரி எழுதியும், பெறுநர், "மாவட்ட ஆட்சியர், மதுரை மாவட்டம்" என்று தெளிவாகவும் எழுதி கீழ் குறிப்பிடப்பட்ட அலுவலருக்கு 19.01.2021 அன்று மாலை 5.00 மணிக்குள் கிடைக்குமாறு அனுப்பி வைக்க வேண்டும்.

உதவி இயக்குநர்,  
புவியியல் மற்றும் சுரங்கத்துறை,  
மாவட்ட ஆட்சியர் அலுவலகம்,  
மதுரை

5. நேரடியாக அலுவலகத்தில் கொடுக்கப்படும் முத்திரை இடப்பட்ட டெண்டர் உறைகளை பெற்றுக் கொண்டமைக்கான தமிழ்நாடு சிறுகனிம சலுகை விதிகள், 1959-ன் பின்னிணைப்பு IX-ல் கண்ட படிவத்தில் ஒப்புதல் கடிதம் வழங்கப்படும். பதிவுத்தபாலில் அனுப்பி வைக்கப்படும் உறைகளுக்கு, அவை அலுவலகத்தில் கிடைக்கப்பெறும் நாளிலிருந்து மூன்று தினங்களுக்குள் ஒப்புதல் கடிதம் அனுப்பி வைக்கப்படும்.

← K. Ilayappan



6. குறிப்பிட்ட காலக்கெடு முடிந்த பின்னர், அலுவலரால் பெறப்படும் முத்திரை வைத்த டெண்டர் உறைகள் மற்றும் உறையின் மீது பெறுநர் "மாவட்ட ஆட்சியர், மதுரை மாவட்டம்" எனக் குறிப்பிடப்படாத டெண்டர் உறைகள் ஏற்றுக்கொள்ளப்படாமலேயே டெண்டர் மனுதாரருக்கு திருப்பப்படும்.

7. டெண்டர் விண்ணப்பப்படிவத்தில் மனுச் செய்யும் நபர்கள் தாங்கள் மனுச் செய்யும் குவாரிக்கு குத்தகையாகச் செலுத்த விரும்பும் தொகையை விண்ணப்பத்தில் குறிப்பிடாமல் இருந்தாலோ, அல்லது பிணை வைப்புத் தொகைக்கான காசோலைகளை விண்ணப்பத்தில் இணைக்காமல் இருந்தாலோ, விண்ணப்பதாளில் விண்ணப்பதாரர் தன் கையொப்பம் செய்யாமல் இருந்தாலோ, தமிழ்நாடு சிறு கனிம சலுகை விதிகளில் கூறப்பட்ட ஆணை உறுதி வாக்கு மூலங்கள் எதுவும் இணைக்கப்படாமல் இருந்தாலோ, மேற்படி டெண்டர் விண்ணப்பம் மாவட்ட ஆட்சியரால் அல்லது அவரால் அங்கீகரிக்கப்பட்ட அலுவலரால் நிராகரிக்கப்படும்.

8. மேற்குறிப்பிட்டவாறு விண்ணப்பம் நிராகரிக்கப்பட்ட டெண்டர் விண்ணப்பதாரர்களுக்கு டெண்டர் திறக்கும் சமயத்தில் அவர் இருந்திருப்பின் மாவட்ட ஆட்சியர் அல்லது அவரது அங்கீகாரம் பெற்றுள்ள அலுவலரால் விண்ணப்பதாரரிடம் தக்க ஒப்புதல் பெற்று காசோலை திருப்பி வழங்கப்படும். டெண்டர் திறக்கும் சமயத்தில் ஆஜரில் இல்லாத நபருக்கு பதிவஞ்சல் கடிதத்தில் கேட்பு காசோலை (Demand Draft) தனியே அனுப்பி வைக்கப்படும். ஆனால் அவ்வாறான விண்ணப்பதாரர் ஏலத்தில் அதிகத் தொகைக்கு ஏலம் கேட்டிருந்து, ஏற்கனவே பிணை வைப்புத் தொகையும் செலுத்தியிருப்பின் அவரது விண்ணப்பம் ஏற்றுக் கொள்ளப்படும்.

9. முன் குறிப்பிடப்பட்ட நிபந்தனைகளின்படி பெறப்பட்ட டெண்டர் உறை அனுப்பிய மனுதாரர்கள் டெண்டர் உறைகள் திறக்கப்படும் போது ஏல அரங்கில் இருக்க அனுமதிக்கப்படுவர்.

10. அலுவலரால் பெறப்பட்ட முத்திரை இடப்பட்ட டெண்டர் உறைகள் திறக்கப்படுவதற்கு முன் இந்த அறிவிக்கையுடன் இணைக்கப்பட்டுள்ள அட்டவணையில் குறிப்பிடப்பட்ட ஒவ்வொரு இனங்களுக்கும் திறந்த முறை பொது ஏலம் 20.01.2021 அன்று காலை 11.00 மணியளவில் தொடங்கி தொடர்ந்து நடத்தப்படும்.

K. I. [Signature]



**பகுதி - II திறந்த முறை பொது ஏலத்தில் கலந்து கொள்வதற்கான நிபந்தனைகள்**

1. பொது ஏலத்தில் கலந்து கொள்ள விரும்புவார் பகுதி I-ல் குறிப்பிடப்பட்டவாறு மனு மற்றும் ஆவணங்களை அசல் மற்றும் இரண்டு நகல்களுடன் ஏல நாளான 20.01.2021 அன்று காலை 11.00 மணிக்கு ஒவ்வொரு கல்குவாரிக்கும் பொது ஏலம் நடக்கும் போது நேரிடையாக பொது ஏலத்தில் கலந்து கொள்ளலாம்.

2. திறந்த முறை ஏலத்தில் கலந்து கொள்ள மனு கொடுப்போர், மனுவின் இனம் 9-ல் கண்டுள்ள வினாவில் டெண்டர் / கேட்புத் தொகை குறிப்பிடத் தேவையில்லை.

3. மூடி முத்திரையிடப்பட்ட உறையின் மூலம் டெண்டர் மனு கொடுத்துள்ள நபர் இரண்டாம் முறையாக மனு கொடுக்க தேவையில்லை. ஆனால் அவர்கள் நேரடியாக திறந்தமுறை பொது ஏலத்திலும் கலந்து கொள்ளலாம்.

4. முத்திரை இடப்பட்ட டெண்டர் உறை கொடுத்துள்ள மனுதாரர் மற்றும் பொது ஏலத்தில் கலந்து கொள்ள உள்ள மனுதாரர் ஆகியோர், பொது ஏலத்தில் கலந்து கொள்ள இயலாத நிலையில் அவர்களது நியமனம் பெற்ற மற்றொரு நபர் மனுதாரரின் ஒப்புதல் கடிதம் பெற்று அதனை சான்று உறுதி அலுவலரின் மேலொப்பம் பெற்று அதனையும், விண்ணப்பம் கொடுத்ததற்கான அலுவலரிடமிருந்து பெறப்பட்ட அசல் ஒப்புதல் கடிதத்தையும் ஏலம் நடத்தும் அலுவலரிடம் ஒப்படைத்துவிட்டு, ஏலத்தில் கலந்து கொள்ள வேண்டும். ஏலம் முடிவடைந்தவுடன் அலுவலர் கொடுத்த ஒப்புதல் கடிதம் மட்டும் திரும்ப ஒப்படைக்கப்படும்.

5 (அ) மாவட்ட ஆட்சியரோ அல்லது அவரது அதிகார அனுமதி பெற்ற அலுவலரோ குவாரி குத்தகை தொடர்பாக திறந்தமுறை ஏலம் நடத்துவார். அப்போது திறந்தமுறை ஏலத்திற்கு மனு கொடுத்தவர்கள் மற்றும் டெண்டர் உறை கொடுத்தவர்களும் தான் கொடுக்க விரும்பும் ஏலத்தொகையை கூற அனுமதிக்கப்படுவர்.

(ஆ) மனுதாரர் அல்லது அவரது அதிகாரம் பெற்ற நபர் யாரேயினும் ஏலத்தில் கலந்து கொள்ளாதபோதும், ஏலம் நடத்தப்பட்டு டெண்டர் உறைகள் திறக்கப்பட்டு விதிமுறைகளின்படி, மேல்நடவடிக்கை தொடரப்படும்.

K. J. [Signature]



6. ஏலம் முடிந்தபின் ஏலம் நடத்தும் அலுவலர், திறந்தமுறை ஏலத்திற்குப் பெறப்பட்ட மொத்த மனுக்களின் எண்ணிக்கை மனு கொடுத்துள்ளவர்களின் பெயர், அதிகப்பணக் கூறப்பட்ட ஏலத் தொகையை குறிப்பிட்டு ஏலம் கூறிய நபர் மற்றும் முகவரி ஆகியவற்றை ஏலம் நடத்தப்படும் இடத்திலேயே அறிவிப்பார்.

7. பின்னர் குத்தகை கோரி பெறப்பட்ட எல்லா மூடி முத்திரை இடப்பட்ட டெண்டர் உறைகளும் திறக்கப்பட்டு, அவற்றில் உள்ள மனுக்கள், ஏலதாரர்கள் மற்றும் டெண்டர்தாரர்கள் முன்னிலையில் ஆய்வு செய்யப்படும்.

8. பகுதி-I-ல் கண்ட நிபந்தனை 3-ல் குறிப்பிடப்பட்டுள்ள ஆவணங்கள் மற்றும் தொகைக்கான வரைவோலைகள் இணைக்கப்படாத மனுக்களும், மனுவின் இனம் 9-ல் டெண்டர் தொகைக்கான குறிப்பிடாத மனுக்களும், டெண்டர்தாரரின் கையொப்பம் இடப்படாத மனுக்களும் தவறான விபரங்கள் எழுதப்பட்ட மனுக்களும் செல்லத்தகாதவை என்று முடிவு செய்யப்பட்டு ஏலக்கூட்டத்திலேயே அறிவிக்கப்படும். இதற்கான தனியே எழுத்து மூலமாக ஆணை ஏதும் பிறப்பிக்கப்பட மாட்டாது. இதுபற்றி மனுவின் மீது விபரம் எழுதப்பட்டு டெண்டர்தாரரின் ஒப்புதல் பெறப்படும்.

9. செல்லுபடியாகத்தக்க மனுக்கள் ஆய்வு செய்யப்பட்டு அவற்றில் அதிகபட்ச டெண்டர் தொகை குறிப்பிடப்பட்டுள்ள டெண்டர்தாரரின் பெயர் மற்றும் முகவரி ஆகியவை ஏலக்கூட்டத்தில் அறிவிக்கப்படும்.

10. ஒவ்வொரு குவாரிக்கும் பெறப்பட்ட டெண்டர் விண்ணப்பங்களில் குறிப்பிடப்பட்டுள்ள அதிகபட்சமான குத்தகைத்தொகை அல்லது ஏலத்தின் மூலம் கேட்கப்படும் அதிகபட்ச ஏலத்தொகை இவற்றில் எது அதிகமோ அந்த தொகைக்கு டெண்டர்/ஏலம் கேட்ட நபர் குத்தகை பெற தகுதியானவர் என ஏல அரங்கில் மாவட்ட ஆட்சியர் அல்லது மாவட்ட ஆட்சியரால் அங்கீகரிக்கப்பட்ட அலுவலரால் அறிவிக்கப்படும்.

11. முதல் நிலை பொது ஏலத்தில் கூறப்பட்ட அதிகபட்ச ஏலத் தொகையைவிட அதிகமாக மறைமுக டெண்டர் முறையில் இரண்டு அல்லது அதற்கு மேற்பட்ட நபர்கள் ஒரே டெண்டர் தொகை குறிப்பிட்டிருந்தால் அவ்வாறு குறிப்பிட்ட டெண்டர்தாரர்களிடையே இரண்டாம் நிலை திறந்த முறை பொது ஏலம் நடத்தப்பட்டு, அதில் அதிகத்தொகை செலுத்த முன் வருபவர் குவாரி குத்தகை பெற தகுதியானவர் என்று அறிவிக்கப்படுவார்.

K. Ilayappan



12. முதல் நிலை திறந்த முறை பொது ஏலத்தில் கூறப்பட்ட அதிகபட்ச ஏலத் தொகையும் மறைமுக டெண்டர் முறையில், குறிப்பிட்ட அதிகபட்ச டெண்டர் தொகையும், ஒரே தொகையாக இருந்தால் அவ்விரு தொகைகளை கூறிய நபர்களிடையே இரண்டாம் நிலை திறந்த முறை ஏலம் நடத்தப்பட்டு அதில் அதிகத்தொகை செலுத்த முன்வருபவர் குவாரி குத்தகை பெற தகுதியானவர் என்று அறிவிக்கப்படுவர்.

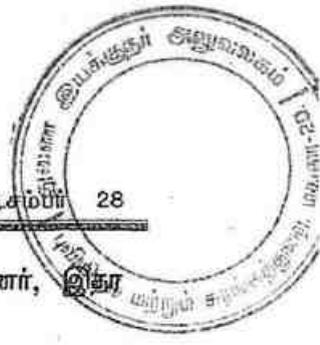
13. (அ) அதிகபட்ச ஏலத் தொகை கோரி குவாரி குத்தகை பெற தகுதியானவர் என்று அறிவிக்கப்பட்ட நபர், அதிகபட்ச ஏலத் தொகையில் 10% சதவீத தொகையை உடனடியாக ஏலம் நடத்திய அலுவலரிடம் செலுத்தி ஒப்புதல் கடிதம் பெற்றுக் கொள்ள வேண்டும். மீதி 90% சதவீதத் தொகையை ஏலம் நடைபெறும் நாளிலிருந்து ஏழு நாட்களுக்குள் செலுத்தக் கோரி அறிவிப்பு ஒப்புதல் கடிதத்திலேயே குறிப்பிடப்பட்டிருக்கும்.

(ஆ) மேலே குறிப்பிட்டவாறு அந்தந்த குவாரிக்கான ஏலக்கேட்பு முடிவு செய்யப்பட்ட உடன் 10% சதவீத தொகை செலுத்தாத பட்சத்தில் அந்த நபரால் ஏற்கனவே அரசுக்கு வாங்கி வரைவோலை மூலம் செலுத்தியுள்ள தொகைகள் அரசுடமையாக்கப்படும்.

14. (அ) நிபந்தனை 13-ன்படி அதிகபட்ச ஏலத் தொகை கூறி குத்தகை பெறத் தகுதியானவர் என்று அறிவிக்கப்பட்ட நபர் உடனடியாக 10% சதவீத தொகை செலுத்தாத நிலையில், அவருக்கு அடுத்தபடியாக அதிக ஏலத் தொகை அல்லது டெண்டர் தொகை குறிப்பிட்ட நபரின் ஏலத்தொகை ஏற்புடையதாக இருக்கும் பட்சத்தில் குத்தகை பெறத் தகுதியானவர் என்று அறிவிக்கப்பட்டு அவர் குறிப்பிட்டுள்ள குத்தகைத் தொகையில் பத்து சதவீதத் தொகையை உடனே செலுத்துமாறு கோரப்படுவார். உரிய தொகையை அவர் அரசுக்குச் செலுத்தினால் அவர் குத்தகை பெறத் தகுதியானவர் என்று அறிவிக்கப்படுவார்.

(ஆ) மேற்கண்டவாறு குத்தகை பெற தகுதியானவர் என்று அறிவிக்கப்பட்ட இரண்டாவது நபரும் 10% சதவீத தொகை செலுத்தாத போது மேற்கண்ட வழிமுறையை மாவட்ட ஆட்சியர் மீண்டும் நடைமுறைப்படுத்தலாம் அல்லது ஏலத் தொகை ஏற்புடையது அல்ல என்று மாவட்ட ஆட்சியர் கருதினால் உரிய குவாரியை மறு டெண்டர் / ஏலம் மூலம் குத்தகைக்கு விடலாம்.

*K. Ilappan*



15. குவாரி குத்தகை பெற தகுதியானவர் பெயர் அறிவிக்கப்பட்ட பின்னர், இந்ர மனுதாரருக்கு வரைவோலையை திரும்ப வழங்க பின்னர் நடவடிக்கை எடுக்கப்படும்.

16. (அ) குத்தகை பெற தகுதியானவர் என்று அறிவிக்கப்பட்ட நபர் நிலுவையிலுள்ள 90% சதவீத குத்தகைத் தொகையை ஏலம் நடைபெறும் நாளிலிருந்து ஏழு நாட்களுக்குள் அதனை அரசுக்கு செலுத்த வேண்டும்.

(ஆ) உயர்ந்த பட்ச ஏலதாரர்/டெண்டர்தாரர் என அறிவிக்கப்படும் நபர் குத்தகை தொகை செலுத்துவதுடன், குத்தகை தொகைக்கு உண்டான வருமான வரி 2% செலுத்தப்படவேண்டும். செலுத்தப்பட்ட வருமானவரிக்கு 10% கூடுதல் வரி செலுத்தப்பட வேண்டும். மேலும் செலுத்தப்பட்ட வருமானவரி மற்றும் கூடுதல் வரிக்கு 3% தீர்வை செலுத்தப்படவேண்டும்.

(இ) மேற்குறிப்பிட்ட 90% சதவீதத் தொகை குறிப்பிட்ட காலத்திற்குள் செலுத்தப்படாவிட்டால், குத்தகை கோரும் நபர் ஏற்கனவே செலுத்தியுள்ள 10 சதவீத தொகை மற்றும் முன்வைப்பு தொகையான ரூ.25,000/- ஆகியவை அரசுடமையாக்கப்படும்.

(ஈ) நிபந்தனை 16(அ)-ன்படி குத்தகைத் தொகை செலுத்தப்படாதபோது தொகை செலுத்தக் கோரப்பட்ட நபருக்கு அடுத்தபடியாக அதிக தொகை செலுத்த டெண்டர் / ஏலம் கூறிய நபர் குத்தகை பெறத் தகுதியானவர் என்று எழுத்து மூலம் அறிவிக்கப்பட்டு அவர் கூறிய மொத்த ஏலத்தொகையை பத்து நாட்களுக்குள் அரசுக்கு செலுத்துமாறு கோரப்படும்.

(உ) நிபந்தனை 16(இ)-ன்படியும் கோரப்பட்ட குத்தகைத் தொகை செலுத்தப்படா விட்டால், தொடர்புடைய கல்குவாரி டெண்டர் / பொது ஏலம் மூலம் குத்தகைக்கு விட மறு அறிவிப்பு செய்யப்பட்டு நடவடிக்கை தொடரப்படும்.

17. (அ) குவாரி குத்தகை கோரி ஒரே ஒரு மறைமுக டெண்டர் மனு கொடுக்கப்பட்டு திறந்த முறை பொது ஏலத்தில் கலந்து கொள்ள யாரும் முன்வரவில்லையெனில், டெண்டர் தொகை அரசுக்கு ஆதாயமானது என்று மாவட்ட ஆட்சியர் கருதினால், அந்த டெண்டர் மனுதாரருக்கு குவாரி குத்தகை வழங்க மாவட்ட ஆட்சியர் ஒப்புதல் அளிக்கலாம். டெண்டர் தொகை அரசுக்கு ஆதாயமானதல்ல என்று மாவட்ட ஆட்சியர் கருதும் பட்சத்தில், மனுவைத் தள்ளுபடி செய்து ஆணையிடப்பட்டு மறு ஏலத்தின் மூலம் குவாரி குத்தகை வழங்க மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு.

K. Illuppu

(ஆ) இரண்டு அல்லது அதற்கு அதிகமான மனுக்கள் பெறப்பட்டாலும் கூட அதிகபட்ச டெண்டர் / ஏலத்தொகை அரசுக்கு ஆதாயமானதல்ல என்று மாவட்ட ஆட்சியர் கருதினால் மனுவை தள்ளுபடி செய்து மறு ஏலம் நடத்த மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு.

### பகுதி - III குவாரி குத்தகை பெறுவதற்கான நிபந்தனைகள்

1. (அ) தமிழ்நாட்டில் எல்லா மாவட்டங்களிலும் சேர்த்து ஒரு மனுதாரருக்கு இரண்டு கல்குவாரி குத்தகைக்கு மேல் வழங்கப்பட மாட்டாது. தவறான தகவல் தந்து இரண்டுக்கு மேற்பட்ட குத்தகைகள் பெறப்பட்டிருப்பது பின்னர் தெரியவந்தால் கடைசியாக கொடுக்கப்பட்ட குத்தகையை ரத்து செய்ய நடவடிக்கை எடுக்கப்படும்.

(ஆ) குவாரி உரிமம் பெறுவது தொடர்பாக உயர்ந்தபட்ச டெண்டர் / ஏலதாரர் 100% சதவீத தொகையைச் செலுத்தி அதற்குரிய சலாளை மாவட்ட ஆட்சியரிடம் ஒப்படைத்த பின்பு குவாரி உரிமம் வழங்க உத்தேசிக்கப்பட்டுள்ள பரப்பாக கருதி உத்தரவை வழங்கி சுரங்கத்திட்ட அறிக்கை மற்றும் மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையில்லாச் சான்று பெற்று சமர்ப்பிக்குமாறு அறிவுறுத்தப்படும்.

(இ) மேற்படி உத்தரவைப் பெற்ற அதிக தொகை செலுத்த டெண்டர் / ஏலம் கோரிய நபர் தகுதியான சுரங்கத்திட்ட அறிக்கையை அங்கீகரிக்கப்பட்ட (RQP) நபரிடமிருந்து தயார் செய்து சம்பந்தப்பட்ட துணை இயக்குநரின் ஒப்புதலுக்கு 90 நாட்களுக்குள் சமர்ப்பிக்க வேண்டும்.

(உ) உயர்ந்தபட்ச டெண்டர் / ஏலதாரர் சமர்ப்பித்த சுரங்கத்திட்டத்தினை பரிசீலனை செய்து திட்டத்தில் மாற்றம் இருப்பின் திருத்தி அமைக்கும் பொருட்டும் சுரங்கத்திட்டம் புவியியல் மற்றும் சுரங்கத்துறை துணை இயக்குநரால் ஒப்புதல் செய்யவும், சுரங்கத்திட்டம் பெறப்பட்ட நாளிலிருந்து 90 நாட்கள் கால அவகாசமாகும்.

(ஊ) சம்பந்தப்பட்ட துணை இயக்குநரால் ஒப்புதல் செய்யப்பட்ட சுரங்கத்திட்ட அறிக்கையை அதிக தொகை செலுத்த டெண்டர் / ஏலம் கூறிய நபர் மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையின்மை சான்று கோரி விண்ணப்பித்து தடையின்மை சான்று பெற்று சமர்ப்பிக்கும் பட்சத்தில் மாவட்ட ஆட்சித்தலைவர் அவர்களால் அதிக தொகை செலுத்த டெண்டர் / ஏலம் கூறிய நபருக்கு குவாரி உரிமம் வழங்க நடவடிக்கை எடுக்கப்படும்.

K. I. Raju



(எ) உரிய காலக்கெடுவிற்குள் உயர்ந்தபட்ச டெண்டர் / ஏலதாரர் மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையின்மை சான்று பெற்று சமர்ப்பிக்கத் தவறும் பட்சத்தில் மாவட்ட ஆட்சித்தலைவர் அவர்களால் மேற்படி ஆணையை இரத்து செய்ய நடவடிக்கை மேற்கொள்ளப்படும்.

(ஏ) குவாரி குத்தகை வழங்குவதற்கு ஒப்புதல் அளித்து குவாரி குத்தகை ஒப்பந்தம் நிறைவேற்றுவது தொடர்பாக தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959-ன் பின்னிணைப்பு 1-ல் கண்டுள்ள படிவத்தில் ஒப்பந்த கருத்துகளில் சேர்க்கை, நீக்கம் மற்றும் மாற்றங்கள் செய்யப்பட்ட வரைவு ஒப்பந்தம் மற்றும் குத்தகை பரப்பைக் காட்டும் புலப்பட நகலும் மனுதாரரின் ஏற்புக்கு அனுப்பப்படும்.

(ஐ) மாவட்ட ஆட்சியரால் குறிப்பிடப்படும் காலக்கெடுவிற்குள் மனுதாரர் கீழ்க்கண்ட ஆவணங்கள் மற்றும் தொகைகளை செலுத்தி அவற்றை மாவட்ட ஆட்சியரிடம் ஒப்படைக்க வேண்டும்.

i) மொத்த குத்தகை தொகையில் 20 சதவீத தொகையை காப்புத் தொகையாக உரிய தலைப்பில் செலுத்தியமைக்கான சலான்.

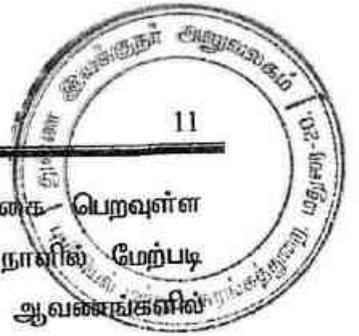
ii) மாவட்ட ஆட்சியரின் அறிவிக்கையில் கோரியுள்ளவாறு நிதிமன்றம் சாரா முத்திரைத்தாள் ஒப்பந்த ஆவணம் தயாரிக்கும் பொருட்டு கொடுக்கப்பட வேண்டும்.

2. (அ) உரிய காலக்கெடுவுக்குள் முன் குறிப்பிடப்பட்ட காப்புத் தொகையை அரசுக்குச் செலுத்தி ஆவணங்களை மாவட்ட ஆட்சியரிடம் ஒப்படைக்காத நபருக்கு ஏற்கனவே குவாரி குத்தகை வழங்கப்படும் என்று ஏற்கனவே கொடுக்கப்பட்ட அறிவிப்பு ரத்து செய்யப்பட்டு அந்த நாள்வரை அவரால் செலுத்தப்பட்ட தொகைகள் மற்றும் ஆவணங்கள் அரசுடமையாக்கப்படும்.

(ஆ) மேற்கண்டவாறு குத்தகை அறிவிப்பினை ரத்து செய்யப்பட்டால், ரத்து ஆணை பெற்ற நபருக்கு அடுத்தபடியாக அதிகத் தொகை செலுத்த டெண்டர்/ஏலம் கூறிய நபருக்கு குத்தகை வழங்க முன்கண்ட நிபந்தனை I-ன்படி நடவடிக்கை தொடரப்படும்.

(இ) குத்தகை வழங்க அறிவிப்பு செய்யப்பட்ட இரண்டாவது நபரும் முழு குத்தகைத் தொகை, காப்புத் தொகை, முத்திரைத்தாள், பரப்புவரி ஆகியவற்றை மாவட்ட ஆட்சியரின் அறிவிக்கையைப் பெற்றுக் கொண்ட பத்து நாட்களுக்குள் செலுத்தவில்லையெனில் உரிய குவாரி மறு டெண்டர்/ஏலம் மூலம் குத்தகைக்கு விடப்பட நடவடிக்கை எடுக்கப்படும்.

K. Ilayappan



3. (அ) கோரப்படும் ஆவணங்களை மற்றும் தொகைகளை குத்தகை பெறவுள்ள மனுதாரர் அரசுக்குச் செலுத்தியபின், அறிவிக்கை மூலம் தெரிவிக்கப்படும் நாளில் மேற்படி குத்தகைதாரர் மாவட்ட ஆட்சியரின் முன்பு ஆஜராகி குத்தகை ஒப்பந்த ஆவணங்களில் கையெழுத்திட்டபின் குத்தகையாளராக அறிவிக்கப்படுவார்.

(ஆ) குத்தகை ஒப்பந்தப்பத்திரம் மற்றும் குத்தகை புலப்படம் ஆகியவற்றை மேற்படி குத்தகையாளர் கையொப்பம் இட்ட பின்னர், அவைகளில் மாறுதல் செய்யவோ, அவற்றின் மீது மாற்றுக்கருத்து தெரிவிக்கவோ குத்தகைதாரர் அனுமதிக்கப்படமாட்டார்கள்.

4. (அ) குத்தகை காலம் ஏற்கனவே கல் உடைக்கப்பட்ட கல்குவாரிகளுக்கு ஐந்து ஆண்டுகள் மற்றும் கல் உடைக்கப்படாத கல்குவாரிகளுக்கு பத்து ஆண்டுகள் மட்டுமே. குத்தகை காலத்தின் ஆரம்பம் மற்றும் முடிவு தேதிகள் ஒப்பந்த ஆவணத்தில் தெளிவாக எழுதப்பட்டிருக்கும்.

(ஆ) ஒப்பந்த ஆவணத்தில் குறிப்பிட்டுள்ளபடி குத்தகை முடிவறும் தேதிக்கு பின்னர் குத்தகை கால நீட்டிப்பு எந்த கோரிக்கையின் அடிப்படையிலும் செய்யப்படமாட்டாது.

(இ) குத்தகை முடிவடையும்போது இக்குத்தகை புதுப்பிக்கப்படமாட்டாது. இது குறித்து புதுப்பித்தல் மனு அளிக்கப்பட்டால் அது விசாரணையின்றி தள்ளுபடி செய்யப்படும்.

5. குவாரி குத்தகை ஒப்பந்தப் பத்திரத்தில் மாவட்ட ஆட்சியருடன் மனுதாரர் கையொப்பம் இடுவதற்கு முன் குத்தகை பரப்பில் உடைகல், ஐல்லி, கட்டக்கல் போன்ற கனிமங்கள் வெட்டியெடுத்தாரானால் அப்பணி குத்தகை பெறாமல் செய்ததாக கருதப்பட்டு விதிமுறைகளின்படி மேல்நடவடிக்கை தொடரப்படும்.

6. (அ) குவாரி குத்தகை காலம் முடிவடைந்தவுடன் குத்தகைதாரர் குத்தகை பரப்பை அரசுக்கு திரும்ப ஒப்படைத்து அதற்கான கடிதத்தை உரிய கிராம நிர்வாக அலுவலர் வசம் ஒப்புவித்து அதற்கான ஆணை உறுதி ஆவணம் தயாரித்து மாவட்ட ஆட்சியரிடம் ஒப்படைக்க வேண்டும்.

**பகுதி - IV குவாரிப்பணி செய்வது தொடர்பான விதிமுறைகள்**

1. (அ) குவாரிப்பணி செய்தவற்கான பொது விதிமுறைகள், மாவட்ட ஆட்சியருடன் குத்தகைதாரர் கையொப்பமிடும் குத்தகை ஆவணத்தில் குறிப்பிடப்பட்டிருக்கும்.

K. Ilayappan



(ஆ) கல் குவாரி குத்தகைக்காலம் குத்தகை ஒப்பந்தப்பத்திரம் நிறைவேற்றப்பட்ட நாளிலிருந்து அனுமதி காலமாக கருதப்படும்.

(இ) மேலும், 1959ம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் அனுபந்தம் 1ல் கண்ட நமுனாவில் உரிய முத்திரைத்தாளில் குத்தகை ஒப்பந்த பத்திரம் நிறைவேற்றி அதனை அவரது சொந்த செலவில் பதிவு செய்து கொடுக்க வேண்டும்.

(ஈ) செலுத்தப்பட்ட குத்தகை தொகை தவிர, தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959-ன் பின்னிணைப்பு II-ல் கண்டவாறு குவாரியிலிருந்து வெளியில் கொண்டு செல்லப்படும் கனிமத்திற்கு அரசால் அவ்வப்போது திருத்தி நிர்ணயிக்கப்படும் சீனியரேஜ் தொகை அல்லது ஒவ்வொரு ஆண்டிற்கான முடக்குவரி இவற்றில் எது அதிகமோ அது செலுத்தப்பட வேண்டும். அவ்வாறு செலுத்தப்படாவிட்டால் குவாரி குத்தகையை ரத்து செய்ய நடவடிக்கை எடுக்கப்படும்.

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

3. மேற்குறிப்பிட்டவை தவிர பின்வரும் சிறப்பு நிபந்தனைகளும் குத்தகைதாரரால் குத்தகை காலத்தில் கடைபிடிக்கப்பட வேண்டும்.

i. குத்தகையாளர் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின்படி குவாரிப்பணி மேற்கொள்ள வேண்டும். தவறும் பட்சத்தில் தமிழ்நாடு சிறுகனிம சலுகை விதிகள் விதி 41 (10) (ii)-ன்படி நடவடிக்கை மேற்கொள்ளப்படும்.

ii. அனுமதி பெறாமல் குவாரியில் வெடிமருந்துகள் பயன்படுத்தக்கூடாது. வெடிபொருட்கள் சட்டம் கண்டிப்பாக கடைப்பிடிக்கப்பட வேண்டும். குவாரியில் வெடி பொருட்கள் பயன்படுத்துவர் தொடர்பாக சென்னை மண்டல சுரங்க பாதுகாப்பு இயக்கக பொது இயக்குநர் அவர்களின் வழிகாட்டு நெறிமுறைகளை பின்பற்றி குறைந்த அழுத்தமுள்ள வெடிமருந்துகளை பயன்படுத்தி குவாரிப்பணி செய்ய வேண்டும்.

iii. குத்தகையாளர் குத்தகைப் பகுதியில் வெட்டியெடுத்து வெளியில் அனுப்பும் சிறுவகைக் கனிமத்திற்கு உரிய கணக்குகளை மதுரை மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை துணை இயக்குநர் குறிப்பிடும் படிவத்தில் சுரங்க விபரப்பதிவேடு ஏற்படுத்தி விபரங்கள் எழுதி பிரதி மாதம் 5-ம் தேதிக்குள் தணிக்கைக்கு சமர்ப்பிக்க வேண்டும்.

K. I...



iv. குத்தகை காலத்தில் ஏற்படுத்தப்பட்ட சுரங்க விபரப் பதிவேடுகளை குத்தகையாளர் குத்தகைக்காலம் முடிந்த பின்னரும் பாதுகாத்து அரசு அலுவலர்கள் ஆய்வுக்கு கேட்கும் போது ஒப்படைக்க வேண்டும்.

v. குத்தகையாளர் கனிமங்களை வெளியில் அனுப்ப அனுப்புரை சீட்டுகளில் (பில்புக்) துணை இயக்குநர் ஒப்புதல் பெற வரும்போது, சீனியரேஜ் தொகையை செலுத்தி, அலுவலகத்திலிருந்து வழங்கப்படும் மொத்த இசைவாணைச்சீட்டுடன் அனுப்புரை சீட்டுகளில் உரிய அலுவலரின் மேலொப்பம் பெற்றுச் சென்று பயன்படுத்த வேண்டும்.

vi. கனிமங்களை குத்தகைப் பகுதியிலிருந்து வெளியில் அனுப்பும் போது அனுப்பப்படும் கனிமத்தின் வகை, அதன் அளவு, கனிமம் எடுத்துச் செல்லும் வாகனத்தின் வகை மற்றும் பதிவு எண், கனிமம் கொண்டு சேர்க்கப்படும் இடம், குவாரியிலிருந்து வாகனம் புறப்படும் நேரம் மற்றும் சென்றடைய உத்தேச நேரம் ஆகிய விபரங்களை அசல் சீட்டில் ஒரே பேனாவாலும் நகலை காப்பன் பேப்பர் அழுத்தம் மூலமும் எழுதி அசலை வாகனத்துடன் அனுப்பி நகலை (அடிக்கட்டு) அடுத்தமுறை அனுமதிபெற வரும்போது ஆய்வுக்கு காண்பித்துவிட்டு திரும்ப பெற்றுச் சென்று பாதுகாப்பாக வைத்திருக்க வேண்டும்.

vii. அனுப்புச் சீட்டில் எல்லா விபர வினாக்களுக்கும் விபரங்கள் எழுதப்படாமலோ அல்லது திருத்தப்பட்டோ அல்லது மேல் எழுத்தப்பட்டோ அல்லது வெவ்வேறு மையினால் எழுதப்பட்டிருப்பின் அந்த அனுப்புரைச் சீட்டுடன் எடுத்துச் செல்லப்படும் கனிமம், அனுமதியின்றி எடுத்துச் செல்லப்படுவதாக கருதி, விதிமுறைகளின்படி நடவடிக்கை எடுக்கப்படும்.

viii. குத்தகை பகுதிக்குச் சென்றுவர பாதைவசதி குத்தகைதாரர், தனது சொந்த பொறுப்பில் ஏற்படுத்திக் கொள்ள வேண்டும். கல்குவாரிப்பணியில் குழந்தை தொழிலாளர்களை பயன்படுத்தக்கூடாது.

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

K. J. [Signature]



x. குத்தகைதாரரை மேற்குறிப்பிட்ட நிபந்தனைகளும் 1959-ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகள் மற்றும் சுரங்கங்கள் மற்றும் கனிமங்கள் (அபிவிருத்தி மற்றும் ஒழுங்குமுறை) சட்டம், 1957 மற்றும் அரசால் அவ்வப்போது கொண்டு வரப்படும் ஆணைகளும், விதிகளும் கட்டுப்படுத்தும்.

xi. கல்குவாரிகளிலிருந்து சாதாரண கல், சக்கைக்கல், கட்டுக்கல், ஜல்லிக்கற்கள் ஆகிய பொது உபயோக சிறு கனிமங்களை மட்டுமே குவாரி செய்ய வேண்டும். இவ்வனுமதியை பயன்படுத்தி வெளிநாட்டிற்கு ஏற்றுமதி செய்வதற்கும், அலங்கார வகை மற்றும் மெருகேற்றம் செய்வதற்கும் பயன்படும் வகையில் பெரிய/சிறிய கிராளைட் கந்துண்டங்களை வெட்டி எடுக்கக்கூடாது.

xii. குத்தகை விடப்படும் குவாரிகளை நீக்கவோ, புதிதாக சேர்க்கவோ, குவாரிப் பரப்பளவை மாற்றவோ, மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு. நிர்வாக சூழல் காரணமாக ஏலத்தை ரத்து செய்ய மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு.

xiii. குத்தகை உரிமம் கோரும் முன் சம்பந்தப்பட்ட குவாரியினை நேரில் பார்வையிட்டு பாதை வசதி, கனிமத்தின் தரம், கனிமத்தின் இருப்பு ஆகியவற்றை ஆராய்ந்து பின்னர் குத்தகை உரிமம்கோரி விண்ணப்பிக்க வேண்டும். பின்னாளில் இது தொடர்பான எந்த ஒரு பின் நிகழ்வுக்கும் மாவட்ட நிர்வாகம்/அரசு பொறுப்பல்ல.

xiv. 1959-ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகள் அட்டவணை படிவம் 1-ல் கண்ட ஒப்பந்தப் பத்திரத்தில் தேவையான அளவுக்கு நிபந்தனைகளை புதியதாக சேர்க்கவோ, நீக்கவோ, மாற்றியமைக்கவோ மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு. குத்தகைப் பத்திரம் ஏற்படுத்திய பின்பு புலனண மற்றும் குவாரி செய்ய ஒதுக்கப்பட்ட பரப்பு குறித்து எவ்வித தாவாவும் செய்ய குத்தகைதாரருக்கு உரிமை கிடையாது.

xv. விண்ணப்பதாரர் குத்தகை தொகையைச் செலுத்தாமலும் முத்திரைத்தாளில் ஒப்பந்தப் பத்திரம் மாவட்ட ஆட்சியரிடம் நிறைவேற்றி சார்-பதிவாளர் அலுவலகத்தில் பதிவு செய்து தராமலும் குவாரிப் பணியை ஆரம்பிக்கக்கூடாது. அவ்வாறு செய்தால் கள்ளத்தனமாக குவாரி செய்ததாகக் கருதப்பட்டு 1959-ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகளின்படி அபராதம் விதிக்கப்படும்.

xvi. ஒரு மனுதாரருக்கு மாநிலத்தில் இரு குவாரி குத்தகைக்கு மேல் குத்தகை வழங்கப்பட மாட்டாது.

K. I. [Signature]

xvii. மேற்படி சிறு கனிமங்கள் எடுக்கும் இடத்தில் சிறு கனிமங்கள் எடுப்பதில்லாது அப்புறப்படுத்துவதிலாவது மேற்படி குத்தகைதாரருக்கு ஏற்படக்கூடிய யாதொரு நஷ்டங்களுக்கான சலுகை எதுவும் அரசினரால் அளிக்கப்பட மாட்டாது.

xviii. டெண்டர் அறிவிக்கை பிரசுரிக்கப்பட்ட பின்னரோ அல்லது குத்தகை உறுதி ஆணை பிறப்பிப்பதற்கு முன்னரோ நிபந்தனைகளை மாற்றவோ அல்லது ரத்துச் செய்யவோ மற்றும் பட்டியலில் கண்டுள்ள எல்லா குவாரிகளுக்கும் குத்தகை உரிமம் கோரும் டெண்டர் மனுக்களை எக்காரணத்தையும் காட்டாமல் இரத்து செய்யவோ அல்லது மூடி முத்திரையிட்ட உறைகளை திறக்கும் நாள், நேரம் ஆகியவைகளைத் தள்ளி வைக்கவோ, நிறுத்தி வைக்கவோ மாவட்ட ஆட்சியருக்கு அதிகாரம் உண்டு.

xix. டெண்டர் விளம்பரத்தின்படி ஏதாவது காரணத்தால் மூடி முத்திரையிடப்பட்ட உறைகள் திறக்கும் நாள் மற்றும் நேரம் ஆகியவை ஒத்தி வைக்க நேர்ந்தால் அதற்கு மனுதாரர்கள் நஷ்ட ஈடு கேட்க உரிமையில்லை. மனுதாரர் ஒவ்வொரு குவாரிக்கும் தனித் தனியே ஒரு ஒப்பந்தப்புள்ளி மனுவை உரிய இணைப்புகளோடு அனுப்ப வேண்டும். ஒரே மனுவில் ஒரு குவாரிக்கு மேல் பல குவாரிகளைக் குறிப்பிட்டு மனு செய்தால் அம்மனு நிராகரிக்கப்படும்.

xx. 1959-ஆம் ஆண்டு தமிழ்நாடு சிறு கனிம சலுகை விதிகளில் கண்டுள்ள அனைத்து சாரம்சங்களையும் மாவட்ட அரசிதழில் கண்டுள்ள அனைத்து நிபந்தனைகளையும் நன்கு தெரிந்து கொண்டபின் டெண்டர் மனுக்களை அனுப்ப வேண்டும். மனு அனுப்பிய பிறகு விதிகள் மற்றும் குத்தகை நிபந்தனைகள் பற்றி சரியாகத் தெரியாது என மனுதாரர் வாதிட்டால் அது ஏற்றுக் கொள்ளப்படமாட்டாது.

xxi. உறுதி செய்யப்பட்ட குத்தகை உரிமத்தை சம்பந்தப்பட்ட உயர் அலுவலர்கள் பொது நன்மையைக் கருதி ரத்துச் செய்ய நேரிட்டால் அதனால் ஏற்படும் இழப்புக்கு ஈடுகோர குத்தகைதாரருக்கு உரிமையில்லை.

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

K. I. [Signature]



xxiii. குத்தகைக்கு விடப்பட்ட புலத்தில் புல வரைபடத்தில் வரையறை செய்யப்பட்டுள்ள இடத்திலும், விஸ்தீரணத்தில் மட்டுமே குத்தகைதாரர் குவாரி செய்ய வேண்டும். அதற்குக் கூடுதலான விஸ்தீரணத்தில் குவாரி செய்வது தெரியவந்தால் குத்தகை ரத்துச் செய்யப்படும்.

xxiv. அனுமதிக்கப்படாத பிற இடங்களில் முறைகேடாக குத்தகைதாரர் குவாரி செய்து அதனால் அவர் மீது வழக்கு தொடரப்பட்டாலோ, அல்லது அரசுக்கு நஷ்டம் ஏற்பட்டாலோ, வழக்கிற்கான செலவுத் தொகை அல்லது நஷ்டஈடு முழுவதும் குத்தகைதாரரிடமிருந்து வசூல் செய்யப்படும்.

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

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

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

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

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

K. Ilayappan



xxx. குவாரி செய்வதற்கு அனுமதிக்கப்பட்டுள்ள இடத்தில் மட்டும்தான் குவாரி செய்ய உரிமையுண்டு.

xxxi. அரசு மற்றும் மாவட்ட ஆட்சியரால் இது விஷயமாக ஏற்படுத்தப்பட்டுள்ள மற்றும் அவ்வப்போது ஏற்படுத்தப்படும் சட்ட திட்டங்களுக்கும், நிபந்தனைகளுக்கும் குத்தகைதாரர் கட்டுப்பட்டு நடக்க வேண்டும்.

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

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

xxxiv. குத்தகை பகுதிக்குச் சென்றுவர பாதைவசதி குத்தகைதாரர், தனது சொந்த பொறுப்பில் ஏற்படுத்திக் கொள்ள வேண்டும்.

xxxv. அருகில் அமைந்துள்ள விவசாய நிலங்களுக்கு எவ்வித பாதிப்பும் இல்லாத வகையில் குவாரிப்பணி மேற்கொள்ள வேண்டும்.

xxxvi. தமிழ்நாடு மாசுக்கட்டுப்பாட்டு வாரிய மாவட்ட சுற்றுச்சூழல் இசைவாணையை குவாரிப்பணி தொடங்கும் முன் பெற்று சமர்ப்பிக்க வேண்டும்.

xxxvii. குத்தகை எடுத்தவர் குத்தகையை அனுபவிக்காவிட்டாலும், செலுத்தப்பட்ட குத்தகைத் தொகை எக்காரணத்தை முன்னீட்டும் வாயஸ் செய்யப்படமாட்டாது.

K. I. [Signature]

## xlvii. (அ) சிறப்பு நிபந்தனைகள்:

i. இந்த டெண்டர் மற்றும் ஏலமுறையில் கலந்து கொள்ளும் விண்ணப்பதாரர்கள் அனைவரும் இந்திய அரசின் வருமான வரித்துறையினரால் வழங்கப்படும் நிரந்தர கணக்கு எண். (PAN CARD) அட்டையை பெற்றிருக்க வேண்டும்.

ii. மேலும் குத்தகை உரிமம் பெற்ற பின்னர் கனிமங்களை எடுத்துச் செல்ல போக்குவரத்து அனுமதி சீட்டுபெற ஒவ்வொருமுறையும் செலுத்துகின்ற சீனியரேஜ் தொகையின் மீது 2.00 சதவீத வருமான வரி தொகை செலுத்த வேண்டும்.

iii. மேலும் குத்தகை உரிமம் பெற்ற பின்னர் கனிமங்களை எடுத்துச் செல்ல போக்குவரத்து அனுமதி சீட்டுபெற ஒவ்வொருமுறையும் செலுத்துகின்ற சீனியரேஜ் தொகையின் மீது 10 சதவீத தொகை மதுரை மாவட்ட கனிம அறக்கட்டளையின் வங்கி கணக்கில் செலுத்த வேண்டும்.

## கல் குவாரி விவரம்

வ. எண்	வட்டம்	கிராமம்	புல எண்	பரப்பு (ஹெக்டேரில்)
1	வாடிப்பட்டி	கச்சைகட்டி	1673 (Part - 6)	1.00.0
2	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part-1A)	0.81.0
3	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part - 2A)	1.00.0
4	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part - 2B)	1.00.0
5	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part - 3)	1.00.0
6	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part - 4)	1.00.0
7	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part - 5)	1.00.0
8	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part-8)	1.00.0



- xxxviii. குவாரியில் எல்லைகள் பற்றிய பிரச்சனைகள் ஏற்பட்டால் மாவட்ட ஆட்சியரின் தீர்ப்பே இறுதியானது.
- xxxix. குத்தகைக்காலம் முடிந்தபின் குத்தகைதாரர்கள் குத்தகைக்கு விடப்பட்ட பகுதிகளில் எந்தவிதமான உரிமையும் கொண்டாடக்கூடாது.
- xi. குவாரி குத்தகை வழங்குவது மற்றும் சம்பந்தப்பட்ட எவ்வித நடவடிக்கைகளும் மாவட்ட ஆட்சியர் அவர்களின் முடிவுக்கு கட்டுப்பட்டதாகும்.
- xii. டெண்டரில் கோரப்படும் கல்குவாரிகளின் பேரில் நீதிமன்றத்தில் ஆணை/தடையாணை பெறப்பட்டால் சம்பந்தப்பட்ட குவாரிக்கு குத்தகை உரிமம் வழங்குவது குறித்து மாவட்ட ஆட்சியரின் முடிவே இறுதியாகும்.
- xlii. குத்தகைக்கு எடுத்தவர் எந்த காரணத்தை முன்னிட்டும் தனக்கு இழப்பு ஏற்பட்டதாக தெரிவித்து நஷ்டஈடு கேட்கக் கூடாது.
- xlili. குவாரியில் வேலை செய்யும் தொழிலாளர்களுக்கும் மற்றும் இதர நபர்களுக்கும் விபத்து ஏற்பட்டால் அதற்கு அரசு பொறுப்பல்ல. முழுப்பொறுப்பும் குத்தகைதாரரைச் சேரும்.
- xliv. குத்தகைதாரர் குவாரியில் புல எண், பரப்பு, குத்தகைதாரர் பெயர், குத்தகை ஆணை எண், குத்தகை தொகை போன்ற விபரங்கள் குறிக்கப்பட்ட தகவல் பலகையை தமது சொந்த செலவில் வைக்க வேண்டும்.
- xlv. குத்தகைதாரர் குவாரியில் எல்லைகளை தெளிவாக தெரியும்படியாக கல் ஊன்றி அடையாளமிட்டு வைத்த பின் குவாரி செய்ய வேண்டும். எல்லைக்கற்களை குத்தகைக் காலம் முழுமைக்கும் நன்கு பராமரிக்க வேண்டும்.
- xlvi. குத்தகைக்கு வழங்கப்பட்ட குவாரிகளிலிருந்து அரசு வேலைகளுக்கு கனிமங்கள் வெட்டி எடுத்துச் செல்ல அரசுக்கு சகல உரிமையும் உண்டு.

K. Illayappan  
277



9	வாடிப்பட்டி	கொண்டையம்பட்டி	83 (Part-9)	1.00.0
10	வாடிப்பட்டி	குலசேகரன்கோட்டை	63 (Part-II)	2.91.0
11	வாடிப்பட்டி	பாலமேடு	52/2 (Part-2)	2.00.0
12	வாடிப்பட்டி	சத்திரவெள்ளாலப்பட்டி	13 (Part)	2.00.0
13	வாடிப்பட்டி	விராலிபட்டி	43	1.00.0
14	வாடிப்பட்டி	இராஜாக்கள்பட்டி	1 (Part-1)	1.00.0
15	மேலூர்	அய்யாபட்டி	379	0.92.0
16	மேலூர்	அய்யாபட்டி	63	0.74.0
17	மேலூர்	சொக்கலிங்கபுரம்	471/1	2.70.0
18	மேலூர்	சொக்கம்பட்டி	352/2 (Part - 1)	2.02.0
19	மேலூர்	சொக்கம்பட்டி	352/2 (Part - 3)	3.20.0
20	மேலூர்	கம்பூர்	283/1 (Part-1)	0.81.0
21	மேலூர்	கம்பூர்	32/2 (Part-A)	1.10.0
22	மேலூர்	கம்பூர்	32/2 (Part-B)	1.10.0
23	மேலூர்	கம்பூர்	32/2 (Part-C)	1.60.0
24	மேலூர்	கம்பூர்	32/2 (Part - D)	2.00.0
25	மேலூர்	கம்பூர்	32/2 (Part - E)	3.00.0
26	மேலூர்	கருங்காலக்குடி	4	1.70.0
27	மேலூர்	கருங்காலக்குடி	619/5 (Part)	2.02.5

இடம் : மதுரை  
நாள் : 24.12.2020

ஒப்பம் .....  
மாவட்ட ஆட்சியர்,  
மதுரை.

K. I. Raju  
278

## இணைப்பு - VI

(தமிழ்நாடு சிறுவகைக் கனிமச் சலுகை விதிகள் 1959-ன் விதி 8 ஐ காண்க)  
குவாரி குத்தகை கோரும் டெண்டர்/ ஏல விண்ணப்பம்  
(அசல் மற்றும் இரண்டு நகல்களில் கொடுக்கவும்)

அனுப்பநர்

அலுவலர் பயன்படுத்த  
அ) மனு பெறப்படும் நாள்.....  
ஆ) பெறப்படும் இடம்

ஒப்பம்

பெறுநர்

மாவட்ட ஆட்சியர்,  
மதுரை,  
மதுரை மாவட்டம்.

மாவட்ட அரசிதழ் எண் .....நாள்.....அல்லது.....  
செய்தித்தாள் விளம்பர நாள்.....ல் வெளியிடப்பட்டுள்ளது தொடர்பாக, தமிழ்நாடு சிறுவகைக்  
கனிமச் சலுகை விதிகள் 1959 இன் விதி 8-ன்படி நாள்/நாங்கள் இந்த விண்ணப்பத்தை  
சமர்ப்பிக்கிறேன்/ சமர்ப்பிக்கிறோம்.

தேவையான விவரங்கள் கீழே கொடுக்கப்படுகிறது:

1. மனுதாரர் பெயர் மற்றும் முழு முகவரி :
2. அ) மனுதாரர் தனி நபரா/தனியார் கம்பெனியா/கூட்டு :  
நிறுவனமா (அல்லது) கூட்டமைப்பா.  
ஆ) மனுதாரர் தனி நபரானால் எந்த நாட்டினர். :  
இ) மனுதாரர் தனியார் கம்பெனி/வியாபார ஸ்தாபனம் :  
அல்லது சங்கமாயின் அதன் இயக்குநர்/  
பங்குதாரர்கள்/உறுப்பினர்கள் எந்த நாட்டவர் என்ற  
விவரம் ( சான்று இணைக்கப்பட வேண்டும்).
3. பிணை வைப்புத்தொகை செலுத்திய விவரம் (வங்கி :  
கேட்பு வரைவோலை எண் மற்றும் நாள் ஆகிய  
விவரங்களை அளிக்கவும்).



நான் / நாங்கள் மேலே எங்களால் அளிக்கப்பட்ட விவரங்கள் உண்மையானவை என்று உறுதியளிக்கிறேன் / உறுதியளிக்கிறோம். நான் / நாங்கள், அரசாங்கம் அல்லது மாவட்ட ஆட்சியர் அவர்களால் கோரப்படும் இதர விவரங்கள் மற்றும் காப்புத்தொகை ஆகியவற்றை அளிக்க தயாராக உள்ளேன் / உள்ளோம். தமிழ்நாடு சிறுவகைக் கனியச் சலுகை விதிகளின் 1959-வ கண்டவாறு குவாரி குத்தகை பெறுவது தொடர்பாகவும், குவாரிப்பணி செய்வது தொடர்பாகவும் விதிக்கப்பட்ட நிபந்தனை, சட்ட உடன்படிக்கை குறித்து நன்றாக அறிவேன் / அறிவோம் என உறுதி அளிக்கிறேன் / அளிக்கிறோம்.

2) சாதாரண கற்கள் வெட்ட வழங்கப்பட்ட கற்குவாரியில் அறுத்து மெருகேற்றி கட்டுமானப்பணிக்கு பயன்படும் கிரானைட் கற்குண்டங்கள் வெட்டமாட்டோம் எனவும், அவ்வாறு கிரானைட் கிடைக்குமானால் குத்தகையை மாவட்ட ஆட்சியர் ரத்து செய்ய நான் / நாங்கள் ஒப்புக்கொள்கிறேன் / ஒப்புக்கொள்கிறோம் என உறுதியளிக்கிறேன் / அளிக்கிறோம்.

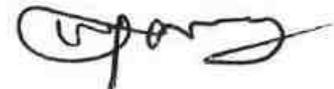
தாங்கள் உண்மையுள்ள,

இடம் :

நாள் :

மனுதாரர் கையொப்பம்

தமிழ்நாடு எழுதுபொருள் மற்றும் அச்சத்துறை ஆணையரால் மதுரை அரசு கிளை அச்சகத்தில் அச்சிட்டு மாவட்ட ஆட்சியரால் வெளியிடப்பட்டது.



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

281





(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
615-										
1SD	ச	த(B)	..	7-3	7	7 71	0 13.5	1 19	179	முதலா கனி.
3E	ச	த(B)	..	7-3	7	7 71	0 03.0	0 22	410	அ. காமராசர்.
3F	ச	த(B)	..	7-3	7	7 71	0 03.0	0 25	373	த. சா. மு. க. கமிட்டி.
4	ச	ய	..	7-3	7	7 71	0 09.5	0 70	170	முதலா கனி.
5	ச	ய	..	8-2	5	2 15	0 33.5	0 72	660	இ. சீ. சந்திரா.
							1 49.5	9 63		
616-1	ச	ய	..	..	..	..	2 72.0	..		456 குளம்.
2	ச	ய	..	..	..	..	0 84.0	..		456 குளம்.
3	ச	த.த.	..	..	..	..	0 83.5	..		பாறை
4	ச	ய	..	8-2	5	2 15	0 33.0	0 71	949	சா. நல்லியம்பாளன். <b>நீர்தாமி</b>
							4 72.5	0 71		
617-1	ச	ய	..	..	..	..	0 21.0	..		செட்டி பாறை.
2	ச	ய	..	8-2	5	2 15	0 88.0	1 90	744	மைனர் பிர முகமது காரியன் சாகுல அமிது
3	ச	த(C)	..	7-3	7	7 71	0 89.5	6 87	744	மைனர் பிர முகமது காரியன் சாகுல அமிது.
							1 98.5	8 77		
618-1	ச	ய	..	..	..	..	0 32.5	..		சாமல் செட்டி ஏந்தல்.
2	ச	ய	..	8-2	5	2 15	0 15.0	0 32	411	மு. கனி.
3	ச	த(C)	..	7-3	7	7 71	0 11.5	0 90	1214	அ. போஸ்.
4	ச	த(C)	..	7-3	7	7 71	0 54.0	4 15	744	மைனர் பிர முகமது காரியன் சாகுல அமிது.
							1 13.0	5 37		
619-1	ச	ய	..	8-2	5	2 15	0 26.0	0 56		தரிசு.
2	ச	ய	..	..	..	..	0 76.5	..		கோடாங்கு சாமல் ஏந்தல்.
3	ச	ய	..	..	..	..	2 02.5	..		பாறை.
4	ச	ய	..	..	..	..	1 16.5	..		முத்து முகமது ராஜா தா ஏந்தல்.
5	ச	ய	..	..	..	..	6 75.5	..		சாமல் செட்டி ஏந்தல்.
6	ச	ய	..	..	..	..	0 50.0	..		சாமல்.
							11 47.0	0 56		

(B) - சாமல் செட்டி குளம் இந்தாம் வகுப்பு.  
 (C) - சாகுல சாகுல குளம் இந்தாம் வகுப்பு.

*[Signature]*  
 Dr. S. KARUPPANNAN, M.Sc., Ph.D.,  
 RQP/MAS/263/2014/A

283

*[Signature]*  
 சா. நல்லியம்பாளன்  
 17. கருவகாலக்குடி  
 மேலார் வட்டம், மதுரை மாவட்டம்

*[Signature]*  
 K. I. ...



PHOTOCOPY OF THE PROPOSED QUARRY LEASE AREA

Field photos in respect of Mr.K.ILAYARAJA, Rough Stone/Jelly/Sakkai quarry lease, over an extent of 2.02.5Hectares, Govt Poramboke land in S.F.No: 619/5(Part) of Karungalakkudi Village, Melur Taluk, Madurai District, Tamil Nadu State.



For quarry purpose only

*[Handwritten signature]*

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,  
ROP/MAS/263/2014/A

285

*[Handwritten signature: K. Ilayaraja]*

*[Handwritten signature]*  
கிராம நிர்வாக அலுவலர்  
17, கருங்காலைத்தடி கிராமம்  
மேலூர் வட்டம், மதுரை மாவட்டம்



தமிழ்நாடு தமிழ்நாடு TAMIL NADU

42AA 591518

தமிழ்நாடு: குடியம்: 10/-  
 எண்: 45 தேதி: 05.01.2021  
 பெயர்: A. அப்துல் பாரி  
 உள்ள: ஒட்டன்சத்திரம்  
 PROPOSED DEED OF BLASTING AGREEMENT

*[Signature]*  
 சி. சுந்தராஜ்,  
 முத்திரத்தாளர் விற்பனையாளர்  
 ஒட்டன்சத்திரம்,  
 உரிமை எண்: 12/2010

This Proposed deed of blasting agreement is entered into at Oddanchatram on this day of 22nd June 2021 between M/S. K.Illayaraja S/o Krishnan, W10/2015, Pettai, Annanagar, karungalakudi, Melur(tk), Madurai(dt), here in after refer to as party of the first part and M/S Bari Traders, 1025/G1, 1<sup>st</sup> West Street society Colony Oddanchatram L.No:E/SC/TN/22/718/(E107164) valid upto 31.03.2024 in form LE-3 of Explosives Rules 2008, herein after referred to as party of the second part.

The party of the first part is going to operate a stone quarry as per ROC NO; 85/2021 (Minerals) Dated 05/02/2021, only after optioning N.O.C from State Environment Impact Assessment Authority Chennai, for a stipulated time granted by the District Authority at S.F no;619/05 Part a Karungalakudi Village, Melur (tk), Madurai(dt), over an extant of 2.02.5 hectares Poramboke land.

**BARI TRADER**

*[Signature]*  
 Proprietor



Where as the party of the first part wants blasting to be done at the above said gravel and stone . quarry site to excavate gravel sand and rough stone, we are ready to accept and operate blasting work at the said site on agreement basis as follows.

The Party of the first part will allot the blasting operations in the above said areas to the party of the second part. who is responsible for blasting rocks and also making his own arrangements for the Explosives and exploding equipment's required for the work. The entire blasting work in the above quarry and the possession of blasting equipment will be handled by the party of the second part and hereby under take the responsibility for the work entrusted. The party of the 2<sup>nd</sup> part will not responsible for the blasting work under taken without the second part in other areas said above. The entire blasting operation will be carried out only after sunrise and before sunset as per explosives rules 2008.

Payment will be made periodically by the party of the 1<sup>st</sup> part for the quantity of explosives used and consumed and hours and time of the exploding equipment put in to use, Calculations will be made and settlement will be arrived at every month. The rates for the items of work will as mutually agreed as marginal cost which includes cost of Explosives , transportation cost and other charges for blasting works. This agreement is made for all blasting work done in the above said areas only.

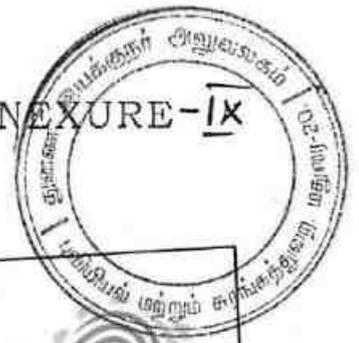
This agreement is valid from the date of execution till validity of quarrying leases granted by the state government to the party of first part of terminable earlier by mutual consent with a month's notice.

**BARI TRADER**  
  
Proprietor

Place ; Oddanchatram,  
Date: 22.06.2021  
Witness;

- 1.)
  
  
  
  
  
  
  
  
  
  
- 2.)





**இந்திய அரசாங்கம்**  
**Government of India**

**இந்திய தனிப்பட்ட அடையாள ஆணைய அமைப்பு**  
**Unique Identification Authority of India**

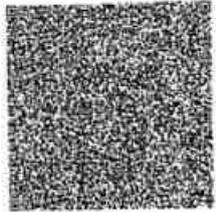
பதிவேட்டு எண்/ Enrolment No.: 2726/10017/68068

Download Date: 05/07/2021

To  
 இளையராஜா கிருஷ்ணன்  
 Ilayaraja Krishnan  
 S/O: Krishnan  
 w10/215  
 PETTAI ANNA NAGAR  
 melur  
 Karungalakudi  
 Karungalakudi  
 Madurai Tamil Nadu - 625101  
 9943424656

Issue Date: 02/07/2021

**Signatur e-Valid**



**உங்கள் ஆதார் எண் / Your Aadhaar No. :**  
**7626 8084 5072**  
**VID : 9139 7036 4337 2962**

எனது ஆதார். எனது அடையாளம்

**நகவல்**

- ஆதார் அடையாளத்திற்கான என்று குடியறிமகக்கு அல்ல
- பாதுகாப்பான QR குறியீடு ஆப்ஸைன் XML / ஆன்லைன் அங்கீகாரத்தைப் பயன்படுத்தி அடையாளத்தை சரிபார்க்கவும்
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

**INFORMATION**

- Aadhaar is a proof of identity, not of citizenship.
- Verify identity using Secure QR Code/ Offline XML/ Online Authentication.
- This is electronically generated letter.

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.
- பல்வேறு அரசு மற்றும் அரசு சாரா சேவைகளை எளிதில் பெற ஆதார் உதவுகிறது.
- உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடியை ஆதாரில் புதுப்பிக்கவும்.
- mAadhaar செயலியைப் பயன்படுத்தி உங்கள் சமர்ப்பு போலிஸ் ஆதாரை எடுத்துச் செல்லுங்கள்.

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- Aadhaar helps you avail various Government and non-Government services easily.
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**இந்திய அரசாங்கம்**  
**Government of India**

**இளையராஜா கிருஷ்ணன்**  
**Ilayaraja Krishnan**  
 பிறந்த நாள்/DOB: 10/05/1967  
**ஆணர் MALE**

Download Date: 05/07/2021

Issue Date: 02/07/2021

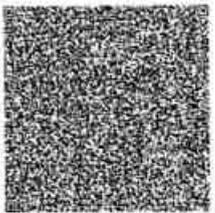
**7626 8084 5072**  
**VID : 9139 7036 4337 2962**

எனது ஆதார். எனது அடையாளம்

**இந்திய அரசாங்கம்**  
**Unique Identification Authority of India**

**முகவரி:**  
 திண்டிவேலி / தாய் பெயர்: கிருஷ்ணன்,  
 டபிள்யூ 10/215, பெட்டை அண்ணா நகர்,  
 மேலூர், கருங்காலக்குடி, மதுரை,  
 தமிழ் நாடு - 625101

**Address:**  
 S/O: Krishnan, w10/215, PETTAI ANNA  
 NAGAR, melur, Karungalakudi, Madurai,  
 Tamil Nadu - 625101



**7626 8084 5072**  
**VID : 9139 7036 4337 2962**

1047 | help@uidai.gov.in | www.uidai.gov.in

Dr. S. K. KRISHNAN, M.Sc., Ph.D.,  
 RQP/MAS/263/2014/A

K. Ilayaraja



*Signature of Shri S. Karuppannan*

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

श्री एस. करुपन्नण, मॉगनीकाडू, मुत्तमंपट्टी पोस्ट, बोम्मीडी वर्यो, ओमलूर तालुक, सेलम डीस्ट्रीक्ट, 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), Bommididi (Via), Omalur Taluk, Salem District, Tamilnadu - 635 301, whose **Photograph and signature** is affixed herein above, having given satisfactory evidence of his qualifications & experience hereby **RECOGNISED** under Rule 22C of the Mineral Concession Rule, 1960 as a Qualified Person to prepare Mining Plans.

उनकीपंजीयन संख्या है  
His registration number is

RQP /MAS/263/2014/A

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

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज पाए जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा।

This certificate will liable to be withdrawn / cancelled in the event of furnishing the wrong information / documents in the Mining Plan submitted by him.

स्थान/ Place : Chennai  
दिनांक/ Date : 16.12.2014.

*Signature of Dr. S. Karuppannan*

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

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

*Signature of Regional Controller of Mines*

# KEY MAP

TOWARDS  
THUVARANKURICHI

TOWARDS  
CHOKKALINGAPURAM

2.5km

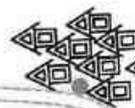
NH-45B

24.0km

NH-45B

1.6km

16.0km



AYYAPATTI  
VILLAGE



0.8km

TOWARDS

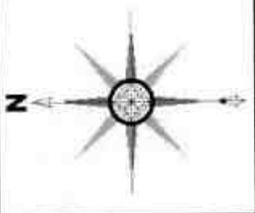


PLATE NO-I

APPLICANT:

Mr. KILAYARAJA  
S/O. Mr. KRISHNAN,  
W/10/215, PETTAL ANNA NAGAR,  
KARUNGALAKUDI, MELUR TALUK,  
MADURAI DISTRICT, TAMILNADU.  
PIN CODE: 625101.

LEASE APPLIED AREA:

S.F.NO : 619/5 (PART),  
EXTENT : 2.02.50 Hect.,  
VILLAGE : KARUNGALAKUDI,  
TALUK : MELUR,  
DISTRICT : MADURAI.

## INDEX

- MINE LEASE AREA
- APPROACH ROAD
- CART ROAD
- NH -45B ROAD

KEY MAP

Not for Sale

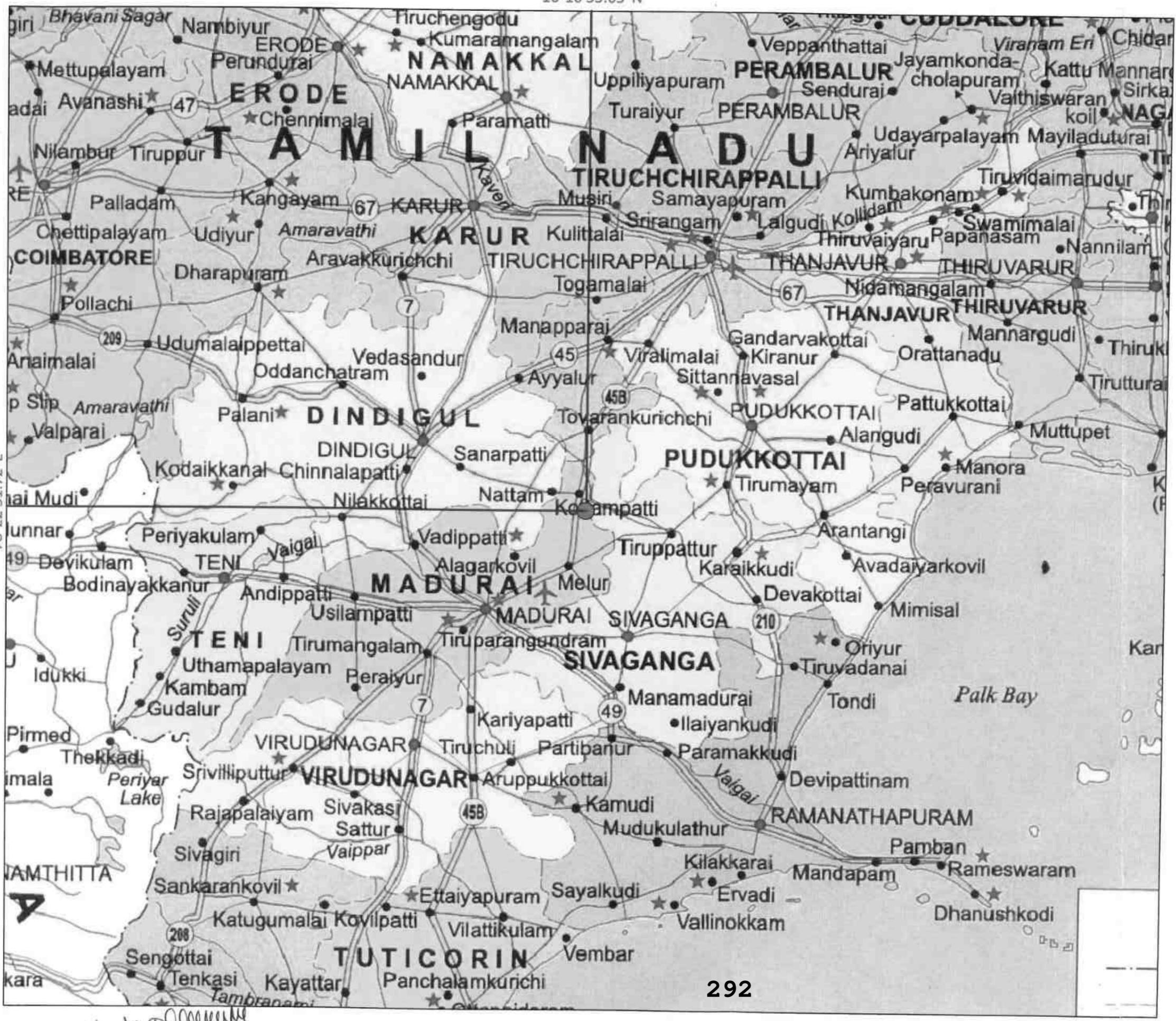
Prepared By:

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

*[Handwritten Signature]*

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

*[Handwritten Signature]*  
K. ILAYARAJA



**PLATE NO-IA**

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

MINE LEASE AREA: ●  
 TOPO SHEET NO : 58-J/08  
 LATITUDE : 10°10'47.02"N to 10°10'52.75"N  
 LONGITUDE : 78°22'51.72"E to 78°23'0.92"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

K. Ilayaraja

10°10'53.05"N

- 245 -



PLATE NO-IB

APPLICANT:  
**Mr.K.ILAYARAJA**  
S/O. Mr.KRISHNAN,  
W10/215, PETTAL, ANNA NAGAR,  
KARUNGALAKUDI, MELUR TALUK,  
MADURAI DISTRICT. TAMILNADU.  
PIN CODE: 625101.

LEASE APPLIED AREA:  
S.F.NO : 619/5 (PART)  
EXTENT : 2.02.50 Hect  
VILLAGE : KARUNGALAKUDI,  
TALUK : MELUR,  
DISTRICT : MADURAI.

TOPO SHEET NO : 58-J/08

LATITUDE : 10°10'47.02"N to 10°10'53.05"N

LONGITUDE : 78°22'51.72"E to 78°23'0.92"E

MINE LEASE AREA



10KM RADIUS



CONVENTIONAL SYMBOLS

Table of conventional symbols for topographic features like roads, rivers, and buildings.

TOPO SHEET MAP

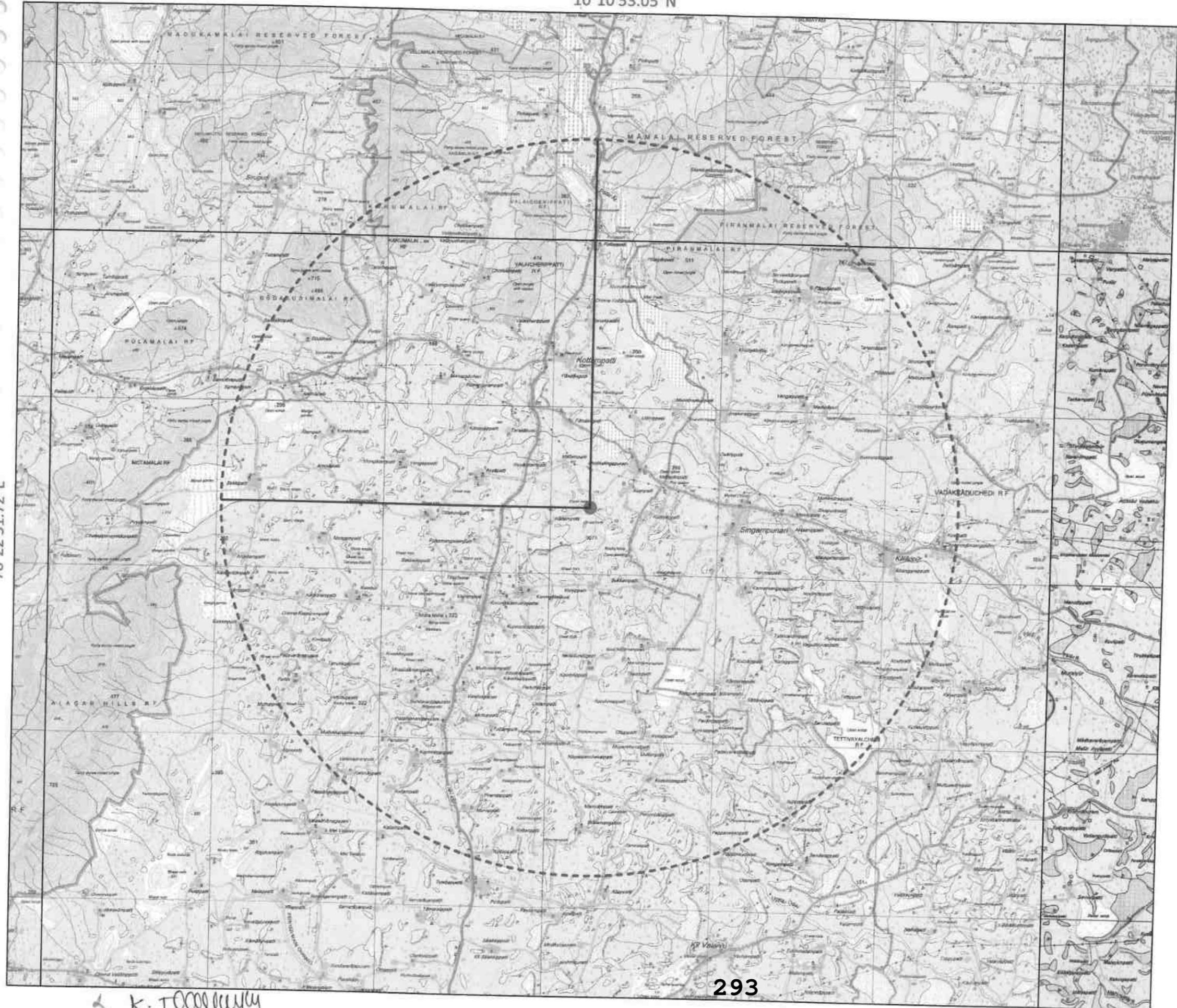
SCALE- 1:1,00,000

Prepared By:

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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

7°22'51.2"E



K. Ilayaraja

10°10'53.05"N



78°22'51.72"E

- 247 -

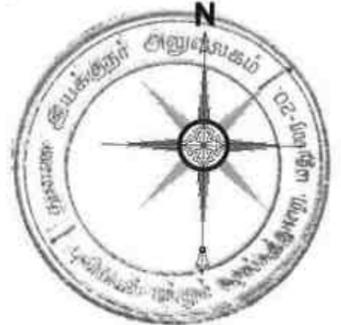


PLATE NO-IC

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAL, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

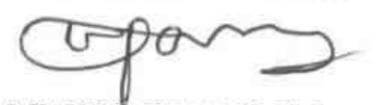
**INDEX**

- MINE LEASE AREA 
- 300m RADIUS 
- 500m RADIUS 
- APPROACH ROAD 
- CART ROAD 
- EXISTING QUARRY PIT 

TOPO SHEET NO : 58-J/08  
 LATITUDE : 10°10'47.02"N to 10°10'53.05"N  
 LONGITUDE : 78°22'51.72"E to 78°23'0.92"E

**SATELLITE IMAGERY MAP**  
 SCALE- 1:5000

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



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

K. Ilayaraja

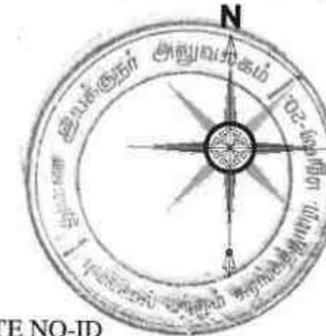


PLATE NO-ID

APPLICANT:  
**Mr.K.ILAYARAJA**  
S/O. Mr.KRISHNAN,  
W10/215, PETTAI, ANNA NAGAR,  
KARUNGALAKUDI, MELUR TALUK,  
MADURAI DISTRICT. TAMILNADU.  
PIN CODE: 625101.

LEASE APPLIED AREA:  
S.F.NO : 619/5 (PART)  
EXTENT : 2.02.50 Hect  
VILLAGE : KARUNGALAKUDI,  
TALUK : MELUR,  
DISTRICT : MADURAI.

**INDEX**

- MINE LEASE AREA 
- SAFETY AREA 
- 300m RADIUS 
- 500m RADIUS 
- APPROACH ROAD 
- CART ROAD 
- EXISTING QUARRY PIT 
- HABITATIONS 

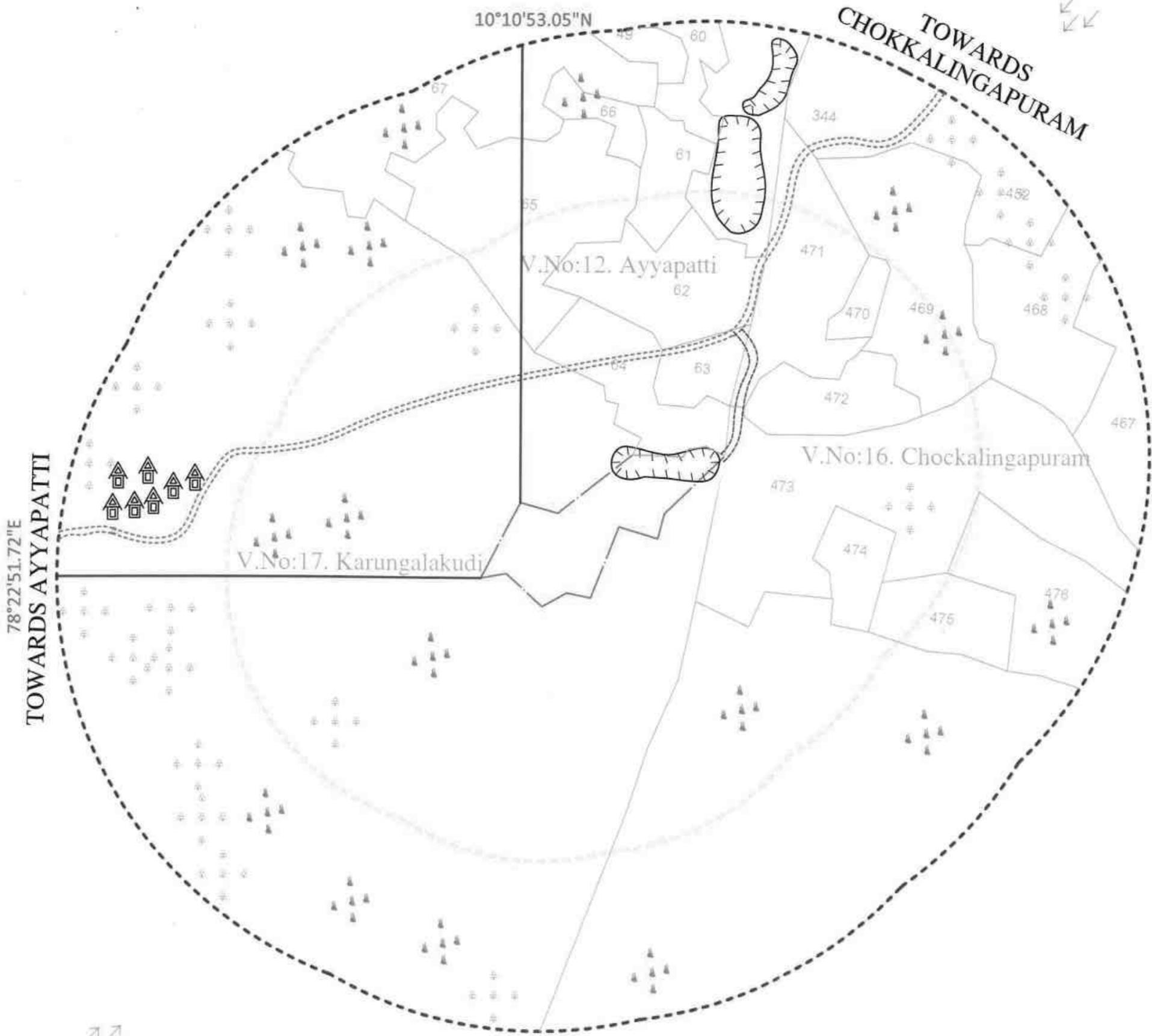
TOPO SHEET NO : 58-J/08  
LATITUDE : 10°10'47.02"N to 10°10'53.05"N  
LONGITUDE : 78°22'51.72"E to 78°23'0.92"E

**ENVIRONMENTAL PLAN**

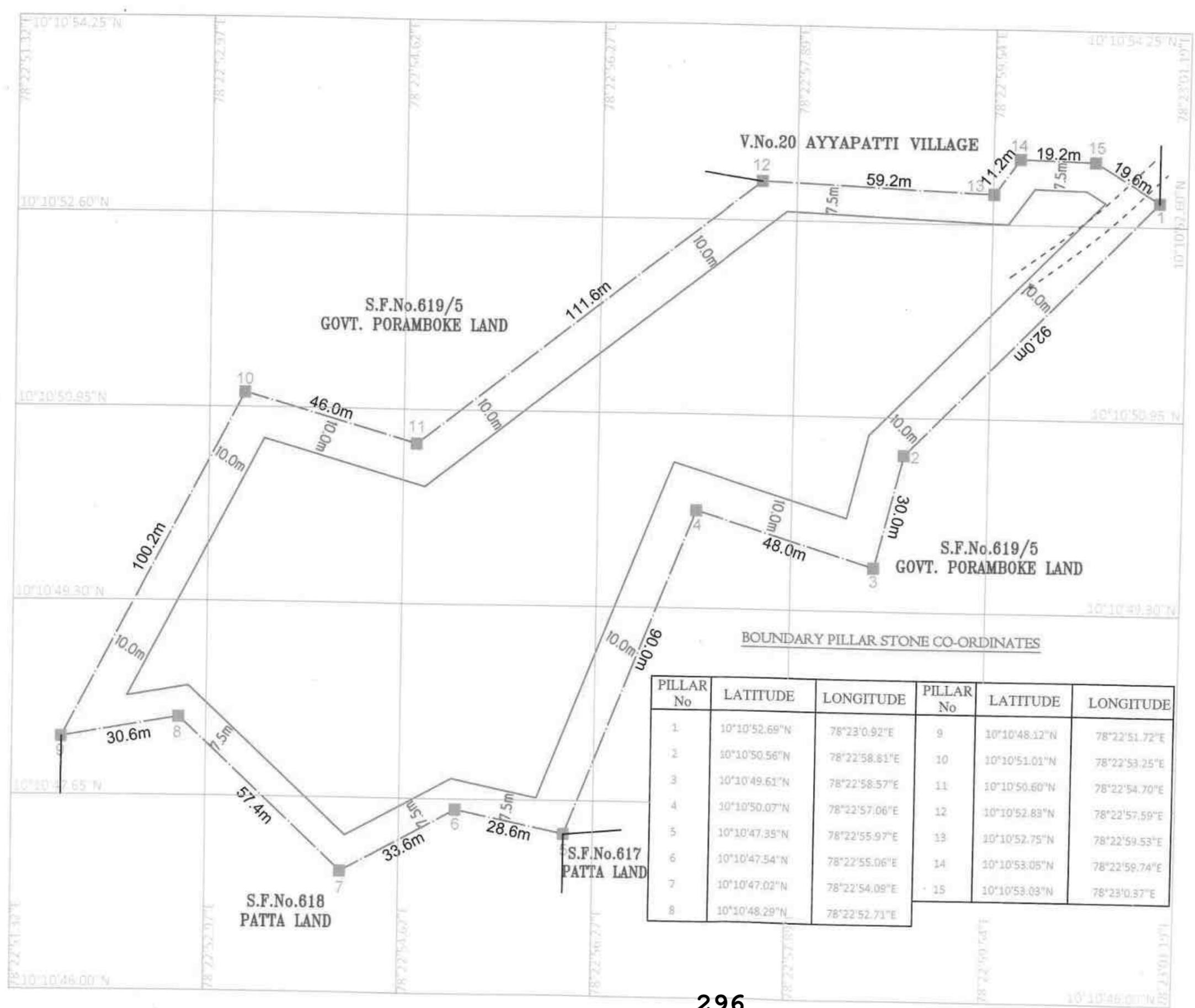
SCALE- 1:5000

Prepared By:  
I DO HEREBY CERTIFY THAT THE PLATE  
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TO THE BEST OF MY KNOWLEDGE

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



K-Ilaiyaru



V.No.20 AYYAPATTI VILLAGE

S.F.No.619/5  
GOVT. PORAMBOKE LAND

S.F.No.619/5  
GOVT. PORAMBOKE LAND

S.F.No.618  
PATTA LAND

S.F.No.617  
PATTA LAND

BOUNDARY PILLAR STONE CO-ORDINATES

PILLAR No	LATITUDE	LONGITUDE	PILLAR No	LATITUDE	LONGITUDE
1	10°10'52.69"N	78°23'0.92"E	9	10°10'48.12"N	78°22'51.72"E
2	10°10'50.56"N	78°22'58.81"E	10	10°10'51.01"N	78°22'53.25"E
3	10°10'49.61"N	78°22'58.57"E	11	10°10'50.60"N	78°22'54.70"E
4	10°10'50.07"N	78°22'57.06"E	12	10°10'52.83"N	78°22'57.59"E
5	10°10'47.35"N	78°22'55.97"E	13	10°10'52.75"N	78°22'59.53"E
6	10°10'47.54"N	78°22'55.06"E	14	10°10'53.05"N	78°22'59.74"E
7	10°10'47.02"N	78°22'54.09"E	15	10°10'53.03"N	78°23'0.37"E
8	10°10'48.29"N	78°22'52.71"E			

PLATE NO-II

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH ROAD
- BOUNDARY PILLAR STONES

MINE LEASE PLAN

SCALE 1 : 1000

Prepared By:

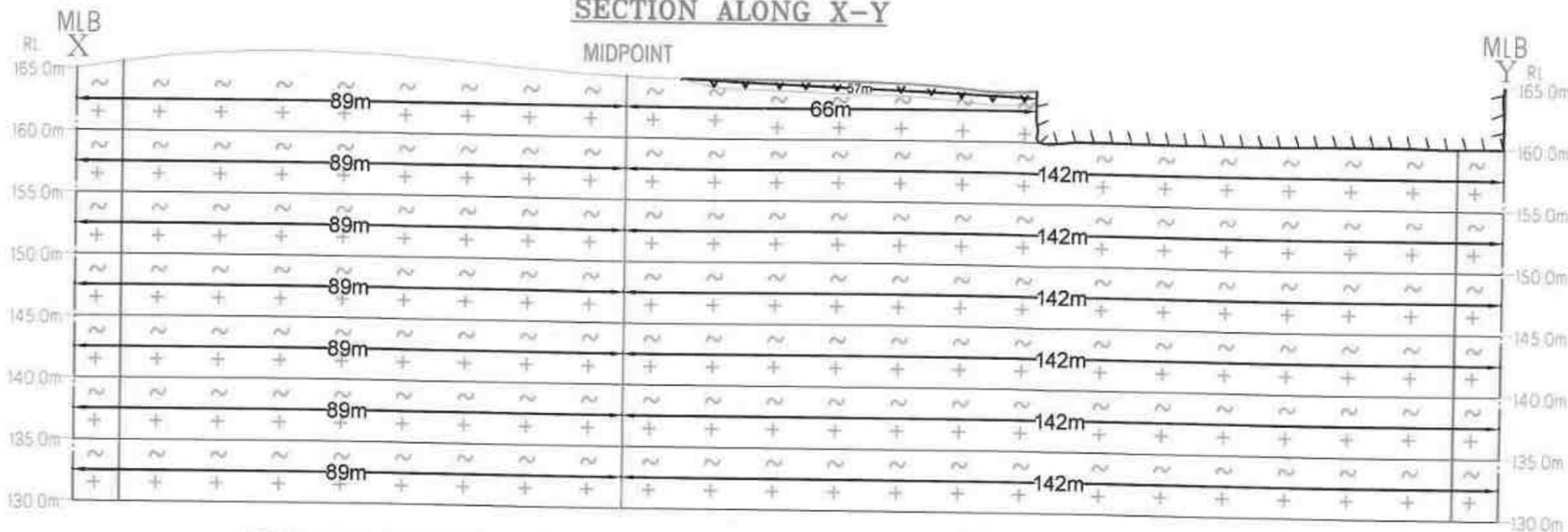
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

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

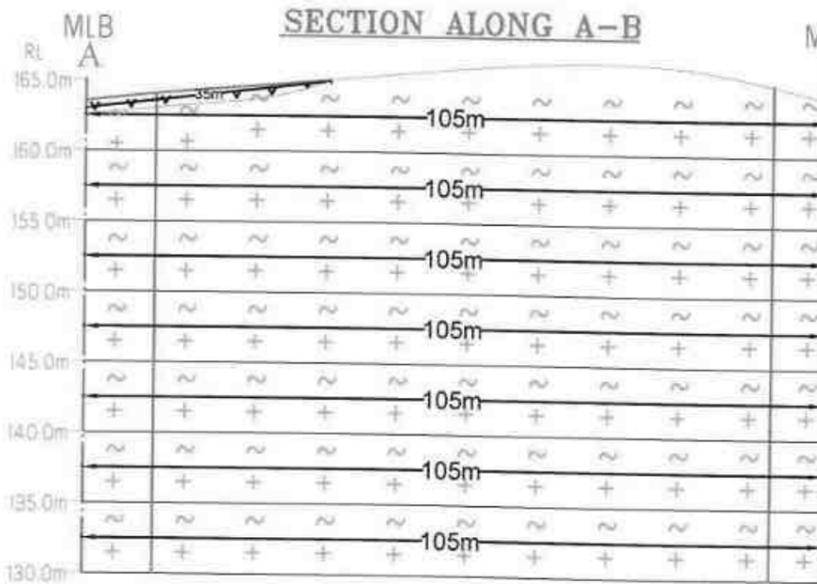
K. Ilayaraja



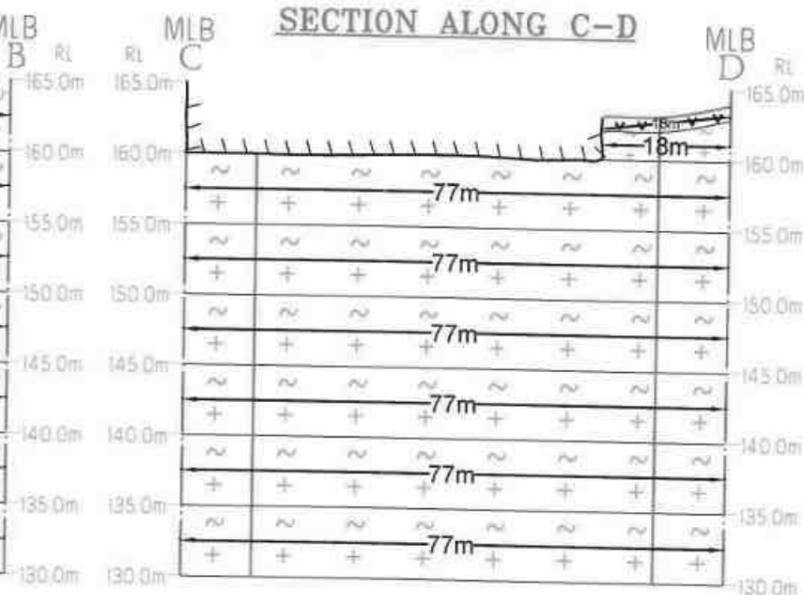
**SECTION ALONG X-Y**



**SECTION ALONG A-B**



**SECTION ALONG C-D**



**GEOLOGICAL RESOURCES**

Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Geological Resources in CBM	Residual Topsoil in CBM
XY-AB	Slope	89	35	1	3115	.....	3115
	I	89	105	5	46725	46725	.....
	II	89	105	5	46725	46725	.....
	III	89	105	5	46725	46725	.....
	IV	89	105	5	46725	46725	.....
	V	89	105	5	46725	46725	.....
	VI	89	105	5	46725	46725	.....
XY-CD	Slope	57	18	1	1026	.....	1026
	I	66	18	5	5940	5940	.....
	II	142	77	5	54670	54670	.....
	III	142	77	5	54670	54670	.....
	IV	142	77	5	54670	54670	.....
	V	142	77	5	54670	54670	.....
	VI	142	77	5	54670	54670	.....
<b>TOTAL</b>				<b>35</b>	<b>665176</b>	<b>661035</b>	<b>4141</b>

K. Ilayaraja

255



**PLATE NO-III A**

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI

**INDEX**

- MINE LEASE AREA
- SAFETY BOUNDARY
- ROUGH STONE
- TOPSOIL
- EXISTING PIT

**SURFACE AND GEOLOGICAL SECTIONS**

HOR 1 : 1000 VER : 500

Prepared By:

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

257

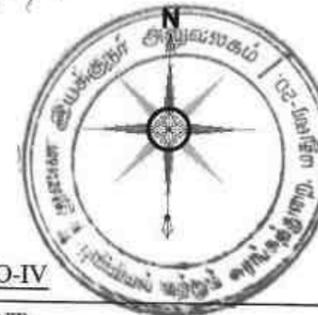


PLATE NO-IV

APPLICANT:  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT, TAMILNADU.  
 PIN CODE: 625101.

LEASE APPLIED AREA:  
 S.F.NO : 619/5 (PART),  
 EXTENT : 2.02.50 Hect,  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

MINE LEASE AREA	
SAFETY DISTANCE	
APPROACH ROAD	
BOUNDARY PILLAR STONES	
TEMPORARY BENCH MARK	
CONTOUR LINES	
SHRUBS	
OUTCROP	
TOP SOIL	
ROUGH STONE	
EXISTING PIT	

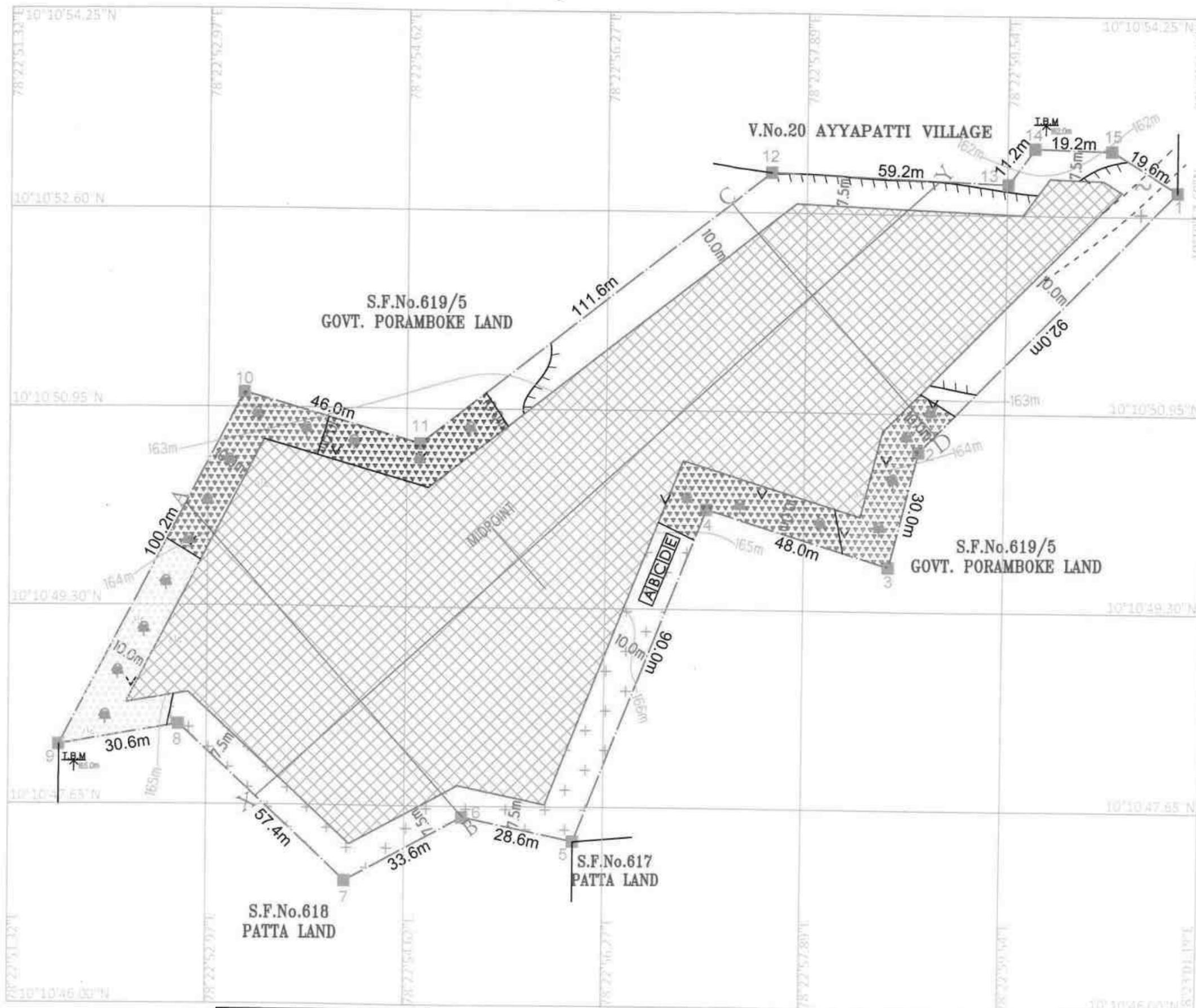
**YEARWISE DEVELOPMENT & PRODUCTION PLAN**

SCALE 1 : 1000

Prepared By:

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

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



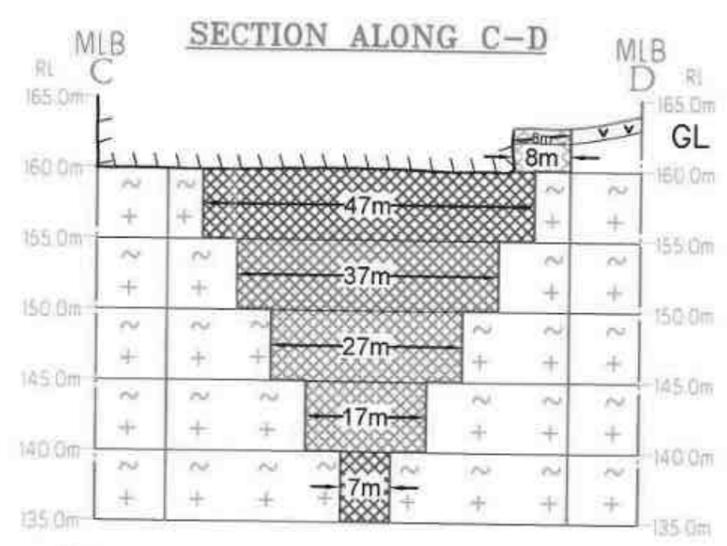
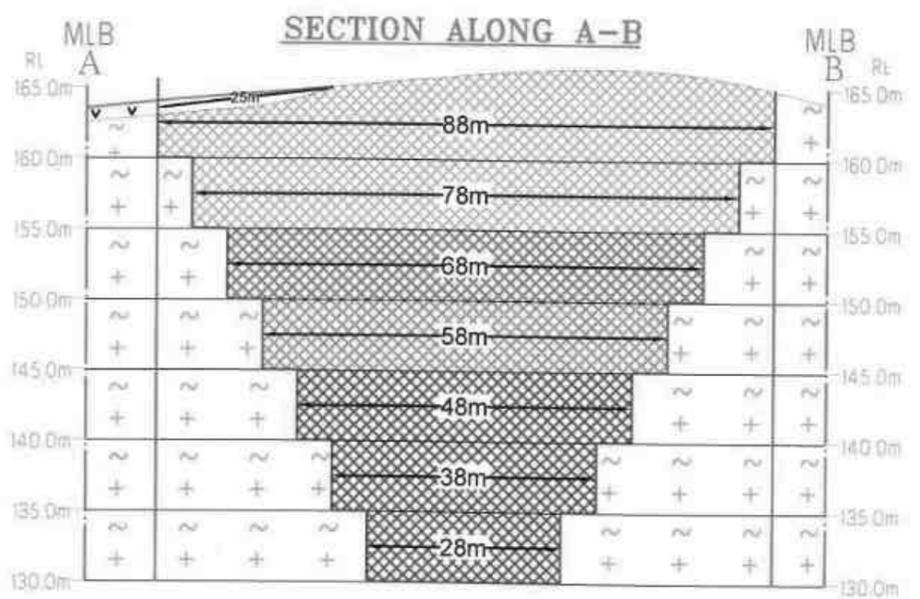
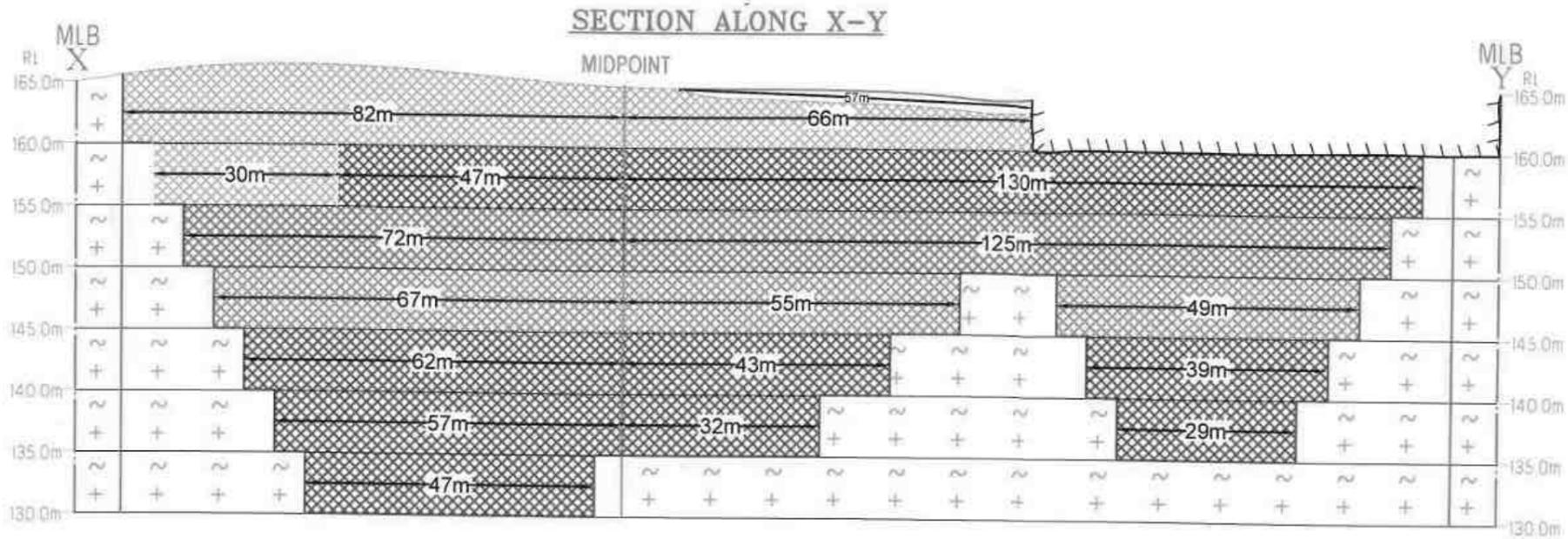
I - Year Proposed area to be Quarried	
II - Year Proposed area to be Quarried	
III - Year Proposed area to be Quarried	
IV - Year Proposed area to be Quarried	
V - Year Proposed area to be Quarried	

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

I - Year Proposed area to be Planted	
II - Year Proposed area to be Planted	
III - Year Proposed area to be Planted	
IV - Year Proposed area to be Planted	
V - Year Proposed area to be Planted	

299

K. Ilayaraja



- 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 PRODUCTION								
YEAR	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Production of rough stone in CBM @100%	Residual Topsoil in CBM
I-YEAR	XY-AB	Slope	82	25	1	2050	.....	2050
		I	82	88	5	36080	36080	.....
		II	30	78	5	11700	11700	.....
II-YEAR	XY-CD	Slope	57	8	1	456	.....	456
		I	66	8	5	2640	2640	.....
III-YEAR	XY-AB	II	47	78	5	18330	18330	.....
		III	130	47	5	30550	30550	.....
IV-YEAR	XY-AB	III	72	68	5	24480	24480	.....
		IV	125	37	5	23125	23125	.....
V-YEAR	XY-AB	IV	67	58	5	19430	19430	.....
		V	104	27	5	14040	14040	.....
		VI	82	17	5	6970	6970	.....
		VII	62	48	5	14880	14880	.....
		VIII	57	38	5	10830	10830	.....
<b>GRAND TOTAL</b>						<b>224276</b>	<b>221770</b>	2506

259

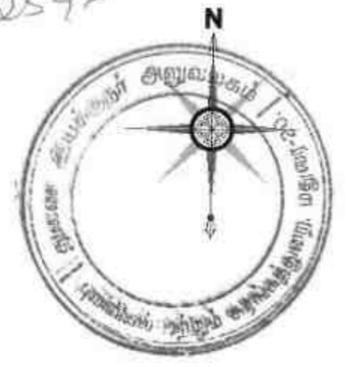


PLATE NO-IVA

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
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 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

- MINE LEASE AREA
- SAFETY BOUNDARY
- ROUGH STONE
- TOPSOIL
- BENCH
- EXISTING PIT

**YEARWISE DEVELOPMENT & PRODUCTION SECTIONS**  
 HOR 1 : 1000, VER 1: 500

Prepared By:

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

K.ILAYARAJA

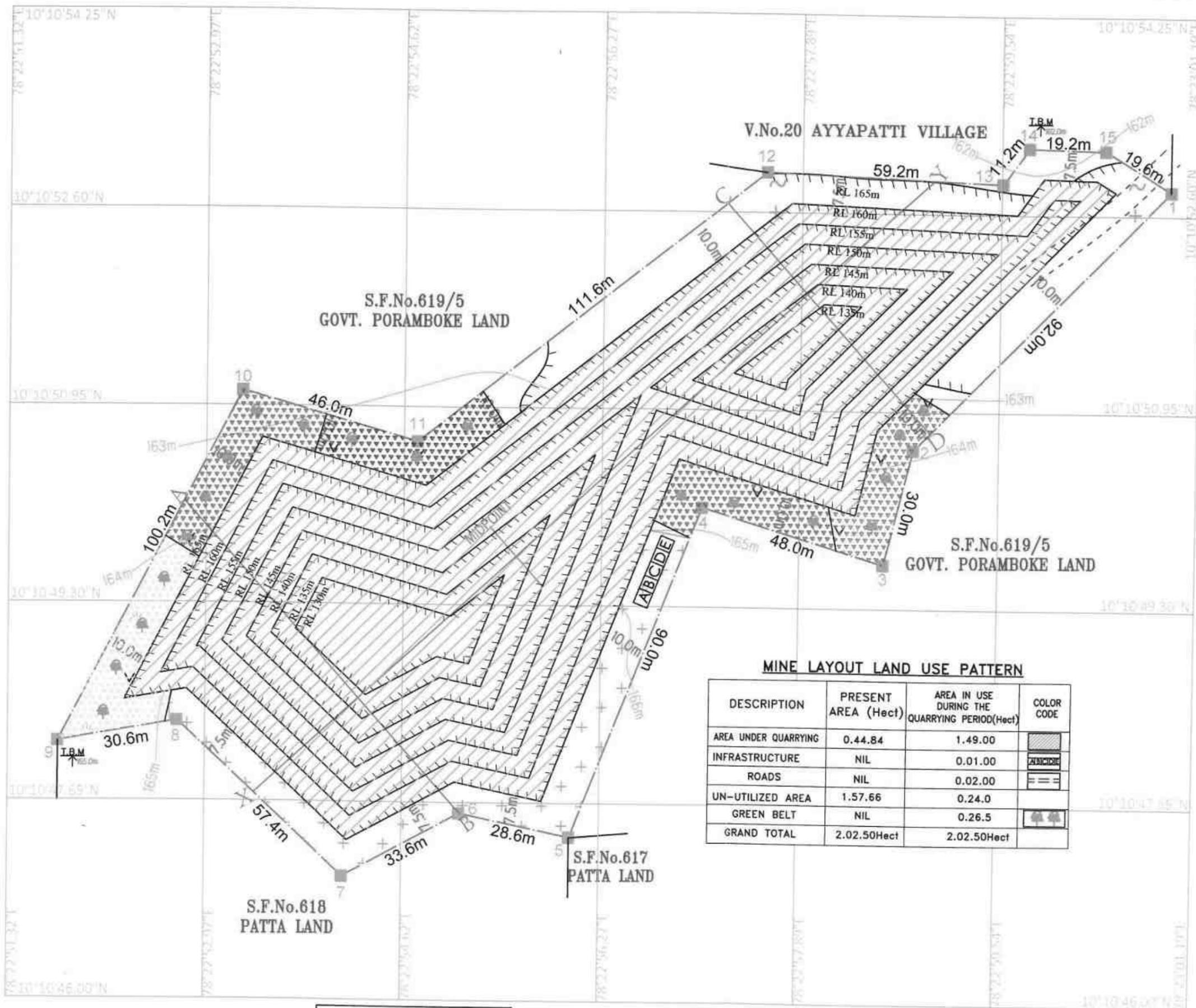


PLATE NO-V

APPLICANT:  
**Mr.K.ILAYARAJA**  
 S/O. MR.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

LEASE APPLIED AREA:  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

- MINE LEASE AREA [Hatched Pattern]
- SAFETY DISTANCE [Line Pattern]
- APPROACH ROAD [Dashed Line Pattern]
- BOUNDARY PILLAR STONES [Square Pattern]
- TEMPORARY BENCH MARK [TBM Symbol]
- CONTOUR LINES [Wavy Line Pattern]
- SHRUBS [Stippled Pattern]
- OUTCROP [Circle Pattern]
- TOP SOIL [V Pattern]
- PROPOSED BENCH [Line Pattern]

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

Prepared By:  
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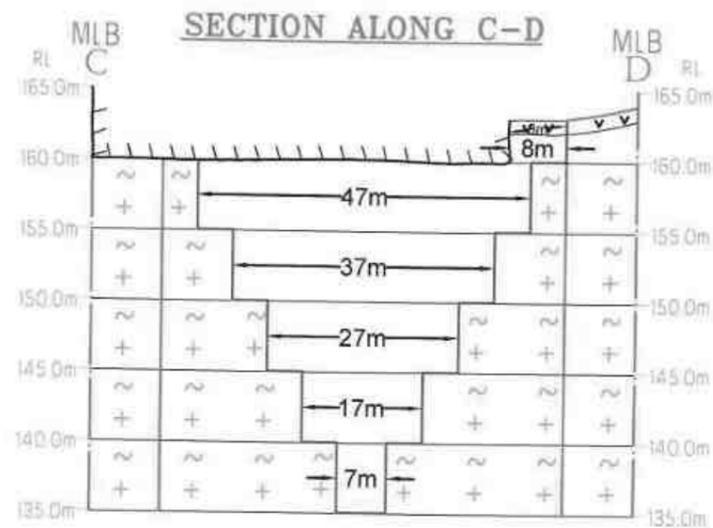
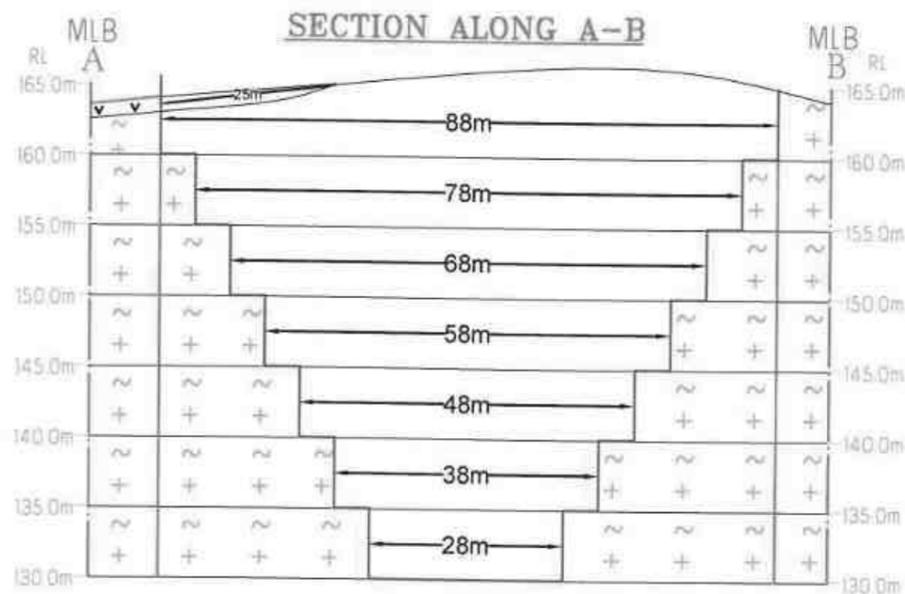
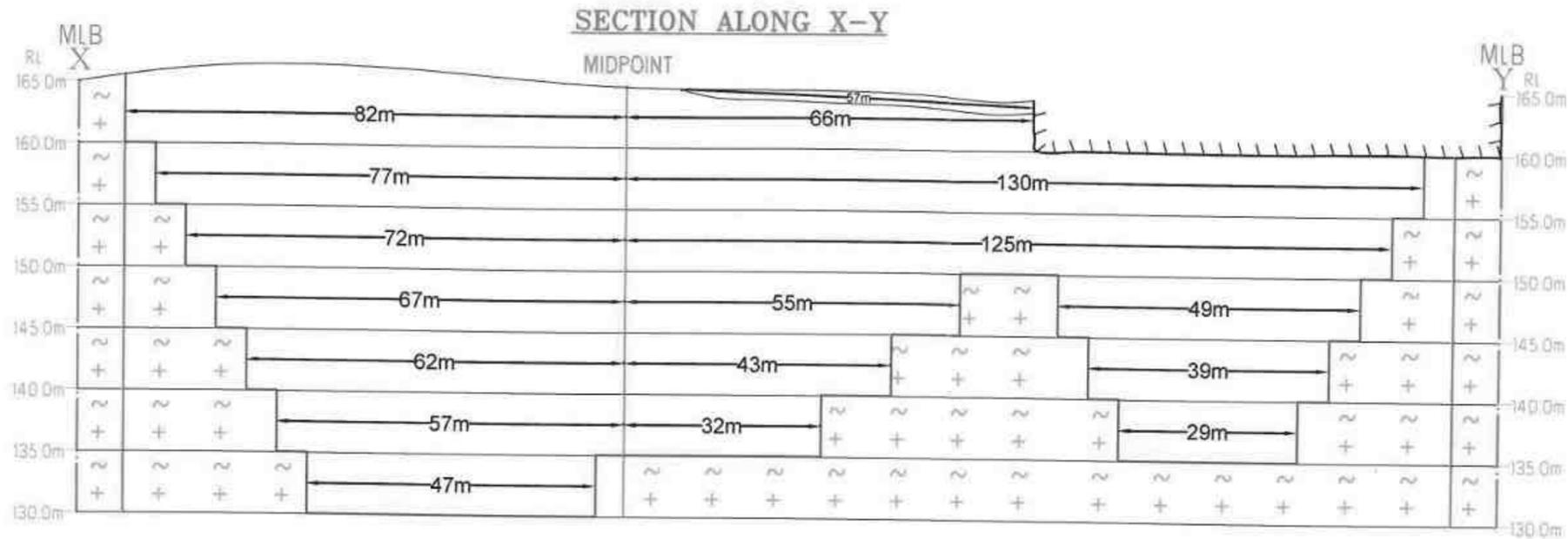
*[Signature]*

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

- I - Year Proposed area to be Planted [Symbol]
- II - Year Proposed area to be Planted [Symbol]
- III - Year Proposed area to be Planted [Symbol]
- IV - Year Proposed area to be Planted [Symbol]
- V - Year Proposed area to be Planted [Symbol]

*K. Ilayaraja*





MINEABLE RESERVES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Mineable Reserves in CBM	Residual Topsoil in CBM
XY-AB	Slope	82	25	1	2050	.....	2050
	I	82	88	5	36080	36080	.....
	II	77	78	5	30030	30030	.....
	III	72	68	5	24480	24480	.....
	IV	67	58	5	19430	19430	.....
	V	62	48	5	14880	14880	.....
	VI	57	38	5	10830	10830	.....
XY-CD	Slope	57	8	1	456	.....	456
	I	66	8	5	2640	2640	.....
	II	130	47	5	30550	30550	.....
	III	125	37	5	23125	23125	.....
	IV	104	27	5	14040	14040	.....
	V	82	17	5	6970	6970	.....
<b>TOTAL</b>				<b>35</b>	<b>224276</b>	<b>221770</b>	<b>2506</b>

K. Ilayaraja

303

- 265 -



PLATE NO-VIA

APPLICANT:  
**Mr.K.ILAYARAJA**  
 S/O. MR.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

LEASE APPLIED AREA:  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

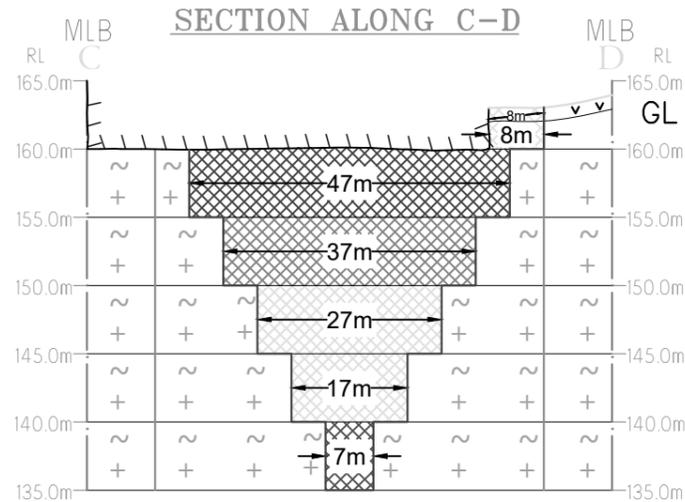
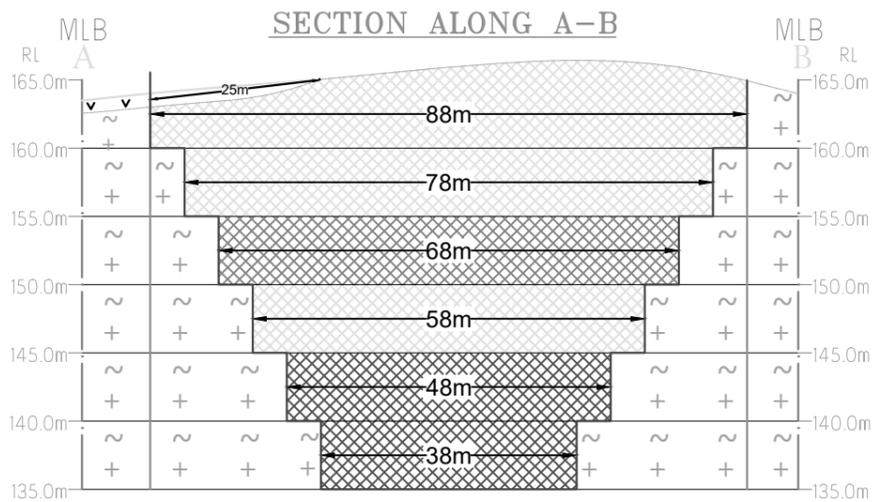
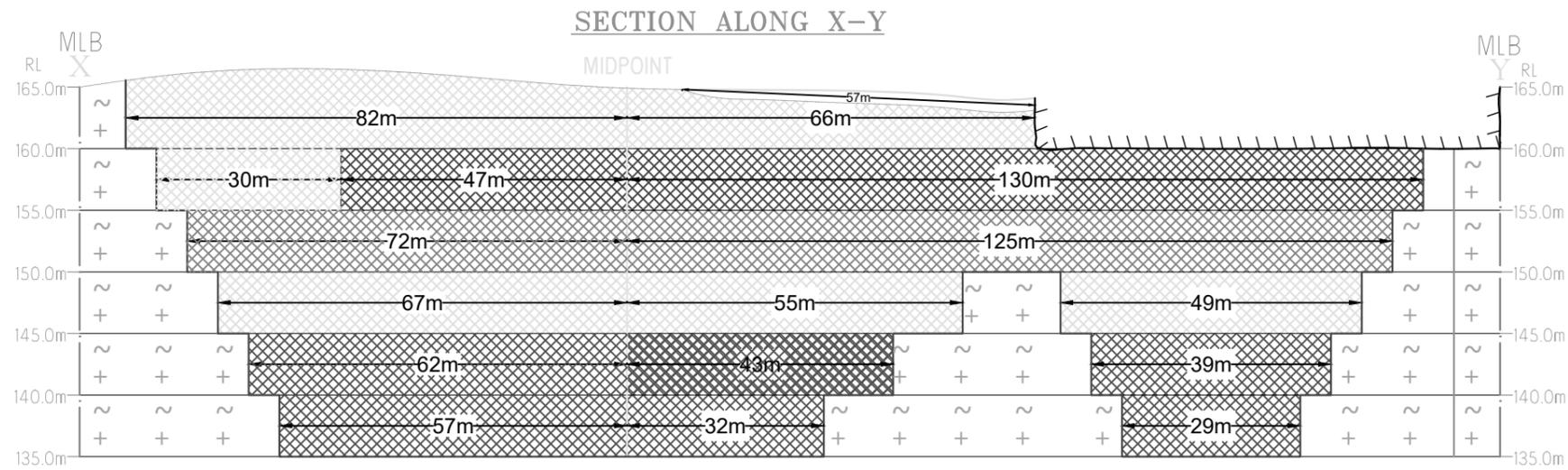
- MINE LEASE AREA
- SAFETY BOUNDARY
- ROUGH STONE
- TOPSOIL
- BENCH
- EXISTING PIT

**CONCEPTUAL / FINAL MINE  
 CLOSURE SECTIONS**  
 HOR 1 : 1000, VER 1: 500

Prepared By:

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



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

YEARWISE PRODUCTION								
YEAR	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Product ion of rough stone in CBM @100%	Product ion of Gravel in CBM
I-YEAR	XY-AB	Slope	82	25	1	2050	.....	2050
		I	82	88	5	36080	36080	.....
		II	30	78	5	11700	11700	.....
XY-CD	Slope	57	8	1	456	.....	456	
	I	66	8	5	2640	2640	.....	
II-YEAR	XY-AB	II	47	78	5	18330	18330	.....
	XY-CD	II	130	47	5	30550	30550	.....
III-YEAR	XY-AB	III	72	68	5	24480	24480	.....
	XY-CD	III	125	37	5	23125	23125	.....
IV-YEAR	XY-AB	IV	67	58	5	19430	19430	.....
	XY-CD	IV	104	27	5	14040	14040	.....
V-YEAR	XY-AB	V	82	17	5	6970	6970	.....
		VI	62	48	5	14880	14880	.....
		VI	57	38	5	10830	10830	.....
	XY-CD	VI	61	7	5	2135	2135	.....
<b>GRAND TOTAL</b>						<b>217696</b>	<b>215190</b>	<b>2506</b>

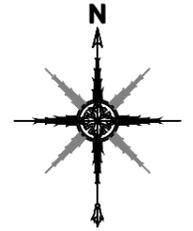


PLATE NO-IVA

APPLICANT:  
**Mr.K.ILAYARAJA**  
 S/O. Mr.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

LEASE APPLIED AREA:  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

MINE LEASE AREA	
SAFETY BOUNDARY	
ROUGH STONE	
TOPSOIL	
BENCH	
EXISTING PIT	

**YEARWISE DEVELOPMENT & PRODUCTION SECTIONS**  
 HOR 1 : 1000, VER 1: 500

Prepared By:

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

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

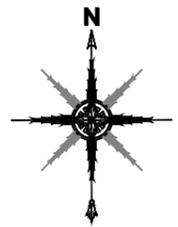
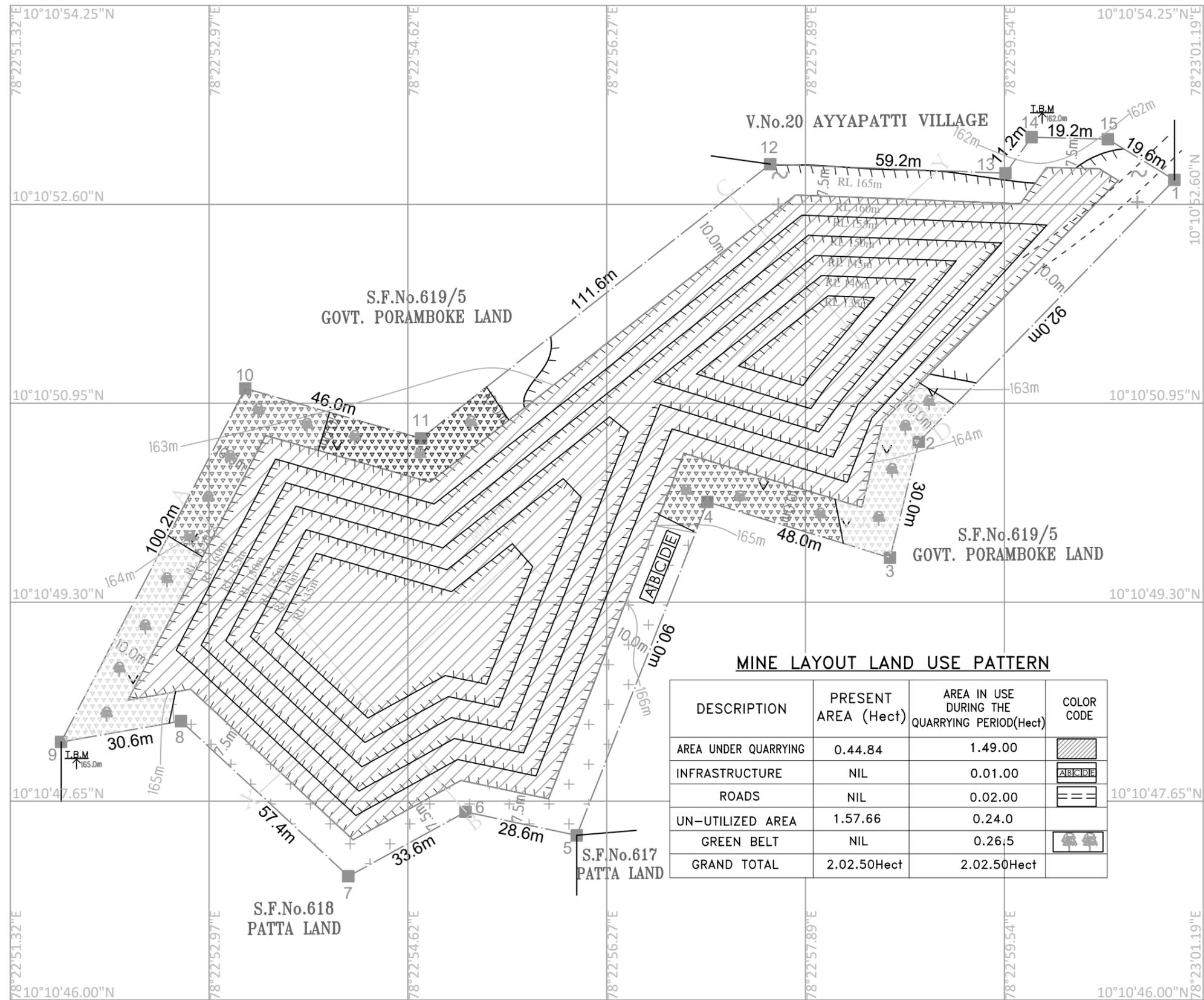


PLATE NO-V

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. MR.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

MINE LEASE AREA	[Hatched Pattern]
SAFETY DISTANCE	[Double Line Pattern]
APPROACH ROAD	[Dashed Line Pattern]
BOUNDARY PILLAR STONES	[Square Pattern]
TEMPORARY BENCH MARK	[I.B.M. Symbol]
CONTOUR LINES	[Contour Line Symbol]
SHRUBS	[Tree Pattern]
OUTCROP	[Dotted Pattern]
TOP SOIL	[V Pattern]
PROPOSED BENCH	[Trench Pattern]

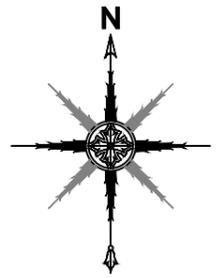
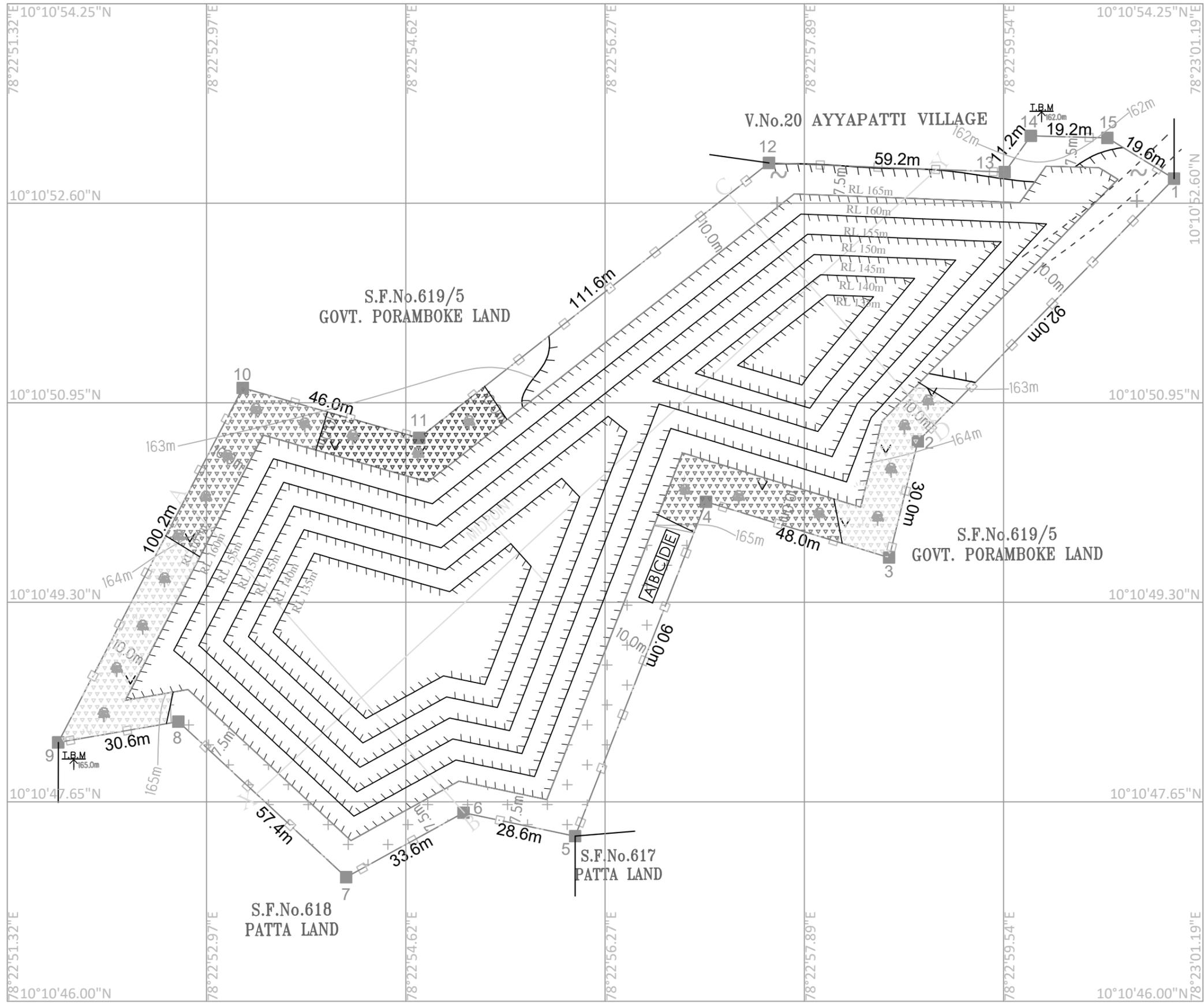
**MINE LAYOUT PLAN AND LAND USE PATTERN**  
 SCALE 1 : 1000

Prepared By:

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

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

- I - Year Proposed area to be Planted [Tree Symbol]
- II - Year Proposed area to be Planted [Tree Symbol]
- III - Year Proposed area to be Planted [Tree Symbol]
- IV - Year Proposed area to be Planted [Tree Symbol]
- V - Year Proposed area to be Planted [Tree Symbol]



**PLATE NO-VI**

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. MR.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

MINE LEASE AREA	
SAFETY BOUNDARY	
APPROACH ROAD	
TEMPORARY BENCH MARK	
CONTOUR LINE	
TOPSOIL	
SHRUBS	
BENCH	
FENCING	
EXISTING PIT	

**CONCEPTUAL / FINAL MINE  
 CLOSURE PLAN  
 SCALE 1 : 1000**

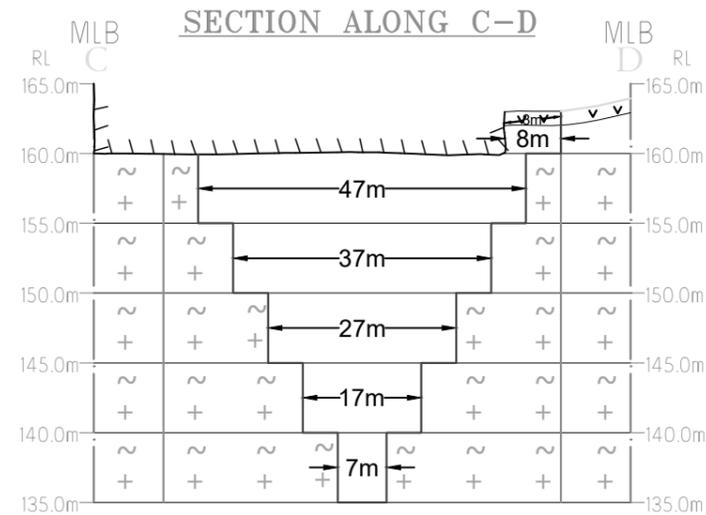
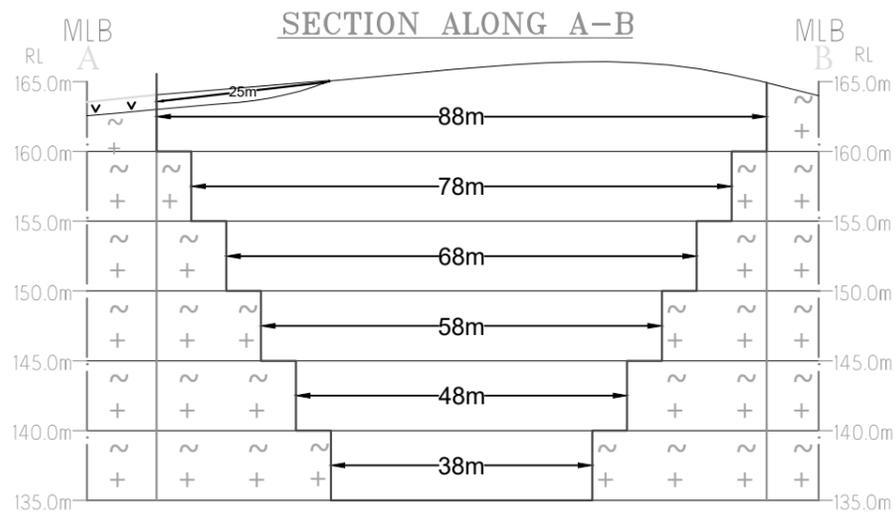
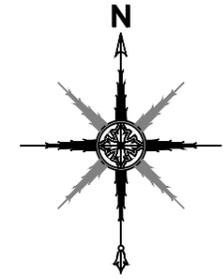
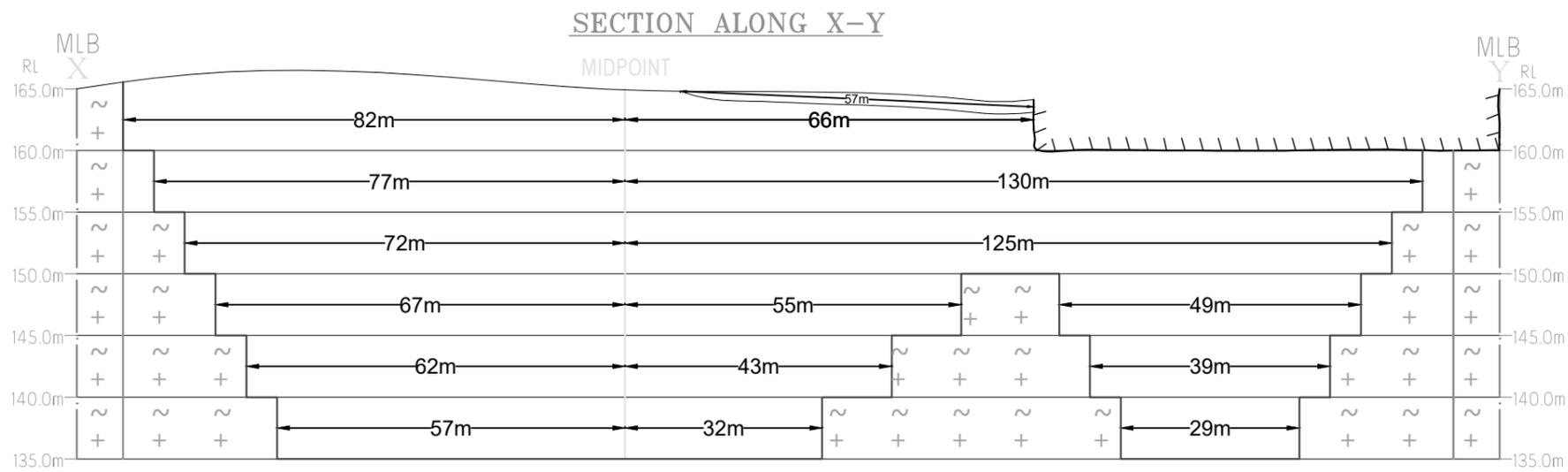
Prepared By:

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

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

- I - Year Proposed area to be Planted
- II - Year Proposed area to be Planted
- III - Year Proposed area to be Planted
- IV - Year Proposed area to be Planted
- V - Year Proposed area to be Planted

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



MINEABLE RESERVES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Mineable Reserves in CBM	Residual Topsoil in CBM
XY-AB	Slope	82	25	1	2050	.....	2050
	I	82	88	5	36080	36080	.....
	II	77	78	5	30030	30030	.....
	III	72	68	5	24480	24480	.....
	IV	67	58	5	19430	19430	.....
	V	62	48	5	14880	14880	.....
XY-CD	Slope	57	8	1	456	.....	456
	I	66	8	5	2640	2640	.....
	II	130	47	5	30550	30550	.....
	III	125	37	5	23125	23125	.....
	IV	104	27	5	14040	14040	.....
	V	82	17	5	6970	6970	.....
<b>TOTAL</b>					<b>217307</b>	<b>215190</b>	<b>2506</b>



**PLATE NO-VIA**

**APPLICANT:**  
**Mr.K.ILAYARAJA**  
 S/O. MR.KRISHNAN,  
 W10/215, PETTAI, ANNA NAGAR,  
 KARUNGALAKUDI, MELUR TALUK,  
 MADURAI DISTRICT. TAMILNADU.  
 PIN CODE: 625101.

**LEASE APPLIED AREA:**  
 S.F.NO : 619/5 (PART)  
 EXTENT : 2.02.50 Hect  
 VILLAGE : KARUNGALAKUDI,  
 TALUK : MELUR,  
 DISTRICT : MADURAI.

**INDEX**

- MINE LEASE AREA
- SAFETY BOUNDARY
- ROUGH STONE
- TOPSOIL
- BENCH
- EXISTING PIT

**CONCEPTUAL / FINAL MINE  
 CLOSURE SECTIONS  
 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.,  
 RECOGNISED QUALIFIED PERSON  
 RQP/MAS/263/2014/A

From

To

Thiru.L.Sattanathan Sankar, M.Sc.,  
Deputy Director,  
Dept. of Geology and Mining,  
Madurai.

Thiru K.Ilayaraja,  
S/o Krishanan,  
W10/215,Pettai,Anna Nagar,  
Karungalakudi,  
Melur Taluk,Madurai.

Roc.No.85/Mines/2021, dated 05.04.2021

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough Stone - Madurai District - Melur Taluk - Karungalakudi Village - Government land - in S.F. No. 619/5(P) - Over an extent of 2.02.5Hects - Tender application preferred by Thiru K.Ilayaraja - Declared as highest bidder - Precise area communicated - Draft Mining Plan submitted - Approval accorded- Regarding.

- Ref:
1. Madurai District Gazette Notification No.17 dated.28.12.2020.
  2. Tender application preferred by Thiru K.Ilayaraja dated.20.01.2021.
  3. Precise communication letter Roc No.85/2021/Mines, dated.05.02.2021
  4. Letter dated.22.04.2021 received from Thiru K.Ilayaraja along with draft mining plan.

\*\*\*\*\*

In the reference 1<sup>st</sup> cited above, the District Collector, Madurai has published the Madurai District Gazette Extraordinary Notification No.17, dated 28.12.2020 wherein the tender cum auction for 27 rough stone quarries on 20.01.2021 were notified.

One Thiru K.Ilayaraja, S/o Krishanan, W10/215, Pettai, Anna Nagar, Karungalakudi, Melur Taluk has declared as highest bidder and precise area was communicated by the Assistant Director to the highest bidder with a direction to submit the mining plan for the S.F. No.619/5(P) over an extent 2.02.5 hecets of Karungalakudi Village, Melur Taluk, Madurai District as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly K.Ilayaraja has submitted the draft Mining Plan and the same has been examined in detail and it is found correct. The mining plan submitted by K.Ilayaraja in respect of the subject area is approved subject to the following conditions:

- (i). That the mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.
- (ii). This approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884(Central Act IV of 1884) and the rules made there under the Tamil Nadu Minor Mineral Concession Rules, 1959.
- (iii). That the mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (iv). Quarrying shall be done as per the approved Mining Plan and that the mining plan is approved without prejudice to any other law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.
- (v). 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.
- (vi). Waste material should be dumped within the lease granted area as earmarked in the Mining Plan.

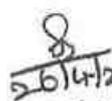
- (vii). Quarrying operations and production shall be carried out as per the approved Mining Plan and the applicant shall be liable to pay the cost of mineral if there is any deviation in the quantum indicated in the approved year wise quantum of production and any such cases as on date are to be dealt with as per Court direction.
- (viii). If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules 1959 and other rules and act in force will attract.
- (ix). The applicant shall strictly adhere to the statutory and safety requirements.

Encl: Approved Mining Plan.

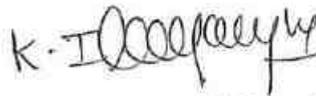
  
 26/4/21  
 O/c Deputy Director,  
 Dept of Geology and Mining,  
 Madurai.

Copy To:

- 1. The Director,  
 Department of Geology and Mining,  
 Guindy, Chennai - 600 032.
 

  
 26/4/21

  
 26/4/2021
- 2. Dr.S.Karuppannan,M.Sc.,Ph.D.,  
 Recognized Qualified Person,  
 RQP/MAS/2619/5(P)/2014/A,  
 No.1/213-B, Ground Floor,  
 Natesan Complex,  
 Oddapatti, Collectorate Post Office,  
 Dharmapuri.

  
 26/04/2021

भारतीय गैर न्यायिक

दस  
रुपये  
रु.10



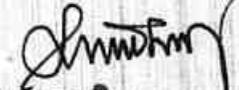
TEN  
RUPEES  
Rs.10

INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMIL NADU

42AA 591518

தமிழ்நாடு: குறியை: 10/-  
எண்: 45 தேதி: 05.06.2021  
பெயர்: A. அப்துல் பாரி  
இடம்: ஒட்டன்சத்திரம்

  
கி. சந்திரராஜ்,  
ஒட்டன்சத்திரம் திற்பனையாளர்  
ஒட்டன்சத்திரம்,  
உரிமம் எண்: 12/2010

PROPOSED DEED OF BLASTING AGREEMENT

This Proposed deed of blasting agreement is entered into at Oddanchatram on this day of 22nd June 2021 between M/S. K.Illayaraja S/o Krishnan, W10/2015, Pettai, Annanagar, karungalakudi, Melur(tk), Madurai(dt), here in after refer to as party of the first part and M/S Bari Traders, 1025/G1, 1<sup>st</sup> West Street society Colony Oddanchatram L.No:E/SC/TN/22/718/(E107164) valid upto 31.03.2024 in form LE-3 of Explosives Rules 2008, herein after referred to as party of the second part.

The party of the first part is going to operate a stone quarry as per ROC NO; 85/2021(Minerals) Dated 05/02/2021, only after optioning N.O.C from State Environment Impact Assessment Authority Chennai, for a stipulated time granted by the District Authority at S.F no;619/05 Part a Karungalakudi Village, Melur (tk), Madurai(dt), over an extant of 2.02.5 hectors Poramboke land.

BARI TRADER

Proprietor

Where as the party of the first part wants blasting to be done at the above said gravel and stone . quarry site to excavate gravel sand and rough stone, we are ready to accept and operate blasting work at the said site on agreement basis as follows.

The Party of the first part will allot the blasting operations in the above said areas to the party of the second part. who is responsible for blasting rocks and also making his own arrangements for the Explosives and exploding equipment's required for the work. The entire blasting work in the above quarry and the possession of blasting equipment will be handled by the party of the second part and hereby under take the responsibility for the work entrusted. The party of the 2<sup>nd</sup> part will not responsible for the blasting work under taken without the second part in other areas said above. The entire blasting operation will be carried out only after sunrise and before sunset as per explosives rules 2008.

Payment will be made periodically by the party of the 1<sup>st</sup> part for the quantity of explosives used and consumed and hours and time of the exploding equipment put in to use, Calculations will be made and settlement will be arrived at every month. The rates for the items of work will as mutually agreed as marginal cost which includes cost of Explosives , transportation cost and other charges for blasting works. This agreement is made for all blasting work done in the above said areas only.

This agreement is valid from the date of execution till validity of quarrying leases granted by the state government to the party of first part of terminable earlier by mutual consent with a month's notice.

**BARI TRADER**

  
**Proprietor**

Place; Oddanchatram,  
Date; 22.06.2021  
Witness;

1.)

2.)

## अनुज्ञापित प्ररूप एल. ई.-3 | LICENCE FORM LE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (घ) देखिए।)  
(See article 3(a) to (d) of Part I of Schedule IV of Explosives Rules, 2008)(ग) उपयोग के लिए एक समय पर वर्ग 1, 2, 3, 4, 5 या वर्ग 7 के विस्फोटक या किसी मैगजीन में वर्ग 6 के विस्फोटक  
Licence to possess : (c) for use, explosives of class 1, 2, 3, 4, 5, 6 or 7 in a magazine

अनुज्ञापित सं. (Licence No.): E/SC/TN/22/718(E107164)

वार्षिक फीस रूपए (Annual Fee Rs): 6800/-



1. Licence is hereby granted to

M/s. Bari Traders (अधिभोगी / Occupier : A. Abdul Bari), 1025/G1, 1st West Street, Society Colony,  
Oddanchatram PO & TK, Town/Village - Oddanchatram, District-DINDIGUL, State-Tamil Nadu, Pincode -  
624619

की अनुज्ञापित अनुदत्त की जाती है।

2. अनुज्ञापितधारी की प्रास्थिति Status of licensee: Partnership Firm

3. अनुज्ञापित निम्नलिखित प्रयोजनों के लिए विधिमान्य है।

Licence is valid only for the following purpose.

possess for use of Nitrate Mixture, Safety Fuse, Detonating Fuse,  
Ordinary/Electric/Non Electric Detonators, - के उपयोग के लिए

4. अनुज्ञापित विस्फोटकों के निम्नलिखित किस्मों, प्रकार और मात्रा के लिए विधिमान्य है।

Licence is valid for the following kinds and quantity of explosives: - (क) (a)

क्र. Sr. No.	नाम और विवरण Name and Description	वर्ग और प्रभाग Class & Division	उप-प्रभाग Sub-division	मात्रा किसी एक समय में Quantity at any one time
1	Nitrate Mixture	2.0	0	2500 Kg
2	Safety Fuse	6.1	0	5000 Mtrs
3	Detonating Fuse	6.2	0	10000 Mtrs
4	Ordinary/Electric/Non Electric Detonators	6.3	0	44000 Nos.

(ख) किसी एक कलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा। अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञापित के लिए।

(b) Quantity of explosives to be purchased in a calendar month [applicable for licence under article 3(b) and (c)].

10 times  
as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञापित परिसर की पुष्टि होती है।

The licensed premises shall conform to the following drawing(s).

रेखाचित्र क्र. (Drawing No.) E/SC/TN/22/718(E107164)

दिनांक (Dated) 13/03/2018

6. अनुज्ञापित परिसर निम्नलिखित पते पर स्थित हैं। The licensed premises are situated at following address:

Survey No. 1, Lakkayankottai Village, ग्राम (Town/Village) - Oddanchatram

जिला (District)

DINDIGUL

राज्य (State)

Tamil Nadu

पोलिस थाना (Police Station) : Oddanchatram

पिनकोड (Pincode)

624619

दूरभाष (Phone)

ई-मेल (E-Mail)

फैक्स (Fax)

7. अनुज्ञापित परिसर में निम्नलिखित सुविधाएं अंतर्दिष्ट हैं।

The licensed premises consist of following facilities.

One RCC magazine

8. अनुज्ञापित समय-समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2008 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपायधर्मों के अधीन रहते हुए अनुदत्त की जाती है।

The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, additional conditions and the following Annexures.

1. उपर्युक्त क्रम से 5 में यथा कथित रेखाचित्र (स्थान, संनिर्माण संबंधी और अन्य विवरण दर्शित करते हुए)

Drawings (showing site, constructional and other details) as stated in serial No. 5 above

2. अनुज्ञापित प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञापित की शर्तों और अतिरिक्त शर्तों

Conditions and Additional Conditions of this licence signed by the licensing authority.

3. दूरी प्ररूप DE-2 | Distance Form DE-2.

9. यह अनुज्ञापित तारीख 31 मार्च 2021 तक विधिमान्य रहेगी। This licence shall remain valid till 31st day of March 2021.

यह अनुज्ञापित, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VII के अधीन तथा उपबर्णित इस अनुज्ञापित की शर्तों का अतिक्रमण करने या यदि अनुज्ञापित परिसर योजना या उससे संलग्न उपबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिशुद्ध की जा सकती है, जहाँ वह लागू हो।

This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 13/03/2018

संयुक्त मुख्य विस्फोटक नियंत्रक | Joint Chief Controller of Explosives  
South Circle, Chennaiनवीनीकरण के पृष्ठांकन के लिए स्थान  
Space for Endorsement of Renewalनवीनीकरण की तारीख  
Date of Renewalसमाप्ति की तारीख  
Date of Expiryअनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प  
Signature of licensing authority and stamp

01/01/2021

31/03/2026

Jt. Chief Controller of Explosives, South Circle, Chennai

कानूनी चेतावनी : विस्फोटकों को गलत ढंग से चलाने या उनका दुरुपयोग विधि के अधीन गंभीर दांडिक अपराध होगा।  
Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.



## Quality Council of India



### National Accreditation Board for Education & Training

## Certificate of Accreditation

### Geo Technical Mining Solutions

No-1/213-B, Ground Floor, Natesan Complex, Oddapatti,  
Collectorate Post office, Dharmapuri, Tamil Nadu-636705

**Accredited as Category – 'B'** organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. 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 IA AC Minutes dated January 29, 2021 on QCI-NABET website.**

*The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/21/1674 dated March 30, 2021. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.*

Sr. Director, NABET  
Dated: March 30, 2021

Certificate No.  
NABET/EIA/2023/IA0067

Valid till  
December 29, 2023

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

