

**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- NONFOREST LAND- FRESH QUARRY

CLUSTER EXTENT = 6.65.2hectares

Patta Land- Rough Stone & Gravel Quarry

At

Kolathur Village, Srirangam Taluk,

Tiruchirappalli District, Tamil Nadu State.

TOR File No. 12529 and ToR Identification No. TO25B0108TN5769639N, Dated: 04.09.2025

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and address	Extent & S.F.No	Production in m³ & Tons
S. VIJAYAKUMAR, S/o. (Late) N. Swaminathan, No.10, Collector Office Road, Cantonment, Tiruchirappalli District- 620 001.	4.00.0ha & S.F. Nos. 790/1B (Part) & 790/2 (Part)	Rough stone 981104 & 2698036 Gravel 34196 & 68392 Depth- 50m (BGL)

ENVIRONMENTAL CONSULTANT



GEO TECHNICAL MINING SOLUTIONS

No: 1/213-B, Ground Floor, Natesan Complex
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NABET ACC. NO: NABET/EIA/23-26/RA 0319

Valid till: 31.12.2026

ENVIRONMENTAL LAB

EXCELLENCE LABORATORY

NABL Accredited and MoEF notified Laboratory

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

S.S.Colony, Madurai, Tamil Nadu

NABL Certificate Number: TC-13674,

Valid Until: 12.05.2026

Baseline Study Period- October through December- 2025

JANUARY- 2026

TERMS OF REFERENCE (ToR) COMPLIANCE
ToR File No.12529
ToR Identification No. TO25B0108TN5769639N, dated. 04/09/2025,
Thiru.S.Vijayakumar, Rough Stone and Gravel Quarry

Specific Terms of Reference for (Mining of Minerals)

1. Seiaa Specific Conditions:

S.No	Terms of Reference	Remarks
1.1	After detailed discussions, the Authority accepts the recommendation of SEAC-II and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 9,81,104m ³ of Rough Stone & 34,196m ³ up to the depth of 50m BGL and the annual peak production includes 2,37,250m ³ of Rough Stone & 13,280m ³ as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-II & normal conditions & the conditions mentioned in Annexure of this minutes.	After the detailed discussions of SEAC, as per the ToR conditions the quantity of production has not exceed.

2. SEAC Conditions - Site Specific

S.No	Terms of Reference	Remarks
Cluster Management Committee		
2.1	1	A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of required statutory personnel, appropriate environmental management, system of maintaining the haul roads and village/panchayat roads, authorized blasting operation, Monitoring

		system of the environmental & other statutory compliances & its reporting methodology, etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal:	
	(a)	Copy of the agreement forming CMC.	The Cluster Management Committee (CMC) regarding following these conditions and same documents will be submitted during the EIA appraisal meeting.
	(b)	The Organisation chart of the Committee with defining the role of the members	
	(c)	The 'Standard Operating Procedures' (SoP) executing the planned activities	
2		The Boundary pillars to be erected as per the mine rules and the evidence should be submitted along with the EIA report.	Boundary pillars of the lease area have shown in figure 2.2 under chapter II in the EIA report page 9.
3		The details of enumeration of structures including schools, colleges, primary health centers should be submitted along with the EIA report.	The details of enumeration of structures will be submitted in final EIA report.
4		The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.	The details of structures up to 1km will be submitted in final EIA report.

	5	The proponent shall furnish photographs of adequate fencing; garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	The photocopy of fencing and garland drainage will be submitted in final EIA report.
	6	The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.	Bio diversity study has carried out and discussed in chapter III under section 3.6 on the EIA report page 52-65.
	7	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	The Sworn Affidavit will be submitted in final EIA report.
	8	The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures.	Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 111-115.
	9	The PP shall prepare a conceptual action plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed and existing quarry wall.	All the information has been discussed in Section 2.6.6 under Chapter II in the EIA report page 20-21.

3. Seac Standard Conditions

S.No	Terms of Reference		Remarks
3.1	1	In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:	As it is a fresh quarry, the conditions are not applicable.
		(i) Original pit dimension	
		(ii) Quantity achieved vs EC Approved Quantity	
		(iii) Balance Quantity as per Mineable Reserve calculated.	
		(iv) Mined out Depth as on date Vs EC Permitted depth	
		(v) Details of illegal/illicit mining	
		(vi) Violation in the quarry during the past working.	
		(vii) Quantity of material mined out outside the mine lease area	
		(viii) Condition of Safety zone/ benches	
		(ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	
3.1	2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.	The VAO certificate is attached in Annexure IV.
	3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether	Enumerate on the structure's details will be submitted in final EIA report.

		it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	
	4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Detailed hydrological study is conducted and discussed in section 3.3.4 under chapter III in the EIA report page 37-43.
	5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	The details of Bio diversity from the reputed institution will be submitted in the final EIA report.
	6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc, up to a radius of 25 km from the proposed site.	The DFO letter will be submitted in the final EIA report.
	7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras,	As it is a fresh lease area, the Slope Stability report is not required.

		NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.	
	8	However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.	As it is a fresh lease area, the Slope Stability report is not required.
	9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	The affidavit for blasting will be submitted in the final EIA report.
	10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	A conceptual design of blasting has been given in Section 2.6.6 under Chapter II in the EIA report page 20-21.

	11	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	The Proponent not operated any other quarry activities elsewhere in the state.
	12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	
	13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	As it is a new quarry, the conditions are not applicable.
	14	Quantity of minerals mined out.	
		Highest production achieved in any one year.	
		Detail of approved depth of mining.	
		Actual depth of the mining achieved earlier.	
		Name of the person already mined in that leases area.	
		If EC and CTO already obtained, the copy of the same shall be submitted.	
		Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
	15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided.	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as

		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).	shown in Figure 2.2 under Chapter II in the EIA report page 9.
	16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.	The drone video will be submitted during final presentation.
	17	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Photographs of adequate fencing, green belt along the periphery of the project area and the photographs showing nearby water bodies will be included in final EIA report.
	18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.	The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. The details reserve estimation has been shown in Table 2.6 under Chapter II in the EIA report page 12.
	19	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	Details of manpower required for this project have been given in Table 2.16 under Chapter II in the EIA report page 22.

	20	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	The hydrogeological study is discussed in the Section 3.3.4 under Chapter III in the EIA report page 37-43.
	21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data were collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed under Chapter III in the EIA report page 25-80.
	22	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared	Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 111-115.

		keeping the concerned quarry and the surrounding habitations in the mind.	
	23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.
	24	Land use of the study area delineating forest area, agricultural land, 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 have been discussed in Section 3.1 under Chapter III in the EIA report page 25-29. The details of surrounding sensitive ecological features have been provided in Table 3.37 under Chapter III in the EIA report page 79. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.10 under Chapter II in the EIA report page 18.
	25	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of	This condition is not applicable to this project because no dumps have been proposed outside the lease area.

		land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.	
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.	
28	Impact on local transport infrastructure due to the Project should be indicated.	Details regarding the impact of the project on traffic are given in Section 3.8 under Chapter III in the EIA report page 77-78.	
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.6 under Chapter III in the EIA report page 52-65.	

	30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.11 under Chapter II in the EIA report page 18.
	31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	The EIA coordinator and the FAE for ecology and biodiversity visited the study area and educated the local students about the importance of protecting the biological environment.
	32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	A detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV in the EIA report page 94-97.
	33	Taller/one year old Saplings raised in appropriate size of bags; preferably ecofriendly bags should be planted as per the advice of local forest	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-

		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.	friendly bags should be purchased and planted with the spacing of 3m between each plant around the proposed project area as per the advice of local forest authorities/botanist.
	34	A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	A disaster management plan for the project has been provided in Section 7.3 under Chapter VII in the EIA report page 110-111.
	35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	A risk assessment plan for the project has been provided in Section 7.2 under Chapter VII in the EIA report page 107-110.
	36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV in the EIA report 97-99.
	37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections

		measures should be detailed along with budgetary allocations.	8.6 and 8.7 under Chapter VIII in the EIA report page 118-119.
	38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 22 people directly as discussed in Section 8.1 under Chapter VIII in the EIA report page 117.
	39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
	40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The benefits of the project are discussed in the Chapter VIII in the EIA report page 117-119.
	41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	It is fresh lease area and the condition is not applicable.
	42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn	A detailed environment management plan has been prepared following the suggestion

		affidavit stating to abide the EMP for the entire life of mine.	made by SEAC, as shown in Chapter X in the EIA report page 121-128. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted in final EIA report.
	43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	The EIA report has been prepared keeping in mind the fact that concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.

Standard Terms of Reference for (Mining of minerals)

1.

S.No	Terms of Reference	Remarks
1.1	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.

1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given	The copy of land document is attached in Annexure III.
1.3	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 are in the name of the lessee.
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.2 under Chapter II, p.9.
1.5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics	Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, as shown in Chapter III.
1.6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority	The lease area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.

1.7	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.121-122.
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided	It is an opencast quarrying operation proposed to operate in Manual method. The Rough Stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90⁰ 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.

1.9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period	The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / Lease period.
1.10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features have been discussed in Section 3.1 under Chapter III, pp.25-29. The details of surrounding sensitive ecological features have been provided in Table 3.37 under Chapter III, p.79. Land use plan of the project area showing pre- operational, operational and post- operational phases are discussed in Table 2.10 under Chapter II, p.18.
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given	It is not applicable as no dumps have been proposed outside the lease area.
1.12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the	It is not applicable as there is no forest land involved within the proposed project area. The details have been discussed in Table 3.37 under Chapter III, p.79.

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

1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is found within the study area. The details of reserve forest within 10km have been discussed Table 3.37 under Chapter III, p.79. Flora and Fauna vegetation details are given in section 3.6.1 and 3.6.2 under chapter III, p.52-65.
1.16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted	There is no any wildlife/protected area from the periphery of the project area. Information regarding wildlife /protected area within 10km has been given in Table 3.37 under Chapter III, p.79. Flora and Fauna vegetation details are given in section 3.6.1 and 3.6.2 under chapter III, p.52-65.
1.17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	The details of National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/ Elephant Reserves within 10 km radius from the periphery of the project area has been given in Table 3.37 under Chapter III, p.79.
1.18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)]	A detailed biological study was carried out in both core and buffer zones and the results

	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.	have been discussed in Section 3.6 under Chapter III, pp.52-65.
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as	Not Applicable The project doesn't attract the C.R.Z. Notification, 2018.

	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)	
1.21	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	Not Applicable. There are no approved habitations of SCs/STs and other weaker sections in the lease area. Therefore, R&R Plan / Compensation Plan for the Project.
1.22	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	Baseline data were collected for the period of October 2025 – December 2025 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.9 under Chapter III, pp. 25-79.

	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	
1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the Chapter IV, pp.82-87.

1.24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.13 under Chapter II, p.20.
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.
1.26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
1.27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV, pp. 81-82.
1.28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and	Not Applicable. The ground water table is found at the depth of 80 m below ground level. The ultimate

	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 State Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished	depth of quarry is 50 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 3.3 under Chapter III, pp.32-43.
1.29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out	Not applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
1.30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The highest elevation of the project area is 142 m AMSL. Ultimate depth of the mine is 50m BGL. Depth to the water level in the area is 80 m BGL.
1.31	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	Greenbelt development plan has been given in Section 4.6 under Chapter IV, pp.94-97.

	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	
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines	Traffic density survey was carried out to analyze 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 3.8 under Chapter III, p.77-78.
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.7 under Chapter II, p.20.

1.34	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 Table 2.11 under Chapter II, in the EIA report page no.18.
1.35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed	Occupational health impacts of the project and preventive measures have been explained in detail in Section 4.8 under Chapter IV, pp.97-99.
1.36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII, pp.118-119.
1.37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 22 people directly as discussed in Section 8.1 under Chapter VIII, p.117.
1.38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include	A detailed Environment Management Plan has been prepared and provided in Tables 10.1 & 10.2 under Chapter X, pp.122-128.

	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	
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project	The outcome of public hearing will be submitted in the final EIA report.
1.40	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.
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	Project Cost is Rs.78,10,000/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs. 31.53Lakhs as capital cost and recurring cost as Rs. 20.96 Lakhs 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. 136.73 Lakhs as shown in Table 10.1 and 10.2 under Chapter X, pp.122-128.
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII, pp.110-111.

1.43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given under Chapter VIII, pp.117-119.
1.44	Besides the above, the below mentioned general points are also to be followed	
a)	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.
b)	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.
c)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Original Baseline monitoring report will be submitted in final EIA report.
d)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided here are in English language.
e)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be submitted in final EIA report.
f)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009 have been followed while preparing the EIA report.

	available on the website of this Ministry, should be followed.	
g)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF &CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No changes are made in the basic scope and the project parameters.
h)	As per the circular no. J 11011/618/2010-IA. II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	It is a new lease area, the condition is not applicable.
i)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III.

SEIAA STANDARD CONDITIONS:

S.No	Terms of Reference	Remarks
Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	A cluster management committee including all the proponents of the rough stone quarrying projects within the cluster of 500 m radius will be constituted for the effective implementation of green belt development plan, water sprinkling, blasting, etc.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.	The members of the cluster management committee will be instructed to carry out EMP in coordination.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	All the information has been discussed in Section 2.6 under Chapter II in the EIA report page 15-21.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	It will be informed to the committee.

6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	It will be advised to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	The information on the health of the workers and the local people will be updated periodically.
Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly, as shown in Section 4.6 under Chapter IV in the EIA report page 94-97.
10	Impact on soil flora & vegetation around the project site.	The details on flora have been provided in Section 3.6 under Chapter III in the EIA report page 52-65. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no

		species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details of vegetation in the lease area have been provided in Section 3.6 under Chapter III in the EIA report page 52-65. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV in the EIA report page 94-97.
12	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological details have been provided in Section 3.6 under Chapter III in the EIA report page 52-65 and measures have been provided in Section 4.6 under Chapter IV in the EIA report page 94-97.
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 80-100.
14	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 in the EIA report page 80.
Forests		

15	The project proponent shall detail 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.
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV in the EIA report page 94-97.
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The impacts of the project on standing trees and the existing trees have been discussed in Section 4.6 under Chapter IV in the EIA report page 94-97.
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	The protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.37 under Chapter III in the EIA report page 79.
Water Environment		
19	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	The detailed hydro-geology will be submitted in the final EIA report.

20	Erosion Control measures.	Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 under Chapter IV in the EIA report page 81-82.
21	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 under Chapter IV in the EIA report page 80-100.
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	An analysis for food chain in aquatic ecosystem has been discussed in Section 3.6 under Chapter III in the EIA report page 52-65.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV in the EIA report page 80-100.
24	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.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV in the EIA report page 94-97.
25	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 in the EIA report page 81.
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV in the EIA report page 81-82.

27	The EIA shall include the impact of mining activity on the following:	
	a. Hydrothermal / Geothermal effect due to destruction in the Environment.	a. The average geothermal gradient of earth is 25 ⁰ C/km. As the proposed depth of mining is 50m below the local ground level, the temperature will increase by 1.25 ⁰ C at the depth of mining.
	b. Bio-geochemical processes and its foot prints including environmental stress.	b. No, Bio-geochemical processes and its foot prints including environmental stress are anticipated and at the end of life of mine the proposed quarry shall be left as an artificial reservoir structure and allowed to collect rain water and shall enrich the ecosystem.
	c. Sediment geochemistry in the surface streams	c. The details of sediment geochemistry are discussed in the Table 3.4 under Chapter III in the EIA report page 30.
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	The measures taken to control noise, air, water, and dust have been given under Chapter IV in the EIA report page 80-100.
Climate Change		

29	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	The carbon emission to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV in the EIA report page 94-97.
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.	The matter has been discussed in Chapter IV in the EIA report page 80-100.
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	There is no emission impact to local livelihood from this quarry project. All the vehicles used for transportation of the quarry materials will be maintained regularly to keep the GHGs emissions within statutory limits.
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.11 under Chapter II in the EIA report page 18.
EMP		
33	Detailed Environment Management Plan along with adaptation, mitigation & remedial	A detailed Environment Management plan has been given under Chapter X in the EIA report page 121-128.

	strategies covering the entire mine lease period as per precise area communication order issued.	
34	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	A detailed Environment Management plan has been given in Tables 10.1 & 10.2 under Chapter X in the EIA report page 122-128.
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and management plan for this project has been provided in Section 7.2 under Chapter VII in the EIA report page 107-110.
Disaster Management Plan		
36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 110-111.
Others		
37	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The VAO certificate is attached in the attached in the Annexure IV.

38	As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	The concerns raised during the public consultation will be submitted in the final EIA report.
39	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 plastic waste management has been given in Section 7.5 under Chapter VII in the EIA report page 115-116.

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.	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 land documents are attached 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	All the documents are in the name of the lessee.

	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/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.2 under Chapter II in the EIA report page 9.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, as shown in Chapter III in the EIA report page 25-79.
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The lease area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/	The Environmental Policy is discussed in the Section 10.1 under Chapter X in the EIA report page 121-122.

	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	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° bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.	The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.

10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1 under Chapter III in the EIA report page 25-29. The details of surrounding sensitive ecological features have been provided in Table 3.37 under Chapter III in the EIA report page 79. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.10 under Chapter II in the EIA report page 18.
11.	Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	It is not applicable as no dumps have been proposed outside the lease area. The entire quarried out rough stone will be transported to the needy customers.
12.	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in	It is not applicable as there is no forest land involved within the proposed project area. The details have been discussed in Table 3.37 under Chapter III in the EIA report page 79.

	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.	It is not applicable as the proposed project area does not involve any forest land.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	There is no any reserve forest in the study area. The details of reserve forest is discussed in the Table 3.37 under Chapter III in the EIA report page 79.
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	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 3.37 under Chapter III in the EIA report page 79.

	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.	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 3.37 under Chapter III in the EIA report page 79.
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	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.6 under Chapter III in the EIA report page 52-65.

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

	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 aspect 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.	Baseline data were collected for the period of October - December 2025 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.9 under Chapter III in the EIA report page 25-79.

23.	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Air Quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the Chapter IV in the EIA report page 82-87.
24.	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.13 under Chapter II in the EIA report page 20.
25.	Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust

	proposed in the Project, if any, should be provided.	suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV in the EIA report page 81-82.
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 80m below ground level. The ultimate depth of quarry is 50m BGL. Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.3 under Chapter III in the EIA report page 32-43.
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated

30.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	The highest elevation of the project area is 142m AMSL. Ultimate depth of the mine is 50m BGL. Depth to the water level in the area is 80m below the ground level.
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. From on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Greenbelt development plan has been given in Section 4.6 under Chapter IV in the EIA report page 94-97.
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	Traffic density survey was carried out to analyses 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 3.8 under Chapter III in the EIA report page 77-78.

	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.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.7 under Chapter II in the EIA report page 20.
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 2.6.5 under Chapter II in the EIA report page 18.
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 detail have been explained in Section 4.8 under Chapter IV in the EIA report page 97-99.
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII in the EIA report page 118-119.

37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 22 people directly as discussed in Section 8.1 under Chapter VIII 117.
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	A detailed Environment Management Plan has been prepared and provided in Table 10.1 & 10.2 under Chapter X in the EIA report page 122-128.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	The outcome of public hearing will be submitted during the final EIA report.
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project cost is Rs.78,10,000/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs. 31.53 Lakhs as capital cost and recurring

		cost as Rs. 20.96 Lakhs 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. 136.73 Lakhs as shown in Tables 10.1 & 10.2 under Chapter X, pp.122-128.
42.	A disaster management plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 110-111.
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given under Chapter VIII in the EIA report page 117-119.
44	Besides the above, the below mentioned general points are also to be followed:	
a)	Executive Summary of the EIA/EMP Report.	Executive summary has been enclosed as a separate booklet.
b)	All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
c)	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil,	Original Baseline monitoring reports will be submitted in the final EIA report.

	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.	All the documents provided here are in English language.
f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be submitted in the final EIA report.
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009 have been followed while preparing the EIA report
h)	Changes, if any made in the basic scope and project parameters (as submitted in Form- I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	No changes are made in the basic scope and the project parameters.

i)	As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	As it is a new lease area, the condition is not 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.	All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III.

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CHAPTER I

INTRODUCTION

1.0 PREAMBLE

An 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 the beneficial and adverse consequences of the proposed project and ensures that these impacts are considered during project design. According to the Ministry of Environment and Forests, Government of India, EIA notification S.O. 1533(E) of September 14, 2006, and its subsequent amendments, projects are categorized into A, B1, and B2 to determine the level of scrutiny and process required. Mining projects whose extent is ≥ 5 ha or the cluster of quarries (if a homogeneous mineral) within a 500m radius whose extent is greater than 5ha falls under category B1. These projects require the preparation and submission of an EIA report to the SEIAA after public consultation to obtain environmental clearance as per Office Memorandum F. No. L-11011/175/2018-IA-II(M), dated: 12.12.2018.

1.1 PURPOSE OF THE REPORT

The purpose of the report is to evaluate the potential environmental, social, and economic effects of the project before it is implemented, adhering to the guidelines outlined in the MoEF & CC Notification, S.O. 996 (E) dated 10.04.2015, and the MoEF & CC Office Memorandum dated 29.08.2017.

1.2 ENVIRONMENTAL CLEARANCE

The Environmental Clearance process for the project will comprise four stages. These stages are screening, scoping, public consultation, and appraisal.

Screening

The project had applied in PARIVESH 2.0 proposal no. SIA/TN/MIN/546341/2025, Dated: 29.07.2025 to obtain terms of reference.

Scoping

The mechanism for issuing online system-generated Standard ToR and reference to SEAC has been enabled on the PARIVESH Portal upon the acceptance of the complete application online. The concerned Member Secretary of SEAC shall refer the project to the concerned SEAC for prescribing additional ToR as per the circular F.No. IA 3-22/15/2022-IA-III [Computer No 178038], dated May 6, 2022.

Public Consultation

In this stage, an application, along with the draft EIA and EMP report, will be submitted to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB), requesting a Public Hearing to be conducted as per the EIA notification of 2006. The outcome of the Public Hearing meeting will be updated in the final EIA report.

Appraisal

At this stage, the final EIA report will be submitted to SEIAA, TN in PARIVESH 2.0. Based on the recommendations of the SEAC, the SEIAA, TN will grant EC or reject the proposal.

1.3 TERMS OF REFERENCE (ToR)

The total extent of quarries within the 500m radius is greater than 5 hectares. The details of the quarries within the cluster are given in Table 1.1.

Table 1.1 Details of quarries within the cluster of 500m radius

Proposed Quarries					
Code	Name of the Owner	S.F. No	Village	Extent (ha)	Status
P1	Thiru.S.Vijayakumar	790/1B (P) & 790/2 (P)	Kolathur	4.00.0	Proposed Area
Existing Quarries					
E1	Thiru.S.Vijayakumar	789/1B	Kolathur	2.65.2	01.02.2023 to 31.01.2033
Total Cluster Extent				6.65.2	---

Source: AD Letter: Roc.No.262/2025/Mines, Dated:05.06.2025

The file was appraised in 602nd SEAC meeting on 07.08.2025 & 876th SEIAA meeting on 25.08.2025 and issued terms of reference (ToR) identification no **TO25B0108TN5769639N** on **04.09.2025** by SEIAA, TN.

1.4 POST ENVIRONMENT CLEARANCE MONITORING

- The project proponent shall prominently advertise in the newspapers, indicating that the project has been accorded environmental clearance and the details of the website where it is displayed.

- The project proponent will submit a half- yearly compliance report of the stipulated environmental conditions to the Regional Office, MoEF & CC, and SEIAA on June 1st and December 1st of every year.

1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

The prior environmental clearance granted for a project or activity may be transferred as per the provisions of paragraph 11 of the Environmental Impact Assessment Notification, 2006 and its subsequent amendments, and the office memorandum File No. IA3-22/19/2023-IA.III [E226246], Dated: 3rd November 2023.

1.6 IDENTIFICATION OF THE PROJECT PROPONENT

The details of the project proponent are given in Table 1.2 below.

1.2 Details of Project Proponent

Name of the Project Proponent	Mr. S. Vijayakumar
Address	S/o. N. Swaminathan (Late), No.10, Collector Office Road, Cantonment, Tiruchirappalli District – 620 001.
Status	Private firm

1.7 BRIEF DESCRIPTION OF THE PROJECT

The method adopted for rough stone excavation is the open-cast, semi-mechanized method involving the formation of benches with a height of 5m and a width of 5m; the overall bench slope is less than 65°. The quarry operation involves shallow jackhammer drilling, slurry blasting, excavation, loading, and transportation.

The overall extent of the project site is 4.00.0 hectares, and it is located in Kolathur Village, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu

The proposed project deals with the excavation of rough stone and gravel, which are primarily used in construction projects. The increasing demand for rough stone, fuelled by a booming construction industry, presents a valuable opportunity. This project will not only meet the rising demand for rough stone but also create jobs for the surrounding villages.

1.8 SCOPE OF THE STUDY

The primary focus of the EIA study is to measure the combined impact of the quarries in the cluster and develop efficient mitigation strategies. The baseline monitoring study was conducted from **October to December 2025**, focusing on various environmental aspects including land, soil, air, water, noise, and ecology, to evaluate the expected effects of the cluster

on the environment and recommend appropriate mitigation strategies for possible negative impacts arising from the proposed project.

1.9 Legislation Applicable to Mining of Mineral Sector

A few important legislations are given below:

- ❖ The Mines Act, 1952
- ❖ The Mines and Mineral (Development and Regulation) Act, 1957
- ❖ Mines Rules, 1955
- ❖ Mineral Concession Rules, 1960
- ❖ Mineral Conservation and Development Rules, 1988
- ❖ State Minor Mineral Concession Rules, 1960
- ❖ Granite Conservation and Development Rule, 1999
- ❖ The Water (Prevention and Control of pollution) Act, 1974
- ❖ The Air (Prevention and Control of pollution) Act, 1981
- ❖ The Environment (Protection) Act, 1986
- ❖ The Forest (Conservation) Act, 1988
- ❖ The Wildlife (Protection) Act, 1972.

CHAPTER II

PROJECT DESCRIPTION

2.0 DECSRIPTION OF THE PROJECT

The proponent Mr. S. Vijayakumar involved in the mining and its auxiliary activities. The proponent had applied for quarry lease on 12.03.2025 to extract rough stone and gravel. The precise area communication letter was issued by Assistant Director, Department of Geology and mining, Tiruchirappalli vide (Roc.No.262/2025/Mines, Dated 03.06.2025). The mining plan thus prepared was approved by Assistant Director, Department of Geology and mining, Tiruchirappalli (Rc.No.262/2025/Mines Dated 05.06.2025). The project area and the proposed excavation details were given in Table 2.1.

Table 2.1 Proposed project area and excavation details

Name of the Quarry	S. Vijayakumar			
Type of Land	Patta Land			
Extent	4.00.0ha			
S.F. No	790/1B (Part) & 790/2 (Part)			
Toposheet No	58 J/10			
Highest Elevation	142m AMSL			
Latitude	10°40'36.02"N to 10°40'42.88"N			
Longitude	78°32'18.07"E to 78°32'26.38"E			
Proposed depth as per ToR	50m BGL			
Ultimate depth for five years	50m BGL			
Geological Resources	Rough stone		Gravel in	
	m ³	Tons	m ³	Tons
	27,60,069	75,90,193	40,001	80,002
Mineable Reserves	10,76,424	29,60,166	34,196	68,392
Proposed production for 5 years	9,81,104	26,98,036	34,196	68,392
Method of Mining	Open cast mechanized mining method			
Topography	Flat Terrain			
Machinery requirements	Jack hammer		3	
	Excavator		2	
	Compressor		1	
	Tipper		10	
Proposed Manpower Deployment	22			
Project Cost	Rs. 78,10,000/-			
Proposed Water Requirement	3.0 KLD			

2.2 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Kolathur village, Inam Kulathur panchayat, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu as shown in Figure 2.1.

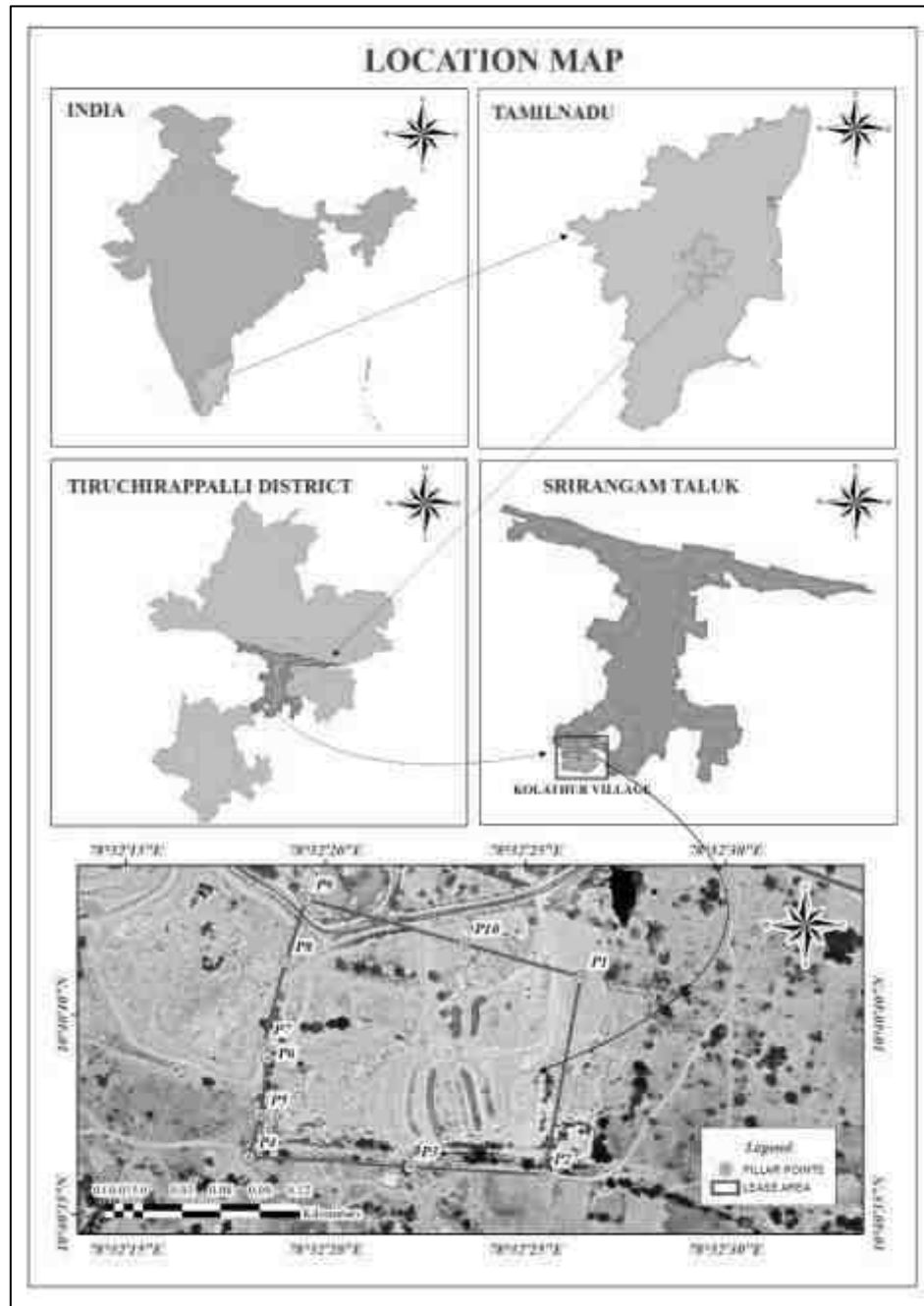


Figure 2.1 Key Map Showing Location of Project Site

The aerial distance between the project site boundary and the Kerala state boundary is about 147km in the western side. To reach the site access the MDR-789 road. The travel distance is around 238m which is connecting Thirumukudal - Nelvoy Road. Accessibility details to the proposed project site have been given in Table 2.2.

Table 2.2 Site Connectivity to the Project Area

Type of Features	Name/Location	Distance (km)	Direction
Bituminous road	Kadapatti- Kalkudi metal road	0.04	N
Nearest Roadways	MDR-789 Thirumukudal - Nelvoy road	1.12	NW
Nearest Town	Manapparai	14.0	SW
Nearest Airport	Tiruchirapalli	20.0	NE
Nearest Villages	Chinna Alampatti	1.0	N
	Kadappatti	0.6	E
	Kalkudi	0.6	S
	Mettuppatti	1.12	W

2.3 LEASEHOLD AREA

The details of the field survey number, subdivision and their extent and the overall extent of the proposed project site is given in Table 2.3.

Table 2.3 Lease hold area details

Survey No	Sub Division	Total Extent in Ha	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F.No.	Applied area out of total area in Ha
790	1B (P)	3.45.34	4840	Mr. S. Vijayakumar	7901B (P)	1.60.20
790	2 (P)	3.45.34	2475		7902 (P)	2.39.80
Total Extent		6.90.68	Applied lease area extent			4.00.0

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.

The overall extent of the project area is 4.00.0Ha as per the precise area communication letter vide Roc.No.262/2025/Mines, dated 03.06.2025 issued by Dept of Geology and Mining, Tiruchirappalli District. The breakup of the existing land use for mining and ancillary feature is given in Table 2.4.

Table 2.4 Present Land use pattern of the project area

Sl. No.	Land Use	Present area (Hect.)
1.	Area under Mining	Nil
2	Infrastructure	Nil
3	Roads	Nil
4	Unutilized	4.00.00
5	Green belt	Nil
6	Settling Tank & Drainage	Nil
	Grand Total	4.00.00

2.3.1 Geo Coordinates

The proposed lease area is flat topography. The maximum elevation (142m) was observed NW side of the lease area and minimum elevation (134m) was observed SE side of the site. The boundary corner and the intermediate stone geographic coordinates is given in Table 2.5 and shown in Figure 2.2.

The quarries within the cluster of 500m radius as per the letter RoC.No.262/2025/Mines dated: 05.06.2025 is enclosed as Annexure II is shown in Figure 2.3.

Table 2.5 Geographic coordinates of the Project area

PILLAR No	LATITUDE	LONGITUDE
1	10°40'40.96"N	78°32'26.38"E
2	10°40'36.02"N	78°32'25.46"E
3	10°40'36.20"N	78°32'22.13"E
4	10°40'36.43"N	78°32'18.07"E
5	10°40'37.49"N	78°32'18.36"E
6	10°40'38.92"N	78°32'18.55"E
7	10°40'39.25"N	78°32'18.44"E
8	10°40'41.33"N	78°32'18.99"E
9	10°40'42.88"N	78°32'19.50"E
10	10°40'41.77"N	78°32'23.47"E

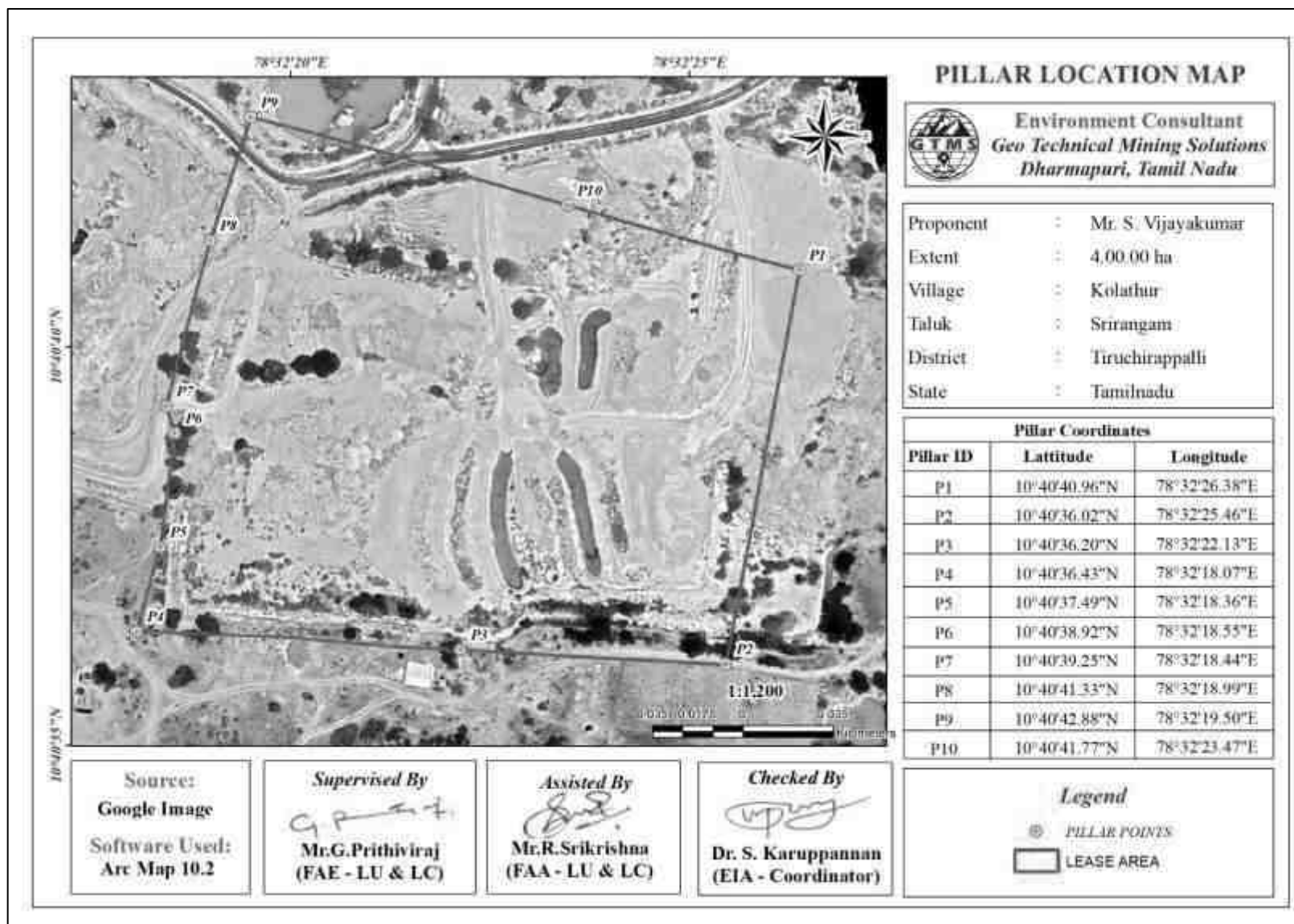


Figure 2.2 Google Earth Image Showing Pillar Coordinates of Lease Area

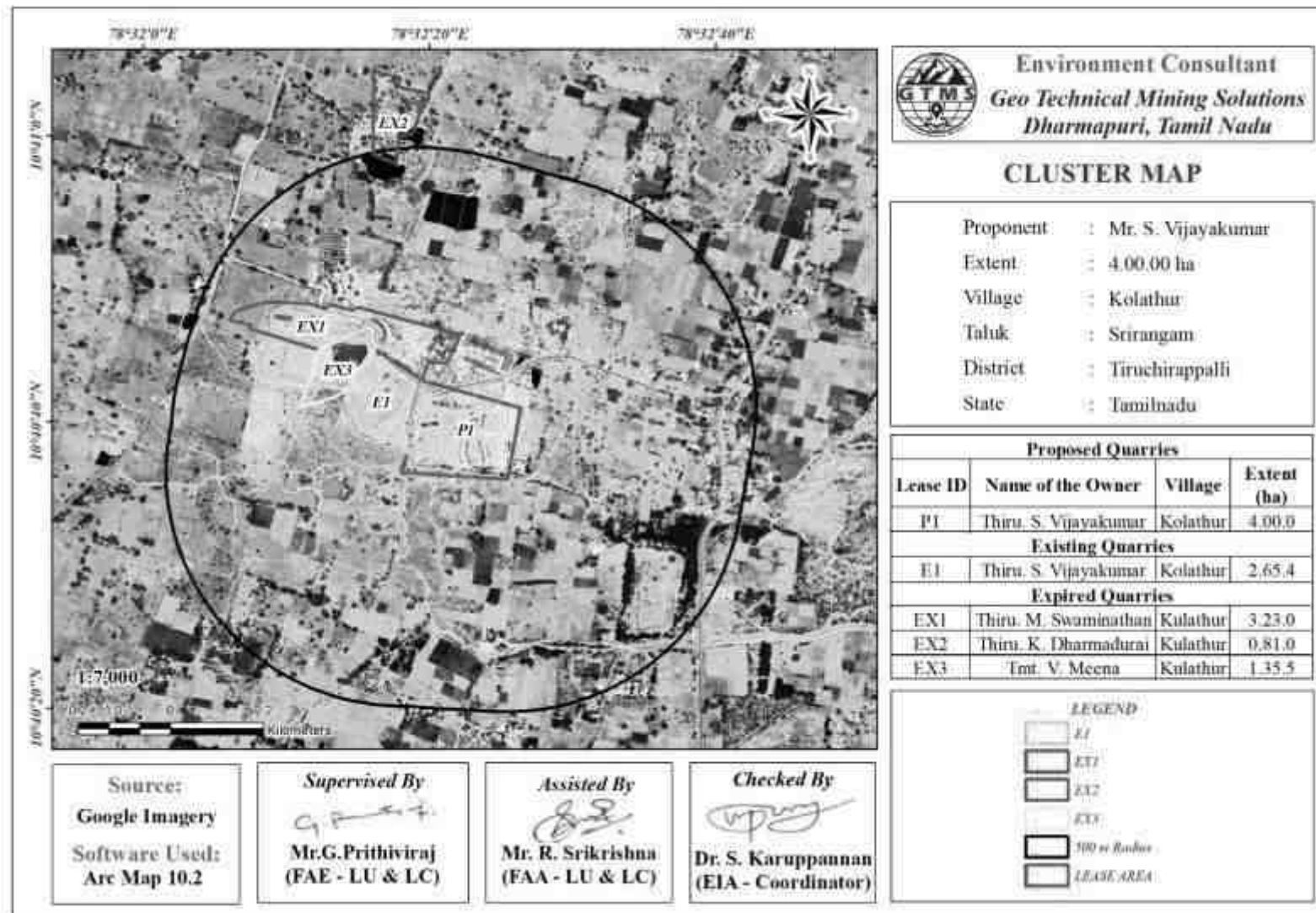


Figure 2.3 Google Earth Image of the cluster

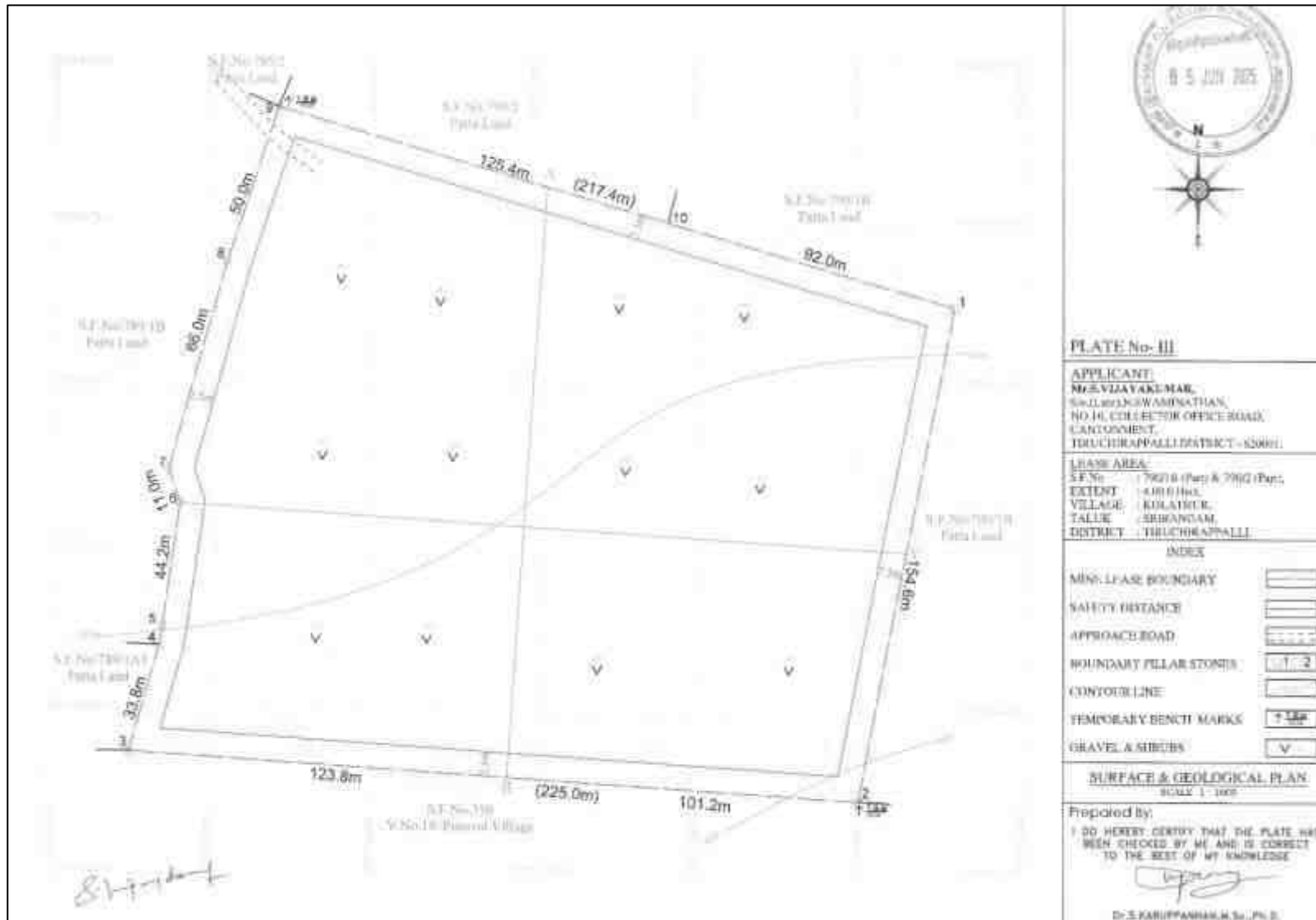


Figure 2.4 Surface & Geological Plan

2.4 GEOLOGY

The rock present in the project site is charnockite exhibits layered, medium to coarse grained hornblende biotite, orthopyroxene charnockite gneiss. The Charnockite Group occupies a major part of the south-west portion of this district with small bands of garnetiferous quartzo-feldspathic gneiss, Granite gneiss and dolerite dykes. The order of superposition of the proposed lease area is

Age	Group	Rock Formation
Recent to Sub recent	----	Red loamy, Alluvium Soil
Proterozoic	Acid intrusive	Pink medium grained granite/Granitic gneiss.
Archean	Charnockite Group	Gneisses, granulites and Charnockite

The analysis of the soil type reveals that the proposed lease area is predominantly covered by river alluvium is transported and is seen in coastal area.

2.5 QUANTITY OF RESERVES

The resources and reserves of rough stone and gravel 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 margins, as shown in Figure 2.5 and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 50m BGL considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The results of geological resources and reserves is given in Table 2.6 and the approved year wise development plan is enclosed as Figure 2.5 & 2.5a.

Table 2.6 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in		Gravel in	
Unit	m ³	Tons	m ³	Tons
Geological Resource in	2760069	7590193	40001	80002
Mineable Reserves in	1076424	2960166	34196	68392
Proposed production for 5 years	981104	2698036	34196	68392

Source: Approved Mining Plan & ToR

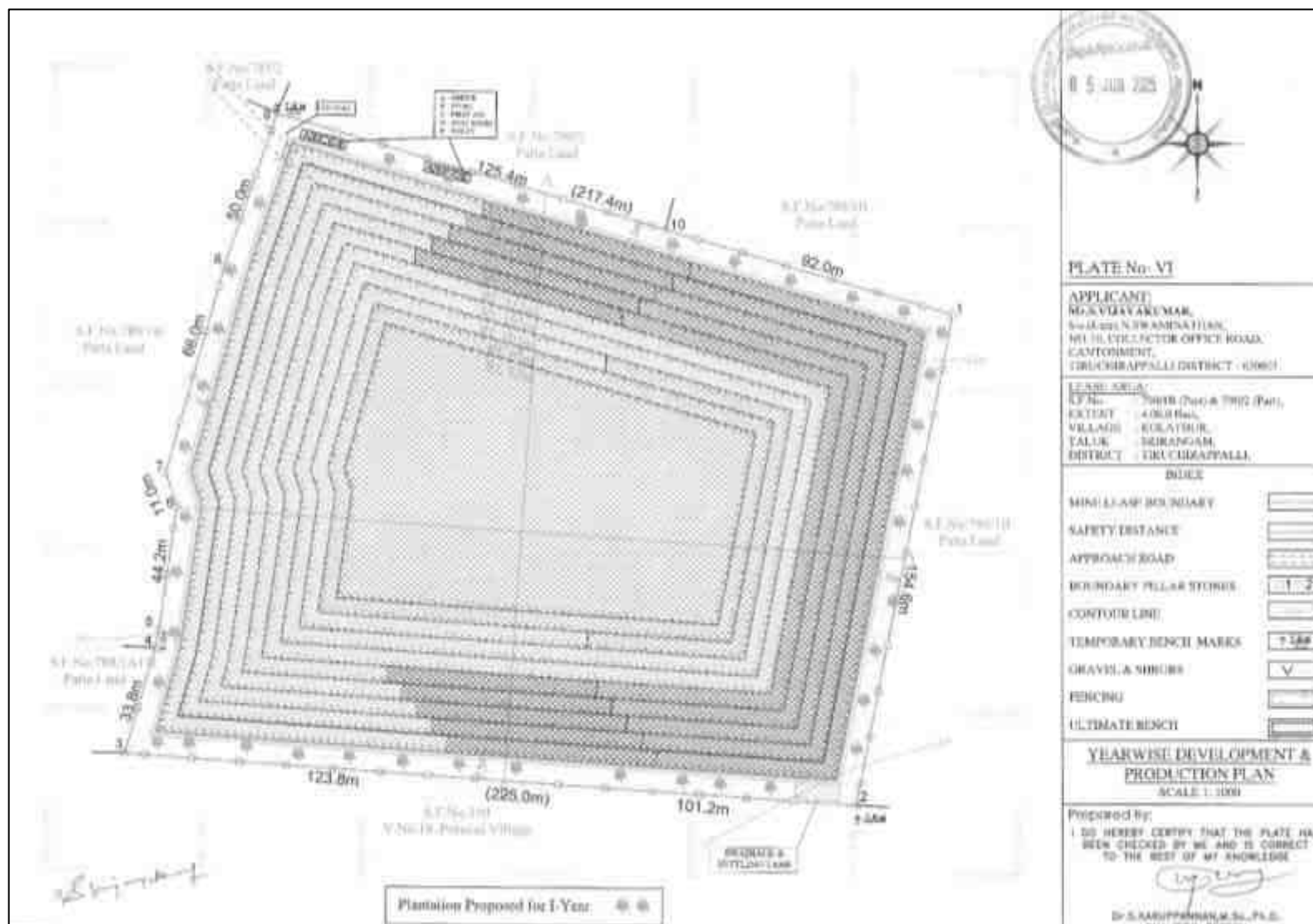


Figure 2.5 Year wise Development & Production Plan

2.6 MINING METHOD

The Quarrying operation is proposed to be carried out by open cast mechanized mining method with the bench height and width of 5 m each. The open cast mechanized method involving drilling and blasting is proposed to extract rough stone. The extracted rough stone will be loaded to the trucks to the nearby stone crushing units. Due permission from D.G.M.S, will be taken as per Rule 106 of MMR 1961 is proposed. Mining operation is proposed in one shift i.e. 8 AM to 4 PM. The average number of working days in a year would be 300 days/yr excluding Sunday & holidays. The production will be slow down trend during monsoon period. In this project, NONEL blasting will be adopted to extract rough stone.

2.6.1 Conceptual Blasting Design

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

Rules of Thumb for Blast Design

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

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

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

Rule 2: Generally, select the densest explosive possible.

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

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

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

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

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

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

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

Rule 6: Stemming should be equal to the burden.

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

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

Subdrill should be equal to 0.3 of burden. It will work when there is row-for-row delay. In blasts where the delay system is both row-for-row and hole-for-hole, the subdrill should be determined by the largest dimension, which can be the spacing or the burden. An average subdrill of 0.4 of spacing is best to use for planning purposes. Based on the above-mentioned rules, blasting design has been conceptualized is given in Table 2.7.

Table 2.7 Conceptual Blasting Design

BLAST DESIGN	
Blasthole Diameter (D) in mm	32
Burden (B) in m	1.2
Spacing (S) in m	1.38
Subdrill in m	0.5
Charge length (C) in m	0.70
Stemming	0.5

Hole Length (L) in m	1.2
Bench Height (BH) in m	2.5
Mass of explosive/hole in g	437.5
Stemming material size in mm	3.2
Burden stiffness ratio	2.08
Blast volume/hole in m ³	4.14
Production of rough stone/day in m ³	701
Number of blast holes/day	169
Number of blast round/day	2
Blasthole pattern	Staggered
Mass of explosive /day in kg	74.06
Powder factor in kg/m ³	0.11
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL

Note: If >2kg of explosives per day use for blasting if proponent get the permission from the DGMS

Statutory Provision & Precaution during Blasting: -

- Blasting permission from DGMS will be taken by the proponent within 6 months from the date of execution of mine.
- Control blasting will be carried out by using delay detonators during multi rows blasting
- No secondary blasting will be carried out.
- Stemming column will be half of the depth of hole with coarse sand.
- Only Statutory designated Blaster will supervise the blasting operation.
- All persons in the radius of minimum 300m from the blasting site will be removed by siren.
- Blasting operation will be carried out during day time only particularly at noon time.

2.6.2 Magnitude of Operation

Based on the results of estimated production the details about the size of operation had provided in Table 2.8.

Table 2.8 Operational Details for Proposed Project

	Rough Stone 5 years		Gravel	
	m³	Ts	Ts	Ts
Proposed production	981104	2698036	34196	68392

Number of Working Days	270	270
Production /Day (m ³) & Ts	726 & 1997	42 & 84
No. of Lorry Loads	121	7

2.6.3 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.9.

Table 2.9 Machinery Details

S. No.	Type	No. of Unit	Size/Capacity	Dia of Hole (mm)	Motive Power
1	Jack Hammers	3	Hand Held	32mm	Diesel
2	Compressor	1	AIR	---	Diesel
3	Excavator	2	2.9 - 4.5 m ³	---	Diesel
Haulage & Transport Equipment					
4	Tipper	10	--	---	Diesel

2.6.4 Post mining land use

The land use at present, at the end of plan period & at the end of conceptual period is given in Table 2.10 below

Table 2.10 Land Use at the end of mine Life

Description	Present area (Hect.)	Area at the end of life of quarry (ha)
Area under Mining	Nil	3.40.33
Infrastructure	Nil	0.02.0
Roads	Nil	0.05.0
Green Belt	4.00.0	Nil
Un-Utilized Area	Nil	0.48.67
Drainage & Settling Tank	Nil	0.04.00
Total	4.00.0	4.00.0

2.6.5 Quarry Closure Budget

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, mine closure plan is not proposed for now. Based on the progressive mine closure plan for the scheme period, the mine closure cost is given in Table 2.10.

Table 2.11 Mine Closure Budget

Activity	Capital Cost
1000 plants inside the lease area	3,00,000
1000 plants outside the lease area	3,00,000
Wire Fencing	4,00,000
Renovation of Garland Drain	40,000
Total	10,40,000

Source: Environment Management Plan

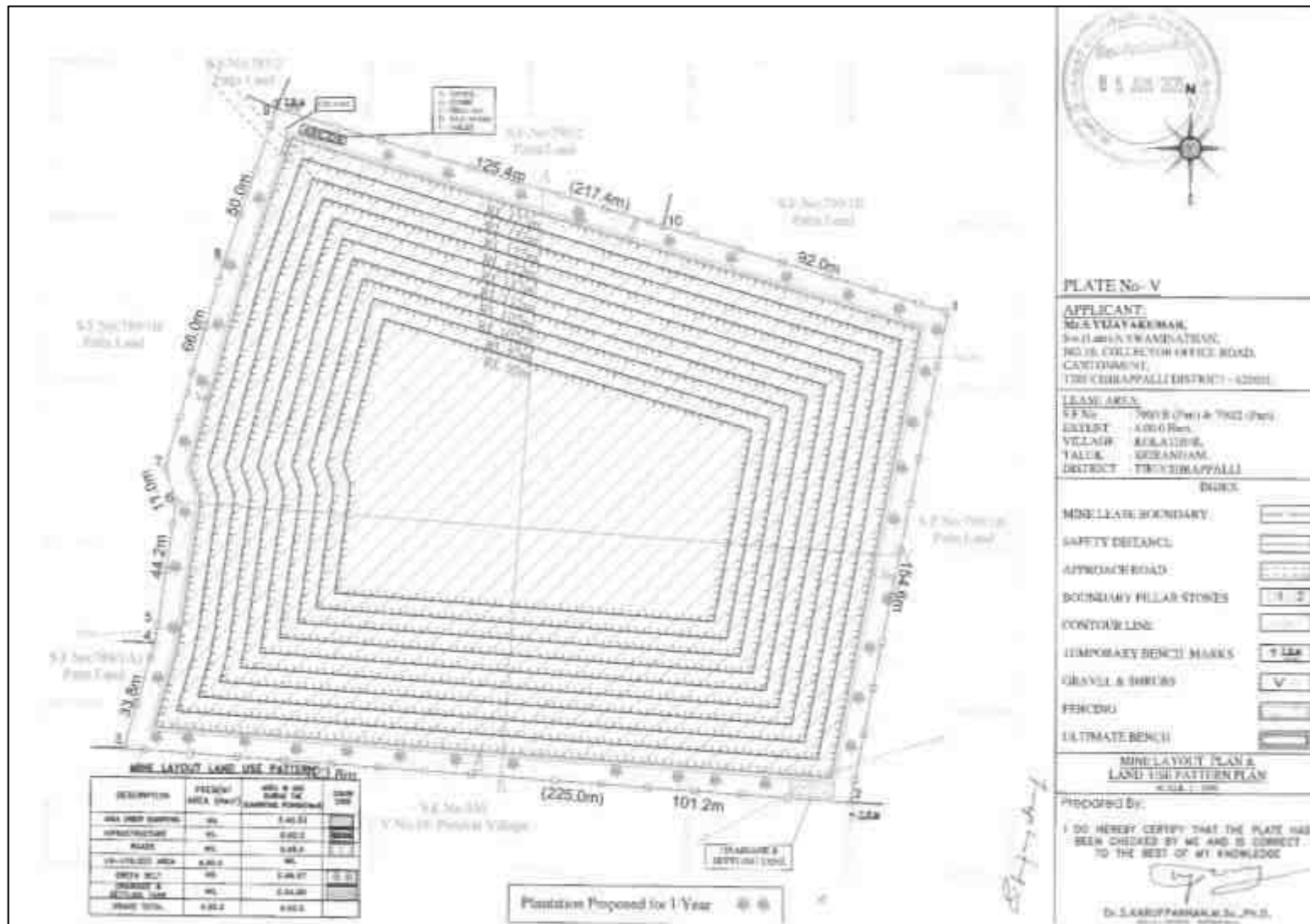


Figure 2.6 Mine Layout Plan and Land Use Pattern

2.6.6 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. The ultimate pit dimension is provided in Table 2.12.

Table 2.12 Ultimate Pit Dimension

Pit	Length (m)	Width (m)	Depth (m)
I	206	166	50

Source: Approved Mining Plan & ToR

2.6.7 Infrastructures

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

Other Infrastructure Requirement

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

2.6.8 Water Requirement

Details of water requirement in 3.0 KLD is given in Table 2.13.

Table 2.13 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	1.0 KLD	Existing bore wells nearby the lease area
Green Belt development	1.0 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.0 KLD	Existing bore wells and approved water vendors
Total	3.0 KLD	

Source: Prefeasibility Report

2.6.9 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.14 Around **42,62,242litres of HSD** will be used for rough stone extraction during 10 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.14 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	Rough Stone (981104m³)	Gravel (34196m³)	Total Diesel (litre)
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m ³ /hr)	20	60	---
Time Required (hours)	49,055	570	---
Total Diesel Consumption for 5 years (litre)	7,84,883	5,699	7,90,582
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/ hole (litre)	0.4	---	---
Number of Drillholes/day	169	---	---
Total Diesel Consumption for 5 years (litre)	91,260	---	91,260
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m ³	6	6	---
Number of Trips / days	121	7	---
Number of Trips / 5 years	163350	5,670	---
Total Diesel Consumption for 5 years (litre)	32,67,000	1,13,400	33,80,400
Total Diesel Consumption by Excavator, Compressor and Tipper			42,62,242

2.6.10 Capital Requirement

The project proponent will invest Rs.1,56,49,280 to the project. The breakup summary of the investment has been given in Table 2.15.

Table 2.15 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset	28,50,000
2	Machinery	20,00,000
3	EMP	29,60,000
	Total Project Cost	78,10,000

Source: *Approved Mining Plan*

2.7 MANPOWER REQUIREMENT

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community. Number of employees required for this project have been provided in Table 2.16.

Table 2.16 Employment Potential for the Proposed Project

1.	Highly Skilled	Mines Manager	1No.
		Mine Engineer	1No.
		Mine Geologist	1No
		Blaster	1No
2.	Unskilled	Musdoor / Labours	18 No's
		Total =	22 No's

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 in Table 2.17.

Table 2.17 Expected Time Schedule

S. No.	Particulars	Time Schedule (in Months)							Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	
1	Baseline Environmental Study for preparing EIA report based on the Standard and Specific ToR Conditions								Soil, Water, Air, Noise, Socio Economics, Ecological Biodiversity and Traffic studies to be carried out by NABL accredited Laboratory and FAE's.
2	Draft EIA Report								Submission to TNPCB
3	Public Hearing Meeting								Minutes will be provided by the Tamil Nadu Pollution Control Board.

4	Final EIA Report (including Public reviews)								Submission to PARIVESH 2.0 Portal for obtaining EC
5	SEIAA Meeting								For environmental clearance
Note: 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 BASELINE ENVIRONMENTAL STUDIES

This chapter presents a regional background to the baseline data at the very onset which will help in better appreciation of micro-level field data generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering **October to December 2025** with CPCB guidelines. Environmental baseline data were collected through an NABL accredited and MoEF & CC notified lab named **Excellence Laboratory** for the environmental attributes including soil, water, air & noise and for flora and fauna, traffic survey and socio-economic details were collected by NABET approved FA's.

Study Area

The study area was divided into two zones:

- core zone - 500m radius cluster and
- buffer zone - 5 km radius from the periphery of the cluster

except for ecological and socio-economic study which considers 10km as buffer zone. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1.

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 5 km radius of the study area	Once during the study period	Study Area	Satellite Imagery & Primary Survey
*Soil	Physico Chemical characteristics	Once during the study period	5 (1 in core & 4 in buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and	Once during the study period	6 (1 surface water & 5	IS 10500& CPCB Standards

	Bacteriological Parameters		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 ₁₀ , PM _{2.5} , SO ₂ NO _x	24 hours, twice a week	5 (1 core & 4 buffer)	S 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
Noise Levels	Ambient noise	Hourly observation for 24 hours per location	5 (1 core & 4 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 the monitoring and testing have been carried out as per the Guidelines of CPCB and MoEF & CC.*

3.1 LAND ENVIRONMENT

3.1.1 Geology and Geomorphology

Study area is mainly composed of Hornblende biotite gneiss and Biotite hornblende genesis as shown in Figure 3.1. hornblende biotite gneiss is a metamorphic rock characterized by its grey colour, prominent foliation and the presence of hornblende and biotite minerals. It's a type of gneiss have a distinct banded or layered appearance due to the alignment of minerals during metamorphism. This foliated metamorphic rock usually forms at convergent plate boundaries and recrystallizes with immense heat and pressure. It is predominantly composed of

- quartz (13-20%),
- plagioclase (33-39%),
- biotite (20-27%),

- microcline (2- 7%),
- titanite (5-10%),
- hornblende (1-10%) and

as accessories may contain metamorphic clinopyroxene, zircon, apatite and opaque minerals.

Geomorphology:

The project site is a pediment- pediplain complex as shown in Figure 3.2. It is a landscape feature in arid and semi-arid regions formed by the erosional processes of pedimentation and pediplanation.

Pediments are gently sloping slightly concave erosional surfaces found at the base of hills or mountains while a pediplain is a much larger broader plain formed by the coalescence of multiple pediments and a pediplain is the end result of the long-term erosion and weathering that creates pediments gradually reducing mountain ranges into a vast flat surface.

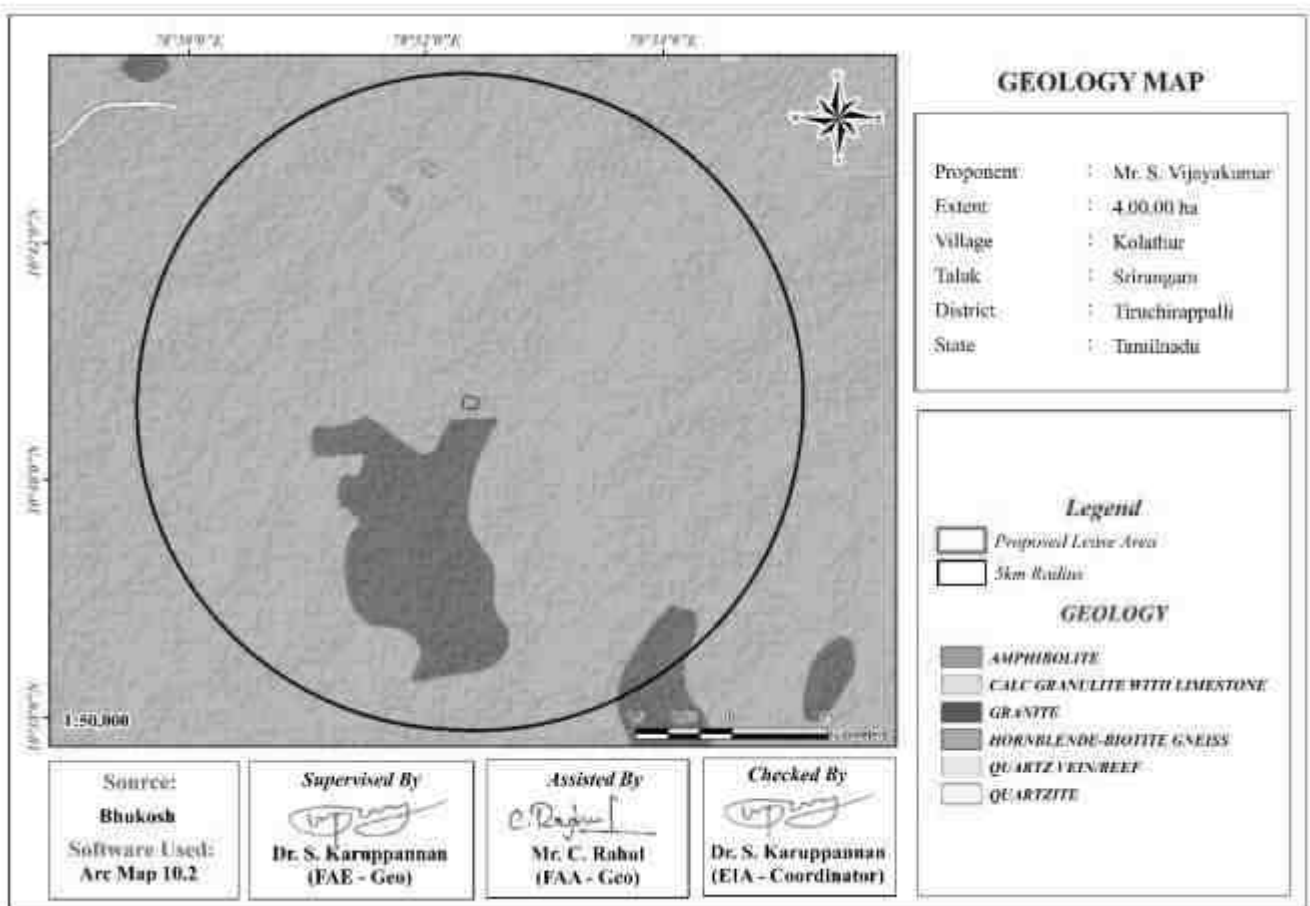


Figure 3.1 Geology Map of 5 km Radius from Proposed Project Site

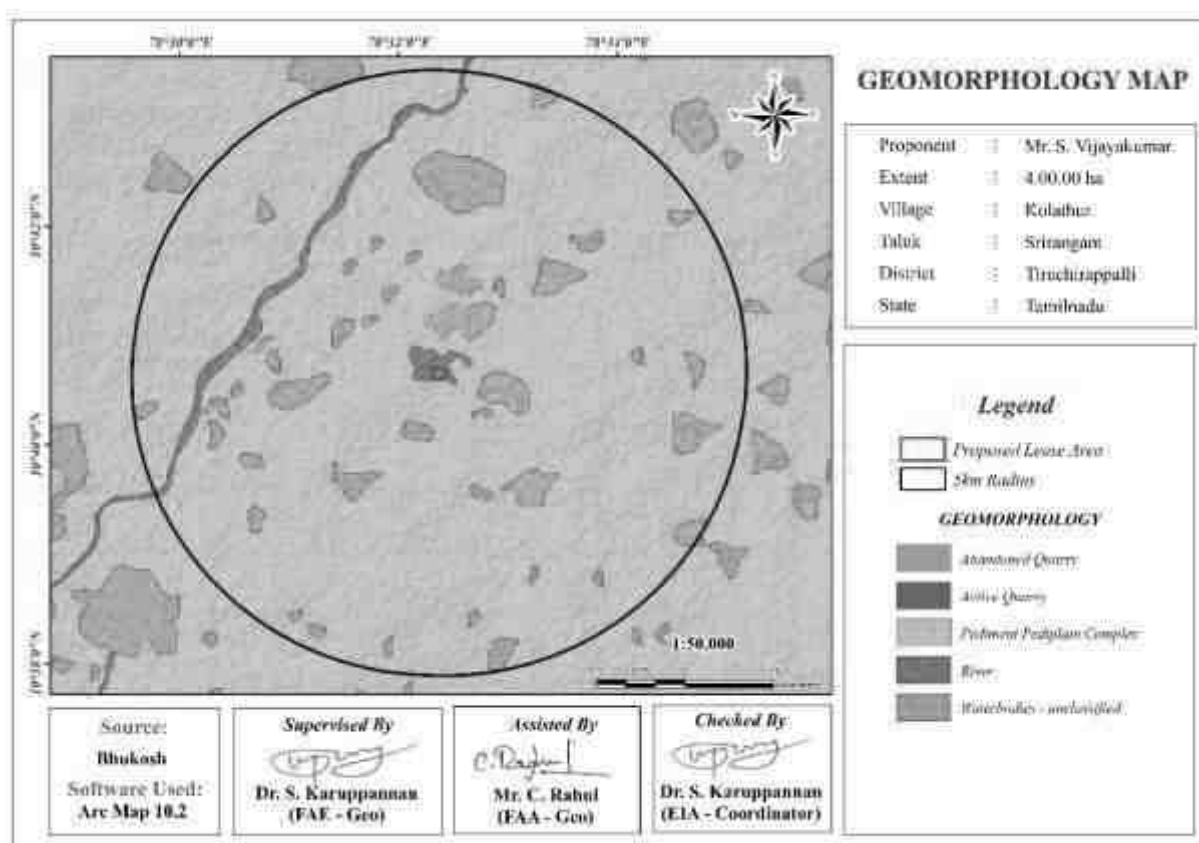


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

3.1.2 Land Use/ Land Cover

The study utilizes the reclassified LULC dataset derived from the Advanced Wide Field Sensor (AWiFS) of the Indian Remote Sensing satellite Resourcesat-1 (P6). The data is accessed through the Bhuvan data portal (<http://bhuvan.nrsc.gov.in>). Sentinel 2-A images acquired in May-June are used for identifying changes. These images are pre-processed to correct atmospheric and radiometric errors ensuring data accuracy. The method calculates the number of changed pixels within the LULC dataset to assess the intensity of land use and land cover changes. This provides insights into the spatial extent of these changes. Land Use and Land Cover (LULC) map as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius. Totally 7 LULCs were mapped and the areal extent of each LULC is provided in Table 3.2

Comparative study of land use land cover (LULC) changes within a radius of 5 km (2020 vs 2025), Also significant changes were observed in land use and topography (Table 3.2). The lowest amount of cropland increased from 5996.54 hectares (72.56%) to 6118.33 hectares (74.03%), while mining activity increased from 39.68 hectares (0.48%) to 105.50 hectares (1.28%). This indicates that the region has enormous resources, but judicious use of minerals is being practiced. The increase in common vegetation over the last five years has increased

from 7.19 hectares (0.09%) to 14.74 hectares (0.18%). Builtup areas also increased from 844.89 hectares (10.22%) to 1033.26 hectares (12.50%), indicating urban growth due to increased economic activities. In fact, the agricultural land has increased slightly and may be replanted in the future. Therefore, there is no significant change or negative impact on LULC due to mining activities in this region.

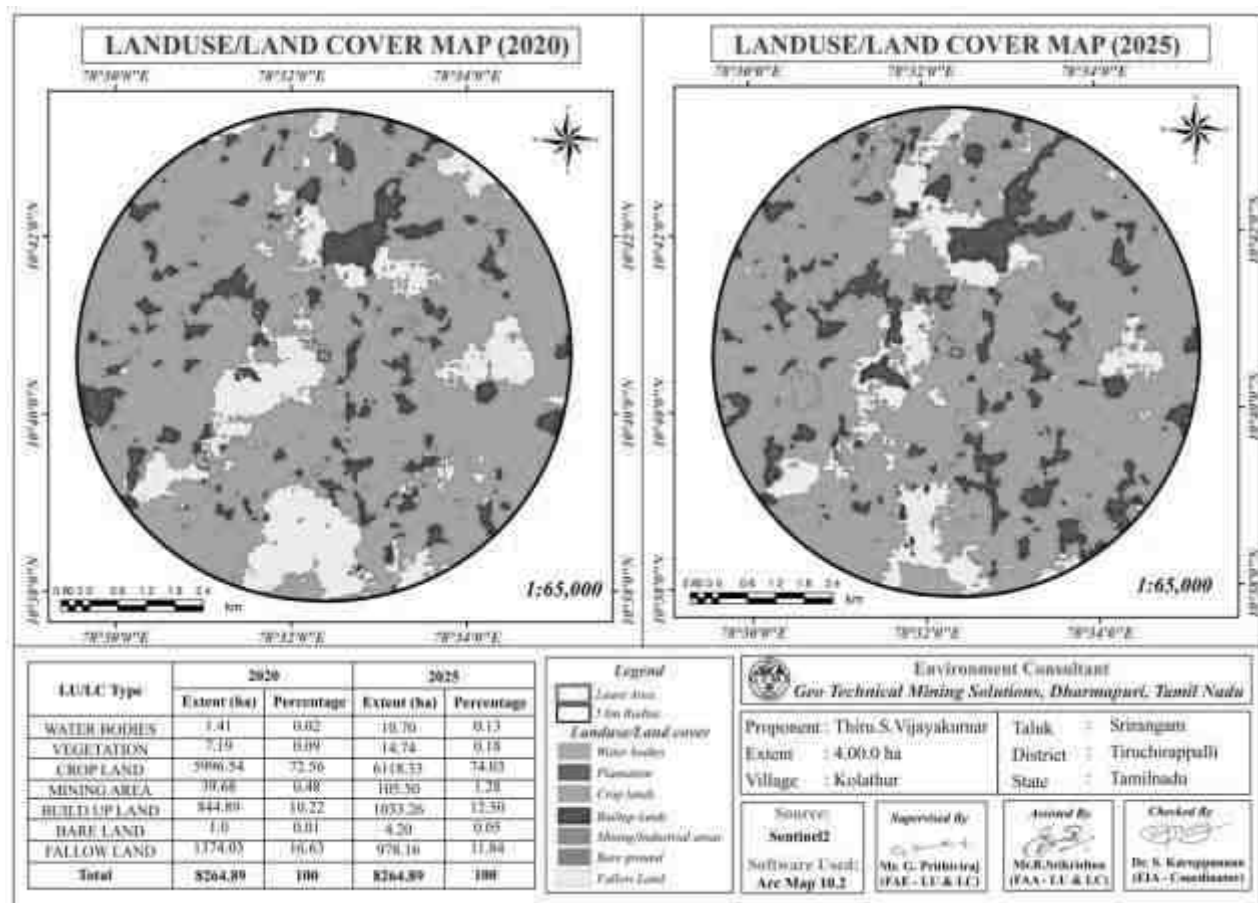


Figure 3.3 LULC Map of 5 km Radius from the Proposed Project Site

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	LU in 2020 in Ha	LU in 2020 in %	LU in 2025 in Ha	LU in 2025 in %
1	Water bodies	1.41	0.02	10.70	0.13
2	Vegetation	7.19	0.09	14.74	0.18
3	Crop land	5996.54	72.56	6118.33	74.03
4	Mining area	39.68	0.48	105.50	1.28
5	Builtup land	844.89	10.22	1033.26	12.50
6	Bare land	1.0	0.01	4.20	0.05
7	Fallow land	1374.03	16.63	978.16	11.84
	Total	8264.89	100	8264.89	100

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The lease area is characterized by undulating terrain and a one-meter difference in elevation across the site. The maximum elevation is 72-142m above mean sea level was observed at the centre of the lease area.

3.1.4 Drainage Pattern

Drainage pattern of the 5km radius study area majorly has dendritic or pinnate drainage pattern in nature indicating the uniform lithology beneath the surface as shown in Figure 3.4. This uniformity implies that the streams and their tributaries are primarily controlled by the slope of the land rather than by variations in rock resistance or structural features like faults or joints.

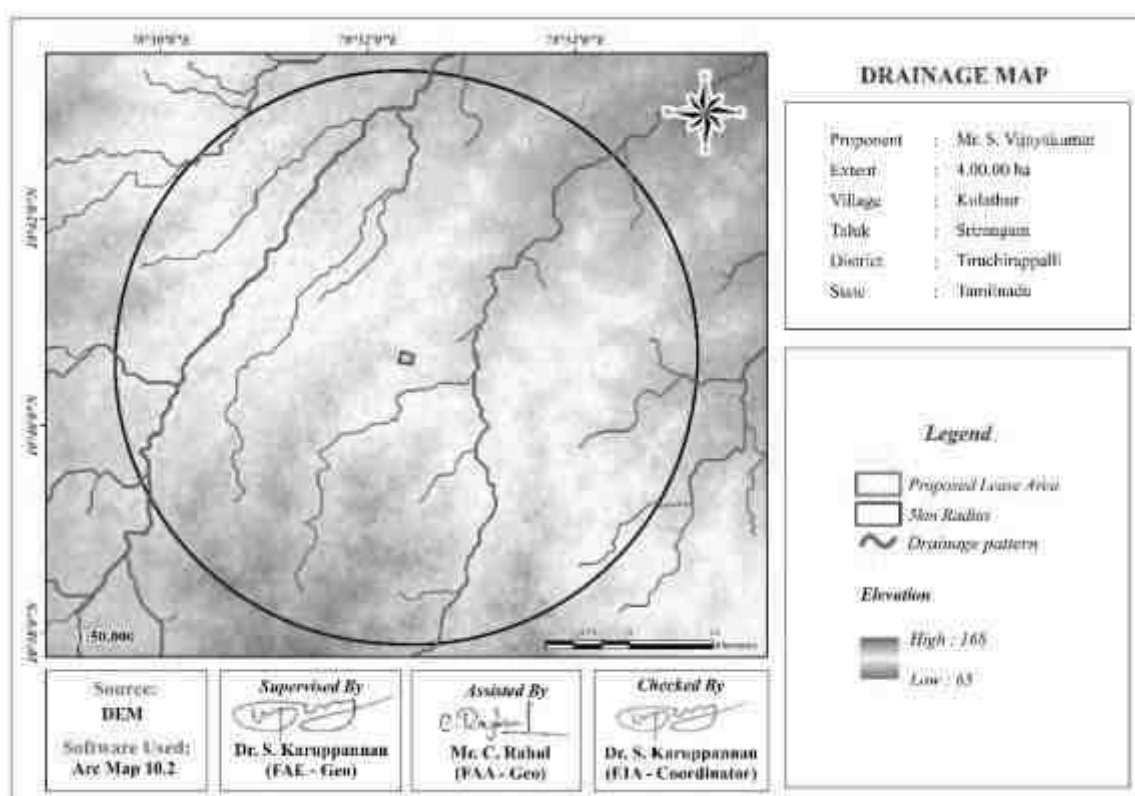


Figure 3.4 Drainage Map of 5 km Radius from Proposed Project Site

3.1.5 Seismic Sensitivity

The proposed lease area is situated in a Seismic Zone II as defined by National Center for Seismology (Official Website of National Centre of Seismology) is shown in Zone II is characterized by low earthquake activity and minimal risk of significant damage. In this region earthquakes typically register as 4.9 or lower on the Richter scale. These are considered low-intensity earthquakes usually causing minor or no damage. Such tremors are often felt by people indoors but rarely cause significant harm A substantial portion of India particularly the peninsular region falls under Zone II.

3.2 SOIL ENVIRONMENTAL

The composite soil samples were collected from the 5 locations of the study area and analysed for different parameters. Auger instrument is used to collect samples at the desired depth typically 6-8 inches. The soil samples were placed in rigid paper bags, labelled and then subjected to air drying and sieving in the laboratory. This process ensures the samples are suitable for assessing macro and micronutrients as well as physicochemical properties. The locations of the sampling sites are given in Table 3.3 and shown in Figure 3.5.

Table 3.3 Soil Sampling Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates
S01	Kalkudi	0.02	S	10°40'35.44"N, 78°32'25.12"E
S02	Kalkudi	0.31	SW	10°40'32.71"N, 78°32'8.44"E
S03	Kalkudi	0.50	NE	10°40'49.55"N, 78°32'40.14"E
S04	Chinnalampatti	0.53	NW	10°40'56.32"N, 78°32'8.54"E
S05	Periyalampatty	0.88	NW	10°40'51.28"N, 78°31'51.78"E

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

Table 3.4 Soil Quality of the Study Area

S. No	Parameters	Unit	S1	S2	S3	S4	S5
Physical- Chemical Parameters							
1	pH @25 ⁰ C	-	9.1	9.7	8.4	8.5	8.9
2	Electrical Conductivity	μS/cm	188	704	203	161	179
3	Total Organic Carbon	%	2.8	3.5	3.6	1.7	3.9
4	Available Nitrogen	%	0.09	0.08	1.1	0.07	0.08
5	Available Potassium	%	0.058	0.158	0.096	0.022	0.086
6	Available Phosphate	%	1.2	0.82	0.68	1.3	1.8
7	Available Calcium	mg/kg	94	166	42	81	426
8	Available Magnesium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
9	Organic Matter	%	0.85	2.5	1.6	1.66	1.32
10	Chloride as Cl	mg/kg	132	140	143	<2.0	<1.0
11	Bulk Density	g/cm ³	6.2	10.4	6.3	5.7	11.2
12	Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
13	Cation Exchange Capacity	meq/kg	3.1	4.8	6.5	2.1	7.3
14	Copper as Cu	mg/kg	4.0	6.6	6.8	2.6	6.9

15	Iron as Fe	mg/kg	3456	2378	4237	3702	4672
16	Lead as Pb	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
17	Total Soluble Sulphates	%	0.89	1.2	0.92	0.72	0.86
18	Zinc as Zn	mg/kg	10	8.4	12	4.9	9.7
19	Boron as B	mg/kg	12	20	18	16	13
20	Sodium Absorption Raddio	meq/L	1.98	4.37	6.41	7.95	1.86
21	Texture	---	Sandy Loam	Silty clay	Sandy Loam	Sandy Loam	Silty clay loam

Source: Sampling Results by Excellence Laboratory, in Association with GTMS

Table 3.4a Assigning Scores to Soil Quality Indicators

S. No.	OM	BD	PH	EC	Total Score	Recommendation
1	31	2	12	11	56	The soil requires major and immediate treatment
2	32	2	11	11	56	
3	33	2	12	11	58	
4	32	2	12	11	57	
5	32	2	12	11	57	
6	32	2	12	11	57	

OM (Organic Matter) BD (Bulk Density) PH (Potential of Hydrogen) EC (Electrical Conductivity) Source: PSS-2262 Soil Quality Monitoring.pdf (okstate.edu).

3.2.1 Physical Characteristics & Chemical Characteristics

1. Soil pH and Electrical Conductivity (EC):

- **pH** ranged from 8.4 to 9.7 indicating that the soil is **neutral to slightly alkaline**, which is favourable for most crops.
- **EC** value ranged from 161 to 704 μ S/cm, suggesting low salt concentration and non-saline soil across the sampling area.

2. Physical Properties

- **Bulk Density** values ranged from 5.7 to 11.2g/cc, which are within the typical range for loamy soils and support good root penetration and aeration.

3. Soil Fertility Status:

- **Total Organic matter** levels ranged from 1.7 to 3.9% by weight, classifying soils as low to moderately fertile in terms of organic matter.
- **Nitrogen (N)** content varied from 0.07 to 1.1% by mass indicating moderate nitrogen availability.
- **Potassium (K)** ranged from 0.022 to 0.158% by mass moderate fertility potential in terms of potassium.

4. Base Elements and Cation Ratios:

- **Calcium (Ca)** levels were highest with 426mg/kg and lowest with 42mg/kg.

- **Magnesium (Mg)** ranged from <1.0mg/kg.

Conclusion:

The soils in the study area are generally non-saline, neutral to slightly alkaline, and moderately fertile with low contamination levels. They exhibit good permeability, porosity, and suitable textural classes for agriculture and greenbelt development. The absence of heavy metals confirms that baseline soil conditions are unpolluted and safe for reclamation and vegetation growth.

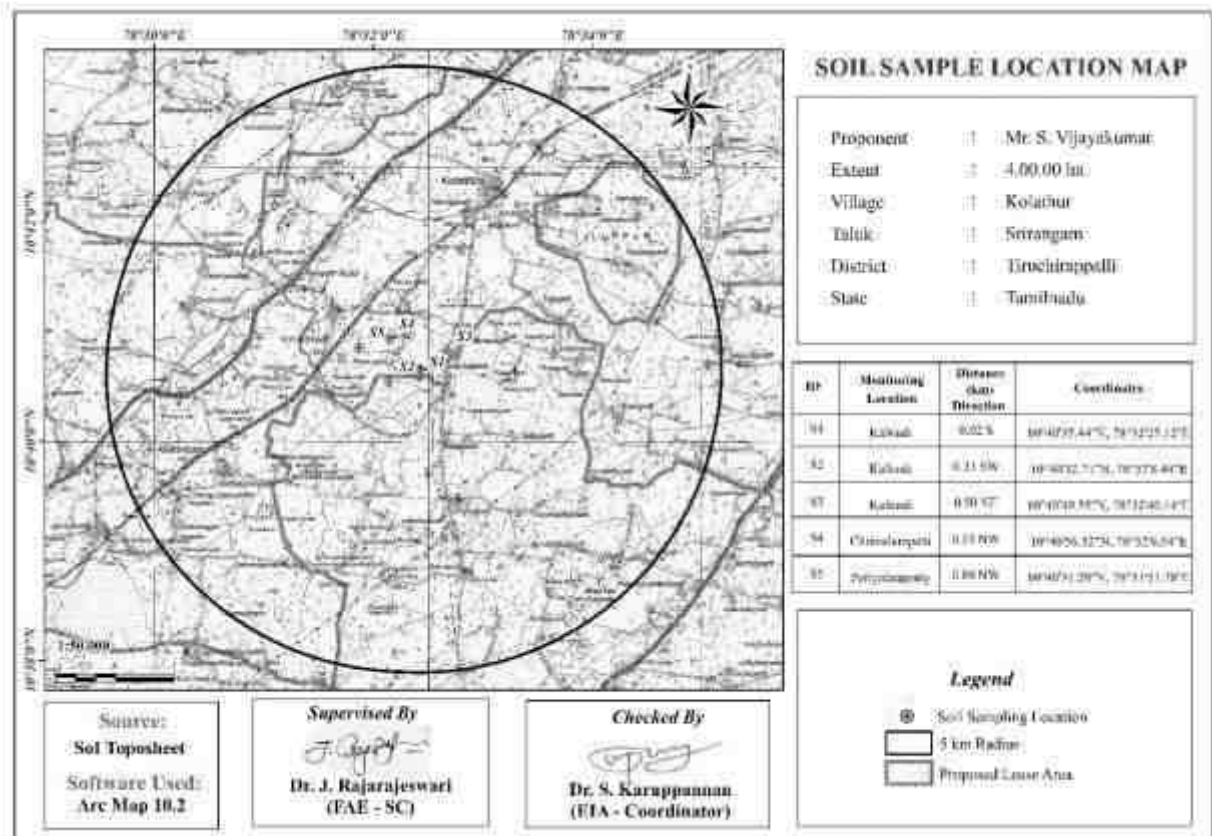


Figure 3.5 Map Showing Soil Sampling Locations within 5km Radius around Proposed Project Site.

3.3 WATER ENVIRONMENT

The study aims to establish a baseline understanding of the current water quality both surface and groundwater in the area recognizing the crucial role these resources play in its development. This involves assessing the existing water quality to understand its suitability for various uses and to identify potential issues or areas of concern. The water sample collected locations were given in Table 3.5 as well as in Figure 3.6.

The analysis of water samples involved several steps sample storage, field measurements and laboratory titrations. Polypropylene containers were used for storage pre-washed with hydrochloric acid and distilled water. Standard methods (APHA 1999) were

applied for water analysis including pH and electrical conductivity (EC) measurements in the field and titrimetric analysis for hardness, calcium, magnesium and chloride. Sodium and potassium were quantified using a flame photometer. All results except pH and EC are reported in mg/l with EC measured in $\mu\text{S}/\text{cm}$ at 25°C.

Table 3.5 Water Sampling Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates
OW1	Kalkudi	0.16	SE	10°40'31.26"N, 78°32'27.59"E
OW2	Kalkudi	0.38	NW	10°40'52.48"N, 78°32'11.76"E
OW3	Kalkudi	0.45	SW	10°40'22.37"N, 78°32'14.08"E
BW1	Inamkulathur	0.42	NE	10°40'41.25"N, 78°32'40.14"E
BW2	Kalkudi	0.53	NW	10°40'40.68"N, 78°32'1.24"E
SW1	Mettupatti	1.79	SW	10°40'33.39"N, 78°31'19.13"E

Source: Sampling Results by *Excellence Laboratory*, in Association with GTMS.

3.3.1 Water Consumption and Sources:

The water consumption in this opencast mine is mostly used for dust suppression by water sprinkling on haulage road, afforestation and domestic use etc.

Sl. No	Activities	Average demand (m^3/day)
1	Drinking water	0.2
2	Utilized Water	0.8
3	Dust suppression	1.0*
4	Green Belt	1.0*
Total		3.0*

*Water for dust suppression and afforestation may not be required for four to five months during the monsoon

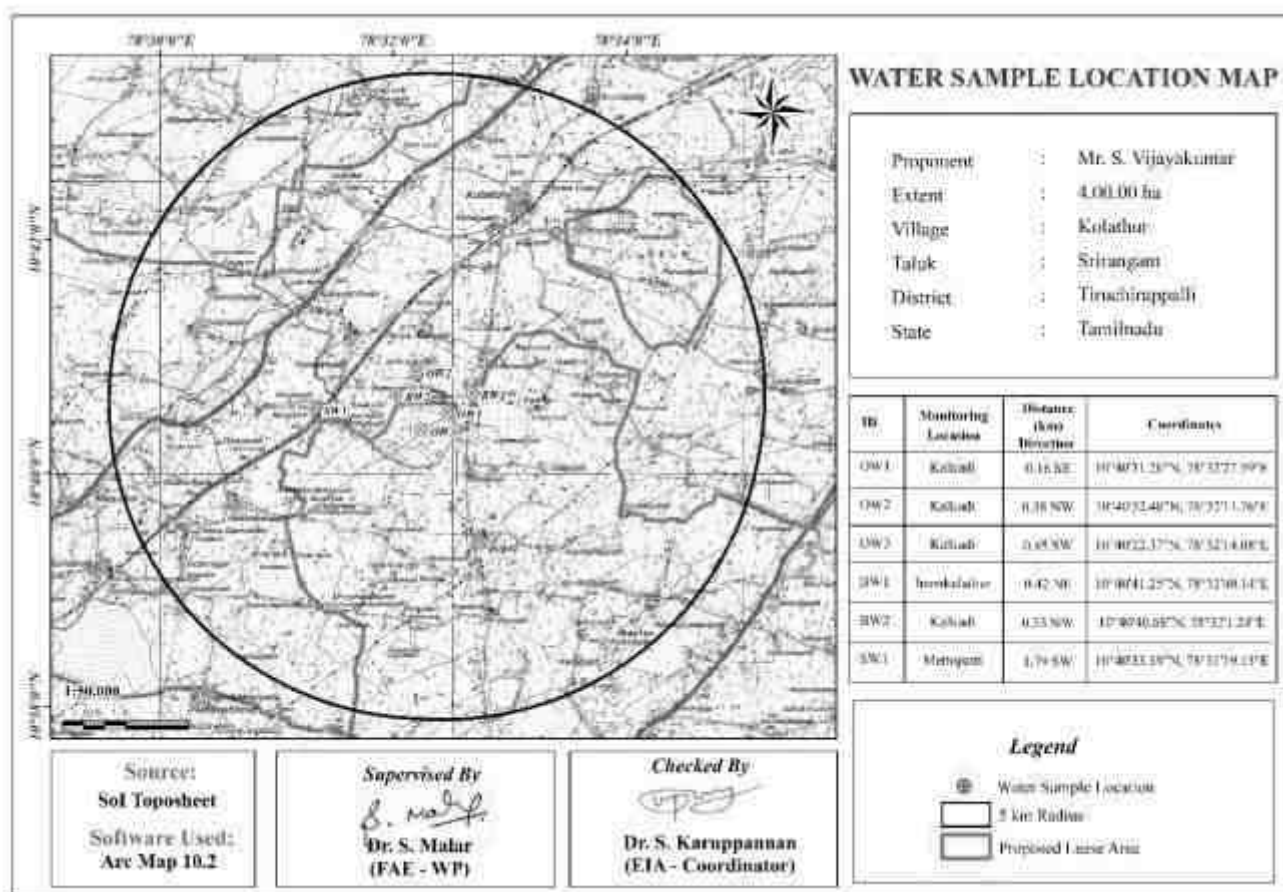


Figure 3.6 Map Showing Water Sampling Locations within 5 km Radius around Proposed Project Site

- The water required for quarrying activities shall be drawn from the Rainwater Harvesting Ponds and from nearby old pits.
- 4-5 months during the monsoon season, water is not required for dust suppression.
- Packed drinking water shall be provided at site for workers.

Table 3.6 Nearest Water Bodies

S. No	Location	Distance (km)	Direction
1	Moorthiammal Kulam	0.291km	N
2	Vittampatti Periyakulam	0.60km	E
3	Mettupatti Lake	1.79km	SW
4	Ponnaiyar River Bank	2.81km	W

3.3.2. Ground Water Quality Resources and Result

3.3.2.1 Physical Parameters:

The observation from the lab results given in Table 3.7 are as follows. The lab results for the water samples collected from the site as per IS 10500:2012 indicate that the basic physical and chemical parameters are within acceptable and permissible limits. The water is

generally considered potable but there are potential issues related to hardness and alkalinity that could affect taste and potentially cause scaling in domestic equipment.

- The **pH** value ranges from 7.1 to 8.9 mg/L. The World Health Organization (WHO) and the Bureau of Indian Standards (BIS) recommend a pH range of 6.5 to 8.5 for drinking water and the values are within the acceptable limits.
- The **turbidity** value is less than 1 NTU which is within the acceptable limit of 1 NTU and permissible limit of 5 NTU indicating minimal presence of suspended particles.
- The **TDS levels** ranged from 569 to 1510 mg/L. In bore well water the TDS is higher than the WHO recommendation of 500 mg/l for drinking water. High TDS levels can affect the taste of water potentially making it salty or bitter. In the long-term excessive TDS can irritate the stomach and according to some health sources may lead to kidney stones and cardiac issues.

3.3.2.2 Chemical Parameters:

- The **calcium** levels range from 64 to 145 mg/L which is within the permissible limit of 200mg/L but slightly above the acceptable limit of 75mg/L. High calcium levels can cause scaling in domestic equipment, reduced detergent efficiency and potential health issues like constipation, gas and bloating.
- The **magnesium** levels range from 07 to 35 mg/L which is within both the acceptable and permissible limits. However, elevated magnesium levels can cause diarrheic and vomiting in children.
- The **chloride** levels range from 35 to 411 mg/L which is within the acceptable and permissible limits of 250 mg/L and 1000 mg/L respectively. Chloride levels exceeding permissible limits can cause a bitter taste in the water and contribute to corrosion.
- The **total alkalinity** levels ranging from 48 to 402 mg/L are slightly above the acceptable limit of 200 mg/L but within the permissible limit of 600 mg/L. Excessive alkalinity can impart a soda taste to the water.
- The **hardness** levels ranging from 110 to 488 mg/L, are within the permissible limit but higher than the acceptable limit. Hardness can lead to corrosion and scaling problems, increased soap consumption and a salty taste.

Overall, the water quality of Borewell and open well based on the analysed parameters is generally suitable for drinking purposes as per IS 10500:2012. However, the higher levels of calcium, alkalinity and hardness could potentially lead to some undesirable effects such as scaling in domestic appliances and a salty or soda taste. Further treatment might be needed to address these issues especially if the water is to be used for a wider range of applications.

3.3.3 Surface water

Mettupatti, a key surface water body in the area, is characterized as an ephemeral lake, meaning it only holds water after rainfall events. A water sample, labelled as SW1, was collected from the lake, specifically 1.79 km southwest, to establish a baseline water quality assessment, as detailed in Table 3.7 and Figure 3.10.

Inference: The surface water quality when compared against CPCB standards does not meet the criteria for drinking water (Class A) but is suitable for irrigation (Class E). Surface water can infiltrate the ground and replenish groundwater reserves which are another important source of freshwater.

Table 3.7 Surface and Ground Water Quality Result

S. No.	Parameters	Units	Results						Permissible Limits as Per IS 10500:2012	
			OW1	OW2	OW3	BW 1	BW 2	SW1	Accept able	Permissible
1.	pH @25°C	-	7.3	7.4	7.1	7.5	7.2	7.2	6.5 - 8.5	No relaxation
2.	Colour	Hazen	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0	15
3.	Turbidity	NTU	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5.0
4.	Total Dissolved Solids	mg/L	1180	1510	1210	569	1200	789	500	2000
5.	Barium as Ba	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.7	No relaxation
6.	Boron as B	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	1.0
7.	Calcium as Ca	mg/L	136	114	145	94	138	64	75.0	200
8.	Chloride as Cl	mg/L	308	411	357	132	352	35	250	1000
9.	Copper as Cu	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	1.5
10.	Fluoride as F	mg/l	0.27	0.38	0.28	0.30	0.42	<1.0	1.0	1.5
11.	Free Residual chlorine	mg/l	<0.1	<1.0	<1.0	<1.0	<1.0	<1.0	0.2	1.0
12.	Iron as Fe	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3	No relaxation
13.	Lead (as Pb)		<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No relaxation
14.	Magnesium as Mg	mg/l	25	22	25	07.9	35	28	30.0	100
15.	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	No relaxation
16.	Nitrate as NO ₃	mg/l	4.2	5.5	7.2	2.0	3.2	<0.1	45.0	No relaxation
17.	Odour	--	Agreeable	Agreeable	Disagreeable	Disagreeable	Agreeable	Disagreeable	agreeable	agreeable
18.	Phenolic compound as C ₆ H ₅ OH	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	BQL 0.001	0.002
19.	Sodium as Na	mg/l	203	282	180	47	192	8.2	-	NA
20.	Sulphate (as SO ₄)	mg/l	101	207	130	76	102	11	400	No relaxation

21.	Total Alkalinity	mg/l	348	402	364	290	339	48	600	No relaxation
22.	Total Arsenic	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	600
23.	Total Hardness (as CaCO ₃)	mg/l	445	375	467	283	488	110	200	600
24.	Total Silica	mg/l	48	67	61	42	76	86	200	600
25.	Zinc (as Zn)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	0.20	5.0	15
26.	Potassium as K	mg/l	5.1	6.5	7.5	6.1	8.0	7.1	--	--
27.	BOD	mg/l	<2.0	<2.0	<2.0	<2.0	<2.0	43	-	BQL 0.001
28.	COD	mg/l	<4.0	<4.0	<4.0	<4.0	<4.0	172	-	BQL 0.001
29.	Total Coliform	CFU/100ml	Absent	Absent	Absent	Absent	Absent	280	Absent	Absent
30.	Escherichia Coli	CFU/100ml	Absent	Absent	Absent	Absent	Absent	220	Absent	Absent

Source: Sampling Results by **Excellence Laboratory**, in association with GTMS

3.3.4 Hydrogeological Studies

The area within a 1.0km radius has numerous open and deep wells, and groundwater level data were collected from both types of wells across two monsoon seasons. This data collection approach allows for a comprehensive understanding of groundwater behaviour in the region considering the variations in well types and seasonal influences.

3.3.4.1 Rainfall

Rainfall data for the study area were collected for the period of 1981-2022(POWER | Data Access Viewer (nasa.gov)). Long term monthly average rainfall was estimated from the data of 2014-2024 and compared with the monthly rainfall for the year 2024, shown in Figure 3.7. The Figure 3.7 shows that monthly rainfall in 2024 is generally high in the months of June, August, October when compared to the long term monthly average rainfall.

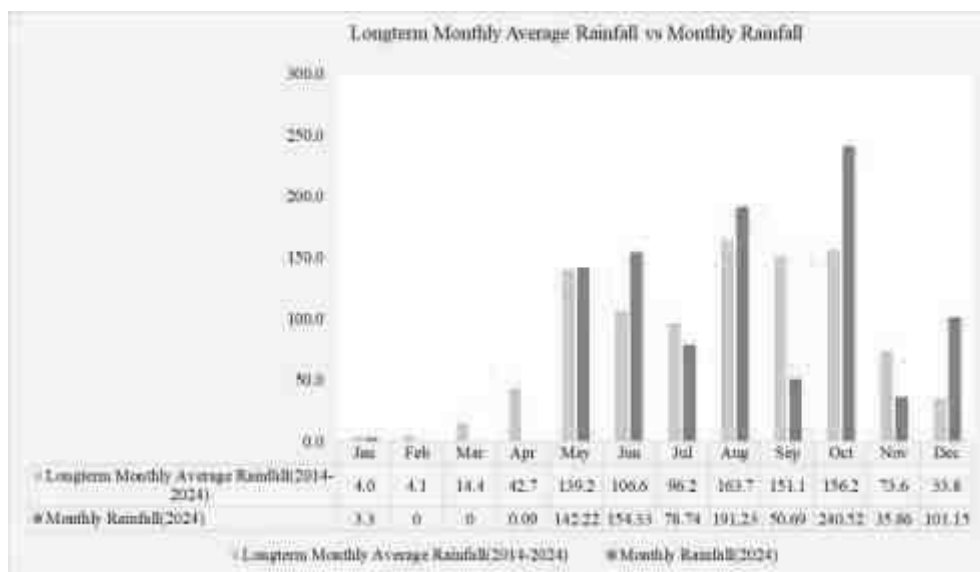


Figure 3.7 Long-Term Monthly Average Rainfall Vs Monthly Rainfall

3.3.4.2 Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2km radius around the proposed project sites for the period from March through May 2025 (Pre-Monsoon Season) and from October to December, 2025 (Post Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.8 and 3.9. According to the data, average depths to the static water table in open wells range from 16.7 to 18.7m BGL in pre monsoon and 15.50-18.30m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in bore wells for the period of October to December, 2025 (Post Monsoon Season) vary from 51.63-55.0m and from 52.67-56.20m for the period of March through May, 2025 (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines. From the maps of open well groundwater flow direction shown in Figures 3.8-3.9, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 6 located in southeast direction of the proposed project site. The groundwater flow maps in Figures 3.10-3.11 show that most of the bore well groundwater for the post- and pre-monsoon seasons flow towards the bore well number 9. It is located in southeast direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Mar-25	Apr-25	May-25	Average		
DW01	17.9	18.3	18.7	18.3	10°40'6.07"N	78°31'50.02"E
DW02	18.2	18.7	19.3	18.7	10°39'43.94"N	78°32'15.18"E
DW03	16.5	16.9	17.9	17.1	10°40'5.76"N	78°33'3.37"E
DW04	16.2	16.8	17.2	16.7	10°40'52.40"N	78°33'10.97"E
DW05	17.9	18.3	18.7	18.3	10°40'45.15"N	78°31'36.24"E
DW06	16.9	17.3	17.9	17.4	10°40'24.79"N	78°32'31.83"E
DW07	17.6	17.9	18.3	17.9	10°41'21.21"N	78°32'8.13"E

DW08	16.9	17.3	18.3	17.5	10°41'19.01"N	78°32'45.83"E
DW09	17.3	17.7	18.5	17.8	10°40'52.56"N	78°32'11.90"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2025	Nov-2025	Dec-2025	Average		
DW01	18.6	18.1	17.6	18.10	10°40'6.07"N	78°31'50.02"E
DW02	18.9	18.3	17.7	18.30	10°39'43.94"N	78°32'15.18"E
DW03	16.9	15.9	15.1	15.97	10°40'5.76"N	78°33'3.37"E
DW04	16.2	15.6	14.7	15.50	10°40'52.40"N	78°33'10.97"E
DW05	18.5	17.8	16.9	17.73	10°40'45.15"N	78°31'36.24"E
DW06	17.4	16.7	15.9	16.67	10°40'24.79"N	78°32'31.83"E
DW07	18.3	17.4	16.8	17.50	10°41'21.21"N	78°32'8.13"E
DW08	17.3	16.5	15.6	16.47	10°41'19.01"N	78°32'45.83"E
DW09	17.9	17.1	16.2	17.07	10°40'52.56"N	78°32'11.90"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2025	Apr-2025	May- 2025	Average		
BW01	53.2	53.9	54.8	53.97	10°41'14.07"N	78°31'36.45"E
BW02	55.2	56.3	57.1	56.20	10°40'23.85"N	78°31'35.35"E
BW03	54.9	55.7	56.9	55.83	10°39'47.55"N	78°31'58.78"E
BW04	55.3	55.9	57.1	56.10	10°39'40.12"N	78°32'28.10"E
BW05	52.6	53.7	55.9	54.07	10°40'37.20"N	78°33'20.35"E
BW06	51.9	52.8	54.3	53.00	10°41'15.02"N	78°32'51.13"E
BW07	53.7	54.6	56.2	54.83	10°41'18.65"N	78°32'15.57"E
BW08	53.6	54.4	55.9	54.63	10°40'49.58"N	78°32'3.82"E
BW09	51.3	52.9	53.8	52.67	10°40'21.31"N	78°32'31.99"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL (m)				Latitude	Longitude
	Oct-2025	Nov-2025	Dec-2025	Average		
BW01	54.5	53.1	52.5	53.37	10°41'14.07"N	78°31'36.45"E
BW02	55.9	55.2	53.9	55.00	10°40'23.85"N	78°31'35.35"E
BW03	55.3	54.2	52.7	54.07	10°39'47.55"N	78°31'58.78"E
BW04	55.8	54.7	53.2	54.57	10°39'40.12"N	78°32'28.10"E
BW05	53.9	52.8	51.4	52.70	10°40'37.20"N	78°33'20.35"E
BW06	53.4	52.5	50.9	52.27	10°41'15.02"N	78°32'51.13"E
BW07	54.9	53.8	51.4	53.37	10°41'18.65"N	78°32'15.57"E
BW08	54.9	53.6	51.9	53.47	10°40'49.58"N	78°32'3.82"E
BW09	52.8	51.9	50.2	51.63	10°40'21.31"N	78°32'31.99"E

Source: Onsite monitoring Data

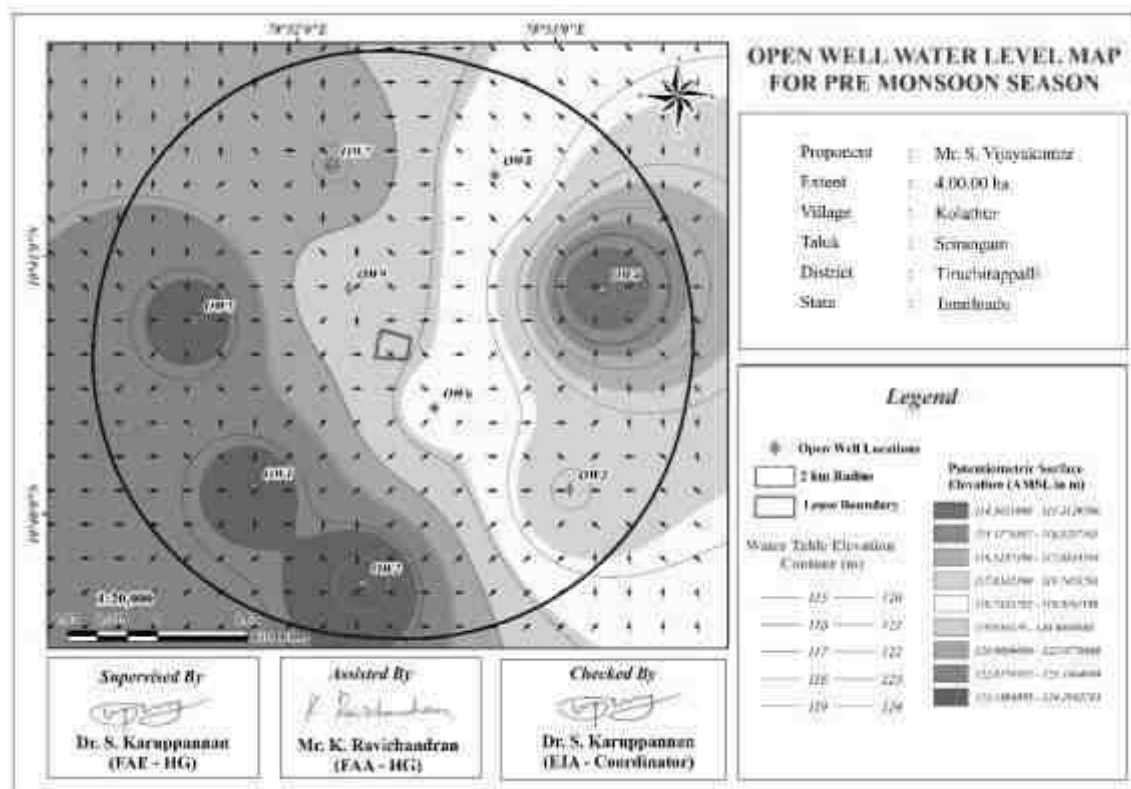


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Pre-Monsoon Season

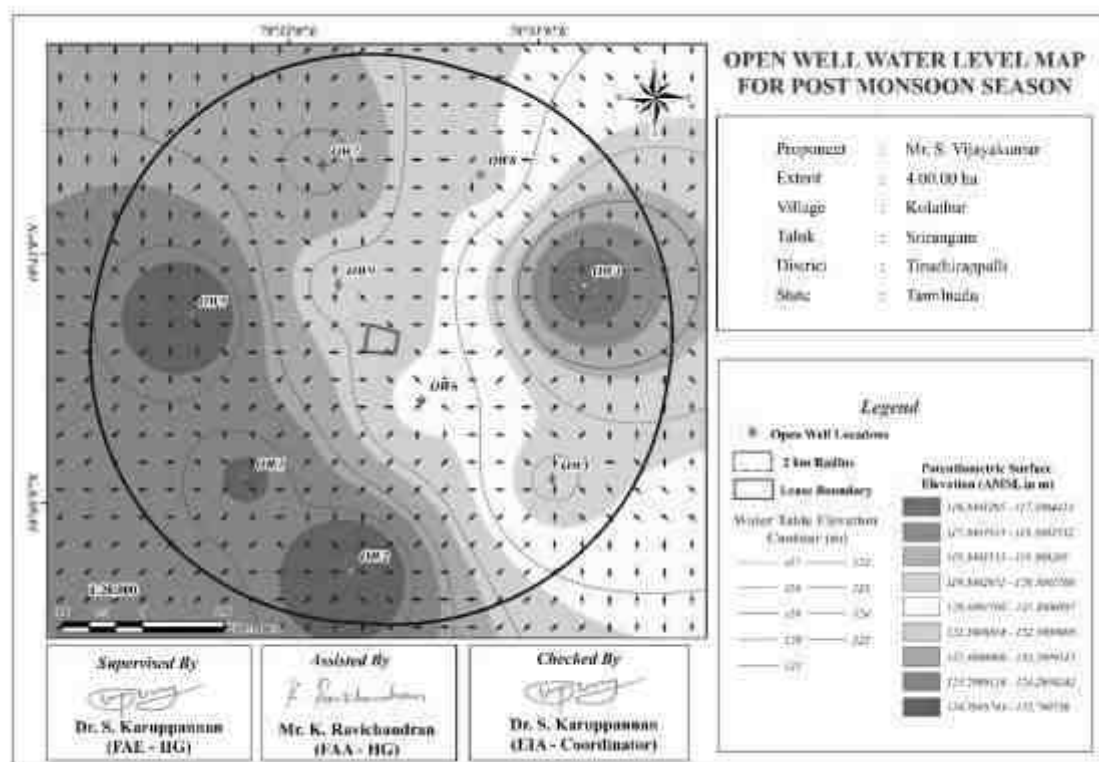


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Post-Monsoon Season

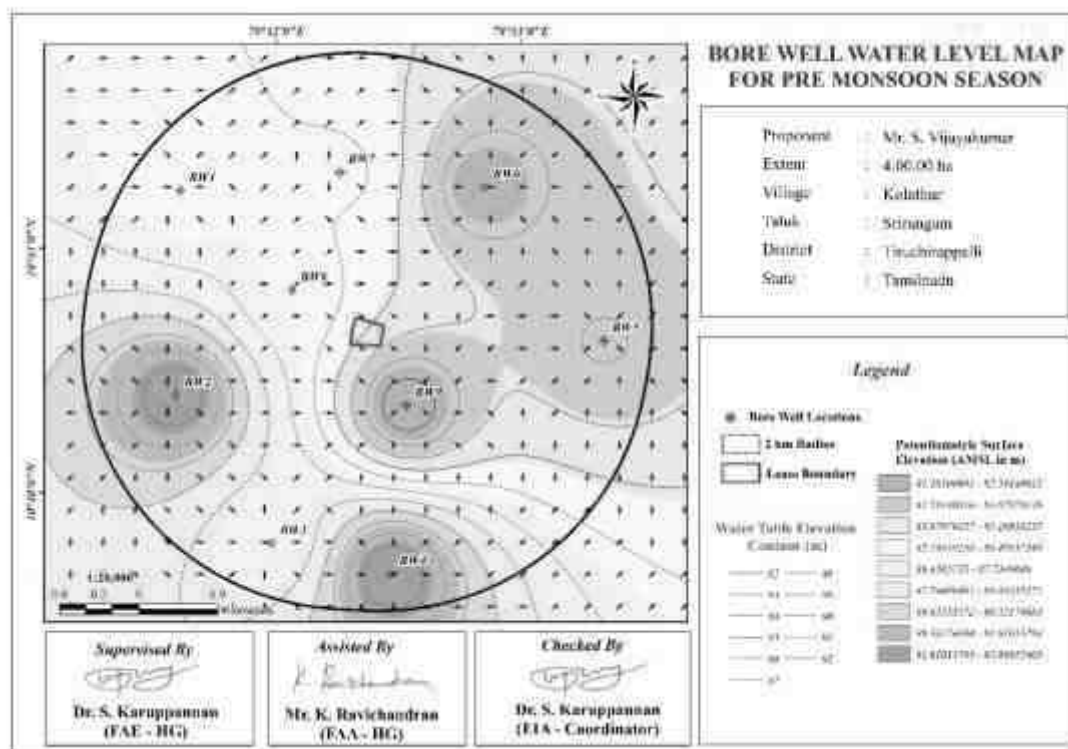


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Pre-Monsoon Season

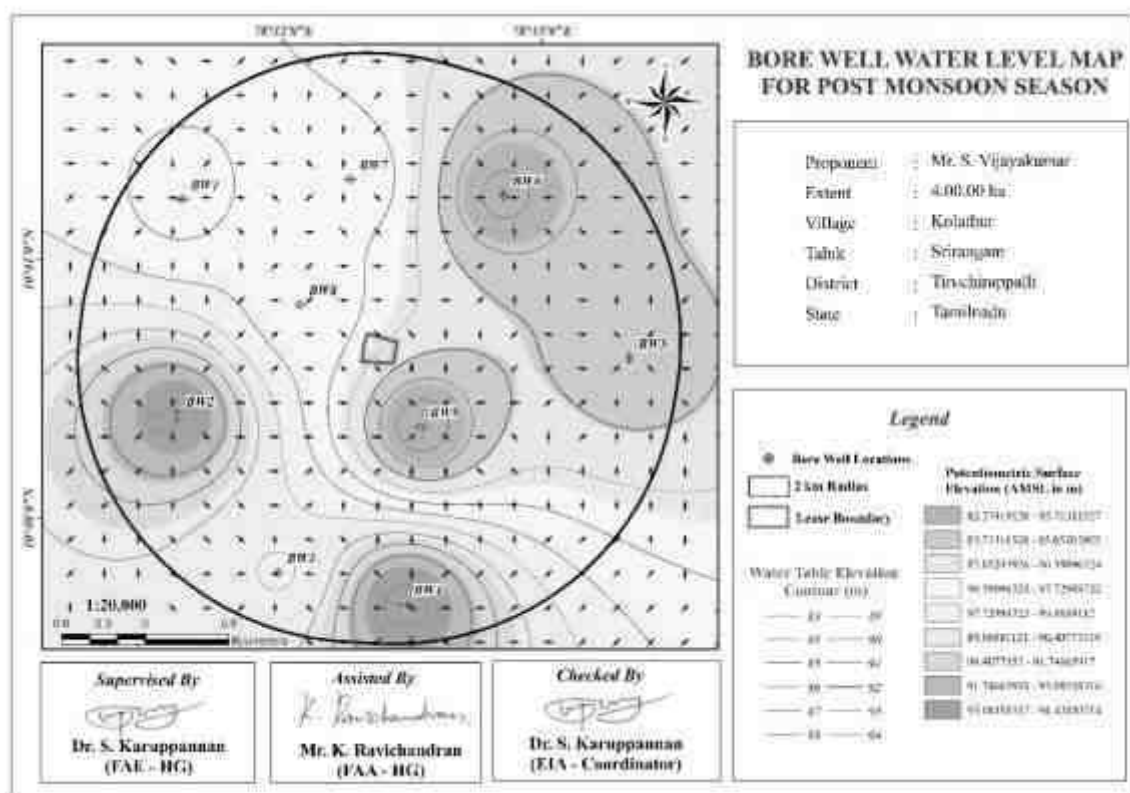


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow During Post-Monsoon Season

3.3.3.3 Electrical Resistivity Investigation

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

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

Table 3.12 Vertical Electrical Sounding Data

Location Coordinates - 10°40'40.84"N 78°32'20.64"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in Ω	Apparent Resistivity in Ωm
1	2	2	11.78	12.44	146.5
2	4	2	49.46	7.42	367.04
3	6	5	112.26	4.98	559.28
4	8	5	200.18	2.86	572.71
5	10	5	75.36	8.49	640.03
6	15	10	173.49	4.53	786.42
7	20	10	310.86	3.18	987.56
8	25	10	487.49	2.29	1118.76
9	30	10	274.75	5.28	1451.78
10	35	10	376.8	4.22	1590.54
11	40	10	494.55	3.33	1649.12
12	45	10	628	2.75	1729.18
13	50	10	777.15	2.39	1857.16
14	65	20	453.6	4.50	2041.05
15	70	20	989.1	2.17	2149.5
16	80	20	1256	1.25	1567.45
17	90	20	1554.3	1.69	2630.93
18	100	20	1653.6	1.62	2680.44

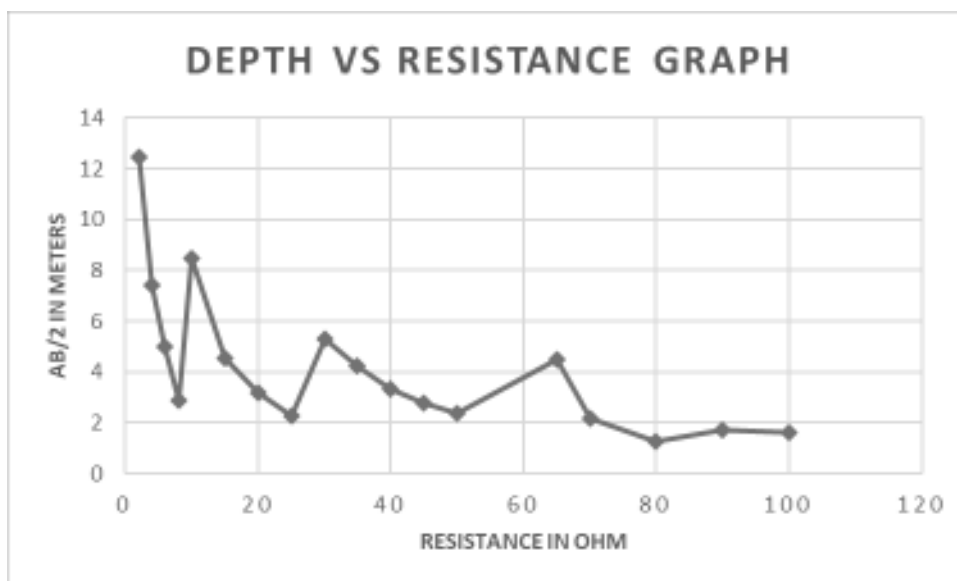


Figure 3.12 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 80 m Below Ground Level in Proposed Project

The low resistivity values indicate occurrence of water at the depth of about 80m below ground level. The maximum depth proposed for the proposed project is 50m BGL. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

3.4 AIR ENVIRONMENT

Baseline studies on the air environment involve identifying specific pollutants and their concentrations in the ambient air of a region. The primary sources of air pollution are identified as vehicular traffic, dust from unpaved roads and domestic and agricultural activities. These sources contribute to the overall air quality and can be further investigated to understand the specific pollutants and their impact

3.4.1 Meteorology

3.4.1.1 Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3m 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 3.12.

Table 3.13 Onsite Meteorological Data

S. No.	Parameters		October,2025	November,2025	December,2025
1	Temperature (°C)	Min	23.07	19.29	16.64
		Max	37.1	33.39	30.56
		Avg	27.54	25.51	22.26
2	Relative Humidity (%)	Min	31.41	51.19	52.04
		Max	98.18	100	100

		Avg	80.64	84.70	85.60
3	Wind Speed (m/s)	Min	0.06	0.11	0.2
		Max	4.24	5.86	5.7
		Avg	1.77	2.40	2.15
4	Wind Direction (degree)	Min	2.2	0.3	0.4
		Max	359	359.5	359.6
		Avg	165.23	107.49	81.26
5	Surface Pressure(kPa)	Min	99.15	99.46	99.46
		Max	100.2	100.39	100.54
		Avg	99.72	100.01	100.04

Source: Sampling Results by Excellence Laboratory, in association with GTMS.

3.4.1.2 Wind Pattern

The wind pattern significantly impacts how air pollutants and noise disperse from a project site. The study employs wind roses to analyse wind patterns. One set of wind roses represents historical data from October to December between 2021 and 2024. Another wind rose focuses on the current study period specifically the October to December period of 2025. This allows for a comparison between past wind patterns and those observed during the current study period. The wind rose diagrams thus produced are shown in Figures 3.13 & 3.14a reveals indicates that while the overall wind speed was moderate 2.08m/s and the majority of the winds observed during the study period came from a broad section of the Northeast to Southwest compass directions.

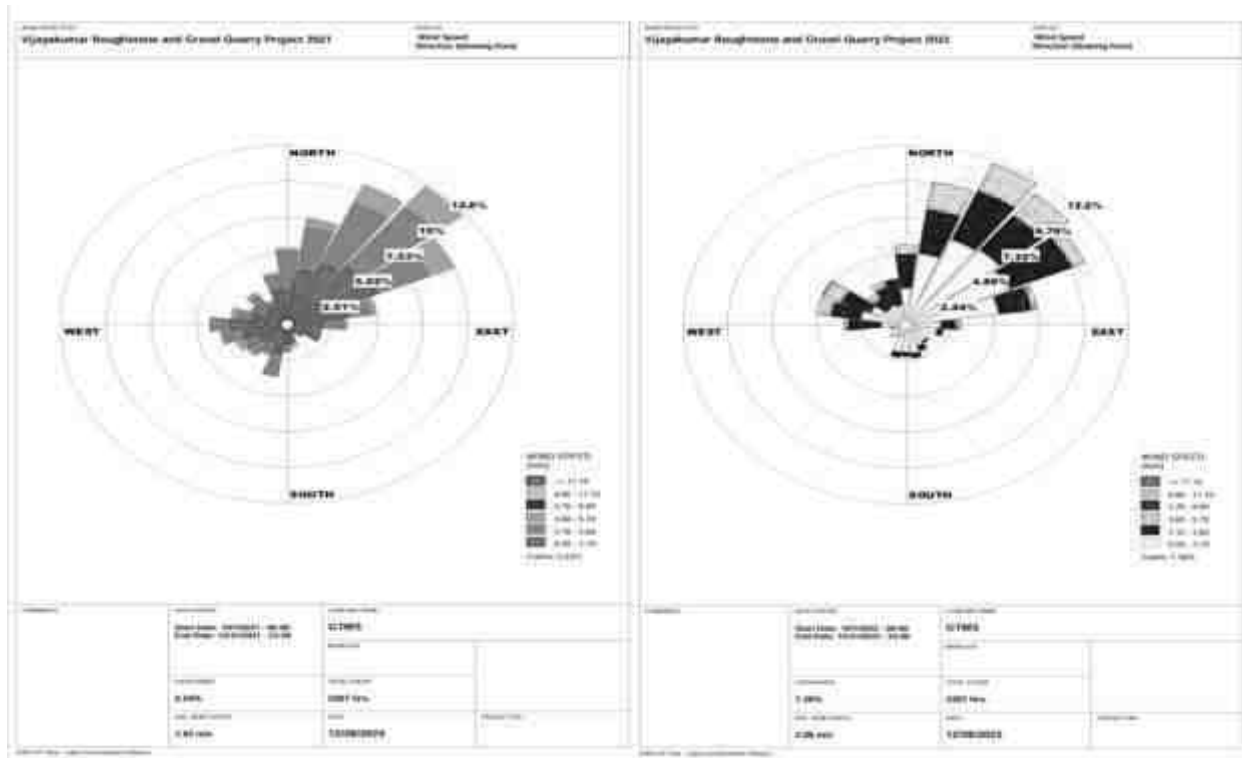


Figure 3.13 Windrose Diagram for 2021- 2022 (October to December)

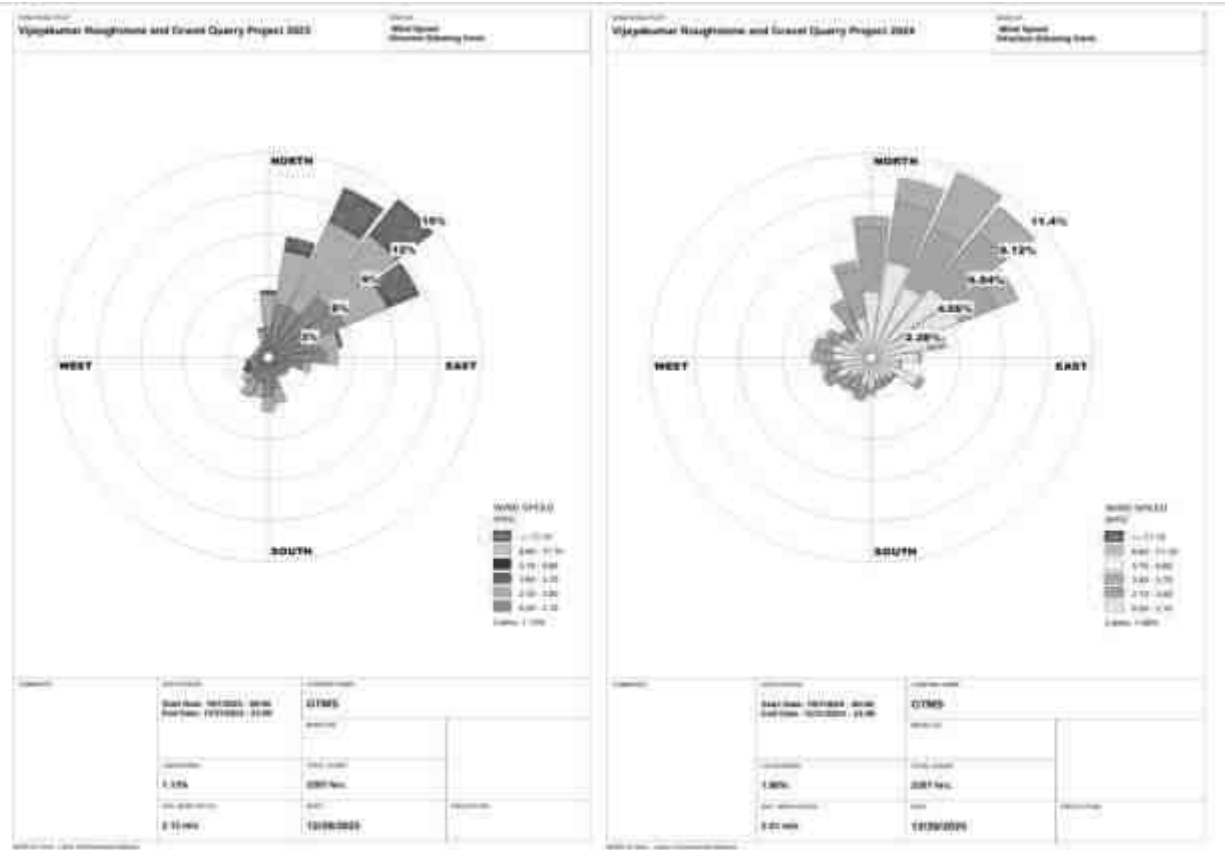


Figure 3.14 Windrose Diagram for 2023-2024 (October to December)

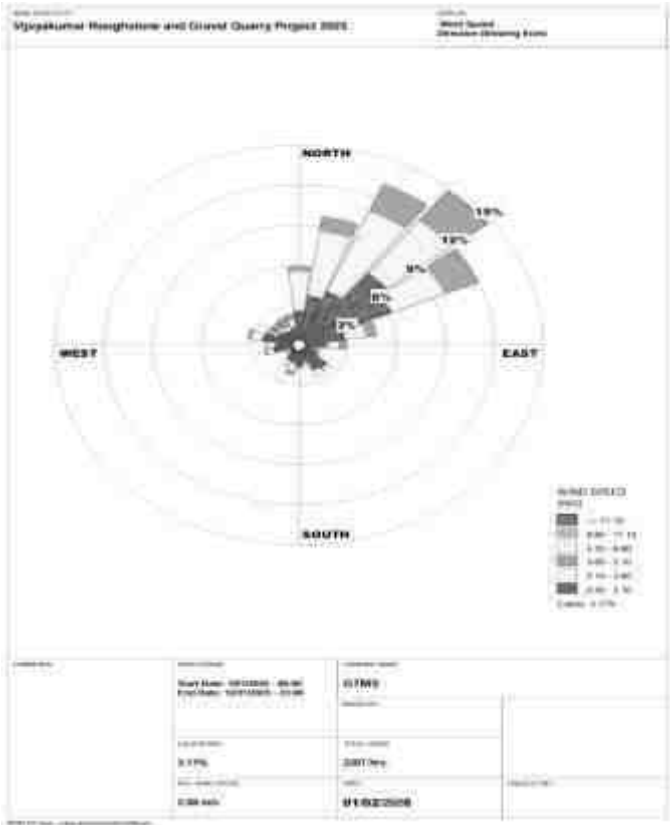


Figure 3.14a Onsite Wind Rose Diagram 2025

3.4.2 Ambient Air Quality Study

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

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

Table 3.14 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
PM _{2.5}	Gravimetric method attenuation method Beta	Fine Particulate Sampler
PM ₁₀	Gravimetric method attenuation method Beta	Respirable Dust Sampler
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hoch Heiser modified method)	Respirable Dust Sampler with gaseous attachment

Table 3.15 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO ₂ (µg/m ³)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO _x (µg/m ³)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM ₁₀ (µg/m ³)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	PM _{2.5} (µg/m ³)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at five (05) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period **October to December 2025**, as per the CPCB, MoEF guidelines and notifications. It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5 m above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a

sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for PM_{2.5}, PM₁₀, sulphur dioxide (SO₂) and nitrogen dioxide (NO_x). The sampling locations are shown in Figure 3.15 and average concentrations of air pollutants are summarized in Tables 3.16 and are shown in Figures 3.16 & 3.17.

Table 3.16 Ambient Air Quality (AAQ) Monitoring Locations

Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
AAQ1	Kalkudi	0.01	S	10°40'36.03"N,	78°32'21.14"E
AAQ2	Inamkulathur	0.35	NE	10°40'40.02"N,	78°32'36.89"E
AAQ3	Mettupatti	1.30	SW	10°40'25.43"N,	78°31'36.63"E
AAQ4	Poruvai	1.40	NW	10°41'8.83"N,	78°31'41.64"E
AAQ5	Kalkudi	1.10	SE	10°40'2.46"N,	78°32'38.15"E

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

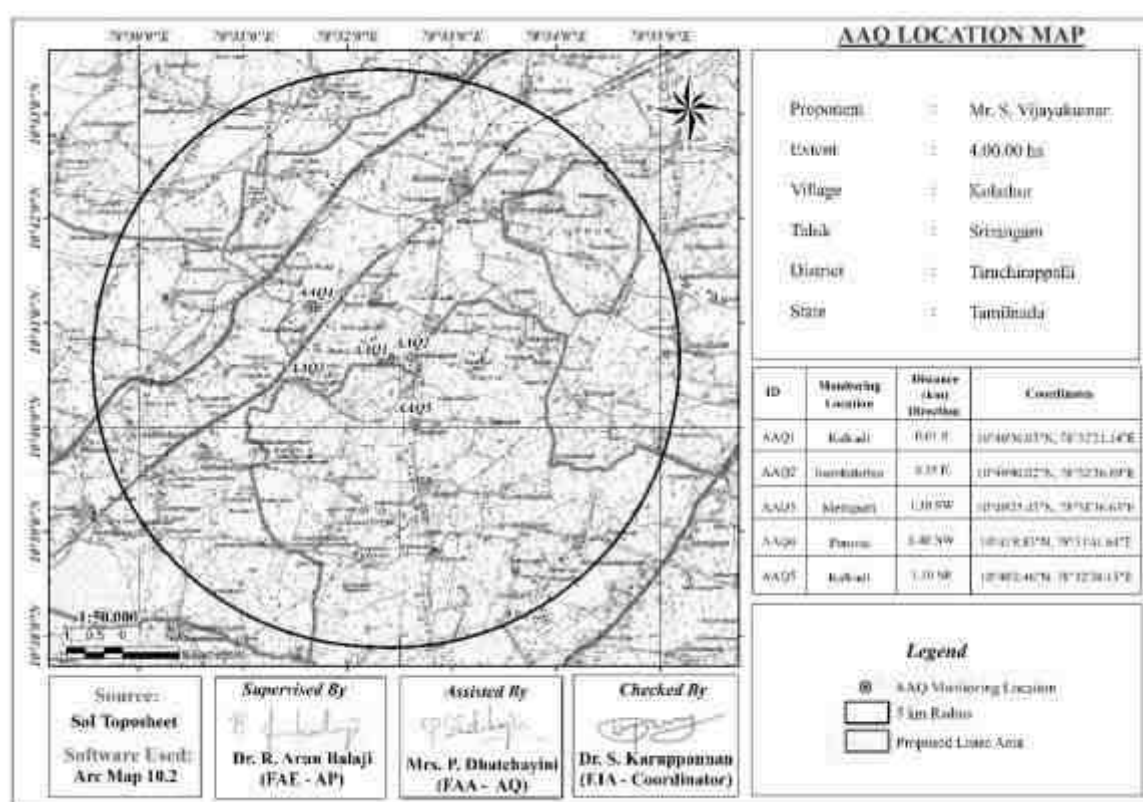


Figure 3.15 Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

Air quality Index (AQI)

The AQI shows that the air quality of the study area falls within good category 42 causing minimal impact to human health.

Table 3.17 Summary of AAQ Result

PM _{2.5}					PM ₁₀			
Station ID	Max	Min	Mean	98th Percentile	Max	Min	Mean	98th Percentile
AAQ1	16.20	14.01	15.34	16.18	44.50	41.05	42.80	44.48
AAQ2	15.29	13.39	14.49	15.24	42.35	39.18	40.83	42.23
AAQ3	16.73	14.20	15.52	16.13	43.91	39.89	41.82	43.62
AAQ4	18.12	16.05	17.18	18.11	44.16	41.09	42.55	44.13
AAQ5	17.60	14.37	16.27	17.58	45.77	42.01	44.09	45.69
SO ₂					NO _x			
AAQ1	5.10	4.04	4.68	5.09	11.30	9.31	10.32	11.24
AAQ2	5.23	4.28	4.87	5.22	10.61	8.45	9.76	10.50
AAQ3	5.39	4.28	4.90	5.33	10.52	8.42	9.55	10.46
AAQ4	5.78	4.67	5.19	5.70	12.14	9.32	11.18	12.11
AAQ5	5.61	4.46	5.01	5.58	11.16	9.15	10.34	11.14

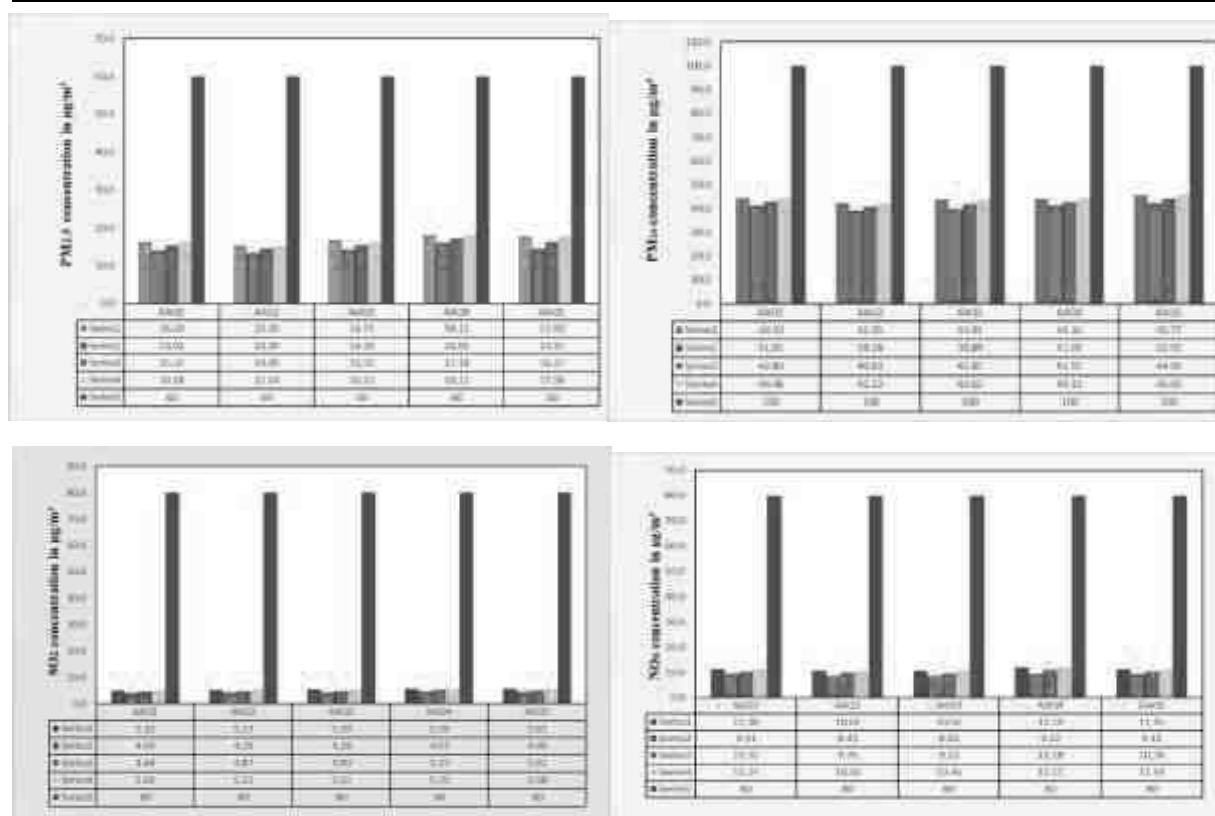


Figure 3.16 Bar Chart showing the concentrations of PM_{2.5}, PM₁₀, NO_x and SO₂

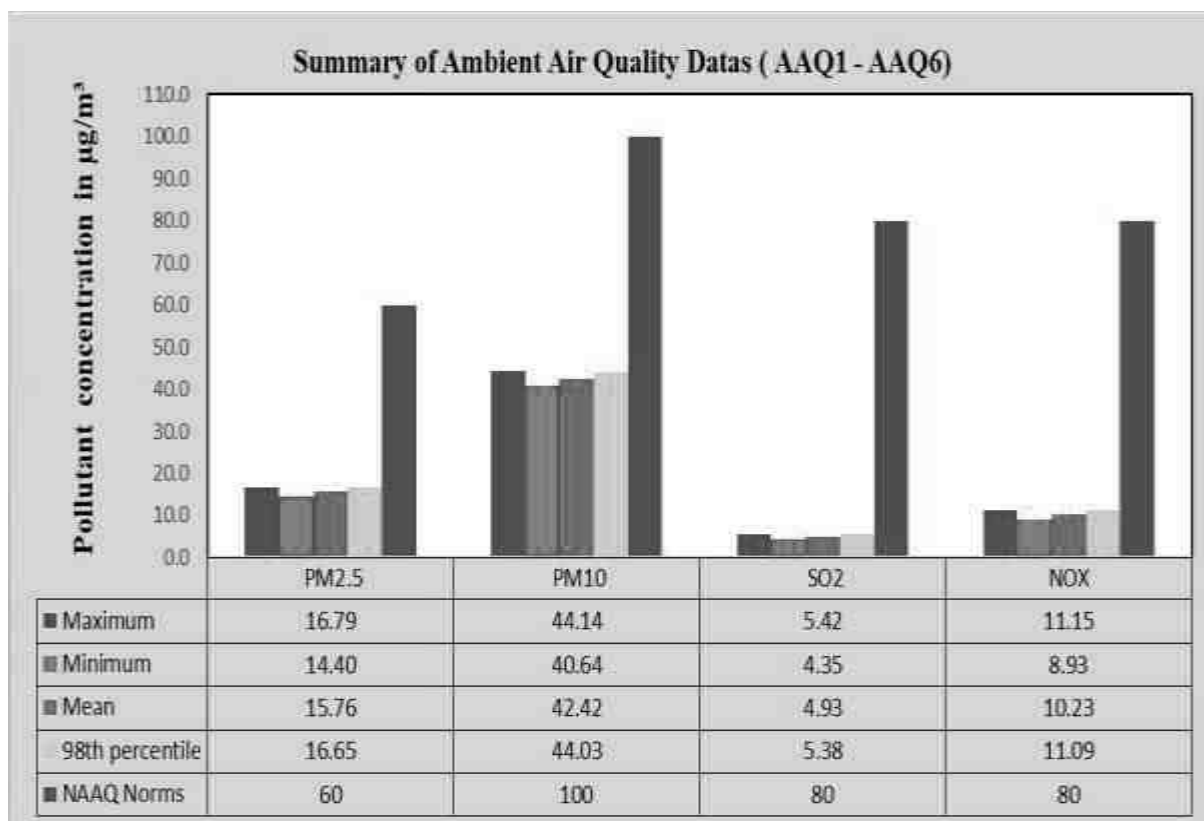


Figure 3.17 Bar Chart Showing the concentrations of pollutants

Results

As per the monitoring data PM_{2.5} ranges from 14.40µg/m³ to 16.79µg/m³, PM₁₀ from 40.64µg/m³ to 44.14µg/m³, SO₂ from 4.35µg/m³ to 5.42µg/m³, NO_x from 8.93µg/m³ to 11.15g/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at five (5) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.18 and spatial occurrence of the locations are shown in Figure 3.20.

Table 3.18 Noise Monitoring Locations

S. No.	Location Code	Monitoring Location	Distance (km)	Direction	Coordinates	
					Latitude	Longitude
1	N1	Core	-	-	10°40'41.29"N,	78°32'19.81"E
2	N2	Kadapatti	0.41	E	10°40'39.40"N,	78°32'39.96"E
3	N3	Mettupatti	1.35	SW	10°40'24.12"N,	78°31'35.55"E
4	N4	Alampatti Pudur	1.60	NW	10°41'13.93"N,	78°31'36.92"E
5	N5	Thalapatti	1.04	SE	10°40'4.84"N,	78°32'38.82"E

Table 3.19 Ambient Noise Quality Result

Station ID	Location	Environmental setting	Average day noise level (dB(A))	Average night noise level (dB(A))	Day time (6.00 AM – 10.00 PM)	Night time (10.00 PM – 6.00 AM)
					Standard (Leq in dB (A))	
N1	Core	Industrial Area	45.2	38.6	75	70
N2	Kadapatti	Residential Area	43.9	42.4	55	45
N3	Mettupatti		42.2	36.7		
N4	Alampatti Pudur		47.6	40.3		
N5	Thalapatti		45.8	41.3		

Source: On-site Monitoring/Sampling by **Excellence Laboratory** in Association with GTMS

The Table 3.19 shows that noise level in core zone was 45.2dB (A) Leq during day time and 38.6dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 42.2 to 47.6dB (A) Leq and during night time from 36.7 to 42.4dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.18 and 3.19.

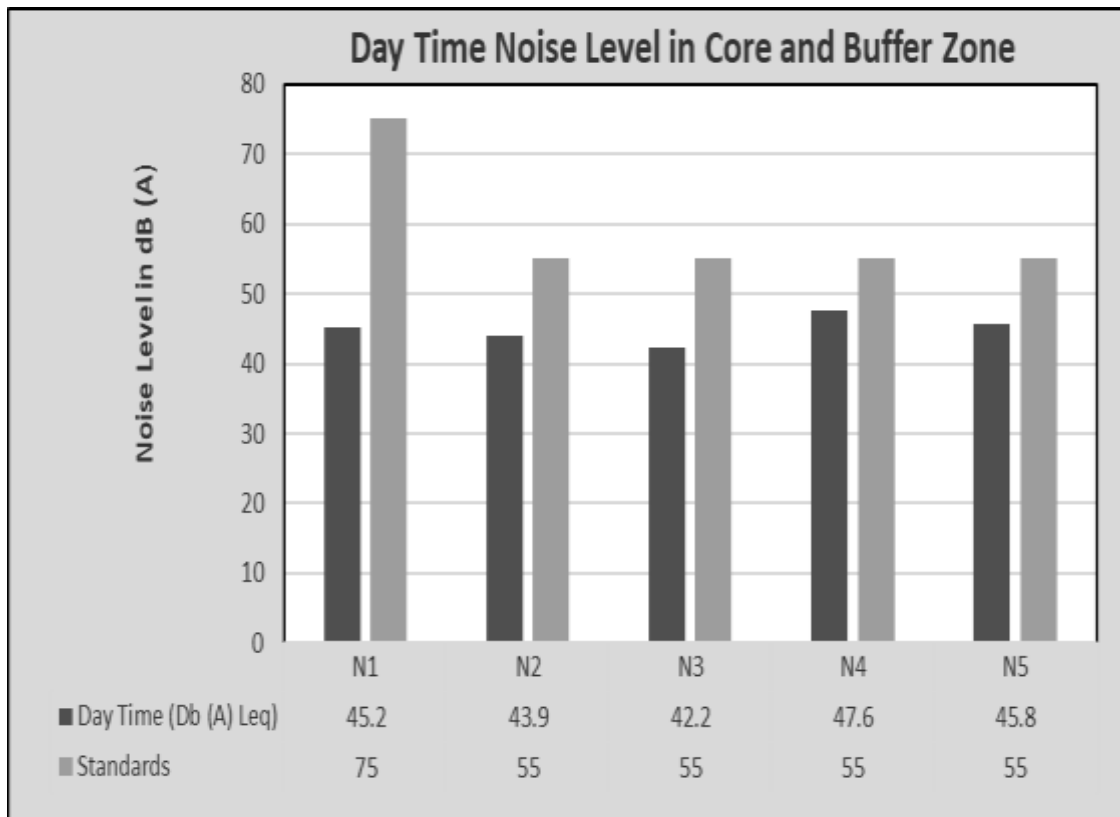


Figure 3.18 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

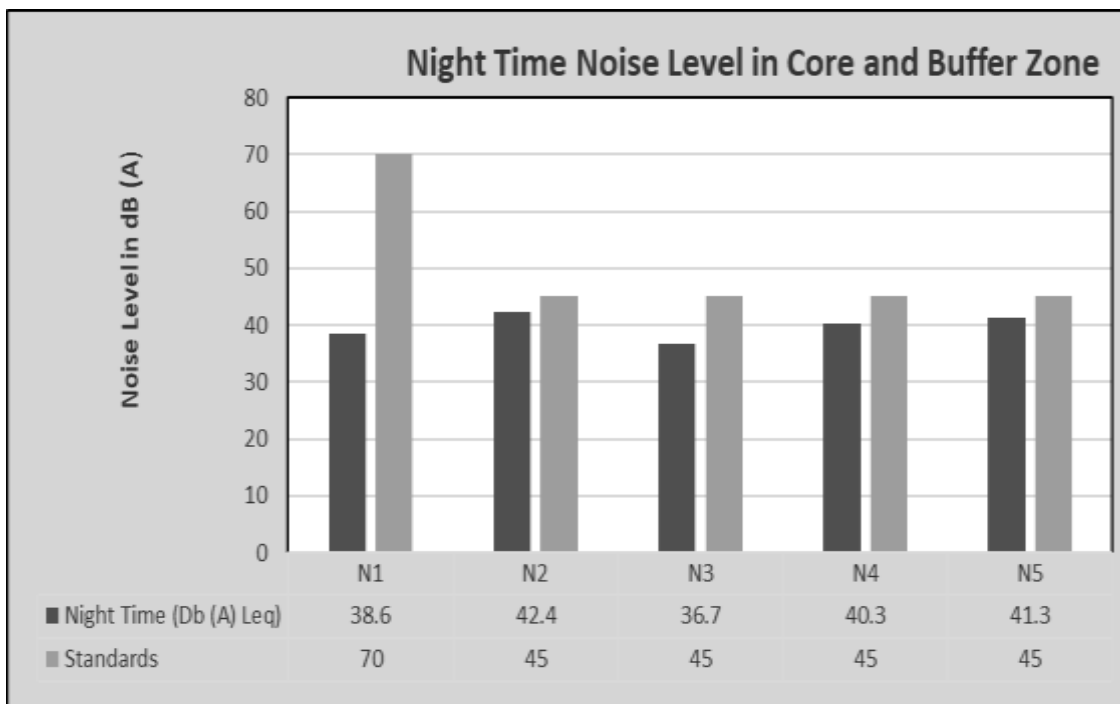


Figure 3.19 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

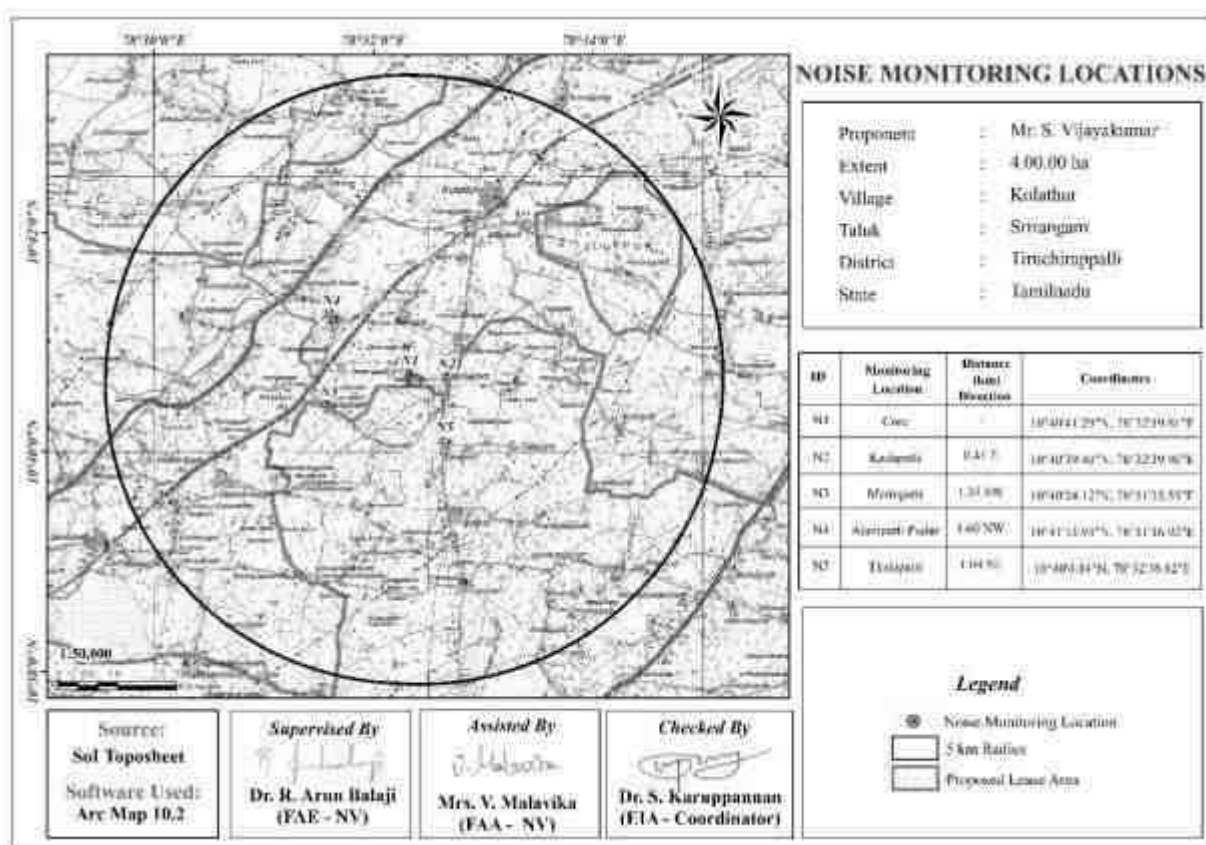


Figure 3.20 Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

3.6 BIOLOGICAL ENVIRONMENT

Biological study of the ecosystem is essential to understand the impact of rough stone quarry on existing flora and fauna of the study area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if any. A survey was conducted to study the flora and fauna in 10km radius by direct and indirect sightings/ data. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made, and all the available information was recorded.

3.6.1 Biodiversity assessment methods

The Rapid Biodiversity Assessment (RBA) provides information about individual flora and fauna species and their habitats, ecosystems and communities, and threatening processes. It reviews existing information and the results of priority taxa and communities.

A major systematic program of fauna survey has been undertaken during the preparation of this RBA. Analysis of data involves the information identifying the flora and

selected fauna groups in relation to different environmental strata across the site, and analysis of species and their responses to disturbance.

The RBA has focused primarily on the ecosystem and species levels of biodiversity because information about genetic variation within species is limited. The trees in each plot have been marked with metal plates so as to cater further field inspection easier. Physical marking of biodiversity has been dealt with for flora only, because of logical reasons. Floristic studies are dealt with in detail in the second part of the RBA.

The biodiversity information presented here is intended to reflect the best understanding of the available information, including information obtained through data audit, expert scientific opinion, and analysis of available data. It also points to deficiencies in existing information. The data presented will be used in the development of the restoration plans, including configuration of the quarry closure, and in the formulation of management recommendations by the experts.

3.20 The study has covered the following aspects to appraise the biodiversity of the site

S. No	Floral Component	Fauna elements
1	Plantations/ Agro- forestry	Total Listing of major Faunal elements
2	Natural Vegetation/ Forest type	Endangered Species/ Endemic Species
3	Flora Identification- Trees	Wildlife Schedules
4	Flora Identification- Shrubs	Migratory Species
5	Flora Identification- Herbs	Migratory corridors or Paths
6	Flora Identification- Climbers	Breeding & Spawning Grounds

The objective of this Section is to characterize and understand the present status of the ecosystems in the study area to assess the bio- diversity and to identify the critical areas. The present study was undertaken as a part of EIA report to understand the present status of ecosystem prevailing in the study area, to compare it with the past condition with the help of available data, to predict changes as a result of present activities and to suggest measures for maintaining the conditions.

3.6.2 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 measure, if required, for vulnerable biota.

- ❖ To assess the nature and distribution of vegetation (Terrestrial and Aquatic) in and around the mining activity.
- ❖ Detail of flora and fauna, Endemic, Rare, Endangered and Threatened (RET Species) separately for core and buffer area based on such primary field survey and clearly indicating the Schedule of fauna present. In case of any schedule- 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.
- ❖ Devise management & conservation measures for biodiversity.

3.6.3 Methodology

A methodology of Sampling 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 10km radius from the project site. No damage is created to flora and fauna during the sampling.

3.6.4 Flora Study

Identification of vegetation in relation to the natural flora and crops was conducted through reconnaissance field surveys and onsite observations in core and buffer zone. The plant species identification was done based on the reference materials and also by examining the morphological characteristics and reproductive materials i.e. flowers, fruits and seeds. Land use pattern in relation to agriculture crop varieties were identified through physical verification of land and interaction with local villagers. Transect method is used in the floral documentation in the buffer zone. Six transects were selected for the study. Each transects were occupied within 10km radius. For trees plots of (10x10m), shrubs (5x5m) and herbs (1x1m) were used and recorded.

3.6.5 Fauna Study

The faunal elements of core and buffer zone were identified by direct sightings or indirect evidences by recording occurrences such as holes, markings, hairs, spines, scats, pellets, droppings and quills (Menon 2003). Standard binocular was used for the observations. The authenticity of faunal elements occurrence was confirmed by interaction with the local people. Avifauna identification was done with pictorial descriptions of published literature. Information pertaining to existence of any migratory corridors and paths were obtained from local inhabitants. The status of each faunal element was determined and wildlife schedule

category was ascertained as per the IUCN- Red Data Book and Wildlife protection (Amendment) Act 2022. The Birds, butterflies, reptiles and odonates were mainly focused during faunal assessment, in which transect method was employed for birds and butterflies. Transect is a path along which one counts and records the occurrence of an individual for study. A straight-line walk covering one km, within a time span of one hour to 30 minutes was carried out in each of the habitats. Each transects were occupied within the 10km radius of the site. Bird species were recorded during the hours of peak activity 07 am to 12 am and evening 3.00 pm to 5.00 pm. Direct observations and bird calls used for bird documentation. Same transects were used for counting birds and butterflies. Opportunistic observations were made for Amphibians, reptiles and odonates. Presence of mammals were recorded by indirect signs. They were classified into species level as and when possible. Recorded bird species were identified to species level using standard books (Ali & Ripley 1987, Grimmett et al., 2016).

Important Value Index (IVI)

The concept of ‘Important Value Index (IVI)’ has been developed for expressing the dominance and ecological success of any species, with a single value (Mishra, 1968, Sharma, 2005). This index utilizes three characteristics, they are (i) Relative frequency and (ii) Relative density. The three characteristics computed using frequency, density and abundance for all the species falling in all the quadrat by using the following formula. The relative frequency, relative density and relative abundance has been calculated to calculate the IVI value

$$IVI = \text{Relative frequency} + \text{Relative abundance} + \text{Relative density} [RF + RA + RD]$$

$$\text{Relative Value Index (RVI)} = \text{Relative Density} + \text{Relative Frequency} [RD + RF].$$

Relative Value Index used for Expressing dominance and Ecological success of Shrub and herb Species in a particular area.

Shannon- Wiener Index, Evenness and Richness

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

The **Shannon Diversity Index** (sometimes called the Shannon- Wiener Index) is a way to measure the diversity of species in a community.

The species diversity index (H) for floral and faunal diversity is calculated by the use of Shannon Wiener Index (Shannon Wiener, 1963) as:

$$H = - \sum (n_i/n) \times \ln (n_i/n)$$

- Where, n_i is individual density of a species and n is total density of all the species
- The Evenness Index (E) is calculated by using Shannon's Evenness formula (Magurran, 2004).
- The higher the value of H, the higher the diversity of species in a particular community

The lower the value of H, the lower the diversity. A value of $H = 0$ indicates a community that only has one species

$$\text{Evenness Index (E)} = H / \ln(S)$$

Where, H is Shannon Wiener Diversity index; S is number of species

The Shannon evenness Index is a way to measure the evenness of species in a community. The term “evenness” simply refers to how similar the abundances of different species are in the community.

3.6.6 Floral diversity Analysis

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.

3.6.6.1 Flora Composition in Core Zone

The core zone presents in tree, shrubs, herbs and grasses. Taxonomically total of 18 species belonging to 11 families have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were Trees 5 (26%) followed by Shrubs 5 (26%), Herbs 8 (35%) and Climbers 3 (13%). The result of core zone of flora studies shows that *Fabaceae* and *Amaranthaceae*, *Lamiaceae* are the main dominating species in the study area it mentioned in Table 3.21. No species found as threatened category.

3.6.6.2 Flora Composition in buffer Zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because of nearby forest covers and agriculture land was found to dominate mostly in Northeast directions. There are 78 belonging to 41 families have been recorded from

the buffer zone. Among the identified, floral (78) species were 26 (30%) trees, Shrubs 19 (19%) Herbs 19 (18%) & Climbers 5 (17%), Creepers & Grasses 13 (16%). According to the findings of the buffer zone flora studies, the dominant species in the study area are *Fabaceae*, *Asteraceae*, and *Euphorbiaceae* as shown in Table 3.23. Apart from the proposed project area, there is agricultural land. Horticulture and agricultural land are untouched. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Details of flora with the scientific name were mentioned in Table 3.23. A list of floral species has been prepared based on a primary survey (site observations) and discussion with local people. The total number of different plant life forms under trees, shrubs, herbs, and climbers is shown in Table 3.23.

Table 3.21 Flora in mine lease area

S.no	Local name	Scientific name	Family name	IUCN- Conservation Status
Trees				
1.	Karuvealan	<i>Prosopis juliflora</i>	Fabaceae	Not Listed
2.	Arapu maram	<i>Albizia amara</i>	Fabaceae	Not Listed
3.	Karuvealan	<i>Prosopis juliflora</i>	Fabaceae	Not Listed
4.	Wetpalai maram	<i>Wrightia tinctoria</i>	Apocynaceae	Not Listed
5.	Neem tree	<i>Azadirachta indica</i>	Meliaceae	Not Listed
Shrubs				
6	Avaram chadi	<i>Senna auriculata</i>	Fabaceae	Not Listed
7	Unni chadi	<i>Lantana camara</i>	Verbenaceae	Not Listed
8	<u>Thazhuthaalai</u>	<i>Chromolaena odorata</i>	Asteraceae	Not Listed
9	Thuthi	<i>Abutilon indicum</i>	Meliaceae	Not Listed
10	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	Not Listed
Herbs				
11	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	Not Listed
12	Kattu kanchippul	<i>Apluda mutica</i>	Poaceae	Not Listed
13	Kolunji chadi	<i>Tephrosia purpurea</i>	Fabaceae	Not Listed
14	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	Not Listed
15	Nearunji mull	<i>Tribulus zeyheri</i>	Zygophyllaceae	Not Listed
16	Pulapoo	<i>Aerva lanata</i>	Amaranthaceae	Not Listed
17	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	Not Listed
18	Thumattikai	<i>Cucumis callosus</i>	Cucurbitaceae	Not Listed
Climber				
19	Veliparuthi	<i>Pergularia daemia</i>	Apocynaceae	Not Listed
20	Kovakka	<i>Coccinia grandis</i>	Cucurbitaceae	Not Listed
21	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	Not Listed

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

Table 3.22 Species Richness (Index) in mine lease area

Details	H	H max	Evenness	Species Richness
Trees	0.85	1.0	0.71	0.73
Shrubs	1.21	1.39	0.58	1.28
Herbs	1.31	1.84	0.74	1.16

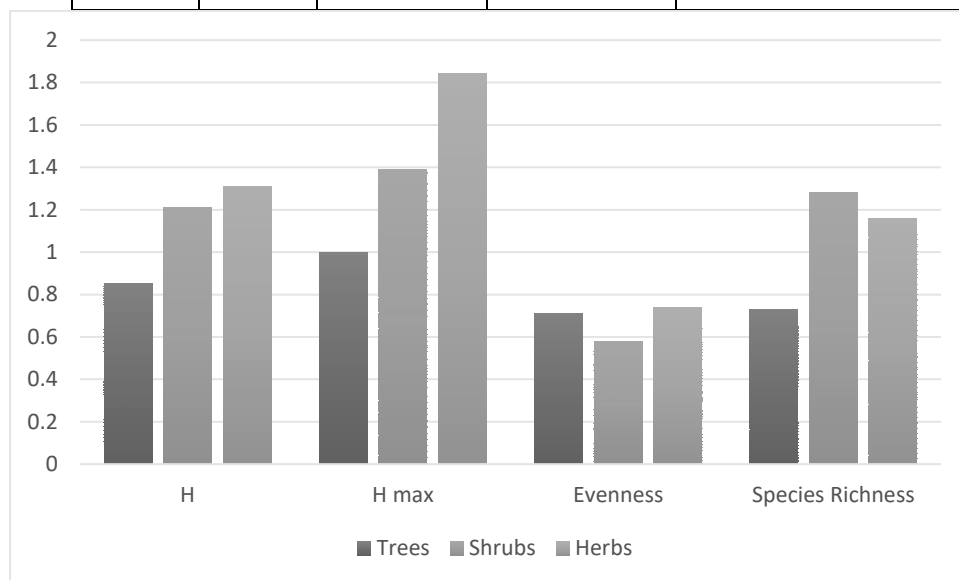


Figure 3.21 Species Richness (Index) in Mine Lease area

Table 3.23 Flora in Buffer Zone

S. No	Local name	Scientific name	Family Name	IUCN Conservation Status
Trees				
1.	Velikathan maram	<i>Prosopis juliflora</i>	Fabaceae	Not Listed
2.	Arapu maram	<i>Albizia amara</i>	Fabaceae	Not Listed
3.	Thunka Maram	<i>Samanea saman</i>	Fabaceae	Not Listed
4.	Pongam oiltree	<i>Pongamia pin nata</i>	Fabaceae	Not Listed
5.	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	Not Listed
6.	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	Not Listed
7.	Neem	<i>Azadirachta indica</i>	Meliaceae	LC
8.	Manga maram	<i>Mangifera indica</i>	Anacardiaceae	Not Listed
9.	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	Not Listed
10.	Savukku	<i>Casuarina equisetifolia</i>	Casuarinaceae	Not Listed
11.	Thailamaram	<i>Eucalyptus</i>	Myrtaceae	Not Listed
12.	Puliyamaram	<i>Tamarindus indica</i>	Fabaceae	Not Listed
13.	Arasanmaram	<i>Ficus religiosa</i>	Moraceae	Not Listed
14.	Athi	<i>Ficus recemosa</i>	Moraceae	Not Listed
15.	Vazhaimaram	<i>Musa</i>	Musaceae	Not Listed
16.	Alamaram	<i>Ficus benghalensis</i>	Moraceae	Not Listed
17.	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	Not Listed

18.	Punnaimaram	<i>Calophyllum inophyllum</i>	Calophyllaceae	Not Listed
19.	Sapota	<i>Manilkara zapota</i>	Sapotaceae	Not Listed
20.	Nelli	<i>Emblica officinalis</i>	Phyllanthaceae	Not Listed
21.	Vadanarayani	<i>Delonix elata</i>	Fabaceae	Not Listed
22.	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	Not Listed
23.	Manja kadambai	<i>Adina cordifolia</i>	Rubiaceae	Not Listed
24.	Pappali maram	<i>Carica papaya L</i>	Caricaceae	Not Listed
25.	Vilvam	<i>Aegle marmelos</i>	Rutaceae	Not Listed
26.	Kariveppilai	<i>Murraya koenigii</i>	Asclepiadaceae	Not Listed
Shrubs				
27.	Unichedi	<i>Lantana camara</i>	Verbenaceae	Not Listed
28.	Sundaika	<i>Solanum torvum</i>	Solanaceae	Not Listed
29.	Erukku	<i>Calotropis gigantea</i>	apocynaceae	Not Listed
30.	Avarai	<i>Senna auriculata</i>	Fabaceae	Not Listed
31.	Sappathikalli	<i>Cereus pterogonus</i>	Cactus	Not Listed
32.	Kattamanaku	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Not Listed
33.	Nochi	<i>Vitex negundo</i>	Lamiaceae	Not Listed
34.	Idlipoo	<i>Xorococ cineia</i>	Rubiaceae	Not Listed
35.	Thuthi	<i>Abutilon indicum</i>	Meliaceae	Not Listed
36.	Chemparuthi	<i>Hibiscus rosa-sinensis</i>	Malvaceae	Not Listed
37.	Arali	<i>Nerium indicum</i>	Apocynaceae	Not Listed
38.	Icham	<i>Phoenix pusilla</i>	Arecaceae	Not Listed
39.	Karunochi	<i>Vitex negundo</i>	Lamiaceae	Not Listed
40.	Arali (White)	<i>Nerium oleander</i>	Apocynaceae	Not Listed
41.	Peacock flower	<i>Caesalpinia pulcherrima</i>	Fabaceae	Not Listed
42.	Yellow Trumpet	<i>Tecoma stans</i>	Bignoniaceae	Not Listed
43.	Indian Nightshade	<i>Solanum violaceum</i>	Solanaceae	Not Listed
44.	Pomegrante	<i>Punica granatum</i>	Lythraceae	Not Listed
45.	Rangoon Creeper	<i>Combretum indicum</i>	Combretaceae	Not Listed
Herbs				
46.	Ponnangani	<i>Alternanthera pungens</i>	Amaranthaceae	Not Listed
47.	Wild thulasi	<i>Hyptis suaveolens (L.)</i>	Lamiaceae	Not Listed
48.	Gopuram Tangi	<i>Andrographis echinoides</i>	Acanthaceae	Not Listed
49.	Amman Paccharisi	<i>Euphorbia hirta</i>	Euphorbiaceae	Not Listed
50.	Paca poondu	<i>Pavonia gallaensis</i>	Malvaceae	Not Listed
51.	Musumusukkai	<i>Mukia maderaspatana</i>	Cucurbitaceae	Not Listed
52.	Nagathali	<i>Opuntia dillenii</i>	Cactaceae	Not Listed
53.	Thumbai	<i>Leucas aspera</i>	Lamiaceae	Not Listed
54.	Kantang kathrikai	<i>Solanum virginianum</i>	Solanaceae	LC
55.	Poolai poondu	<i>Aerva lanata</i>	Amaranthaceae	Not Listed
56.	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	Not Listed
57.	Thottalchinungi	<i>Mimosa pudica</i>	Fabaceae	Not Listed

58.	Anachundaikai	<i>Solanum violaceum</i>	Solanaceae	Not Listed
59.	Kombumul	<i>Acanthospermum hispidum</i>	Asteraceae	Not Listed
60.	Wild thulasi	<i>Hyptis suaveolens (L.)</i>	Lamiaceae	Not Listed
61.	Agave	<i>Agave sisalana</i>	Asparagaceae	Not Listed
Climber				
62.	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	Not Listed
63.	Vishnukrandai	<i>Evolvulus alsinoides</i>	Convolvulaceae	Not Listed
64.	Sirupunaikkali	<i>Passiflora foetida</i>	Passifloraceae	Not Listed
65.	Veliparuthi	<i>Pergularia daemia</i>	Apocynaceae	Not Listed
66.	Kovakka	<i>Coccinia grandis</i>	Cucurbitaceae	Not Listed
Creepers				
67.	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	Not Listed
68.	Vallarai	<i>Merremia gangetica</i>	Convolvulaceae	Not Listed
69.	Thumattikai	<i>Cucumis callosus</i>	Cucurbitaceae	Not Listed
70.	Siru puladi	<i>Desmodium triflorum</i>	Fabaceae	Not Listed
71.	Vallikeerai	<i>Ipomoea aquatica</i>	Convolvulaceae	Not Listed
72.	Sangupoo	<i>Clitoria ternatia</i>	Fabaceae	Not Listed
73.	Nagathali	<i>Opuntia dillenii</i>	Nagathali	Not Listed
Grasses				
74.	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	Not Listed
75.	Arugampul	<i>Cynodon dactylon</i>	Poaceae	Not Listed
76.	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	Not Listed
77.	Korai	<i>Cyperus rotandus</i>	Poaceae	Not Listed
78.	Kala Pullu	<i>Eragrostis ferruginea</i>	Poaceae	Not Listed
79.	Kattu kanchippul	<i>Apluda mutica</i>	Poaceae	Not Listed

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

3.6.7 Fauna Study

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

Table 3.24 Methodology applied during survey of fauna

S. No.		Method of Sampling	References
1	Insects	Random walk, Opportunistic observations	Pollard (1977); Kunte (2000)
2	Reptiles	Visual encounter survey (Direct Search)	Daniel J.C (2002)
3	Amphibians	Visual encounter survey (Direct Search)	
4	Mammals	Tracks and Signs	Menon V (2014)
5	Avian	Random walk, Opportunistic observations.	Grimmett R (2011); Ali S (1941)

3.6.7.1 Fauna in Core Zone

A total of 24 species were observed in the Core zone (Table. 3.25). Among them are 8 Insects, 5 Reptiles, 4 Mammals and 9 Avian. A total of 24 species belonging to 20 families were recorded from the core area. The study shows that number of species decreases towards the mining area. This might be due the lack of vegetation. None of these species in the core zone are threatened or endemic. The survey was conducted to identify species listed in IUCN Red List. According to the field data, any species are not of Schedule I and nine species are of schedule IV. 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 3.24.

3.6.7.2 Fauna in Buffer Zone

A total of 48 species belonging to 34 families have been recorded from the buffer zone area (Table.3.26). Based on habitat classification the majority of species were Birds 13 (30%), followed by Insects 14 (28%), Reptiles 13 (26%), Mammals 5 (10%) and Amphibians 3 (6%). There are 7 Schedule II species and 27 species are under schedule IV according to Indian wild life Act 1972. A total fifteen species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Table 3.25 Fauna in Core Zone

S. No	Common name/English Name	Family Name	Scientific Name	Schedule list wildlife protection act 1972	IUCN Red List data
Reptiles					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NE	NE
2	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NE	NE
3	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
4	Common krait	Elapid snakes	<i>Bungarus caeruleus</i>	Schedule IV	LC
5	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
Insects					
1	Plain Tiger	Nymphalidae	<i>Dananuschrysippus</i>	NL	LC
2	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
3	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NE	LC
4	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
7	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
8	Ant	Formicidae	<i>Camponotus vicinus</i>	NL	NL

Mammals					
1	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
2	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule II	LC
3	Rat	Murids	<i>Rattusrattus</i>	Schedule IV	LC
4	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
Avian					
1	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NE	LC
2	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	NE	LC
3	Koel	Cucalidae	<i>Dynamism scolopaceus</i>	Schedule IV	LC
4	Common cuckoo	Cucalidae	<i>Cuculus canorus</i>	NE	LC
5	House crow	Corvidae	<i>Corvus splendens</i>	NE	LC
6	Crow Pheasant	Cucalidae	<i>Centropus sinensis</i>	Schedule IV	LC
7	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	Schedule IV	LC

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

Table 3.26 Fauna in Buffer Zone

S. No	Common name/ English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	UCN Red List data
Insects					
1	Honey bee	Apidae	<i>Apis cerana</i>	Schedule IV	LC
2	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
3	Common Indian crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
4	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
5	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
6	Jewel beetle	Buprestidae	<i>Eurythyrea austriaca</i>	Schedule IV	LC
7	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
8	Ant	Formicidae	<i>Camponotus vicinus</i>	NL	LC
9	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	LC
10	Dragonfly	Gomphidae	<i>Ceratogomphus pictus</i>	Schedule IV	LC
11	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
12	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
13	Lesser grass blue	Lycaenidae	<i>Zizina otis indica</i>	Schedule IV	LC
14	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
Reptiles					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
2	Chameleon	Chamaeleonidae	<i>Chameleon zeylanicus</i>	Schedule II	LC
3	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	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	Olive keel back water snake	Natricidae	<i>Atretium schistosum</i>	Sch II (Part II)	LC
7	Whip Snake	Elapidae	<i>Dryphis nasutus</i>	Sch II (Part II)	LC
8	Common krait	Elapid snakes	<i>Bungarus caeruleus</i>	Schedule IV	LC
9	Indian wall lizard	Gekkonidae	<i>Hemidactylus flaviviridis</i>	Schedule IV	NL
10	Saw scaled viper	Elapidae	<i>Echis carinatus</i>	Sch II (Part II)	LC
11	Brahminy skink	Scincidae	<i>Eutropis carinata</i>	NL	LC
12	Scincidae	Viperidae	<i>Vipera russeli</i>	Sch II (Part II)	LC
13	Common skink		<i>Mabuya carinatus</i>	NL	LC
Mammals					
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	Indian hare	Leporidae	<i>Lepus nigricollis</i>	Schedule IV	LC
4	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule (Part II)	LC
5	Brown rat	Muridae	<i>Rattus norvegicus</i>	Schedule IV	LC
Aves					
1	Koel	Cuculidae	<i>Eudynamis</i>	Schedule IV	LC
2	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
3	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
4	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
5	Asian green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
6	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotus cafer</i>	Schedule IV	LC
7	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	Schedule IV	LC
8	Shikra	Accipitridae	<i>Accipiter badius</i>	NL	LC
9	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
10	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
11	Two-tailed Sparrow	Dicruridae	<i>Passer domesticus</i>	Schedule IV	LC
12	Grey Francolin	Phasianidae	<i>Francolinus pondicerianus</i>	Schedule IV	LC
13	Common Quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
14	White-breasted waterhen	Rallidae	<i>Amaurornis phoenicurus</i>	NL	LC
15	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC
Amphibians					
1	Indian Burrowing frog	Dicroglossidae	<i>Sphaerotheca breviceps</i>	Schedule IV	LC
2	Pond Frog	Ranidae	<i>Rana hexadactyla</i>	Schedule IV	LC
3	Tiger Frog	Chordata	<i>Hoplobatrachus tigerinus (Rana tigerina)</i>	Schedule IV	LC

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

Aquatic Vegetation

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

Table 3.27 Aquatic Fauna and Flora

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

*LC- Least Concern, NA-Not yet assessed

Phytoplankton's:

Microcystis, Nitzschia, Oscillatoria, Navicula and Pediatrum sps.

Zooplanktons:

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

Food chain

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

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

3.6.3 Agriculture & Horticulture in Tiruchirappalli district:

Major Horticulture crops grown are Cashew, Banana, Mango, Acidlime, Guava, Tapioca, Brinjal, Chillies, Greens, Gourds, Turmeric, Marigold, Jasmine, Tube rose etc.

Major Agricultural Crops

Major horticulture crops cultivated in this district are vegetables crops like tomato, brinjal, chillies, onion and turmeric. Details of major field crops and Agricultural in 1km radius is given in Table. 3.28.

Table 3.28 Major Crops in 1km radius

S. No	Major crops	Scientific name	Families
1	Sorghum	<i>Sorghum bicolor</i>	Poaceae
2	Gingelly	<i>Sesamum indicum</i>	Pedaliaceae
3	Groundnut	<i>Arachis hypogaea</i>	Legumes
4	Millets	<i>Panicum miliaceum L</i>	Poaceae
5	Sesame	<i>Sesamum indicum</i>	Pedaliaceae
6	Cotton	<i>Gossypium herbaceum</i>	Malvaceae

Major Horticulture Crops

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

Horticulture

Major horticulture crops cultivated in Tiruchirappalli district Major Horticulture crops grown are Cashew, Banana, Mango, Acidlime, Guava, Tapioca, Brinjal, Chillies, Greens, Gourds, Turmeric, Marigold, Jasmine, Tube rose etc. Details of major field crops and horticulture cultivation in 1km radius is given in Table 3.29.

Table 3.29 Major Field Crops & Horticulture cultivation in 1km radius.

S. No	Common Name	Scientific Name	Family
Major Horticultural Crops			
1	Cashew	<i>Anacardium occidentale</i>	Anacardiaceae
2	Banana	<i>Musa × paradisiaca</i>	Musaceae
3	Mango	<i>Mangifera indica</i>	Anacardiaceae
4	Papaya	<i>Carica papaya</i>	Caricaceae
5	Lemon	<i>Citrus aurantifolia</i>	Rutaceae
6	Guava	<i>Psidium guajava</i>	Myrtaceae
Vegetables			
7	Chillies	<i>Capsicum annuum</i>	Solanaceae
8	Tapioca	<i>Manihot esculenta</i>	Spurges
9	Brinjal	<i>Solanum melongena</i>	Nightshade
10	Tomato	<i>Solanum lycopersicum</i>	Nightshade
11	Bottle Gourd	<i>Lagenaria siceraria</i>	Cucurbits
12	Ladies finger	<i>Abelmoschus esculentus</i>	Mallows

3.7 SOCIO ECONOMIC ENVIRONMENT

The major developmental activities in the mining and industrial sector are crucial for economic development and the creation of direct and indirect employment opportunities. These activities also fulfil society's basic and modern needs of the society, ultimately improving the quality of life through advancements in social, economic, health, education, and nutritional status within the project region, state, and country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for developmental projects. Thus, the study of socio-economic environment component incorporating various facets related to prevailing social and cultural conditions and economic status of the mining (rough stone quarry) project region is an important part of the EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socio-economics and parameters of human interest due to the project.

3.7.1 Objectives of the Study

The objectives of the socio-economic impact assessment are as follows:

- a) To study the socio-economic status of the people living in the study area of the project.
- b) To identify the basic needs of the nearby villages within the study area.
- c) To assess the impact on socio-economic environment due to the project.
- d) To provide the employment and improved living standards.
- e) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

3.7.2 Methodology

The study employed cluster sampling to outline two zones around the proposed project site: Zone 1 (Core Zone, 0-1 km radius) and Zone 2 (Low Impact Zone, 1–5 km radius). The primary data collection was conducted through structured interviews, field observation, and focus group discussions with the local people of in Kolathur Village, Srirangam Taluk of Tiruchirappalli District, Tamil Nadu. The secondary data were collected from the Census report 2011 and official records, covering demographics and basic services including information on population, number of households, literacy rates, sex ratios, worker details and the availability of basic services. This study covers the positive and negative impacts of the project's establishment, and provides recommendations for analysing and mitigating adverse effects. The study areas are illustrated in Figure 3.22.

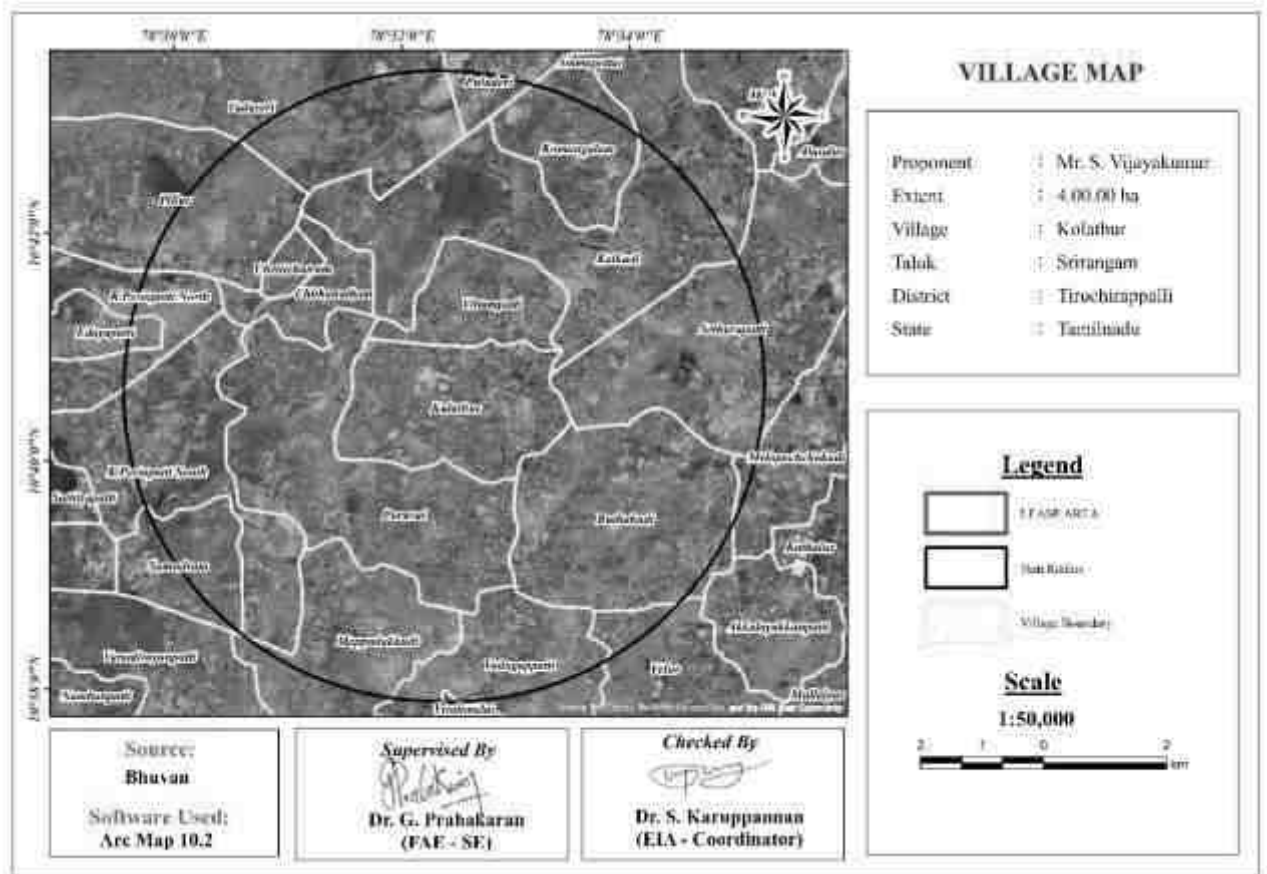


Figure 3.22 Details Village Boundaries within 1 km and 5 km Radius of the Project Lease area

3.7.3 Demographic Profile of Tiruchirappalli District

Tiruchirappalli district lies almost at the exact centre of Tamil Nadu. The district has an area of 4,404 square kilometres. It is bounded in the north by Salem district, Northwest by Namakkal district, in the Northeast by Perambalur District, East by Ariyalur district and Thanjavur District, in the southeast by Pudukkottai district and Sivagangai district, in the south by Madurai district, in the southwest by Dindigul district and, in the west by Karur district. The district shares its borders with 10 other districts, the highest for any district in the state. The Kaveri River flows through the length of the district and is the principal source of irrigation and drinking water. According to the 2011 Census, the had population of 2,722,290 of which male and female were 1,352,284 and 1,370,006 respectively. In 2001 census, Tiruchirappalli had a population of 2,418,366 of which males were 1,208,534 and remaining 1,209,832 were females. Average literacy rate of Tiruchirappalli in 2011 were 83.23 compared to 83.23 of 2001. If things are looked out at gender wise, male and female literacy were 89.72 and 76.87 respectively. For 2001 census, same figures stood at 86.55 and 69.31 in Tiruchirappalli District. Total literate in Tiruchirappalli District was 2,038,981 of which male and female were 1,087,765 and 951,216 respectively. In 2001, Tiruchirappalli District had 1,673,478 in its district.

The Sex Ratio in Tiruchirappalli, it stood at 1013 per 1000 male compared to 2001 census figure of 1001. The average national sex ratio in India is 940 as per latest reports of Census 2011 Directorate. In 2011 census, child sex ratio is 947 girls per 1000 boys compared to figure of 955 girls per 1000 boys of 2001 census data.

Source: <https://www.census2011.co.in/census/district/36-tiruchirappalli.html>

3.7.4 Profile of Study Area - Kolathur Village

Kolathur is large village situated in Srirangam taluka of Tiruchirappalli district. As per the Population Census 2011, there are a total 1,194 families residing in the Kulathur. The total population of Kulathur is 5049 out of which 2524 are males and 2525 are females thus the Average Sex Ratio of Kulathur is 987.

In Kolathur village population of children with age 0-6 is 608 which makes up 12.04 % of total population of village. Average Sex Ratio of Kolathur village is 1000 which is higher than Tamil Nadu state average of 996

Kolathur village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Kolathur village was 79.35 % compared to 80.09 % of Tamil Nadu. In Kolathur Male literacy stands at 85.12 % while female literacy rate was 73.59 % and workforce, as presented in Table 3.30.

Table. 3.30 Demographic Status of Kolathur Village

Particulars	Total	Male	Female
Total No. of Houses	1194	-	-
Population	5049	2524	2525
Child (0-6)	608	306	302
Schedule Caste	1145	562	583
Schedule Tribe	1	0	1
Literacy %	79.35%	85.12%	73.59%
Total Workers	2347	1468	879
Main Worker	1589	-	-
Marginal Worker	758	369	389

Source: <https://www.census2011.co.in/data/village/639344-kolathur-tamil-nadu.html>

3.7.5 Working Population- Kolathur Village

In Kolathur village out of total population, 2347 were engaged in work activities. 67.70 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 32.30 % were involved in Marginal activity providing livelihood for less than 6 months. Of 2347 workers engaged in Main Work, 366 were cultivators (owner or co-owner) while 341 were Agricultural labourer

Benefits:

The local people have been provided with either direct employments or indirect employment such as business, contract works and development work like roads, etc. and other welfare amenities such as medical facilities, conveyance, free education, drinking water supply etc. The number of villages and human settlements within a radius of 5km from the project site along with population, their education level etc. Table 3.31 presents detailed demographic, social, and economic indicators for villages in the study area. The total population of the study area is 54,449, comprising 27,198 males and 27,251 females, indicating a balanced gender composition with a sex ratio of approximately 1,002 females per 1,000 males, which is slightly higher than the national average. The child population (0–6 years) accounts for about 12.8% of the total population, reflecting a relatively young and growing population structure.

District-wise, about 43% of the population resides in Tiruchirappalli district, while the remaining 57% is located in Pudukkottai district, indicating higher settlement concentration in Pudukkottai. Among all villages, Viralimalai is the most populous, followed by Kolathur and K. Periapatti North, whereas Chettichatram has the smallest population.

Scheduled Caste (SC) population forms a significant social group, accounting for approximately 21% of the total population. Higher concentrations of SC population are observed in villages such as Viralimalai, Velur, Kolathur, and Samudram. The Scheduled Tribe

(ST) population is negligible, with only a few individuals recorded across the entire study area, indicating that the region is not tribal-dominated.

In terms of literacy, the study area records an overall literacy rate of about 63%. A clear gender disparity is evident, with male literacy at around 71% and female literacy at about 55%. Villages such as Viralimalai, Kolathur, and K. Periapatti North exhibit comparatively higher literacy levels, while smaller villages show lower literacy due to limited educational infrastructure and accessibility

The workforce profile shows that approximately 49% of the total population is engaged in economic activities. Male workforce participation (59%) is considerably higher than that of females (39%), highlighting a dependence on male labour and the need for enhanced women-oriented livelihood opportunities

Table 3.31 Population Structure and Literacy Rate of Study Area

Village Name	No. of Houses	Population in Gender wise		Child (0-6)		Schedule Caste		Schedule Tribe		Literacy Rate		Total Workers	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Villages in Tiruchirappalli District													
Komangalam	837	1615	1578	210	190	105	96	1	0	1148	799	1012	810
Sethurapatti	690	1414	1436	211	176	551	599	0	0	912	718	829	496
Chithanatham	395	842	856	109	116	205	222	0	0	593	405	373	373
K.Periapatti North	1062	2200	2254	262	249	407	412	0	0	1579	1117	1376	1300
Chettichatram	87	188	168	32	13	91	80	0	0	121	93	98	100
K.Periapatti South	450	1014	991	141	109	214	216	0	0	727	535	637	618
Samudram	811	1870	1806	263	237	542	541	0	0	1308	900	1078	763
Kolathur	1194	2524	2525	306	302	562	583	0	1	1885	1635	1468	879
Sub-Total	5526	11667	11614	1534	1392	2677	2749	1	1	8273	6202	6871	5339
Villages in Pudukkottai District													
Vittampatti	265	614	594	118	99	40	47	0	0	338	234	348	301
Melapachchakudi	553	1080	1190	130	160	47	51	0	0	786	685	637	367
Edayapatti	356	794	856	106	103	367	385	0	1	470	367	472	419
Poruvai	433	1038	1057	146	157	321	308	0	0	665	534	615	485
Kalkudi	625	1470	1470	228	220	133	119	0	0	957	670	859	726
Buthakudi	763	1556	1543	202	178	34	41	0	0	963	804	899	502
Meppudakkudi	644	1492	1479	192	195	124	133	0	0	1077	821	904	540
Vadugappatti	255	564	531	66	47	195	176	0	0	376	257	351	174
Velur	682	1440	1517	176	197	652	726	0	0	962	711	988	791
Viralimalai	2759	5483	5400	695	646	1131	1123	0	1	4383	3796	3103	1037
Sub-Total	7335	15531	15637	2059	2002	3044	3109	0	2	10977	8879	9176	5342
Total	12861	27198	27251	3593	3394	5721	5858	1	3	19250	15081	16047	10681

Source: Tamil Nadu Census Reports – 2011.

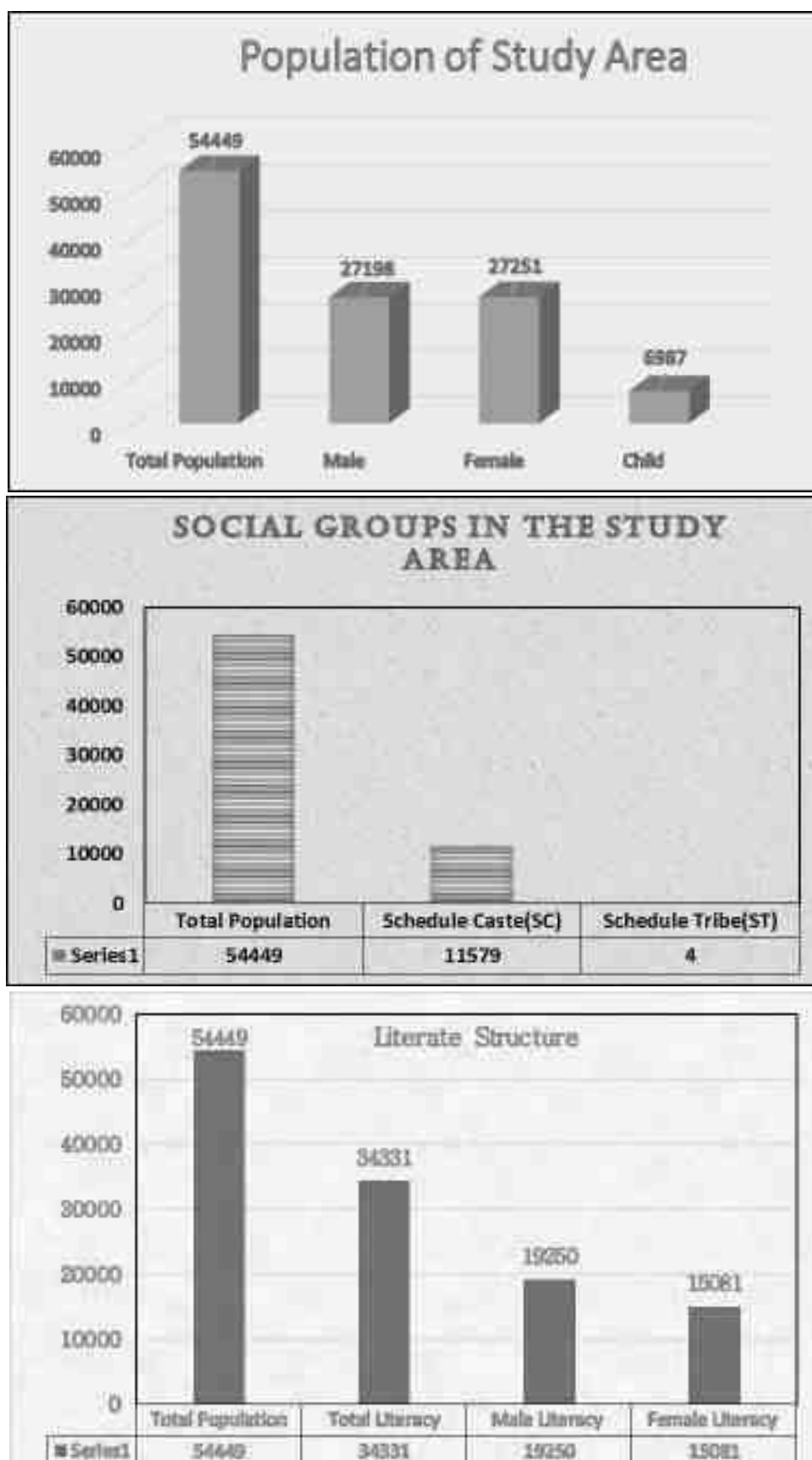


Figure 3.23: Demographic Details – Population, Social Groups, and Literacy Rate in the Study Villages

Table 3.32 Workforce Details of the Study Area (Percentage wise)

Village Name	Total Worker	Total Male Workers	Total Female Workers	Total Main Workers	Total Main Cultivators	Total Main Agricultural Labourers	Total Other Workers	Total Non-Workers
<i>Villages in Tiruchirappalli District</i>								
Komangalam	1822	1012	810	1647	633	710	278	1371
Sethurapatti	1325	829	496	1216	231	596	377	1525
Chithanatham	746	373	373	697	131	374	159	952
K.Periapatti North	2676	1376	1300	2485	717	1049	665	1778
Chettichatram	198	98	100	197	48	16	133	158
K.Periapatti South	1255	637	618	1085	202	485	378	750
Samudram	1841	1078	763	1565	194	601	767	1835
Kolathur	2347	1468	879	1589	366	341	758	2094
<i>Sub-Total</i>	<i>12210</i>	<i>6871</i>	<i>5339</i>	<i>10481</i>	<i>2522</i>	<i>4172</i>	<i>3515</i>	<i>10463</i>
<i>Villages in Pudukkottai District</i>								
Vittampatti	649	348	301	649	150	305	191	559
Melapachchakudi	1004	637	367	869	136	181	544	1266
Edayapatti	891	472	419	869	279	348	238	759
Poruvai	1100	615	485	655	30	372	241	995
Kalkudi	1585	859	726	1581	128	1216	231	1355
Buthakudi	1401	899	502	905	243	145	473	1698
Meppudakkudi	1444	904	540	1391	211	861	312	1527
Vadugappatti	525	351	174	509	352	74	81	570
Velur	1779	988	791	1344	85	837	372	1178
Viralimalai	4140	3103	1037	3841	188	359	3260	6743
<i>Sub-Total</i>	<i>14518</i>	<i>9176</i>	<i>5342</i>	<i>12613</i>	<i>1802</i>	<i>4698</i>	<i>5943</i>	<i>16650</i>
Total	26728	16047	10681	23094	4324	8870	9458	27113

Source: Tamil Nadu Tiruchirappalli districts Census Reports – 2011

3.7.6 Workforce Participation

The Table 3.32 provides a breakdown of the workforce distribution across various villages in terms of the total workers, main workers, cultivators, agricultural laborers, other workers, and non-workers. The worker distribution across the study area highlights significant variation in labour participation between villages. The study area has a total workforce of 26,728 persons, comprising 16,047 male workers and 10,681 female workers, indicating a male-dominated workforce participation pattern. The total number of main workers is 23,094, accounting for about 86% of the total workers, which reflects a relatively stable employment structure. The remaining workers are engaged in marginal or seasonal activities. The total number of non-workers in the study area is 27,113, indicating a substantial dependent population.

District-wise analysis shows that Pudukkottai district accounts for a higher share of workers (14,518) compared to Tiruchirappalli district (12,210), which corresponds with its larger population base. However, Tiruchirappalli villages exhibit a more balanced male & female workforce participation, especially in villages such as K. Periapatti North and Kolathur. Agriculture continues to be the dominant source of livelihood in the study area. A total of 4,324 main cultivators and 8,870 agricultural labourers are recorded, together constituting nearly 57% of the main workforce.

Villages such as K. Periapatti North, Samudram, Kalkudi, and Meppudakkudi show a high dependence on agricultural activities, particularly agricultural labour. The “other workers” category, which includes employment in industries, services, trade, transport, construction, and contract works, accounts for 9,458 workers, reflecting a gradual shift towards non-agricultural occupations. This trend is particularly evident in Viralimalai, Kolathur, Samudram, and Melapachchakudi, where industrial and service-sector employment opportunities are more prominent.

Among individual villages, Viralimalai records the highest workforce participation, with 4,140 workers, and also shows a strong dominance of non-agricultural employment, as reflected by the high number of “other workers.” In contrast, smaller villages such as Chettichatram and Vadugappatti have limited employment opportunities and higher proportions of non-workers.

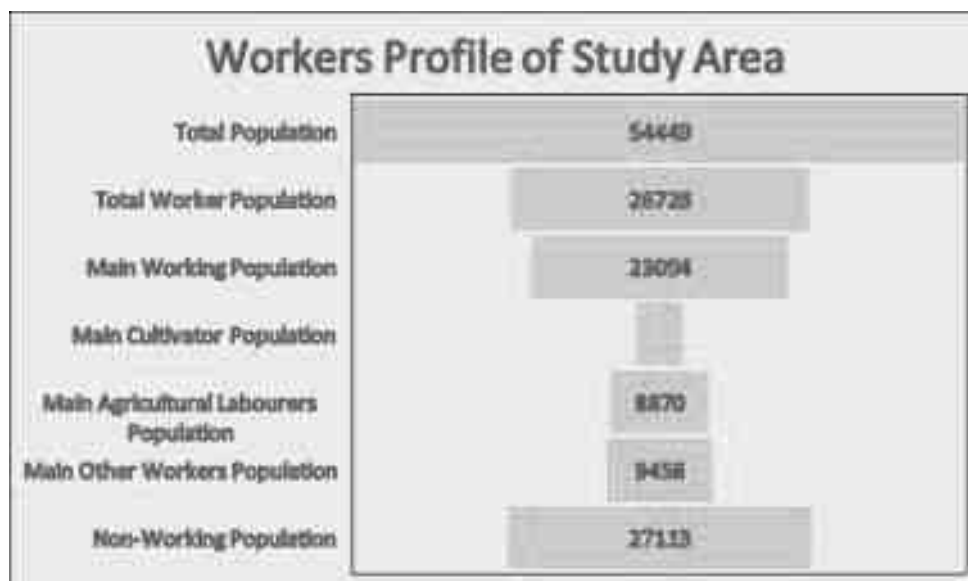


Figure 3.24 Details of Workforce in the Study Villages

As per SEAC recommendation the project proponent should spend minimum of 5 lakhs to the nearby school from the proposed project site as part of CER cost. Also, the village panchayat will get direct benefit from the government through District mineral Resource fund (DMF) for infrastructure development activities.

- ❖ Awareness and Opinion of the People About the Project, to assess public awareness and opinions regarding the proposed project, the following key observations were recorded:
- ❖ During the survey, it was observed that only residents of nearby villages were aware of the proposed project, while those in more distant villages were largely unaware.

People in the region expressed expectations that the project would generate employment opportunities and lead to improvements in education, transportation, and sanitation facilities provided by the project authorities.

Recommendation and Suggestion

The village development plans are made in consultation with the community through Gram Sabha; these appear to address the needs of the community. However, it may be noted that at the implementation stage these plans often are fraught with problem of inadequate funds, lack of proper planning, corruption, vested interests and political agendas. Hence while ascertaining the scope for convergence with the government activities, care must be taken to ascertain realistic possibilities for implementation.

- Women empowerment: Home based income generation activities, vocational training programs and common education centre for increasing the literacy rate.

- Education: Free uniform, construction of common rooms and library, computer education and physical education, furniture and equipment in schools, up-gradation of existing school infrastructure through the CSR funds.
- Agriculture/livestock: Infrastructure such as agricultural practices, electricity connections, assistance with buying improved tools and equipment, capacity building, supply and/or knowledge of better variety of seeds, pasture land development and trainings on animal husbandry & facility of veterinary doctor.
- Health: Improvements in sanitary conditions of villages, assistance with construction of latrines, improvement in drainage system, health camps and awareness campaigns for diseases like common cold, malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of PHCs and Anganwadi centres.
- People with disability: Establishment of centre for special education, sensitization of the community towards disabled and awareness on Government schemes.
- Marginalized Communities and Vulnerable Groups: 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.
- Connectivity: Transport connectivity to easiness accessibility to the region.
- Greenbelt: Establish a greenbelt and plant saplings around quarry boundaries, village schools, and village roads.

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.

Conclusion

This study was carried out the baseline socio-economic conditions of the study area. It examined parameters including the population, number of households, literacy rate, sex ratio, workforce details, and the availability of essential amenities like transportation, drinking water, road connectivity, and educational facilities. The study revealed both positive and negative socio-economic implications associated with the proposed project and cluster quarries. While potential environmental and social impacts must be addressed, the project is expected to provide significant economic benefits in terms of local employment and improved livelihood opportunities in directly and indirectly. Therefore, with the implementation of effective mitigation and management measures, the project can contribute positively to the socio-economic development of the area while minimizing adverse impacts.

3.8 TRAFFIC DENSITY

The traffic survey conducted based on the transportation route of material, the Rough Stone and gravel is proposed to be transported mainly through Village Road and Inamkulathur – Viralimali as shown in Table 3.33 and in Figure 3.25. 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 3.33 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.43 Km-E	Village Road
TS2	NH-15(Coimbatore – Nagapattinam)	2.88 Km- N	NH-15(Coimbatore – Nagapattinam)
TS3	NH-45B (Trichy-Madurai)	6.84km-SE	NH-45B (Trichy-Madurai)

Source: On-site monitoring by GTMS FAE & TM

Table 3.34 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	33	99	43	43	65	33	175
TS2	133	399	110	110	212	106	615
TS3	152	456	232	232	338	169	857

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 3.35 Rough Stone Transportation Requirement

Transportation of Rough and Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	121	363

Source: Approved Mining Plan

Table 3.36 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC –1960 guidelines
TS1	175	121	296	1200
TS2	615	121	736	1500
TS3	875	121	996	1500

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

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

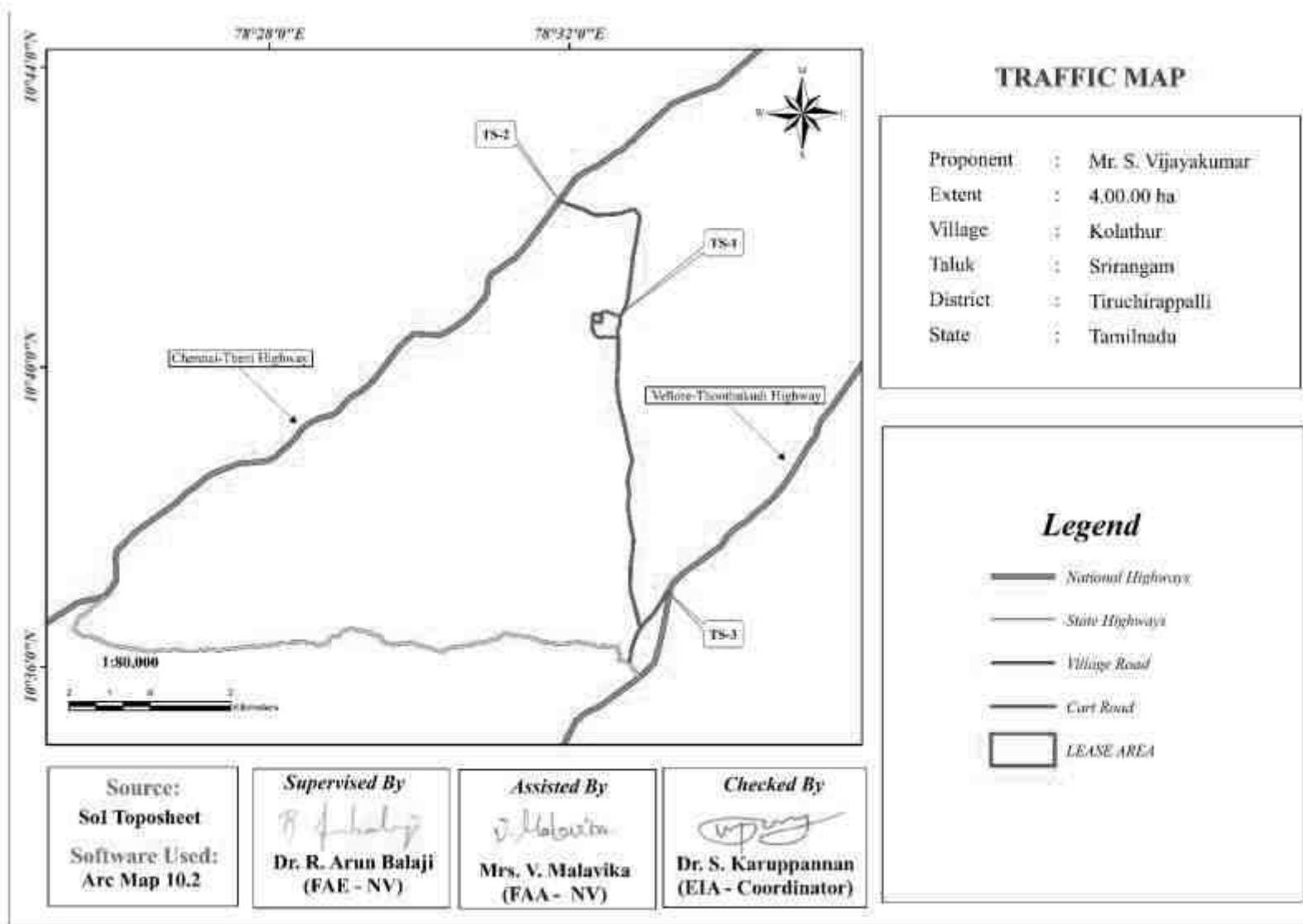


Figure 3.25 Traffic Density Map

3.9 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries and National Park within 25km radius. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environmentally sensitive areas around the proposed mine lease area i.e., 25 km radius and the nearby water bodies are given in the Table 3.37.

Table 3.37 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	Kadavur Slender Loris Sanctuary	32.10km-W
2	Reserve Forest	Viramalai R.F	14.97km-W
		Naganur R.F	15.31km-W
		Amayapuram R.F	17.9km- W
		Poygaimalai R.F	15.89km- SW
3	Lakes/ Reservoirs/ Dams/Streams/Rivers	Moorthiammal Kulam	0.29km- N
		Vittamapatti Tank	625m- E
		Alampatti chinna Kulam	1.17km- W
		Alampatti Periya Kulam	1.42km- W
		Ponnaiyar River Bank	2.77km- NW
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Critically Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet

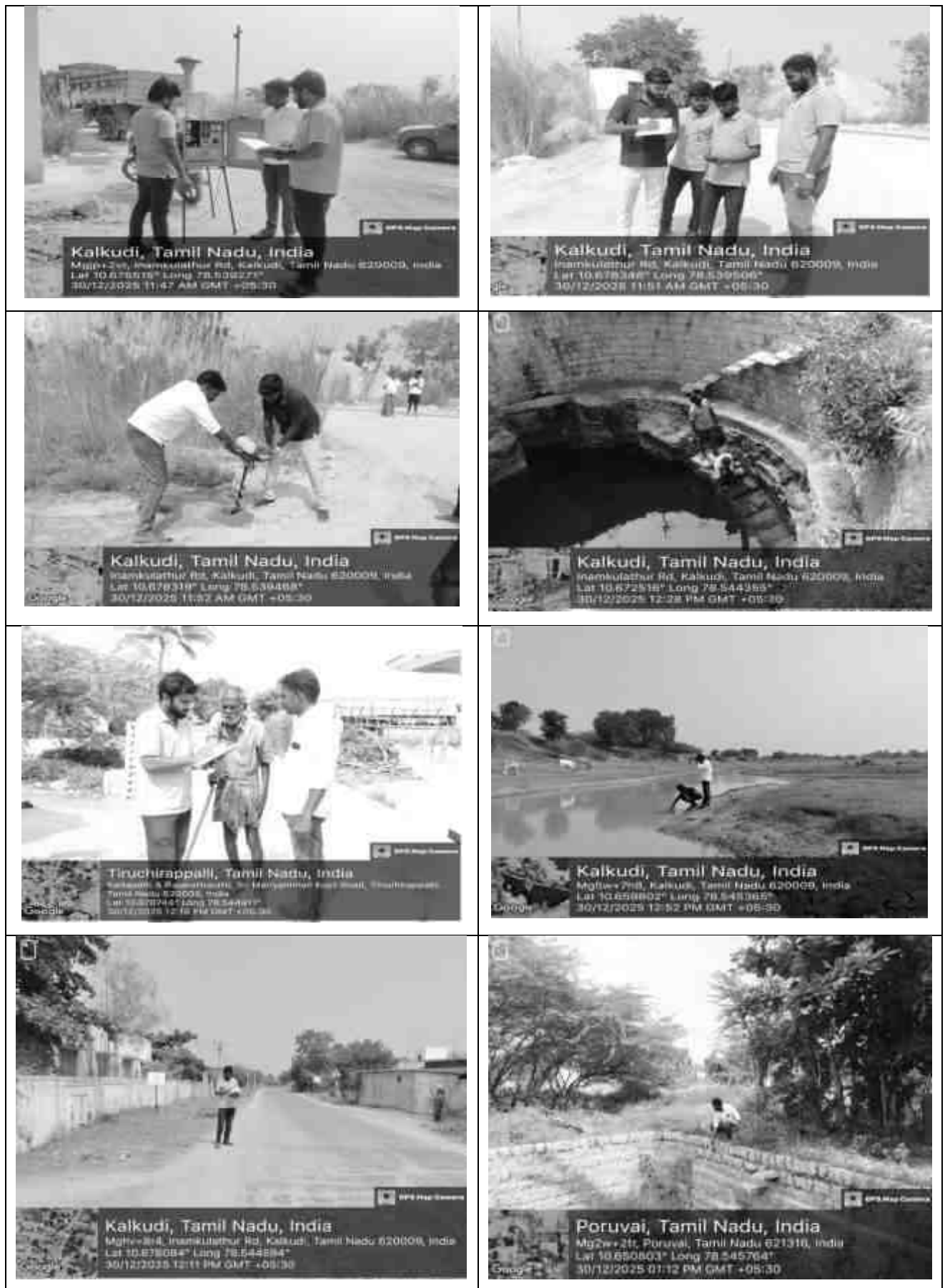


Figure 3.26 Field Study Photographs

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

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

4.1 LAND ENVIRONMENT

Anticipated Impact

- ❖ Permanent change on land use and land cover.
- ❖ Change in topography of the mine lease area.
- ❖ Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- ❖ Degradation of the aesthetic environment of the core zone due to quarrying
- ❖ Soil erosion and sediment deposition in the nearby agricultural fields during the rainy season
- ❖ Increase in agricultural productivity of land when mine water is discharged to the surrounding lands for irrigation

Common Mitigation Measures from Proposed Project

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

Anticipated Impact on Soil Environment

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

Common Mitigation Measures from proposed project

- ❖ Construction of garland drains, settling pits, and check dams to prevent runoff and siltation
- ❖ Run-off diversion – Garland drains will be constructed around the project boundary to prevent surface flows from entering the quarry works areas and will be discharged into the settling tanks to reduce suspended sediment loads before runoff is discharged from the quarry site.
- ❖ Retain existing or re-plant the vegetation will be retained at the site wherever possible.
- ❖ Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.3 WATER ENVIRONMENT

Anticipated Impact

- ❖ Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas
- ❖ As the proposed project acquires 3.0KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

Common Mitigation Measures for the Proposed Project

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

- ❖ Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program.

4.4 AIR ENVIRONMENT

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

Emission Estimation

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

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	$E = [u^{0.4} a^{0.2} \{9.7 + 0.01p + b/(4 + 0.3b)\}]$	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm ³ /yr); a = Lease area(km ²); E = Emission rate(g/s).

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. It is important to note that PM₁₀ emission rate is derived from the SPM estimation in the background that PM₁₀ constitutes 52% of SPM emission. The PM_{2.5}, PM₁₀, SO₂ and NO_x emission results have been given in Table 4.2.

Table 4.2 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m ²	Calculated Value (g/s/m ²)
Overall Mine	PM _{2.5}	0.25608	40000	1.3E-005
Overall Mine	PM ₁₀	0.51216	40000	6.482E-06

4.4.1 Modelling of Incremental Concentration

Anticipated incremental concentration and net increase in emissions due to quarrying activities within 500 m around the project area is predicted by open pit source modelling using AERMOD Software and the incremental values of the air pollutants were added to the base line data monitored at the proposed site to predict total GLC of the pollutants, as shown in Tables 4.3 - 4.4.

Model Results

The post project resultant concentrations of PM₁₀, PM_{2.5} is given in Tables 4.3-4.4.

Table 4.3 Incremental & Resultant GLC of PM_{2.5}

Station ID	Distance to core area (km)	PM _{2.5} concentrations(µg/m ³)				Comparison against air quality standard (60 µg/m ³)	Magnitude of change (%)	Significance
		Direction	Baseline	Predicted	Total			
AAQ1	0.01	S	15.34	7.99	23.33	Below standard	52.1	Not significant
AAQ2	0.35	NE	14.49	2	16.49		13.8	
AAQ3	1.30	SW	15.52	2	17.52		12.9	
AAQ4	1.40	NW	17.18	2	19.18		11.6	
AAQ5	1.10	SE	16.27	0.8	17.07		4.9	

Table 4.4 Incremental & Resultant GLC of PM₁₀

Station ID	Distance to core area	PM ₁₀ concentrations(µg/m ³)				Comparison against air quality standard (100 µg/m ³)	Magnitude of change (%)	Significance
		Direction	Baseline	Predicted	Total			
AAQ1	0.01	S	42.80	16.5	59.3	Below standard	38.6	Not significant
AAQ2	0.35	NE	40.83	5	45.83		12.2	
AAQ3	1.30	SW	41.82	5	46.82		12.0	
AAQ4	1.40	NW	42.55	5	47.55		11.8	
AAQ5	1.10	SE	44.09	1	45.09		2.3	

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

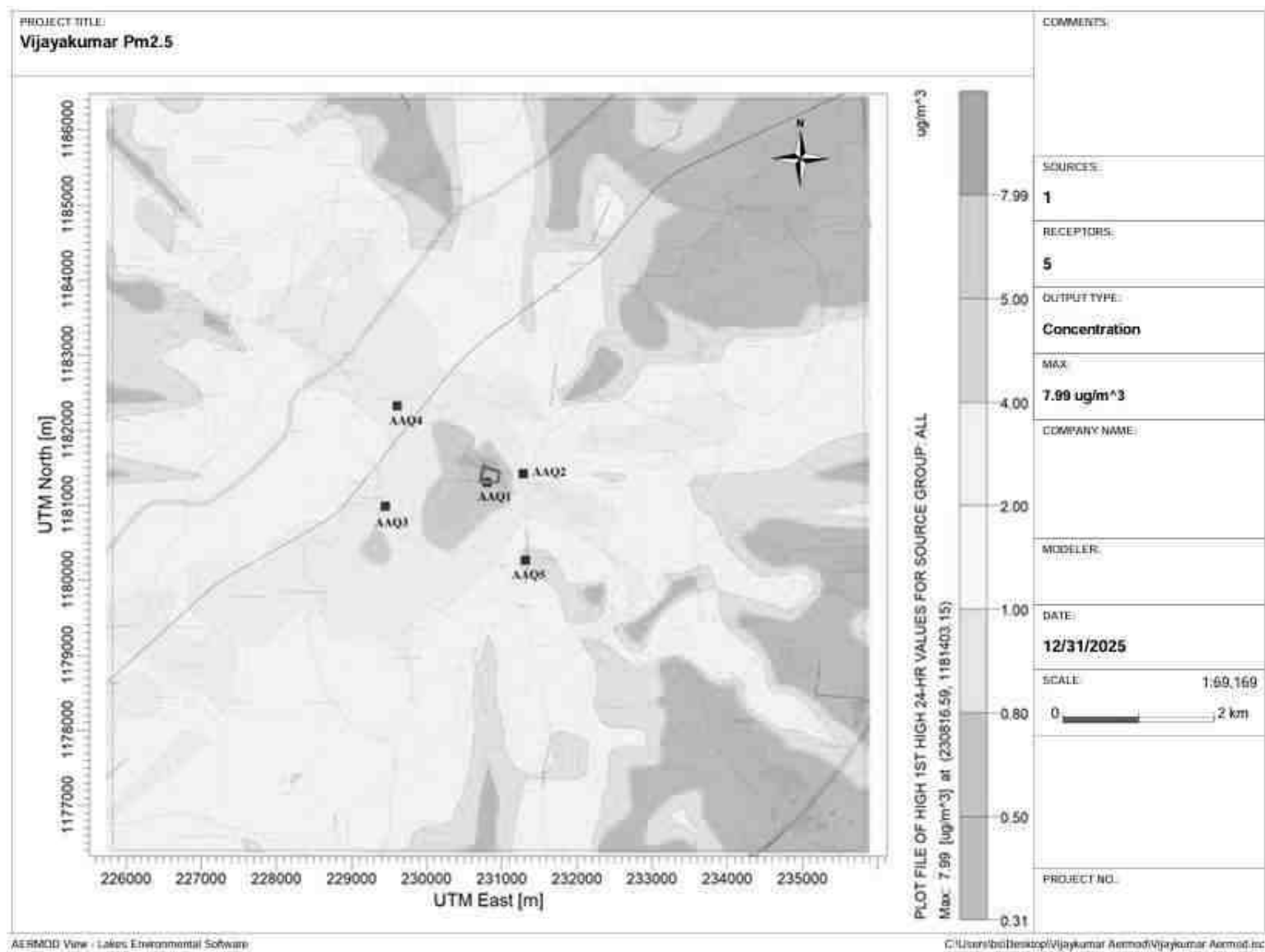


Figure 4.1 Predicted Incremental Concentration of PM_{2.5}

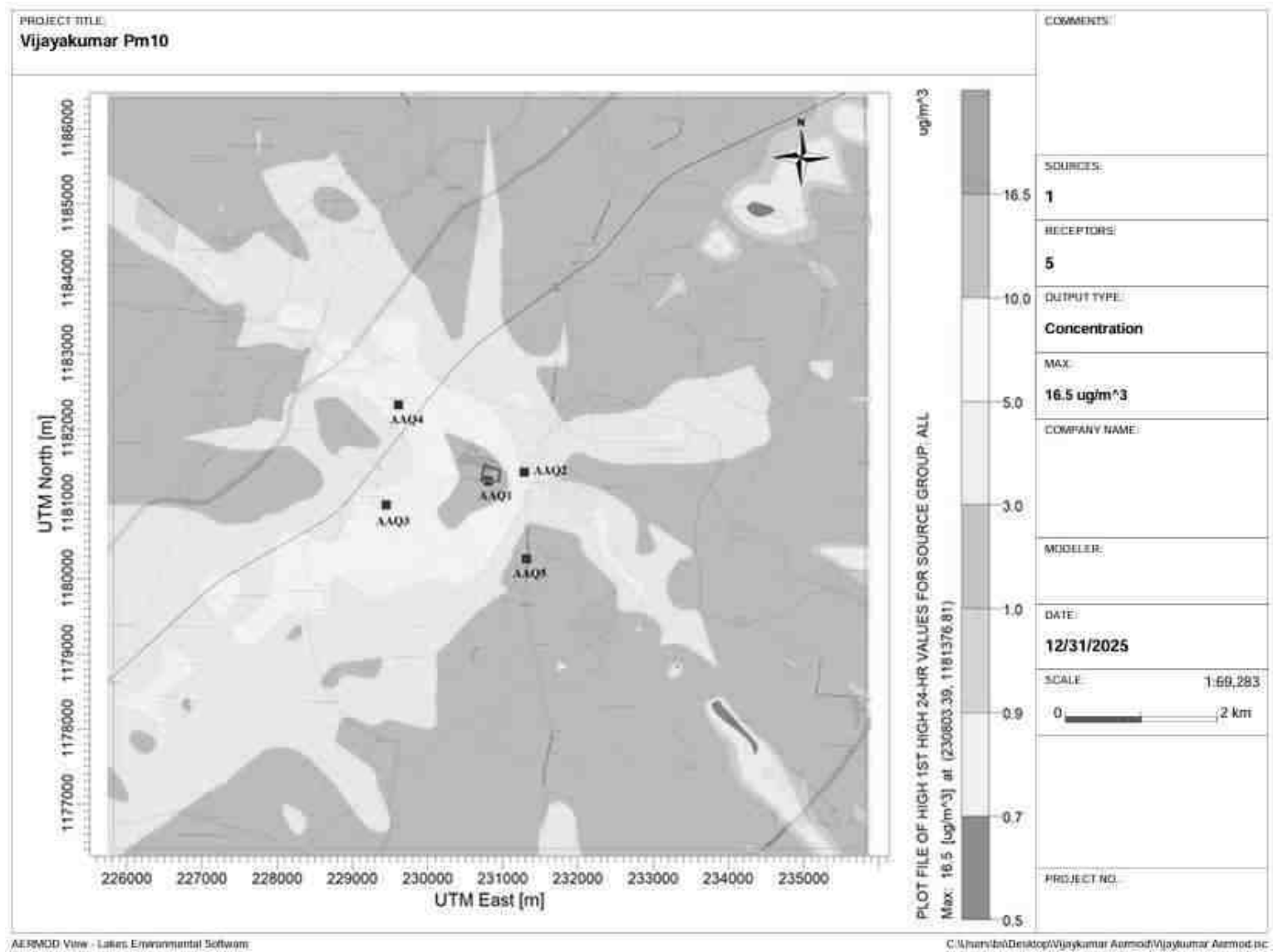
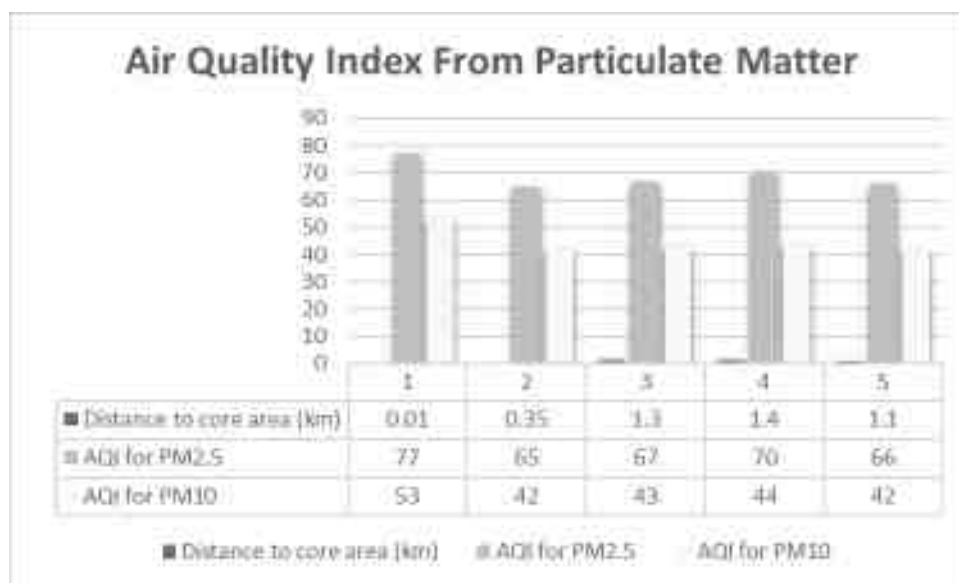


Figure 4.2 Predicted Incremental Concentration of PM₁₀

The Air Quality index for the baseline and predicted values of PM_{2.5} and PM₁₀ are given in table below.

Station ID	Distance to core area (km)	Direction	PM _{2.5} (µg/m ³)		AQI for PM _{2.5}	PM ₁₀ (µg/m ³)		AQI for PM ₁₀
			Baseline Conc.	Total (Baseline + Predicted GLC)		Baseline Conc.	Total (Baseline + Predicted GLC)	
AAQ1	0.01	S	15.34	23.33	77	42.80	59.3	53
AAQ2	0.35	NE	14.49	16.49	65	40.83	45.83	42
AAQ3	1.30	SW	15.52	17.52	67	41.82	46.82	43
AAQ4	1.40	NW	17.18	19.18	70	42.55	47.55	44
AAQ5	1.10	SE	16.27	17.07	66	44.09	45.09	42

<https://www.airnow.gov/aqi/aqi-calculator-concentration/>



In the present study American Meteorological Society and the United States Environmental Protection Agency Dispersion Model (AERMOD) air quality model was run for pre-monsoon season under maximum atmospheric temperature conditions. The AERMOD has been run for PM₁₀ and PM_{2.5} distribution with 24-Hr maximum concentration and concentration contours were obtained as given in Figure 4.1 and 4.2. From these Isopleths plots it is observed that the highest pollutants concentrations predicted by AERMOD was near the major source in the core area and a maximum of 59.3µg/m³ of PM₁₀ and 23.3µg/m³ of PM_{2.5} were found to be below the prescribed NAAQS near the source. The AQI vales of PM₁₀ shows

moderate and PM_{2.5} shows good in all the locations. By adopting suitable mitigation measures the pollutant levels in the atmosphere can be controlled further.

Mitigation Measures

There will be transportation of rough stone from the area to the crusher which is located at a distance of about 50m within the cluster boundary. Considering average annual production of 539607 tons per annum i.e. 1998 tons per day of stone there will be movement of around 121 trucks per day for transportation of the stone. This will create additional traffic load to the road and also additional emission due to vehicular movement. The mitigation measures to minimize the air pollution are given in Table 4.5 below.

Table 4.5 Proposed Mitigation Measures for Air pollution

Potential Sources of air pollution	Magnitude of air pollution	Proposed Pollution Control Measure
Excavation	Emission of Particulate Matter	Provide Personal Protective Equipment's for workers
Drilling and Blasting	Emission of Particulate Matter and emission gaseous	Wet drilling and controlled blasting will adopt. Optimized blast parameters and design were given in chapter 2 should follow for blasting. Safety shelter will construct within the lease area. Provide PPEs for workers.
Loading of material on dumper	Air emission	Water sprinkler with wide angle nozzle of angle 150° will be selected for water sprinkling in the dust prone area.
Transportation	High Dust generation	Regular grading of haul roads will be practiced. Planting of trees all along mine haul roads outside the lease. Water sprinklers will install along the haul road. Vehicle without PUC certificate will not be allowed. Cover tarpaulin to the tipper during transportation.
Storage of Topsoil	High Dust generation	High dust generation due to wind from the topsoil storage area. This area will be installed with permanent water sprinkler. Plantation will be provided in the dump slope.

4.5 NOISE ENVIRONMENT

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

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

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.

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

Anticipated Impact

- ✚ Mining operations generate significant noise impacting both worker health and nearby communities.
- ✚ These impacts can range from annoyance and sleep disturbance to structural damage and hearing loss. Effective management of noise is crucial to mitigate these adverse effects.

Sources of Noise in Mining:

- ✚ **Drilling and Blasting:** Prolonged exposure to high-intensity noise from drilling and blasting can lead to hearing loss and other auditory problems
- ✚ **Heavy Machinery:** Excavators, haul trucks, and other equipment used in mining operations generate substantial noise.
- ✚ **Loading and Transportation:** The movement and handling of materials within the mine site contribute to noise pollution.

The attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 45.2 dB (A), the barrier effect. Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are: source data,

receptor data, and attenuation factor. Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.6.

Table 4.6 Activity and Noise Level Produced by Machinery

S. No.	Machinery / activity	Impact on environment?	Noise produced in dB(A) at 50 ft from source*
1	Blasting	Yes	94
2	Jack hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total			95.8

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

Table 4.7 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level (dBA)	Total (dBA)
Core	-	45.2	44.0	47.6
Kadapatti	410	43.9	31.7	44.2
Mettupatti	1350	42.2	21.4	47.6
Alampatti Pudur	1600	47.6	19.9	45.8
Thalapatti	1040	45.8	23.6	38.4
NAAQ Standards	Industrial Day Time -75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

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

Common Mitigation Measures

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

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

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

4.5.1 Ground Vibrations

Anticipated Impact

- 🏠 Mining operations generate significant noise and vibration impacting both worker health and nearby communities.
- 🏠 These impacts can range from annoyance and sleep disturbance to structural damage and hearing loss. Effective management of noise and vibration is crucial to mitigate these adverse effects.

Sources of Noise and Vibration in Mining:

- 🏠 **Drilling and Blasting:** A primary source of both noise and ground vibrations, with the intensity dependent on the amount of explosives, atmospheric conditions and proximity to the blast.
- 🏠 **Heavy Machinery:** Excavators, haul trucks, and other equipment used in mining operations generate substantial noise.
- 🏠 **Loading and Transportation:** The movement and handling of materials within the mine site contribute to noise pollution.

The major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kutcha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining lease area and may cause injury to persons or damage to the structures. The ground vibrations due to the blasting in the quarry are calculated using the empirical equation. The empirical equation for assessment of peak particle velocity (PPV) is given below:

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

Where,

V = peak particle velocity (mm/s), K = site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

Table 4.8 Predicted PPV Values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	69.93	320	1.467	19	0.53	148

Table 4.9 Predicted PPV Values due to Blasting at 100-500m radius

Location ID	Maximum Charge in kgs	Radial Distance in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	69.93	100	9.434	19	2.15	161
		200	3.112		0.94	153
		300	1.627		0.57	149
		400	1.027		0.41	146
		500	0.718		0.31	144

The PPV results shows that the ground vibration is well below the permissible limits set by DGMS through circular 71,997 for domestic houses near by the lease area at the dominant frequency of <8 Hz

Common Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ Blasting shelter will be provided as per DGMS guidelines
- ❖ Blasting operations will be carried out only during day time
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed
- ❖ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire
- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

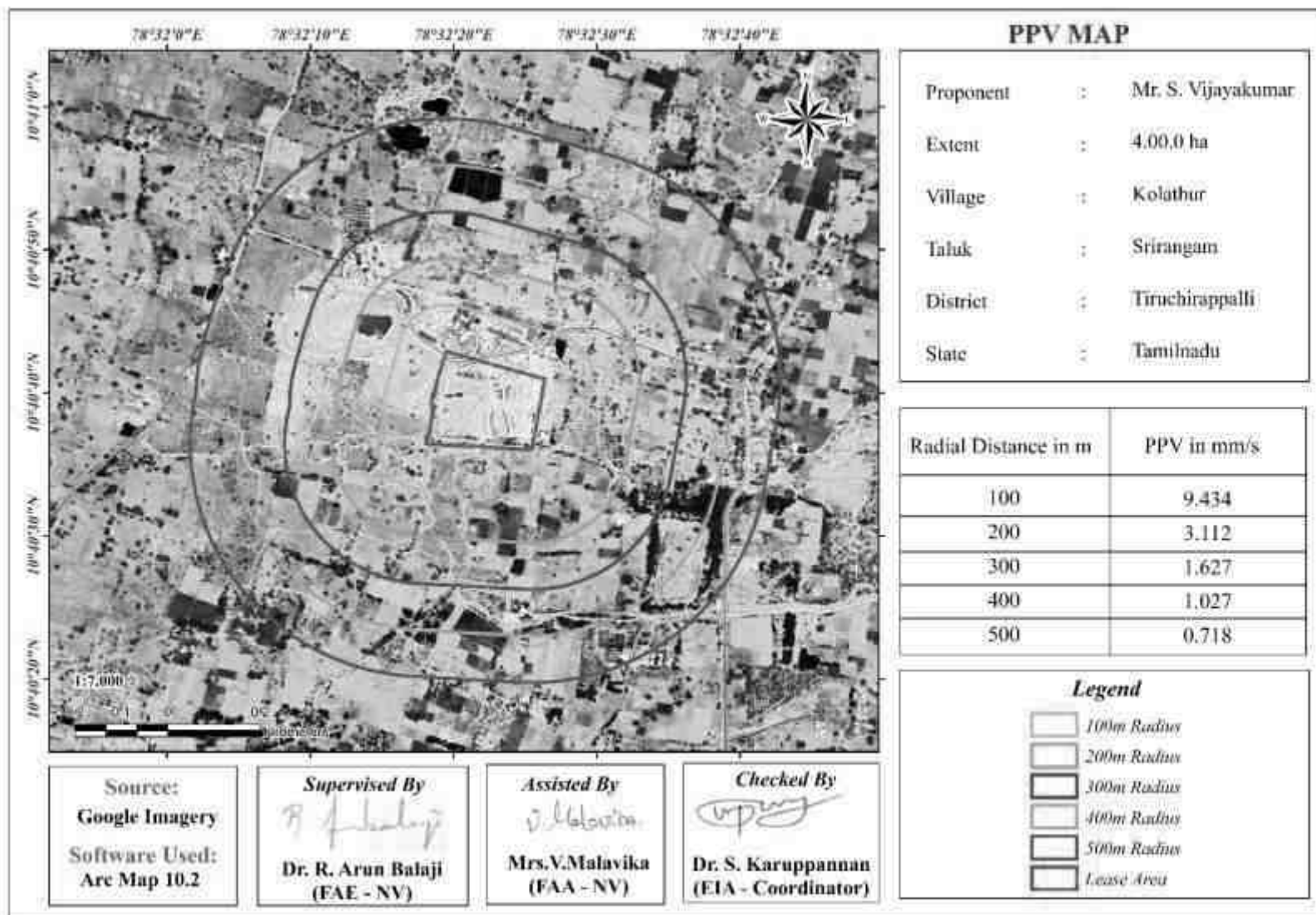


Figure 4.3 100-500m PPV Map

4.6 ECOLOGY AND BIODIVERSITY

4.6.1 *Impact on Ecology and Biodiversity*

- ❖ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ❖ The Number of plants in the mining lease area is given in Chapter III Table 3.21 which vegetation in the lease area may be affected during mining.
- ❖ Carbon released from quarrying machineries and tippers during quarrying would be 718kg per day, 194005kg per year and 970026kg over ten years, as provided in Table 4.10.

Table 4.10 Carbon Released During Ten Years of Rough Stone and Gravel Production

	Per day	Per year	Per ten years
Fuel consumption of excavator	34	9065	45326
Fuel consumption of tipper	718	194005	970026
Total fuel consumption in Liters	752	203070	1015352
CO ₂ emission in kg	2014	544228	2721143
Fuel consumption of compressor	28.4	7668	76680

4.6.2 *Mitigation Measures on Flora*

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ None of the plants in the lease area will be cut during operational phase of the mine. we recommend uprooting and planting of the 10 trees along the 7.5 m safety zone to prevent environmental pollution during quarrying. As the survival rate due to uprooting was only 30%, 100 seedlings will be procured at the rate of 10 seedlings per tree and planted in 7.5 m safety zone.
- ❖ Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- ❖ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 194005kg of carbon per year. Therefore, we recommend 500 planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.12), about 2000 trees (Table 4.13) will be planted within three months from the beginning of

mining. These trees, when grown up would sequester carbon of about 2481383kg of the total carbon, as provided in Table 4.11.

Table 4.11 CO₂ Sequestration

CO ₂ sequestration in kg	178	47952	239760
Remaining CO ₂ not sequestered in kg	1837	496276	2481383
Trees required for environmental compensation	20662		
Area required for environmental compensation in hectares	41		

Table 4.12 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 lebbeck</i>	Fabaceae	Vagai	Tree	
5	<i>Delonix regia</i>	Fabaceae	Cemmayir-konrai	Tree	
6	<i>Bauhinia racemose</i>	Fabaceae	Aathi	Tree	
7	<i>Cassia fistula</i>	Fabaceae	Sarakondrai	Tree	
8	<i>Aegle marmelos</i>	Fabaceae	Vilvam	Tree	
9	<i>Pongamia pinnata</i>	Fabaceae	Pungam	Tree	
10	<i>Thespesia populnea</i>	Malvaceae	Puvarasu	Tree	

Table 4.13 Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered (m ²)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	800	640	7200
	Number of plants outside the mine lease area		
	1200	960	10800
Total	2000	1600	18000

4.6.3. Anticipated Impact on Fauna

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

Mitigation Measures on Fauna

- ❖ Fencing will be constructed around the proposed mine lease area to restrict the entry of stray animals
- ❖ The workers shall be trained not to harm any wildlife near the project site
- ❖ The quarry operation using in NONAL blasting Method Technic so controlled in sound and vibration.
- ❖ The awareness in employs

4.6.4. Aquatic Biodiversity

- ❖ There is no aquatic vegetation around 1km of the mine lease area.

4.6.5 Impact on agriculture and horticulture crops in 1km Radius

- ❖ Problems to agricultural and horticulture land due to dust caused by movement of heavy vehicles.
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season.
- ❖ The fugitive dust released from the mining operations may cause effect on the agricultural and horticulture land who are directly exposed to the fugitive dust.
- ❖ Dust from the quarries is likely to affect reproductive systems in nearby agricultural and horticulture lands.
- ❖ Dust from quarries can affect plant growth and reduce vegetable yields.

4.6.6 Mitigation Measures on agriculture and horticulture crops.

- ❖ The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases.
- ❖ Quarry approach roads are sprayed with water 3 times a day to control dust. Thus, the damage to the nearby farmlands is controlled.

- ❖ A green belt will be created in 7.5m & 10m safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust.

4.7 SOCIO ECONOMIC ENVIRONMENT

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.

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 85dB(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 85dB(A), the peak sound levels reach 140dB(C), or the average maximum sound level reaches 110dB(A)
- ❖ Ear muffs provided will be capable of reducing sound levels at the ear to at least 85dB(A)
- ❖ Periodic medical hearing checks will be performed on workers exposed to high noise levels.

4.8.3 Physical Hazards

The following measures are proposed for control of physical hazards

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

4.8.4 Occupational Health Survey

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests: general physical tests, audiometric tests, full chest, X-ray, Lung function tests, spirometry tests, periodic medical examination – yearly, lung function test – yearly, those who are exposed to dust, and eye test Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine

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

4.9 Mine Waste Management

No waste is anticipated from any of the proposed quarries.

4.10 Mine Closure

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

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

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

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

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.,

Chemical Stability

The solid wastes on the mine site should be chemically stable. This means that the consequences of chemical changes or conditions leading to leaching of metals, salts or organic compounds should not endanger public health and safety nor result in the deterioration of environmental attributes. If the pollutant discharges likely to cause adverse impacts is predicted

in advance, appropriate mitigation measures like settling of suspended solids or passive treatment to improve water quality as well as quantity, etc., could be planned. Monitoring should demonstrate that there is no adverse effect of pollutant concentrations exceeding the statutory limits for the water, soil and air qualities in the area around the closed mine.

Biological Stability

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

- ❖ Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- ❖ Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- ❖ Where it is desirable to get a quick growth response from the native flora during those times

when moisture is not a limiting factor. For example, development of green barriers

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

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

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

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

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

5.2 ANALYSIS OF ALTERNATIVE SITE

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

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

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

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

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

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

CHAPTER VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

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

6.1 METHODOLOGY OF MONITORING MECHANISM

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

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

- ❖ Seeking expert's advice when needed.

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

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

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

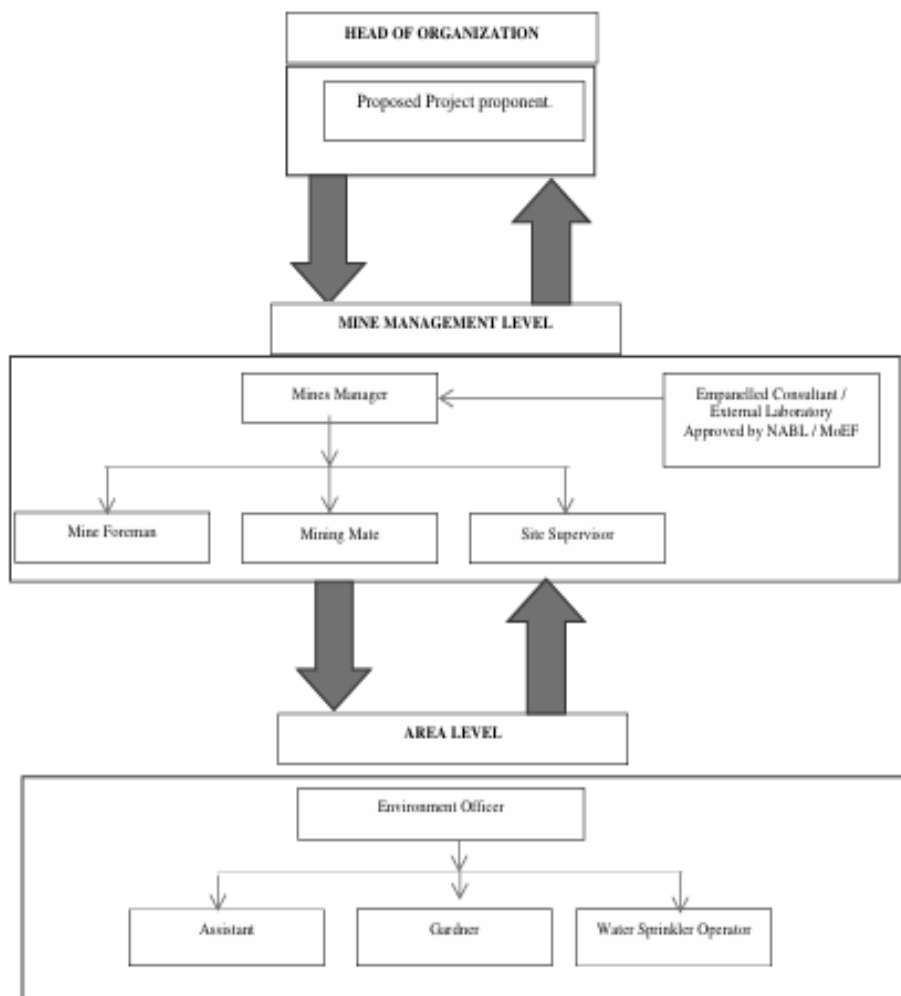


Figure 6.1 Proposed environmental monitoring chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

Table 6.1 Implementation Schedule for Proposed Project

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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

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

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil quality and
- ❖ Greenbelt development
- ❖ The details of proposed monitoring schedule have been provided in Table 6.2.

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

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

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

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

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

Table 6.3 Environment Monitoring Budget

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

Source: Field Data

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

CHAPTER VII

ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

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

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

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

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

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

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

Table 7.1 Risk Assessment & Control Measures for Proposed Project

S. No.	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. ✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited. ✓ Fire-fighting and first-aid provisions in the mine office complex and mining area. ✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use. ✓ Working of quarry, as per approved plans and regularly updating the mine plans. ✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut. ✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager. ✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.
2	Drilling	Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst;	✓ Safe operating procedure established for drilling (SOP) will be strictly followed. ✓ Only trained operators will be deployed. ✓ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places,

		Drill Rod may break;	✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other. ✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ✓ Operator shall regularly use all the personal protective equipment.
3	Blasting	Fly rock, ground vibration, Noise and dust. Improper charging, stemming & Blasting/ fining of blast holes Vibration due to movement of vehicles	✓ The maximum charge per delay and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blast can be conducted safely. ✓ SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation ✓ Shots are fired during daytime only. ✓ All holes charged on any one day shall be fired on the same day. ✓ The danger zone is and will be distinctly demarcated (by means of red flags)
4	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material	✓ 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.

		While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. ✓ Concave mirrors should be kept at all corners ✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point ✓ Loading according to the vehicle capacity ✓ Periodical maintenance of vehicles as per operator manual
5	Natural calamities	Unexpected happenings	✓ Escape Routes will be provided to prevent inundation of storm water ✓ Fire Extinguishers & Sand buckets
6	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

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

- ❖ Rescue and medical treatment of casualties;
- ❖ Safeguard other people;
- ❖ Minimize damage to property and the environment;
- ❖ Initially contain and ultimately bring the incident under control;
- ❖ Secure the safe rehabilitation of affected area; and
- ❖ Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.
- ❖ In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations. Structure of the team has been shown in Figure 7.1.

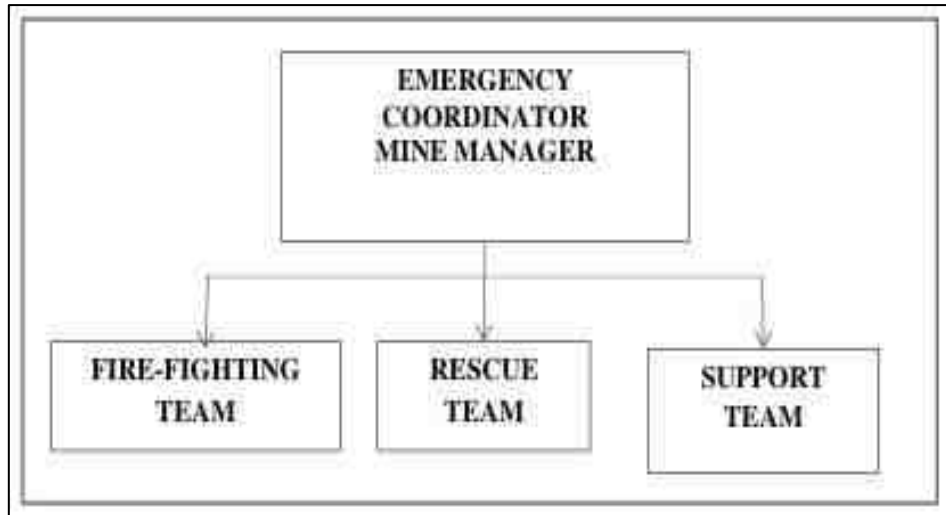


Figure 7.1 Disaster management team layout for proposed project

7.3.1 Emergency Control Procedure

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

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

7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the projects within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative

study, the proposed project, known as P1, E1 are taken into consideration. The details of P1 & E1 have been given in Table 7.2 & 7.3.

Table 7.2 Salient Features of P1

Name of the Quarry	S. Vijayakumar			
Type of Land	Patta Land			
Extent	4.00.0ha			
S.F. No	790/1B (Part) & 790/2 (Part)			
Toposheet No	58- J/10			
Highest Elevation	142m AMSL			
Latitude	10°40'36.02"N to 10°40'42.88"N			
Longitude	78°32'18.07"E to 78°32'26.38"E			
Proposed depth as per ToR	50m BGL			
Ultimate depth for five years	50m BGL			
Geological Resources	Rough stone		Gravel in	
	m ³	Tons	m ³	Tons
	27,60,069	75,90,193	40,001	80,002
Mineable Reserves	10,76,424	29,60,166	34,196	68,392
Proposed production for 5 years	9,81,104	26,98,036	34,196	68,392
Method of Mining	Open cast mechanized mining method			
Topography	Flat Terrain			
Machinery requirements	Jack hammer		3	
	Excavator		2	
	Compressor		1	
	Tipper		10	
Proposed Manpower Deployment	22			
Project Cost	Rs. 78,10,000/-			
Proposed Water Requirement	3.0 KLD			

Table 7.3 Salient Features of the Cluster E1

Name of the Quarry	S. Vijayakumar
Type of Land	Patta Land
Extent	2.65.2ha
S.F.No	789/1B
Toposheet No	58-J/10
Location of Project Site	10°40'37.86232"N to 10°40'44.89562"N 78°32'7.26062"E to 78°32'19.48800"E
Highest Elevation	125m AMSL
Ultimate depth of Mining	23m BGL
Geological Resources	Rough Stone in m ³ & Tons
	366028 & 1006577

Mineable Reserves	Rough Stone in m ³ & Tons	
	514848 & 1415832	
Proposed reserves for five years	Rough Stone in m ³ & Tons	
	366028 & 1006577	
Method of Mining	Open- Cast Mechanized mining	
Topography	Elevated Topography	
Machinery proposed	Jack Hammer	7
	Compressor	1
	Tipper	4
	Excavator	1
Proposed Manpower Deployment	28 Nos	
Project Cost	Rs.55,45,000/-	
Proposed Water Requirement	3.3 KLD	

7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from the proposed project have been given in Tables 7.4 and 7.5.

Table 7.4 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	5 Years in (m ³ & Ts)	Per Year in (m ³ & Ts)	Per Day in (m ³ & Ts)	Number of Lorry Load Per Day
P1	981104 & 2698036	196220 & 539607	726 & 1998	121
E1	366028 & 1006577	73205 & 201315	271 & 745	46
Grand Total	1347132 & 3704613	269425 & 740922	997 & 2743	167

Table 7.5 Cumulative Production Load of Gravel

Proposed Production Details				
Quarry	3 Years in (m ³ & Ts)	Per Year in (m ³ & Ts)	Per Day in (m ³ & Ts)	Number of Lorry Load Per Day
P1	34196 & 68392	11398 & 22797	42 & 84	7
E1	12852 & 25704	4284 & 8568	15 & 31	3
Grand Total	47048 & 94097	15682 & 31365	57 & 115	10

The cumulative study shows that the overall production of rough stone from the quarry is 997m³ or 2743Ts per day with a capacity of 167 trips of rough stone per day and gravel from the quarry is 57m³ or 115 Ts per day with a capacity of 10 trips of gravel per day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the proposed project on air environment of the cluster have been provided in Table 7.6. The cumulative values resulting from the project for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.6 Cumulative Impact Results from the proposed project

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	
PM _{2.5}	18.9	6.75	25.65
PM ₁₀	44.2	13.1	57.3

7.4.2 Noise Environment

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

Table.7.7 Cumulative Impact of Noise for one Cluster Projects

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	330	E	43.9	32.4	47.3	55
Habitation Near E1	650	E	45.2	28.5	47.2	
Cumulative Noise (dB (A))					47.2	

Source: Lab Monitoring Data

The cumulative analysis of noise due to cluster project shows that habitation will receive about 47.2dB(A) respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for day time.

Ground Vibrations

Cumulative results of ground vibrations due to mining activities from the cluster project have been shown in Table 7.8.

Table 7.8 Cumulative Effect of Ground Vibrations Resulting from cluster Project

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	69.93	330	1.467
E1	52.00	650	0.435
Total			1.902

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

7.4.3 Socio Economic Environment

Socio Economic benefits of the proposed project were calculated and the results have been shown in Table 7.9 the project together will contribute Rs. 10,00,000/-towards CER fund.

Table 7.9 Socio Economic Benefits from the Cluster Project

Location ID	Project Cost	CER Cost
P1	Rs. 78,10,000/-	Rs. 5,00,000
E1	Rs. 55,45,000/-	Rs. 5,00,000
Grand Total	Rs. 1,33,55,000/-	Rs. 10,00,000

Table 7.10 Employment Benefits for Cluster Project

Location ID	Employment
P1	22
E1	28
Grand Total	50

A total of 50 people will get employment from the cluster project.

7.4.4 Ecological Environment

Table 7.11 Greenbelt Development Benefits from the Cluster Project

Code	Number of Trees proposed	Area to be covered (m ²)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	2000	18,000	1600	<i>Azadirachta indica</i> , <i>Albizia lebbeck</i> , <i>Delonix regia</i> , <i>Tectona grandis</i> , etc.,
E1	1325	9685	5487	
Total	3325	27685	7087	

Cumulative studies show that the proposed project will plant about 3325 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Tectona grandis*, etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 7087 trees will survive in this green belt development program.

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

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

7.5.1 Objective

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

A detailed action plan to manage plastic waste has been provided in Table 7.12.

Table 7.12 Action Plan to Manage Plastic Waste

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

Source: Proposed by FAEs and EC

CHAPTER VIII

PROJECT BENEFITS

8.0 GENERAL

The proposed project at Kolathur Village, aims to produce **981104m³** or **2698036Ts** of rough stone and **34196m³** or **68392Ts** of gravel over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 22 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

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

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

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

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

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

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

8.5 OTHER TANGIBLE BENEFITS

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

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

8.6 CORPORATE SOCIAL RESPONSIBILITY

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

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

- ❖ Health Services Social Development
- ❖ Infrastructure Development
- ❖ Education & Sports
- ❖ Self-Employment
- ❖ CSR Cost Estimation
- ❖ CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Kolathur Village. CSR budget is allocated.

8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

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

01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is ≤ 100 crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 5,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

Table 8.1 CER Action Plan

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

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

8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs. 10,89,58,802** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget for Rough Stone (Rs.)	Budget for Gravel (Rs.)
CER	5,00,000	
Seigniorage @ Rs.90/m ³ of rough stone / Rs.56/m ³ of gravel	8,82,99,360	20,82,976
District Mineral Foundation Tax @ 10% of Seigniorage	88,29,936	2,08,297
Green Tax @ 10% of Seigniorage	88,29,936	2,08,297
Total	10,64,59,232	24,99,570

CHAPTER IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

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

10.1 ENVIRONMENTAL POLICY

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

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

10.1.1 Description of the Administration and Technical Setup

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

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

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

10.2 Budgetary Provision for Environmental Management

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

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost	Recurring Cost/annum
			(Rs.)	(Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	40000	40000
	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. 2,500 per unit recurring cost for maintenance	100000	10000
	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	450000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5,000/- per tipper/dumper deployed	60000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	20000
	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare	0	80000
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
	Total Air Environment		1050000	730000
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0

	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for Portable blaster shed	Installation of portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	240382
Total Noise Environment			50000	242382
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	41100	20550
Total Water Environment			41100	20550
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal).	45000	40000

		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Total Waste Management			50000	42000
Mine Closure	1. Progressive Closure Activity - Surface Runoff management	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	40000	20000
	2. Progressive Closure Activity 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	800000	40000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - 200 trees inside lease area & 300 trees outside the 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)	400000	60000
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	120000	12000

	4. Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 15% of the proposed closure cost will be spent during the final mine closure stage - Last Year	64000	0
	5. Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budget and not necessarily implemented in the Project Site	0	0
	Total Mine Closure		1424000	132000
	Condition Implementation of EC, Mining Plan & DGMS	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	10,000	1,000
		Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	0	50,000
		Workers will be provided with Personal Protective Equipment's	88,000	22,000
		Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions		
		Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms		
		Provision of PPE @ Rs. 4000/- per employee with recurring based on		

		wear and tear (say, @ Rs. 1000/- per employee) – 20 Employees		
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	22,000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/- for 2 kits	0	8,000
	Slope stability action plan	Slope stability action plan when depth beyond 30m BGL	2,00,000	0
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10,000	2,000
	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	2,00,000	40,000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30,000	5,000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR, 1961 @	0	7,80,000

		40,000/- for Manager & @ 25,000/- for Foreman / Mate		
Total Implementation of EC			538000	930000
TOTAL			31.53 Lakhs	20.96 Lakhs

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

Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year	Total Recurring Cost	Total EMP Cost
20.96	22.00	23.1	24.25	25.46	115.77Lakhs	20.96 + 115.77= 136.73Lakhs

In order to implement the environmental protection measures, an amount of **Rs. 31.53L** as capital cost and recurring cost as **Rs. 20.96L** 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. 136.73L** as shown in Table 10.2.

10.3 CONCLUSION

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

CHAPTER XI

SUMMARY AND CONCLUSION

11.1 INTRODUCTION

As the proposed rough stone and gravel mining project (P1) falls within the quarry cluster of 500 m radius with the total extent of 6.65.2ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No. 790/1B (P) & 790/2 (P) over the extent of 4.00.0ha is situated in the cluster falling in Kolathur Village, Srirangam Taluk, Tiruchirappalli District and Tamil Nadu. The quarries involved in the calculation of cluster extent are one proposed quarry, one existing quarry.

11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes from 10°40'36.02"N to 10°40'42.88"N and Longitudes from 78°32'18.07"E to 78°32'26.38"E in in Kolathur Village, Srirangam Taluk, Tiruchirappalli District and Tamil Nadu. According to the approved mining plan, about 9,81,104m³ & 26,98,036 Ts of rough stone and 34,196 m³ & 68,392 Ts of gravel will be mined up to the ultimate depth of 50m BGL in the five years. The quarrying operation is proposed to be carried out by opencast semi mechanized mining method involving drilling, blasting, and formation of benches of the prescribed dimensions.

11.3 DESCRIPTION OF THE ENVIRONMENT

Baseline data were collected to evaluate the existing environmental condition in the core and buffer areas during **October to December 2025** as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified **Excellence Laboratory** for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

11.3.1 Land Environment

Land use pattern of the area of 5 km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 11.1.

Table.11.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Water	10.70	0.13
2	Trees	14.74	0.18
3	Flooded Vegetation	6118.33	74.03
4	Crops	105.50	1.28
5	Built Area	1033.26	12.50
6	Mining area	4.20	0.05
7	Bare Ground	978.16	11.84
Total		8264.89	100.0

Source: Sentinel II Satellite Imagery

11.3.2 Soil Environment

Physical Characteristics & Chemical Characteristics

- pH ranged from 8.4 to 9.7 indicating that the soil is neutral to slightly alkaline, which is favourable for most crops.
- EC value ranged from 161 to 704 μ S/cm, suggesting low salt concentration and non-saline soil across the sampling area.

Physical Properties

- Bulk Density values ranged from 5.7 to 11.2g/cc, which are within the typical range for loamy soils and support good root penetration and aeration.

Soil Fertility Status:

- Total Organic matter levels ranged from 1.7 to 3.9% by weight, classifying soils as low to moderately fertile in terms of organic matter.
- Nitrogen (N) content varied from 0.07 to 1.1% by mass indicating moderate nitrogen availability.
- Potassium (K) ranged from 0.022 to 0.158% by mass moderate fertility potential in terms of potassium.

Base Elements and Cation Ratios:

- Calcium (Ca) levels were highest with 426mg/kg and lowest with 42mg/kg.
- Magnesium (Mg) ranged from <1.0mg/kg.

Conclusion:

The soils in the study area are generally non-saline, neutral to slightly alkaline, and moderately fertile with low contamination levels. They exhibit good permeability, porosity, and suitable textural classes for agriculture and greenbelt development. The absence of heavy metals confirms that baseline soil conditions are unpolluted and safe for reclamation and vegetation growth

11.3.3 Water Environment

Mettupatti, a key surface water body in the area, is characterized as an ephemeral lake, meaning it only holds water after rainfall events. A water sample, labelled as SW1, was collected from the lake, specifically 1.79 km southwest, to establish a baseline water quality assessment, as detailed in Table 3.8 and Figure 3.10.

Inference: The surface water quality when compared against CPCB standards does not meet the criteria for drinking water (Class A) but is suitable for irrigation (Class E). Surface water can infiltrate the ground and replenish groundwater reserves which are another important source of freshwater.

Physical Parameters:

The observation from the lab results given in Table 3.6 are as follows. The lab results for the water samples collected from the site as per IS 10500:2012 indicate that the basic physical and chemical parameters are within acceptable and permissible limits. The water is generally considered potable but there are potential issues related to hardness and alkalinity that could affect taste and potentially cause scaling in domestic equipment.

- The **pH** value ranges from 7.1 to 8.9 mg/L. The World Health Organization (WHO) and the Bureau of Indian Standards (BIS) recommend a pH range of 6.5 to 8.5 for drinking water and the values are within the acceptable limits.
- The **turbidity** value is less than 1 NTU which is within the acceptable limit of 1 NTU and permissible limit of 5 NTU indicating minimal presence of suspended particles.
- The **TDS levels** ranged from 569 to 1510 mg/L. In bore well water the TDS is higher than the WHO recommendation of 500 mg/l for drinking water. High TDS levels can affect the taste of water potentially making it salty or bitter. In the long-term excessive TDS can irritate the stomach and according to some health sources may lead to kidney stones and cardiac issues.

Chemical Parameters:

- The **calcium** levels range from 64 to 145 mg/L which is within the permissible limit of 200mg/L but slightly above the acceptable limit of 75mg/L. High calcium levels can cause scaling in domestic equipment, reduced detergent efficiency and potential health issues like constipation, gas and bloating.
- The **magnesium** levels range from 07 to 35 mg/L which is within both the acceptable and permissible limits. However, elevated magnesium levels can cause diarrheic and vomiting in children.
- The **chloride** levels range from 35 to 411 mg/L which is within the acceptable and permissible limits of 250 mg/L and 1000 mg/L respectively. Chloride levels exceeding permissible limits can cause a bitter taste in the water and contribute to corrosion.

- The **total alkalinity** levels ranging from 48 to 402 mg/L are slightly above the acceptable limit of 200 mg/L but within the permissible limit of 600 mg/L. Excessive alkalinity can impart a soda taste to the water.
- The **hardness** levels ranging from 110 to 488 mg/L, are within the permissible limit but higher than the acceptable limit. Hardness can lead to corrosion and scaling problems, increased soap consumption and a salty taste.

Overall, the water quality of Borewell and open well based on the analysed parameters is generally suitable for drinking purposes as per IS 10500:2012. However, the higher levels of calcium, alkalinity and hardness could potentially lead to some undesirable effects such as scaling in domestic appliances and a salty or soda taste. Further treatment might be needed to address these issues especially if the water is to be used for a wider range of applications.

11.3.4 Air Environment

As per the monitoring data PM_{2.5} ranges from 14.40µg/m³ to 16.79µg/m³, PM₁₀ from 40.64µg/m³ to 44.14µg/m³, SO₂ from 4.35µg/m³ to 5.42µg/m³, NO_x from 8.93µg/m³ to 11.15g/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index (AQI)

The AQI shows that the air quality of the study area falls within good category 42 causing minimal impact to human health.

11.3.5 Noise Environment

Noise level in core zone was 45.2dB (A) Leq during day time and 38.6dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 42.2 to 47.6dB (A) Leq and during night time from 36.7 to 42.4dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.3.6 Biological Environment

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

Flora in mine lease area (core zone)

The core zone presents in tree, shrubs, herbs and grasses. Taxonomically total of 18 species belonging to 11 families have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were Trees 5 (26%) followed by Shrubs 5 (26%), Herbs 8 (35%) and Climbers 3 (13%). The result of core zone of flora studies shows

that *Fabaceae* and *Amaranthaceae*, *Lamiaceae* are the main dominating species in the quarry lease area.

Flora in 10 km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because of nearby forest covers and agriculture land was found to dominate mostly in Northeast directions. There are 78 belonging to 41 families have been recorded from the buffer zone. Among the identified, floral (78) species were 26 (30%) trees, Shrubs 19 (19%) Herbs 19 (18%) & Climbers 5 (17%), Creepers & Grasses 13 (16%). According to the findings of the buffer zone flora studies, the dominant species in the study area are *Fabaceae*, *Asteraceae*, and *Euphorbiaceae* as shown in Table 3.22. Apart from the proposed project area, there is agricultural land. Horticulture and agricultural land are untouched. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Details of flora with the scientific name were mentioned in Table 3.22. A list of floral species has been prepared based on a primary survey (site observations) and discussion with local people. The total number of different plant life forms under trees, shrubs, herbs, and climbers is shown in Table 3.22.

Fauna in Core Zone

A total of 24 species were observed in the Core zone (Table. 3.24). Among them are 8 Insects, 5 Reptiles, 4 Mammals and 9 Avian. A total of 24 species belonging to 20 families were recorded from the core area. The study shows that number of species decreases towards the mining area. This might be due the lack of vegetation. None of these species in the core zone are threatened or endemic. The survey was conducted to identify species listed in IUCN Red List. According to the field data, any species are not of Schedule I and nine species are of schedule IV. There are no critically endangered, endangered, vulnerable and endemic species were observed.

11.3.7 Socio Economic Environment

The proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of people's standard of living.

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

11.4.1 Land Environment

Anticipated Impact

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

- ✚ Decrease in the agricultural productivity of the surrounding land due to soil quality degradation

Mitigation Measures

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

11.4.2 Water Environment

Anticipated Impact

- ✚ Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas
- ✚ As the proposed project acquires 4.0 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

Mitigation Measures

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

11.4.3 AIR ENVIRONMENT

Anticipated Impact

- ✚ 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

Mitigation Measures

Drilling

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

Haul Road and Transportation

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

Green Belt

- ✚ Planting of trees all along mine haul roads outside the lease 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

11.4.4 Noise Environment

Anticipated Impact

- ✚ Mining operations generate significant noise impacting both worker health and nearby communities.
- ✚ These impacts can range from annoyance and sleep disturbance to structural damage and hearing loss. Effective management of noise is crucial to mitigate these adverse effects.

Sources of Noise in Mining:

- ✚ **Drilling and Blasting:** Prolonged exposure to high-intensity noise from drilling and blasting can lead to hearing loss and other auditory problems
- ✚ **Heavy Machinery:** Excavators, haul trucks, and other equipment used in mining operations generate substantial noise.
- ✚ **Loading and Transportation:** The movement and handling of materials within the mine site contribute to noise pollution.

Mitigation Measures

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

- ✚ Usage of sharp drill bits while drilling which will help in reducing noise
- ✚ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- ✚ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- ✚ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system

- ✚ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ✚ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- ✚ Silencers / mufflers will be installed in all machineries
- ✚ Greenbelt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- ✚ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness
- ✚ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects

Ground Vibrations

Anticipated Impact

- ✚ Mining operations generate significant noise and vibration impacting both worker health and nearby communities.
- ✚ These impacts can range from annoyance and sleep disturbance to structural damage and hearing loss. Effective management of noise and vibration is crucial to mitigate these adverse effects.

Sources of Noise and Vibration in Mining:

- ✚ ***Drilling and Blasting:*** A primary source of both noise and ground vibrations, with the intensity dependent on the amount of explosives, atmospheric conditions and proximity to the blast.
- ✚ **Heavy Machinery:** Excavators, haul trucks, and other equipment used in mining operations generate substantial noise.
- ✚ **Loading and Transportation:** The movement and handling of materials within the mine site contribute to noise pollution.

Common Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ Blasting shelter will be provided as per DGMS guidelines

- ❖ Blasting operations will be carried out only during day time
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed
- ❖ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire
- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

11.4.5 Biological Environment

Impact on Ecology and Biodiversity

- ✚ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ✚ The Number of plants in the mining lease area is given in chapter 3 table 3.21 which vegetation in the lease area may be removed during mining.
- ✚ Carbon released from quarrying machineries and tippers during quarrying would be 718kg per day, 194005kg per year and 970026kg over ten years.

Mitigation Measures on Flora

- ✚ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.

- ✚ None of the plants in the lease area will be cut during operational phase of the mine. we recommend uprooting and planting of the 10 trees along the 7.5 m safety zone to prevent environmental pollution during quarrying. As the survival rate due to uprooting was only 30%, 100 seedlings will be procured at the rate of 10 seedlings per tree and planted in 7.5 m safety zone.
- ✚ Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- ✚ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 194005kg of carbon per year. Therefore, we recommend 500 planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ✚ As per the greenbelt development plan as recommended by SEAC (Table 4.12), about 2000 trees (Table 4.13) will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 2481383kg of the total carbon.

Anticipated Impact on Fauna

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

Mitigation Measures on Flora

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

11.4.6 Socio Economic Environment

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

11.4.7 Occupational Health

- ✚ All the persons will undergo pre-employment and periodic medical examination

- ✚ Employees will be monitored for occupational diseases by conducting medical tests: General physical tests, Audiometric tests, Full chest, X-ray, Lung function tests, Spiro metric tests, Periodic medical examination – yearly, Lung function test – yearly, those who are exposed to dust and Eye test
- ✚ Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost.
- ✚ The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

11.5 Environment Monitoring Program

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

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

11.6 ADDITIONAL STUDIES

11.6.1 Risk Assessment

The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project.

11.6.2 Disaster Management Plan

The objective of the disaster management plan is to make use of the combined resources of the mine and the outside services to:

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

11.6.3 Cumulative Impact Study

The results on the cumulative impact of the proposed project on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.

- ✚ The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time
- ✚ PPV resulting from the proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- ✚ The cluster project will allocate Rs. 10,00,000/- towards CER as recommended by SEAC
- ✚ The cluster project will directly provide jobs to 50 local people, in addition to indirect jobs
- ✚ The cluster project will plant 7087 about trees in and around the lease area

11.7 Project Benefits

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

- ✚ Direct employment to 22 local people
- ✚ Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- ✚ Strengthening of existing community facilities through the Community Development Program
- ✚ Skill development & capacity building like vocational training.
- ✚ Rs. 5,00,000 will be allocated for CER

11.8 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs. 31.53L** as capital cost and recurring cost as **Rs. 20.96L** 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. 136.73L** as shown in Table 10.2.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, **S. Vijayakumar** has engaged **Geo Technical Mining Solutions**, a NABET accredited consultancy for carrying out the EIA study as per the ToR issued.

Address of the consultancy:

No: 1/213B Natesan Complex,
Oddapatti, Dharmapuri – 636705,
Tamil Nadu, India.
Email: info.gtmsdpi@gmail.com
Web: www.gtmsind.com
Phone: 04342 232777.

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

S.No.	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
Approved Functional Area Experts & EC					
1.	Dr. S. Karuppannan	EIA Coordinator (EC) In-house	1(a)(i)	HG, GEO	B
2.	G. Prithiviraj	In-house, FAE	1(a)(i)	LU	B
3.	Dr. J. Rajarajeswari	Empanelled FAE	1(a)(i)	SC	B
4.	Dr. S. Malar	In-house, FAE	1(a)(i)	WP	B
5.	Dr. R. Arun Balaji	In-house, FAE	1(a)(i)	AP	B
6.	Dr. R. Arun Balaji	In-house, FAE	1(a)(i)	AQ	B
7.	Dr. R. Arun Balaji	In-house, FAE	1(a)(i)	NV	B
8.	Dr. J. Rajarajeswari	Empanelled FAE	1(a)(i)	EB	B
9.	Dr. G. Prabakaran	Empanelled FAE	1(a)(i)	SE	B
10.	J.N. Manikandan	Empanelled FAE	1(a)(i)	SHW, HW	B
Approved Functional Area Associates					
11.	R.Srikrishna	FAA	1(a)(i)	LU	B
12.	K. Ravichandran	FAA	1(a)(i)	HG	B
13.	C.Raghul	FAA	1(a)(i)	Geo	B
14.	P.Dhatchayini	FAA	1(a)(i)	AQ	B
15.	V. Malavika	FAA	1(a)(i)	HW, NV	B

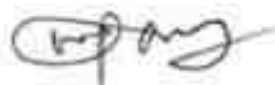
Team Members					
16.	M.Muralidharan	In-house, FAE	1(a)(i)	TM for FAE NV, HW	-
17.	A. Jothibas	In-house, FAE	1(a)(i)	TM for FAE AP, AQ	-

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

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

Signature

:



Date

:

Name

: Dr. S. Karuppannan

Designation

: EIA Coordinator

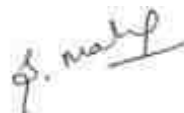
Name of the EIA Consultant Organization : Geo Technical Mining Solutions

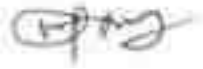
Period of Involvement

: Till date

We, the FAEs, FAAs and TM hereby declare that information furnished in this EIA/EMP report for. **S. Vijayakumar**, rough stone and gravel quarry project with the extent of 4.00.0ha situated in the cluster with the extent of 6.65.20ha in Kolathur Village, Srirangam Taluk, Tiruchirappalli District, and Tamil Nadu is true and correct to the best of our knowledge.

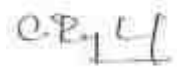
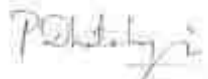
List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	- Identification of different sources of air pollution due to the proposed mine activity - Prediction of air pollution and propose mitigation measures / control measures	Dr. R. Arun Balaji	
2	WP	- Suggesting water treatment systems, drainage facilities - Evaluating probable impacts of	Dr. S. Malar	

		effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.		
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	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.	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. Prabakaran	
6	EB	○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna. ○ Suggesting species for greenbelt development.	J.Rajarajeshwari	

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

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	R. Srikrishna	LU	- Site visit with FAE - Provide inputs & Assisting FAE for LU	
2	C. Raghu	GEO	- Field visits along with FAE - Assistance to FAE in both primary and secondary data collection	
3	K. Ravichandran	HG	- Site visit with FAE - Provide inputs & Assisting FAE for HG	
4	P. Dhatchayini	AQ	- Site visit with FAE - Assistance to FAE in collection of both primary and secondary data	
5	V. Malavika	HW, NV	- Site visit with FAE - Assistance to FAE in collection of both primary and secondary data	

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 **S. Vijayakumar** rough stone and gravel quarry project with the extent of 4.00.0ha situated in the cluster with the extent of 6.65.2ha in Kolathur Village, Srirangam Taluk, Tiruchirapalli District, and Tamil Nadu is true and correct to the best of our knowledge.

Signature : 

Date :

Name : **Dr. S. Karuppannan**

Designation : Managing Partner

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

NABET Certificate No & Issue Date : NABET/EIA/23-26/RA 0319

Validity : Till 31.12.2026



File No: 12529
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA),
TAMIL NADU)



Dated 04/09/2025



To,

Thiru.S.Vijayakumar
 S/o. (Late) N.Swaminathan, No.10, Collector office road, Cantonment, Tiruchirappalli, Tamil Nadu-620001.
 vswaminathan334@gmail.com

Subject: Grant of Terms of Reference along with Public Hearing under the provision of the EIA Notification 2006, as amended -regarding.

Sir/Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference along with Public Hearing (ToR) for the Proposed Rough Stone and Gravel Quarry over an extent of 4.00.0 Ha of S.F. No. 790/1B (Part) & 790/2 (Part), of Kolathur Village, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu by Thiru. S. Vijayakumar – “B1” and Schedule S. No. 1(a) – ToR issued along with Public Hearing- preparation of EIA report – Regarding.

Ref: 1. Online proposal No. SIA/TN/MIN/546341/2025, Dated: 29.07.2025.

2. Minutes of the 602nd Meeting of SEAC held on 07.08.2025.

3. Minutes of the 876th Meeting of Authority held on 25.08.2025.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25B0108TN5769639N
(ii) File No.	12529
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals, 1(a) Mining of minerals
(vii) Name of Project	Kolathur Village Rough Stone and Gravel Mining Lease
(viii) Name of Company/Organization	SWAMINATHAN VIJAYAKUMAR
(ix) Location of Project (District, State)	TIRUCHIRAPPALLI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xi) Applicability of General Conditions	no
(xii) Applicability of Specific Conditions	no

1. In view of the particulars given in the Para 1 above, the project proposal inter alia including Form-1 (Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.
2. The above-mentioned proposal has been considered by SEIAA in the meeting held on 25.08.2025. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B,)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.
3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).
4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal **Thiru.S.Vijayakumar** under the provisions of EIA Notification, 2006 and as amended thereof.
5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
6. The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
7. This issues with the approval of the Competent Authority.
8. The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

Copy To

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Additional chief Secretary to Government, Environment and Forests Department, Tamil Nadu.
3. The Additional Chief Secretary to Government, Natural Resources Department, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai – 34.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
6. The Chair Person, TNPC Board, 76, Mount Salai, Guindy, Chennai-32
7. The District Collector, Tiruchirappalli District,
8. The Commissioner of Geology and Mines, Guindy, Chennai-32
9. Assistant Director, Department of Geology & Mining, Tiruchirappalli District,
10. EI Division, Ministry of Environment & Forests, Parivaran Bhawan, New Delhi.
11. File Copy.

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Seiaa Specific Conditions :

S. No	Terms of Reference
1.1	After detailed discussions, the Authority accepts the recommendation of SEAC-II and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 9,81,104m ³ of Rough Stone & 34,196m ³ up to the depth of 50m BGL and the annual peak production includes 2,37,250m ³ of Rough Stone & 13,280m ³ as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-II & normal conditions &

S. No	Terms of Reference
	the conditions mentioned in Annexure of this minutes.

2. Seac Conditions - Site Specific

S. No	Terms of Reference
2.1	1. A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: (i) Copy of the agreement forming CMC. (ii) The Organisation chart of the Committee with defining the role of the members (iii) The 'Standard Operating Procedures' (SoP) executing the planned activities. 2. The Boundary pillars to be erected as per the mine rules and the evidence should be submitted along with the EIA report. 3. The details of enumeration of structures including schools, colleges, primary health centers should be submitted along with the EIA report. 4. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & up to 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations. 5. The proponent shall furnish photographs of adequate fencing; garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan. 6. The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report. 7. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine. 8. The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures. 9. The PP shall prepare a conceptual action plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed and existing quarry wall.

3. Seac Standard Conditions

S. No	Terms of Reference
3.1	1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining

S. No	Terms of Reference
	(vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m. 2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site. 3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc. 4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry. 5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report. 6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site. 7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC. 8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level. 9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent. 10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site. 11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences. 12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines, 13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? 14. Quantity of minerals mined out. Highest production achieved in any one year Detail of approved depth of mining. Actual depth of the mining achieved earlier. Name of the person already mined in that leases area. If EC and CTO already obtained, the copy of the same shall be submitted. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.

S. No	Terms of Reference
	15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). 16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc., 17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan. 18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same. 19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment. 20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. 21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study. 22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind. 23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted. 24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. 25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided. 26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered. 27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided. 28. Impact on local transport infrastructure due to the Project should be indicated. 29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.

S. No	Terms of Reference
	30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific. 31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible. 32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner. 33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner 34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period. 35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period. 36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. 37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations. 38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation. 39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. 40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc. 41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCCB. 42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine. 43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	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
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given
1.3	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
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould 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)
1.5	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
1.6	Details about the land proposed for mining activities should be givenwith 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
1.7	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
1.8	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
1.9	The study rea 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
1.10	Land use of the study rea 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
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land

S. No	Terms of Reference
	area, distance from mine lease, its land use, R&R issues, if any, should be given
1.12	A 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 State Expert Appraisal Committees
1.13	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
1.14	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
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given
1.16	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
1.17	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
1.18	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
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)

S. No	Terms of Reference
1.21	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
1.22	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
1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map
1.24	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
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided
1.26	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
1.27	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
1.28	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 State Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished
1.29	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

S. No	Terms of Reference
1.30	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
1.31	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
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report
1.34	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
1.35	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
1.36	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
1.37	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
1.38	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
1.39	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
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given

S. No	Terms of Reference
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report
1.43	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
1.44	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) 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. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF 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. g) 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. h) 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. i) 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

SEIAA STANDARD CONDITIONS :

Cluster Management Committee

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

Agriculture & Agro-Biodiversity

9. Impact on surrounding agricultural fields around the proposed mining Area.
10. Impact on soil flora & vegetation around the project site.
11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP.

12. The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horti-cultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

Forests

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

Water Environment

19. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
20. Erosion Control measures.
21. 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.
22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
23. The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment, by the activities.
24. 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.
25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.
27. The EIA shall include the impact of mining activity on the following:
- a) Hydrothermal/Geothermal effect due to destruction in the Environment.
 - b) Bio-geochemical processes and its foot prints including Environmental stress.
 - c) Sediment geochemistry in the surface streams.

Energy

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

Climate Change

29. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.
31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.

Mine Closure Plan

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

EMP

33. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.
34. The Environmental Impact Assessment should hold detailed study on EMP with budget

for Green belt development and mine closure plan including disaster management plan.

Risk Assessment

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

Disaster Management Plan

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

Others

37. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.
38. 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.
39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the Environment. The ecological risks and impacts of plastic & microplastics on aquatic Environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

A. STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.

- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

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

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

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

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

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

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

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

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

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

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

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

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

13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.

29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
 - After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above-

mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.

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



Signature Not Verified

Digitally Signed by : A R Rahul Nadh IAS
Member Secretary, SEIAA

Date: 04/09/2025

From

Dr.A.Lalitha, M.Sc.,M.Phil., Ph.D.,
Assistant Director,
Geology and Mining,
Tiruchirappalli.

To

Thiru.S.Vijayakumar,
S/o. (Late) N.Swaminathan,
No.10, Collector Office Road,
Cantonment,
Tiruchirappalli - 620 001.

Rc.No.262/2025/Mines dated:05.06.2025.

Sir,

Sub: Mines and quarries - Minor minerals -
Tiruchirappalli District - Srirangam Taluk -
Kolathur Village - S.F.Nos.790/1B (P) & 790/2
(P) over an extent of 4.00.0 Hects. of Patta land
- Rough Stone and Gravel quarry permission
requested by Thiru.S.Vijayakumar, S/o. (Late)
N.Swaminathan Trichy - Precise area
communicated - Mining Plan approved - the
details of existing/abandoned quarries situated
within 500M radial distance requested by the
applicant - details furnished - Reg.

Ref: 1) Thiru.S.Vijayakumar, S/o. (Late)
N.Swaminathan Trichy District application
dated 12.03.2025.
2) Precise area communication letter Rc.No.520/
2021/Mines dated 03.06.2025.
3) Assistant Director of Geology and Mining,
Tiruchirappalli letter Rc No.262/2025/Mines
dated. 05.06.2025.
4) Thiru.S.Vijayakumar, S/o. (Late)
N.Swaminathan Trichy letter No. Nil dated
05.06.2025.

Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, Tiruchirappalli has applied for grant of quarry lease for quarrying Rough Stone and Gravel over an extent of 4.00.0 Hects. of patta lands in S.F.Nos.790/1B (P) & 790/2 (P) of Kolathur village, Srirangam Taluk, Tiruchirappalli District for a period of 10 years for Rough Stone and 3 years for Gravel under Rule 19 of Tamil Nadu Minor Mineral Concession Rules, 1959.

In the reference 2nd cited, The precise area communicated to the applicant Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan with a direction to produce the Mining Plan in respect of the lease applied area.

In the reference 3rd cited, the Assistant Director of Geology and Mining, Tiruchirappalli has approved the mining plan vide letter Rc.No.262/2025/Mines dated.05.06.2025.

In the reference 4th cited, the applicant Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan has requested to furnish the details of all quarries located within 500 Mt radius from the lease area for obtaining environmental Clearance from SEIAA.

Hence, the details of quarries situated within 500 M radial distance from the periphery of this proposed quarry are furnished as follows.,

Sl. No	Name of the lessee/applicant	Name of Village & Survey Number	Extent in Hectare	Lease Period
(i) Abandoned/Expired quarries				
1	Thiru.N.Swaminathan, S/o.Nallusamy Gounder, No.39, State Bank Colony, Kirappatti, Trichy -12	S.F.No.785/1,2 of Kulathur village, Srirangam Taluk	3.23.0 Hect.	5 Years 24.09.2005 to 23.09.2010
2	Thiru.K.Dharmadurai, S/o.Kandasamy (Late), Vittampatti, Kulathur Post, Pudukottai	S.F.No.322 (P) of Kulathur village, Srirangam Taluk	0.81.0 Hect.	5 Years 10.08.2009 to 09.08.2014
3	Tmt.V.Meena, W/o.S.Vijayakumar, No.10, Collector Office Road, Trichy -01.	S.F.No.786/2 of Kulathur village, Srirangam Taluk	1.35.5 Hect.	5 Years 19.11.2018 to 18.11.2023
(ii) Existing quarries				
1	Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, No.10, Collector Office Road, Cantonment, Tiruchirappalli - 620 001.	S.F.No.789/1B of Kolathur village, Srirangam Taluk	2.65.2	10 years (01.02.2023 to 31.01.2033)

(iii) Proposed quarries				
1	Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, No.10, Collector Office Road, Cantonment, Tiruchirappalli - 620 001.	S.F.Nos.790/1B (P) & 790/2 (P) of Kolathur village, Srirangam Taluk	4.00.0	10 years for Rough Stone & First 3 years for Gravel from the date of execution of lease deed
(iv) Future Proposed quarries				
1	-Nil-			

22.12.25
Assistant Director
Geology and Mining,
Tiruchirappalli.

22.12.25

From

Dr.A.Lalitha, M.Sc.,M.Phil., Ph.D.,
Assistant Director,
Geology and Mining,
Tiruchirappalli.

To

Thiru.S.Vijayakumar,
S/o. (Late) N.Swaminathan,
No.10, Collector Office Road,
Cantonment,
Tiruchirappalli – 620 001.

Rc.No.262/2025/Mines

Dated: 05.06.2025

Sir,

Sub: Mines and quarries – Minor minerals – Tiruchirappalli District – Srirangam Taluk – Kolathur Village – S.F.Nos.790/1B (P) & 790/2 (P) over an extent of 4.00.0 Hects. of Patta land – Rough Stone and Gravel quarry permission requested by Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, Trichy - Instructions for submitting approved mining plan and Environment clearance – Submission of mining plan for approval – Approved – Reg.

Ref: 1. Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, Trichy District application dated 12.03.2025
2. This office even Memo letter No. dated 03.06.2025
3. Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan Tiruchirappalli letter dated 04.06.2025 (Submission of Mining Plan)

In the reference 1st cited Thiru.S.Vijayakumar S/o. (Late) N.Swaminathan has requested for the grant of quarry lease of Rough Stone (10 years) and Gravel (3 years) to quarry over an extent of 4.00.0 Hects. of patta land in S.F.Nos.790/1B (P) & 790/2 (P) of Kolathur Village, Srirangam Taluk, Tiruchirappalli District.

In this connection, in the reference 2nd cited, Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan was directed to produce the mining plan for approval and to obtain environmental clearance from State level Environment Impact Assessment Authority for an extent of 4.00.0 Hects. of Patta land in S.F.Nos.790/1B (P) & 790/2 (P) of Kolathur Village,

Srirangam Taluk, Tiruchirappalli District for a period of Ten years for Rough stone and First Three years for quarrying Gravel.

In the reference 3rd cited, Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan has submitted three copies of Mining plan, prepared by Dr.S.Karuppannan. M.Sc., Ph.D., Qualified Person, Geo Technical Mining Solutions, No.1/213-B, Natesan Complex, Oddapatti, Collectorate Post Office, Dharmapuri - 636 705.

The Mining Plan submitted by Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, Trichy has been scrutinized as per the guidelines issued by the Commissioner of Geology and Mining, Chennai in his letter Rc.No.3868 / LC/2012 dated 19-11-2012 and based on the reports and records and accordingly as authorized by the Commissioner of Geology and Mining, Chennai in his letter dated 19.11.2012, I hereby approve the above said mining plan for the quantity of **9,81,104 CBM / 26,98,036 MT** for Rough stone for the period of first five years and **34,196 CBM / 68,392 MT** for Gravel for first three years.

This approval is 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 and 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 contempt jurisdiction.

(iv) Quarrying should be done as per the approved mining plan and that the mining 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.

Thiru.S.Vijayakumar, S/o. (Late) N.Swaminathan, Trichy is directed to produce Environmental Clearance from the State Level Environmental Impact Assessment Authority for the above applied area as per rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Encl: 2 Copies of Approved Mining Plan.

25/05/2010
Assistant Director
Geology and Mining,
Tiruchirappalli.

25/05/2010
05.6.25.

MINING PLAN

FOR

KOLATHUR VILLAGE ROUGH STONE AND GRAVEL MINING LEASE WITH
PROGRESSIVE QUARRY CLOSURE PLAN

Patta land /Open Cast-Semi-Mechanized Mining/Non- Forest/Non-Captive Use

Lease period 10 Years from the date of lease execution

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

LOCATION OF THE LEASE AREA

STATE : TAMILNADU
DISTRICT : TIRUCHIRAPPALLI
TALUK : SRIRANGAM
VILLAGE : KOLATHUR
EXTENT : 4.00.00 Hectares
S.F. No's : 790/1B (Part) & 790/2 (Part)



ADDRESS OF THE APPLICANT

Mr.S.VIJAYAKUMAR,

S/o.(Late) N.Swaminathan,
No.10, Collector Office Road,
Cantonment,
Tiruchirappalli District – 620 001.

This Mining Plan is approved subject to the conditions stipulated in this office Lr.No. 262 / 2025 / Mines., Dated: 05.06.2025. As per the Rule 41 & 42 of TNMMCR 1959.

ASSISTANT DIRECTOR
GEOLOGY & MINING
TIRUCHIRAPPALLI

PREPARED BY

Dr. S. KARUPPANNAN. MSc., Ph.D.

Qualified Person



GEO TECHNICAL MINING SOLUTIONS
(ANABET accredited & ISO certified Company)

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Handwritten signature



ANNEXURES

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1.	Copy of precise area communication letter	I
2.	Copy of FMB (Field Measurement book)	II
3.	Copy of "A" register & Adangal	III
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Shirahat

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LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Toposheet Map	I-B	1:1,00,000
4	Satellite Imagery Map	I-C	1: 5,000
5	Environmental Plan	I-D	1: 5,000
6	Mine Lease Plan	II	1:1000
7	Surface, Geological Plan	III	Plan 1:1000
8	Geological Sections	IIIA	Sections Hor 1:1000 Ver 1:100
9	Conceptual Plan	IV	Plan 1:1000
10	Conceptual Sections	IVA	Sections Hor 1:1000 Ver 1:100
11	Mine Layout Plan and Land Use Pattern	V	Plan 1:1000
12	Year wise Development, Production Plan	VI	Plan 1:1000
13	Year wise Development & Production Sections	VIA	Sections Hor 1:1000 Ver 1:100
14	Progressive Quarry Clouser Plan	VII	Plan 1:1000
15	Progressive Quarry Clouser Sections	VIIA	Sections Hor 1:1000 Ver 1:100

Mr.S.Vijayakumar,
S/o.(Late) N.Swaminathan,
No.10, Collector Office Road,
Cantonment,
Tiruchirappalli District - 620 001.



CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry lease in patta land at S.F.No's: 790/1B (Part) & 790/2 (Part), over an extent of 4.00.00 hectares of Kolathur Village, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu State has been prepared by

Dr. S. KARUPPANNAN. M.Sc., Ph.D. (Qualified Person)

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

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

Qualified Person

GEO TECHNICAL MINING SOLUTIONS

(A NABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

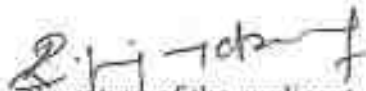
E-mail: info.gtmsdpi@gmail.com,

Website: www.gtmsind.com

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

Place: Tiruchirappalli, TN.

Date:


Signature of the applicant
(S.Vijayakumar)

Mr.S.Vijayakumar,
S/o.(Late) N.Swaminathan,
No.10, Collector Office Road,
Cantonment,
Tiruchirappalli District – 620 001.



DECLARATION

The Mining Plan in respect of rough stone and gravel quarry lease in Patta land at S.F.No's: 790/1B (Part) & 790/2 (Part) over an extent of 4.00.00hectares of Kolathur Village, Srirangam Taluk, Tiruchirappalli 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: Tiruchirappalli, TN.
Date:


Signature of the applicant
(S.Vijayakumar)

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

Qualified Person

GEO TECHNICAL MINING SOLUTIONS

(A NABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

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

Website: www.gtmsind.com



CERTIFICATE

This is to certify that, the provisions of 19(1) & 20 Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone and gravel quarry lease in S.F.No's: 790/1B (Part) & 790/2 (Part), over an extent of 4.00.00hectares of Kolathur Village, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu State granted to **Mr. S.Vijayakumar**, Tiruchirappalli District.

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

Place: Dharmapuri, TN

Date:

Signature of the Qualified Person

DR.S.KARUPPANNAN, M.Sc., Ph.D.
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, TamilNadu, India

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

Qualified Person

GEO TECHNICAL MINING SOLUTIONS

(A NABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

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

Website: www.gtmsind.com



CERTIFICATE

I certify that, in preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No's: 790/1B (Part) & 790/2 (Part), over an extent of 4.00.00hectares of Kolathur Village, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu State prepared to **Mr.S.Vijayakumar**, Tiruchirappalli District, covers all the provisions of Mines Act, Rules, and Regulations etc., made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date:

Signature of the Qualified Person

Dr. S. KARUPPANNAN, M.Sc., Ph.D.
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
A NABET Accredited and ISO Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office, Oddapatti,
Tiruchirappalli District, Tamil Nadu, India

MINING PLAN

FOR KOLATHUR VILLAGE ROUGH STONE AND GRAVEL MINING LEASE

PROGRESSIVE QUARRY CLOSURE PLAN

Patta land / Open cast-Semi-Mechanized Mining/Non-forest/Non-Captive Use

Lease period 10 Years from the date of lease execution

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



INTRODUCTORY NOTES:

- a) **Introduction:** The Mining plan with progressive quarry closure plan is prepared for Mr.S.Vijayakumar, S/o.(Late) N.Swaminathan, No.10, Collector Office Road, Cantonment, Tiruchirappalli District – 620 001, Tamilnadu State and filed with application for new proposals has submitted to the Department of Geology and Mining (ADG & M), Tiruchirappalli, dated 12.03.2025 had requested to grant the quarry lease for rough stone and gravel in S.F.No's: 790/1B (Part) & 790/2 (Part) over an extent of 4.00.00hectares of Kolathur Village, Srirangam Taluk, Tiruchirappalli District, Tamil Nadu State.
- b) **The Precise area communication letter:** The Assistant Director, Department of Geology and mining, Tiruchirappalli has directed to the applicant Mr.S.Vijayakumar through his precise area communication letter vide **Roc.No.262/2025/Mines Dated 03.06.2025**, for quarrying lease rough stone and gravel at Tamil Nadu State, Tiruchirappalli District, Srirangam Taluk, Kolathur Village in S.F.No's: 790/1B (Part) & 790/2 (Part) over an extent of 4.00.00hectares has recommended as following conditions for a period of Ten (10) years under Rule 19(1) & 20 Tamil Nadu Minor Mineral concession rules, 1959.
- While quarrying should not hindrance to nearby patta lands and the public.
 - Quarrying work should be carried out with a safety distance of 7.5 meters for the Patta lands adjacent to the applied lease area.
 - Child labor should not be employed.
 - Quarry workers should be registered with the Tamil Nadu Labour Welfare Board and group insurance should be ensured.
 - As instructed by the Director, Department of Geology and Mining, Chennai vide letter No. 2735/MM2/2020 dated 28.08.2020, after the completion of the quarry work, the lessees in the quarry area should re-establish the land in such a way that grass and plants grow again and produce fodder for animals at their own expense.

vi. As per the letter of the Director, Department of Geology and Mining, Chennai, letter No. 2921/MM4/2016 dated:09.03.2021, the applicant should conduct DGPS Survey of the above area at his own cost with the company's own agency, prepare and submit a mining plan.

- c) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 and submitted under rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for mining lease as per conditions mentioned in the precise area communication letter **Roc.No.262/2025/Mines Dated 03.06.2025.**
- d) **Geological resources and Mineable reserves:** Geological resource of estimated as **2800070m³/7670195MT**(Note: MT = Metric Ton) including the resources of safety zone, gravel etc. Of which, rough stone resources of about **2760069m³ / 7590193MT** and gravel is **40001m³/ 80002MT**. The total mineable reserve is estimated to be **1110620m³ / 3028558MT** by deducting the reserve safety zone, block in benches from the total Geological resources. of which, rough stone is about **1076424m³/ 2960166MT** and gravel is **34196m³ / 68392MT** up to a depth of 70m below ground level (Refer Plate No. IIIA & IVA).
- e) **Proposed Production Schedule:** Total proposed production of rough stone is **981104m³/ 2698036MT** and gravel is **34196m³ / 68392MT** up to a depth of 50 m below ground level for five years plan period. (Refer Plate No. VIA).
- f) **Environmental Sensitivity of the proposed lease area: -**
- Interstate boundary:** There is no interstate boundary around 10Km radius periphery of proposed lease area.
 - Wildlife Sanctuaries any:** There is no wild life sanctuary situated around 10km radius from the lease area.
 - Forest (conservation) Act, 1980:** No forest land granted for quarrying and there is no reserve forest around 60m radius.
 - CRZ Notification, 2019:** There is no Sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 2019.
- h) **Environmental measures to be adopted during the ongoing activity period,**
- Usage of sharp drill bits while drilling which will help in reducing noise.
 - Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.
 - Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.

Signature



- d. Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.
- e. Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- f. Transportation of material will be carried out during day time and material will be covered with tarpaulin.
- g. The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- h. And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

a.	Name of the Applicant	:	Mr. S.Vijayakumar,
	Applicant address	:	S/o.(Late) N.Swaminathan, No.10, Collector Office Road, Cantonment,
	District	:	Tiruchirappalli.
	State	:	Tamilnadu
	Pin code	:	620 001
	Phone	:	+91 99655 48005
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	.....
b.	Status of the Applicant		
	Private individual	:	Private Individual
	Cooperative Association	:	---
	Private company	:	---
	Public Company	:	---
	Public Sector Undertaking	:	---
	Joint Sector Undertaking	:	---
	Other (pl. specify)	:	---
c.	Mineral(s) Which are occurring in the area and which the applicant intends to mine	:	Rough Stone and Gravel Quarry Lease
d.	Period for which the mining lease granted /renewed/ proposed to be applied	:	The precise area has been communicated to the applicant for quarrying period of Ten (10) Years.
e.	Name of the QP preparing the Mining Plan	:	Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,

Shirahant

	Address	:	Geo Technical Mining Solutions (A NABET Accredited & ISO certified Company) No: 1/213-B, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
	Fax	:	Nil
	e-mail	:	info.gtmsdpi@gmail.com
	Telex	:	Nil
f.	Name of the prospecting agency	:	Geo Technical Mining Solutions GSR 286(E) No:272, Ministry of Mines Notification 7th April 2022.
	Address	:	No: 1/213-B, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705
	Phone	:	+91 9443937841, 7010076633
g.	Reference No. and date of consent letter from the state government.	:	The precise area communication letter issued by the Deputy Director (i/c), Department Geology and Mining, Tiruchirappalli vide Roc.No.262/2025/Mines Dated 03.06.2025.



2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB				
	District & State	:	Tiruchirappalli, Tamil Nadu				
	Taluk	:	Walajabad				
	Village	:	Devariambakkam				
Khasra No./ Plot No./ Block Range/ Felling Series etc.:							
S.No	Survey No	Sub Division	Total Extent in Hect	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F.No.	Mine lease Applied area out of total area in hect.
1	790	1B	3.45.34	4840	Vijayakumar S/o	790/1B(P)	1.60.20
2	790	2	3.45.34	2475	Swaminathan	790/2(P)	2.39.80
Total			1.55.00				4.00.00
Lease area (hectares)				:	4.00.00Hectares		



Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	The proposed lease area is recorded as patta land. Copy of land documents are enclosed. (Ref.Anne.No's: III & IV)																																	
Ownership / Occupancy	:	This is a patta land S.F.No's. 790/1B (Part) & 790/2 (Part) is registered on the name of Vijayakumar S/o Swaminathan vide patta no.4840 & 2475.																																	
Existence of Public Road / Railway line if any nearby and approximate distance	:	✓ Exploited quarry materials will be transported through the approach road is situated on the west side. ✓ There is an MDR-789 is situated on the southern side about 238m which is connecting Thirumukudal - Nelvoy Road.																																	
Toposheet No. with latitude and longitude	:	Toposheet No. 58 J/10 Latitude: From 10°40'36.02"N to 10°40'42.88"N Longitude: From 78°32'18.07"E to 78°32'26.38"E																																	
Geo-Coordinates of the lease boundary:																																			
<table border="1"> <thead> <tr> <th>S.No</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr><td>1</td><td>10°40'40.96"N</td><td>78°32'26.38"E</td></tr> <tr><td>2</td><td>10°40'36.02"N</td><td>78°32'25.46"E</td></tr> <tr><td>3</td><td>10°40'36.20"N</td><td>78°32'22.13"E</td></tr> <tr><td>4</td><td>10°40'36.43"N</td><td>78°32'18.07"E</td></tr> <tr><td>5</td><td>10°40'37.49"N</td><td>78°32'18.36"E</td></tr> <tr><td>6</td><td>10°40'38.92"N</td><td>78°32'18.55"E</td></tr> <tr><td>7</td><td>10°40'39.25"N</td><td>78°32'18.44"E</td></tr> <tr><td>8</td><td>10°40'41.33"N</td><td>78°32'18.99"E</td></tr> <tr><td>9</td><td>10°40'42.88"N</td><td>78°32'19.50"E</td></tr> <tr><td>10</td><td>10°40'41.77"N</td><td>78°32'23.47"E</td></tr> </tbody> </table>			S.No	Latitude	Longitude	1	10°40'40.96"N	78°32'26.38"E	2	10°40'36.02"N	78°32'25.46"E	3	10°40'36.20"N	78°32'22.13"E	4	10°40'36.43"N	78°32'18.07"E	5	10°40'37.49"N	78°32'18.36"E	6	10°40'38.92"N	78°32'18.55"E	7	10°40'39.25"N	78°32'18.44"E	8	10°40'41.33"N	78°32'18.99"E	9	10°40'42.88"N	78°32'19.50"E	10	10°40'41.77"N	78°32'23.47"E
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Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is an barren Land.																																	
b. <i>Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. It is preferred that the area to be</i>	:	Refer plate no-IA & IB																																	

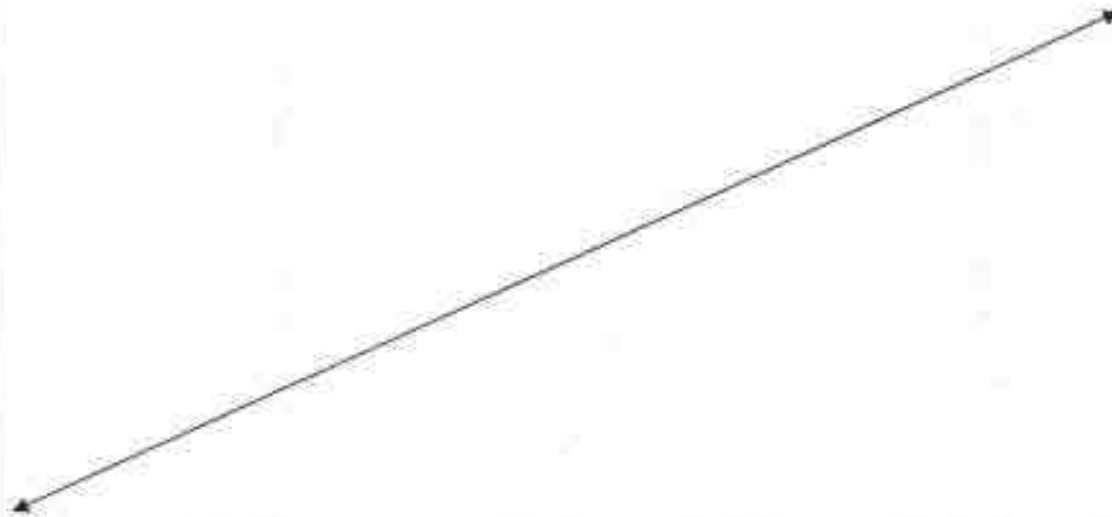
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marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.



i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Inamkulathur	2.70Km	North
b.	Nearest police station	Inamkulathur	2.70km	North
c.	Nearest fire station	Tiruchirapalli	18km	NE
d.	Nearest medical facility	Inamkulathur	2.70Km	North
e.	Nearest school	Inamkulathur	2.70Km	North
f.	Nearest railway station	Inamkulathur	2.70Km	North
g.	Nearest port facility	Tuticorin	215km	South
h.	Nearest airport	Tiruchirapalli	20km	NE
i.	Nearest DSP office	Tiruchirappalli	15.5km	Northwest
j.	Nearest villages	Chinna Alampatti	1.0km	North
		Kadappatti	0.6km	East
		Kalkudi	0.6km	South
		Mettuppatti	1.12km	West



PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

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

(i)	Topography	:	The proposed lease area is flat topography. The maximum elevation (142m) was observed Northwest side of the site. The slope is towards south east side and falls in Toposheet no. 58J/10
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(ii)

a) Geology of the District:

Crystalline rocks of Archaean to late Proterozoic age occupy over 80% of the area of the Tamilnadu, while the rest is covered by Phanerozoic sedimentary rocks mainly along the coastal belt and in a few inland river valleys. The hard rock terrain comprises predominantly of Charnockite and Khondalite groups and their migmatitic derivatives, supracrustal sequences of Sathyamangalam and Kolar groups and Peninsular Gneissic Complex (Bhavani Group), intruded by ultramafic complexes, basic dykes, granites and syenites. The sedimentary rocks of the coastal belt include fluviatile, fluvio-marine and marine sequences, such as Gondwana Supergroup (Carboniferous to Permian and Upper Jurassic to Lower Cretaceous), marine sediments of Cauvery basin (Lower Cretaceous to Paleogene), Cuddalore/Panambarai Formation (Mio-Pliocene) and sediments of Quaternary and Recent age. Order of superposition of the proposed lease area,

b) Soils:

The analysis of the soil type reveals that the proposed lease area is predominantly covered by river alluvium is transported and is seen in coastal area.

c) Lineaments:

The general trend of the gneiss is NE-SW direction and the regional trend observed is NNE- SSW to NW-SE direction. The deposition of Gondwana rocks, the sedimentary rocks, in faulted troughs and in the rugged topography of crystalline rocks took place during jurassic period. The insitu soils laterites and alluvial deposits were deposited along the Cauvery rivers during the quaternary period. The data have been checked by field studies and survey of India topographical maps at the 1: 1,00,000 scale.

Order of superposition of the proposed lease area,

	Age	Group	Rock Formation
	Recent	Alluvium and beach sands	Sand, gravel, silt and clay
	Pleistocene	Laterite, soils, talus	Laterites, sandy clay, silt
	-----Unconformity-----		
	Archean	Charnockite Group	Pyroxene Granulite, Charnockite (acid to intermediate)/ Crystalline limestone / Quartzite
	Lower Cretaceous to Jurassic	Sandstones & Shales	Fine to medium grained sand stone with clay intercalations of greenish soft shale
	Archean	Crystalline formations	Charnockites, granites and associated basic and ultrabasic intrusive
(iii)	Local / Mine Geology of The Mineral Deposit: Topography of the proposed lease area: The applied lease area exhibits an flat topography and The maximum elevation (142m) was observed northwest side of the site. The rocks exhibits layered, medium to coarse grained hornblende biotite, orthopyroxene granitic gneiss. The Gravel is obtained the average of 0-1.0m and a rough stone starts from 1.0m to 70m (R.L.142m – 72m) from the surface level. The Surface plan showing elevation, contour, accessibility road and Geological map was prepared the proposed lease area. Mode of origin: The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures. Physiography of the rocks: Dark colour and clouding of the feldspars are typical features of these rocks as bluish in quartz. 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 microcline and orthoclase, the fine micro perthitic texture being common. Order of superposition of the proposed lease area,											
	<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>Fine to medium grained clayey soil</td></tr> <tr> <td>Archaean</td><td>Charnockite Group</td><td>Charnockites</td></tr> </tbody> </table>	Age	Group	Rock Formation	Recent to Sub recent	—	Fine to medium grained clayey soil	Archaean	Charnockite Group	Charnockites	★
Age	Group	Rock Formation									
Recent to Sub recent	—	Fine to medium grained clayey soil									
Archaean	Charnockite Group	Charnockites									
(iv)	Drainage Pattern	: There is no major river found within 50m radius. The drainage in the area is sub-dendritic in nature.									

(b)	<i>The topographic plan of the lease area prepared on a scale of 1 :1000 or 1 : 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:</i>	
	a. Present status:	: The QP examined the surface features during survey. It is a fresh quarry lease.
	b. Surface Plan	: Surface plan showing elevation contour and accessibility road was prepared at the scale of 1: 1000, as shown in Plate No. III.
(c)	Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:	: Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:1000, as shown in Plate No. IIIA
(d)	<i>Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below:-</i> No future programmed proposed in this area. Its massive homogeneous parent rock. Hence exploration proposal is not required to this mining project.	

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

The geological resources were computed by cross section method with respect to the boundaries of the lease area. In this method, the lease area was divided into three longitudinal and three transverse section to calculate the volume of material up to the depth of 70m below ground level for ten years plan period. (Refer Plate No. III & IIIA). The one longitudinal and one transverse cross section were assigned XY-AB as respectively. Using the cross-sectional

Signature

method, total reserve is estimated to be $2800070\text{m}^3 / 7670195\text{ MT}$ including the resources of safety zone, and gravel, etc. Of which, rough stone resources of about $2760069\text{m}^3 / 7590193\text{ MT}$ and gravel is $40001\text{m}^3 / 80002\text{ MT}$.

GEOLOGICAL RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M^3	Rough Stone in M^3	Gravel in M^3	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	221	181	1	40001	.....	40001	2	.....	80002
	I	221	181	4	160004	160004	.....	2.75	440011	.....
	II	221	181	5	200005	200005	.....	2.75	550014	.....
	III	221	181	5	200005	200005	.....	2.75	550014	.....
	IV	221	181	5	200005	200005	.....	2.75	550014	.....
	V	221	181	5	200005	200005	.....	2.75	550014	.....
	VI	221	181	5	200005	200005	.....	2.75	550014	.....
	VII	221	181	5	200005	200005	.....	2.75	550014	.....
	VIII	221	181	5	200005	200005	.....	2.75	550014	.....
	IX	221	181	5	200005	200005	.....	2.75	550014	.....
	X	221	181	5	200005	200005	.....	2.75	550014	.....
	XI	221	181	5	200005	200005	.....	2.75	550014	.....
	XII	221	181	5	200005	200005	.....	2.75	550014	.....
	XIII	221	181	5	200005	200005	.....	2.75	550014	.....
	XIV	221	181	5	200005	200005	.....	2.75	550014	.....
TOTAL					2800070	2760069	40001	.....	7590193	80002
GRAND TOTAL					2800070	2760069	40001	.....	7590193	80002

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

The total mineable reserve is estimated to be $1110620\text{m}^3 / 3028558\text{ MT}$ by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 70m below ground level. Of which, rough stone is about $1076424\text{m}^3 / 2960166\text{ MT}$ and gravel is $34196\text{m}^3 / 68392\text{ MT}$. The commercially viable rough stone has been prepared on 1:1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:1000 as vertical axis (Refer plate no's. IV & IVA).

MINEABLE RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in M^3	Rough Stone in M^3	Gravel in M^3	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	206	166	1	34196	.....	34196	2	.....	68392
	I	206	166	4	136784	136784	.....	2.75	376156	.....
	II	196	156	5	152880	152880	.....	2.75	420420	.....
	III	186	146	5	135780	135780	.....	2.75	373395	.....
	IV	176	136	5	119680	119680	.....	2.75	329120	.....
	V	166	126	5	104580	104580	.....	2.75	287595	.....
	VI	156	116	5	90480	90480	.....	2.75	248820	.....
	VII	146	106	5	77380	77380	.....	2.75	212795	.....

Signature

VIII	136	96	5	65280	65280	.....	2.75	179520	.....
IX	126	86	5	54180	54180	.....	2.75	148995	.....
X	116	76	5	44080	44080	.....	2.75	121220	.....
XI	106	66	5	34980	34980	.....	2.75	96195	.....
XII	96	56	5	26880	26880	.....	2.75	73920	.....
XIII	86	46	5	19780	19780	.....	2.75	54395	.....
XIV	76	36	5	13680	13680	.....	2.75	37620	.....
TOTAL				1110620	1076424	34196	.....	2960166	68392
GRAND TOTAL				1110620	1076424	34196	.....	2960166	68392

4.0 MINING:

a)	Briefly describe the existing / proposed method for developing / working the deposit with all design parameters. (Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)	:	The mining operation is open-cast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961, in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.
----	---	---	--

b) **Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.**
 Total proposed production rough stone is about **981104m³ / 2698036MT** and gravel is **34196m³ / 68392MT** up to a depth of 50m below ground level for five years plan period. (Refer Plate No's. VI & VIA).

Year	Pit No.(s)	Topsoil/Overburden (m ³)	ROM (MT)	Saleable rough stone (MT) @ 100%	Rough stone rejects (MT)	Sub grade/ Weathered rock (MT)	Saleable Gravel (MT)	Rough stone to waste ratio
I	I	...	606040	579480	...	...	26560	...
II	I	...	644346	622766	...	...	21580	...
III	I	...	604692	584440	...	...	20252	...
IV	I	...	461615	461615	...	...	...	...
V	I	...	449735	449735	...	...	...	...
Total	---	---	2766428	2698036	---	---	68392	---

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

Signature

YEARWISE PRODUCTION RESERVES

Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In m ³	Rough Stone In m ³	Gravel In m ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
I-YEAR	XY-AB	I	80	166	1	13280	.....	13280	2	.....	26560
		I	80	166	4	53120	53120	.....	2.75	146080	.....
		II	70	156	5	54600	54600	.....	2.75	150150	.....
		III	60	146	5	43800	43800	.....	2.75	120450	.....
		IV	50	136	5	34000	34000	.....	2.75	93500	.....
		V	40	126	5	25200	25200	.....	2.75	69300	.....
		TOTAL									
II-YEAR	XY-AB	I	65	166	1	10790	.....	10790	2	.....	21580
		I	65	166	4	43160	43160	.....	2.75	118690	.....
		II	65	156	5	50700	50700	.....	2.75	139425	.....
		III	65	146	5	47450	47450	.....	2.75	130488	.....
		IV	65	136	5	44200	44200	.....	2.75	121550	.....
		V	65	126	5	40950	40950	.....	2.75	112613	.....
		TOTAL									
III-YEAR	XY-AB	I	61	166	1	10126	.....	10126	2	.....	20252
		I	61	166	4	40504	40504	.....	2.75	111386	.....
		II	61	156	5	47580	47580	.....	2.75	130845	.....
		III	61	146	5	44530	44530	.....	2.75	122457	.....
		IV	61	136	5	41480	41480	.....	2.75	114070	.....
		V	61	126	5	38430	38430	.....	2.75	105682	.....
		TOTAL									
IV-YEAR	XY-AB	VI	156	116	5	90480	90480	.....	2.75	248820	.....
		VII	146	106	5	77380	77380	.....	2.75	212795	.....
		TOTAL									
V-YEAR	XY-AB	VIII	136	96	5	65280	65280	.....	2.75	179520	.....
		IX	126	86	5	54180	54180		2.75	148995	
		X	116	76	5	44080	44080		2.75	121220	
				TOTAL							
		GRAND TOTAL									

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திருச்சிராப்பள்ளி, திருச்சி

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S. H. J.

d)	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	: Composite plan not prepared in this proposed lease area																																															
c)	<i>Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:</i> At this rate of production, the expected life of quarry is calculated as given below: <u>Rough stone:</u> Mineable reserves of rough stone (5 Years) = 981104m³ / 2698036 MT Annual Peak production = 226460m³ / 622766 MT <u>Gravel:</u> Mineable reserves of gravel = 34196m³ / 68392 MT																																																
f)	<i>Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:</i>																																																
i)	Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame:	: Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about up to a depth of 70m below ground level (R.L.142m to 72m) from the petrogenetic character of the charnockite rock as well as from the actual mining practice in the area and with the current trend of rough stone production the quarry may sustain for 10 years.																																															
ii)	Whether ultimate pit limit has been determined and demarcated on surface and geological plan :- The ultimate pit limit has been determined and demarcated in the conceptual plan <table border="1"> <thead> <tr> <th colspan="6">SECTION XY-AB</th> </tr> <tr> <th>Bench</th> <th>Period</th> <th>Overburden/ Mineral</th> <th>L (m)</th> <th>W (m)</th> <th>D (m)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td rowspan="8">First Five years Period</td> <td rowspan="2">Gravel</td> <td>206</td> <td>166</td> <td>1</td> </tr> <tr> <td>I</td> <td>206</td> <td>166</td> <td>4</td> </tr> <tr> <td>II</td> <td rowspan="6">Rough stone</td> <td>196</td> <td>156</td> <td>5</td> </tr> <tr> <td>III</td> <td>186</td> <td>146</td> <td>5</td> </tr> <tr> <td>IV</td> <td>176</td> <td>136</td> <td>5</td> </tr> <tr> <td>V</td> <td>166</td> <td>126</td> <td>5</td> </tr> <tr> <td>VI</td> <td>156</td> <td>116</td> <td>5</td> </tr> <tr> <td>VII</td> <td>146</td> <td>106</td> <td>5</td> </tr> </tbody> </table>		SECTION XY-AB						Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)	I	First Five years Period	Gravel	206	166	1	I	206	166	4	II	Rough stone	196	156	5	III	186	146	5	IV	176	136	5	V	166	126	5	VI	156	116	5	VII	146	106	5
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		VIII			136	96	5	
		IX			126	86	5	
		X			116	76	5	
		Total Depth						50
		XI	Second Five years Period	Rough stone	106	66	5	
		XII			96	56	5	
		XIII			86	46	5	
		XIV			76	36	5	
		Total Depth						20
iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: -	: The recovery of rough stone in this quarry is 100%. There is no waste rock will be proposed in this lease area.						
iv)	Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal: -	: As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.						
v)	Whether post mining land use envisaged: -	: At the end of mining activities over the quarry pit may be utilized for storage of rain water and may be converted in to dumping yards for solid waste by adopting suitable technologies.						
g)	Open cast mining							
i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	: It is a fresh quarry lease. The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 5m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.						
ii)	Describe briefly the layout of	The rough stone is proposed to quarry at 5m bench height & width conventional opencast						



	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	semi mechanized quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste and are removal using Hydraulic excavator and loaded directly to the tippers and transported to the needy customer. Bench height = 5mts. Bench width = 5mts.																					
	a. Details of Topsoil/ Overburden	No separate of topsoil will be removed																					
	b. Rough Stone waste and side burden waste:-	The recovery of rough stone in this quarry is 100%. There is no rough stone waste or side burden will be removed.																					
H	Underground Mining	Not applicable																					
i)	Extent of mechanization: Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations																						
	(1) Drilling Machines: Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Details of drilling equipment's are given below.																						
	<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>3</td><td>32 mm</td><td>Hand held</td><td>--</td><td>Diesel</td><td>--</td></tr> <tr> <td>Compressor</td><td>1</td><td>--</td><td>Air</td><td>--</td><td>Diesel</td><td>--</td></tr> </tbody> </table>	Type	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.	Jack Hammer	3	32 mm	Hand held	--	Diesel	--	Compressor	1	--	Air	--	Diesel	--	
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	(2) Loading Equipment: <table border="1"> <thead> <tr> <th>Type</th><th>Nos</th><th>Size / Capacity</th><th>Make</th><th>Motive power</th><th>H.P.</th></tr> </thead> <tbody> <tr> <td>Hydraulic Excavator</td><td>2</td><td>2.9-4.5m³</td><td>--</td><td>Diesel</td><td>--</td></tr> </tbody> </table>		Type	Nos	Size / Capacity	Make	Motive power	H.P.	Hydraulic Excavator	2	2.9-4.5m ³	--	Diesel	--									
Type	Nos	Size / Capacity	Make	Motive power	H.P.																		
Hydraulic Excavator	2	2.9-4.5m ³	--	Diesel	--																		
	(3) Haulage and Transport Equipment (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>10</td><td>--</td><td>--</td><td>Diesel</td><td>--</td></tr> </tbody> </table>	Type	Nos	Size / Capacity	Make	Motive power	H.P.	Tipper	10	--	--	Diesel	--										
Type	Nos	Size / Capacity	Make	Motive power	H.P.																		
Tipper	10	--	--	Diesel	--																		
	Whether the dumpers are fitted with exhaust conditioner should be indicated: The dumpers not used in this quarry area, hence it's a small "B" category mine.																						
b)	Transport from mine head to the destination	Tipper will be used for transport rough stone from the mine head to needy customer.																					

c)	Describe briefly the transport system (please specify)	Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customer's area.																				
	i) Ore transported by: own trucks / hired trucks	Hired trucks for initially production purposes.																				
	ii) Main destination to which ore is transported (giving to and from distance)	The excavated stone materials road material will be supplied to the consumers like road laying, earth filling, building construction, etc																				
a)	Details of hauling / transport equipment:																					
	<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>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> </tr> </tbody> </table>						Type	Nos	Size / Capacity	Make	Motive power	H.P.	--	--	--	--	--	--				
Type	Nos	Size / Capacity	Make	Motive power	H.P.																	
--	--	--	--	--	--																	
4)	(4). Miscellaneous: Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.																					
	(A) Operations	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.																				
	(B) Machineries deployed	Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted.																				
5.	BLASTING: <i>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.</i> Blasting pattern: The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. Rough stone production for 5 years = 981104m³ / 2698036MT <table border="1"> <thead> <tr> <th colspan="2">BLAST DESIGN</th> </tr> </thead> <tbody> <tr> <td>Blasthole Diameter (D) in mm</td> <td>32</td> </tr> <tr> <td>Burden (B) in m</td> <td>1.2</td> </tr> <tr> <td>Spacing (S) in m</td> <td>1.38</td> </tr> <tr> <td>Subdrill in m</td> <td>0.5</td> </tr> <tr> <td>Charge length (C) in m</td> <td>0.70</td> </tr> <tr> <td>Stemming</td> <td>0.5</td> </tr> <tr> <td>Hole Length (L) in m</td> <td>1.2</td> </tr> </tbody> </table>						BLAST DESIGN		Blasthole Diameter (D) in mm	32	Burden (B) in m	1.2	Spacing (S) in m	1.38	Subdrill in m	0.5	Charge length (C) in m	0.70	Stemming	0.5	Hole Length (L) in m	1.2
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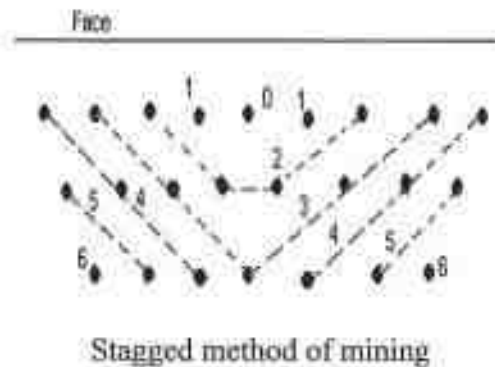


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Bench Height (BH) in m	2.5
Mass of explosive/hole in g	437.5
Stemming material size in mm	3.2
Burden stiffness ratio	2.08
Blast volume/hole in m ³	4.14
Production of rough stone/day in m ³	701
Number of blast holes/day	169
Number of blast round/day	2
Blasthole pattern	Staggered
Mass of explosive /day in kg	74.06
Powder factor in kg/m ³	0.11
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL

Note: If >2kg of explosives per day use for blasting if proponent get the permission from the DGMS



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:

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- ❖ 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	: 169holes
Yield	: 701m ³
Total explosive required	: 74.06kg-Slurry explosives
Charge per hole	: 0.437kg
Blasting at day time only	: 12.0p.m-1.0p.m

c)	Powder factor in ore and overburden / waste / development heading / stope	:	Powder factor is proposed as 0.11kg per hole of explosives
d)	Whether secondary blasting is needed, if so describe it briefly	:	There is no secondary blasting involved.
e)	Storage of explosives (like capacity and type of explosive magazine)	:	1. The applicant is advised to engage an authorized explosive agency to carry out blasting. 2. First Aid Box will be keeping ready at all the time. 3. Necessary precautionary announcement will be carried out before the blasting operation.
6.	MINE DRAINAGE:		
a)	Likely depth of water table based on observations from nearby wells and water bodies	:	The ground water table is reported as of 80m in summer and 75m in rainy season from the general ground level observed in the adjacent bore well.
b)	Workings expected to be _____ m. above / reach below water table by the year _____	:	Proposed mining depth is 50m below ground level. Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.
c)	Quantity and quality of water	:	The ground water may not rise immediately

S. V. S. S.



	likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged		in this type of mining. However the rain water percolation and collection of water from the seepage shall be less than 300 L per m and it shall be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and it is not contaminated with any hazardous things.
7.	STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:		
a).	Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the years: No other wastes are removed during years.		
b).	Land chosen for disposal of waste with proposed justification	:	There is no waste are proposed.
c).	Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise.	:	The recovery of rough stone in this quarry is 100%. If rough stone may be unsold will be keep within the lease boundary.
8.	USE OF MINERAL:		
a).	Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc
b).	Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone (charnockite) and gravel the same are used for building materials and road metal. So, there is no chemical specifications are specified. Only physical specifications are involved.

Signature

c).	Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.	:	Not blending process is involved, after blasting the rough stone and gravel will be directly loaded to the needy customer.																					
9.	OTHERS																							
	Describe briefly the following a) Site services	:	Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provided as per the Metalliferous Mines Regulations, 1961 as a welfare amenity for our quarry laborers.																					
	b) Employment potential: As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision. The following man power is proposed for quarrying stone material during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of as per the MMR, 1961 norms.																							
	<table border="1"> <tr> <td rowspan="4">1.</td> <td>Highly Skilled</td> <td>Mines Manager</td> <td>1No.</td> </tr> <tr> <td></td> <td>Mine Engineer</td> <td>1No.</td> </tr> <tr> <td></td> <td>Mine Geologist</td> <td>1No.</td> </tr> <tr> <td></td> <td>Blaster</td> <td>1No.</td> </tr> <tr> <td>2.</td> <td>Unskilled</td> <td>Musdoor / Labours</td> <td>18 No's</td> </tr> <tr> <td colspan="3"></td> <td>Total = 22 No's</td> </tr> </table>			1.	Highly Skilled	Mines Manager	1No.		Mine Engineer	1No.		Mine Geologist	1No.		Blaster	1No.	2.	Unskilled	Musdoor / Labours	18 No's				Total = 22 No's
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2.	Unskilled	Musdoor / Labours	18 No's																					
			Total = 22 No's																					
10	MINERAL PROCESSING/BENEFICIATIONS:																							
(a)	If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.	:	Excavated rough stone minerals directly will be used by the applicant for required size $\frac{1}{2}$, $\frac{3}{4}$ and $1\frac{1}{2}$ inches Jelly which are mainly used in road and building construction purpose. The recovery of rough stone in this quarry is 100%.																					



(b)	Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	:	No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.
(c)	A flow sheet or schematic diagram of the processing procedure should be attached.	:	Not applicable.
(d)	Specify quantity and type of chemicals to be used in the processing plant.	:	Not applicable
(e)	Specify quantity and type of chemicals to be stored on site / plant.	:	Not applicable
(f)	Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and of recycling.	:	Drinking is 0.2KLD, utilized water is 0.8KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 3.0KLD per day. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. The sewage water to a tune of 0.9KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit.



PART – B

11.0 ENVIRONMENTAL MANAGEMENT PLAN:

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

11.1	Fresh lease land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.	<table border="1"> <thead> <tr> <th>Sl. No.</th><th>Land Use</th><th>Present area (Hect.)</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Area under Mining</td><td>Nil</td></tr> <tr> <td>2</td><td>Infrastructure</td><td>Nil</td></tr> <tr> <td>3</td><td>Roads</td><td>Nil</td></tr> <tr> <td>4</td><td>Unutilized</td><td>4.00.00</td></tr> <tr> <td>5</td><td>Green belt</td><td>Nil</td></tr> <tr> <td>6</td><td>Settling Tank & Drainage</td><td>Nil</td></tr> <tr> <td colspan="2">Grand Total</td><td>4.00.00</td></tr> </tbody> </table>	Sl. No.	Land Use	Present area (Hect.)	1.	Area under Mining	Nil	2	Infrastructure	Nil	3	Roads	Nil	4	Unutilized	4.00.00	5	Green belt	Nil	6	Settling Tank & Drainage	Nil	Grand Total		4.00.00
Sl. No.	Land Use	Present area (Hect.)																								
1.	Area under Mining	Nil																								
2	Infrastructure	Nil																								
3	Roads	Nil																								
4	Unutilized	4.00.00																								
5	Green belt	Nil																								
6	Settling Tank & Drainage	Nil																								
Grand Total		4.00.00																								
11.2	Water Regime	: Water table in this area is noticed at a depth of 80m in summer and 75m in rainy season from the general ground level and presently the quarrying of rough stone is ultimate up to a depth of 70m below ground level. Hence, it will not affect the ground water depletion of this area. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development.																								
11.3	Flora and Fauna	: There is no major flora observed in this area and except bushes, shrubs, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.																								
11.4	Quality of air, ambient noise level and water	: Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.																								

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

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

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

Sl. No.	Land Use	Area in use during the quarrying period (Hect.)
1	Area under Mining	3.40.33
2	Infrastructure	0.02.0
3	Roads	0.05.0
4	Green Belt	0.48.67
5	Un-Utilized Area	Nil
6	Drainage & Settling Tank	0.04.00
Grand Total		4.00.00

ii).	Air Quality	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.
iii).	Water quality	A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.
iv).	Noise levels	Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)	No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity shall be recorded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
vi).	Water regime	No major river or any odai track are found around 50m radius.

vii).	Socio-economics	1. To provide Employment opportunities to the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.	There are no historical monuments, etc found around 300m radius.

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

i).	temporary storage and utilization of topsoil	: No separate of topsoil will be removed.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during ten years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.	: The present mining is proposed depth of 50m from below the ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.

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

Green Belt Development:

Safety barrier, 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

Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	4867	500	80%	@100 Rs Per sapling	50,000/-
Second	Approach	-	300	80%		30,000/-

		road and Nearby Village Road						
	Third	Schools	—	200	80%		20,000/-	
	Total						1,00,000/-	
iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the years (and upto conceptual plan period for 'A' category mines).			:	No waste or rejects shall be proposed.			
v).	Measures to control erosion / sedimentation of water courses.			:	Not applicable. There is no major dumps are stabilize in this quarry area.			
vi).	Treatment and disposal of water from mine.			:	It will not be harmful and it does not require any treatment before discharging into the natural courses.			
vii).	Measures for minimizing adverse effects on water regime.			:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.			
viii).	Protective measures for ground vibrations / air blast caused by blasting.			:	It is a small "B" category open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.			
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.			:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.			
x).	Socioeconomic benefits arising out of mining.			:	The nearest villages are will get employment benefits.			

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

Not applicable. It is B category quarry

12.0 PROGRESSIVE QUARRY CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of	:	The Ultimate mining is an average depth of 70m below ground level. The mined-out
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	already mined out area.		area will be fenced on top of working bench with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 500 trees will be proposed in the quarry area. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	The quarry lease is a fresh mining lease, no mitigation measures observed.
12.4	Mine closure activity	:	The present mining plan is proposed to depth of 50m below ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS being a mechanized operation.
12.6	Disaster management and Risk Assessment	:	Open cast mining method is adopted in this quarry. If the benches are made with



		proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.
12.7	Care and maintenance during temporary discontinuance	: A board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.
12.8	Economic repercussions of closure of quarry and man power entrenchments	: During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 22 labors will be improved.

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

A	Fixed Asset Cost:	
	1. Land Cost	: Rs. 20,00,000/-
	2. Labour Shed	: Rs. 1,00,000/-
	3. Sanitary Facility	: Rs. 1,00,000/-
	4. Fencing	: Rs. 2,50,000/-
	5. Other expenses (Security guard, dust bin, etc)	: Rs. 4,00,000/-
	Total	: Rs. 28,50,000/-
B	B. Machinery cost	: Rs. 20,00,000/- (Hire Basis)

Signature

C	Total Expenditure of EMP cost (for five years)	
	1. Drinking Water Facility	: Rs. 1,00,000/-
	2. Sanitary facility & Maintenance	: Rs. 2,00,000/-
	3. Permanent water sprinkler	: Rs. 1,50,000/-
	4. Afforestation and its maintenance	: Rs. 1,00,000/-
	5. Safety Kits	: Rs. 1,00,000/-
	6. Provision of tyre washing facility	: Rs. 1,50,000/-
	7. Blasting materials with blast mat cost	: Rs. 15,00,000/-
	8. Drainage & Settling Tank (0.04.0Hect or 400 Sq.m x 400)	Rs. 1,60,000/-
	9. Environment monitoring	: Rs. 5,00,000/-
	Total	: Rs. 29,60,000/-
D	Total Project Cost (A+B+C)	: Rs. 78,10,000/-



13.0 FINANCIAL ASSURANCE:

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

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- (i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (ii) The applicant will endeavor every attempt to quarry the rough stone economically without any wastage and to improve the environment and ecology.
- (iii) The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued by the Assistant Director, Department of Geology and Mining, Tiruchirappalli vide letter Roc.No.262/2025/Mines Dated 03.06.2025.
- (iv) Total proposed production rough stone 981104m³/ 2698036MT and gravel is 34196m³ / 68392MT up to a depth of 50m below ground level for five years plan period.

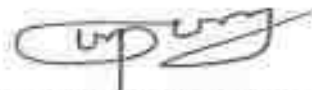
x Shijith

17.0 CSR Expenditure:

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

Place: Dharmapuri, TN

Date:



Signature of the Qualified Person

DEEPAJAYUPPANNAN, M.Sc, Ph.D.,
Qualified Person
Geo & TECHNICAL MINING SOLUTIONS
A MBST Accredited and ISO Certified Company
1/233-B, Ground Floor, Wateran Corridor,
Collectorate Post Office, Odanandi,
Dharmapuri-636705, Tamil Nadu, India

This Mining Plan is approved subject
to the conditions stipulated in this
office Lr.No. 262 / 2025 / Mines.,
Dated : 05.6.2025. As per the
Rule 41 & 42 of TNMMCR 1959.

5-10/05/25
ASSISTANT DIRECTOR
GEOLOGY & MINING
TIRUCHIRAPPALLI.

05.6.25

ந.க.எண்.262/2025/கனிமம்

உதவி இயக்குநர் அலுவலகம்,
புனியியல் மற்றும் சுரங்கத்துறை,
மாவட்ட ஆட்சியரக வளாகம்,
திருச்சிராப்பள்ளி- 636 001

நாள்:03.06.2025.

குறிப்பாணை

பொருள்: கனிமங்களும் சுரங்கங்களும் - சிறுவகைக் கனிமம் - திருச்சிராப்பள்ளி மாவட்டம் - பூநீரங்கம் வட்டம் - கொளத்தூர் கிராமம் - புல எண்கள்.790/18 (பகுதி) மற்றும் 790/2 (பகுதி) - மொத்தம் 4.00.0 ஹெக்டேர் - பட்டா நிலத்தில் கல் குவாரி செய்ய அனுமதி கோரி திரு.S.விஜயகுமார் என்பவர் விண்ணப்பித்தது - ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீட்டு ஆணையம் சான்றிதழ் அனுப்பக் கோருதல் - தொடர்பாக.

- பார்வை:**
1. திரு.S.விஜயகுமார், த/பெ.சுவாமிநாதன் (லேட்) என்பவரது விண்ணப்ப நாள்: 12.03.2025,
 2. இவ்வலுவலக இதே எண்ணிட்ட கடிதம் நாள்:25.03.2025 (வருவாய் கோட்டாட்சியர், பூநீரங்கம் அவர்களுக்கு முகவரியிடப்பட்டது),
 3. வருவாய் கோட்டாட்சியர், பூநீரங்கம் அவர்களின் கடித ந.க.எண்.அ1/2279/2025 நாள்: 27.05.2025,
 4. தனி வட்டாட்சியர் (கனிமம்), புனியியல் மற்றும் சுரங்கத்துறை திருச்சிராப்பள்ளி புலத்தணிக்கை அறிக்கை நாள்: 03.06.2025,
 5. அரசாணை எண்: 79, தொழில் (எம்.எம்.சி1)துறை, நாள்: 06.04.2015,
 6. அரசாணை எண்:169, தொழில் (எம்.எம்.சி1) துறை, நாள்:04.08.2020.

பார்வை 1-ல் காணும் விண்ணப்பத்தில், 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதி எண்.19(1)ன்படி திருச்சிராப்பள்ளி மாவட்டம், பூநீரங்கம் வட்டம், கொளத்தூர் கிராமம், 790/18 (பகுதி) மற்றும் 790/2 (பகுதி)-ல் 4.00.0 ஹெக்டேர் பட்டா நிலத்தில் 10 ஆண்டுகளுக்கு கல் மற்றும் கிராவல் குவாரி செய்ய அனுமதி கோரி திரு.S.விஜயகுமார் என்பவர் விண்ணப்பம் அளித்துள்ளார். விண்ணப்பதாரர் விண்ணப்பத்துடன் கீழ்க்கண்ட ஆவணங்களையும் சமர்ப்பித்துள்ளார்.

X SH - 12



2) மேற்படி இவ்விண்ணப்பம் தொடர்பாக, பார்வை 3 மற்றும் 4-ல் காணும் பூரீரங்கம், வருவாய் கோட்டாட்சியர் மற்றும் திருச்சிராப்பள்ளி புலியியல் மற்றும் சுரங்கத்துறை, தனி வட்டாட்சியர் (கனிமம்) ஆகியோர் புலத்தணிக்கை மேற்கொண்டு திருச்சிராப்பள்ளி மாவட்டம், பூரீரங்கம் வட்டம், கொளத்தூர் கிராமம், புல எண்கள்.790/1B (பகுதி) மற்றும் 790/2 (பகுதி) மொத்த விஸ்தீரணம் 4.00.0 ஹெக்டேர் பட்டா நிலத்தில் பத்து (10) ஆண்டுகள் கல் குவாரியும், இதில் முதல் (3) ஆண்டுகள் கிராவல் குவாரி செய்ய திரு.S.விஜயகுமார் என்பவருக்கு அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளார்கள்.

மனுதாரர் குத்தகை அனுமதி கோரியுள்ள புல எண்கள்.790/1B (பகுதி) (1.60.2) மற்றும் 790/2 (பகுதி) (2.39.8) மொத்த விஸ்தீரணம் 4.00.0 ஹெக்டேர் பட்டா நிலங்கள் கிராம கணக்குகளில் கீழ் கண்டவாறு தாக்கலாகியுள்ளது.

கணினி 'அ' பதிவேடு:

புல எண்	வகைப்பாடு	மொத்த பரப்பளவு (ஹெக்ட.)	குவாரி அனுமதி கோரியுள்ள பரப்பளவு (ஹெக்ட.)	பட்டா எண்	பட்டாதாரர் பெயர்
790/1B (பகுதி)	ர.பு	3.45.34	1.60.20	4840	சுவாமிநாதன் மகன் விஜயகுமார்
790/2 (பகுதி)	ர.பு	3.45.34	2.39.80	2475	சுவாமிநாதன் மகன் விஜயகுமார்
மொத்தம்		6.90.68	4.00.00		

கிராம 10(1) சிட்டா மற்றும் கணினி சிட்டா:

புல எண்	வகைப்பாடு	மொத்த பரப்பளவு (ஹெக்ட.)	குவாரி அனுமதி கோரியுள்ள பரப்பளவு (ஹெக்ட.)	பட்டா எண்	பட்டாதாரர் பெயர்
790/1B (பகுதி)	ர.பு	3.45.34	1.60.20	4840	சுவாமிநாதன் மகன் விஜயகுமார்
790/2 (பகுதி)	ர.பு	3.45.34	2.39.80	2475	சுவாமிநாதன் மகன் விஜயகுமார்

மேற்கண்ட புல எண்கள் 790/1B (பகுதி) மற்றும் 790/2 (பகுதி) மனுதாரர் பெயரில் தனி பட்டவாக உள்ளது.

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புல எண்.790/1B (பகுதி)-ன் நான்கெல்லை விபரம்:

வடக்கு	:	புல எண்: 790/1B - விஜயக்குமார் - பட்டா நிலம்	*
தெற்கு	:	புல எண்: புதுக் கோட்டை (பொருவாய் கிராம எல்லை)	
கிழக்கு	:	புல எண்: 790/1B - விஜயக்குமார் - பட்டா நிலம்	
மேற்கு	:	புல எண்: 790/2 - விஜயக்குமார் - பட்டா நிலம்	

புல எண்.790/2 (பகுதி)-ன் நான்கெல்லை விபரம்:

வடக்கு	:	புல எண்: 790/2 பட்டா நிலம்
தெற்கு	:	புல எண்: புதுக் கோட்டை (பொருவாய் கிராம எல்லை)
கிழக்கு	:	புல எண்: 790/1B பட்டா நிலம்
மேற்கு	:	புல எண்: 789/1B - விஜயக்குமார் - பட்டா நிலம். புல எண்: 785/1A1 -நந்தக்குமார் - பட்டா நிலம்.

மேலும் குவாரி அனுமதி கோரும் புலத்திலிருந்து 300 மீட்டர் சுற்றளவில் புராதான சின்னங்கள், வழிபாட்டுத்தலங்கள், பொதுக் கட்டிடங்கள், மயானம், இடுகாடு, குடியிருப்புகள், நீராதாரங்கள், உயர் மற்றும் தாழ்வழுத்த மின்சாரம் கம்பங்கள், விலை மதிப்புமிக்க மரங்கள் ஏதும் இல்லை. குவாரிப்பணி செய்ய விண்ணப்பித்துள்ள இப்புலமானது இதற்கு முன் குவாரிப் பணி செய்யப்படாத சம நிலமாக உள்ளது.

எனவே, வருவாய் கோட்டாட்சிபர், பூநீரங்கம் மற்றும் உதவி இயக்குநர், புனியியல் மற்றும் சுரங்கத்துறை, திருச்சிராப்பள்ளி ஆகியோரின் அறிக்கையின்படி திருச்சிராப்பள்ளி மாவட்டம், பூநீரங்கம் வட்டம், கொளத்தூர் கிராமம், 790/1B (பகுதி) மற்றும் 790/2 (பகுதி)ல் 4.00.0 ஹெக்டேர் பட்டா நிலத்தில் திரு.S.விஜயகுமார் என்பவருக்கு 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதி 19(1)-ன்படி குத்தகை பத்திரம் நிறைவேற்றப்பட்ட நாளிலிருந்து சாதாரண கற்கள் வெட்டியெடுக்க பத்து (10) ஆண்டுகளுக்கும் மற்றும் கிராவல் வெட்டியெடுக்க முதல் மூன்று (3) ஆண்டுகளுக்கும் கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு குவாரி குத்தகை உரிமம் வழங்குவதற்குரிய குத்தகை தேற்ற (Precise Area Communication) பரப்பாக கருதப்படுகிறது.

நிபந்தனைகள்:

1. அருகிலுள்ள பட்டா நிலங்களுக்கும் மற்றும் பொது மக்களுக்கும், எவ்வித இடையூறும் இன்றி கல் குவாரி மேற்கொள்ள வேண்டும்.

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2. அருகில் உள்ள பட்டா நிலத்திற்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு கல் மற்றும் கிராவல் குவாரிப்பணி மேற்கொள்ள வேண்டும்.
3. குழந்தை தொழிலாளர்களை வேலைக்கு அமர்த்தல் கூடாது.
4. குவாரித் தொழிலாளர்களை தமிழ்நாடு தொழிலாளர் நல வாரியத்தில் பதிவு செய்வதுடன் குழு காப்பீடு செய்வதையும் உறுதி செய்திடல் வேண்டும்.
5. இயக்குநர், புனியியல் மற்றும் சுரங்கத் துறை, சென்னை அவர்களின் ந.க.எண்.2735/MM2/2020 தேதி.28.08.2020 கடிதத்தில் அறிவுறுத்தியவாறு குவாரிப் பணி முடிந்த பிறகு, குவாரிப் பகுதியில் குத்தகைதாரர்கள் தங்களது சொந்த செலவில் மீண்டும் புல், தாவரங்கள் வளரும் வகையிலும் அவை விலங்கினங்களின் தீவனத்திற்கு உற்பத்தி செய்யும் வகையிலும் நிலத்தினை சீர் செய்ய வேண்டும்.

6. இயக்குநர், புனியியல் மற்றும் சுரங்கத்துறை, சென்னை அவர்களின் கடித ந.க.எண்.2921/எம்.எம்.4/2016 தேதி.09.03.2021-ல் தெரிவித்த படி, அங்கீகரிக்கப்பட்ட நபர்களை கொண்டு மேற்கண்ட புலத்தினை விண்ணப்பதாரர் தனது சொந்த செலவில் DGPS, Survey செய்து அதன் அடிப்படையில் வரைவு சுரங்கத் திட்டம் அறிக்கையினை தயார் செய்து சமர்ப்பிக்க வேண்டும்

மேலும், தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண். 41 மற்றும் 42-ன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறும், மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப்பெறவும் மனுதாரர் கேட்டுக்கொள்ளப்படுகிறது.

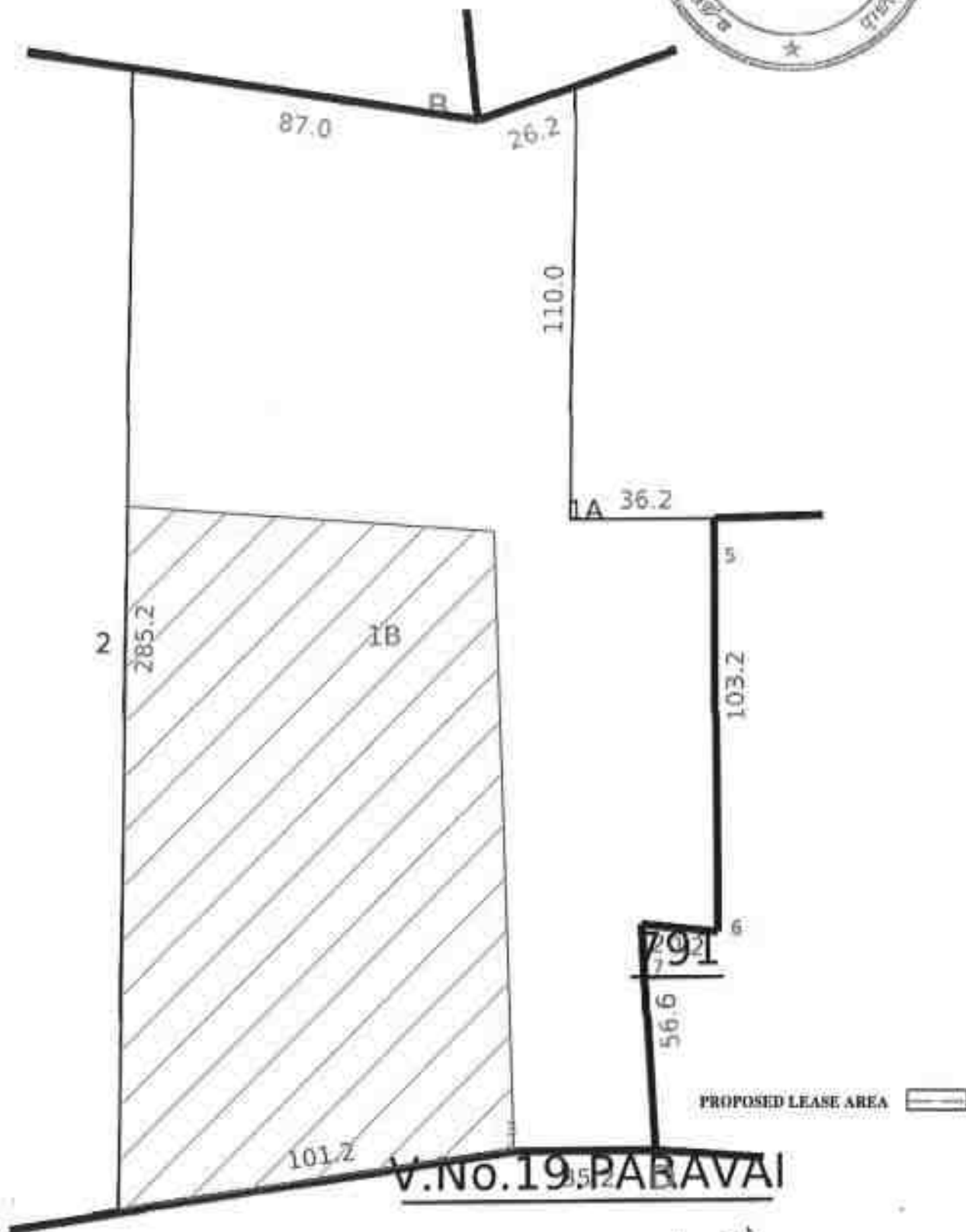
உதவி இயக்குநர்,
 புனியியல் மற்றும் சுரங்கத்துறை,
 திருச்சிராப்பள்ளி

பெறுதல்.
 திரு.ச.விஜயகுமார்,
 த/பெ.சுவாமிநாதன்,
 எண்.10, மாவட்ட ஆட்சியர் ரோடு,
 திருச்சிராப்பள்ளி - 620 001.

03/06/25

FMB Sketch

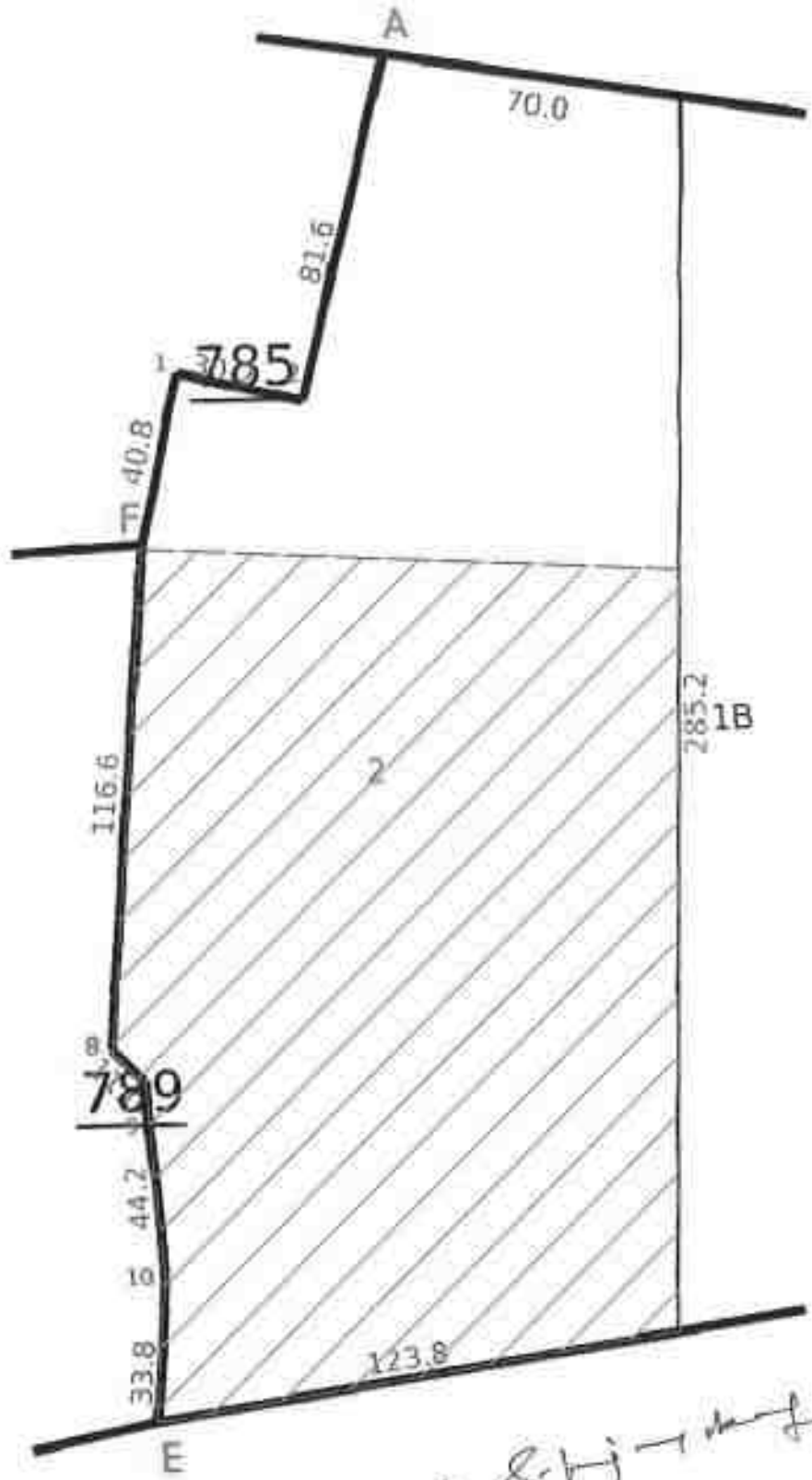
ANNEXURE - ①



V.No.19 PARAVAI

x S. V. R. S. R.

FMB Sketch



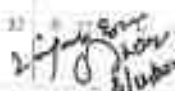
PROPOSED LEASE AREA

S. H. - 1



B-100-70 முடிவுகள்

1	2	3	4	5	6	7	8	9	10	11	12
100	1	700-7	7	11	...	8-5	11	1-33	0-31-0	0-24	1000 கிராமிய இளைஞர்
	8	-8	8	11	...	8-5	12	1-33	0-31-9	0-51	700 கிராமிய இளைஞர்
	9	-8	8	11	...	8-5	17	1-33	0-31-0	0-48	1000 கிராமிய இளைஞர்
	10	-10	10	11	...	...	...	...	0-31-1	...	...
									2-31-0	4-17	...
100	1	700-1	1	11	...	8-3	12	1-33	7-00-0	12-24	1000 கிராமிய இளைஞர்
	2	-2	2	11	...	...	...	...	0-02-1	...	...
									5-00-1	12-24	...
100	...	700	7	11	...	8-3	13	1-33	1-02-1	12-24	1000 கிராமிய இளைஞர்
100	1A	700-1A	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1B	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1C	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1D	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1E	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1F	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1G	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1H	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1I	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1J	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்
	1K	-1000	1	11	...	8-3	13	1-33	0-08-0	0-14	1000 கிராமிய இளைஞர்


 J. Jayaraman
 தலைவர், கிராமிய இளைஞர் இயக்கம்
 41, சோழவந்திய சாலை
 புதுச்சேரி

Handwritten signature



1422 ஆம் பக்கமில்

திரு. வி. பி. பி.

மாண்புமிகு

மாண்புமிகு

மாண்புமிகு

மாண்புமிகு

தில் வரித் திட்டத்தின்படி
புலன்களின் விபரம்.

மாண்புமிகு
பெயர்.

முதல் பாகம்.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
நிலை அளவை எண்.	உட்கிராம எண்.	பகுதி	நிலை.	ஒரு மீட்டர் அளவு இரு மீட்டர்	கைப்பற்று தராதவையு பெயரும் எண்ணும் அல்லது அனுபவ தராதவையு பெயர்.	நிலைத்தின் எந்த பகுதி கைப்பற்று தராதவையால் பயிற்சி பெற்றிருக்கிறது.	எந்த மாதத்தில் பயிற்சி கொடுக்கப்பட்டது எந்த மாதத்தில் அதுவரை கொடுக்கப்பட்டது.	பயிற்சியின் பெயர்.	பயிற்சி / அனுபவம். மாண்புமிகு	உண்மையான மாண்புமிகு அளவு.	நிலைத்தின் அளவு விவரம்.
313	11	0-16.0	0-25	2475	திரு. வி. பி. பி.			5			
784	3	0-21.5	0-23	2475	-do-		07	சுமார் 0-20 5			
784	4	0-21.0	0-14	2475	-do-			3			
784	5	0-14.5	1-03	2475	-do-		07	சுமார் 0-10-00			
784	6	1-13.5	1-74	2475	-do-		07	சுமார் 0-05-00			
785	1	1-13.0	2-50	2475	-do-			3			
785	2	1-10.0	2-45	2475	-do-			3			
786	1	1-5.0	1-11	2475	-do-			3			
787	112	1-34.0	2-05	2475	-do-			3			
789	13	2-15.15	2-06	2475	-do-			3			
790	2	2-15.5	2-28	2475	-do-			3			

திரு. வி. பி. பி.
மாண்புமிகு
41. கைப்பற்று தராதவையால்
பயிற்சி பெற்றிருக்கிறது.



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

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



மாவட்டம் : திருச்சிராப்பள்ளி

வட்டம் : ஸ்ரீரங்கம்

வருவாய் கிராமம் : கொளத்தூர்

பட்டா எண் : 4840

உரிமையாளர்கள் பெயர்

1. வேட் கவாமிநாதன்

மகன்

விஜயகுமார்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
790	18	3 - 45.34	5.28	--	--	--	--	2023/0103/15/372500- 2022/15/07/000477SD ----- Digitally signed: approved through AutoMutation - 13/10/2023 12:18:31PM
		3 - 45.34	5.28					

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றுள் தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 15/07/2020/04840/50075 என்ற குறிப்பு எண்ணை உள்ளிடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 04-02-2025 அன்று 10:21:43 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- எகப்பேசி கேமராவின் 2D barcode படப்பாள் மூலம் பயித்து 3D/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

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



மாவட்டம் : திருச்சிராப்பள்ளி

வட்டம் : ஸ்ரீரங்கம்

வருவாய் கிராமம் : கொளத்தூர்

பட்டா எண் : 2475

உரிமையாளர்கள் பெயர்

1. சுவாமிநாதன்

கந்தை

விஜயகுமார்

புல எண்	உட்பிரிவு	புன்செய்		தன்செய்		மற்றுள்ள		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	
790	2	3 - 45.34	5.28	--	--	--	--	2022/0103/15/319519- 2021/15/07/000232SD ----- Digitally signed: Kandesamy C Zonal Deputy Tahsildar 29/12/2022 07:13:12:AM
		3 - 45.34	5.28					

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் தகவல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 15/07/070/02475/50035 என்ற குறிப்பு எண்ணை உள்ளிடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 04-02-2025 அன்று 10:19:30 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- மாகபேசி கேமராவின் 2D barcode லாட்பான் மூலம் லாடத்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்.

PHOTOCOPY OF THE APPLIED LEASE AREA

Site photos in respect of rough stone and gravel quarry lease in S.F.No's: 790/1B (Part) & 790/2 (Part) Patta Land - over an extent of 4.00.00 hectares - Kolathur village - Srirangam Taluk - Tiruchirapalli District, Tamil Nadu State in belongs to **Mr. S.Vijayakumar,**



S. Vijayakumar



இந்திய அரசாங்கம்
Government of India

ஒருமுகத் தனிப்படுத்தல் அமைப்பின் ஆணையர் தலைமையிடம்
Unique Identification Authority of India

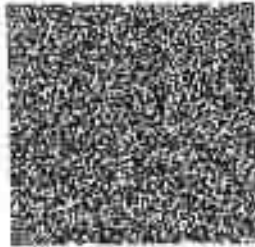
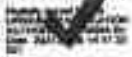
பதிவேட்டு எண் / Enrolment No.: 0000/00485/33812

Download Date: 25/05/2021

To
விஜயகுமார் சுவாமிநாதன்
Vijayakumar Swaminathan
S/O Swaminathan
Old No 9a, New No 10,
Collector Office Road,
Cantonment,
Near T V S Southern Road Ways,
Tiruchirappalli
Tiruchirappalli
Tiruchirappalli Tamil Nadu - 620001
9965548005

Issue Date: 03/01/2018

Signature valid



உங்கள் ஆதார் எண் / Your Aadhaar No. :

2979 7391 7683

VID : 9192 2186 0062 2609

எனது ஆதார், எனது அடைபாள்



இந்திய அரசாங்கம்
Government of India



Download Date: 25/05/2021



விஜயகுமார் சுவாமிநாதன்
Vijayakumar Swaminathan
பிறந்த நாள்/DOB: 29/12/1979
ஆண்/ MALE

Issue Date: 03/01/2018

2979 7391 7683

VID : 9192 2186 0062 2609

எனது ஆதார், எனது அடைபாள்



- 279 -

ANNEXURE 2



தகவல்

- ஆதார் அடையாளத்திற்கான சான்று, குடியரிமைக்கு அல்ல
- பாதுகாப்பான OR குறியீடு ஆப்ளவன் XML / ஆப்ளவன் அப்கோர்த்தைப் 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 இமேயில் ஆதாரைப் புதுப்பிக்கவும்
- mAadhaar செயலியைப் பயன்படுத்தி உங்கள் ஸ்மார்ட் போனில் ஆதாரை எடுத்துச் செல்லுங்கள்

- Aadhaar is valid throughout the country.
- Aadhaar helps you avail various Government and non-Government services easily.
- Keep your mobile number & email ID updated in Aadhaar.
- Carry Aadhaar in your smart phone – use mAadhaar App.



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Unique Identification Authority of India



முகவரி:
விஜயகுமார் சுவாமிநாதன், பழைய நம்பர் 9a, புதிய
நம்பர் 10, கபிலாசு ஆபீஸ் ரோடு, 4
எண் அடைபாள் ரோடு மூலம், ஆதாரிடம்,
அடைபாள் ரோடு, திருச்சிராப்பள்ளி,
திருச்சிராப்பள்ளி,
தமிழ் நாடு - 620001

Address:
S/O Swaminathan, Old No 9a, New No 10,
Collector Office Road, Near T V S Southern
Road Ways, Cantonment, Tiruchirappalli,
Tiruchirappalli,
Tamil Nadu - 620001



2979 7391 7683

VID : 9192 2186 0062 2609

எனது ஆதார், எனது அடைபாள்

Reg. No. 03HMM/007
Co/Code 013 / 106



அறிவியல் புலம்
FACULTY OF SCIENCE

பெரியார் பல்கலைக்கழக ஆட்சிக்குழு 2005 ஆம் ஆண்டு ஏப்ரல் மாதம் நடந்த பயன்பாட்டு புவியமைப்பியல் தேர்வில்

S கருப்பண்ணன் என்பவர்

தனிச்சிறப்புடன் முதல் வகுப்பில்

தேர்ச்சி பெற்றார் என்று நக்க

தேர்வாளர்கள் சான்றளித்தபடி

அறிவியல் திறைஞர்

என்னும் பட்டத்தை அவருக்குப் பல்கலைக்கழக இலச்சினைபுடன் வழங்குகிறது.

The Syndicate of the Periyar University hereby makes known that
KARUPPANNAN S *has been*
admitted to the **DEGREE OF MASTER OF SCIENCE in**
APPLIED GEOLOGY

he/she having been certified by duly appointed Examiners to be qualified to receive the same and was placed in the **FIRST CLASS WITH DISTINCTION**
at the Examination held in **APR-2005**



Given under the seal of this university

[Signature]

[Signature]

[Signature]



BALAJI MINES

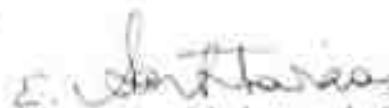
Proprietor: E. SANTHARAMAN,
PURITY LIME STONE SUPPLIERS,
5/88, CHINNAGOLLAPATTI, KANNANKURICHI P. O.,
SALEM-636 008, Tamil Nadu.

Mines: Devar Malai Village, Kulithalai Tal., KARUR DL. (Via) Karur to Palayam.

EXPERIENCE CERTIFICATE

I, E. SANTHARAMAN being the Managing Director of BALAJI MINES do hereby certify that Thiru. S. KARUPPANNAN, son of TSUNDARAM (whose signature is appended) worked as a Geologist in Balaji Mine, Devar malai village, Kulithalai Taluk, Karur District, from 01.06.2005 to 10.10.2010. During his term of work aforesaid, he has obtained practical experience as detailed overleaf. The duties connected with his work have involved his continuous attendance at the mine, and have been efficiently performed by him.

I believe him to be of good character and a fit and proper person to be examined for Certificate of Competency.


(Signature with date and official Seal)

TIN No: 33852702141
CST No: 704829 / 7-4-99
BALAJI MINES
5/88, Chinnagollapatty,
Kannankurichi (P.O), SALEM-8.


(Signature of Candidate)

x 





Mathur
Cell: 94476 33259

Mathur
Cell: 94432 84076
94348 244321

SRI RAMAJAYAM GRANITES

733, Krishnagar Main Road, Opp. E. G. Office, MATHUR - 635 203
email: sramajayamgranites@gmail.com

Date: 11/06/2025



EXPERIENCE CERTIFICATE

This is to certify that **Mr. Karuppannan Sundaram** has been worked as a
"Senior Geologist" in our company from 11th October 2010 to 11th October 2011.
During this period, he has been involved in the Quality Control for Granite block
extraction from quarry. Involvement of his work is highly appreciated and have been
efficiently worked in our company. The duties connected with his work have been
continuous attendance at the quarry.

I wish him all the best in all his future endeavors.

FOR SRI RAMAJAYAM GRANITES

[Signature]
Proprietor
11/06/2025

[Signature]
12/06/2025

**DEPUTY DIRECTOR
DEPARTMENT OF GEOLOGY AND MINING
DHARMAPURI**

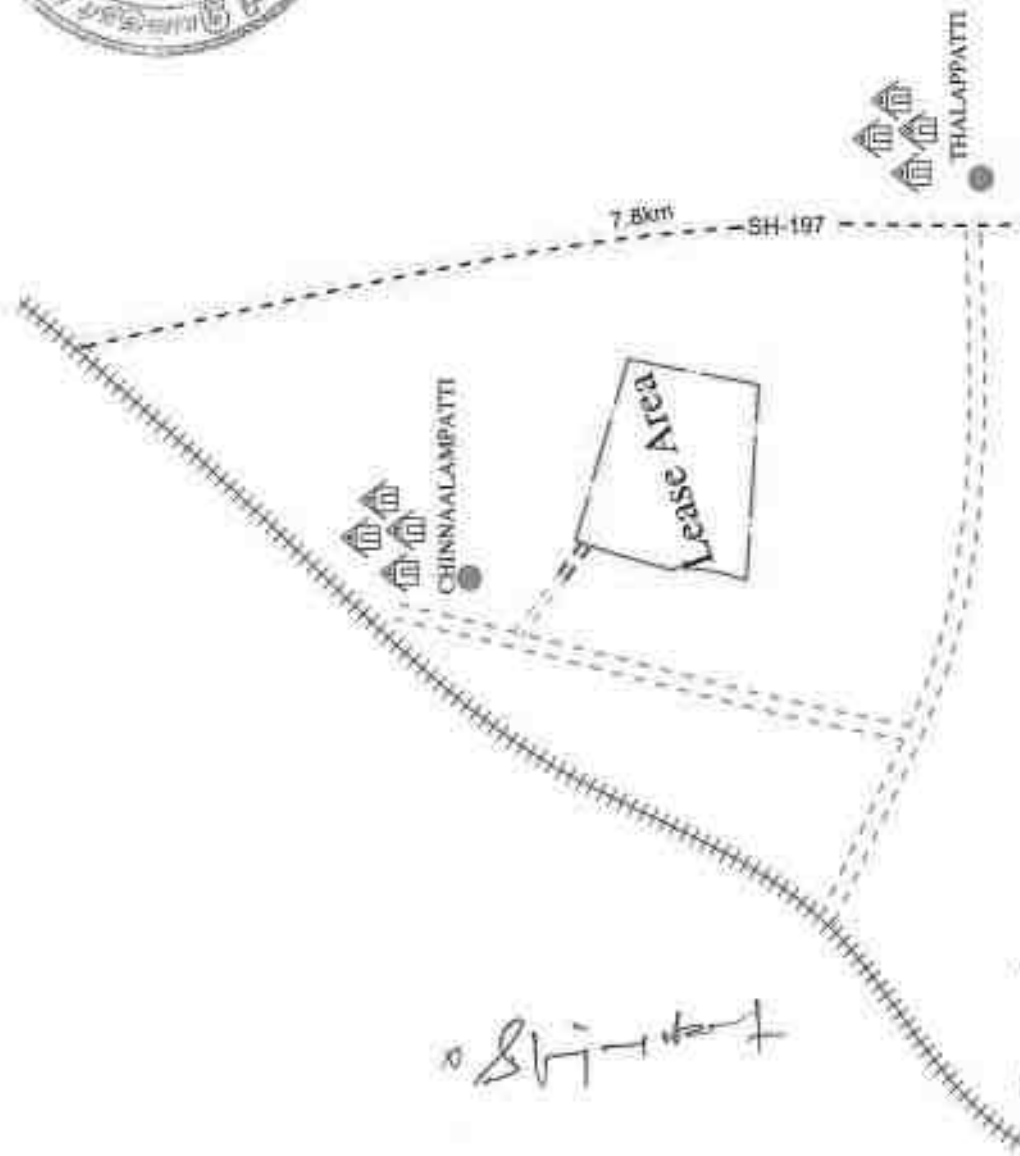
[Signature]

[Signature]

Towards
TIRUCHIRAPPALI



Shiranth



Towards
MANAPPARAI

Towards
VIRALIMALAI



PLATE No-I

APPLICANT:

Mr.S.VIJAYAKUMAR,

S/o.(Late)N.SWAMINATHAN,

NO.10, COLLECTOR OFFICE ROAD,

CANTONMENT,

TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:

S.F.No : 790/1B (Part) & 790/2 (Part),

EXTENT : 4.00.0 Hect.

VILLAGE : KOLATHUR,

TALUK : SRIRANGAM,

DISTRICT : TIRUCHIRAPPALLI

INDEX

MINE LEASE AREA

APPROACH ROAD

SH-197

VILLAGE ROAD

RAILWAY ROAD

HABITATION



KEY MAP

Not to Scale

Prepared By:

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

[Signature]

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

-287-

10°40'40.95"N



PLATE No-IA

APPLICANT:
Mr.S.VIJAYAKUMAR,
S/o.(Late).N.SWAMINATHAN,
NO.10, COLLECTOR OFFICE ROAD,
CANTONMENT,
TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
S.F.No : 790/1B (Part) & 790/2 (Part),
EXTENT : 4.00.0 Hect.
VILLAGE : KOLATHUR,
TALUK : SRIRANGAM,
DISTRICT : TIRUCHIRAPPALLI

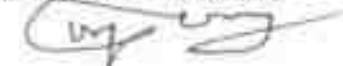
INDEX

MINE LEASE AREA : ●
TOPO SHEET No : 58-J/10
LATITUDE : 10°40'35.02"N to 10°40'40.95"N
LONGITUDE : 78°32'18.07"E to 78°32'26.38"E

LOCATION PLAN
NOT TO SCALE

Prepared By:

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BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE


Dr.S.KARUPPANNAM,M.Sc.,Ph.D.
DISTRICT SURVEYOR

10°40'40.98"N

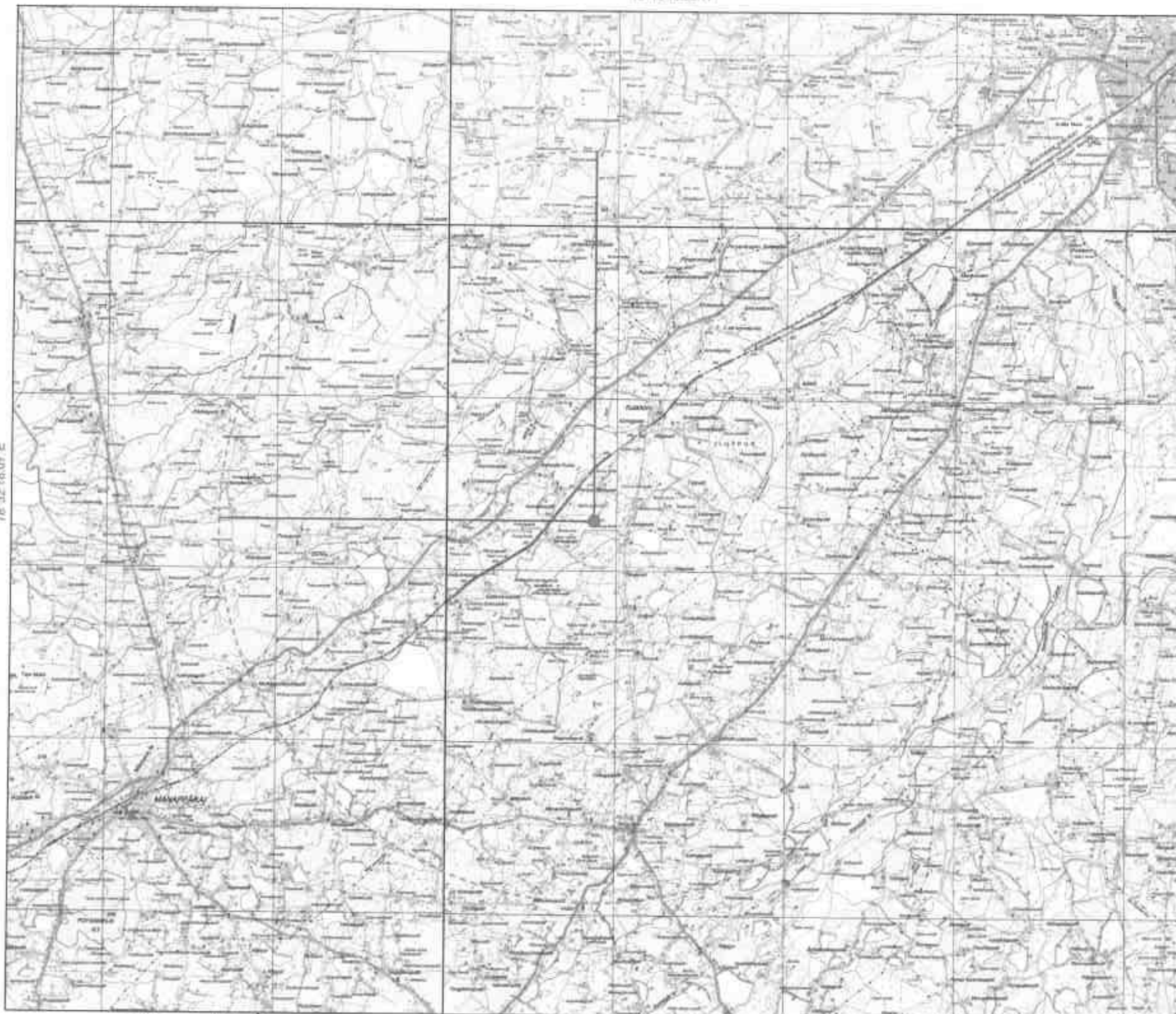


PLATE No-IB

APPLICANT:
Mr.S.VIJAYAKUMAR,
S/o.(Late).N.SWAMINATHAN,
NO.10, COLLECTOR OFFICE ROAD,
CANTONMENT,
TIRUCHIRAPPALLI DISTRICT - 620001

LEASE AREA:

S.F.No	: 790/1B (Part) & 790/2 (Part).
EXTENT	: 4.00.0 Hect.
VILLAGE	: KOLATHUR.
TALUK	: SRIRANGAM.
DISTRICT	: TIRUCHIRAPPALLI.

TOPO SHEET No. 58-J/10

LATITUDE : 10°40'36.02"N to 10°40'40.96"N

LONGITUDE : 78°32'18.07"E to 78°32'26.38"E

MINE LEASE AREA



10KM RADIUS

[illegible]

TOPOSHEET MAP

SCALE= 1:1,00,000

Prepared By:

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

Dr. S. KARUPPANSAN, M.Sc., Ph.D.
QUALIFIED PERSON

10°40'40.96"N

78°32'18.07"E

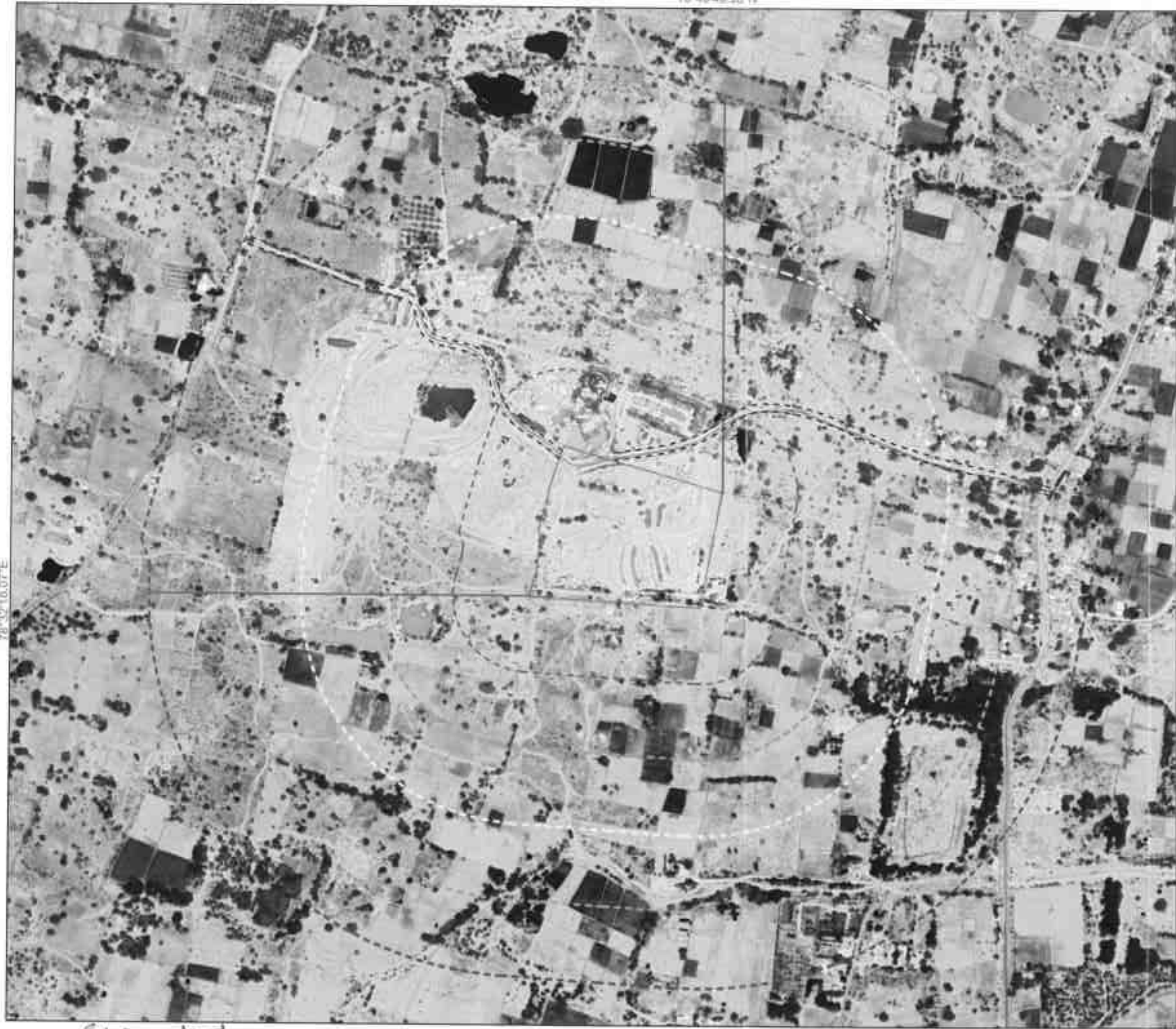


PLATE No-IC

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late) N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
 EXTENT : 4.00.0 Hect,
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI.

INDEX

MINE LEASE AREA	
APPROACH ROAD	
VILLAGE ROAD	
CART ROAD	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	

TOPO SHEET No : 58-J/10
 LATITUDE : 10°40'36.02"N to 10°40'40.96"N
 LONGITUDE : 78°32'18.07"E to 78°32'26.38"E

SATELLITE IMAGERY PLAN
 SCALE- 1:5000

Prepared By:

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

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

Handwritten signature/initials at the bottom left of the map area.



OCTOBER TO DECEMBER

JULY TO SEPTEMBER

[Handwritten signature]



PLATE No-ID

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
 EXTENT : 4.00.0 Hect,
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI

INDEX

MINE LEASE AREA	
APPROACH ROAD	
VILLAGE ROAD	
CART ROAD	
EXISTING PIT	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	
HABITATION	
SHRUBS & TREES	

TOPO SHEET No : 58-J/10
 LATITUDE : 10°40'36.02"N to 10°40'40.96"N
 LONGITUDE : 78°32'18.07"E to 78°32'26.38"E

ENVIRONMENTAL PLAN

SCALE= 1:5000

Prepared By:

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

[Handwritten signature]

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

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



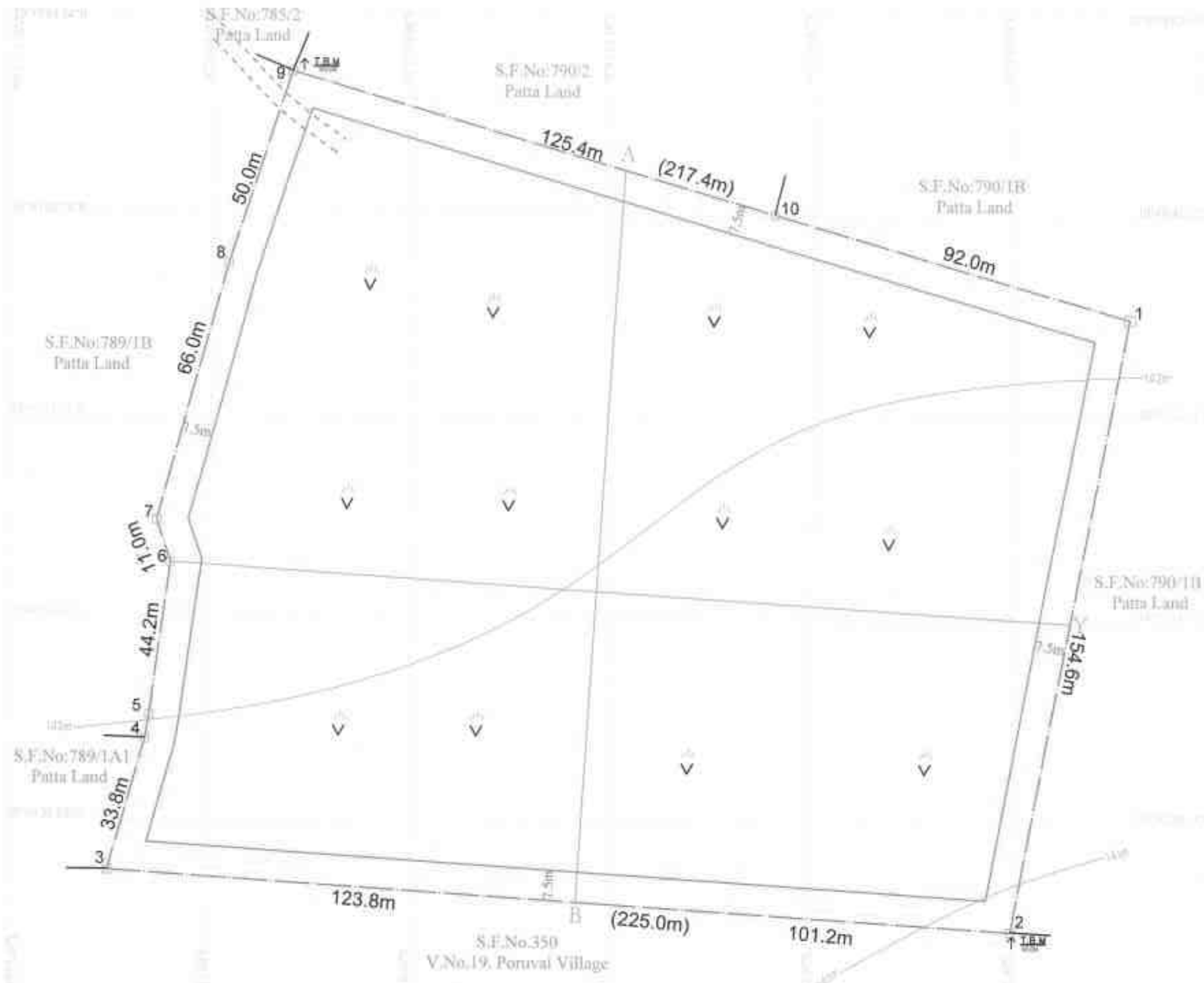


PLATE No- III

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
 EXTENT : 4.00.0 Hect,
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI

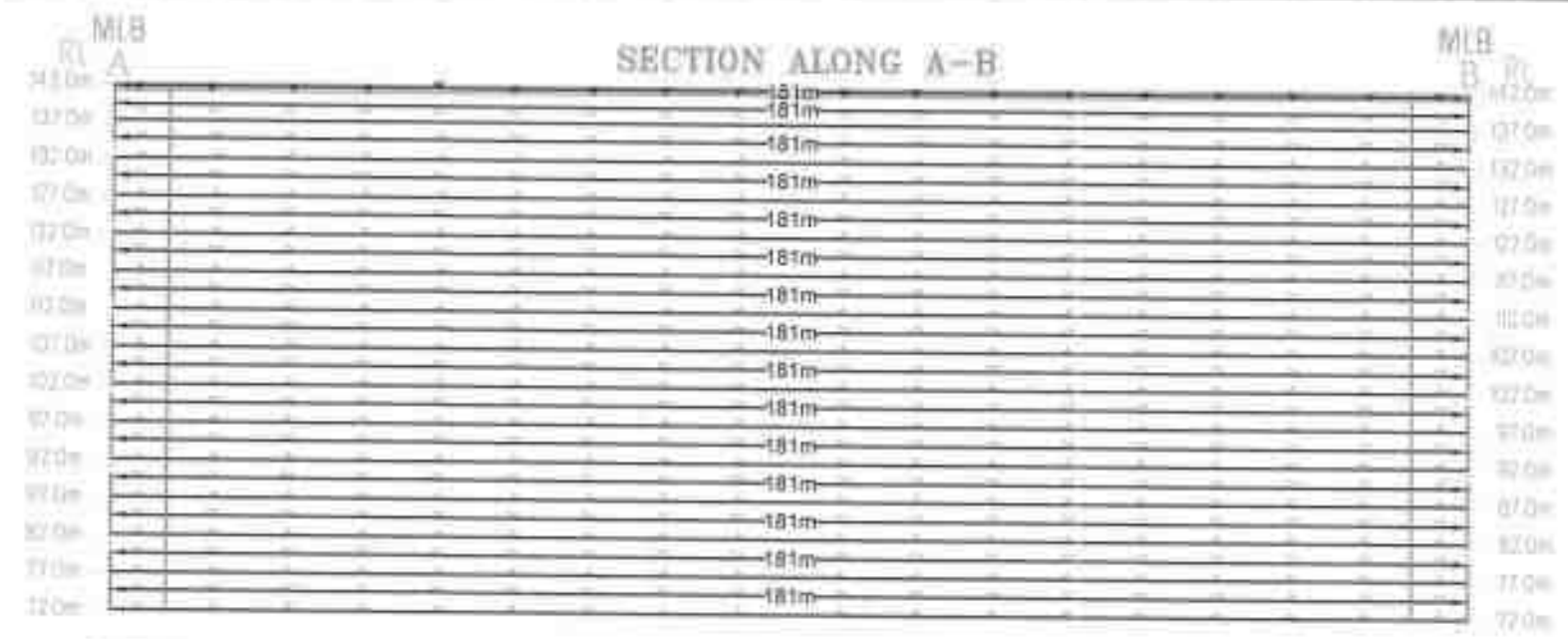
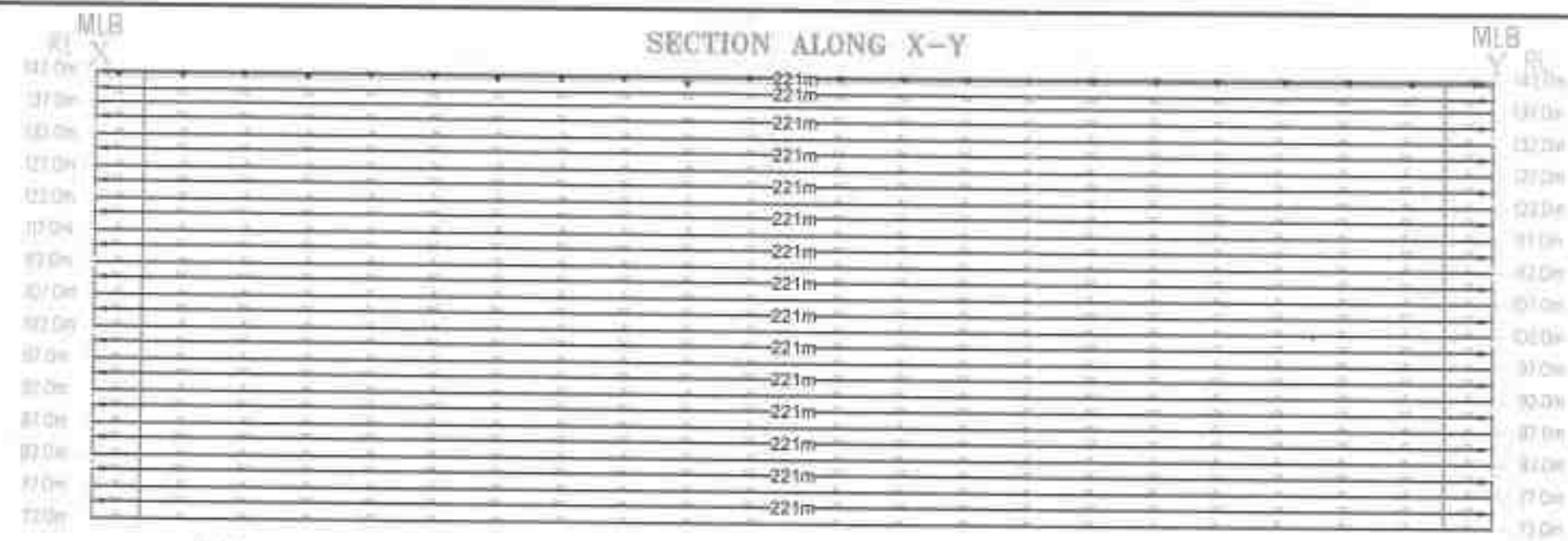
INDEX	
MINE LEASE BOUNDARY	
SAFETY DISTANCE	
APPROACH ROAD	
BOUNDARY PILLAR STONES	
CONTOUR LINE	
TEMPORARY BENCH MARKS	
GRAVEL & SHRUBS	

SURFACE & GEOLOGICAL PLAN
 SCALE 1 : 1000

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

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

S. Vijayakumar



GEOLOGICAL RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	221	181	1	40001	.....	40001	2	.....	80002
	I	221	181	4	160004	160004	.....	2.75	440011	.....
	II	221	181	5	200005	200005	.....	2.75	550014	.....
	III	221	181	5	200005	200005	.....	2.75	550014	.....
	IV	221	181	5	200005	200005	.....	2.75	550014	.....
	V	221	181	5	200005	200005	.....	2.75	550014	.....
	VI	221	181	5	200005	200005	.....	2.75	550014	.....
	VII	221	181	5	200005	200005	.....	2.75	550014	.....
	VIII	221	181	5	200005	200005	.....	2.75	550014	.....
	IX	221	181	5	200005	200005	.....	2.75	550014	.....
	X	221	181	5	200005	200005	.....	2.75	550014	.....
	XI	221	181	5	200005	200005	.....	2.75	550014	.....
	XII	221	181	5	200005	200005	.....	2.75	550014	.....
	XIII	221	181	5	200005	200005	.....	2.75	550014	.....
	XIV	221	181	5	200005	200005	.....	2.75	550014	.....
TOTAL					2800070	2760069	40001	.....	7590193	80002
GRAND TOTAL					2800070	2760069	40001	.....	7590193	80002

PLATE No- IIIA

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
 EXTENT : 4.00.0 Hect,
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI.

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MINE LEASE BOUNDARY ☐

SAFETY DISTANCE ☐

GRAVEL ☒ ☒ ☒

ROUGH STONE ☐

GEOLOGICAL SECTIONS
 SCALE - HOR 1 : 1000 & VER 1: 1000

Prepared By:

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

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

Shirub



PLATE No- IV

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
 EXTENT : 4.00.0 Hect,
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI

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FENCING	
ULTIMATE BENCH	

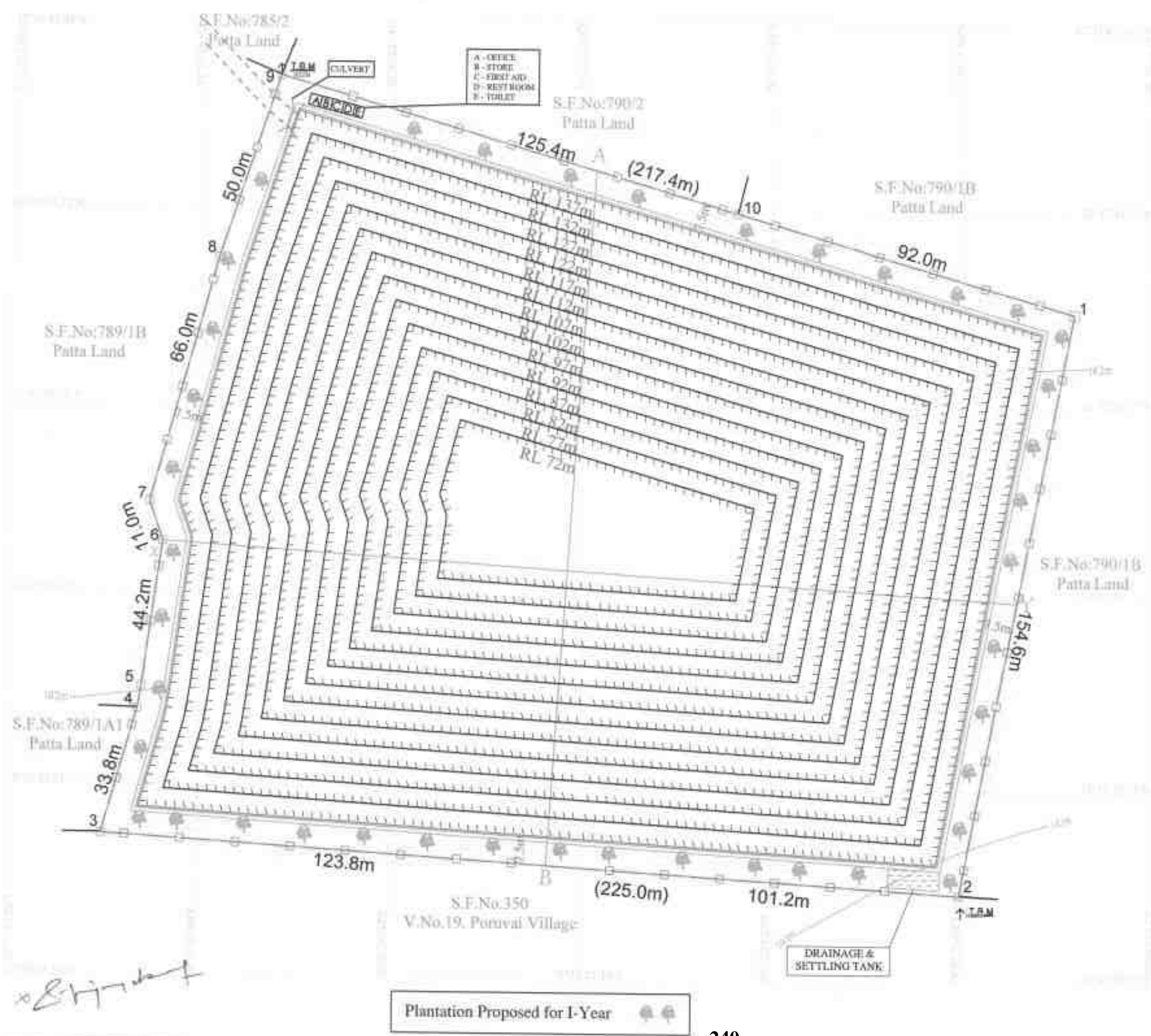
CONCEPTUAL PLAN

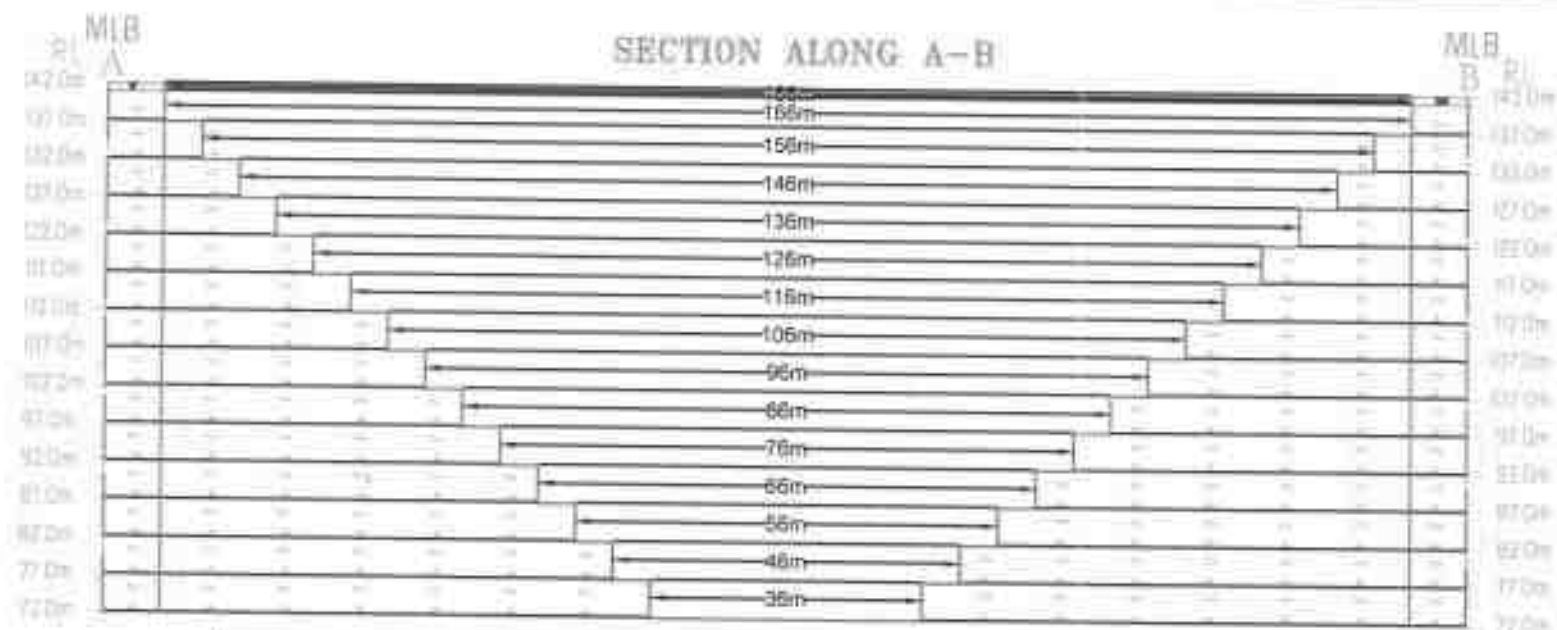
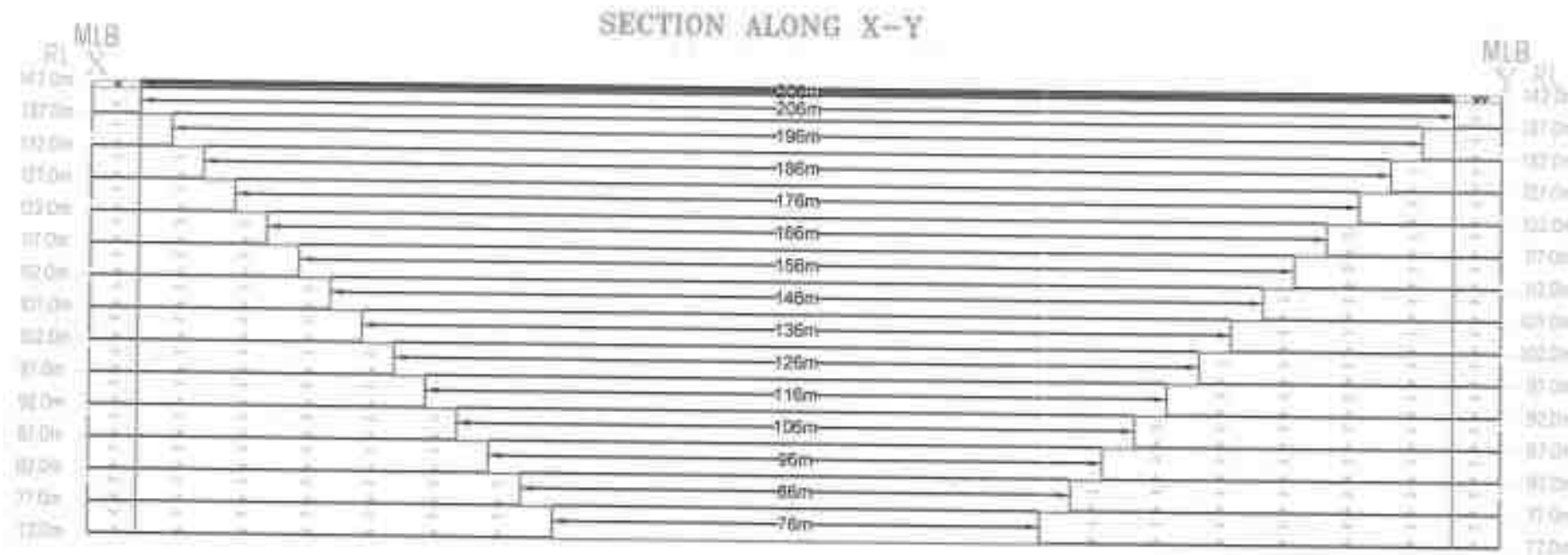
SCALE 1: 1000

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.
ASSISTANT COMMISSIONER





MINEABLE RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	206	166	1	34196	.....	34196	2	.....	68392
	I	206	166	4	136784	136784	.....	2.75	376156	.....
	II	196	156	5	152880	152880	.....	2.75	420420	.....
	III	186	146	5	135780	135780	.....	2.75	373395	.....
	IV	176	136	5	119680	119680	.....	2.75	329120	.....
	V	166	126	5	104580	104580	.....	2.75	287595	.....
	VI	156	116	5	90480	90480	.....	2.75	248820	.....
	VII	146	106	5	77380	77380	.....	2.75	212795	.....
	VIII	136	96	5	65280	65280	.....	2.75	179520	.....
	IX	126	86	5	54180	54180	.....	2.75	148995	.....
	X	116	76	5	44080	44080	.....	2.75	121220	.....
	XI	106	66	5	34980	34980	.....	2.75	96195	.....
	XII	96	56	5	26880	26880	.....	2.75	73920	.....
	XIII	86	46	5	19780	19780	.....	2.75	54395	.....
	XIV	76	36	5	13680	13680	.....	2.75	37620	.....
TOTAL					1110620	1076424	34196	.....	2960166	68392
GRAND TOTAL					1110620	1076424	34196	.....	2960166	68392



PLATE No- IVA

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part).
 EXTENT : 4.00.0 Hect.
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI.

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- MINE LEASE BOUNDARY
- SAFETY DISTANCE
- GRAVEL
- ROUGH STONE
- ULTIMATE BENCH

CONCEPTUAL SECTIONS
 SCALE - HOR 1 : 1000 & VER 1:1000

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

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



PLATE No- V

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
 EXTENT : 4.00.0 Hect,
 VILLAGE : KOLATHUR,
 TALUK : SRIRANGAM,
 DISTRICT : TIRUCHIRAPPALLI

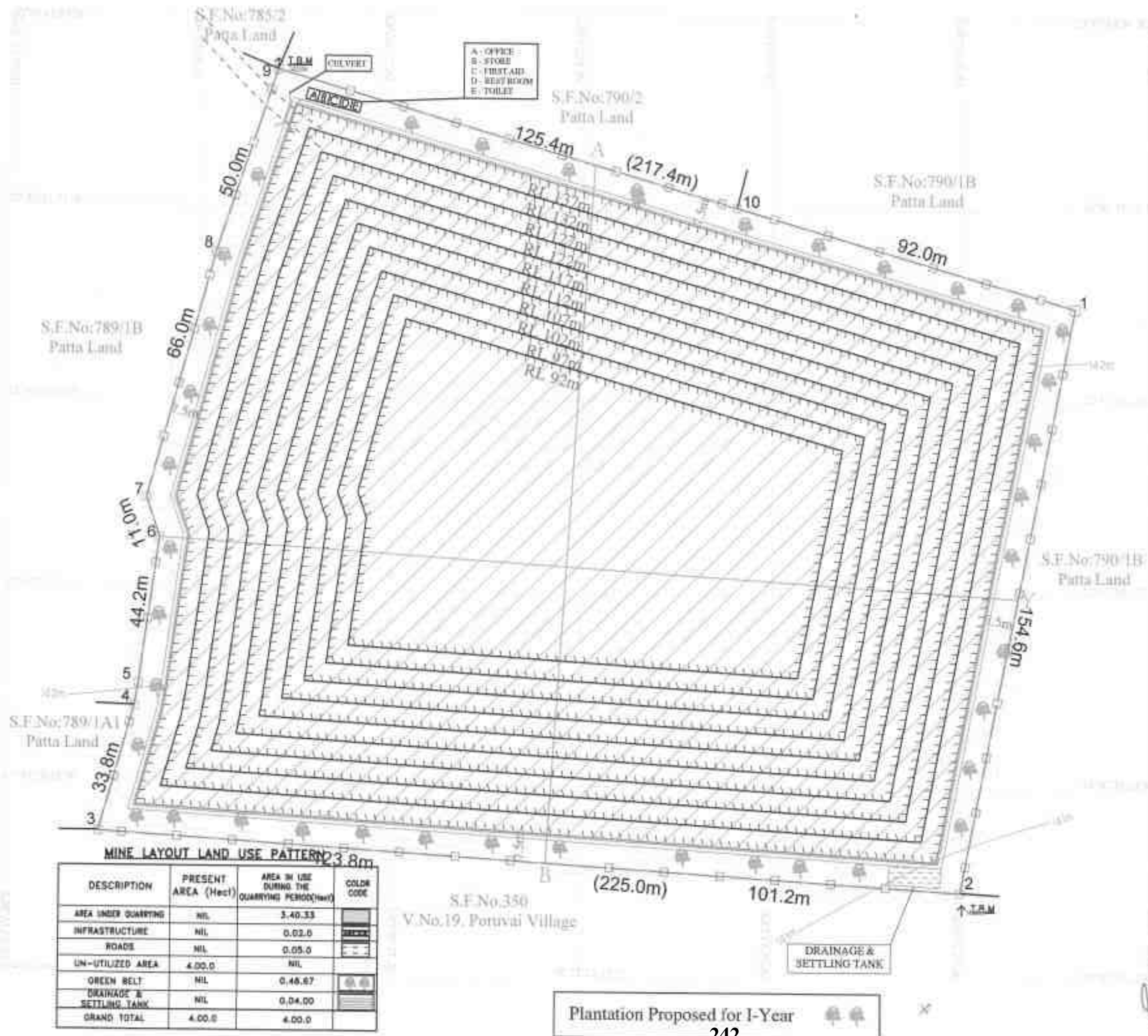
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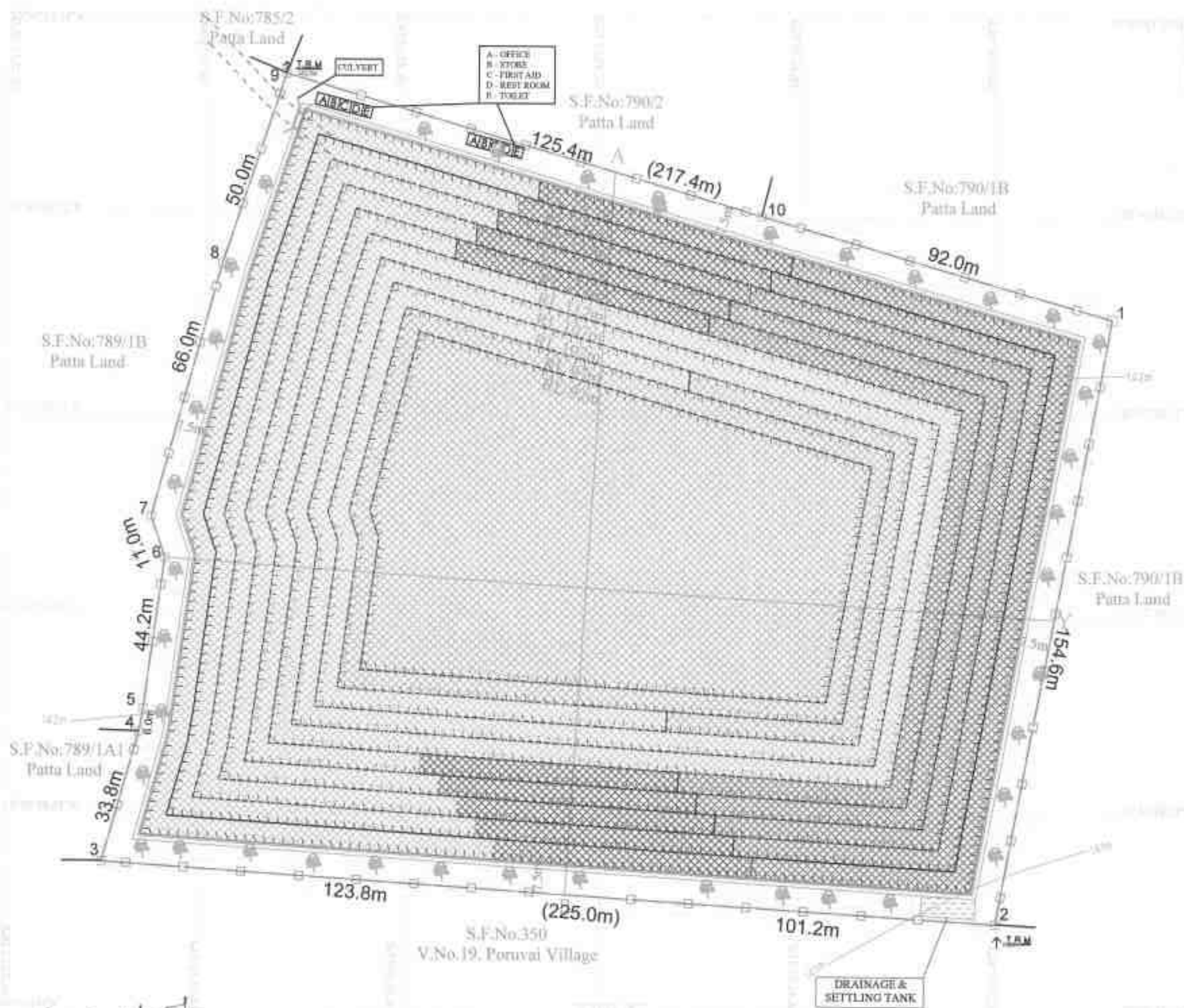
MINE LEASE BOUNDARY	
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APPROACH ROAD	
BOUNDARY PILLAR STONES	
CONTOUR LINE	
TEMPORARY BENCH MARKS	
GRAVEL & SHRUBS	
FENCING	
ULTIMATE BENCH	

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

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
 REGISTRAR OF MINES, TIRUCHIRAPPALLI

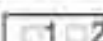




APPLICANT:
Mr.S.VIJAYAKUMAR,
S/o.(Late).N.SWAMINATHAN,
NO.10, COLLECTOR OFFICE ROAD,
CANTONMENT,
TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:	
S.F.No	: 790/1B (Part) & 790/2 (Part).
EXTENT	: 4.00.0 Hect.
VILLAGE	: KOLATHUR.
TALUK	: SRIRANGAM.
DISTRICT	: TIRUCHIRAPPALLE.

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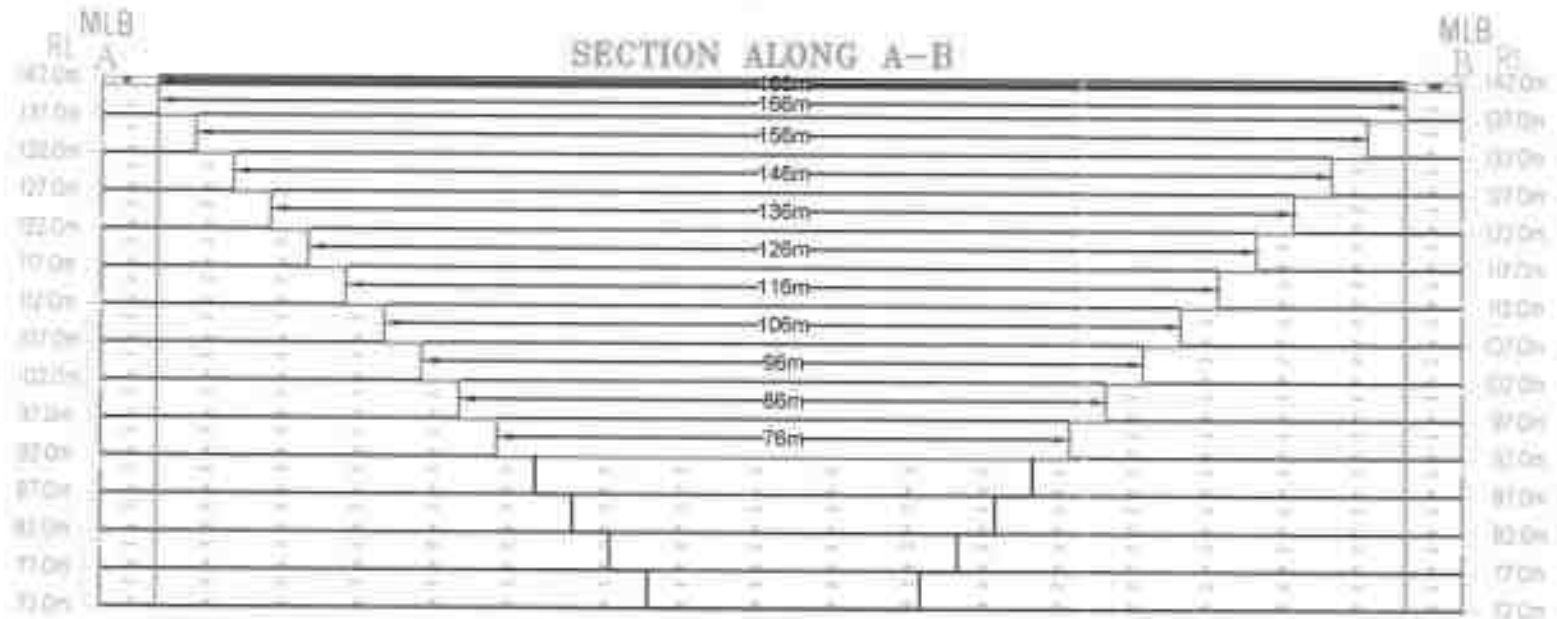
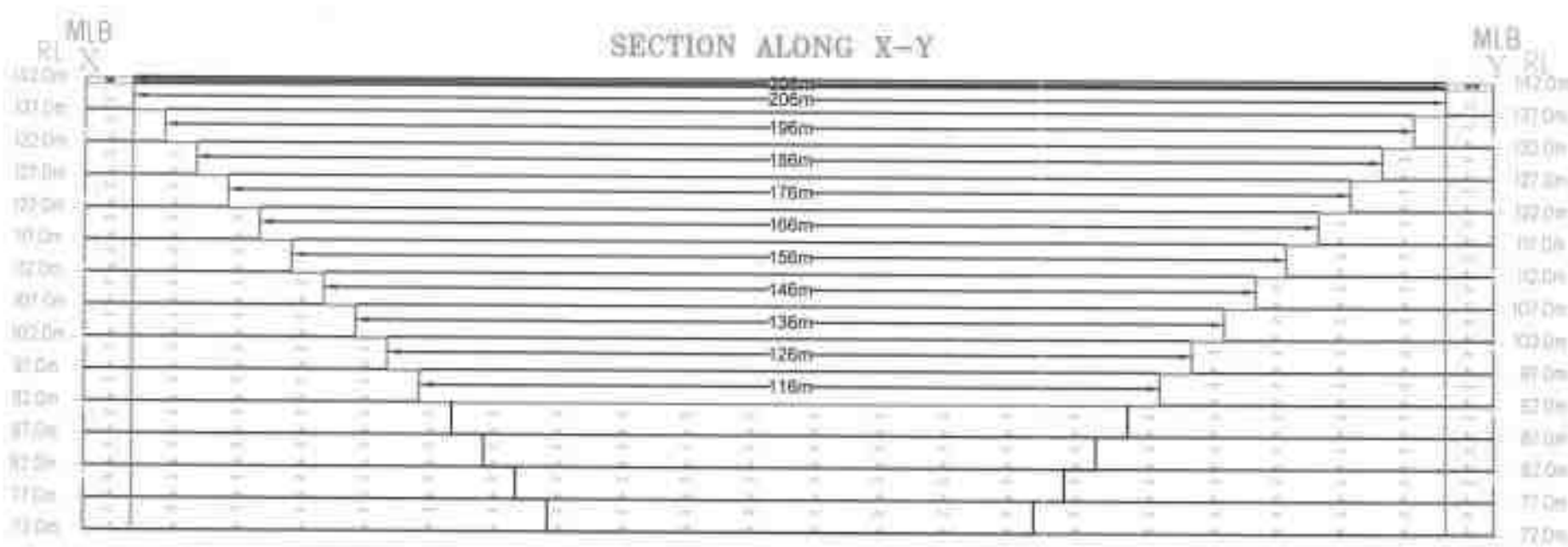
YEARWISE DEVELOPMENT & PRODUCTION PLAN

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.
QUALIFIED PERSON



PRODUCTION RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	206	166	1	34196	.....	34196	2	.....	68392
	I	206	166	4	136784	136784	.....	2.75	376156	.....
	II	196	156	5	152880	152880	.....	2.75	420420	.....
	III	186	146	5	135780	135780	.....	2.75	373395	.....
	IV	176	136	5	119680	119680	.....	2.75	329120	.....
	V	166	126	5	104580	104580	.....	2.75	287595	.....
	VI	156	116	5	90480	90480	.....	2.75	248820	.....
	VII	146	106	5	77380	77380	.....	2.75	212795	.....
	VIII	136	96	5	65280	65280	.....	2.75	179520	.....
	IX	126	86	5	54180	54180	.....	2.75	148995	.....
	X	116	76	5	44080	44080	.....	2.75	121220	.....
TOTAL					1015300	981104	34196	.....	2698036	68392
GRAND TOTAL					1015300	981104	34196	.....	2698036	68392



PLATE No- VIIA

APPLICANT:
Mr.S.VIJAYAKUMAR,
 S/o.(Late).N.SWAMINATHAN,
 NO.10, COLLECTOR OFFICE ROAD,
 CANTONMENT,
 TIRUCHIRAPPALLI DISTRICT - 620001.

LEASE AREA:
 S.F.No : 790/1B (Part) & 790/2 (Part),
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PROGRESSIVE SECTION

SCALE - HOR 1 : 1000 & VER 1:1000

Prepared By:

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

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

சிராம நிர்வாக அலுவலர்
41, இனாம்குளத்தூர் சிராமம்
ஸ்ரீரங்கம் வட்டம்



National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Technical Mining Solutions, Dharmapuri

5/1485-3, Salem Main Road, Elakkiyampatty, Dharmapuri, Tamil Nadu

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors.

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals - including opencast and underground mining	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated January 24, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3142 dated Feb 19, 2024. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.

Issue Date
Feb 19, 2024

Valid up to
Dec 31, 2026



Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0319

Prof (Dr) Varinder S Kanwar
(CEO NABET)

For the updated list of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.