

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

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

“B1” CATEGORY (Cluster) – MINOR MINERAL – CLUSTER –

PATTA LAND - FRESH QUARRY

THIRU. A. RAMAMOORTHY ROUGH STONE AND GRAVEL QUARRY

Cluster Extent – 7.27.96 Ha, Lease Period: 5 Years

Project Proponent




Thiru. A. Ramamoorthi

S/o. Arumugam,

Katchaikatti Village,

Vadipatti Taluk,

Madurai District – 625 218

PROJECT LOCATION	PROPOSED PRODUCTION
S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu Extent: 1.36.5 ha	Reserves: 75,025 m ³ of Rough stone & 6,439 m ³ of Topsoil Peak Production = 16,390 m ³ of Rough Stone 3,339 m ³ of Topsoil Proposed Depth = 21 m BGL Mining Plan Period: 5 years
ToR obtained vide File No: 10811 ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024	
Environmental Consultant GEO EXPLORATION AND MINING SOLUTIONS  Old No. 260-B, New No. 17, Advaitha Ashram Road, Alagapuram, Salem – 636 004, Tamil Nadu, India Accredited for sector 1 Cat 'A', sector 31 & 38 Cat 'B' Certificate No : NABET/EIA/2225/RA 0276  Phone: 0427-2431989, Email: infogeoexploration@gmail.com  Web: www.gemssalem.com	Laboratory EHS 360 LABS PRIVATE LIMITED, 10/2 Ground floor, 50 th street, 7 th Avenue, Ashok Nagar, Chennai – 600 083.
<u>Baseline Monitoring Period</u> March 2024 to May 2024	
AUGUST 2024	

UNDERTAKING

I Thiru. A. Ramamoorthi given undertaking that this Draft EIA & EMP report prepared for our Rough stone and Gravel quarry situated in S.F. No 1131/1B, 1131/3 & 1131/4, over an extent of 1.36.5 Ha in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State based on the Transfer in ToR obtained vide issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024.

I hereby assured that the Data's submitted and information given by me is true and correct to the best of my knowledge.

Signature of the Project Proponent



Thiru. A. Ramamoorthi

Place : Madurai

Dated :

DECLARATION

I Dr. M. Ifthikhar Ahmed – EIA Co Ordinator declare that the Draft EIA & EMP report for the Rough stone and Gravel quarry in S.F.No 1131/1B, 1131/3 & 1131/4, over an extent of 1.36.5 Ha in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State has been prepared by Geo Exploration and Mining Solutions, Salem, Tamil Nadu.

The Data's provided in the EIA report are true and correct to the best of my knowledge.

Signature of the EIA Co Ordinator



Dr. M. Ifthikhar Ahmed

Managing Partner

M/s. Geo Exploration and Mining Solutions

Place : Salem

Dated :

For easy representation of Proposed and Existing Quarries in the Cluster are given unique codes and identifies and studied in this EIA/EMP Report.

CODE	Name of the Owner	S.F. Nos	Extent	Status
P1	Thiru. A.Ramamoorthy, S/o. Arumugam, Katchaikatti Village, Vadipatti Taluk, Madurai – 625 218.	1131/1B, 1131/3 & 1131/4	1.36.5 ha	ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024
TOTAL			1.36.5 ha	
EXISTING QUARRY				
CODE	Name of the Owner	S.F. No & Village	Extent	Status
E1	Thiru. Anantha Siva S/o Soundarapandian, No 551, K.K.Nagar, Alavandan, Madurai – 625 020.	1141/2A, 1141/2B, 1141/4B, 1142, 1144/4	2.25.46 ha	Lease Period – 04.06.2018 – 03.12.2024
E2	Thiru. M.Inbaraj S/o P.mariyappan, 4/202, Katchaikatti Road, Chinna Manaickamoatti, T.vadipatti Taluk, Madurai District	1135/7, 1159/2A, 1159/3, 1159/4, 1159/5, 1159/6, 1216/1, 1216/2, 1138, 1135/1A2, 1135/1B2, 1135/2B, 1135/5, 1135/6	3.66.0 ha	Lease Period – 20.09.2019 – 19.09.2024
TOTAL			5.91.46 ha	
EXPIRED/ABANDONED QUARRIES				
EX1	Thiru. K.Rajesh Royal Blue Metals(P) Ltd, Thathampatti Village, Vadipatti Taluk Madurai District	1144/1a, 1144/1b, 1144/6a	0.71.0	Lease Period – 19.08.2014 – 18.08.2019
EX2	Thiru. C. Sundarapandian Plot no. 551, KK Nagar, Madurai	1218/1	0.61.5	Lease Period – 21.06.2014 – 20.06.2019
TOTAL			1.32.5 ha	
TOTAL CLUSTER EXTENT			7.27.96 ha	

Note:-

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

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. A. Ramamoorthi

ToR Identification No.: TO24B0108TN5141142N Dated: 03.06.2024.

SEIAA SPECIFIC CONDITION		
1	The Authority accepts the recommendation of SEAC and decided to grant Terms of reference (ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC	Noted and Agreed
SEAC CONDITION – SITE SPECIFIC		
1	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 500 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc.	Detailed in Chapter No.3
2	The Proponent shall study the details of water course situated adjacent to the proposed lease area such as its origin, flow direction, end point etc.,	Detailed in Chapter No.3
3	The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal.	It is proposed to plant 680 nos of trees inside and outside of the lease area and the photographs will be submitted in the Final EIA Appraisal
4	The study on impact of the proposed quarrying operations on the surrounding environment which includes reserve forest, water bodies, etc.	Detailed in Chapter No.4
5	The Project Proponent shall furnish the revised EMP based on the study carried out on impact of the dust & other environmental impacts due to proposed quarrying operations on the nearby agricultural lands for remaining life of the mine in the format prescribed by the SEAC considering the cluster situation.	Detailed in Chapter No.3
Annexure-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 (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zonelbenches	Not Applicable, It is a Fresh Quarry

	(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.	Detailed in chapter-3 and VAO certificate is incorporated in the Draft EIA/EMP report.														
3	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 500 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc.	Detailed in Chapter No.3														
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 1km of the proposed quarry.	<table border="1"> <tr> <td>Odai</td> <td>Adjacent to the lease applied area on Northern side, hence 50m safety distance provided</td> </tr> <tr> <td>Odai</td> <td>190m North</td> </tr> <tr> <td>Mullai Periyar Channel</td> <td>3.6 Km SW</td> </tr> <tr> <td>Tank</td> <td>5.7 km SW</td> </tr> <tr> <td>Santhaiyar River</td> <td>7.0 km NE</td> </tr> <tr> <td>Santhaiyar Dam</td> <td>7.7 km NE</td> </tr> <tr> <td>Vaigai River</td> <td>9.0 km SW</td> </tr> </table> <p>Detailed EIA study has been carried out considering the impact to the water bodies and eco system of the area. Details are covered in the Chapter No.3 and 4. Attached detailed hydrological report in Annexure.</p>	Odai	Adjacent to the lease applied area on Northern side, hence 50m safety distance provided	Odai	190m North	Mullai Periyar Channel	3.6 Km SW	Tank	5.7 km SW	Santhaiyar River	7.0 km NE	Santhaiyar Dam	7.7 km NE	Vaigai River	9.0 km SW
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5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Detailed in chapter-3 ecology environment in the draft 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.	Waguthumalai R.F – 207.75 Km – NorthEast Kadavur Slender Loris Sanctuary – 36 km – North East Kodaikanal wildlife Sanctuary – 36 km Northwest DFO letter will be obtained and attached in the Final EIA/EMP report annexure														
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.	Fresh lease application. The altitude of the area is 228m (max) above Mean Sea level														

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.	Ultimate Pit Dimension Pit-I 63m(L) x 52m (W) x21m(D) Pit-II 25m(L) x 124m (W) x16m(D) Proposed Depth = 21m Bgl (20m Rough Stone + 1m Topsoil)
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/1st Class mines manager appointed by the proponent.	Proponent will be submit Affidavit stating that the blasting operation will be carried out by the competent person as per the MMR 1961 in the Final EIA Appraisal
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 30m from the blast site.	The Blasting will be carried out by controlled blasting adopting muffle blasting and line drilling. The cost for the controlled blasting is allotted in the EMP
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.	No other Quarries in the name of proponent
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	It is a Fresh Lease application.
13	what was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	It is a Fresh Lease application.
14	Quantity of minerals mined out a) Highest production achieved in any one year b) Detail of approved depth of mining c) Actual depth of the mining achieved earlier d) Name of the person already mined in that leases area e) If EC and CTO already obtained' the copy of the same shall be submitted f) whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	Not Applicable, It is a Fresh lease application
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	Coordinates for all the boundaries are given in the Chapter No.2 Satellite imagery of the project site marked with Lease boundary, Safety area

	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.,	Drone video survey covering the Cluster, Greenbelt and fencing will be submitted during appraisal.
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.	The area has been fenced and the photographs are given in the Chapter No.2, No trees within the proposed excavation area, No transplantation is required. Water bodies near to the project site is given in the Chapter No.2
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.	As per ToR obtained Five Year Production: 75,025m ³ of Rough stone, 6,439m ³ of Topsoil Proposed Depth = 21m Bgl The proposed plantation is 680 Nos.along the safety barrier, village road and panchayat road Details of Geological Resources and Proposed reserves are discussed under Chapter No. 2.
19	The Project Proponent shall provide the organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	Discussed about Organization chart in Chapter 6,
20	The project proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1km (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 are this regard may be provided.	The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.
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.	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 to assess the cumulative impact of the proposed project on the environment is prepared. The details of Baseline study is given in the Chapter No. 3.
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 Cumulative impact study due to mining operations is explained in chapter – 7

	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.	The rain water will be collected in the mine pit at the lower point later it will be utilized for the haul road maintenance, Greenbelt development etc.,
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 pre operational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use Land cover study within the radius of 10km is detailed in the Chapter No. 3
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.	Not applicable, There is no wastages anticipated, the entire quarried out Rough stone material will be utilized..
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.	The area is not declared as Critically polluted area, No court case pending against the project. Proponent obtained Precise area communication letter, Approval for the Mining plan. The Details are enclosed as Annexure .
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.	The rain water collected in the pits after spell of rain will be used for greenbelt development and dust suppression.
28	Impact on local transport infrastructure due to the Project should be indicated.	There is no group of Houses, Schools in the proposed transportation route. Proposed Transportation route with mitigation measures are given in the Chapter No.2
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.	The Flora study in the core zone has been carried out and the details are given in the Chapter No.3
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	The mine closure plan is detailed in the Chapter No.4 The budget for the mine closure is included in the Environmental Management plan in Chapter No.10 ,
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 Flora and Fauna study around the vicinity of the site is carried out by the Functional area experts along with Local School Students.

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 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.	The plantation in the project site will be carried out using native and mixed plantation. The recommended species for the plantation is given in the Chapter No.4 Table
33	Taller/one year old Saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted in proper replacement 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.	Noted and Agreed. The plantation in the project site will be carried out using native and mixed plantation. The recommended species for the plantation is given in the Chapter No.4
34	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Disaster management Plan details in Chapter-7
35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.	A Risk Assessment and management Plan Chapter- 7
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 with mitigation measures are detailed in the Chapter No.7, Details of Periodical Medical Examination given in the Chapter No.10
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.	The details of the population in the impact zone (within 500m radius) is detailed in the Chapter No.3,
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.	Socio Economic study covering 10 km radius is detailed in the Chapter No.3
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 court case and litigation pending against the 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.	It is explained in Chapter -3- socio economic study
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.	Not applicable, the project is fresh proposal
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.	The EMP has been prepared for the entire life of the mine. Proponent given affidavit stating the EMP will be submitted during the appraisal after completion of Public hearing.
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 Reference besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted and agreed

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.	Cluster management committee has been formed with mutual agreement with the proponents including Existing and Proposed quarry at present 3 Nos are members in this CMC
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..	As per the committee agreement proponents will coordinates for the Greenbelt development, Water sprinkling and tree plantation activities combinedly
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 formation of committee with list of members has been submitted to the AD mines office, Madurai and the same will be update in every year
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.	As per the committee agreement the blasting frequency will be discussed and carryout by the Mines Manager appointed by the proponents and the same will be updated in the committee minutes
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	Details discussed in chapter 7 of Final EIA report
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	Details discussed in chapter 6 of Final EIA report

	the committee in implementing the environmental policy devised shall be given in detail.	
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	Noted & agreed
8	The committee shall furnish the Emergency Management within the cluster.	Details discussed in chapter 7.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	Details discussed in chapter 10.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	Noted & agreed
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	Detailed discussed in chapter 7.
Impact study of mining		
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following a) Soil health & bio-diversity b) Climate change leading to Droughts, Floods etc. c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature' & Livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health' e) Agriculture, Forestry & Traditional practices. 1) Hydrothermal/Geothermal effect due to destruction in the Environment' g) Bio-geochemical processes and its foot prints including environmental stress' h) Sediment geochemistry in the surface steams.	Details of Soil health is given in Chapter No 3 and biodiversity is given in Chapter No 3. The project will not cause any significant changes in the climate Climatic changes and GHG are described in Chapter No 4. Details of water contamination and impact on aquatic ecosystem is given in Chapter No 4. Hydrothermal/ Geothermal effects due to destruction in the environment, Bio geochemical process and sediment geo chemistry given in the Chapter No 7.
Agriculture & Agro-Biodiversity		
13	Impact on surrounding agricultural fields around the proposed mining Area.	Detailed discussed in chapter 4.
14	Impact on soil flora & vegetation around the project site.	Detailed discussed in chapter 4.
15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details discussed in chapter 10
16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora. fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The EIA study on biodiversity, natural ecosystem, the soil micro flora, fauna was carried out and discussed in earlier slides. The species overcome periods of un favorable weather conditions by building up large seed stock in the soil, which is known as "soil seed banks". This strategy protects plant species diversity against local extinction of the species during the disturbance and provides information on the past population dynamics and structure and future regeneration potential of degraded land.

		The proposed project site is a dry land without any major vegetation and its proposed to remove the top layer of gravelly formation and sold in open market and the 7.5m of safety barrier shall be remained un touched all around the lease applied area.
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	During Mine Closure the excavated pit will be allowed to collect rain water and shall act as an artificial reservoir and shall prove beneficial for the ecosystem. The proposed greenbelt activity shall also prove beneficial for the ecosystem during mine closure
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands. Horticulture, Agriculture and livestock .	The project area is bounded by Existing quarries on the South side. Proponent proposed to erect green mesh along with fencing on the boundary of the proposed quarry besides, Budgetary allocation given in the Chapter No. 10.
Forest		
19	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	Waguthumalai R.F – 207.75 Km – NorthEast Kadavur Slender Loris Sanctuary – 36 km – North East Kodaikanal wildlife Sanctuary – 36 km Northwest
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	Ecology and Biodiversity environment deals in Chapter-3
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Ecology and Biodiversity environment deals in Chapter-3
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Anticipated Environment Impact and Mitigation measures are detailed in Chapter No.4
Water Environment		
23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks. canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect Groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	There are 7 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
24	Erosion Control measures.	Noted & agreed
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby villages, water-bodies/ Rivers. & any ecological fragile areas.	Details in Chapter 2
26	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Details in Chapter 2 and 4 impact of bio diversity
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment by the activities.	Noted & agreed

28	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	Noted & agreed. Detailed under Chapter 3.
29	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil, physical, chemical components and microbial components.	Details in Chapter 3 Soil environment.
30	The Environmental impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Details in Chapter 3 Water environment.
Energy		
31	The measures taken to control Noise. Air, Water. Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	Details in Chapter 3 environmental monitoring details.
Climate Change		
32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	Details of carbon emission and mitigation activities are given in the Chapter No.4
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Details in Chapter-3 for meteorological and climate/weather data representation of graphs.
Mine Closure Plan		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Details in Chapter 2 mine closure plan
EMP		
35	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	Detailed under Chapter 10
36	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	Details in Green belt development in chapter 4
Risk Assessment		
37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Detailed under Chapter 7
Disaster Management Plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/unfavorable 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.	Details in Study 7.3 Disaster Management Plan in Chapter -7
Others		
39	The project proponent shall furnish VAO Certificate with reference to 300m radius regard to approved habitations. schools. Archaeological	Noted & agreed. Detailed under Chapter 4

	sites. Structures. railway lines, roads. Water bodies such as streams, odai, vaari, canal, channel. river, lake pond, tank etc.,	
40	As per the MoEF& CC office memorandum tr.No.22-65/2017-1A.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.	Noted and agreed
41	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	Details of carbon emission and mitigation activities are given in the Chapter No.4

S. No	Terms of Reference	Reply
1.1	An EIA-EMP Report shall be prepared for peak capacity (.MTPA) operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA	Peak Production = 16,390m ³ of Rough Stone Proposed Depth = 21m bgl Project area of 1.36.5Ha.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for.... MTPA of mineral production based on	Peak capacity of 16,390m ³ operation to cover the impacts and environment management plan in chapter- IV and Chapter-10 covered in project specific activities. Baseline Data were collected for Summer Season March– May 2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. III
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided.	Noted, Google earth image showing lease area with Coordinates of pillars in chapter-II.
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance	Land use and land cover of the 10km Radius of study area is discussed in Chapter No. III. Geology map of the project area covering 10km radius Figure No. 2.5, Page No. 20. Geomorphology of the area is given in Chapter No 2 Figure No 2.6, Page No. 20 There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.

1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	Land use and land cover of the study area is discussed in Chapter No. III with Physical features such as waterbodies, odai, canal etc.,
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be	DEM data using Drainage pattern around 10km radius showing streams and lakes etc., discussed in Chapter No. 3.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and	Drainage pattern around 10km radius showing streams and lakes etc., is discussed in Chapter No. 3.
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be	Details in chapter-2 showing the land features. And also enclosed Approved mining plan in annexure
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.	It is an opencast quarrying operation proposed to operate in Mechanized method. The Rough Stone quarry formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90 ^o bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.	Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.

1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of	Not Applicable. The details of waste dump management are given in the Chapter No. 4			
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights	Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.5.			
		Description	Present area (Ha)	Area at the end of lease period (Ha)	
		Area under quarrying	Nil	0.51.5	
		Infrastructure	Nil	0.01.0	
		Roads	Nil	0.02.00	
		Green Belt	Nil	0.12.0	
		Unutilized Area	1.36.5	0.70.0	
		Grand Total	1.36.5	1.36.5	
		S.No	Details	Area (Ha)	
		1	Buildings		
2	Infrastructure				
3	Roads				
4	Others (Specify)				
	Total				
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.			

1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SO _x , NO _x and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/	Baseline Data were collected for Summer season March–May 2024 as per CPCB Notification and MoEF & CC Guidelines.Details in Chapter No. 3.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air) / downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting	Details in chapter-3 showing the various sampling stations As per CPCB guidelines.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10km buffer zone i.e.,	Air Quality Modelling and windrose pattern for prediction of incremental GLC's of pollutant was carried out using AERMOD view 12 Model. Details in Chapter No. 4.
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to	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 in Chapter-II.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative	Detailed in chapter-3 socio-economic study with occupational status & economic status of the study area. The study should also include the status of infrastructural facilities and amenities present in the study area CSR are discussed under Chapter 8.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will	Detailed Ecology and biodiversity study in chapter-3
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be	Detailed in chapter-4 population in the impact zone and measures for occupational health and safety and proposed occupational health in chapter-X

1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be	Noted and agreed
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of	The ground water table is at 57m below ground level. In these projects, ultimate depth is 21m Bgl It is inferred the quarrying activities in the Cumulative EIA project (Quarry) will not intersect the Ground water table.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.	Detailed in Chapter-IV Anticipated and mitigation measures of in the study area.
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the	Total Water Requirement: 1.5 KLD Discussed under Chapter 2, Table No 2.15, The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Methodology And Instrument Used For Air Quality Analysis in chapter-3 and Air Pollution control equipment (APCEs) in chapter-10 sub 10.2 Environmental policy.
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored.	Details in Machinery and equipment details in Chapter-2 Table No 2.10
1.27	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption	Noted and agreed
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan	A Risk Assessment and Disaster Preparedness and management Plan Chapter- 7
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	Detailed in Machinery and technology used Chapter-3 Table 3.17 – Methodology and Instrument Used for Air Quality Analysis Detailed study in chapter-4 Impact of choice of mining method and impact on air quality and blasting and noise and vibrations.

1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no much significant impact due to the proposed transportation from the project area. Details in Chapter 2. Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of	Detailed in chapter-2 for mineral transportation route with approach roads etc., and impacting air quality detailed given chapter-4
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined-out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes	Discussed under Chapter 2. Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt	Greenbelt Development Plan is discussed under Chapter 4,
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.	The total cost and the details are given in the Chapter No. 10
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio-economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.	CSR are discussed under Chapter 8. And specific budgetary provisions (capital and recurring) for specific activities over the life of the project in chapter-10
1.38	Corporate Environment Responsibility:	CER are discussed under Chapter 8.
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.	Detailed in chapter-10 The Environment Policy
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the	

1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance	The Environment Monitoring Cell discussed under Chapter 6
1.42	d) To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders etc.	The Environment Monitoring Cell discussed under Chapter 6
1.43	e) Environment Management Cell and its responsibilities to be clearly spell out in	The Environment Monitoring Cell discussed under Chapter 6
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations	The Environment Monitoring Cell discussed under Chapter 6
1.45	Status of any litigations/ court cases filed/pending on the project should be	No litigation is pending in any court against this project
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.	Kadavur Slender Loris Sanctuary – 36 km – North East Kodaikanal wildlife Sanctuary – 36 km Northwest It will submit final EIA/EMP report.
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable	It will submit final EIA/EMP report
1.48	Details on the Forest Clearance should be given as per the format given: Total Mine lease area (ha): Total Forest Land (Ha) : Date of FC : Extent of Forest Land : Balance area for which FC is yet to be obtained: Status of application for diversion of forest	Waguthumalai R.F – 207.75 Km – NorthEast Total Mine Lease area 1.36.5ha It will submit final EIA/EMP report
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be	Enclosed Approved mining plan in Annexure volume-I
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form.	The outcome of public hearing will be updated in the final EIA/AMP report.
1.51	PP shall carry out survey through drone highlighting the ground reality for at least 10	Noted and agreed
1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from	Noted and agreed

1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)	As per detailed in front page of Draft EIA/EMP, NABET, NABL certification detailed given in the report.
1.54	The compliances of Tor must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapters	As per Tor compliance each chapter wise page and table, figure no given in the EIA/EMP report.

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1. INTRODUCTION

1.0 PREAMBLE

The project proponent Thiru. A.Ramamoorthi Rough Stone and Gravel Quarry Extent 1.36.5 Ha in S.F. No. 1131/1B, 1131/3, 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District.

- Proponent applied for Rough stone and Gravel quarry lease on 17.02.2022
- Precise area communication letter was issued by District Collector, Madurai R.C.No.255/Mines/2022 Dated:27.09.2023
- The Mining Plan was prepared by Recognized Qualified Person and approved by Deputy Director, Geology and Mining, Madurai District, vide R.C.No. 255/Mines/2023 Dated:14.12.2023.
- The Mining plan has been approved for the quantity of 75,025 m³ of Rough stone, and 6,439 m³ of Gravel up to the depth of 21 m bgl for the period of Five years.

As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries - 1 proposal and 2 Existing quarries forming Cluster Category {Total Extent of the Cluster is 7.27.96 Ha}- Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016).

- Proponent applied for Transfer Terms of Reference vide Proposal No. SIA/TN/MIN/467876/2024 Dated 30.03.2024 and the Transfer ToR was Granted vide ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024
- Based on the ToR Baseline Monitoring study has been carried out for one season i.e., **March – May 2024** and this EIA/EMP report is prepared for considering cumulative impacts arising out of these projects, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) to minimize those adverse impacts.

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound project.

1.1 PURPOSE OF THE REPORT

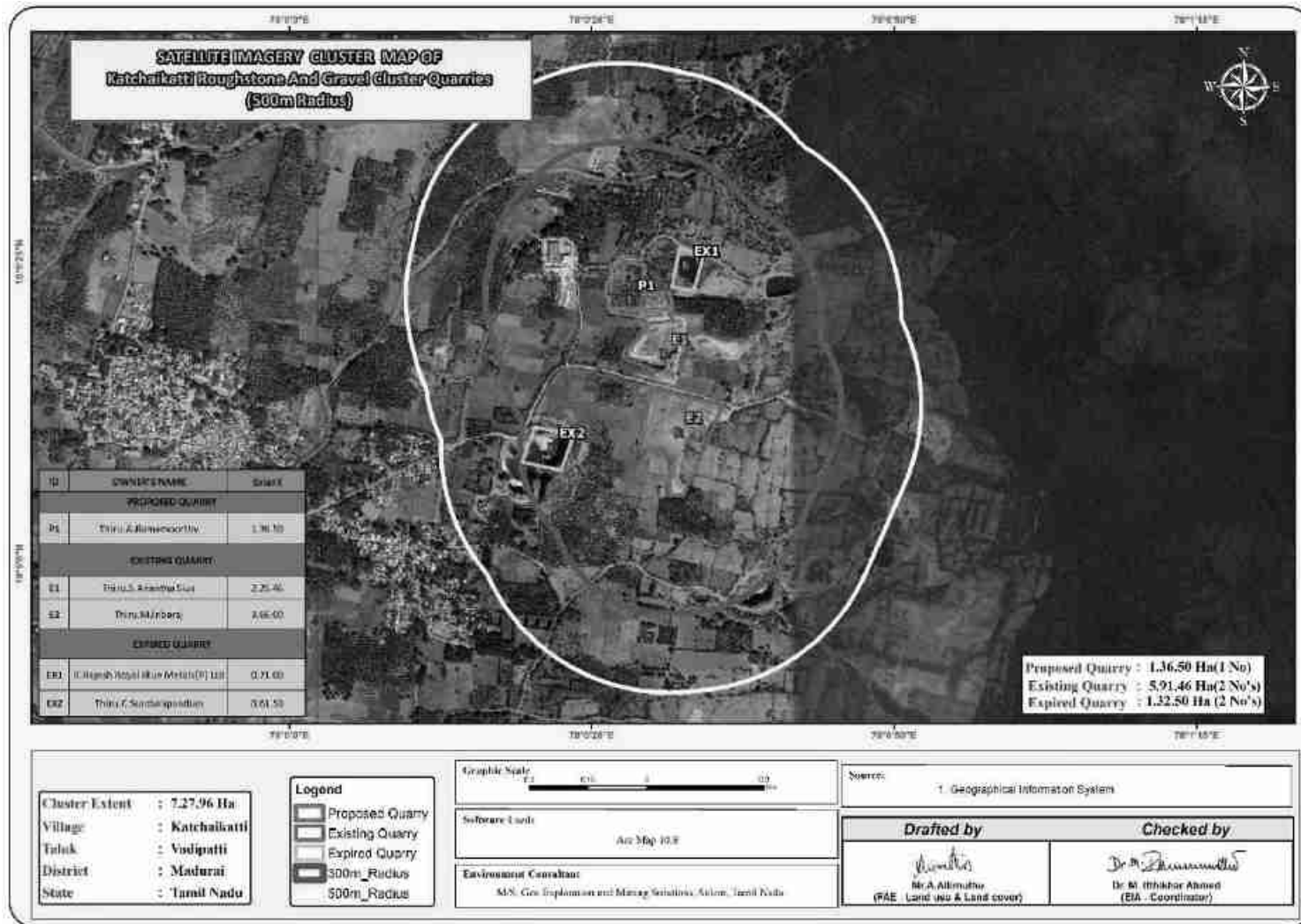
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 1889 of 20th April 2022, Mining Projects are classified under two categories i.e. A (> 250 Ha) and B (≤ 250 Ha), and Schematic Presentation of Requirements on Environmental Clearance of Minor Minerals including cluster situation in Appendix–XI.

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed projects are categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

“Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”

FIGURE 1.1 SATELLITE IMAGERY CLUSTER QUARRIES 500m RADIUS



1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1 Identification of Project Proponent

TABLE 1.1: SALIENT FEATURES OF THE PROPOSED PROJECT

Name of the Project Proponent	Thiru. A. Ramamoorthi
Address	S/o. Arumugam, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218
Mobile No	9791312720
Email	sivabrickworks@gmail.com
Status	Individual

Source: Approved Mining Plan.

1.2.2 Identification of Project Proponent

TABLE 1.3: BRIEF DESCRIPTION OF THE PROJECT

Name of the Project	Thiru. A. Ramamoorthi Rough Stone & Gravel Quarry	
S.F. No.	1131/1B, 1131/3 & 1131/4	
Extent	1.36.5 ha	
Village Taluk and District	Katchaikatti Village, Vadipatti Taluk, Madurai District.	
Land Type	patta land	
Land Ownership	It is a Patta lands. S.F.Nos 1131/1B, 1131/3 & 1131/4 Registered in the name of Thiru.Sundarapandiyan, s/o Sellaiya vide Patta No.5686. the applicant has obtained consent from the Pattadhar for the period of 10 years.	
Toposheet No	58-J/04	
Latitude between	10°05'20.91"N to 10°05'25.03"N	
Longitude between	78°00'26.05"E to 78°00'31.67"E	
Highest Elevation	228 m AMSL	
Lease Period	Ten years	
Mining Plan Period	Five years	
Proposed Depth of Mining	21 m bgl (1m Topsoil +20 m Rough stone)	
Geological Resources	Rough Stone in m ³	Topsoil m ³
	2,73,000	13,650
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	75,025	6,439
Proposed Quantity of Production for this Mining Plan Period Five Years	75,025	6,439
Peak Production	16,390	3,339
Ultimate Pit Dimension	63 m (L) * 52 m (W) * 21 m (D) Below ground level	
	25 m (L) * 124 m (W) * 16 m (D) Below ground level	
Water Level in the surrounds area	57m bgl	

Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards southern side. The altitude of the area is 228 m (max) above mean sea level. The area is covered by 1 m thickness of Topsoil Formation. Massive Charnockite is found after 1 m (Topsoil Formation) which is clearly inferred from the nearby existing quarrying pit on the southern side	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 Nos
	Excavator with Bucket and Rock Breaker	1 No
	Tippers	2 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	34 Nos	
Project Cost	Rs.42,52,000/-	
EMP cost	Rs. 3,80,000/-	
Total Project cost	Rs.46,35,000	
CER Cost	Rs 5,00,000	
Nearby Water Bodies	Odai	Adjacent to the lease applied area on Northern side, hence 50m safety distance provided
	Odai	190m North
	Mullai Periyar Channel	3.6 Km SW
	Tank	5.7 km SW
	Santhaiyar River	7.0 km NE
	Santhaiyar Dam	7.7 km NE
	Vaigai River	9.0 km SW
Greenbelt Development Plan	Proposed to plant 680 trees in the 7.5 m Safety Zone, panchayat road etc..	
Proposed Water Requirement	1.5 KLD	
Nearest Habitation	570m – SW	
Nearest Reserve Forest	Waguthumalai R.F – 207.75 Km – NorthEast	
Nearest Wild Life Sanctuary	Kadavur Slender Loris Sanctuary – 36 km – North East Kodaikanal wildlife Sanctuary – 36 km Northwest	

Source: Approved Mining Plan

1.3 BRIEF DESCRIPTION OF THE PROJECT

1.3.1 Nature and Size of the Project

The quarrying operation is proposed to be carried out by Opencast Mechanized Mining method with 5.0m bench height and 5.0m bench width by deploying Jack Hammer Drilling & Slurry Explosive during blasting.

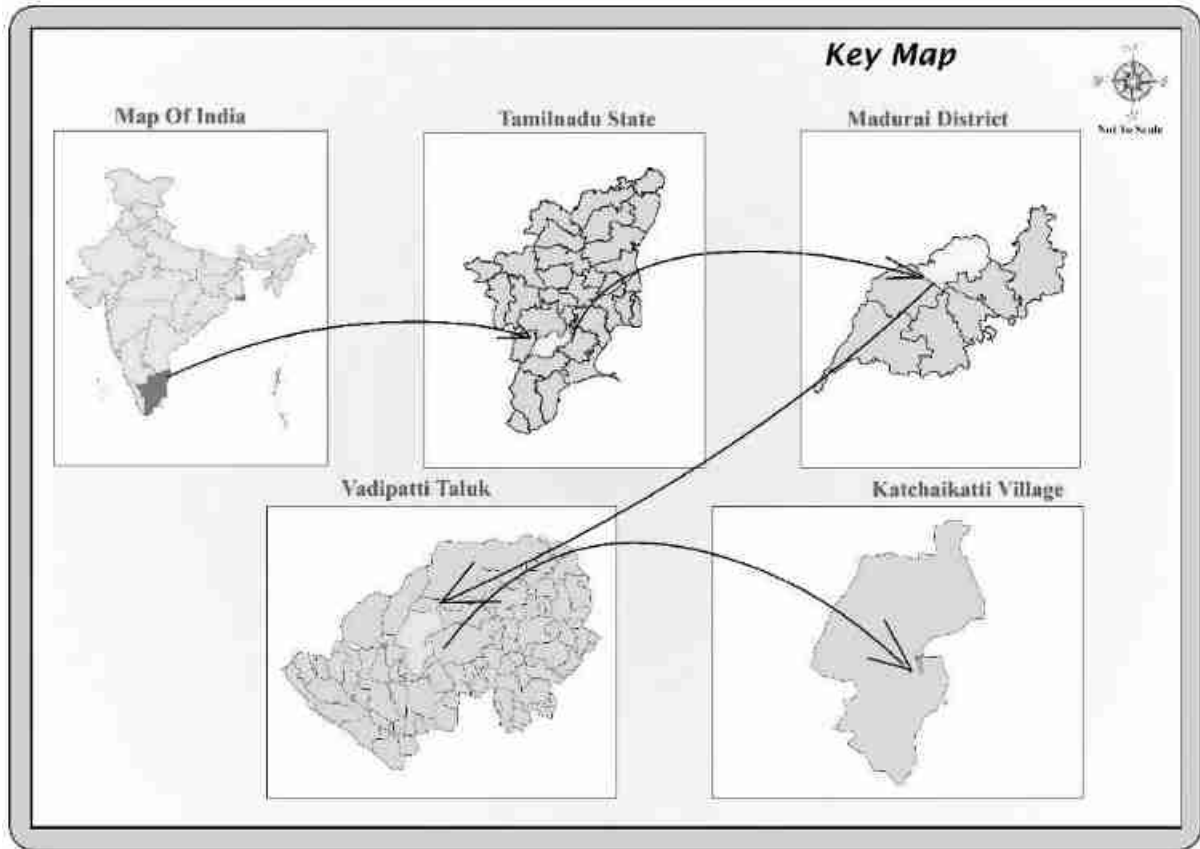
Hydraulic Excavator and tippers are used for Loading and transportation. Rock Breakers are deployed to avoid secondary blasting.

The peak production of rough stone is 16,390 m³ maximum in a year (54m³ per day/4Tippers per day). The depth of the mining is 21m Bgl.

1.3.2 Location of the Project

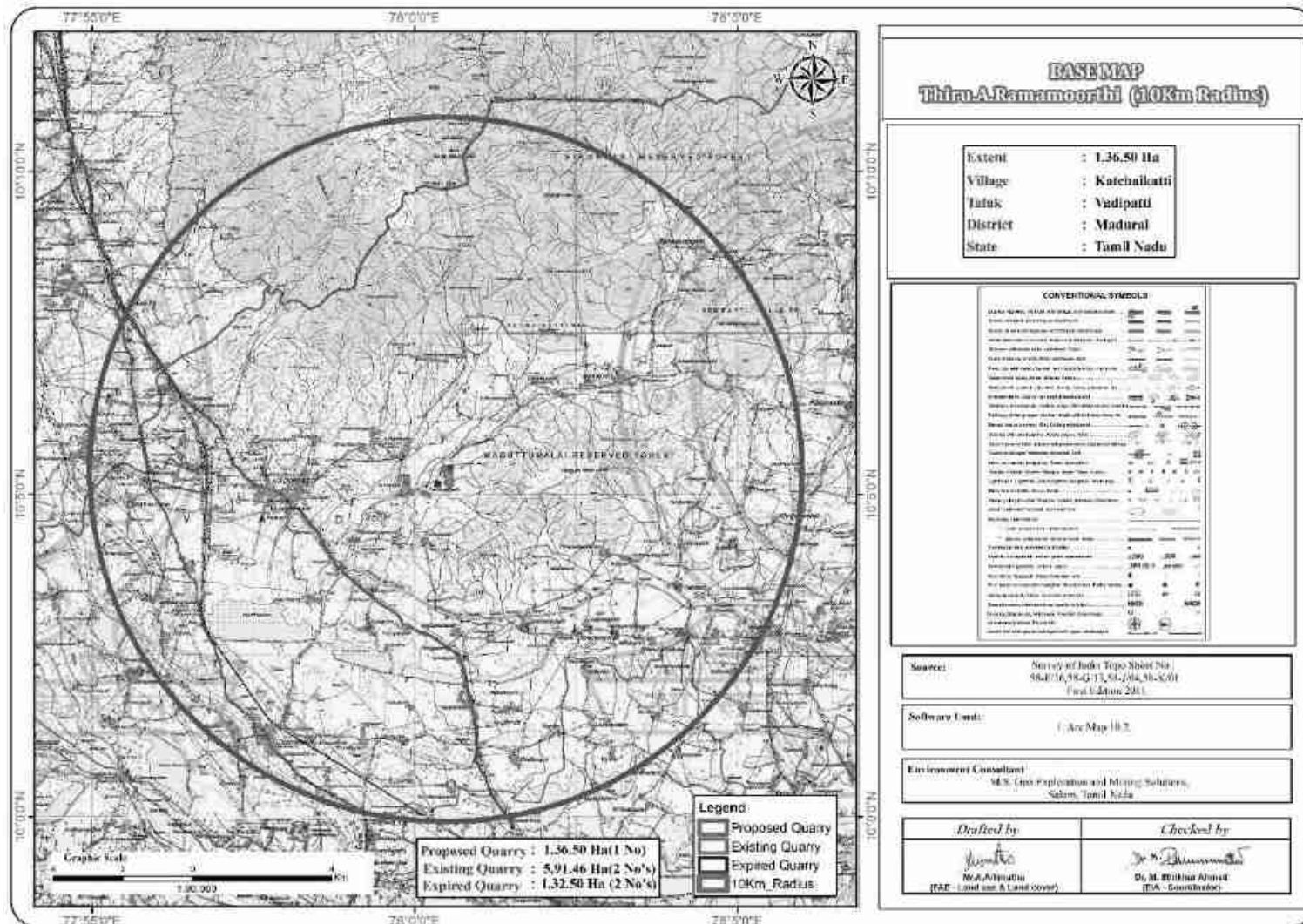
- ✚ The proposed quarry project falls in Katchaikatti Village, Vadipatti Taluk and Madurai District.
- ✚ Proposed quarry is located about 500m NorthEast side of Katchaikatti Village
- ✚ The Katchaikatti Village is located about 3.3 km SouthEast of Vadipatti Taluk.
- ✚ The area is marked in the Survey of India, Toposheet No. 58-J/04 The area lies between the Latitudes of 10° 05'20.91"N to 10°05'25.03"N and Longitudes of 78°00'26.05"E to 78°00'31.67"E

FIGURE: 1.2 KEY MAP SHOWING THE LOCATION OF THE CLUSTER SITE



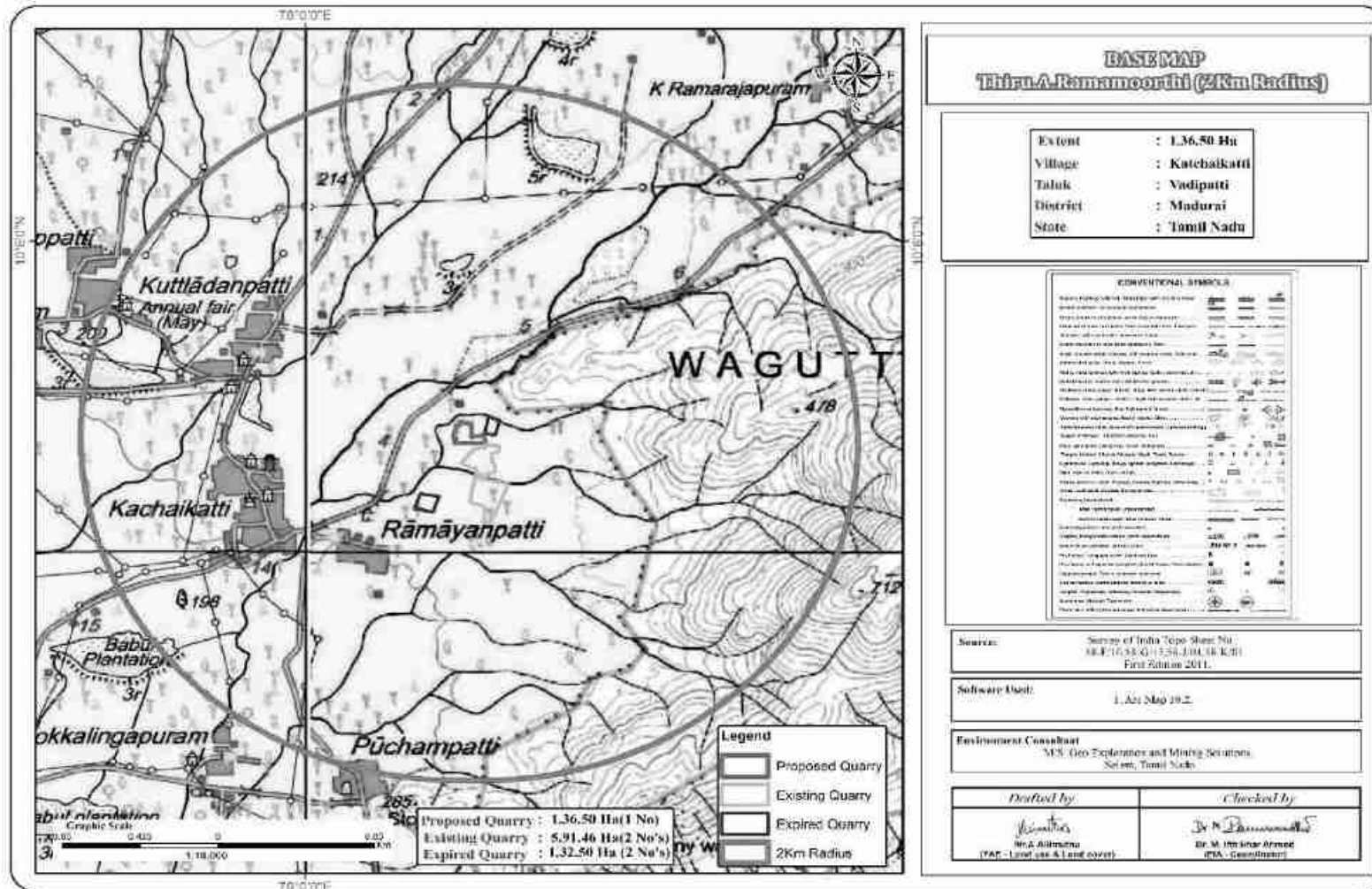
Source: Survey of India Toposheet 58-J/04

FIGURE 1.3: TOPOSHEET MAP OF THE STUDY AREA 10 KM RADIUS



Source: Survey of India Toposheet 58-J/04

FIGURE 1.4: TOPOSHEET MAP OF THE STUDY AREA 2 KM RADIUS



1.4 ENVIRONMENTAL CLEARANCE

The Environmental Clearance process for the project will comprise of four stages. These stages in sequential order are given below:-

1. Screening,
2. Scoping
3. Public consultation &
4. Appraisal

SCREENING –

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 17.02.2022
- Precise Area Communication Letter was issued by the Deputy Director Department of Geology and Mining, Madurai R.C.No.255/Mines/2022 Dated:27.09.2023
- The Mining Plan was prepared by Recognized Qualified Person and approved by Deputy Director, Geology and Mining, Madurai District, vide R.C.No. 255/Mines/2023 Dated:14.12.2023
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/467876/2024 Dated: 30.03.2024.

SCOPING –

- The proposal was placed in 464th SEAC meeting held on 03.05.2024 and the committee recommended for issue of ToR.
- The proposal was considered in 722th SEIAA meeting held on 24.05.2024 and issued ToR issued by SEIAA-TN vide ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024

PUBLIC CONSULTATION –

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

APPRAISAL –

Appraisal is the detailed scrutiny by the State Expert Appraisal Committee (SEAC) of the application and other documents like the final EIA & EMP Report, outcome of the Public Consultations including Public Hearing Proceedings, submitted by the proponent to the regulatory authority concerned for grant of environmental clearance.

1.5 TERMS OF REFERENCE (ToR)

ToR was issued by the SEIAA vide ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024. The Details of the ToR Compliance is given in the Page No. I - XVII

1.6 POST ENVIRONMENT CLEARANCE MONITORING

The proposed project proponents shall submit a half-yearly compliance report in respect of stipulated Environmental Clearance terms and conditions to MoEF & CC Regional Office & SEIAA after grant of EC on 1st June and 1st December of each calendar year as per MoEF & CC Notification S.O. 5845 (E) Dated: 26.11.2018.

1.7 GENERIC STRUCTURE OF EIA DOCUMENT

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC.

1.8 THE SCOPE OF THE STUDY

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the summer season (March to May 2024) for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project.

TABLE 1.4: ENVIRONMENT ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM10, PM 2.5, SO2, NO2	Continuous 24-hourly samples twice a week for three months at 7 locations (1 Core & 6 Buffer)
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 6 locations – 4 ground water and 2 surface water samples; once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was collected from the Forest department.
5	Noise levels	Noise levels in dB(A)	7 locations – data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 locations during study period
7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.

8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk analysis done for the risk associated with mining.

Source: Field Monitoring Data

The data has been collected as per the requirement of the ToR issued by SEIAA – TN.

1.8.1 Regulatory Compliance & Applicable Laws/Regulations for Proposed Quarry

- Application for Quarrying Lease as per Tamil Nadu Minor Mineral Concession Rules, 1959
- Obtained Precise Area Communication Letter as per Tamil Nadu Minor Mineral Concession Rules, 1959 for Preparation of Mining Plan and obtaining Environmental Clearance
- The Mining Plan has been approved under Rule 41 & 42 as amended of Tamil Nadu Minor Mineral Concession Rules, 1959
- ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024.

2. PROJECT DESCRIPTION

2.0 GENERAL

The Proposed Rough Stone and gravel Quarry requires Environmental Clearance. There are One proposed and Two existing quarry forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 7.27.96 ha

As the extent of cluster are more than 5 ha, the proposal falls under B1 Category as per the Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018, and requirement for EIA, EMP and Public Consultation for obtaining Environmental Clearance.

2.1 DESCRIPTION OF THE PROJECT

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarry.

Method is mining is common for the proposed quarry in the cluster. Rough Stone and gravel is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.2 LOCATION OF THE PROJECT

- ✚ The proposed quarry project falls in Katchaikatti Village, Vadipatti Taluk and Madurai District.
- ✚ Proposed quarry is located about 500m NorthEast side of Katchaikatti Village
- ✚ The Katchaikatti Village is located about 3.3 km SouthEast of Vadipatti Taluk.
- ✚ The area is marked in the Survey of India, Toposheet No. 58-J/04 The area lies between the Latitudes of 10° 05'20.91"N to 10°05'25.03"N and Longitudes of 78°00'26.05"E to 78°00'31.67"E

The project does not fall within 10 km radius of any Eco – sensitive zone, National Park, Tiger Reserve, Elephant Corridor and Biosphere Reserves.

TABLE 2.1: SITE CONNECTIVITY

Nearest Roadway	NH-44 Kanniyakumari – Bengaluru – 3 km – West SH-73 Thirumanagalam – Silukkuvarpatti - 8 km – SouthWest
Nearest Village	Katchaikatti – 500m-SW
Nearest Town	Vadipatti- 5.0 km –W
Nearest Railway	Vadipatti- 6.7 km – W
Nearest Airport	Madurai Airport – 29 Km –SE
Seaport	Thoothukudi – 145 km – SE

Source: Survey of India Toposheet

TABLE 2.2: CO-ORDINATES – PROJECT BOUNDARY

Boundary Pillar No.	Latitude	Longitude
---------------------	----------	-----------

1	10° 05' 20.99"N	78° 00' 26.31"E
2	10° 05' 21.94"N	78° 00' 26.51"E
3	10° 05' 21.98"N	78° 00' 26.05"E
4	10° 05' 23.26"N	78° 00' 26.33"E
5	10° 05' 23.16"N	78° 00' 26.64"E
6	10° 05' 24.35"N	78° 00' 26.59"E
7	10° 05' 24.37"N	78° 00' 27.01"E
8	10° 05' 25.03"N	78° 00' 27.26"E
9	10° 05' 24.60"N	78° 00' 29.34"E
10	10° 05' 22.09"N	78° 00' 29.34"E
11	10° 05' 22.48"N	78° 00' 31.42"E
12	10° 05' 20.98"N	78° 00' 31.67"E
13	10° 05' 20.91"N	78° 00' 29.40"E

FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA



FIGURE 2.2: GOOGLE IMAGE OF THE PROJECT AREA

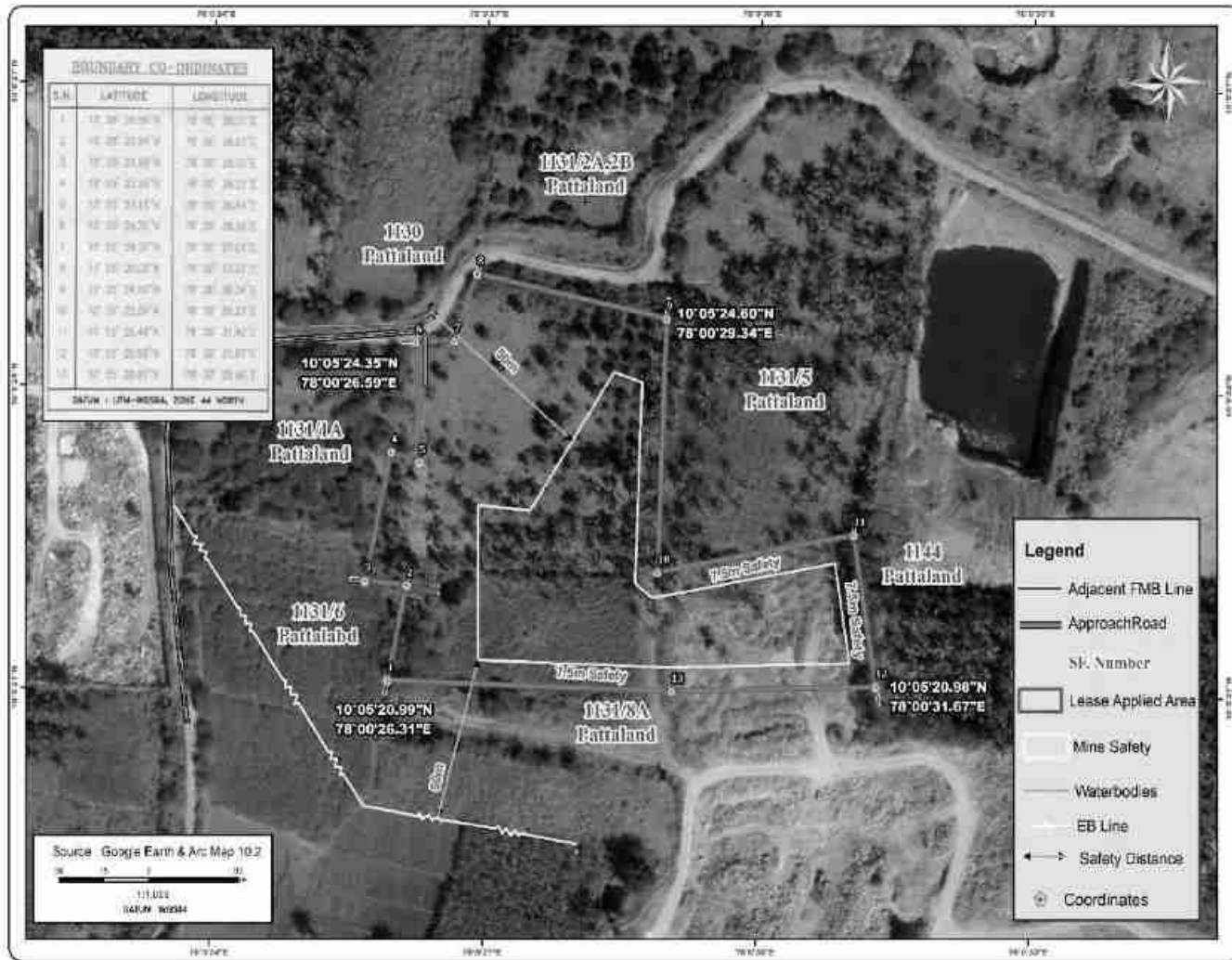


FIGURE 2.3: QUARRY LEASE PLAN / SURFACE PLAN

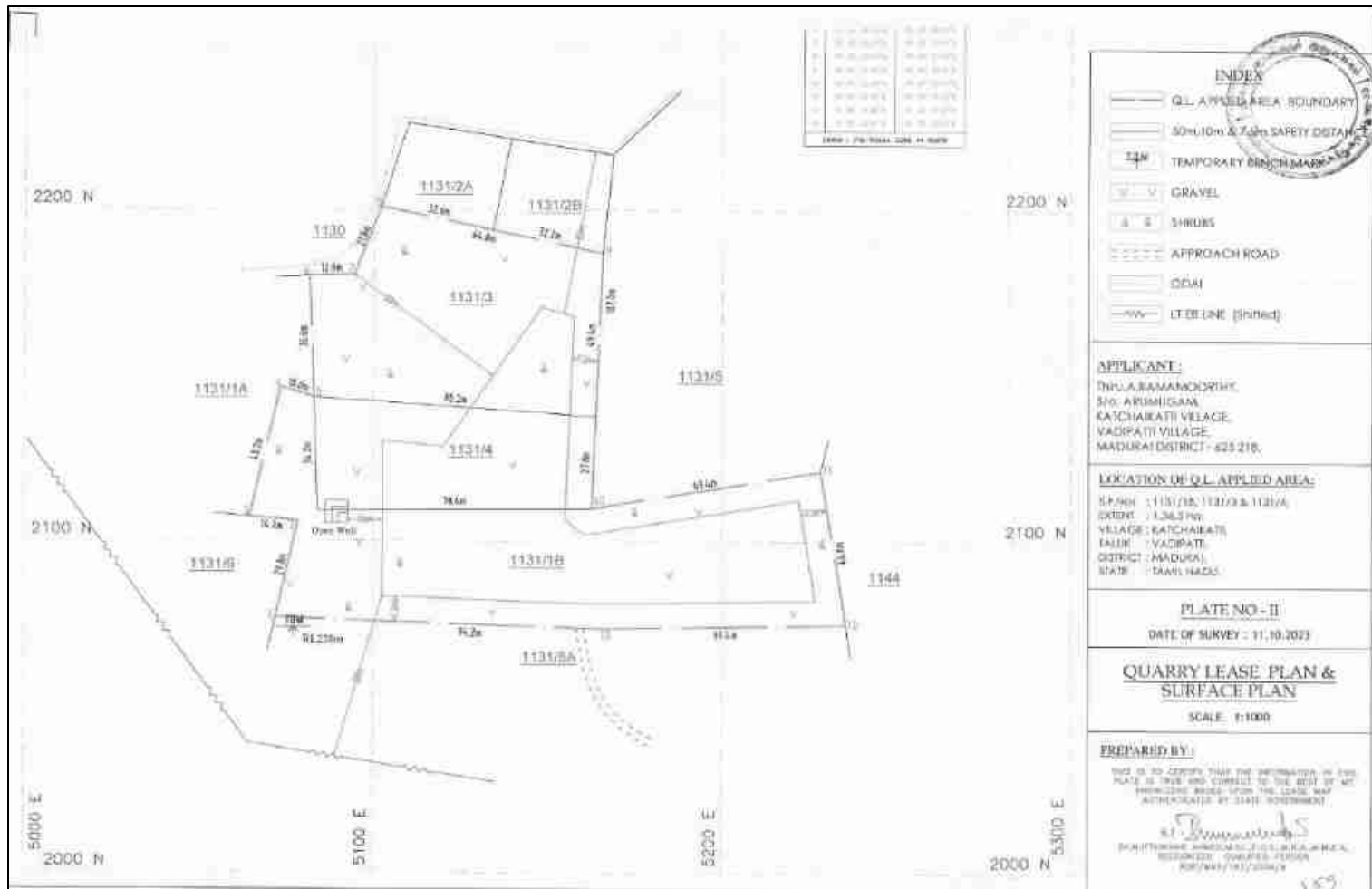


FIGURE 2.4: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE

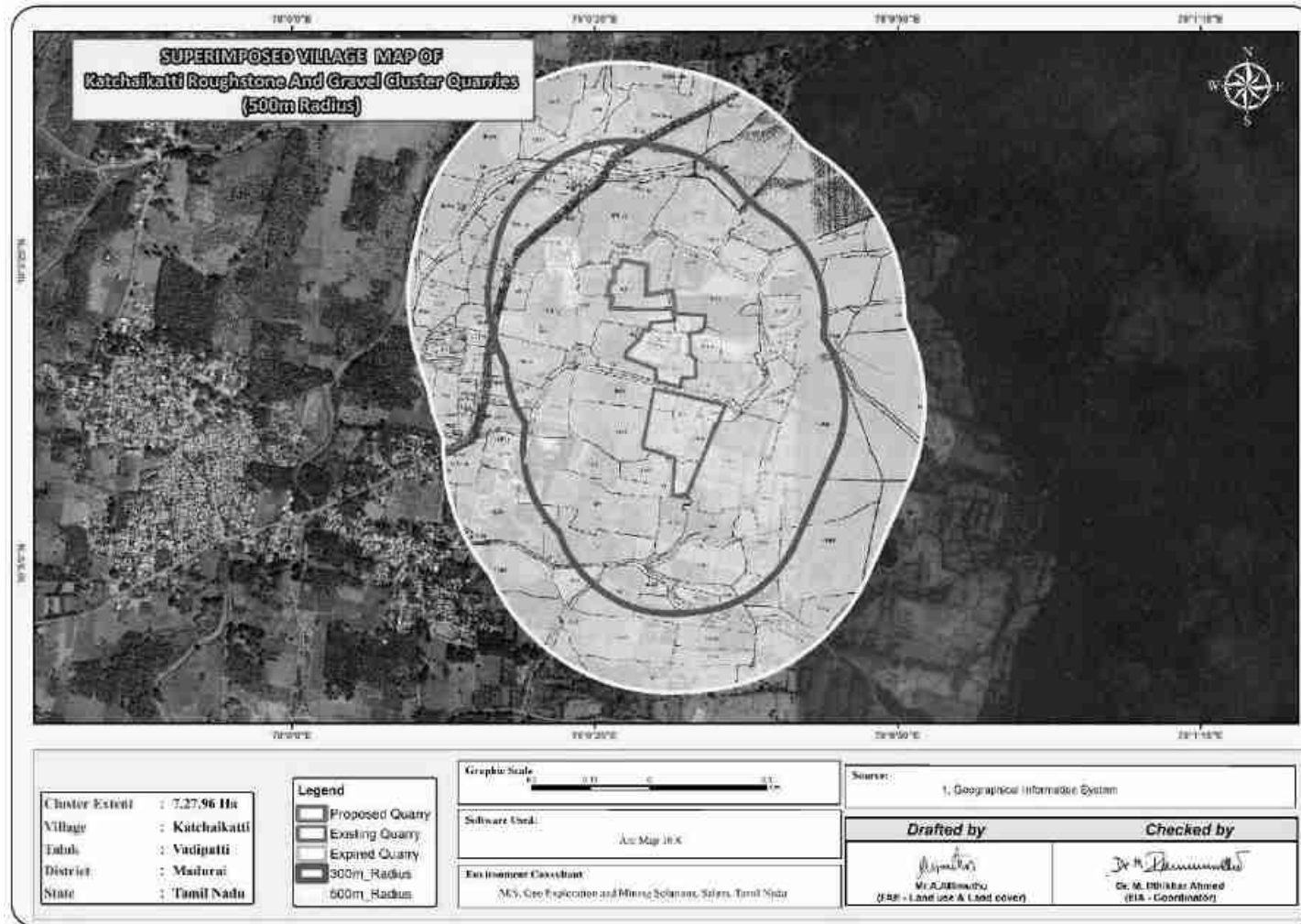


FIGURE 2.5: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS

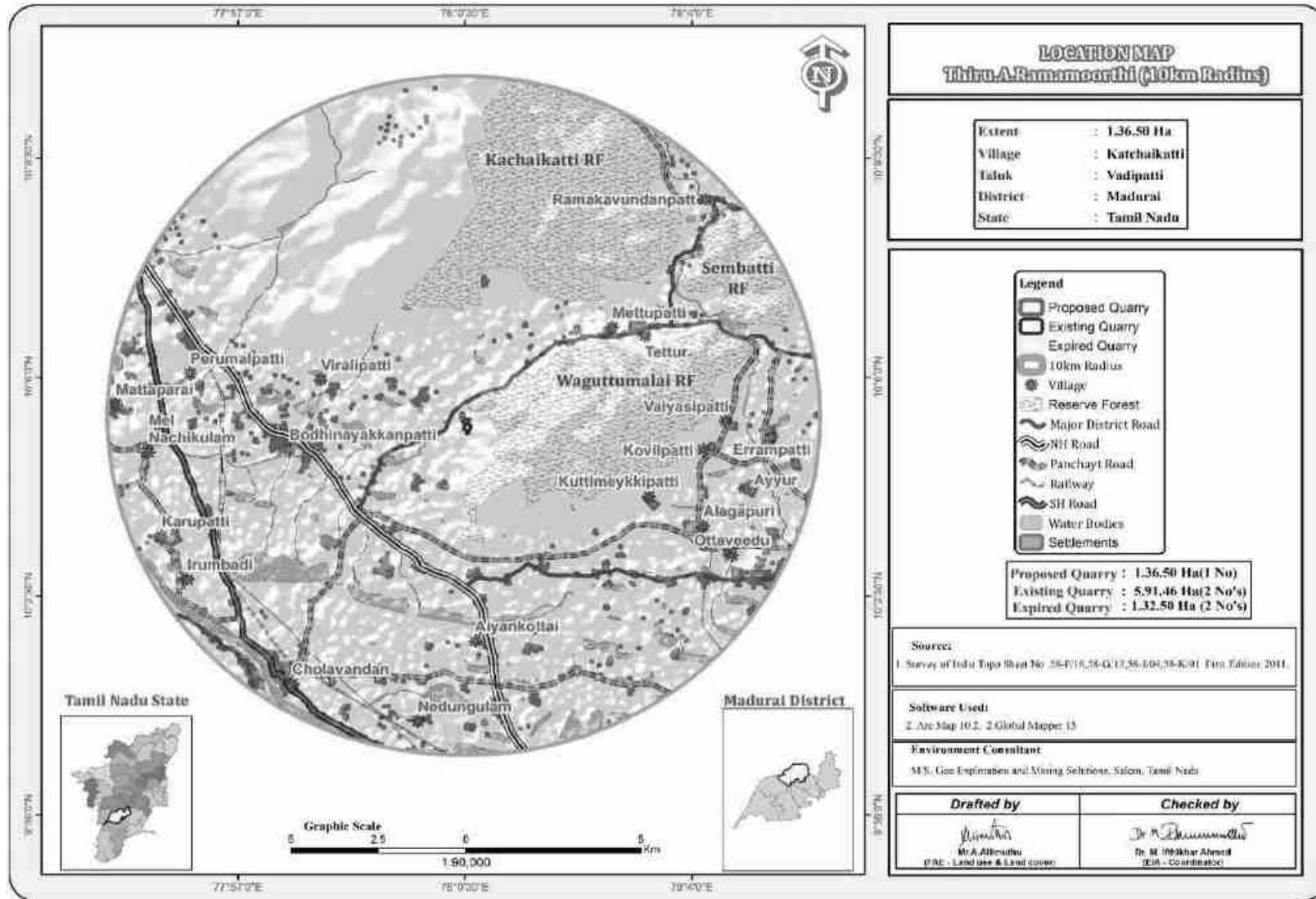


FIGURE 2.6: IMAGE SHOWING SURFACE FEATURES AROUND 5KM RADIUS

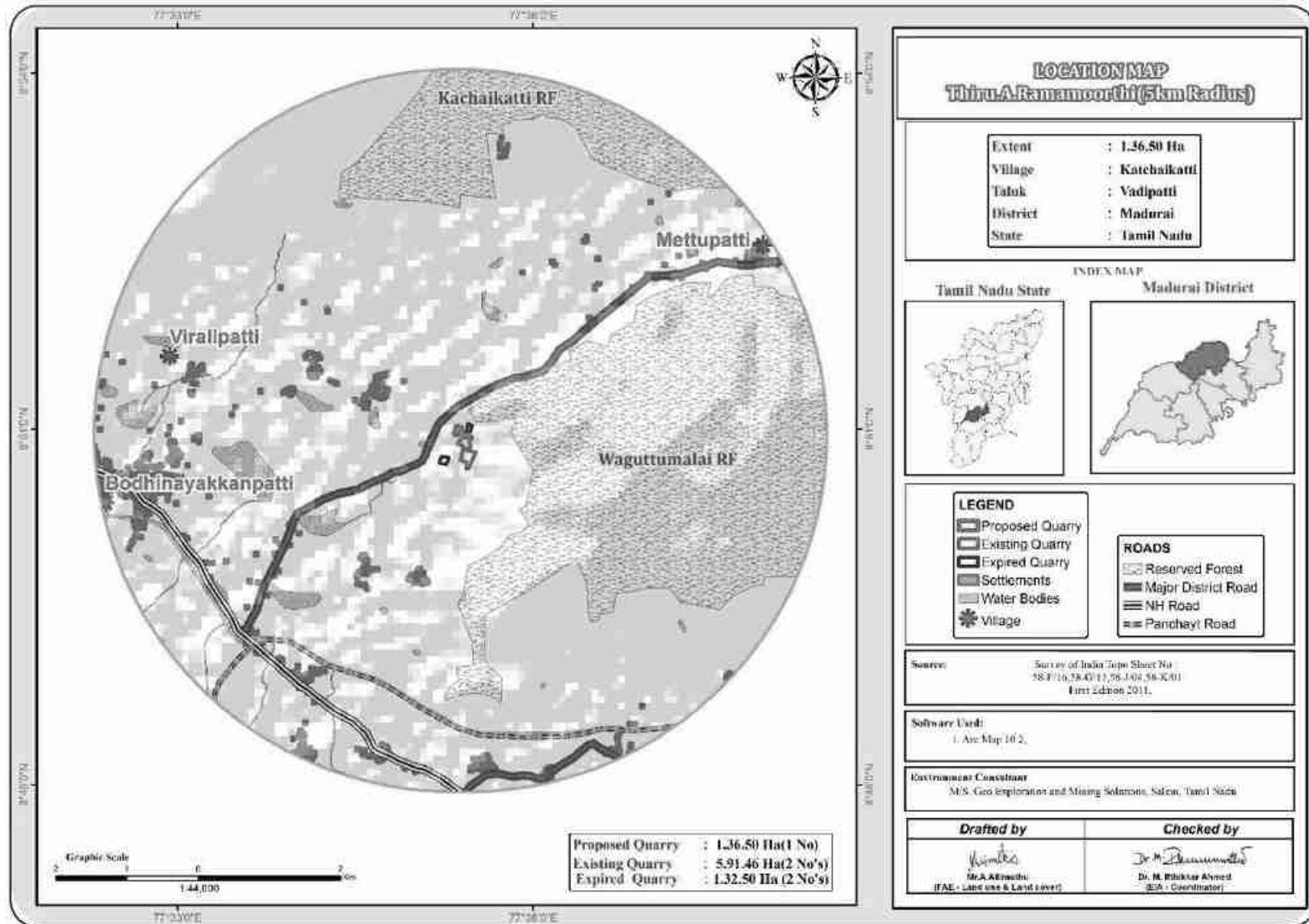
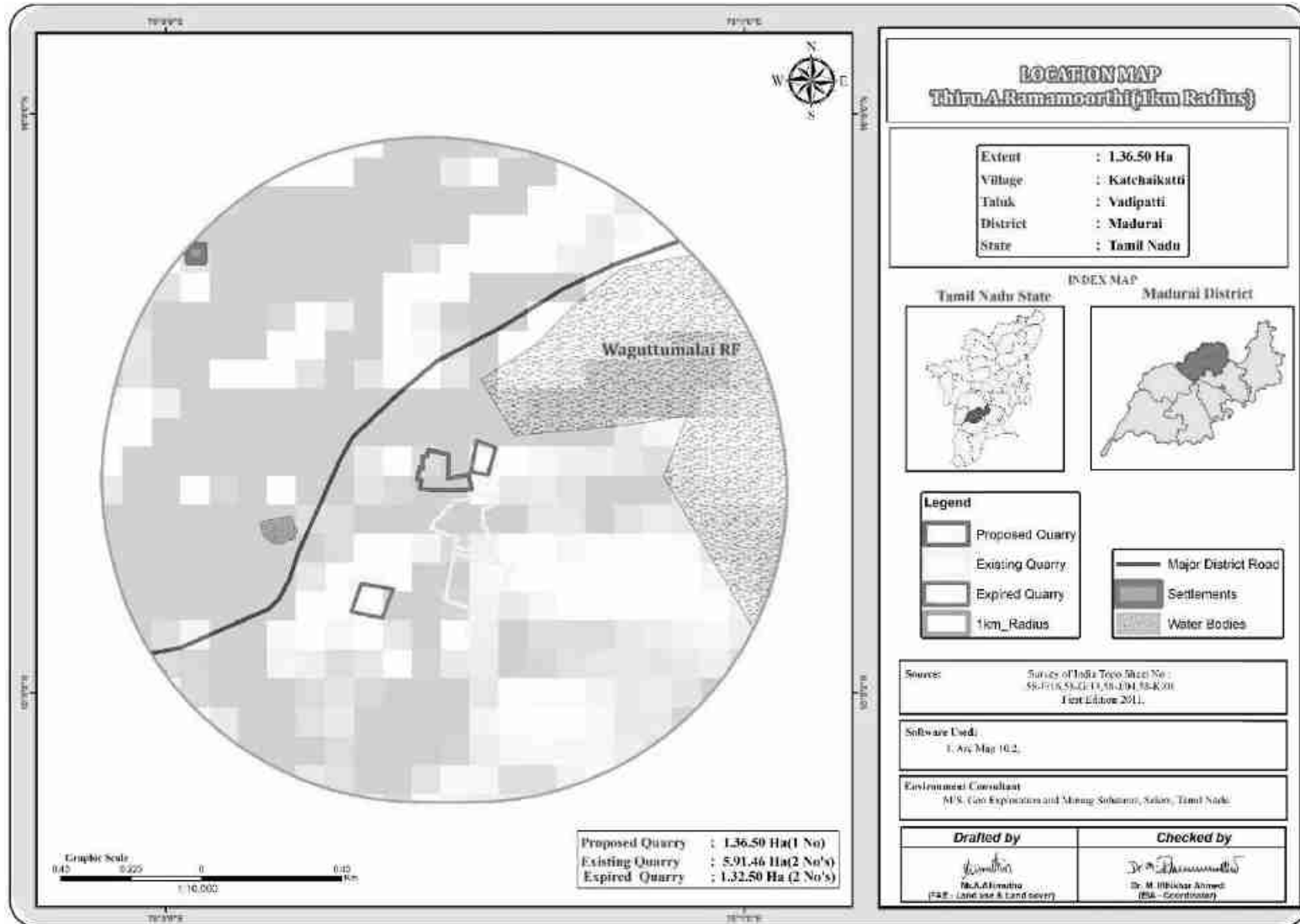


FIGURE 2.7: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS



2.2.1 Project Area

- Proposed Project is site specific
- There is No beneficiation or processing proposed inside the project area.
- There is no forest land involved in the proposed project and is devoid of major vegetation and trees.

TABLE 2.3: LAND USE PATTERN

DESCRIPTION	PRESENT AREA IN (HA)	AREA AT THE END OF LEASE PERIOD (HA)
Area under quarry	Nil	0.51.5
Infrastructure	Nil	0.01.00
Roads	Nil	0.02.00
Green Belt	Nil	0.12.0
Un – utilized area	1.36.5	0.70.0
TOTAL	1.36.5	1.36.5

Source: Approved Mining Plans

2.2.2 Size or Magnitude of Operation

TABLE 2.4: OPERATIONAL DETAILS

PARTICULARS	DETAILS	
	Rough Stone (5Year Plan period)	Topsoil (2 Years Plan period)
Geological Resources in m ³	2,73,000	13,650
Mineable Reserves in m ³	75,025	6,439
Year wise production for 5 years	75,025	6,439
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m ³	50	10
No of Lorry loads (12m ³ per load)	4	1
Total Depth of Mining	21 m bgl (1 m Topsoil + 20 m Rough Stone)	

2.3 GEOLOGY

2.3.1 Regional Geology

Madurai district of Tamil Nadu forms a part of southern Granulitic terrain and is predominantly occupied by crystalline rocks of Archaean to late Proterozoic age. Regionally, the rocks can be grouped under five categories namely –

1. Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet- sillimanite ± biotite ± cordierite ± spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite.

2. Charnockite Group consisting of acid charnockite and pyroxene granulite.

3.Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (maficsultramafics).

4.Migmatite group made up of banded hornblendebiotite gneiss, grey granitic gneiss, pink granitic gneiss and grey hornblende granite

Stratigraphy of the area –

Age	Group	Lithology
Holocene		Block cotton soil/clay±gypsum
Cenozoic		Kankar/calc-tufa
Neoproterozoic	Acid intrusives	Quartz veins Pegmatite Pink Granite
	Sivamalai syenite Complex	Nepheline-syenite
	Chalk Hills (Basic Intrusives)	Pyroxenite/Dunite
Archaean - Palaeoproterozoic	Peninsular Gneissic Complex (II) PGC (II)	Pink Granite Gneiss Hornblende Biotite gneiss
	Archaean	Charnockite Group
		Charnockite (Unclassified) Pyroxene Granulite Banded Magnetite Quartzite

Madurai District is predominantly occupied by hornblende Biotite gneisses of PGC (II) with enclaves of Magnetite Quartzite, Pyroxene Granulite and Charnockite. The area exposes several bands of Pyroxene Granulite which is medium grained, medium to dark grey in colour and stand out prominently in the gneissic country generally parallel to regional foliation. Charnockite is coarse grained, massive, many places it is foliated, grey coloured and greasy and exposed as bouldery outcrops and small knolls. It is well exposed in Central, Western and Southern parts of the Madurai District. The general strike of foliation varies from ENE-WSW, E-W with dipping towards NW and N respectively.

Hornblende-Biotite gneiss is well foliated, medium to coarse grained, pale grey and exposed as sheets and small knolls. Pink Granite gneiss occurs as thin bands and lensoidal bodies. It is a medium grained rock composed of alternating bands of mafic (mainly of biotite and hornblende) and felsic (Feldspar and Quartz) minerals. It is well recognized in Avinashi area.

Basic intrusives such as pyroxenite/dunite occurs as Outcrop and lensoidal bodies in the country rock and mostly concordant to the regional foliation. Many basic intrusive are reported in south and south-east of Madurai town. The trend of these bodies is east-west.

Nepheline syenite is a leucocratic, coarse-grained rock and composed mainly of Feldspar with Nepheline and shows pitted appearance due to removal of Nepleline. This alkaline rock is available in and around Sivanmalai area only.

Acid intrusives comprising pink granite, pegmatite and quartz veins are traversed country rocks in micro (cm wide-meter long) to meso-scale (few meters wide and several meter long) extend. Granite is exposed around 9 km SW of Avanashi. Small scale pegmatite and quartz veins are noticed almost in all the rock types.

Acid intrusives are overlain by sediments of Quaternary age, represented by Kankar and black cotton soil with Gypsum. Most of the area is covered by brown and red brown soil. Some part of the area covered with black cotton soil contains Gypsum as lumps. Black cotton soil covers south-western part of the district.

Source: District Survey Report for Minor Minerals Madurai District – May 2019

<https://cdn.s3waas.gov.in/s3f5f8590cd58a54e94377e6ae2eded4d9/uploads/2019/06/2019061089.pdf>

2.3.2 Local Geology:

The study area follows the regional trend and mainly comprises of Hard Rock Formation as a homogeneous formation / Batholith formation of Charnockite. The area is covered by 1m thickness of Topsoil. Massive Charnockite is found after 1m (Topsoil) which is clearly inferred from the existing quarry pit.

2.3.3 Hydrogeology

The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from 20-25 m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40 m bgl in remaining parts of the district. The depth of dug wells varies from 10 – 20 m with a yield of 45 – 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 – 3 lps. In general there are about 2 – 3 fracture zones less than 50 m and about 2 – 3 fracture form beyond 100 m also. The variation in the yield of bore wells are very high in the district. Potential fractures with high discharge have been established along Valandur-usilampatti Timmarasanayakanur, Thirali Peraiyur tract and Palkalainagar- Nilayur tract in the district. The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May) and 1.86 to 5.74 m bgl during post monsoon period.

Aquifer Systems:

Occurrence and storage of groundwater depend upon three factors viz., Geology, Topography and rainfall in the form of precipitation. Apart from Geology, wide variation in topographic profile and intensity of rainfall constitutes the prime factors of groundwater recharge. Aquifers are part of the more complex hydro geological system and the behaviour of the entire system cannot be interpreted easily. In hard rock terrain the occurrence of Ground Water is limited to top weathered, fissured and fractured zone which extends to maximum 30 m on an average it is about 10-15 m in Madurai District.

In Sedimentary formations, the presence of primary inter granular porosity enhances the transmitting capacity of groundwater where the yield will be appreciable. The sedimentary area which occupies the eastern part of the District along the coastal tract is more favourable for groundwater recharge. Ground Water occurs both in semi confined and confined conditions. A brief description of occurrence of groundwater in each formation is furnished below.

Alluvial Formations

In the river alluvium groundwater occurs under water table condition. The maximum thickness is 37 m and the average thickness of the aquifer is approximately 12 m. These formations are porous and permeable which have good water bearing zones.

Tertiary Cuddalore sandstone

Tertiary formations are represented by Cuddalore Sandstone and characterised as fluvial to brackish marine deposits. Predominantly this formation is divided into Lower and Upper Cuddalore formations. In the Upper Cuddalore formations the groundwater occurs in semi confined conditions, whereas in the Lower Cuddalore the groundwater occurs in confined condition with good groundwater potential.

Cretaceous Formations

Groundwater occurring in the lens shape in the sandy clay lenses and fine sand is underlain by white and black clay beds which constitute phreatic aquifer depth which ranges 10m to 15m below ground level. Phreatic aquifer in Limestone is potential due to the presence of Oolitic Limestone.

Hard Rock Formations

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less in other type of rocks when compared to gneissic formation. The groundwater potential is low, when compared with the gneissic formations

Granitic Gneiss

Groundwater occurs under water table conditions in weathered, jointed and fractural formations. The pore space developed in the weathered mantle acts as shallow granular aquifers and forms the potential water bearing and yielding zones water table is shallow in canal and tank irrigation regions and it is somewhat deeper in other regions.

Charnockite

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less when compared to gneissic formations. The groundwater potential is low, when compared with the gneissic formations.

Aquifer Parameters

The boundaries of this deposit are well defined in Theniar sub basin where the thickness varies from 40 to 60m below ground level. In other areas the thickness of valley fill sediments slightly varies between 30 and 40m below ground level. Recharge is mainly from precipitation and surface runoff during monsoon seasons. The range of aquifer parameter values of valley fill sediments are furnished below

TABLE 2.5: RANGE OF AQUIFER PARAMETERS

Name	T (m ² /d)	K (m/day)	Yield of wells (lpm)
Alluvium	210-1500	19.57 – 48.93	315 - 1080
Hard rocks	15-60	0.98-2.45	45-135
Valley fill sediments	75-150	1.95-4.40	225-450

Source: <http://nwm.gov.in/sites/default/files/Notes%20on%20Madurai%20District.pdf>

FIGURE 2.8: REGIONAL GEOLOGY MAP

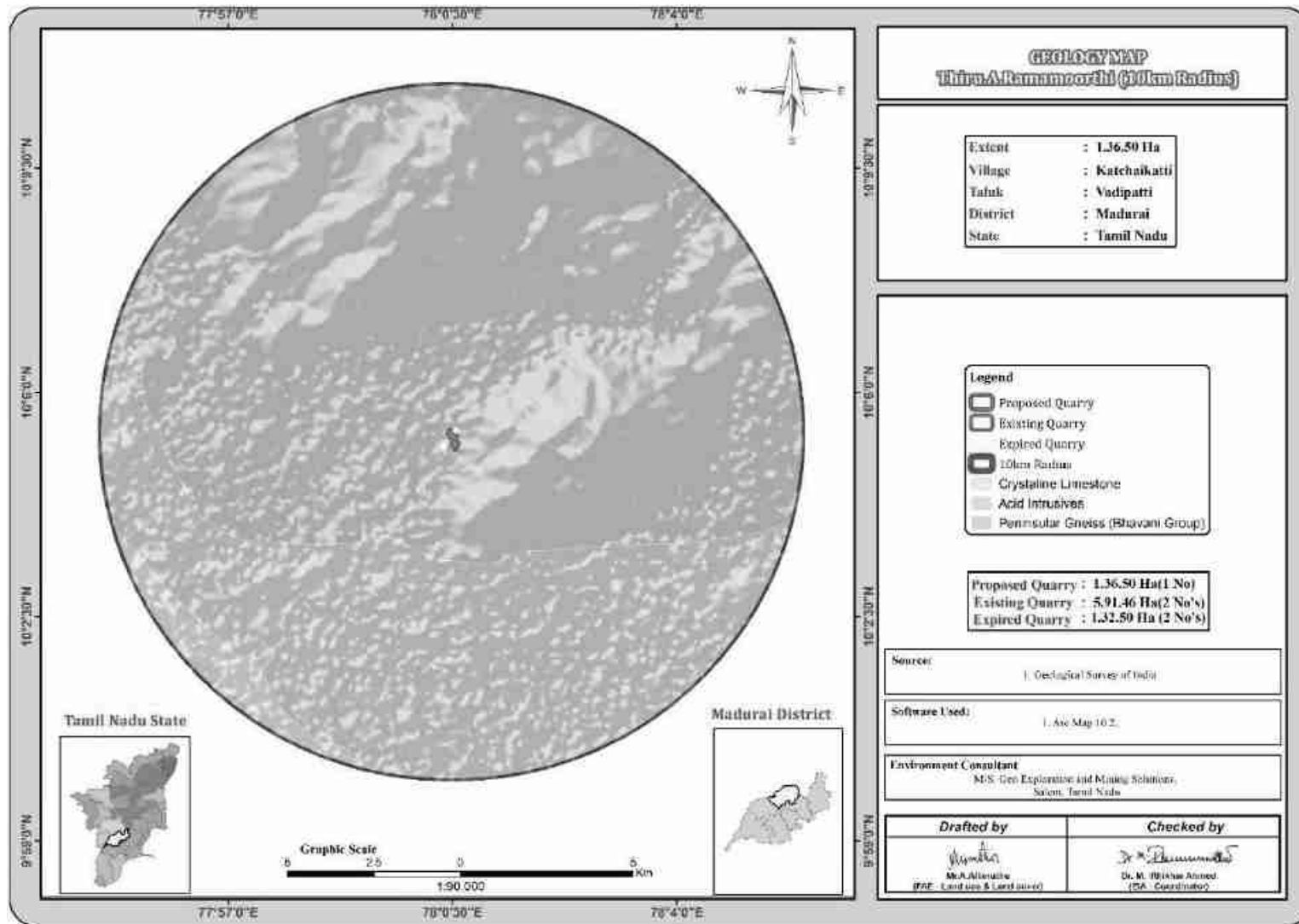
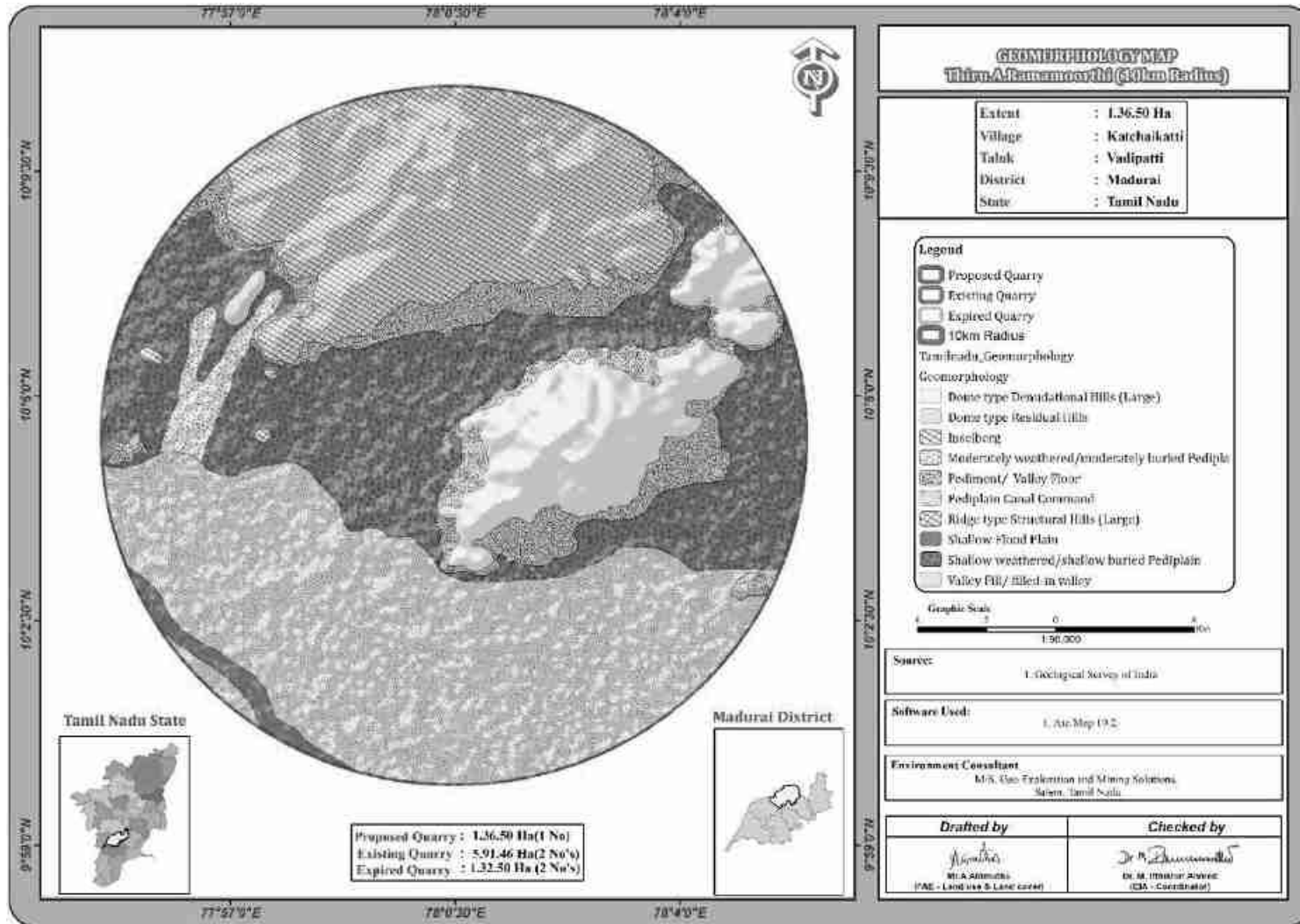


FIGURE 2.9: GEOMORPHOLOGY MAP



2.4 RESOURCES AND 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 all the proposed projects.

Based on the availability of Geological Resources the Mineable Reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m (Safety Barrier all around the applied area) and safety distance as per precise area communication letter and deducting the locked up reserves during bench formation (Also called as Bench Loss) and the Mineable Reserves is calculated considering there is no waste / overburden / side burden (100% Recovery Anticipated) for all the proposed projects.

TABLE 2.6: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT

	ROUGH STONE (m³)	TOPSOIL (m³)
Geological Resource in m³	2,73,000	13,650
Mineable Resource in m³	75,025	6,439

Source: Approved Mining Plan

TABLE 2.7: YEAR-WISE PRODUCTION PLAN FOR FIVE YEARS

YEAR	ROUGH STONE (m³)	TOPSOIL (m³)
I	16,380	3,339
II	14,760	3,100
III	15,005	-
IV	16,390	
V	12,490	
TOTAL	75,025	6,439

Source: Approved Mining Plan

Disposal of Waste

There is no waste anticipated in these Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%). Top layer of Gravel formation will be removed and sold to needy customers directly.

Conceptual Mining Plan/ Final Mine Closure Plan

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

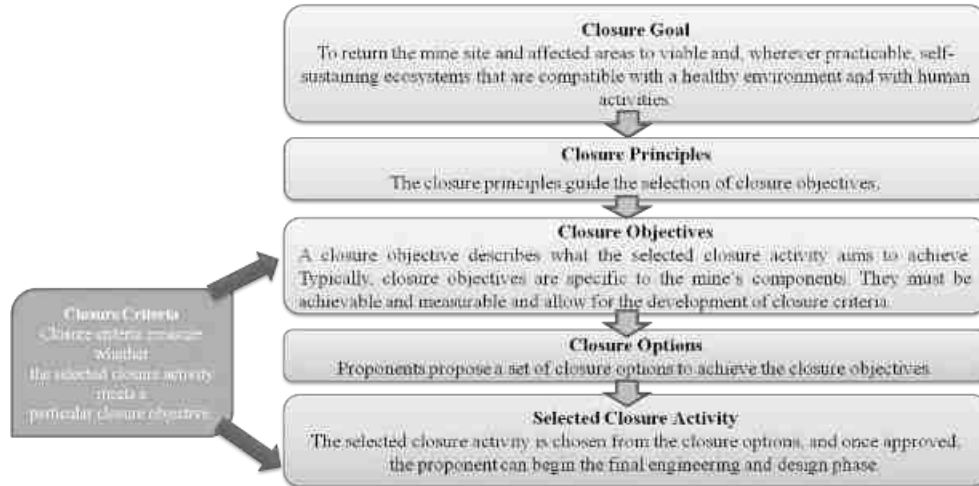
TABLE 2.8: ULTIMATE PIT DIMENSION

PROPOSAL			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	63	52	21 m bgl
II	25	124	16 m bgl

Source: Approved Mining Plan

- At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem

- Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- The principal closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non-contaminating, and capable of sustaining an agreed post-mining land use.

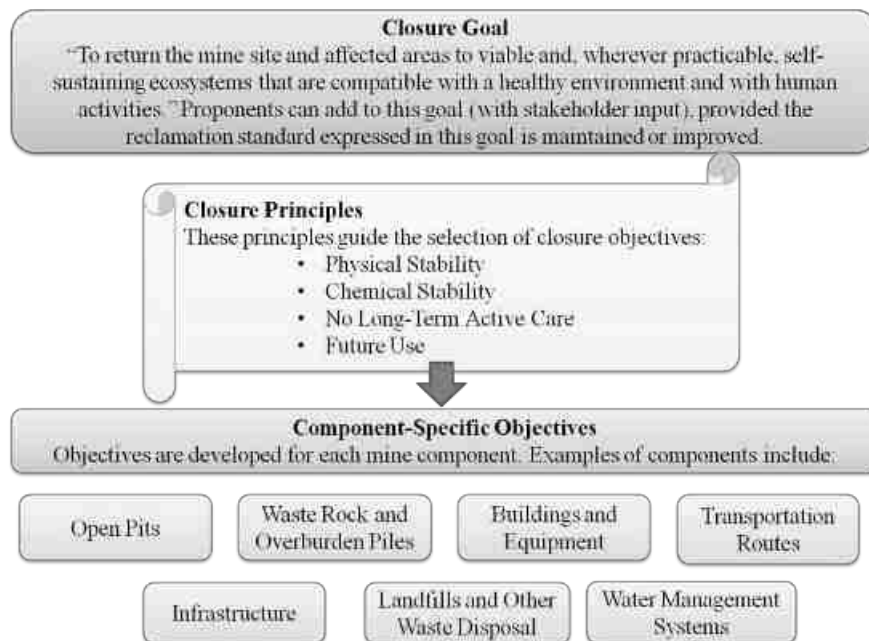


Closure Objectives –

- Access to be limited, for the safety of humans and wildlife.
- The open pit mine workings and pit boundary are physically and geo-technically stable.
- Water quality in flooded pits is safe for humans, aquatic life, and wildlife.
- Discharge of contaminated drainage has been minimized and controlled.
- Original or desired new surface drainage patterns have been established.
- For flooded pits, in-pit aquatic habitat has been established where practical and feasible.
- Emergency access and escape routes from flooded pits for humans and wildlife are in place.
- Dust levels are safe for people, vegetation, aquatic life, and wildlife.

Closure Planning & Options Considerations in Mine Design –

- The closure of mine is well planned at the initial stage of planning & design consideration by the internal and external stake holders
- Construction of 2m height bund all along the mine pit boundary and ensure its stability all time & construction of garland drain along the natural slope to avoid sliding and collection of soil to the pit & surface runoff during rainfall
- After complete exploitation of mineral, the lowest bench foot wall side will be maintained as plain surface without any sump pits to avoid any accidents
- All the sharp edges will be dressed to smoother face before the closure of mine and ensure no loose debris on hanging wall side
- There is a river on southern side of the project area. The river will not be hindered by any of mine closure activities
- The project proponent as a part of social responsibilities assures to supply the stored mine pit water to the nearby villages after effective treatment process as per the standards of TNPCB & TWAD
- Native species will be planted in 3 row patterns on the boundary barriers and 1st bench, a full-time sentry will be appointed at the gate to prevent inherent entry of public & cattle.
- The access road to the quarry will be cut-off immediately after the closure
- The layout design shall be prepared and get approved from Department of Geology and Mining.
- The proponent is instructed to construct as per the layout approved
- Physical and chemical stability of structures left in place at the site, the natural rehabilitation of a biologically diverse, stable environment, the ultimate land use is optimized and is compatible with the surrounding area and the requirements of the local community, and taking the needs of the local community into account and minimizing the socio-economic impact of closure
- There will be a positive change in the environmental and ecology due to the mine closure



Post-Closure Monitoring –

The purpose of post-closure monitoring with respect to open pit mine workings is to ensure the attainment of closure objectives.

- Monitor physical and geotechnical stability of remnant pit walls.
- Monitor the ground regime in pit walls to confirm achievement of design objectives.
- Monitor water level in pit to confirm closure objectives regarding fish, fish habitat, and wildlife safety are being achieved.
- Sample water quality and quantity at controlled pit discharge points.
- Identify and test unanticipated areas where water management is an issue.
- Inspect integrity of barriers such as berms & fences.
- Monitor wildlife interactions with barriers to determine effectiveness.
- Inspect aquatic habitat in flooded pits where applicable.
- Monitor dust levels.

TABLE 2.9: MINE CLOSURE BUDGET

Activity	Year					Cost	Total Cost
	I	II	III	IV	V		
Plantation in Nos	30	30	80	80	80	@ 200 Rs/ Saplings including maintenance	Rs 45,000
Plantation cost	6000	6000	16000	16000	16000		
Renovation of Wire Fencing (560 meters)	1,68,000					@ 300Rs per meter	Rs 1,68,000
Renovation of Garland Drain (350 meters)	3,30,000					@ 300Rs per meter	Rs 1,05,000
TOTAL							Rs 3,18,000

Source: Proposed by FAE's and EC

2.5 METHOD OF MINING

Proposed Method of Mining is common for the Proposed Project – The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required

fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.5.1 Drilling & Blasting Parameters

Drilling & Blasting will be carried out as per parameters given below: -

Spacing	–	1.2m
Burden	–	1.0 m
Depth of hole	–	1.5 m
Charge per hole	–	0.50 – 0.75kg
Powder factor	–	6.0 tonnes/kg
Diameter of hole	–	32 mm
Peak production Capacity	=	54m ³ of Rough stone per day
Spacing X Burden X Depth	=	1.4m X 1.1m X 1.5m = 2.31 m ³
	=	2.31 m ³ X 2.6 (Bulk Density) = 6.0 Ts per ole

hence for the peak production of 54m³ (6.0 Ts) = 47 Nos of holes to be drilled per day

Explosives per hole = ½ kg hence 24 kg of Explosives will be utilized maximum considering the peak production.

Type of Explosives to be used –

Slurry explosives (An explosive material containing substantial portions of a liquid, oxidizers, and fuel, plus a thickener), NONEL / Electric Detonator & Detonating Fuse

Storage of Explosives –

No proposal for storage of explosives within the project area, the respective project proponents have made agreement with authorized explosives agencies for carrying out blasting activities and competent person as per DGMS guidelines will be employed for safety and supervision of overall quarrying activities.

The explosives will be sourced from the blasting agency on daily basis and the blasting will be carried out under the supervision of competent qualified Blaster and it will be ensured that there shall be no balance of explosive stock; any balance stock will be taken back by the supplier.

2.5.2 Extent of Mechanization

TABLE 2.10 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	6	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker Unit 4	1	300 HP	Diesel Drive
4	Trucks	2	20 Tonnes	Diesel Drive

Source: Approved Mining Plans

2.6 GENERAL FEATURES

2.6.1 Existing Infrastructures

Infrastructures like Mine office, Temporary Rest shelters for workers, Latrine and Urinal Facilities will be constructed as per the Mine Rule after the grant of quarry lease in all the proposed quarries.

2.6.2 Drainage Pattern

There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic.

2.6.3 Traffic Density

The traffic survey conducted based on the transportation route of material, the Rough Stone is proposed to be transported mainly through Ramayanpatti to Palamedu Road (MDR 568) on South West and Palamedu Road (MDR)

Traffic density measurements were performed at two locations

1. Major District Road Ramayanpatti to Palamedu Road (MDR 568)
2. Major District Road_ Palamedu Road

Traffic density measurement 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.

TABLE.2.11: TRAFFIC SURVEY LOCATIONS

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Major District Road Ramayanpatti to Palamedu Road (MDR 568)	1.3Km_SW	MDR
TS2	Major District Road_ Palamedu Road	600m NE	MDR

Source: On-site monitoring by GEMS FAE & TM

TABLE 2.12: EXISTING TRAFFIC VOLUME

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	150	450	50	50	160	53	553
TS2	200	600	85	85	368	184	869

Source: On-site monitoring by GEMS FAE & TM

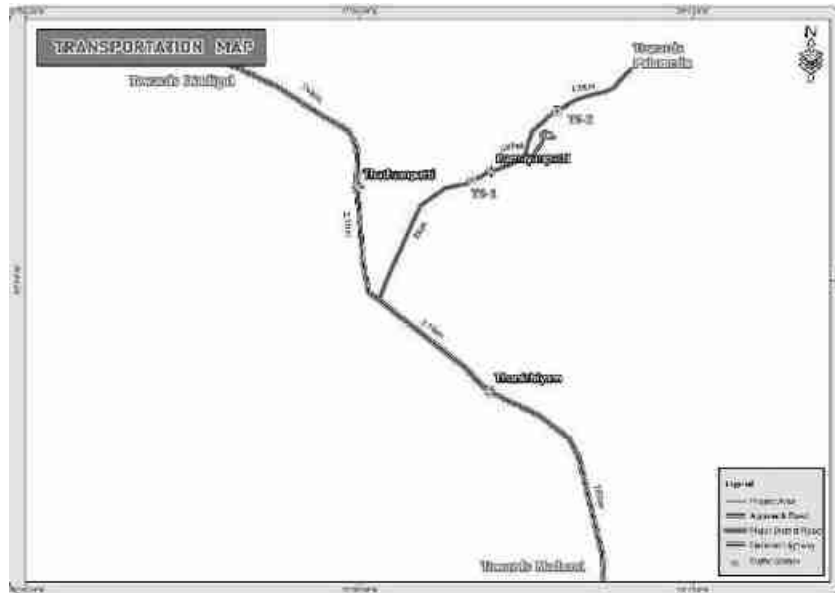
* PCU conversion factor: HMV (Trucks and Bus) = 3, LMV (Car, Jeep and Auto) = 1 and 2/3 Wheelers = 0.5

TABLE 2.13: ROUGH STONE & GRAVEL HOURLY TRANSPORTATION REQUIREMENT

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day Cumulatively	Volume in PCU
12 tonnes	6	18

Source: Data analysed from Approved Mining Plan

FIGURE.2.12: MINERAL TRANSPORTATION ROUTE MAP



Proposed Transportation Route:

1. The Rough stone will be transported to the Crusher which is located 1000m Southwest side of the project site.
2. Existing approach road is located on the south side
3. No Major Habitation, Schools in the proposed transportation route.

TABLE 2.14: SUMMARY OF TRAFFIC VOLUME

Route	Existing Traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960guidelines
Major District Road Ramayanpatti to Palamedu Road (MDR 568)	553	18	571	1500
Major District Road_ Palamedu Road	869	18	887	1500

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

- Due to these projects the existing traffic volume will not exceed
- 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.

2.6.4 Mineral Beneficiation and Processing

There is no proposal for the mineral processing or ore beneficiation in any of the proposed project

2.7 PROJECT REQUIREMENT

2.7.1 Water Source & Requirement

Detail of water requirements in KLD as given below:

TABLE 2.15: WATER REQUIREMENT FOR THE PROJECT

PROPOSAL		
*Purpose	Quantity	Source
Dust Suppression	0.6 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Green Belt development	0.5 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Domestic purpose	0.4 KLD	Water Tankers
Total	1.5 KLD	

Source: Prefeasibility report

* Drinking water will be sourced from Approved Water Vendors

2.7.2 Power and Other Infrastructure Requirement

No proposed projects require power supply for the mining operations. The quarrying activity is proposed during day time only (General Shift 8 AM – 5 PM, Lunch Break 1 PM – 2 PM). Electricity for use in office and other internal infrastructure will be obtained from SEB by respective project proponent.

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

2.7.3 Fuel Requirement

High speed Diesel (HSD) will be used for mining machineries. Diesel will be brought from nearby Fuel Stations.

Average diesel consumption is around = 500 Liters of HSD / day per proposed project.

2.7.4 Project Cost

TABLE 2.16: PROJECT COST OF PROPOSED PROJECT

Project Cost	Rs.47,25,000/-
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Source: Approved Mining Plan & Prefeasibility Report

2.8 EMPLOYMENT REQUIREMENT:

The following manpower's are proposed in the mining plan to carry out the day-to-day quarrying activities, the same employment is maintaining aimed at the proposed production target and also to comply with the statutory provisions of The Metalliferous mines regulations, 1961 for all the proposed projects.

TABLE 2.17: PROPOSED MANPOWER DEPLOYMENT

Geologist	1
Mines Foreman	1
Blaster / Mate	1
Excavator Operator	1
Tipper Driver	2
Water sprinklers	1
Jack hammer operator	4
Security	2
Labour & Helper	4
Cleaner & Co-operator	4
Total	21

Source: Approved Mining Plan & Pre-Feasibility report.

2.9 PROJECT IMPLEMENTATION SCHEDULE

The mining operation will commence after the grant of Environmental Clearance, Consent to operate (CTO), Execution of Lease Deed and Obtaining permission from the DGMS (Notice of Opening).

TABLE 2.18: EXPECTED TIME SCHEDULE

Sl.No.	Particulars	Time Schedule (In Month)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to Operate						
3	Execution of Lease deed						
4	Permission from DGMS						
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

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

3. DESCRIPTION OF ENVIRONMENT

3.0 GENERAL

The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering March 2024 to May 2024 with CPCB guidelines for the following attributes –

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

Environmental data has been collected with reference to cluster quarries by EHS 360 Labs Private Limited, – An accredited by ISO/IEC 17025:2017 (NABL) Laboratory

Study Area

An area of 10 km radius (aerial distance) from the periphery of the cluster is considered for EIA study. The study area has been divided into two zones viz **core zone** and **buffer zone**.

- Core zone is considered as cluster area
- Buffer zone taken as 10km radius from the periphery of the Cluster. Both Core zone and Buffer zone is taken as the study area.

Study Period

The baseline study was conducted during the summer season i.e., March 2024 to May 2024.

Study Methodology

- The project area was surveyed in detail with the help of Total Station Survey instruments and pillars were marked. The boundary coordinates were superimposed on the satellite imagery to understand the relief of the area, besides Land use pattern of the area was studied through the Bhuvan (ISRO)
- Soil samples were collected and analysed for relevant physio-chemical characteristics in order to assess the impact due to mining activities and to recommend saplings for Greenbelt development.
- Ground water samples were collected from the existing bore wells, Surface water was collected from water bodies in the buffer zone and analysed as per CPCB Guidelines.
- An onsite meteorological station was setup in cluster area, to collect data about wind speed, wind direction, temperature, relative humidity, rainfall and general weather conditions were recorded throughout the study period.
- Air quality Data's were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM₁₀ and SO₂, NO_x with gaseous attachments & Fine Dust Samplers (FDS) for PM_{2.5} and other parameters as per NAAQ norms and analysed for primary air pollutants to work out the existing status of air quality.

- The Noise level measurements were also made at various locations in different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone.
- Baseline biological studies were carried out to assess the ecology of the study area to study the existing flora and fauna pattern of the area.
- Socio-Economic survey was conducted at village and household level in the study area to understand the present socio-economic conditions and assess the extent of impact due to the proposed mining project. The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of samples analysis, etc., are given below 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 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Auto matic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (March 2024 – May 2024)	7 (1 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (1 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrant & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

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

3.1 LAND ENVIRONMENT

The main objective of this section is to provide a baseline status of the study area covering 10km radius around the proposed mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

3.1.1 Land Use/ Land Cover

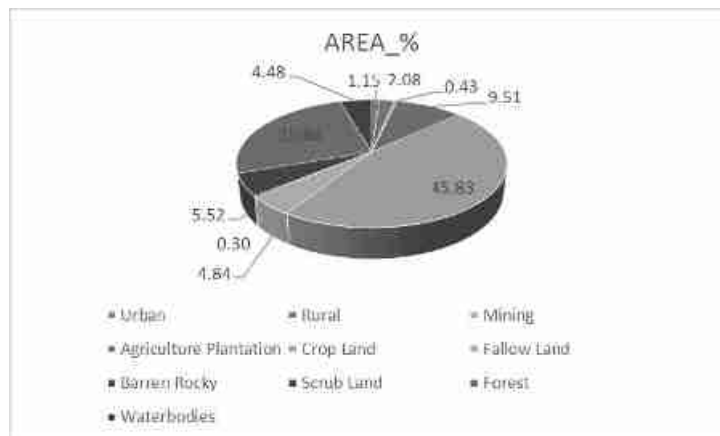
A visual interpretation technique has been adopted for land use classification based on the keys suggested in the chapter – V of the guidelines issued by NNRMS Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover.

S.No	CLASSIFICATION	AREA_HA	AREA_%
BUILTUP			
1	Urban	366.66	1.15
2	Rural	665.67	2.08
3	Mining	136.61	0.43
AGRICULTURAL LAND			
4	Agriculture Plantation	3042.20	9.51
5	Crop Land	14655.02	45.83
6	Fallow Land	1546.65	4.84
BARREN/WASTE LANDS			
7	Barren Rocky	94.49	0.30
8	Scrub Land	1765.02	5.52
FOREST			
9	Forest	8270.01	25.86
WETLANDS/ WATER BODIES			
10	Waterbodies	1432.81	4.48
TOTAL		31975.14	100.00

TABLE 3.2: LAND USE / LAND COVER TABLE 10 KM RADIUS

Source: Survey of India Toposheet and Landsat Satellite Imagery

FIGURE 3.1: PIE DIAGRAM OF LAND USE AND LAND COVER ANALYSIS



Source: Table 3.2

FIGURE 3.2: PHYSIOGRAPHIC MAP 10KM RADIUS

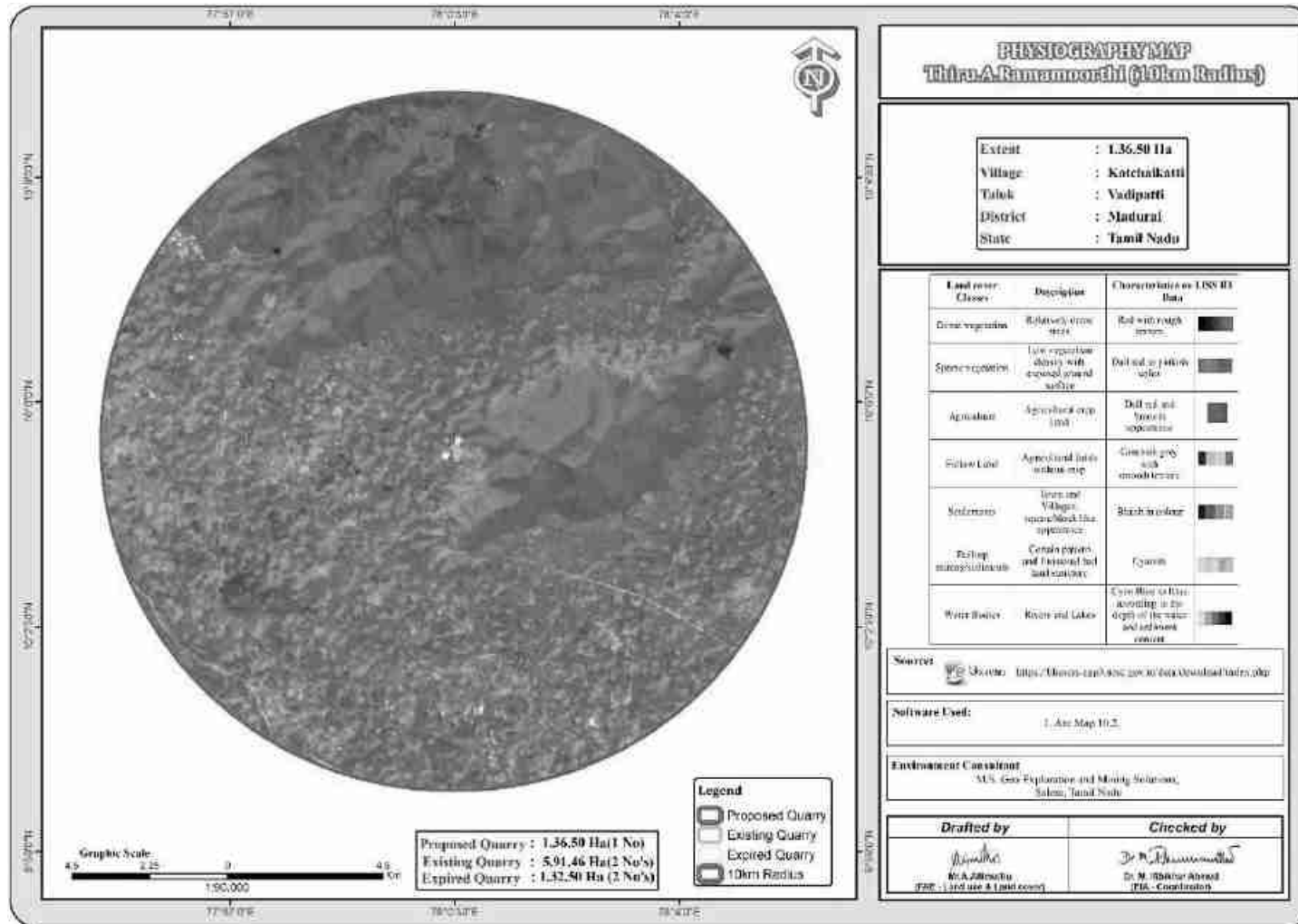
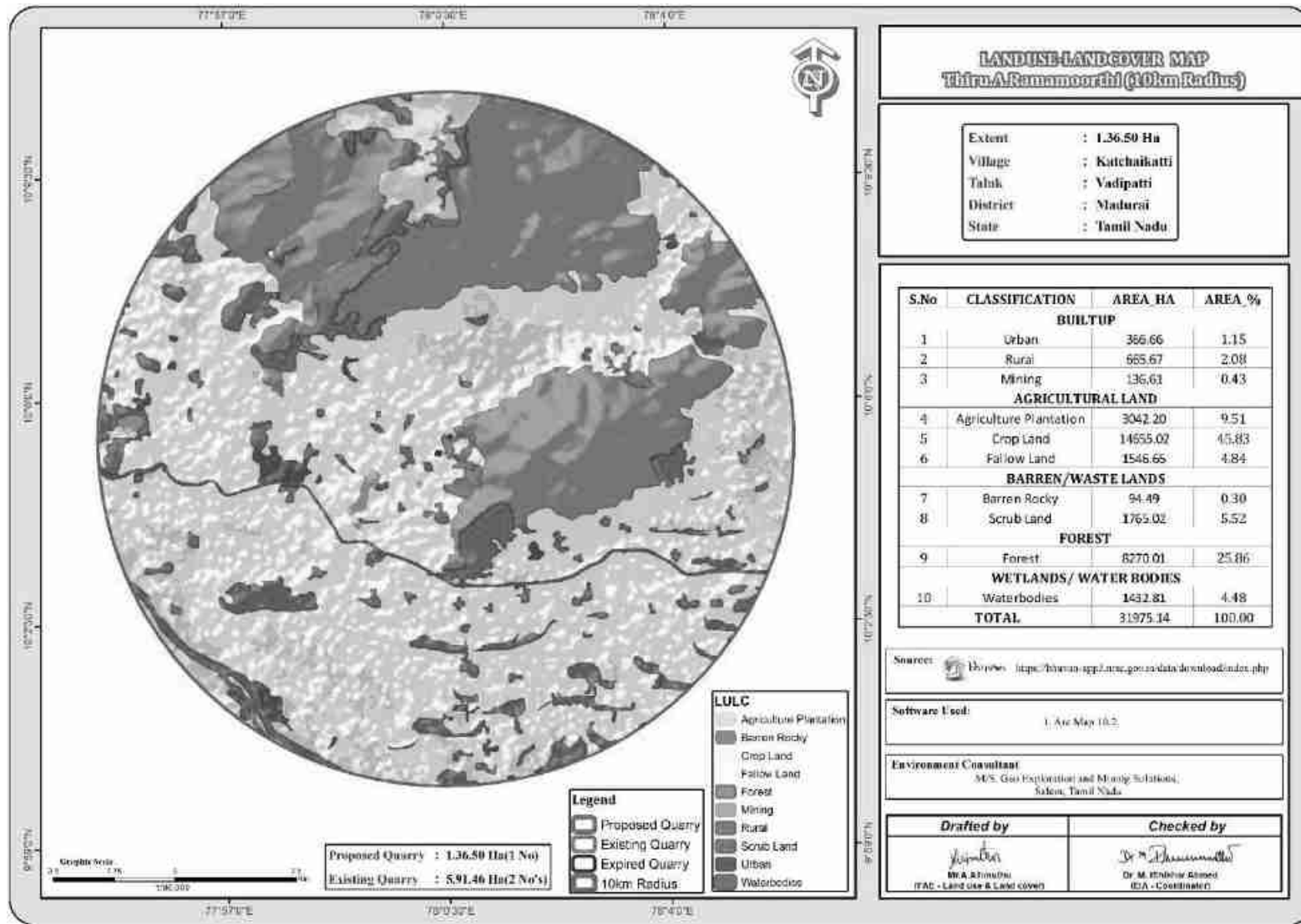


FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS



From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture land (includes crop land, plantation and fallow land) 60.18% followed by Built-up Lands 3.23%, Scrub Land 5.52%; Water bodies 4.48% and Mining – 0.43%.

The total mining area within the study area is 136.61 ha i.e., 0.43%. The cluster area of 7.27.96 ha contributes about 5.3 % of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.1.2 Topography

The project area exhibits plain terrain having gentle slope towards Southeast side, the southwest of the area is existing Rough stone and gravel quarry. to utilize temporary storage of Crushed materials.

3.1.3 Drainage Pattern of the Area

The drainage pattern of the area is dendritic – sub dendritic. Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land. There are no streams, canals or water bodies crossing within the project area.

3.1.4 Seismic Sensitivity

The proposed project site falls in the seismic Zone III, low damage risk zone as per BMTPC, Vulnerability Atlas of Seismic zone of India IS: 1893 – 2002. The project area falls in the hard rock terrain on the peninsular shield of south India which is highly stable.

(Source: https://moes.gov.in/writereaddata/files/LS_EN_20032020_385.pdf)

3.1.5 Environmental Features in the Study Area

There is no Wildlife Sanctuaries, National Park and Archaeological monuments within project area. No Protected and Reserved Forest area is involved in the project area. Therefore, there will be no need to acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e. 10 km radius, are given in the below Table 3.3.

TABLE 3.3: DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE CLUSTER

Sl.No	Sensitive Ecological Features	Name	Arial Distance in km from Cluster
1	National Park / Wild life Sanctuaries	Kadavur Slender Loris Sanctuary	36km - NE
2	Reserve Forest	Waguthumalai R.F.	207.75 Km NE
3	Lakes/Reservoir/ Dams/Stream/Rivers	Santhaiyar River	7.0km NE
4	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	None	Nil within 10KM Radius
5	Critically Polluted Areas	None	Nil within 10km Radius
6	Mangroves	None	Nil within 10km Radius
7	Mountains/Hills	None	Nil within 10km Radius
8	Notified Archaeological Sites	None	Nil within 10km Radius
9	Industries/ Thermal Power Plants	None	Nil within 10km Radius
10	Defence Installation	None	Nil within 10km Radius

Source: Survey of India Toposheet

TABLE 3.4: NEARBY WATER BODIES FROM THE PROPOSED PROJECT SITE

Sl.No	NAME	DISTANCE & DIRECTION
1	Odai	Adjacent to the lease applied area on Northern side, hence 50m safety distance provided
2	Odai	190m North
3	Mullai Periyar Channel	3.6 Km SW
4	Tank	5.7 km SW
5	Santhaiyar River	7.0 km NE
6	Santhaiyar Dam	7.7 km NE
7	Vaigai River	9.0 km SW

Source: Village Cadastral Map and Field Survey

3.1.6 Soil Environment

Soil quality of the study area is one of the important components of the land environment. The composite soil samples were collected from the study area and analysed for different parameters. The locations of the monitoring sites are detailed in Table 3.5 and Figure 3.3.

The objective of the soil sampling is -

- To determine the baseline soil characteristics of the study area; study the impact of proposed activity on soil characteristics and study the impact on soil more importantly agriculture production point of view.

TABLE 3.5: SOIL SAMPLING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Project Area	Core Zone	10° 5'21.41"N 78° 0'29.14"E
2	S-2	Katchaikatti	1.2km West	10° 5'21.36"N 77°59'46.59"E
3	S-3	Thathakavundanpatti	5.0km SE	10° 3'26.98"N 78° 2'22.69"E
4	S-4	Viralipatti	3.8km NW	10° 6'5.43"N 77°58'28.03"E
5	S-5	Mettupatti	4.7km NE	10° 6'48.37"N 78° 2'37.90"E
6	S-6	Kattakulam	5.2km SW	10° 2'54.75"N 77°59'2.97"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

Methodology –

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land use conditions. The samples were collected by auger boring into the soil up to 90-cm depth. Six (6) locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were analysed for physical and chemical characteristics. The samples were sent to laboratory for analysis. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology in respect are given in below Table 3.6.

TABLE 3.6: METHODOLOGY OF SAMPLING COLLECTION

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

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

Soil Testing Result –

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium. The standard classifications of soil and physico-chemical characteristics of the soils are presented below in Table 3.6 & Test Results in Table 3.7.

FIGURE 3.6: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS

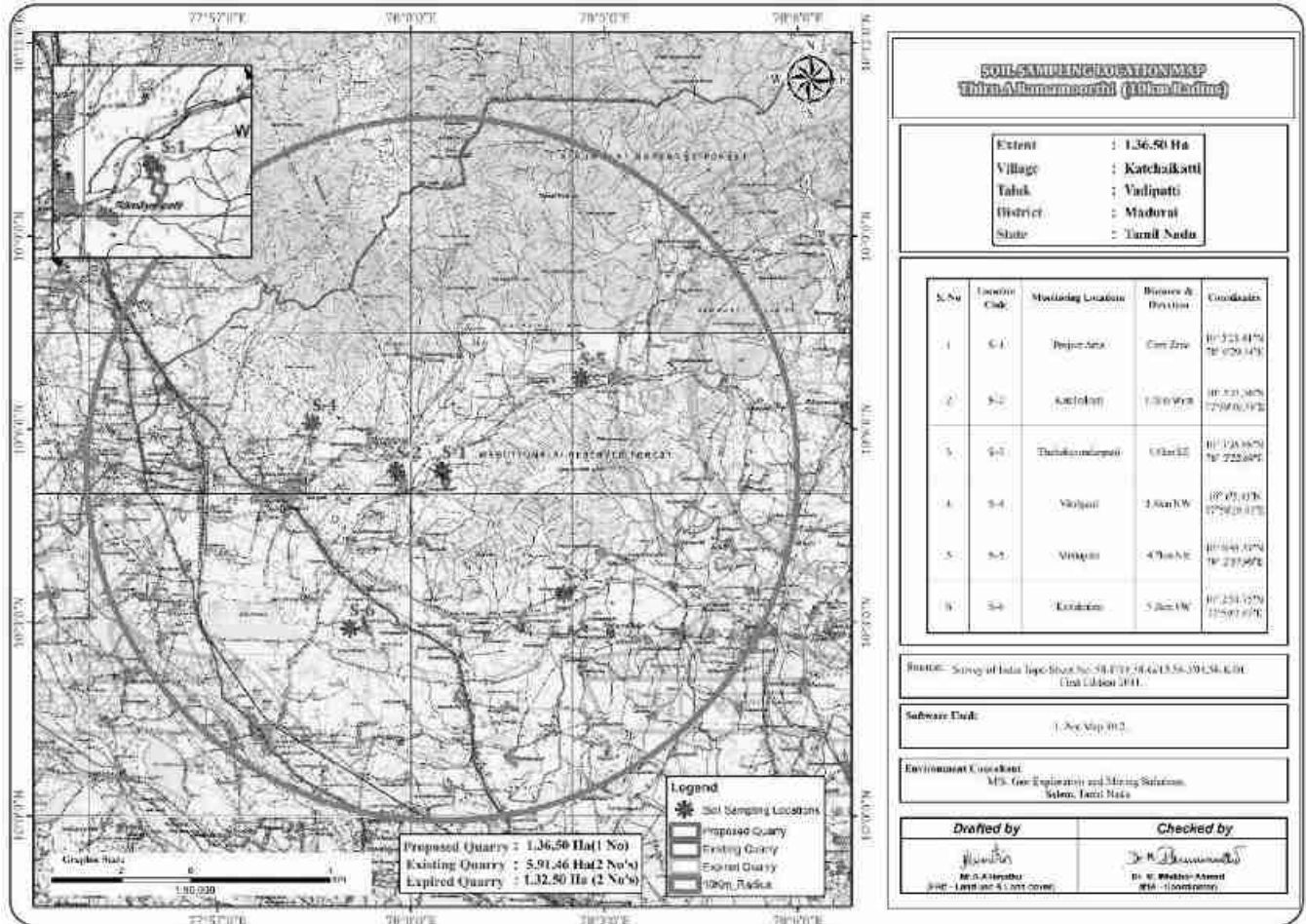


FIGURE 3.7: SOIL MAP

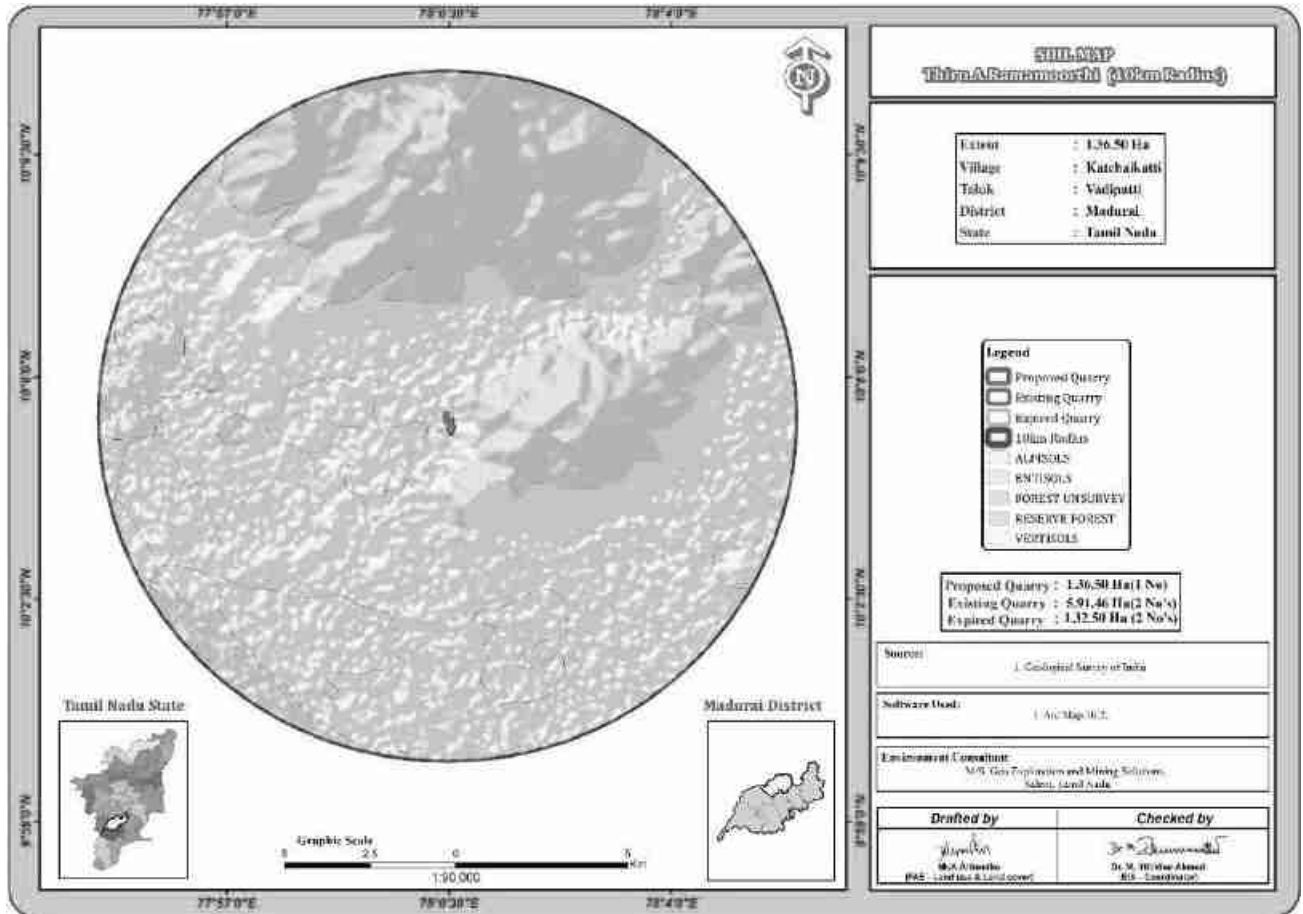


TABLE 3.7: SOIL QUALITY OF THE STUDY AREA

S. No	Test Parameters	Protocols	S-1 Core Zone	S-2 Katchaikattil	S-3 Thathakavun danpatti	S-4 Viralipatti	S-5 Mettupatti	S-6 Kattakula m
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.21	8.23	7.84	7.94	8.05	8.06
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff: 2016)	402 µmhos/cm	423 µmhos/cm	430 µmhos/cm	256µmhos/cm	364.2 µmhos/cm	452 µmhos/cm
03	Texture:							
	Clay	By Gravimetric Method	36.7%	38.9%	38.7%	37.9%	36.2%	38.4%
	Sand		27.4%	24.4%	24.8%	27.6%	27.9%	25.2%
	Silt		35.9%	36.7%	36.5%	34.5%	35.9%	36.4%
04	Water Holding Capacity	By Gravimetric Method	48.1 %	41.9%	42.1%	40.6%	40.9%	42.6%
05	Bulk Density	By Cylindrical Method	1.02g/cm ³	0.92 g/cm ³	1.09 g/cm ³	0.85 g/cm ³	0.85 g/cm ³	1.03 g/cm ³
06	Porosity	By Gravimetric Method	42.8 %	43.7 %	40.1%	39.8%	46.5%	41.1%
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	60.5mg/kg	68.4mg/kg	66mg/kg	80.9 mg/kg	55.6 mg/kg	59.8 mg/kg
08	Magnesium as Mg		30.5 mg/kg	31.9 mg/kg	35.6 mg/kg	40.4 mg/kg	26 mg/kg	26.9 mg/kg
09	Manganese as Mn		22.8 mg/kg	21.4mg/kg	23.5 mg/kg	26.6 mg/kg	19.5 mg/kg	26.8 mg/kg
10	Zinc as Zn		1.25 mg/kg	2.12 mg/kg	1.09 mg/kg	1.26 mg/kg	1.84 mg/kg	1.32 mg/kg
11	Boron as B		2.97 mg/kg	1.62 mg/kg	1.08mg/kg	1.64mg/kg	1.04mg/kg	1.5 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	75.9 mg/kg	63.7 mg/kg	86.4mg/kg	67.5 mg/kg	60.4 mg/kg	75.6 mg/kg
13	Total Soluble Sulphate as SO ₄	IS: 2720 Part 22: 1972 (Reaff: 2015)	0.016 %	0.0018 %	0.0019%	0.0010%	0.0017%	0.0019%
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	35.6 mg/kg	36.8 mg/kg	30.7 mg/kg	43.4 mg/kg	33.2 mg/kg	42.8 mg/kg
15	Total Phosphorus as P	IS 10158: 1982 (Reaff: 2019)	2.32 mg/kg	1.26 mg/kg	1.96 mg/kg	1.02 mg/kg	3.20 mg/kg	3.9 mg/kg
16	Total Nitrogen as N	IS 14684: 1999 (Reaff:2019)	435.8 mg/kg	357.8 mg/kg	378.9 mg/kg	250 mg/kg	382.5mg/kg	421mg/kg
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	BDL (DL: 1.0 mg/kg)					
18	Total Chromium as Cr		BDL (DL: 1.0 mg/kg)					
19	Copper as Cu		BDL (DL: 1.0 mg/kg)					
20	Lead as Pb		1.28 mg/kg	0.78mg/kg	1.13 mg/kg	1.66 mg/kg	1.03 mg/kg	0.90 mg/kg
21	Iron as Fe		2.62 mg/kg	4.97 mg/kg	3.29 mg/kg	2.09 mg/kg	1.68 mg/kg	3.56 mg/kg
22	Organic Matter	IS: 2720 Part 22: 1972 (Reaff: 2015)	1.20%	1.48%	2.01%	1.81%	1.82%	1.94%
23	Organic Carbon	IS: 2720 Part 22: 1972 (Reaff: 2015)	0.97%	0.86%	1.17%	1.05%	1.06%	1.13%
24	Cation Exchange Capacity	USEPA 9080 – 1986	46.8 meg /100g of soil	42.6 meg /100g of soil	42.7 meg /100g of soil	39.8 meg /100g of soil	32.9 meg /100g of soil	49.5 meg /100g of soil

Source: Sampling Results by EHS360 Labs Private Limited

Interpretation & Conclusion

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay Loam Soil and Bulk Density of Soils in the study area varied between 0.85 – 1.09 g/cc. The Water Holding Capacity ranging from 40.6 – 48.1 % and Porosity of the soil samples is found to be medium i.e. ranging from 39.8 - 46.5%.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.84 to 8.23
- The available Nitrogen content range between 250 to 435.8 mg/kg
- The available Phosphorus content range between 1.02 to 3.20 mg/kg
- The available Potassium range between 30.7 to 43.4 mg/kg

3.2 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

3.2.1 Surface Water Resources:

Vaigai River is the major surface water body in the study area and the rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of drinking water for few months after rainy season.

3.2.2 Ground Water Resources:

Groundwater occurs in all the crystalline formations of oldest Achaeans and Recent Alluvium. The occurrence and behaviour of groundwater are controlled by rainfall, topography, geomorphology, geology, structures etc.

Ground water is occurring in phreatic conditions in weathered and fractured gneiss rock formation. The weathering is controlled by the intensity of weathering and fracturing. Dug wells as wells as bore wells are more common ground water abstraction structures in the area. The diameter of the dug well is in the range of 7 to 10 m and depth of dug wells range from 7.6 to 13m bgl. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigation for one or two crops in monsoon period.

3.2.3 Methodology

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

- Drainage pattern;
- Location of Residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions

Two (2) surface water and Four (4) ground water samples were collected from the study area and were analysed for physio-chemical, heavy metals and bacteriological parameters in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.9 and shown as Figure 3.6.

TABLE 3.8: WATER SAMPLING LOCATIONS

S.NO	CODE	LOCATIONS	DISTANCE & DIRECTION	COORDINATES
GROUND WATER				
1	WW-1	Near Project Area	220m South	10° 5'13.07"N 78° 0'28.17"E
2	WW-2	Viralipatti	3.7km NW	10° 6'4.60"N 77°58'31.22"E
3	BW-1	Near Project Area	240m NW	10° 5'32.52"N 78° 0'24.81"E
4	BW-2	Thathakavundanpatti	5.0km SE	10° 3'28.39"N 78° 2'28.32"E
SURFACE WATER				
5	SW-1	Vaigai River	9km SW	10° 1'40.98"N 77°57'15.83"E
6	SW-2	Sathaiyar Reservoir	7.7km NE	10° 6'51.47"N 78° 4'28.17"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

FIGURE 3.9: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS

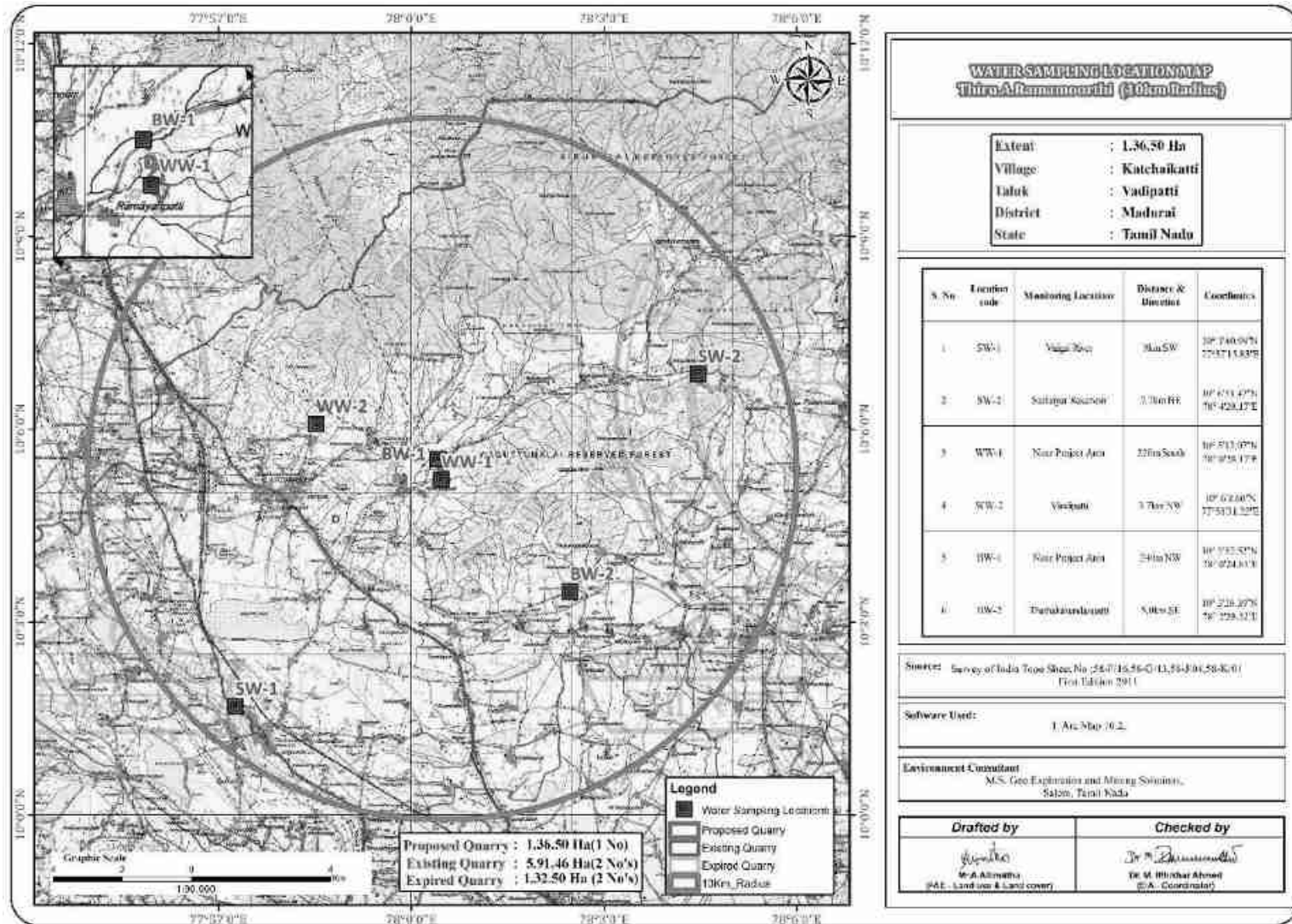


TABLE 3.9: GROUND WATER SAMPLING RESULTS

S.No.	Parameters	Test Method	WW1- Near Project Area	WW2- Viralipatti	BW-1 Near Project Area	BW-2 Thatakavundanpatti	
	Discipline: Chemical	Group: Water					
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	<5	<5	<5	<5	
2	Odour	IS 3025 Part 5:2018	Agreeable	Agreeable	Agreeable	Agreeable	
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.56	7.80	7.62	7.47	
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	1106 µmhos/cm	1144 µmhos/cm	989 µmhos/cm	984 µmhos/cm	
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	<1.0 NTU	<1.0 NTU	<1.0 NTU	<1.0 NTU	
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	652mg/l	674 mg/l	592mg/l	588 mg/l	
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	244 mg/l	256 mg/l	212 mg/l	224 mg/l	
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	60.9 mg/l	54.5mg/l	44.8 mg/l	48.1 mg/l	
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	22.3 mg/l	29.1 mg/l	24.3 mg/l	25.3mg/l	
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	224 mg/l	232 mg/l	190.6 mg/l	198.5 mg/l	
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	186mg/l	198.6 mg/l	165.4 mg/l	176.5mg/l	
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	48.7 mg/l	50.5 mg/l	56.8 mg/l	41.3mg/l	
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.18 mg/l	0.41 mg/l	0.42 mg/l	0.29 mg/l	
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)				
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.36 mg/l	0.35 mg/l	0.31 mg/l	0.17 mg/l	
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	3.6 mg/l	4.9 mg/l	3.4 mg/l	4.3mg/l	
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)				
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)				
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)				
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)				
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)				
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)				
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)				
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)				
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)				
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)				
27	Mineral Oil	IS 3025 Part 39:1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)				
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43:1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)				
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)				
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)				
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)				
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)				
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)				
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)				
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)				
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)				
	Discipline: Biological						
	Group: Water						
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	143 MPN/100ml	170 MPN/100ml	96 MPN/100ml	128 MPN/100ml	
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

TABLE 3.10: SURFACE WATER SAMPLING RESULTS

S.No.	Parameters	Test Method	SW-1- Vaigai River	SW-2 Sathaivar Reservoir
	Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	11 Hazen	10 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	8.01	8.03
4	Conductivity @ 25°C	IS 3025 Part 14:2013	1378 µmhos/cm	1488 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	7.5 NTU	5.6 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	813 mg/l	878 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	356 mg/l	360 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	97.7mg/l	92.9 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	27.2 mg/l	31.1 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	204.5 mg/l	317.5 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	316.1 mg/l	324.4mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	55.9 mg/l	52.6 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.36 mg/l	0.37 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.29 mg/l	0.29 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	7.6 mg/l	8.6 mg/l
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	11.5 mg/l	10.2 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	38 mg/l	35 mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	6.1 mg/l	5.6 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	1.8 mg/l	1.8 mg/l
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	19.5 mg/l	19 mg/l
	Discipline: Biological	Group: Water		
40	Total Coliform	APHA 23 rd Edn. 2017:9221B	650 MPN/100ml	568 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	120 MPN/100ml	112 MPN/100ml

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

3.2.4 Interpretation & Conclusion

Surface Water

Ph: The pH varied from 10 to 11 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids varied from 813 to 878 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 316.1 – 324.4 mg/l. Nitrates varied from 7.6 to 8.6 mg/l, while sulphates varied from 52.6 to 55.9 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.47 to 7.80 and within the acceptable limit of 6.5 to 8.5. PH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 586 - 674 mg/l in all samples. The Total hardness varied between 212 – 256 mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.2.5 Hydrology and Hydrogeological studies

The district is underlain by hard rock formation fissured and fractured crystalline rocks constitute the important aquifer systems in the district. Geophysical prospecting was carried out in that area by SSRMP-80 Instrument by qualified Geo physicist with the help of IGIS software and it was inferred that the low resistance encountered at the depth between 57m. The maximum depth proposed out of proposed project is 21m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area. There is no necessity of stream, channel diversion due to these proposed projects.

During the rainy season there is a possibility of collection of seepage water from the subsurface levels which will be collected and stored in the mine sump pits and will be used for dust suppression and greenbelt development and during the end of the life of the mine this collected water will act as a temporary reservoir.

TABLE 3.11: SUMMER SEASON WATER LEVEL OF OPEN WELLS 1 KM RADIUS

S. No	LABEL	LONGITUDE	LATITUDE	Mar-24	Apr-24	May-24
1	OW1	10° 05' 35.58"N	78° 00' 02.40"E	11	11.5	12
2	OW2	10° 05' 48.93"N	78° 00' 11.83"E	11.3	11.8	12.3
3	OW3	10° 05' 50.37"N	78° 00' 37.38"E	11.5	12	12.5
4	OW4	10° 05' 23.91"N	78° 00' 45.93"E	11.1	11.6	12.1
5	OW5	10° 05' 08.26"N	78° 00' 44.79"E	11.6	12.1	12.6
6	OW6	10° 04' 42.58"N	78° 00' 42.37"E	11.2	11.7	12.2
7	OW7	10° 04' 51.29"N	78° 00' 13.97"E	11.4	11.9	12.4
8	OW8	10° 05' 18.67"N	78° 00' 06.33"E	11.7	12.2	12.7

Source: Onsite monitoring data

FIGURE 3.10: OPEN WELL CONTOUR MAP -MARCH- MAY 2024

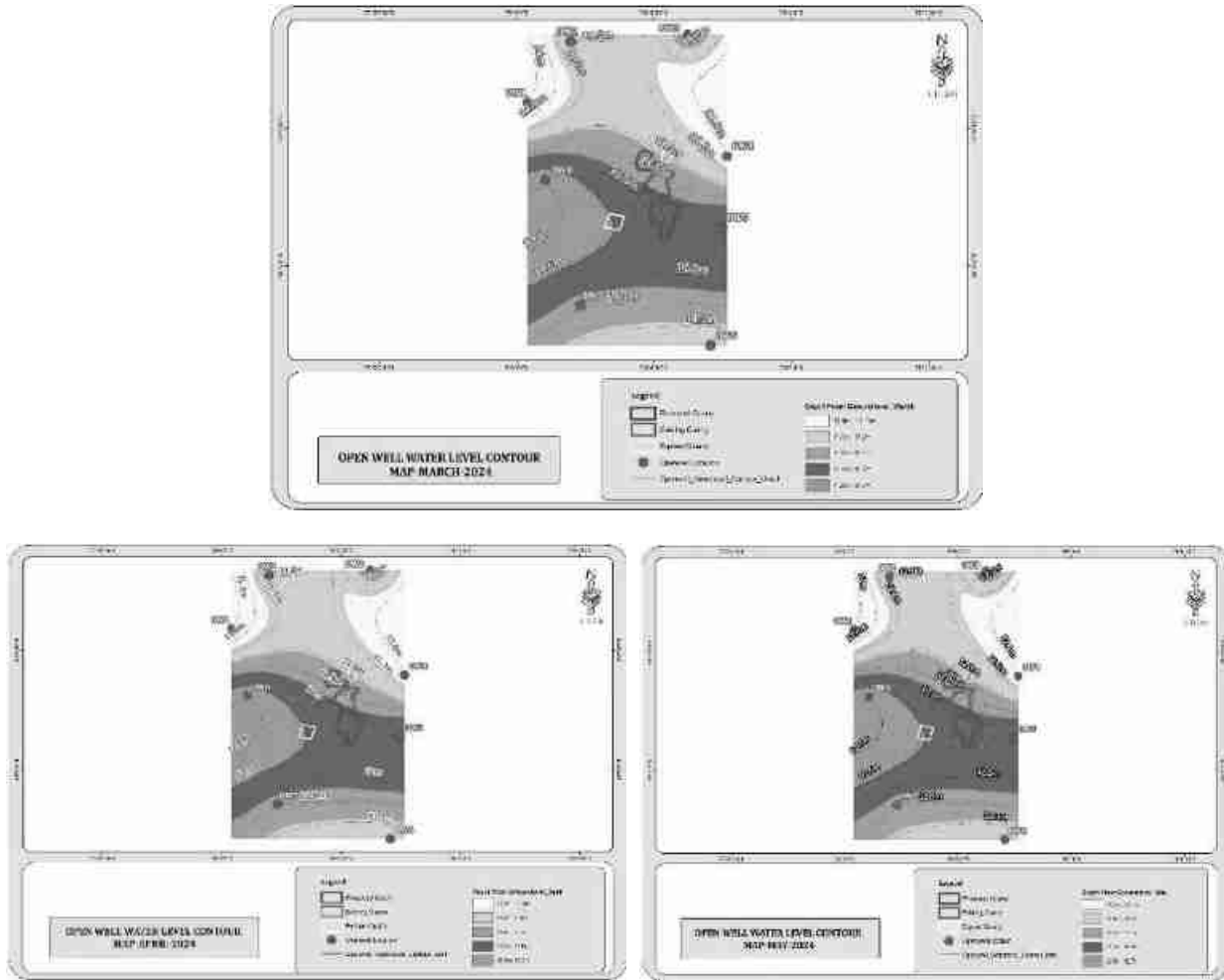


TABLE 3.12: SUMMER SEASON WATER LEVEL OF BOREWELLS 1 KM RADIUS

S.No	Name	LONGITUDE	LATITUDE	Mar-24	Apr-24	May-24
1	BW1	10° 05' 10.38"N	78° 00' 10.51"E	56	56.5	57
2	BW2	10° 05' 45.07"N	78° 00' 02.41"E	56.3	56.8	57.3
3	BW3	10° 05' 44.61"N	78° 00' 40.75"E	56.1	56.6	57.1
4	BW4	10° 05' 24.27"N	78° 00' 46.97"E	56.2	56.7	57.2
5	BW5	10° 05' 11.27"N	78° 00' 51.36"E	56.4	56.9	57.4
6	BW6	10° 04' 43.35"N	78° 00' 52.76"E	56.5	57	57.5
7	BW7	10° 04' 53.44"N	78° 00' 14.05"E	56.8	57.3	57.8

Source: Onsite monitoring data

FIGURE 3.11: BOREWELL CONTOUR MAP – MARCH- MAY 2024



FIGURE 3.12: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

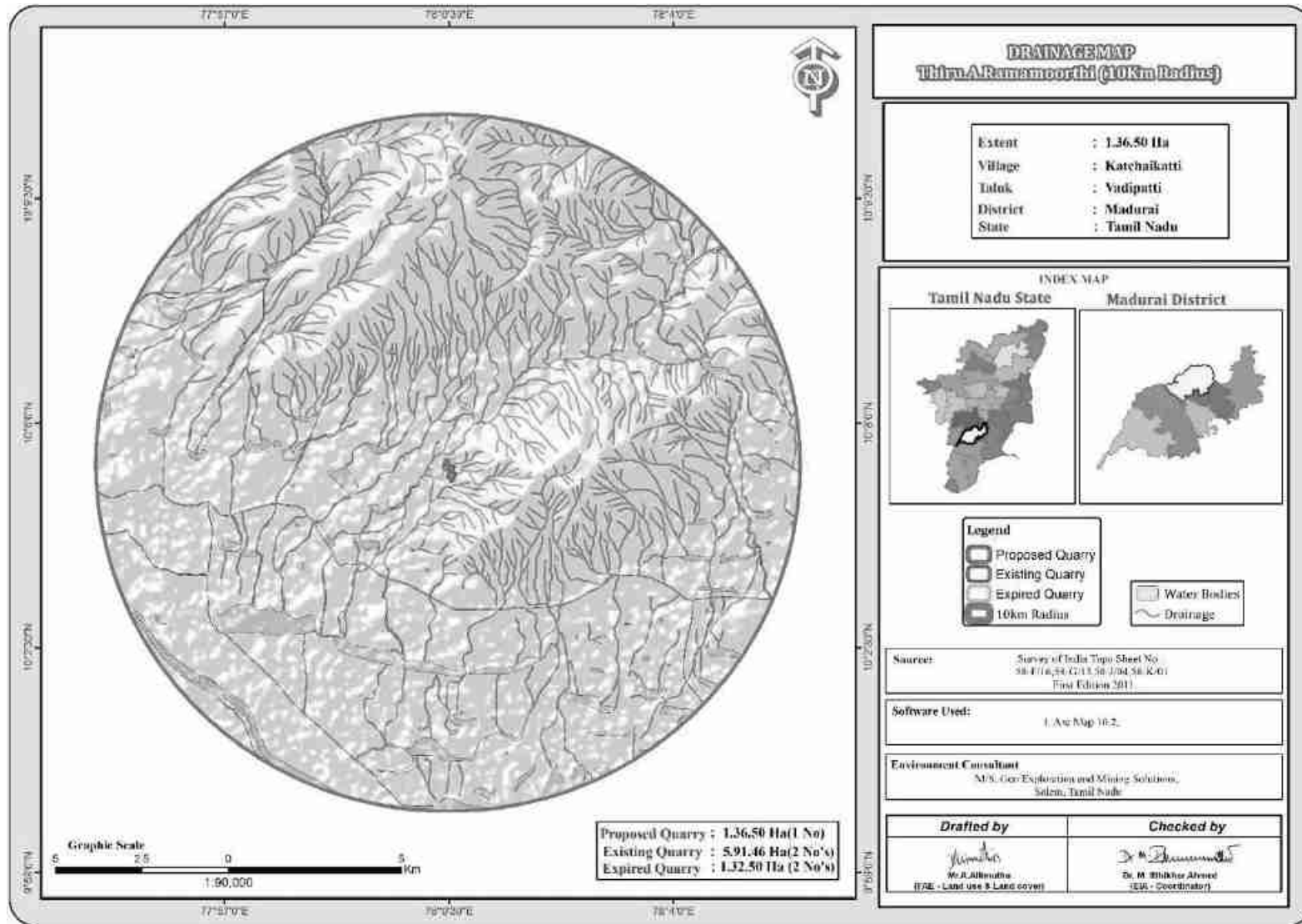
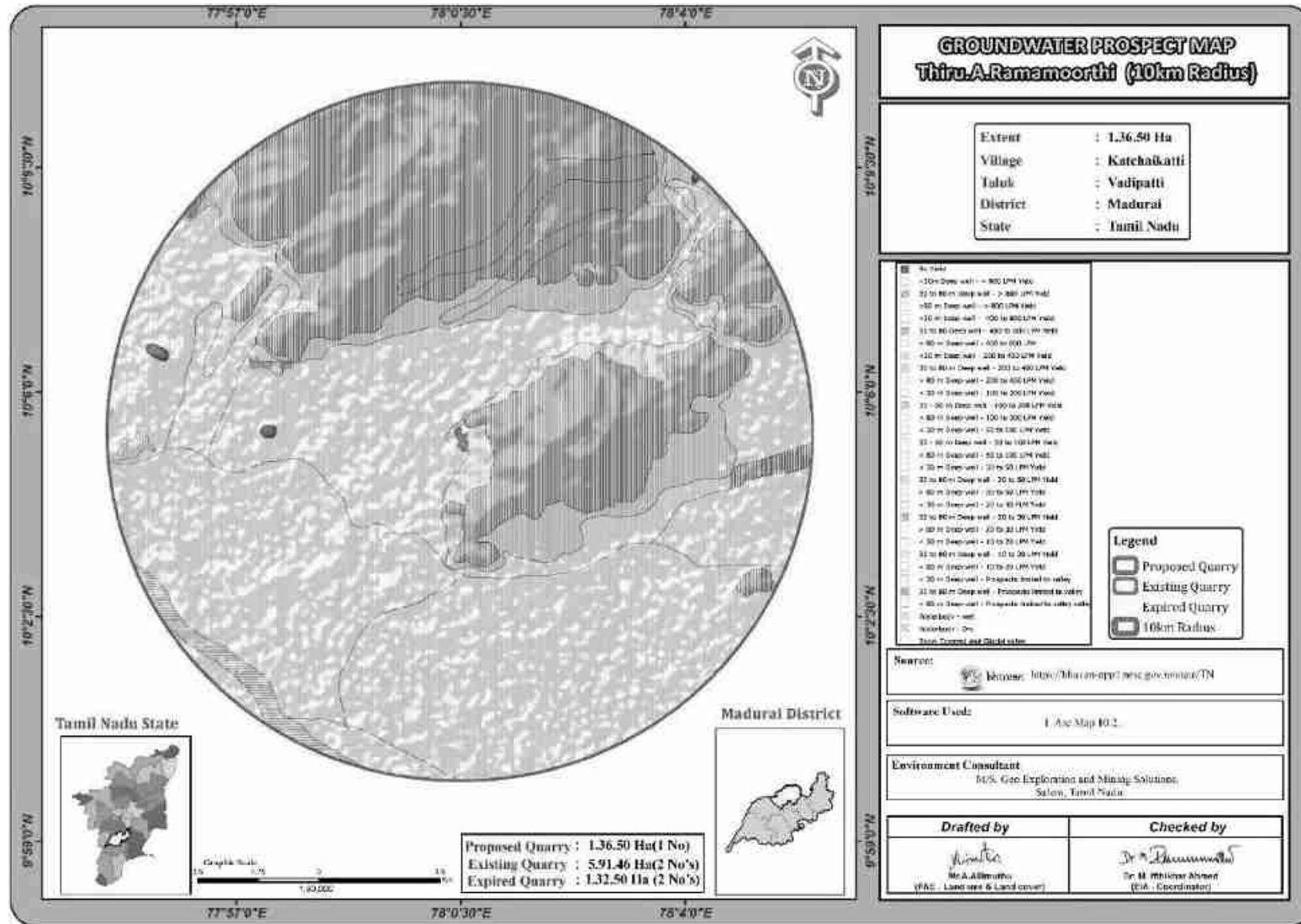


FIGURE 3.13: GROUND WATER PROSPECT MAP



3.2.5.1 Methodology and Data Acquisition

Electric Resistivity Method is well established for delineating lateral as well vertical discontinuities in the resistive structure of the Earth's subsurface. The present study makes use of vertical electric sounding (VES) to delineate the Vertical Resistivity structure at depth. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral inhomogeneities and is capable of providing higher depth of investigation. This is four electrodes collinear set up where in the outer electrodes send current into the ground and the inner electrodes measure the potential difference.

The present study utilizes maximum current electrode separation $AB/2$. The data from this survey are commonly arranged and contoured in the form of Pseudo-section that gives an approximate of the subsurface resistivity. This technique is used for the inversion of Schlumberger VES data to predict the layer parameter namely layer resistivity and Geo electric layer thickness. The main goal of the present study is to search the vertical inhomogeneities that is consistent with the measured data.

For a Schlumberger among the Apparent resistivity can be calculated as follows

$$\rho_a = \frac{G \Delta V}{I}$$

ΔV = potential difference between receiving electrodes

G = Geometric Factor.

Rocks show wide variation in resistivity ranging from 10⁻⁸ more than 10⁺¹⁴ ohmmeter. On a broad classification, one can group the rocks falling in the range of 10⁻⁸ to 1 ohmmeter as good conductors. 1 to 10⁶ ohmmeter as intermediate conductors and 10⁶ to 10¹² ohmmeter as more as poor conductor. The resistivity of rocks and subsurface lithology, which is mostly dependent on its porosity and the pore fluid resistivity is defined by Archie's Law,

$$\rho_r = F \rho_w = a \phi^m \rho_w$$

ρ_r = Resistivity of Rocks

ρ_w = Resistivity of water in pores of rock

F = Formation Factor

ϕ = Fractional pore volume

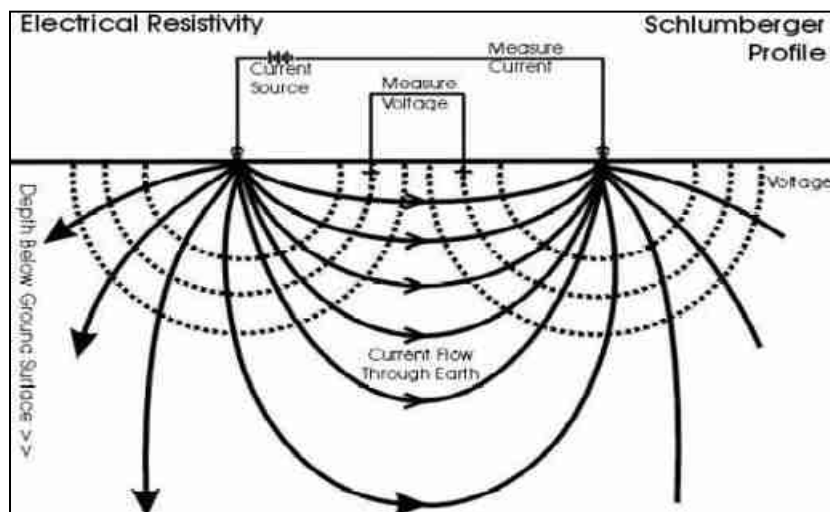
a = Constants with values ranging from 0.5 to 2.5

3.2.5.2 Survey Layout

The layout for a resistivity survey depends on the choice of the current and potential electrode arrangement, which is called electrode array. Here the present study is considered with Schlumberger array. In which the distance may be used for current electrode separation while potential electrode separation is kept on third to one fifth of the same. One interesting aspect in VES is the principle of reciprocity, which permits interchange of the potential and current electrode without any effect on the measured apparent resistivity.

The field equipment deployed for the study is in a deep resistivity meter with a model of SSR – MP – AT. This Signal stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation features for Earth resistivity. In the presence of random earth Noises the signal to noise ration can be enhanced by \sqrt{N} where N is the number of stacked readings. This SSR meter in which running averages of measurements $[1, (1+2)/2, (1+2+3)/3 \dots (1+2+\dots+16/16)]$ up to the chosen stacks are displayed and the final average is stored automatically, in memory utilizing the principles of stacking to achieve the benefit of high signals to noise ratio. Based on these above significations the signal stacking resistivity meter was used for (VES) Vertical Electric Resistivity Sounding.

RESISTIVITY SURVEY PROFILE



Measurements of ground Resistivity is essentially done by sending a current through two electrodes called current electrodes (C_1 & C_2) and measuring the resulting potential by two other electrodes called potential electrode (P_1 & P_2). The amount of current required to be sent into the ground depends on the contact resistance at the current electrode, the ground resistivity and the depth of interest.

3.2.5.3 Data Presentation

It was inferred that the low resistance encountered at the depth between 57m. The maximum depth proposed out of proposed project is 21m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area.

3.2.5.4 Geophysical Data Interpretation

The geophysical data was obtained to study the lateral variations, vertical in homogeneities in the sub – surface with respect to the availability of groundwater. From the interpreted data, it has inferred that the area has moderate groundwater potential in the investigated area. This small quarrying operation will not have any significant impact on the natural water bodies.

3.3 AIR ENVIRONMENT

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

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the cluster forms the baseline information. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. The prime objective of the baseline air quality study was to establish the existing ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed projects in cluster.

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

3.3.1 Meteorology & Climate

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

A temporary meteorological station was installed at project site by covering cluster quarries. The station was installed at a height of 3 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis.

Climate –

- The atmospheric conditions prevailing in this region are of a tropical nature. The summers are much rainier than the winters in Madurai. This location is classified as Aw by Köppen and Geiger. In Madurai, the average annual temperature is 28.2 °C | 82.7 °F. The precipitation level on a yearly basis amounts to 849 mm | 33.4 inch as per the meteorological records.
- The Madurai are located close to the equator, making the summers difficult to define. The most popular time to visit is January, February, March, September, November, December.
- The month with the least amount of precipitation is January exhibiting a mere 16 mm | 0.6 inch rainfall. The greatest amount of precipitation occurs in October, with an average of 180 mm | 7.1 inch.
- The month of May boasts the highest average temperature, with a recorded maximum of 31.0 °C | 87.8 °F. The lowest average temperatures in the year occur in December, when it is around 24.6 °C | 76.4 °F.

Source: <https://en.climate-data.org/asia/india/tamil-nadu/madurai-5892/>

Rainfall –

TABLE 3.13: RAINFALL DATA

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

Source: <https://www.twadboard.tn.gov.in/content/madurai>

TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Mar 2024	Apr- 2024	May - 2024
1	Temperature (°C)	Max	31.62	34.24	34.86
		Min	26.56	30.89	26.13
		Avg	29.09	32.56	30.49
2	Relative Humidity (%)	Avg	52.44	52.22	67.78
3	Wind Speed (m/s)	Max	4.2	4.29	4.53
		Min	2.38	2.19	1.35

		Avg	3.29	3.24	2.94
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		ENE,SSE	SSE,ENE	WSW,SW

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

Correlation between Secondary and Primary Data

The meteorological data collected at the site is almost similar to that of secondary data collected from IMD Madurai_Agro. A comparison of site data generated during the three months with that of IMD, Madurai_Agro reveals the following:

- The average maximum and minimum temperatures of IMD, Madurai_Agro showed a higher in respect of on-site data i.e. in Thirumal village.
- The relative humidity levels were lesser at site as compared to IMD, Madurai_Agro.
- The wind speed and direction at site shows similar trend that of IMD, Madurai_Agro.

Wind rose diagram of the study site is depicted in Figure. 3.8. Predominant downwind direction of the area during study season is North-East to South East.

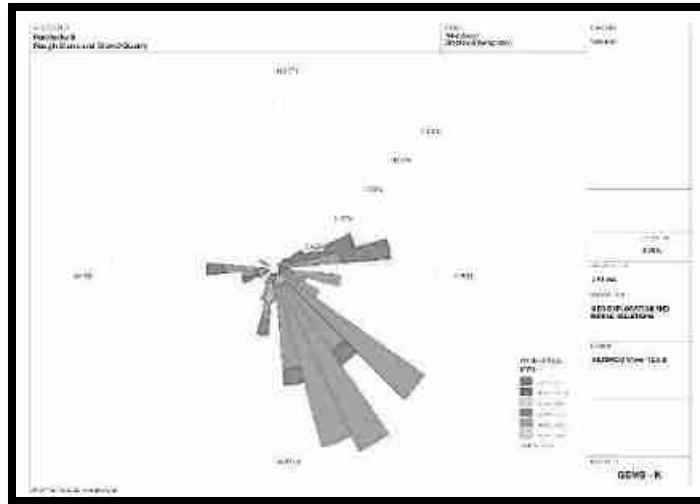


FIGURE. 3.14 WIND ROSE

In the abstract of collected data wind rose were drawn on presented in figure No.3.14 during the monitoring period in the study area

1. Predominant winds were from NE & SE
2. Wind velocity readings were recorded between 2.38 to 4.53m/s
3. Calm conditions prevail of about 0.00 % of the monitoring period
4. Temperature readings ranging from 26.13 to 34.86 °C
5. Relative humidity ranging from 52.22 to 6.78 %
6. The monitoring was carried out continuously for three months

3.3.2 Methodology and Objective

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

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

3.3.3 Sampling and Analytical Techniques

TABLE 3.15: METHODOLOGY AND INSTRUMENT USED FOR AAQ ANALYSIS

Parameter	Method	Instrument
PM2.5	Gravimetric Method Beta attenuation Method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM10	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hochheiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by EHS360 Labs Private Limited & CPCB Notification

TABLE 3.16: NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide (µg/m ³)	Annual Avg.*	50.0	20.0
		24 hours**	80.0	80.0
2	Nitrogen Dioxide (µg/m ³)	Annual Avg.	40.0	30.0
		24 hours	80.0	80.0

3	Particulate matter (size less than 10µm) PM10 (µg/m3)	Annual Avg.	60.0	60.0
		24 hours	100.0	100.0
4	Particulate matter (size less than 2.5 µm PM2.5 (µg/m3)	Annual Avg.	40.0	40.0
		24 hours	60.0	60.0

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

*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval,

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

3.3.4 Frequency & Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at seven (7) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period March to May 2024. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂) & Nitrogen Dioxide (NO₂) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

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

3.3.5 Ambient Air Quality Monitoring Stations

Seven monitoring stations were set up in the study area as depicted in Figure 3.6.1 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

TABLE 3.17: AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Project Area	Core Zone	10° 5'24.21"N 78° 0'27.02"E
2	AAQ-2	Near Existing Quarry	300m SE	10° 5'12.77"N 78° 0'36.75"E
3	AAQ-3	Katchaikatti	1.2km West	10° 5'20.92"N 77°59'46.03"E
4	AAQ-4	Thathakavundanpatti	5.0km SE	10° 3'26.58"N 78° 2'23.02"E
5	AAQ-5	Viralipatti	3.8km NW	10° 6'4.82"N 77°58'28.03"E
6	AAQ-6	Mettupatti	4.7km NE	10° 6'47.34"N 78° 2'38.17"E
7	AAQ-7	Kattakulam	5.2km SW	10° 2'54.97"N 77°59'4.11"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS.

FIGURE 3.16: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

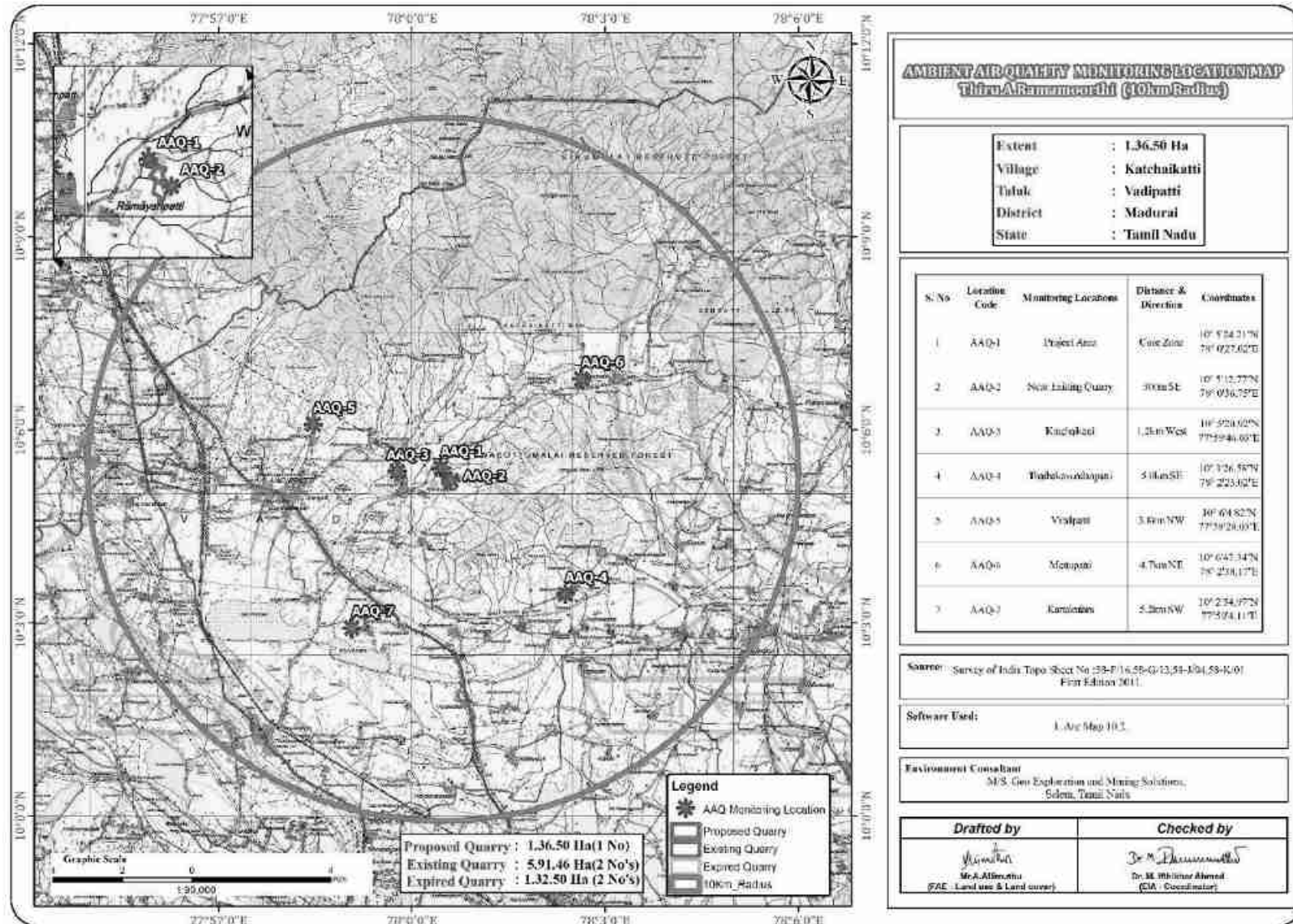


TABLE 3.18: SUMMARY OF AAQ – 1 to AAQ – 7

PM10	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	43.9	43.0	43.1	43.1	44.3	43.1	43.9
Minimum	41.0	40.4	40.9	40.0	41.9	40.6	42.2
Maximum	46.5	45.2	45.3	46.0	46.5	44.8	45.5
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0

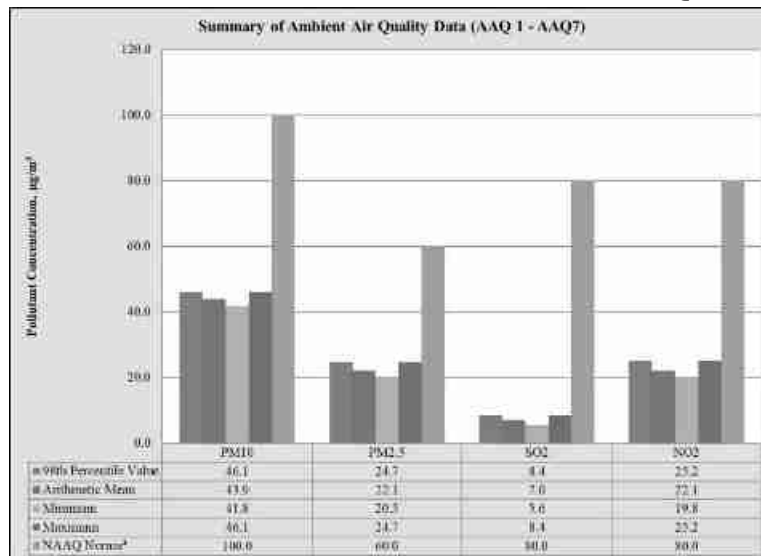
PM2.5	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	22.3	21.3	21.2	22.0	21.5	21.2	22.6
Minimum	20.4	20.2	20.2	0.0	20.3	18.0	20.3
Maximum	24.5	22.6	22.6	0.0	23.5	24.7	24.9
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0

SO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	6.7	7.0	6.6	6.3	7.0	6.4	6.6
Minimum	4.5	6.2	5.1	5.2	5.6	5.1	5.1
Maximum	8.2	8.4	8.5	7.9	8.8	7.9	8.2
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

NO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	21.4	20.7	21.6	21.0	23.1	21.3	21.9
Minimum	19.5	19.6	19.5	18.7	20.2	18.5	20.3
Maximum	24.1	22.7	23.0	23.5	25.3	22.9	23.9
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

TABLE 3.19: ABSTRACT OF AMBIENT AIR QUALITY DATA

1	Parameter	PM10	PM2.5	SO ₂	NO ₂
2	No. of Observations	260	260	260	260
3	10 th Percentile Value	41.8	20.3	5.6	19.8
4	20 th Percentile Value	42.5	20.6	5.9	20.4
5	30 th Percentile Value	42.7	20.9	6.2	20.7
6	40 th Percentile Value	43.1	21.3	6.4	21.0
7	50 th Percentile Value	43.5	21.6	6.6	21.5
8	60 th Percentile Value	43.8	21.7	6.9	21.7
9	70 th Percentile Value	44.2	22.1	7.1	22.2
10	80 th Percentile Value	44.5	22.7	7.4	22.7
11	90 th Percentile Value	45.0	23.5	7.9	23.6
12	95 th Percentile Value	45.3	24.1	8.2	24.2
13	98 th Percentile Value	46.1	24.7	8.4	25.2
14	Arithmetic Mean	43.9	22.1	7.0	22.1
15	Geometric Mean	43.8	22.1	6.9	22.0
16	Standard Deviation	1.3	1.4	0.9	1.7
17	Minimum	41.8	20.3	5.6	19.8
18	Maximum	46.1	24.7	8.4	25.2
19	NAAQ Norms*	100.0	60.0	80.0	80.0
	% Values exceeding Norms*	0.0	0.0	0.0	0.0

FIGURE 3.17: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ 7

Source: Table 3.26

FIGURE 3.18: BAR DIAGRAM OF PARTICULATE MATTER PM_{2.5}

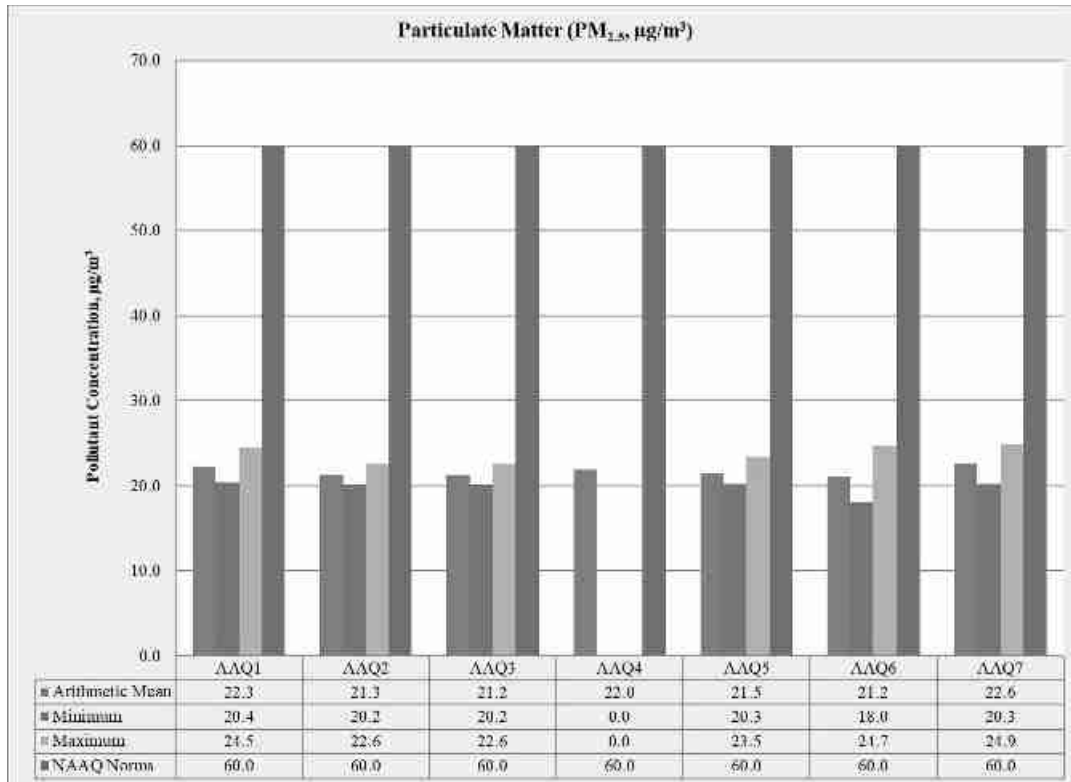


FIGURE 3.19: BAR DIAGRAM OF PARTICULATE MATTER PM₁₀

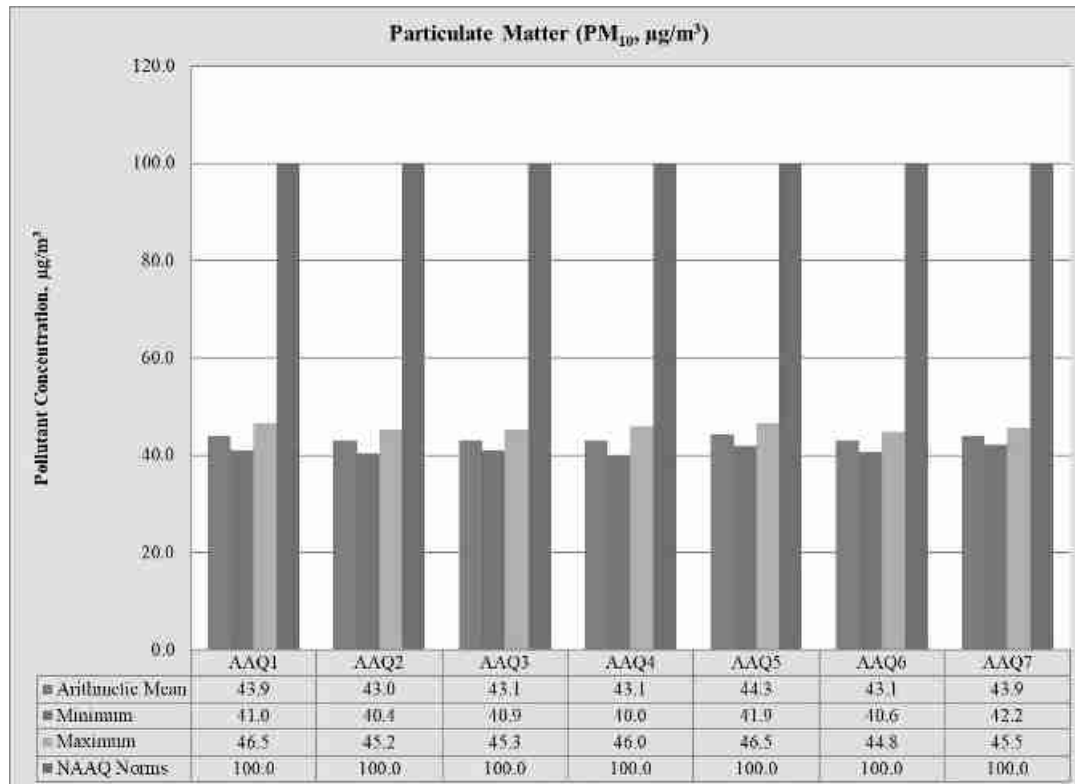


FIGURE 3.20: BAR DIAGRAM OF GASEOUS POLLUTANT SO₂

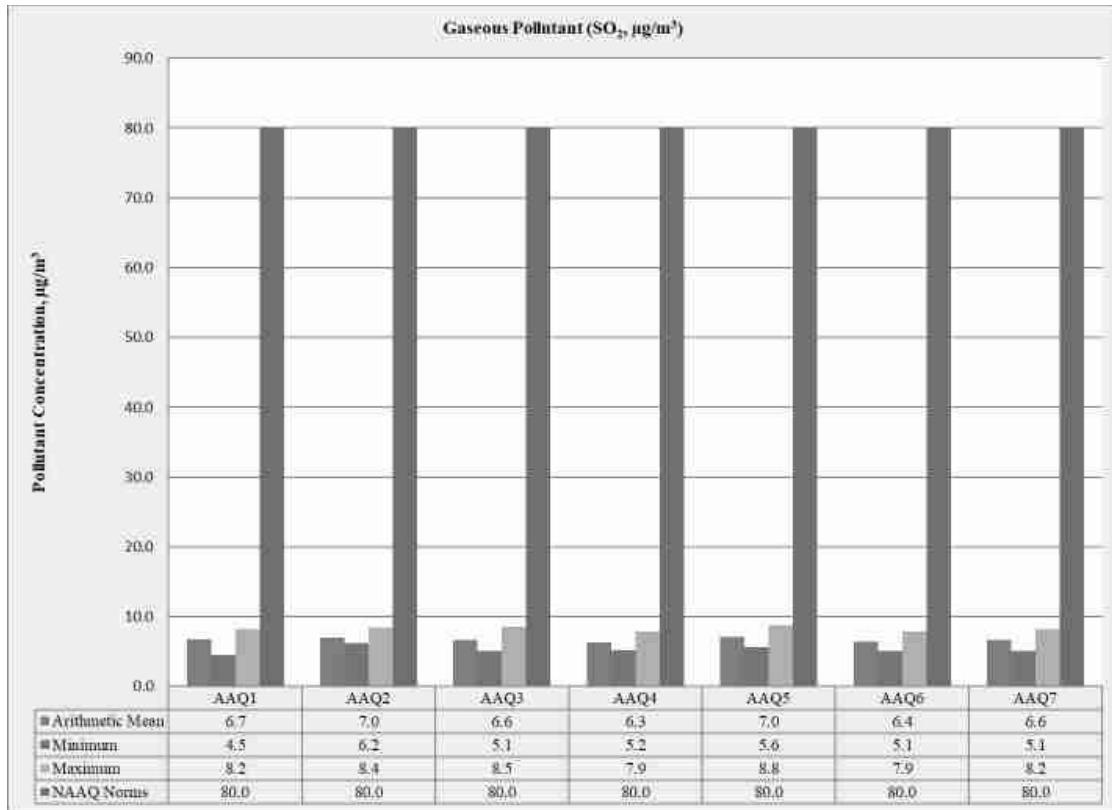
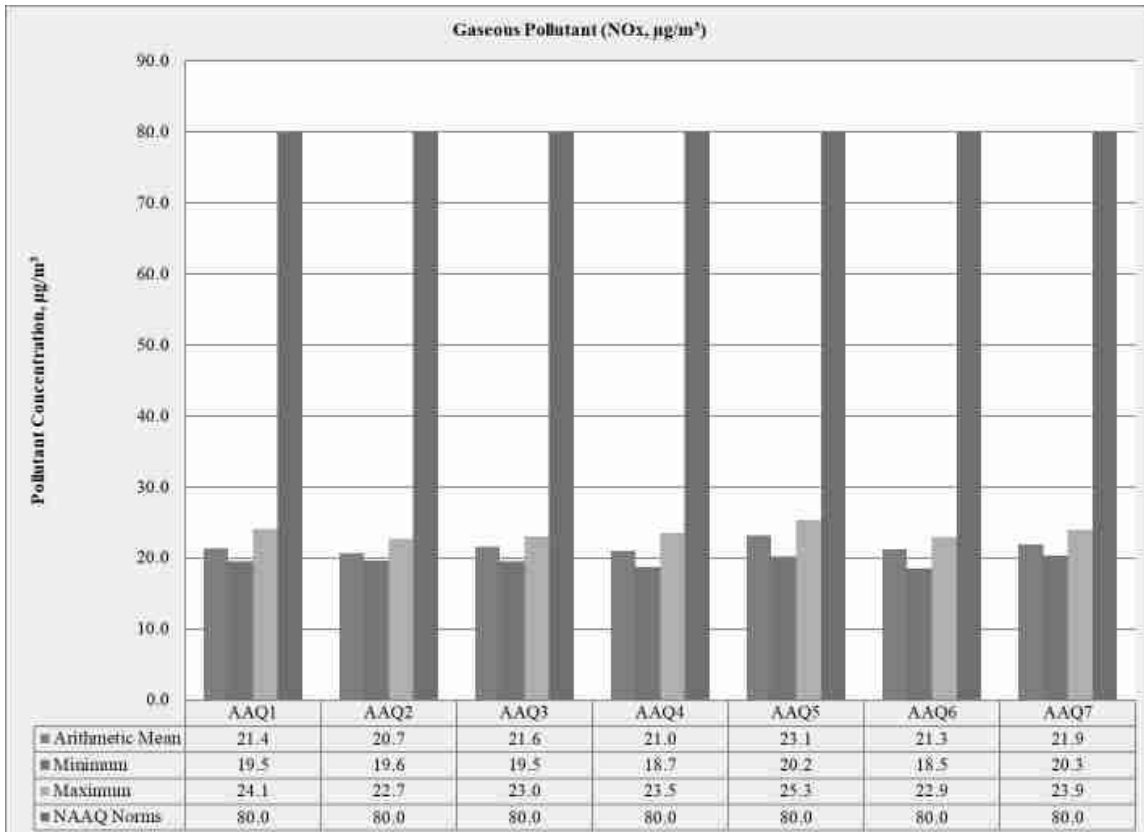


FIGURE 3.21: BAR DIAGRAM OF GASEOUS POLLUTANT NO_x



3.3.6 Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 41.8µg/m³ to 46.1 µg/m³, PM_{2.5} data ranges from 20.3 µg/m³ to 24.7 µg/m³, SO₂ ranges from 5.6µg/m³ to 8.4 µg/m³ and NO_x data ranges from 19.8 µg/m³ to 25.2 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.3.7 FUGITIVE DUST EMISSION –

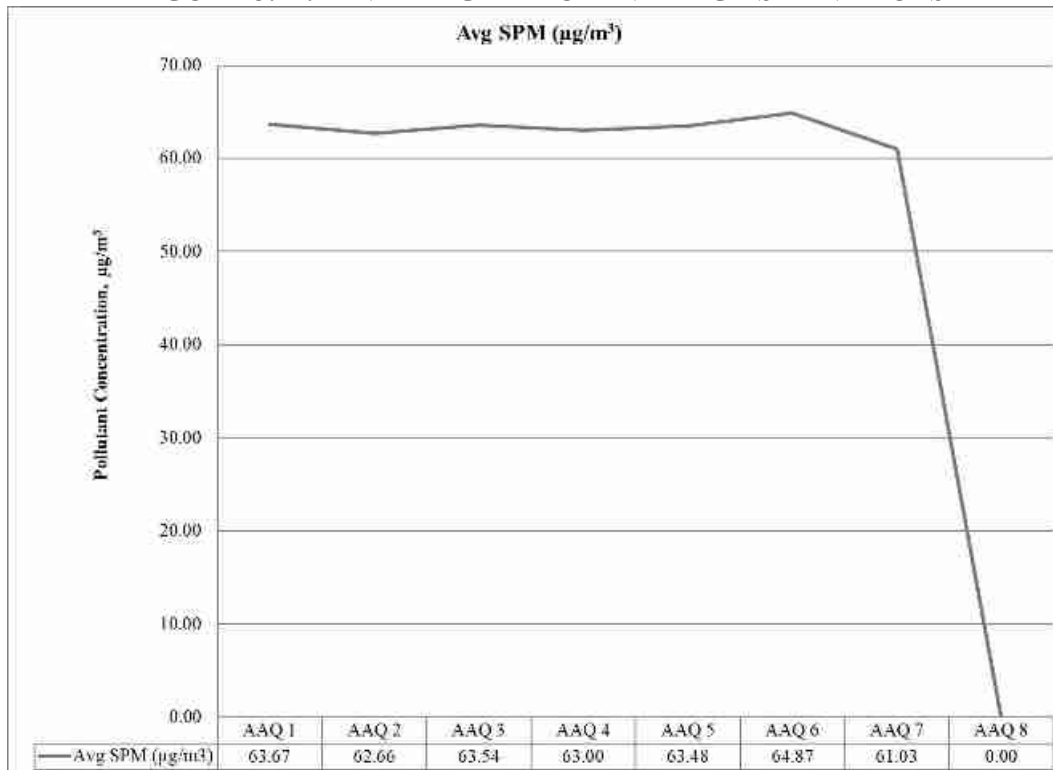
Fugitive dust was recorded at 7AAQ monitoring stations for 30 days average during the study period.

TABLE 3.20 AVERAGE FUGITIVE DUST SAMPLE VALUES

AAQ Locations	Avg SPM (µg/m ³)
AAQ 1	63.67
AAQ 2	62.66
AAQ 3	63.54
AAQ 4	63.00
AAQ 5	63.48
AAQ 6	64.87
AAQ7	61.03

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

FIGURE 3.22: LINE DIAGRAM OF AVERAGE SPM VALUES



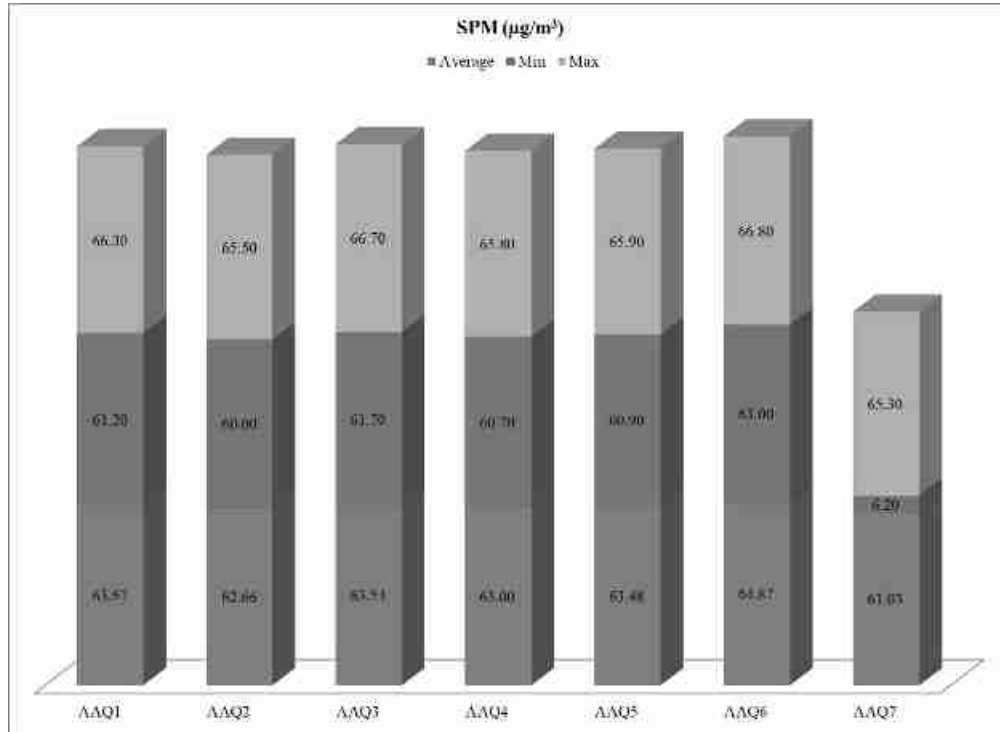
Source: Table 3.20

TABLE 3.21: FUGITIVE DUST SAMPLE VALUES IN $\mu\text{g}/\text{m}^3$

SPM ($\mu\text{g}/\text{m}^3$)	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Average	63.67	62.66	63.54	63.00	63.48	64.87	61.03
Min	61.20	60.00	61.70	60.70	60.90	63.00	6.20
Max	66.30	65.50	66.70	65.80	65.90	66.80	65.30

Source: Calculations from Lab Analysis Reports

FIGURE 3.23: BAR DIAGRAM OF SPM VALUES



Source: Table 3.20

3.4 NOISE ENVIRONMENT

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

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

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (7) locations. The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that it best suited the purpose and objectives of the study.

TABLE 3.22: DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Project Area	Core Zone	10° 5'23.58"N 78° 0'27.65"E
2	N-2	Near Existing Quarry	300m SE	10° 5'13.09"N 78° 0'36.51"E
3	N-3	Katchaikatti	1.2km West	10° 5'21.84"N 77°59'46.37"E
4	N-4	Thathakavundanpatti	5.0km SE	10° 3'26.75"N 78° 2'22.96"E
5	N-5	Viralipatti	3.8km NW	10° 6'4.96"N 77°58'27.77"E
6	N-6	Mettupatti	4.7km NE	10° 6'47.72"N 78° 2'38.29"E
7	N-7	Kattakulam	5.2km SW	10° 2'55.08"N 77°59'3.94"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

3.4.2 Method of Monitoring

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

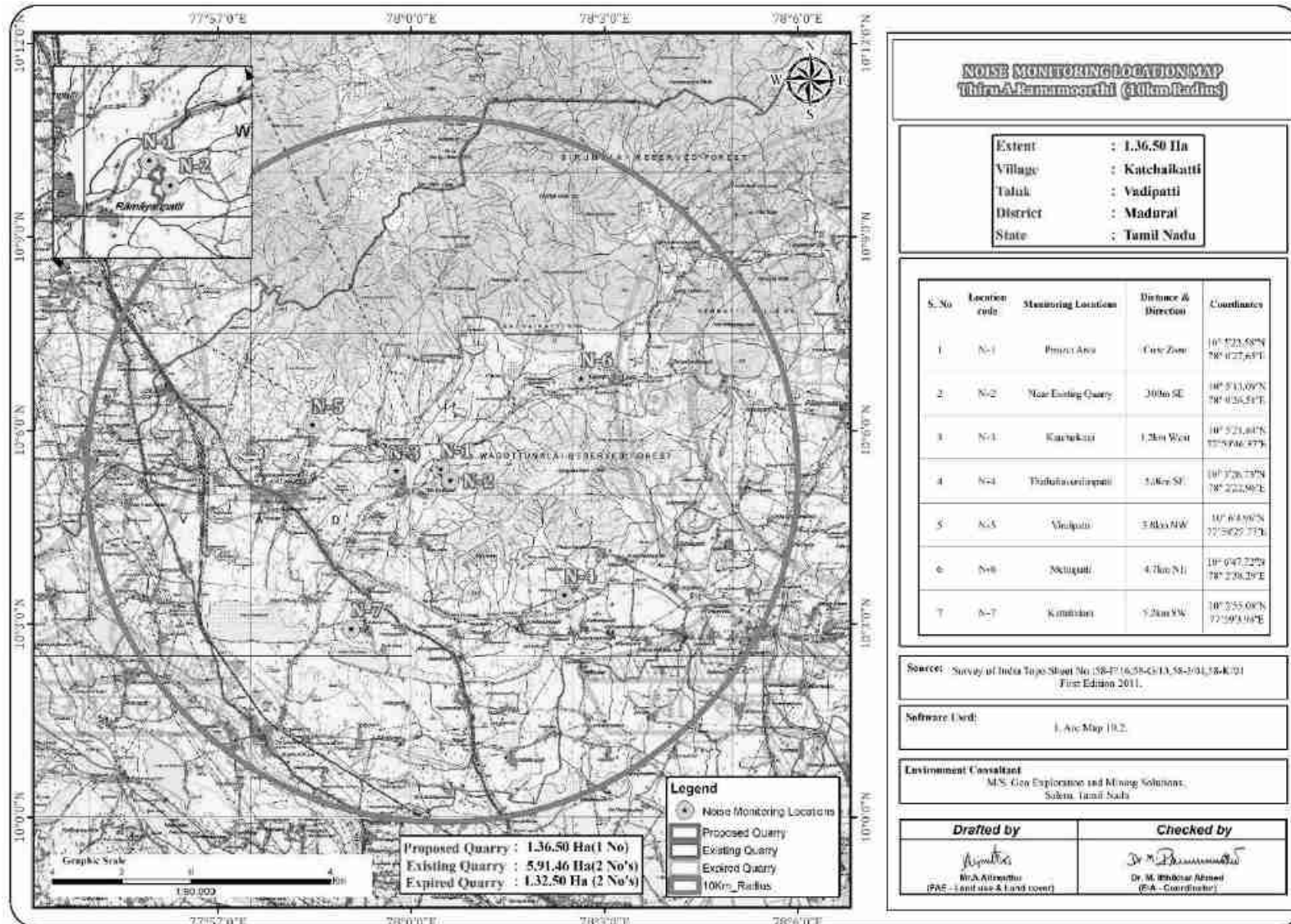
Measured noise levels, displayed as a function of time, is useful for describing the acoustical climate of the community. Noise levels recorded at each station with a time interval of about 60 minutes are computed for equivalent noise levels. Equivalent noise level is a single number descriptor for describing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

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

Where L = Sound pressure level at function of time dB (A)

T = Time interval of observation

FIGURE 3.24: NOISE MONITORING STATIONS AROUND 10 KM RADIUS



3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352)

An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.31

Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

TABLE 3.23: AMBIENT NOISE QUALITY RESULTS

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Project Area	43.1	37.2	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
2	Near Existing Quarry	40.5	38.1	Residential Day Time- 55 dB (A) Night Time- 45 dB (A)
3	Katchaikatti	39.2	36.5	
4	Thathakavundanpatti	38.2	37.4	
5	Viralipatti	39.2	36.7	
6	Mettupatti	37.1	35.9	
7	Kattakulam	36.5	34.2	

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

FIGURE 3.26: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE

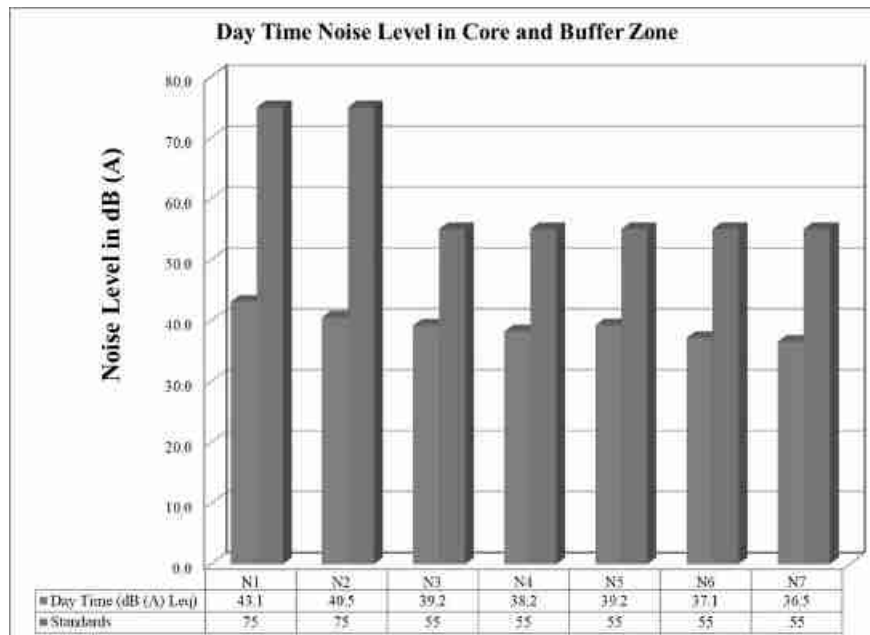
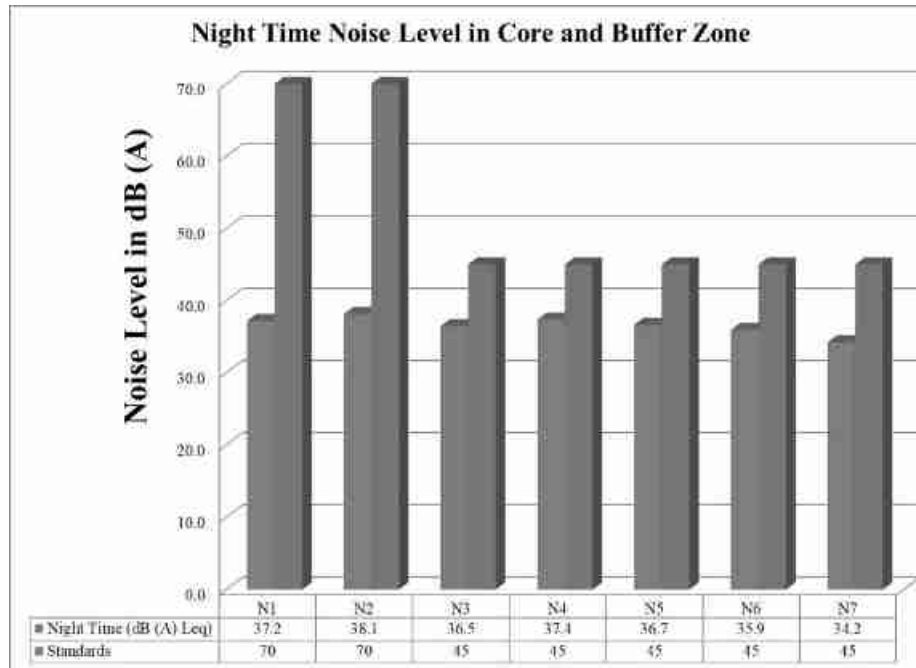


FIGURE 3.27: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE

3.4.4 Interpretation & Conclusion:

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 40.5-43.1 (A) Leq and during night time were from 37.2 - 38.1 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 36.5 to 39.2 dB (A) Leq and during night time were from 34.2 to 37.4 dB (A) Leq.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.5 ECOLOGICAL ENVIRONMENT

Ecology is a branch of science which dealing the relations and interactions between organisms and their environment. An ecological survey of the study area was conducted, particularly with reference to listing of species and assessment of the existing baseline ecological conditions in the study area. The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area. Data has been collected through extensive survey of the area with reference to flora and fauna. Information is also collected from different sources i.e. government departments such as District Forest Office, Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared

3.5.1. Study area Ecology

The core area extent of 1.36.5 Ha of has an impact on the diversity of flora and fauna of the surrounding area. But present work was carried out on the detailed study of the impacts of the Rough stone and gravel quarry on the ecology and biodiversity of the core lease area with the proper mitigation and sustainable management plan. The proposed mine lease area is situated on a plain terrain. The following methods were applied during the baseline study of flora, fauna and diversity assessment.

3.5.2. Objectives of Biological Studies

- a) Undertake an intensive field survey to assess the status of floral & faunal component in different habitats in the core and buffer areas of the project site.
- b) Identification and listing of flora and fauna which are important as per the Wildlife (Protection) Act 1972.
- c) Suggest Wildlife conservation (species specific/habitat specific) and management plan for the threatened (critically endangered & endangered species - schedule I) faunal species if any reported within the study area.
- d) To identify the impacts of mining on agricultural lands and how it affects.
- e) Proper collection of information about wildlife Sanctuaries/ national parks/ biosphere reserves of the project area.
- f) Devise management & conservation measures for biodiversity.

3.5.2.1. Floral Study

- The floral survey of the project area is based on field survey of the area.
- The local flora was identified by their morphological observation, such as the size, age and shape of the leaf, flowers, fruits, and their bark features of the stem, and also documented their habitat viz. Trees, Shrubs, Herbs, Grasses, Climbers etc.
- After surveying the core and the buffer areas, a detailed floral inventory has been compiled. A list of all plants from the study area was prepared and their habitats were recorded.
- Selection of sampling locations was made with reference to topography, land use, vegetation pattern, wind pattern, etc. The observations were taken on natural vegetation, roadside plantations, and non-forest areas (agricultural fields, in plain areas, village wasteland, etc.) for quantitative representation of different species.

3.5.3. Methodology of Sampling

Primary survey was conducted with established and accepted ecological methods in different habitats of study area. The field data collection mainly included biodiversity status assessment of different life forms habit of flora elements such as Trees, Shrubs, Climbers Herbs and Grass. Faunal diversity was assessed by inventorying the taxonomical groups like Mammals, Herpetofauna, birds and butterflies.

Nocturnal faunal species were searched by locating their calls during night time and by searching along the forest shrubs areas, dense dry bushes, below the stones, water bodies. During the study, to know more about the seasonal presence of flora and faunal species, information was obtained from local people and forest department.

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

Plot method is used in the floral documentation in the core and buffer zone. For trees (10x10-m), shrubs (5x5-m) and herbs (1x1-m) plots were taken. Birds and butterflies were mainly focused during faunal assessment, 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 desired distance, within a time span of one hour to 30 minutes was carried out in the proposed region. Bird species were recorded during the hours of peak activity. 0700 to 1100 Hrs and 1430 to 1730 Hrs (Bibby et al. 2000).

Direct observations and bird calls were used for bird documentation. Same transects were used for counting butterflies. Opportunistic observations were made for Amphibians, reptiles and ordinates. Presence of mammals was recorded by direct and indirect signs. All possible transects were taken for birds and butterflies. Birds and butterflies were classified into species level. Recorded bird species were identified to species level using standard books (Ali & Ripley 1987, Grimmett et al., 2016).

The secondary baseline data of flora and fauna has been complied through the following data sources:

1. Forest working plan
2. Schedule I to V: Indian Wildlife (Protection) Act, 1972
3. Vivek Menon, Indian Mammals: A Field Guide. Hachette Book publishing India Pvt.Ltd., India.
4. Daniel J.C. The Book of Indian Reptiles and Amphibians, Bombay Natural History Society., India.
5. Ali, S and Ripley. handbook of the Birds of India and Pakistan together with those of Nepal, Sikkim and Bhutan, Oxford University Press, Bombay.
6. ENVIS Centre on Wildlife and Protected Area.
7. Birds Life Data Zone
8. Ebird.org
9. Global Biodiversity Information Facility

3.5.3.1. Sampling

A stratified simple random sampling procedure was employed to obtain a sample from study area. The study area was further stratified in different land use/ecosystems.

3.5.3.2. Sampling Size

Keeping in mind both random sampling technique and covering all land use patterns for the study following sampling locations were chosen depending up on the area of the proposed site.

3.5.3.3. Timing of Study

The study was carried out during morning and evening hours, to cover the different activity phases for important species such as time resting, feeding, hunting, and daily movements.

3.5.3.4. Observations from Sampling

The various observations relating to flora and fauna species are discussed in detail below, in separate sections.

3.5.3.5. Field Equipment's/ References

Following tools/equipment were used for conducting phytosociological study.

- Ballpoint pen, Field bags, Field notebooks, field shoes, gloves, GPS, Measuring tapes and scales, Plant cutters, packet lens, ropes etc.
- Canon Mark III Camera with 50-500mm lens– Snap shots taken
- Leica Binoculars (8x 20) to spot/identify species
- IUCN Red Data Book – <https://www.iucnredlist.org/species>

Ornithological/Entomological/Herpetological/Mammalian catalogues and pictorial descriptions from various authors and websites are followed for species identification.

3.5.4. Part I Field Sampling Techniques (Fauna Sampling)

3.5.4.1. Transect walk – Birds

Eight no transect lines with varying length (100m-300m) and fixed width (2m) were laid which cuts through the core and buffer areas of proposed site. The transect surveys were conducted from 0700 to 1100Hrs and 1430 to 1730Hrs (Bibby et al. 2000). All avifauna found along these transects were recorded for analysing the data. Counts were conducted while there is no heavy rain, mist or strong wind.

3.5.4.2. Modified Pollard Walk – for Butterflies

The Modified Pollard Walk (Pollard 1977, 1993, Walpole 1999) using fixed width transect walk method were employed to investigate butterfly spatial distribution, diversity and abundance at the different survey sites.

3.5.4.3. Visual Encounter Survey (VES) - reptiles and Amphibians

VES is a time-constrained sampling technique (Campbell and Christman, 1982; Corn and Bury, 1990). It needs a systematic search through an area or habitat for a prescribed time period (Campbell and Christman, 1982). The result of VES is measured against the time spent on search. VES technique is one of the simplest methods, and an appropriate technique for both inventory and monitoring Herpetofauna (Heyer et al. 1994).

3.5.4.4. Observational methods- Mammals

For the purpose of recording mammals, we used two different observational techniques: (1) direct observations, and (2) recording of occurrences like holes, markings, scats, hairs, and spines (Menon 2003). For identification confirmations, photographs with a scale reference were used, and locations were recorded using a portable GPS device. Indigenous knowledge particularly that of the locals, was occasionally employed to compile a preliminary list of species and/or aid in the recognition of indicators.

3.5. Flora

The quadrat sampling technique was used for sampling vegetation. Sampling quadrats of regular shape of dimensions 10 × 10 m, 5 × 5 m and 1 × 1 m, were nested within each other and were defined as the units for sampling the area and measuring the diversity of trees, Shrubs and herbs respectively.

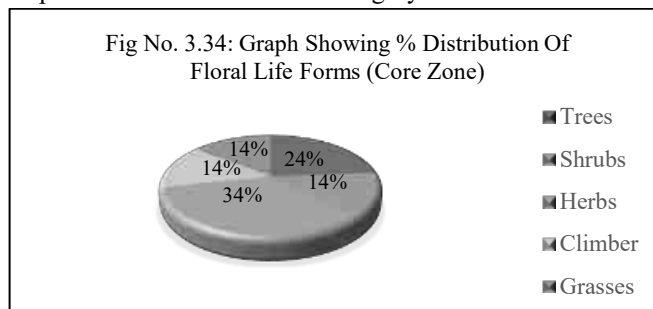
Table No: 3.53. Flora in the Core zone of lease area (Primary Survey)

Sl.No	English Name	Vernacular Name	Scientific Name	Family Name
Trees				
1.	Neem or Indian lilac	Vembu maram	<i>Azadirachta indica</i>	Meliaceae
2.	Velvet mesquite	Mullu maram	<i>Prosopis juliflora</i>	Fabaceae
3.	Asian Palmyra palm	Panai maram	<i>Borassus flabellifer</i>	Arecaceae
4.	Indian plum	Elanthai maram	<i>Ziziphus mauritiana</i>	Rhamnaceae
5.	Coconut	Thennai maram	<i>Cocos nucifera</i>	Arecaceae
Shrubs				
6.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae
7.	West Indian Lantana	Unni chedi	<i>Lantana camara</i>	Verbenaceae
8.	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae
Herbs				
9.	Indian nettle	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae
10.	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae
11.	Devil 's thorn	Nerunji	<i>Tribulus terrestris</i>	Zygophyllales
12.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
13.	Pignut	Nattapoochedi	<i>Hyptis suaveolens</i>	Lamiaceae
14.	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae
15.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae
Climber				
16.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae
17.	Rosary Pea	Gundumani	<i>Abrus precatorius</i>	Fabaceae
18.	Ivy gourd	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae
Grasses				
19.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
20.	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae
21.	Great brome	Thodappam	<i>Bromus diandrus</i>	Poaceae

3.5.1. Flora Composition in the Core Zone (Primary Survey)

Core zone flora sampling was conducted between 8.00 am to 10.30 am in three locations. The proposed mine lease area is situated on a plain terrain. we used with quadrat sampling methods. Taxonomically a total of 21 species belonging to 13 families have been recorded from the core mining lease area. Based on the habitat classification of the enumerated plants the majority of species were Herbs 7 followed by Trees 4, Grasses 3, Climbers 3 and Shrubs 3. Details of flora with the scientific name were mentioned in Table No. 3.53. The result of

the core zone of flora studies shows that Fabaceae and Poaceae are the main dominating species in the study area mentioned in Table No.3.53. No species found as threatened category



The trees surveys were conducted around 300m radius from the proposed project site. This is the standard scientific method followed by various workers in respect of phytosociological studies (Cottom and Curtis 1956; Ralhan et al. 1982; Saxena and Sing 1982; Nayak et al. 2000; Lu et al. 2004; Nautiyal 2008). While sampling, circumference at breast Height (CBH) of tree species was measured at 1.37m from ground level, along with the name of the species, phenology (flowering, fruiting, and flushes), and uses. After surveying areas, a detailed trees inventory has been compiled. A list of all plants from the study area was prepared and their habitats were recorded. The species of trees were documented during this base line survey. The dominant plant species growing in this area were *Azadirachta indica* *Prosopis juliflora*, etc. Please refer the Table No.3.54.

Table No: 3.54. Tree survey around 300m radius from the proposed project site

S.No	English Name	Vernacular Name	Scientific Name	No of trees
Trees				
1.	Acacia Nilotica	Karuvelammaram	Vachellianilotica	4
2.	Mesquite	Mullumaram	Prosopis juliflora	33
3.	Neem	Vembu	Azadirachta indica	27
4.	Asian Palmyra palm	Panai maram	Borassus flabellifer	6
5.	Bitter Albizia	Arappu Tree	Albizia amara	4
6.	Coconut	Thennai maram	Cocos nucifera	60

(Sources: Species observation in the field study)

Table No: 3.55. Flora in Buffer Zone of Katchaikatti Village, Rough stone and gravel quarry (Primary data & Secondary data)

Sl.No	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type *(E,M,EM)
Trees					
1.	Neem or Indian lilac	Vembu	Azadirachta indica	Meliaceae	M
2.	Common fig	Athi Maram	Ficus Carica	Anacardiaceae	EM
3.	Frywood	Vaagai	Albizia lebbek	Mimosaceae	M
4.	Indian plum	Elanthai maram	Ziziphus mauritiana	Rhamnaceae	EM
5.	Mango	Manga	Mangifera indica	Anacardiaceae	E
6.	Oil cake tree	Wunja	Albizia amara	Fabaceae	M
7.	Chinaberry	Malai vembu	Melia azedarach L	Meliaceae	M
8.	Velvet mesquite	Mullu maram	Prosopis juliflora	Fabaceae	M
9.	Indian rosewood	Shisham	Dalbergia sissoo	Fabales	M
10.	Madras thorn	Kudukapuli	Pithecellobium dulce	Fabaceae	EM
11.	Portia tree	Poovarasam	Thespesia Populnea	Malvaceae	E
12.	Royal poinciana	Cemmayir Konra	Delonix regia	Fabaceae	M
13.	Lemon	Ezhumuchoipalam	Citrus lemon	Rutaceae	EM
14.	Jamun Fruit Plant	Naval maram	Syzygium cumini	Myrtaceae	EM
15.	Gum arabic tree	Karuvelam	Vachellia nilotica	Fabaceae	E
16.	Kassod Tree	ManjalKonrai	Cassia siamea	Fabaceae	M
17.	Asian Palmyra palm	Panai maram	Borassus flabellifer	Arecaceae	E
18.	Bamboo	Moongil	Bambusoideae	Poaceae	E
19.	Teak	Thekku	Tectona grandis	Verbenaceae	E
20.	Indian mulberry	Nuna maram	Morinda tinctoria	Rubiaceae	E
21.	Banyan	Alai	Ficus benghalensis	Moraceae	E
22.	Cashew	Munthiri	Anacardium occidentale	Anacardiaceae	EM
23.	Coconut	Thennai maram	Cocos nucifera	Arecaceae	EM
24.	Horsetail She-oak	Savukku maram	Casuarina equisetifolia	Casuarinaceae	E
25.	Eucalyptus	Thailam maram	Eucalyptus tereticornis	Myrtaceae	M
26.	Creamy peacock flower	Perungondrai	Delonix elata	Fabaceae	M
27.	Pongamia pinnata	Pongam	Millettia pinnata	Fabaceae	M
28.	Indian bael	Vilvam	Aegle marmelos	Rutaceae	E
29.	Indian gooseberry	Nelli	Phyllanthus emblica	Phyllanthaceae	EM
30.	Guava	Koyya	Psidium guajava	Myrtaceae	EM
31.	Tamarind	Puliyamaram	Tamarindus indica	Legumes	EM
32.	Drumstick tree	Murunga maram	Moringa oleifera	Moringaceae	EM

33.	Sugar apple	Sitapalam	Annona squamosal	Annonaceae	EM
34.	Papaya	Pappali maram	Carica papaya L	Caricaceae	EM
35.	Banana tree	Vazhaimaram	Musa acuminata	Musaceae	EM
36.	Jack fruit	Palamaram	Artocarpus heterophyllus	Moraceae	E
Shrubs					
1.	Lantana	Unnichi	Lantana camara	Verbenaceae	M
2.	Night shade plan	Sundaika	Solanum torvum	Solanaceae	EM
3.	Castor oil plant	Amanakku	Ricinus communis	Euphorbiaceae	M
4.	Thorn apple	Oomathai	Datura stramonium	Solanaceae	E
5.	Rough cocklebu	Ottarachedi	Xanthium strumarium	Asteraceae	M
6.	Triangular spruge	Chaturakalli	Euphorbia antiquorum	Euphorbiaceae	NE
7.	Indian jujube	Elanthai	Ziziphus mauritiana	Rhamnaceae	M
8.	Coffee senna	Kattuttakarai	Senna occidentalis	Fabaceae	M
9.	Rosy Periwinkle	Nithyakalyani	Cathranthus roseus	Apocynaceae	M
10.	Milk Weed	Erukku	Calotropis gigantea	Apocynaceae	M
11.	Avaram	Avarai	Senna auriculata	Apocynaceae	M
12.	Chinese chastetree	Nochi	Vitex negundo	Lamiaceae	M
13.	Indian mallow	Thuthi	Abutilon indicum	Malvaceae	M
14.	Indian Oleander	Arali	Nerium indicum	Apocynaceae	M
15.	Shoe flower	Chemparuthi	Hibiscu rosa-sinensis	Malvaceae	EM
16.	Puriging nut	Kattamanakku	Jatropha curcas	Euphorbiaceae	EM
17.	Columnar Cactus	Sappathikalli	Cereus pterogonus	Cactaceae	M
18.	Bush Morning Glory	Neyvelik Kattamanakku	Ipomoea carnea	Convolvulaceae	E
19.	Century plant	Anaikathalai	Agave americana	Asparagaceae	M
20.	Jackal jujube	Soorai pazham	Ziziphus oenopolia	Rhamnaceae	M
21.	Tiger nail	Eli verandi	Martynia annua	Martyniaceae	M
22.	Peacock Flower	Mayil Kontai	Caesalpinia pulcherrima	Fabaceae	M
23.	Water spinach	Nalikam	Ipomoea aquatica	Convolvulaceae	E
24.	Cassava	Maravalli kizhangu	Manihot esculenta	Euphorbiaceae	EM
25.	Hopbush	Virali	Dodonaea viscosa	Sapindaceae	E
26.	Paper flower	Kahitha poo	Bougainvillea glabra	Nyctaginaceae	M
27.	Datura metel	Uumaththai	Datura metel	Solanaceae	NE
Herbs					
1.	Coat buttons	Thatha poo	Tridax procumbens	Asteraceae	M
2.	Eggplant	Kathrikkai	Solanum melongena	Solanaceae	EM
3.	Aloe barbadensis	Katrazhai	Aloe vera	Asphodelaceae	M
4.	Mountain knotgrass	Thengaipoo kirai	Aerva lanata	Amaranthaceae	M
5.	Prickly chaff flower	Nayuruv	Achyranthes aspera	Amaranthaceae	M

6.	Bindii	Nerunchi	Tribulus terrestris	Zygophyllaceae	M
7.	Fish poison	Kolinchi	Tephrosia purpurea	Fabaceae	M
8.	Ban Tulsi	Melakai poondu	Croton bonplandianus	Euphorbiaceae	
9.	Commelina benghalensis	Kanavazha	Commelina benghalensis	Commelinaceae	M
10.	Asthma-plant	Amman pacharisi	Euphorbia hirta	Euphorbiaceae	EM
11.	Indian doab	Arugampul	Cynodon dactylon	Poaceae	EM
12.	Spiny amaranth	Mullu keerai	Amaranthus spinosus	Amaranthaceae	M
13.	Chilli	Milakai	Capsicum annum	Solanaceae	M
14.	Flannel Weed	Sida mutti	Sida cordifolia	Malvaceae	M
15.	Indian Copperleaf	Kuppaimeni	Acalypha indica	Euphorbiaceae	EM
16.	Marsh barbel	Neermulli	Hygrophila auriculata	Acanthaceae	M
17.	Asian spiderflower	Naaikaduku	Cleome viscosa L	Cleomaceae	M
18.	Tomato	Thakkali	Solanum lycopersicum	Solanaceae	EM
19.	White dammar	Mookutipoondu	Vicoa indica	Asteraceae	M
20.	Cleome viscosa	Nai kadugu	Celome viscosa	Capparidaceae	EM
21.	Bindii	Nerunji mullu	Tribulus terrestris	Zygophyllaceae	M
22.	Bara Gokhru	Yanainerunjil	Pedaliium murex	Pedaliaceae	M
23.	Digeria muricata	Thoiya keerai	Digeria muricata	Amaranthaceae	EM
24.	False daisy	Karisalankanni	Eclipta alba	Asteraceae	EM
25.	Sessile Joyweed	Ponnakanni	Alternanthera sessilis	Amaranthaceae	EM
26.	Pignut	Nattapoochedi	Hyptis suaveolens	Lamiaceae	EM
27.	Field beans	Avarai	Hyacinth Beans	Fabaceae	EM
28.	Common leucas	Thumbai	Leucas aspera	Lamiaceae	EM
29.	Holy basil	Thulasi	Ocimum tenuiflorum	Lamiaceae	EM
30.	Malabar catmint	Pei veratti	Anisomeles malabarica	Lamiaceae	M
31.	Coat buttons	Thatha poo	Tridax procumbens	Asteraceae	M
32.	Indian mint	Karpura valli	Coleus amboinicus	Lamiaceae	M
33.	Aloe barbadensis	Katrazhai	Aloe vera	Asphodelaceae	EM
34.	Europeanblack nightshade	Manathakkali	Solanumnigrum	Solanaceae	EM
35.	Bright eyes	Nithiyakalyani	Catharanthus roseus	Apocynaceae	M
36.	Carrot grass	Parttiniyam	Parthenium hysterophorus	Asteraceae	-
Climber/Creepers					
1.	Stemmed vine	Perandai	Cissus quadrangularis	Vitaceae	EM
2.	Rosary Pea	Gundumani	Abrus precatorius	Fabaceae	EM
3.	Ivy gourd	Kovai	Coccinia grandis	Cucurbitaceae	EM
4.	Balloon plant	Mudakathan	Cardiospermum halicacabum	Sapindaceae	EM
5.	Bitter apple	Peikkumatti	Citrullus colocynthis	Cucurbitaceae	M

6.	Butterfly pea	Sangu poo	Clitoria ternatea	Fabaceae	M
7.	Betel	Vettilai	Piper betle	Piperaceae	EM
8.	Pointed gourd	Kovakkai	Trichosanthes dioica	Cucurbitaceae	M
9.	Wild bitter	Pavarkai	Momordica charantia	Cucurbitaceae	M
10.	Bottle Guard	Sorakkai	Lagenaria siceraria	Cucurbitaceae	EM
11.	White pumpkin	Poosanaikkaai	Cucurbitaceae	Cucurbitaceae	M
12.	Wild jasmine	Malli	Jasminum augustifolium	Oleaceae	EM
13.	Nut grass	Korai	Cyperus rotandus	Poaceae	EM
14.	Cucumis maderaspatanus	Musumusukkai	Mukia maderaspatana	Cucurbitaceae	M
Grasses					
1.	Eragrostis	Pullu	Eragrostis ferruginea	Poaceae	E
2.	Windmill grass	Chevvarakupul	Chloris barbata	Amaranthaceae	NE
3.	Great brome	Thodappam	Bromus diandrus	Poaceae	E
4.	Jungle rice	Kuthirai vaalKattu arusi	Echinochloa colona	Poaceae	NE
5.	Mauritian Grass	Moongil pul	Apluda mutica	Poaceae	NE
6.	Needle Grass	Thodappam	Aristida adscensionis	Poaceae	E
7.	Eragrostis	Pullu	Eragrostis ferruginea	Poaceae	E

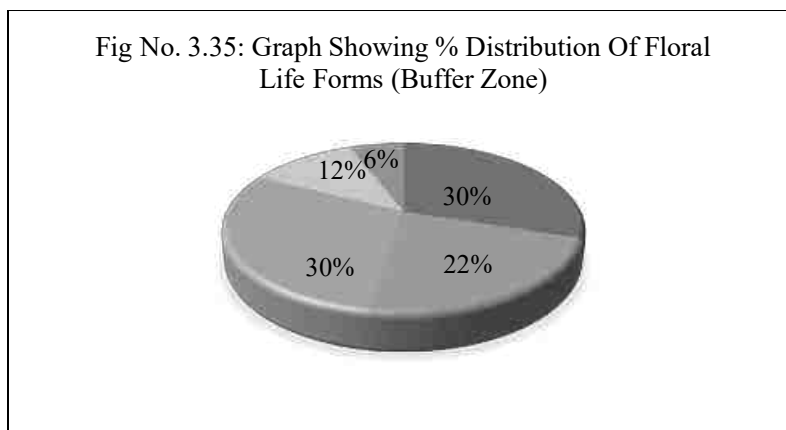
*E- Economical, M- Medicinal, EM- Both Economical and Medicinal, NE- Not evaluated

3.5.2. Flora Composition in the Buffer Zone (Primary data & Secondary data)

Buffer zone flora sampling was conducted between 10.30 am to 1.00 pm in eight different locations in 10 km radius as per the ToR. The most important and widely used methods for a general assessment is belt transect/quadrade methods. The study area was divided according to habitat types followed the random sampling methods in the selected area. For plant biodiversity study in the ecosystems, the quadrade methods were followed. The proposed project site there are 120 species in the buffer zone study area in total, based on records. The floral (120) varieties among them Trees 36, Herbs 36, Shrubs 27, Climbers/ Creepers 14 and Grasses 7 were identified. The result of the buffer zone of flora studies shows that Fabaceae and Cucurbitaceous, Euphorbiaceae is the main dominating species in the study area mentioned in Table No.3.55. There are no impacts due to this mining activity. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. 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. A list of floral species has been prepared based on 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 No 3.56 and their % distribution is shown in Figure No 3.35.

Table No: 3.56: Number of floral life forms in the Study Area

S. No	Plant Life Form	Number of Species
1	Trees	36
2	Shrubs	27
3	Herbs	36
4	Climber/ Creeper	14
6	Grasses	7
Total No. of Species		120



3.5.3. Species Diversity

Shannon Diversity Index has been used for estimating the diversity among the eight sampling sites to highlight the most diverse site, and calculate the Shannon Wiener diversity index of each site using the formula:

$$H = - \sum P_i \ln P_i$$

Where, H' = Shannon index of diversity

S= Number of individuals of one species

$$P_i = \frac{\text{Number of individuals of one species}}{\text{Total number of all individuals in the sample}}$$

ln: is the logarithm to the base e-[

To estimate floral diversity, quadrat samplings were carried out at 8 locations where 10 quadrates were laid down each of 10×10 m, 5×5 m, and 1×1 m in size at each location. Sampling locations were randomly selected on plots of land where agriculture was not practiced or orchard or plantation was not present. Biodiversity value following Shannon Diversity Index was found to be:

Table No: 3.57 Floral Diversity

Sample Location	Shannon diversity index	Evenness	Richness (number of species)	Total number of individuals	Average population size
Location-1	3.03	0.96	57	112	2.24
Location-2	3.53	0.95	43	61	1.52
Location-3	3.52	0.94	40	70	1.76
Location-4	3.22	0.94	30	52	1.23
Location-5	3.34	0.96	33	46	1.41
Location-6	3.34	0.96	33	54	1.63
Location-7	3.60	0.97	40	53	1.32
Location-8	3.20	0.95	28	36	1.37

3.5.3.1. Interpretation

The Shannon Diversity Index (H) of the vegetation that exists in the project profile area (an assemblage of trees/shrubs and herbs) ranges from 3.03 to 3.60. The values were found highest around the location -7. Three locations were selected in and around the floral diversity shows more than average values because of the presence of ground cover. Tree diversity was found to be dominated by a few tree and herbs species such as *Acacia nilotica*, and *Propropis juliflora*, *Calotropis gigantea*, No RET (Rare, Endangered, and Threatened) floral species were recorded from the vegetational survey.



A. *Jatropha curcas*



B. *Ocimum tenuiflorum*



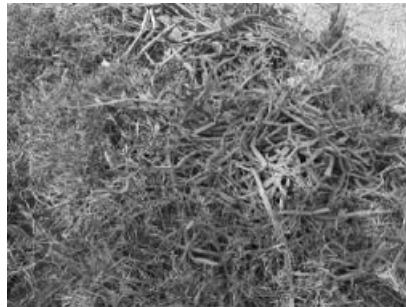
C. *Mangifera indica*



D. *Ricinus communis*



E. *Momordica charantia*



F. *Cissus quadrangularis*



G. *Eucalyptus tereticornis*



H. *Euphorbia antiquorum*



I. *Parthenium hysterophorus*



J. *Cocos nucifera*



K. *Tribulus terrestris*



L. *Coccinia grandis*



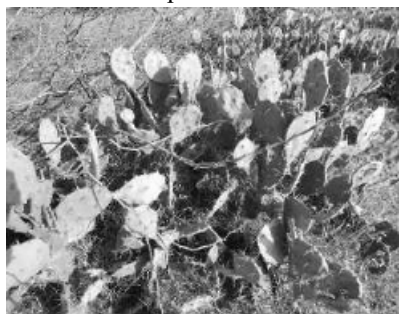
M. *Tridax procumbens*



N. *Tecoma stans*



O. *Vitex negundo*



P. *Opuntia dillenii*



Q. *Pithecellobium dulce*



R. *Prosopis juliflora*



S.Borassus flabellifert

T.Lantana camara

U.Calotropis gigantea

Fig No: 3.36. Flora species observation in the Buffer zone area**3.5.4. Economically important Flora of the study area**

Agricultural crops: The main agricultural crops are maize and paddy. The locals also cultivate a variety of vegetables and fruits, including brinjal, drumsticks, onion, and coriander, as well as fruits like banana, papaya, mangoes, and guava.

Medicinal species: Several more medicinal plants commonly found in wastelands are also present in the near area. Azadirachta indica (Neem), Ocimum tenuiflorum (Holy basil), etc., and others are common medicinal plants in the area.

Rare and endangered floral species: There are no rare or endangered or threatened (RET) species in the study area. During the vegetation survey, there are no species that are endangered or threatened under IUCN (International Union for Conservation of Nature and Natural resources) guidelines.

3.5.5. The vegetation in the RF / PF areas, ecologically sensitive areas

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves/(existing as well as proposed) within 10 km of the mine lease area. There are few reserve forest located in study area, Veguthumalai R.F located about 220m on northeast followed by Sirumalai R.F 4.5 km-N and Sembathi R.F 7.2km-NE. Hence submission of clearance from the National Board of Wildlife does not arise. No Wildlife Sanctuary in the study area. In addition, No Biosphere Reserves, Wildlife corridors, or, Tiger / Elephant reserves within 10 km of the project area. No protected (PF) forests either in the mine lease area or in the buffer zone. Thus, no forest land is involved in any manner.

There are no protected or ecologically sensitive areas such as National parks or Important Bird Areas (IBAs), or Wetlands or migratory routes of fauna or water bodies or human settlements within the proposed mine lease area. There are no Biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thus, the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive. It is away from the proposed project site.

Thus, no forest land is involved in any manner. There are no impacts due to this mining activity. There are neither forests nor forest dwellers nor 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.

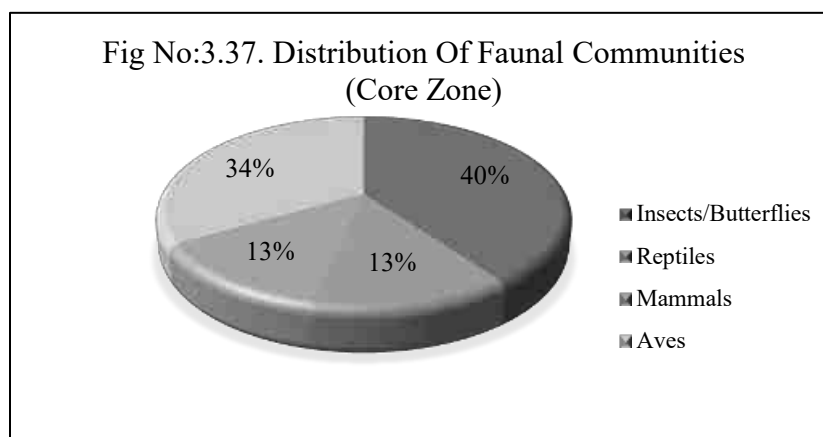
3.6. Fauna**3.6.1. Fauna Composition in the Core Zone (Primary data)**

Core zone fauna samplings were conducted between 6.00 am to 8.00 am in three locations. A total of 10 varieties of species were observed in the Core zone of Katchaikatti village, Rough stone and gravel quarry (Table No.3.59) among them numbers of Insects/ Butterflies 6, Reptiles 2, Mammals 2, and Avian 5. A total of 15 species have been recorded from the core mining lease area. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species and 14 species are under Schedule IV according to the Indian Wildlife Act 1972. A total of 5 species of bird were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable, and endemic species were observed. Details of fauna in the core zone with the scientific name were mentioned in Table No. 3.58.

Table No: 3.58. Fauna in the Core zone of lase area, Rough stone and gravel quarry (Primary data)

SI.No	Scientific Name	Common Name	IUCN Red List data
Insects/Butterflies			
1.	Agriansp	Dragonfly	-
2.	Musca domestica	House fly	-
3.	Danaus genutia	Common Tiger	NL
4.	Danaus genutia	Striped Tiger	LC
5.	Apisindica	Honey Bee	-
6.	Hamitermes silvestri	Termite	LC
Reptiles			
1.	Calotes versicolor	Garden lizard	LC
2.	Mabuya carinatus	Common skink	LC
Mammals			
1.	Mus booduga	Indian Field Mouse	NL
2.	Herpestes javanicus	Asian Small Mongoose	LC
Aves			
1.	Acridotheres tristis	Common myna	LC
2.	Laniusexcubitor	Shikra	LC
3.	Corvussplendens	House crow	LC
4.	Eudynamys	Koel	LC
5.	Dicrurus macrocercus	Black drongo	LC

*NL- Not listed, LC- Least Concern



3.6.2. Fauna Composition in the Buffer Zone

As the animals, especially vertebrates move from place to place in search of food, shelter, mate or other biological needs, separate lists for core and buffer areas are not feasible however, a separate list of fauna pertaining to core and buffer zone are listed separately. There are few reserve forest located in study area, Veguthumalai R.F located about 220m on northeast followed by Sirumalai R.F 4.5 km-N and Sembathi R.F 7.2km-NE. As such there are no chances of occurrence of any rare or endangered or endemic or threatened (REET) species within the core or buffer area.

There are no Sanctuaries, National Parks, Tiger Reserve or Biosphere Reserve or Elephant Corridor or other protected areas within 10 km radius from core area. It is evident from the available records, reports, and circumstantial evidence that the entire study area including the core and buffer areas were free from any endangered animals. There were no resident birds other than common bird species such as, green bee eaters, Indian blue robin, Common Mynas, Black drongs, Crows, Woodpecker bird etc.

The list of Mammals (*directly sighted animals & Secondary data) is given in table No.3.59. The list of bird species recorded during field survey and literature from the study area is given in Table No 3.60. The list of reptilian species recorded during field survey and literature from the study area are given in Table No 3.61. The list of insect species recorded during field survey and literature from the study area are given in Table No 3.62. The list of Amphibian species recorded during the field survey and literature from the study area are given in Table No 3.67 and List of Butterflies identified from the project site and their conservation status is given in Table No.3.64. It is apparent from the list that none of the species either spotted or reported is included in Schedule I of the Wildlife Protection Act. Similarly, none of them comes under the REET category.

Taxonomically a total of 66 species were identified from the project site. Based on habitat classification the majority of species were Insects 5, followed by birds 24, Reptiles 8, Mammals 6, amphibians 3, and Butterflies 20. A total of 24 species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed. There are no impacts on nearby fauna species.

Dominant species are mostly birds and insects, and three was observed during the extensive field visit *Sphaerotheca breviceps*, *Euphlyctis hexadactylus*, *Bufo melanostictus*, There is no schedule I Species in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

**Table No: 3.59. List of Fauna & Their Conservation Status,
Mammals: (*directly sighted animals & Secondary data)**

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Funambulus palmarum</i>	Indian palm squirrel	LC
2.	<i>Mus booduga</i>	Indian Field Mouse	LC
3.	<i>Herpestes javanicus</i>	Asian Small Mongoose	LC
4.	<i>Lepus nigricollis</i>	Indian hare	LC
5.	<i>Rattus norvegicus</i>	Brown rat	LC
6.	<i>Lepus nigricollis</i>	Rabbit	LC

Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Table No: 3.60. Listed birds

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Bubulcus ibis</i>	Cattle Egret	LC
2.	<i>Saxicoloidesfulvicata</i>	Indian Robin	LC
3.	<i>Streptopeliachinensis</i>	Spotted Dove	LC
4.	<i>Accipiter badius</i>	Shikra	LC
5.	<i>Coraciasbenghalensis</i>	Indian Roller	LC
6.	<i>Anthusrufulus</i>	Paddyfield Pipit	LC
7.	<i>Nectarinia minima</i>	Small Sunbird	LC
8.	<i>Acridotherestrictis</i>	Common Myna	LC
9.	<i>Vanellusindicus</i>	Red-wattled Lapwing	-
10.	<i>Dicrurusmacrocerus</i>	Black Drongo	LC
11.	<i>Lonchurapunctulata</i>	Spotted Munia	LC
12.	<i>Dendrocittavagabunda</i>	Indian Treepie	LC
13.	<i>Corvussplendens</i>	House Crow	LC
14.	<i>Eudynamys</i>	Koel	LC
15.	<i>Psittacula krameni</i>	Rose ringed parakeet	LC
16.	<i>Dicrurus macrocerus</i>	Black drongo	LC
17.	<i>Corvus splendens</i>	House crow	LC
18.	<i>Alcedo atthis</i>	Small blue kingfisher	LC
19.	<i>Columba livia</i>	Rock pigeon	LC

20.	Cuculus canorus	Common Cukoo	LC
21.	Pycnonotus cafer	Red vented Bulbul	LC
22.	Milvus migrans	Black kite	LC
23.	Meropsorientalis	Small Bee-eater	LC
24.	Halcyon smyrnensis	White-breasted Kingfisher	LC

Not Evaluated (NE) Least Concern (LC) Near Threatened (NT) Endangered (E)**Table No: 3.61. List of Reptiles either spotted or reported from the study area.**

SI. No	Scientific Name	Common Name	IUCN Red List data
1.	Calotes versicolor	Oriental garden lizard	LC
2.	Hemidactylus flaviviridis	House lizards	NL
3.	Naja naja	Indian cobra	LC
4.	Vipera russeli	Russell's viper	NL
5.	Ahaetulla nasuta	Green vine snake	LC
6.	Ptyas mucosa	Rat snake	NL
7.	Bungarus caeruleus	Common krait	LC
8.	Basiliscus vittatus	Brown basilisk	LC

Table No: 3.62. List of insects either spotted or reported from the study area

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	Trithemis kirbyi	Scarlet rock glider	LC
2.	Pachydiplax longipennis	Blue dasher	LC
3.	Hieroglyphus sp	Grasshopper	LC
4.	Camponotus Vicinus	Ant	NL
5.	Ceratogomphus pictus	Dragonfly	-

Table No: 3.63. List of Amphibians either spotted or reported from the study area

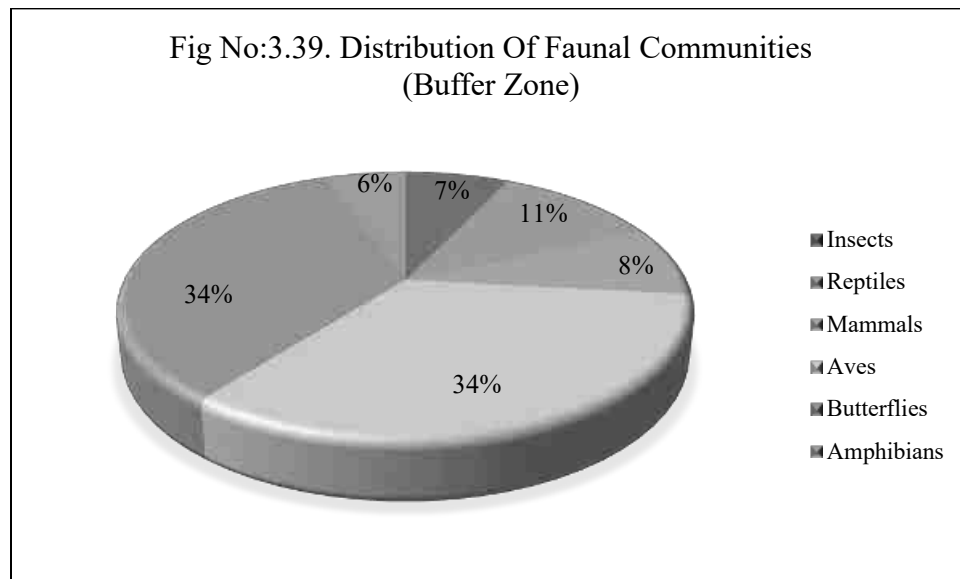
SI. No	Scientific Name	Common Name	IUCN Red List data
1.	Sphaerotheca breviceps	Indian Burrowing frog	LC
2.	Euphlyctis hexadactylus	Green pond frog	LC
3.	Bufo melanostictus	Indian Toad	LC

NT – Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Table No: 3.64. List of Butterflies identified from the project site and their conservation status

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	Danaus genutia	Striped Tiger	LC
2.	Danaus chrysippuschrysippus	Plain Tiger	LC
3.	Acraea terpsicore	Tawny Coster	LC
4.	Papiliopolytespolytes	Common Mormon	LC
5.	Papiliopolytesromulus	Common Mormon	LC
6.	Papiliodemoleusdemoleus	Lime Butterfly	LC
7.	Hypolimnasmisippus	DanaidEggfly	LC
8.	Junoniahierta	Yellow Pansy	LC
9.	Junonialemonias	Lemon Pansy	LC
10.	Hypolimnasmisippus	DanaidEggfly	LC
11.	Phalantaphalantha	Common Leopard	LC
12.	Zizulahlax	Tiny Grass Blue	LC
13.	Catochrysopsstrabo	Forget-Me-Not	LC
14.	Euchrysopscejeus	Gram Blue	LC

15.	Lampidesboeticus	Pea Blue	LC
16.	Euploea core	Common Crow	LC
17.	Melanitisledaleda	Common Evening Brown	LC
18.	Jamidescelenocelano	Common Cerulean	LC
19.	Evereslacturnus	Indian Cupid	LC
20.	Pachlioptaaristolochiae	Common Rose	LC



Livestock like cattle, buffalo, goat, poultry, duck and pig are reared for dairy products, meat, and egg and for agriculture purpose. Majority of cattle and buffalo are of local variety. Backyard poultry farms are mostly common in this area; however, some commercial poultry farms are also recorded in the study area.

Table No. 3.65: Description of Flora & Fauna

S. No	Type of Species	Name	Local Name
Flora			
1.	Endangered species	None	None
2.	Threatened species	None	None
3.	Near Threatened species	None	None
4.	Vulnerable species	None	None
Fauna			
5.	Endangered species	None	None
6.	Threatened species	None	None
7.	Near Threatened species	None	None
8.	Vulnerable species	None	None
9.	Migratory Corridors & Flight Paths	No corridors & flight paths	-
10.	Breeding & Spawning grounds	None	-
11.	Invasive Alien species	None	None



A. *Danaus chrysippus*



B. *Junonia iphita*



C. *Euploea core*



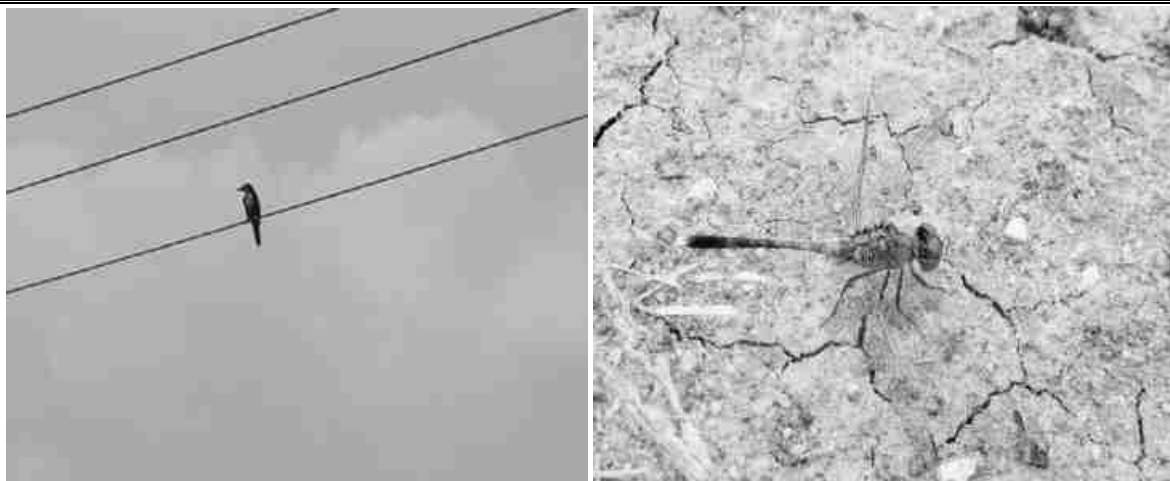
D. *Hypolimnasmisippus*



E. *Calotes versicolor*



F. *Dicurus macrocercus*

**G. Alcedo atthis****H. Pachydiplax longipennis**(Sources: Species observation in the field study)**Fig No: 3.39. Fauna species observation in the buffer zone area**

3.6.3. Aquatic Ecology

The study area has seasonal water bodies is located away from the proposed project site. Mining activities will not have an impact on aquatic ecosystems because no effluent discharge from the Rough stone and gravel quarry is planned. There are no natural perennial surface water bodies, such as marshes, rivers, streams, lakes, or agricultural sites, inside the mining lease area. There is no aquatic flora and, aquatic fauna. Hence, it does not harbour any significant aquatic life. Therefore, the project is not likely to affect the aquatic ecology. Aquatic weeds are found to be growing everywhere in 10 km radius area, in every water bog, pond, etc. Typha angustata can be found growing all along the drains of villages, small water-logged depressions, and agricultural fields lacking water but containing enough moisture to support its growth. And where water is present, Eichhornia crassipes has taken its roots and covers the entire water surface by its sprawl and invasion.

3.6.3.1. Objectives of Aquatic Studies

- Generating data through actual field collection in these locations over the study period.
- Impacts on aquatic fauna/flora
- Consulted with locals to obtain knowledge about aquatic flora and animals.

3.6.3.2. Macrophytes

The macrophytes observed within the study area are tabulated in Table No 3.66

Table No.3.66 Description of Macrophytes (Primary data & Secondary data)

Sl.No	Common Name	Scientific name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1.	Water hyacinth	<i>Eichornia crassipe</i>	Agayatamarai	NA
2.	Floating lace plant	<i>Aponogeton natans</i>	Kottikizhnagu	NA
3.	Blue water lily	<i>Nymphaea nouchali</i>	Nellambal	LC
4.	Sambu	<i>Typha angustifolia</i>	Narrowleaf cattail	LC
5.	Cross Grass	<i>Carex cruciata</i>	Koraipullu	NA
6.	Tall Flat Sedge	<i>Cyperus exaltatus</i>	Koraikizhangu	LC

Sources: Species observation in the field study

3.6.3.3. Aquatic Faunal Diversity

Amphibian species like the common Indian Burrowing frog, and Green pond frog, and etc. were sighted near the water bodies located in the study area.

Table No. 3.67. Amphibians Observed/Recorded from the Study Area& Secondary data

SI. No	Common Name/English Name	Scientific Name	Schedule list wildlife Protection act 1972
1.	Indian Burrowing frog	<i>Sphaerotheca breviceps</i>	Schedule IV
2.	Green pond frog	<i>Euphlyctis hexadactylus</i>	Schedule IV
3.	Indian Toad	<i>Bufo melanostictus</i>	Schedule IV

3.6.3.4. Other Aquatic Fauna

3.6.3.5. Fishes

The study area has low aquatic diversity, with few types of fish living. The species of fish reported during the primary visit are Rohu, Catla, Catfish, etc. Species of fish reported in the study area are given in Table No 3.67.

Table No 3.68. Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data

S.No	Common name	Scientific name	Family
1.	Ponithia	<i>Puntius sophore</i>	Cyprinidae
2.	Catla	<i>Catla Catla</i>	Cyprinidae
3.	Catfish	<i>Siluriformes</i>	-
4.	Rohu	<i>Labeo rohita</i>	Cyprinidae

3.10. Findings/Results

The assessment was carried out during the summer season. The inspection day was quite all right with respectable weather. The details of the flora and fauna observed are given below.

S.No	Ecological sensitive habitat	Direction and Distance from the project site
1.	National Parks/ Wildlife Sanctuary/ Biosphere reserves/ Elephant Reserve/ Any Other Reserve	Nil
2.	Reserved Forests	There are few reserve forest located in study area, Veguthumalai R.F located about 220m on northeast followed by Sirumalai R.F 4.5 km-N and Sembathi R.F 7.2km-NE.
3.	Wildlife Corridors & Routes	No notified wildlife corridors are present in 10 km vicinity.
4.	Wetlands / Water bodies	-
5.	Ramsar Site	Nil
6.	Important Bird Habitats	Nil
7.	Breeding/nesting areas of endangered species	Not present
8.	Mangroves	None

There are no critically endangered, endangered, vulnerable, and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

3.8. Conclusion

The observations and assessment of the overall ecological scenario involve details such as classification of Biogeographic zone, eco-region, habitat types, and land cover, distances from natural habitats, vegetation/forest types, and sensitive ecological habitats such as Wetlands sites, Important Bird areas, migration corridors of important wildlife etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, and wildlife species etc., and consulted and discussed with local people, from the villages, herders and farmers who inhabit close to the proposed project area.

Sources:

<https://avibase.bsc-eoc.org/checklist.jsp?region=INsetnma&list=howardmoore>

<https://www.ifoundbutterflies.org/taxonomy/term/6507>

<https://www.inaturalist.org/places/madurai>

<https://www.picturethisai.com/region/India-Tamil-Nadu-Madurai.html>

<https://www.forests.tn.gov.in/>

[Invasive Alien Species | IUCN](#)

[Global Biodiversity Information Facility](#)

3.6 SOCIO ECONOMIC ENVIRONMENT

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

It is expected that the Socio-Economic Status of the area will substantially improve because of this proposed project. As the proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area and, thus, improve their standard of living.

3.6.1 Objectives of the Study

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

- To study the socio-economic status of the people living in the study area of the proposed mining project.
- To assess the impact of the project on Quality of life of the people in the study area.
- To recommend Community Development measures needs to be taken up in the study Area.

3.6.2 Scope of Work

- To study the Socio-economic Environment of the area from the secondary sources;
- Data Collection & Analysis
- Prediction of project impact
- Mitigation Measures

3.6.3 District Profile

Madurai is a city in the Indian state of Tamil Nadu. Madurai is the administrative headquarters of Madurai district is a major city in the Indian state of Tamil Nadu. It is the cultural capital of Tamil Nadu and the administrative headquarters of Madurai District. As of the 2011 census, it was the third largest Urban agglomeration in Tamil Nadu

after Chennai and Madurai and the 44th most populated city in India. The district is bounded by Theni in the west, Sivaganga in the east, Dindigul in the north, Virudhunagar in the south and small parts of Tiruchirappalli in the northeast.

3.6.4 Study area:

KATCHAIKATTI VILLAGE

According to Census 2011 information the location code or village code of Katchiakatti village is 640723. Katchiakatti village is located in Vadipatti taluka of Madurai district in Tamil Nadu, India. It is situated 5km away from sub-district headquarter Vadipatti (tehsildar office) and 30km away from district headquarter Madurai. As per 2009 stats, Seminipatti is the gram panchayat of Katchiakatti village.

The total geographical area of village is 2402.35 hectares. Katchiakatti has a total population of 13,141 peoples, out of which male population is 6,552 while female population is 6,589. Literacy rate of katchiakatti village is 62.58% out of which 70.07% males and 55.12% females are literate. There are about 3,350 houses in katchiakatti village. Pincode of katchiakatti village locality is 625218. Vadipatti is nearest town to katchiakatti village for all major economic activities.

TABLE 3.41: RAJAKKALPATTI VILLAGE POPULATION FACTS

Population	13,141
Male Population	6,552
Female Population	6,589
Literate Population	8,223
Male Literate Population	4,591
Female Literate Population	3,632
Illiterate Population	4,918
Male Illiterate Population	1,961
Female Illiterate Population	2,957

Source: <https://etrace.in/census/village/tirumal-thirumangalam-district-madurai-tamil-nadu-640986/>

TABLE 3.45: POPULATION DATA OF STUDY AREA

Sl.No.	Village Name	No of HH	Total Population	Male	Female	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate
1	Alagapuri	1073	4293	2140	2153	3224	1720	1504	1069	420	649
2	Andipatti	451	1677	860	817	1233	685	548	444	175	269
3	Chinnailandaikulam	365	1311	633	678	894	474	420	417	159	258
4	Chinnamanayakkanpatti	144	532	263	269	347	183	164	185	80	105
5	Chittalangudi	970	3696	1874	1822	2417	1364	1053	1279	510	769
6	Errampatti	545	2051	1039	1012	1292	716	576	759	323	436
7	Irumbadi	1576	5845	2951	2894	3975	2214	1761	1870	737	1133
8	Kallanai	2590	10045	5135	4910	7524	4121	3403	2521	1014	1507
9	Kalvelipatti	1233	4363	2153	2210	3005	1640	1365	1358	513	845
10	Karupatti	885	3399	1712	1687	2419	1316	1103	980	396	584
11	Katchiakatti	3350	13141	6552	6589	8223	4591	3632	4918	1961	2957
12	Katchirairuppu	427	1482	778	704	1171	661	510	311	117	194
13	Kattakulam	643	2440	1197	1243	1714	922	792	726	275	451
14	Keelachinnanampatti	199	768	360	408	520	274	246	248	86	162
15	Kilakarai	133	469	231	238	317	176	141	152	55	97
16	Kondayampatti	839	2999	1497	1502	2105	1149	956	894	348	546
17	Kovilpatti	347	1347	693	654	838	473	365	509	220	289
18	Kuthimeikipatti	326	1302	630	672	923	496	427	379	134	245
19	Moolakurichi	151	620	340	280	430	262	168	190	78	112
20	Nachikulam	1108	4378	2170	2208	3144	1710	1434	1234	460	774
21	Nagari	214	890	450	440	641	345	296	249	105	144
22	Nedungulam	422	1710	853	857	1222	642	580	488	211	277
23	Periya Ilandaikulam	398	1436	747	689	893	516	377	543	231	312
24	Pillayarnatham	119	491	241	250	315	173	142	176	68	108
25	Ramayagoundenpatti	169	742	389	353	384	237	147	358	152	206
26	Sambakulam	142	556	262	294	332	162	170	224	100	124
27	Sembathi	133	485	249	236	303	166	137	182	83	99
28	Sirumalai	102	407	207	200	163	92	71	244	115	129
29	Siruvalai	289	1282	636	646	946	518	428	336	118	218
30	Thanichiyam	1988	7573	3738	3835	5334	2882	2452	2239	856	1383
31	Thenur	1692	6464	3267	3197	4663	2558	2105	1801	709	1092
32	Thethoor	1538	5906	2996	2910	3804	2155	1649	2102	841	1261
33	Thirumalnattam	178	707	343	364	463	254	209	244	89	155
34	Thiruvavayanallur	230	852	434	418	608	327	281	244	107	137
35	Thiruvudagam	793	3094	1551	1543	2173	1188	985	921	363	558
36	Thodaneri	398	1479	754	725	1073	590	483	406	164	242
37	Thummachchampatti	253	947	461	486	634	336	298	313	125	188
38	Urseri	1673	6505	3236	3269	4307	2391	1916	2198	845	1353
39	Vaigasipatti	305	1159	583	576	739	413	326	420	170	250
40	Vairavanatham	293	1064	543	521	749	406	343	315	137	178
41	Vayalur	219	984	496	488	731	391	340	253	105	148
42	Viralipatti	294	1133	581	552	678	386	292	455	195	260
43	Vittankulam	151	551	275	276	360	202	158	191	73	118

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

TABLE 3.46: WORKERS PROFILE OF STUDY AREA

Sl.No.	Village Name	Total Workers Population	Male Workers	Female Workers	Total Main Workers	Main Workers Male	Main Workers Female	Main Cultivation Workers	Main Agriculture Workers	Main Other Workers	Non-Worker Population
1	Alagapuri	1762	1050	712	132	77	55	891	708	2050	1762
2	Andipatti	421	247	174	5	4	1	264	151	653	421
3	Chinnailandaikulam	725	391	334	23	15	8	382	309	584	725
4	Chinnamanayakkanpatti	239	145	94	2	2	0	138	92	280	239
5	Chittalangudi	1381	941	440	176	136	40	681	508	1887	1381
6	Errampatti	1036	619	417	55	42	13	744	213	981	1036
7	Irumbadi	2683	1865	818	70	60	10	1497	1055	3018	2683
8	Kallanai	3731	2562	1169	165	130	35	1271	2199	5471	3731
9	Kalvelipatti	1782	1095	687	128	88	40	1121	518	2039	1782
10	Karupatti	1533	957	576	145	118	27	1069	305	1799	1533
11	Katchiakatti	7144	3951	3193	438	312	126	4558	2032	5754	7144
12	Katchirairuppu	611	349	262	27	18	9	473	111	490	611
13	Kattakulam	906	553	353	65	52	13	551	268	1144	906
14	Keelachinnanampatti	496	259	237	11	10	1	376	96	268	496
15	Kilakarai	296	153	143	11	7	4	254	29	162	296
16	Kondayampatti	1138	747	391	109	81	28	535	475	1514	1138
17	Kovilpatti	588	394	194	59	50	9	201	325	737	588
18	Kuthimeikipatti	715	392	323	71	32	39	494	141	540	715
19	Moolakurichi	161	156	5	1	1	0	132	28	411	161
20	Nachikulam	1556	966	590	465	256	209	589	440	2161	1556
21	Nagari	323	243	80	9	8	1	182	129	517	323
22	Nedungulam	908	496	412	71	58	13	637	173	727	908
23	Periya Ilandaikulam	622	345	277	144	79	65	337	140	562	622
24	Pillayarnatham	93	69	24	13	7	6	7	73	189	93
25	Ramayagoundenpatti	423	239	184	122	63	59	235	63	316	423
26	Sambakulam	48	24	24	4	3	1	40	4	180	48
27	Sembathi	244	145	99	6	6	0	172	64	238	244
28	Sirumalai	214	103	111	2	1	1	205	6	173	214
29	Siruvalai	233	197	36	11	10	1	32	185	688	233
30	Thanichiyam	3294	2131	1163	235	203	32	1614	1362	3937	3294
31	Thenur	2300	1630	670	233	152	81	771	1264	3647	2300
32	Thethoor	3038	1714	1324	438	278	160	2124	440	2617	3038
33	Thirumalnattam	378	205	173	0	0	0	325	52	328	378
34	Thiruvalavanallur	320	238	82	14	14	0	65	236	459	320
35	Thiruvedagam	1235	783	452	74	60	14	700	430	1531	1235
36	Thodaneri	448	418	30	83	79	4	237	126	908	448
37	Thummachampatti	590	306	284	77	30	47	289	214	349	590
38	Urseri	2844	1823	1021	99	72	27	1264	1452	3306	2844
39	Vaigasipatti	623	350	273	134	70	64	180	306	535	623
40	Vairavanatham	228	167	61	3	3	0	156	67	610	228
41	Vayalur	35	24	11	23	19	4	7	1	235	35
42	Viralipatti	549	314	235	65	53	12	378	104	551	549
43	Vitankulam	94	69	25	8	7	1	0	83	257	94

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

TABLE 3.47: COMMUNICATION & TRANSPORT FACILITIES IN THE STUDY AREA

Sl	Village Name	PO	SPO	PTO	T	PCO	MP	IC / CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Alagapuri	2	1	2	1	1	1	2	1	1	2	1	2	2	2	1	1	2	1
2	Andipatti	2	1	2	1	2	1	2	2	1	2	2	1	2	1	1	1	2	1
3	Chinnailandaikulam	2	1	2	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
4	Chinnamanayakkanpatti	2	2	2	2	2	1	2	2	2	2	2	1	2	1	1	1	2	1
5	Chittalangudi	2	1	2	1	2	1	2	2	1	1	2	2	2	2	1	1	2	1
6	Errampatti	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
7	Irumbadi	2	1	2	1	1	1	2	2	1	1	1	2	2	1	1	1	2	1
8	Kallanai	2	1	1	1	1	1	2	1	2	2	2	2	1	2	1	1	2	1
9	Kalvelipatti	2	1	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
10	Karupatti	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	2	1
11	Katchiakatti	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
12	Katchirairuppu	2	1	2	1	2	1	2	2	1	2	2	2	2	2	2	1	2	1
13	Kattakulam	2	2	2	1	1	1	2	2	2	2	2	2	2	1	1	1	2	1
14	Keelachinnanampatti	2	2	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
15	Kilakarai	2	1	2	2	2	1	2	2	1	2	2	2	2	2	1	1	2	1
16	Kodayampatti	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
17	Kovilpatti	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	1	2	1
18	Kuthimeikipatti	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
19	Moolakurichi	2	2	2	2	2	1	2	2	1	2	2	2	2	1	1	1	2	1
20	Nachikulam	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
21	Nagari	2	1	2	2	1	1	2	2	1	1	2	1	2	1	1	1	2	1
22	Nedungulam	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
23	Periya Ilandaikulam	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
24	Pillayamatham	2	2	2	2	1	1	2	2	1	2	2	2	2	1	1	1	2	1
25	Ramayagoundenpatti	2	2	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
26	Sambakulam	2	2	2	2	2	1	2	2	1	2	2	2	2	2	1	1	2	1
27	Sembathi	2	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	1
28	Sirumalai	2	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	1
29	Siruvai	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
30	Thanichiyam	1	1	1	1	1	1	2	2	1	1	2	1	2	1	1	1	2	1
31	Thenur	2	1	2	1	1	1	2	2	1	1	2	1	2	1	1	1	2	1
32	Thethoor	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
33	Thirumalnattam	2	1	2	2	2	1	2	2	1	1	2	2	2	1	1	1	2	1
34	Thiruvavayanallur	2	2	2	1	1	1	2	2	2	2	2	2	2	1	1	1	2	1
35	Thiruvudagam	1	1	1	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
36	Thodaneri	2	1	2	1	1	1	2	2	2	1	2	2	2	1	1	1	2	1
37	Thummachampatti	2	2	2	1	2	1	2	2	1	2	2	1	2	1	1	1	2	1
38	Urseri	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
39	Vaigasipatti	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	1	2	1
40	Vairavanatham	2	2	2	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
41	Vayalur	2	1	2	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
42	Viralipatti	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1	1	2	1
43	Vittankulam	2	2	2	2	2	1	2	2	1	1	2	2	2	1	1	1	2	1

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

TABLE 3.48: WATER & DRAINAGE FACILITIES IN THE STUDY AREA

Sl	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1	Alagapuri	1	2	1	1	1	2	2	2	1	1	1
2	Andipatti	1	2	1	1	1	1	2	1	1	1	1
3	Chinnailandaikulam	1	2	2	2	1	2	2	2	1	1	1
4	Chinnamanayakkanpatti	1	2	2	2	2	2	2	2	1	1	1
5	Chittalangudi	1	2	1	2	1	2	2	2	1	1	1
6	Errampatti	1	1	2	1	1	2	2	2	1	1	1
7	Irumbadi	1	1	1	1	1	2	2	2	1	1	2
8	Kallanai	1	1	1	1	1	2	2	2	1	1	1
9	Kalvelipatti	1	1	1	1	1	2	2	2	1	1	2
10	Karupatti	1	2	1	1	1	1	2	2	1	1	2
11	Katchiakatti	1	1	1	1	1	2	1	2	1	1	1
12	Katchirairuppu	1	2	1	1	1	2	2	2	1	1	2
13	Kattakulam	1	2	2	1	1	2	2	2	1	1	1
14	Keelachinnanampatti	2	2	2	1	1	2	2	2	1	1	1
15	Kilakarai	1	2	2	2	2	2	2	2	2	1	2
16	Kondayampatti	1	1	1	1	1	2	2	2	1	1	2
17	Kovilpatti	1	1	1	1	1	2	2	2	1	1	1
18	Kuthimeikipatti	1	2	2	2	2	2	2	2	1	1	2
19	Moolakurichi	1	2	2	1	2	2	2	2	2	1	2
20	Nachikulam	1	1	1	1	1	2	2	2	1	1	2
21	Nagari	1	2	2	2	2	2	2	2	2	1	1
22	Nedungulam	1	2	2	2	1	2	2	2	1	1	2
23	Periya Ilandaikulam	1	2	2	2	2	2	2	2	1	1	1
24	Pillayamatham	1	1	2	2	2	2	2	2	1	1	2
25	Ramayagoundenpatti	1	2	1	1	1	2	2	2	1	2	2
26	Sambakulam	2	2	2	2	2	2	2	2	1	1	2
27	Sembathi	1	1	1	2	1	2	2	2	2	2	1
28	Sirumalai	1	2	1	1	1	2	2	2	2	2	2
29	Siruvai	1	2	2	1	1	2	2	2	1	1	2
30	Thanichiyam	1	1	1	1	1	2	2	2	1	1	2
31	Thenur	1	1	2	1	1	2	2	2	1	1	2
32	Thethoor	1	1	1	1	1	2	2	2	1	1	1
33	Thirumalnattam	1	2	2	2	2	2	2	2	1	1	2
34	Thiruvalavayanallur	1	2	2	2	1	2	2	2	1	1	1
35	Thiruvudagam	1	1	2	2	1	2	2	2	1	1	2
36	Thodaneri	1	2	2	2	1	2	2	2	1	1	1
37	Thummachampatti	1	2	2	2	1	2	2	2	1	1	1
38	Urseri	1	1	1	1	1	2	2	2	1	1	2
39	Vaigasipatti	1	2	2	1	1	2	2	2	1	1	1
40	Vairavanatham	1	2	2	2	2	2	2	2	2	1	1
41	Vayalur	1	1	1	1	1	2	2	2	1	1	2
42	Viralipatti	1	2	2	2	1	2	1	2	1	1	2
43	Vittankulam	1	2	1	2	2	2	2	2	1	1	2

Abbreviations: T - Tap Water; R / C - River / Canal; CW - Covered Well; T/P/L - Tank / Pond / Lake; UCW - Uncovered Well; CD - Covered Drainage; HP - Hand Pump; OD - Open Drainage; TW/BH - Tube / Bore Well; CT - Community Toilet Complex for General public; S - Spring

Note – 1 - Available within the village; 2 - Not available

TABLE 3.49: OTHER FACILITIES IN THE STUDY AREA

Sl	Village Name	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	NPS	APS	BDRO	PS
1	Alagapuri	2	2	2	1	1	1	2	2	1	1	2	2	1	1	1	1	1
2	Andipatti	2	2	2	2	1	1	2	2	1	1	2	2	2	1	2	2	1
3	Chinnailandaikulam	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1
4	Chinnamanayakkanpatti	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
5	Chittalangudi	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1
6	Errampatti	2	2	2	2	1	1	2	2	2	2	2	2	1	1	2	1	1
7	Irumbadi	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
8	Kallanai	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	1	1
9	Kalvelipatti	2	2	2	2	1	1	2	2	1	1	2	1	2	1	1	2	1
10	Karupatti	2	2	2	2	1	1	2	2	1	1	2	2	1	1	1	2	1
11	Katchiakatti	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1	1
12	Katchirairuppu	2	2	2	2	1	1	2	2	1	1	1	2	1	1	1	1	1
13	Kattakulam	2	2	2	2	1	1	2	2	1	1	2	1	2	1	2	2	1
14	Keelachinnanampatti	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
15	Kilakarai	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	1	1
16	Kondayampatti	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	2	1
17	Kovilpatti	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1
18	Kuthimeikipatti	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	2	1
19	Moolakurichi	2	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1	1
20	Nachikulam	2	2	2	2	1	1	2	2	1	1	2	1	2	1	1	1	1
21	Nagari	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1
22	Nedungulam	2	2	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1
23	Periya Ilandaikulam	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1
24	Pillayamatham	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1
25	Ramayagoundenpatti	2	2	2	2	1	1	2	2	1	1	1	2	1	1	1	1	1
26	Sambakulam	2	1	1	2	1	1	2	2	1	1	1	1	2	1	1	1	1
27	Sembathi	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
28	Sirumalai	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
29	Siruvalai	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
30	Thanichiyam	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1
31	Thenur	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
32	Thethoor	2	2	2	1	1	1	2	2	1	1	2	1	1	1	1	1	1
33	Thirumalnattam	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
34	Thiruvalavayanallur	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
35	Thiruvetagam	2	2	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1
36	Thodaneri	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
37	Thummachampatti	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1	1
38	Urseri	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
39	Vaigasipatti	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
40	Vairavanatham	2	2	2	2	1	1	1	2	1	1	1	1	2	1	1	2	1
41	Vayalur	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1	1
42	Viralipatti	2	2	2	2	1	1	2	2	1	1	2	2	1	1	2	1	1
43	Vittankulam	2	2	2	2	1	2	2	2	1	1	2	1	1	1	2	1	1

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

TABLE 3.50: EDUCATIONAL FACILITIES IN THE STUDY AREA

Sl	Village Name	PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
		G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
1	Alagapuri	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	Andipatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	Chinnailandaikulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Chinnanamayakkanpatti	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Chittalangudi	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Errampatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	Irumbadi	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Kallanai	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	Kalvelipatti	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Karupatti	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	Katchiakatti	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	Katchirairuppu	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
13	Kattikulam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14	Keelachinnanampatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Kilakarai	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Kondayampatti	1	1	1	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
17	Kovilpatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	Kuthimeikipatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	Moolakurichi	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20	Nachikulam	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21	Nagari	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	Nedungulam	1	2	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
23	Periya llandaikulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
24	Pillayarnatham	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
25	Ramayagoundenpatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
26	Sambakulam	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
27	Sembathi	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
28	Sirumalai	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
29	Siruvilai	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30	Thanichiyam	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
31	Thenur	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
32	Thethoor	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
33	Thirumalnattam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
34	Thiruvavayanallur	2	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
35	Thiruvudagam	1	1	1	1	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
36	Thodaneri	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
37	Thummachchampatti	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
38	Urseri	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
39	Vaigasipatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
40	Vairavanatham	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
41	Vayalur	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
42	Viralipatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
43	Vittankulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

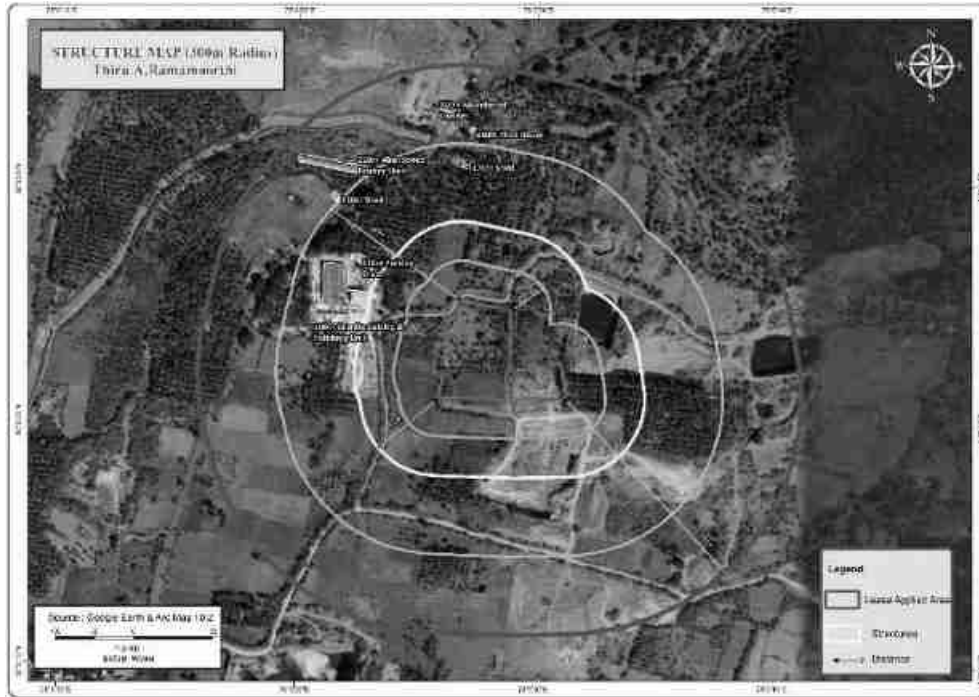
TABLE 3.51: MEDICAL FACILITIES IN THE STUDY AREA

Sl. No.	Village Name	CHC	PHC	PHSC	MCW	TBC	HA	HAM	D	VH	MHC	FWC	NGM-I/O
1	Alagapuri	0	0	1	0	0	0	0	0	0	0	0	b
2	Andipatti	0	0	1	0	0	0	0	0	0	0	0	b
3	Chinnailandaikulam	0	0	0	0	0	0	0	0	0	0	0	a
4	Chinnamanayakkanpatti	0	0	0	0	0	0	0	0	0	0	0	b
5	Chittalangudi	0	0	2	0	0	0	0	0	0	0	0	a
6	Errampatti	0	0	1	1	0	0	0	0	1	0	0	a
7	Irumbadi	0	0	1	0	0	0	0	0	0	0	0	b
8	Kallanai	0	2	1	2	2	0	0	2	0	0	2	
9	Kalvelipatti	0	0	1	0	0	0	0	0	0	0	0	b
10	Karupatti	0	0	1	0	0	0	0	0	0	0	0	c
11	Katchiakatti	1	1	2	1	1	0	0	1	1	0	1	
12	Katchirairuppu	0	0	0	0	0	0	0	0	0	0	0	a
13	Kattakulam	0	0	0	0	0	0	0	0	0	0	0	b
14	Keelachinnanampatti	0	0	0	0	0	0	0	0	0	0	0	a
15	Kilakarai	0	0	1	0	0	0	0	0	0	0	0	b
16	Kondayampatti	0	0	1	0	0	0	0	0	1	0	0	b
17	Kovilpatti	0	0	0	0	0	0	0	0	0	0	0	b
18	Kuthimeikipatti	0	0	1	0	0	0	0	0	0	0	0	b
19	Moolakurichi	0	0	0	0	0	0	0	0	0	0	0	b
20	Nachikulam	0	0	1	0	0	0	0	0	1	0	0	b
21	Nagari	0	0	0	0	0	0	0	0	0	0	0	a
22	Nedungulam	0	0	0	0	0	0	0	0	0	0	0	a
23	Periya Ilandaikulam	0	0	0	0	0	0	0	0	0	0	0	b
24	Pillayarnatham	0	0	1	0	0	0	0	0	0	0	0	b
25	Ramayagoundenpatti	0	0	0	0	0	0	0	0	0	0	0	b
26	Sambakulam	0	0	1	0	0	0	0	0	1	0	0	b
27	Sembathi	0	0	0	0	0	0	0	0	0	0	0	a
28	Sirumalai	0	0	0	0	0	0	0	0	0	0	0	b
29	Siruvalai	0	0	0	0	0	0	0	0	0	0	0	b
30	Thanichiyam	0	1	1	1	1	0	0	1	1	0	1	
31	Thenur	0	0	1	0	0	0	0	0	0	0	0	a
32	Thethoor	0	0	2	0	0	0	0	0	0	0	0	b
33	Thirumalnattam	0	0	0	0	0	0	0	0	0	0	0	b
34	Thiruvavayanallur	0	0	0	0	0	0	0	0	0	0	0	a
35	Thiruvudagam	0	0	1	0	0	0	0	0	1	0	0	b
36	Thodaneri	0	0	1	0	0	0	0	0	0	0	0	a
37	Thummachampatti	0	0	0	0	0	0	0	0	0	0	0	b
38	Urseri	0	0	1	0	0	0	0	0	0	0	0	a
39	Vaigasipatti	0	0	0	0	0	0	0	0	0	0	0	a
40	Vairavanatham	0	0	0	0	0	0	0	0	0	0	0	b
41	Vayalur	0	0	0	0	0	0	0	0	0	0	0	b
42	Viralipatti	0	0	0	0	0	0	0	0	0	0	0	a
43	Vittankulam	0	0	0	0	0	0	0	0	0	0	0	b

Abbreviations: CHC-Community Health Centre; TBC-TB Clinic; VH- Vaternity Hospital; PHC-Primary Health Centre; HA-Aallopathic Hospital; FWC-Family Welfare Centre; PHSC-Primary Health Sub Centre; HAM-Alternative Medicine Hospital; MH-Mobile Health Clinic; MCW-Maternity and Child Welfare Centre; D-Dispensary; NGM-I/O-Non Government Medical Facilities In & Out Patient

Note – 1 - Available within the village; 2 - Not available a-facility available at <5kms b-facility available at>10kms

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

STRUCTURE MAP WITHIN 300M RADIUS**Enumeration of Structures from 0 - 300m Radius**

Structure Numbers	Distance & Direction from the project site	Structure Details and Usage Purpose	Type of Structure Structures (Kutchu/ Brick/ Cement/ RCC/ Framed Structures)	No. of Occupants	Structure belongs to owner (Yes/No)	Remarks
1	100m – West	Granite Cutting and Polishing Unit	RCC, Sheet and framed structure	Nil	No	Industry for the production of Granite
2	130m – NW	Parking Shed	Sheet structure	Nil	No	Used to park Vehicles
3	170m – North	Shed	Sheet structure	Nil	No	Used to store agriculture products
4	210m – NW	Shed	Sheet structure	Nil	No	Used to store agriculture products
5	210m – NW	Abandoned Poultry Shed	Brick Structure	Nil	No	Abandoned
6	210- North	Tiled House	Brick Structure	2 Nos	No	Resident
7	230m – NW	Abandoned Crusher	Framed Structure	Nil	No	Abandoned

3.6.6 Recommendation and Suggestion

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

3.6.7 Summary & Conclusion

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

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

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

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

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

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

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

4.1 LAND ENVIRONMENT:

4.1.2 Anticipated Impact

- 0.51.5 Ha of the land will be under mining since the Permanent or temporary change on land use and land cover will occur
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.

If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

4.1.2 Mitigation Measures

- The 0.51.50 Ha of the land will be converted into temporary reservoir which will full fill the water scarcity in the drought season and the nearby agriculture land will benefitted by the supply of water
- About 680 Nos of trees will be planted in the lease area and approach road will retain the eco system
- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development in the production
- Construction of garland drains all around the quarry pits and construction of silt trap at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt.
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- Fencing will be constructed before starting the mining operation and it will be maintained in the conceptual stage Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.1.3 Soil Environment

4.1.4 Impact on Soil Environment

- Removal of vegetation cover
- Soil Erosion in the project site during rainy season due to quarry operation

4.1.5 Mitigation Measures

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

4.1.6 Waste Dump Management

There is no waste anticipated in this Rough Stone and gravel quarrying operation. The entire quarried out materials will be utilized (100%).

4.2 WATER ENVIRONMENT

4.2.1 Anticipated Impact

- The major sources of water pollution normally associated due to mining and allied operations are:
 - Generation of waste water from vehicle washing.
 - Washouts from surface exposure or working areas
 - Domestic sewage
 - Disturbance to drainage course in the project area
 - Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.

- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table
- 1.5 KLD water will be utilized for the quarrying operation

4.2.2 Mitigation Measures

- Water for the quarrying operation such as sprinkling on haul roads, Greenbelt development will be sourced from the lower part of the mine pit which is specifically allotted to collect the rain water.
- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system.
- Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.

4.3 AIR ENVIRONMENT

4.3.1. Anticipated Impact

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

4.3.1.1. Modelling of Incremental Concentration from all Proposed Projects

Wind erosion of the exposed areas and the air borne particulate matter generated by quarrying operation, and transportation are mainly PM₁₀ & PM_{2.5} and emissions of Sulphur dioxide (SO₂) & Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are the cause of air pollution in the project area.

Similarly, loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles causes of pollution. This leads to an impact on the ambient air environment around the project area.

Anticipated incremental concentration due to this quarrying activity and net increase in emissions due to quarrying activities within 500 meters around the project area is predicted by Open Pit Source modelling using

AERMOD Software.

Prediction of impacts on air environment has been carried out taking into consideration cumulative production all the quarries fall in the Cluster. Air environment and net increase in emissions by Open pit source modelling in AERMOD Software AERMOD 12.

4.3.2.1 Emission Estimation

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER =overall emission reduction efficiency, %

The proposed mining activity includes various activities like ground preparation, excavation, handling and transport of Rough Stone. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 4-2.

4.3.2 Frame work of Computation & Model details

Suspended Particulate Matter (SPM) is the major pollutant occurred during quarrying activities. The prediction included the impact of Excavation, Drilling, Blasting (Occasionally), loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and Cloud cover.

Impact was predicted over the distance of 10 km around the source to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM₁₀ was observed close to the source due to low to moderate wind speeds. Incremental value of PM₁₀ was superimposed on the base line data monitored at the proposed site to predict total GLC of PM₁₀ due to combined impacts

TABLE 4.1: ESTIMATED EMISSION RATE

PM ₁₀			
Activity	Source type	Value	Unit
Drilling	Point Source	0.060060352	g/s
Blasting	Point Source	0.000189040	g/s
Mineral Loading	Point Source	0.037735221	g/s
Haul Road	Line Source	0.002485221	g/s/m
Overall Mine	Area Source	0.088428146	g/s
SO ₂			
Activity	Source type	Value	Unit
Overall Mine	Area Source	0.000240941	g/s
NO _x			
Overall Mine	Area Source	0.000037537	g/s

FIGURE 4.1: AERMOD TERRAIN MAP

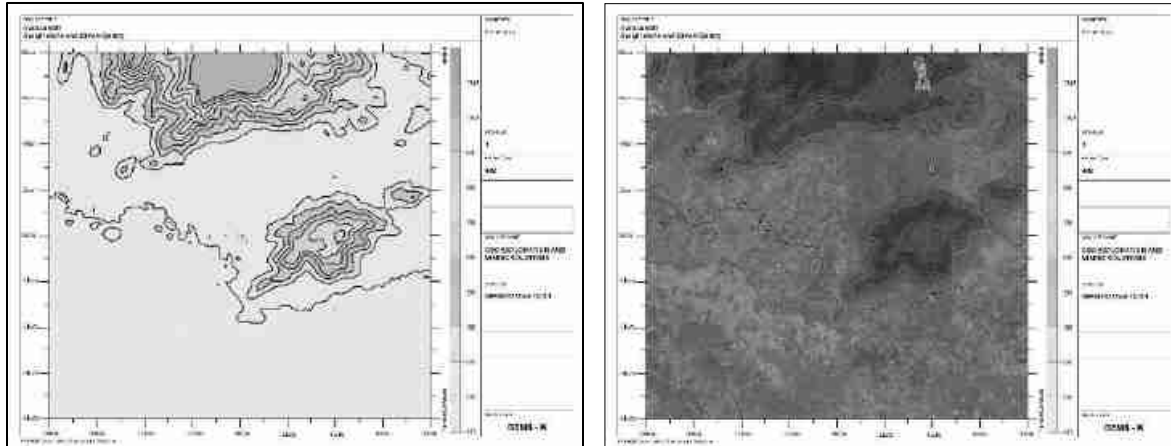


FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM₁₀

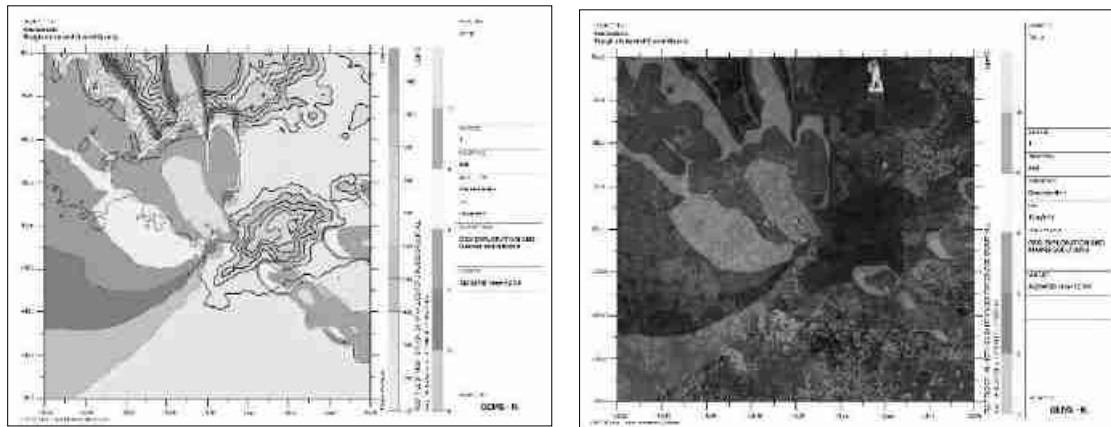


FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM_{2.5}

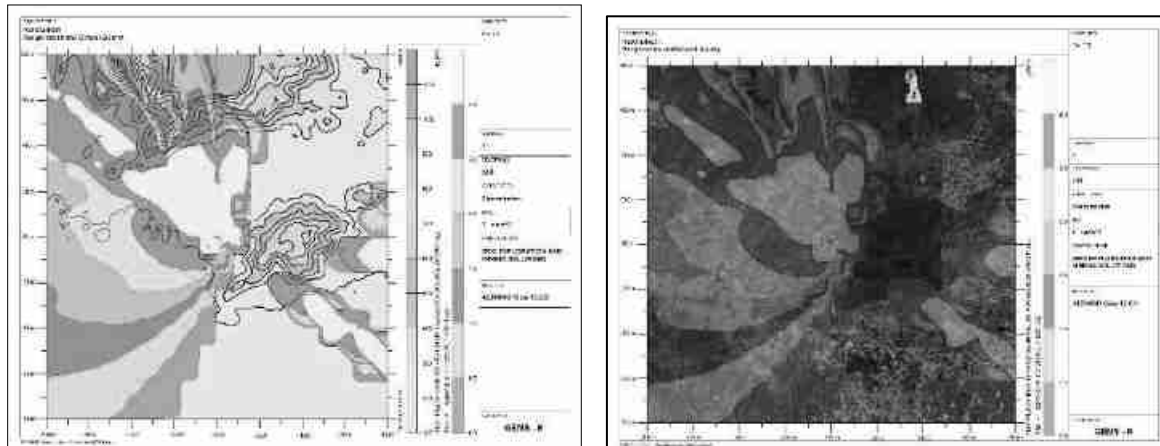


FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF NO_x

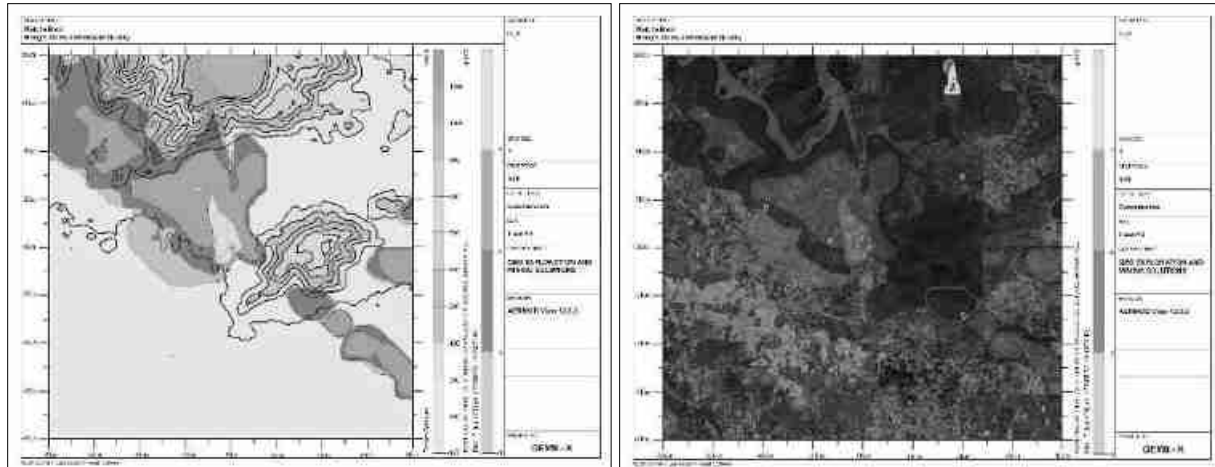


FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF SO₂

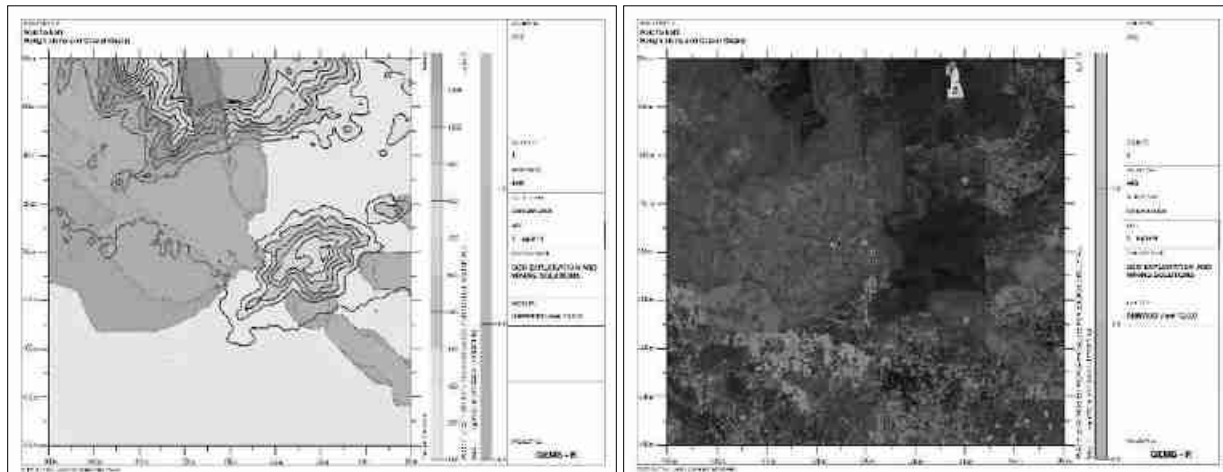
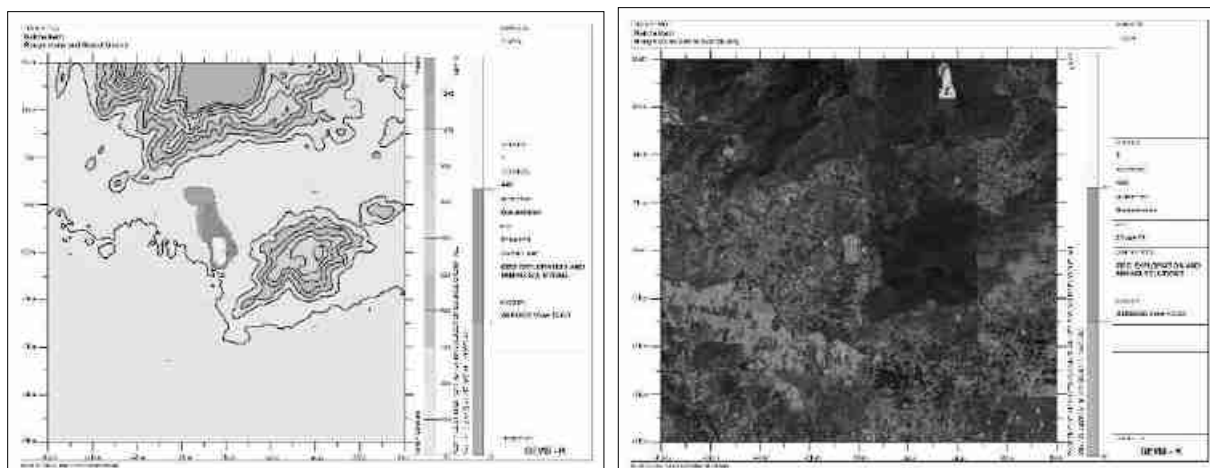


FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST



4.3.2.1 Model Results

The post project Resultant Concentrations of PM₁₀, PM_{2.5}, SO₂ & NO_x (GLC) is given in Table below:

TABLE 4.2: INCREMENTAL & RESULTANT GLC OF PM₁₀

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ due to mining (µg/m ³)	Total PM ₁₀ (µg/m ³)
AAQ1	10° 5'24.21"N 78° 0'27.02"E	-28	45	43.9	10.61	54.5
AAQ2	10° 5'12.77"N 78° 0'36.75"E	268	-313	43.0	7.50	50.5
AAQ3	10° 5'20.92"N 77°59'46.03"E	-1290	-65	43.1	9.00	52.1
AAQ4	10° 3'26.58"N 78° 2'23.02"E	4049	-3163	43.1	3.00	46.1
AAQ5	10° 6'4.82"N 77°58'28.03"E	-3869	1334	44.3	6.71	51.0
AAQ6	10° 6'47.34"N 78° 2'38.17"E	4002	2616	43.1	0	43.1
AAQ7	10° 2'54.97"N 77°59'4.11"E	-2580	-4589	43.9	1.10	45.0

TABLE 4.3: INCREMENTAL & RESULTANT GLC OF PM_{2.5}

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM _{2.5} (µg/m ³)	Incremental value of PM _{2.5} due to mining (µg/m ³)	Total PM _{2.5} (µg/m ³)
AAQ1	10° 5'24.21"N 78° 0'27.02"E	-28	45	22.3	4.81	27.1
AAQ2	10° 5'12.77"N 78° 0'36.75"E	268	-313	21.3	3.36	24.7
AAQ3	10° 5'20.92"N 77°59'46.03"E	-1290	-65	21.2	3.72	24.9
AAQ4	10° 3'26.58"N 78° 2'23.02"E	4049	-3163	22.0	1.40	23.4
AAQ5	10° 6'4.82"N 77°58'28.03"E	-3869	1334	21.5	2.77	24.3
AAQ6	10° 6'47.34"N 78° 2'38.17"E	4002	2616	21.2	0	21.2
AAQ7	10° 2'54.97"N 77°59'4.11"E	-2580	-4589	22.6	0.69	23.3

TABLE 4.4: INCREMENTAL & RESULTANT GLC OF SO₂

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO ₂ (µg/m ³)	Incremental value due to mining (µg/m ³)	Total SO ₂ (µg/m ³)
AAQ1	10° 5'24.21"N 78° 0'27.02"E	-28	45	6.7	1.10	7.8
AAQ2	10° 5'12.77"N 78° 0'36.75"E	268	-313	7.0	0.89	7.9
AAQ3	10° 5'20.92"N 77°59'46.03"E	-1290	-65	6.6	1.00	7.6
AAQ4	10° 3'26.58"N 78° 2'23.02"E	4049	-3163	6.3	0	6.3
AAQ5	10° 6'4.82"N 77°58'28.03"E	-3869	1334	7.0	0.67	7.7
AAQ6	10° 6'47.34"N 78° 2'38.17"E	4002	2616	6.4	0	6.4
AAQ7	10° 2'54.97"N 77°59'4.11"E	-2580	-4589	6.6	0	6.6

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF NOX

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value due to mining (µg/m ³)	Total NO _x (µg/m ³)
AAQ1	10° 5'24.21"N 78° 0'27.02"E	-28	45	21.4	7.30	28.7
AAQ2	10° 5'12.77"N 78° 0'36.75"E	268	-313	20.7	1.83	22.5
AAQ3	10° 5'20.92"N 77°59'46.03"E	-1290	-65	21.6	3.60	25.2
AAQ4	10° 3'26.58"N 78° 2'23.02"E	4049	-3163	21.0	0	21.0
AAQ5	10° 6'4.82"N 77°58'28.03"E	-3869	1334	23.1	1.40	24.5
AAQ6	10° 6'47.34"N 78° 2'38.17"E	4002	2616	21.3	0	21.3
AAQ7	10° 2'54.97"N 77°59'4.11"E	-2580	-4589	21.9	0	21.9

From the resultant of cumulative concentration i.e., Background + Incremental Concentration of pollutant in all the receptor locations without effective mitigation measures are still within the prescribed NAAQ limits of 100, 80 & 80 µg/m³ for PM₁₀, SO₂ & NO_x respectively. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be further being controlled.

4.3.4. Mitigation Measures

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

Advantages of Wet Drilling: -

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

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e. at the time lunch hours, controlled charge per hole as well as charge per round of hole
- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & 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 below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & 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 & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.

- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt –

- 680 Nos of trees will be planted through this project in the lease area and village roads (Approach Road) to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

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 & tipper drivers
- Ambient Air Quality Monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed

4.4 NOISE ENVIRONMENT

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. These activities will not cause any problem to the inhabitants of this area because there is no human settlement within 300m radius from the project site. 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 working pit due to these major noise-generating sources. Noise modelling has been carried out to assess the impact on surrounding ambient noise levels.

Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves, which are propagated outwards from the source through the air at a speed of 1,100 ft/sec, with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using model based on first principle.

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

Where:

Lp_1 & Lp_2 are sound levels at points located at distances r_1 & r_2 from the source.

$Ae_{1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

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

4.4.1 Anticipated Impact

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

- Source data
- Receptor data
- Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4-8.

TABLE 4.7: ACTIVITY AND NOISE LEVEL PRODUCED BY MACHINERY

Sl.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 Noise Produced			95.8

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

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

TABLE 4.8: PREDICTED NOISE INCREMENTAL VALUES

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	45.7	44.9	43.1	41.6	42.7	40.7	40.2
Incremental Value dB(A)	60.1	50.6	38.5	26.1	28.5	26.7	25.8
Total Predicted Noise level dB(A)	60.3	51.6	44.4	41.7	42.9	40.9	40.4

The incremental noise level is found within the range of 51.6-60.3 dB (A) in Core Zone and 40.4-44.4 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations are within permissible limits of Industrial area (core zone) & Residential area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.).

4.4.2 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;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
 - Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects

4.4.3 Ground Vibrations

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

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

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

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

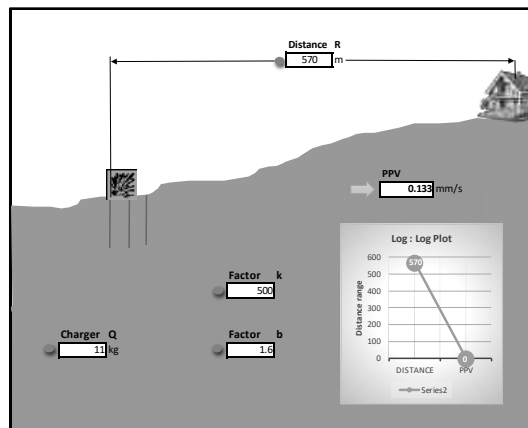
B = constant related to the rock and site (usually 1.6)

R = distance from charge (m)

TABLE 4.9: PREDICTED PPV VALUES DUE TO BLASTING

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	11	570-SW	0.133

FIGURE 4.6: GROUND VIBRATION PREDICTION



From the above graph, the charge per blast 11 kg is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But the all the project proponents ensure that the charge per blast shall be less than 20kg and carry out blasting twice or thrice a day based on the onsite conditions under the supervision of competent person employed. However, as per statutory

requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.4.3.1 Mitigation Measures

- It is proposed to carry out blasting operation 11kg per round so that the vibration will be minimal
- The mining operation will be carried out without deep hole drilling, 25mm small dia cartridge will be utilized for the blasting
- The blasting operations in the project site without deep hole drilling and blasting using delay detonators, which reduces the ground vibrations;
- Proper quantity of explosive, 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.
- The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used.
- The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects.
- Appropriate blasting techniques shall be adopted such that the predicted peak particle velocity shall not exceed 8 mm/s.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

4.5. Impact on the Biological Environment

4.5.1. Anticipated Impact on agricultural land associated with flora

1. Dust particle settle on neighbouring agricultural land it is located about 150m on the west side. During operation and minerals are transported in approach roads.
2. There shall be negligible air emissions or effluents from the project site. During the loading of the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

4.5.2 Mitigation Measures

4.5.2.1. General Guidelines for Green Belt Development

Drone survey was covered the green belt and fencing as per the terms of references. The green belt and plantation purposes in and around the proposed mine lease area native species, fruit-bearing trees, medicinal plants, and dense canopy trees should be selected. These species should be tolerant to pollution levels as per Bio- Geography zones of India.

After the operation of mining production capacity, Green belt and Plantation species should be in accordance with the Terms and Conditions of the Environmental Clearance Green belt is created not only for the purpose of protecting sensitive areas or maintaining the ecological balance but because they also act as efficient biological filters

or sinks for particulate and gaseous emissions, generated by vehicular movements and various industrial and mining activities. Optimally designed green belts can be effective in reducing the impact of fugitive emissions and pollutants accidentally or otherwise released at ground levels.

4.5.3.2. Proposed Green Belt

Extensive green belt development will be started during the construction phase, which will continue till the operation of the plant. About 450-500 trees will be planted per hectare all around the plant, approach roads, and township premises. Locally available types of trees that are resistant to pollutants will be planted. In addition to the above, all open spaces available within the premises will be developed as nurseries, parks, gardens, and other forms of greenery. 5 m wide greenbelt will be developed along the plant premises, as per land available.

4.5.3.3. Development of Green Belt

The plantation matrix adopted for the green belt development includes pit of 0.3 m x 0.3 m in size with a spacing of 2 m x 2 m. In addition, earth filling and manure may also be required for the proper nutritional balance and nourishment of the sapling. It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration. Multi-layered plantations comprising of medium height trees (7 m to 10 m) and shrubs (5 m height) are proposed for the green belt.

4.5.3.4. Selection of Plant Species for Green Belt Development

It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration. Multi-layered plantations comprising of medium height trees (7 m to 10 m) and shrubs (5 m height) are proposed for the green belt. Green belt is plantation of trees for reducing the air pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. Green plants form a surface capable of absorbing air pollutants and forming sinks for pollutants. It improves the aesthetic value of local environment. Under present project, green belts have been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution. Regional tree saplings in eco-friendly bags like *Pterocarpus marsupium*, *Pongamia pinnata*, *Limonia acidissima*, and *Cassia roxburghii* will be planted along the Lease boundary and avenues as well as over Non-active dumps with intervals 3m in between with the GPS Coordinates. The greenbelt development plan aims to overall improvement in the environmental conditions of the region Native plant species will be preferred.

- The species should be wind-firm and deep-rooted.
- The species should form a dense canopy.
- Fast-growing plants will be planted
- Species tolerance to air pollution like SO₂ and NO₂ should be preferred.
- Plants having large leaf area index will be considered
- Soil improving plants (Nitrogen fixing rapidly decomposable leaf litter).
- Attractive appearance with good flowering and fruit-bearing.
- Birds and insects attract tree species.
- Roadsides will be planted with local vegetation.

Table No 4.1. List of plant species proposed for Greenbelt development

S. No	Scientific name	Tamil Name
1	<i>Aegle marmelos</i>	Vilva maram
2	<i>Albizia lebbeck</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limonia acidissima</i>	Vila maram
6	<i>Syzygium cumini</i>	Naval maram
7	<i>Toona ciliata</i>	Santhana Vembu
8	<i>Ficus hispida</i>	Aththi maram

9	Borassus flabellifer	Panai-maram
10	Madhuca longifolia	Illupai maram

(*Source: Term of Reference-ToR)

Table No 4.2.Species suitable for abatement of noise and dust pollution

S. No	Botanical name	Common name
1	Azadirachta indica	Vembhu maram
2	Ficus religiosa	Arasan maram
3	Ficus hispida	Aththi maram
4	Bombax ceiba	Mul Elavu
5	Syzygium cumini	Naval maram
6	Tamarindus indica	Puliyamaram
7	Mangifera indica	Manga maram
8	Harwickia binata	Anjan maram
9	Delonix regia	Neruppu Kondrai
10	Cassia Fistula	Sara Kondrai

(*Source: Guidance for Developing Green belts Manual, CPCB 2000)

The above-suggested list covers species with thick canopy cover, perennial green nature, native origin, and a large leaf area index. The proposed species will help in forming an effective barrier between the mine site area and the surroundings.

These species need to be planted along the periphery of the lease area for absorb fugitive emissions and noise levels which is generated during mining activities. All the open spaces, where tree plantation may not be possible, should be covered with shrubs and grass to prevent erosion of topsoil.

4.5.4. Anticipated Impact on Fauna

- Noise generation due to vehicle may affect avifauna.
- The lease area is not inhabited by any wild life, as there is no forest cover, hence there will not be any effect on migration or extinction of wildlife.
- There is no National Park, Biosphere Reserve, Wildlife corridors, and Tiger/Elephant Reserve found within 10 km radius of the project site.

4.5.4.1. Measures for protection and conservation of wildlife species

- Topsoil has a large number of seeds of native plant species in the mining area.
- Topsoil will be used for restoration and suitable surfaces for planted seedlings.
- Checks and controls the movement of vehicles in and out of the mine.
- Undertaking mitigative measures for a conducive environment to the flora and fauna in consultation with Forest Department.
- A dust suppression system will be installed within the mine and periphery of the mine.
- Plantation around the mine area will help in creating habitats for small faunal species and create a better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

4.5.3. Impact on Aquatic Biodiversity

- The major lake along the project sites doesn't have a rich biodiversity and almost all the species of both fauna and flora listed are either least concerned or not evaluated.
- There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.

Table No. 4.3. Overall Ecological impact assessments of Katchaikatti Village, Rough stone Quarry, Vadipatti Taluk, Madurai District and Tamil Nadu.

S.No	Attributes	Assessment
	Activities of the project affect the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in the mining lease site. The fauna sighted mostly migrated from the buffer area.
2	Located near an area populated by rare or endangered species	No Endangered, Critically Endangered, or vulnerable species were sighted in the core mining lease area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	Nil
4	The proposed project restricts access to waterholes for wildlife	'No '
5	Proposed mining project impact surface water quality that also provides water to wildlife	'No 'scheduled or threatened wildlife animals are sighted regularly core in the core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity areas.	Surface runoff management such as drains is constructed properly so there will be no siltation effect in the nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities.	'No'
8	The project release effluents into a water body that also supplies water to a wildlife.	No water body near to core zone so the chances of water becoming polluted is low.
9	Mining projects affect the forest-based livelihood/ any specific forest product on which local livelihood depended.	'No'
10	The project likely to affect migration routes.	'No 'migration route was observed during the monitoring period.
11	The project is likely to affect the flora of an area, which have medicinal value	'No'
12	Forestland is to be diverted, has carbon high sequestration.	'No 'There was no forest land diverted.
13	The project is likely to affect wetlands, Fish breeding grounds, and marine ecology.	'No'. Wetland was not present in the near core Mining lease area. No breeding and nesting ground is present in the core mining area.

(*Source: EIA Guidance Manual-Mining and Minerals, 2010)

TABLE 4.12: RECOMMENDED SPECIES FOR GREENBELT DEVELOPMENT PLAN

Sl.No	Name of the plant (Botanical)	Common Name	Habit
1	<i>Aegle marmelos</i>	Vilvam	Tree
2	<i>Bauhinia racemose</i>	Aathi	Tree
3	<i>Thespesia populnea</i>	Puvarasu	Tree
4	<i>Pongamia pinnata</i>	Pungam	Tree

The 7.5m Safety distance along the boundary has been identified to be utilized for subsequent Afforestation. However, the afforestation should always be carried out in a systematic and scientific manner. Regional trees like Athi, Pongamia, Pinnata will be planted along the Lease boundary and avenue plantation will be carried out in the project site. The rate of survival expected to be 80% in this area. Greenbelt development Plan is given in

TABLE 4.13: GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Area to be covered in m ²	Name of the species
I	680	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development and along village roads.	Vilvam, Aathi, Puvarasu & Pungam

4.6 SOCIO ECONOMIC

4.6.1 Anticipated Impact

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

4.6.2 Mitigation Measures

- 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

4.7 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

4.7.1 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

4.7.2 Noise

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

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

- Periodic medical hearing checks will be performed on workers exposed to high noise levels

4.7.3 Physical Hazards

The following measures are proposed for control of physical hazards

- Specific personnel training on work-site safety management will be taken up;
- Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide, especially after blasting activities;
- 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

4.7.4 Occupational Health Survey

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

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

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

4.8 MINE WASTE MANAGEMENT

No waste is anticipated, the entire mined out material will be sold to needy crushers and customers.

4.9 MINE CLOSURE

The ultimate depth of the mine is 21m bgl and the life of the mine is 5 years, after completion of mining operation the following action will be taken in the project site as a part of Mine closure plan

- The total Mined out land would be around 0.51.50 Ha this land will be converted into temporary water reservoir which will facilitate to collect the rain water
- The stagnant water will be supplied to the nearby agriculture land during drought seasons
- Fencing will be re constructed around the pit after closure, the warning/ danger display board will be placed on all the sides of the project site
- The un utilized area and haul roads will be converted as plantation area, fruit bearing trees will be planted to retain the eco system of the area
- Final Mine closure plan will be prepared and submitted to the concerned authority

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.

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.

4.9.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.9.1.1 Physical Stability

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

4.9.1.2 Chemical Stability

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

4.9.1.3 Biological Stability

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

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

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

The Mine closure plan should be as per the approved mine 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.

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.1 INTRODUCTION

Consideration of alternatives to a project proposal is a requirement of EIA process. During the scoping process, alternatives to a proposal 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.

5.2 FACTORS BEHIND THE SELECTION OF PROJECT SITE

Thiru A. Ramamoorthi Rough Stone and gravel quarry Project at Katchaikatti Village is a mining project for excavation of Rough Stone, which is site specific. All the proposed mining lease areas have following advantages: -

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

5.3 ANALYSIS OF ALTERNATIVE SITE

No alternatives are suggested as all the mine sites are mineral specific

5.4 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

Mechanized open cast mining operation with drilling and blasting method will be used to extract Rough Stone in the area. All the applied mining lease areas have following advantages –

- As the mineral deposition is homogeneous and batholith formation, therefore opencast method of working is preferred over underground method
- The material will be loaded with the help of excavators into dumpers / trippers and transported to the needy customers.
- Blasting and availability of drills along with controlled blasting technology gives desired fragmentation so that the mineral is handled safely and used without secondary blasting.
- Semi-skilled labours fit for quarrying operations are easily available around the nearby villages

5.5 ANALYSIS OF ALTERNATIVE TECHNOLOGY

Open cast mechanized method has been selected for these projects. 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.

6. 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 as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting 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 projects; 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 all the proposed quarries.

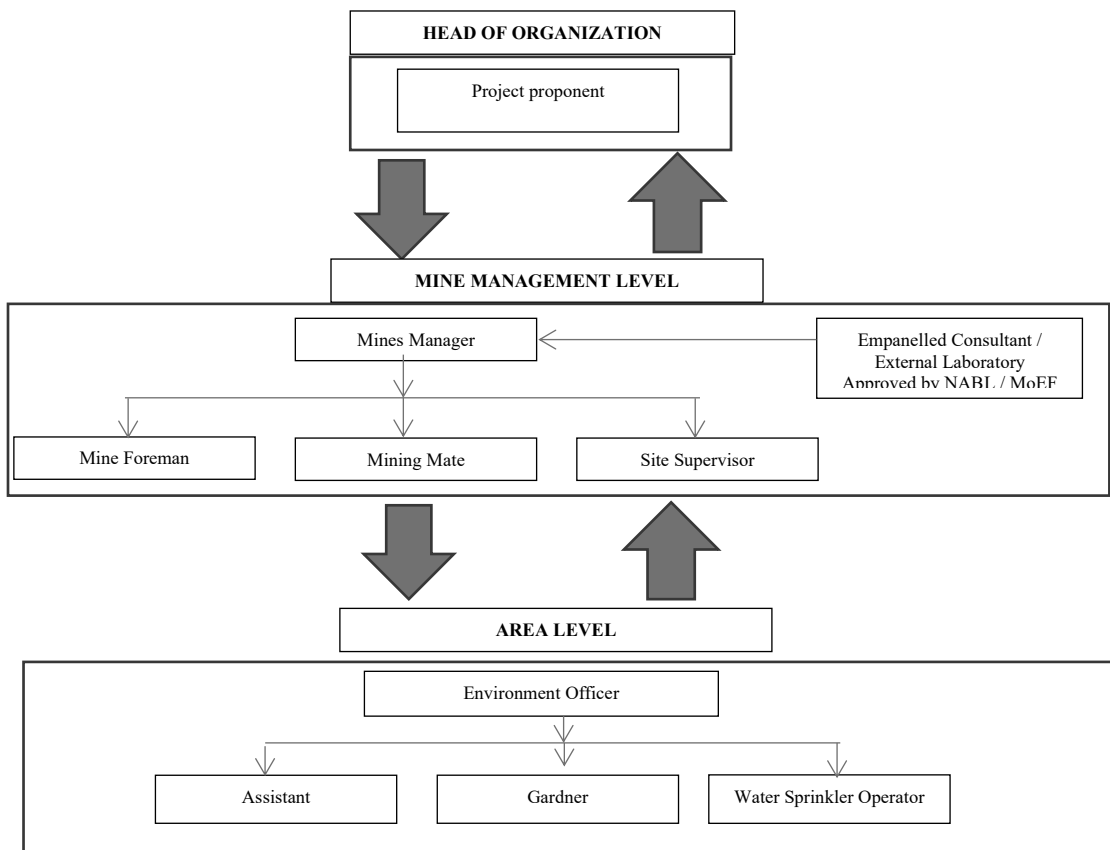
The responsibilities of this cell will be:

- 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 each proposed project proponent. The half-yearly reports are submitted to Ministry of Environment and Forest, Regional Office and SEIAA 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).

FIGURE 6.1: PROPOSED ENVIRONMENTAL MONITORING CELL



* The Environmental Monitoring Cell will be formed in all the proposed projects

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The mitigation measures proposed in Chapter-4 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

Sl 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
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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 monitoring is detailed in Table 6.2

TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC

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 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 EMP

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 capital cost for Environmental Monitoring Programme is Rs 76,000/- and the recurring cost is Rs 76,000/- per annum for each Proposed Project.

TABLE 6.3 ENVIRONMENT MONITORING BUDGET

Sl.No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	Rs. 76,000/-	Rs. 76,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
Total		Rs 76,000/-	Rs 76,000/-

Source: Approved Mining Plan

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.

7. ADDITIONAL STUDIES

7.0 GENERAL

The following Additional Studies were done as per items identified by project proponent and items identified by regulatory authority. And items identified by public and other stakeholders will be incorporated after Public Hearing.

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

7.1. PUBLIC CONSULTATION

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

7.2 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 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 all proposed projects. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

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 below Table 7.1.

TABLE 7.1 RISK ASSESSMENT& CONTROL MEASURES

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; 7

			<p>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</p> <p>Working of quarry, as per approved plans and regularly updating the mine plans;</p> <p>Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut;</p> <p>Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager;</p> <p>Maintenance and testing of all mining equipment as per manufacturer 's guidelines.</p>
2	Drilling	<p>Improper and unsafe practices</p> <p>Due to high pressure of compressed air, hoses may burst</p> <p>Drill Rod may break</p>	<p>Safe operating procedure established for drilling (SOP) will be strictly followed.</p> <p>Only trained operators will be deployed.</p> <p>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,</p> <p>Drilling shall not be carried on simultaneously on the benches at places directly one above the other.</p> <p>Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual.</p> <p>All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition.</p> <p>Operator shall regularly use all the personal protective equipment.</p>
4	Blasting	<p>Fly rock, ground vibration, Noise and dust.</p> <p>Improper charging, stemming & Blasting/ fining of blast holes</p> <p>Vibration due to movement of vehicles</p>	<p>Restrict maximum charge per delay as per regulations and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blasting can be conducted safely.</p> <p>SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation</p> <p>Shots are fired during daytime only.</p> <p>All holes charged on any one day shall be fired on the same day.</p> <p>The danger zone will be distinctly demarcated (by means of red flags)</p>

5	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	Before commencing work, drivers personally check the dumper/truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. Concave mirrors should be kept at all corners All vehicles should be fitted with reverse horn with one spotter at every tipping point Loading according to the vehicle capacity Periodical maintenance of vehicles as per operator manual
6	Natural calamities	Unexpected happenings	Escape Routes will be provided to prevent inundation of storm water Fire Extinguishers & Sand Buckets
7	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 height.

Source: Analysed and Proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated

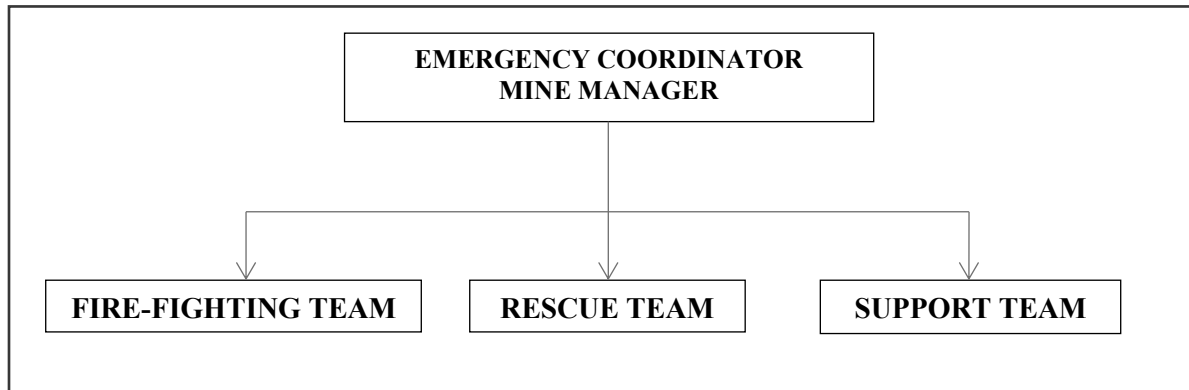
The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations and the coordination among key personnel and their team has been shown in Fig 7.1.

FIGURE 7.1: DISASTER MANAGEMENT TEAM LAYOUT



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

TABLE 7.2: PROPOSED TEAMS TO DEAL WITH EMERGENCY SITUATION

DESIGNATION	QUALIFICATION
FIRE-FIGHTING TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
RESCUE TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
SUPPORT TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Assistant Team Leader	Environment Officer
Team Member	Mining Mate
Security Team Leader/ Emergency Security Controller	Mines Foreman

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

Roles and responsibilities of emergency team –

(a) Emergency coordinator (EC)

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

(b) Incident controller (IC)

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

(c) Communication and advisory team

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

(d) Roll call coordinator

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

(e) Search and rescue team

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

(f) Emergency security controller

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

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

Proposed fire extinguishers at different locations –

The following type of fire extinguishers has been proposed at strategic locations within the mine.

TABLE 7.3: PROPOSED FIRE EXTINGUISHERS AT DIFFERENT LOCATIONS

LOCATION	TYPE OF FIRE EXTINGUISHERS
Electrical Equipment's	CO ₂ type, foam type, dry chemical powder type
Fuel Storage Area	CO ₂ type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

Alarm system to be followed during disaster –

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

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

- All safety precautions and provisions of Metalliferous Mines Regulations (MMR), 1961 is strictly followed during all mining operations.
- Observance of all safety precautions for blasting and storage of explosives as per MMR 1961.
- Entry of unauthorized persons into mine & allied areas is completely prohibited.

- Fire-fighting and first-aid provisions in the mines office complex and mining area are provided.
- Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees and the use of same is strictly adhered to through regular monitoring.
- Training and refresher courses for all the employees working in hazardous premises.
- Working of mine, as per approved plans and regularly updating the mine plans.
- Cleaning of mine faces is regularly done.
- Handling of explosives, charging and blasting are carried out only by qualified persons following SOP.
- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Provision of high-capacity standby pumps with generator sets with enough quantity of diesel for emergency pumping especially during monsoon.
- A blasting SIREN is used at the time of blasting for audio signal.
- Before blasting and after blasting, red and green flags are displayed as visual signals.
- Warning notice boards indicating the time of blasting and NOT TO TRESPASS are displayed at prominent places.
- Regular maintenance and testing of all mining equipment were carried out as per manufacturer's guidelines.

7.4 CUMULATIVE IMPACT STUDY

For easy representation of Proposed and Existing Quarries in the Cluster are given unique codes and identifies and studied in this EIA/EMP Report.

TABLE 7.4: LIST OF QUARRIES WITHIN 500 METER RADIUS

PROPOSED QUARRY				
CODE	Name of the Owner	S.F. Nos	Extent	Status
P1	Thiru. A.Ramamoorthy, S/o. Arumugam, Katchaikatti Village, Vadipatti Taluk, Madurai – 625 218.	1131/1B, 1131/3 & 1131/4	1.36.5 ha	ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024
kTOTAL			1.36.5 ha	
EXISTING QUARRY				
CODE	Name of the Owner	S.F. No & Village	Extent	Status
E1	Thiru. Anantha Siva S/o Soundarapandian, No 551, K.K.Nagar, Alavandan,	1141/2A, 1141/2B, 1141/4B, 1142, 1144/4	2.25.46 ha	Lease Period – 04.06.2018 – 03.12.2024

Madurai – 625 020.				
E2	Thiru. M.Inbaraj S/o P.mariyappan, 4/202, Katchaikatti Road, Chinna Manaickamoatti, T.vadipatti Taluk, Madurai District	1135/7, 1159/2A, 1159/3, 1159/4, 1159/5, 1159/6, 1216/1, 1216/2, 1138, 1135/1A2, 1135/1B2, 1135/2B, 1135/5, 1135/6	3.66.0 ha	Lease Period – 20.09.2019 – 19.09.2024
TOTAL			5.91.46 ha	
EXPIRED/ABANDONED QUARRIES				
EX1	Thiru. K.Rajesh Royal Blue Metals(P) Ltd, Thathampatti Village, Vadipatti Taluk Madurai District	1144/1a, 1144/1b, 1144/6a	0.71.0	Lease Period – 19.08.2014 – 18.08.2019
EX2	Thiru. C. Sundarapandian Plot no. 551, KK Nagar, Madurai	1218/1	0.61.5	Lease Period – 21.06.2014 – 20.06.2019
TOTAL			1.32.5 ha	
TOTAL CLUSTER EXTENT			7.27.96 ha	

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

TABLE 7.5: SALIENT FEATURES OF PROPOSAL -P1

Name of the Project	Thiru. A. Ramamoorthi Rough Stone & Gravel Quarry	
S.F. No.	1131/1B, 1131/3 & 1131/4	
Extent	1.36.5 ha	
Village Taluk and District	Katchaikatti Village, Vadipatti Taluk, Madurai District.	
Land Type	patta land	
Land Ownership	It is a Patta lands. S.F.Nos 1131/1B, 1131/3 & 1131/4 Registered in the name of Thiru.Sundarapandian, s/o Sellaiya vide Patta No.5686. the applicant has obtained consent from the Pattadhar for the period of 10 years.	
Toposheet No	58-J/04	
Latitude between	10°05'20.91"N to 10°05'25.03"N	
Longitude between	78°00'26.05"E to 78°00'31.67"E	
Highest Elevation	228 m AMSL	
Lease Period	Ten years	
Mining Plan Period	Five years	
Proposed Depth of Mining	21 m bgl (1m Topsoil +20 m Rough stone)	
Geological Resources	Rough Stone in m ³	Topsoil m ³
	2,73,000	13,650
Mineable Reserves	Rough Stone in m ³	Gravel m ³

	75,025	6,439
Proposed Quantity of Production for this Mining Plan Period Five Years	75,025	6,439
Peak Production	16,390	3,339
Ultimate Pit Dimension	63 m (L) * 52 m (W) * 21 m (D) Below ground level	
	25 m (L) * 124 m (W) * 16 m (D) Below ground level	
Water Level in the surrounds area	57m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards southern side. The altitude of the area is 228 m (max) above mean sea level. The area is covered by 1 m thickness of Topsoil Formation. Massive Charnockite is found after 1 m (Topsoil Formation) which is clearly inferred from the nearby existing quarrying pit on the southern side	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 Nos
	Excavator with Bucket and Rock Breaker	1 No
	Tipper	2 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	34 Nos	
Project Cost	Rs.42,52,000/-	
EMP cost	Rs. 3,80,000/-	
Total Project cost	Rs.46,35,000	
CER Cost	Rs 5,00,000	
Nearby Water Bodies	Odai	Adjacent to the lease applied area on Northern side, hence 50m safety distance provided
	Odai	190m North
	Mullai Periyar Channel	3.6 Km SW
	Tank	5.7 km SW
	Santhaiyar River	7.0 km NE
	Santhaiyar Dam	7.7 km NE
	Vaigai River	9.0 km SW
Greenbelt Development Plan	Proposed to plant 680 trees in the 7.5 m Safety Zone, panchayat road etc..	

Proposed Water Requirement	1.5 KLD
Nearest Habitation	570m – SW
Nearest Reserve Forest	Waguthumalai R.F – 207.75 Km – NorthEast
Nearest Wild Life Sanctuary	Kadavur Slender Loris Sanctuary – 36 km – North East Kodaikanal wildlife Sanctuary – 36 km Northwest

Source: Approved Mining Plan

TABLE 7.6: SALIENT FEATURES OF PROPOSAL “E1”

Name of the Quarry	Thiru. S. Ananthasiva Rough Stone abd Gravel Quarry Project	
Toposheet No	58-J/02	
Latitude between	10°05'14.74"N to 10°05'20.75"N	
Longitude between	78°00'29.18"E to 78°00'34.14"E	
Proposed Depth of Mining	17m bgl	
Geological Resources	Rough Stone in m ³	Gravel m ³
	6,77,640	45,176
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	1,83,250	36,954
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs. 18,75,000/-	
CER Cost	Rs 5,00,000 /-	

TABLE 7.7: SALIENT FEATURES OF PROPOSAL “E2”

Name of the Quarry	Thiru. M. Inbaraj Rough Stone and Gravel Quarry Project	
Toposheet No	58-J/04	
Latitude between	10°05'05"N to 10°05'12"N	
Longitude between	78°00'28"E to 78°00'38"E	
Proposed Depth of Mining	10m bgl	
Geological Resources	Rough Stone in m ³	Gravel m ³
	5,78,690	42,558

Mineable Reserves	Rough Stone in m ³	Gravel m ³
	1,90,369	38,454
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	20 Nos	
Project Cost	Rs. 83,16,880/-	
CER Cost	Rs 5,00,000 /-	

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the quarries (proposed and existing) within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting.

Air Environment –

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.5& 7.9

TABLE 7.10: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Quarry	PROPOSED PRODUCTION DETAILS			
	5 /10 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
P1	75,025	15,005	50	4
Total	75,025	15,005	50	4
E1	1,83,250	36,650	122	10
E2	1,90,369	38,073	126	11
Total	3,73,619	74,723	248	21
Grand Total	4,48,644	89,728	298	25

TABLE 7.11: CUMULATIVE PRODUCTION LOAD OF TOPSOIL

Quarry	PROPOSED PRODUCTION DETAILS			
	2 - 3 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
P1	6,439	3,219	10	1
Total	6,439	3,219	10	1
E1	36,954	12,318	41	3
E2	38,454	12,818	43	4
Total	75,408	25,136	84	7
Grand Total	81,847	28,355	94	8

On a cumulative basis considering the 2 quarries it can be seen that the overall production of Rough Stone is 582 m³ per day and overall production of Gravel is 132 m³ per day with a capacity of 48 trips of Rough Stone per day and 11 Trips per day of Gravel from the cluster.

Note: Per day production of Rough Stone is calculated for 5/10 Years Lease Period and for Gravel production with 1, 2 or 3 or 5 years of production period. And the load of existing quarries is covered under existing environment of the cluster.

Based on the above production quantities the emissions due to various activities in all the 2 mines includes various activities like ground preparation, excavation, handling and transport of ore. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 7.14.

TABLE 7.12: EMISSION ESTIMATION FROM QUARRIES WITHIN 500 METER RADIUS

EMISSION ESTIMATION FOR QUARRY "P1"				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.060060352	g/s
	Blasting	Point Source	0.000189040	g/s
	Mineral Loading	Point Source	0.037735221	g/s
	Haul Road	Line Source	0.002485221	g/s/m
	Overall Mine	Area Source	0.088428146	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000240941
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000037537	g/s
EMISSION ESTIMATION FOR QUARRY "E1"				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.076460368	g/s
	Blasting	Point Source	0.000632115	g/s
	Mineral Loading	Point Source	0.041326405	g/s
	Haul Road	Line Source	0.002489759	g/s/m
	Overall Mine	Area Source	0.054185359	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000512272
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000025810	g/s
EMISSION ESTIMATION FOR QUARRY "E2"				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.077339137	g/s
	Blasting	Point Source	0.000669285	g/s
	Mineral Loading	Point Source	0.041444956	g/s
	Haul Road	Line Source	0.00248998	g/s/m
	Overall Mine	Area Source	0.065829684	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000553843
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000043180	g/s

Source: Emission Calculations

TABLE 7.13: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM₁₀ in µg/m³	
Location	P1
Background	43.9
Incremental	10.61

Resultant	54.5
NAAQ Norms	100 µg/m³
PM_{2.5} in µg/m³	
Location	P1
Background	22.3
Incremental	4.81
Resultant	27.1
NAAQ Norms	60 µg/m³
SO₂ in µg/m³	
Location	P1
Background	6.7
Incremental	1.10
Resultant	7.8
NAAQ Norms	80 µg/m³
NO_x in µg/m³	
Location	P1
Background	21.4
Incremental	7.30
Resultant	28.7
NAAQ Norms	80 µg/m³

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.

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using 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 & 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.

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

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

Source data has been computed taking into account of all the machinery and activities used in the mining process.

TABLE 7.14: PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	45.7	45.0	48.4	55
Habitation Near E1	44.5	45.6	48.1	
Habitation Near E2	43.4	45.6	47.7	

Source: Lab Monitoring Data

The incremental noise level is found within the range of 47.7 – 48.4 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (The Principal Rules were published in the Gazette of India, vide S.O.123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment(Protection) Act, 1986.).

Ground Vibrations

Ground vibrations due to mining activities in the all the 2 Mines within cluster are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from the all the 2 mines is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining areas and may cause injury to persons or damage to the structures.

Nearest Habitations from 2 mines respectively are as in below Table 7.17

TABLE 7.15: NEAREST HABITATION FROM EACH MINE

Location ID	Distance in Meters
Habitation Near P1	570
Habitation Near E1	530
Habitation Near E2	530

The ground vibrations due to the blasting in all the mines are calculated using the empirical equation for assessment of peak particle velocity (PPV) is:

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

TABLE 7.16: GROUND VIBRATIONS AT 3 MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	11	570	0.133
E1	20	530	0.240
E2	21	530	0.250

Source: Blasting Calculations

From the above table, the charge per blast is considered as maximum in each mine and the resultant PPV is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Socio Economic Environment –

The 5 mines shall contribute towards CER and the community shall develop.

TABLE 7.16: SOCIO ECONOMIC BENEFITS FROM 3 MINES

Code	Project Cost	CER Cost
P1	Rs.42,52,000/-	Rs 5,00,000/-
Total	Rs.42,52,000/-	Rs 5,00,000/-
E1	Rs. 18,75,000/-	Rs 5,00,000/-
E2	Rs. 20,55,000/-	Rs.5,00,000/-
Total	Rs. 39,30,000/-	Rs 10,00,000/-
Grand Total	Rs. 81,82,000/-	Rs.15,00,000/-

As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is ≤ 100 crores, they shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC.

- Proposed project shall fund towards CER – **Rs 5,00,000/-**
- Existing project shall fund towards CER – **Rs 10,00,000/-**
- 3 Projects in Cluster shall fund towards CER – **Rs 15,00,000/-**

TABLE 7.18: EMPLOYMENT BENEFITS FROM 3 MINES

Code	Employment
P1	34
Total	34
E1	18

E2	20
Total	38
Grand Total	72

A total of 34 people will get employment due to 1 proposed mine in cluster and 38 people are already employed at existing mines.

TABLE 7.19: GREENBELT DEVELOPMENT BENEFITS FROM 3 MINES

CODE	No of Trees proposed to be planted	Survival %	Name of the Species
P1	680	80%	Neem, Pongam,Vilvam
Total	680		
E1	1100	80%	Neem, Pongam,Vilvam
E2	1800	80%	Neem, Pongam,Vilvam
Total	2900		

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Neem, Pinnata et., in the Cluster at a rate of 3,660 Trees Planted over a period of 5 Years with Survival Rate of 80% by proposed quarry.

7.5 PLASTIC WASTE MANAGEMENT PLAN

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.

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.

TABLE 7.20: ACTION PLAN TO MANAGE PLASTIC WASTE

Sl.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 FAE's and EC

8. PROJECT BENEFITS

8.0 GENERAL

The Proposed Project for Quarrying Rough Stone and gravel quarry at Katchaikatti Village aims to produce 75,025m³ Rough Stone & 6,439 m³ of Topsoil over a period of 5 Years for Rough Stone. This will enhance the socio-economic activities in the adjoining areas and will result in these 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 34 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be opportunity for indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

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

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

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

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.5 OTHER TANGIBLE BENEFITS

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

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

CORPORATE SOCIAL RESPONSIBILITY

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

- Health Services
- Social Development
- Infrastructure Development
- Education & Sports
- Self-Employment

CSR Cost Estimation

- CSR activities will be taken up in the Katchaikatti village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.

CORPORATE ENVIRONMENT RESPONSIBILITY

For the existing quarries 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, all the mines being a green field project & Capital Investment is \leq 100 crores, they shall contribute 2% of Capital Investment towards CER.

For the proposed projects it is recommended to spent Rs 5,00,000/- towards CER Activities in the nearby Government School for Renovation or reconstruction of Existing Toilet, Providing Note books to the school library, Plantation in the school ground & any other recommendations by the School Head masters.

TABLE 8.1 CER – ACTION PLAN

Code	CER
P1	Rs 5,00,000/-

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

9. ENVIRONMENTAL COST BENEFIT ANALYSIS

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

10. 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 of 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 Thiru. A. Ramamoorthi 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 programmes 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.

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 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 programme
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.2 LAND ENVIRONMENT MANAGEMENT

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (un utilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. Aesthetic of the Environment will not be affected. There is no major vegetation in the project area during the course of quarrying operation and after completion of the quarrying operation thick plantation will be developed under greenbelt development programme.

TABLE 10.1: PROPOSED CONTROLS FOR LAND ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.3 SOIL MANAGEMENT

There is no overburden or waste anticipated from proposed project.

TABLE 10.2: PROPOSED CONTROLS FOR SOIL MANAGEMENT

CONTROL	RESPONSIBILITY
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Surface run-off from the project boundary via garland drains will be diverted to the mine pits	Mine Foreman & Mining Mate
Design haul roads and other access roads with drainage systems to minimize concentration of flow and erosion risk	Mines Manager
Empty sediment from sediment traps Maintain, repair or upgrade garland drain system	Mines Manager
Test soils for pH, EC, chloride, size & water holding capacity	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.4 WATER MANAGEMENT

In the proposed quarrying project, no process is involved for the effluent generation, only oil & grease from the machinery wash is anticipated and domestic sewage from mine office. The quarrying operation is proposed upto a depth of 21 m BGL, the water table in the area is 57 m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3: PROPOSED CONTROLS FOR WATER ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.5 AIR QUALITY MANAGEMENT

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

TABLE 10.4: PROPOSED CONTROLS FOR AIR ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.6 NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time.

TABLE 10.5: PROPOSED CONTROLS FOR NOISE ENVIRONMENT

CONTROL	RESPONSIBILITY
Development of thick greenbelt all along the Buffer Zone (7.5 Meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman
Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring shall be carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.7 GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone quarry operation creates vibration due to the blasting and movement of Heavy Earth moving machineries, fly rocks due to the blasting.

TABLE 10.6: PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

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

Source: Proposed by FAE's & EIA Co-ordinator

10.8 BIOLOGICAL ENVIRONMENT MANAGEMENT

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

Following control measures are proposed for its management and will be the responsibility of the Mines Manager.

- Greenbelt development all along the safety barrier of the project area
- It is also proposed to implement the greenbelt development programme and post plantation status will be regularly checked for every season.
- The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- Year wise greenbelt development will be recorded and monitored
 - Based on the area of plantation.
 - Period of plantation
 - Type of plantation
 - Spacing between the plants
 - Type of manuring and fertilizers and its periods
 - Lopping period, interval of watering
 - Survival rate
 - Density of plantation

- The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.8.1 Green Belt Development Plan

About 680 nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7 PROPOSED GREENBELT ACTIVITIES FOR 5 YEAR PLAN PERIOD

Year	No. of trees proposed to be planted	Area to be covered in m ²	Name of the species
I	680	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development and along village roads.	Neem, Pongamia, vilvam etc.,

Source: proposed by FAE's & EIA Coordinator

The objectives of the greenbelt development plan are –

- Provide a green belt around the periphery of the quarry area to combat the dispersal of dust in the adjoining areas,
- Protect the erosion of the soil, Conserve moisture for increasing ground water recharging,
- Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

A well-planned Green Belt with multi rows (three tiers) preferably with long canopy leaves shall be developed with dense plantations around the boundary and haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

10.8.2 Species Recommended for Plantation

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

- Creating of bio-diversity.
- Fast growing, thick canopy cover, perennial and evergreen large leaf area,
- Efficient in absorbing pollutants without major effects on natural growth

TABLE 10.8: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT

S.No	Botanical Name	Local Name	Importance
1.	Azadirachta indica	Neem, Vembu	Neem oil & neem products
2.	Tamarindus indica	Tamarind	Edible & Medicinal and other Uses
3.	Polyalthia longifolia	Nettilinkam	Tall and evergreen tree
4.	Borassus Flabellifer	Palmyra Palm	Tall Wind breaker tree and its fruits are edible

Source: Proposed by FAE's & EIA Coordinator

10.9 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

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

10.9.1 Medical Surveillance and Examinations

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

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

- General Physical Examination and Blood Pressure
- X-ray Chest and ECG
- Sputum test
- Detailed Routine Blood and Urine examination

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

TABLE 10.9: MEDICAL EXAMINATION SCHEDULE

S. No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check - up					
B	Audiometric Test					
C	Eye Check - up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					

Medical Follow ups:- Work force will be divided into three targeted groups age wise as follows:-		
Age Group	PME as per Mines Rules 1955	Special Examination
Less than 25 years	Once in a Three Years	In case of emergencies
Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

10.9.2 Proposed Occupational Health and Safety Measures

-
- The mine site will have adequate drinking water supply so that workers do not get dehydrated.
 - Lightweight and loose-fitting clothes having light colours will be preferred to wear.
 - Noise exposure measurements will be taken to determine the need for noise control strategies.
 - The personal protective equipment will be provided for mine workers.
 - Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
 - At noisy working activity, exposure time will be minimized.
 - Dust generating sources will be identified and proper control measure will be adopted.
 - Periodic medical examinations will be provided for all workers.
 - Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
 - The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
 - In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipment's will be provided to them.
 - A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
 - Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS

10.9.3 Health and Safety Training Programme

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

TABLE 10.10: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation Ground control hazards Occupational health hazards Electrical hazards First aid Explosives
Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul road maintenance,	Employees assigned to new work tasks	Before new Assignments	Variable	Task-specific health & safety procedures and SOP for various mining activity. Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	Required health and safety standards Transportation controls Communication systems Escape ways, emergency evacuations Fire warning Ground control hazards First aid Electrical hazards Accident prevention Explosives Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	Hazard recognition and avoidance Emergency evacuation procedures Health standards Safety rules Respiratory devices

Source: Proposed by FAE's & EIA Coordinator as per DGMS Norms

10.9.4.: Budgetary Provision for Environmental Management –

Adequate budgetary provision has been made by the Company for execution of Environmental Management Plan. The Table 10.11 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.11: EMP BUDGET FOR PROPOSED PROJECT

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	13650	13650
	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
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance - 2 Units	50000	5000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per Truck/Dumper deployed - 2 Units	10000	500
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000
	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	27300
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be during operation of transportation vehicles, 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 implements 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 / Compentent 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 Tonnes of Blasted Material	0	195065
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	5000	20000
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
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	13650	5000
	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	273000	10000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 680 Trees - (580 Inside Lease Area & 100 Outside Lease Area)	Site clearance, preparation of land, digging of pits / trenches, soil amendmets, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring)	116000	17400

		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	30000	3000
	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	#47700	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 Budge and not necessarily implemented in the Project Site	#675225	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
	Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 34 Employees	84000	21000
	Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	21000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	2730
	Slope stability action plan	Slope stability action plan in the end of fourth year plan period	200000	0
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	68250	10000

	vehicles /HEMMs. Flaggers will be deployed for traffic management			
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoeEF & CC OM	500000	0
TOTAL			2318550	1288645

*Marked cost is already discussed in the mining plan hence that is not included in the total Environmental Management plan cost Total Cost for the five years

Year	Total Cost
1 st	₹ 36,07,195/-
2 nd	₹ 13,53,077/-
3 rd	₹ 14,20,731/-
4 th	₹ 14,91,768/-
5 th	₹ 16,14,056/-
Total	95 LAKHS

Cost inflation 5% per annum

Note: This Environmental Management plan cost will vary according to the public consultation comments

10.10 CONCLUSION –

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

11. SUMMARY AND CONCLUSION

Thiru. A. Ramamoorthi Rough Stone and Gravel Quarry Extent:1.36.5 Ha consisting of 1 Proposed,2 Existing Quarries falls under “B” category as per MoEF & CC Notification S.O. 3977 (E).

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B-1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed projects are categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance. “Draft EIA report prepared on the basis of ToR issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”.

Environmental monitoring and audit mechanism have been recommended before and after commencement of the project, where necessary, to verify the accuracy of the EIA predictions and the effectiveness of recommended mitigation measures.

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the months March– May2024 for various environmental components so as to assess the anticipated impacts of quarry project on the environment and suitable mitigation measures for likely adverse impacts due to the proposed project is suggested individually for the respective proposed project under Chapter 10.

The project proponent ensures to obtain necessary clearances and quarrying will be carried out as per rules and regulations. The Mining Activity will be carried out in a phased manner as per the approved mining plan after obtaining EC, CTO from TNPCB, execution of lease deed and obtaining DGMS Permission and working will be carried out under the supervision of Competent Persons employed.

Overall, the EIA report has predicted that the project will comply with all environment standards and legislation after commencement of the project and operational stage mitigation measures are implemented.

Mining operations has positive impact on environment and socio economy such as landscape improvement, water as by-product, economy development and better public services, providing and supply of Rough Stone as per market demand.

Sustainable and modern mining leads us to see positive impact of mining operation and providing consistent employment for nearly 34 people directly in the proposed projects and indirectly around 50 people.

As discussed, it is safe to say that the proposed quarries are not likely to cause any significant impact to the ecology of the area, as adequate preventive measures will be adopted to keep the various pollutants within the permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigate technique, as well as to serve as biological indicators for the pollutants released from the Thiru. A. Ramamoorthi Rough Stone and Gravel Quarry Extent:1.36.50 Ha.

12. DISCLOSURE OF CONSULTANT

The Project Proponent –

Thiru. A. Ramamoorthi have engaged M/s Geo Exploration and Mining Solutions, an Accredited Organization under Quality Council of India – National Accreditation Board for Education & Training, New Delhi, for carrying out the EIA Study as per the ToR Issued.

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaita Ashram Road,
Alagapuram, Salem – 636 004
Tamil Nadu, India
Email: infogeoexploration@gmail.com
Web: www.gemssalem.com
Phone: 0427 2431989.

The Accredited Experts and associated members who were engaged for this EIA study as given below –

Sl.No.	Name of the expert	In house/ Empanelled	EIA Coordinator		FAE	
			Sector	Category	Sector	Category
1	Dr. M. Ifthikhar Ahmed	In-house	1	A	WP GEO SC	B A A
2	Dr. P. Thangaraju	In-house	-	-	HG GEO	A A
3	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	B A B
4	Mr. N. Senthilkumar	Empanelled	38 28	B B	AQ WP RH	B B A
5	Mrs. Jisha parameswaran	In-house	-	-	SW	B
6	Mr. Govindasamy	In-house	-	-	WP	B
7	Mrs. K. Anitha	In-house	-	-	SE	A
8	Mrs. Amirtham	In-house	-	-	EB	B
9	Mr. Alagappa Moses	Empanelled	-	-	EB	A
10	Mr. A. Allimuthu	In-house	-	-	LU	B
11	Mr. S. Pavel	Empanelled	-	-	RH	B
12	Mr. J. R. Vikram Krishna	Empanelled	-	-	SHW	A

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

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the Draft EIA & EMP report prepared for our Rough Stone and Gravel quarry situated in S.F. No 1131/1B, 1131/3 & 1131/4, over an extent of 1.36.50 1Ha in Katchaikatti Village, Vadipai Taluk, Madurai District, Tamil Nadu State. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

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

Name: **Dr. M. Ifthikhar Ahmed**

Designation: **EIA Coordinator**

Date & Signature:

Dr. M. Ifthikhar Ahmed


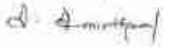










Period of Involvement: **January 2024 to till date**

Associated Team Member with EIA Coordinator:

1. **Mr. Viswanathan**
2. **Mr. Santhoshkumar**
3. **Mr. S. Ilavarasan**

FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT




Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	<ul style="list-style-type: none"> ▪ Identification of different sources of air pollution due to the proposed mine activity ▪ Prediction of air pollution and propose mitigation measures / control measures 	Mr. A. Jagannathan	<i>[Signature]</i>
2	WP	<ul style="list-style-type: none"> ▪ Suggesting water treatment systems, drainage facilities ▪ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures. 	Dr. M. Ifthikhar Ahmed	<i>[Signature]</i>
			Mr. N. Senthilkumar	<i>[Signature]</i>
3	HG	<ul style="list-style-type: none"> ▪ Interpretation of ground water table and predict impact and propose mitigation measures. ▪ Analysis and description of aquifer Characteristics 	Dr. P. Thangaraju	<i>[Signature]</i>
4	GEO	<ul style="list-style-type: none"> ▪ 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. M. Ifthikhar Ahmed	<i>[Signature]</i>
			Dr. P. Thangaraju	<i>[Signature]</i>

5	SE	<ul style="list-style-type: none"> Revision in secondary data as per Census of India, 2011. Impact Assessment & Preventive Management Plan Corporate Environment Responsibility. 	Mrs. K. Anitha	
6	EB	<ul style="list-style-type: none"> Collection of Baseline data of Flora and Fauna. Identification of species labelled as Rare, Endangered and threatened as per IUCN list. Impact of the project on flora and fauna. Suggesting species for greenbelt development. 	Mrs. Amirtham	
			Mr. Alagappa Moses	
7	RH	<ul style="list-style-type: none"> Identification of hazards and hazardous substances Risks and consequences analysis Vulnerability assessment Preparation of Emergency Preparedness Plan Management plan for safety. 	Mr. N. Senthilkumar	
			Mr. S. Pavel	
			Mr. J. R. Vikram Krishna	
8	LU	<ul style="list-style-type: none"> Construction of Land use Map Impact of project on surrounding land use Suggesting post closure sustainable land use and mitigative measures. 	Mr. A. Allimuthu	
9	NV	<ul style="list-style-type: none"> Identify impacts due to noise and vibrations Suggesting appropriate mitigation measures for EMP. 	Mr. A. Jagannathan	
10	AQ	<ul style="list-style-type: none"> Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. Recommending mitigations measures for EMP 	Mr. N. Senthilkumar	
11	SC	<ul style="list-style-type: none"> Assessing the impact on soil environment and proposed mitigation measures for soil conservation 	Dr. M. Ifthikhar Ahmed	
12	SHW	<ul style="list-style-type: none"> Identify source of generation of non-hazardous solid waste and hazardous waste. Suggesting measures for minimization of generation of waste and how it can be reused or recycled. 	Mr. A. Jagannathan	
			Mr. J. R. Vikram Krishna	

LIST OF TEAM MEMBERS ENGAGED IN THIS PROJECT

Sl.No.	Name	Functional Area	Involvement	Signature
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1	Mr. S. Nagamani	AP; GEO; AQ	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures ▪ Provide inputs on Geological Aspects ▪ Analyse & provide inputs and assist FAE with meteorological data, emission estimation, AERMOD modelling and suggesting control measures 	<i>S. Nagamani</i>
2	Mr. Viswathanan	AP; WP; LU	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures ▪ Assisting FAE on sources of water pollution, its impacts and suggest control measures ▪ Assisting FAE in preparation of land use maps 	<i>P. Viswathanan</i>
3	Mr. Santhoshkumar	GEO; SC	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs on Geological Aspects ▪ Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts 	<i>Mr. Santhosh Kumar</i>
4	Mr. Umamahesvaran	GEO	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs on Geological Aspects ▪ Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan 	<i>S. Umamahesvaran</i>
5	Mr. A. Allimuthu	SE	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of data's ▪ Provide inputs by analysing primary and secondary data 	<i>A. Allimuthu</i>
6	Mr. S. Ilavarasan	LU; SC	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assisting FAE in preparation of land use maps ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts 	<i>S. Ilavarasan</i>
7	Mr. E. Vadivel	HG	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE & provide inputs on aquifer characteristics, ground water level/table ▪ Assist with methods of ground water recharge and conduct pump test, flow rate 	<i>E. Vadivel</i>

8	Mr. D. Dinesh	NV	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE and provide inputs on impacts due to proposed mine activity and suggest mitigation measures ▪ Assist FAE with prediction modelling 	
9	Mr. Panneer Selvam	EB	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of baseline data ▪ Provide inputs and assist with labelling of Flora and Fauna 	
10	Mrs. Nathiya	EB	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of baseline data ▪ Provide inputs and assist with labelling of Flora and Fauna 	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. M. Ifthikhar Ahmed, Managing Partner, Geo Exploration and Mining Solutions, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared the Draft EIA & EMP report prepared for our Rough stone and Gravel quarry situated in S.F. No 1131/1B, 1131/3 & 1131/4, over an extent of 1.36.50Ha in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature & Date:



Name:

Dr. M. Ifthikhar Ahmed

Designation:

Managing Partner

Name of the EIA Consultant Organization:

M/s. Geo Exploration and Mining Solutions

NABET Certificate No & Issue Date:

NABET/EIA/2225/RA 0276 Dated: 20-2-2023

Validity:

Valid till 06.08.2025

ANNEXURE
THIRU. A. RAMAMOORTHY
ROUGH STONE & GRAVEL QUARRY

S.F. Nos. 1131/1B, 1131/3 & 1131/4,
Katchaikatti Village, Vadipatti Taluk, Madurai District

EXTENT = 1.36.5 ha

ToR obtained

File No: 10811ToR Identification: TO24B0108TN5141142N Dated: 03.06.2024

Project Proponent
Thiru. A. Ramamoorthi,
S/o. Arumugam,
Katchaikatti Village,
Vadipatti Taluk,
Madurai District – 625 218.

LIST OF ANNEXURES

Annexures	DESCRIPTION	PAGE NOS
P1- THIRU. A. RAMAMOORTHY	COPY OF TERMS OF REFERENCE	1A - 14A
	COPY OF 500M RADIUS QUARRIES DETAILS LETTER	15A - 17A
	COPY OF MINING PLAN APPROVED LETTER	18A - 20A
	COPY OF APPROVED MINING PLAN WITH PLATES	21A – 88A
	COPY OF HYDROGEOLOGICAL REPORT	89A - 105A
	COPY OF EXPLOSIVE LETTER	106A – 108A
	COPY 300m AND VAO ATTESTATION LETTER	109A – 110A
E1 THIRU. ANANTHA SIVA	COPY OF PRECISE AREA COMMUNICATION LETTER	111A – 112A
	COPY OF BASE LINE MONITORING DATA	113A – 154A
	COPY OF CONSULTANT ACCREDITATION CERTIFICATE	155A



सत्यमेव जयते

File No: 10811
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment
Authority(SEIAA), TAMIL NADU)



Dated 03/06/2024



To,

ARUMUGAM RAMAMOORTHY
ARUMUGAM RAMAMOORTHY
Katchaikatti Village, Vadipatti Taluk, Madurai District , Madurai, MADURAI, TAMIL NADU, 625218
sundarapandianc4050@gmail.com

Subject: Grant of Terms of Reference (ToR) along with Public Hearing along with Public Hearing under the provision of the EIA Notification 2006-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference (ToR) along with Public Hearing under the provision of the EIA Notification 2006-regarding in respect of project A.Ramamoorthi, Rough Stone and Gravel Quarry Extent: 1.36.5ha S.F.Nos. 1131/1B, 1131/3 & 1131/4 of Katchaikatti Village, Vadipatti Taluk, Madurai District. submitted to Ministry vide proposal number SIA/TN/MIN/467876/2024 dated 02/05/2024.

Ref:1. Online proposal No. SIA/TN/MIN/467876/2024, Dated:30.03.2024.

2. Your application submitted for Terms of Reference dated:08.04.2024.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO24B0108TN5141142N
(ii) File No.	10811
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals A.Ramamoorthi, Rough Stone and Gravel Quarry Extent: 1.36.5ha S.F.Nos. 1131/1B, 1131/3 & 1131/4 of Katchaikatti Village, Vadipatti Taluk, Madurai District.
(vii) Name of Project	
(viii) Name of Company/Organization	ARUMUGAM RAMAMOORTHY
(ix) Location of Project (District, State)	MADURAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the Ministry for an appraisal by the State Environment Impact Assessment Authority (SEIAA) under the provision of EIA notification 2006 and its subsequent amendments.
4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority(SEIAA) Appraisal Committee of SEIAA in the meeting held on 24/05/2024. 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.
5. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference (ToR) along 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).
6. 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 grant Terms of Reference for instant proposal of Thiru. ARUMUGAM RAMAMOORTHY under the provisions of EIA Notification, 2006 and as amended thereof.
7. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
8. The Terms of Reference 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.
9. This issues with the approval of the Competent Authority.
10. 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 Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. The APCCF (C), Regional Office, MoEF& CC (SZ), 34, HEPC Building, 1st& 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai -34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
6. The District Collector, Madurai District.
7. Stock File.

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Seiaa Specific Conditions:

S. No	Terms of Reference
1.1	The Authority accepts the recommendation of SEAC and decided to grant Terms of Reference

S. No	Terms of Reference
	(ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC

2. Seac Conditions - Site Specific

S. No	Terms of Reference
2.1	<ol style="list-style-type: none"> 1. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 500 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. 2. The Proponent shall study the details of water course situated adjacent to the proposed lease area such as its origin, flow direction, end point etc., 3. The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal. 4. The study on impact of the proposed quarrying operations on the surrounding environment which includes reserve forest, water bodies, etc. 5. The Project Proponent shall furnish the revised EMP based on the study carried out on impact of the dust & other environmental impacts due to proposed quarrying operations on the nearby agricultural lands for remaining life of the mine in the format prescribed by the SEAC considering the cluster situation.

3. Seac Standard Conditions

S. No	Terms of Reference
3.1	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m. 2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site. 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.

S. No	Terms of Reference
	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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,</p> <p>13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?</p> <p>14. Quantity of minerals mined out.</p> <ul style="list-style-type: none"> ● 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. <p>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).</p> <p>16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,</p> <p>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.</p> <p>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.</p> <p>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.</p>

S. No	Terms of Reference
	<p>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.</p> <p>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.</p> <p>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.</p> <p>23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>28. Impact on local transport infrastructure due to the Project should be indicated.</p> <p>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.</p> <p>30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.</p> <p>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.</p> <p>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.</p> <p>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</p>

S. No	Terms of Reference
	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p> <p>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.</p>

4. Seiaa Standard Conditions:

S. No	Terms of Reference
4.1	<p>Cluster Management Committee</p> <ol style="list-style-type: none"> 1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry. 2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc., 3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines. 4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. 5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. 6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail. 7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.

S. No	Terms of Reference
	<p>8. The committee shall furnish the Emergency Management plan within the cluster.</p> <p>9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.</p> <p>10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.</p> <p>11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.</p> <p>Impact study of mining</p> <p>12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following</p> <p>a) Soil health & soil biological, physical land chemical features .</p> <p>b) Climate change leading to Droughts, Floods etc.</p> <p>c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.</p> <p>d) Possibilities of water contamination and impact on aquatic ecosystem health.</p> <p>e) Agriculture, Forestry & Traditional practices.</p> <p>f) Hydrothermal/Geothermal effect due to destruction in the Environment.</p> <p>g) Bio-geochemical processes and its foot prints including environmental stress.</p> <p>h) Sediment geochemistry in the surface streams.</p> <p>Agriculture & Agro-Biodiversity</p> <p>13. Impact on surrounding agricultural fields around the proposed mining Area.</p> <p>14. Impact on soil flora & vegetation around the project site.</p> <p>15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.</p> <p>16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.</p> <p>17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.</p> <p>18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.</p> <p>Forests</p> <p>19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.</p> <p>20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.</p> <p>21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.</p> <p>22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.</p> <p>Water Environment</p> <p>23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.</p> <p>24. Erosion Control measures.</p> <p>25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.</p> <p>26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.</p>

S. No	Terms of Reference
	<p>27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.</p> <p>28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.</p> <p>29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.</p> <p>30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.</p> <p>Energy</p> <p>31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.</p> <p>Climate Change</p> <p>32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.</p> <p>33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.</p> <p>Mine Closure Plan</p> <p>34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.</p> <p>EMP</p> <p>35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.</p> <p>36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.</p> <p>Risk Assessment</p> <p>37. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.</p> <p>Disaster Management Plan</p> <p>38. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.</p> <p>Others</p> <p>39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.</p> <p>40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.</p> <p>41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.</p>

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	An EIA-EMP Report shall be prepared for peak capacity (.....MTPA)operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of mineral production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
1.3	Propoer KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of lengthe, quantity and quality of water to be diverted
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.

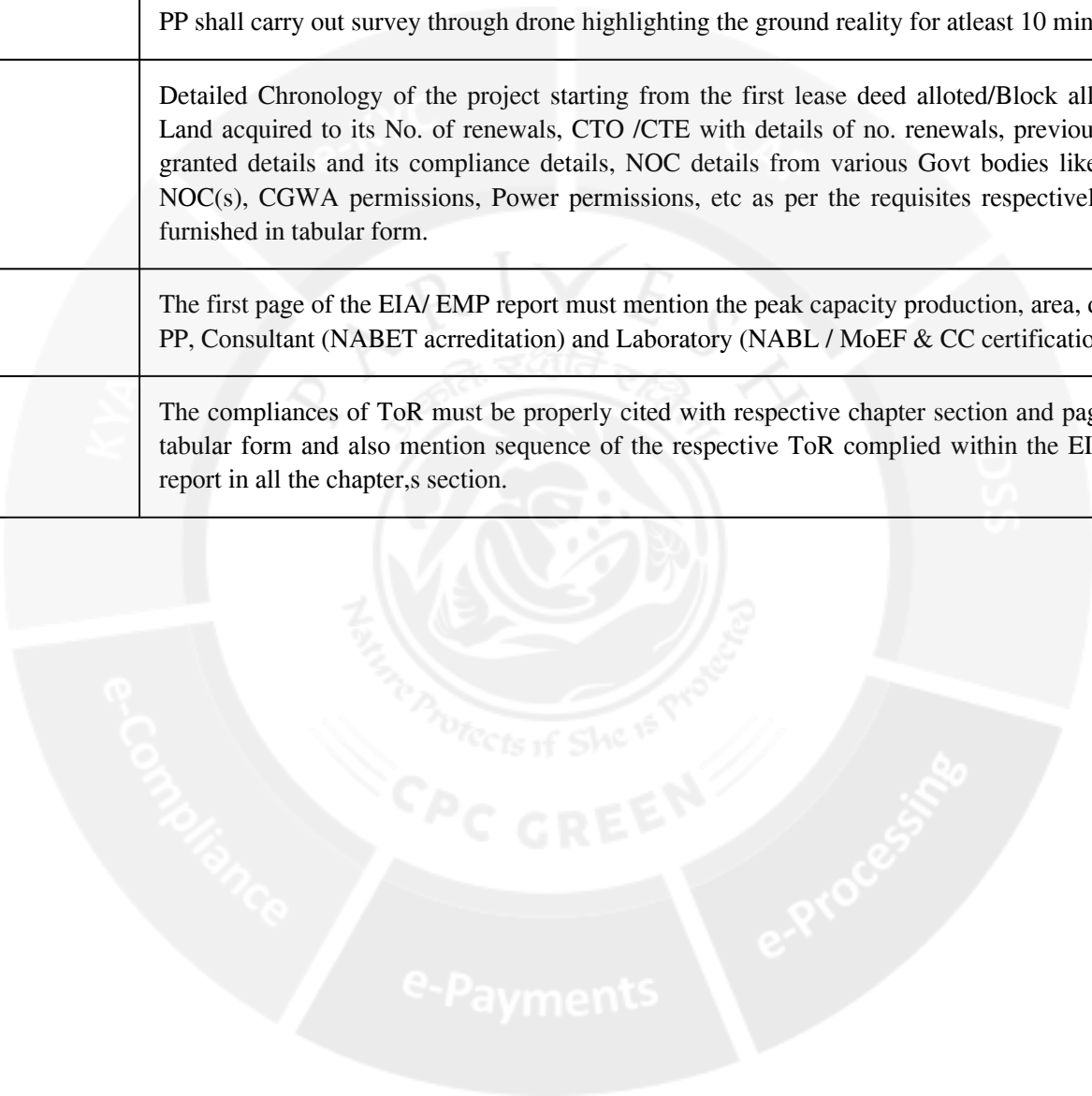
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1.11	<p>A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.</p>																																																						
1.12	<p>Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights</p> <table border="1"> <thead> <tr> <th>S.N</th> <th>ML/Project use</th> <th>Land Area Surface Rights(ha)</th> <th>Area under Surface Rights(ha)</th> <th>Area Under Mining Rights(ha)</th> <th>Area under Both (ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Agricultural land</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Forest Land</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Grazing Land</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Settlements</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Others (specify)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Details</th> <th>Area (ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Buildings</td> <td></td> </tr> <tr> <td>2</td> <td>Infrastructure</td> <td></td> </tr> <tr> <td>3</td> <td>Roads</td> <td></td> </tr> <tr> <td>4</td> <td>Others (specify)</td> <td></td> </tr> <tr> <td></td> <td>Total</td> <td></td> </tr> </tbody> </table>	S.N	ML/Project use	Land Area Surface Rights(ha)	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under Both (ha)	1	Agricultural land					2	Forest Land					3	Grazing Land					4	Settlements					5	Others (specify)					S.N.	Details	Area (ha)	1	Buildings		2	Infrastructure		3	Roads		4	Others (specify)			Total	
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1.13	<p>Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.</p>																																																						
1.14	<p>One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.</p>																																																						
1.15	<p>Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting</p>																																																						

S. No	Terms of Reference
	sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.

S. No	Terms of Reference
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored
1.27	PP to evaluate the green house emission gases from the mine operation and corresponding carbon absorption plan.
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route.
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.

S. No	Terms of Reference																																			
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with the schedule of the implementation of the R&R Plan should be given.																																			
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.																																			
1.38	Corporate Environment Responsibility:																																			
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.																																			
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.																																			
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.																																			
1.42	d) To have proper checks and balances, the company should have a well laid down 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.																																			
1.43	e) Environment Managment Cell and its responsibilities to be clearly spleel out in EIA/ EMP report																																			
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.																																			
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.																																			
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.																																			
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.																																			
1.48	<p>Details on the Forest Clearance should be given as per the format given:</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;">Total ML Total</td> <td style="width: 15%;">Date</td> <td style="width: 15%;">Extent</td> <td style="width: 15%;">ofBalance</td> <td style="width: 15%;">area</td> <td style="width: 15%;">forStatus of appl For</td> </tr> <tr> <td></td> <td>Project Area Forest</td> <td>of FC</td> <td>Forest</td> <td>which FC is yet to</td> <td>obtained</td> <td>be diversion of forest</td> </tr> <tr> <td></td> <td>(ha)</td> <td></td> <td>Land</td> <td></td> <td></td> <td>land</td> </tr> <tr> <td></td> <td>land (ha)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td colspan="6">If more than one provide details of each FC</td> </tr> </table>		Total ML Total	Date	Extent	ofBalance	area	forStatus of appl For		Project Area Forest	of FC	Forest	which FC is yet to	obtained	be diversion of forest		(ha)		Land			land		land (ha)							If more than one provide details of each FC					
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S. No	Terms of Reference
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes
1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.



Signature Not Verified

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

Date: 03/06/2024

From

Thiru.G.Gurusamy, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Madurai.

To

Thiru.A.Ramamoorthy,
S/o.Arumugam,
Katchaikatti Village,
Vadipatti Village,
Madurai - 625 218.

Roc. No.255/Mines/2023-2, dated. 14.12.2023

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone and Gravel - Madurai District - Vadipatti Taluk - Katchaikatti Village - Patta lands - S.F. Nos. 1131/1B, 1131/3 & 1131/4 Over an extent of 1.36.5 Hects - Application preferred by Thiru.A.Ramamoorthy - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - 500m details requested - Furnished - Reg.

- Ref:
1. Quarry lease application preferred by Thiru.A.Ramamoorthy, dated.Nil.
 2. Precise area communication letter Roc No.255/Mines/2023, dated.27.09.2023.
 3. Letter dated.13.12.2023. Received from Thiru.A.Ramamoorthy along with draft mining plan on 13.12.2023
 4. This office letter even, dated. 13.12.2023.
 5. Letter dated Nil. Received from Thiru.A.Ramamoorthy on 13.12.2023.

Thiru.A.Ramamoorthy has preferred an application for the grant of lease to quarry Rough stone and Gravel over an extent of 1.36.5 hectares of patta lands in SF.Nos.1131/1B , 1131/3 & 1131/4 of Katchaikatti Village, Vadipatti Taluk under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

Based on reports and recommendations of the Revenue Divisional Officer, Madurai and Assistant Geologist (Mines), precise area was communicated to the applicant vide reference 2nd cited with a direction to submit mining plan as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly Thiru.A.Ramamoorthy has submitted the draft Mining Plan and the same has been approved on 13.12.2023. In this connection the applicant has requested to furnish the details of quarry lease / mining lease situated within 500 mts radius from the subject quarry for obtaining Environment Clearance from the State level Environment Impact Assessment Authority.

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

a. Existing Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecets)	Collector's Proceedings No & date	Lease period
1.	Anantha Siva.S, S/o, Soundarapandian, No. 551, K.K. Nagar, Alavandan Madurai - 625 020	Vadipatti / Katchaikatti	1141/2A (0.47.0), 1141/2B (0.51.5), 1141/4B (0.17.5), 1142 (0.51.0), 1144/4 (0.37.0) & 1131/8B2. (0.21.46)	2.25.4 6	Rec.No. 762/2017, Dt 08.03.2018 & Rc.No.358/Mine s/ 2023, Dated: 25.04.2023	04.06.2018 - 03.06.2023 Extension period 04.06.2023 to 03.12.2024
2.	Inbaraj.M, S/o. P.Mariyappan, 4/202, Katchaikatti Road, Chinna manaickampatti, T.Vadipatti Taluk, Madurai District	Vadipatti / Katchaikatti	1135/7 (0.21.5), 1159/2A (0.91.5), 1159/3 (0.16.0), 1159/4 (0.08.0), 1159/5 (0.06.5), 1159/6 (0.08.0), 1216/1 (0.44.0), 1216/2 (0.26.0), 1138 (0.52.0), 1135/1A2 (0.09.0), 1135/1B2 (0.13.5), 1135/2B (0.23.5), 1135/5 (0.26.5) & 1135/6 (0.20.0)	3.66.0	Rec.No. 1001/2016, Dt 18.09.2019	20.09.2019 - 19.09.2024

b. Expired / Abandoned Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecst)	Collector's Proceedings No & date	Lease period
1.	K.Rajesh, Royal Blue Metals (P) Ltd., Thathampatti Village, Vadipatti	Katchaikatti	1144/1a (0.24.5), 1144/1b (0.20.0) & 1144/6a (0.26.5)	0.71.0	Re.No.338/2012 dated.10.06.2014	19.08.2014 - 18.08.2019
	C.Sundara pandian, Plot.No.551, K.K.Nagar, Madurai	Katchaikatti	1218/1	0.61.5	Rec.No.534/ 2012 Dt 10.06.2014	21.06.2014 - 20.06.2019

c. Proposed Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecst)
1.	Thiru.A.Ramamoorthy	Katchaikatti	1131/1B, 1131/3 & 1131/4	1.36.5

GM
14/12/2022
Deputy Director,
Dept. of Geology and Mining,
Madurai

Copy to:

WJ
14/12/22
The Chairman,
State Level Environment Impact,
Assessment Authority, Tamil Nadu,
3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet, Chennai-15.

From

Thiru.G.Gurusamy, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Madurai.

To

Thiru.A.Ramamoorthy,
S/o.Arumugam,
Katchaikatti Village,
Vadipatti Village,
Madurai - 625 218.

Roc. No.255/Mines/2023, dated.14.12.2023

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone and Gravel - Madurai District - Vadipatti Taluk - Katchaikatti Village - Patta lands - S.F. Nos. 1131/1B, 1131/3 & 1131/4 Over an extent of 1.36.5 Hects - Application preferred by Thiru.A.Ramamoorthy - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - Reg.

Ref: 1. Quarry lease application preferred by Thiru.A.Ramamoorthy, dated.Nil.
2. Precise area communication letter Roc No.255/Mines/2023, dated.27.09.2023.
3. Letter dated.13.12.2023. Received from Thiru.A.Ramamoorthy along with draft mining plan on 13.12.2023

Thiru.A.Ramamoorthy has preferred an application for the grant of lease to quarry Rough stone and Gravel over an extent of 1.36.5 hectares of patta lands in SF.Nos.1131/1B, 1131/3 & 1131/4 of Katchaikatti Village, Vadipatti Taluk under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

Based on reports and recommendations of the Revenue Divisional Officer, Thirumangalam and Assistant Geologist (Mines), precise area was communicated to the applicant vide reference 2nd cited with a

direction to submit mining plan as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly, Thiru.A.Ramamoorthy has submitted the draft Mining Plan and the same has been examined in detail and found correct. The mining plan submitted by Thiru.A.Ramamoorthy in respect of the subject area is approved subject to the following conditions:

- (i). That the mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.
- (ii). This approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under the Tamil Nadu Minor Mineral Concession Rules, 1959.
- (iii). That the mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (iv). Quarrying shall be done as per the approved Mining Plan and that the mining plan is approved without prejudice to any other law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.
- (v). If anything is found to be concealed as required by the Mines Act in the contents of the Mining Plan and the proposal for

rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

- (vi). Waste material should be dumped within the lease granted area as earmarked in the Mining Plan.
- (vii). Quarrying operations and production shall be carried out as per the approved Mining Plan and the applicant shall be liable to pay the cost of mineral if there is any deviation in the quantum indicated in the approved year wise quantum of production and any such cases as on date are to be dealt with as per Court direction.
- (viii). If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules 1959 and other rules and act in force will attract.
- (ix). The applicant shall strictly adhere to the statutory and safety requirements.

Encl: Approved Mining Plan.

GM
14/12/2023
Deputy Director,
Dept. of Geology and Mining,
Madurai.

Copy To:

The Commissioner,
Department of Geology and Mining,
Guindy, Chennai - 600 032

WJ
14/12/23

MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR KATCHAIKATTI ROUGH STONE AND GRAVEL QUARRY



(PREPARED UNDER RULES 41 & 42 AS AMENDED IN TAMIL NADU MINOR MINERAL CONCESSION RULES, 1959)

Patta Lands / Lease Period = Five Years

IN

LOCATION OF THE QUARRY LEASE APPLIED AREA

EXTENT : 1.36.5 Ha
S.F.NOS : 1131/1B, 1131/3 & 1131/4
VILLAGE : KATCHAIKATTI
TALUK : VADIPATTI
DISTRICT : MADURAI
STATE : TAMIL NADU

FOR

APPLICANT

Thiru. A.Ramamoorthi,

S/o. Arumugam,
Katchaikatti Village,
Vadipatti Taluk,
Madurai District – 625 218.

PREPARED BY

Dr. M. IFTHIKHAR AHMED, M.Sc., M.B.A., F.G.S, Ph.D.,

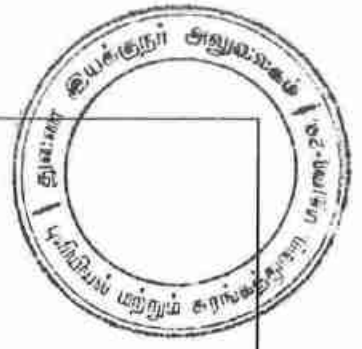
RQP/MAS/183/2004/A

Recognized Qualified Person

No.17, Advaita Ashram Road,
Alagapuram, Salem District – 636 004.

Cell: 94422 78601 & 94433 56539.

E-mail: infogeoexploration@gmail.com



A.Ramamoorthi,
S/o. Arumugam,
Katchaikatti Village,
Vadipatti Taluk,
Madurai District – 625 218.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Katchaikatti Rough Stone Quarry in S.F.Nos. 1131/1B, 1131/3 & 1131/4 over an extent of 1.36.5 Ha of Patta lands in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State has been prepared by

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,

RQP/MAS/183/2004/A

Recognized Qualified Person

I have entrusted the works to prepared the Mining plan based upon the production requirements to me as per the Mines Acts, Rules, Regulations and Amendments as on date. I request to the Deputy Director / Assistant Director (i/c), Department of Geology and Mining, Madurai District, Tamil Nadu State to make further correspondence regarding the modification of the Mining Plan with the said Qualified Person at his following address.

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,

No. 17, Advaita Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: 94422 78601 & 94433 56539.

I hereby undertake that all the responsibilities of contents in the Mining plan and if any corrections 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. If there is any substantial change during operation. I will carried out a Modified Mining plan and seek its approval from concerned Authorities.

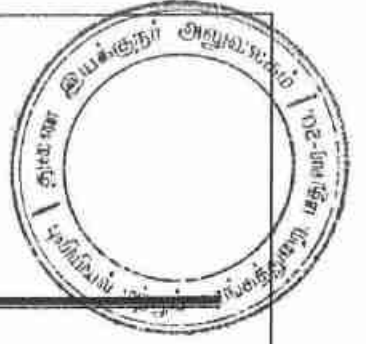
Signature of the Applicant

A.Ramamoorthi

Place: Madurai

Date: 09.10.2023

A.Ramamoorthi,
S/o. Arumugam,
Katchaikatti Village,
Vadipatti Taluk,
Madurai District – 625 218.



DECLARATION OF THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Katchaikatti Rough Stone Quarry in S.F.Nos. 1131/1B, 1131/3 & 1131/4 over an extent of 1.36.5 Ha of Patta lands in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State has been prepared in full consultation with me by

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,
RQP/MAS/183/2004/A
Recognized Qualified Person

I have understood its contents and agree to implement the same in accordance with Laws applicable to Mines and I will take all the responsibility for working the quarry in a manure under Rule 23 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Signature of the Applicant

A.Ramamoorthi

Place: Madurai
Date: 13.10.2023

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,

No. 17, Advaita Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: 94422 78601 & 94433 56539.



CERTIFICATE FROM THE RECOGNIZED QUALIFIED PERSON

This is to certify that the Provisions of under Rules 41 & 42 as per the Amended under Tamil Nadu Minor Mineral Concession Rules, 1959 have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan for Katchaikatti Rough Stone Quarry in S.F.Nos. 1131/1B, 1131/3 & 1131/4 over an extent of 1.36.5 Ha of Patta lands in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State has been prepared for

Thiru.A.Ramamoorthi,

S/o. Arumugam,

Katchaikatti Village,

Vadipatti Taluk,

Madurai District – 625 218.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of the Assistant Director, Department of Geology and Mining, Madurai District, Tamil Nadu for such permissions/ exemptions/ relaxations and approvals.

It is also certified that information furnished in the above Mining Plan are true and correct to the best of my knowledge.

Signature of the Recognized Qualified Person

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,
RQP/MAS/183/2004/A

Place: Salem

Date: 13.10.2023

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,

No. 17, Advaita Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: 94422 78601 & 94433 56539.



CERTIFICATE FROM THE RECOGNIZED QUALIFIED PERSON

Certified that the Provisions of Mines Act, Rules and Regulations and Orders made there under have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan for Katchaikatti Rough Stone Quarry in S.F.Nos. 1131/1B, 1131/3 & 1131/4 over an extent of 1.36.5 Ha of Patta lands in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State has been prepared for

Thiru.A.Ramamoorthi,

S/o. Arumugam,

Katchaikatti Village,

Vadipatti Taluk,

Madurai District – 625 218.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of Director General of Mines Safety (DGMS), No.5, II Street, Block-AA, Anna Nagar, Chennai-40, Tamil Nadu for such permissions / exemptions / relaxations and approvals.

It is also certified that information furnished in the Mining Plan are true and correct to the best of my knowledge.

Signature of the Recognized Qualified Person

Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,
RQP/MAS/183/2004/A

Place: Salem

Date: 13.10.2023

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LIST OF PLATES

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MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR KATCHAIKATTI ROUGH STONE QUARRY

(PREPARED UNDER RULES 41 & 42 AS PER THE AMENDED UNDER TAMIL NADU MINOR MINERAL
CONCESSION RULES, 1959)

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The applicant **Thiru. A.Ramamoorthi**, S/o. Arumugam, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 has entrusted and given consent to preparation of Mining plan and Progressive Mine Closure Plan as per the provisions of Mines Act, Rules, Regulations and as amended till date.

The Applicant has applied quarry lease for quarrying of Rough stone in S.F.Nos. **1131/1B, 1131/3 & 1131/4** over an extent of **1.36.5 hectares** of patta land in Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State for a period of ten years under Rules 19 (1), 20 & 33 of Tamil Nadu Minor Mineral Concession Rules, 1959.

The application was examined, Scrutinized, Inspected and processed by the Deputy Director / Assistant Director, Department of Geology and Mining, Madurai and issued a Precise Area Communication letter vide letter **Rc.No.255/Mines/2022, Dated:27.09.2023** for preparation of Mining plan as per the Rule 41 & 42 of Tamil Nadu Minor Mineral Concession Rules 1959 within 30 days and getting approval from the Department of Geology and Mining, Madurai to obtain Environmental Clearance from the State Level Environment Impact Assessment Authority (SEIAA), Tamil Nadu, with the conditions to provide:

Conditions as mentioned in the Precise Area Communication on dated 27.09.2023:

General Conditions:

1. The applicant should submit the approved mining plan and Environmental Clearance for the grant of Rough Stone quarry lease for over an extent of 1.36.5 Hectares of patta lands in S.F.Nos. 1131/1B, 1131/3 & 1131/4 of Katchaikatti Village, Vadipatti Taluk and Madurai District.
2. A safety distance of 7.5 meters to the surrounding patta lands of the lease applied area.

Specific conditions as per precise area communication letter on dated 27.09.2023

1. A safety distance of 50 meters to the Odai in S.F.No. 1130 on the North side of the lease applied area.
2. A safety distance of 50 meters to the Electric Pole and EB LT Line on the South side of the lease applied area or it has to be shifted from the applied area before the execution of lease deed.
3. A necessary safety distance to the square open well in S.F.No. 1131/1B on the West side of the lease applied area.

This Mining Plan along with Progressive Mine closure Plan is prepared in full consultation with **Thiru.A.Ramamoorthi**, S/o. Arumugam, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 for Rough stone quarry over an extent 1.36.5 hectares of patta lands in S.F.No. 1131/1B, 1131/3 & 1131/4 of Katchaikatti Village, Vadipatti Taluk, Madurai District, Tamil Nadu State under Rules 19 and 20 of Tamil Nadu Minor Mineral Concession Rules, 1959 with obtained full consent as per the application and Production schedule in preparation of Mining plan as per the provisions of Mines Act, Rules, Regulations as on date.

The Mining plan has been prepared after carrying the field survey, collection of Primary & secondary data, environmental setting, geological features and tentatively estimated the Resources & Reserves, depth of mining as identified in the field with best our knowledge and experience. This mining plan is prepared by considering the Rule 41 & 42 as Amended in Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the EIA Notification 2006 and its subsequent Amendments.

In order to ensure compliance of the order of the Honourable Supreme Court Dated: 27.02.2012 in I.A.No.12.13.2011 in Special Leave Petition SLP (C) No 19628-19629/2009, it has been now decided that all mining projects of minor minerals including their renewal is require prior environmental clearance. As per amendment in EIA Notification 2006 vide S.O. 1886(E), Dated:20.04.2022 "All mining lease area in respect of minor mineral mining leases and ≤ 250 ha mining lease area in respect of major mineral mining lease other than coal" would be treated as category B and will be considered by the state notified by Ministry of Environment, Forest and Climate Change as prescribed procedure under EIA notification 2006.

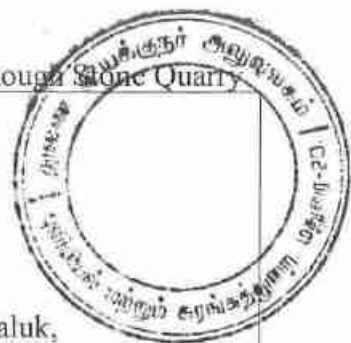
The field survey carried out by the Recognized Qualified Person and Team as on 11.10.2023.

Short Notes of Mining Plan:

- a. Village Panchayat - Katchaikatti
- b. Panchayat Union - Vadipatti
- c. The Geological Resources are **2,73,000m³** of Rough Stone and **13,650m³** of Topsoil in the entire area.
- d. The Total Mineable Reserves are **75,025m³** of Rough Stone and **6,439m³** of Topsoil in the entire area.
- e. The proposed quantity of reserves/ (level of production) to be mined are **75,025m³** of Rough Stone for five years and **6,439m³** of Topsoil for three years in the entire area.
- f. Total extent of the lease applied area = 1.36.5 Ha
- g. Topography of the area = The area exhibits plain topography



- h. Proposed Depth of mining = 21m below ground level.
- i. Lease Period = Five Years
- j. Mining plan period = Five years
- k. It is a fresh lease application.
- l. Method of mining / level of mechanization.
Opencast mechanized method, the quarry operation involves shallow jack hammer drilling, slurry blasting with NONEL initiation.
- m. Type of machineries proposed in the quarrying operation is given below:
Excavators attached with rock breaker (Rental Basis).
Shallow Jack hammer, Compressor (Diesel drive) (4 Jack hammer capacity).
- n. No trees will be uprooted due to this quarrying operation.
- o. The approach road from the main road to quarry road will be constructed and maintained in a good condition for the haulage of Rough Stone.
- p. There is No Export of this Rough Stone.
- q. Topo sketch covering 10km and 1km radius around the proposed area with markings of habitations, water bodies including streams, rivers, roads, major structure like bridges, wells, archaeological importance, places of worships are marked and enclosed as Plate Nos. IA & IB.
- r. The lease applied area is about 1.36.5 Ha bounded by thirteen corners; the corners are designated as 1-13 Clockwise from the Southwestern corner the Co – ordinates for the all the corners are clearly marked in the Quarry Lease and Surface Plan enclosed as Plate No. II.
- s. The plans of proposed quarrying area showing the dimensions of the pit, their proposed depth and maximum area of proposed quarrying are enclosed as Plate Nos. IV & V.
- t. General conditions will not be applicable for the proposed area. The area applied for lease is 10Km away from the,
- i) *Interstate Boundary,*
 - ii) *Protected area under wild life protection ACT 1972,*
 - iii) *Critically polluted areas as identified by CPCB,*
 - iv) *Notified Eco sensitive areas,*
- u. There is no waste anticipated during this quarry operation, hence waste dump is not proposed in the lease applied area.
- v. Around 21 employees are deploying in the quarrying operation.
- w. Total Cost of the project is about **Rs.47,25,000/-**.

**2.0 GENERAL INFORMATION**

2.1 a) Name of the Applicant : Thiru. A. Ramamoorthi,
S/o. Arumugam,

b) Address of the Applicant (With Phone No and Aadhaar No)

Address : Katchaikatti Village, Vadipatti Taluk,
Madurai District.

Pin Code : 625 218

Mobile No : 97913 12720 & 93606 44050

Aadhaar No : 9129 3745 4546

E-mail ID : sivabrickworks@gmail.com

c) Status of the Applicant (Individual / Company / Firm):

The applicant is an Individual.

2.2 a) Mineral which the Applicant intends to mine:

The Applicant intends to quarry Rough Stone only.

b) Precise area communication letter details received from the Competent Authority of the Government:

The precise area communication letter was received from the Deputy Director / Assistant Director (i/c), Department of Geology and Mining, Madurai District vide **Re.No.255/Mines/2022, Dated: 27.09.2023** and was given to us for the preparation of mining plan to meet out the applicant production schedule.

c) Period of permission / lease to be granted:

As per Precise area communication letter is mentioned in ten years lease period, but as per applicant's requirement of production schedule and availability of mineral reserve the life of mine is arrived five years only. Since the applicant request to grand the lease period for five years only.

d) Name and address of the Recognized Qualified Person who preparing the Mining Plan:

Name : **Dr. M.Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,**
Recognized Qualified Person

Address : No.17, Advaita Ashram Road,
Alagapuram, Salem District – 636 004.

Telephone : 0427- 2431989 (Office)

Cell No : 94422 78601 & 94433 56539

Registration No : RQP/MAS/183/2004/A

Valid Date : 10.01.2024

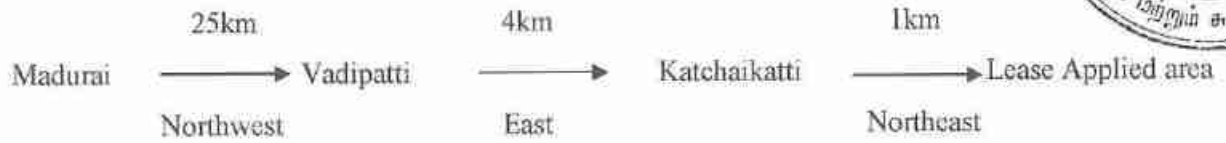
Email : infogeoexploration@gmail.com



3.0 LOCATION

a) Details of the area with location map:

The lease applied area is about 22km Northwest side of Madurai, 5km East side of Vadipatti and 1.0km Northeast side of Katchaikatti Village.



Location Map of the Lease Applied Area

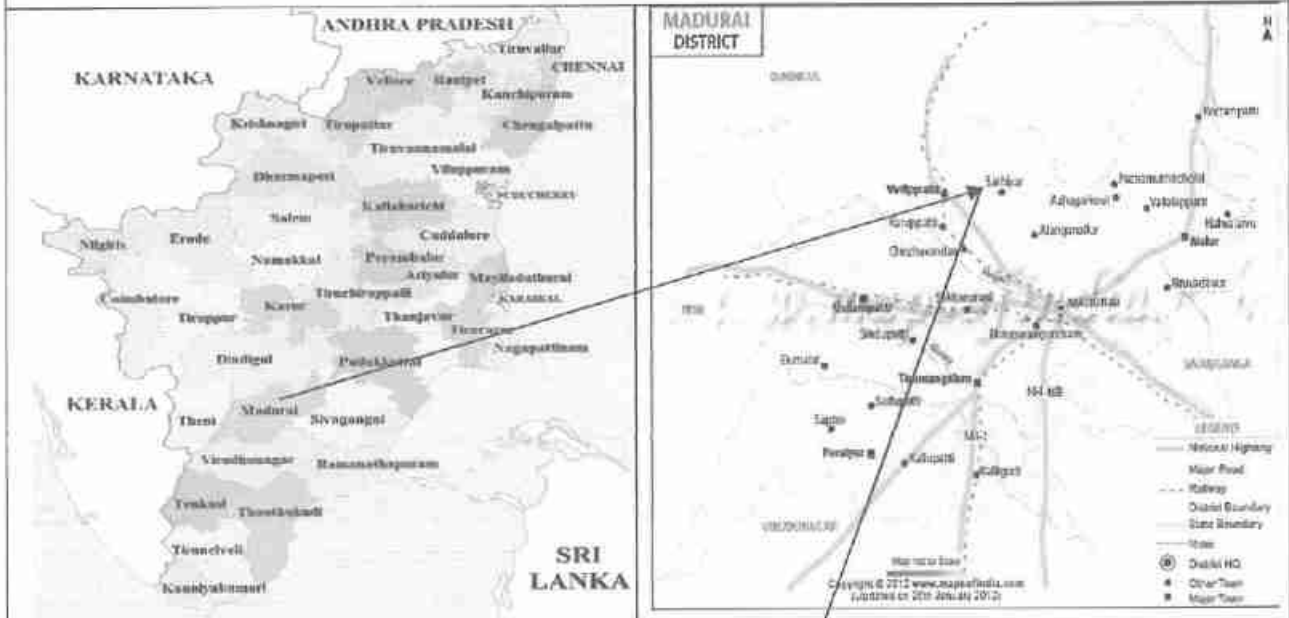


TABLE-1

District	Taluk	Village	S.F. No.	Lease Applied Area (Ha)	Patta No.
Madurai	Vadipatti	Katchaikatti	1131/1B	0.68.5	5686
			1131/3	0.43.5	
			1131/4	0.24.5	
Total Extent				1.36.5	

Source: As per the FMB and 'A' register record furnished by the applicant.

b) Classification of the area (Ryotwari/ Poramboke / others):

It is a Patta lands classified as punjai (Barren land) which is not fit for vegetation/ Cultivation.

c) Ownership / Occupancy of the applied area (surface right):

It is a Patta lands, registered in the name of Thiru. C.Sundarapandian, vide Patta No. 5686. The applicant has obtained consent from the Pattadar. Refer Annexure Nos. IV & VII.

d) Topo sheet No. with latitude and longitude:

The lease applied area falls in the Topo sheet No: 58 - J/04 Latitude between: 10°05'20.91"N to 10°05'25.03"N and Longitude between: 78°00'26.05"E to 78°00'31.67"E on WGS datum-1984. Please refer the Plate Nos. I to II.

e) Existence of public road / Railway line, if any nearby and approximate distance:

The approach (Mud) road is situated on the South side which connects to the Vadipatti – Palamedu Road at a distance of 500m of the applied area.

Road access is available from the quarry to state highways and National Highway, no villages are enrooted hence the traffic density is not much more due to the transportation of Rough Stone.

The approach road from the quarry is will be constructed and the same will be utilized for haulage and maintained during the entire lease period, tree sapling will be planted on the either side of the road to prevent dust and noise propagation to the nearby areas.

The Nearest Railway line is Madurai – Dindigul which is about 7.0km on the West side of the lease applied area.

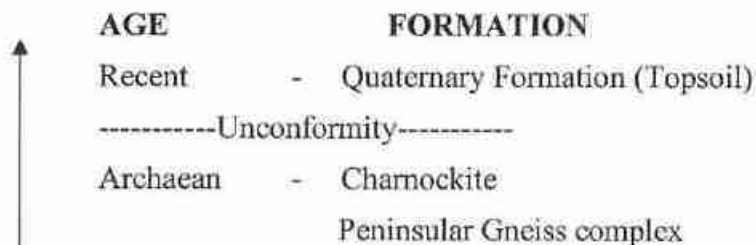
PART - A**4.0 GEOLOGY AND MINERAL RESERVES****4.1 Brief description of the Topography and general Geology of the area (with plans):**

The lease applied area exhibits plain topography. The area has gentle slopes towards Southern side. The altitude of the area is 228m (max) above Mean Sea level. The area is covered by 1m thickness of Topsoil. Massive Charnockite is found after 1m (Topsoil) which is clearly inferred from the existing quarry pit situated on the Southern side.

The Water level in the surrounding area is 57m below from general ground profile which is observed from the nearby bore wells. Average annual rainfall is about 985mm.

Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale of the Charnockite body is N40°E – S40°W with dipping towards SE60°.

The general geological sequences of the rocks in this area are given below:

**4.2 Details of exploration already carried out if any:**

State Geology and Mining Dept, Govt. of Tamil Nadu, has carried out the Regional prospecting and exploration in these areas during 1992 to 1993.

Geological Survey of India has carried out detailed mapping in Madurai District. Besides, the Qualified Person and his team members made a detailed geological study of the proposed area. The Rough stone formation is clearly inferred from the existing quarry pit situated on the Southern side.

4.3 Estimation of Reserves:**a) Geological reserves with geological sections on a scale of 1:1000 / 1:2000**

As far as Rough Stone (Charnockite) is concerned, the only practical method is the systematic geological mapping and delineation of Rough Stone within the field and careful evaluation of body luster, physical properties, engineering properties and commercial aspects etc.,

Totally three sections have been drawn, one section along the strike direction as (X-Y) Length wise and other two cross sections are drawn perpendicular to strike as (A-B & C-D) Width wise to cover the maximum area considered for lease.

The Topographical, Geological Plan and Sections demarcated the commercial marketable Rough Stone (Charnockite) deposit has been prepared in 1:1000 scale (please refer the Geological Plan and Sections Plate No. III & III-A). As the sale of Rough Stone is in terms of cubic meters (Volume) only and not in terms of tonnage.

Estimation of Geological Resources (Plate No. III):

The Geological Resources of Rough Stone are calculated up to a maximum depth of 21m (1m Topsoil + 20m Rough Stone) below ground level. The total Geological resources are calculated by area method. The total geological resources are given below:

Table - 2

GEOLOGICAL RESOURCES			
Area (m ²)	Depth (m)	Geological Resources in Rough stone (m ³)	Topsoil (m ³)
13,650	1	-	13650
13,650	20	273000	-

Total Geological Resources of Topsoil : 13,650m³

Total Geological Resources of Rough Stone : 2,73,000m³

Geological Resources has been computed based on the physical investigation and filed survey data.

Mineable Reserves:

The Mineable reserves are calculated after leaving the safety distance and bench loss to a maximum depth of 21m below ground level.

TABLE-3

MINEABLE RESERVES						
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Mineable Reserves of Rough stone in (m ³) 100%	Top soil (m ³)
XY-AB	I	63	53	1	-	3339
	II	63	52	5	16380	-
	III	58	42	5	12180	-
	IV	53	32	5	8480	-
	V	48	22	5	5280	-
	Total					42320
XY-CD	I	25	124	1	-	3100
	II	24	123	5	14760	-
	III	19	113	5	10735	-
	IV	14	103	5	7210	-
	Total					32705
Grand Total					75025	6439

The mineable reserves have been computed as 75,025m³ of Rough Stone and 6,439m³ of Topsoil at the rate of 100% recovery upto a maximum depth of 21m below ground level for a period of five years.



5.0 MINING

5.1 Method of mining (opencast / underground):

Open cast Mechanized Mining is being carried out with 5.0 meter vertical bench with a bench width is not less than the bench height.

However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) is available with Director General of Mines Safety. If the applicant/lessee intends to modify the dimensions of benches, relaxation and permission are available with Director General of Mines Safety under 106 (2) (b) of Metalliferous Mines Regulations, 1961. In such a scenario if there is any drastic change in the Resources and Reserves a modified plan will be submitted to the concerned authority for necessary relaxation, clearance and permission. The relaxation will be applied and obtained after the execution of lease deed / commencement of quarry operation.

5.2 Mode of working (mechanized, semi mechanized, manual):

The Rough Stone is proposed to quarry at 5m bench height & width with conventional Opencast Mechanized Method.

The quarry operation involves shallow jack hammer drilling, slurry explosives in blasting, excavation, Loading and transportation of Rough stone to the needy crusher.

The production of Rough stone in this quarry involves the following method which is typical for Rough Stone quarrying in contrast to other major mineral mining.

Splitting of rock mass of considerable volume from the parent rock mass by shallow jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers.

Occasionally hydraulic excavators are attached with rock breakers for fragmentation to avoid secondary blasting. The primary boulders thus splitted are removed from the pits by excavators and further made to smaller sizes by rock breakers attached in excavators. It is a conventional opencast mechanized method of mining.

5.3 Proposed Bench Height and Width:

The bench height is proposed 5.0 meter vertical bench the width of the bench is not less than the Height. After obtaining relaxation as per 106 2(b) of Metalliferous Mines Regulations, 1961 from the DMS, the realignment of benches will be carried out.

5.4 Indicate the overburden / mineral production expected pit wise as detailed below (composite plan and section showing pit layout, dumps, disposal of waste if any etc.):

The overburden in the form of Topsoil, the top soil will be safely removed and preserve all along the boundary barrier to facilitate the afforestation. The excavated rough stone will be directly loaded into tippers to the needy customers. The Composite year wise Development and production plan and sections indicating the pit lay out and green belt development are shown in Plate No- III.

As per Precise area communication letter is mentioned in ten years lease period, but as per applicant's requirement of production schedule and availability of mineral reserve the life of mine is arrived five years only. Since the applicant request to grand the lease period for five years only.

Yearwise development and Production

TABLE-4

YEARWISE DEVELOPMENT AND PRODUCTION DETAILS							
Section	Year	Bench	Length in (m)	Width in (m)	Depth in (m)	Recoverable Reserves of Rough Stone (m ³)	Topsoil (m ³)
I	XY-AB	I	63	53	1	-	3339
		II	63	52	5	16380	-
		Total				16380	3339
II	XY-CD	I	25	124	1	-	3100
		II	24	123	5	14760	-
		Total				14760	3100
III	XY-AB	III	58	42	5	12180	-
	XY-CD	III	5	113	5	2825	-
	Total				15005		
IV	XY-CD	III	14	113	5	7910	-
	XY-AB	IV	53	32	5	8480	-
	Total				16390		
V	XY-AB	V	48	22	5	5280	-
	XY-CD	IV	14	103	5	7210	-
	Total				12490		
Grand Total						75025	6439

The Recoverable reserves have been computed as **75,025m³** of Rough Stone and **6,439m³** of Topsoil at 100% recovery upto depth of 21m below ground level for five years.

The applicant ensures the total quantity proposed in the benches will not exceed during the quarrying operation. Besides the Rough Stone locked up in benches will be exploited after obtaining necessary permission from the office of **Director General of Mine Safety, Chennai** region by submitting relevant documents, appropriate safety plans and its Mitigation measures.

Mining Plan and PQCP

Katchaikatti Rough Stone Quarry



One lorry load	=	6m ³ (approx)
Total No of Working days	=	300 Days per year
Total quantity to be removed in these five years plan period	=	75,025m ³
Hence total lorry loads per day	=	75,025m ³ /6m ³
	=	12,504 lorry loads
	=	12,504/5 years
	=	2,501/300 Days
Rough Stone	=	8 lorry loads per day

Working hours = 8.30 am to 5.30 pm (with 12.30-1.30 pm lunch break)

5.5 Machineries to be used:

For Mining:

The following machineries are utilized on rental basis for the development and production work at this quarry.

TABLE-5

I. DRILLING MACHINE:

S. No.	Type	Nos	Dia Hole mm	Size Capacity	Motive power
1	Jack hammer	2	30-35	1.2m to 2.0m	Compressed air
2	Compressor	1	-	400 psi	Diesel Drive

II. EXCAVATION & LOADING EQUIPMENT:

S. No.	Type	Nos	Capacity	Motive Power
1	Excavator with Bucket and Rock Breaker	1	300	Diesel Drive

III. HAULAGE WITHIN THE MINE & TRANSPORT EQUIPMENT:

S. No.	Type	Nos	Capacity	Motive Power
1	Tipper	2	20 tonnes	Diesel Drive

5.6 Disposal of Overburden/Waste:

There is no Waste anticipated during this plan period hence, disposal of waste does not arise. The overburden in the form of Topsoil, the top soil will be safely removed and preserve all along the boundary barrier to facilitate the afforestation. The excavated Rough Stone (100%) will be directly loaded into Tippers to the needy customers.

5.7 Use of the Mineral:

The excavated rough stone (100%) will be directly loaded into Tippers as raw form to the needy nearby crushing unit to making Road metals and construction materials.

5.8 Brief note on conceptual mining plan for the entire lease period base on the geological, mining and Environment considerations:

Conceptual mining plan is prepared with an object of long term systematic development of benches, layouts, selection of permanent structures, depth of quarrying and ultimate pit dimensions, selection of sites for construction of infrastructure, etc.,

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

As the applicant has applied quarry lease for five years, the ultimate pit limit (dimension) at the end of this mining plan period is given below:

TABLE-6

Section	Length in m (Max)	Width in m (Max)	Depth in m (Max)
XY-AB	63	52	21m below ground level
XY-CD	25	124	16m below ground level

All the base line information studies like Air quality monitoring, Noise and vibration monitoring, Water analysis studies will be carried out every year as per the MoEF & CC Norms. Please refer Plate Nos. III & IV. As per the NGT orders the applicant is directed to plant 500 trees per hectares along the quarry site and in the haul road either at the regular or the phased manner by planting native species.

There is no waste anticipated during the entire life of quarry. Hence, backfilling is not possible in this Rough stone quarry. After completion of quarry operation, the quarried out pit will be allowed to collect the seepage and rainwater and the water storage will be kept as temporary reservoir for charging the nearby wells and the water will be utilized for Green belt development purpose. The quarry area will be fenced with barbed wire fencing also safety bund constructed around the quarry to prevent inadvertent entry of public and cattle (Refer Plate No. IV and V).

6.0 BLASTING

6.1 Blasting pattern:

The quarrying operation is proposed to carried out by Mechanized Opencast Method in conjunction with conventional method of mining using shallow Jack hammer drilling and mild blasting with NONEL initiation of shattering effect for loosen the Rough stone. Nonel initiation provides reasonably good solution to fly rock problem. The main objectives of Nonel Blasting are to reduce the ground vibration, noise, flyrocks generated due to blasting operations. The overall cost of blasting in NONEL is very less compared to electrical blasting and hence it optimizes the cost of blasting.

**Anticipated theoretical calculation of PPV**

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

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

Table 7: Predicted PPV Values due to Blasting

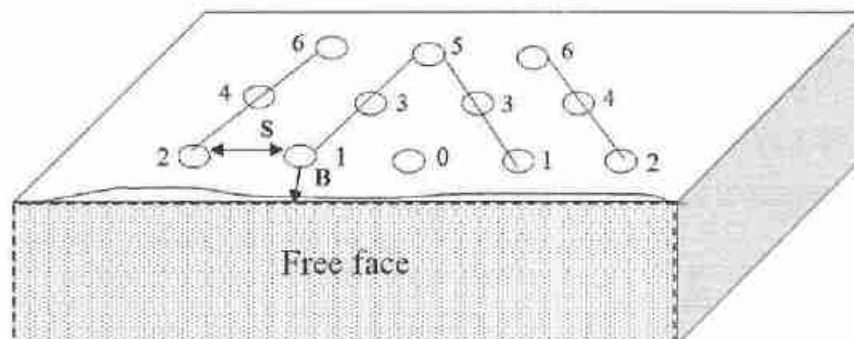
Maximum Charge per day (kg)	Number of Round Blast per day	Number of holes blasted per round	Number of holes blasted per day	Nearest Infrastructure (m)	PPV (mm/s)
26	1	52	52	560	0.272

From the above table, the charge per blast of 26kg is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. If charge per blast will be required for more than 100 kg, the applicant ensures that carry out the blasting twice or thrice a day based on the onsite conditions under the supervision of competent qualified statutory personnel employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

Drilling and blasting parameters are as follows:

Depth of Each hole	:	1.6m
Spacing between holes	:	1.2m
Burden for hole	:	1.0m
Diameter of hole	:	32mm
Pattern of hole	:	Zigzag – Multi-rows
Inclination of holes	:	80°from horizontal
Use of delay detonators	:	25millisecond delays
Detonating fuse	:	Non-Electric Detonators

BLASTING PATTERN DRAWING





Staggered "V" Pattern of Blasting Design

Spacing	=	1.2m
Burden	=	1.0m
Depth of the hole	=	1.5m
No of holes proposed per day	=	52 Holes

6.2 Type of explosives to be used:

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 secondary blasting is proposed. NONEL blasting and muffle blasting may be adopted after permission from DGMS.

6.3 Measures proposed to minimize ground vibration due to blasting:

The quarry is situated more than 300m away from the nearby villages, Controlled blasting measures of NONEL initiation is being adopt for minimizing ground vibration and fly rock.

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

NONEL Delay detonators:

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

The major advantages of delay blasting are:

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

Blasting program for the production per day:

No of Holes	=	52 Holes
Yield	=	130 Tons
Powder factor	=	5 Tons/Kg of explosives
Total explosive required	=	26 Kg-Slurry explosives
Charge/ hole	=	0.5 Kg
Blasting at day time only	=	12.00 – 12.30p.m (whenever required).



6.4 Storage and safety measures to be taken while blasting:

The applicant will engage authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory foreman/Permit Mines Manager. The explosives agencies should be having the valid Blaster certificate. He will blast holes in the quarry site. After the completion of Blasting the explosives Agencies will take it out back the remaining quantity of Explosives. The Competent Qualified Statutory personnel appointed by the applicant will maintain the records of Explosives as per the Indian Explosives Act.

7.0 MINE DRAINAGE

7.1 Depth of water table (based on nearby wells and water bodies):

The area is a plain topography; since the lease applied area consists the most common type of dendritic drainage pattern. The water table in the area is about 57m which is observed from the existing private boreholes. The lease area is fully covered by Massive Charnockite formation. The quarry operation confined to well above the water table hence, the Ground Water problem will not arise. If water seepage may occur due to the fracture, the same will be used for Greenbelt. Anyhow, Garland drain will be constructed all along the boundary to prevent surface run-off water entering into the quarry.

TABLE-8

Type	Distance & Direction	Location
Bore Well	180m Northwest side	10°05'26.99"N 78°00'21.25"E

7.2 Arrangements and places where the mine water is finally proposed to be discharged:

The quarry operations are confined to well above the water table during the entire lease period. If water is encountered at quarry due to rain water and seepage, the same will be pumped out by 5HP water pump and discharge to the Green belt development areas. Besides, the water will also be used for dust suppression on haul roads during Haulage of machineries.

8.0 OTHER PERMANENT STRUCTURES (also shown in the map)

S.No	Description	Particulars	Aerial Distance & Direction															
1	Nearest National Highway	(NH-44) Bangalore to Kanyakumari	3km - West															
2	State Highways	(SH-73) Thirumangalam to Silukkuvarpatti	8km - Southwest															
3	Railway station	Vadipatti Railway station	6.7km - West															
4	Airport	Madurai Airport	29 km - Southeast															
5	Nearest Habitation	560m - SW Katchaikatti Panchayat Office - 1km - SW																
6	Town	Vadipatti	5km - West															
7	Nearest Government School	Vadipatti - Government Girls Higher Secondary School	3.6km - West															
8	Nearest Dispensary	Vadipatti	5km - West															
9	Government Hospital	Vadipatti	5km - West															
10	Reserved Forest	No Reserve Forest within 60m Radius. Nearest Reserve Forest is Veguthumalai R.F. - 220m Northeastern side.																
11	Defense Installation / Historical Monuments / Archaeological	Nil within 500m radius.																
12	Nearby Water Bodies	Odai - Adjacent to the lease applied area on Northern side, hence 50m safety distance provided. Odai - North side - 190m.																
13	Interstate Boundary	Around 81 km - West (Kerala State Boundary)																
14	Critically Polluted areas identified by the CPCB	Around 147 km - NW (Coimbatore - SIDCO)																
15	Protected areas Notified under wildlife (Protection) Act, 1972	Around 35.8 km - NW (Kodaikanal Wildlife Sanctuary)																
16	Applicability of CRZ, Notification 2011 as amended.	Not Applicable																
17	Applicability of Hill Area Conservation Authority (HACA) Clearance.	Not Applicable																
18	Housing area, EB line (HT & LT Line)	Electric pole and EB LT line are shifted beyond 50m away from the applied area. There is no other Housing area, EB line (HT & LT Line) within the radius of 50m from the lease applied area.																
19	Boundaries of the permitted area.	The boundaries of the permitted areas are as follows: North - S.F.Nos. 1130, 1131/2A & 1131/2B East - S.F.Nos. 1131/5 & 1144 South - S.F.No. 1131/8A West - S.F.Nos. 1131/6, 1131/1A.																
20	Adjacent Patta lands / Govt. Land	<table border="1"> <thead> <tr> <th>Direction</th> <th>Classification</th> <th>Safety Distance</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>Patta land / Odai</td> <td>7.5m / 50m</td> </tr> <tr> <td>East</td> <td>Patta land</td> <td>7.5m</td> </tr> <tr> <td>South</td> <td>Patta land</td> <td>7.5m</td> </tr> <tr> <td>West</td> <td>Patta land</td> <td>7.5m</td> </tr> </tbody> </table>	Direction	Classification	Safety Distance	North	Patta land / Odai	7.5m / 50m	East	Patta land	7.5m	South	Patta land	7.5m	West	Patta land	7.5m	
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North	Patta land / Odai	7.5m / 50m																
East	Patta land	7.5m																
South	Patta land	7.5m																
West	Patta land	7.5m																

(Refer Plate No. II):



9.0 EMPLOYMENT POTENTIAL & WELFARE MEASURES

9.1 Employment potential (skilled, un skilled):

TABLE - 9

Designation	Present Employment position	Employees Requirement	Total
a) Supervisory category			
Geologist	-	1	1
b) Skilled labour			
Mine Foreman	-	1	1
Blaster/Mate	-	1	1
Excavator – Operator	-	1	1
Truck Drive	-	2	2
Water sprinkler Driver	-	1	1
Jack-Hammer Drillers	-	4	4
c) Unskilled			
Security	-	2	2
Labour & Helper	-	4	4
Co-operator and Cleaner	-	4	4
Total	-	21	21

The proposed output per man shift:

TABLE - 10

Average ROM Production expected per annum	15,005m ³
No. of days likely to be worked	300 days
Average ROM production per day	50m ³
O/S = Average Production per day / Average employment per day	$50m^3 / 21 = 2.4m^3$

The above manpower is adequate to meet out the production schedule and the machinery strength envisaged in the mining plan and to comply with the statutory provisions of the Mines Safety Regulations. It is been ensured that the labour will not be employed less than 18 years, **No child labour** will engaged or entertained for any kind of quarrying operations. All the labours engaged for quarrying operations will be insured during the quarry lease period

9.2 Welfare Measures:

a. Drinking Water:

Packaged drinking water is available from the nearby approved water vendors in Katchaikatti which is about 1km on the Southwest side of the lease applied area.

b. Sanitary Facilities:

Hygienic modern Sanitary Facilities will be constructed as semi permanent structure and it will be maintained periodically as hygienic.



c. First aid facility:

First aid kits are kept in Mines office room, in case of such eventuality is the victim will be given first aid immediately at the site by the competent and statutory foreman/permit manager/mate will be in charge of first aid and injured person will be taken to the hospital by the applicant's vehicle. Hospital is available in Vadipatti located at a distance of 5km on the West side.

d. Labour Health:

Periodically medical check-up related to occupational health safety will be conducted to all the workers in applicant own cost.

e. Precautionary safety measures to the labourers:



- Helmets,
- Mine Goggles,
- Ear plugs,
- Ear muffs,
- Dust mask,
- Reflector jackets,
- Safety Shoes

All personnel protective equipment as per the DGMS standard will be provided as per the specification approved by Director of mines safety. Periodically medical check-up will be conducted for all workers for any mine health related problems. Proper training and vocational education will be given by qualified and experienced safety officer to all the employees about the safety and systematic Rough stone quarrying operations. The drillers and workers will be sent for vocational training periodically, to carry out the quarrying operations scientifically and to safe guard the men and machinery and to create awareness about conventional opencast quarrying operations.

PART - B**10.0 ENVIRONMENT MANAGEMENT PLAN**

The EMP is prepared based on the Mines act, Rules & amendment from by state & central government. If the SEIAA / SEAC instructed the modification and alter the EMP the outcome of their recon would be final and the applicant is instructed to follow the EIA / EMP for its compliance as per the CPCB / TNPCB Norms.

Environment	Anticipated impact	Mitigation measure
Land Environment	i. Topography of the area will change due to mining activity. Around 0.51.5 Ha. area will be proposed to quarry operation.	i. No waste will be anticipated during entire life of quarry. Hence, backfilling is not proposed in this quarry operation. Anyhow, barbed wire fencing and safety bund will be constructed around the quarry to prevent inadvertent entry of public and cattle. ii. The excavated benches shall be developed for plantation with grasses, herbs and shrubs of local species to improve aesthetic of the area and to prevent any soil erosion and landslide. iii. Mining benches will not exceed beyond the approved height and width. iv. Leftover foreign material like polythene bag, jute bag and useless articles will not be allowed to litter and no ill managed dumping will be used for filling the excavated pits
	ii. Soil quality and it's fertility of adjacent lands will be affected due to fugitive dust and Vehicular emissions during drilling, blasting, loading, unloading and haulage of men and machineries.	This is discussed in following Air Environment due to avoid repetition.



Water Environment	<p>Surface Mining can have direct impact on physico-chemical characteristics of the local drainage and groundwater resources. The detrimental effects, if any, to water resources resulting from surface mining are caused by following:</p> <ol style="list-style-type: none"> Alteration of natural drainage pattern resulting from modification of topography. Abnormal increase in the turbidity of the Odai. Damage to riparian vegetation and in-stream habitat. The activities can also disrupt the ecological diversity in many ways. Contamination of groundwater if mining intersects with the water table. 	<ol style="list-style-type: none"> Construction of Garland drain with check dam and settling tank will be constructed around the quarry to collect the surface run off rain water and which will be discharge in to the natural drainage system and water bodies in the Odai passing on the Northern side in manure as prescribed by TNPCB standards. Further mining will be completely stopped during the monsoon for free flow of surface run off and allowing natural recharge of groundwater. No wastewater shall be generated from the quarry activity. Proper drainage will be Maintained to eliminate inundation of working pits during rains from run-off water. The mine pit water collected due to rains will be utilized for water spraying on the haul Roads and watering for plantations. Septic tanks and soak pits will be provided for the disposal of domestic/ washroom effluents. The deposit will be worked from the top surface up to a depth of 21m below ground level and shall not in any case intersect and contaminate the ground water as the depth of the water table in the area is 57meters.
Air Environment	<p>In surface mining operations, the source of air pollution may cause deterioration of air quality due to the fugitive dust emissions from drilling/blasting, scooping, loading-unloading operation of extracted mineral and its transportation. Drilling/blasting and loading of quarry material would be associated with the fugitive dust emission in</p>	<ol style="list-style-type: none"> Green belt will be developed in the safety zone with thick long leaves plant to arrest the fugitive dust and vehicular emissions on the surrounding environments. Wet drilling with dust extractor unit will be carried out to minimize the dust generation. Controlled blasting with Proper blasting pattern will be followed to prevent rock fragmentation and generation of minimal fine dust to the atmosphere. Quarry material will be handled under wet condition during loading and



	<p>the active area whereas fugitive emission during transportation would affect the areas/villages situated adjacent to the road side. Another source of air pollution would be emission from the drilling machinery and excavators/tippers vehicles to be used for loading.</p>	<p>unloading to minimize the dust generation of proposition, besides loaded materials are covered by Tarpaulin until to reach the destination during transportation.</p> <p>v. Regular water sprinkling to the haul road to arrest the dust generation.</p> <p>vi. Provision of dust filters/ mask to workers working at dust prone and affected areas.</p> <p>vii. Vehicular emission as a result of combustion of diesel generates small particulate matter (PM₁₀ & PM_{2.5}), Nitrogen oxides and Sulphur dioxide (NO₂ & SO₂). High quality diesel will be used in the motor vehicles to control these pollutants.</p> <p>viii. PUC (Pollution under control) certified vehicles will be used for transportation.</p> <p>ix. CPCB Prescribed emission standards for the vehicles would be followed.</p> <p>x. All vehicles and their exhausts would be well maintained and regularly tested for pollutant concentrations.</p>
<p>Noise Environment</p>	<p>In the present mining activity for building material, noise will be generated from drilling machinery, blasting and vehicular movement. Noise level in the working environment is compared with the standards prescribed by Central Pollution Control Board as adopted and enforced by the Govt. of India through Noise Pollution (Regulation and Control) Rules, 2000.</p>	<p>i. Selection of new low – noise equipments for the quarry operation.</p> <p>ii. The noise levels shall be maintained within the permissible levels by involving all the noise regulating measures in vehicles and drilling/blasting operations.</p> <p>iii. To ensure minimum vibrations and noise due to blasting, Non-electric delay detonators in continuous sequence is proposed.</p> <p>iv. Personnel Protective Equipment (PPE) like earmuffs and earplugs shall be provided to the employees whose in critical operation like drilling, blasting and excavation as occupational safety measures.</p> <p>v. Proper maintenance done with regular interval by the Oiling and greasing for the machineries and vehicles to control the Source of noise during operation and</p>



		<p>transportation.</p> <p>vi. Regular and proper maintenance of machinery and transportation vehicles shall be ensured.</p> <p>vii. Transporting vehicles are enforcing the speed limits of 20km/hour within quarry area and not exceed 40km per hour from quarry to destination to reduce Noise and vibration level.</p> <p>viii. There would be restrictions on mining activity and vehicular movement during night hours.</p>
<p>Biological Environment</p>	<p>The area having main floras are Neem, Indian jujube, Cocos nucifera, Palm, Senna auriculata, Calotropis, Casuarina, Teak, Acacia nilotica and shrubs. No plants of botanical interest or animals of zoological interest recorded within 500m radius. The anticipated impacts on biological environment as follows:</p> <p>i. Diversity of living insects in the overburden material.</p> <p>ii. Natural habitats of the existing faunas and its breeding will change due to the noise and vibration during operation.</p> <p>iii. Mining may drive away the nearby residents from their habitat.</p> <p>iv. Access roads crossing the riparian areas will</p>	<p>i. The natural habitats of the existing flora and fauna will not be disturbed.</p> <p>ii. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many species.</p> <p>iii. Fruit bearing trees will be planted to survive of the existing native faunas.</p> <p>iv. No clearance of vegetation will be done during the entire mining operations.</p> <p>v. Water sprinkling on haul roads would be reduces the dust emission, thus avoiding damage to the crops and plants.</p> <p>vi. No night hour mining will be carried out which may catch the attention of wildlife.</p>



	<p>have impact on the species disturbing the ecosystem.</p> <p>v. Diminution of the quality and quantity of habitat essential for aquatic and riparian species</p> <p>vi. Deposition of dust on the plant and crop leaves is affecting the photosynthesis, Pollination, ratio of growth and reduction in the yield of agriculture.</p> <p>vii. Excessive and unscientific surface mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology.</p>
<p>Socio Economic Environment</p>	<p>Any activity during mining will have adverse impact on Environment, careful mitigation measures are proposed to balance the impact on the existing environment and the applicant is always instruct to carry out safe, sustainable, eco-friendly mining operations at all times. The following positive impact on the society due to this mining activity.</p> <p>i. More than 10 local peoples getting direct employment and more than 15 peoples are getting indirect employment due to this developmental project.</p> <p>ii. The continuation of opportunity for the employments, the nearby villages, living peoples and their life style would be improved.</p> <p>iii. The applicant is advised to invest the CER cost (@ 2% from the total Project Cost) to develop the local Panchayat.</p> <p>Does not arise.</p>



10.1 Environment impact assessment statement describing impact of mining on the five years:

In the mining plan proposed for a production of Rough stone does not involve deep hole drilling and blasting. Such limited mining activity is not likely to cause any impact adversely on the environment. As far as pollution of air, water and noise concerned, the environmental impact studies will be conducted as per EIA notification issued by MoEF& CC. It is B Category mine. The estimated budget would be around **Rs.3,80,000/-**. The compliance monitoring will be carried out for every six months as prescribed by the MOEF&CC and with state concerned authorities

10.2 Proposal for waste management:

There is no waste anticipated in this Rough stone quarrying operation. The entire quarried out materials will be utilized (100%). The maintenance of machineries & fuelling will be carried out as per the TNPCB Norms and the waste will be disposed in the Norms.

10.3 Proposal for reclamation of land affected during mining activities and at the end of mining (refilling / fencing etc.):

In the mining plan only to a maximum depth of 21m below ground level has been envisaged as workable depth for safe & economic quarrying operation during entire life of quarry. There is no waste generated hence, backfilling is not possible. After completion of quarry operation the quarried out pit will be allowed to collect the seepage and rainwater and the water storage will be kept as temporary reservoir for charging the nearby wells and the water will be utilized for Green belt development purpose. The quarry area will be fenced with Barbed wire fencing also safety bund constructed around the quarry to prevent inadvertent entry of public and cattle. The barbed wire fencing cost would be around **Rs.1,68,000/-**.

10.4 Programme of Greenbelt development (indicate extend, number, name of species to be afforested):

The safety zone all along the boundary barrier has been identified to be utilized for Greenbelt development. Appropriate native species of Neem, Pongamia Pinnata, Casuarina, etc., trees will be planted in a phased manner as described below.

TABLE-10

Years	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	30	80	240	Neem, Pongamia Pinnata, Casuarina, etc.,	24
II	30	80	240		24
III	30	80	240		24
IV	30	80	240		24
V	30	80	240		24

Nearly 1,200sq.m area is proposed to use under Greenbelt by planting 150 Number of tree saplings during mining plan period with an anticipated survival rate of 80% (Please refer Plate No. IV & V). The estimated budget for plantation and maintenance of Greenbelt development would be around **Rs.15,000/-** for the period of five years.

The Greenbelt Development will be formed in around the quarried out top benches and approach road. The cost would be around Rs.30,000/-.

10.5 Proposed financial estimate / budget for (EMP) environment management:

Budget Provision for the entire quarrying period:

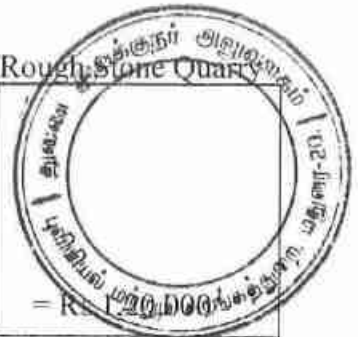
TABLE-11

S. No	Monitory and Analysis Description	Rate per location	No. of location	Total Charges/ six months	Total Charges/ year
1	Ambient air quality monitoring	6500	4	26000	52000
2	Noise level monitoring	250	4	1000	2000
3	Ground vibration monitoring	1000	2	2000	4000
4	Water sampling and analysis	9000	1	9000	18000
Total EMP Cost/ year					76,000

The EMP cost would be around Rs.3,80,000/- for the period of five years.

A. Project / investment / Operational cost

i) Land cost	The Land value as per the Government Guideline land cost is calculated as follows, <table border="1"> <thead> <tr> <th>S.F.Nos.</th> <th>Extent</th> <th>Cost/Ha</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>1131/1B</td> <td>0.68.5</td> <td>578500</td> <td>396272.5</td> </tr> <tr> <td>1131/3</td> <td>0.43.5</td> <td>578500</td> <td>251647.5</td> </tr> <tr> <td>1131/4</td> <td>0.24.5</td> <td>578500</td> <td>141732.5</td> </tr> <tr> <td>Total</td> <td>1.36.5</td> <td>Total</td> <td>789652.5</td> </tr> </tbody> </table> i.e., Rs. 7,90,000/- (Source: https://tnreginet.gov.in/portal/)	S.F.Nos.	Extent	Cost/Ha	Total	1131/1B	0.68.5	578500	396272.5	1131/3	0.43.5	578500	251647.5	1131/4	0.24.5	578500	141732.5	Total	1.36.5	Total	789652.5	= Rs. 7,90,000/-
S.F.Nos.	Extent	Cost/Ha	Total																			
1131/1B	0.68.5	578500	396272.5																			
1131/3	0.43.5	578500	251647.5																			
1131/4	0.24.5	578500	141732.5																			
Total	1.36.5	Total	789652.5																			
ii) Machinery to be used	The following machineries are proposed to meet out the productions. Excavator attached with rock breaker, Tippers, Tractor mounted compressor with jack hammer and loose tools (Rental Basis)	= Rs.20,00,000/-																				
iii) Refilling/ Fencing	Fencing will be constructed around the quarry pit to prevent the inadvertent entry of public and cattles cost would be around	= Rs.1,68,000/-																				
iv) Labourers shed	Labour sheds will be constructed as semi permanent structure. The cost would be around	= Rs.3,50,000/-																				
v) Sanitary facility	Adequate latrine and urinal accommodation shall be provided at conveniently accessible places the cost would be around	= Rs.1,00,000/-																				
vi) Others items	First aid room & accessories	= Rs.1,00,000/-																				



vii) Drinking water facility for the labourers	Packaged drinking water will be provided for all the Labours. Drinking water will be readily available at conveniently accessible points during the whole of the working shift the cost would be around	= Rs.1,20,000/-
viii) Sanitary arrangement	The latrine and urinal will keep clean and sanitary condition. The maintenance cost would be around	= Rs.1,00,000/-
ix) Safety kit	All the Safety kit such as Helmet, Earmuffs, Goggles, Reflector Jackets, Safety shoes etc., will be provided to the workers by the applicant own cost which would be around	= Rs.2,00,000/-
x) Water sprinkling	Water will be sprinkled in the haul roads by water sprinklers the cost would be around	= Rs.1,50,000/-
xi) Garland drains Construction	Construction of garland drains to divert surface run-off from virgin area away from mining area	= Rs.1,29,000/-
xii) Greenbelt etc.	Greenbelt program will be carried out in the boundary barriers the cost would be around	= Rs.25,000/-
	Greenbelt program will be carried out in the quarried out top benches and approach road	= Rs.30,000/-
Total Operational Cost		= Rs.42,52,000/-
B. EMP Cost: - (Per year)		
Air Quality monitoring		Rs.52,000/-
Water Quality Sampling		Rs.18,000/-
Noise Monitoring		Rs. 2,000/-
Ground Vibration test		Rs. 4,000/-
Total Cost		Rs.76,000/-
Total EMP Cost for the five years period is Rs.3.80,000/-		
Description		Amount (Rs.)
A. Operational Cost		42,52,000
B. EMP Cost		3,80,000
Total Project Cost (A+ B)		46,35,000
The applicant indents to involve corporate environment responsibilities (CER) activity like Water purifier, Sanitary facilities, Cot and Bed facilities to the nearby Govt. Primary Health Centre and Water purifier, Sanitary facilities, Bench & Table facilities to the nearby Government School at 2.0% from the total project cost. The Cost would be around Rs.93,000/- .		93,000
Total Cost		47,25,000
The Total cost would be around forty-seven lakhs and twenty five thousand only.		

11.0 PROGRESSIVE QUARRY CLOSURE PLAN**11.1 Introduction:**

The entire area is proposed for a short period of 5 years only hence, the progressive quarry closure plan may not be applicable to this quarry. Anyhow, during temporary discontinuance of quarry the following measures will be taken.

- Barbed wire fencing will be constructed around the quarry.
- Benches will be smoothening.
- Quarry will be closed & sentries will be posted round the clock.
- Green belt development will be maintained.

Machineries will be removed from pit and engaged in another site.

11.2 Present and Post Land use pattern:

LAND USE TABLE-12

Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
Quarrying Pit	Nil	0.51.5
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.12.0
Unutilized Area	1.36.5	0.70.0
Grand Total	1.36.5	1.36.5

11.3 Statutory obligations:

The applicant ensures to comply all the conditions stipulated in the precise area communication letter before grant of quarry lease and during the course of quarry operations as per the DGMS, Department of Geology and Mines, Labour Enforcement officer, controller of Explosives etc., circulars, Norms, Rules, Regulations and Act.

11.4 Progressive quarry closure plan preparation:

Name and address of the Recognized Qualified Person who prepared the progressive closure plan and name and address of the executing agency who is involved in the preparation of progressive quarry closure plan.

Name : **Dr. M.Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,**
Recognized Qualified Person

Address : No.17, Advaita Ashram Road,
Alagapuram, Salem District – 636 004.

Telephone : 0427- 2431989 (Office)

Cell No : 94422 78601 & 94433 56539

Registration No : RQP/MAS/183/2004/A

Valid Date : 10.01.2024

Applicant will himself implement the closure plan; no outside agency will be involved.

**(i) Safety & Security:**

Safety measures will be implemented to prevent access in the excavation area an unauthorized persons as per Mine Act 1952, MMR 1961.

- Safety measures will be implemented as per Mine Act 1952, MMR 1961, and Mines Rules 1955.
- Provisions of MMR 1961 shall be strictly followed and all roads shall be wider than the height of the bench or equal to the height of the bench and have a gradient of not more than 1 in 16.
- The bench height will be 5.0m.
- Width of working bench will be kept about 5.0m for ease of operations and provide sufficient room for the movement of equipments.
- Protective equipment like dust masks, ear-plugs/ muffs and other equipments shall be provided for use by the work persons.
- Notices giving warning to prevent inadvertent entry of persons shall be displayed at all conspicuous places and in particular near mine entries.
- Danger signs shall be displayed near the excavations and proper signal by siren alarm will be provide before blasting time to prevent any accident.
- Security guards will be posted.
- In the event of temporary closer, approaches will be fenced off and notice displayed.

(ii) Disaster Management and Risk Assessment:

This should deal with action plan for high risk accidents like landslides, subsidence, flood, fire, seismic activities, tailing dam failures etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of applicant to meet such eventualities and the assistance to be required from the local authorities should be described.

- The mechanized mining activities in the area may involve any high risk accident due to side falls/collapse, flying stones due to blasting etc.
- The complete quarrying operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, TNMMCR 1959 and other laws applicable to mine will be strictly complied with.
- During heavy rainfall the mining activities will be suspended.
- All persons in supervisory capacity will be provided with proper communication facilities.
- Competent persons will be provided FIRST AID kits which they will always carry.
- The Greenbelt Development will be formed in around the quarried out top benches and approach road of the lease applied area.

Environmental Monitoring Cell:

A dedicated team nominated by the mine manager or Agent will monitor and maintain the environmental compliances of the quarry as per the approved Environment Management Plan and report the Compliance to the Mine Manager half yearly.

Disaster Management Cell:

The Competent Qualified Statutory managers appointed by the applicant as per the Director of Mines Safety will be responsible for Disaster Management. It care any eventualities his mobile number will be displayed and he will take all the precautions and safety measures as per Mines and Minerals (Development and Regulations) Act, 1957.

**(iii) Disposal of mining machinery**

All the Machineries will be engaged on rental basis, the same has been maintained in good condition during entire life of quarry. Hence, disposal or decommissioning of mining machinery does not arise.

(iv) Care and Maintenance during Temporary Discontinuance:

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstance following measures shall be taken for care, maintenance and monitoring of conditions.

- Notice of temporary discontinuance of work in mine shall be given to the DGMS as per the MMR 1961.
- All the mining machinery shall be shifted to a safe place.
- Entrance to the mine or part of the mine, to be discontinued shall be fenced off. Fencing shall be as per the circular 11/1959 from DGMS.
- Security Guards shall be posted for the safety and to prevent any unauthorized entry to the area.
- Carry out regular maintenance of the facilities/area detailed below in such a way as would have been done as if the mines were operation:
 - Quarry roads and approach roads,
 - Fencing on approach roads,
 - Checking and maintenance of machines and equipment,
 - Drinking water arrangements,
 - Quarry office, first aid stations etc.
- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out as per CPCB and IBM Guideline.
- Care and upkeep of plantation shall be carried out on regular basis.
- Status of the working and status monitoring for re-opening of the mines shall be discussed daily.

In case of discontinuance due to any natural calamities/abnormal conditions, quarrying operation will be restarted as early as possible after completing rescue work, restoring safety and security, repairs of roads etc.

(v) Economic Repercussion of Closure of Quarry and manpower Retrenchments:

The Quarry Lease is granted for a period of maximum five years only. As per the production Programme envisaged, there will be no effect on the man power as the majority of persons belong to nearby villages and will have an option either to be available for employment for the next contract/ lease or do the agriculture in their fields.

(vi) Abandonment Cost:

As at present mining is not going to be closed so abandonment cost could not be assessed. However, based on the progressive quarry closure activities during the plan period, cost is assessed as given below:

LAND USE TABLE-13

ACTIVITY		YEARS					RATE	COST (Rs.)
		I	II	III	IV	V		
Plantation under safety zone	Nos	30	30	30	30	30	@200 Rs Per sapling	15,000
	Cost	6000	6000	6000	6000	6000		
Plantation in quarried out top benches	Nos	-	-	50	50	50	@300 Rs Per Meter	30,000
	Cost	-	-	10000	10000	10000		
Wire Fencing (In Mtrs) 560 Mtrs		1,68,000	-	-	-	-	@300 Rs Per Meter	1,68,000
Garland Drain (In Mtrs) 350 Mtrs		1,05,000	-	-	-	-	@300 Rs Per Meter	1,05,000
TOTAL								3,18,000

12.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

This Mining Plan for Rough Stone (Charnockite) are under Rules 41 & 42 as per the Amended under Tamil Nadu Minor Mineral Concession Rules, 1959. The provisions of the Act, Rules and Regulations and orders made there under shall be complied within the quarrying operation, so that the safety of the mine, machinery and person will be well protected. Permission, relaxation or exemption wherever required for the safe and scientific quarrying of the deposit will be obtained from the Department of Mines Safety. Any violation pointed out by the inspecting authorities shall be rectified and modified after scrutiny comments as per the guidelines of the Concerned Department and Authorities.

This Mining plan & mine design is prepared based on the requirement instructed by the applicant to me. If there is any change in the production schedule, change of technology, change in product mix. The applicant is advice to prepare a modification mining plan and get approval by the concerned authority for subsequent clearance and approval. The same will be monitored by the inspecting authority of Department of Geology and mining and other Concerned Departments under Rule 25 and sub rule (5)(d) in Rule 36 of Tamil Nadu Minor Mineral Concession Rules, 1959.

I hereby ensure that the information provided is correct to best of my knowledge and experience, some of the information contained in this report has been provided by external sources and by the applicant and is presented as the form as submitted by the applicant. The information is not intended to serve as legal advice related to the individual situation. I do not owe and specifically disclaim any liability resulting from the use during the course of quarrying operations after the grant of lease. The document may be scrutinized by the competent authority before approval.

Prepared by



Dr. M. Ifthikhar Ahmed, M.Sc., M.B.A., F.G.S, Ph.D.,

RQP/MAS/183/2004/A

Recognized Qualified Person

Place: Salem

Date: 13.10.2023

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

Rec. No. 225/mms/2022
Date: 14/12/2023

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

14/12/23
Deputy Director,
Geology and Mining,
Madurai.

TOPOGRAPHICAL VIEW OF KATCHAIKATTI ROGH STONE

QUARRY LEASE APPLIED AREA



ந.க.எண்.255/கனிமம்/2022

புவியியல் மற்றும் சுரங்கத்துறை
மாவட்ட ஆட்சியர் அலுவலகம்
மதுரை.

நாள்:27.09.2023



குறிப்பாணை

பொருள்: கனிமங்களும், சுரங்கங்களும் - சிறுகனிமம் - சாதாரணகற்கள் - மதுரை மாவட்டம் - வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், புல எண்கள்.1131/1B, 1131/3 மற்றும் 1131/4 மொத்தம் 1.36.50 ஹெக்டேர்- திரு.A.ராமமூர்த்தி - பத்து ஆண்டுகள் - மதுரை வருவாய் கோட்டாட்சியர் - உதவிப் புவியியலாளர் - தகுதிவாய்ந்த நிலப்பரப்பாக தெரிவித்து 90 தினங்களுக்குள் சுரங்க வரைவு திட்டம் சமர்ப்பிக்க கோரியது - சமர்ப்பிக்க தவறியது - சுரங்க வரைவு திட்டம் சமர்ப்பிக்க கால நீட்டிப்பு செய்து தருமாறு கோரியது - 30 தினங்களுக்குள் சமர்ப்பிக்குமாறு அறிவுறுத்துவது - தொடர்பாக.

- பார்வை:
1. திரு.A.ராமமூர்த்தி, த/பெ.ஆறுமுகம், கச்சைக்கட்டி கிராமம், வாடிப்பட்டி வட்டம், மதுரை என்பவரின் மனு நாள்.இல்லை. இவ்வலுவலகத்தில் பெறப்பட்ட நாள். 17.02.2022.
 2. மதுரை வருவாய் கோட்டாட்சியரின் ந.க.எண்.அ/4012/2022, நாள்.13.06.2022.
 3. உதவி புவியியலாளர் (கனிமம்) புலத்தணிக்கை அறிக்கை, நாள்.27.01.2023.
 4. இவ்வலுவலக குறிப்பாணை ந.க.எண்.255/கனிமம்/2022 நாள்.30.01.2023.
 5. திரு.A.ராமமூர்த்தி, த/பெ.ஆறுமுகம், கச்சைக்கட்டி கிராமம், வாடிப்பட்டி வட்டம், மதுரை என்பவரின் கடித நாள்.26.09.2023.

மதுரை மாவட்டம், மதுரை வட்டம், வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், புல எண்கள்.1131/1B, 1131/3 மற்றும் 1131/4 மொத்தம் 1.36.50 ஹெக்டேர் பரப்பளவு பட்டா நிலத்தில் 10 வருடங்களுக்கு சாதாரணகற்கள் வெட்டியெடுக்க திரு.A.ராமமூர்த்தி என்பவர் பார்வை 1-ன் படி உரிய ஆவணங்களுடன் விண்ணப்பித்துள்ளார்.

மேற்படி விண்ணப்பம் தொடர்பாக மனுதாரர் சாதாரணகர்கள் வெட்டியெடுக்க உரிமம் கோரிய பிரஸ்தாப புலத்தை மதுரை வருவாய் கோட்டாட்சியர் மற்றும் உதவி புவியியலாளர் (கனிமம்), மதுரை மற்றும் ஆகியோர் புலத்தணிக்கை மேற்கொண்டு வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், புல எண்கள்.1131/1B, 1131/3 மற்றும் 1131/4 மொத்தம் 1.36.50 ஹெக்டேர் பரப்பில் மட்டும் சாதாரண கர்கள் குவாரிப் பணி செய்ய திரு. A.ராமமூர்த்தி என்பவருக்கு கீழ்க்காணும் நிபந்தனைகளுக்குட்பட்டு குவாரி குத்தகை உரிம அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

நிபந்தனைகள்

- மதுரை மாவட்டம், வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், புல எண்கள்.1131/1B, 1131/3 மற்றும் 1131/4-ல் மொத்தம் 1.36.50 ஹெக்டேர் பரப்பளவில் சாதாரண கர்கள் கனிமம் வெட்டியெடுக்க குவாரி குத்தகை உரிமம் வழங்குவது தொடர்பாக, ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் சுற்றுச்சூழல் ஒப்புதல் ஆகியவற்றை பெற்றளிக்கப்பட வேண்டும்.
- விண்ணப்பப் புலங்களைச் சுற்றியுள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.
- விண்ணப்பப் புலத்திற்கு வடக்கு பகுதியில், புல எண்.1130-ல் செல்லும் ஒடைக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.
- விண்ணப்பப் புலத்தின் தெற்கு பகுதியில் உள்ள தாழ்வழுத்த மின்கம்பங்கள் மற்றும் மின்கம்பிகளுக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும். அல்லது குத்தகை ஒப்பந்தப்பத்திரம் நிறைவேற்றப்படுவதற்கு முன்பு மின்கம்பங்களை மாற்றியமைக்க வேண்டும்.
- விண்ணப்ப புல எண்.1131/1B-ல் மேற்கு பகுதியில் உள்ள சதுர கிணற்றுக்கு உரிய பாதுகாப்பு இடைவெளி விட வேண்டும்.

அதன்படி மதுரை மாவட்டம், வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், புல எண்கள்.1131/1B, 1131/3 மற்றும் 1131/4-ல் மொத்தம் 1.36.50 ஹெக்டேர்ஸ் பரப்பில் மட்டும் உடைகல் குவாரி செய்ய 10 (பத்து) வருடகாலத்திற்கு தகுதிவாய்ந்த



நிலப்பரப்பாக கருதி தமிழ்நாடு சிறுகனிம சலுகைவிதிகள்-1959 விதி எண்.41-ன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்கதிட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு மனுதாரரைக் கேட்டுக்கொள்ளப்படுகிறது. மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத் திட்டத்தின் தொடர்ச்சியாக 1959ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.42-ன்படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்குமாறு பார்வை 4ல் காணும் இவ்வலுவலக குறிப்பாணையின் வாயிலாக தெரிவிக்கப்பட்டது. மேற்படி 90 நாட்கள் கால அவகாசத்தில் வரைவு சுரங்க திட்டத்தினை இவ்வலுவலகத்தில் சமர்ப்பிக்கப்படவில்லை.

இந்நிலையில் பார்வை 5ல் காணும் திரு.A.ராமமூர்த்தி என்பவர் கடிதத்தில், கச்சைக்கட்டி கிராமத்தில் அமைந்துள்ள சர்வே எண். 1131/1B, 1131/3 மற்றும் 1131/4ல் அமைந்துள்ள இடத்தில் கல்குவாரி செய்ய விண்ணப்பிருந்ததாகவும், அதற்கு Mining Plan 90 நாட்களுக்குள் போட்டு தருமாறு கேட்டிருந்ததாகவும், இந்த இடத்தில் அமைந்துள்ள மின்கம்பங்களை வேறு இடத்தில் மாற்றி அமைக்க பரிந்துரைத்ததாகவும், அதை மாற்றி அமைப்பதற்கு கால தாமதம் ஆகி விட்டபடியால் என்னால் 90 நாட்களுக்குள் Mining Plan போட்டுத்தர இயலவில்லை எனவும், எனவே Mining Plan போடுவதற்கு எனக்கு கால நீட்டிப்பு செய்து தருமாறு தெரிவித்துள்ளார்.

எனவே மேற்படி திரு.A.ராமமூர்த்தி என்பவரின் கோரிக்கையினை ஏற்று, மதுரை மாவட்டம், வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், புல எண்கள்.1131/1B, 1131/3 மற்றும் 1131/4-ல் மொத்தம் 1.36.50 ஹெக்டேர்ஸ் பரப்பில் மட்டும் உடைகல் குவாரி செய்ய 10 (பத்து) வருட காலத்திற்கு தகுதிவாய்ந்த நிலப்பரப்பாக கருதியும், மேலும் தமிழ்நாடு சிறுகனிம சலுகைவிதிகள்-1959 விதி எண்.41-ன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்கதிட்டத்தினை 30 தினங்களுக்குள்

சமர்ப்பிக்குமாறு மனுதாரரைக் கேட்டுக்கொள்ளப்படுகிறது. மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத் திட்டத்தின் தொடர்ச்சியாக 1959ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.42-ன்படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.

AM

27.9.2023

துணை இயக்குநர் /
உதவி இயக்குநர் (பொ),
புவியியல் மற்றும் சுரங்கத்துறை,
மதுரை

பெறுநர்:

திரு. A.ராமமூர்த்தி,
த/பெ.ஆறுமுகம்,
கச்சைகட்டி கிராமம்,
வாடிப்பட்டி வட்டம்,
மதுரை

பெறுநர்
27/9/2023

TAMIL NADU ELECTRICITY BOARD
MADURAI Electricity Distribution Circle



From

To

Tr./Tmt. C.SUNDARAPANDI
Appl.No :1560123146
Appl.Type :DCW-Works/LT
Distrib :
Adds : C.Sundarapandi Dno.551.K
.K.Nagar Madurai

LR.NO.AE/JE/O&M/ vdpj /E.App.Tracking/D.No /20 23
DATED: 18.03.2023

Dear Sir / Madam,

Sub: Elecy -MADURAI.Elecy.Distn.Circle - Application for
DCW-Works/LT Demand Issued - Payment Requested-Reg.

You are informed that your application No 1560123146 Dated 27-01-2023 towards DCW-Works/LT in distribution of VADIPATTY section has already been sanctioned on 24-02-2023. Your are requested to pay an additional amount of Rs.217462/- before 01-04-2023 without fail to proceed further.

Account Code	Amount(Rs.)
55110-Consumer Contribution towards value of Works-(incurred by consumers)(GST Applicable)	0.00
47621-Deposits Collected for DCW nature (GST Applicable)	134290.00
46941-CGST	16586.1.00
46942-SGST	16586.1.00
62948-Rounding Off	-2.00
Total	217462.00

(Rupees Two Lakhs Seventeen Thousand Four Hundred And Sixty Two Only)

V. Sundarapandi
Yours faithfully,
DISTRIBUTION
TANGED CO. LTD.
VADIPATTY-625 218

TANGEDCO CIN No. U40109TN2009SGC973746
SAC Code : 996912

TANGEDCO GSTIN : 33AADCT47H4E1ZC
HSN Code : 27160000

தமிழ்நாடு மின் உற்பத்தி மற்றும் பரிமாணக் கழகம் லிமிடெட்

மதுரை பின் பரிமாண வாய்
மீள் கட்டண இரீசுது

C.SUNDARAPANDI

வயாள் : 1584123446

மின் இலின் : 10040007

இரீசுது எண் : 230320234312

வரிசை எண் : 10040007
நாள் : 230320234312

கட்டண விகிதம் :

பெயர்	கட்டண விவரம்	தொகை (ரூ.)
GST இலின்	கட்டண விவரம்	
47621 Deposits Collected for DCW nature (GST Applicable)		184290
55110 Consumer Contribution towards value of Works-(invoiced by Consumers)(GST Applicable)		165801
46941 CGST @ 9%		165801
46942 SGST @ 9%		0.00
62946 Rounding Off		217462
Total		
Two Lakh Seventeen Thousand Four Hundred And Sixty Two Only மொத்தம்		217462

தொகை (மொத்தம்) :

Cheque/DD No: 090966 Date: 23/03/2023 Amount: 217462/- Bank: UBOB
இதர விவரங்கள் :

56) Support services as Invoice No. 10040007

சுணக்கீட்டாளர்/சுணக்கீட்டுதல்தரர்/வருவாய் மேற்பார்வைதரர்
தலைவர் மற்றும் கட்டுப்பாட்டுத் துறை

SNP





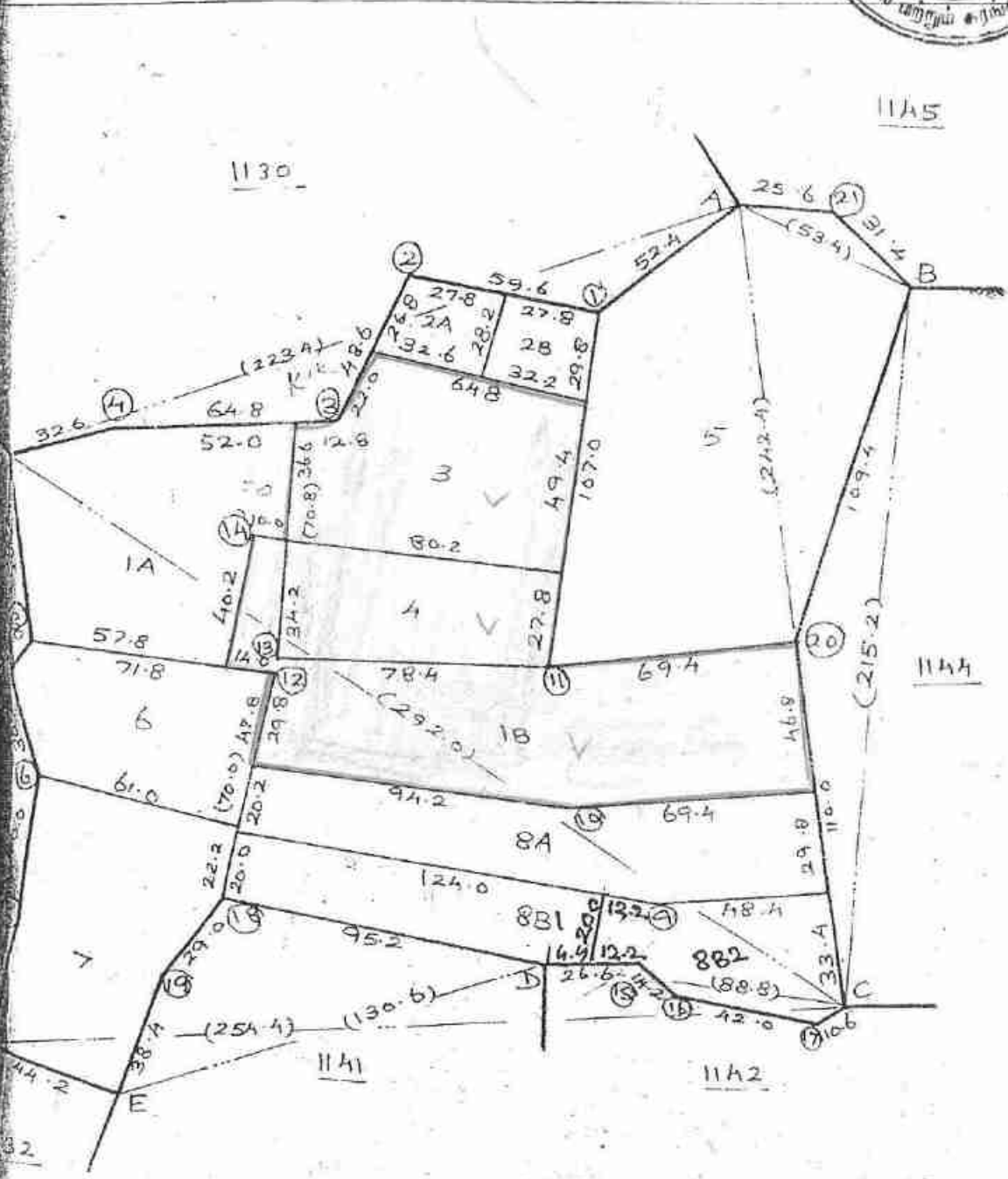
சுய
யாபயலடி

செயல் 62.0

கிராமம் { 616031
பெயர் {

செயல் 1131

பரப்பு: ஹெக்டேர் 4



LEASE APPLIED AREA

[Signature]
TAGE ADMINISTRATIVE OFFICE
J, KACHAIKATTY VILLAGE
VADIPATTY TALUK

[Signature]
Tahsildar
Vadipatti

31.5.2022



தமிழக அரசு

வருவாய்த் துறை

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



மாவட்டம் : மதுரை

வட்டம் : வாடிப்பட்டி

வருவாய் கிராமம் : 3 கச்சைகட்டி

பட்டா எண் : 5686

உரிமையாளர்கள் பெயர்

1. செல்லையா

மகன்

சுந்தரபாண்டியன்

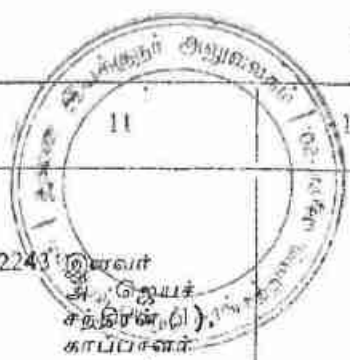
புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
1131	1B	0 - 68.50	2.55	--	--	--	--	2020/0103/24/129807- -- -- 09-09-2020
1131	3	0 - 43.50	1.62	--	--	--	--	2020/0103/24/129807- -- -- 09-09-2020
1131	4	0 - 24.50	0.90	--	--	--	--	2020/0103/24/129807- -- -- 09-09-2020
		1 - 36.50	5.07					

குறிப்பு 2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/14/003/05686/150305 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 24-01-2023 அன்று 12:13:44 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

1	2	3	4	5	6	7	8	9	10	11	12
							கு. னை.	ஹ. ஏர்ஸ்	கு. னை		
1	1129B-1	ர	4		7-1	3	3 71	0 29.0	1 08	2243	இயவர் அ. ஜெயசு சுந்திரன்(1), காப்பசனர் தாயார் சிங்காரம்மாள். அ. முத்து ராஜ் (2). சேதுராமன்(3).
2	-2	ர	4	...	7-1	3	3 71	0 92.5	3 42	2592	அ. சேது ராமன் மற்றும் ஐந்து பேர்களும். *
3	-3	ர	4	...	7-1	3	3 71	0 76.5	2 82	1549	தி. ரெங்க ராஜ்.
4A	-4A	ர	4	...	7-1	3	3 71	0 37.5	1 39	1391	அ ராமசாமி ரெட்டியார்.
4B1	-4B1	ர	4	...	7-1	3	3 71	0 45.5	1 68	909	தா. நாணப்ப ரெட்டியார்.
4B2	-4B2	ர	4	...	7-1	3	3 71	0 48.5	1 78	191	இ. வல்லி என்கிற இள மாத்தரன் அம்பலம்.
	-5	ர	4	...	7-1	3	3 71	0 35.5	1 32	542	சீனி என்கிற க. சிங்கம ரெட்டியார்.
								3 64.0	13 49		
...	1130	அ	4	0 27.0	ஒடை.
1A	1131-1A	ர	4	...	7-1	3	3 71	0 49.5	1 83	840	ரா. திருமால் ரெட்டியார்.
1B	-1B	ர	4	...	7-1	3	3 71	0 68.5	2 55	448	தி. கோவிந்த ரெட்டியார்.
2A	-2A	ர	4	...	7-1	3	3 71	0 09.0	0 33	1762	நா. வெங்கிட சாமி ரெட்டியார்.
2B	-2B	ர	4	...	7-1	3	3 71	0 09.0	0 33	1762	நா. வெங்கிட* சாமி ரெட்டியார்.
3	-3	ர	4	...	7-1	3	3 71	0 43.5	1 62	2590	G. வெட்குமி
4	-4	ர	4	...	7-1	3	3 71	0 24.5	0 90	1998	சு. லட்சுமி(1). வெங்கிடசாமி ரெட்டியார்(2).



[Handwritten Signature]

Tahsildar
Vadipatti

அ-பதிவேடு விவரங்கள்



மாவட்டம் : மதுரை

வட்டம் : வாடிப்பட்டி

கிராமம் : 3 கச்சைகட்டி

1. புல எண்	1131	9. மண் வயனமும் ரகமும்	7 - 1
2. உட்பிரிவு எண்	3	10. மண் தரம்	3
3. பழைய புல உட்பிரிவு எண்	3	11. தீர்வை (ரூ - ஹெ)	3.71
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 43.50
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	1.62
6. நிலத்தின் வகை	பஞ்சை	14. பட்டா எண்	5686
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	0	16. பெயர்	1.சுந்தரபாண்டியன்

குறிப்பு 1:



1.

மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 110305 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

அ-பதிவேடு விவரங்கள்



மாவட்டம் : மதுரை

வட்டம் : வாடிப்பட்டி

கிராமம் : 3 கச்சைகட்டி

1. புல எண்	1131	9. மண் வயனமும் ரகமும்	7 - 1
2. உட்பிரிவு எண்	4	10. மண் தரம	3
3. பழைய புல உட்பிரிவு எண்	4	11. தீர்வை (ரூ - ஹெ)	3.71
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 24.50
5. அரக / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	0.90
6. நிலத்தின் வகை	பஞ்சை	14. பட்டா எண்	5686
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	0	16. பெயர்	1.சுந்தரபாண்டியன்

குறிப்பு 1:



1.

மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 110305 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

அ-பதிவேடு விவரங்கள்



மாவட்டம் : மதுரை
வட்டம் : வாடிப்பட்டி
கிராமம் : 3 கச்சைகட்டி

1. புல எண்	1131	9. மண் வயனமும் ரகமும்	7 - 1
2. உட்பிரிவு எண்	1B	10. மண் தரம்	3
3. பழைய புல உட்பிரிவு எண்	1B	11. தீர்வை (ரூ - ஹெ)	3.71
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 68.50
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	2.55
6. நிலத்தின் வகை	பஞ்சை	14. பட்டா எண்	5686
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	0	16. பெயர்	1.சுந்தரபாண்டியன்

குறிப்பு 1:



1.

மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 110305 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.



தமிழ்நாடு தமிழ்நாடு TAMILNADU

29 DEC 2021

A. ராமமூர்த்தி
கச்சைக்கட்டி

[Signature]
P. கண்ணன்

CN 021794

முத்திரைத்தரன் விநியோகம்
ஆர்.டி.என்: 3827 / ஆ 3 / 2006-3
199, தாமரைப்பட்டி (எ) சிட்டம்பலம்
மதுரை - தமிழ்நாடு



குத்தகை ஒப்பந்தப் பத்திரம்

2021-ம் வருடம் டிசம்பர் மாதம் 29-ம் தேதிக்கு,
தமிழ் ஸ்ரீ பிலவ வருடம் மார்கழி மாதம் 14-ம் தேதி,

மதுரை மாவட்டம், வாடிப்பட்டி வட்டம், கச்சைக்கட்டி கிராமம், டோர்
நிர்.212/29-ல் வசித்து வரும் லேட்.ஆறுமுகம் அவர்கள் குமாரர்
திரு.A.ராமமூர்த்தி அவர்களுக்கு,

மதுரை மாவட்டம், மதுரை டவுன், K.K.நகர், டோர் நிர்.551-ல் வசித்து
வரும் லேட்.செல்லையா அவர்கள் குமாரர் திரு.C.சுந்தரபாண்டியன் ஆகிய
நாள் எழுதிக்கொடுத்த குத்தகை ஒப்பந்தப் பத்திரம் என்னவென்றால்,

எழுதி வாங்குபவர்

?
A.ராமமூர்த்தி

எழுதிக்கொடுப்பவர்

[Signature]
e. Sundara Pandian

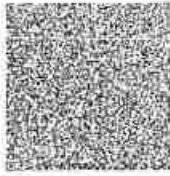
आयकर विभाग
INCOME TAX DEPARTMENT



भारत सरकार
GOVT. OF INDIA



स्थायी लेखा संख्या कार्ड
Permanent Account Number Card
EKHPR4191G



नाम / Name
RAMAMOORTHY A.

पिता का नाम / Father's Name
ARUMUGAM

जन्म की तारीख /
Date of Birth
24/04/1989

हस्ताक्षर / Signature

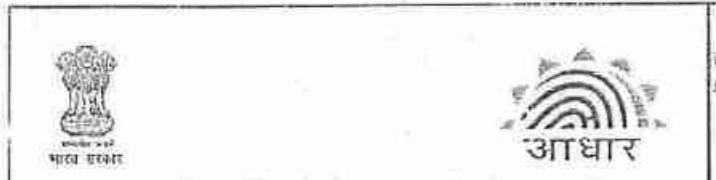
इस कार्ड के खोने/चूने पर कृपया पुलिस को/लॉन्गर्स
आयकर विभाग सेवा इकाई, एनएस सी १०१
चौबी प्रजिड, मनी गवर्नमेंट,
प्लॉट नं. ३४१, सर्वे नं. ९९७/४,
मॉडल कॉलोनी, डीएन बंगला चौक के पास
पुणे - ४११ ०१६

*If this card is lost / someone's lost card is found,
please inform / return to :*

Income Tax PAN Services Unit, NSDL
4th Floor, Main St. Sterling,
Plot No. 341, Survey No. 997/4,
Model Colony, Near Deep Bunglow Chowk,
Pune - 411 016.

Tel: 91-20-2721 8080, Fax: 91-20-2721 8081
e-mail: timinfo@nsdl.co.in





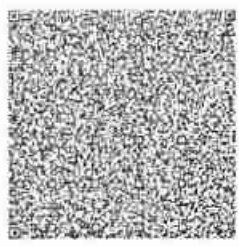
இந்திய அரசாங்கம்
Government of India

இலக்கூர் குடியரசும் அடையாள அமைப்பு அமைப்பு
Unique Identification Authority of India

பதிவேட்டு எண்/ Enrolment No.: 2007/27950/08109

To
ராமமூர்த்தி ஆறுமுகம்
Ramamoorthi Arumugam
S/O: Arumugam
NO 212/L9
PERUMAL NAGAR
KACHAIKATTI
VADIPATTI TAULK
Katchiakatti
Madurai Tamil Nadu - 625218
9791312720

Signature Box Verified
Digitally signed by
Ramamoorthi Arumugam
DN: cn=Ramamoorthi Arumugam,
o=UIDAI, ou=UIDAI, email=UIDAI@uidai.gov.in, c=IN



உங்கள் ஆதார் எண் / Your Aadhaar No. :

9129 3745 4546
VID : 9135 3028 7131 3508

எனது ஆதார். எனது அடையாளம்



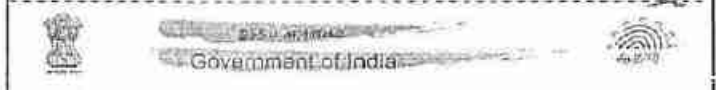
தகவல்

- ஆதார் அடையாளத்திற்கான சான்று குடியறிமைக்கு அல்ல
- பாதுகாப்பான QR குறியீடு: ஆப்லைன் XML / ஆன்லைன் அங்கீகாரத்தைப் பயன்படுத்தி அடையாளத்தை சரிபார்க்கவும்
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

INFORMATION

- Aadhaar is a proof of identity, not of citizenship.
- Verify identity using Secure QR Code/ Offline XML/ Online Authentication.
- This is electronically generated letter.

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்
- பல்வேறு அரசு மற்றும் அரசு சாரா சேவைகளை எளிதில் பெற ஆதார் உதவுகிறது
- உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடியை ஆதாரில் புதுப்பிக்கவும்
- நாடுவள செயலியைப் பயன்படுத்தி உங்கள் ஸ்மார்ட் போனில் ஆதாரை எடுத்துக் செல்லுங்கள்
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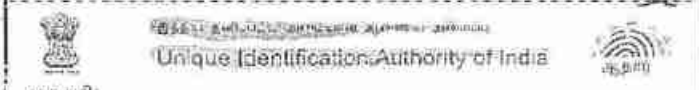


ராமமூர்த்தி ஆறுமுகம்
Ramamoorthi Arumugam
பிறந்த நாள்/DOB: 24/08/1986
ஆண் / MALE

Issue Date: 23/03/2013

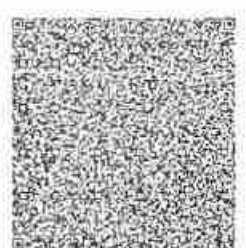
9129 3745 4546
VID : 9135 3028 7131 3508

எனது ஆதார். எனது அடையாளம்



முகவரி:
S/O: ஆறுமுகம், எண் 212/எல்9, பெருமாளர் நகர், கச்சைக்கட்டி, வாடிப்பட்டி ஊழமை, கட்சியாக்கட்டி, மதுரை, தமிழ்நாடு - 625218
Address:
S/O: Arumugam, NO 212/L9, PERUMAL NAGAR, KACHAIKATTI, VADIPATTI TAULK, Katchiakatti, Madurai, Tamil Nadu - 625218

Download Date: 07/03/2022



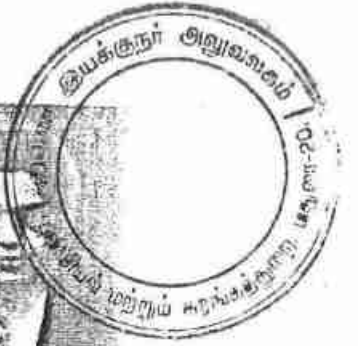
9129 3745 4546
VID : 9135 3028 7131 3508

1047 | help@uidai.gov.in | www.uidai.gov.in

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



M. Dharmalingam



अर्हताप्राप्त व्यक्ति के रूप में मान्यता प्रमाण पत्र
(खनिज रियायत नियमावली, 1960 के नियम 22सी के तहत)
CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON
(Under Rule 22C of Mineral Concession Rules, 1960)

श्री एम. इफ्तिकार अहमद, 129/8, 11वीं क्रॉस, सिवया नगर, अलघापुरम-पी.आ., सैलम - 636 004, तमिल नाडू, जिनका फोटो और हस्ताक्षर ऊपर दिया हुआ है, तथा जिनहोंने अपनी अर्हता और अनुभव का संतोषजनक साक्ष्य दिया है, को खनन योजना तैयार करने हेतु खनिज रियायत नियमावली 1960 के नियम 22सी के तहत अर्हताप्राप्त व्यक्ति के रूप में मान्यता प्रदान की जाती है।

Shri M. Ifthikhar Ahmed, 129/8, 11th Cross, Sivaya Nagar, Alagapuram (PO), Salem - 636 004, Tamilnadu whose Photograph and signature is affixed herein above, having given satisfactory evidence of his qualifications & experience hereby **RECOGNISED** under Rule 22C of the Mineral Concession Rule, 1960 as a Qualified Person to prepare Mining Plans.

उनकी पंजीयन संख्या है
His registration number is

RQP/MAS/183/2004/A

यह मान्यता 10 वर्षों की अवधि के लिए मान्यता है जो दिनांक 10.01.2024 को समाप्त होगी।
This recognition is valid for a period of 10 years ending on 10.01.2024

संकेत द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज चार्ज जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा।

This certificate will be liable to be withdrawn / cancelled in the event of furnishing the wrong information / documents in the Mining Plan submitted by him.

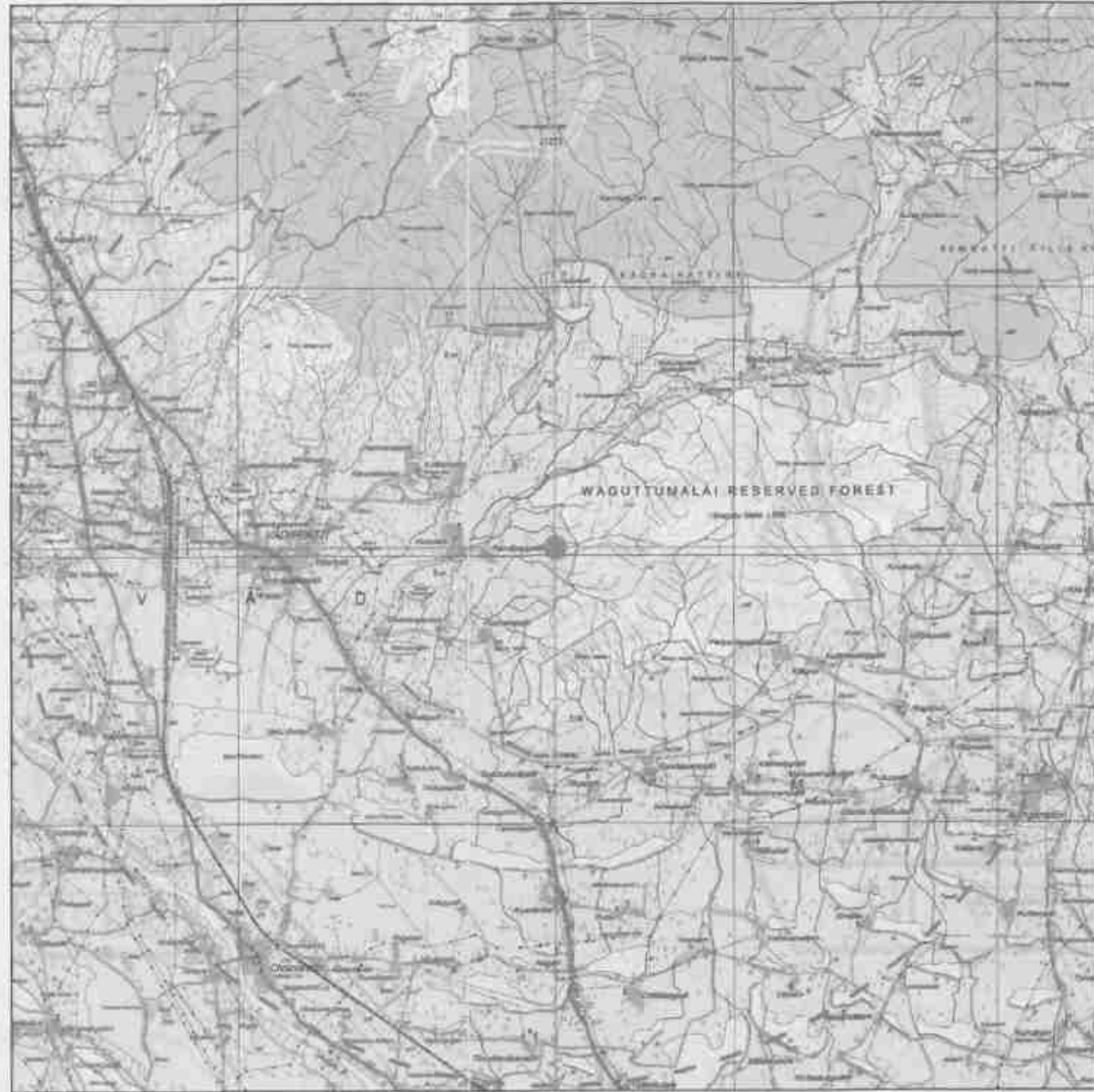
स्थान / Place : Chennai
दिनांक / Date : 02.01.2014

श्री क्षेत्रीय खान नियंत्रक / Regional Controller of Mines
भारतीय खान ब्यूरो / Indian Bureau of Mines
चेन्नई क्षेत्र / Chennai Region



10° 10' 50.19"N

77° 54' 57.96"E



09° 59' 55.76"N

78° 05' 59.81"E

- Express highway: with toll; with bridge; with distance stone
- Roads metalled: according to importance
- Roads, double carriageway; according to importance
- Unmetalled road. Cart-track. Pack-track with pass. Foot-path
- Streams: with track in bed; undefined. Canal
- Dams: masonry or rock-filled; earthwork. Weir
- River; dry with water channel; with island & rocks. Tidal river
- Submerged rocks. Shoal. Swamp. Reeds
- Wells: lined; unlined. Tubewell. Spring. Tank; perennial; dry
- Embankments: road or rail; tank. Broken ground
- Railways, broad gauge: double; single with station; under construction
- Railways, other gauges: double; single with distance stone
- Mineral line or tramway. Kiln. Cutting with tunnel
- Contours with sub-features. Rocky slopes. Cliffs
- Sand features: (1) flat. (2) sand-hills(permanent). (3) dunes(stilling)
- Towns or Villages: inhabited; deserted. Fort
- Huts: permanent; temporary. Tower. Antiquities
- Temple. Chattri. Church. Mosque. Idgh. Tomb. Graves
- Lighthouse. Lightship. Buoy: lighted; unlighted. Anchorage
- Mine. Vine on trellis. Grass. Scrub
- Palms: palmyra; other. Plantain. Corifer. Bamboo. Other trees
- Areas: cultivated; Wooded. Surveyed trees
- Boundary, international
- Boundary, state: demarcated; undemarcated
- Boundary, district; subdivision; taluk or taluk; forest
- Boundary pillars: surveyed; unlocated
- Heights, triangulated: station; point; approximate
- Bench-mark: geodetic; tertiary; canal
- Post office. Telegraph office. Overhead tank
- Rest house or inspection bungalow. Circuit house. Police station
- Camping Ground. Forest reserved; protected
- Space names: administrative; locality or tribal
- Hospital. Dispensary. Veterinary. Hospital/Dispensary
- Aerodrome. Helipad. Tourist site
- Powerline: with pylons surveyed; with poles unsurveyed



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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APPLICANT :

Thiru.A.RAMAMOORTHY,
S/o. ARUMUGAM,
KATCHAIKATTI VILLAGE,
VADIPATTI VILLAGE,
MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:

S.F.Nos : 1131/1B, 1131/3 & 1131/4,
EXTENT : 1.36.5 Ha.
VILLAGE : KATCHAIKATTI,
TALUK : VADIPATTI,
DISTRICT : MADURAI
STATE : TAMIL NADU.

PLATE NO - I-A

DATE OF SURVEY : 11.10.2023

**TOPO SKETCH OF QUARRY LEASE
APPLIED AREA FOR 10km RADIUS**

SCALE: 1:1,00,000

PREPARED BY :



THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

Dr. M. Iftikhar Ahmed

Dr. M. IFTIKHAR AHMED, M.Sc., F.O.S., M.B.A., M.M.E.A.
RECOGNIZED QUALIFIED PERSON
RQP/WAS/185/2004/A

TOPO SHEET NO. : 58 J/04

LATITUDE : 10°05'20.91"N to 10°05'25.03"N
LONGITUDE : 78°00'26.05"E to 78°00'31.67"E

10km RADIUS : 
Q.L. APPLIED AREA : 

5000 E 2300 N

5100 E

5200 E

2300 N
5300 E



BOUNDARY CO-ORDINATES

S.R.	LATITUDE	LONGITUDE
1	10 30 20.87 N	78 02 24.7 E
2	10 30 24.47 N	78 02 24.7 E
3	10 30 24.87 N	78 02 24.7 E
4	10 30 22.87 N	78 02 24.7 E
5	10 30 22.47 N	78 02 24.7 E
6	10 30 24.87 N	78 02 24.7 E
7	10 30 24.77 N	78 02 24.7 E
8	10 30 24.87 N	78 02 24.7 E
9	10 30 24.87 N	78 02 24.7 E
10	10 30 24.87 N	78 02 24.7 E
11	10 30 24.87 N	78 02 24.7 E
12	10 30 24.87 N	78 02 24.7 E
13	10 30 24.87 N	78 02 24.7 E
14	10 30 24.87 N	78 02 24.7 E
15	10 30 24.87 N	78 02 24.7 E

SATON / SIVAKKAL, ZONE 44 NORTH

2200 N

2200 N

2100 N

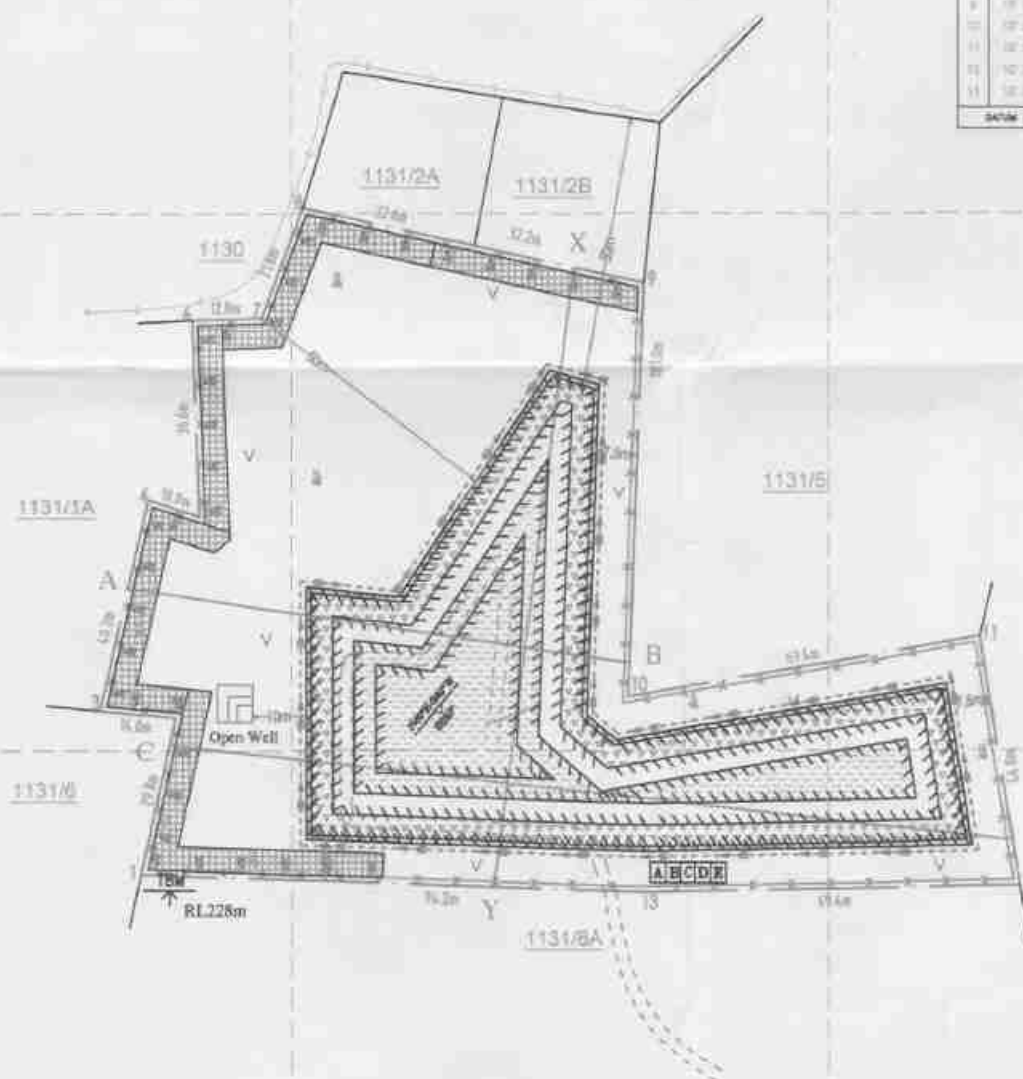
2100 N

5000 E

5100 E

5200 E

2000 N
5300 E



INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m, 10m & 7.5m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- GRAVEL
- SHRUBS
- APPROACH ROAD
- ODAI
- QUARRY PIT
- QUARRY ROAD
- BARBED WIRE FENCING
- PROPOSED GARLAND DRAIN
- EXISTING LAND FORM
- SOIL LAYER
- REHABILITATED LAND FORM
- OLD SURFACE LEVEL
- FINISHED SURFACE LEVEL
- RAIN WATER STORAGE

APPLICANT:
 Thiru.A.RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATTI VILLAGE,
 MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:
 S.F.Nos : 1131/18, 1131/3 & 1131/4,
 EXTENT : 1.36.5 Ha,
 VILLAGE : KATCHAIKATTI,
 TALUK : VADIPATTI
 DISTRICT : MADURAI
 STATE : TAMIL NADU.

PLATE NO - IV
 DATE OF SURVEY : 11.10.2023

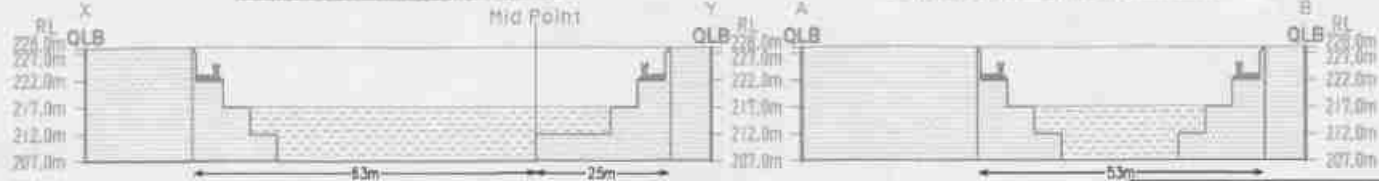
**PROGRESSIVE QUARRY CLOSURE
 PLAN & SECTIONS**
 SCALE: 1:1000

PREPARED BY:
 THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
 PLATE IS TRUE AND CORRECT TO THE BEST OF MY
 KNOWLEDGE BASED UPON THE BEST MAP
 AUTHENTICATED BY STATE GOVERNMENT

 Dr. MUTHUKUMAR AHMED M.Sc., F.O.S., M.B.A., M.M.E.A.,
 RECOGNIZED QUALIFIED PERSON
 RQP/MAS/183/2004/A

SECTION ALONG X-Y

SECTION ALONG A-B



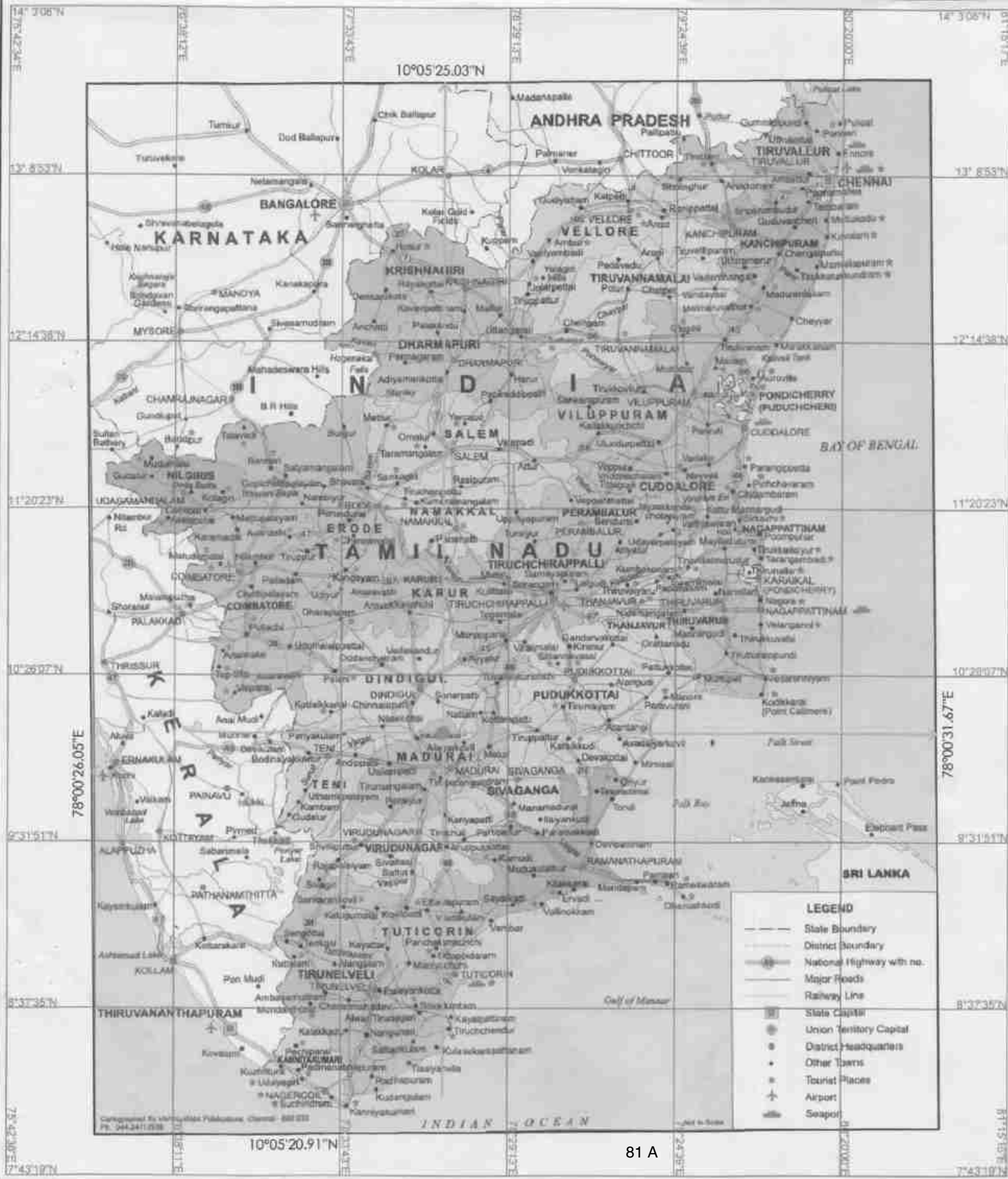
SECTION ALONG C-D



Proposed Pit Dimension (max)
 XY-AB = 63mX52mX21m(d)
 XY-CD = 25mX124mX16m(d)

- SITE SERVICES**
- A - OFFICE
 - B - STORE ROOM
 - C - FIRST AID ROOM
 - D - REST SHELTER
 - E - TOILET

1 - V yr Proposed area to be Planted



INDEX

Q.L.APPLIED AREA : ●

TOPO SHEET NO. : 58 J/04

LATITUDE : 10°05'20.91"N to 10°05'25.03"N
 LONGITUDE : 78°00'26.05"E to 78°00'31.67"E

APPLICANT :

Thiru.A.RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATTI VILLAGE,
 MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:

S.F.Nos : 1131/18, 1131/3 & 1131/4,
 EXTENT : 1.36.5 Ha,
 VILLAGE : KATCHAIKATTI,
 TALUK : VADIPATTI,
 DISTRICT : MADURAI,
 STATE : TAMIL NADU.

PLATE NO - I

DATE OF SURVEY : 11.10.2023

LOCATION PLAN

SCALE. 1:24,00,000

PREPARED BY :

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP AUTHENTICATED BY STATE GOVERNMENT

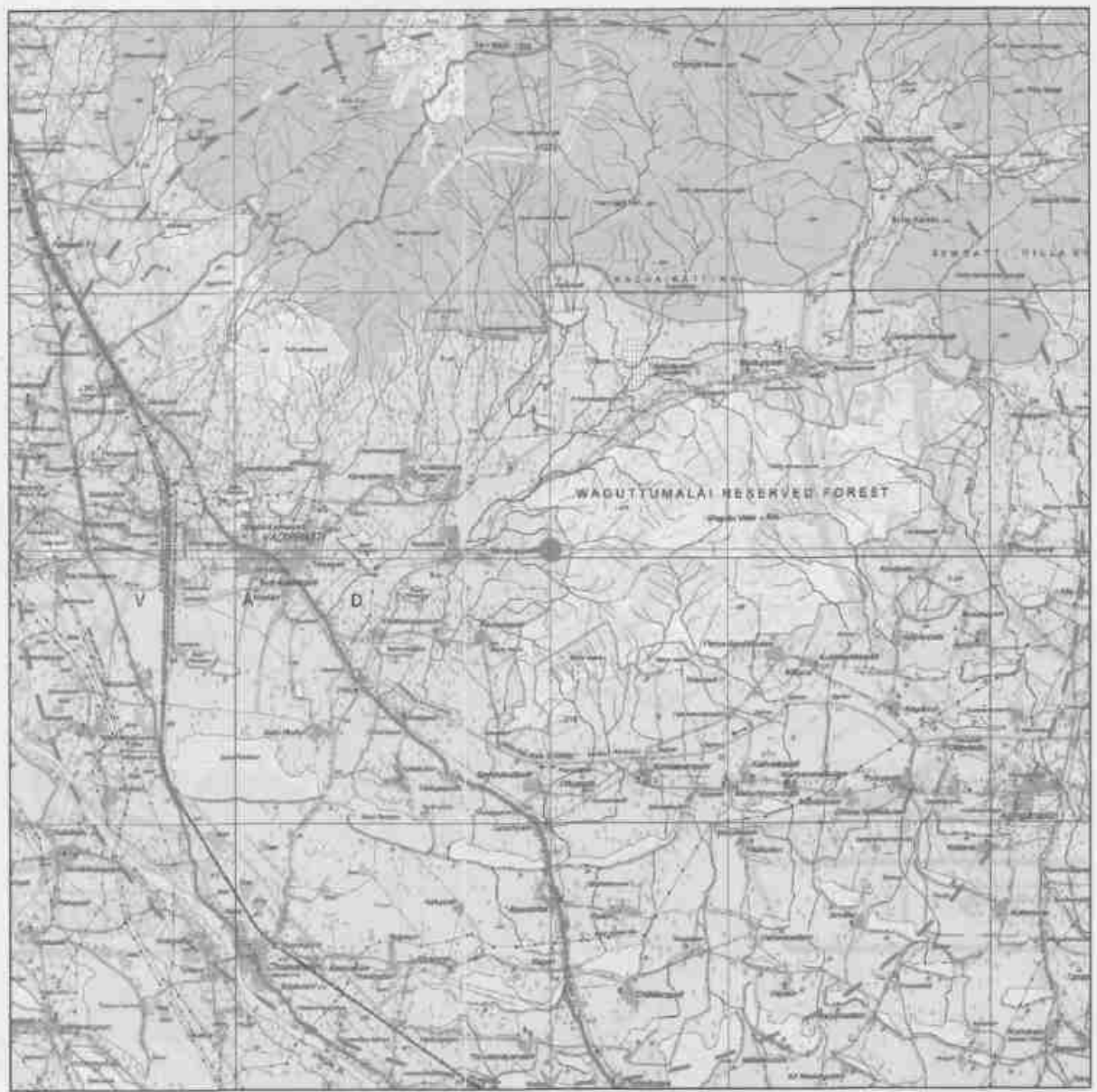
Dr. M. Ithirhar Ahmed
 Dr.M.ITHIRHAR AHMED,M.Sc.,F.G.S.,M.B.A.,M.M.E.I.,
 RECOGNIZED QUALIFIED PERSON
 ROP/MAS/183/2004/A

- LEGEND**
- State Boundary
 - District Boundary
 - National Highway with no.
 - Major Roads
 - Railway Line
 - State Capital
 - Union Territory Capital
 - District Headquarters
 - Other Towns
 - Tourist Places
 - Airport
 - Seaport



10° 10' 50.19"N

77° 54' 57.96"E



78° 05' 59.81"E

09° 59' 55.76"N

- Express highway, with toll; with bridge; with distance stone.....
- Roads metalled: according to importance.....
- Roads, double carriageway, according to importance.....
- Unmetalled road. Cart-track. Pack-track with pass. Foot-path.....
- Streams: with track in bed; undefined. Canal.....
- Dams: masonry or rock-filled; earthwork. Weir.....
- River; dry with water channel; with island & rocks. Tidal river.....
- Submerged rocks. Shoal. Swamp. Reeds.....
- Wells: lined; unlined. Tubewell. Spring. Tanks: perennial; dry.....
- Embankments: road or rail; tank. Broken ground.....
- Railways, broad gauge: double: single with station; under construction.....
- Railways, other gauges: double; single with distance stone; etc.....
- Mineral line or tramway. Kin. Cutting with tunnel.....
- Contours with sub-features. Rocky slopes. Cliffs.....
- Sand features: (1) flat. (2) sand-hills(permanent). (3) dunes(shifting).....
- Towns or Villages: inhabited; deserted. Fort.....
- Huts: permanent; temporary. Tower. Antiquities.....
- Temple. Chhatri. Church. Mosque. Idgah. Tomb. Graves.....
- Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage.....
- Mine. Vine on trellis. Grass. Scrub.....
- Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees.....
- Areas: cultivated; Wooded. Surveyed trees.....
- Boundary, international.....
- Boundary, state: demarcated; undemarcated.....
- Boundary, district; subdivision; taluk or taluk; forest.....
- Boundary pillars: surveyed; unlocated.....
- Heights, triangulated: station; point; approximate.....
- Bench-mark: geodetic; tertiary; canal.....
- Post office. Telegraph office. Overhead tank.....
- Rest house or inspection bungalow. Circuit house. Police station.....
- Camping Ground. Forest: reserved; protected.....
- Species names: administrative; locality or tribal.....
- Hospital. Dispensary. Veterinary: Hospital/Dispensary.....
- Aerodrome. Helipad. Tourist site.....
- Powerline: with pylons surveyed; with poles unsurveyed.....



1:200	1:500	1:1000
BM 03-3	BM 03-2	BM 03-1
1:1000	1:2000	1:5000
1:10000	1:25000	1:50000

APPLICANT :

Thiru. A. RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATTI VILLAGE,
 MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:

S.F. Nos : 1131/1B, 1131/3 & 1131/4.
 EXTENT : 1.36.5 Ha.
 VILLAGE : KATCHAIKATTI
 TALUK : VADIPATTI,
 DISTRICT : MADURAI,
 STATE : TAMIL NADU.

PLATE NO - I-A

DATE OF SURVEY : 11.10.2023

TOPO SKETCH OF QUARRY LEASE APPLIED AREA FOR 10Km RADIUS

SCALE: 1:1,00,000

PREPARED BY :

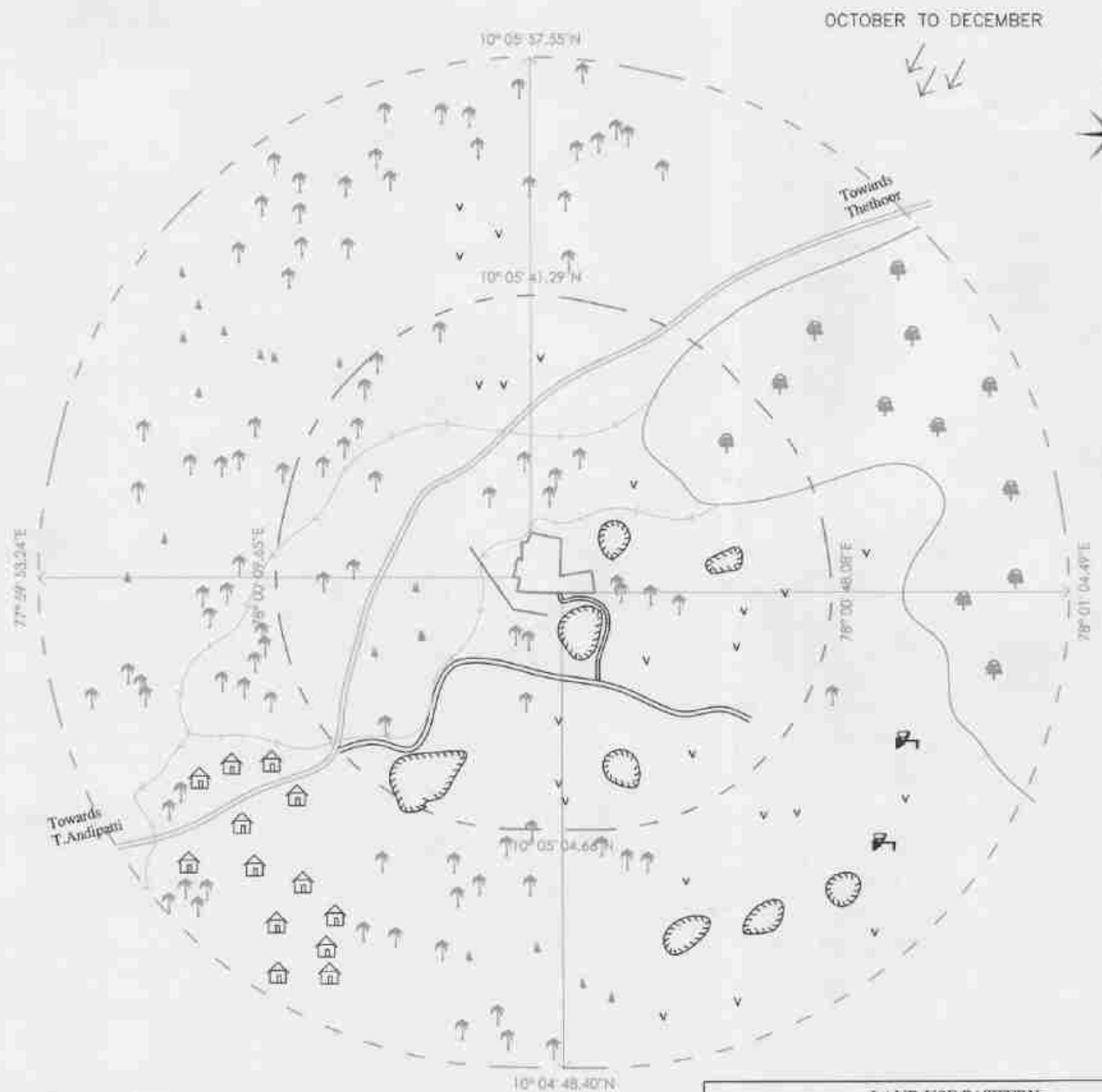
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M. J. J. J.
 Dr. M. ITHIKHAR AHMED, M.Sc., P.G.S., M.B.A., M.M.E.A.,
 RECOGNIZED QUALIFIED PERSON
 ROP/MAS/183/2004/A

156

TOPO SHEET NO. : 58 J/04
 LATITUDE : 10°05'20.91"N to 10°05'25.03"N
 LONGITUDE : 78°00'26.05"E to 78°00'31.67"E
 10km RADIUS :

Q.L. APPLIED AREA : 82 A



OCTOBER TO DECEMBER

77° 59' 33.24"E

10° 05' 37.55"N

10° 05' 41.29"N

10° 05' 04.66"N

10° 04' 48.40"N

Towards Theerthoor

Towards T. Andipatti

JULY TO SEPTEMBER

TOPO SHEET NO. : 58 J/04
 LATITUDE : 10°05'20.91"N to 10°05'25.03"N
 LONGITUDE : 78°00'26.05"E to 78°00'31.67"E

83

LAND USE PATTERN

DESCRIPTION	PERCENTAGE	INDEX
OLD PITS/ CRUSHER	(07%)	
TREES	(08%)	
ROADS	(04%)	
HABITATION	(01%)	
AGRICULTURE LAND	(16%)	
ODAI	(05%)	
BARREN LAND	(12%)	v v
ELEVATED AREA	(47%)	
TOTAL	100%	

INDEX

- Q.L. APPLIED AREA
- 1 Km RADIUS
- 500m RADIUS
- SEASONAL AGRICULTURE LAND
- TREES
- HABITATION
- WIND DIRECTION
- APPROACH ROAD
- MAJOR DISTRICT ROAD
- QUARRY PIT & CRUSHER UNIT
- ODAI
- ELEVATED AREA
- BARREN LAND
- E.B. LINE



APPLICANT :

Thru. A. RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATTI VILLAGE,
 MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:

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 EXTENT : 1.36.5 Ha.
 VILLAGE : KATCHAIKATTI,
 TALUK : VADIPATTI,
 DISTRICT : MADURAI,
 STATE : TAMIL NADU.

PLATE NO - I-B

DATE OF SURVEY : 11.10.2023

ENVIRONMENTAL & LAND USE PLAN

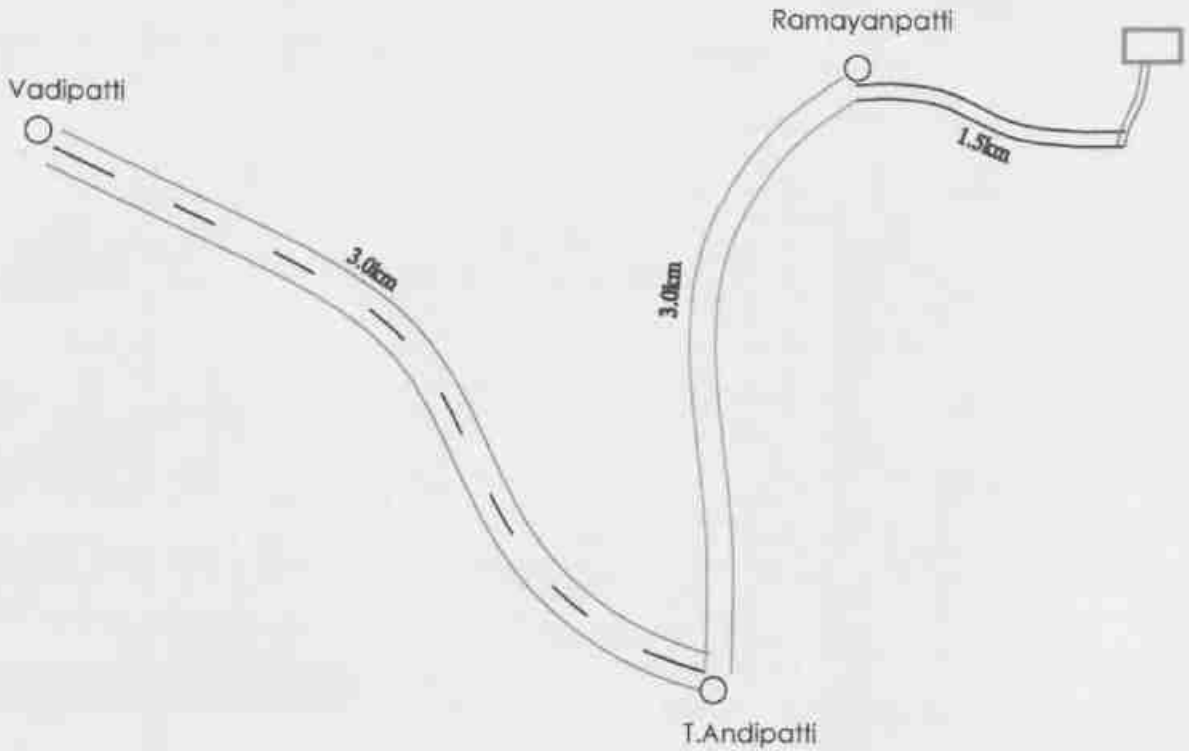
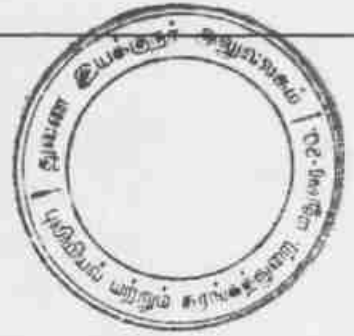
SCALE. 1:10,000







PREPARED BY :

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP AUTHENTICATED BY STATE GOVERNMENT

Dr. MIFTKHAN AHMED, M.Sc., F.G.S., M.B.A., M.M.E.A.P.
 RECOGNIZED QUALIFIED PERSON
 ROP/MAS/183/2004/A

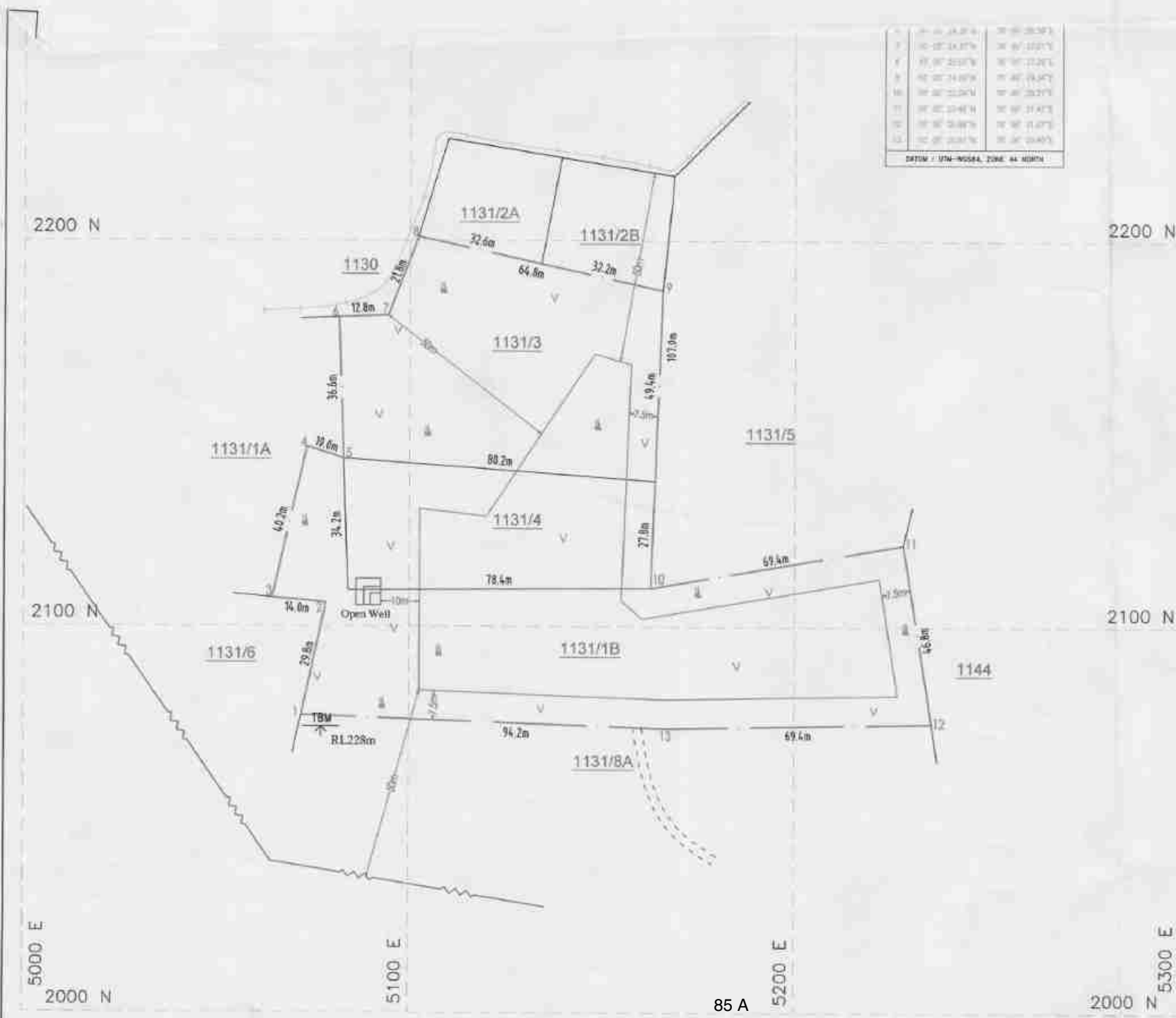
PLATE NO : I-C
ROUTE MAP



<p style="text-align: center;"><u>INDEX</u></p> <p>LEASE APPLIED AREA </p> <p>NH-ROAD </p> <p>MAJOR DISTRICT ROAD </p> <p>EARTHEN ROAD </p> <p>APPROACH ROAD </p>	<p><u>APPLICANT :</u> Thiru.A.RAMAMOORTHY, S/o. ARUMUGAM, KATCHAIKATTI VILLAGE, VADIPATTI VILLAGE, MADURAI DISTRICT - 625 218.</p>	<p><u>SCALE :</u> NOT TO SCALE</p>
	<p><u>LOCATION OF Q.L. A. AREA:</u> S.F.Nos : 1131/1B, 1131/3 & 1131/4, EXTENT : 1.36.5 Ha, VILLAGE : KATCHAIKATTI, TALUK : VADIPATTI, DISTRICT : MADURAI, STATE : TAMIL NADU.</p>	<p><u>PREPARED BY:</u>  Dr.M.JIFTHIKHAR AHMED, M.Sc., F.G.S., M.B.A., M.M.E.A., RECOGNIZED QUALIFIED PERSON ROP/MAS/1B5/2004/A 152</p>

1	40 00 24.27 N	37 00 28.57 E
2	40 00 24.27 N	37 00 28.57 E
3	40 00 24.27 N	37 00 28.57 E
4	40 00 24.27 N	37 00 28.57 E
5	40 00 24.27 N	37 00 28.57 E
6	40 00 24.27 N	37 00 28.57 E
7	40 00 24.27 N	37 00 28.57 E
8	40 00 24.27 N	37 00 28.57 E
9	40 00 24.27 N	37 00 28.57 E
10	40 00 24.27 N	37 00 28.57 E
11	40 00 24.27 N	37 00 28.57 E
12	40 00 24.27 N	37 00 28.57 E
13	40 00 24.27 N	37 00 28.57 E

DATE: 11/10/2023, TIME: 11:00 AM



INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m, 10m & 7.5m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- GRAVEL
- SHRUBS
- APPROACH ROAD
- ODAI
- LT EB LINE (Shifted)

APPLICANT:

Thiru.A.RAMAMOORTHY,
S/o. ARUMUGAM,
KATCHAIKATTI VILLAGE,
VADIPATTI VILLAGE,
MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:

S.F.Nos : 1131/1B, 1131/3 & 1131/4.
EXTENT : 1.36.5 Hq.
VILLAGE : KATCHAIKATTI,
TALUK : VADIPATTI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

PLATE NO - II

DATE OF SURVEY : 11.10.2023

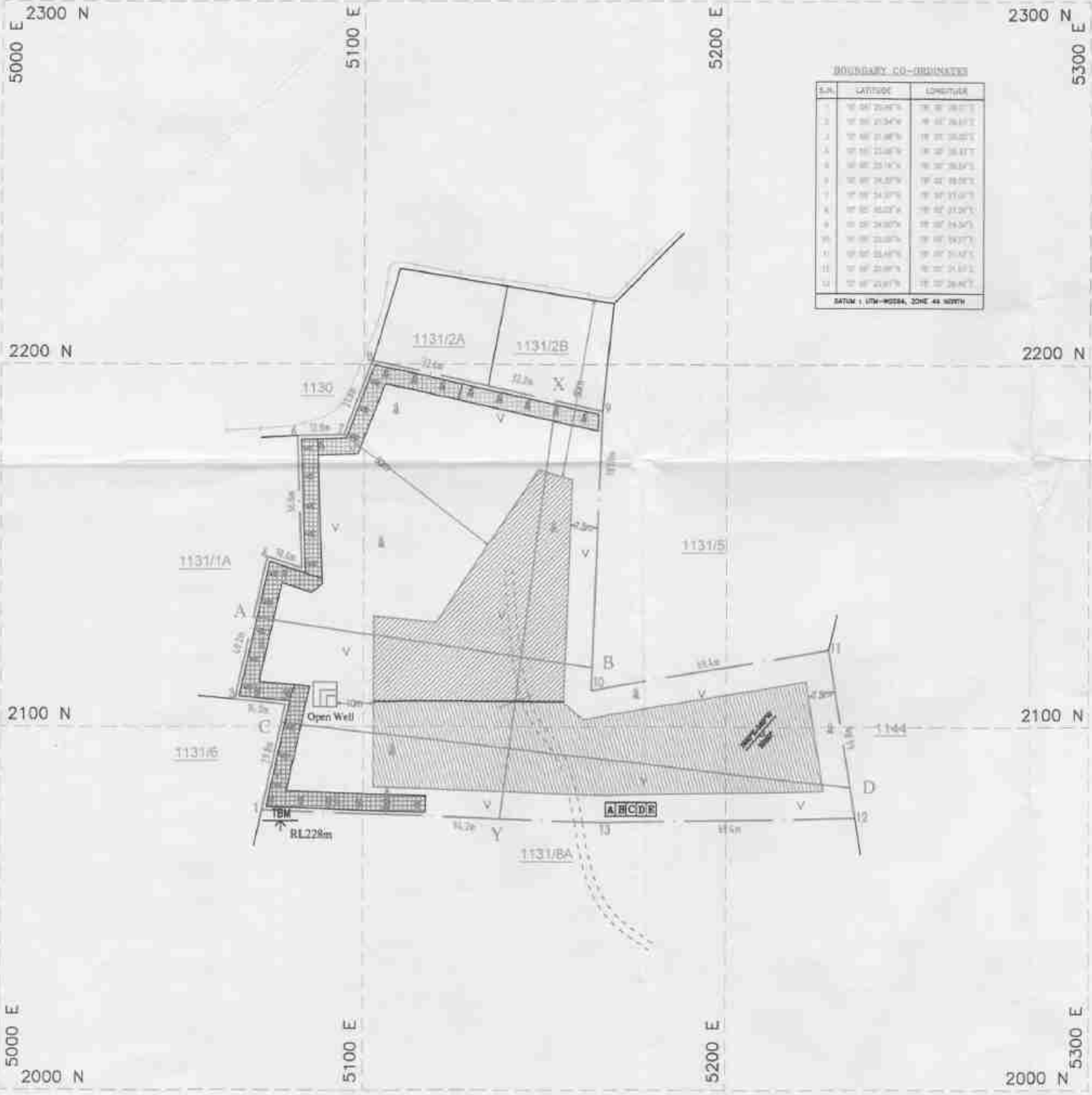
QUARRY LEASE PLAN & SURFACE PLAN

SCALE: 1:1000

PREPARED BY:

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(Signature)
DR. MUTHUKHAR AHMED, M.Sc., F.O.S., M.B.A., M.M.C.A.
RECOGNIZED - QUALIFIED PERSON
ROP/WAS/183/2004/A



BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	10 50' 20.47"	78 30' 36.11"
2	10 50' 23.47"	78 30' 36.12"
3	10 50' 23.47"	78 30' 36.20"
4	10 50' 23.47"	78 30' 36.37"
5	10 50' 25.14"	78 30' 36.47"
6	10 50' 26.07"	78 30' 36.57"
7	10 50' 24.07"	78 30' 37.07"
8	10 50' 23.07"	78 30' 37.07"
9	10 50' 24.07"	78 30' 37.07"
10	10 50' 24.07"	78 30' 37.07"
11	10 50' 24.07"	78 30' 37.07"
12	10 50' 23.07"	78 30' 36.47"

DATUM : 1. UTM-WGS84, ZONE 48 NORTH

SITE SERVICES (Proposed)
 A - OFFICE
 B - STORE ROOM
 C - FIRST AID ROOM
 D - REST SHELTER
 E - TOILET

- I - yr Proposed area to be Quarried
- II - yr Proposed area to be Quarried
- III - yr Proposed area to be Quarried
- IV - yr Proposed area to be Quarried
- V - yr Proposed area to be Quarried
- I - yr Proposed area to be Planned
- II - yr Proposed area to be Planned
- III - yr Proposed area to be Planned
- IV - yr Proposed area to be Planned
- V - yr Proposed area to be Planned

- INDEX**
- Q.L. APPLIED AREA BOUNDARY
 - 50m, 10m & 7.5m SAFETY DISTANCE
 - TEMPORARY BENCH MARK
 - GRAVEL
 - SHRUBS
 - APPROACH ROAD
 - ODAI

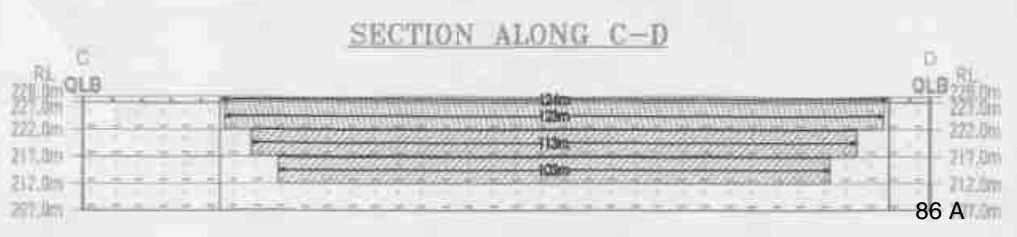
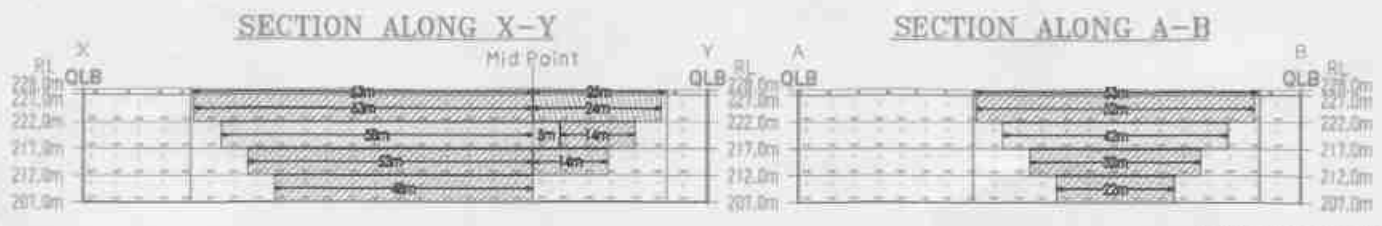
APPLICANT:
 Thiru. A. RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATI VILLAGE,
 MADURAI DISTRICT - 625 218.

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 S.F.No. : 1131/18, 1131/3 & 1131/4,
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 VILLAGE : KATCHAIKATTI,
 TALUK : VADIPATI,
 DISTRICT : MADURAI,
 STATE : TAMIL NADU.

PLATE NO - III
 DATE OF SURVEY : 11.10.2023

**TOPOGRAPHY, GEOLOGICAL PLAN,
 YEARWISE DEVELOPMENT &
 PRODUCTION PLAN & SECTIONS**
 SCALE: 1:1000

PREPARED BY:
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 AUTHENTICATED BY STATE GOVERNMENT
 M. Miththikar Ahmed
 Dr. M. MITHTHIKAR AHMED, M.Sc., F.C.S., M.B.A., M.W.C.A.
 RECOGNIZED QUALIFIED PERSON
 RCP/MAS/183/2004/A



LAND USE PATTERN

DESCRIPTION	PRESENT AREA IN (Ha)	AREA AT THE END OF LEASE PERIOD (Ha)
QUARRYING PIT	Nil	0.51.5
INFRASTRUCTURE	Nil	0.01.0
ROADS	Nil	0.02.0
GREEN BELT	Nil	0.12.0
UN-UTILIZED AREA	1.36.5	0.70.0
TOTAL	1.36.5	1.36.5



BOUNDARY POINT COORDINATES

S.N.	LATITUDE	LONGITUDE
1	10° 00' 20.00" N	76° 00' 30.00" E
2	10° 00' 20.00" N	76° 00' 30.00" E
3	10° 00' 20.00" N	76° 00' 30.00" E
4	10° 00' 20.00" N	76° 00' 30.00" E
5	10° 00' 20.00" N	76° 00' 30.00" E
6	10° 00' 20.00" N	76° 00' 30.00" E
7	10° 00' 20.00" N	76° 00' 30.00" E
8	10° 00' 20.00" N	76° 00' 30.00" E
9	10° 00' 20.00" N	76° 00' 30.00" E
10	10° 00' 20.00" N	76° 00' 30.00" E
11	10° 00' 20.00" N	76° 00' 30.00" E
12	10° 00' 20.00" N	76° 00' 30.00" E
13	10° 00' 20.00" N	76° 00' 30.00" E
14	10° 00' 20.00" N	76° 00' 30.00" E

SCALE : 1:5000, ZONE 44 NORTH



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- 50m, 10m & 7.5m SAFETY DISTANCE
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- GRAVEL
- SHRUBS
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- QUARRY PIT
- QUARRY ROAD
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- PROPOSED GARLAND DRAIN
- EXISTING LAND FORM
- SOIL LAYER
- REHABILITATED LAND FORM
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APPLICANT :
 Thiru. A. RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATTI VILLAGE,
 MADURAI DISTRICT - 625 218.

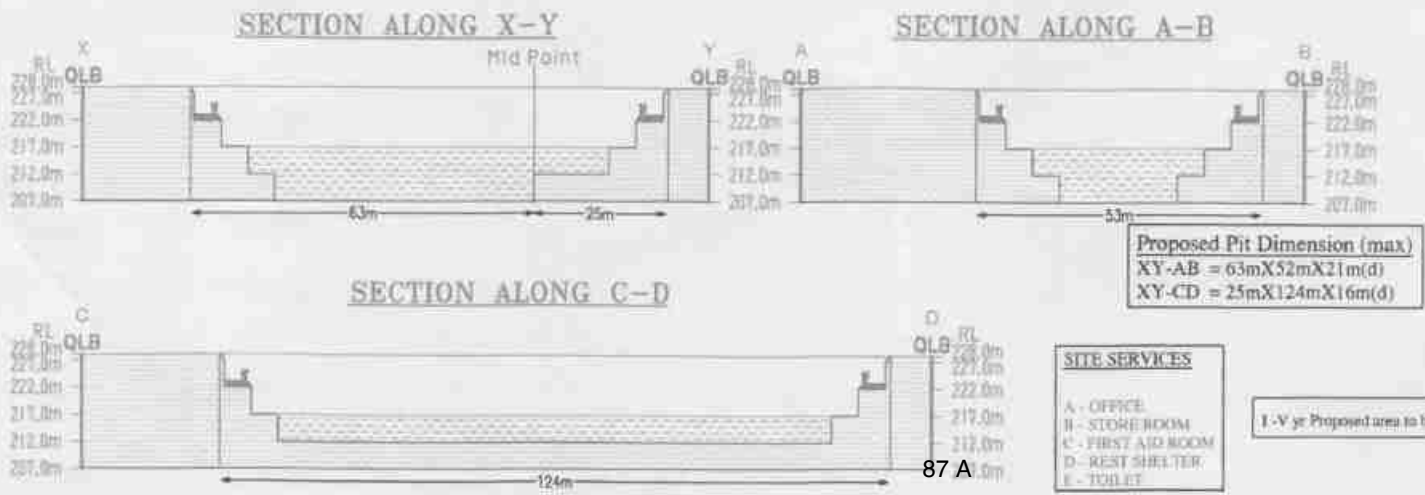
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 VILLAGE : KATCHAIKATTI,
 TALUK : VADIPATTI,
 DISTRICT : MADURAI,
 STATE : TAMIL NADU.

PLATE NO - IV
 DATE OF SURVEY : 11.10.2023

**PROGRESSIVE QUARRY CLOSURE
 PLAN & SECTIONS**
 SCALE : 1:1000

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 RECOGNIZED QUALIFIED PERSON
 RQP/MAS/185/2004/A



Proposed Pit Dimension (max)
 XY-AB = 63mX52mX21m(d)
 XY-CD = 25mX124mX16m(d)

- SITE SERVICES**
- A - OFFICE
 - B - STORE ROOM
 - C - FIRST AID ROOM
 - D - REST SHELTER
 - E - TOILET

1-V yr Proposed area to be Planted

5000 E 2300 N

5100 E

5200 E

2300 N 5300 E



BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	10° 07' 24.874"	79° 00' 24.217"
2	10° 07' 24.874"	79° 00' 24.217"
3	10° 07' 24.874"	79° 00' 24.217"
4	10° 07' 24.874"	79° 00' 24.217"
5	10° 07' 24.874"	79° 00' 24.217"
6	10° 07' 24.874"	79° 00' 24.217"
7	10° 07' 24.874"	79° 00' 24.217"
8	10° 07' 24.874"	79° 00' 24.217"
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11	10° 07' 24.874"	79° 00' 24.217"
12	10° 07' 24.874"	79° 00' 24.217"
13	10° 07' 24.874"	79° 00' 24.217"
14	10° 07' 24.874"	79° 00' 24.217"

SRM - 17M-NORRA, ZONE 44 NORTH

2200 N

2200 N

SITE SERVICES

- A - OFFICE
- B - STORE ROOM
- C - FIRST AID ROOM
- D - REST SHELTER
- E - TOILET

I-V for Proposed area to be Planned

2100 N

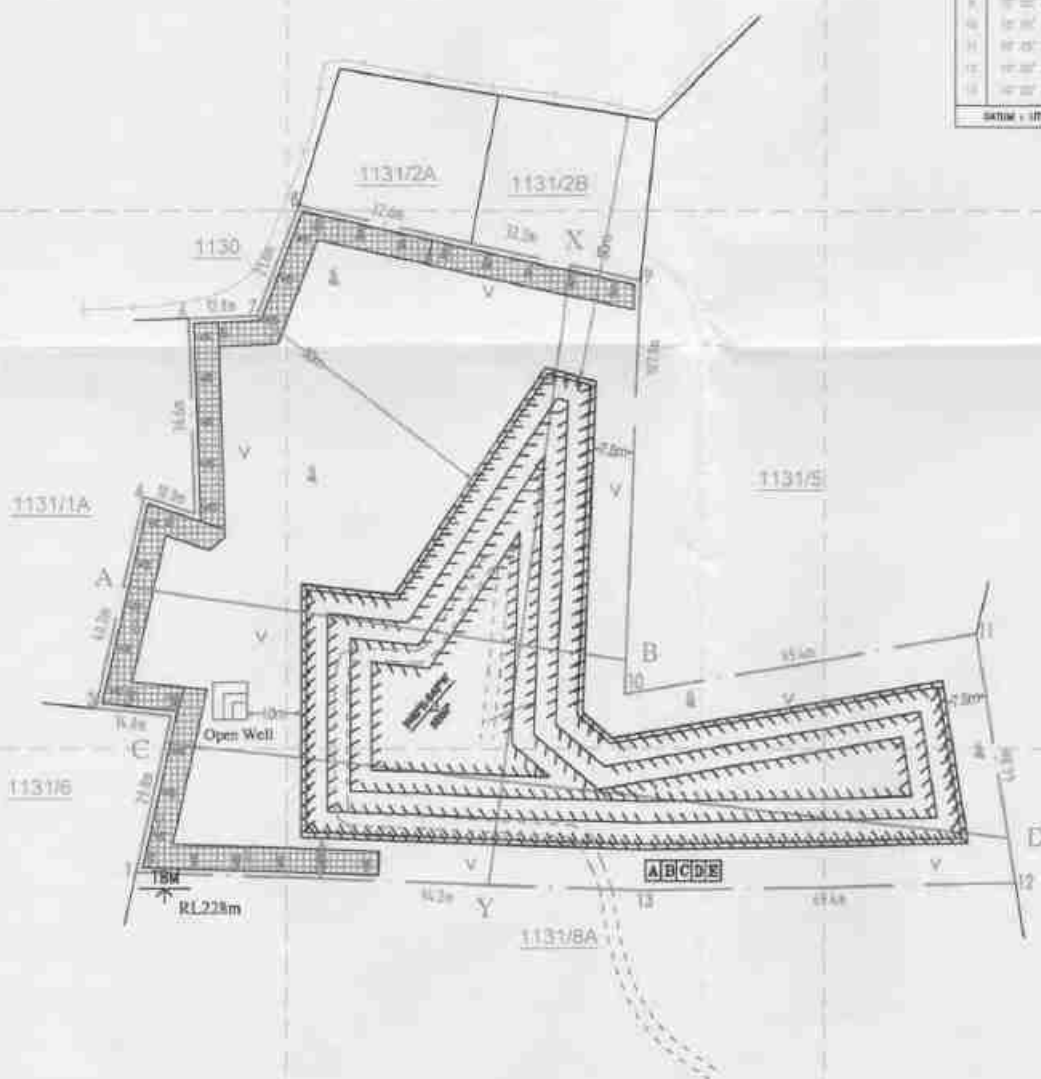
2100 N

5000 E 2000 N

5100 E

5200 E

2000 N 5300 E



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- QUARRY PIT
- QUARRY ROAD

APPLICANT:
 Thiru. A. RAMAMOORTHY,
 S/o. ARUMUGAM,
 KATCHAIKATTI VILLAGE,
 VADIPATTI VILLAGE,
 MADURAI DISTRICT - 625 218.

LOCATION OF Q.L. APPLIED AREA:
 S.P.Nos : 1131/1B, 1131/3 & 1131/4
 EXTENT : 1.36.5 Ha.
 VILLAGE : KATCHAIKATTI
 TALUK : VADIPATTI
 DISTRICT : MADURAI
 STATE : TAMIL NADU.

PLATE NO - V

DATE OF SURVEY : 11.10.2023

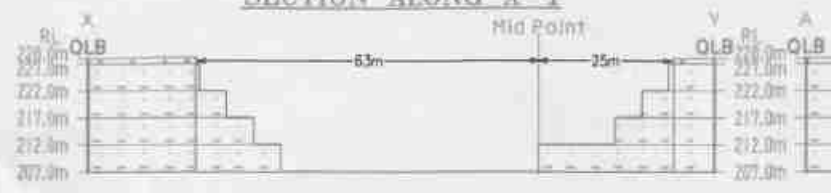
CONCEPTUAL PLAN & SECTIONS

SCALE: 1:1000

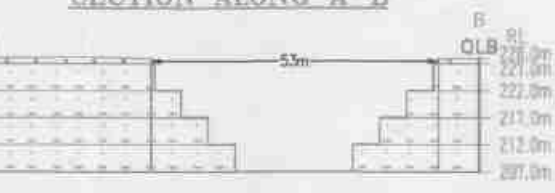
PREPARED BY:
 THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
 PLATE IS TRUE AND CORRECT TO THE BEST OF MY
 KNOWLEDGE BASED UPON THE LEASE MAP
 AUTHENTICATED BY STATE GOVERNMENT

 DR. MITHUNKUMAR AHMED M.Sc., F.G.S., M.B.A., M.M.E.A.
 RECOGNIZED QUALIFIED PERSON
 ROP/MAS/185/2004/A

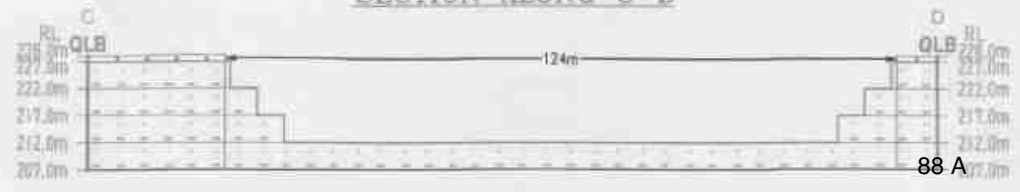
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG C-D



Ultimate Pit Dimension (max)
 XY-AB = 63mX52mX21m(d)
 XY-CD = 25mX124mX16m(d)

HYDROGEOLOGICAL REPORT

Rough Stone Quarry Over an extent of

1.36.5Ha of Patta land in S.F.Nos. 1131/1B, 1131/3 & 1131/4 of

Katchaikatti Village, Vadipatti Taluk, Madurai District,

Tamil Nadu State.

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**HYDRO - GEOLOGICAL STUDIES AT THIRU. A. RAMAMOORTHY
ROUGH STONE & GRAVEL QUARRY IN KATCHAIKATTI VILLAGE,
VADIPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

1 INTRODUCTION

Proprietor of **Thiru. A. Ramamoorthi** Rough stone and Gravel quarry Over an extent of 1.36.5 hectares of Patta land in S.F. Nos. 1131/1B, 1131/3 & 1131/4 of Katchaikatti village, Vadipatti Taluk, Madurai District, Tamil Nadu state on the hydrological regime of the area, The above area has been studied & investigated for finding out Ground water level and aquifer thickness and water quality in and around mine lease area. The electrical resistivity method, TEM study in Rough stone and gravel quarry and genesis rock with determine the shallow and deeper freshwater aquifer in the proposed mining area in Katchaikatti Village.

1.1. Scope of Study

In the present study, the main aim of the shallow and deeper aquifer investigation through electrical resistivity VES, Method is used to measure the apparent resistivity of the Study area. The present study is estimating the ground water level in Katchaikatti village, Vadipatti Taluk, Madurai District, Tamil Nadu village proposed leasehold area and their surrounding area. The study area is mostly covered by Water level, type of sand, type of rock and their basement rock characters. The main aim of the study is to determine the water table and flow movement of this Lease and surrounding area (Fig.1).

1.2. Profiles in the Study Area.

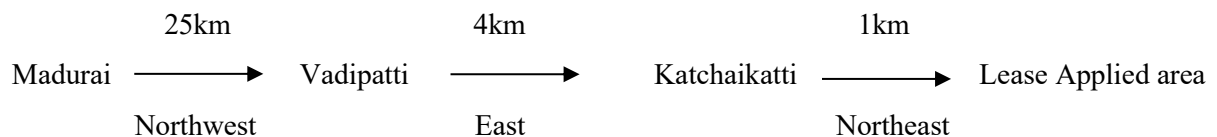
Name of the Lessee	: Thiru. A. Ramamoorthi
Survey No	: 1131/1B, 1131/3 & 1131/4
Extent	: 1.36.5 hectares.
Village	: Katchaikatti village,
Taluka	: Vadipatti Taluk,
District	: Madurai
State	: Tamil Nadu

2 STUDY AREA DESCRIPTION



Figure.1. Shows proposed mine lease area

The lease applied area falls in the Topo sheet No: **58 - J/04** Latitude between: **10°05'20.91''N to 10°05'25.03''N** and Longitude between: **78°00'26.05''E to 78°00'31.67''E** on WGS datum-1984. The lease applied area is about 22km Northwest side of Madurai, 5km East side of Vadipatti and 1.0km Northeast side of Katchaikatti Village.



2.1 Topography of the Lease Area and Its Surrounding Environments:

The lease applied area exhibits plain topography. The area has gentle sloping towards Southern side. The altitude of the area is 228m (max) above Mean Sea level. The area is covered by 1m thickness of Topsoil. Massive Charnockite is found after 1m (Topsoil) which is clearly inferred from the existing quarry pit situated on the Southern side.

The Water level in the surrounding area is 57m below general ground profile which is observed from the nearby bore wells. Average annual rainfall is about 985mm.



Figure 2. Topography and Outcrop in the lease area

3 REGIONAL GEOLOGY OF MADURAI DISTRICT

Madurai with a total area of 3860 sq.km. is one of the trifurcated districts of the erstwhile composite Madurai and is situated between North latitudes $9^{\circ} 30'$ - $10^{\circ} 16'$ and east longitudes $77^{\circ} 15'$ - $78^{\circ} 25'$. It is bound by Theni district in the west, Dindigul district in the north, Karur and Sivaganga districts in the east and by Virudunagar district in the south. It comprises 10 taluks, viz., Madurai East, Madurai West, Thirupparankundram, Usilampatti, Tirumangalam, Madurai South, Madurai North, Vadipatti, Peraiyur and Melur taluks with Madurai City as the district headquarters. Madurai district is covered by granulite facies high grade metamorphic rocks and younger intrusives which fall under the following categories:

1. Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet-sillimanite \pm biotite \pm cordierite \pm spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite.
2. Charnockite Group consisting of acid charnockite and pyroxene granulite.
3. Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (mafic ultra-mafic).

high discharge have been established along Valandur-usilampatti Timmarasanayakanur, ThiraliPeraiyur tract and Palkalainagar- Nilayur tract in the district. The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May) and 1.86 to 5.74 m bgl during post monsoon period. (Source: CGWB).

5 METHODOLOGY OF STUDY

1. Open well and bore well water level measurement, depth of water level diameter of open well, agriculture land survey.
2. Geophysical survey for deep aquifer in nearby site Rock and soil geology also collected for the aquifer characteristic study
3. Aquifer thickness and quality measurement study in nearby proposed mine site areas of the study area

5.1 Geophysical Investigation

5.1.1 Vertical Electrical resistivity sounding for aquifer study.

The electrical resistivity study is used to determine aquifer and occurred rock in the proposed site. The DDR 3 equipment was used for data collection (**Fig.3**)

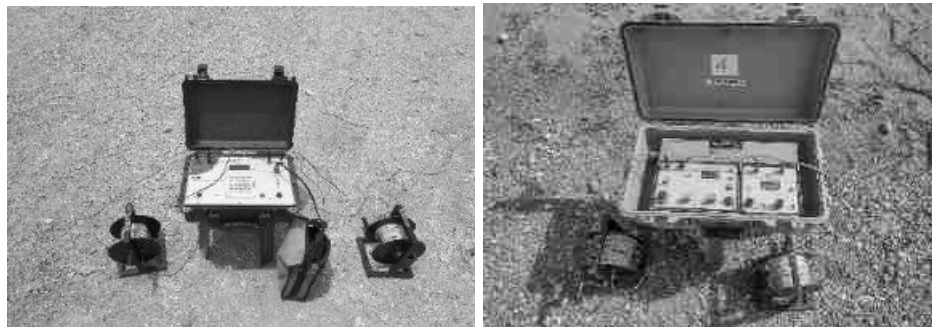


Figure 3. Electrical resistivity survey Instruments.

5.2.2 Basic Principles

The electrical properties of rocks in the upper part of the earth's crust are dependent upon the lithology, porosity, and the degree of pore space saturation and the salinity of the pore water. Saturated rocks have lower resistivity than unsaturated and dry rocks. The higher the porosity of the saturated rock, or the higher the salinity of the saturating fluids, the lower is the resistivity. The presence of clays and conductive minerals also reduces the resistivity of the rock.

The resistivity of earth materials can be studied by measuring the electrical potential distribution produced at the earth's surface by an electric current that is passed through the earth. Current is moved through the subsurface from one current electrode to the other and the potential difference is recorded as the current passes. From this information, resistivity values of various layers are acquired and layer thickness can be identified.

The apparent resistivity values determined are plotted as a log function versus the log of the spacing between the electrodes. These plotted curves identify thickness of layers. If there are multiple layers (more than 2), the acquired data is compared to a master curve to determine layer thickness.

This method is least influenced by lateral in-homogeneities and capable of providing higher depth of investigation.

The resistance R of a certain material is directly proportional to its length L and cross-sectional area A, expressed as:

$$R = R_s * L/A \text{ (in Ohm)}$$

Where R_s is known as the specific resistivity (characteristic of the material and independent of its shape or size)

With Ohm's Law,

$$R = dV/I \text{ (Ohm)}$$

Where dV is the potential difference across the resistor and I is the electric current through the resistor. The specific resistivity may be determined by:

$$R_s = (A/L) * (dV/I) \text{ (in Ohm m)}$$

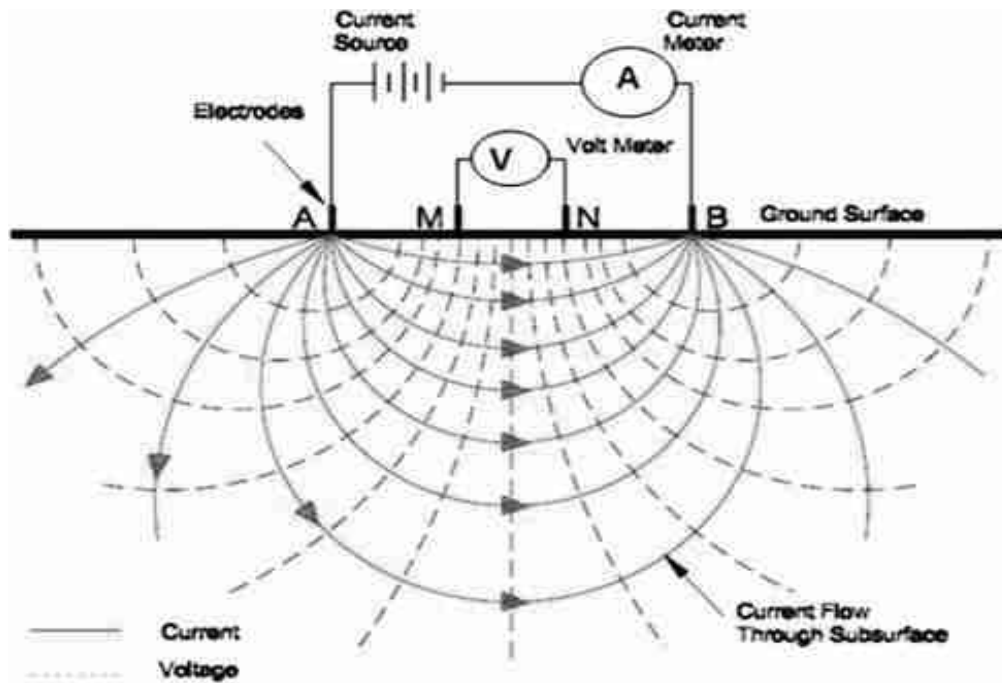


Figure 4. Schematic Diagram of Electrical resistivity principle



Figure 5. Geophysical survey location in the lease area

6. GEOPHYSICAL DATA INTERPRETATION & GRAPH

Table 1 Geophysical data of Station 1

<i>S. No</i>	<i>Ab/2</i>	<i>Mn /2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	21.3	100.37
2	4	1	23.6	4.55	107.21
3	6	1	55.0	2.43	133.60
4	8	1	99.0	1.68	166.25
5	10	1	155.5	1.24	192.83
6	10	5	23.6	5.83	137.37
7	15	5	62.8	2.98	187.24
8	20	5	117.8	1.98	233.26
9	30	5	274.9	1.13	310.63
10	40	5	494.8	0.72	356.26

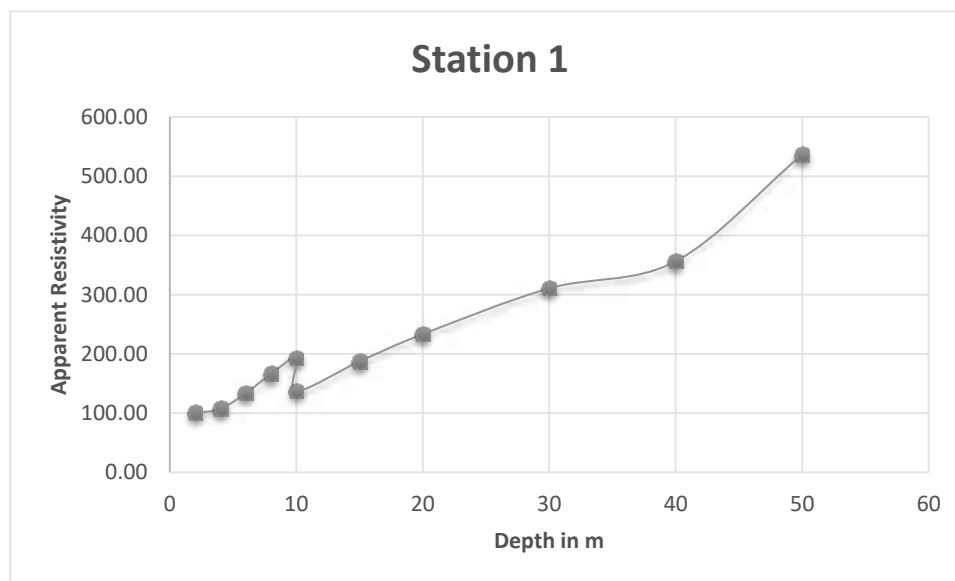


Figure 6 Graphical Representation of Geophysical data Station 1

Table 2 Geophysical data of Station 2

<i>S. No</i>	<i>Ab/2</i>	<i>Mn /2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	31.6	148.91
2	4	1	23.6	11.84	278.97
3	6	1	55.0	6.57	361.21
4	8	1	99.0	4.15	410.69
5	10	1	155.5	2.68	416.76
6	10	5	23.6	12.02	283.22
7	15	5	62.8	6.16	387.05
8	20	5	117.8	3.6	424.12
9	30	5	274.9	1.96	538.78
10	40	5	494.8	1.18	583.87

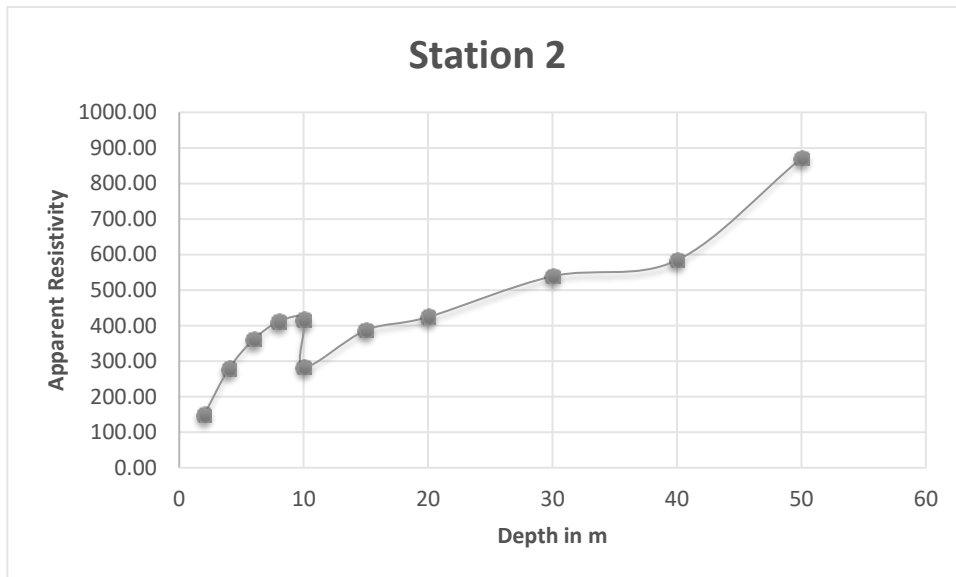


Figure 7 Graphical Representation of Geophysical data Station 2

Table 3 Geophysical data of Station 3

<i>S. No</i>	<i>Ab/2</i>	<i>Mn/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	44.8	211.12
2	4	1	23.6	13.6	320.44
3	6	1	55.0	5.41	297.43
4	8	1	99.0	3.58	354.28
5	10	1	155.5	2.65	412.10
6	10	5	23.6	11.72	276.15
7	15	5	62.8	6.32	397.10
8	20	5	117.8	3.8	447.68
9	30	5	274.9	1.47	404.09
10	40	5	494.8	0.75	371.10
11	50	5	777.5	0.69	536.51

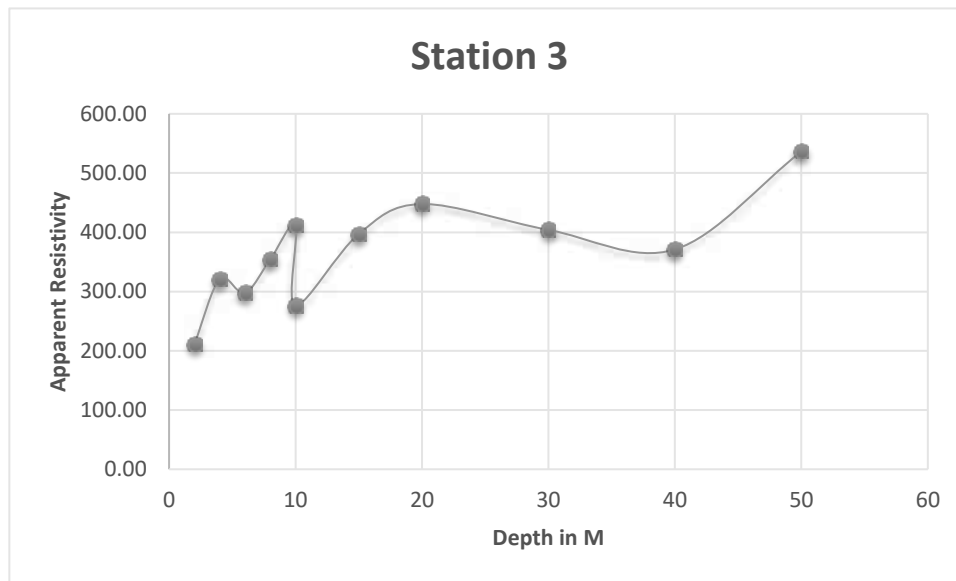


Figure 8 Graphical Representation of Geophysical data Station 3

Table 4 Geophysical data of Station 4

<i>S. No</i>	<i>Ab/2</i>	<i>Mn/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	27.4	129.12
2	4	1	23.6	6.48	152.68
3	6	1	55.0	3.82	210.02
4	8	1	99.0	2.52	249.38
5	10	1	155.5	1.75	272.14
6	10	5	23.6	5.52	130.06
7	15	5	62.8	3.04	191.01
8	20	5	117.8	2.27	267.43
9	30	5	274.9	1.56	428.83
10	40	5	494.8	0.85	420.58
11	50	5	777.5	0.74	575.38

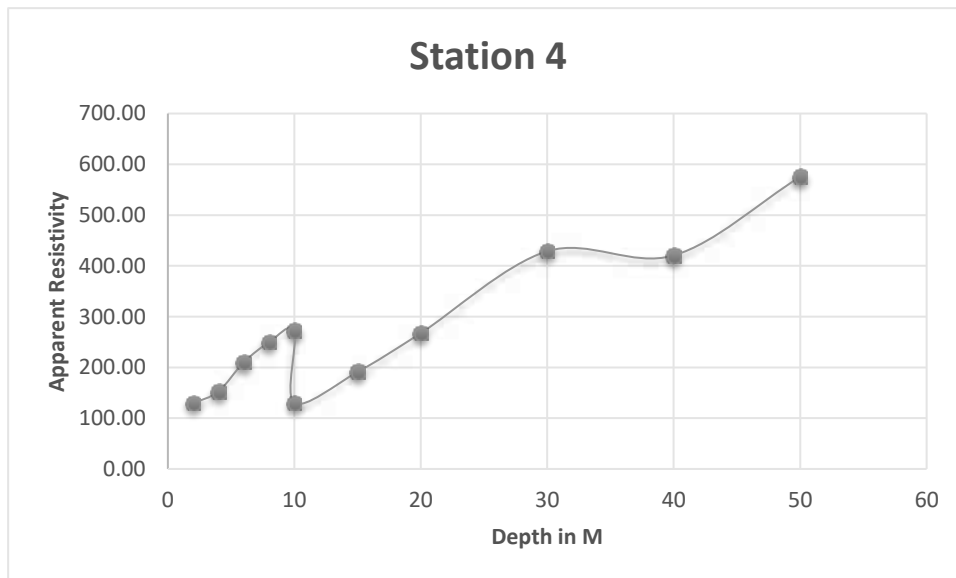


Figure 9 Graphical Representation of Geophysical data Station 4

Table 5 Geophysical data of Station 5

<i>Sr. No.</i>	<i>AB/2</i>	<i>MN/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	45.8	215.83
2	4	1	23.6	8.39	197.69
3	6	1	55.0	3.54	194.62
4	8	1	99.0	2.6	257.30
5	10	1	155.5	1.9	295.47
6	10	5	23.6	8.68	204.52
7	15	5	62.8	4	251.33
8	20	5	117.8	2.45	288.63
9	30	5	274.9	1.44	395.84
10	40	5	494.8	0.56	277.09
11	50	5	777.5	0.47	365.45

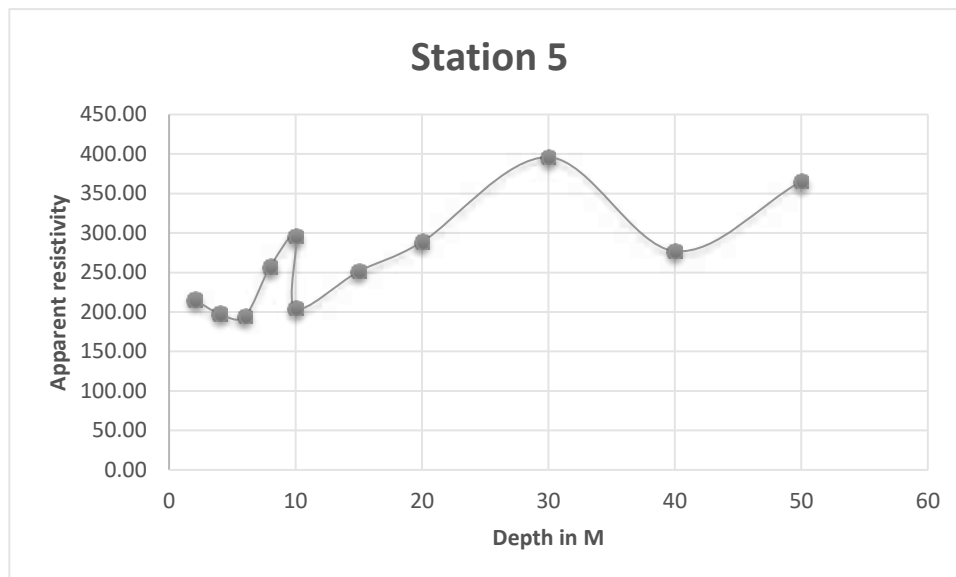


Figure 10 Graphical Representation of Geophysical data Station 5

Table 6 Geophysical data of Station 6

<i>Sr. No.</i>	<i>AB/2</i>	<i>MN/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	29.6	139.49
2	4	1	23.6	5.49	129.36
3	6	1	55.0	2.42	133.05
4	8	1	99.0	1.48	146.46
5	10	1	155.5	1.06	164.84
6	10	5	23.6	4.04	95.19
7	15	5	62.8	1.96	123.15
8	20	5	117.8	1.27	149.62
9	30	5	274.9	0.8	219.91
10	40	5	494.8	0.56	277.09
11	50	5	777.5	0.48	373.22

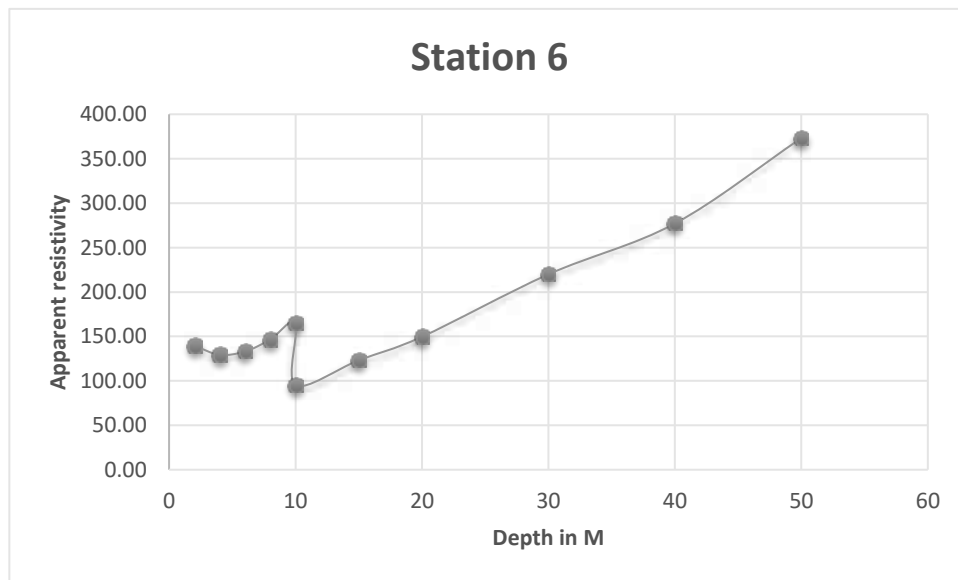


Figure 11 Graphical Representation of Geophysical data Station 6

7. LITHOLOGY MODELLING USING GEOPHYSICAL DATA

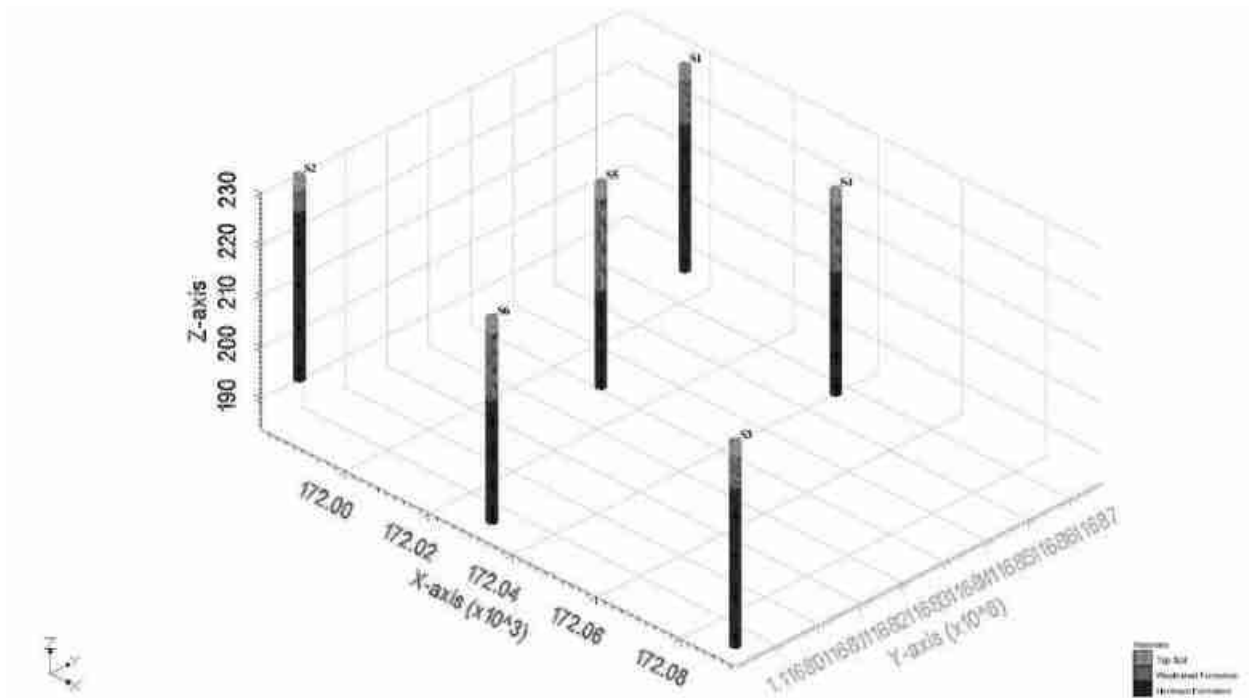


Figure 12 Borehole view of Subsurface Lithology

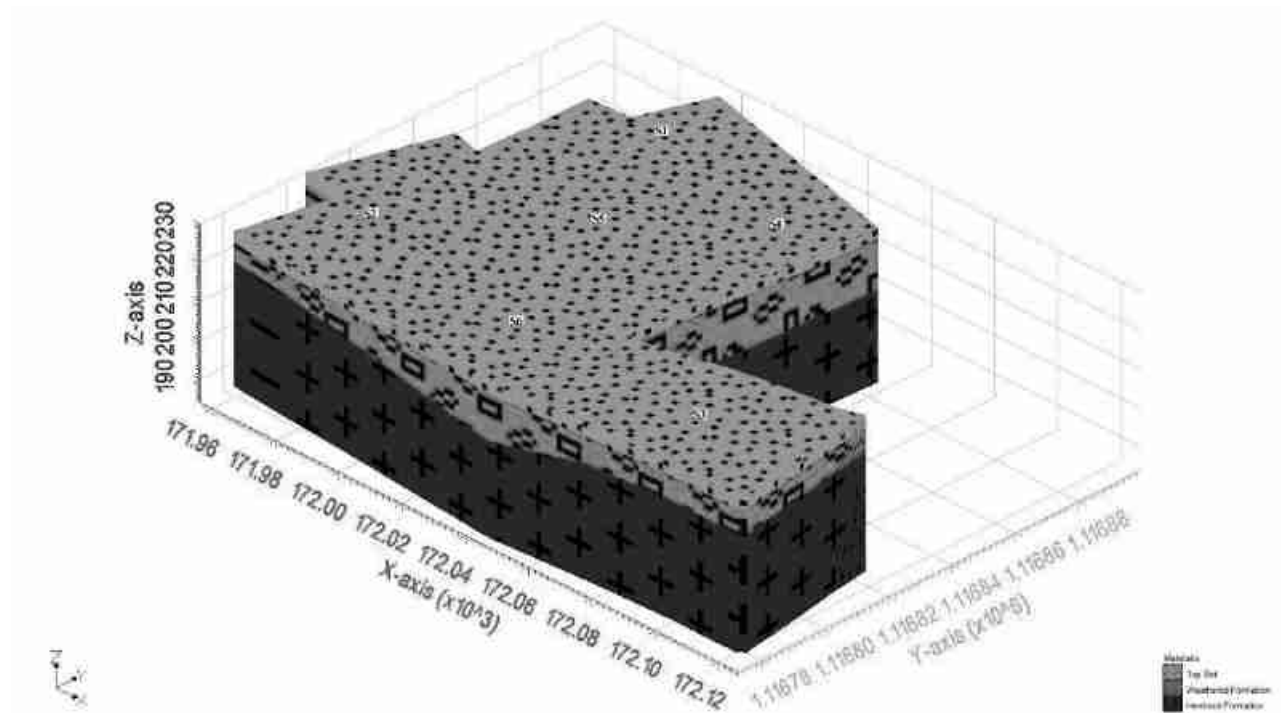


Figure 13 Solid view of Subsurface Lithology

8. CONCLUSION

- ❖ The lease applied area exhibits plain topography. The area has gentle sloping towards Southern side. The altitude of the area is 228m (max) above Mean Sea level.
- ❖ The geological study of the given area covered by Top soil and rough stone in the entire area. The discharge of the groundwater controlled by the massive charnockite rock.
- ❖ The massive Charnockite formation act as a barrier and restrict the groundwater flow movement in the mine lease area.
- ❖ Based on the geophysical investigation, Vertical Electrical Sounding (VES) were conducted to determine the subsurface water table and rock types up to depth of 50 m.
- ❖ The subsurface formation up to this depth can be categorized as follows,
 - ❖ **0m to 2m (Average) - Top Soil**
 - ❖ **3m to 50m (Average) – weathered & Charnockite Formation (Massive Formation)**
- ❖ In this mine lease area, groundwater occurs at shallow depth, depending on the intensity of weathering and its development is much less compared to gneissic formation. The mine area such no major intersections of water table are expected up to 50m.
- ❖ The aquifer are found within the weathered / fractured metamorphic terrain. Currently the aquifers are located at **55 to 60 meters** below ground level (BGL). However, considering the approved mining plan depth, which is **21 meters** below ground level. It will not impact the groundwater table.
- ❖ From the above study it can be concluded there will be no adverse effect on the hydrological regime, water drainage, environment, and livelihood. Agricultural activity in the region.



Dr. P. Thangaraju, M.Sc., Ph.D.,

Govt. Approved Hydro Geologist
M/s. Geo Exploration and Mining Solutions,
Regd. Office: No. 17, Advaita Ashram Road,
Alagapuram, Salem – 636 004, Tamil Nadu.

Annai Explosives

H.O. : No. 19/6, Narayanan Lane, South Car Street, DINDIGUL - 624 001. T.N.

Factory : magazine@kuttathupatty, SF No. 327/15A, 15B

Mobile : +91 98421 43589, 98654 22289, 95668 28716

Email : annaiexplosives@gmail.com

Managing Partners

S. VELMURUGAN

A. BARNAPASS

Date : 04/01/2024

To:
Mr.A.Ramamoorthy,
S/o.Arumugam,
D.No.212/29, Katchaikatti Village,
Vadipatti Taluk,
Madurai District.

Ref: Your Letter dated.

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

Sir,

We are having explosives Licence in Form 22 holding No. L.No. E/SC/TN/22/716(E86924) Valid up to 31.03.2026 in form LE-3 and L.No. E/SC/TN/22/790(E137873) Valid up to 31.03.2027 situated in Survey Nos.327/15A & 327/15B at Kuttathupatti Village, Dindigul District. Our office functions at Address: No.19/16, Narayanan Lane, South Car Street, Dindigul Taluk, Dindigul District.

We are enacting 4 Explosives Vans for transporting detonators and Class 2 separately for our Magazine to our work site and well experienced and licensed blasters and shot firer for safe Blasting work since 2 years without untoward incident.

We are willing to undertake work on contract basis at your S.F.No.1131/1B, 1131/4 and 1131/3 in Katchaikatti Village, Vadipatti Taluk, Madurai District.

Thanking You

For Annai Explosives


(Proprietor)

Enclosure:

1. Licence Copy

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

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग | के अनुच्छेद 3(क) से (घ) देखिए।)
(See article 3(a) to (d) of Part I of Schedule IV of Explosives Rules, 2008)

(ग) उपयोग के लिए एक समय पर वर्ग 1, 2, 3, 4, 5 या वर्ग 7 के विस्फोटक या किसी मैगजीन में वर्ग 6 के विस्फोटक रखने के लिए अनुज्ञप्ति
Licence to possess : (c) for use, explosives of class 1, 2, 3, 4, 5, 6 or 7 in a magazine

अनुज्ञप्ति सं. (Licence No.) : E/SC/TN/22/790(E137873)
वार्षिक फीस रकम (Annual Fee Rs): 6800/-

1. Licence is hereby granted to

M/s. ANNAI EXPLOSIVES (अधिभोगी / Occupier : VELMURUGAN S), No.19/16, Narayanan Lane, South Car Street, Town/Village -
Dindigul, District-DINDIGUL, State-Tamil Nadu, Pincode - 624001



की अनुज्ञप्ति अनुदत्त की जाती है।

2. अनुज्ञापितगरी की प्राप्ति (Status of licensee : Partnership Firm)

3. अनुज्ञप्ति निम्नलिखित प्रयोजनों के लिए विधिमान्य है।
Licence is valid only for the following purpose.

possess for use of Nitrate Mixture, Detonators, Detonating Fuse, Safety Fuse, - के उपयोग के लिए

4. अनुज्ञप्ति विस्फोटकों के निम्नलिखित किस्मों, प्रकार और मात्रा के लिए विधिमान्य है।

Licence is valid for the following kinds and quantity of explosives: - (क) (a)

क्र Sr. No.	नाम और विवरण Name and Description	वर्ग और प्रभाग Class & Division	उप-प्रभाग Sub-division	मात्रा किसी एक समय में Quantity at any one time
1.	Nitrate Mixture	2.0	0	2750 Kg.
2.	Detonators	6.3	0	44000 Nos.
3.	Detonating Fuse	6.2	0	10000 Mtrs
4.	Safety Fuse	6.1	0	10000 Mtrs

(ख) किसी एक कैलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञप्ति के लिए]

(b) Quantity of explosives to be purchased in a calendar month [applicable for licence under article 3(b) and (c)]:

3 times
as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञापन परिसर की पृष्टि होती है।

रेखाचित्र क्र. (Drawing No.) E/SC/TN/22/790(E137873)

दिनांक (Dated) 12/10/2022

6. अनुज्ञापन परिसर निम्नलिखित पते पर स्थित हैं। The licensed premises are situated at following address:

Survey No. 327/15A, 15B, ग्राम (Town/Village) : KUTTATHIRUPATTY

पुलिस थाना (Police Station) : DINDIGUL TALUK

जिला (District) : DINDIGUL

राज्य (State) : Tamil Nadu

पिनकोड (Pincode) : 624002

दूरभाष (Phone) : 9842143589

ई-मेल (E-Mail) : annaalexposives@gmail.com

फैक्स (Fax)

7. अनुज्ञापन परिसर में निम्नलिखित सुविधाएं अंतर्भूत हैं।

The licensed premises consist of following facilities.

One storage house

8. अनुज्ञप्ति सगव - समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2004 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपावहनों के अधीन रहते हुए अनुदत्त की जाती है।

The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2004 framed there under and the conditions, additional conditions and the following Annexures.

1. उपर्युक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण संबंधी और अन्य विवरण दर्शित करते हुए)।

Drawings (showing site, constructional and other details) as stated in serial No. 5 above.

2. अनुज्ञप्ति प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञप्ति की शर्तों और अतिरिक्त शर्तों।

Conditions and Additional Conditions of this licence signed by the licensing authority.

3. दूरी प्रारूप DE-2। (Distance Form DE-2)

9. यह अनुज्ञप्ति तारीख 31 मार्च 2027 तक विधिमान्य रहेगी। This licence shall remain valid till 31st day of March 2027.

यदि अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VII के अधीन तथा उपदर्शित इस अनुज्ञप्ति की शर्तों का अधिकमन करने या यदि अनुज्ञापन परिसर योजना या उससे संलग्न उपबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिबंधित की जा सकती है, जहां वह लागू हो।

This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 12/10/2022

संयुक्त मुख्य विस्फोटक नियंत्रक | Joint Chief Controller of Explosives
South Circle, Chennai

नवीनीकरण के पृष्ठानक के लिए स्थान
Space for Endorsement of Renewal

नवीकरण की तारीख
Date of Renewal

समाप्ति की तारीख
Date of Expiry

अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प
Signature of licensing authority and stamp

कानूनी चेतावनी : विस्फोटकों को गलत ढंग से चलाने या उनका दुरुपयोग विधि के अधीन गंभीर दंडिक अपराध होगा।
Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

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

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

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (घ) देखिए।)
(See article 3(a) to (d) of Part 1 of Schedule IV of Explosives Rules, 2008)

(ग) उपयोग के लिए एक समय पर वर्ग 1, 2, 3, 4, 5 या वर्ग 7 के विस्फोटक या किसी मैगजीन में वर्ग 6 के विस्फोटक रखने के लिए अनुज्ञप्ति
Licence to possess : (c) for use, explosives of class 1, 2, 3, 4, 5, 6 or 7 in a magazine

अनुज्ञप्ति नं. (Licence No.): E/SC/TN/22/716(E86924)

वार्षिक फीस रुपए (Annual Fee Rs): 9800/-

1. Licence is hereby granted to.

M/s. ANNAI EXPLOSIVES (अधिभोगी / Occupier : S. Velmurugan), No.19/16, Nanyanan Lane, South Car Street, Town/Village - Dindigul, District-DINDIGUL, State-Tamil Nadu, Pincode - 624001



को अनुज्ञप्ति अनुदत्त की जाती है।

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

3. अनुज्ञप्ति निम्नलिखित प्रयोजनों के लिए विधिमाम्य है।
Licence is valid only for the following purpose.

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

possess for use of Nitrate Mixture, Safety Fuse, Detonating Fuse, Electric and/or Ordinary Detonators, - के उपयोग के लिए

क्र. सं. (Sr. No.)	नाम और विवरण (Name and Description)	वर्ग और प्रभाग (Class & Division)	उप-प्रभाग (Sub-division)	मात्रा किसी एक समय में (Quantity at any one time)
1.	Nitrate Mixture	2.0	0	4400 Kg
2.	Safety Fuse	6.1	0	10000 Mtrs
3.	Detonating Fuse	6.2	0	20000 Mtrs
4.	Electric and/or Ordinary Detonators	6.3	0	44000 Nos.

(ख) किसी एक कलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञप्ति के लिए]

(b) Quantity of explosives to be purchased in a calendar month [applicable for licence under article 3(b) and (c)]:

8 times as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञप्त परिसर की पुष्टि होती है।
The licensed premises shall conform to the following drawing(s):

रेखाचित्र क्र. (Drawing No.) E/SC/TN/22/716(E86924)
दिनांक (Dated) 29/01/2018

6. अनुज्ञप्ति परिसर निम्नलिखित पते पर स्थित है। The licensed premises are situated at following address:

Survey No(s). 327/15A & 327/15B, ग्राम (Town/Village) - Kuttathurampy Village, Dindigul West Taluk, पुलिस थाना (Police Station): Dindigul Taluk P.S.

जिला (District)	DINDIGUL	राज्य (State)	Tamil Nadu	पिनकोड (Pincode)	624002
दूरभाष (Phone)	98421 43589	ई.मेल (E-Mail)	prabhakarprabhu17@gmail.com	फैक्स (Fax)	

7. अनुज्ञप्ति परिसर में निम्नलिखित सुविधाएं अंतर्भूत हैं।
The licensed premises consist of following facilities.

Gas High explosives Room, one Detonator Room both connected with a lobby in the middle.

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

1. उपर्युक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण संबंधी और अन्य विवरण दर्शित करते हुए)।
Drawings (showing site, constructional and other details) as stated in serial No. 5 above.

2. अनुज्ञप्ति प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञप्ति की शर्तें और अतिरिक्त शर्तें।
Conditions and Additional Conditions of this licence signed by the licensing authority.

3. दूरी प्ररूप DE-2 | Distance Form DE-2.

9. यह अनुज्ञप्ति तारीख 31 मार्च 2022 तक विधिमाम्य रहेगी। This licence shall remain valid till 31st day of March 2022.

यह अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VIII के अधीन तथा उपवर्णित इस अनुज्ञप्ति की शर्तों का अधिक्रमण करने या यदि अनुज्ञप्त परिसर योजना या उसके संलग्न उपबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिबंधित की जा सकती है, जहां वह लागू हो।
This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, whenever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 29/01/2018

संयुक्त मुख्य विस्फोटक नियंत्रक | Joint Chief Controller of Explosives
South Circle, Chennai

Amendments :

• Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 27/10/2021

नवीनीकरण के पृष्ठांकन के लिए स्थान
Space for Endorsement of Renewal


नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
17/05/2022	31/03/2026	J. Chief Controller of Explosives, South Circle, Chennai

कानूनी चेतावनी : विस्फोटकों को गलत ढंग से चलाने या उनका दुरुपयोग विधि के अधीन गंभीर दंडिक अपराध होगा।
Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

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

பிணம்

டிபன் டாஸ்க், அரங்கம், திட்டுக் குளம்
 டிபன், சிமென்ட் கிராமத்தின் தொழிலாளர்
 டிபன் சிமென்ட் கிராமத்தின் தொழிலாளர் சிமென்ட்
 கிராமம் சிமென்ட் கிராமம்: 1131/1B, 1131/3, 1131/4ல்
 ஏ.நா.36.5 சிமென்ட் தொழிலாளர் டிபன் (கிராமம்)
 கிராமம் 500 மீட்டர் சிமென்ட் கிராமம் கிராமம்
 கிராமம், கிராமம், ஏ.நா.36.5, கிராமம், கிராமம்
 கிராமம் கிராமம் கிராமம், கிராமம், கிராமம், கிராமம்
 கிராமம் கிராமம் கிராமம் கிராமம், கிராமம் கிராமம்
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 கிராமம் கிராமம் கிராமம் கிராமம் கிராமம் கிராமம்


 20.12.2013
 கிராம நிர்வாக அலுவலர்
 கிராமம் கிராமம்
 கிராமம் கிராமம்

TOPOGRAPHICAL VIEW OF KATCHAIKATTI
ROUGH STONE AND GRAVEL QUARRY LEASE APPLIED AREA



Name of the Applicant : **A.Ramamoorthi,**
S/o. Arumugam,
Address : Katchaikatti Village,
Vadipatti Taluk,
Madurai District – 625 218.

LOCATION DETAILS

Extent : 1.36.5 Ha
S.F.Nos. : 1131/1B, 1131/3 & 1131/4
Village : Katchaikatti
Taluk : Vadipatti
District : Madurai
State : Tamil Nadu

Signature of the applicant

A.Ramamoorthi

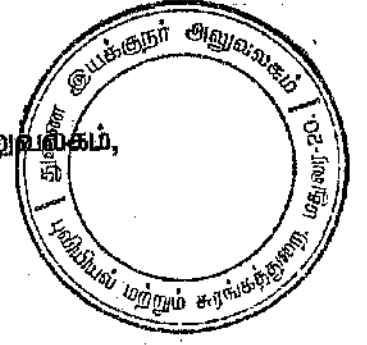
(Village Administrative Officer)
Attestation
VILLAGE ADMINISTRATIVE OFFICE
3, KACHAIKATTY VILLAGE
VADIPATTY TALUK

புவியியல் மற்றும் சுரங்கத்துறை

ந.க.எண். 762/2017-கனிமம்

மாவட்ட ஆட்சியர் அலுவலகம்,
மதுரை.

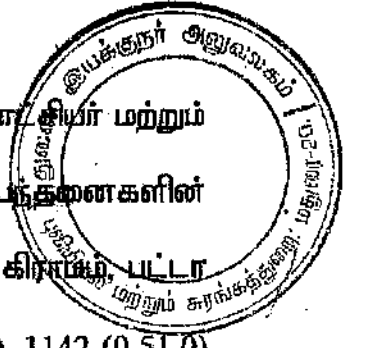
நாள்: 10.10.2017

குறிப்பாணை

பொருள் : கனிமங்களும் சுரங்கங்களும் - மதுரை மாவட்டம் - வாடிப்பட்டி வட்டம் - கச்சைகட்டி கிராமம் - புல எண் 1141/2A மற்றும் சிலவற்றில் 2.24.46 ஹெக்டேர் பரப்பில் அமைந்துள்ள பட்டா புலத்தில் உடைகல் / கிராவல் குவாரி செய்ய அனுமதி கோரியது - தகுதியான நிலப்பரப்பாக தெரிவித்தல் - தொடர்பாக

- பார்வை:
1. திரு. S. ஆனந்த சிவா, மதுரை என்பவரின் விண்ணப்பம் நாள். 24.02.2017. இவ்வலுவலகத்தில் பெறப்பட்ட நாள். 26.05.2017
 2. இவ்வலுவலக கடிதம் இதே ந.க.எண். நாள். 02.06.2017
 3. திரு. S. ஆனந்த சிவா, மதுரை என்பவரின் மனு நாள். 28.06.2017.
 4. இவ்வலுவலக கடிதம் இதே ந.க.எண். நாள். 03.07.2017
 5. வட்டாட்சியர், வாடிப்பட்டி கடிதம் ந.க.எண். ஆ.1/4551/2017, நாள். 31.07.2017.
 6. வருவாய் - கோட்டாட்சியர்(பொ), மதுரை கடிதம் ந.க.எண். 2685/2017/ஏய், நாள். 05.08.2017.
 7. உதவி இயக்குநர் (கனிமம்) அறிக்கை நாள். 27.09.2017

மதுரை மாவட்டம், வாடிப்பட்டி வட்டம், கச்சைகட்டி கிராமம், பட்டா புல எண்கள். 1141/2A (0.47.0), 1141/2B (0.51.5), 1141/4B (0.17.5), 1142 (0.51.0) மற்றும் 1144/4 (0.37.0) மற்றும் 1131/8B2 (0.21.46) ஆக மொத்தம் 2.25.46 ஹெக்டேர்ஸ் பரப்பில் உடைகல் / கிராவல் குவாரி செய்ய அனுமதி கோரி திரு. S. ஆனந்த சிவா என்பவர் விண்ணப்பித்துள்ளார்.



எனவே, மதுரை வருவாய் கோட்டாட்சியர், வாடிப்பட்டி வட்டாட்சியர் மற்றும் உதவி இயக்குநர் (கனிமம்) ஆகியோரின் பரிந்துரை மற்றும் நிபந்தனைகளின் அடிப்படையில் மதுரை மாவட்டம், வாடிப்பட்டி வட்டம், கச்சைகட்டி கிராமம், பட்டா புல எண்கள்.1141/2A (0.47.0), 1141/2B (0.51.5), 1141/4B (0.17.5), 1142 (0.51.0) மற்றும் 1144/4 (0.37.0) மற்றும் 1131/8B2 (0.21.46) ஆக மொத்தம் 2.25.46 ஹெக்டேயர் பரப்பில் 5 (ஐந்து) வரூட காலத்திற்கு உடைகல் / கிராவல் குவாரி செய்ய தகுதியான நிலப்பரப்பாக கருதி மனுதாரர் திரு.S.ஆனந்த சிவா என்பவருக்கு தெரிவிக்கப்படுகிறது.

மேலும் தமிழ்நாடு சிறு கனிம சலுகை விதிகள்-1959 விதி எண்.41 மற்றும் 42-ன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறும், மாவட்ட சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெறவும் மனுதாரரைக் கேட்டுக் கொள்ளப்படுகிறது.

(ஓம்.) கொ.வீர ராகவ ராவ்,
மாவட்ட ஆட்சியர்,
மதுரை.

/உந/உப/

மா.வட்ட ஆட்சியருக்காக,
மதுரை.

பெறுநர்:

திரு.S.ஆனந்த சிவா
த/பெ.சௌந்திரபாண்டியன்
கதவு எண்:551
கே.கே.நகர்
ஆளவந்தான்
மதுரை - 625 020

20/11/17

M. DEEPA ALANKAR
RQP / MAS / 152 / 2000 - A

TEST REPORT

Report No	EHS360/TR/2023-24/001	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/001
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ1 Project Area - 10° 5'24.21"N 78° 0'27.02"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	45.6	23.8	7.8	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	46.5	22.1	8.0	23.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	43.8	21.8	6.5	21.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	42.8	20.4	5.8	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	42.8	21.8	4.5	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	43.9	20.7	5.9	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	45.6	23.4	6.0	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	44.7	22.7	7.1	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	43.8	21.4	6.8	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	42.9	20.7	5.2	23.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	42.1	21.4	5.4	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	41.5	20.6	6.6	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	42.1	21.6	5.9	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	43.0	22.8	6.7	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	45.7	23.7	7.0	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	46.2	24.5	7.9	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.8	23.0	6.1	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	44.6	22.8	5.3	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	43.4	21.6	6.9	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	44.0	20.7	7.8	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	45.7	23.9	8.0	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	46.5	24.2	7.5	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	44.3	23.4	7.9	20.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	43.2	22.5	6.4	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	42.9	21.7	7.3	22.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	41.0	22.9	8.2	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Verified by



Authorised Signatory

A-17

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/001	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/001
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ1 Project Area - 10° 5'24.21"N 78° 0'27.02"E		

Date	Period. hrs	SPM (µg/m ³)	As (ng/m ³)	C6H6 (µg/m ³)	BaP (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)
13.03.2024	7:00-7:00	58.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	56.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	57.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	55.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	59.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	58.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	59.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	56.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	57.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	55.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	58.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	59.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	60.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	56.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	55.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	57.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	59.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	58.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	59.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	58.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	56.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	59.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/002	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/002
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 2 – Near Existing Quarry - 10° 5'12.77"N 78° 0'36.75"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	43.3	21.6	7.3	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	40.6	20.9	6.6	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	44.2	22.6	8.4	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	42.7	20.4	6.3	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	43.9	21.5	7.5	19.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	44.3	21.6	6.9	22.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	40.7	20.7	6.2	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	42.9	22.0	7.6	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	43.6	21.8	6.8	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	44.3	20.9	6.3	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	41.8	21.2	7.4	20.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.6	20.4	7.8	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	44.5	20.5	6.9	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	42.4	21.7	7.0	20.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	44.2	20.7	7.7	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	43.7	21.8	7.4	20.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	45.2	22.1	6.6	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	41.9	20.6	6.3	19.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	44.3	21.8	6.8	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	43.8	22.3	7.9	20.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	41.9	20.5	6.2	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	40.4	21.7	7.3	21.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	42.3	21.9	7.4	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	41.6	20.6	6.5	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	43.1	21.8	6.3	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	42.6	20.2	7.4	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/002	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/002
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 2 – Near Existing Quarry - 10° 5'12.77"N 78° 0'36.75"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
13.03.2024	7:00-7:00	61.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	61.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	61.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	61.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	61.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	60.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	61.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<100	<60	<80	<80	<100

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/003	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/003
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ3 – Katchaikatti - 10° 5'20.92"N 77°59'46.03"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	42.7	21.6	6.2	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	42.8	20.8	6.4	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	41.9	20.8	5.9	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	42.5	21.6	6.2	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	43.7	20.5	7.5	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	44.9	21.2	6.0	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	43.5	22.6	7.9	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	42.7	21.3	8.5	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	41.1	20.8	7.4	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	43.8	20.2	6.9	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	44.0	21.4	5.1	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.6	20.6	6.2	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	43.5	21.8	6.9	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	41.8	20.6	5.1	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	40.9	20.7	6.3	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	42.6	21.4	7.4	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.7	21.9	6.5	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	44.2	20.5	6.4	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	43.6	21.6	7.9	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	42.8	22.2	6.2	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	45.3	21.6	7.1	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	44.7	20.4	6.8	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	43.9	22.6	7.2	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	42.6	21.8	6.8	20.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	43.5	21.3	5.1	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	41.8	20.5	6.8	22.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/003	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/003
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ3 – Katchaikatti - 10° 5'20.92"N 77°59'46.03"E		

Date	Period. hrs	SPM (µg/m ³)	As (ng/m ³)	C6H6 (µg/m ³)	BaP (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)
13.03.2024	7:00-7:00	66.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	63.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	62.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	62.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	61.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	63.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	62.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	62.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	62.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<100	<60	<80	<80	<100

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/004	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/004
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ4 – Thathakavundanpatti - 10° 3'26.58"N 78° 2'23.02"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	40.7	20.6	5.2	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	41.6	22.0	6.1	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	43.8	22.8	6.0	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	42.7	23.5	5.2	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	43.6	20.9	5.9	22.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	42.7	21.1	6.4	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	45.9	23.0	7.6	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	46.0	22.3	6.1	19.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	44.8	20.8	7.1	20.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	43.2	21.7	6.5	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	43.8	23.5	5.9	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.6	22.6	6.1	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	41.7	23.7	7.5	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	42.8	22.5	6.6	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.5	21.0	5.3	21.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	44.0	20.3	6.9	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	42.2	23.1	5.8	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	41.7	22.7	6.4	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	41.6	20.1	7.9	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	40.0	21.5	6.4	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	43.8	20.9	6.0	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	42.7	21.3	5.8	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	43.9	21.4	6.2	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	44.5	22.1	5.6	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	43.8	23.1	5.4	19.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	42.6	22.9	6.9	18.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/004	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/004
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ4 – Thathakavundanpatti - 10° 3'26.58"N 78° 2'23.02"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
13.03.2024	7:00-7:00	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	62.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	61.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	63.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	63.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	60.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	61.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	61.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	62.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	63.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	61.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	60.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	61.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<100	<60	<80	<80	<100

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/005	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/005
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ5 –Viralipatti - 10° 6'4.82"N 77°58'28.03"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	44.2	20.3	7.2	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	45.3	21.2	6.3	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	46.1	22.5	8.2	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	45.2	23.1	6.2	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	44.0	22.1	8.3	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	45.2	20.3	6.3	22.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	46.5	22.4	8.4	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	45.0	21.0	7.3	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	43.2	23.5	6.2	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	44.1	20.3	8.4	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	45.0	21.2	7.2	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	44.2	20.3	7.2	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	45.3	21.2	6.3	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	44.8	21.6	6.2	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.5	22.0	7.0	20.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	42.8	21.4	8.8	23.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	41.9	21.6	6.6	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	43.5	21.1	7.1	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	42.8	22.1	7.5	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	44.5	21.7	7.4	24.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	43.5	20.8	6.9	23.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	44.6	21.6	7.8	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	45.2	20.9	5.6	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	44.3	21.4	6.8	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	43.6	22.4	6.3	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	42.7	21.6	5.7	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/005	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/005
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ5 –Viralipatti - 10° 6'4.82"N 77°58'28.03"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
13.03.2024	7:00-7:00	65.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	63.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	62.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	61.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	60.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	61.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<100	<60	<80	<80	<100

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

TC-9583

Report No	EHS360/TR/2023-24/006	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/006
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 6 – Mettupatti 4.7km NE - 10° 6'47.34"N 78° 2'38.17"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	44.5	21.4	7.2	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	43.6	20.8	6.9	18.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	42.9	21.6	5.8	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	43.8	22.4	6.3	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	42.7	23.4	5.9	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	43.1	24.5	6.9	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	42.8	23.6	7.1	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	41.7	24.7	6.6	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	40.6	23.4	5.2	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	42.8	24.6	6.7	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	43.2	18.8	7.4	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.7	18.0	6.8	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	42.5	19.6	7.2	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	43.6	21.1	6.4	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	42.1	20.4	5.6	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	41.8	21.6	6.7	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.5	19.8	5.8	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	44.8	20.7	6.9	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	42.5	19.6	6.6	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	43.1	20.6	5.1	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	44.5	19.5	5.5	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	42.6	21.4	7.9	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	43.8	19.6	6.1	22.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	42.7	21.7	5.6	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	44.2	19.5	5.4	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	43.7	18.1	6.9	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/006	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/006
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 6 – Mettupatti 4.7km NE - 10° 6'47.34"N 78° 2'38.17"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
13.03.2024	7:00-7:00	66.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	64.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	66.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	65.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	65.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	66.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	63.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<100	<60	<80	<80	<100

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/007	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/007
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 7 Kattakulam - 10° 2'54.97"N 77°59'4.11"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
13.03.2024	7:00-7:00	44.5	23.6	7.6	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.03.2024	7:15-7:15	42.4	24.9	6.1	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.03.2024	7:00-7:00	44.5	23.5	5.1	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.03.2024	7:15-7:15	45.2	24.1	6.4	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.03.2024	7:00-7:00	43.8	23.7	5.9	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.03.2024	7:15-7:15	42.6	24.5	6.1	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	44.4	23.5	7.6	20.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	43.2	22.3	6.6	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	44.7	23.7	5.3	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	45.5	24.1	6.5	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	42.4	20.6	5.7	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	44.5	21.1	6.2	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	43.7	22.8	6.8	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	43.6	23.1	7.5	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	44.6	20.3	8.2	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	45.5	21.7	7.4	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.2	22.9	6.9	23.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	44.8	23.4	7.4	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	42.6	21.5	6.0	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	43.8	20.7	5.7	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	44.5	22.1	7.2	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	42.2	21.8	6.6	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.05.2024	7:00-7:00	43.4	23.6	7.1	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:15-7:15	44.8	22.5	6.8	23.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.05.2024	7:00-7:00	44.6	20.3	7.0	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.05.2024	7:15-7:15	43.2	21.4	6.3	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit
Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
 Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report.
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TEST REPORT

Report No	EHS360/TR/2023-24/007	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/007
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 7 Kattakulam - 10° 2'54.97"N 77°59'4.11"E		

Date	Period. hrs	SPM (µg/m ³)	As (ng/m ³)	C6H6 (µg/m ³)	BaP (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)
13.03.2024	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.03.2024	7:15-7:15	6.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.03.2024	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.03.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.03.2024	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.03.2024	7:15-7:15	62.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	61.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	61.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.05.2024	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:15-7:15	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.05.2024	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.05.2024	7:15-7:15	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<100	<60	<80	<80	<100

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

A 17
Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 009	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 009
Sample Description	Ambient Noise	Sample Collected Date	25.05.2024

Location	N1 – Project Area - 10° 5'23.58"N 78° 0'27.65"E			N2 – Near Existing Quarry - 10° 5'13.09"N 78° 0'36.51"E		
Parameter	Min	Max	Parameter	Min	Max	Parameter
Time	dB(A)	dB(A)	Time	dB(A)	dB(A)	Time
06:00-07:00	39.6	44.2	06:00-07:00	39.6	44.2	06:00-07:00
07:00-08:00	40.7	44.9	07:00-08:00	40.7	44.9	07:00-08:00
08:00-09:00	37.2	42.9	08:00-09:00	37.2	42.9	08:00-09:00
09:00-10:00	39.5	44.8	09:00-10:00	39.5	44.8	09:00-10:00
10:00-11:00	40.9	45.2	10:00-11:00	40.9	45.2	10:00-11:00
11:00-12:00	36.2	41.1	11:00-12:00	36.2	41.1	11:00-12:00
12:00-13:00	38.2	40.3	12:00-13:00	38.2	40.3	12:00-13:00
13:00-14:00	39.8	44.5	13:00-14:00	39.8	44.5	13:00-14:00
14:00-15:00	40.5	45.7	14:00-15:00	40.5	45.7	14:00-15:00
15:00-16:00	38.4	42.3	15:00-16:00	38.4	42.3	15:00-16:00
16:00-17:00	39.6	43.5	16:00-17:00	39.6	43.5	16:00-17:00
17:00-18:00	37.2	40.2	17:00-18:00	37.2	40.2	17:00-18:00
18:00-19:00	39.9	44.2	18:00-19:00	39.9	44.2	18:00-19:00
19:00-20:00	37.5	42.1	19:00-20:00	37.5	42.1	19:00-20:00
20:00-21:00	38.5	43.1	20:00-21:00	38.5	43.1	20:00-21:00
21:00-22:00	37.5	41.9	21:00-22:00	37.5	41.9	21:00-22:00
22:00-23:00	35.2	40.9	22:00-23:00	35.2	40.9	22:00-23:00
23:00-00:00	33.7	37.4	23:00-00:00	33.7	37.4	23:00-00:00
00:00-01:00	34.2	38.5	00:00-01:00	34.2	38.5	00:00-01:00
01:00-02:00	33.4	35.4	01:00-02:00	33.4	35.4	01:00-02:00
02:00-03:00	35.4	40.1	02:00-03:00	35.4	40.1	02:00-03:00
03:00-04:00	35.7	40.5	03:00-04:00	35.7	40.5	03:00-04:00
04:00-05:00	36.5	41.1	04:00-05:00	36.5	41.1	04:00-05:00
05:00-06:00	33.5	38.1	05:00-06:00	33.5	38.1	05:00-06:00
Result	Day Means		41.4	Result		Day Means
	Night Means		37.2	Night Means		Night Means

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****



Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 010	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 010
Sample Description	Ambient Noise	Sample Collected Date	25.05.2024

N3 – Katchaikatti - 10° 5'21.84"N 77°59'46.37"E			N4 – Thathakavundampatti - 10° 3'26.75"N 78° 2'22.96"E			
Parameter	Min	Max	Parameter	Min	Max	Parameter
Time	dB(A)	dB(A)	Time	dB(A)	dB(A)	Time
06:00-07:00	36.2	40.7	06:00-07:00	36.2	40.7	06:00-07:00
07:00-08:00	35.2	39.8	07:00-08:00	35.2	39.8	07:00-08:00
08:00-09:00	37.2	41.5	08:00-09:00	37.2	41.5	08:00-09:00
09:00-10:00	35.8	39.6	09:00-10:00	35.8	39.6	09:00-10:00
10:00-11:00	37.4	42.1	10:00-11:00	37.4	42.1	10:00-11:00
11:00-12:00	36.1	40.8	11:00-12:00	36.1	40.8	11:00-12:00
12:00-13:00	37.8	41.5	12:00-13:00	37.8	41.5	12:00-13:00
13:00-14:00	36.4	40.3	13:00-14:00	36.4	40.3	13:00-14:00
14:00-15:00	35.7	39.4	14:00-15:00	35.7	39.4	14:00-15:00
15:00-16:00	37.9	41.5	15:00-16:00	37.9	41.5	15:00-16:00
16:00-17:00	39.4	43.1	16:00-17:00	39.4	43.1	16:00-17:00
17:00-18:00	37.8	41.6	17:00-18:00	37.8	41.6	17:00-18:00
18:00-19:00	36.8	41.5	18:00-19:00	36.8	41.5	18:00-19:00
19:00-20:00	35.8	40.2	19:00-20:00	35.8	40.2	19:00-20:00
20:00-21:00	36.2	40.1	20:00-21:00	36.2	40.1	20:00-21:00
21:00-22:00	34.2	38.7	21:00-22:00	34.2	38.7	21:00-22:00
22:00-23:00	35.7	40.7	22:00-23:00	35.7	40.7	22:00-23:00
23:00-00:00	32.7	36.8	23:00-00:00	32.7	36.8	23:00-00:00
00:00-01:00	33.4	40.7	00:00-01:00	33.4	40.7	00:00-01:00
01:00-02:00	32.2	36.9	01:00-02:00	32.2	36.9	01:00-02:00
02:00-03:00	33.9	37.8	02:00-03:00	33.9	37.8	02:00-03:00
03:00-04:00	34.5	38.7	03:00-04:00	34.5	38.7	03:00-04:00
04:00-05:00	34.7	38.5	04:00-05:00	34.7	38.5	04:00-05:00
05:00-06:00	33.4	37.6	05:00-06:00	33.4	37.6	05:00-06:00
Result	Day Means		39.2	Result		Day Means
	Night Means		36.5	Night Means		Night Means

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 011	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 011
Sample Description	Ambient Noise	Sample Collected Date	25.05.2024

Location	N5 – Viralipatti - 10° 6'4.96"N 77°58'27.77"E			N6 – Mettupatti - 10° 6'47.72"N 78° 2'38.29"E		
Parameter	Min	Max	Parameter	Min	Max	Parameter
Time	dB(A)	dB(A)	Time	dB(A)	dB(A)	Time
06:00-07:00	36.4	40.6	06:00-07:00	36.4	40.6	06:00-07:00
07:00-08:00	37.4	41.9	07:00-08:00	37.4	41.9	07:00-08:00
08:00-09:00	36.4	40.5	08:00-09:00	36.4	40.5	08:00-09:00
09:00-10:00	37.4	41.2	09:00-10:00	37.4	41.2	09:00-10:00
10:00-11:00	34.8	38.4	10:00-11:00	34.8	38.4	10:00-11:00
11:00-12:00	36.4	40.9	11:00-12:00	36.4	40.9	11:00-12:00
12:00-13:00	38.2	42.7	12:00-13:00	38.2	42.7	12:00-13:00
13:00-14:00	37.4	41.2	13:00-14:00	37.4	41.2	13:00-14:00
14:00-15:00	35.7	39.4	14:00-15:00	35.7	39.4	14:00-15:00
15:00-16:00	38.4	42.1	15:00-16:00	38.4	42.1	15:00-16:00
16:00-17:00	35.2	38.2	16:00-17:00	35.2	38.2	16:00-17:00
17:00-18:00	37.8	41.6	17:00-18:00	37.8	41.6	17:00-18:00
18:00-19:00	36.8	41.5	18:00-19:00	36.8	41.5	18:00-19:00
19:00-20:00	35.8	40.2	19:00-20:00	35.8	40.2	19:00-20:00
20:00-21:00	37.4	41.5	20:00-21:00	37.4	41.5	20:00-21:00
21:00-22:00	36.2	40.8	21:00-22:00	36.2	40.8	21:00-22:00
22:00-23:00	35.7	40.7	22:00-23:00	35.7	40.7	22:00-23:00
23:00-00:00	32.1	37.5	23:00-00:00	32.1	37.5	23:00-00:00
00:00-01:00	33.4	40.7	00:00-01:00	33.4	40.7	00:00-01:00
01:00-02:00	34.8	39.4	01:00-02:00	34.8	39.4	01:00-02:00
02:00-03:00	33.9	37.8	02:00-03:00	33.9	37.8	02:00-03:00
03:00-04:00	32.6	36.8	03:00-04:00	32.6	36.8	03:00-04:00
04:00-05:00	34.7	38.5	04:00-05:00	34.7	38.5	04:00-05:00
05:00-06:00	33.4	38.1	05:00-06:00	33.4	38.1	05:00-06:00
Result	Day Means		39.2	Result		Day Means
	Night Means		36.6	Night Means		Night Means

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 012	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 012
Sample Description	Ambient Noise	Sample Collected Date	25.05.2024


Location	N7 - Kattakulam - 10° 2'55.08"N 77°59'3.94"E		
parameter	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)
06:00-07:00	33.2	37.8	36.1
07:00-08:00	34.5	38.4	36.9
08:00-09:00	35.1	39.7	38.0
09:00-10:00	33.3	37.9	36.2
10:00-11:00	32.2	36.4	34.8
11:00-12:00	33.8	38.6	36.8
12:00-13:00	34.8	38.9	37.3
13:00-14:00	32.4	36.7	35.1
14:00-15:00	33.8	37.5	36.0
15:00-16:00	34.7	38.9	37.3
16:00-17:00	33.5	37.9	36.2
17:00-18:00	34.1	38.9	37.1
18:00-19:00	32.4	36.9	35.2
19:00-20:00	35.8	40.2	38.5
20:00-21:00	33.7	37.8	36.2
21:00-22:00	34.6	38.7	37.1
22:00-23:00	33.8	37.4	36.0
23:00-00:00	30.4	34.8	33.1
00:00-01:00	32.8	36.3	34.9
01:00-02:00	31.7	35.2	33.8
02:00-03:00	30.4	34.7	33.1
03:00-04:00	32.6	36.8	35.2
04:00-05:00	32.4	35.6	34.3
05:00-06:00	32.5	36.9	35.2
Result	Day Means		36.5
	Night Means		34.2

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.



Report No	EHS360/TR/2023-24/ 013	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 013
Sample Description	Soil 1	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Project Area - 10° 5'21.41"N 78° 0'29.14"E		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.21
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	402 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	40.5 %
04	Bulk Density	By Cylindrical Method	1.02 g/cm ³
05	Porosity	By Gravimetric Method	42.8 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	60.5 mg/kg
07	Magnesium as Mg		30.5 mg/kg
08	Chloride as Cl		75.9 mg/kg
09	Soluble Sulphate as SO ₄		0.016 %
10	Total Phosphorus as P		2.32 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	435.8 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.20 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	0.97 %

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 013	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 013
Sample Description	Soil 1	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Project Area - 10° 5'21.41"N 78° 0'29.14"E		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	36.7 %
	Sand		27.4 %
	Silt		35.9 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	22.8 mg/kg
16	Zinc as Zn		1.25 mg/kg
17	Boron as B		2.97 mg/kg
18	Potassium as K		35.6 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.28 mg/kg
23	Iron as Fe		2.62 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 014	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 014
Sample Description	Soil 2	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Katchaikatti - 10° 5'21.36"N 77°59'46.59"E		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.23
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	423 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	41.9 %
04	Bulk Density	By Cylindrical Method	0.92 g/cm ³
05	Porosity	By Gravimetric Method	43.7 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	68.4 mg/kg
07	Magnesium as Mg		31.9 mg/kg
08	Chloride as Cl		63.7 mg/kg
09	Soluble Sulphate as SO ₄		0.0018 %
10	Total Phosphorus as P		1.26 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	357.8 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.48 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	0.86 %

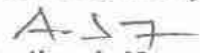
*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory



Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 014	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 014
Sample Description	Soil 2	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Katchaikatti - 10° 5'21.36"N 77°59'46.59"E		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	38.9 %
	Sand		24.4%
	Silt		36.7 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	21.4 mg/kg
16	Zinc as Zn		2.12 mg/kg
17	Boron as B		1.62 mg/kg
18	Potassium as K		36.8 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		0.78 mg/kg
23	Iron as Fe		4.97 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

*****End of Report*****



Verified by

Authorised Signatory

A 17
Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 015	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 015
Sample Description	Soil 3	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Thathakavundanpatti - 10° 3'26.98"N 78° 2'22.69"E		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.84
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	430 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	42.1 %
04	Bulk Density	By Cylindrical Method	1.09 g/cm ³
05	Porosity	By Gravimetric Method	40.1 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	66 mg/kg
07	Magnesium as Mg		35.6 mg/kg
08	Chloride as Cl		86.4 mg/kg
09	Soluble Sulphate as SO ₄		0.0019 %
10	Total Phosphorus as P		1.96 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	378.9 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.01 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.17 %

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 015	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 015
Sample Description	Soil 3	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Thathakavundanpatti - 10° 3'26.98"N 78° 2'22.69"E		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	38.7 %
	Sand		24.8 %
	Silt		36.5 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	23.5 mg/kg
16	Zinc as Zn		1.09mg/kg
17	Boron as B		1.08 mg/kg
18	Potassium as K		30.7 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.13 mg/kg
23	Iron as Fe		3.29 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986


*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory


 Name : Santhosh Kumar A
 Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 016	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 016
Sample Description	Soil 4	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Viralipatti - 10° 6'5.43"N 77°58'28.03"E		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.94
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	256 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	40.6. %
04	Bulk Density	By Cylindrical Method	0.85 g/cm ³
05	Porosity	By Gravimetric Method	39.8 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	80.9 mg/kg
07	Magnesium as Mg		40.4 mg/kg
08	Chloride as Cl		67.5 mg/kg
09	Soluble Sulphate as SO ₄		0.0010 %
10	Total Phosphorus as P		1.02 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	250 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.81 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.05 %

*****End of Report*****



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Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 016	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 016
Sample Description	Soil 4	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Viralipatti - 10° 6'5.43"N 77°58'28.03"E		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	37.9 %
	Sand		27.6 %
	Silt		34.5 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	26.6 mg/kg
16	Zinc as Zn		1.26 mg/kg
17	Boron as B		1.64 mg/kg
18	Potassium as K		43.4 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.66 mg/kg
23	Iron as Fe		2.09 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

*****End of Report*****

Page 1 of 1

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A S K

Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/ 017	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 017
Sample Description	Soil 5	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Mettupatti - 10° 6'48.37"N 78° 2'37.90"E		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.05
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	364.2 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	40.9 %
04	Bulk Density	By Cylindrical Method	0.85 g/cm ³
05	Porosity	By Gravimetric Method	46.5 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	55.6 mg/kg
07	Magnesium as Mg		26 mg/kg
08	Chloride as Cl		60.4 mg/kg
09	Soluble Sulphate as SO ₄		0.0017 %
10	Total Phosphorus as P		3.20 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	382.5 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.82 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.06 %

*****End of Report*****

Page 1 of 1

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Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/ 017	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 017
Sample Description	Soil 5	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Mettupatti - 10° 6'48.37"N 78° 2'37.90"E		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	36.2 %
	Sand		27.9 %
	Silt		35.9 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	19.5 mg/kg
16	Zinc as Zn		1.84 mg/kg
17	Boron as B		1.04 mg/kg
18	Potassium as K		33.2 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.03 mg/kg
23	Iron as Fe		1.68 mg/kg
24	Cation Exchange Capacity	USEPA 9080 – 1986	32.9 meq/100g of soil


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 Name : Santhosh Kumar A
 Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/ 018	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 018
Sample Description	Soil 6	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Kattakulam - 10° 2'54.75"N 77°59'2.97"E		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.06
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	452 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	42.6 %
04	Bulk Density	By Cylindrical Method	1.03 g/cm ³
05	Porosity	By Gravimetric Method	41.1 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	59.8 mg/kg
07	Magnesium as Mg		26.9 mg/kg
08	Chloride as Cl		75.6 mg/kg
09	Soluble Sulphate as SO ₄		0.0019 %
10	Total Phosphorus as P		3.9 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	421 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.94 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.13 %

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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/ 018	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 018
Sample Description	Soil 6	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 KG	Sample Received On	27.05.2024
Sample Condition	Good	Test Commenced On	27.05.2024
Sampling Location	Kattakulam - 10° 2'54.75"N 77°59'2.97"E		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	38.4 %
	Sand		25.2 %
	Silt		36.4 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	26.8 mg/kg
16	Zinc as Zn		1.32 mg/kg
17	Boron as B		1.5 mg/kg
18	Potassium as K		42.8 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		0.90 mg/kg
23	Iron as Fe		3.56 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

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Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/019	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/019
Sample Description	Surface Water (SW-1)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Vaigai River - 10° 1'40.98"N 77°57'15.83"E		

S.No.	Parameters	Test Method	RESULTS
Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	11 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	8.01
4	Conductivity @ 25°C	IS 3025 Part 14:2013	1378 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	7.5 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	813 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	356 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	97.7 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	27.2 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	204.5 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	316.1 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	55.9 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.36 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.29 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	7.6 mg/l

*****End of Report*****



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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/019	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/019
Sample Description	Surface Water (SW-1)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Vaigai River - 10° 1'40.98"N 77°57'15.83"E		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	11.5 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	38 mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	6.1 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	1.8 mg/l
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	19.5 mg/l
	Discipline: Biological	Group: Water	
40	Total Coliform	APHA 23 rd Edn. 2017:9221B	650 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	120 MPN/100ml

*****End of Report*****



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[Signature]

Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/021	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/021
Sample Description	Surface Water (SW-2)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Sathaiyar Reservoir - 10° 6'51.47"N 78° 4'28.17"E		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	10.2 mg/l
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	35 mg/l
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	5.6 mg/l
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	1.8 mg/l
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	568 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	112 MPN/100ml

*****End of Report*****

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 Name: Santhosh Kumar A
 Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/022	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Customer Name			
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/022
Sample Description	Ground Water (WW-1)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Near Project Area - 10° 5'13.07"N 78° 0'28.17"E		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	< 5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.56
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	1106 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	< 1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	652 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	244 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	60.9 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	22.3 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	224 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	186 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	48.7 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.18 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.36 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	3.6 mg/l

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/022	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/022
Sample Description	Ground Water (WW-1)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Near Project Area - 10° 5'13.07"N 78° 0'28.17"E		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	143 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

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Verified by



Authorised Signatory

 Name: Santhosh Kumar A
 Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/023	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Customer Name			
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/023
Sample Description	Ground Water (WW-2)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Viralipatti - 10° 6'4.60"N 77°58'31.22"E		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	< 5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.80
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	1144 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	< 1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	674 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	256 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	54.5 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	29.1 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	232 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	198.6 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	50.5 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.41 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.35 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	4.9 mg/l

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/023	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/023
Sample Description	Ground Water (WW-2)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Viralipatti - 10° 6'4.60"N 77°58'31.22"E		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	170 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

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Authorised Signatory

 Name: Santhosh Kumar A
 Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-1)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Near Project Area - 10° 5'32.52"N 78° 0'24.81"E		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	< 5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.62
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	989 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	< 1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	592 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	212 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	44.8 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	24.3 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	190.6 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	165.4 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	56.8 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.42 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.31 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	3.4 mg/l

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Near Project Area - 10° 5'32.52"N 78° 0'24.81"E		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	96 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

Page 1 of 1

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Authorised Signatory

 Name: Santhosh Kumar A
 Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Customer Name			
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	30.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	31.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	31.05.2024
Sampling Location	Thathakavundanpatti - 10° 3'28.39"N 78° 2'28.32"E		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	< 5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.47
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	984 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	< 1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	588 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	224 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	48.1 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	25.3 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	198.5 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	176.5 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	41.3 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.29 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.17 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	4.3 mg/l

*****End of Report*****

Page 1 of 1

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	08.06.2024
Site Location	M/s.A. Ramamoorthy S/o. Arumugam, S.F. Nos. 1131/1B, 1131/3 & 1131/4, Katchaikatti Village, Vadipatti Taluk, Madurai District – 625 218 - Extent: 1.36.5ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	26.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	27.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	27.05.2024
Sampling Location	Thathakavundanpatti - 10° 3'28.39"N 78° 2'28.32"E		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	128 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

Page 1 of 1

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Authorised Signatory

 Name: Santhosh Kumar A
 Designation : Quality Manager

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National Accreditation Board for Education and Training



Certificate of Accreditation

Geo Exploration & Mining Solutions, Salem

No. 17, Advaita Ashram Road, Fairlands, Salem – 636 004, Tamilnadu, India.

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 opencast only	1	1 (a) (i)	A
2	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	B
3	Building and construction projects	38	8(a)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated Jan 06, 2023 and posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/2684 dated Feb 20, 2023. The accreditation needs to be renewed before the expiry date by Geo Exploration & Mining Solutions, Salem following due process of assessment.

Sr. Director, NABET
Dated: Feb 20, 2023

Certificate No.
NABET/EIA/2225/RA 0276

Valid up to
August 06, 2025

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to the QCI-NABET website.