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 – MINOR MINERAL – CLUSTER – NON-FOREST LAND-PATTA LAND-

THIRU.K. SURESH ROUGH STONE AND GRAVEL QUARRY

(1 Proposed + 1 Existing)

Lease Period/Mining Plan Period – 10 years

Total Cluster Extent = 6.98.39 Ha

PROJECT PROPONENT	PROPOSED PROJECT	PROPOSED PRODUCTION
Thiru. K. Suresh, S/o. Kovil Pillai, No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu State – 625 531	Extent:2.83.50 ha S.F. Nos: 24/1B, 24/1E, 24/1F2 and 24/1F3 Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State.	**First Five-Year Production** Rough Stone = 2,18,165 m^3 Gravel = 91,400 m^3 **Second Five Year Production** Rough Stone = 90,610 m^3 Annual Peak Production = 61,535 m^3 of Rough Stone Proposed Depth = 44m bgl For 10 years

ToR obtained vide

File No.13008 TOR Identification No.TO25B0108TN5648250N Dated:06.01.2026

Environmental Consultant	Laboratory
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/25-28/RA 0424** **Validity Period: 25.08.2025 – 06.08.2028** Phone: 0427-2431989, Email: ifthiahmed@gmail.com, geothangam@gmail.com **Web: www.gemssalem.com**	**ENVIRONMENTAL LAB** **CHENNAI METTEX LAB PRIVATE LIMITED** **(Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD)** **Jothi Complex, 83,** **M.K.N Road, Guindy,** **Chennai – 600 032**

Baseline Monitoring Period

October to December 2025

JANUARY 2026

DECLARATION BY THE PROJECT PROPONENT

I, K.Suresh – Authorized Signatory of **Thiru.K.Suresh Rough Stone and Gravel Quarry** hereby declare that this EIA & EMP report prepared by **M/s. Geo Exploration and Mining Solutions** for our Rough Stone & Gravel Quarry situated in S.F.No.24/1B, 24/1E, 24/1F2 and 24/1F3 over an extent of 2.83.50 Ha in Thenpalanzhi Village, Thirupparankundram Taluk and Madurai District based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide File No.13008 TOR Identification No. TO25B0108TN5648250N Dated: 06.01.2026

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

K.Suresh

Place : Madurai

Dated :

UNDERTAKING BY THE EIA COORDINATOR

I, Dr. M. Ifthikhar Ahmed, EIA Coordinator given undertaking that, this EIA & EMP report prepared for Thiru.K.Suresh Rough Stone & Gravel Quarry situated in S.F.No.24/1B, 24/1E, 24/1F2 and 24/1F3 over an extent of 2.83.50 Ha in Thenpalanzhi Village, Thirupparankundram Taluk and Madurai District based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide File No.13008 TOR Identification No. TO25B0108TN5648250N Dated: 06.01.2026

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 EIA Co Ordinator

Dr. M. Ifthikhar Ahmed

Managing Partner

M/s. Geo Exploration and Mining Solutions

Place : Salem

Dated :

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 below-mentioned Functional Area Experts and Team Members prepared the EIA/EMP for Thiru.K.Suresh Rough Stone and Gravel Quarry over an Extent of 2.83.50 ha in Thenpalanzhi Village, Thirupparankundram Taluk and Madurai District of Tamil Nadu. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature & Date:	Dr. M. Ifthikhar
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/25-28/RA0424 Dated: 25-08-2025**
Validity:	**Valid till 06.08.2028**

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the EIA/EMP for Thiru.K.Suresh Rough Stone and Gravel Quarry over an Extent of 2.83.50 ha in Thenpalanzhi Village, Thirupparankundram Taluk and Madurai District of Tamil Nadu. It is also certified that information furnished in the 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:

Period of Involvement: **Oct 2023 to till date**

Associated Team Member with EIA Coordinator:

1. **Mr.A.Naveen**
2. **Mr. M. Shaik Nawas**

FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT

Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	▪ Identification of different sources of air pollution due to the proposed mine activity ▪ Prediction of air pollution and propose mitigation measures / control measures	Mr. A. Jagannathan	
2	WP	▪ Suggesting water treatment systems, drainage facilities ▪ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Dr. M. Ifthikhar Ahmed	
3	HG	▪ Interpretation of ground water table and predict impact and propose mitigation measures. ▪ Analysis and description of aquifer Characteristics	Mr. L. Jayaraj	
4	GEO	▪ Field Survey for assessing the regional and local geology of the area. ▪ Preparation of mineral and geological maps. ▪ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	Mr. B. Vengadagiri	
5	SE	▪ Revision in secondary data as per Census of India, 2011. ▪ Impact Assessment & Preventive Management Plan ▪ Corporate Environment Responsibility.	Mr. A. Allimuthu	

6	EB	▪ Collection of Baseline data of Flora and Fauna. ▪ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ▪ Impact of the project on flora and fauna. ▪ Suggesting species for greenbelt development.	Mr. Panneer Selvam	
7	RH	▪ Identification of hazards and hazardous substances ▪ Risks and consequences analysis ▪ Vulnerability assessment ▪ Preparation of Emergency Preparedness Plan ▪ Management plan for safety.	Mr. N. Senthilkumar	
8	LU	▪ 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	▪ Identify impacts due to noise and vibrations ▪ Suggesting appropriate mitigation measures for EMP.	Mr. A. Jagannathan	
10	AQ	▪ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ▪ Recommending mitigations measures for EMP	Mr. N. Senthilkumar	
11	SC	▪ Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. M. Ifthikhar Ahmed	
12	SHW	▪ Identify source of generation of non-hazardous solid waste and hazardous waste. ▪ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	Mr. A. Jagannathan	

LIST OF TEAM MEMBERS ENGAGED IN THIS PROJECT

Sl.No.	Name	Functional Area	Involvement	Signature
1	Mr. M. Shaik Nawas	AQ; NV; SC	▪ Site Visit with FAE ▪ Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures ▪ Analyse & provide inputs and assist FAE with meteorological data, emission estimation, AERMOD modelling and suggesting control measures ▪ Assist FAE and provide inputs on impacts due to proposed mine activity and suggest mitigation measures ▪ Assist FAE with prediction modelling ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts	
2	Mr. A. Naveen	LU	▪ Site Visit with FAE ▪ Assisting FAE in preparation of land use maps	

NABET CERTIFICATE

भारतीय गुणवत्ता परिषद्
QUALITY COUNCIL OF INDIA
Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Exploration and Mining Solutions, Salem

No. 17, Advaitha Ashram Road, Fairlands, Salem, Tamil Nadu – 636 004

*Geo Exploration and Mining Solutions, Salem is Re-Accredited (RA3) **as Category-A organization** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations (Version 3), for the preparation of EIA/EMP reports in the sectors listed below, as per the specified categories*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	Mineral beneficiation	7	2 (b)	A
3.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
4.	Building and construction projects	38	8 (a)	B

Note: Names of approved experts and sectors are mentioned in RAAC minutes dated August 21, 2025, 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/25/3827 dated August 25, 2025. The accreditation needs to be renewed before the expiry date by Geo Exploration and Mining Solutions, Salem following due process of assessment.

Valid up to
August 06, 2028

Issue Date
August 25, 2025

Certificate No.
NABET/EIA/25-28/RA 0424

Varinder S Kanwar

Prof (Dr) Varinder S Kanwar
(CEO – NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website

For easy represantation of Proposed and Existing, Expired Quarry in the Cluster are given unique codes and identifies and studied in this EIA /EMP Report.

CODE	Name of the Owner	Village	S.F. Nos	Extent in Ha	Status
PROPOSED QUARRY					
P1	**Thiru. K. Suresh,** S/o. Kovil Pillai, No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu State – 625 531.	Thenpalani	24/1B, 24/1F2, 24/1F3 & 24/1E	2.83.5 Ha	File No.13008 TOR Identification No. TO25B0108TN5648250N Dated: 06.01.2026
NEARBY PROPOSED QUARRY					
P2	**M/s.Nithyasree Green Energy**	Thenpalani	31(Part) (Thenpalani Periya Tank) (Rule- 7, Gravel Quarry- 3 Months)	2.17.0 Ha	-
	TOTAL EXTENT			**2.83.5 Ha**	
EXISTING QUARRY					
E-1	Thiru. M.Rajasekar	Thenpalani	20/3,21/1, 22/1B2A & 23/5	4.14.89	29.05.2025 To 28.05.2035
	TOTAL EXTENT			**4.14.89 Ha**	
EXPIRED/ABADONED QUARRY					
EX-1	Thiru. M.Rajasekar	Thenpalani	23/2B, 23/2E, 23/2F &23/3	1.61.0 Ha	23.11.2013 to 22.11.2018
	TOTAL EXTENT			**1.61.0 Ha**	
	TOTAL CLUSTER EXTENT			**6.98.39 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.K.Suresh Rough Stone & Gravel Quarry

File No.13008 TOR Identification No. TO25B0108TN5648250N Dated: 06.01.2026

SEAC Conditions - Site Specific		
Major Condition		
1	During the meeting, the waste dump & a Shed was observed in KML of the proposed area. Hence, the Project Proponent shall remove the same and furnish photographic/videographic evidence, along with the EIA report.	Noted and agreed
2	From KML, mining was noticed in Eastern side of the proposed area and the PP shall furnish details of the same duly obtained from AD mines along with the EIA report	Noted and agreed.
Other site-specific conditions		
1	A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: (i) Copy of the agreement forming CMC. (ii) The Organisation chart of the Committee with defining the role of the Members (iii) The 'Standard Operating Procedures' (SoP) executing the planned activities	Noted and agreed.
2	The Geo referenced Boundary pillars to be erected on the field as per the mine rules and the evidence should be submitted along with the EIA report.	Noted and agreed Boundary pillars have been erected at all corners of the quarry, and the relevant photographs will be submitted in the final EIA report.
3	The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report	**Noted and agreed** The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures are given in the EIA report, Chapter No. III
4	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & up to 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.	**Noted and agreed** The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures are given in the EIA report, Chapter No. III
5	The proponent shall furnish photographs of adequate fencing; garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	**Noted and agreed** The area has been fenced and plantation activities carried out within the project site. Details given in chapter 2.
6	The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.	**Noted and agreed** The biodiversity study has been conducted by a Functional Area Expert through a NABET-

		accredited consultant. The detailed are presented in Chapter 3.
7	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	**Noted and agreed.**
8	The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures	Noted and agreed.
9	The PP shall prepare a conceptual action plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed and existing quarry wall.	Noted and agreed.
10	The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/videographic evidence along with the EIA report.	Noted and agreed.

2.SEAC STANDARD CONDITIONS		
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 zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	Not applicable, It is a fresh lease application.
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.	**Noted & agreed.** Details of habitations around the proposed mining area have been assessed, and a latest certificate from the Village Administrative Officer (VAO) confirming the location of habitations within a 300m radius from the periphery of the site has been obtained. The VAO certificate enclosed with as annexure.
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.	**Noted and agreed** The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No. III
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.	**Noted and agreed** 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

5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	**Noted and agreed** Biodiversity study has been carried out by Functional Area Expert by the NABET accredited consultant. The detailed study is given in the Chapter No.3
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.	**Noted and agreed** DFO letter will be submitted during the appraisal meeting.
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.	**Noted and agreed** The proponent has agreed to carry out the slope stability study, when a depth of 30 meters is reached in the quarry, ensuring that the reports will be submitted together with the HYCR.
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.	**Noted and agreed** The proponent has agreed to carry out the slope stability study, when a depth of 30 meters is reached in the quarry, ensuring that the reports will be submitted together with the HYCR.
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.	**Noted and agreed** Proponent given affidavit stating that the blasting will be carried out under the supervision of Competent person.
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.	**Noted and agreed** The Proponent will implement scientifically designed blasting methods using safe and proven techniques to ensure minimal vibration levels and prevent any rock fragments from reaching nearby areas. A technical plan detailing the approach and safety measures will be submitted for review and approval by the competent authority.
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	**Noted and agreed.** The Project Proponent does not operate any other quarry
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,	Noted and agreed
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	Noted and agreed.
14	Quantity of minerals mined out. · Highest production achieved in any one year · Detail of approved depth of mining. · Actual depth of the mining achieved earlier. · Name of the person already mined in that leases area.	Noted and agreed

	· If EC and CTO already obtained, the copy of the same shall be submitted. · Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/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).	**Noted and agreed** Satellite imagery of the project area along with boundary coordinates is given in the Chapter No 2, Figure No.2.2, Page No.11. Geomorphology of the area is given in Chapter No 2, Figure No.2.10, Page No.23 Land use pattern of the project area is tabulated in the Chapter No.2. Table no 2.4, Pg.No.18
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	**Noted and agreed.** PP carried out the drone video survey and will be submitted during the appraisal while obtaining the EC.
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.	**Noted and agreed** The area has been fenced and plantation activities carried out within the project site.
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.	**Noted and agreed** The details of mineral reserves have been provided in Chapter No 1, Mineable reserves– 3,08,775 m^3 Peak Production – 61535 m^3 Depth – 44m bgl
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.	**Noted and agreed.** The PP provided 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.
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.	**Noted and agreed** 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	**Noted and agreed** Baseline Data were collected for One Season (Post-Monsoon) Oct- Dec 2025 as per CPCB Notification and MoEF & CC Guidelines. Details in 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	**Noted and agreed** The Cumulative impact study due to mining operations is explained in chapter - 7

	control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	**Noted and agreed.** A detailed plan outlining the collection, storage, and recharge of surface runoff will be prepared, considering both seasonal variations.
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.	**Noted and agreed** 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
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.
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	**Not Applicable**. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	**Noted and agreed** Part of the working pit will be allowed to collect rain water during the spell of rain will be used for greenbelt development and dust suppression. The Mine Closure Plan is prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
28	Impact on local transport infrastructure due to the Project should be indicated.	**Noted and agreed** Transportation details mentioned in Chapter -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.	**Noted and agreed** Details of the trees in the buffer zone given in Chapter No.3&4
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific	**Noted and agreed** After the completion of mining operation, the part of the quarried-out land will be utilized as temporary storage reservoir. The details are given in the Chapter No.4
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	**Noted and agreed.**
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,	**Noted and agreed** Noted & agreed. It is proposed to plant a 1420 nos of trees in the 7.5m safety barrier and village roads.

	State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	
33	Taller/one-year-old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent 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** No trees within the project site. it is proposed to plant 1420 Nos of Trees in the safety barrier and Village roads.
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	**Noted and agreed** A comprehensive Disaster Management Plan covering the entire life of the quarry lease prepared and incorporated into the EIA/EMP report. This plan will address potential risks and outline mitigation and emergency response measures to ensure safety and compliance throughout the project duration. Refer Chapter 7
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	**Noted and agreed** A detailed Risk Assessment and Management Plan prepared for the entire lease period of the quarry and incorporated into the EIA/EMP report. The plan will identify potential hazards and outline mitigation measures to ensure safe and sustainable mining operations throughout the project lifecycle.
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.	**Noted and agreed** The project will assess potential occupational health risks and implement preventive measures, including use of PPE, dust control, and regular health monitoring. Pre-placement and periodic medical examinations will be conducted as per the schedule incorporated in the EMP. Adequate facilities and training will be provided to ensure worker health and safety throughout the mining operations.
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.	**Noted and agreed** No Public Health Implications anticipated due to this project. Details of CER are discussed under Chapter 8
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.	**Noted and agreed** A detailed socio-economic study covering a 5 km radius around the quarry has been undertaken. The Project Proponent commits to implementing community welfare measures like employment generation, education support, and health camps, with defined milestones and timelines to ensure effective benefits to the local population.
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.	**Noted and agreed** No, Litigation 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.	**Noted and agreed** Project benefits discussed in chapter 8
41	If any quarrying operations were carried out in the proposed quarrying site for which now the	Noted and agreed.

	EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	
42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	**Noted and agreed** The EMP prepared for the life of the mine and discussed in chapter 10.
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.	Noted & agreed.

ADDITIONAL CONDITIONS-Annexure-B		
Cluster Management committee		
1.	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Cluster management committee has been formed with mutual agreement with the proponents including Existing and Proposed quarry at present 2 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 Draft 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 the committee in implementing the environmental policy devised shall be given in detail.	Details discussed in chapter 6 of draft EIA report

7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	Noted & agreed
8	The committee shall furnish the Emergency Management plan 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 caried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise arca 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	The EIA study on biodiversity, natural ecosystem, the soil micro flora, fauna was carried out and discussed in earlier slides.

	seed banks and suggest measures to maintain the natural Ecosystem.	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 barren agricultural land on North sides Proponent have erected Barbed wire fencing on all the sides of the project site 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.	Details discussed in the chapter No.3
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	Details discussed in the chapter No.4
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Noted and agreed
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Noted and agreed
	Water Environment	
23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks. canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect ground water. Necessary data and documentation in	There are 8 open wells and 6 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method

	this regard may be provided, covering the entire mine lease period.	
24	Erosion Control measures.	Details discussed in the chapter No.4
25	Detailed study shalt 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.	Discussed in Chapter No.3
26	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.
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.	There is no Top soil in the project area, the overburden in the form of Gravel formation. Details of impact on soil environment is detailed in Chapter No.4.
30	The Environmental lmpact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	There is, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area. Ecological Environment is discussed under Chapter 3
Energy		
31	The measures taken to control Noise. Air, Water. Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	Detailed discussed in chapter 4
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.	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3)

		Carbon dioxide (CO_2): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane (CH_4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N_2O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater .
33	The Environmental lmpact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Detailed discussed in chapter 3.
Mine Closure Plan		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
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.	Detailed discussed in chapter 10
Disaster Management Plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	Details 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 sites. Structures. railway lines, roads. Water bodies such as streams, odai, vaari, canal, channel. river, lake pond, tank etc.	It is incorporated in this draft EIA report Annexure
40	As per the MoEF& CC office memorandum tr.No.22-65l201 7-lA.lll dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and	Noted and agreed.

	all the activities proposed shall be part of the Environment Management Plan.	
41	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	Plastic waste management in the project area detailed in Chapter No.7.

STANDARD TERMS OF REFERENCE		
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	**Not applicable.** The project is Not a violation category. This proposal falls under B1 Category (Cluster situation)
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	The applied land for quarrying is a Patta Land. Document is enclosed along with Approved Mining Plan as Annexure Volume 1.
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	**Noted & agreed.**
4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Map showing – Project area is superimposed on Satellite imagery is enclosed in Figure No. 2.3 Project area boundary coordinates superimposed on Toposheet – Figure No. 2.2 Surface Features around the project area covering 10km radius – Figure No. 2.4 Geology map of the project area covering 10km radius - Figure No. 2.7 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.8
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Map showing – Geology map of the project area covering 10km radius - Figure No. 2.7 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.8.
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The applied area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.

7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	The proponent has framed their Environmental Policy and the same is discussed in the Chapter No 10.1.
8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	It is an opencast quarrying operation proposed to operate in Mechanized method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90^0 bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.	**Noted & agreed.** The study area considered for this study is 10 km radius and all data contained in the EIA report such as waste generation etc., is for the Life of the Mine / lease period.
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	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 2.3.
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given	**Not Applicable.** There is no waste anticipated during this quarry operation. The entire quarried out rough stone will be transported to the needy customers. No Dumps is proposed outside the lease area.
12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	**Not Applicable.** There is no Forest Land involved in the proposed project area. The proposed project area is a Patta land. Approved Mining Plan is enclosed as Annexure Volume 1.
13	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	**Not Applicable.** The proposed project area does not involve any Forest Land.

14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	**Not Applicable.** The project doesn't attract Recognition of Forest Rights Act, 2006.
15	The vegetation in the RF/PF areas in the study area, with necessary details, should be given.	No Reserve Forest within the Study Area.
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	**Not Applicable.** There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 KM of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	**Not Applicable.** There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
18	A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	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. Detailed in Chapter No. 3.
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	**Not Applicable.** Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	**Not Applicable.** The project doesn't attract The C. R. Z. Notification, 2018.
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-	**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.

	wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	
22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Baseline Data were collected for One Season Oct to dec 2025 (Post Monsoon Season) as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3.
23	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Air Quality Modelling for prediction of incremental GLC's of pollutant was carried out using AERMOD view 9.6.1 Model. Details in Chapter No. 4.
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	Total Water Requirement: 3.0 KLD Discussed under Chapter 2, Table No 2.13. Figure No. 2.8.
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain will be used for greenbelt development and dust suppression. The Mine Closure Plan is prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.

27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Not Applicable. The ground water table inferred 96m below ground level. The ultimate depth of quarry is 44m. This proposal of 44m below ground level will not intersect the ground water table, which is inferred from the hydro-geological carried out at the project site. Discussed under Chapter 3.
29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There is no stream, seasonal or other water bodies passing within the project area. Therefore, no modification/ diversion of water bodies is anticipated.
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	Highest elevation of the project area is 176m AMSL. Ultimate depth of the mine is 44m BGL Water level of the area is 96m BGL
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Greenbelt Development Plan is discussed under Chapter 4. Figure No. 4.14. Pg.no.140.
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter 2.
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2.
34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Discussed under Chapter 2. Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical	Occupational health impact and details of the medical examination to the workers given in the Details in Chapter 10.

	medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No Public Health Implications anticipated due to this project. Details of CER and CSR are discussed under Chapter 8.
37	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No Negative Impact on Socio Economic Environment on the Study Area is anticipated and this project shall benefit the Socio-Economic Environment by ways of employment for 35 people directly and 80 people indirectly. Details in Chapter 2.
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed Environment Management Plan for the project to mitigate the anticipated impacts described under Chapter 4 is discussed under Chapter 10.
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	Public hearing points and commitment of the project proponent is detailed in the chapter No.7.
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs.3,79,93,000/- CER Cost is Rs 3,00,000/-
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Details in Chapter 7.
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Details in Chapter 8.
44	**Besides the above, the below mentioned general points are also to be followed: -**	
A	Executive Summary of the EIA/EMP Report	Enclosed as a separate volume
B	All documents to be properly referenced with index and continuous page numbering.	All the documents are properly referenced with index and continuous page numbering.
C	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of Tables and source of the data collected are indicated.
D	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC / NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project	Baseline monitoring reports are enclosed with Annexure
E	Where the documents provided are in a language other than English, an English translation should be provided.	Not Applicable.
F	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Questionnaire of the project is enclosed with Annexure
G	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II(I) Dated: 4th August, 2009,	Noted & agreed. Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) Dated: 4th August, 2009 are followed.

	which are available on the website of this Ministry, should be followed.	
H	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	There is no changes in Form-I, Mining plan and Pre-feasibility report.
I	As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Not Applicable.
J	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Surface Plan – Figure No. 2.2. Pg.no.13. Geological Plan – Figure No. 2.7. Pg.no.20. Working Plan – Figure No. 2.9. Pg.no.21 Closure Plan – Figure No. 2.10. Pg.no.22

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1. INTRODUCTION

1.0 PREAMBLE

The project proponent Thiru.K.Suresh applied for Rough stone and Gravel quarry over an extent of 2.83.50 Ha in S.F. Nos 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State. As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries - 1 Proposal and 1 Existing quarry in the 500m Radius forming Cluster Category - Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016).

- Proponent applied for Rough Stone and Gravel quarry lease on 15.07.2025.
- Precise Area Communication Letter was issued by the Joint Director, Department of Geology and Mining Madurai R.C. No: 1129/Kanimam/2025, Dated: 10.09.2025.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Madurai District, vide R.C. No: 1129/Mines/2025, Dated: 15.10.2025.
- The Mining plan has been approved for the quantity of 3,08,775m^3 of Rough Stone and 91,400m^3 of Gravel up to the depth of 44m bgl for the period of Ten years.
- Proponent applied for Terms of Reference vide Proposal No. SIA/TN/MIN/557825/2025 Dated: 14.11.2025 and the Proposal was Appraised in 651st SEAC -II meeting held on 14.11.2025 & in 937th SEIAA Meeting held on 23.12.2025 and the ToR was Granted vide File.No.13008 ToR. Identification No TO25B0108TN5648250N Dated: 06.01.2026.
- Based on the ToR Baseline Monitoring study has been carried out for one season (Post Monsoon Season) ie., **October to December 2025**

It is a Fresh Proposal that proponent applied for the extent ie.,2.83.5 Ha in S.F. Nos.24/1B, 24/1E, 24/1F2 and 24/1F3, The Mining plan was proposed to quarry upto the depth of 44 m bgl for the quantity of Rough stone 3,08,775m^3, quantity of Gravel is 91,400 m^3 for Ten years plan period and the ToR granted for the same quantity and area. since the EIA /EMP report is prepared for the quantity and depth as per the ToR.

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. 1886 of 20thApril 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 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"

FIGURE: 1.1 SATELLITE IMAGERY MAP SHOWING 500M RADIUS AREA AROUND THE PROJECT SITE

1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1 Identification of Project

TABLE 1.1: SALIENT FEATURES OF THE PROPOSED PROJECT

Name of the Project	Thiru.K.Suresh Rough Stone & Gravel Quarry
S.F. No.	24/1B, 24/1E, 24/1F2 and 24/1F3
Extent	2.83.5 ha
Land Type	Patta Land classified as punjai
Village Taluk and District	Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District

Source: Approved Mining Plan.

1.2.2 Identification of Project Proponent

TABLE 1.2: DETAILS OF PROJECT PROPONENT

Name of the Project Proponent	Thiru.K.Suresh
Address	S/o. Kovil Pillai, No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu State – 625 531
Mobile	+91 99655 06413 & 98421 06413
Status	Individual

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.

TABLE 1.3: BRIEF DESCRIPTION OF THE PROJECT

Name of the Quarry	Thiru.K.Suresh Rough Stone & Gravel Quarry	
Toposheet No	58 G/13	
Latitude between	09°55'00.2645”N to 09°55'08.5231”N	
Longitude between	77°59'47.2679"E to 77°59'53.7028”E	
Highest Elevation	176 m AMSL	
Proposed Depth of Mining	44m bgl (4m Gravel + 40m Rough Stone)	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	11,34,000	1,13,400
Mineable Reserves	Rough Stone in m^3	Gravel m^3
	3,08,775	91,400
Year-wise Production for First Five years	Rough Stone in m^3	Gravel m^3
	2,18,165	91,400
Year-wise Production for Second Five years	Rough Stone in m^3	Gravel m^3
	90,610	-
Ultimate Pit Dimension	XY-AB: 51m (L) X 98m (W) X 29m BGL (D) XY-CD: 72m (L) X 116m (W) X 44m BGL (D) XY-EF: 50m (L) X 190m (W) X 34m BGL (D)	
Water Level in the surrounding area	96m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease area is a plain topography. The area has gentle slope towards Southwestern side. The altitude of the area is 383m (max) above mean sea level.	
Machinery proposal for this scheme period	Hand Jack Hammer	8 Nos
	Compressor	2 Nos
	Excavator with Bucket & Rock Breaker	2 Nos
	Tippers	3 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	35 Nos	
Total Project Cost	Rs.3,79,93,000/-	
Proposed CER Cost	Rs.3,00,000/-	
Nearby Water Bodies	Thenpalanzhi Periya Kanmoi	110m South
	Odai	250m SW
	Koothiyarkundu Kanmai	5.7km- SE
	Vaigai Raiver	6.6km NE
Greenbelt Development Plan	Proposed to plant about 1420 Nos of trees in the safety barrier and village roads considering 500 Nos of Trees per hectare.	
Proposed Water Requirement	3.0 KLD	
Nearest Habitation	630m -North East	

Source: Approved Mining Plan

1.3.2 Location of the Project

- The Lease area located about 14 km Southwestern side of Madurai Town is located 6km Northwest from Tiruparangkunram Town, situated 1.3km Northwest from Thenpalanzhi

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

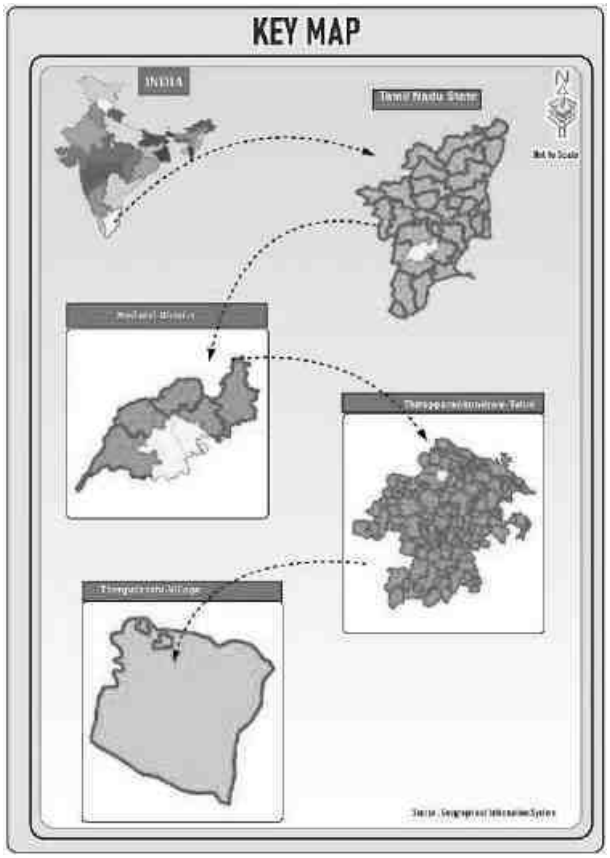


FIGURE 1.3: TOPOSHEET MAP SHOWING 10KM RADIUS AREA AROUND THE PROJECT SITE

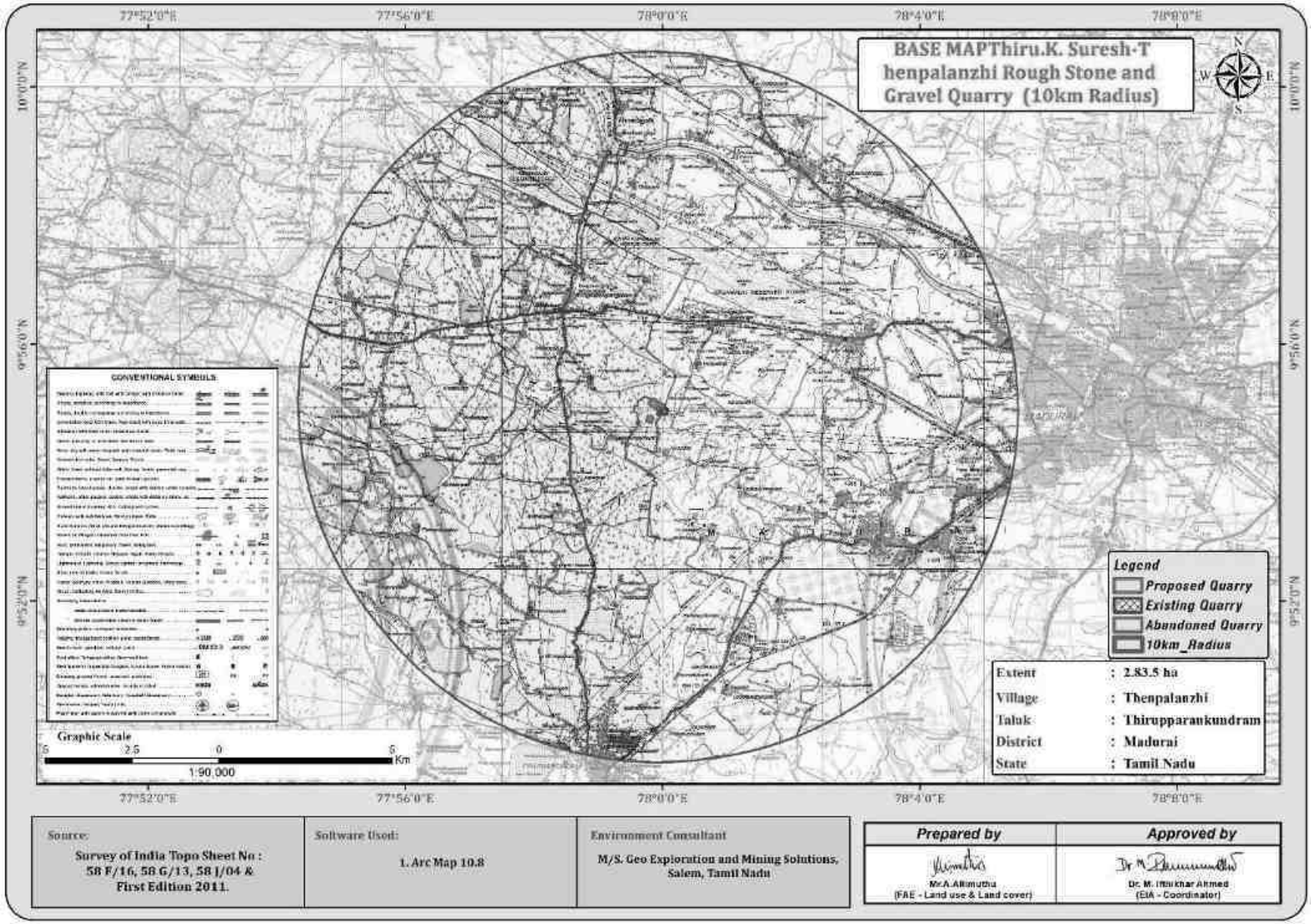
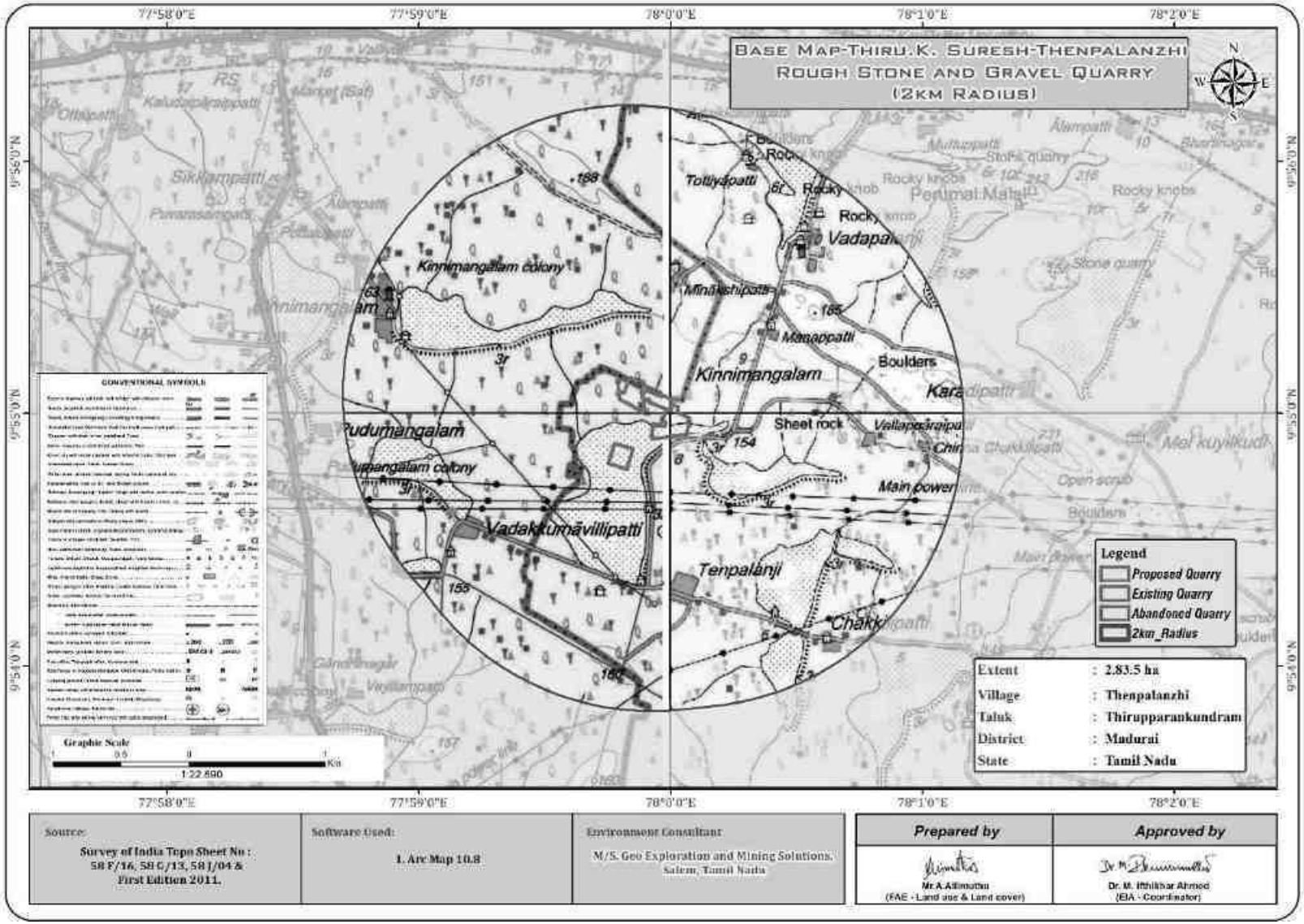


FIGURE 1.4: TOPOSHEET MAP SHOWING 2KM RADIUS AREA AROUND THE PROJECT SITE



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 project proponent applied for Rough Stone Quarry Lease Dated: 15.07.2025
- Precise Area Communication Letter was issued by the Deputy Director, Department of Geology and Mining, Madurai Vide Rc.No.1129/Mines/2025 dated 10.09.2025
- Mining Plan approved by Assistant Director, Department of Geology and Mining, Madurai vide Roc.No. 1129/Mines/2025 Dated: 15.10.2025
- Cluster Certificate approved by Deputy Director, Department of Geology and Mining, Madurai vide Roc.No. 1129/Mines/2025-2 Dated: 15.10.2025
- 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/557825/2025 dated.14.11.2025.

SCOPING –

- The proposal was placed in 651st SEAC meeting held on 14.11.2025 and the committee recommended for issue of ToR.
- The proposal was considered in 937th SEIAA meeting held on 23.12.2025 and issued ToR vide File No.13008 TOR Identification No. TO25B0108TN5648250N Dated 06.01.2026.

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. Chapter No. 7.

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. The report has been prepared using the following references:

- Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, February, 2010
- EIA Notification, 14thSeptember, 2006
- Tor- File No.12910 TOR Identification No. TO25B0108TN5841848N Dated.18.12.2025
- Approved Mining Plan.

1.5 TERMS OF REFERENCE (ToR)

Compliance to ToR issued vide –

- Tor- File No.13008 TOR Identification No. TO25B0108TN5648250N Dated 06.01.2026.
- **The details of the compliance status are given in the Page No. i – Xviii.**

1.6 POST ENVIRONMENT CLEARANCE MONITORING

The proponent will 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 Post Monsoon season (October to December 2025) 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	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Continuous 24-hourly samples twice a week for three months at 8 locations (1 Core & 7Buffer)
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)	8 locations (1 Core & 7 Buffer) – 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: Onsite Monitoring Data/Sampling by Laboratories, 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.
- Environment (Protection) Act,1986
- EIA Notification, 2006.
- Tor- File No.13008 TOR Identification No. TO25B0108TN5648250N Dated 06.01.2026.

2. PROJECT DESCRIPTION

2.0 GENERAL

Thiru.K.Suresh Rough stone and Gravel Quarry requires Environmental Clearance. There are One (1) proposed, one (1) existing and forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 6.98.39 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 project is site specific and there is no additional area required for the project. There is no effluent generation/discharge from the proposed quarries. Opencast mechanized method is proposed 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 pit head to the needy crushers and rock breakers to avoid secondary blasting.

2.2 LOCATION OF THE PROJECT

- The area is located in S. F. Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3, of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State.
- The entire quarry lease area falls in the Patta land, the lease applied area is exhibits plain terrain.
- The Altitude of the area is **176m (**Maximum) above MSL.
- The area is mentioned in GSI Topo sheet No. 58 G/13
- The Latitude between of **09°55'00.2645" N to 09°55'08.5231" N**
- The Longitude between of **77°59'47.2679''E to 77°59'53.7028" E** on WGS 1984 datum.

TABLE 2.1: SITE CONNECTIVITY

Nearest Roadway	National Highway - (NH85) Madurai to Theni – 2.4km- North State Highway-(SH-73) Thirumangalam to Pallapatti – 2.4km- West
Nearest Village	Meenakshipatti –630m - NE
Nearest Town	Thirupparankundram – 6.0km – South East
Nearest Railway Station	Vadapalanzhi Railway station – 2.5km – North East
Nearest Airport	Madurai Airport – 13km – SE
Seaport	Tuticorin – 130 km – Southeast

*Source: Survey of India **Toposheet***

TABLE 2.2: BOUNDARY CO-ORDINATES OF PROPOSED PROJECT

Boundary Pillar No.	Latitude	Longitude
1	09°55'00.2645"N	77°59'53.3613"E
2	09°55'02.0067"N	77°59'50.5310"E
3	09°55'03.3042"N	77°59'47.8480"E
4	09°55'04.4764"N	77°59'47.7397"E
5	09°55'04.4956"N	77°59'47.2679"E
6	09°55'05.6135"N	77°59'47.5442"E
7	09°55'05.6033"N	77°59'47.6023"E
8	09°55'05.4442"N	77°59'47.5685"E
9	09°55'04.9057"N	77°59'48.8913"E
10	09°55'08.5231"N	77°59'50.2254"E
11	09°55'08.2725"N	77°59'51.0191"E
12	09°55'07.7305"N	77°59'51.4381"E

13	09°55'07.5597"N	77°59'51.8281"E
14	09°55'08.1188"N	77°59'52.0750"E
15	09°55'07.8900"N	77°59'52.6184"E
16	09°55'07.4731"N	77°59'53.6085"E
17	09°55'05.9628"N	77°59'53.3095"E
18	09°55'04.8462"N	77°59'52.9549"E
19	09°55'04.6874"N	77°59'53.3287"E
20	09°55'03.6380"N	77°59'53.1773"E
21	09°55'03.5247"N	77°59'53.7028"E
22	09°55'02.3280"N	77°59'53.5775"E

FIGURE 2.1: SITE PHOTOGRAPHS

FIGURE 2.1: PHOTOGRAPHS OF GREENBELT & FENCING

FIGURE 2.2: SATELLITE IMAGINERY MAP SHOWING THE PROJCT AREA

FIGURE 2.3: QUARRY LEASE PLAN / SURFACE PLAN

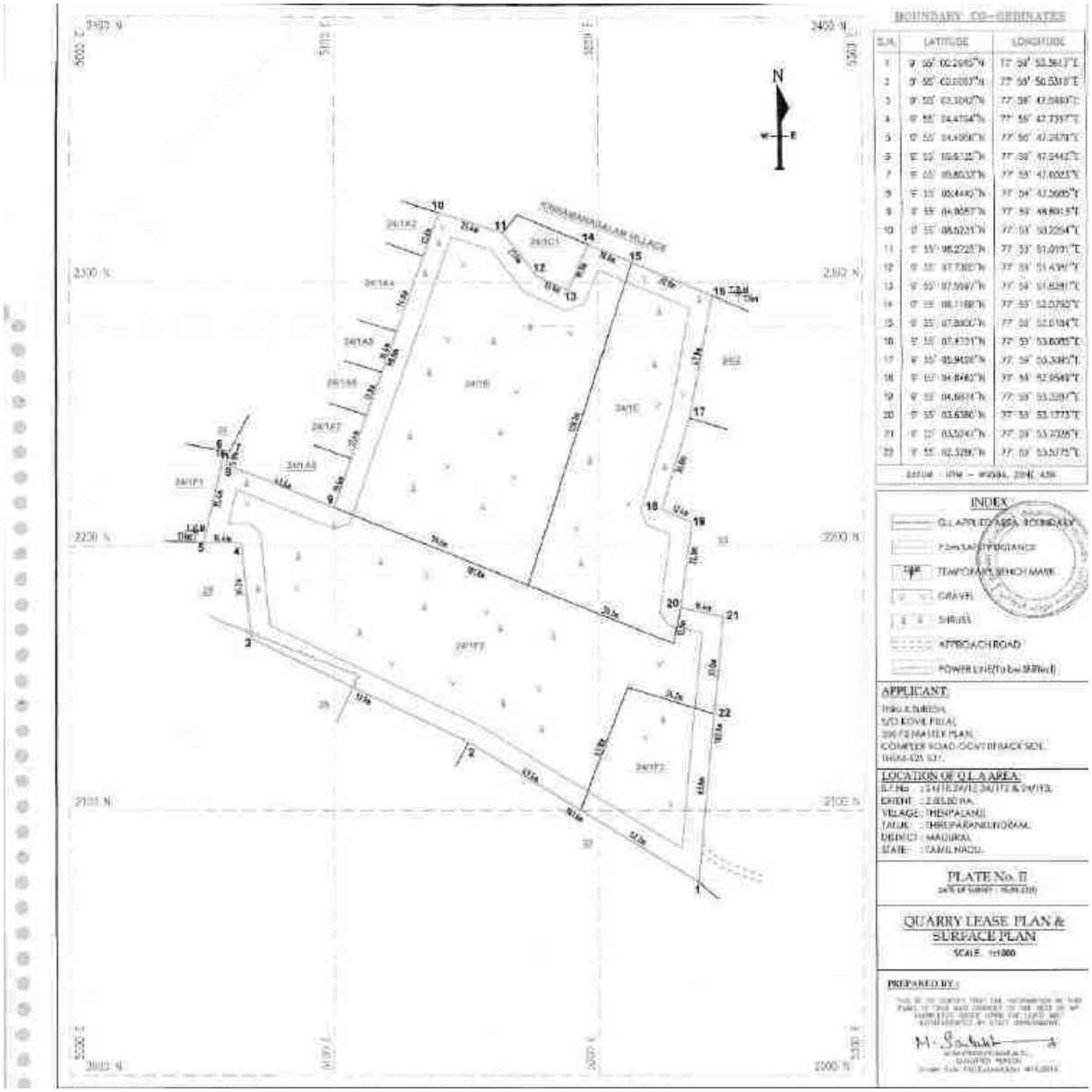


FIGURE 2.4: SUPERIMPOSED VILLAGE MAP SHOWING 500M RADIUS AREA AROUND THE PROJECT SITE

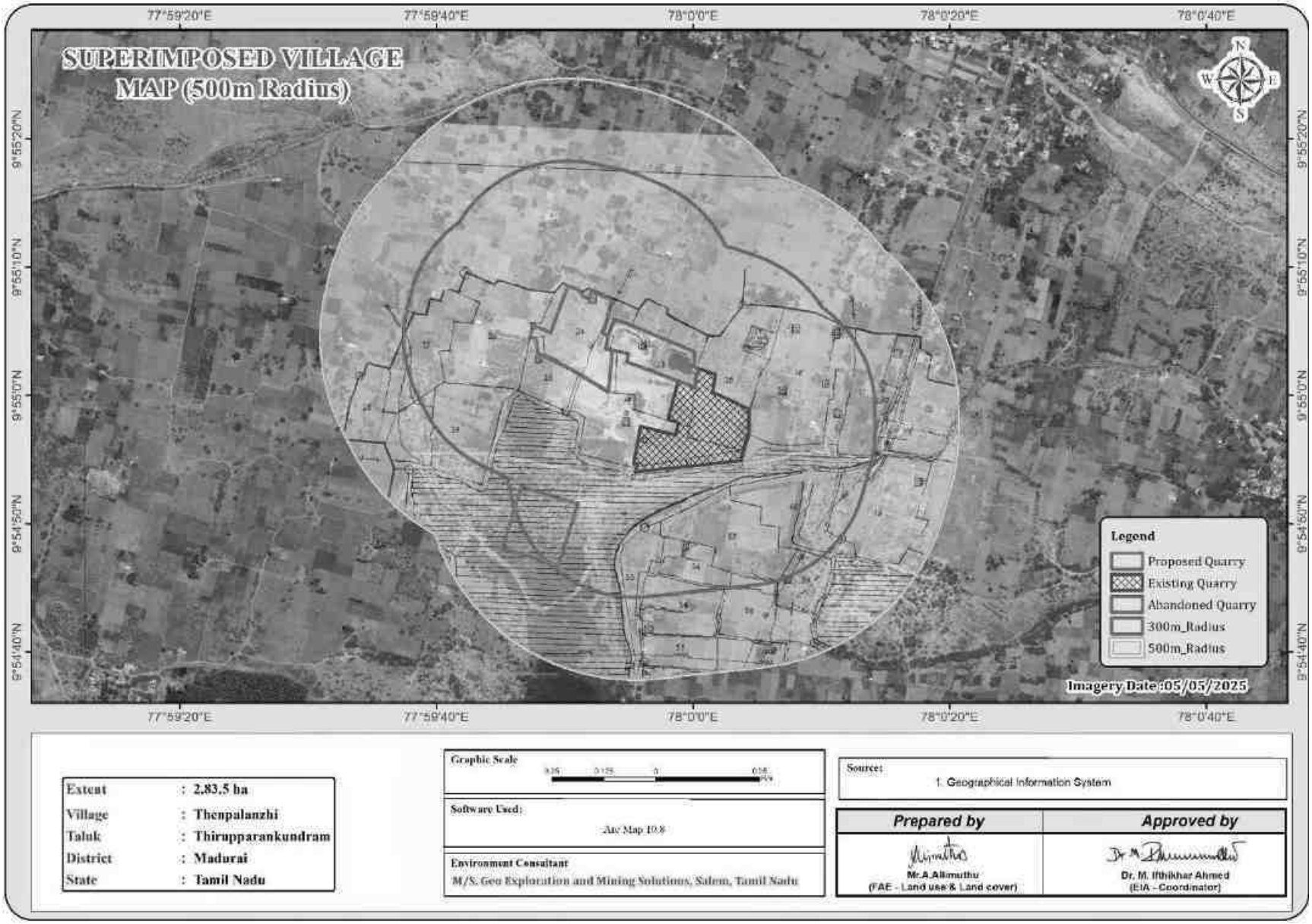


FIGURE 2.5: LOCATION MAP SHOWING 10KM RADIUS AREA AROUND THE PROJECT SITE

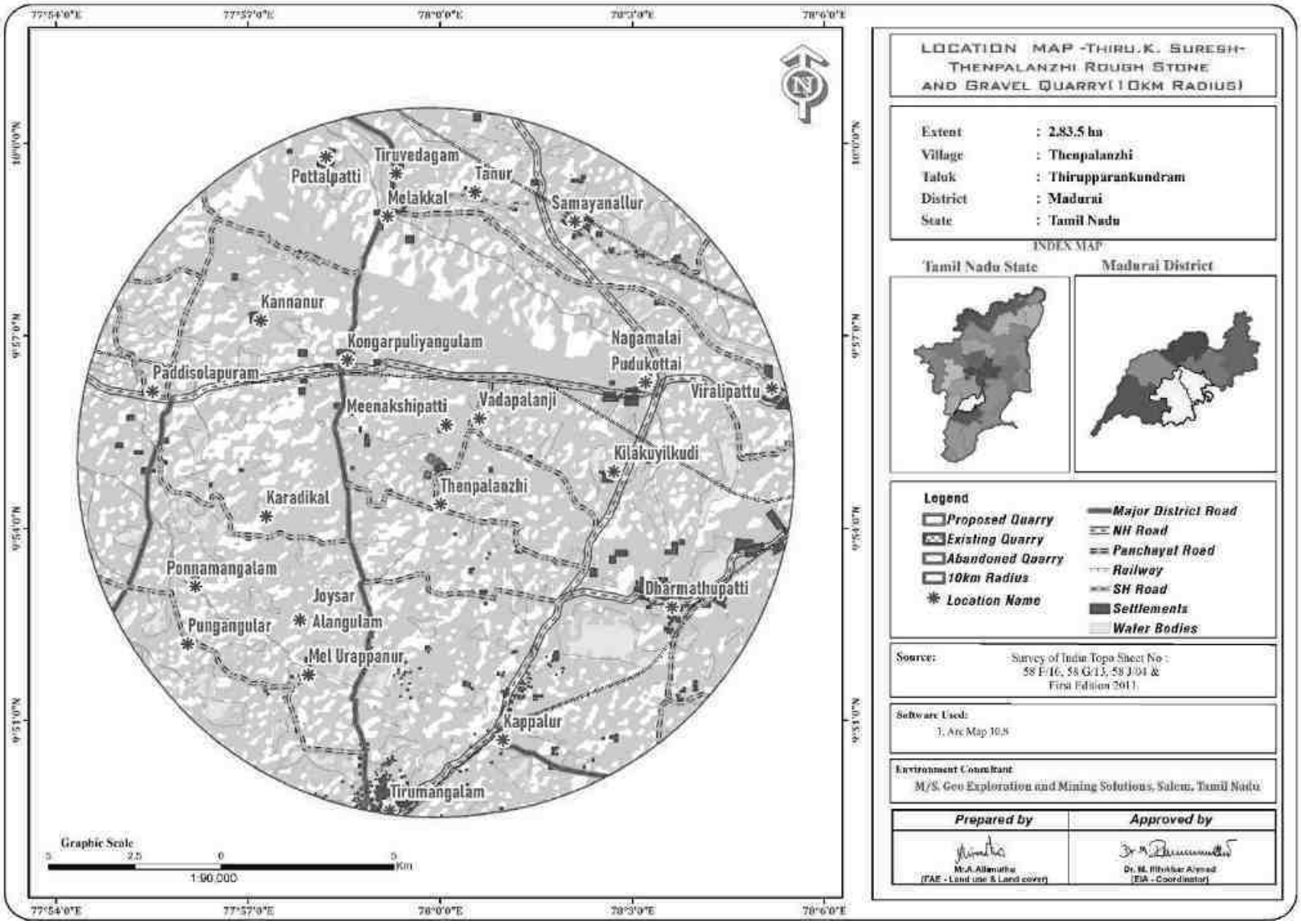


FIGURE 2.6: LOCATION MAP SHOWING 5KM RADIUS AREA AROUND THE PROJECT SITE

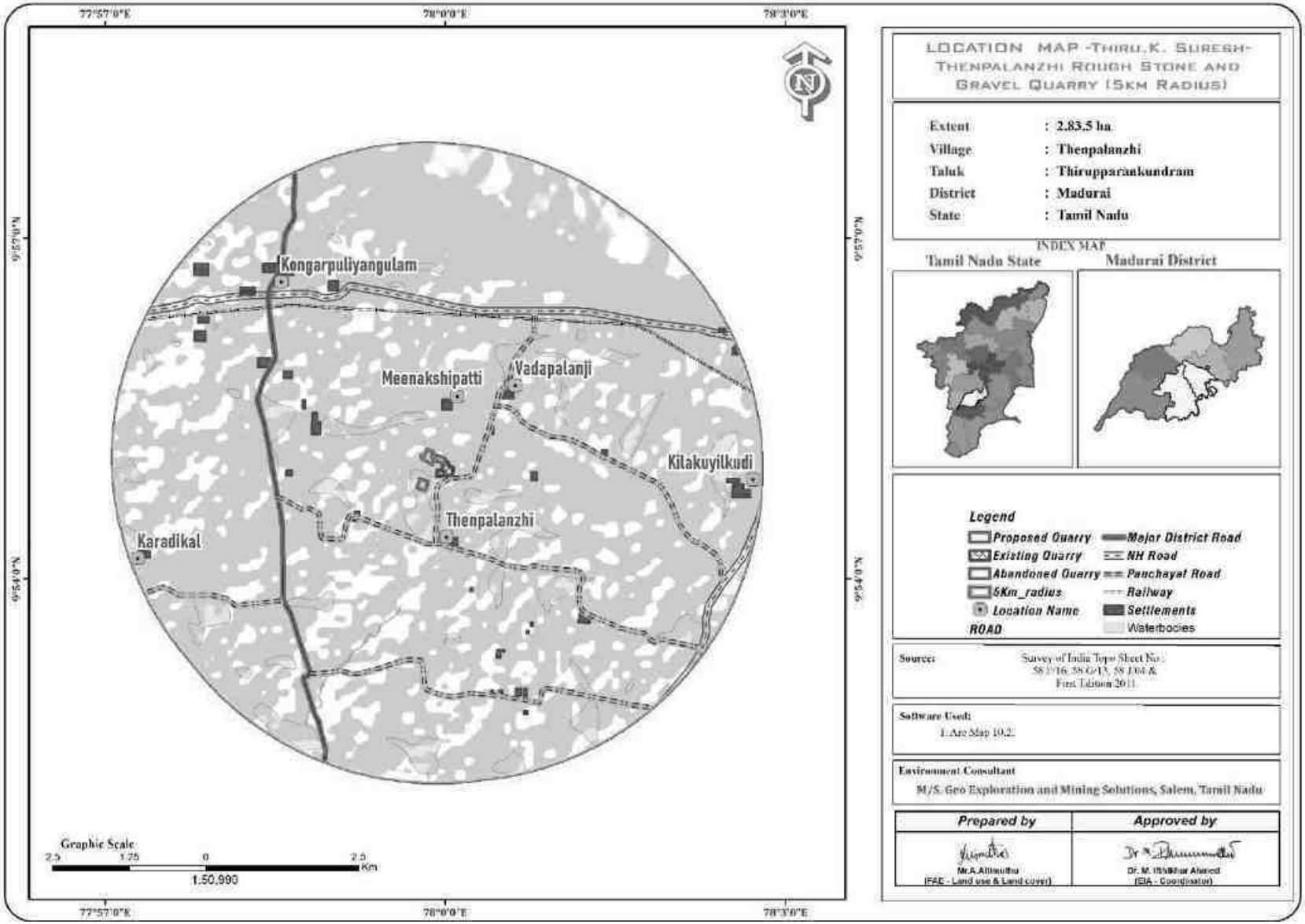
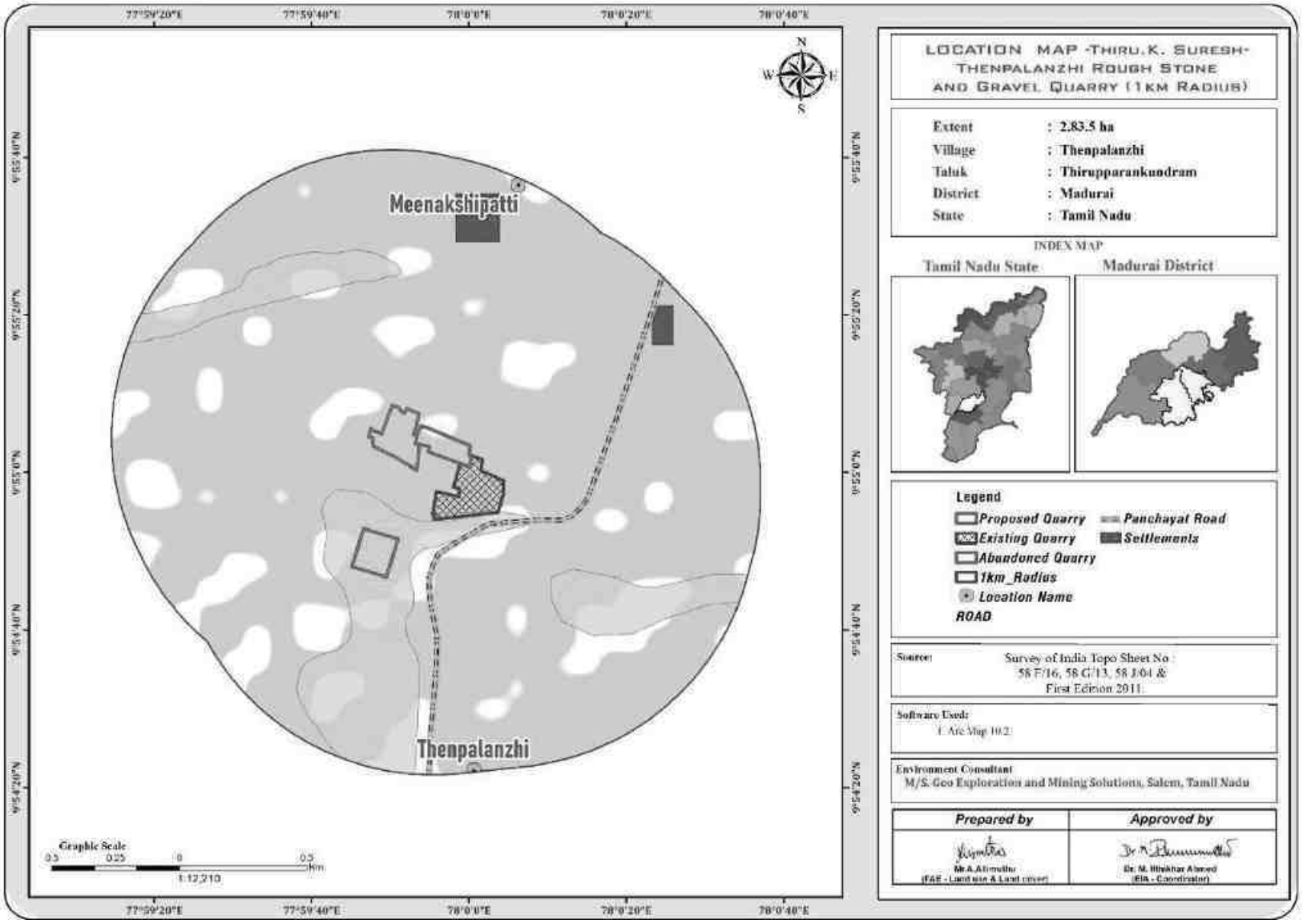


FIGURE 2.7: LOCATION MAP SHOWING 1KM RADIUS AREA AROUND THE PROJECT SITE



2.2.1 Project Area

- The 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 projects and is devoid of major vegetation and trees.

TABLE 2.3: LAND USE PATTERN OF THE PROPOSED PROJECT

DESCRIPTION	PRESENT AREA IN (Ha)	AREA REQUIRED DURING THE FIRST FIVE YEARS (Ha)	AREA AT THE END OF THE LEASE PERIOD (Ha)
Area under quarry	Nil	2.21.4	2.21.4
Infrastructure	Nil	0.02.0	0.02.0
Roads	Nil	0.02.0	0.02.0
Green Belt	Nil	0.32.1	0.58.1
Un – utilized area	2.83.5	0.26.0	Nil
TOTAL	**2.83.5**	**2.83.5**	**2.83.5**

Source: Approved Mining Plan

2.2.2 Size or Magnitude of Operation

TABLE 2.4: OPERATIONAL DETAILS FOR PROPOSED PROJECT

PARTICULARS	DETAILS	
	Rough Stone (10 Year Plan period)	**Gravel (3 Years Plan period)**
Geological Resources in m^3	11,34,000	1,13,400
Mineable Reserves in m^3	3,08,775	91,400
First Five reserves in m^3	2,18,165	91,400
Second Five reserves in m^3	90,610	-
Mining Plan Period	10 Years	
Number of Working Days	300 Days/Year	
Production per day in m^3	**103**	**108**
No of Lorry loads (12 m^3 per load)	**9**	**9**
Total Depth of Mining	44m (4m Gravel + 40m Rough Stone) Below Ground Level	

Source: Approved Mining Plan

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 garnetiferousquartzo-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 pyroxinite/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 conditionsin 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 brakish 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

TABLE 2.6: GROUND WATER LEVEL VARIATIONS OF MADURAI DISTRICT

Jan 2020	May 2020	Jan 2021	May 2021	Jan 2022	May 2022	Jan 2023	May 2023	Jan 2024	May 2024	5 Years Pre-Monsoon Average	5Years Post Monsoon Average
7.03	10.3	4.78	5.35	3.38	4.38	2.57	4.30	3.11	4.75	5.82	4.19

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

FIGURE 2.8: GEOLOGY MAP SHOWING 10KM RADIUS AREA AROUND THE PROJECT SITE

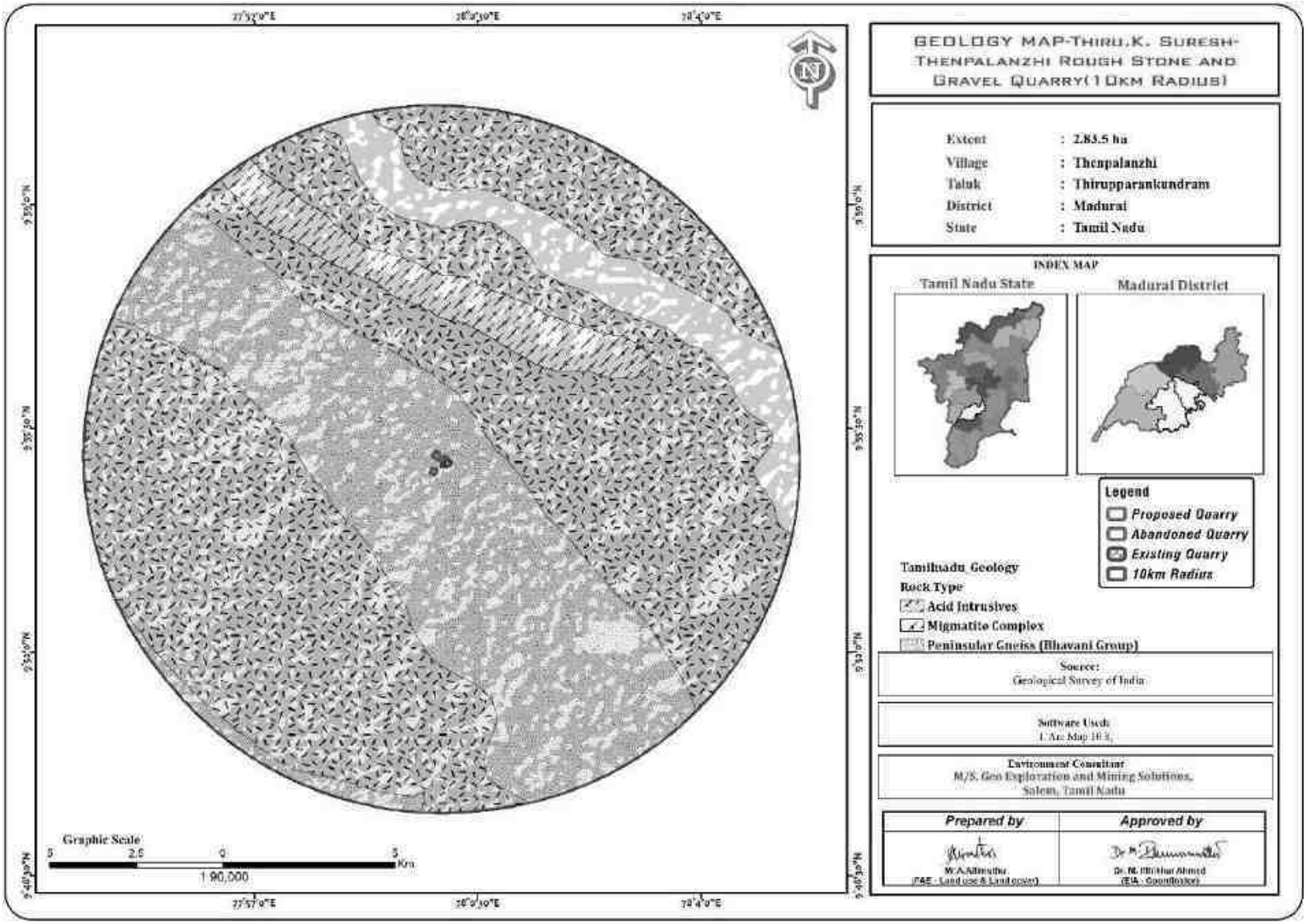


FIGURE 2.9: GEOMORPHOLOGY MAP SHOWING 10KM RADIUS AREA AROUND THE PROJECT SITE

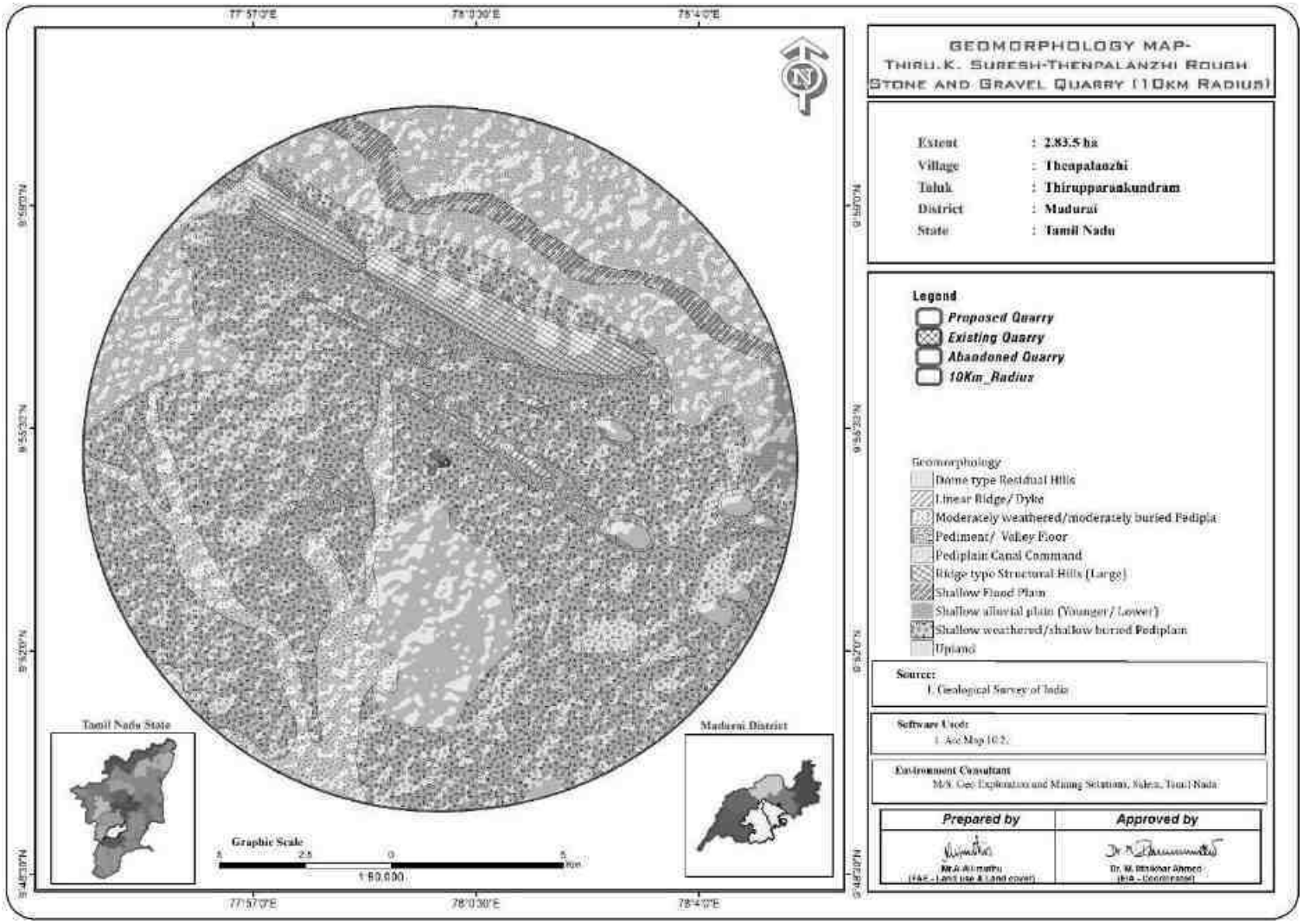


FIGURE 2.10: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS – FOR 1st FIVE YEAR

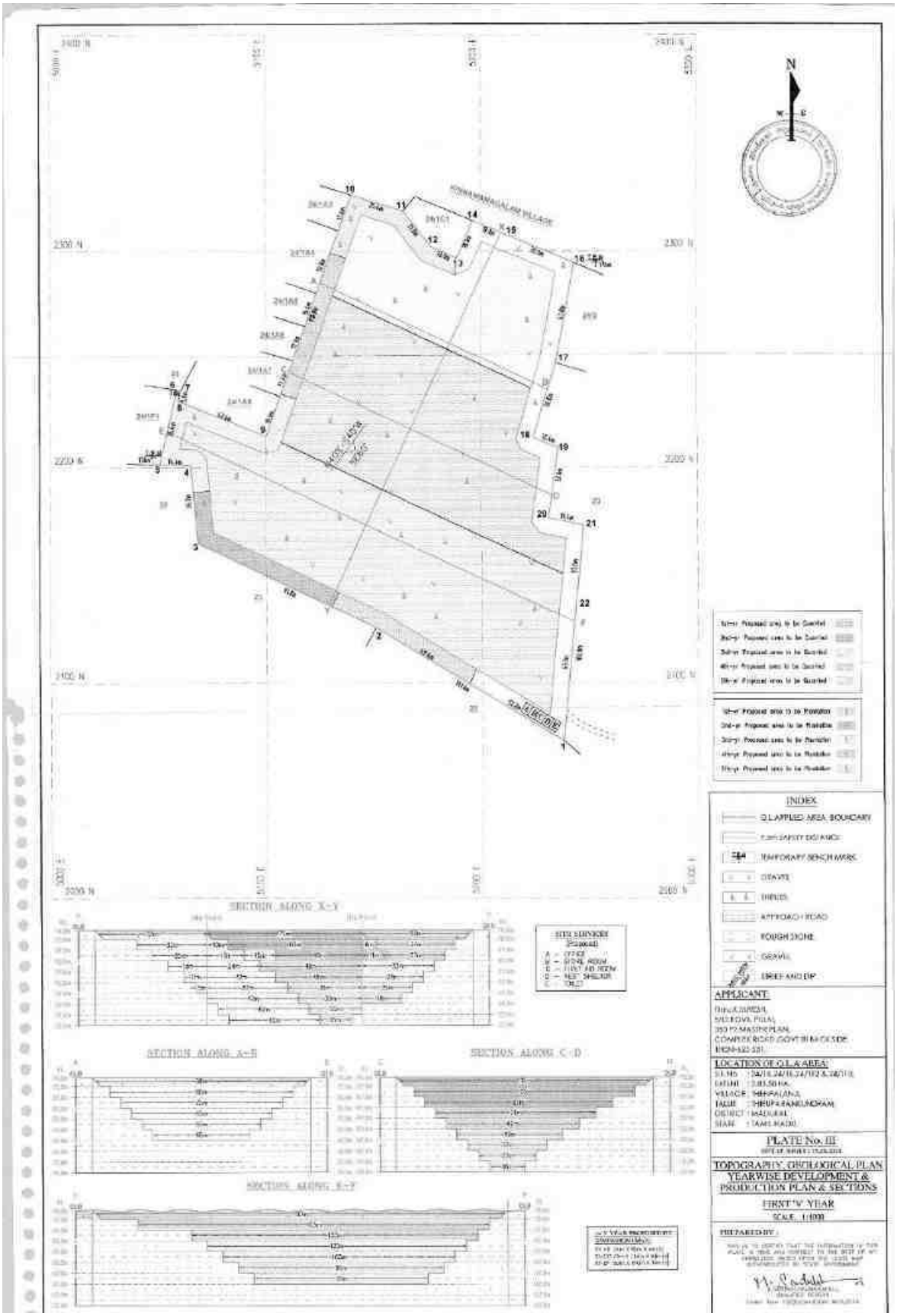


FIGURE 2.10 A: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS – FOR 2nd FIVE YEAR

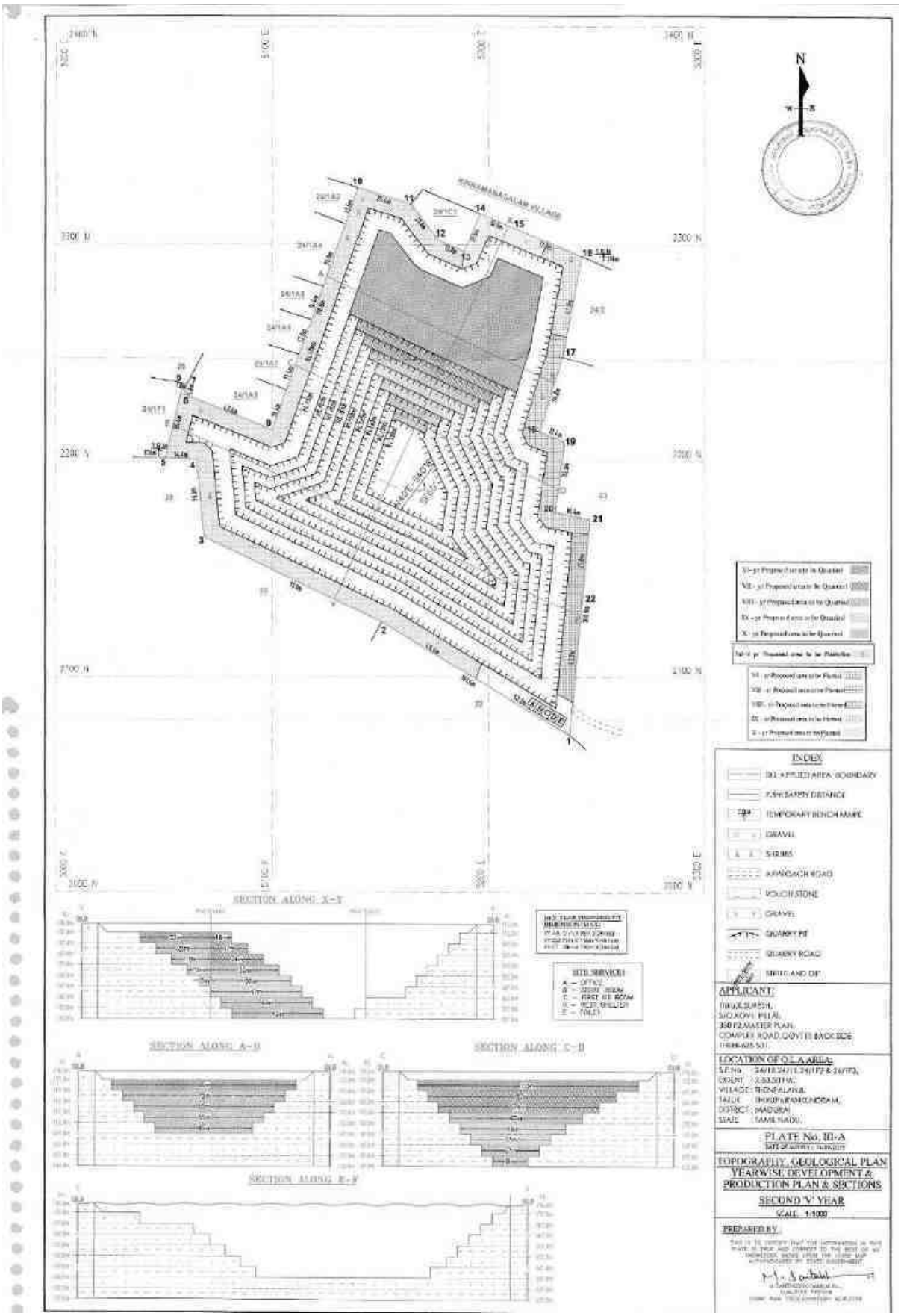
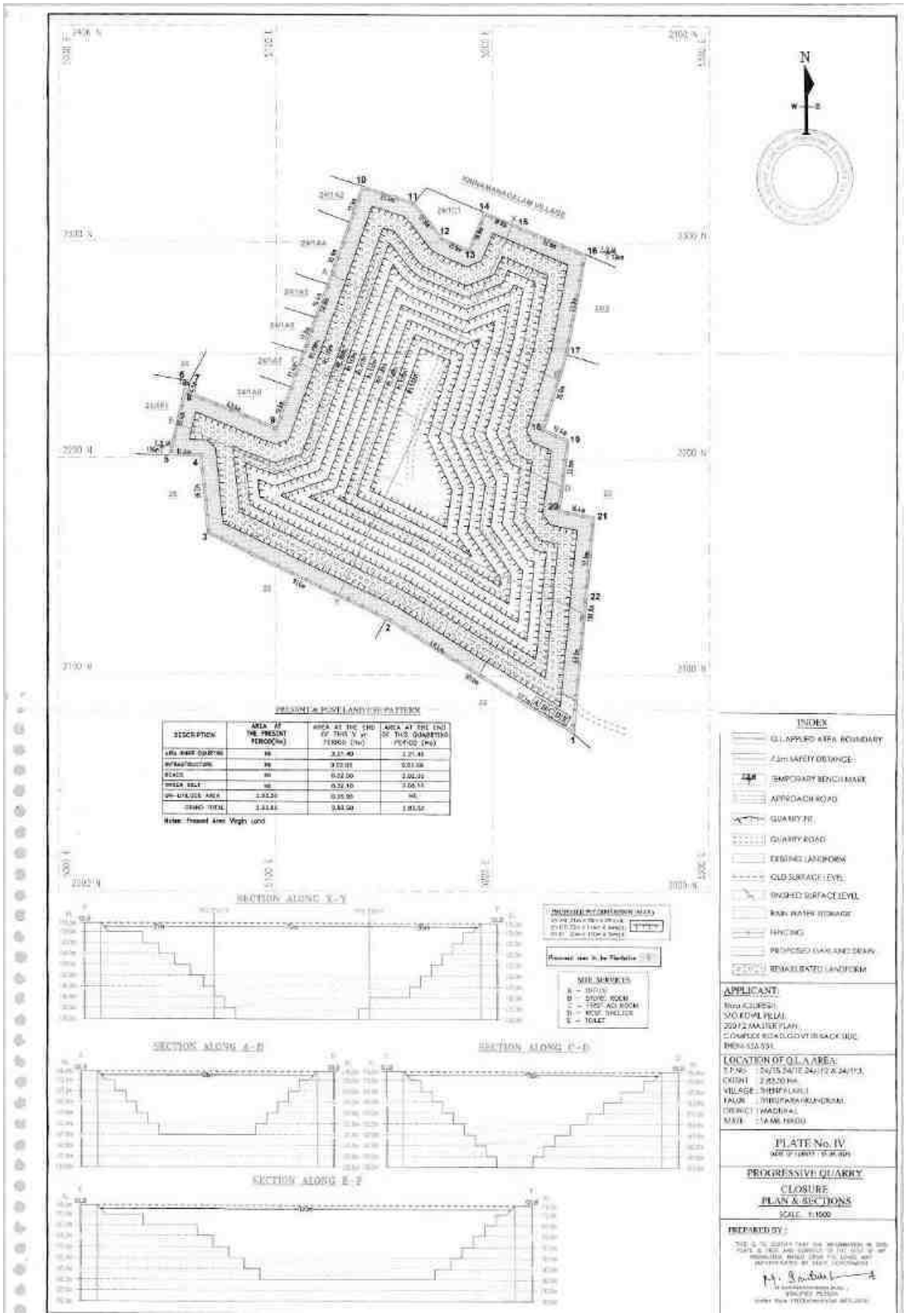


FIGURE 2.11: CLOSURE PLAN AND SECTIONS



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 the proposed project.

Based on the availability of Geological Resources the Mineable Reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m (Safety 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 the proposed project.

TABLE 2.6: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT

	Rough Stone	Gravel (3 years)
Geological Resource in m^3	11,34,000	1,13,400
Mineable Resource in m^3	3,08,775	91,400
Proposed production of Rough stone for 10 years in m^3	3,08,775	91,400

Source: Approved Mining Plan

TABLE 2.7A: FIRST FIVE YEAR-WISE PRODUCTION PLAN

Year	Rough Stone in m^3	Gravel in m^3
1st	48,110	38,000
2nd	61,535	33,408
3rd	41,445	19,992
4th	30,160	-
5th	36,915	-
Total	**2,18,165**	**91,400**

Source: Approved Mining Plan

TABLE 2.7 B: NEXT FIVE YEAR-WISE PRODUCTION PLAN

Year	Rough Stone in m^3	Gravel in m^3
6th	19,175	-
7th	16,275	-
8th	25,145	-
9th	16,835	-
10th	13,180	-
Total	**90,610**	-

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

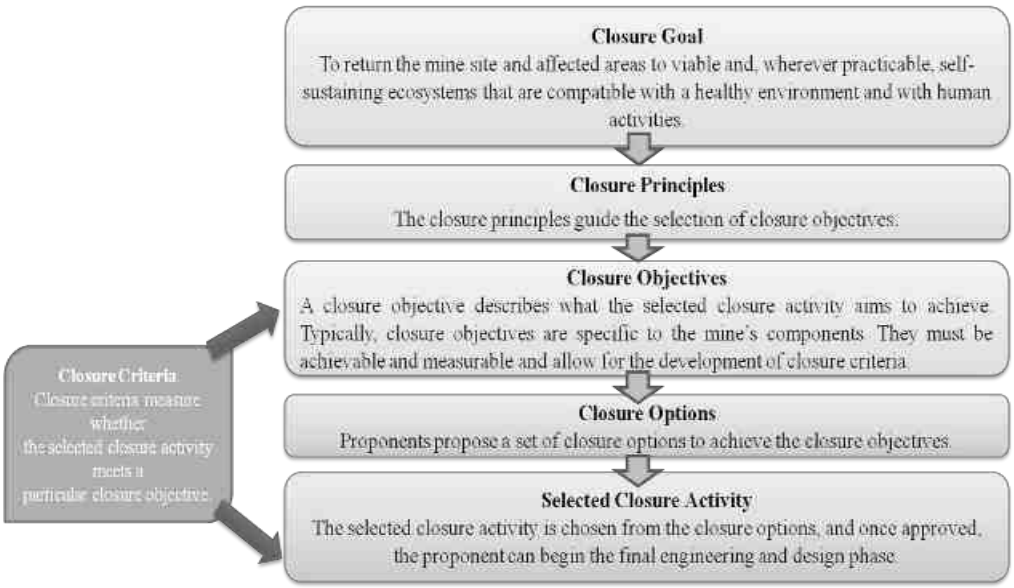
The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.

TABLE 2.8: ULTIMATE PIT DIMENSION

SECTION	Length (Max) (m)	Width (Max) (m)	Depth (Max)
XY-AB	51	98	29m bgl
XY-CD	72	116	44m bgl
XY-EF	50	190	34m 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.



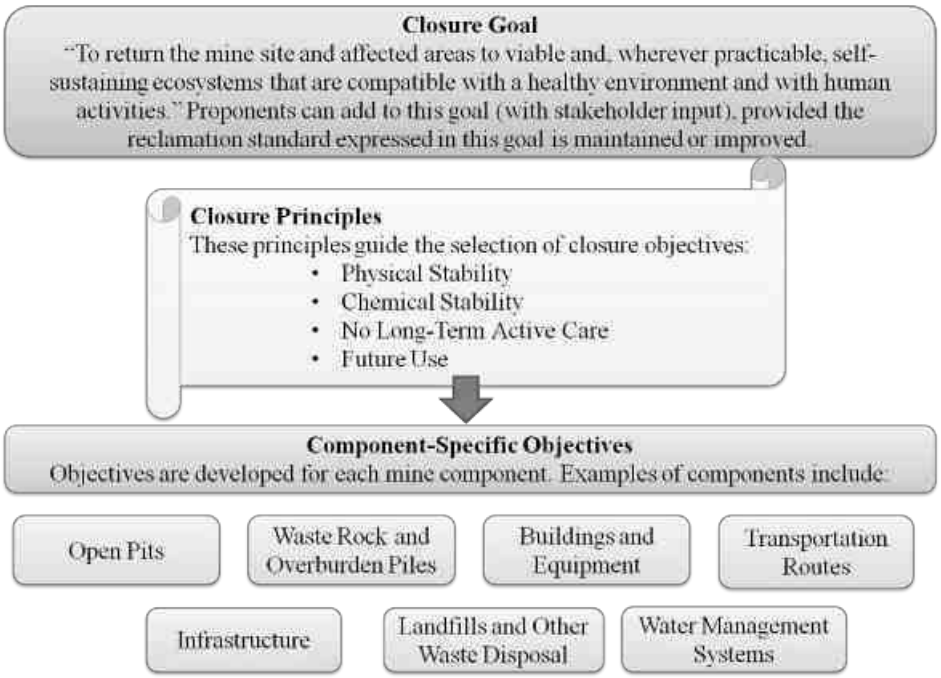
Closure Objectives –

- 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
- 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	YEARS										RATE	COST (Rs./-)
	I	II	III	IV	V	VI	VII	VIII	IX	X		
Plantation under safety zone	1420	-	-	-	-	-	-	-	-	-	@200 Rs Per sapling	2,84,000
Plantation in quarried out benches and approach road		-	-	-	-	-	-	-	-	-		
Barbed Wire Fencing (In Mtrs) 800 Mtrs	2,40,000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	2,40,000
Garland drain (In Mtrs) 750 Mtrs	2,25,000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	2,25,000
											TOTAL	**7,49,000/-**

2.5 METHOD OF MINING

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

Diameter of hole – 32 mm 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
Dia of hole	–	30-32 mm

Details of blasting design and parameters are discussed in approved mining plan.

Volume of Rough Stone will be excavated from one hole	=	3 Tonnes
Total Volume from proposed quarry	=	**3,08,775** m^3
	=	**3,08,775** /10
	=	**308778**/300
	=	103* 2.6
	=	268 Tonnes per day
Therefore, Number of Holes per day	=	268/3

= 89 Holes per day

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	Hand Jack hammers	8	1.2m to 2.0m	Compressed air
2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	2	300 HP	Diesel Drive
4	Tippers / Dumpers	3	20 Tonnes	Diesel Drive

2.6 GENERAL FEATURES

2.6.1 Existing Infrastructures

Infrastructures like Mine office, Temporary Rest shelters for workers, Latrine and Urinal Facilities already provided in the project area the same will be maintained in good condition.

2.6.2 Drainage Pattern

Drainage pattern are created by stream erosion over time that reveals characteristics of the kind of rocks and geological structures in a landscape region drained by streams. 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.

Dendritic patterns, which are by far the most common, develop in areas where the rock (or unconsolidated material) beneath the stream has no particular fabric or structure and can be eroded equally easily in all directions.

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

Traffic density measurements were performed at two locations

1. Vadapalanji Panchayat Road– Panchayat Road
2. Thenpalanzhi-Mavilipatti Panchayat Road

Traffic density measurement was 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	Vadapalanji Panchayat Road	1.3km NE	Panchayat Road
TS2	Thenpalanzhi-Mavilipatti Panchayat Road	1.2km South	Panchayat Road

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	100	300	100	100	200	100	500
TS2	150	450	100	100	250	125	675

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

*PCU=∑(Number of vehicles× PCU factor)

TABLE 2.13: ROUGH STONE & GRAVEL HOURLY TRANSPORTATION REQUIREMENT

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
20 tonnes	10	30

Source: Data analysed from Approved Mining Plan

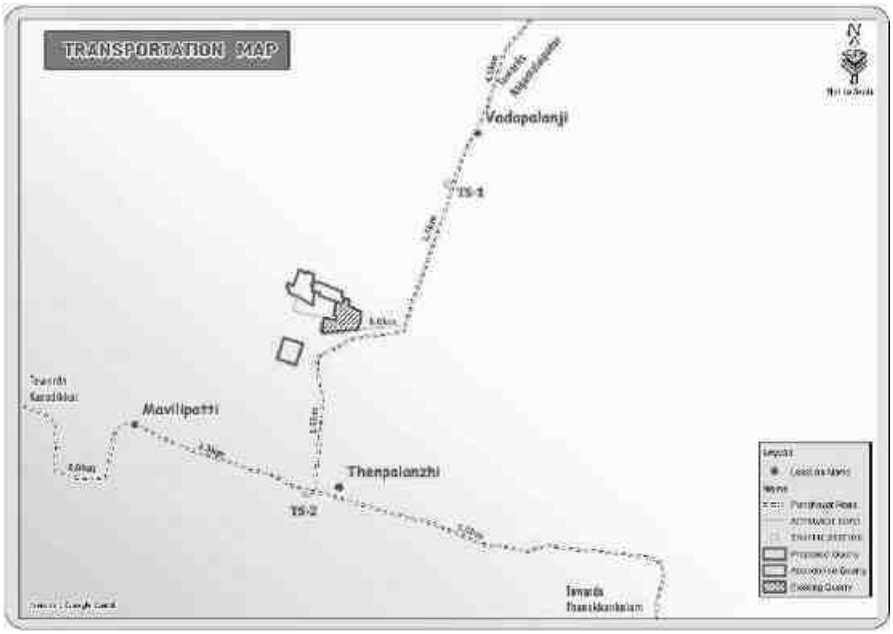
TABLE 2.14: SUMMARY OF TRAFFIC VOLUME

Route	Existing Traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960guidelines
Vadapalanji Panchayat Road	500	30	530	1500
Thenpalanzhi-Mavilipatti Panchayat Road	675	30	705	1200

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.

FIGURE.2.12: MINERAL TRANSPORTATION ROUTE MAP



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

*Purpose	Quantity	Source
Dust Suppression	1.5 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Green Belt development	1.0 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Domestic purpose & Drinking	0.5 KLD	Water Tankers
Total	**3.0 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 quarrying machineries. Diesel will be brought from nearby Fuel Stations.

Gravel:

Per hour Excavator will consume	=	10 liters / hour
Per hour Excavator will excavate	=	60m^{3}of Gravel
Gravel quantity	=	91400/60 = 1523hours
Diesel consume	=	1523 hours x 10 liters
Total diesel consumption	=	**15,230** Liters of HSD will be utilized for Gravel

Rough stone:

Per hour Excavator will consume	=	16 liters / hour
Per hour Excavator will excavate	=	20m^{3}of Rough stone
Rough stone quantity	=	3,08,775/20 = 15,439 hours
Diesel consume	=	15,439 hours x 16 liters
Total diesel consumption	=	**2,47,024** Liters of HSD will be utilized for Rough Stone
Total diesel consumption	=	**2,62,254** Liters of HSD will be utilized for this Mining plan Period

2.7.4 Project Cost

TABLE 2.16: PROJECT COST OF PROPOSED PROJECT

Project Cost	Rs.3,79,93,000/-

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 the proposed project.

TABLE 2.17: PROPOSED MANPOWER DEPLOYMENT

S.No	Employment	No. of persons
1	Mines Manager	1
2	Geologist	1
3	Mine Foreman	1
4	Blaster/ Mate	1
5	Excavator Operator	2
6	Tipper driver	3
7	Water Sprinkler driver	1
8	Jack hammer operator	16
9	Security	1
10	Labour & Helper	2
11	Cleaner & Co-operator	6
	Total	**35**

Source: Approved Mining Plans of respective Project

2.9 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the Environmental Clearance will be compiled before the start of mining operation.

TABLE 2.18: EXPECTED TIME SCHEDULE

Sl.No.	Particulars	Time Schedule (In Month)					Remarks if any
		1st	2nd	3rd	4th	5th	
1	Environmental Clearance						
2	Consent to Operate						Production Start Period
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 October to December 2023 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 Chennai Mettex Lab Private Limited, Salem – 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 Post monsoon season i.e., October to December 2025.

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 were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM_{10} and SO_2, 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/Automatic 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 (October-December 2025)	7 (2 core & 5 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (2 core & 5 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by Chennai Mettex Lab 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

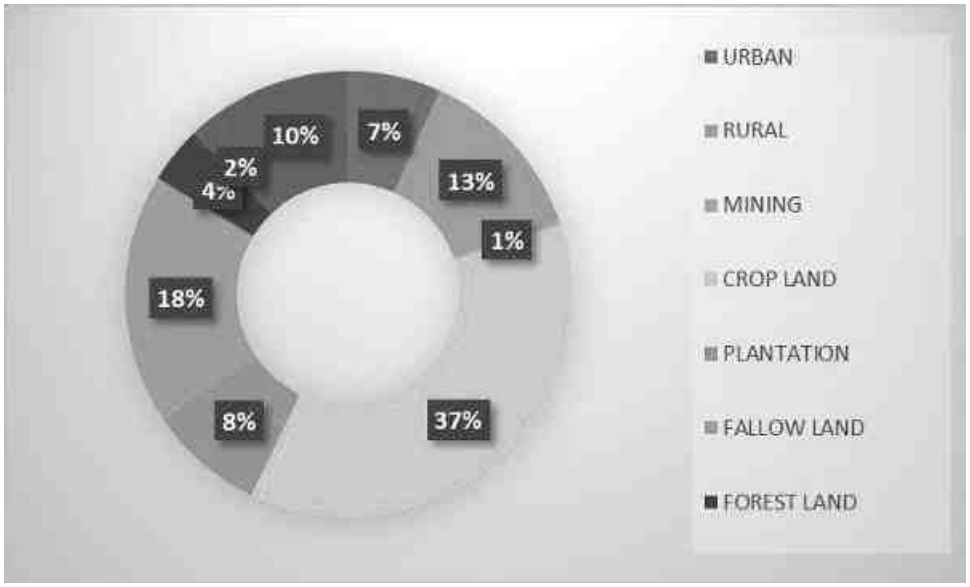
A visual interpretation technique has been adopted for land use classification based on the keys suggested in the chapter – V of the guidelines issued by NNRMS Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through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

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

		10km Radius		2km Radius	
S.No	**CLASSIFICATION**	**AREA_HA**	**AREA_%**	**AREA_HA**	**AREA_%**
	BUILTUP				
1	URBAN	2245.442	6.71	0.00	0.00
2	RURAL	4279.39	12.79	195.16	13.89
3	MINING	148.7358	0.44	17.02	1.21
	AGRICULTURAL LAND				
4	CROP LAND	12461.15	37.24	529.33	37.66
5	PLANTATION	2799.47	8.37	30.20	2.15
6	FALLOW LAND	6079.07	18.17	509.64	36.26
	FOREST				
7	FOREST LAND	1374.83	4.11	0.00	0.00
	BARREN/WASTE LANDS				
8	SCRUB LAND	653.91	1.95	30.62	2.18
	WETLANDS/ WATER BODIES				
9	WATER BODIES/LAKE/ RIVER	3423.25	10.23	93.54	6.66
TOTAL		33465.24	100.00	1405.51	100.00

Source: Survey of India Toposheet and Landsat Satellite Imagery

FIGURE 3.1: PIE DIAGRAM OF LAND USE AND LAND COVER



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 and fallow land (includes crop land) 63.78% followed by Built-up Lands – 19.94%, Scrub land – 1.95%, and Water bodies 10.23%.

The total mining area within the study area is 148.73 ha i.e., 1.88%. The cluster area of 6.98.39ha contributes about 4.69% 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 is almost plain terrain having gentle slope towards north eastern side of the area is existing Rough Stone quarry. The Western side of the area is side casted up to the maximum 0.5m 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 II, 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.

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.

FIGURE 3.2: PHYSIOGRAPHIC MAP 10KM RADIUS

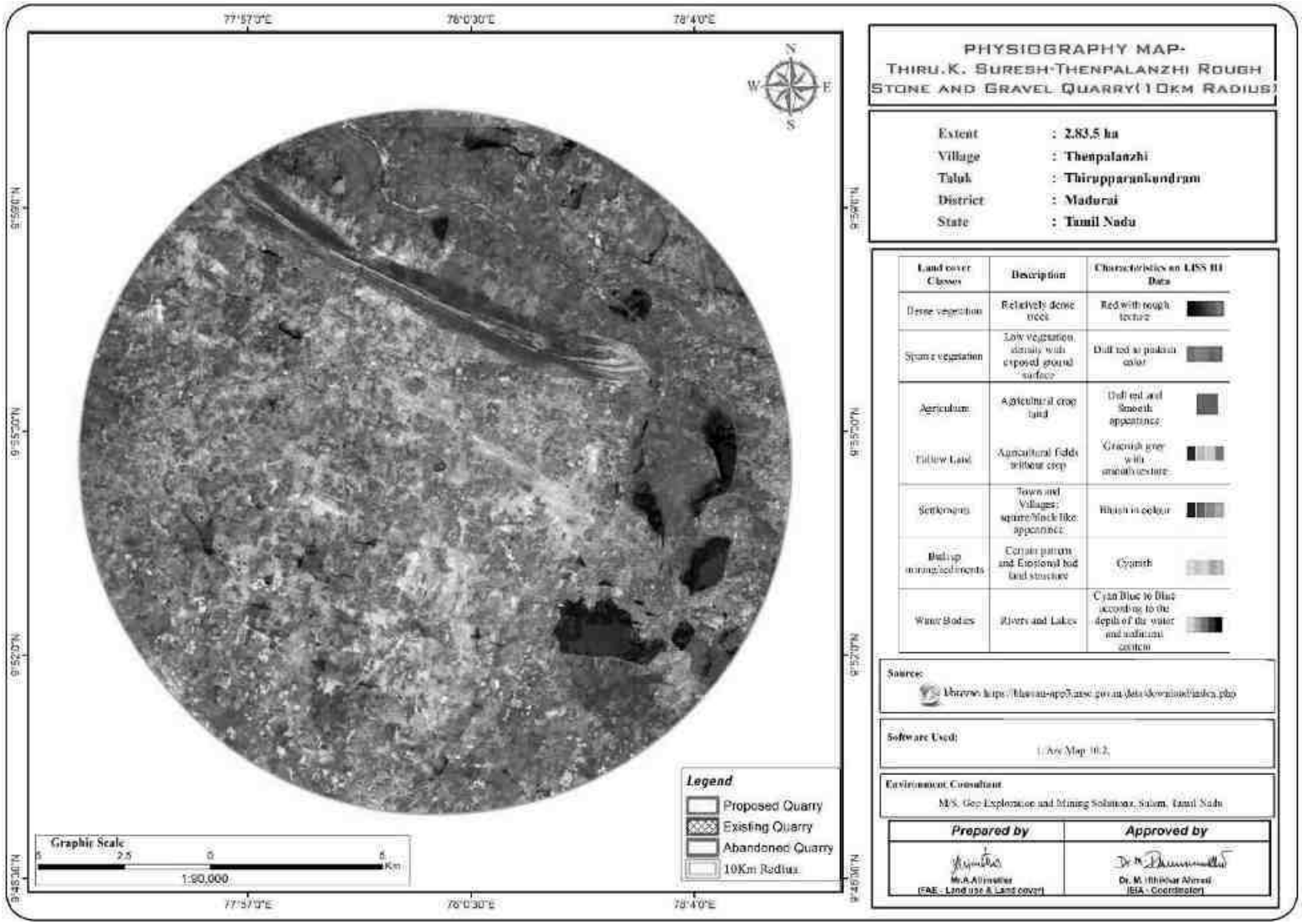
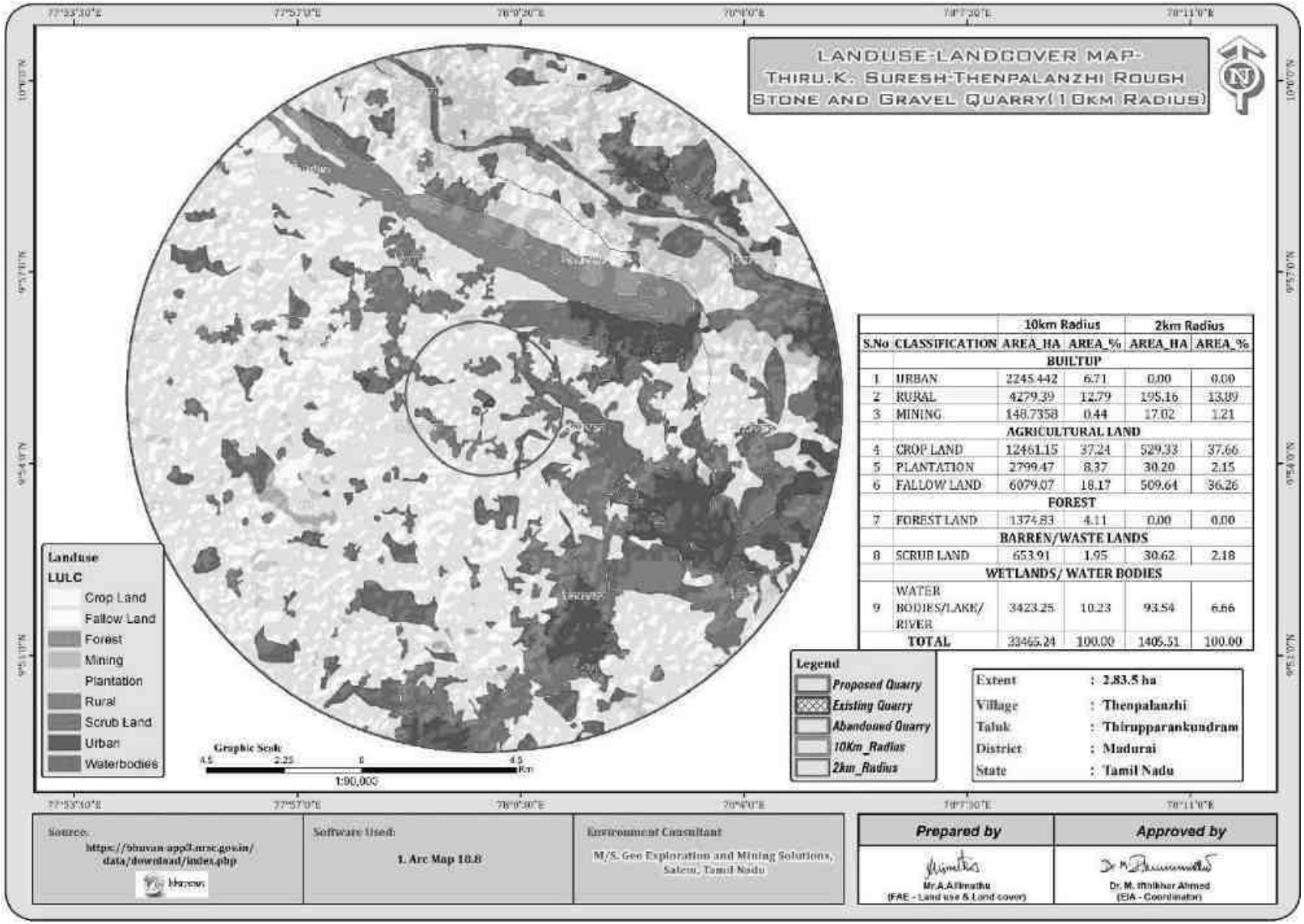


FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS



		10km Radius		2km Radius	
S.No	CLASSIFICATION	AREA_HA	AREA_%	AREA_HA	AREA_%
	BUILTUP				
1	URBAN	2245.442	6.71	0.00	0.00
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	AGRICULTURAL LAND				
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9	WATER BODIES/LAKE/ RIVER	3423.25	10.23	93.54	6.66
	TOTAL	33465.24	100.00	1405.51	100.00

TABLE 3.3: DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE CLUSTER

S.No	Sensitive Ecological Features	Name	Arial Distance in km from Cluster
1	National Park / Wild life Sanctuaries	None	Nil within 10km Radius
2	Reserve Forest	Kodimangalam B Block R.F	3.4km – NE
3	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	Srivilliputhur Megamalai Tiger Reserve	28.1km – SW
4	Critically Polluted Areas	Coimbatore - SIDCO Industrial Estate	Around 30 km- South West
5	Mangroves	None	Nil within 10km Radius
6	Mountains/Hills	None	Nil within 10km Radius
7	Notified Archaeological Sites	None	Nil within 10km Radius
8	Industries/ Thermal Power Plants	None	Nil within 10km Radius
9	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	Thenpalanzhi Periya Kanmoi	110m South
2	Odai	250m SW
3	Koothiyarkundu Kanmai	5.7km- SE
4	Vaigai Raiver	6.6km NE

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 3.5.

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	9°55'5.54"N 77°59'51.23"E
2	S-2	Meenakshipatti (Residential)	910m NE	9°55'33.85"N 78° 0'5.37"E
3	S-3	Thenpalanzhi (Residential)	1.3km South	9°54'18.79"N 77°59'54.42"E
4	S-4	Kannanur (Agriculture)	6.2km NW	9°57'4.95"N 77°57'6.29"E
5	S-5	Kilakuyilkudi (Residential)	4.8km SE	9°54'41.27"N 78° 2'31.33"E

6	S-6	Karadikal (Agriculture)	4.5km SW	9°54'8.17"N 77°57'24.29"E

Source: On-site monitoring/sampling by Chennai Mettex 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 Chennai Mettex Lab 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 are presented below in Figure 3.4 and the physico-chemical characteristics of the soil & Test Results in Table 3.7.

FIGURE 3.5: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS

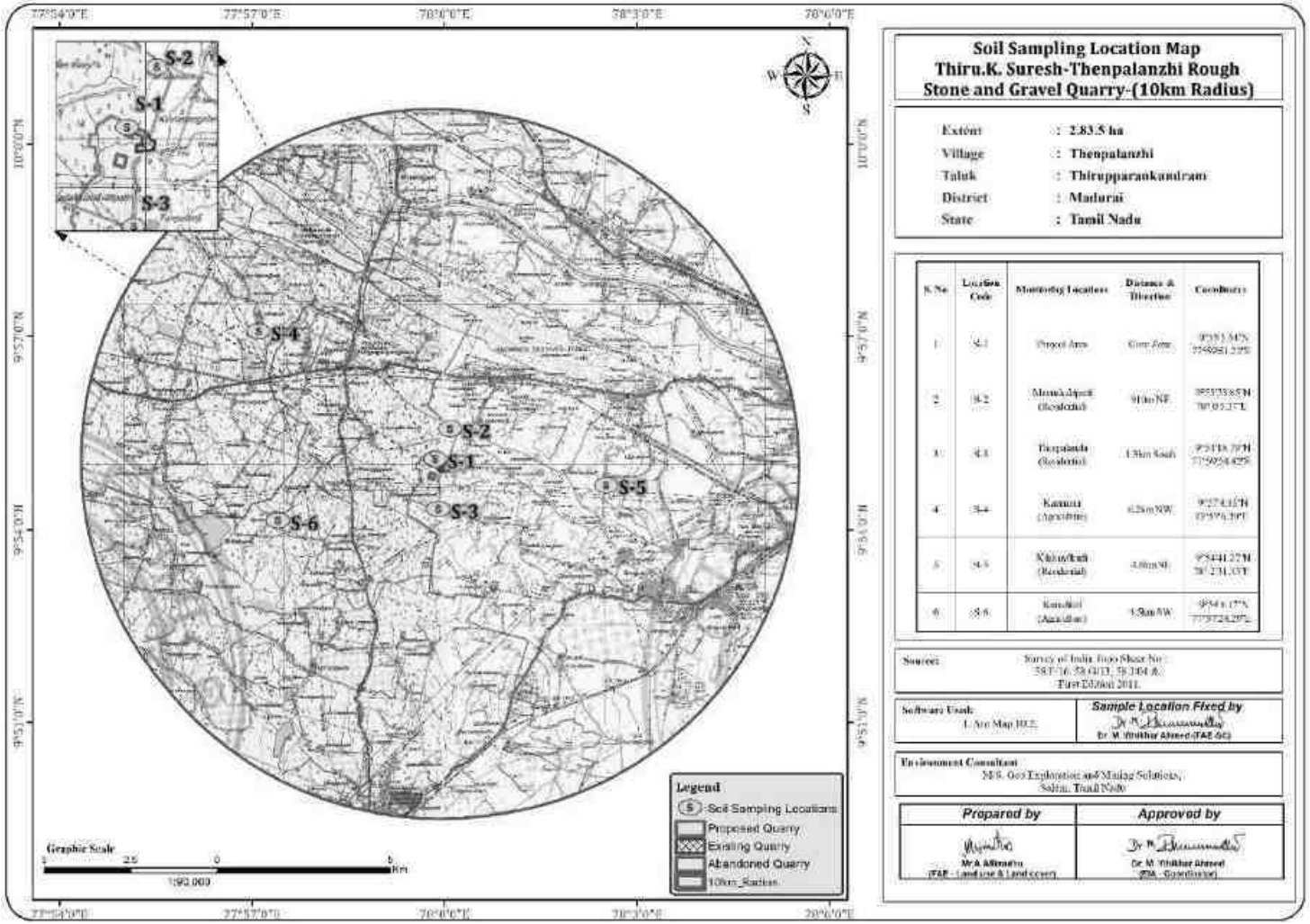


FIGURE 3.6: SOIL MAP

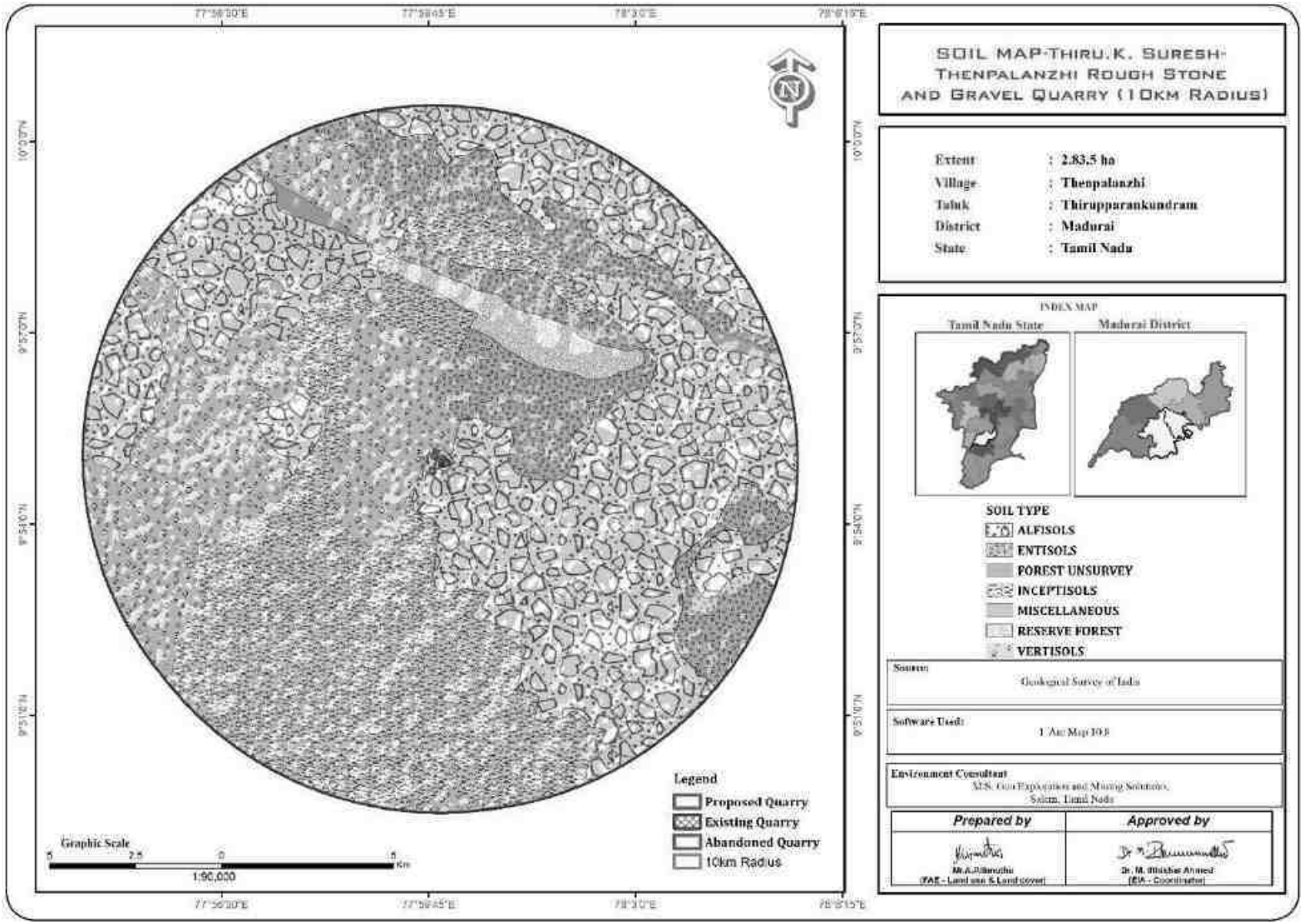


TABLE 3.7: SOIL QUALITY OF THE STUDY AREA

Parameter		S-1 (Project Area)	S-2 (Meenakshipatti)	S-3 (Thenpalanzhi)	S-4 (Kannanur)	S-5 (Kilakuyilkudi)	S-6 (Karadikal)
1	pH @ 25°C	7.01	7.8	6.69	6.38	5.93	6.42
2	Conductivity @ 25°C	266 µmhos/cm	215 µmhos/cm	159 µmhos/cm	381.0 µmhos/cm	297 µmhos/cm	289 µmhos/cm
3	Texture						
	Clay	27.7 %	29.3 %	28.8 %	29.0 %	31.2 %	31.0 %
	Sand	37.1 %	36.8 %	38.5 %	37.2 %	35.9%	35.9 %
	Silt	35.2 %	32.9 %	32.7 %	33.8 %	32.9%	33.1 %
4	Water Holding Capacity	43.3 %	46.1%	46.4 %	49.8 %	44.6 %	41.9 %
5	Bulk Density	1.01 g/cm3	1.02 g/cm3	0.98 g/cm3	1.21 g/cm3	1.12 g/cm3	1.03 g/cm3
6	Porosity	39.1 %	49.7 %	36.7 %	43.3 %	46.2 %	39.8 %
7	Calcium as Ca	58.8 mg/kg	50.7 mg/kg	56.6 mg/kg	65.6 mg/kg	59.2 mg/kg	62.6 mg/kg
8	Magnesium as Mg	26.6 mg/kg	28.9 mg/kg	24.8 mg/kg	33.6 mg/kg	27.5 mg/kg	3.8 mg/kg
9	Manganese as Mn	29.3 mg/kg	24.3 mg/kg	20.6 mg/kg	28.7 mg/kg	26.8 mg/kg	27.9 mg/kg
10	Zinc as Zn	1.27 mg/kg	3.61 mg/kg	3.45 mg/kg	4.78 mg/kg	2.16 mg/kg	3.24 mg/kg
11	Boron as B	1.08 mg/kg	1.62 mg/kg	1.07 mg/kg	2.12 mg/kg	1.04/kg	1.34 mg/kg
12	Chloride as Cl	168 mg/kg	94.0 mg/kg	76.8 mg/kg	151.8 mg/kg	116 mg/kg	82.8 mg/kg
13	Total Soluble Sulphate as SO_4	0.025 %	0.018 %	0.022 %	0.024 %	0.017 %	0.016 %
14	Potassium as K	21.1 mg/kg	28.8 mg/kg	19.7 mg/kg	32.3 mg/kg	27.7 mg/kg	22.7 mg/kg
15	Total Phosphorus as P	1.30 mg/kg	2.92 mg/kg	4.13 mg/kg	4.24 mg/kg	2.41 mg/kg	2.09 mg/kg
16	Total Nitrogen as N	212 mg/kg	369 mg/kg	352 mg/kg	476.5 mg/kg	242.8 mg/kg	295.7 mg/kg
17	Cadmium as Cd	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	1.05 mg/kg	1.32 mg/kg	1.23 mg/kg	1.47 mg/kg	0.97 mg/kg	1.03 mg/kg
21	Iron as Fe	7.63 mg/kg	8.18 mg/kg	8.98 mg/kg	9.21 mg/kg	8.03 mg/kg	9.98 mg/kg
22	Organic Matter	2.18 %	2.25 %	2.01 %	3.46 %	2.17 %	2.12 %
23	Organic Carbon	1.27 %	1.31 %	1.17 %	2.01 %	1.26 %	1.23 %
24	Cation Exchange Capacity	25.9 meq/100g of soil	24.8 meq/100g of soil	28.9 meq/100g of soil	40.9 meq/100g of soil	22.1 meq/100g of soil	31.7 meq/100g of soil

Source: Sampling Results by Chennai Mettex Lab Private Limited.

FIGURE 3.7: SOIL SAMPLE COLLECTION

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 (27.7 % 31.2%) to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 0.98– 1.21 g/cm^3. The Water Holding Capacity is found to be medium i.e., ranging from 41.9 – 49.8 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 5.93 to 7.8
- The available Nitrogen content range between 212 to 476.5 mg/kg
- The available Phosphorus content range between 1.3to 4.24 mg/kg
- The available Potassium range between 19.7 mg/kg to 32.3 mg/kg

Observation:

The pH of the Soil indicates that the soil is Neutral and arid region and ideal for plant growth.

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:

Vagai 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., 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 7.2 to 13 m 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 3.8 and shown as Figure 3.5.

TABLE 3.8: WATER SAMPLING LOCATIONS

S.NO	CODE	LOCATIONS	DISTANCE & DIRECTION	CO-ORDINATES
SURFACE WATER				
1	SW-1	Thenpalanzhi Lake	970m South	9°54'28.75"N 77°59'53.27"E
2	SW-2	Pullanari Kanmaai	5.7km NW	9°56'20.69"N 77°56'54.04"E
GROUND WATER				
3	OW-1	Near Project Area	80m NE	9°55'9.44"N 77°59'55.43"E
4	OW-2	Karadikal (Residential)	5km SW	9°54'8.14"N 77°57'15.64"E
5	BW-1	Near Project Area	180m NW	9°55'14.16"N 77°59'49.03"E
6	BW-2	Kilakuyilkudi	4.8km SE	9°54'40.00"N 78° 2'31.44"E

Source: On-site monitoring/sampling by Chennai Mettex Lab Private Limited in association with GEMS

FIGURE 3.8: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS

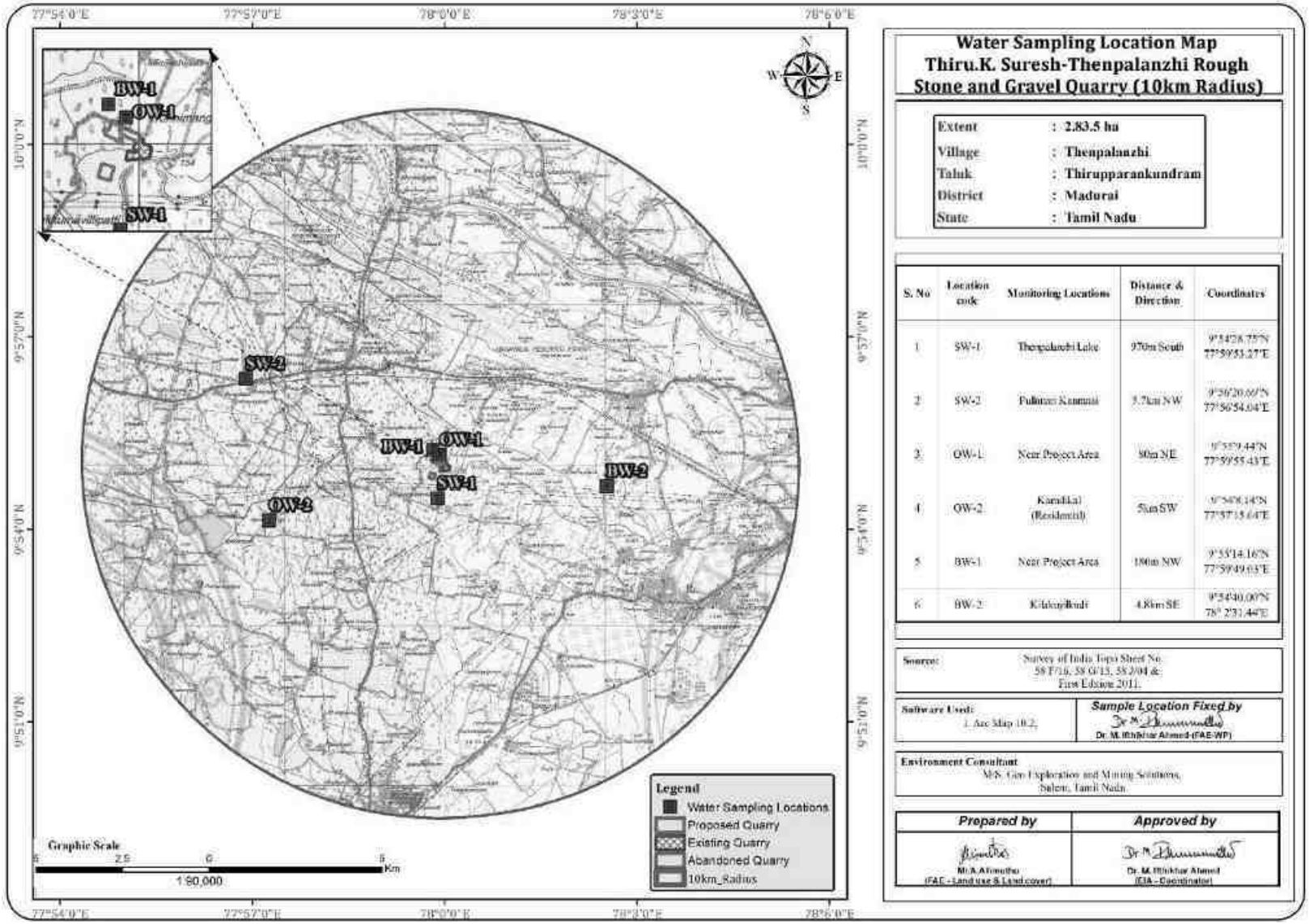


TABLE 3.9: GROUND WATER SAMPLING RESULTS

S.NO	Parameter	OW-1 (Near Project Area)	OW-2 (Karadikal)	BW-1 (Near Project Area)	BW-2 (Kilakuyilkudi)
1	Color	5	5 Hazen	5 Hazen	5 Hazen
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH@ 25ºC	7.75	7.62	7.23	7.20
4	Electrical Conductivity @ 25ºC	1187.0 µmhos/cm	1093.0 µmhos/cm	890.0 µmhos/cm	897.0 µmhos/cm
5	Turbidity	1 NTU	2 NTU	1 NTU	1 NTU
6	Total Dissolved Solids	688.0 mg/l	634.0 mg/l	516.0 mg/l	520.0 mg/l
7	Total Hardness as $CaCO_3$	188.0 mg/l	172.0 mg/l	148.0 mg/l	136.0 mg/l
8	Calcium as Ca	45.6 mg/l	42.4 mg/l	34.2 mg/l	32.6 mg/l
9	Magnesium as Mg	18.4 mg/l	16.5 mg/l	15.5 mg/l	16.5 mg/l
10	Total Alkalinity	201.4 mg/l	166.2 mg/l	127.5 mg/l	115.8 mg/l
11	Chloride as Cl^-	223.3 mg/l	215.6 mg/l	165.5 mg/l	168.5 mg/l
12	Sulphate as SO_4^-	46.8 mg/l	43.3mg/l	35.7 mg/l	36.9 mg/l
13	Iron as Fe	0.38 mg/l	0.37 mg/l	0.28 mg/l	0.34mg/l
14	Free Residual Chlorine	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	0.46 mg/l	0.31 mg/l	0.26 mg/l	0.27 mg/l
16	Nitrates as NO_3	7.7 mg/l	7.8 mg/l	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)
17	Copper as Cu	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic Compunds as C_6H_5OH	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents as	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cynaide as CN	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	Barium as Ba	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
32	Ammonia (as Total	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
33	Sulphide as H_2S	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)

35	Total Arsenic as As	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)
37	Total Coliform	210 MPN/100ml	143 MPN/100ml	121 MPN/100ml	161 MPN/100ml
38	*Escherichia coli*	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml

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

TABLE 3.10: SURFACE WATER SAMPLING RESULTS

Sl. No.	Parameter	RESULT	
		SW1(Thenpalanzhi Lake)	SW2 (Pullanari Kanmaai)
1	Colour	5 Hazen	6 Hazen
2	Odour	Agreeable	Agreeable
3	pH at 25°C	8.03	7.98
4	Conductivity @ 25°C	1290.0 µmhos/cm	1130.0 µmhos/cm
5	Turbidity	3 NTU	4 NTU
6	Total Dissolved Solids	748.0 mg/l	655.0mg/l
7	Total Hardness as $CaCO_3$	220.0 mg/l	208.0 mg/l
8	Calcium as Ca	55.5 mg/l	52.2 mg/l
9	Magnesium as Mg	20.4 mg/l	19.4 mg/l
10	Total Alkalinity as $CaCO_3$	205.6 mg/l	198.7 mg/l
11	Chloride as Cl	250.6 mg/l	225.4 mg/l
12	Sulphate as SO_4	52.6 mg/l	52.1 mg/l
13	Iron as Fe	0.50 mg/l	0.39 mg/l
14	Residual Free Chlorine	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	0.49 mg/l	28 mg/l
16	Nitrate as NO_3	16.3 mg/l	16.3 mg/l
17	Copper as Cu	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C_6H_5OH	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	15.3 mg/l	12.2 mg/l
32	Chemical Oxygen Demand	50.2 mg/l	40.1mg/l
33	Dissolved Oxygen	7.5 mg/l	6.7 mg/l
34	Barium as Ba	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
36	Sulphide as H_2S	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	23.3 mg/l	30.4 mg/l
40	Total Coliform	1198 MPN/100ml	1171 MPN/100ml

41	*Escherichia coli*	201 MPN/100ml	189 MPN/100ml

Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number.

3.2.4 Interpretation& Conclusion

Surface Water

The pH varied from 7.98 to 8.03 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 655 to 748mg/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 225.4 –250.6mg/l. Nitrates varied from 16.3 mg/l., while sulphates varied from 52.1 to 52.6 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.20 to 7.75 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. Total Dissolved Solids were found in the range of 516-688mg/l in all samples. Total hardness varied between 136-188mg/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 78-73m. The maximum depth proposed out of proposed projects is 42m (2m Gravel 40m Rough stone) below ground level.

Ground water levels and Flow Direction based on the Bore well and open well Data's

In general, the ground water movement is based on the gradient i.e., water moves from the highest static ground water elevation to lowest static ground water elevation point. The ground water movement is important aspect to locating the recharge and discharge areas. Therefore, the data has been collected in the study area. Water level measured in the eight open well and 8 borewells.

The average water level in the open well is varies from = 11.35m to 11.95m bgl

The water level in the bore well is varies from = 56.52to 57.12m bgl

Based on the water level contour map of the open well and bore well the water flow direction in the particular region is towards North & South side.

The water level in the area is above 55m 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.

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

S.NO	LABEL	LONGITUDE	LATITUDE	OCT-25	NOV-25	DEC-25
1	OW-1	77° 59' 55.4494" E	9° 55' 09.3643" N	14.5	15.1	15.7
2	OW-2	77° 59' 39.4884" E	9° 55' 07.0030" N	15.1	15.7	16.3
3	OW-3	77° 59' 35.3850" E	9° 54' 48.5366" N	14.8	15.4	16
4	OW-4	77° 59' 18.6476" E	9° 54' 40.1010" N	15.2	15.8	16.4
5	OW-5	77° 59' 14.6709" E	9° 55' 26.2154" N	14.6	15.2	15.8
6	OW-6	77° 59' 41.1387" E	9° 55' 44.2220" N	14.7	15.3	15.9
7	OW-7	78° 00' 13.4602" E	9° 55' 07.0051" N	15	15.6	16.2
8	OW-8	78° 00' 34.5057" E	9° 54' 53.6978" N	14.9	15.5	16.1

Source: Onsite monitoring data

FIGURE 3.9: OPEN WELL CONTOUR MAP (OCT- DEC 2025)

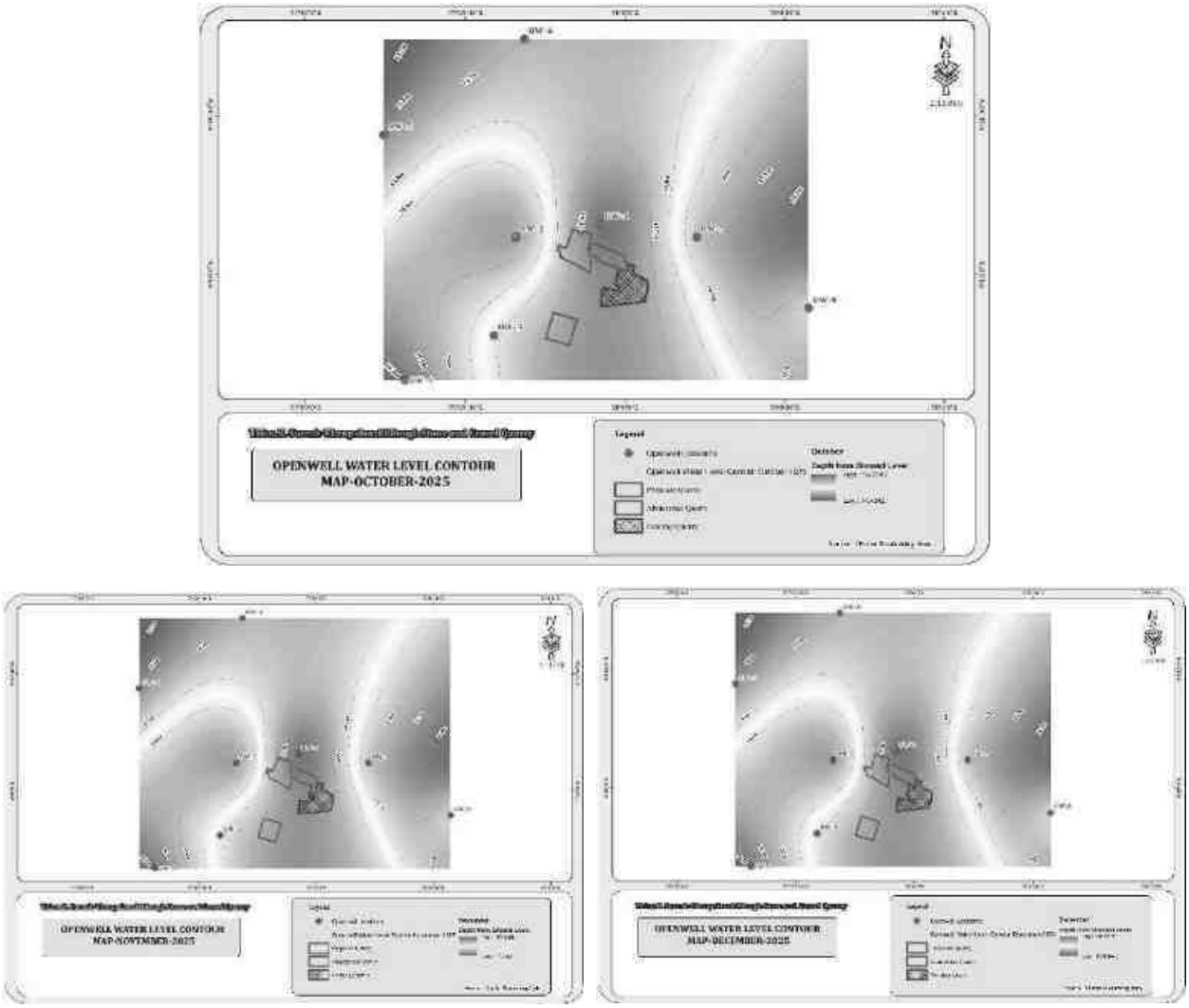


TABLE 3.12: POST MONSOON SEASON WATER LEVEL OF BOREWELLS 1 KM RADIUS

S.NO	LABEL	LONGITUDE	LATITUDE	OCT-25	NOV-25	DEC-25
1	BW1	77° 59' 49.0642" E	9° 55' 14.1040" N	97.1	97.7	98.3
2	BW2	78° 00' 09.8067" E	9° 54' 57.6071" N	98.1	98.7	99.3
3	BW3	78° 00' 25.8283" E	9° 55' 24.6756" N	96.5	97.1	97.7
4	BW4	77° 59' 59.3153" E	9° 54' 22.0479" N	96.4	97	97.6
5	BW5	77° 59' 08.8849" E	9° 55' 03.0161" N	98.2	98.8	99.4
6	BW6	77° 59' 50.1678" E	9° 55' 41.6698" N	97.6	98.2	98.8

Source: Onsite monitoring data

FIGURE 3.10: BOREWELL CONTOUR MAP (OCT-DEC 2025)

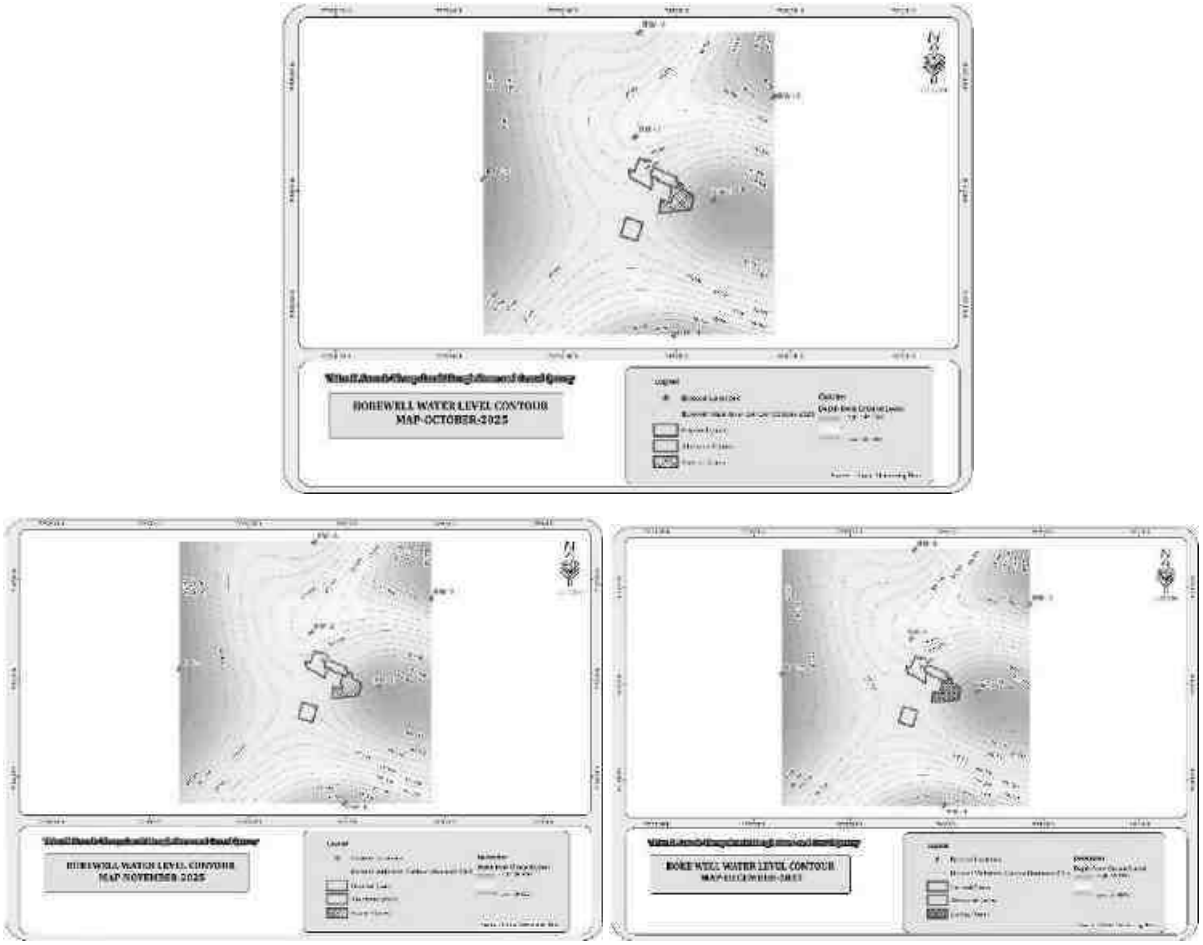
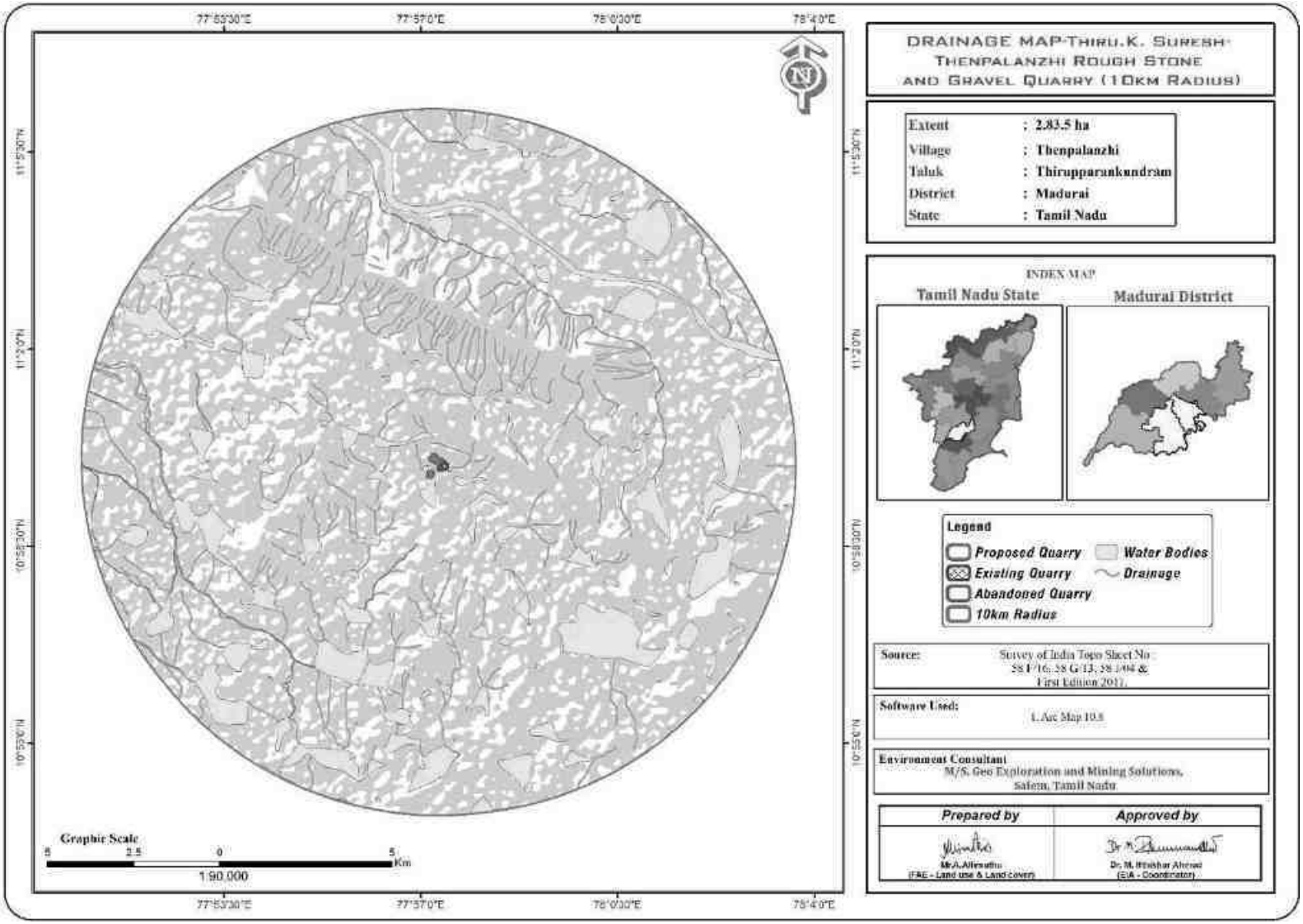
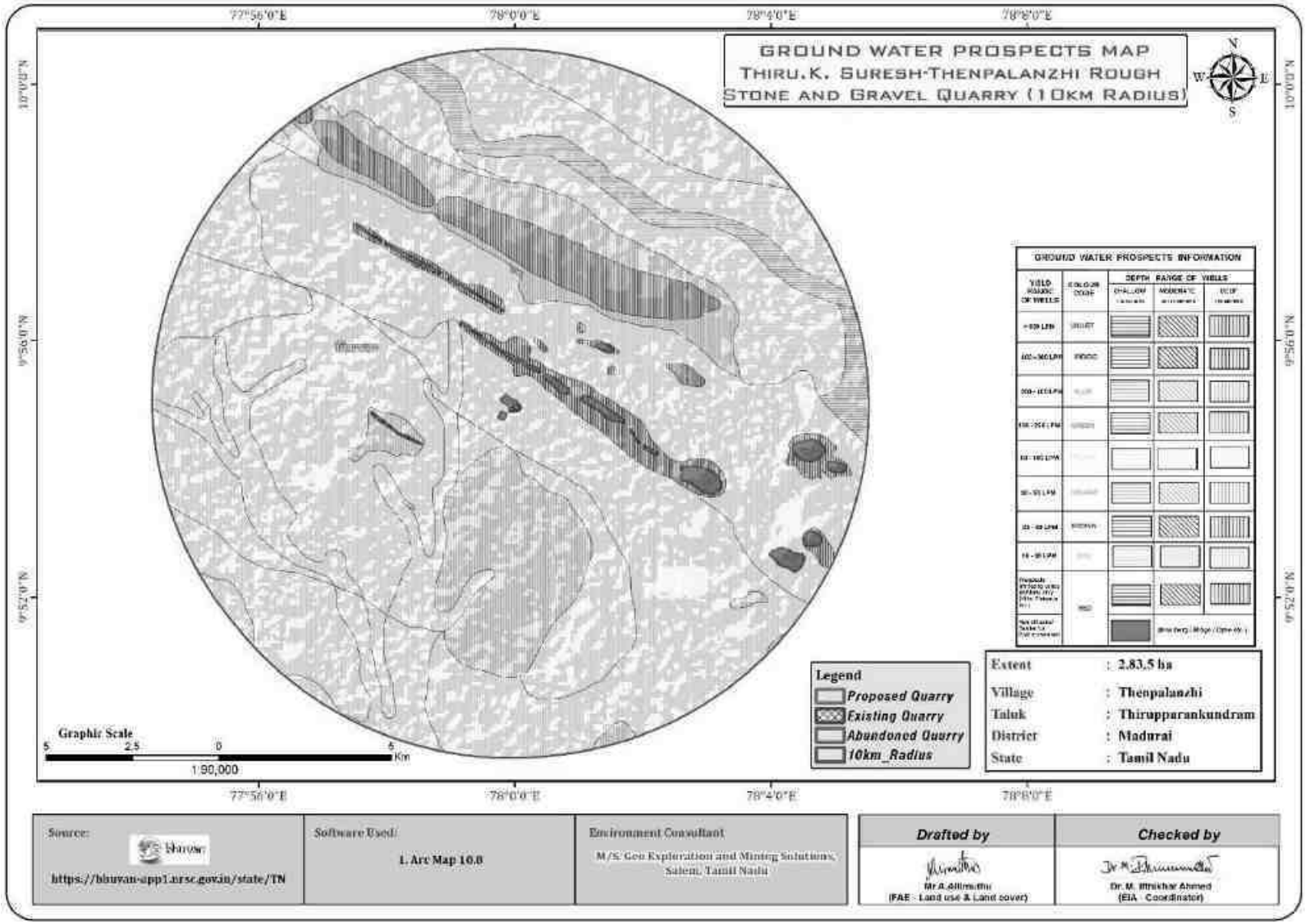


FIGURE 3.11: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE



Remarks: it is inferred that the area is dendritic to sub dendritic pattern

FIGURE 3.12: GROUND WATER PROSPECT MAP



Remarks: Water table in the area is 80m as per the Bhuvan Data

FIGURE 3.12:PHOTOGRAPHS OF WATER SAMPLING COLLECTION

Geophysical Resistivity Survey

3.2.5.1 Methodology and Data Acquisition

The Geophysical Electrical Resistivity survey conducted in the area Schlumberger configuration, Vertical Electrical Sounding (VES) method. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral in homogeneities 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 farm 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 in homogeneities 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,

$$\rho_r = F\rho_w = a\,Ø^m\rho_w$$

ρr = Resistivity of Rocks

ρw = Resistivity of water in pores of rock

F = Formation Factor

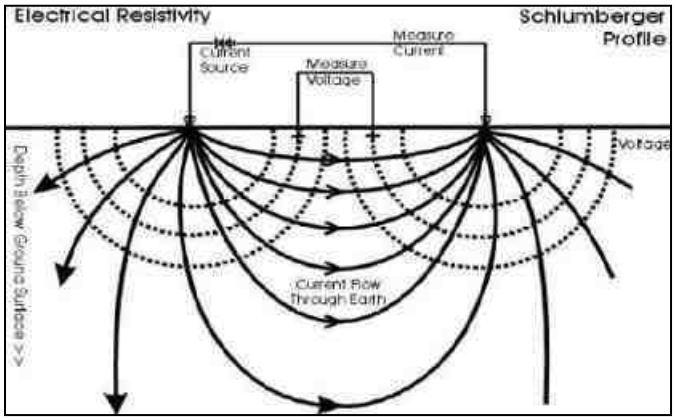
Ø = Fractional pore volume

A = Constants with values ranging from 0.5 to 2.5

3.2.5.2 Survey Layout

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 nose ration can be enhanced by √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 … (1+2...+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 78-73m. The maximum depth proposed out of proposed projects 42m 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.

It is inferred that the existing quarries in the surrounding area reaches maximum of 78m and the water table is not intersected, only the seepage water during rainy season encountered from the upper layer and it will be used for the Greenbelt development, Dust suppression and quarrying operation.

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 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.

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 best time to travel 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.

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
2019	2020	2021	2022	2023	2024	
671.9	684.2	1095.2	1118.5	984	485.9	827.4

Source: https://www.twadboard.tn.gov.in/content/Madurai

TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Oct-2025	Nov-2025	Dec-2025
1	Temperature (^{0}C)	Max	29.28	28.07	25.47
		Min	25.13	21.87	20.48
		Avg	27.20	24.97	22.97
2	Relative Humidity (%)	Avg	77.66	83.64	86.72
3	Wind Speed (m/s)	Max	3.40	4.94	3.76
		Min	0.96	1.01	0.93
		Avg	2.18	2.97	2.34
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		ENE,E	NNE,NE	NNE,NE

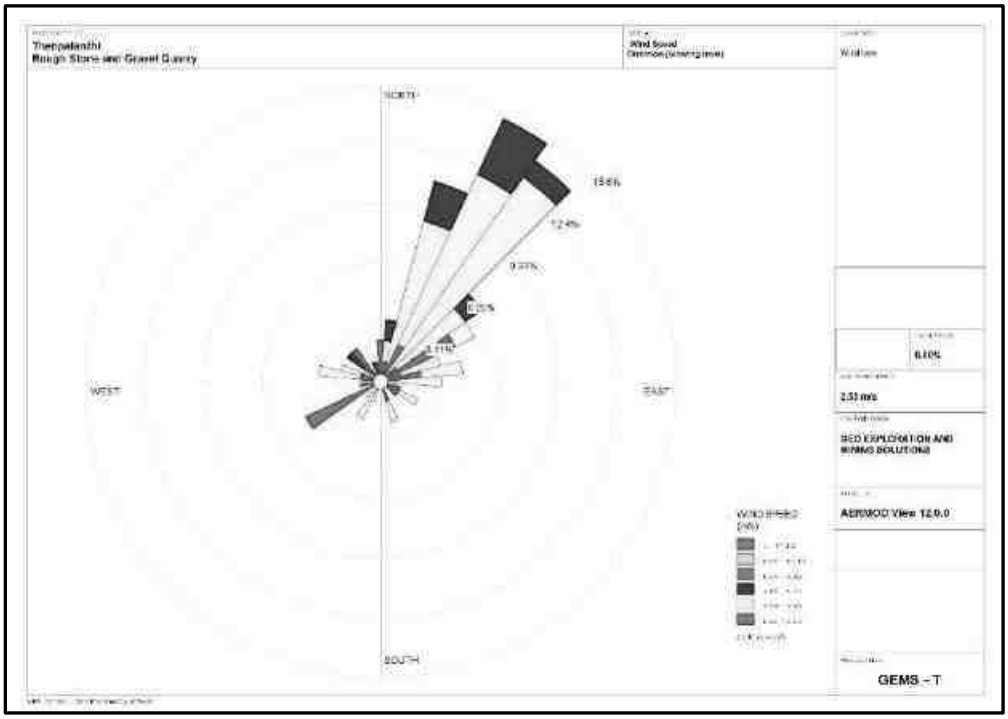
Source: On-site monitoring/sampling by Chennai Mettex Lab Private Limited in association with GEMS

Correlation between Secondary and Primary Data

The average rain fall over the period of five years is 827.4mm. 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

Wind rose diagram of the study site is depicted in Figure. 3.14. Predominant downwind direction of the area during study season is North-East to South West.

FIGURE 3.13: WINDROSE DIAGRAM



In the abstract of collected data wind rose were drawn on presented in figure No.3.13 during the monitoring period in the study area

1. Predominant winds were from ENE, E, NNE
2. Wind velocity readings were recorded between 0.50 to 5.70m/s
3. Calm conditions prevail of about 0.00 % of the monitoring period
4. Temperature readings ranging from 22.97 to 27.20 °C
5. Relative humidity ranging from 77.66-86.72%
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
SO2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NOx	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 Chennai Mettex Lab 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/m3)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide (µg/m3)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	Particulate matter (size less than 10µm) PM10 (µg/m3)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	Particulate matter (size less than 2.5 µm PM2.5 (µg/m3)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

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

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

3.3.4 Frequency & 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 Oct – Dec 2023. The baseline data of ambient air has been generated for PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2) & Nitrogen Dioxide (NO_2) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

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 (7) monitoring stations were set up in the study area as depicted in Figure 3.15 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	9°55'7.47"N 77°59'50.36"E
2	**AAQ-2**	Near Existing Quarry	330m SE	9°54'55.00"N 78° 0'3.34"E
3	**AAQ-3**	Meenakshipatti (School)	910m NE	9°55'34.42"N 78° 0'6.31"E
4	**AAQ-4**	Thenpalanzhi (Residential)	1.3km South	9°54'17.61"N 77°59'52.71"E
5	**AAQ-5**	Kannanur (Residential)	6.2km NW	9°57'7.89"N 77°57'6.78"E
6	**AAQ-6**	Kilakuyilkudi (Residential)	4.8km SE	9°54'43.31"N 78° 2'31.74"E
7	**AAQ-7**	Karadikal (Residential)	4.5km SW	9°54'12.16"N 77°57'25.41"E

Source: On-site monitoring/sampling by Chennai Mettex Lab Private Limited in association with GEMS.

FIGURE 3.14: PHOTOGRAPHS OF AMBIENT AIR QUALITY MONITORING

FIGURE 3.15: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

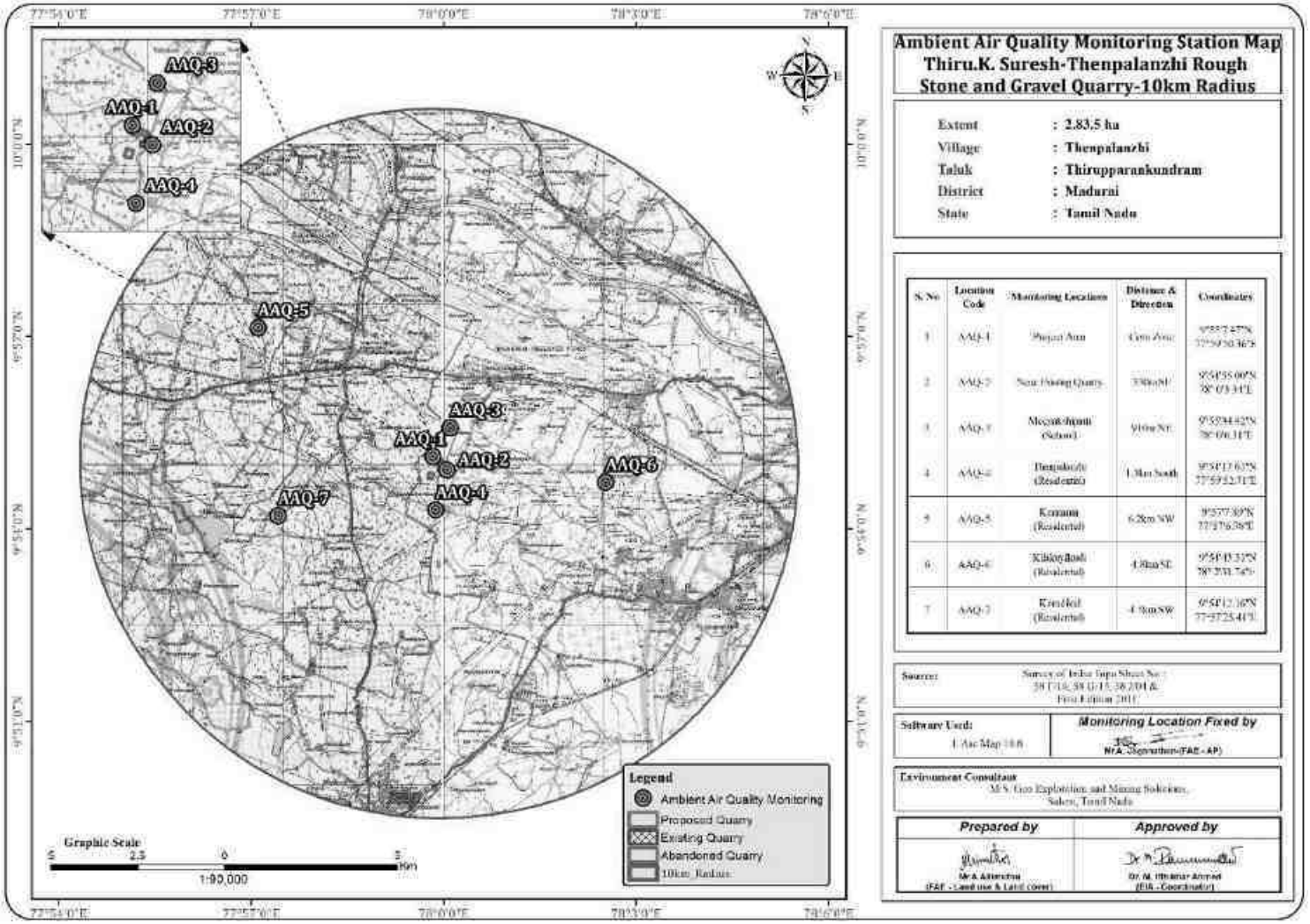


TABLE 3.18: SUMMARY OF AAQ 1 to AAQ 7

PM_{10}	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**
Arithmetic Mean	32.2	34.0	33.2	36.5	35.7	36.0	36.1
Minimum	30.0	30.6	30.9	32.4	32.2	32.1	32.2
Maximum	33.9	37.9	35.9	39.9	40.0	39.9	40.0
NAAQ Norms	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
$PM_{2.5}$	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**
Arithmetic Mean	21.7	22.1	22.4	22.0	21.1	21.3	20.7
Minimum	19.0	19.0	18.3	19.1	19.0	19.0	19.0
Maximum	24.1	23.9	25.1	24.7	23.0	23.3	23.0
NAAQ Norms	**60.0**	**60.0**	**60.0**	**60.0**	**60.0**	**60.0**	**60.0**
SO_2	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**
Arithmetic Mean	5.4	5.7	6.4	5.7	8.5	6.2	6.3
Minimum	4.5	4.8	5.1	4.5	5.1	5.0	5.1
Maximum	6.5	7.4	7.5	7.0	64.0	7.2	7.5
NAAQ Norms	**80.0**	**80.0**	**80.0**	**80.0**	**80.0**	**80.0**	**80.0**
NO_2	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**
Arithmetic Mean	20.7	24.0	24.1	23.3	23.1	23.1	23.0
Minimum	17.5	21.5	21.0	21.3	20.0	21.0	21.0
Maximum	24.7	25.8	26.6	25.0	25.0	25.0	25.0
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	PM_{10}	$PM_{2.5}$	SO_2	NO_2
2	No. of Observations	260	260	260	260
3	10th Percentile Value	32.1	19.1	5.0	21.0
4	20th Percentile Value	32.9	20.0	5.2	21.6
5	30th Percentile Value	33.5	20.7	5.6	22.2
6	40th Percentile Value	33.9	21.2	5.8	22.7
7	50th Percentile Value	34.8	21.9	6.0	23.3
8	60th Percentile Value	35.5	22.2	6.3	23.9
9	70th Percentile Value	36.7	22.6	6.5	24.1
10	80th Percentile Value	37.9	23.0	6.9	24.8
11	90th Percentile Value	39.1	23.5	7.0	25.0
12	95th Percentile Value	39.6	23.9	7.3	25.3
13	98th Percentile Value	40.0	24.7	7.5	25.8
14	Arithmetic Mean	36.0	22.1	6.3	23.6
15	Geometric Mean	35.9	22.0	6.2	23.6
16	Standard Deviation	2.8	1.7	0.8	1.6
17	Minimum	32.1	19.1	5.0	21.0
18	Maximum	40.0	24.7	7.5	25.8

FIGURE 3.16: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ7

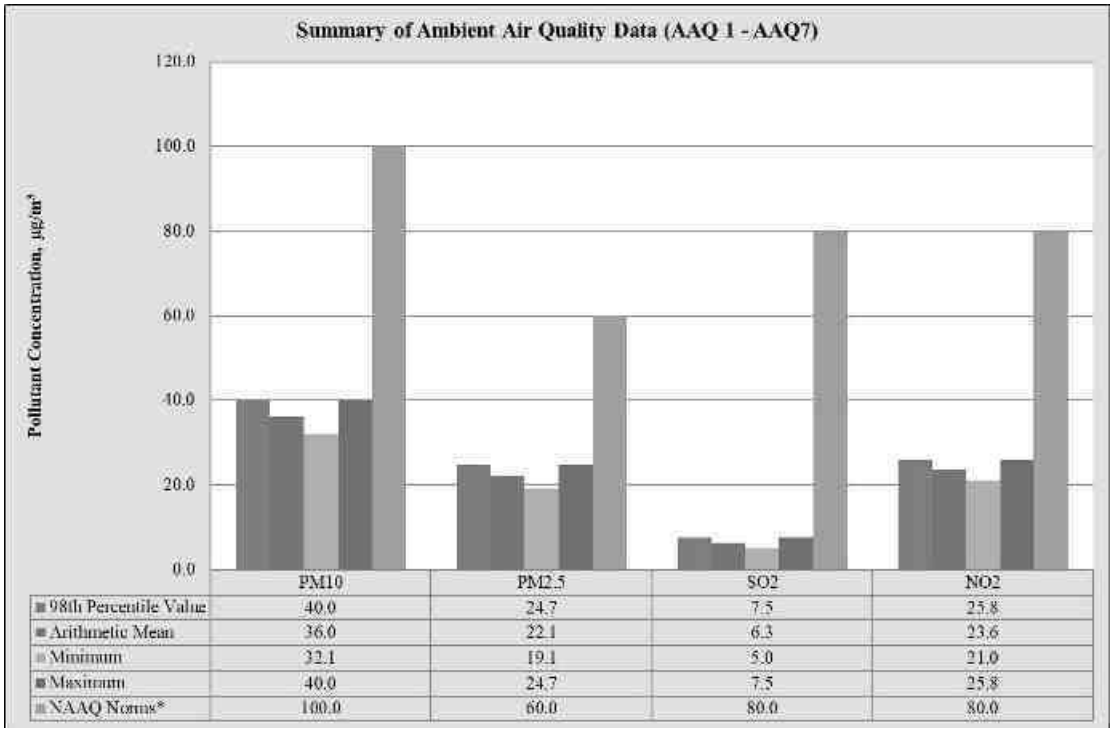


FIGURE 3.17: BAR DIAGRAM OF PARTICULATE MATTER $PM_{2.5}$

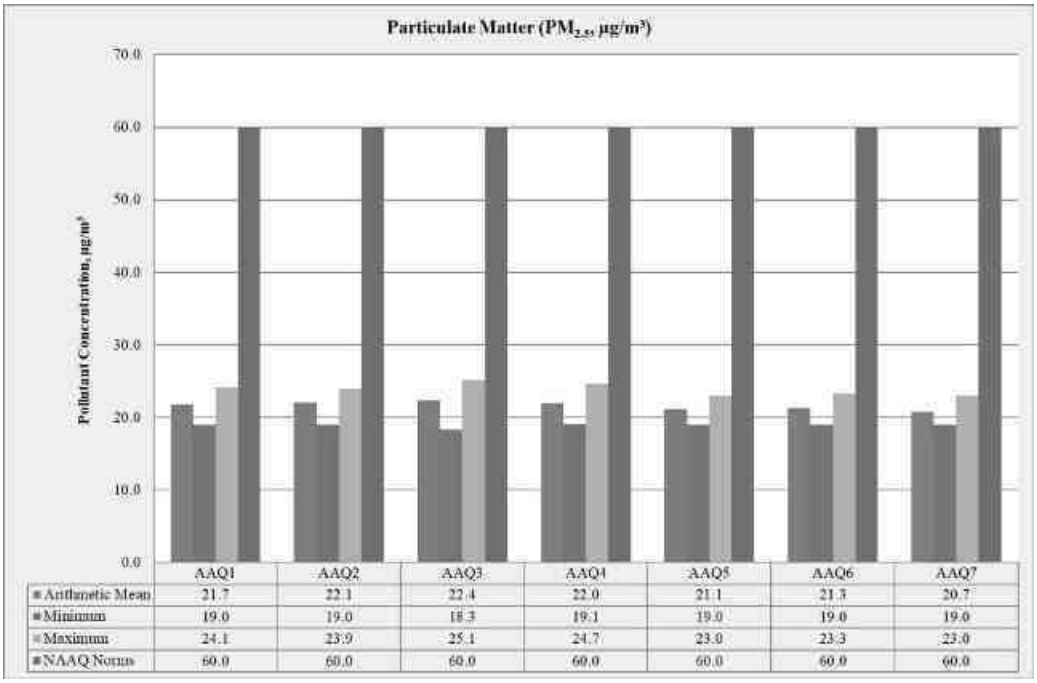


FIGURE 3.18: BAR DIAGRAM OF PARTICULATE MATTER PM_{10}

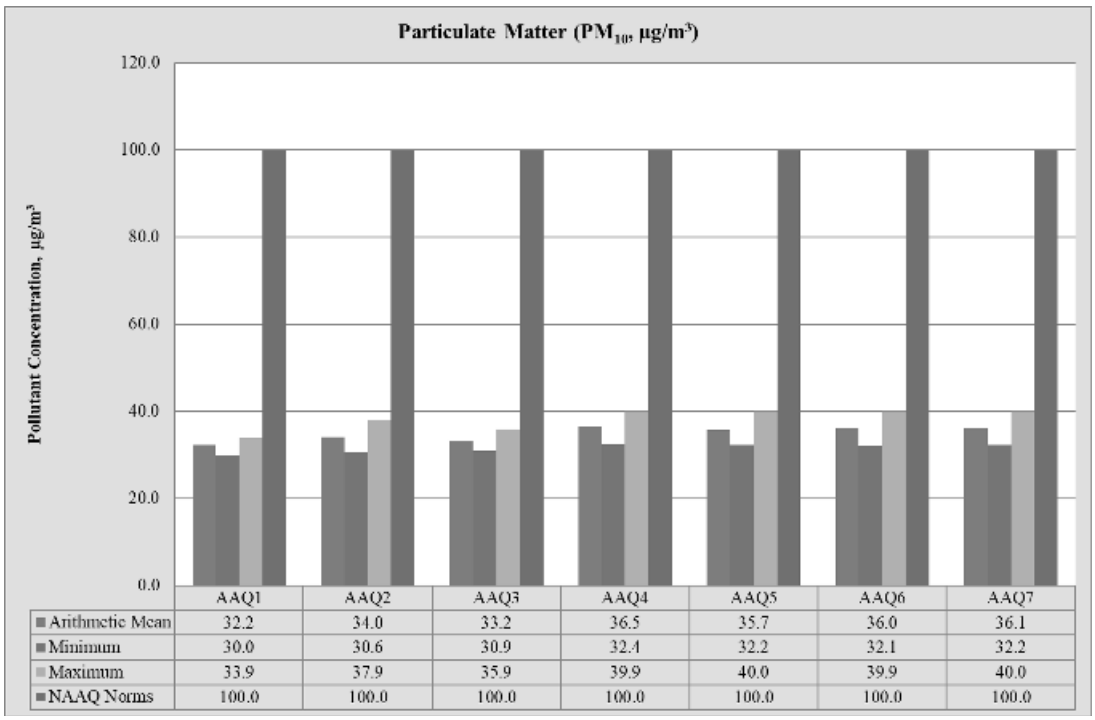
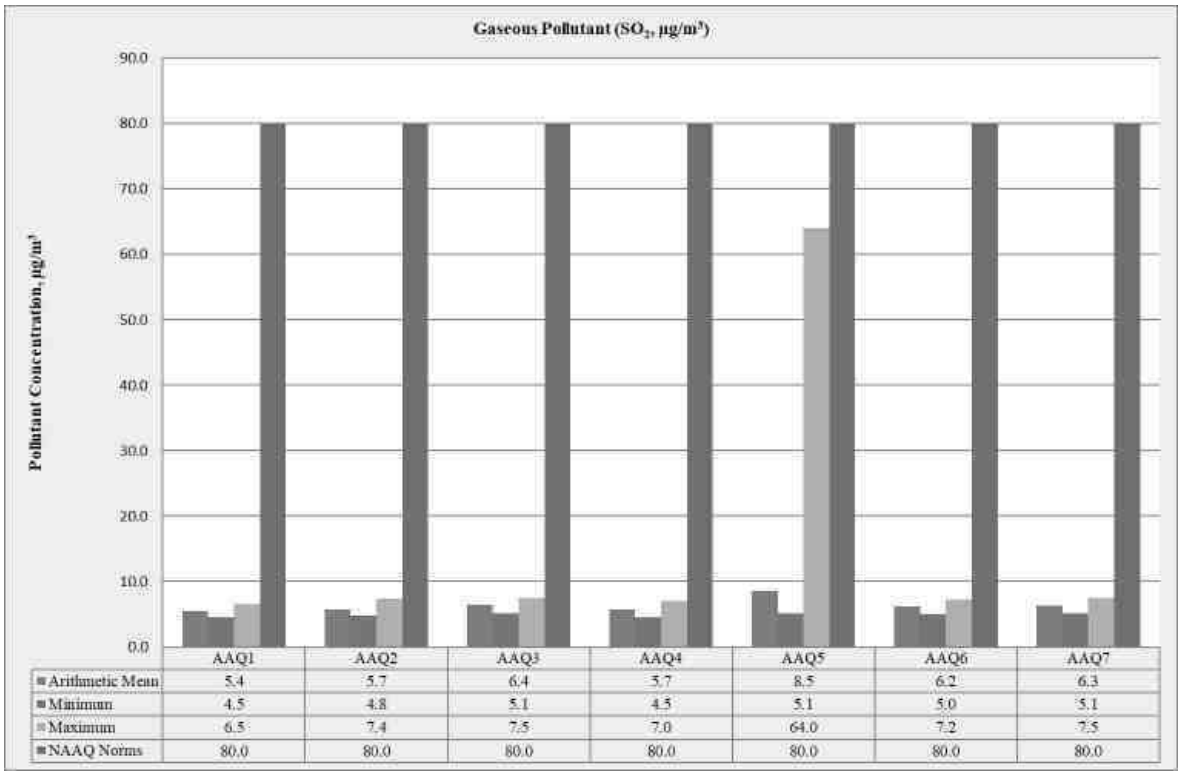
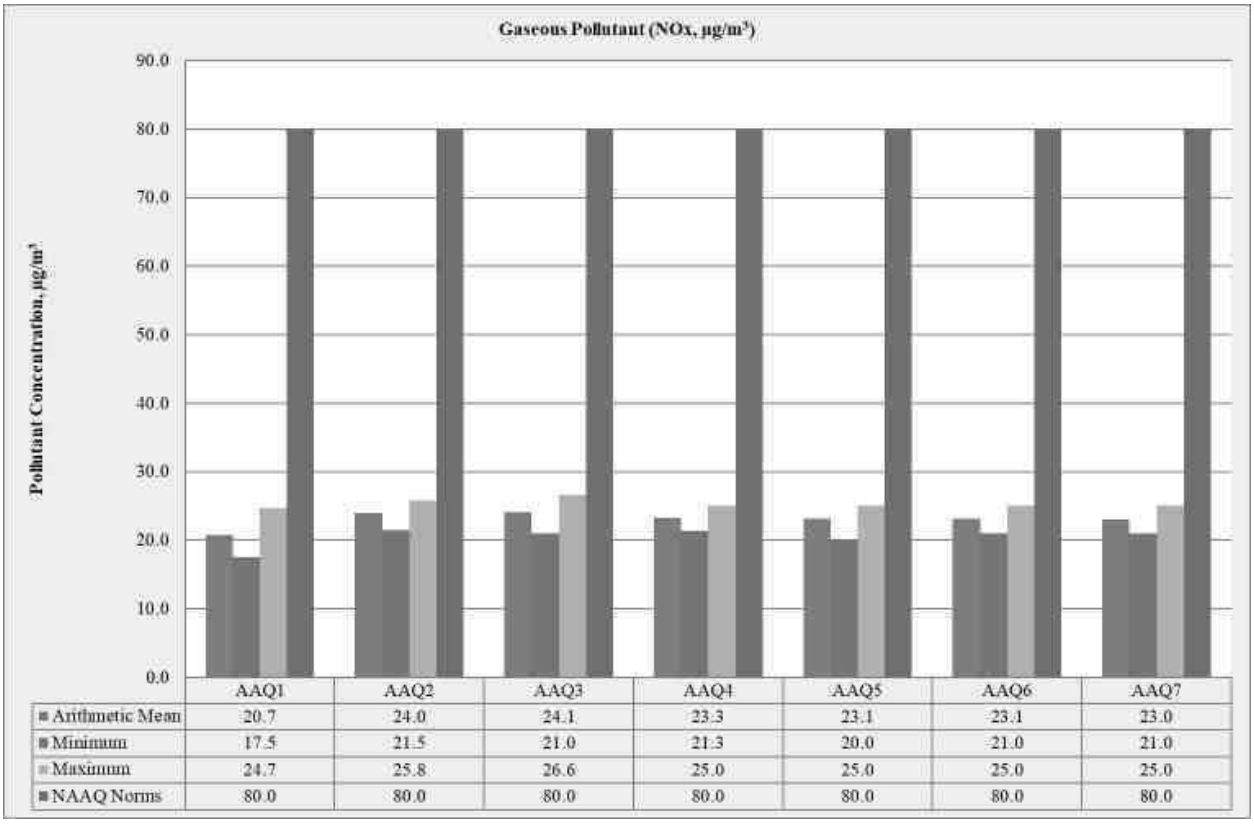


FIGURE 3.19: BAR DIAGRAM OF GASEOUS POLLUTANT SO_2



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	5.4	5.7	6.4	5.7	8.5	6.2	6.3
Minimum	4.5	4.8	5.1	4.5	5.1	5.0	5.1
Maximum	6.5	7.4	7.5	7.0	64.0	7.2	7.5
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

FIGURE 3.20: BAR DIAGRAM OF GASEOUS POLLUTANT NO_x



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	20.7	24.0	24.1	23.3	23.1	23.1	23.0
Minimum	17.5	21.5	21.0	21.3	20.0	21.0	21.0
Maximum	24.7	25.8	26.6	25.0	25.0	25.0	25.0
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

3.3.6 Interpretations & Conclusion

As per monitoring data, PM_{10} ranges from 32.2 µg/m^3 to 36.5 µg/m^3, $PM_{2.5}$ data ranges from 20.7 µg/m^3 to 22.4 µg/m^3, SO_2 ranges from 5.4µg/m^3 to 8.5µg/m^3 and NO_2 data ranges from 20.7 µg/m^3 to 24.1 µg/m^3. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in 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 measurement was carried out at each ambient air quality station. The main aim of the noise level monitoring is

- To assess the ambient Noise level in the study area
- Type of noise pollution generated in the core zone
- To predict the temporal changes in the ambient noise level in the area

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 3.21: DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N1	Project Area	Core Zone	9°55'5.04"N 77°59'49.33"E
2	N2	Near Existing Quarry	330m SE	9°54'54.89"N 78° 0'2.99"E
3	N3	Meenakshipatti (School)	910m NE	9°55'35.03"N 78° 0'7.40"E
4	N4	Thenpalanzhi (Residential)	1.3km South	9°54'17.62"N 77°59'54.18"E
5	N5	Kannanur (Residential)	6.2km NW	9°57'7.94"N 77°57'7.49"E
6	N6	Kilakuyilkudi (Residential)	4.8km SE	9°54'43.00"N 78° 2'31.87"E
7	N7	Karadikal (Residential)	4.5km SW	9°54'11.77"N 77°57'25.66"E

Source: On-site monitoring/sampling by Chennai Mettex Lab Private Limited in association with GEMS.

FIGURE 3.23: PHOTOGRAPHS OF NOISE MONITORING

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,

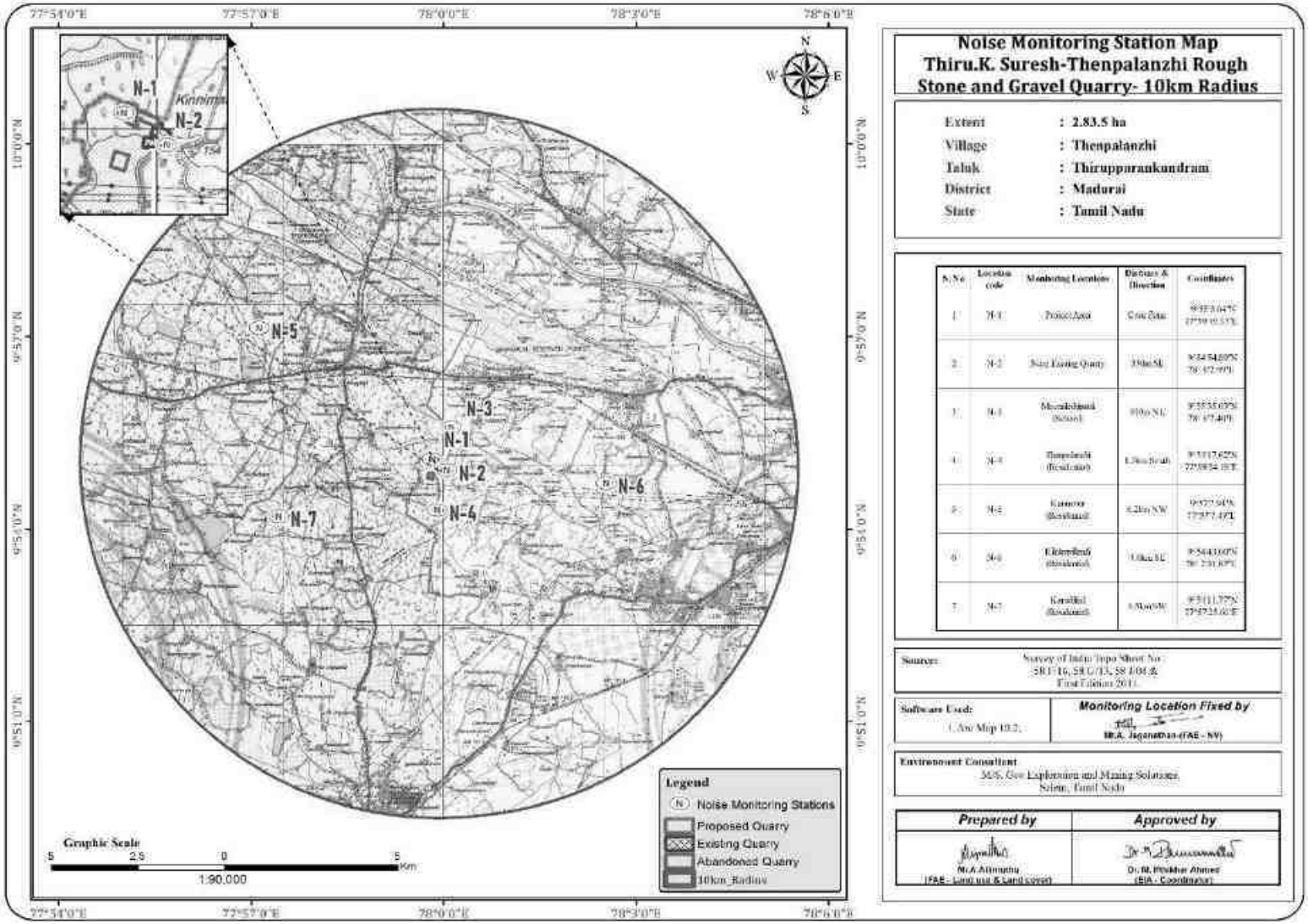
$Leq = 10 \text{ Log } L / T\sum (10Ln/10)$

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

T = Time interval of observation

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

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 3.32.

Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

TABLE 3.22: AMBIENT NOISE QUALITY RESULT

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Project Area	39.0	34.5	**Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)**
2	Near Existing Quarry	39.6	35.1	
3	Meenakshipatti (School)	40.3	34.5	
4	Thenpalanzhi (Residential)	41.9	35.2	
5	Kannanur (Residential)	42.2	34.5	**Residential Day Time– 55 dB (A) Night Time- 45 dB (A)**
6	Kilakuyilkudi (Residential)	42.0	34.9	
7	Karadikal (Residential)	41.0	35.7	

Source: On-site monitoring/sampling by Chennai Mettex Lab Private Limited in association with GEMS

FIGURE 3.25: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE

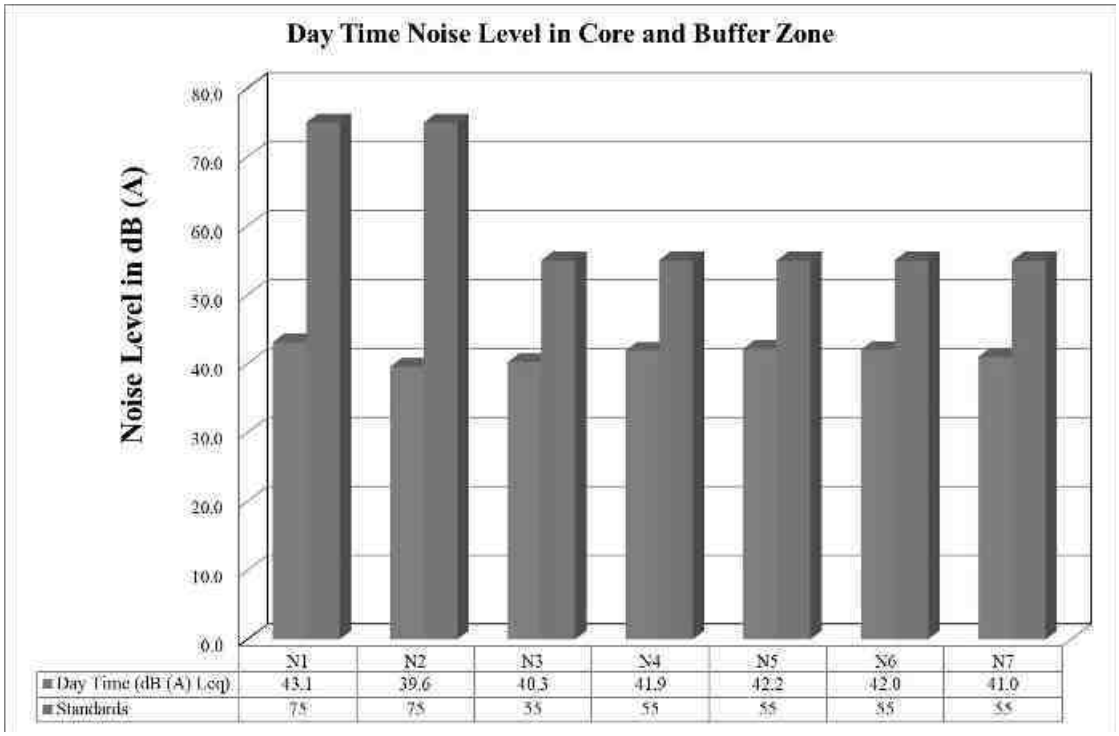
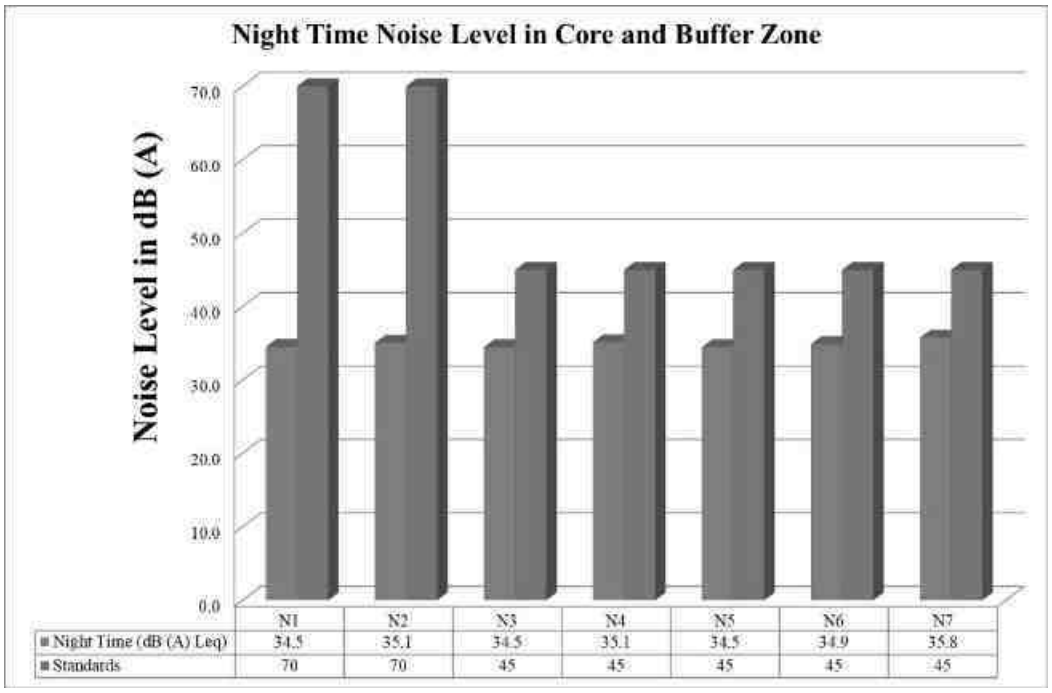


FIGURE 3.26: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE



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 39.6-43.1 dB (A) Leq and during night time were from 34.5-35.1 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 40.3 to 42.2 dB (A) Leq and during night time were from 34.5 to 35.8 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.5 BIOLOGICAL ENVIRONMENT

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

3.5.1.Study area Ecology

The core area extent of 2.83.50 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)

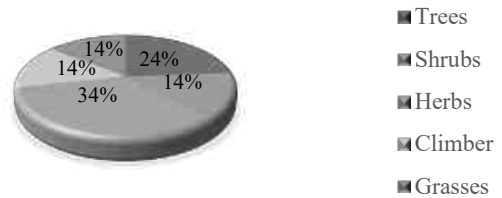
SI.No	English Name	Vernacular Name	Scientific Name	Family Name
Trees				
1.	Neem or Indian lilac	Vembu maram	*Azadirachta indica*	Meliaceae
2.	Velvet mesquite	Mullu maram	*Prosopis juliflora*	Fabaceae
3.	Asian Palmyra palm	Panai maram	*Borassus flabellifer*	Arecaceae
4.	Indian plum	Elanthai maram	*Ziziphus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

Fig No. 3.34: Graph Showing % Distribution Of Floral Life Forms (Core Zone)



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 Thenpalanzhi Village, Rough stone and gravel quarry (Primary data & Secondary data)

SI.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 lebbeck	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	Poovarasan	Thespesia Populnea	Malvaceae	E
12.	Royal poinciana	Cemmayir Konra	Delonix regia	Fabaceae	M
13.	Lemon	Ezhumuchaipalam	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	Unnichedi	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 annuum	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	Pedalium 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	Vetrilai	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**

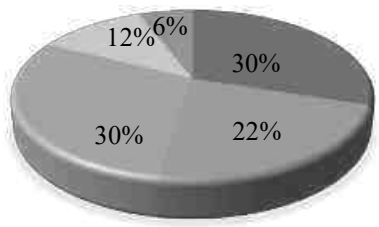
3.5.2. Flora Composition in the Buffer Zone (Primary data & Secondary data)

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/quadrate 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 quadrate 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**

Fig No. 3.35: Graph Showing % Distribution Of Floral Life Forms (Buffer Zone)



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 = - ∑ Pi. ln Pi.

Where, H' = Shannon index of diversity

S= Number of individuals of one species

Pi = ----------

N = 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 Propsopis juliflora, Calotropis gigantea, No RET (Rare, Endangered, and Threatened) floral species were recorded from the vegetational survey.

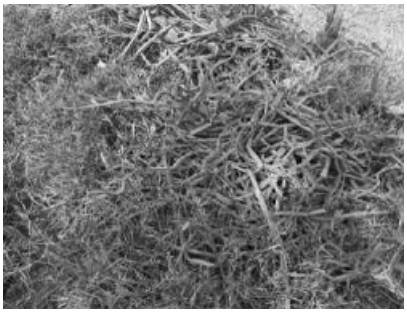
A.Jatropha curcas

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 locared 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.

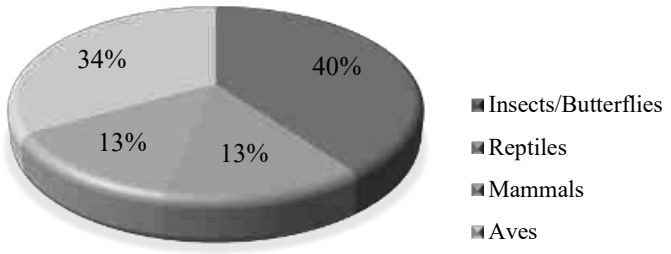
Table No: 3.58. Fauna in the Core zone of lase area, Rough stone and gravel quarry (Primary data)

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

Fig No:3.37. Distribution Of Faunal Communities (Core Zone)



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 locared in study area, Veguthumalai R.F located about 220m on northeast follow ed 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 drangos, 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, Bufomelanostictus, 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.	Funambulus palmarum	Indian palm squirrel	LC
2.	Mus booduga	Indian Field Mouse	LC
3.	Herpestes javanicus	Asian Small Mongoose	LC
4.	Lepus nigricollis	Indian hare	LC
5.	Rattus norwegicus	Brown rat	LC
6.	Lepus nigricollis	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.	Bubulcus ibis	Cattle Egret	LC
2.	Saxicoloidesfulicata	Indian Robin	LC
3.	Streptopeliachinensis	Spotted Dove	LC
4.	Accipiter badius	Shikra	LC
5.	Coraciasbenghalensis	Indian Roller	LC
6.	Anthusrufulus	Paddyfield Pipit	LC
7.	Nectarinia minima	Small Sunbird	LC
8.	Acridotherestristis	Common Myna	LC
9.	Vanellusindicus	Red-wattled Lapwing	-
10.	Dicrurusmacrocercus	Black Drongo	LC
11.	Lonchurapunctulata	Spotted Munia	LC
12.	Dendrocittavagabunda	Indian Treepie	LC
13.	Corvussplendens	House Crow	LC
14.	Eudynamys	Koel	LC
15.	Psittacula krameni	Rose ringed parakeet	LC
16.	Dicrurus macrocercus	Black drongo	LC
17.	Corvus splendens	House crow	LC
18.	Alcedo atthis	Small blue kingfisher	LC
19.	Columba livia	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 russseli	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.	Bufomelanostictus	Indian Toad	LC

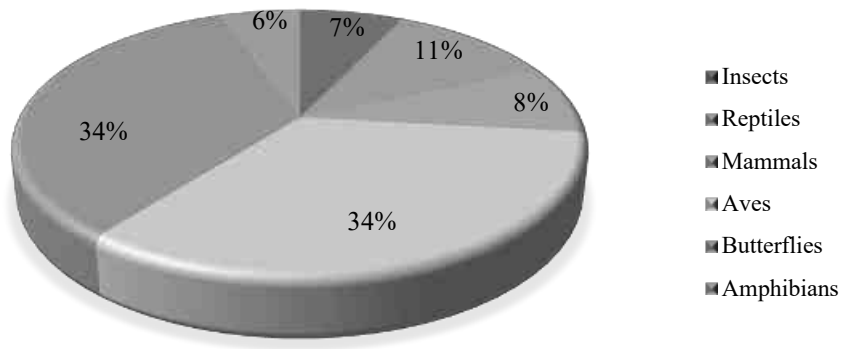
NT – Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

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.	Zizulahylax	Tiny Grass Blue	LC
13.	Catochrysopsstrabo	Forget-Me-Not	LC

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

Fig No:3.39. Distribution Of Faunal Communities (Buffer Zone)



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.

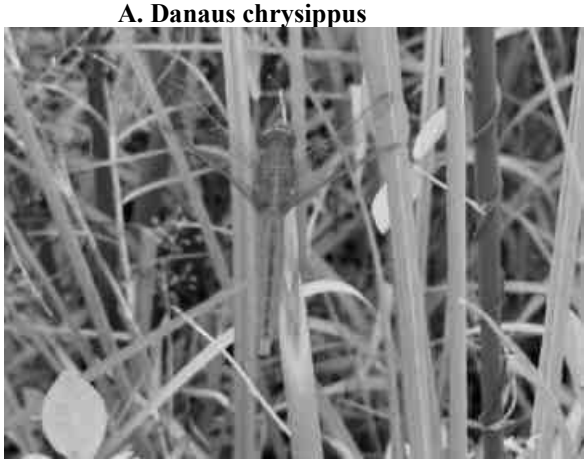
Table No. 3.65: Description of Flora & Fauna

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	-

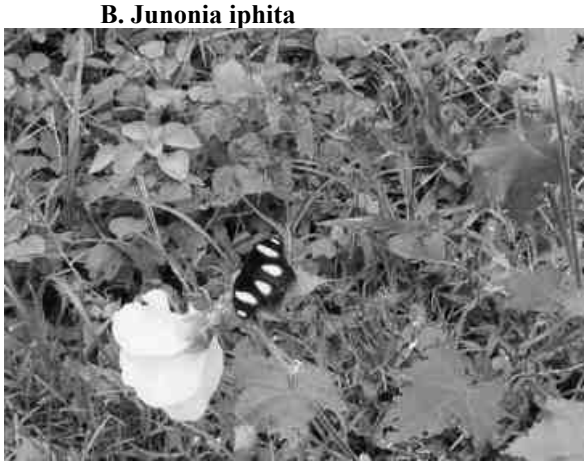
10.	Breeding & Spawning grounds	None	-
11.	Invasive Alien species	None	None

A. Danaus chrysippus

B. Junonia iphita



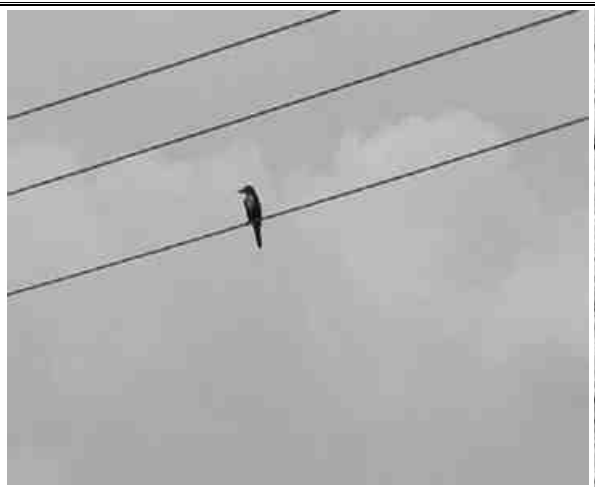
C. Euploea core



D. Hypolimnasmisippus

E. Calotes versicolor

F. Dicrurus 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	*Eichornia crassipe*	Agayatamarai	NA
2.	Floating lace plant	*Aponogetonnatans*	Kottikizhnagu	NA
3.	Blue water lily	*Nymphaea nouchali*	Nellambal	LC
4.	Sambu	*Typha angustifolia*	Narrowleaf cattail	LC
5.	Cross Grass	*Carex cruciata*	Koraipullu	NA
6.	Tall Flat Sedge	*Cyperus exaltatus*	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	*Sphaerotheca breviceps*	Schedule IV
2.	Green pond frog	*Euphlyctis hexadactylus*	Schedule IV
3.	Indian Toad	*Bufomelanostictus*	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.	Ponthia	*Puntius sophore*	Cyprinidae
2.	Catla	*Catla Catla*	Cyprinidae
3.	Catfish	*Siluriformes*	-
4.	Rohu	*Labeo rohita*	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	Srivilliputhur Megamalai Tiger Reserve – 28.1km – SW
2.	Reserved Forests	Kodimangalam B Block R.F.– 3.4km – 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

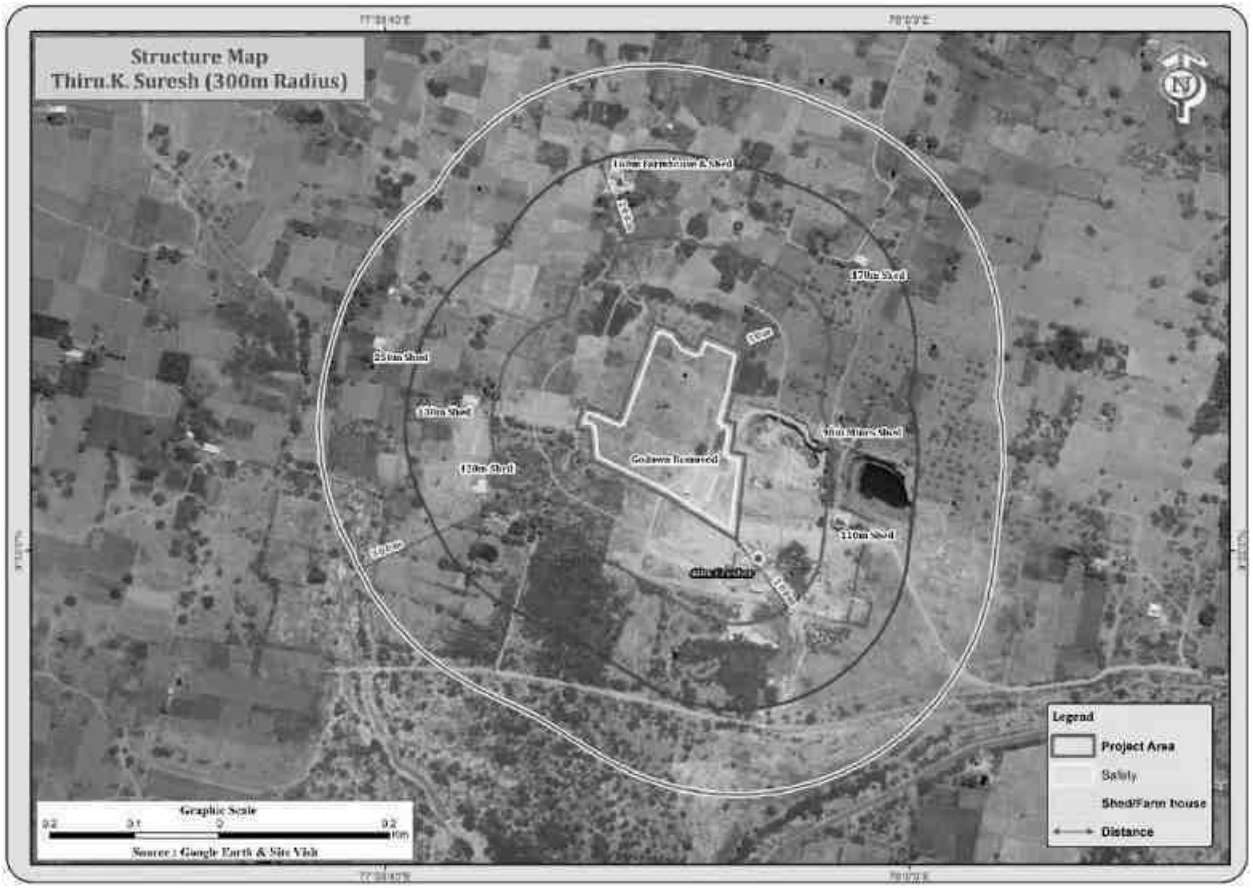
3.6 SOCIO ECONOMIC ENVIRONMENT

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.

STRUCTURE STUDY IN 500m RADIUS

There are few structures within the radius of 300m from the project site, the details of the structures is given below:

FIGURE 3.32: STRUCTURE MAP 300m RADIUS



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.
- 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 Study area:

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.

Thenpalanzhi Village

Thenpalanji is a medium size village located in Madurai South Taluka of Madurai district, Tamil Nadu with total 431 families residing. The Thenpalanji village has population of 1543 of which 759 are males while 784 are females as per Population Census 2011

Sex Ratio of Thenpalanzhi Village -Census 2011

In Thenpalanji village population of children with age 0-6 is 166 which makes up 10.76 % of total population of village. Average Sex Ratio of Thenpalanji village is 1033 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Thenpalanji as per census is 1075, higher than Tamil Nadu average of 943.

Literacy of Thenpalanzhi Village

Thenpalanji village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Thenpalanji village was 68.77 % compared to 80.09 % of Tamil Nadu. In Thenpalanji Male literacy stands at 77.17 % while female literacy rate was 60.60 %.

Worker's profile of Thenpalanzhi Village

In Thenpalanji village out of total population, 974 were engaged in work activities. 44.66 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 55.34 % were involved in Marginal activity providing livelihood for less than 6 months. Of 974 workers engaged in Main Work, 24 were cultivators (owner or co-owner) while 104 were Agricultural labourer.

TABLE 3.41: Population characteristics

Particulars	Total	Male	Female
Total No. of Houses	431	-	-
Population	1543	759	784
Child (0-6)	166	80	86
Schedule Caste	254	124	130
Schedule Tribe	0	0	0
Literacy	68.77 %	77.17 %	60.60 %
Total Workers	974	480	494
Main Worker	435	-	-
Marginal Worker	539	195	344

Source: https://www.census2011.co.in/data/village/641025-thenpalanji-tamil-nadu.html

TABLE 3.42: POPULATION DATA OF STUDY AREA AROUND 10KM RADIUS

SI.No.	Village Name	NO HH	Total Population	Male	Female	Total SC Population	Male SC	Female SC	Total ST Population	Male ST	Female ST	Total Literate Population	Male Literate	Female Literate
1	Chettikulam	131	538	285	253	85	52	33	0	0	0	388	227	161
2	Josyar Alangulam	113	442	227	215	173	88	85	0	0	0	365	205	160
3	K.Puliyankulam	1091	3815	2024	1791	379	185	194	0	0	0	2588	1518	1070
4	Karadikal	1076	4074	2124	1950	565	286	279	0	0	0	2798	1631	1167
5	Karumathur	1902	6737	3559	3178	1075	566	509	4	4	0	4421	2664	1757
6	Kilakuyilkudi	697	2606	1349	1257	410	204	206	0	0	0	1733	1001	732
7	Kinnimangalam	1197	4572	2378	2194	1397	715	682	0	0	0	2948	1751	1197
8	Kokkulam (Anaiyur)	2912	10698	5514	5184	1539	786	753	0	0	0	8015	4473	3542
9	Kunnamampatti	162	601	302	299	163	77	86	0	0	0	330	193	137
10	Melakuyilkudi	486	1920	995	925	326	159	167	3	3	0	1353	770	583
11	Melamathur	414	1539	795	744	585	299	286	0	0	0	990	566	424
12	Panniyan	721	2627	1379	1248	422	214	208	0	0	0	1694	1020	674
13	sakkilipatti	382	1557	780	777	160	86	74	0	0	0	858	494	364
14	Thenpalanji	431	1543	759	784	254	124	130	0	0	0	947	524	423
15	Thoppur	878	3139	1567	1572	334	170	164	0	0	0	2246	1246	1000
16	Uchapatti	1024	3936	1987	1949	1042	523	519	0	0	0	2811	1514	1297
17	Vadapalanji	1723	6590	3321	3269	953	482	471	15	9	6	4242	2423	1819
18	Vannankulam	9	33	17	16	0	0	0	0	0	0	9	7	2
19	Vedarpuliankulam	703	2639	1309	1330	406	198	208	24	13	11	1712	933	779

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

TABLE 3.43: WORKERS PROFILE OF STUDY AREA

SI.No.	Village Name	Total Illiterate	Male Illiterate	Female Illiterate	Total Workers	Male Workers	Female Workers	Total Main Workers	Main Workers	Main Workers	Main Cultivation	Main Cultivation	Main Cultivation	Main Agriculture	Main Agriculture
1	Chettikulam	150	58	92	383	201	182	379	200	179	4	2	2	318	147
2	Josyar Alangulam	77	22	55	294	149	145	198	108	90	34	17	17	138	70
3	K.Puliyankulam	1227	506	721	2205	1281	924	1987	1158	829	303	159	144	867	373
4	Karadikal	1276	493	783	2624	1390	1234	2005	1169	836	972	574	398	532	226
5	Karumathur	2316	895	1421	3714	2064	1650	2749	1556	1193	385	273	112	1366	542
6	Kilakuyilkudi	873	348	525	1340	827	513	1174	769	405	344	207	137	310	117
7	Kinnimangalam	1624	627	997	2472	1459	1013	2380	1411	969	170	105	65	1481	737
8	Kokkulam (Anaiyur)	2683	1041	1642	5026	3198	1828	3041	2145	896	408	263	145	821	470
9	Kunnamampatti	271	109	162	396	188	208	393	186	207	79	40	39	302	136
10	Melakuyilkudi	567	225	342	936	580	356	731	529	202	100	57	43	133	58
11	Melamathur	549	229	320	723	465	258	632	444	188	33	28	5	303	183
12	Panniyan	933	359	574	1620	887	733	1600	877	723	413	218	195	743	312
13	sakkilipatti	699	286	413	909	473	436	653	376	277	82	47	35	383	177
14	Thenpalanji	596	235	361	974	480	494	435	285	150	24	13	11	104	52
15	Thoppur	893	321	572	1530	972	558	1220	885	335	50	35	15	50	34
16	Uchapatti	1125	473	652	1812	1196	616	1692	1112	580	13	8	5	382	178
17	Vadapalanji	2348	898	1450	3152	1969	1183	2269	1546	723	103	66	37	491	210
18	Vannankulam	24	10	14	26	13	13	26	13	13	15	7	8	11	6

19	Vedarpuliankulam	927	376	551	1308	748	560	1298	745	553	97	54	43	805	382

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

TABLE 3.44: EDUCATIONAL FACILITIES IN THE STUDY AREA

		PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
Sl	Village Name	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	Chettikulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	Josyar Alangulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	K.Puliyankulam	1	2	1	1	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Karadikal	1	2	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Karumathur	1	1	1	1	1	2	1	2	1	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2
6	Kilakuyilkudi	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	Kinnimangalam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Kokkulam (Anaiyur)	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2
9	Kunnamampatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Melakuyilkudi	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	Melamathur	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	Panniyan	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	sakkilipatti	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	Thenpalanji	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Thoppur	1	2	1	1	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2
16	Uchapatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2
17	Vadapalanji	1	2	1	1	1	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2
18	Vannankulam	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	Vedarpuliankulam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Abbreviations: PPS-Pre Primary School; SSS-Senior Secondary School; DC-Degree School; PT-Polytechnic; PS-Primary School; G-Government; EC-Engineering College; VTS-Vocational School /ITI; MS-Middle School; P-Private; MC-Medical College; SSD-Special School For Disabled; SS-Secondary School; MI-Management College/Institute;
Note – 1 - Available within the village; 2 - Not available

TABLE 3.45: 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	Chettikulam	0	0	0	0	0	0	0	0	0	0	0	
2	Josyar Alangulam	0	0	0	0	0	0	0	0	0	0	0	
3	K.Puliyankulam	0	0	1	1	0	0	0	0	0	0	0	a
4	Karadikal	0	0	1	0	0	0	0	0	1	0	0	
5	Karumathur	0	0	1	0	0	0	0	0	1	0	0	b
6	Kilakuyilkudi	0	0	1	0	0	0	0	0	0	0	0	b
7	Kinnimangalam	0	0	1	0	0	0	0	0	0	0	0	b
8	Kokkulam (Anaiyur)	1	1	1	1	1	0	0	1	1	0	1	a
9	Kunnamampatti	0	0	0	0	0	0	0	0	0	0	0	
10	Melakuyilkudi	0	0	0	0	0	0	0	0	0	0	0	a
11	Melamathur	0	0	0	0	0	0	0	0	1	0	0	a
12	Panniyan	0	0	1	0	0	0	0	0	0	0	0	a
13	sakkilipatti	0	0	0	0	0	0	0	0	0	0	0	b
14	Thenpalanji	0	0	1	0	0	0	0	0	0	0	0	b
15	Thoppur	0	0	1	0	1	0	0	0	0	0	0	
16	Uchapatti	0	0	1	0	0	0	0	0	0	0	0	a
17	Vadapalanji	0	0	3	0	0	0	0	0	0	0	0	b
18	Vannankulam	0	0	0	0	0	0	0	0	0	0	0	b
19	Vedarpuliankulam	0	0	1	0	0	0	0	0	0	0	0	

Abbreviations: CHC-Community Health Centre; TBC-TB Clinic; VH- Veternity 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

3.6.6 Recommendation and Suggestion

- The main activities in the area are agriculture, quarry operation and Crushing units there are 1 Number of quarry operated in the region and now only 1 quarry is operating at present which will expire lease period in 2035 December. Hence starting up of new mine in this region is necessary at current scenario
- 1 number of Crusher operating within 1km and the demand of rough stone is high to the crushing units 40 Nos of peoples depending upon the crushing units in the area and crushers are meeting scarcity due to supply demand in the region.
- Due to the project about 35 Nos of peoples will benefitted directly due to employment and more than 20 Nos of peoples and Crushers will have benefitted through this project
- As part of CER activities proponent intends to spend Rs 3 Lakhs for the improvement of School sanitation facilities, Greenbelt development and other needs.
- At the end of the life of the mine the mined-out pit will act as temporary reservoir, the collected rain water in the mine pit may utilized for the nearby agriculture lands.

Apart from the following general activities will be conducted

- 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.
- 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

- 2.21.4 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 2.21.4 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 1420 Nos of trees will be planted in the lease area and approach road will retain the ecosystem
- 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
- 3.0 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 judicially 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 Proposed Project

Wind erosion of the exposed areas and the air borne particulate matter generated by quarrying operation, and transportation are mainly PM_{10} & $PM_{2.5}$ and emissions of Sulphur dioxide (SO_2) & Oxides of Nitrogen (NOx) 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 falls 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 PM_{10} was observed close to the source due to low to moderate wind speeds. Incremental value of PM_{10} was superimposed on the base line data monitored at the proposed site to predict total GLC of PM_{10} due to combined impacts

TABLE 4.1: ESTIMATED EMISSION RATE

PM_{10}			
Activity	**Source type**	**Value**	**Unit**
Drilling	Point Source	0.057163476	g/s
Blasting	Point Source	0.000147641	g/s
Mineral Loading	Point Source	0.037230613	g/s
Haul Road	Line Source	0.002484835	g/s/m
Overall Mine	Area Source	0.041269987	g/s
So2	Point Source	0.000173413	g/s
Nox	Point Source	0.000004876	g/s

FIGURE 4.1: AERMOD TERRAIN MAP

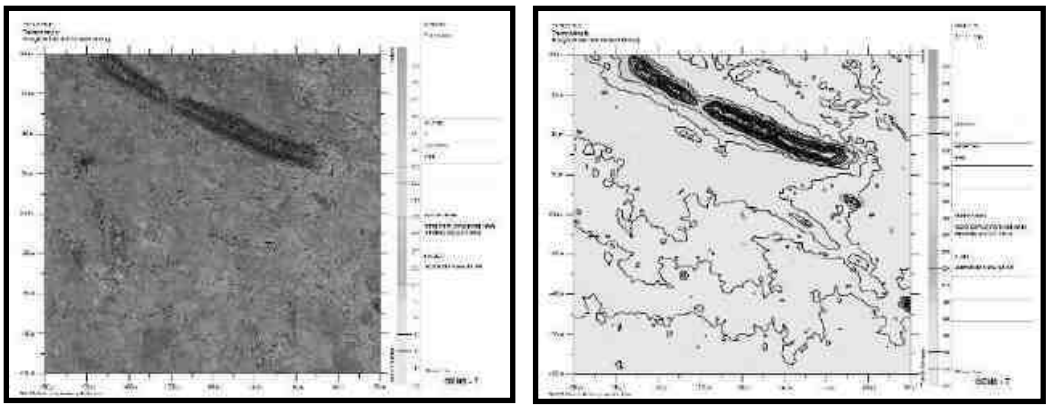


FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM_{10}

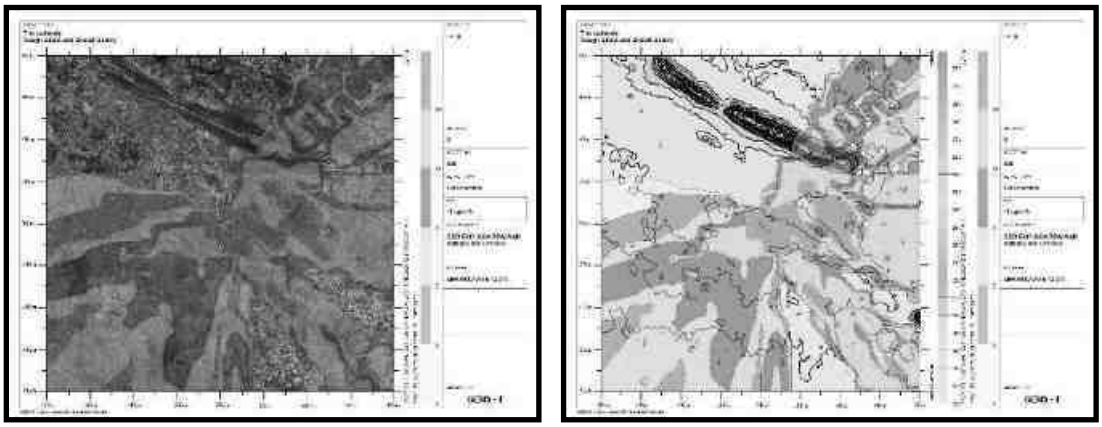


FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF $PM_{2.5}$

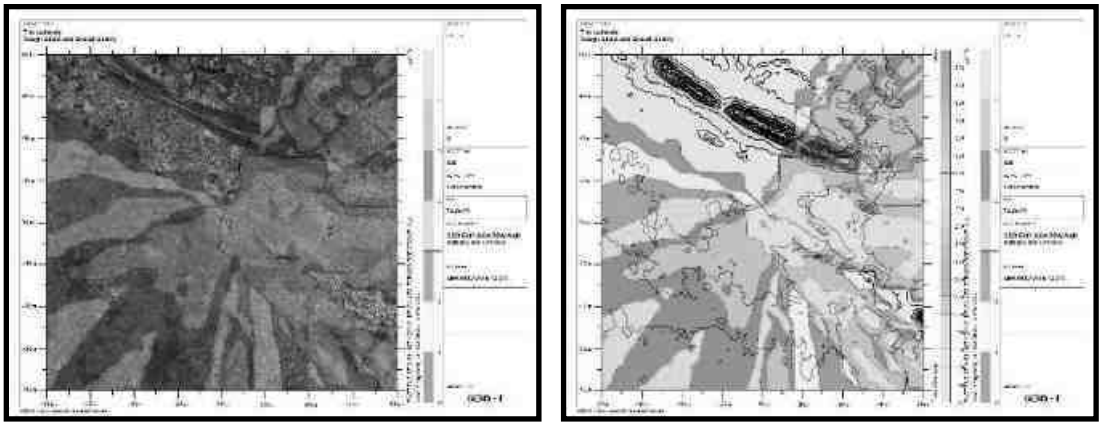


FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF NO_X

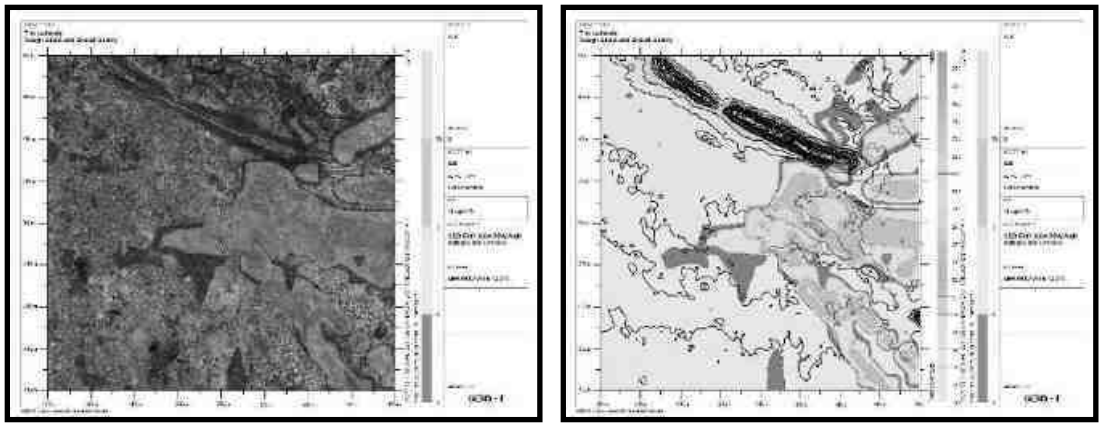


FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF So2

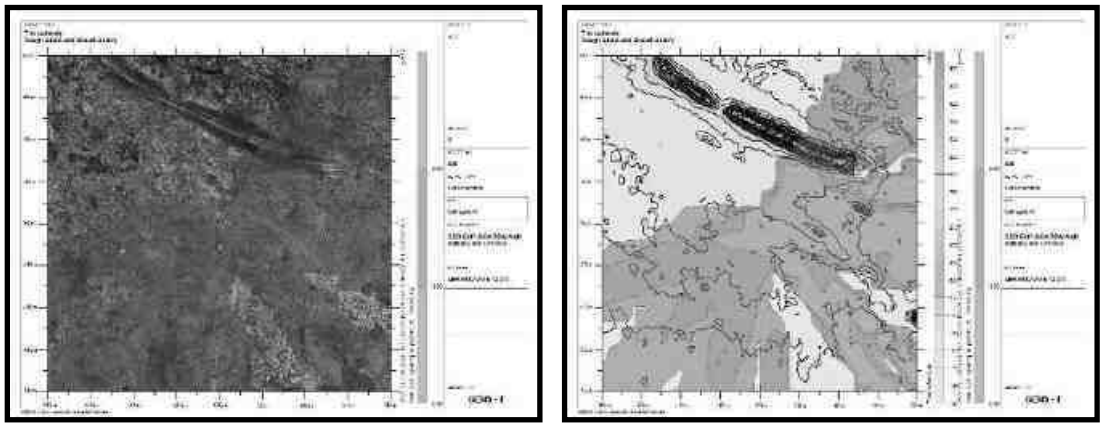
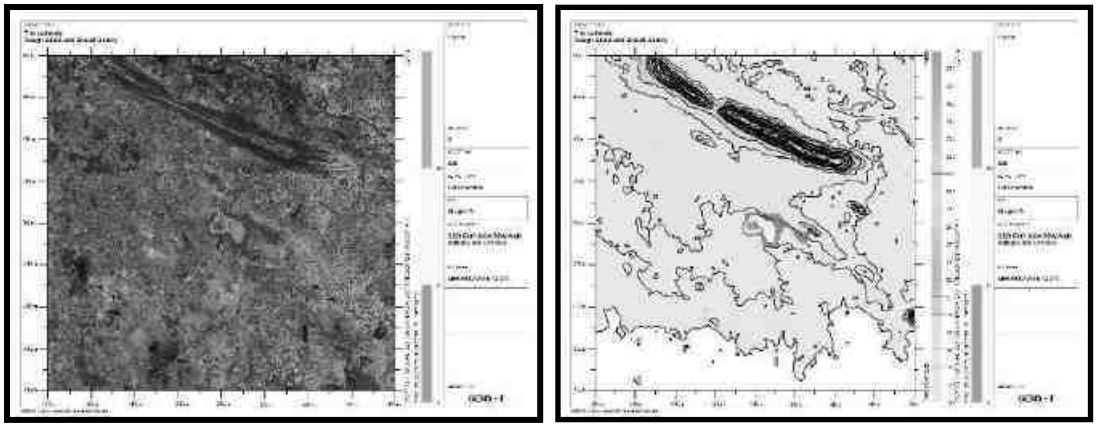


FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST



4.3.2.1 Model Results

The post project Resultant Concentrations of PM_{10}, $PM_{2.5}$, SO_2 & NO_X (GLC) is given in Table below:

TABLE 4.2: INCREMENTAL & RESULTANT GLC OF PM_{10}

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	9°55'7.47"N 77°59'50.36"E	-15	77	32.2	15.69	47.89
AAQ2	9°54'55.00"N 78° 0'3.34"E	384	-318	34.0	15.41	49.41
AAQ3	9°55'34.42"N 78° 0'6.31"E	476	908	33.2	11.82	45.02
AAQ4	9°54'17.61"N 77°59'52.71"E	55	-1471	36.5	14.00	50.5
AAQ5	9°57'7.89"N 77°57'6.78"E	-5040	3803	35.7	0	35.7
AAQ6	9°54'43.31"N 78° 2'31.74"E	4945	-678	36.0	15.17	51.17
AAQ7	9°54'12.16"N77°57'25.41"E	-4470	-1641	36.1	12.10	48.2

TABLE 4.3: INCREMENTAL & RESULTANT GLC OF PM2.5

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	9°55'7.47"N 77°59'50.36"E	-15	77	21.7	7.80	29.5
AAQ2	9°54'55.00"N 78° 0'3.34"E	384	-318	22.1	7.49	29.59
AAQ3	9°55'34.42"N 78° 0'6.31"E	476	908	22.4	5.30	27.7
AAQ4	9°54'17.61"N 77°59'52.71"E	55	-1471	22.0	6.78	28.78
AAQ5	9°57'7.89"N 77°57'6.78"E	-5040	3803	21.1	0	21.1
AAQ6	9°54'43.31"N 78° 2'31.74"E	4945	-678	21.3	7.21	28.51
AAQ7	9°54'12.16"N77°57'25.41"E	-4470	-1641	20.7	6.00	26.7

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	9°55'7.47"N 77°59'50.36"E	-15	77	5.4	2.29	7.69
AAQ2	9°54'55.00"N 78° 0'3.34"E	384	-318	5.7	2.27	7.97
AAQ3	9°55'34.42"N 78° 0'6.31"E	476	908	6.4	1.63	8.03
AAQ4	9°54'17.61"N 77°59'52.71"E	55	-1471	5.7	2.20	7.9
AAQ5	9°57'7.89"N 77°57'6.78"E	-5040	3803	8.5	0	8.5
AAQ6	9°54'43.31"N 78° 2'31.74"E	4945	-678	6.2	2.24	8.44
AAQ7	9°54'12.16"N77°57'25.41"E	-4470	-1641	6.3	2.00	8.3

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF NO_X

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NOx (µg/m³)	Incremental value due to mining (µg/m³)	Total NOx (µg/m³)
AAQ1	9°55'7.47"N 77°59'50.36"E	-15	77	20.7	10.43	31.13
AAQ2	9°54'55.00"N 78° 0'3.34"E	384	-318	24.0	10.14	34.14
AAQ3	9°55'34.42"N 78° 0'6.31"E	476	908	24.1	0	24.1
AAQ4	9°54'17.61"N 77°59'52.71"E	55	-1471	23.3	5.88	29.18
AAQ5	9°57'7.89"N 77°57'6.78"E	-5040	3803	23.1	0	23.1
AAQ6	9°54'43.31"N 78° 2'31.74"E	4945	-678	23.1	9.00	32.1
AAQ7	9°54'12.16"N77°57'25.41"E	-4470	-1641	23.0	1.00	24

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 & NOX 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 taurpaulin
- 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-metaled 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 –

- 1420 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.

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

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.

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

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 nose prediction modelling.

TABLE 4.8: PREDICTED NOISE INCREMENTAL VALUES

Location ID	**N1**	**N2**	**N3**	**N4**	**N5**	**N6**	**N7**
Maximum Monitored Value (Day) dB(A)	56.6	54.7	55.4	53.9	54.9	53.9	54.7
Incremental Value dB(A)	50.56	46.48	27.04	29.73	24.54	26.12	30.00
Total Predicted Noise level dB(A)	57.56	55.31	55.41	53.92	54.90	53.91	30.00

The incremental noise level is found within the range of 50.56 dB (A) in Core Zone and 24.54 – 46.48 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 though 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:

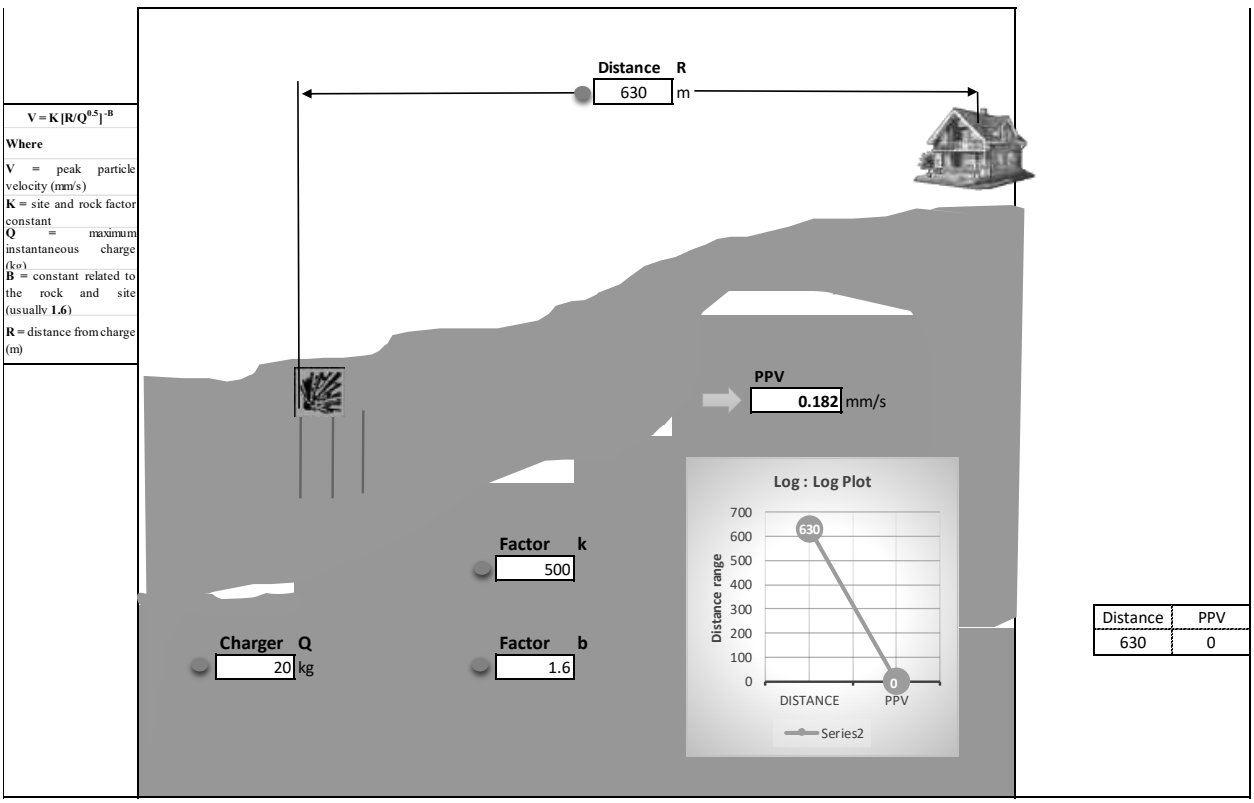
$$V = K\,[R/Q^{0.5}]^{-B}$$

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	20	630	0.182

FIGURE 4.6: GROUND VIBRATION PREDICTION



From the above graph, the charge per blast of 20 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. Hence the project proponent ensures that the charge per blast shall be less than 20 kg 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 20kg 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 BIOLOGICAL ENVIRONMENT

There is a requirement to establish a stable ecosystem with both ecological and economic returns. Minimization of soil erosion and dust pollution enhances the beauty of the core and the buffer zone. To achieve this, it is planned to increase plantation activities. The basic objectives of plantations are as follows: -

- Improvement of Soil quality
- Quick vegetative cover to check soil erosion
- Improvement in mining site stability
- Conservation of biological diversity
- As dust receptor which likely to produce during mining.

4.5.2 Mitigation Measures

4.5.2.1. General Guidelines for Green Belt Development

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.

- Plants that grow fast will be preferred.
- Preference for high canopy covers plants with local varieties.
- Perennial and evergreen plants will be preferred.
- The development of the Green Belt is an important aspect for any plant because:
  - **a.** It improves the ambient air quality by controlling Suspended Particulate Matter (SPM) in the air.
  - **b.** It helps in noise abatement for the surrounding area.
  - **c.** It helps in the settlement of new birds and insects within itself.
  - **d.** It maintains the ecological balance.
  - **e.** It increases the aesthetic value of the site.

4.5.2.2. Species Recommendation for Plantation granted in the district.

Following points have been considered while recommending the species for plantation

- The natural growth of existing species and the survival rate of various species.
- Suitability of a particular plant species for a particular type of area.
- Creating biodiversity.
- Fast-growing, thick canopy copy, perennial, and evergreen large leaf area.
- Efficient in absorbing pollutants without major effects on natural growth.
- The following species may be considered primary for plantations best suited for the prevailing climate condition in the area.

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

S. No	Name of the plant (Botanical)	Family Name	Common Name	Habit
1.	*Cassia roxburghii*	Fabaceae	Sengondrai	T
2.	*Syrygium cumini*	Myrtaceae	Naval	T
3.	*Morinda pubescens*	Rubiaceae	Nuna	T
4.	*Thespesia Populnea*	Malvaceae	Puvarasu	T
5.	*Borassus flabellifer*	Arecaceae	Panai	T
6.	*Saraca asoca*	Fabaceae	Asoca	T
7.	*Limonia acidissima*	Rutaceae	Odhiam	T
8.	*Lannea coromandelica*	Anacardiaceae	Vila maram	T
9.	*Pongamia pinnata*	Fabaceae	Pungam	T
10.	*Pterocarpus marsupium*	Fabaceae	Vengai	T

4.5.3. Anticipated Impact on Fauna

- No rare, endemic & endangered species are reported in the buffer zone. However, during the course of mining, the management will practice the scientific method of mining with a proper Environmental

Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.

- Fencing around the mine lease area to restrict the entry of stray animals.
- Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

4.5.3.1. 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 for 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.

4.5.3.2. Mitigation Measures

- A suitable plan for the conservation of Schedule-I Species have been prepared and the necessary fund for implementation for the same will be made.
- All the preventive measures will be taken for the growth & development of fauna.
- Creating and developing awareness for nature and wildlife in the adjoining villages.
- The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm.

4.5.4. Impact on Aquatic Biodiversity

Mining activities will not disturb the aquatic ecology as there is no effluent discharge proposed from the Rough stone & Gravel quarry. There is no natural perennial surface water body within the mine lease area, like wetlands, rivers streams, lakes, and farmer sites. There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. Kindly refer the Chapter 3, clause No 3.6.3. Aquatic biodiversity is observed in the study area.

Table No. 4.3. Overall Ecological impact assessments of Thenpalanzhi Village, Rough stone & Gravel quarry, Thirupparankundram Taluk, Madurai District.

S.No	Attributes	Assessment
1.	Impact of mining activity on agricultural land nearby the proposed project site.	Agricultural land is located away from the proposed project site. There are no impacts on the agricultural land & Horticulture and livestock. Kindly refer to the conclusion.
2.	Impact on soil flora & vegetation around the project site.	'No '

3.	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.
4.	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.
5.	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	'No '
6.	The proposed project restricts access to waterholes for wildlife	'No '
7.	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.
8.	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.
9.	Risk of fall/slip or cause death to wild animals due to project activities.	'No'
10.	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.
11.	Mining projects affect the forest-based livelihood/ any specific forest product on which local livelihood depended.	'No'
12.	The project likely to affect migration routes.	'No 'migration route observed during the monitoring period.
13.	The project is likely to affect the flora of an area, which have medicinal value	'No'
14.	Forestland is to be diverted, has carbon high sequestration.	'No 'There was no forest land diverted.
15.	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

SI.No	Name of the plant (Botanical)	Family Name	Common Name	Habit
1	*Azadirachta indica*	Meliaceae	Neem, Vembu	Tree
2	*Polyalthialongifolia*	Annonaceae	Kattumaram	Tree
3	*Borassus Flabellifer*	Arecaceae	Palmyra Palm	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 Neem, 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 tress proposed to be planted	Area to be covered in m^2	Name of the species
I	1420	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development.	Mahogany, Neem, Pungan, Puliyan etc.,

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 44m bgl and the life of the mine is 10 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 2.21.4Ha 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.

- This area denotes the indicative of flow pattern of the rock mass in N35^{0}E to S35^{0}W with dipping SE60^0.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility.
- Socio – economic background.

Enough infrastructure exists and lesser resources are required to be deployed. Since, any major construction for infrastructure is not required and hence does not affect the environment considerably

5.2 FACTORS BEHIND THE SELECTION OF PROJECT SITE

Thiru.K.Suresh Rough Stone & Gravel Quarry Project at Thenpalanzhi Village is a mining project for excavation of Rough Stone and gravel, which is site specific. 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 – II, 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 and gravel in the area. 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 this project. This technology is having least gestation period, economically viable, safest and less labour intensive. The method has in built flexibility for increasing or decreasing the production as per market condition. The proposed technology (open cast mining with mechanized excavation and modern dust/noise control measures) represents the most viable and sustainable option for this project.

6. ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

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 CTE/CTO.

6.1 METHODOLOGY OF MONITORING MECHANISM

Implementation of EMP and periodic monitoring will be carried out by Project Proponent. 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).

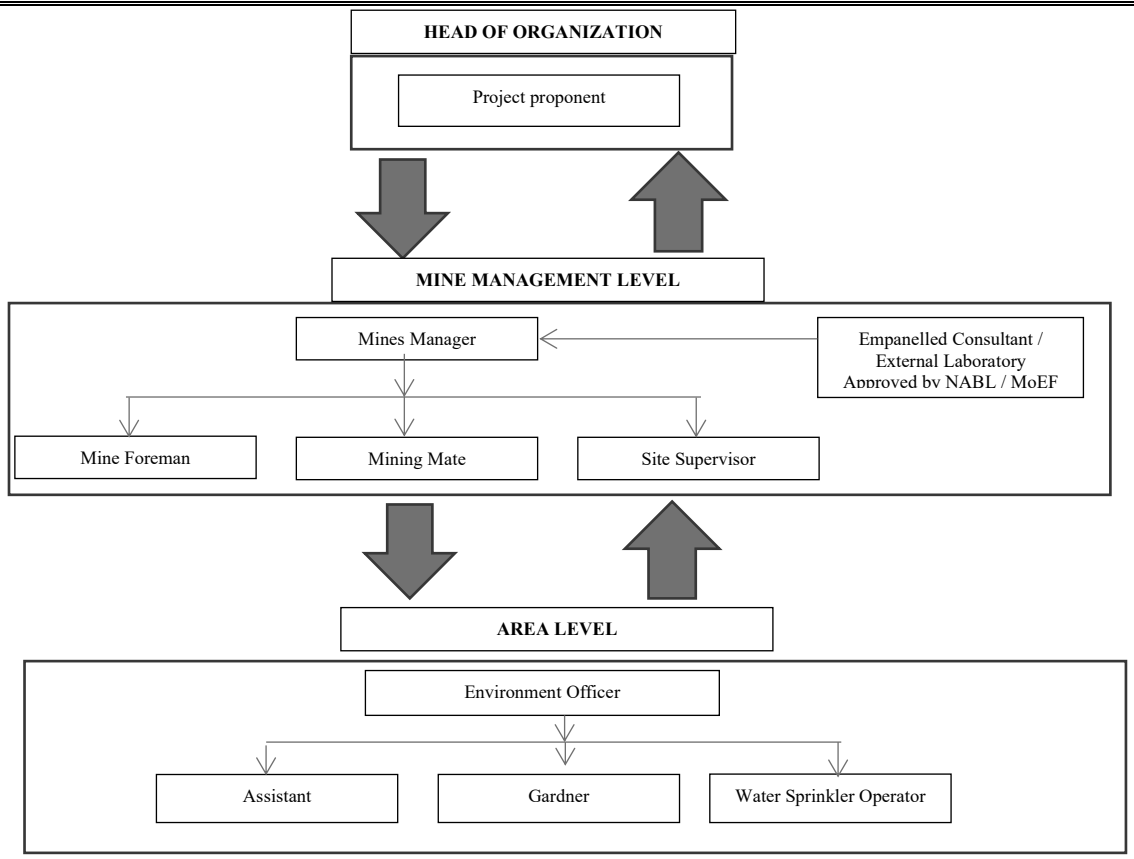


FIGURE 6.1: PROPOSED ENVIRONMENTAL MONITORING CELL PROPOSAL

* The Environmental Monitoring Cell will be formed in the proposed project

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 FOR PROPOSED PROJECTS

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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 are detailed in Table 6.2

TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC FOR MINES

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 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 7.3 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; ▪ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use

			▪ Working of quarry, as per approved plans and regularly updating the mine plans; ▪ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut; ▪ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager; ▪ Maintenance and testing of all mining equipment as per manufacturer ‘s guidelines.
2	Drilling	Improper and unsafe practices Due to high pressure of compressed air, hoses may burst Drill Rod may break	▪ Safe operating procedure established for drilling (SOP) will be strictly followed. ▪ Only trained operators will be deployed. ▪ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places, ▪ Drilling shall not be carried on simultaneously on the benches at places directly one above the other. ▪ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ▪ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ▪ Operator shall regularly use all the personal protective equipment.
4	Blasting	Fly rock, ground vibration, Noise and dust. Improper charging, stemming & Blasting/ fining of blast holes Vibration due to movement of vehicles	▪ 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. ▪ SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation ▪ Shots are fired during daytime only. ▪ All holes charged on any one day shall be fired on the same day. ▪ The danger zone will be distinctly demarcated (by means of red flags)
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 II. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated.

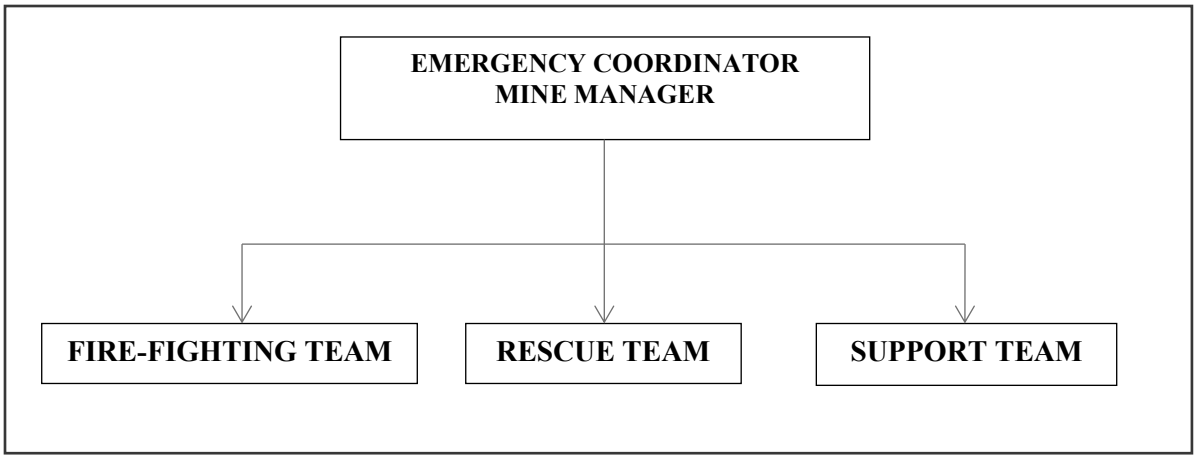
The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

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

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

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations 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 mine manager. In his absence senior most people available at the mine shall be emergency coordinator till arrival of mine 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 7.4: 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 proposed quarry. A mobile communication network and wireless shall connect Mine Emergency Control Room (MECR) to control various departments of the mine, fire station and neighbouring industrial units/mines.

7.4 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 7.5: LIST OF QUARRIES IN CLUSTER

CODE	Name of the Owner	Village	S.F. Nos	Extent in Ha	Status
PROPOSED QUARRY					
P1	**Thiru. K. Suresh,** S/o. Kovil Pillai, No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu State – 625 531.	Thenpalani	24/1B, 24/1F2, 24/1F3 & 24/1E	2.83.5 Ha	File No.13008 TOR Identification No. TO25B0108TN5648250N Dated: 06.01.2026
NEARBY PROPOSED QUARRY					
P2	**M/s.Nithyasree Green Energy**	Thenpalani	31(Part) (Thenpalani Periya Tank) (Rule- 7, Gravel Quarry- 3 Months)	2.17.0 Ha	-
	TOTAL EXTENT			**2.83.5 Ha**	
EXISTING QUARRY					
E-1	Thiru. M.Rajasekar	Thenpalani	20/3,21/1, 22/1B2A & 23/5	4.14.89	29.05.2025 To 28.05.2035
	TOTAL EXTENT			**4.14.89 Ha**	
EXPIRED/ABADONED QUARRY					
EX-1	Thiru. M.Rajasekar	Thenpalani	23/2B, 23/2E, 23/2F &23/3	1.61.0 Ha	23.11.2013 to 22.11.2018
	TOTAL EXTENT			**1.61.0 Ha**	
	TOTAL CLUSTER EXTENT			**6.98.39 Ha**	

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

TABLE 7.6: SALIENT FEATURES OF PROPOSAL -P1

Name of the Quarry	Thiru.K.Suresh Rough Stone & Gravel Quarry
Toposheet No	58 G/13
Latitude between	09°55'00.2645”N to 09°55'08.5231”N
Longitude between	77°59'47.2679"E to 77°59'53.7028”E

Highest Elevation	176 m AMSL	
Proposed Depth of Mining	44m bgl (4m Gravel + 40m Rough Stone)	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	11,34,000	1,13,400
Mineable Reserves	Rough Stone in m^3	Gravel m^3
	3,08,775	91,400
Year-wise Production for First Five years	Rough Stone in m^3	Gravel m^3
	2,18,165	91,400
Year-wise Production for Second Five years	Rough Stone in m^3	Gravel m^3
	90,610	-
Ultimate Pit Dimension	XY-AB: 51m (L) X 98m (W) X 29m BGL (D) XY-CD: 72m (L) X 116m (W) X 44m BGL (D) XY-EF: 50m (L) X 190m (W) X 34m BGL (D)	
Land Ownership	It is a Patta land. Registered in the name of applicant (Thiru.K.Suresh), vide Patta Nos.1839, 1862 An 1715	
Water Level in the surrounding area	96m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease area is a plain topography. The area has gentle slope towards Southwestern side. The altitude of the area is 383m (max) above mean sea level.	
Machinery proposal for this scheme period	Hand Jack Hammer	8 Nos
	Compressor	2 Nos
	Excavator with Bucket & Rock Breaker	2 Nos
	Tippers	3 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	35 Nos	
Total Project Cost	Rs.3,79,93,000/-	
Proposed CER Cost	Rs.3,00,000/-	
Nearby Water Bodies	Thenpalanzhi Periya Kanmoi	110m South
	Odai	250m SW
	Koothiyarkundu Kanmai	5.7km- SE
	Vaigai Raiver	6.6km NE
Greenbelt Development Plan	Proposed to plant about 1420 Nos of trees in the safety barrier and village roads considering 500 Nos of Trees per hectare.	
Proposed Water Requirement	3.0 KLD	
Nearest Habitation	630m -North East	

Source: Approved Mining Plan

TABLE 7.7: SALIENT FEATURES OF EXISTING QUARRY -E1

Name of the Project	Thiru.M.Rajasekar Rough stone and Gravel quarry
EC granted	File no.11829 EC Identification No.EC25C0108TN5417652N Dated.13.05.2025
S.F. No.	20/3, 21/1, 22/1B2A and 23/5
Extent	4.14.89 ha
Village Taluk and District	Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District.
Land Type	Proponent own patta land

Toposheet No	58 – G/13 and 58/K01	
Latitude between	09°54'53.95"N to 9°55'02.20"N	
Longitude between	77°59'55.17"E to 78°00'04.32"E	
Lease period	10 Years	
Mining Plan period	10 years	
Proposed Depth of Mining	52m [2m Gravel + 50m Rough stone] below ground level	
	Rough Stone in m^3	Gravel m^3
Mineable Reserves	3,04,340 m^3	43,426m^3
Year wise Production	3,04,340 m^3	43,426m^3
Peak Production	51,090 m^3	14,560 m^3
Water Level in the region	96 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives	
Machinery proposed	Jack Hammer	3Nos
	Compressor	1 No
	Excavator with Bucket and Rock Breaker	1Nos
	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	29 Nos	
Project Cost	Rs. 113 Lakhs	
EMP Cost	Rs. 8.62 Lakhs/-	
CER Cost	Rs. 3,00,000/-	
Greenbelt Development Plan	Proposed to plant 2075Nos of trees considering 500 Nos of trees/ Ha criteria The plantation will be developed around the project site and nearby village roads	
Proposed Water Requirement	1.9 KLD	
Nearest Habitation	420m-NE	

Air Environment –

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.17& 7.18.

TABLE 7.8: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

	PROPOSED PRODUCTION DETAILS			
Quarry	**10 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day (12 m^3 per load)**
P1	3,08,775	30,878	103	9
E1	3,04,340	30,434	101	8
Total	**6,13,115**	**61,312**	**204**	**17**

TABLE 7.9: CUMULATIVE PRODUCTION LOAD OF GRAVEL

	PROPOSED PRODUCTION DETAILS			
Quarry	**3 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day (12 m^3 per load)**
P1	91,400	30467	102	8
E1	43,426	14475	48	4

Total	**1,34,826**	**44942**	**150**	**12**

On a cumulative basis considering all the 2 quarries it can be seen that the overall production of Rough Stone is 204 m^3 per day, overall production of Gravel is 150 m^3 per day with a capacity of 17 trips of Rough Stone per day, 12 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 & Topsoil 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 7.19.

TABLE 7.10: 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	0.100530643	g/s
	Blasting	Point Source	0.002483730	g/s
	Mineral Loading	Point Source	0.045892172	g/s
	Haul Road	Line Source	0.002503832	g/s/m
	Overall Mine	Area Source	0.075060963	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.001484958	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000143967	g/s
EMISSION ESTIMATION FOR QUARRY "E1"				
	Activity	**Source type**	**Value**	**Unit**
Estimated Emission Rate for PM_{10}	Drilling	Point Source	0.100530526	g/s
	Blasting	Point Source	0.002483740	g/s
	Mineral Loading	Point Source	0.045892172	g/s
	Haul Road	Line Source	0.002503832	g/s/m
	Overall Mine	Area Source	0.075060963	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.001484951	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000143967	g/s

Source: Emission Calculations

TABLE 7.11: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM_{10} in µg/m^3	
Background	44.9
Incremental	18.92
Resultant	63.8
NAAQ Norms	**100 µg/m^3**
PM_{25} in µg/m^3	
Background	24.0
Incremental	10.8
Resultant	34.8
NAAQ Norms	**100 µg/m^3**
SO_2 in µg/m^3	
Background	6.8
Incremental	4.39
Resultant	11.2
NAAQ Norms	**80 µg/m^3**

NO_x in µg/m^3	
Background	22.4
Incremental	13.68
Resultant	36.1
NAAQ Norms	**80 µg/m^3**

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.

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

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.

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

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 7.12: PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	56.6	54.7	55.4	53.9	54.9	53.9	54.7
Incremental Value dB(A)	50.56	46.48	27.04	29.73	24.54	26.12	30.00
Total Predicted Noise level dB(A)	57.56	55.31	55.41	53.92	54.90	53.91	30.00

Source: Lab Monitoring Data

The incremental noise level is found within the range of 24.5 (Buffer zone) – 50.56 dB (A) in Core 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 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 7 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 7.22

TABLE 7.13: NEAREST HABITATION FROM EACH MINE

Location ID	Distance in Meters
Habitation Near P1	630m – NE
Habitation Near E1	420m – NE

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 7.14: GROUND VIBRATIONS FROM THE CLUSTER

Location Code	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	20	630m – NE	0.182
E1	20	420m – NE	0.349

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 2 mines shall contribute towards CER and the community shall develop.

TABLE 7.15: SOCIO ECONOMIC BENEFITS FROM THE CLUSTER

Location Code	Project Cost	CER Cost
P1	Rs.3,79,93,000/-	Rs.3,00,000/-
P2	Rs.1,13,00,000	Rs.3,00,000/-
Total	**Rs.4,92,93,000/-**	**Rs.6,00,000/-**

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.

- 1 Proposed project shall fund towards CER – **Rs 3,00,000/-**
- Existing project shall fund towards CER – **Rs 3,00,000/-**
- All Projects in Cluster shall fund towards CER – **Rs 6,00,000/-**

TABLE 7.16: EMPLOYMENT BENEFITS FROM THE CLUSTER

Quarry	**Employment**
P1	35 Nos
E1	29 Nos
Total	**64 Nos**

A total of 35 people will get employment due to 1 proposed mine in cluster and 29 people are already employed at existing mines.

TABLE 7.17: GREENBELT DEVELOPMENT BENEFITS FROM THE CLUSTER

CODE	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species
P1	1420	80%	Safety zone, village roads	Mahogany, Neem, Pungan, Puliyan etc.,
P2	2075	80%		
Total	**3495**			

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Mahogany, Neem, Pungan, Puliyan etc., in the Entire Cluster at a rate of 3495 Trees Planted over a period of 10 Years

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOAL

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 7.18: 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

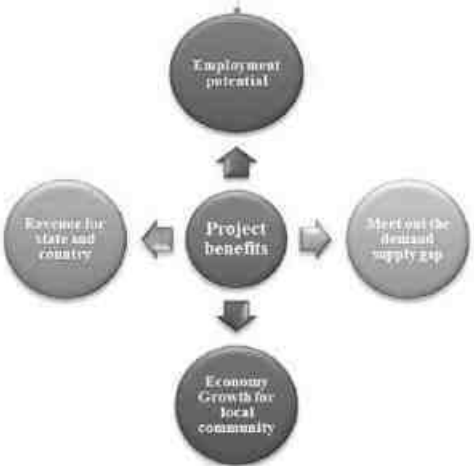
Source: Proposed by FAE's and EC

8. PROJECT BENEFITS

8.0 GENERAL

Thiru.K.Suresh for Quarrying Rough Stone and Gravel at Thenpalanzhi Village aims to produce cumulatively 3,08,775m^3 Rough Stone over a period of 10Years, 91,400m^3 of Gravel over a period of 3 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

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



8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 35 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

Thiru.K.Suresh Rough Stone and Gravel Quarry are located in Thenpalanzhi Village, Thirupparankundram Taluk and Madurai District of Tamil Nadu and the area have communications, roads and other facilities already well established. The following physical infrastructure facilities will further improve due to proposed mine.

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

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

8.5 OTHER TANGIBLE BENEFITS

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

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

8.6 CORPORATE SOCIAL RESPONSIBILITY

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

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

8.7 CSR Cost Estimation

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

8.8 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is ≤ 100 crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 3,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

TABLE 8.1: CER – ACTION PLAN

S. No.	Activity	Budget (Rs.in Lakh)
1	The applicant Indents to involve in corporate environment responsibilities (CER) activities to the nearby Government School for the following activities • Renovation of Existing toilet • Providing Environmental Related books to the class room • Carrying out tree plantation and its maintenance • Other requirement from the School administration Proponent intends to Spend Rs 5 Lakhs for the above said activities to the Government School near the project site.	Rs.3,00,000
Total		**Rs.3, 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.K.Suresh

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
Refuelling to be undertaken in a safe location, away from vehicle movement pathways&100 m away of any watercourse Refuelling activity to be under visual observation at all times. Drainage of refuelling 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
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 44 m BGL, the water table in the area is 96m 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
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 and Gravel 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 Coordinator

10.8 BIOLOGICAL ENVIRONMENT MANAGEMENT

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

- Greenbelt development all along the safety barrier of the project area
- It is also proposed to implement the greenbelt development 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 1420 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	Survival %	Area to be covered	Name of the species
I	1420	80%	Safety zone, village roads	Mahogany, Neem, Pungan, Puliyan etc.,

Source: Conceptual Plan of Approved Mining plan& 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

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

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

10.9.2 Proposed Occupational Health and Safety Measures –

- The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- Lightweight and loose-fitting clothes having light 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: ENVIRONMENTAL MANAGEMENT PLAN BUDGET FOR PROPOSED PROJECT

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring per annum
Air Environment	Haul road maintenance & Water sprinkling	Lump sum fund allocation for daily maintenance of haul roads and thrice a day water sprinkling by fixed sprinklers or water tankers	0	50000
	Muffle blasting – To control fly rocks during blasting	Lump sum fund allocation Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure	Lump sum fund allocation for ensuring wet drilling by covering drill holes with wet gunny bags and spraying water while drilling	0	10000
	No overloading of trucks/tippers/tractors	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Lump sum fund allocation Manual Monitoring through Security guard	0	5000

	Enforcing speed limits of 20 km/hr within ML area	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Regular monitoring of exhaust fumes as per RTO norms	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	5000
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	0
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 made in Operating Cost	0	0
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Provision made in Operating Cost	0	0

	3. Greenbelt development under safety zone during the Scheme period (150 Saplings)	Provision made in Operating Cost	0	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure 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	100000
	Workers will be provided with Personal Protective Equipment's	Lumpsum fund allocation	50000	15000
	Health check up for workers will be provisioned	IME & PME Health check up for all the employees will be covered batch wise.	0	50000
	First aid facility will be provided	Lumpsum fund allocation	0	5000
	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 will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Lumpsum fund allocation	50000	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Appointment of Competent person for ensuring the safety operation	Provision made in operational cost	0	0

	Control Dust and Fly rocks to the nearby structures	Erection of GI Sheet fencing on the North, North West & North East side of the project site	150000	10000
	Slope stability action plan	Slope stability action plan in the end of fourth year plan period	200000	0
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Lumpsum fund allocation	300000	0
TOTAL			**5,60,000**	**3,02,000**

Year wise Break Up Cost

Year	Total Cost	Year	Total Cost
1st	₹ 8,62,000	6st	₹ 3,85,437
2nd	₹ 3,17,100	7th	₹ 4,04,709
3rd	₹ 3,32,955	8th	₹ 4,24,944
4th	₹ 3,49,603	9th	₹ 4,46,192
5th	₹ 3,67,083	10th	₹ 4,68,501
Total Rs. 44 Lakhs			

Cost inflation 5% per annum

In order to implement the environmental protection measures, an amount of Rs.9.6 lakhs as capital cost and recurring cost as Rs. 3.02 lakhs as recurring cost is proposed considering present market price considering present market scenario for the proposed project.

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.K.Suresh Rough Stone & Gravel Quarry (Extent: 2.83.50 ha) 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.

A detailed Draft EIA/EMP Report is prepared for public and other stakeholders' suggestions and a final EIA/EMP Report will be prepared based on the outcome of Public Consultation.

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 October to December 2025 for various environmental components so as to assess the anticipated impacts of the cluster quarry projects 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 & Gravel as per market demand.

Sustainable and modern mining leads us to see positive impact of mining operation and providing consistent employment for nearly 35 people directly in the cluster and indirectly around 80 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.K.Suresh Rough Stone & Gravel Quarry (Extent: 2.83.50ha).

12. DISCLOSURE OF CONSULTANT

Company Profile: The Project Proponent Thiru.K.Suresh 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, Advaitha 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** **38**	**A** **B**	WP GEO SC	B A A
2	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	B A B
3	Mr. A. Allimuthu	In-house	-	-	LU SE	A B
4	Mr. N. Senthilkumar	Empanelled	**31** **38**	**A** **B**	AQ RH	A A
5	Mr. P. Panneer Selvam	In-house	-	-	EB	B
6	Mr. L. Jayaraj	In-house	-	-	HG	B
7	Mr. Vengadagiri Balasubramanian	In-house	-	-	GEO	A

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

ANNEXURE

THIRU.K. SURESH ROUGH STONE AND GRAVEL QUARRY

S.F. Nos: 24/1B, 24/1E, 24/1F2 and 24/1F3

Extent:2.83.50 ha
Thenpalanzhi Village
Thirupparankundram Taluk,
Madurai District, Tamil Nadu State

Total Cluster Extent = 6.98.39 Ha

Project Proponent

Thiru. K. Suresh,
S/o. Kovil Pillai,
No. 350 F2, Master Plan Complex Road,
Govt. ITI Back Side,
Theni Taluk and District,
Tamil Nadu State – 625 531

LIST OF ANNEXURES

Annexures	DESCRIPTION	PAGE NO
P1-	COPY OF TERMS OF REFERENCE	1A - 21A
	COPY OF 500M LETTER & APPROVAL LETTER	22A - 27A
	COPY OF MINING PLAN WITH PLATES	28A – 99A
	COPY OF HYDROLOGY REPORT	100A – 114A
E1-	COPY OF EXISTING EC COPY	115A - 157A
	COPY OF BASE LINE MONITORING DATA	158A-186A
	COPY OF CONSULTANT ACCREDITATION CERTIFICATE	187A

File No: 13008
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
***

Dated: **06/01/2026**

To,

SURESH K
No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni taluk and District - 625531, TAMIL NADU.
prithviaggregates@gmail.com

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

Sir/Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference along with Public Hearing (ToR) for the Proposed Rough Stone & Gravel Quarry over an extent of 2.83.50 Ha in S.F.Nos. 24/1B, 24/1E, 24/1F2 & 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu by Thiru. K. Suresh - "B1" and Schedule S.No.1(a) – ToR issued along with Public Hearing- preparation of EIA report – Regarding.

Ref:
1. Online proposal No. SIA/TN/MIN/557825/2025, Dated: 14.11.2025.
2. Minutes of the 651st Meeting of SEAC held on 11.12.2025.
3. Minutes of the 937th Meeting of Authority held on 23.12.2025.

2. The particulars of the proposal are as below:

(i) TOR Identification No.	TO25B0108TN5648250N
(ii) File No.	13008
(iii) Clearance Type	Fresh ToR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Rough Stone and Gravel Quarry Project Belongs to K. Suresh
(viii) Name of Company/Organization	SURESH K
(ix) Location of Project (District, State)	MADURAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xi) Applicability of General Conditions	no

(xii) Applicability of Specific Conditions no

1.In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.
2.The above-mentioned proposal has been considered by SEIAA in the meeting held on 23.12.2025. The minutes of the meeting and all the Application and documents submitted [viz. Form-1 Part A, Part B] are available on PARIVESH portal which can be accessed by scanning the QR Code above.
3.The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).
4.The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal of **Thiru. K. Suresh** under the provisions of EIA Notification, 2006 and as amended thereof.
5.The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
6.The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
7.This issues with the approval of the Competent Authority.
8.The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

Copy To

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

Annexure 1

Specific Terms of Reference s for (Mining Of Minerals)

1. Seiaa Specific Conditions :

S. No	Terms of Reference
1.1	After detailed discussions, the Authority accepts the recommendation of SEAC-II and decided to

S. No	Terms of Reference
	grant Terms of Reference (ToR) along with Public Hearing for the quantity of 3,08,775m^3 of Rough Stone & 91,400m^3 of Gravel up to the depth of 44m BGL. The annual peak production is 61,535m^3 of Rough Stone & 38,000m^3 of gravel as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-II & normal conditions & the SEIAA Standard conditions.

2. Seiaa Standard Conditions :

S. No	Terms of Reference
2.1	**<u>Cluster Management Committee</u>** 1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry. 2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc., 3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines. 4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. 5. The committee shall deliberate on risk & emergency management plan, fire safety & evacuation plan and sustainable development goals pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. 6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report. 7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner. 8. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity. **<u>Agriculture & Agro-Biodiversity</u>** 9. Impact on surrounding agricultural fields around the proposed mining Area. 10. Impact on soil flora & vegetation around the project site. 11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP. 12. The Environmental Impact Assessment should study the agro-biodiversity, agro- forestry, horti-cultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. **<u>Forests</u>** 15. The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife. 16. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.

S. No	Terms of Reference
	17. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 18. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. **Water Environment** 19. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. 20. Erosion Control measures. 21. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 23. The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment, by the activities. 24. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. 25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. 27. The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including Environmental stress. c) Sediment geochemistry in the surface streams. **Energy** 28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished. **Climate Change** 29. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. 30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features. 31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood. **Mine Closure Plan** 32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued. **EMP** 33. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs. 34. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan. **Risk Assessment** 35. To furnish risk assessment and management plan including anticipated vulnerabilities during

S. No	Terms of Reference
	operational and post operational phases of Mining. **Disaster Management Plan** 36. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. **Others** 37. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc. 38. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan. 39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the Environment. The ecological risks and impacts of plastic & microplastics on aquatic Environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

SEAC CONDITIONS - SITE SPECIFIC

Major Condition:

1. **During the meeting, the waste dump & a Shed was observed in KML of the proposed area. Hence, the Project Proponent shall remove the same and furnish photographic/videographic evidence, along with the EIA report.**
2. **From KML, mining was noticed in Eastern side of the proposed area and the PP shall furnish details of the same duly obtained from AD mines along with the EIA report.**

Other site-specific conditions:

1. **A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal:**
   - **(i) Copy of the agreement forming CMC.**
   - **(ii) The Organisation chart of the Committee with defining the role of the members**
   - **(iii) The 'Standard Operating Procedures' (SoP) executing the planned activities**.
2. The Geo referenced Boundary pillars to be erected on the field as per the mine rules and the evidence should be submitted along with the EIA report.
3. The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report.
4. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300m & upto 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.
5. The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.

6. The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.
7. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
8. The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures.
9. The PP shall prepare a conceptual working plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed and existing quarry wall.
10. The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/videographic evidence along with the EIA report.

SEAC STANDARD CONDITIONS

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 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 water bodies like lake, water tanks, etc are located within 1 km of the proposed quarry.
5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.
8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.
9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.
11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,

13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
14. Quantity of minerals mined out.
    - Highest production achieved in any one year
    - Detail of approved depth of mining.
    - Actual depth of the mining achieved earlier.
    - Name of the person already mined in that leases area.
    - If EC and CTO already obtained, the copy of the same shall be submitted.
    - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,
17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on

actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.

21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
28. Impact on local transport infrastructure due to the Project should be indicated.
29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.

31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detail ed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.

Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

STANDARD TERMS OF REFERENCE

1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
4) All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for

mining should have approval from State land use board or the concerned authority.

7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

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

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

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

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

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

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

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

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

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

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

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

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

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

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

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

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

32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

37) Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

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

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

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

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

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

    a) Executive Summary of the EIA/EMP Report

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

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

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

analysis/testing reports should be available during appraisal of the Project.

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

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

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

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

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

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

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

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

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

wells located around the site and impacts on the wells due to mining activity.

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

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

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

a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
b. All documents may be properly referenced with index, page numbers and continuous page numbering.
c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -l1013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website http://www.moef.nic.in/ may be referred.

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

Signature Not Verified

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

Date: 06/01/2026

From

Thiru.S.Vijayakumaran, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Madurai.

To

Thiru.K.Suresh,
S/o.Kovil Pillai,
No. 350 F2, Master Plan Complex
Road, Govt. ITI Back Side,
Theni Taluk and District.

Roc. No.1129/Mines/2025-1, dated. 15.10.2025

Sir,

Sub: Mines and Minerals - Minor Mineral – Rough stone and Gravel - Madurai District – Thirupparankundram Taluk – Thenpalanji Village – Patta lands - S.F. Nos. 24/1B etc., - Over an extent of 2.83.5 Hects - Application preferred by Thiru.K.Suresh - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - Reg.

Ref:
1. Quarry lease application preferred by Thiru. K.Suresh, dated.15.07.2025.
2. Precise area communication letter Roc No.1129/ Mines/2025, dated.19.09.2025.
3. Letter dated.Nil, received from Thiru. K.Suresh along with draft mining plan. (Received on 08.10.2025

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Thiru. K.Suresh has preferred an application for the grant of lease to quarry Rough stone and Gravel in S.F. Nos. 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) & 24/1E (0.58.00), over an extent of 2.83.5 Hects of Thenpalanji Village, Thirupparankundram Taluk, Maudrai District 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 over an extent of 2.83.5 hects of patta lands in

SF.Nos. 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) & 24/1E (0.58.00)in Thenpalanji Village, Thirupparankundram Taluk 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.K.Suresh has submitted the draft Mining Plan and the same has been examined in detail and found correct. The mining plan submitted by Thiru. K.Suresh 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.

15/10/2025

Deputy Director,
Dept. of Geology and Mining,
Madurai.

Copy To:

15/10/25

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

From

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

To

Thiru.K.Suresh,
S/o.Kovil Pillai,
No. 350 F2, Master Plan Complex
Road, Govt. ITI Back Side,
Theni Taluk and District.

Roc. No.1129/Mines/2025-2, dated. 15.10.2025

Sir,

Sub: Mines and Minerals - Minor Mineral – Rough stone and Gravel - Madurai District – Thirupparankundram Taluk – Thenpalanji Village – Patta lands - S.F. Nos. 24/1B etc., - Over an extent of 2.83.5 Hects - Application preferred by Thiru.K.Suresh - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - Reg.

Ref:
1. Quarry lease application preferred by Thiru. K.Suresh, dated.15.07.2025.
2. Precise area communication letter Roc No.1129/ Mines/2025, dated.19.09.2025.
3. Letter dated. Nil, received from Thiru. K.Suresh along with draft mining plan. (Received on 08.10.2025
4. This office letter even no, dated.15.10.2025.
5. Letter dated Nil. Received from Thiru. K.Suresh Received on 13.10.2025.

*****

Thiru. K.Suresh has preferred an application for the grant of lease to quarry Rough stone and Gravel in S.F. Nos. 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) & 24/1E (0.58.00), over an extent of 2.83.5 Hects of Thenpalanji Village, Thirupparankundram Taluk, Maudrai District 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 over an extent of 2.83.5 hects of patta lands in SF.Nos. 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) & 24/1E (0.58.00) in Thenpalanji Village, Thirupparankundram Taluk 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. K.Suresh has submitted the draft Mining Plan and the same has been approved on 15.10.2025. Moreover, 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 / Taluk	S.F.No.	Extent (in hects)	Collector's Proceedings No & date	Lease period
1.	Thiru. Rajasekar.M	Thenpalanji / Thirupparan kundram	20/3, 21/1, 22/1B2A & 23/5	4.14.89	Roc.No.1020/Mines/ 2024, Dated: 29.05.2025	29.05.2025 - 28.05.2035

b. Expired / Abandoned Quarries

Sl No	Name of the Owner	Village / Taluk	S.F.No.	Extent (in hects)	Collector's Proceedings No & date	Lease period
1.	Thiru. Rajasekar.M	Thenpalanji / Thirupparan kundram	23/2B, 23/2E, 23/2F & 23/3	1.61.0	Roc.No.237/ 2012 Dt 09.10.2013	23.11.2013 - 22.11.2018

c. Proposed Quarries

Sl No	Name of the Owner	Village / Taluk	S.F.No.	Extent (in hects)
1.	Thiru. K.Suresh	Thenpalanji / Thirupparan kundram	24/1B, 24/1F2, 24/1F3 & 24/1E	2.83.5
2.	M/s. Nithyashree Green Energy	Thenpalanji / Thirupparan kundram	31 (Part) (Thenpalanji Periya Tank) (Rule - 7, Gravel Quarry - 3 Months)	2.17.0

15/10/2025

Deputy Director,
Dept. of Geology and Mining,
Madurai

Copy to:

15/10/25

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

MINING PLAN ALONG WITH PROGRESSIVE QUARRY CLOSURE PLAN FOR THENPALANZHI ROUGH STONE AND GRAVEL QUARRY

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

Patta Land / Lease Period = Ten Years

IN

LOCATION OF THE QUARRY LEASE APPLIED AREA

EXTENT	: 2.83.5 Ha
S.F.NOs.	: 24/1B, 24/1E, 24/1F2 and 24/1F3
VILLAGE	: THENPALANZHI
TALUK	: THIRUPPARANKUNDRAM
DISTRICT	: MADURAI
STATE	: TAMIL NADU

FOR

APPLICANT

THIRU. K. SURESH,
S/o. Kovil Pillai,
No. 350 F2, Master Plan Complex Road,
Govt. ITI Back Side,
Theni Taluk and District,
Tamil Nadu State – 625 531
Mobile No. +91 99655 06413 and 98421 06413.

PREPARED BY

M. SANTHOSHKUMAR, M.Sc.,
Qualified Person
(Under Rule 15(I)(a) and (I)(b) of MCR, 2016)

Plot No.3, Kattuvattam, Kothukara Samathi Via,
Kannakurichi,
Salem District – 636 008.
Mobile No.: +91 92800 99263.
E-mail ID: santoshgeo2004@gmail.com

ABBREVIATIONS

- EIA - Environment Impact Assessment.
- EMP - Environment Management Plan.
- SEIAA - State Level Environment Impact Assessment Authority.
- SEAC - State Expert Appraisal Committee
- MoEF&CC - Ministry of Environment, Forest and Climate changes.
- CPCB - Central Pollution control board.
- TNPCB - Tamil Nadu Pollution control board.
- DMS - Director of Mines Safety.
- DGMS - Director of General Mines Safety.
- CRZ - Coastal Regulatory Zone.
- HACA - Hill Area Conservation Authority.
- S.F.No. - Survey Field Number.
- MMR - Metalliferous Mines Regulations.
- MCR - Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules.
- TNMMCR - Tamil Nadu Minor Mineral Concession Rules.
- PPV - Peak Particle Velocity.
- QP - Qualified Person.
- MSL - Mean Sea Level
- BGL - Below Ground Level
- MT - Metric Tonne
- RS - Rough Stone

K. SURESH,
S/o. Kovil Pillai,
No. 350 F2, Master Plan Complex Road,
Govt. ITI Back Side,
Theni Taluk and District,
Tamil Nadu State – 625 531
Mobile No. +91 99655 06413 and 98421 06413.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Thenpalanzhi Rough Stone and Gravel Quarry over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State has been prepared by

M. SANTHOSHKUMAR, M.Sc.,
Qualified Person

I have entrusted the works to prepare 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, 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.

M. SANTHOSHKUMAR, M.Sc.,
Plot No.3, Kattuvattam, Kothukara Samathi Via,
Kannakurichi,
Salem District – 636 008.
Mobile No.: +91 92800 99263.

I hereby undertake that all the responsibilities of contents in the Mining plan and if any corrections made in the Mining plan by the 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

(K. SURESH)

Place: Theni

Date: 11.09.2025

K. SURESH,
S/o. Kovil Pillai,
No. 350 F2, Master Plan Complex Road,
Govt. ITI Back Side,
Theni Taluk and District,
Tamil Nadu State – 625 531
Mobile No. +91 99655 06413 and 98421 06413.

DECLARATION OF THE APPLICANT

The Mining plan and Progressive Quarry Closure Plan in Respect of Thenpalanzhi Rough Stone and Gravel Quarry over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State has been prepared in full consultation with me by.

M. SANTHOSHKUMAR, M.Sc.,
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

(K. SURESH)

Place: Theni
Date: 17.09.2025

CERTIFICATE

Certified that I am, **M. SANTHOSHKUMAR, M.Sc.,** residing at Plot No.3, Kattuvattam, Kothukara Samathi Via, Kannakurichi, Salem District - 636 008, holding a Post Graduate Degree in Geology (M.Sc. Applied Geology) from Annamalai University, Chidambaram and I worked in the field of Mining in a role of Geologist.

Rule 15(I)(a) and (b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 stipulates the eligibility for preparing Mining plans as "(I)(a) a post graduate degree in Geology granted by a university established" and (I)(b) "Professional experience of five years of working in a supervisory capacity in the field of mining after obtaining the degree". Since my qualification and experience are satisfied the Rule (I)(a) and (I)(b) of 15 of the said Rules, I am eligible to prepare Mining Plans for both Major and Minor Minerals.

Accordingly, I prepared this Mining plan and Progressive Quarry Closure Plan in Respect of Thenpalanzhi Rough Stone and Gravel Quarry over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State for **Thiru. K. Suresh,** S/o. Kovil Pillai residing at No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu – 625 531. Since the Mining Plan is prepared as per the provisions contained in Rule 15(I)(a) and (I)(b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Signature of the Qualified Person

M.S

(M. SANTHOSHKUMAR, M.Sc.,)

Place: Salem

Date: 17.09.2025

M. SANTHOSHKUMAR, M.Sc.,
Plot No.3, Kattuvattam, Kothukara Samathi Via,
Kannakurichi,
Salem District – 636 008.
Mobile No.: +91 92800 99263.
E-mail ID: santoshgeo2004@gmail.com

CERTIFICATE FROM THE QUALIFIED PERSON

This is to certify that the Provisions of Prepared under Rules 41 & 42 as Amended in Tamil Nadu Minor Mineral Concession Rules, 1959. The preparation of Mining plan and Progressive Quarry Closure Plan for Thenpalanzhi Rough Stone and Gravel Quarry over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State has been prepared for

THIRU. K. SURESH,
S/o. Kovil Pillai,
No. 350 F2, Master Plan Complex Road,
Govt. ITI Back Side,
Theni Taluk and District,
Tamil Nadu State – 625 531
Mobile No. +91 99655 06413 and 98421 06413.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of the Deputy 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 Qualified Person

M. Santoshi

(M. SANTHOSHKUMAR, M.Sc.,)

Place: Salem

Date: 17.09.2025

M. SANTHOSHKUMAR, M.Sc.,
Plot No.3, Kattuvattam, Kothukara Samathi Via,
Kannakurichi,
Salem District – 636 008.
Mobile No.: +91 92800 99263,
E-mail ID: santoshgeo2004@gmail.com.

CERTIFICATE FROM THE QUALIFIED PERSON

Certified that the Provisions of Mines Act, Rules and Regulations or Orders made there under have been observed in the preparation of Mining plan and Progressive Quarry Closure Plan for Thenpalanzhi Rough Stone and Gravel Quarry over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State has been prepared for

THIRU. K. SURESH,
S/o. Kovil Pillai,
No. 350 F2, Master Plan Complex Road,
Govt. ITI Back Side,
Theni Taluk and District,
Tamil Nadu State – 625 531
Mobile No. +91 99655 06413 and 98421 06413.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of Director of Mines Safety (DMS), 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 Qualified Person

M. Santosh

(M. SANTHOSHKUMAR, M.Sc.)

Place: Salem
Date: 17.09.2025

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MINING PLAN ALONG WITH PROGRESSIVE QUARRY CLOSURE PLAN FOR THENPALANZHI ROUGH STONE AND GRAVEL QUARRY

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

INTRODUCTION AND EXECUTIVE SUMMARY:

The applicant **Thiru. K. Suresh**, S/o. Kovil Pillai residing at No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu State – 625 531 has entrust 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 for quarrying Rough stone and Gravel over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District for the period of Ten years under rule 19 and 20(2)(a) of Tamil Nadu Minor Mineral Concession Rules, 1959.

The application was examined, Scrutinized, Inspected and processed by the Deputy Director, Department of Geology and Mining, Madurai District and passed a precise area communication letter vide **R.C.No.1129/Mineral/2025, Dated: 10.09.2025** under rule 19 and 20(2)(a) of Tamil Nadu Minor Mineral Concession Rules, 1959 for submission of Draft Mining plan and obtain approval within 90 days under Rules 41 and 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 the applicant should obtain Environmental Clearance from the Environment Impact Assessment Authority, Tamil Nadu to quarrying Rough stone for the period of **Ten years** with following conditions (Refer Annexure No. I):

General Condition:

1. A safety distance of 7.5 meters should be provided to the adjacent patta lands.

Special Condition:

1. Before execution of Lease deed, the applicant should be relocating the Low-tension power line and Pole on the Southern side of the applied area.

This Mining Plan along with Progressive quarry closure Plan is prepared in full consent with **Thiru. K. Suresh**, S/o. Kovil Pillai residing at No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District, Tamil Nadu State – 625 531 in respect of Thenpalanzhi Rough stone and Gravel quarry over an extent 2.83.5 Hectares of patta lands in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State under amended Rule 41 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 investigation, geological survey, collection of Primary & secondary data, geological attributes, environmental setting and estimated the Resources & Reserves, depth of mining as identified in the field with best our knowledge and experience without any geological exploration. This present 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 investigation was carried out by the Qualified Person and his Team as on 12.09.2025.

Short Notes of Mining plan:

a. Village Panchayat - Vadapalanzhi

b. Panchayat Union - Thirupparankundram

c. Total extent of the lease applied area is 2.83.5 Ha.

d. Topography of the area - Flat topography.

e. The Estimated Reserves and Resources are given table below (Refer Plate No. III & III-A):

Table – 1

Description		Rough stone (MT)	Gravel (MT)
Estimated Geological Resources		31,18,500	2,26,800
Tentative Mineable Reserves		8,49,131	1,82,800
Proposed production schedule	1st five years	5,99,953	1,82,800
	2nd five years	2,49,178	-
Annual Peak Production		1,69,221	76,000
Depth of Estimation		40m	4m

The EIA and EMP will be prepared for maximum proposed reserves and the Impact will be accounting an annual peak production value.

f. Proposed Depth of mining = 44m – BGL (R.L. 176m – R.L. 132m)

g. Lease Period = Ten Years

h. Mining Plan period = Five Years

i. It is a fresh lease applied area, at present the area is virgin. Hence, no existing pit.

j. Method of mining / level of mechanization.

Opencast mechanized method, the quarry operation involves Hand Jack hammer is proposed to drilling and slurry blasting with NONEL initiation,

k. Type of machineries proposed in the quarrying operation is given below.

Excavators attached with 0.90m³ Bucket and rock breaker.

Jack hammer, Compressor (Diesel drive) (4 Jack hammer capacity)

Tippers.

l. No trees will be uprooted due to this quarry operation.

m. The approach road from the main road to quarry is already existence; the same will be maintain in good condition for the haulage of quarry materials and machineries.

n. There is No Export of this Rough stone and Gravel.

o. 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 and places of worships is marked and enclosed as Plate Nos. IA & IC.

p. The lease applied area is bounded by twenty two corners; the corners are designated as 1 – 22 clock-wise from the Southeastern corner and Co-ordinates for all the corners are clearly marked in the Quarry Lease Plan and Surface Plan enclosed as Plate No. II.

q. 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. III and III-A.

r. General conditions will not 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.

s. There is no waste anticipated during entire quarry operation. Hence, waste dump is not proposed in the lease applied area.

t. Around 35 employees are proposed to deploying the quarrying operation.

u. Total Cost of the project is about **Rs.3,79,93,000/-**.

1.0 GENERAL INFORMATION

1.1 Name of the Applicant with Address:

Name	:	**Thiru. K. Suresh**, S/o. Kovil Pillai
Address	:	No. 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Taluk and District,
State with PIN Code	:	Tamil Nadu State – 625 531.
Mobile No.	:	+91 99655 06413 and 98421 06413
Aadhaar No.	:	5119 3523 8350 (Refer Annexure No. VII)
E-mail ID	:	prithviaggregates@gmail.com.

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

The applicant is an Individual.

1.3 Mineral which the Applicant intends to mine:

The Applicant intends to quarry Rough stone and Gravel.

1.4 Period of permission / lease to be granted:

Ten Years as mentioned in Precise area Communication letter.

1.5 Name and address of the Qualified Person who preparing the Mining Plan:

Name	:	**M. SANTHOSHKUMAR, M.Sc.,** Qualified Person (As per Rule 15(I)(a) and (I)(b) of MCR, 2016)
Address	:	Plot No. 3, Kattuvattam, Kothukara samathi via, Kannankurichi, Salem District,
State with PIN Code	:	Tamil Nadu – 636 008.
Mobile No.	:	+91 92800 99263
Email	:	santoshgeo2004@gmail.com

(Refer Annexure Nos. VIII and VIII-A).

1.6 Name and Address of the Prospecting Agency:

State Geology and Mining Department, Government 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 regional exploration studies and geological mapping in Tamil Nadu. Besides, the Qualified Person and his team members made a detailed geological study of the proposed area and the Rough stone is clearly inferred from the surface outcrop and adjacent existing quarry pit. No detailed Exploration has carried out.

1.7 Reference no. Date of grant/ Precise Area Communication received form the State Government:

The precise area communication letter was received from the Deputy Director, Department of Geology and Mining, Madurai District vide **R.C.No.1129/Mineral/2025, Dated: 10.09.2025** (Refer Annexure No. I) and was given to us for the preparation of mining plan to meet out the applicant's production schedule.

2.0 LOCATION AND ACCESSIBILITY:

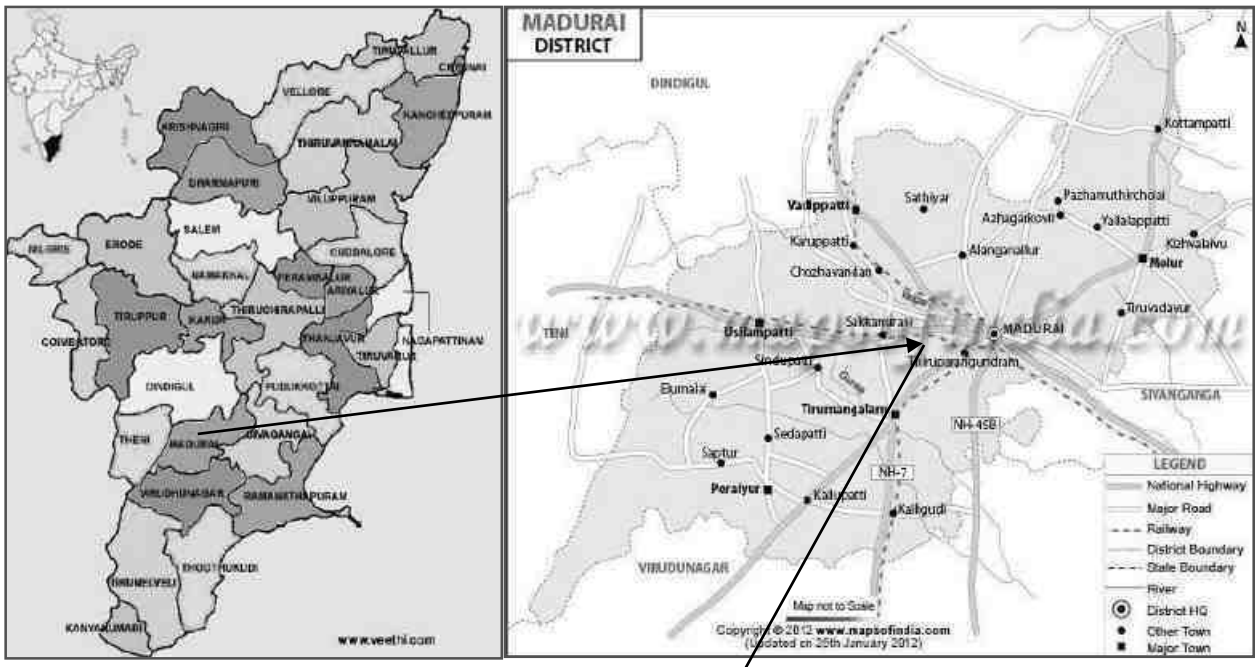
2.1. Details of the area with location map:

The lease applied area is located about 14km Southwestern side of Madurai town, 6km Northwestern side of Thirupparankundram town and 1.3km Northwestern side of Thenpalanzhi hamlets.

Madurai —9km→ Thirupparankundram —5km→ Thenpalanzhi —1.3km→ Lease applied area

Northeast Northwest Northwest

Location Map of the Lease Applied area



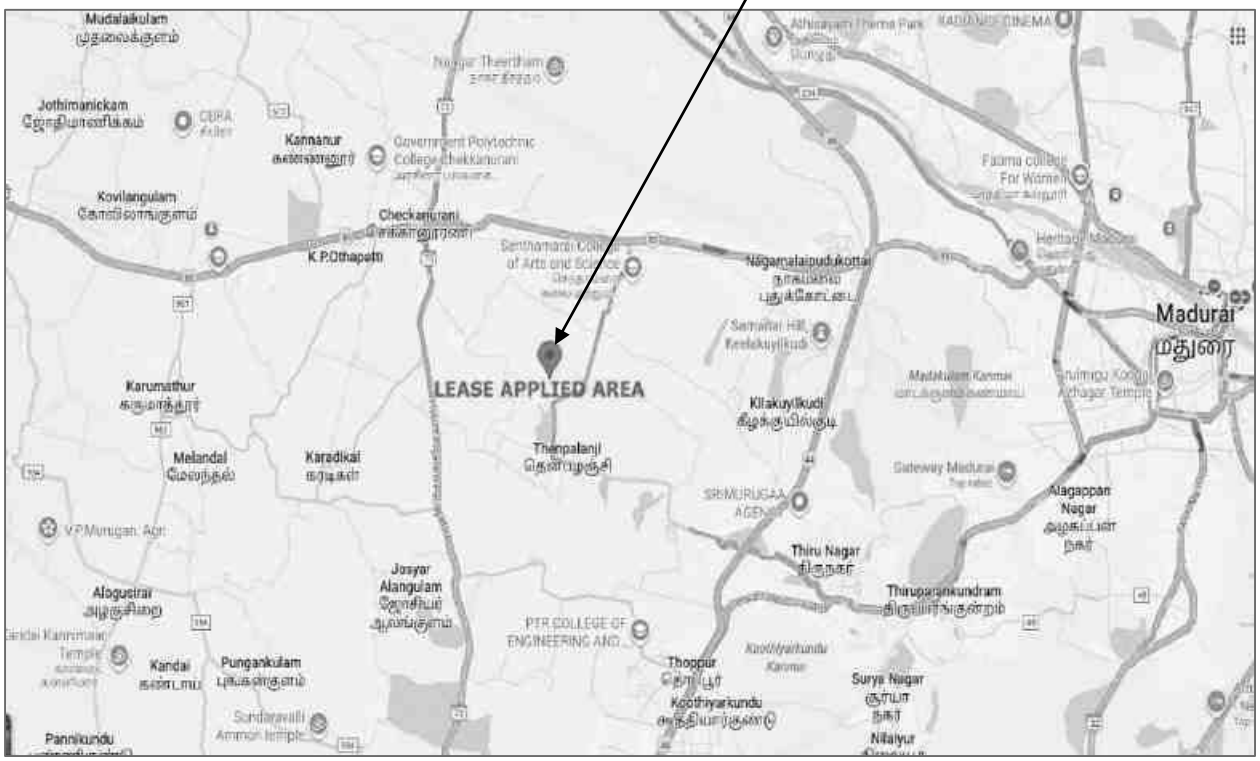


Table – 2

District	Taluk	Village	S.F. No.	Area (Ha.)	Patta no.
Madurai	Thirupparankundram	Thenpalanzhi	24/1B	0.90.5	1839
			24/1E	0.58.0	1862
			24/1F2	1.11.5	1715
			24/1F3	0.23.5	
			Total	**2.83.5**	-

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

2.2. Classification of the area (Ryotwari/ Poramboke / others):

It is a patta land, classified as punsei (Refer Annexure No. IV to VI).

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

It is patta lands, registered in the name of applicant (Thiru. K. Suresh) vide patta Nos. 1839, 1862 and 1715 (Refer Annexure No. IV to VI).

2.4. Existence of public road / Railway line, if any nearby and approximate distance:

The approach (cart track) road is situated on the Southeastern side, which is connects to the Thenpalanzhi – Vadapalanzhi Village Road situated at 700m on the Southeastern side of the lease applied area.

Road access is available from the quarry to National Highway, no towns are enrooted hence the traffic density is not much more due to the transportation of Rough stone and Gravel.

The approach road from the quarry is already existence and the same has been utilized for haulage and maintained during the entire lease period.

The Nearest Railway line is Madurai to Theni which is located at 2.2km on the Northern side of the area as per the GSI Toposheet and Google Map.

2.5. Toposheet No. with latitude and longitude:

The lease applied area falls in the Toposheet No: **58G/13** Latitude between: **09°55'00.2645"N to 09°55'08.5231"N** and Longitude between: **77°59'47.2679''E to 77°59'53.7028"E** on WGS datum-1984 as per the GSI Toposheet (Refer Plate Nos. I to II).

PART – A

3.0 GEOLOGY AND EXPLORATION:

3.1 Brief description of the Topography and general Geology of the area (with plans):

The lease applied area is situated in flat terrain. The gradient of the area towards Southern side and altitude of the area is 176m above from Mean Sea Level. The area is covered by gravel having an average thickness of 4m and followed by Massive Charnockite which is clearly inferred from the adjacent existing quarry pit.

The Water level in the surrounding area is 96m below from general ground profile which is observed from private borewells. Average annual rainfall is about 827mm.

Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with accumulation of recent quaternary formation. On regional scale of the Charnockite body is N40°E – S40°W with dipping towards SE60º.

The general geological sequences of the rocks in this area are given below:

AGE		FORMATION
Recent	-	Quaternary formation (Gravel)
---------Unconformity----------		
Archaean	-	Charnockite
		Peninsular Gneissic complex

3.2 Details of exploration already carried out if any:

State Geology and Mining Department, 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 is clearly inferred from the surface outcrops and adjacent existing quarry pit.

3.3 Estimation of Reserves:

a) Geological Resources 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, commercial aspects etc.,

Totally four sections have been drawn, one along the strike direction as (X-Y) Length wise and other three cross sections drawn perpendicular to strike (A-B, C-D & E-F) Width wise to cover the maximum area considered for lease upto 44m depth below from the ground profile.

The Topographical, Geological plan and sections demarcated the commercial marketable Rough stone and Gravel deposit has been prepared in the scale of 1:1000 (please refer the Geological plan and sections Plate No. III). As the sale of Rough stone and Gravel are in terms of Metric Tonnes and the Bulk density has been considered as 2.75 for Rough stone and 2 for Gravel. No Exploration has been carried out.

Estimation of Geological Resources (Plate No. III):

The Geological Resources of Rough stone and Gravel are estimated upto a depth of 44m [4m Gravel + 40m Rough stone] below from existing ground profile. Due to irregular shape of the area, the Geological resources are estimated by area method and total estimated geological resources are given table below (Plate No. III):

TABLE – 3

Extent (Ha.)	Area/Ha (m^2)	Area (m^2)	Depth (m)	Rough stone @ 100% Recovery (m^3)	Gravel (m^3)	Bulk density	Rough stone @ 100% Recovery (MT)	Gravel (MT)
2.83.5	10000	28350	4	-	113400	2	-	226800
		28350	40	1134000	-	2.75	3118500	-

Estimated Geological Resources of Rough Stone : **31,18,500 MT**

Estimated Gravel : **2,26,800 MT**

Geological Resources has been estimated based on the physical investigation and filed survey data**.**

Tentative Mineable Reserves:

The mineable reserves are estimated after leaving the safety distance and Bench loss.

TABLE – 4

Section	Bench	Length (m)	Width (m)	Depth (m)	Rough Stone @ (100%) (m^3)	Gravel (m^3)	Bulk Density	Rough Stone @ (100%) Recovery (MT)	Gravel (MT)
XY-AB	i	51	98	4	-	19992	2	-	39984
	ii	33	85	5	14025	-	2.75	38568.75	-
	iii	25	75	5	9375	-	2.75	25781.25	-
	iv	18	65	5	5850	-	2.75	16087.5	-
	v	11	55	5	3025	-	2.75	8318.75	-
	vi	5	45	5	1125	-	2.75	3093.75	-
Total					**33400**	**19992**	-	**91850**	**39984**
XY-CD	i	72	116	4	-	33408	2	-	66816
	ii	72	103	5	37080	-	2.75	101970	-
	iii	72	87	5	31320	-	2.75	86130	-
	iv	72	74	5	26640	-	2.75	73260	-
	v	72	62	5	22320	-	2.75	61380	-
	vi	72	49	5	17640	-	2.75	48510	-
	vii	72	37	5	13320	-	2.75	36630	-
	viii	67	27	5	9045	-	2.75	24874	-
	ix	57	16	5	4560	-	2.75	12540	-
Total					**161925**	**33408**	-	**445294**	**66816**

XY-EF	i	50	190	4	-	38000	2	-	76000
	ii	43	163	5	35045	-	2.75	96373.75	-
	iii	38	133	5	25270	-	2.75	69492.5	-
	iv	33	120	5	19800	-	2.75	54450	-
	v	28	108	5	15120	-	2.75	41580	-
	vi	23	95	5	10925	-	2.75	30043.75	-
	vii	18	81	5	7290	-	2.75	20047	-
Total					**113450**	**38000**	-	**311987**	**76000**
Grand Total					**308775**	**91400**	-	**849131**	**182800**

Tentative Mineable Reserves of Rough Stone : **8,49,131 MT**

Estimated Gravel : **47,700 MT**

The Tentative mineable reserves have been estimated at the rate of 100% recovery upto a depth of 44m below from the ground profile.

4.0 MINING:

4.1 Method of mining (opencast / underground):

Open cast Mechanized Mining is being carried out with 5.0 meters 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. The relaxation will be applied and obtained after execution of lease deed/ commencement of quarry operation. 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.

4.2 Mode of working (mechanized/ manual):

The Rough Stone is proposed to quarry at 5m bench height & width with conventional Opencast Mechanized Method.

The quarry operation involves Drilling, Blasting, Rock breaking, 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 by considerable volume from the parent rock mass by drilling with Hand Jack Hammer and blasting, the liberated Rough stone will be loaded into the Tipper by hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers.

Hydraulic excavators are attached with rock breakers for fragmentation of large boulders to avoid secondary blasting and easy handling of material. 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.

4.3 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.

4.4 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 Composite year wise Development and production plan and sections indicating the Pit lay out, Greenbelt development are shown in Plate No. III and III-A.

Year wise Development and Production

TABLE – 5

YEARWISE DEVELOPMENT AND PRODUCTION FOR 1st FIVE YEARS

Year	Section	Bench	Length (m)	Width (m)	Depth (m)	Rough Stone @ (100%) (m^3)	Gravel (m^3)	Bulk Density	Rough Stone (MT)	Gravel (MT)
I	XY-EF	i	50	190	4	-	38000	2	-	76000
		ii	37	163	5	30155	-	2.75	82926	-
		iii	27	133	5	17955	-	2.75	49376	-
	Total					**48110**	**38000**	-	**132302**	**76000**
II	XY-EF	ii	6	163	5	4890	-	2.75	13447.5	-
		iii	11	133	5	7315	-	2.75	20116	-
	XY-CD	i	72	116	4	-	33408	2	-	66816
		ii	62	103	5	31930	-	2.75	87807.5	-
		iii	40	87	5	17400	-	2.75	47850	-
	Total					**61535**	**33408**	-	**169221**	**66816**

III	XY-AB	i	51	98	4	-	19992	2	-	39984
	XY-CD	iii	15	87	5	6525	-	2.75	17944	-
	XY-EF	iv	33	120	5	19800	-	2.75	54450	-
		v	28	108	5	15120	-	2.75	41580	-
	Total					**41445**	**19992**	-	**113974**	**39984**
IV	XY-CD	iv	48	74	5	17760	-	2.75	48840	-
		v	40	62	5	12400	-	2.75	34100	-
	Total					**30160**	-	2.75	**82940**	-
V	XY-CD	vi	35	49	5	8575	-	2.75	23581	-
		vii	30	37	5	5550	-	2.75	15262.5	-
		viii	25	27	5	3375	-	2.75	9281.25	-
		ix	15	16	5	1200	-	2.75	3300	-
	XY-EF	vi	23	95	5	10925	-	2.75	30043.75	-
		vii	18	81	5	7290	-	2.75	20047.5	-
	Total					**36915**	-	2.75	**101516**	-
Grand Total						**218165**	**91400**	-	**599953**	**182800**

The Recoverable reserves have been estimated as **5,99,953 MT** of Rough stone and **1,82,800 MT** of Gravel @ 100% recovery upto a depth of 44m below from the ground profile for first five years (Refer Plate No. III).

TABLE – 5A

YEARWISE DEVELOPMENT AND PRODUCTION FOR 2nd FIVE YEARS								
Year	**Section**	**Bench**	**Length (m)**	**Width (m)**	**Depth (m)**	**Rough Stone @ (100%) (m^3)**	**Bulk Density**	**Rough Stone (MT)**
VI	XY-AB	ii	33	85	5	14025	2.75	38569
	XY-CD	ii	10	103	5	5150	2.75	14163
	Total					**19175**	**2.75**	**52732**
VII	XY-CD	iii	17	87	5	7395	2.75	20336
		iv	24	74	5	8880	2.75	24420
	Total					**16275**	**2.75**	**44756**
VIII	XY-CD	v	32	62	5	9920	2.75	27280
	XY-AB	iii	25	75	5	9375	2.75	25781
		iv	18	65	5	5850	2.75	16088
	Total					**25145**	**2.75**	**69149**
IX	XY-CD	vi	37	49	5	9065	2.75	24929
		vii	42	37	5	7770	2.75	21367
	Total					**16835**	**2.75**	**46296**
X	XY-CD	viii	42	27	5	5670	2.75	15592.5
		ix	42	16	5	3360	2.75	9240
	XY-AB	v	11	55	5	3025	2.75	8318.75
		vi	5	45	5	1125	2.75	3093.75
	Total					**13180**	**2.75**	**36245**
Grand Total						**90610**	**2.75**	**249178**

The Recoverable reserves have been estimated as **2,49,178 MT** of Rough stone at 100% recovery for **remaining five years of the lease period** (Refer Plate No. III-A). Total excavation will be proposed **8,49,131 MT** of Rough stone and **1,82,800 MT** of Gravel for the period of ten years upto a depth of 44m.

Annual peak production capacity in the quarry is **1,69,221 MT of Rough stone** and **76,000 MT of Gravel** and the proposed production schedule is arrived as per applicant's requirement and the **EIA & EMP will be prepared an annual peak production.**

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 of Mine Safety, Chennai region by submitting relevant documents, appropriate safety plans and its Mitigation measures.

One lorry load	=	20 MT (approximate)
Total Number of Working days	=	300 days per year
Total quantity to be removed during this plan period		
(RS 8,49,131 MT + Gravel 1,82,800 MT)	=	10,31,931 MT
Maximum material handling on one year		
(RS 1,69,221 MT + Gravel 66,816 MT)	=	2,36,037 MT
Hence maximum lorry loads per day	=	2,36,037 MT/20 MT
	=	11,802 lorry loads
	=	11,802/300 Days
Maximum	**=**	**39 lorry loads per day**.

Working hours = 8.30 am to 5.30 pm (with 12.30-1.30 P.M. lunch break).

4.5 Machineries to be used:

For Mining:

The following machineries are utilized for the development and production work at this quarry.

TABLE – 6

I. DRILLING MACHINE:

S. No.	Type	Nos.	Dia Hole mm	Size Capacity	Motive power
1	Hand Jackhammer	8	32	1.2m to 2.0m	Air Compression
2	Compressor	2	-	400 psi	Diesel Drive

II. EXCAVATION & LOADING EQUIPMENT:

S. No.	Type	Nos.	Capacity	Motive Power
1	Excavator with Bucket and Rock Breaker	2	300	Diesel Drive

III. HAULAGE WITHIN THE MINE & TRANSPORT EQUIPMENT:

S. No.	Type	Nos.	Capacity	Motive Power
1	Tipper	3	20 tonnes	Diesel Drive
2	Water Sprinkling Tanker	1	10,000 litres	Diesel Drive

4.6 Brief note on conceptual mining plan for the entire lease period base on the geological, mining and environmental 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 awarded quarry lease for Ten years, the ultimate pit limit (dimension) at the end of this lease period is given below:

TABLE – 7

Section	Length (m)	Width (m)	Depth (m) (Max.)
XY-AB	51	98	29m – BGL (R.L. 176m – 147m)
XY-CD	72	116	44m – BGL (R.L. 176m – 132m)
XY-EF	50	190	34m – BGL (R.L. 176m – 142m)

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 and V. As per the NGT orders the applicant is directed to plant 500 tree saplings per hectares along the quarry site either at the regular or the phased manner by planting native species.

There is no waste anticipated during the entire life of quarry. Hence, there is no proposal for backfilling. After completion of quarry operations, the quarry pit will be allowed to collect the seepage and rain water, the water storage will be kept as temporary reservoir to charging the nearby wells and utilized for greenbelt development. When the quarry reaches its ultimate pit limit or at the end of life of quarry, greenbelt development will be carried out over the quarried out top bench. The Conceptual Mining is based upon the entire ROM proposed for the life of the Mine.

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).

5.0 BLASTING:

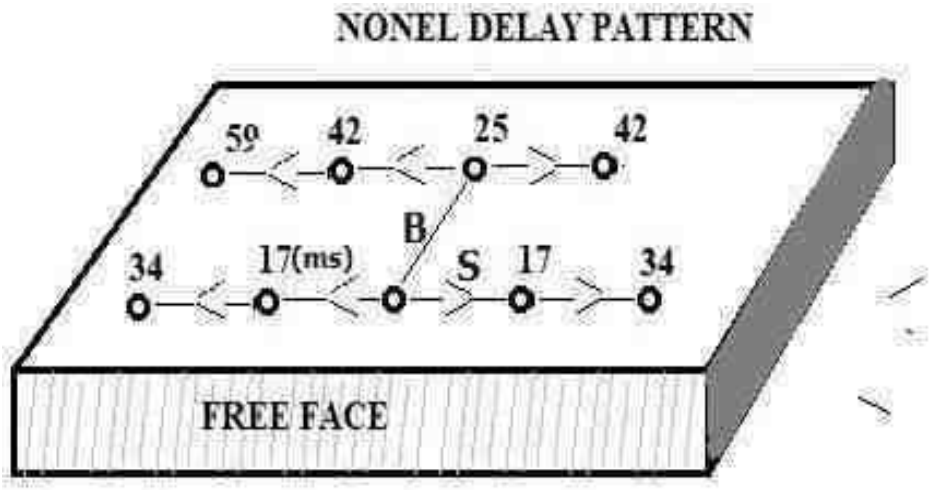
5.1 Blasting pattern:

Selection of drilling pattern for blasting varies with the type and size of the drills used, depth of hole, kind of rock, quantity, rapidity of the explosives and amount of steaming. The quarrying operation is proposed to carried out by Jack hammer drilling and blasting of shattering effect for loosen the Rough Stone with NONEL initiation. Hand Jackhammer drilling will be proposed for drilling and blasting for splitting the boulders from parent rock mass followed by rock breaker attached with excavator for secondary fragmentation of large size boulders to avoid secondary blasting. Nonel initiation provides reasonably good solution to fly rock problem. The main objectives of Nonel Blasting are to reduce the ground vibration, noise, fly rocks generated due to blasting operations. The overall cost of blasting in NONEL is very less compared to electrical blasting hence it optimizes the cost of blasting.

Drilling and blasting parameters are as follows:

Depth of Each hole	:	1.5m
Spacing between holes	:	1.0m
Burden for hole	:	0.75m
Diameter of hole	:	35mm
Pattern of hole	:	Staggered pattern
Inclination of holes	:	80°from horizontal
Use of delay detonators	:	NONEL
Hole to Hole	:	17 milli second delay (ms)
Row to Row	:	25 milli second delay (ms)

Staggered Pattern of Blasting Design



Spacing (S)	**=**	**1.0m**
Burden (B)	**=**	**0.75m**
Depth of the hole	**=**	**1.5m**
No. of holes proposed per day (Peak Production)	**=**	**188 Holes**

5.2 Type of explosives to be used:

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.

5.3 Measures proposed to minimize ground vibration due to blasting:

The quarry is situated more than 300m away from the nearby villages, Controlled blasting measures by NONEL initiation is being adopt for minimizing ground vibration and fly rock.

Hand jackhammer drilling with 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:

NONEL blasting permits for bottom initiation and lesser charge per delay.

The major advantages of NONEL 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 (As per Peak production capacity):

The Hydraulic excavators are attached with rock breakers for breaking the rock mass to reduce the blasting and explosive usage also to avoid secondary blasting. Anyhow, as per day's production schedule the maximum blasting program proposed as given below.

Annual Peak production	= 1,69,221 MT
No of Holes	= 188 Holes
Yield	= 564 MT
Powder factor	= 6 MT/ Kg of explosives
Maximum explosive required	= 94 Kg-Slurry explosives
Charge/ hole	= 0.5 Kg
Blasting at day time only	= 12.30 – 1.00 P.M. (whenever required)

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)

PREDICTED PPV VALUES DUE TO BLASTING

Table – 8

Maximum Charge per day (kg)	Number of Round Blast per day	Maximum Charge per Round (kg)	Number of holes blasted per round	Number of holes blasted per day	Maximum Charge blast at a time by NONEL (kg)	Nearest Infrastructure (m)	PPV (mm/s)
94	2	47	94	188	1 (2 Holes)	630	0.361

From the above table, the charge per blast of 47kg 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. Anyhow, the applicant ensures that carry out the **blasting twice a day** based on the site condition 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.

5.4 Storage and safety measures to be taken while blasting:

The applicant will engage authorized explosive agency as approved by Petroleum and Explosives safety Organization (PESO) to carry out the 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 completion of Blasting the explosive Agency will take it out back the remaining quantity of Explosives. The blasting and quarrying operation is advised to handle by competent qualified statutory personnel approved by the DGMS and competent authorities and he will maintain the records of Explosives as per the Indian Explosives Act, Mines Act and Environment Protection Act.

6.0 MINE DRAINAGE:

6.1 Depth of water table (based on nearby wells and water bodies):

The lease applied area consist dendritic drainage pattern. The water table in the area is about 96m which is observed from the existing private boreholes. The lease applied area is fully covered by Massive Charnockite. The quarry operation confined to well above the water table hence, the Ground Water problem will not arise. Anyhow, Garland drain will be constructed along the boundary to prevent surface run-off water entering into the quarry.

TABLE – 9

Type	Distance & Direction	Location
Bore Well	55m Northeastern side	09°55'06.5102"N 77°59'55.2811"E

6.2 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 Greenbelt development areas. Besides, the water will also be used for dust suppression on haul roads during Haulage of machineries.

7.0 STACKING OF MINERAL WASTE AND DISPOSAL OF WASTE:

There is no waste anticipated during entire life of the quarry hence, disposal/stacking of waste does not arise.

8.0 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. The quarried out gravel will be directly loaded into Tippers for filling and levelling of low-lying areas, this will be done only after obtaining permission and paying necessary seigniorage fee to the Government.

9.0 OTHERS:

9.1 Other Permanent Structure (also shown in the map)

TABLE – 10

S.No.	Structure - Nearest	Particulars	Aerial Distance & Direction
1	National Highway	(NH-85) Madurai to Theni	2.4 km – North
2	State Highways	(SH-73) Thirumangalam to Pallapatti	2.4 km – West
3	Railway station	Vadapalanzhi	2.5 km – NE
4	Airport	Madurai	14 km – SE
5	Town	Thirupparankundram	6 km – SE
6	Government School	Meenakshipatti - Govt. High School	900m – NE
7	Government Hospital	Thoppur (Austinpatti)	3.8 km – SE
8	Habitation	630m – NE	
9	Reserved Forest	Kudimangalam R.F. – 3.5km – NE	
10	Nearby Water Bodies	Odai demarcated in the applied area in North – South direction but there is no remarks found in the field during inspection. Odai – 250m – SW. Thenpalanzhi Pariya Kanmoi – 110m – South (Approximately 1359.6 million Liters capacity)	
11	Defence Installation/ Historical Monuments/ Archaeological	Nil within 500m radius.	
12	Interstate Boundary	Around 78 km – SW (Kerala State Boundary).	
13	Critically Polluted areas identified by the CPCB	Around 159 km – NW (Kurichi SIDCO, Coimbatore).	
14	Protected areas Notified under wildlife (Protection) Act, 1972.	Around 28.1 km – SW (Srivilliputhur (Giant Squirrel) Wildlife Sanctuary).	
15	Applicability of CRZ, Notification 2011 as amended.	Not Applicable	
16	Applicability of Hill Area Conservation Authority (HACA) Clearance.	Not Applicable	
17	Housing area, EB line (HT & LT Line)	There is an EB-LT line passing on the Southern side of the applied area, the same will be shifted more than 50m away from the area. There is no EB-HT line or Housing area located within 50m radius from the lease applied area.	
18	Boundaries of the permitted area.	The boundaries of the permitted area as follows (Refer Plate No. II): North - S.F.Nos. 24/1C1 & Kinnimangalam Village East - S.F.Nos. 24/2 and 23 South - S.F.Nos. 22 and 25 West - S.F.Nos. 24/1A2, 1A4, 1A5, 1A6, 1A7, 1A8, 1F1 and 26.	
19	Adjacent Patta lands / Govt. Land	Direction / Classification / Safety Distance North / Patta land / 7.5m East / Patta land / 7.5m South / Patta land / 7.5m West / Patta land / 7.5m (Refer Plate No. II):	

TABLE – 11

STRUCTURE WITHIN **100m** Number of Structures – 2 Nos.					
Number of Structure	**Type of Structure**	**Usage Purpose**	**Commercial / industry/ residential/ farm house/ Govt. building**	**Occupants of Building/ Structure**	**Remarks**
2	Shed	Crusher Plant and Labour rest shed	Industry	No resident	-
STRUCTURE WITHIN **100 - 200m** Number of Structures – 5 Nos.					
5	Shed	Storage for Agriculture goods	Farm house	No resident	Private
STRUCTURE WITHIN **200 - 300m** Number of Structures – 2 Nos.					
2	Shed	Storage for Agriculture goods	Farm house	No resident	Private

9.2 Employment potential (skilled, semi-skilled, un skilled):

TABLE – 12

Designation	**Present Employment position**	**Employees Requirement**	**Total**
a) Supervisory category			
Mine Manager	-	1	1
Geologist	-	1	1
Mine Foreman	-	1	1
Blaster/Mate	-	1	1
b) Skilled labour			
Excavator – Operator	-	2	2
Tipper Driver	-	3	3
Water sprinkler Driver	-	1	1
Jack-Hammer Drillers	-	16	16
c) Unskilled			
Security	-	1	1
Labour & Helper	-	2	2
Co-operator and Cleaner	-	6	6
Total	-	**35**	**35**

The proposed output per man shift:

TABLE – 13

Annual Peak Production of Rough stone		1,69,221 MT
No. of days likely to be worked		300 days
Average production per day		564 MT
OMS =	Average Production per day / Average employment per day	564 / 35 = 16 MT

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.

9.3 Welfare Measures:

a) Drinking Water:

Packaged drinking water is available from the nearby water vendors in Thirupparankundram town which is located about 6km on the Southeastern side of the lease applied area.

b) Sanitary Facilities:

Hygienic modern Sanitary Facilities will be constructed as semi-permanent structure within the applied area and it will be maintained periodically.

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 Thoppur (Austinpatti) located at 3.8km on the Southeastern side of the area.

d) Labour Health:

Periodically medical check-up related to occupational health safety will be conducted to all the workers in applicant's own cost.

e) Precautionary safety measures to the labourers:

- Helmets,
- Reflector Jackets
- Dust mask
- Mine Goggles,
- Ear plugs,
- Ear muffs
- 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.

10.0 MINERAL PROCESSING:

No mineral processing/beneficiation involved.

PART – B

11.0 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.	i. Backfilling is the only source of mitigation measure for topographical changes, but no waste will be anticipated during entire life of this Rough stone and Gravel quarry. Hence, backfilling is not proposed. ii. The Mining benches will not exceed beyond the approved height and width. iii. At the end of life of mine, the pit will be allowed to collect the seepage and rain water and the water storage will be kept as temporary reservoir for charging the nearby wells also the water utilized for greenbelt development purpose.
	ii. Soil quality on surrounding land environment will impact due to; a) Dust propagation during quarry operation like drilling, blasting, loading, unloading and movement of men, Vehicle and machineries. b) Vehicular and machineries emissions and spillage of oil and grease.	i. Regular water sprinkling on dust prone area like haul road and other active area to arrest the dust generation. ii. Greenbelt will be developed in the safety zone with thick long leave plants to arrest the fugitive dust and vehicular emissions propagation. iii. Wet drilling with dust extractor unit by proper drilling pattern and controlled blasting with NONEL initiation will be carried out to minimize the dust generation. iv. Excavated benches shall be developed by planting with grasses, herbs and shrubs of local species to prevent soil erosion and landslide.

	c) Propagation of foreign material like polythene bag or undecomposed waste materials dumping.	v. PUC (Pollution under control) certified vehicles will be used for transportation and all vehicles and their exhausts would be well maintained and regularly tested for pollutant concentrations. vi. Oiling and greasing will be managed in respective places at vehicle maintenance shed and oil tray will be use to collect the spillage during maintenance and the same will be disposed in manner. vii. Non-degradable foreign material like polythene bag, Plastic water containers or cool drink containers or ill managed dumping will not be allowed within quarry premises.
Water Environment	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: i. Flow direction of Surface run off water will interrupting during rainy season due to modification of topography. ii. Surface water course will be contaminated due to dust propagation and vehicle emission.	i. Garland drain with check dam will be constructed all along the boundary barrier to prevent surface run off rain water entering into the pit. ii. The pit water due to rain and seepage will be utilized for water sprinkling on haul Roads and plantations. iii. Greenbelt will be developed in the safety zone with thick long leaves plants and water sprinkling on dust prone area to arrest the fugitive dust and vehicular emissions. iv. Further mining will be completely stopped during monsoon for free flow of surface run off and allowing natural recharge of groundwater. v. No wastewater will be generated from the quarry activity. Proper drainage will be Maintained to eliminate inundation of working pit during rain from run-off water. vi. Septic tanks and soak pits will be provided for the disposal of domestic/ washroom effluents, the same will be disposed in proper manner.

Air Environment	In surface mining operations, the source of air pollution may cause deterioration of air quality due to; a) 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 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.	i. Regular water sprinkling on haul road and dust prone area to arrest the dust generation. ii. Greenbelt will be developed in the safety zone with thick long leaves plants to arrest the fugitive dust and vehicular emissions. iii. Wet drilling with dust extractor unit by proper drilling pattern and controlled blasting with NONEL initiation will be carried out to minimize the dust generation. iv. Quarry material will be handled under wet condition during scooping, loading and unloading to minimize the dust propagation, besides loaded materials are covered by Tarpaulin until to reaches its destination. v. Provision of dust filters/ Nose mask to workers working at dust prone areas. vi. Vehicular emission as a result of combustion of diesel generates particulate matter (PM_{10} & $PM_{2.5}$), Nitrogen oxides and Sulphur dioxide (NO_2 & SO_2). High quality diesel will be used in the motor vehicles to control these pollutants. vii. PUC (Pollution under control) certified vehicles will be used for transportation and all vehicles and their exhausts would be well maintained and regularly tested the pollutant concentrations. viii. CPCB Prescribed emission standards for the vehicles would be followed.
Noise Environment	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.	i. Selection of innovative low – noise equipments for the quarry operation. ii. Greenbelt will be developed in the safety zone which will act as acoustic barrier to minimize the noise propagation. iii. The noise levels shall be maintained within the permissible levels by involving all the noise regulating measures in vehicles and drilling/blasting operations. iv. To ensure minimum vibrations and noise due to blasting, NONEL in continuous sequence is proposed. v. 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.

		vi. 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 transportation. vii. Regular and proper maintenance of machinery and transportation vehicles shall be ensured. viii. Transporting vehicles are enforcing the speed limits of 25km/hour within quarry area and not exceed 40km per hour from quarry to destination to reduce Noise and vibration.
Biological Environment	The area having main floras are Cocos nucifera, Neem, Prosopis juliflora, Calotropis, Bushes and shrubs. No plants of botanical interest or animals of zoological interest recorded within 500m radius. The anticipated impacts on biological environment as follows: i. Public and cattle may cause serious injury by inadvertent entry to the pit. ii. Natural habitats of the existing faunas will change due to the noise and vibration during blasting and quarry operation. iii. Diversity of living insects and faunas due to vibration. iv. The mining activities can also disrupt the poultry farm and ecological diversity due to noise by drilling, blasting and operation. v. Deposition of dust on the plant and crop leaves is affecting the photosynthesis, Pollination, growth ratio and agriculture productivity.	i. 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. ii. The natural habitats of the existing flora and fauna will not be disturbed. iii. Fruit bearing trees will be planted to survive the existing birds and faunas. iv. No clearance of vegetation will be done during the entire mining operations. v. Green belt development as acoustic barrier, Low noise equipment and machineries for drilling and operation and Controlled blasting by Nonel is reduce the noise within permissible limit to sustain the Poultry farms and existing ecology. vi. Regular Water sprinkling on haul roads would be reduces the dust propagation, thus avoiding damage to the crops and plants.

Socio – Economic Environment	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. i. It is proposed to provide employment to about 35 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. ii. 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. iii. Improvement of Physical structure like 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. iv. The continuation of opportunity for the employments, the nearby villages, living peoples and their life style would be improved. v. The applicant is advised to invest the CER cost (@ 2% from the total Project Cost) to develop the local Panchayat.	i. Preference employment will be given to the local community. This quarrying activity will also indirectly provide employment to the local community by the way of petty shops, hotels, etc. ii. The CER activity proposed by the applicant will enhance the requirement of the local community. iii. The improvement of physical structure like medical and social benefits of local community will get enhanced. iv. There will be a positive enhancement of lifestyle of the nearby village.

11.1 Environmental impact assessment statement describing impact of mining on the next Ten years:

In the mining plan proposed for a small production of Rough stone and gravel does not involve deep hole drilling and heavy 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 compliance monitoring will be carried out for every six months as prescribed by the MOEF & CC and with state concerned authorities.

11.2 Proposal for waste management:

There is no waste anticipated in this Rough stone and Gravel 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.

11.3 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 44m below from the ground profile has been envisaged as workable depth for safe & economic quarrying operation during entire life of quarry. There is no waste anticipated during entire life of the quarry hence, backfilling is not proposed. After completion of quarry operations, the quarry pit will be allowed to collect the seepage and rain water, the water storage will be kept as temporary reservoir to charging the nearby wells and will be utilized for greenbelt development. When the quarry reaches its ultimate pit limit or at the end of life of quarry, greenbelt development will be carried out over the quarried out top bench. 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.

11.4 Programme of Greenbelt development (indicate extend, number, name of species to be afforested):

The safety distance along the boundary barrier to be proposed for greenbelt development by planting 1,000 tree saplings (Area 5,810m^2) also the applicant proposed to plant 300 tree saplings in the quarried out top benches and 300 saplings on approach road and maintain at least 1,300 plants at the end of the lease period at a survival rate of 80%. Manuring and tree guards will be provided by the applicant to safeguard and maintain the plants. The plantation will be carried out based on the output Environmental Clearance and the recommended species will be planted in a phased manner as described below (Refer Plate No. III to V).

Table – 14

Year	No. of tress proposed to be planted	Area to be covered (m^2).	Survival (%)	Name of the species
I	120	642	80%	Neem, Pongamia Pinnata, Cordia dichotoma, Mango, Senkondrai, Mookusali maram, Mantharai, etc.,
II	120	642	80%	
III	120	642	80%	
IV	120	642	80%	
V	120	642	80%	
VI	80	520	80%	
VII	80	520	80%	
VIII	80	520	80%	
IX	80	520	80%	
X	80	520	80%	

11.5 Proposed financial estimate / budget for the project:

Budget Provision for the Mining Plan period:

TABLE – 15

<table>
<tr><th colspan="2">A. Operational Cost / Project Cost / Investment:</th><th>Cost (Rs.)</th></tr>
<tr><td>i) Land cost</td><td>The Land value as per the Government Guideline land cost is calculated as follows,
<table>
<tr><th>S.F. No.</th><th>Area (Ha)</th><th>Cost / Ha.</th><th>Total/Rs.</th></tr>
<tr><td>24/1B</td><td>0.90.5</td><td>12,35,500</td><td>11,18,128</td></tr>
<tr><td>24/1E</td><td>0.58.0</td><td>12,35,500</td><td>7,16,590</td></tr>
<tr><td>24/1F2</td><td>1.11.5</td><td>12,35,500</td><td>13,77,583</td></tr>
<tr><td>24/1F3</td><td>0.23.5</td><td>12,35,500</td><td>2,90,342</td></tr>
<tr><td>Total</td><td>2.83.5</td><td>12,35,500</td><td>35,02,643</td></tr>
</table>
Total Land Cost (Round off) = Rs.35,03,000/-
(source : https://tnreginet.gov.in/portal/)</td><td>35,03,000</td></tr>
<tr><td>ii) Machinery cost</td><td>The following machineries are proposed to meet out the productions on rental basis.
i. Excavator (2 Nos.)
ii. Rock breaker (2 Nos.)
iii. Tippers (3 Nos.)
iv. Compressor (2 Nos.)
v. Hand jack hammer and loose tools (8 Nos.)</td><td>1,00,00,000
2,00,000
60,00,000
15,00,000
4,00,000</td></tr>
<tr><td></td><td>Total</td><td>2,61,00,000</td></tr>
<tr><td>iii) Blasting Cost</td><td>Explosives, Detonator, etc., (Rs. 6 per ton) (8,49,131 MT x Rs. 6)</td><td>50,95,000</td></tr>
<tr><td>iv) Labourers shed</td><td>Labour shed will be constructed as semi-permanent structure. The cost is around</td><td>5,00,000</td></tr>
<tr><td>v) Sanitary facility</td><td>Adequate latrine and urinal accommodation has provided at conveniently accessible places the cost would be around.</td><td>1,00,000</td></tr>
<tr><td>vi) Drinking water facility for the labourers</td><td>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.</td><td>2,60,000</td></tr>
<tr><td>vii) Sanitary arrangement</td><td>The latrine and urinal will keep clean and sanitary condition. The maintenance cost would be around.</td><td>3,00,000</td></tr>
<tr><td>viii) Safety kit</td><td>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.</td><td>50,000</td></tr>
<tr><td>ix) CCTV arrangements.</td><td>Installation of CCTV cameras in the quarry area.</td><td>50,000</td></tr>
<tr><td colspan="2">Total Cost</td><td>3,59,58,000</td></tr>
</table>

B. EMP Cost:		Cost (Rs.)
1.	Environmental Monitoring Program (Air Quality, Water Quality Sampling, Noise and Ground vibration test) Rs. 50,000/ year.	5,00,000
2.	Water will be sprinkled in the haul roads by own water sprinklers for dust suppression (1 No.). The cost would be around.	6,00,000
3.	Fencing constructed around the lease area to prevent the inadvertent entry of public and cattle cost would be around (Total Peripheral length 800m x Rs. 300/meter).	2,40,000
4.	Construction of Garland drain with check dam to prevent surface run-off rain water entering to the quarry pit, the construction cost is around (Total Peripheral length 750m x Rs. 300/meter).	2,25,000
5.	First aid room & accessories	50,000
6.	Dust extractor unit for Jackhammer (8 Nos.)	2,00,000
7. Greenbelt development for dust suppression & Noise control measures	Greenbelt development will be carried out along the safety barrier; the cost would be around (1,000 saplings x Rs. 200/sapling).	2,00,000
	Greenbelt development will be carried out along the quarried out top benches; the cost would be around (300 saplings x Rs. 200/sapling).	60,000
	Greenbelt development will be carried out on haul road; the cost would be around (300 saplings x Rs. 200/sapling).	60,000
	Total EMP Cost (B)	**20,35,000**

Description	Cost (Rs.)
A. Project Cost	**3,59,58,000**
B. EMP Cost	**20,35,000**
Total Project Cost (A+ B)	**3,79,93,000**

The applicant will ensure to involve corporate environment responsibilities (CER) activity @ 2% from the total project cost or as recommended by the concerned authority.

The total cost would be around three crore seventy nine lakhs and ninety three thousand only.

12.0 PROGRESSIVE QUARRY CLOSURE PLAN

12.1 Introduction:

As per guidelines for preparation of mining plan prescribed under Minor Mineral Conservation and Development Rules, 2010 also the entire area is proposed for a short period of Ten 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.

a. Barbed wire fencing will be constructed around the quarry.
b. Benches will be smoothening.
c. Quarry will be closed & sentries will be posted round the clock.
d. Green belt development will be maintained.
e. Machineries will be removed from pit and engaged in another site.

12.2 Present and Post Land use pattern:

TABLE – 16

Description	Present area (Ha)	Area required during first five years (Ha)	Area at the end of the lease period (Ha)
Area Under Quarrying	Nil	2.21.4	2.21.4
Infrastructure	Nil	0.02.0	0.02.0
Roads	Nil	0.02.0	0.02.0
Green Belt	Nil	0.32.1	0.58.1
Unutilized Area	2.83.5	0.26.0	Nil
Grand Total	**2.83.5**	**2.83.5**	**2.83.5**

12.3 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.

12.4 Progressive quarry closure plan preparation:

Name and address of the Qualified Person who prepared the progressive closure plan and executing agency who is involved in the Preparation of progressive quarry closure plan.

Name	:	**M. SANTHOSHKUMAR, M.Sc.,** Qualified Person (Under Rule 15(I)(a) and (I)(b) of MCR, 2016)
Address	:	Plot No.3, Kattuvattam, Kothukara Samathi Via, Kannakurichi, Salem District
State with PIN Code	:	Tamil Nadu – 636 008.
Mobile No.	:	+91 92800 99263 and 97914 41745
Email ID	:	santoshgeo2004@gmail.com

The 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 un-authorized 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 machineries and vehicles.
- Personnel Protective equipment like dust masks, ear-plugs/ muffs and other equipment shall be provided for use by the working personnel.
- 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 given to the public before blasting to prevent accident.
- Security guards will be posted.
- In the event of temporary closer, approaches will be fenced off and notice displayed.
- Installation of CCTV cameras in the quarry and entrance of the quarry.
- Monitoring of Quarrying operation by external agency as directed by authorities.

(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 mining 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 panchayat 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 to the competent authority from time to time.

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 purchased afresh, the same has been maintained in good condition during entire life of quarry, if required the machineries will be replaced or repaired. After completion of quarry operation all machineries will be engaged at another quarry area or sold to the second hand. 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, mining 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 Ten 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 at present scenario:

TABLE – 17

ACTIVITY		YEARS										RATE	COST (Rs.)
		I	II	III	IV	V	VI	VII	VIII	IX	X		
Plantation under safety zone	Nos	120	120	120	120	120	80	80	80	80	80	Rs.200 Per sapling	2,00,000
	Cost	24000	24000	24000	24000	24000	16000	16000	16000	16000	16000		
Plantation in quarried out top benches and approach road	Area	Approach Road			Quarried out top bench								1,20,000
	Nos	300	-	-	100	100	100	-	-	-	-		
	Cost	60000	-	-	20000	20000	20000	-	-	-	-		
Barbed Wire Fencing (800 Mtrs)		2,40,000	-	-	-	-	-	-	-	-	-	Rs300 Per Meter	2,40,000
Garland Drain (750 Mtrs)		2,25,000	-	-	-	-	-	-	-	-	-	Rs300 Per Meter	2,25,000
Total													**7,85,000**

13.0 STATUTORY COMPLIANCE TO BE FOLLOWED DURING THE COURSE & CLOSURE OF QUARRY LEASE:

The Applicant after execution of lease deed should ensure to carry out that the quarry operation in accordance to the Approved Mining plan and as per TNMMCR, 1959, Mines Act 1952 & MMR 1961.

The conditions in the nutshell as follows:

1. The quarry operation should be fenced with the barbed wire and three tier Greenbelt has to be carried out all along the boundary barriers and should be maintained till the end of the life of the mine.
2. The quarry operation should be carried out as per the regulation 3,4,5 of MMR 1961 as prescribed in the form I, II, III, IVA, IVB, IVC, V, VI.
3. Statutory competent qualified person as per regulation 39, 40, 41, 42, 43, 44, 47, 48 of MMR 1961 should be appointed to carryout day today quarrying operation in scientific & systematic manner.
4. Blasting has to be carried out during the designated timing as per the approved mining plan with sufficient warning all around the mines by only the Qualified blaster as indicated in the regulations 153, 154, 156, 160, 166, 167, 169 of MMR 1961.
5. During the Quarrying operations the benches has to be maintained and haul roads should be maintained as per the regulations 60, 61, 62, 65, 66, 95, 96, 105, 106, 110, 115, 118 of MMR 1961. When the quarry attains 30mts depth from the general ground profile a slope stability study should be carried out with competent authorized agencies only.
6. All PPE should be provided to the employees and periodic Medical Examination has to be carried out as per the regulation 124, 127, 177, 178, 181, 183, 185, 188, 190, 191A of MMR 1961.
7. The Applicant should submit the quarterly, half yearly & Annual returns to the concerned Authorities as per regulation 3, 4, 5, 9 &10 MMR 1961 on time and HYCR self-compliance reports should be submitted to the State Pollution control Board.
8. Periodical Hydrology & Hydrogeological Studies has to be carried out during the course of quarrying operation. if any significant seepages is inferred, the applicant should carry out a comprehensive Hydrogeological studies to ensure the impact of agricultural activities in and around the mine (Open well & Tube well). If the impact is noticed considerably the quarry had to be continued only after obtaining permission clearances and approval from the competent regulatory authorities.
9. The lessee should utilize green energy / Solar energy as far as possible for operation of machineries, equipment and illumination in the mine's office, quarry boundaries and avenue roads.
10. The lessee should ensure all the skilled and semi-skilled workers should be provided trainings in nearby Vocational Training centre as per the MVTR 1966 and should be registered in Shram Suvidha portal as directed by the Ministry of labour.
11. The lessee should carry out the quarrying operation keeping the view of mineral conservation, development and sustainable mining.
12. If the lessee intends to deviate from the approved mining plan, a modified mining plan has to be prepared submitted and approved from the concerned authority before making any significant changes in the mining operations.
13. The lessee should carry out the mining operation in Eco friendly environment with good hygienic conditions to the employees deployed and maintain good harmony with local communities in the impact zone.
14. The conditions stipulated in the lease deed and Environmental clearance especially the mitigation measures as proposed in EMP to the SEIAA has to be followed during the course of quarrying operation and also to as per the rules of TNMCR 1959, Mine act 1952, MMR 1961, Mine Rule 1955, Environment Protection Act 1986 and Indian Explosive act 1884 and Indian Explosive Rules 2008 and all the amendments issued by the concern State and Central Government authorities from time to time.

This Mining plan for Rough stone (Charnockite) and Gravel is under Rules 41 & 42 as per the Amended under Tamil Nadu Minor Mineral Concession Rules, 1959. The provisions of the Mines 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 and mine design is prepared based on the requirement and full consent by the applicant to me. If there is any change in the production schedule, change of technology, change in product mix during the course of operations, the applicant is advice to prepare a modified 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

M. S

M. SANTHOSHKUMAR, M.Sc.,
Qualified Person

Place: Salem
Date: 17.09.2025

PHOTOGRAPHS OF THE THENPALANZHI
ROUGH STONE AND GRAVEL QUARRY LEASE APPLIED AREA

ANNEXURES

புவியியல் மற்றும் சுரங்கத்துறை

ந.க.எண.1129/கனிமம்/2025

துணை இயக்குநர் அலுவலகம்,
மாவட்ட ஆட்சியர் அலுவலக வளாகம்,
மதுரை.

நாள்: 10.09.2025

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - சாதாரணகற்கள் மற்றும் கிராவல் - மதுரை மாவட்டம் - திருப்பரங்குன்றம் வட்டம் - தென்பழஞ்சி கிராமம் - பட்டா புல எண்கள். 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) மற்றும் 24/1E (0.58.00) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 2.83.5 ஹெக்டேர் - 10 (பத்து) வருடங்களுக்கு சாதாரணகற்கள் மற்றும் கிராவல் குவாரி உரிமம் வழங்கல் - உகந்த பரப்பு (Precise Area) தேர்வு செய்யப்பட்டது - சுரங்கத்திட்டம் மற்றும் மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்க கோருவது - தொடர்பாக.

பார்வை:

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6. 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 41 மற்றும் 42.
7. அரசாணை எண்.169 தொழில் (எம்.எம்.சி.1) துறை, நாள்: 04.08.2020.
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மதுரை மாவட்டம், திருப்பரங்குன்றம் வட்டம், தென்பழஞ்சி கிராமம், 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) மற்றும் 24/1E (0.58.00) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 2.83.5 ஹெக்டேர் பரப்பில் 10 வருடங்களுக்கு சாதாரணகற்கள்

மற்றும் கிராவல் வெட்டி எடுத்து குவாரி செய்ய குத்தகை உரிமம் வழங்க கோரி திரு. M.சுரேஷ் என்பவர் பார்வை 1-இல் காணும் விண்ணப்பத்தினை சமர்ப்பித்துள்ளார்.

2) மேற்கண்ட விண்ணப்பம் தொடர்பாக, திருமங்கலம் வருவாய் கோட்டாட்சியர் மற்றும் புவியியல் மற்றும் சுரங்கத்துறை, உதவி புவியியலாளர் ஆகியோரின் ஆய்வு அறிக்கையில், மதுரை மாவட்டம், திருப்பரங்குன்றம் வட்டம், தென்பழஞ்சி கிராமம், 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) மற்றும் 24/1E (0.58.00), ஆனது பட்டா எண்.1839, 1862 மற்றும் 1715-ன்படி விண்ணப்பதாரர் கோவில்பிள்ளை மகன் சுரேஷ் பெயரில் கிராம கணக்கில் தர்க்கலாகியுள்ளது. விண்ணப்பப் புலங்களில் ஏற்கனவே குத்தகை உரிமம் ஏதும் வழங்கப்படவில்லை எனவும், அனுமதி கோரும் விண்ணப்பப் புல எண்களில் 1 முதல் 2 மீ ஆழம் வரை மண் / கிராவல் மற்றும் அதற்கு கீழ் எம்.சாண்ட் மற்றும் ஜல்லி தயாரிக்க பயன்படும் பாறை வகைகள் அமையப் பெற்றுள்ளன எனவும், விண்ணப்பிக்கப்பட்ட புலங்களை சுற்றிலும் 300 மீட்டர் சுற்றளவில் தொல்லியல்துறையின் மூலம் பாதுகாக்கப்பட்ட பகுதிகளாக அறிவிக்கப்பட்ட இடங்கள் மற்றும் வரலாற்றுச் சின்னங்கள் ஏதும் இல்லை. விண்ணப்ப புலங்களில் புல எண்கள். 24/1E மற்றும் 24/1F2 ஆகியவற்றில் ஓடை செல்லும் புலம் என விளக்கி புலப்படச்சுவடியில் மட்டும் சுட்டி காட்டப்பட்டுள்ளது. அப்புலத்தினை பார்வையிட்டதில், ஓடை போன்ற அமைப்பிற்று நீர்வரத்திற்கான நிரந்தர ஆதார அமைப்புகள் ஏதும் இப்புலத்தில் இல்லை. மேலும், இதில் சேகரித்து ஓடும் நீர் கண்மாய் மற்றும் கால்வாய் போன்ற நீர்நிலைகளுக்கு இணைப்பாக இல்லை. ஓடை போன்ற விளக்கிகள் தனியாக உட்பிரிவு செய்யப்பட்ட புலங்களாக, புலப்படசுவடியில் குறிப்பிடப்படவில்லை. இது ஊராட்சி மற்றும் பொதுப்பணித்துறைக்கு சொந்தமான ஓடை ஏதுமில்லை என திருப்பரங்குன்றம் வட்டாட்சியர் மற்றும் திருமங்கலம் வருவாய் கோட்டாட்சியர் அறிக்கை செய்துள்ளனர். மேற்படி விண்ணப்ப புலங்களில் புல எண்கள். 24/1E மற்றும் 24/1F2 ஆகியவற்றில் ஓடை செல்லும் புலம் என விளக்கி புலப்படச்சுவடியில் உள்ளவாறு புலத்தில் அமையப்பெறவில்லை. விண்ணப்ப புலத்தின் கிழக்கு பகுதியில் அமைந்துள்ள தி.ள்.பிரித்திவி அக்ரிகேட்ஸ் நிறுவனத்தினரின் கல் அரைக்கும் தொழிற்சாலை (கிரசர்)

அமையப்பெற்றுள்ளது. விண்ணப்ப புலத்தின் வடக்கு பகுதியில் மயானம் அமையப் பெற்றுள்ளது. மேலும், 60 மீட்டர் சுற்றளவில் காப்பு காடுகள் மற்றும் 50 மீட்டர் சுற்றளவில் தேசிய / மாநில நெடுஞ்சாலைகள், கட்டிடங்கள் ஏதும் இல்லை. விண்ணப்ப புலத்தின் தெற்கு பகுதியில் தாழ்வழுத்த மின்கம்பி செல்கிறது. எனவே மதுரை மாவட்டம், திருப்பரங்குன்றம் வட்டம், தென்பழஞ்சி கிராமம், 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) மற்றும் 24/1E (0.58.00) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 2.83.5 ஹெக்டேர் பரப்பளவிற்கு சாதாரணகற்கள் மற்றும் கிராவல் வெட்டி எடுத்து குவாரிப்பணி செய்ய திரு.M.சுரேஷ் என்பவருக்கு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி. 19(1) மற்றும் 20-ன்கீழ் பத்து (10) ஆண்டுகளுக்கு, நிபந்தனைகளுக்குட்பட்டு குவாரி உரிமம் வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

3) பார்வை 5-இல் காணும் விண்ணப்பதாரர் திரு.M.சுரேஷ் என்பவரின் மனுவில், விண்ணப்ப புலங்களுக்கு தெற்கு பகுதியில் சுமார் 30 மீட்டருக்கு அப்பால் தாழ்வழுத்த மின்கம்பி செல்கிறது எனவும், மேற்காணும் கம்பி மற்றும் மின்கம்பத்தினை தமிழ்நாடு மின்உற்பத்தி மற்றும் பகிர்மானக் கழகம் லிமிடெட், மதுரை மூலமாக குத்தகை உரிமம் நிறைவேற்றப்படுவதற்கு முன் மாற்றியமைத்து விடுவேன் எனவும், மேற்கண்ட மின்கம்பிக்கு பாதுகாப்பு இடைவெளி விடுவதிலிருந்து விலக்களிக்குமாறும் கோரியுள்ளார்.

4) எனவே, துறை அலுவலர்களின் பரிந்துரையினை ஏற்றும் நிபந்தனைகளுக்கு உட்பட்டும், மதுரை மாவட்டம், திருப்பரங்குன்றம் வட்டம், தென்பழஞ்சி கிராமம், 24/1B (0.90.50), 24/1F2 (1.11.50), 24/1F3 (0.23.50) மற்றும் 24/1E (0.58.00) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 2.83.5 ஹெக்டேர் பரப்பில் சாதாரண கற்கள் மற்றும் கிராவல் குவாரி செய்வதற்கு 10 (பத்து) வருட காலத்திற்கு கீழ்காணும் நிபந்தனைகளுக்கு உட்பட்டு தகுதிவாய்ந்த நிலப்பரப்பாக (Precise area) கருதப்படுகிறது.

<u>நிபந்தனைகள்</u>

1. விண்ணப்பப் புலங்களைச் சுற்றியுள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.

2. விண்ணப்ப புலத்தின் கிழக்கு பகுதியில் அமைந்துள்ள தி.ள்.பிரித்திவி அக்ரிகேட்ஸ் நிறுவனத்தினரின் கல் அரைக்கும் தொழிற்சாலைக்கு (கிரசர்) உரிய பாதுகாப்பு இடைவெளிவிட்டு குவாரிப் பணி மேற்கொள்ள வேண்டும்.
3. விண்ணப்ப புலத்தின் வடக்கு பகுதியில் அமைந்துள்ள மயானத்திற்கு 50மீ பாதுகாப்பு இடைவெளிவிட்டு குவாரி பணி மேற்கொள்ள வேண்டும்.
4. விண்ணப்ப புலத்தின் தெற்கு பகுதியில் செல்லும் தாழ்வழுத்த மின்கம்பி மற்றும் மின்கம்பத்தினை குத்தகை ஒப்பந்தப் பத்திரம் நிறைவேற்றப்படுவதற்கு முன் மாற்றியமைக்க வேண்டும்.

4) மேலும், தமிழ்நாடு சிறுகனிம சலுகைவிதிகள்-1959, விதி எண்.41-இன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்கதிட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு மனுதாரரைக் கேட்டுக்கொள்ளப்படுகிறது, அதன் தொடர்ச்சியாக ஏற்பளிக்கப்பட்ட சுரங்கத் திட்டத்தினை பெற்று விதி எண்.42-இன்படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என்ற விபரம் விண்ணப்பதாரர் திரு.M.சுரேஷ் என்பவருக்கு தெரிவிக்கப்படுகிறது.

10/09/2025

துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
மதுரை.

10/9/25

பெறுநர்:

திரு. M.சுரேஷ்,
த/பெ. கோவில்பிள்ளை,
எண்.350, கு2, மாஸ்டர் பிளான்,
காம்ப்ளக்ஸ் ரோடு,
அரசு தொழிற்பயிற்சி நிலையம்,
தேனி மாவட்டம் 625 531.

நகல்:

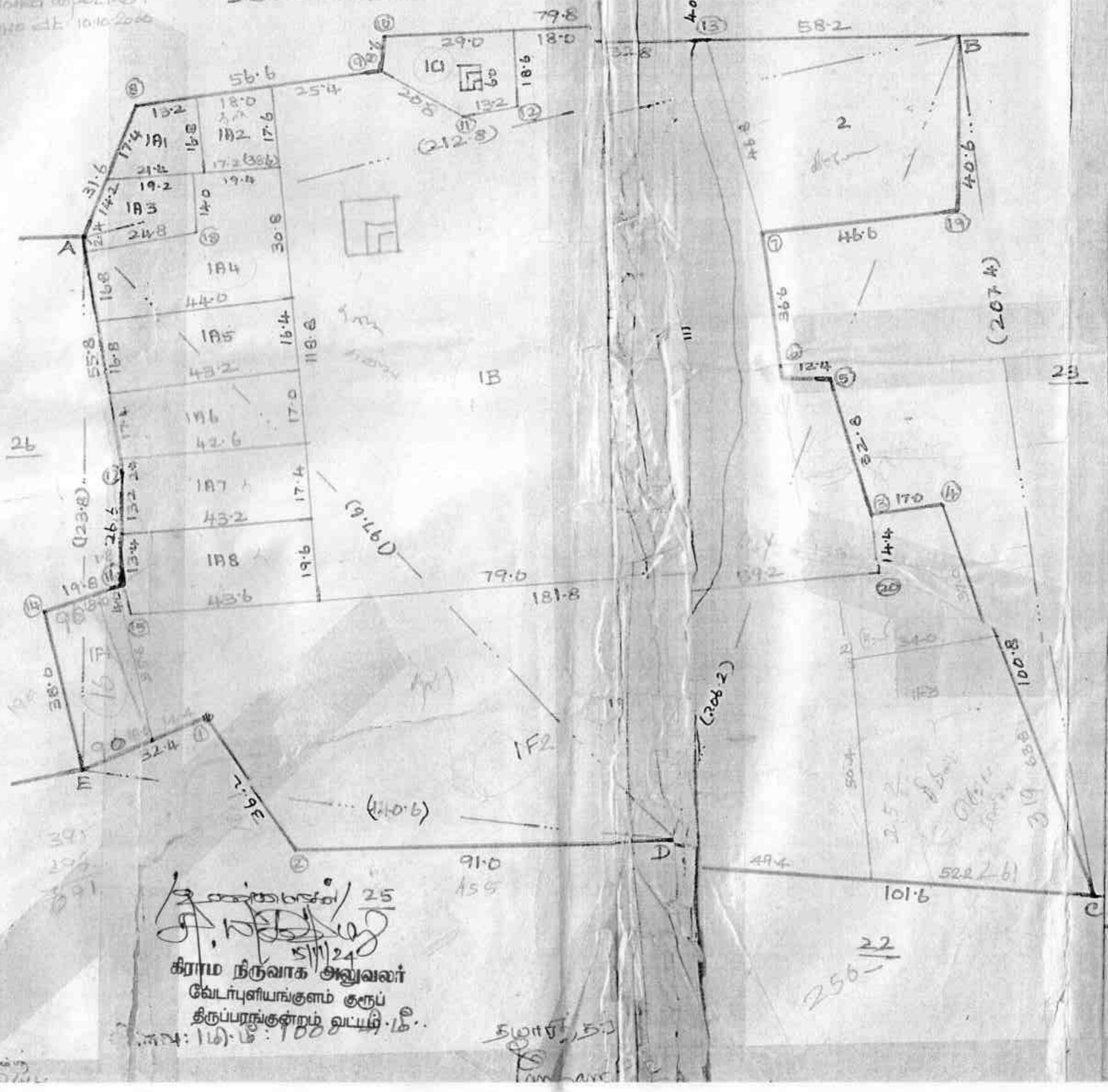
உறுப்பினர் செயலர்,
மாநில சுற்றுசூழல் தாக்க மதிப்பீட்டு ஆணையம் (SEIAA),
சென்னை.

மாவட்டம் : மதுரை

வட்டம் : மதுரை தெற்கு புல எண் : 24

கிராம எண் : 1 கிண்ணிமங்கலம்
திருமங்கலம் தாலுக்கா.

New Subdivn 1F1, 1F2, 1F3 are plotted as per ZTRSA 110/2010 dt. 10.10.2010



		B		
		(206.2)		
		D		
		B		
		206.2		
		80.8	27.8	2.0
		D		
		197.6		
18	18.4	17.5		
		A		
		123.8		
		68.6	7.8	17
		42.2	9.2	16
		37.4	10.6	18
4	9.6	36.6		
		E		
		B		
		212.8		
13	11.8	156.6		
12	3.4	102.6		
10	10.6	97.0		
10	11.0	92.0		
11	6.2	90.0		
10	27.6	78.2		
9	20.0	74.2		
8	26.4	16.0		
		A		
		B		
		207.4		
19	5.6	167.2		
7	52.6	167.2		
6	53.0	131.2		
5	40.6	124.8		
4	19.2	99.0		
3	35.6	97.6		
		C		
		I		
		141.6		
		50.4	11.6	2
1	16.6	27.8		
		E		

கிராம நிர்வாக அலுவலர்
வேடர்புளியங்குளம் குரூப்
திருப்பரங்குன்றம் வட்டம்.

79A

District : Madurai

Taluk : Thirupparankundram

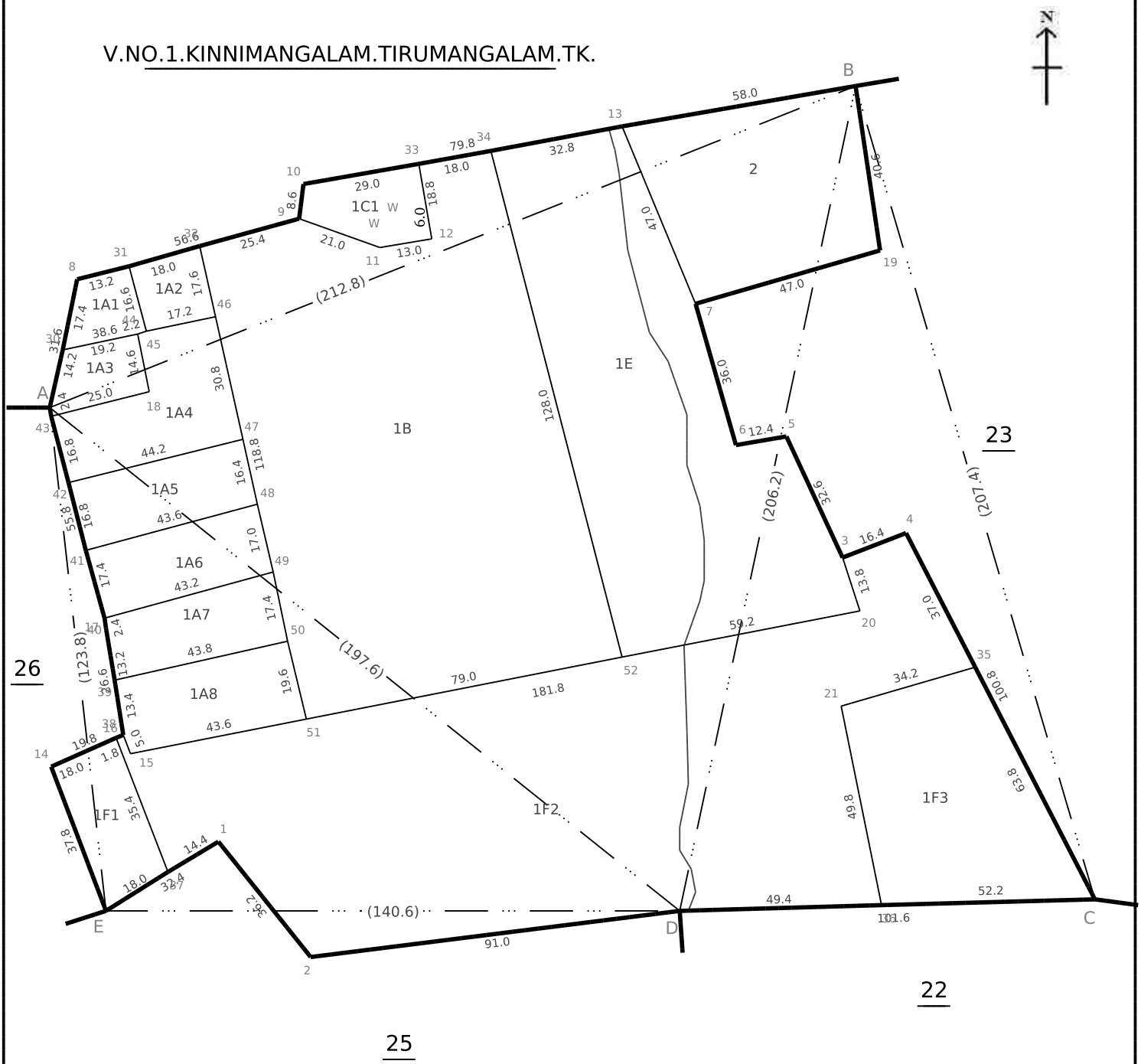
Village : Thenpalanzhi [16]

Survey No : 24

Area : Hect 03 Ares 67.50

Scale : 1 : 1000

V.NO.1.KINNIMANGALAM.TIRUMANGALAM.TK.



Signed By Tahsildar

Name of approver : tahtp

Date of Approval : 16-10-2017

Date of Issue: 28-06-2025 10:51:46

Survey and Settlement Department, Government of TamilNadu

80A

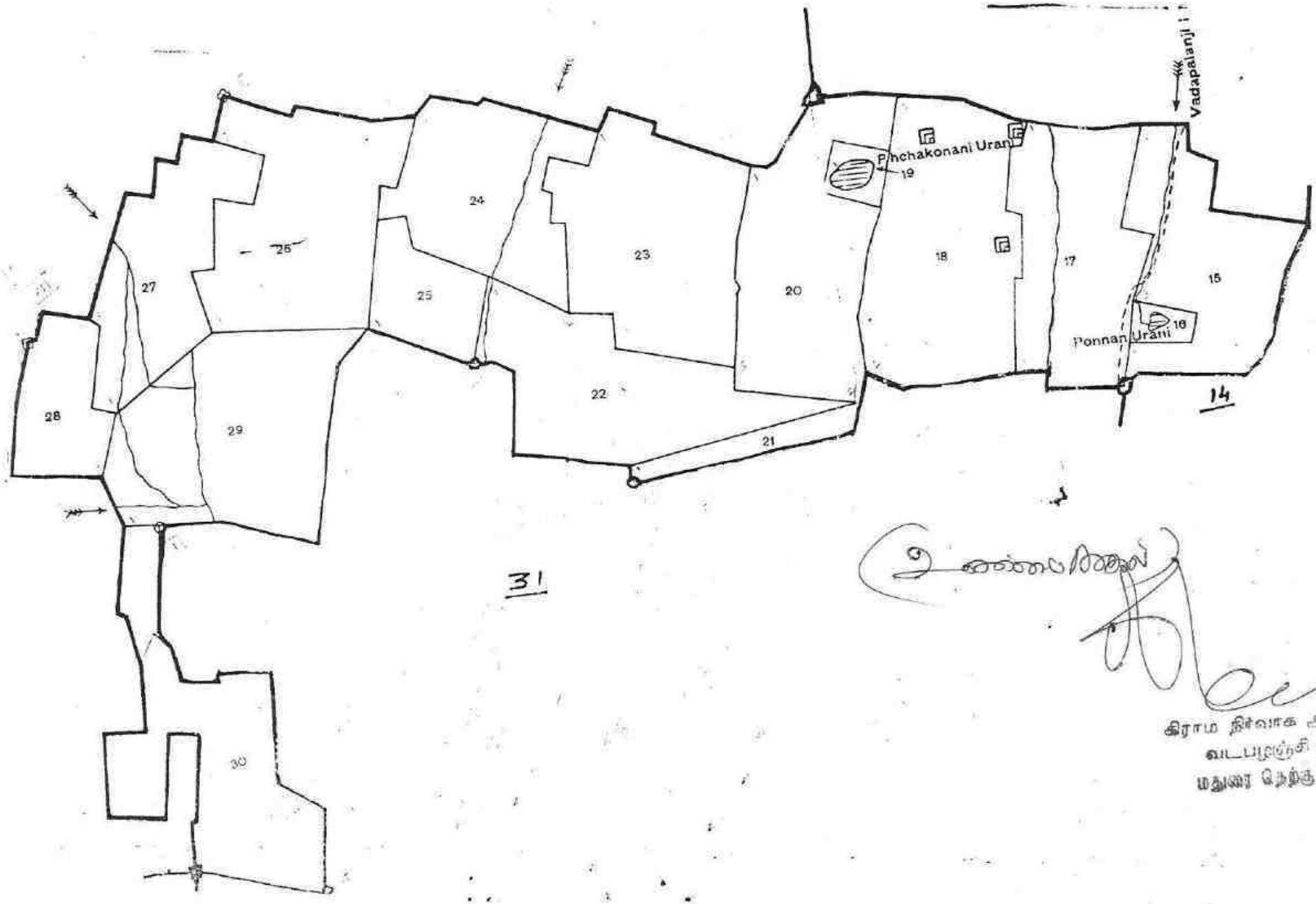
240 fv.1

மாவட்டம்: மதுரை

வட்டம்: மதுரை தெற்கு

போலோர் ஸ்கெட்ச்

கிராமம்: 16. தென் பழங்கி



கிராம நிர்வாக அலுவலர்
வடபழஞ்சி குரூப்
மதுரை தெற்கு வட்டம்

81A

No. 16
THENPALANJI
MADURAI SOUTH TALUK
MADURAI DISTRICT

Area by	Traverse	433 Hectares	03 · 5 Ares
	Fields	435 Hectares	83 · 0 Ares

Scale 1 : 5000

10 5 0 100 200 300 400 Metre

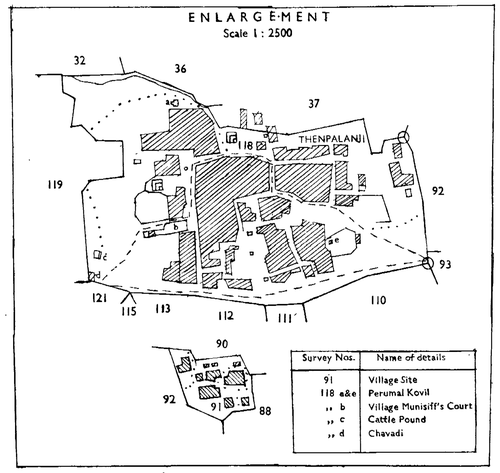
100 50

1 Hectare

Note :- THENPALANI is Corrected as THENPALANJI as per J. D., C. S. O., Ref. J1/12335/94 dated 29-11-95.

TIRUMANGALAM TALUK

ENLARGEMENT
Scale 1 : 2500



Survey Nos.	Name of details
91	Village Site
118 a&e	Perumal Kovil
,, b	Village Munisiff's Court
,, c	Cattle Pound
,, d	Chavadi

Survey Nos.	Name of details
16	Ponnan Urani
19	Phchakonani Urani
31 a	Ayyanar Kovil
,, b	Karuppaswami Kovil
45	Periya Kanmoi Urani
73 & 96	Thattan Urani
74	Mala Kovil
,, a	Mala Kovil Urani
85 a	Sanga Urani
,, b	Urani
87	Arasuramaruthu Urani
118	Kachamarathan Kovil
121	Pathai Urani

STANDARD REFERENCE SHEET

Bore Well		Madras Survey	
Boundary of the Units in the grouped village		Metalled Concrete or Black top road with km stone	
Building with more than one storey (Multi Storied Building)		Micro Wave repeater Station (adopted only in restricted Maps)	
Burial ground		Minor circuit Station	
Calingula		Modern series	
Cart track		Mosque	
Chain Survey Station (Town Survey)		Parent village	PUNDI
Church		Primary Health Centre	
Community hall		Railway line	
Culvert and bridge		River, Canal and aqueduct	
Cyclone Shelter		River and stream with anicut	
Earthen road		Rock mark	
Electric Power House		Round Water Tank	
Electric Sub- Station		Round Well	
Electric Transformer (adopted only in restricted maps)	T	Salt pan	
Electric Transmission line		Sand	
Ferry		Schools	S
Field Stone (Town Survey)		Scrub and Jungle	
Foot Path		Sluice	
Forest Cairn (or) Pillar		Square Water Tank	
Fort		Square Well	
Fountain		Survey Field boundary	
Gravelled road with km Stone		Swamp	
Grazing Ground		Tank	
Gurudwara		Telegraph line	
Hamlet	Pundi	Telephone Exchange	
Hostel	H	Telephone line	
Hydrant		Telephone Station	
Indigo vat		Temple	
Kalam		Thatched house	
Khandam Station		Theodolite Station (Town Survey)	
Lambton's G. T. Survey Station & height in metres above sea level		Tiled (or) terraced house	
Lamp Post		Village boundary	
Light House		Village boundary Station	
Limit of rocky ground		Village Trijunction Station	

V. No. 16 Thenpalanji S. Nos. 1 to 136 Updating Registry Scheme (Supplemental Survey) G. O. Ms. No. 869 C. T. & R. E. Dept. dated 30-9-1985

Notification under section 5 of the Tamil Nadu Survey and Boundaries Act VIII of 1923 published in the T. N. G. Gazette dated 16-10-1985 and section 13 published in Madurai District Gazette dated 23-12-1987

Reg. No.V-515/1993 (Thiruvalluvar Andu 2024) (C. S. O., 1 :5000) Revenue Department-30.

Published by Thiru S. MEIKANDADEVAN, I. A. S., Commissioner of Survey and Settlement, Madras & Thiru. P. MURUGESAN, Additional Director of Survey and Land Records, Madras, on behalf of the Government of Tamil Nadu, 1993 (Thiruvalluvar Andu 2024)

Printed under the superintendence of Thiru S. VARADHAPPAN, Joint Director of Survey and Land Records, at the Photo-Zinco Press, Central Survey Office, Madras-5.

Year of first publication 1884 (Thiruvalluvar Andu 1915)

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தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : திருப்பரங்குன்றம்

வருவாய் கிராமம் : 1 தென்பழஞ்சி

பட்டா எண் : 1862

உரிமையாளர்கள் பெயர்

1. கோவில்பிள்ளை மகன் சுரேஷ்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
24	1E	0 - 58.00	1.60	--	--	--	--	2024/0103/24/348383-- -------- 20-10-2024
		0 - 58.00	1.60					

குறிப்பு :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **24/17/016/01862/80697** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 22-10-2024 அன்று 12:23:27 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : திருப்பரங்குன்றம்

வருவாய் கிராமம் : 1 தென்பழஞ்சி

பட்டா எண் : 1715

உரிமையாளர்கள் பெயர்

1. கோவில் பிள்ளை மகன் சுரேஷ் -

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
24	1F2	1 - 11.50	3.11	--	--	--	--	2023/0103/24/300199--110/1410 -------- 21-12-2023
24	1F3	0 - 23.50	0.65	--	--	--	--	2023/0103/24/300199--110/1410 -------- 21-12-2023
		1 - 35.00	3.76					

குறிப்பு :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **24/17/016/01715/80624** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 22-10-2024 அன்று 12:16:41 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : திருப்பரங்குன்றம்

வருவாய் கிராமம் : 1 தென்பழஞ்சி

பட்டா எண் : 1839

உரிமையாளர்கள் பெயர்

1. கோவில்பிள்ளை மகன் சுரேஷ்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
24	1B	0 - 90.50	2.49	--	--	--	--	2024/0103/24/340815-- -------- 29-08-2024
		0 - 90.50	2.49					

குறிப்பு :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **24/17/016/01839/80661** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 22-10-2024 அன்று 12:21:42 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
நதி	உருளைக் கிழங்கு	பாரம்.	தக்காளி.	இடுபொருள் அல்லாத செலவு	கைமாறும் தொகை கொடுக்கப்பட்ட விவரம் அல்லது இனவிளக்கம் தரக்கூடிய விவரம்.	காலத்து அறுவடை செய்யப்பட்டது.	காலத்தில் அறுவடை செய்யப்பட்டது.	பயிரிடாத பெயர்.	பயிரிடாத / அறுவடைக்கு உகந்தது.	உகந்தமையால் பாழ்செய்தது.	விழுக்காடு அளவை விழுக்காடு.
24	1E	0.40	0.47	1.60	980	— do —					
24	1E	0.40	0.47	1.60	980	— do —					
24	1E2	0.30	0.45	1.75							
24	1E2	0.11	0.11	1.75							

மாதிரி குறிப்பேடு

அரசு மாதிரிப் பண்ணை
பயிர்த்தகவல் அறிக்கை

01. நெல்லுபயிர்

அரசு மாதிரிப் பண்ணை

380/ 1-R.F. III-A-10-20,00,000 Cps.-GBP.-MDU.-7-2023.

குறிப்பேடு எண்கள்.

(13)	எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.
(14)	பயிரிடாத பெயர்.
(15)	பயிரிடாத / அறுவடைக்கு பாழ்.
(16)	உகந்தமையால் பாழ்செய்தது.
(17)	விழுக்காடு அளவை விழுக்காடு.
(18)	(அ) கலப்பு. (இ) பயன்தரும் பயிர் செய்யப்பட்ட நிலம். (ஆ) கலப்பு இல்லாதவை. (1) பயிர்களின் பெயர் (2) கலப்பு பயிரிடப்பட்ட விகிதம் (3) முழுப்பரப்பு (4) பயிரிடப்பட்ட பரப்பு (5) பாசனம் (6) மகசூல் (7) மகசூல் மதிப்பு (8) மகசூல் மதிப்பு (9) பயிரிடாத பெயர் (10) பயிரிடாத / அறுவடைக்கு பாழ் (11) உகந்தமையால் பாழ்செய்தது (12) விழுக்காடு அளவை (13) எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.
(19)	மாதிரி பரவலாக்கப் பயிர்

(அ) கலப்பு. (இ) பயன்தரும் பயிர் செய்யப்பட்ட நிலம். (ஆ) கலப்பு இல்லாதவை. (1) பயிர்களின் பெயர் (2) கலப்பு பயிரிடப்பட்ட விகிதம் (3) முழுப்பரப்பு (4) பயிரிடப்பட்ட பரப்பு (5) பாசனம் (6) மகசூல் (7) மகசூல் மதிப்பு (8) மகசூல் மதிப்பு (9) பயிரிடாத பெயர் (10) பயிரிடாத / அறுவடைக்கு பாழ் (11) உகந்தமையால் பாழ்செய்தது (12) விழுக்காடு அளவை (13) எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது. (14) பயிரிடாத பெயர் (15) பயிரிடாத / அறுவடைக்கு பாழ் (16) உகந்தமையால் பாழ்செய்தது (17) விழுக்காடு அளவை (18) (

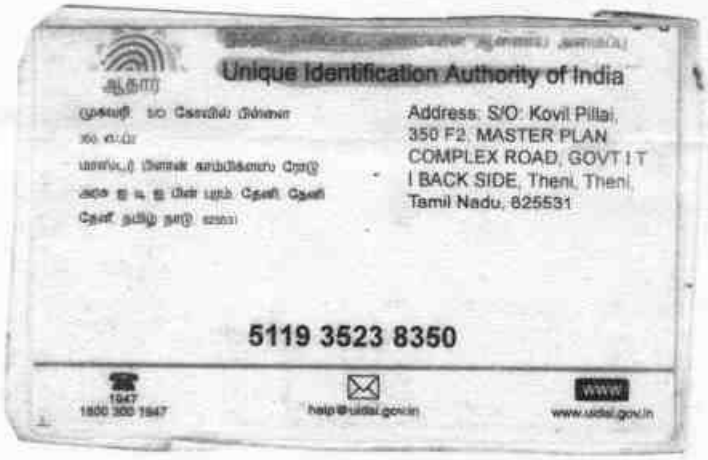
1		2	3	4	5	6	7	8		9		10		11	12
24	1B	1B,1C2, 1D	ர	பு	0	7 - 2	4	2	77	0	90.50	2	49	583-செல்வராஜ். வ	
24	1C1	1CP	ர	பு	0	7 - 2	4	2	77	0	4.50	0	12	525-அழகுமலை மற்றும் 8 நபர்(கள்)	
24	1E	1E	ர	பு	0	7 - 2	4	2	77	0	58.00	1	60	192-மைனர் பாலமுருகன் மற்றும் 2 நபர்(கள்)	
24	1F1	1F	ர	பு	0	7 - 2	4	2	77	0	6.50	0	18	494-பொன்னம்மாள் மற்றும் 4 நபர்(கள்)	
24	1F2	1F	ர	பு	0	7 - 2	4	2	77	1	11.50	3	11	19-செல்வராஜ்	
24	1F3	1F	ர	பு	0	7 - 2	4	2	77	0	23.50	0	65	583-செல்வராஜ். வ	
24	2	2	ர	பு	0	7 - 2	4	2	77	0	22.50	0	62	274-சுப்பிரமணியன்	
TOTAL FOR SURVEY NUMBER- 24										3	67.50	10	17		
25	1A	25-1P	ர	பு	0	7 - 2	4	2	77	0	4.50	0	12	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	1B	1P	ர	பு	0	7 - 2	4	2	77	0	22.00	0	61	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	2A	2P	ர	பு	0	7 - 2	4	2	77	0	8.50	0	24	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	2B	2P,3P	ர	பு	0	7 - 2	4	2	77	0	52.00	1	44	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	2C	2P	ர	பு		7 - 2	4	2	77	0	9.00	0	25	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	2D	2P	ர	பு	0	7 - 2	4	2	77	0	6.50	0	18	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	3B	3P	ர	பு		7 - 2	4	2	77	0	18.50	0	50	737-உமாசுந்தரி மற்றும் 2 நபர்(கள்)	
25	3C	3P	ர	பு		7 - 2	4	2	77	0	21.00	0	59	19-செல்வராஜ்	
TOTAL FOR SURVEY NUMBER- 25										1	42.00	3	93		
26	1	26-1	ர	பு	0	7 - 2	4	2	77	0	43.50	1	21	318-ராம முப்பர்	
26	2A1	2AP	ர	பு	0	7 - 2	4	2	77	0	15.50	0	43	357-வெள்ளையன்	
26	2A2	2AP	ர	பு	0	7 - 2	4	2	77	0	15.00	0	41	357-வெள்ளையன்	
26	2A3	2AP,2B P	ர	பு	0	7 - 2	4	2	77	0	17.00	0	51	15-பாப்பா மற்றும் 2 நபர்(கள்)	

உண்மைநகல்

31/11/24

கிராம நிருவாக அலுவலர்
வேடர்புளியங்குளம் குரூப்
திருப்பரங்குன்றம் வட்டம்

இந்திய அரசாங்கம்
Government of India
Suresh Kovil Pillai
DOB: 04/03/1963
Male
5119 3523 8350
ஆதார் - சாதாரண மனிதனின் அதிகாரம்


Unique Identification Authority of India
Address: S/O: Kovil Pillai, 350 F2, MASTER PLAN COMPLEX ROAD, GOVT I.T I BACK SIDE, Theni, Theni, Tamil Nadu, 625531
5119 3523 8350
1947
1800 300 1947
help@uidai.gov.in
www.uidai.gov.in

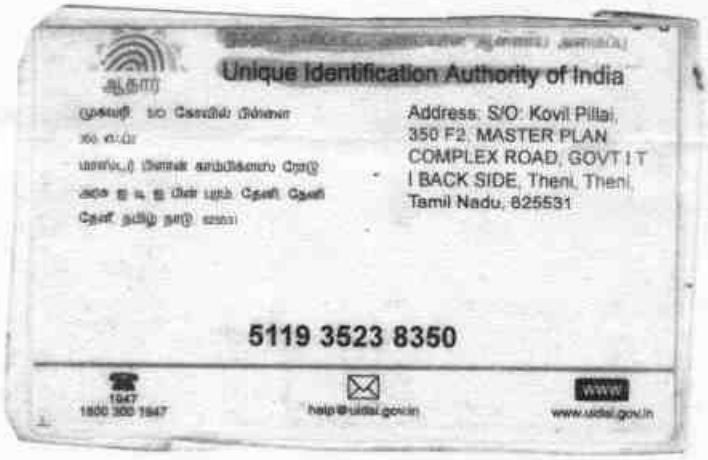
இந்திய அரசாங்கம்
Government of India

சுரேஷ் கோயில்பிள்ளை
Suresh Kovil Pillai

பிறந்த நாள்/DOB: 04/03/1963
ஆண்/பெண் : Male

5119 3523 8350

ஆதார் - சாதாரண மனிதனின் அதிகாரம்



ஆதார்
Unique Identification Authority of India

முகவரி: S/O: கோயில் பிள்ளை
350 F2, MASTER PLAN
COMPLEX ROAD, GOVT I.T
I BACK SIDE, Theni, Theni,
Tamil Nadu, 625531

5119 3523 8350

1947
1800 300 1947
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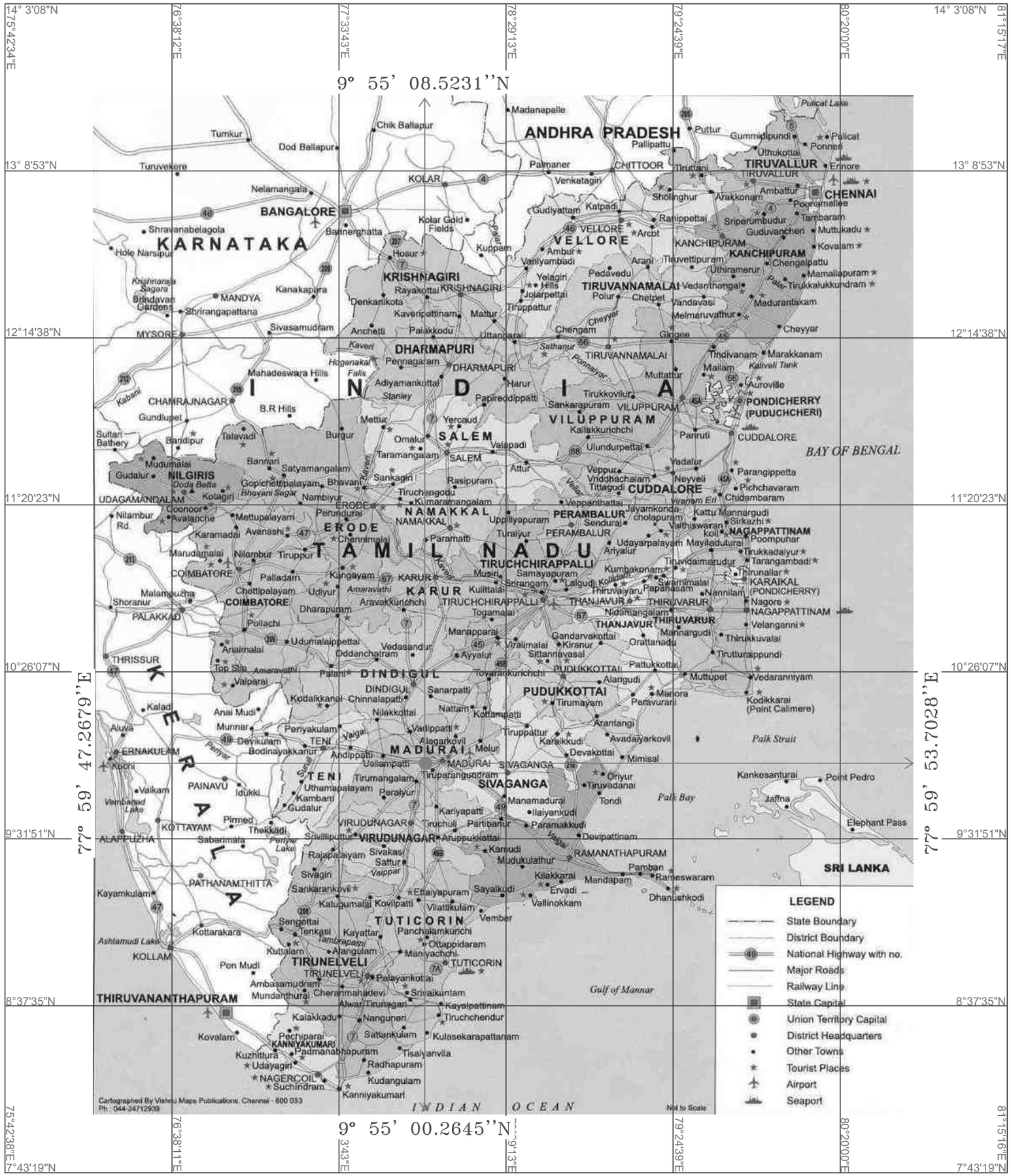
PLATES



N

PLATE NO:I

DATE OF SURVEY : 01.09.2025

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

Q. L.A AREA :

TOPO SHEET NO. : 58 G/13

LATITUDE : 9° 55' 00.2645''N to 9° 55' 08.5231''N

LONGITUDE : 77° 59' 47.2679''E to 77° 59' 53.7028''E

LOCATION PLAN

SCALE 1:24,00,000

PREPARED BY :

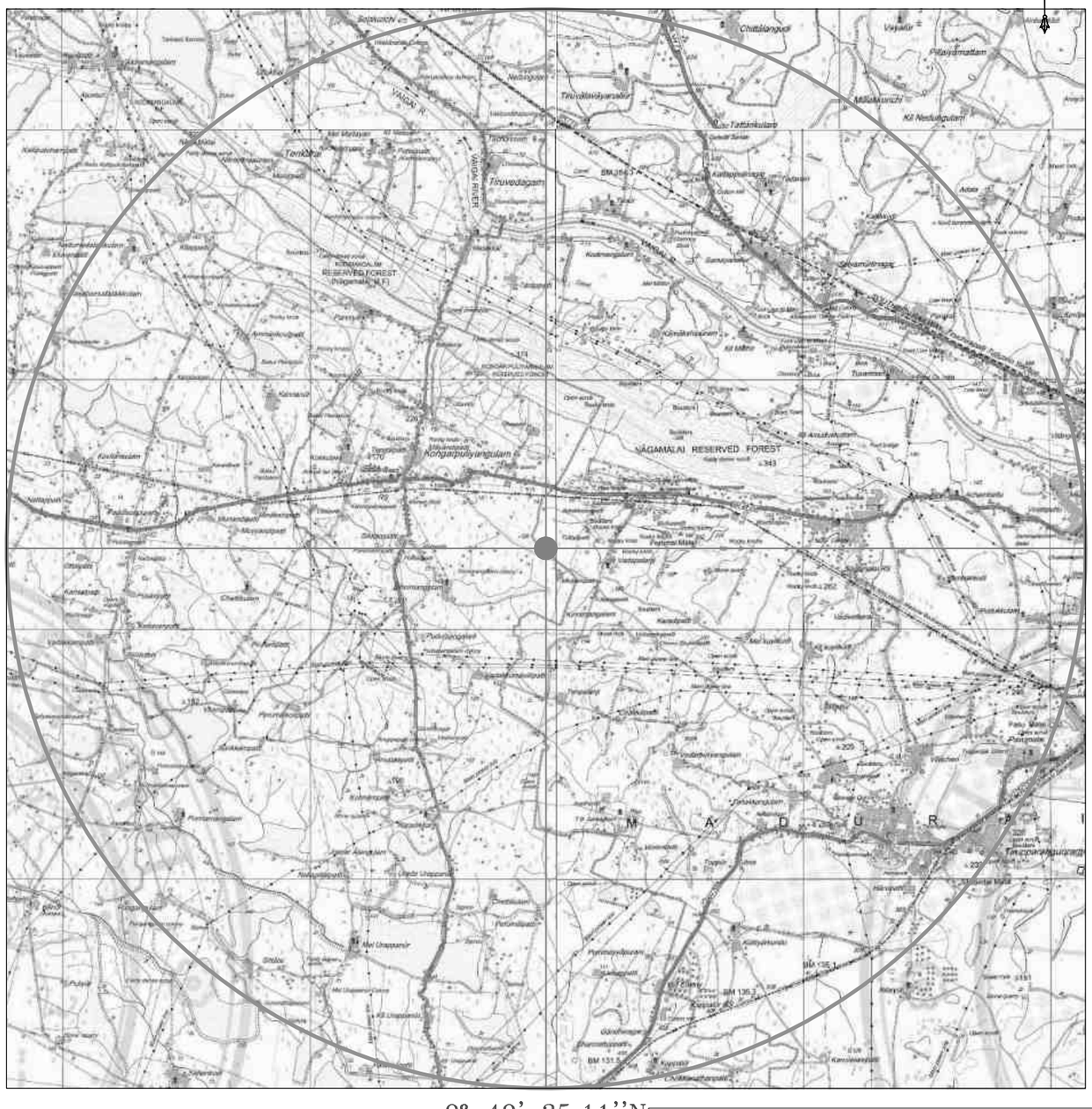
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASEMAP AUTHENTICATED BY STATE GOVERNMENT

M.Santosh

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(1)(a)and(b)of MCR,2016

10° 00' 33.68''N

77° 54' 19.30''E



78° 05' 21.63''E

9° 49' 35.11''N

TOPO SHEET NO. : 58 G/13

LATITUDE : 9° 55' 00.2645"N to 9° 55' 08.5231"N

LONGITUDE : 77° 59' 47.2679"E to 77° 59' 53.7028"E

10KM RADIUS :

Q.L.A AREA :

PLATE NO:I-A

DATE OF SURVEY : 01.09.2025

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

TOPO SKETCH OF QUARRY LEASE APPLIED AREA FOR 10Km RADIUS

SCALE– 1:100000

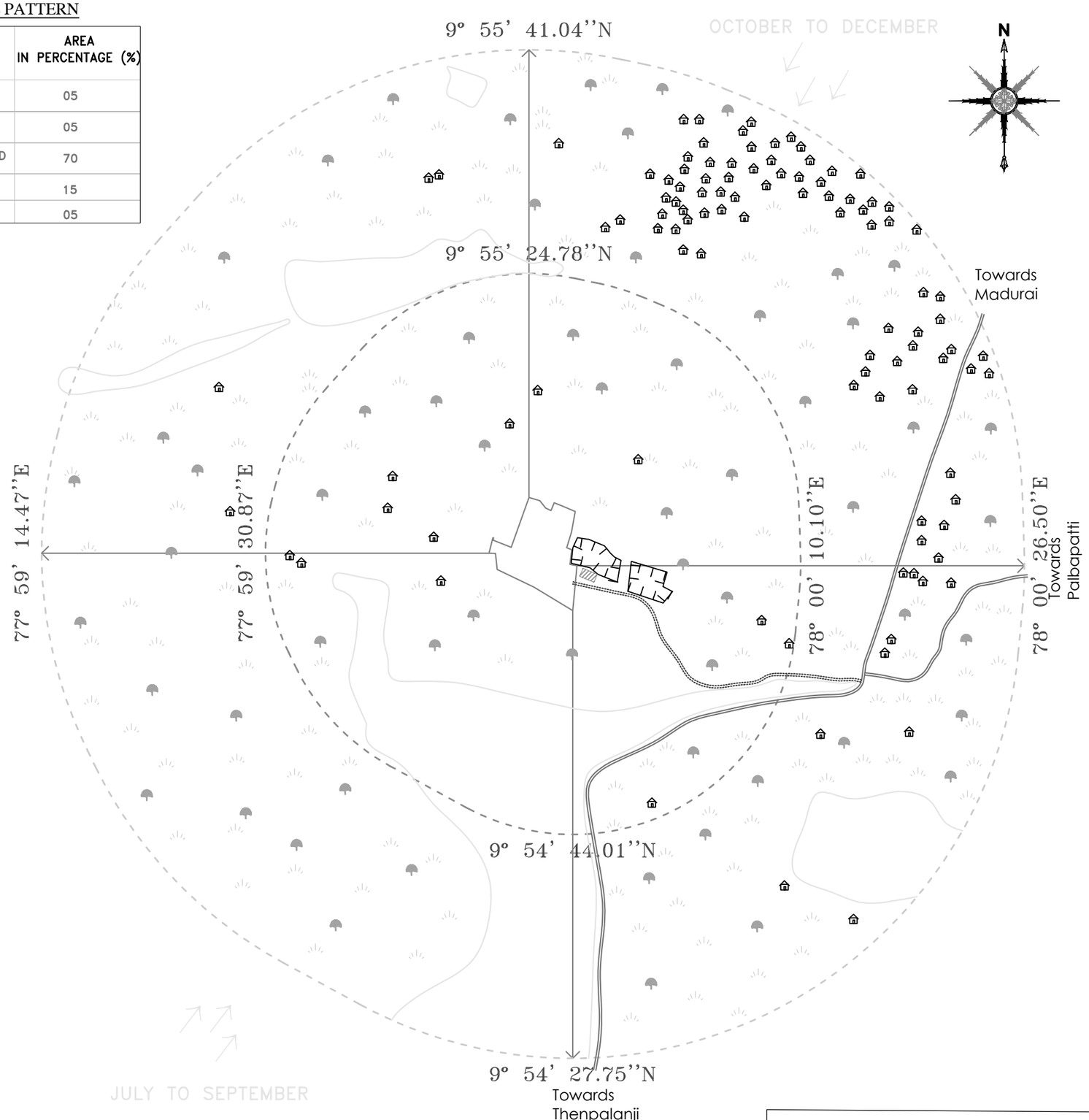
PREPARED BY :

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASEMAP AUTHENTICATED BY STATE GOVERNMENT

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(I)(a)and(b)of MCR,2016

LAND USE PATTERN

DESCRIPTION	AREA IN PERCENTAGE (%)
TREES	05
ROAD	05
AGRICULTURAL LAND	70
QUARRY\TANK	15
HABITATION	05



TOPO SHEET NO. : 58 K/03

LATITUDE : 9° 28' 18.1601"N to 9° 28' 27.3291"N

LONGITUDE : 78° 10' 47.0425"E to 78° 10' 53.1109"E

PLATE NO:I-B

DATE OF SURVEY : 01.09.2025

1KM RADIUS :

500M RADIUS :

Q.L.APPLIED AREA:

APPLICANT:

Thiru.R.HARIHARASUDHAN,
S/O.RAJA,
No.27,GURUBHAGAVAN ILLAM,
STAR NAGAR 5TH STREET,
P and T NAGAR AANAIYOOR,
MADURAI NORTH TALUK,
MADURAI-625 017.

LOCATION OF Q.L.A AREA:

S.F.No : 3/8,3/9,3/10,etc.,
EXTENT : 3.59.00HA.
VILLAGE : SUNDAKOTTAI,
TALUK : ARUPPUKOTTAI,
DISTRICT : VIRUDHUNAGAR,
STATE : TAMIL NADU.

INDEX

- APPROACH ROAD
- WIND DIRECTION
- TREES
- QUARRY PIT
- SEASONAL AGRICULTURE LAND
- VILLAGE ROAD
- SHED
- TANK
- CRUSHER PLANT
- ODAI

ENVIRONMENTAL & LANDUSE 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 LEASEMAP AUTHENTICATED BY STATE GOVERNMENT

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(I)(a)and(b)of MCR,2016

PLATE NO:I-C

DATE OF SURVEY : 01.09.2025

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

Q.L.APPLIED AREA BOUNDARY

APPROACH ROAD

MAJOR ROAD

VILLAGE ROAD

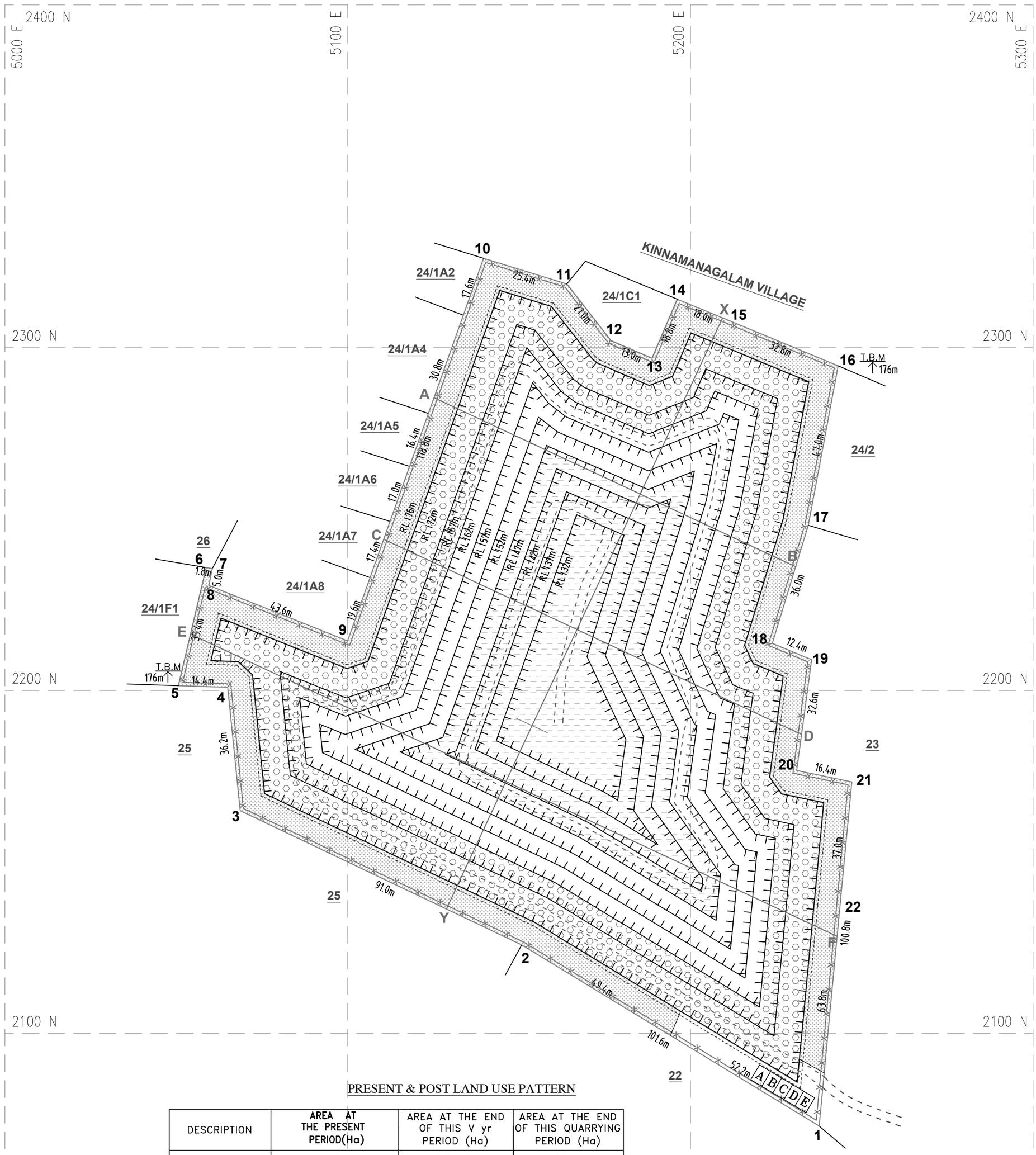
KEY PLAN

Not to Scale

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 LEASEMAP AUTHENTICATED BY STATE GOVERNMENT

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(I)(a)and(b)of MCR,2016

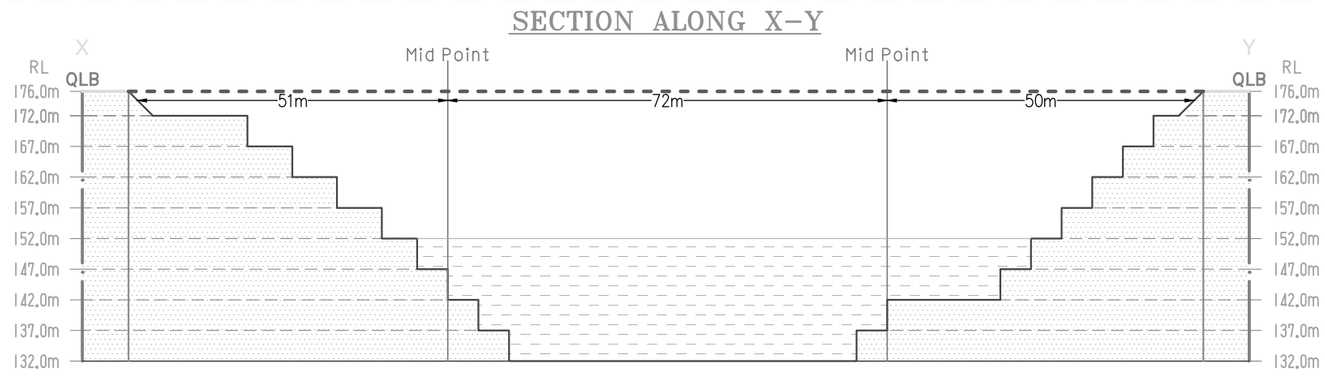


PRESENT & POST LAND USE PATTERN

DESCRIPTION	AREA AT THE PRESENT PERIOD(Ha)	AREA AT THE END OF THIS V yr PERIOD (Ha)	AREA AT THE END OF THIS QUARRYING PERIOD (Ha)
AREA UNDER QUARRYING	Nil	2.21.40	2.21.40
INFRASTRUCTURE	Nil	0.02.00	0.02.00
ROADS	Nil	0.02.00	0.02.00
GREEN BELT	Nil	0.32.10	0.58.10
UN-UTILIZED AREA	2.83.50	0.26.00	NIL
GRAND TOTAL	2.83.50	2.83.50	2.83.50

Notes: Present Area Virgin Land

SECTION ALONG X-Y



PROPOSED PIT DIMENSION (MAL)

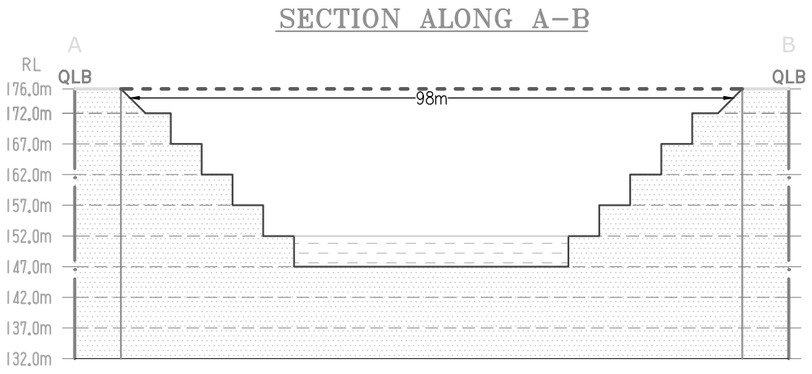
XY-AB 51m X 98m X 29m(d)
XY-CD 72m X 116m X 44m(d)
XY-EF 50m X 190m X 34m(d)

Proposed area to be Plantation

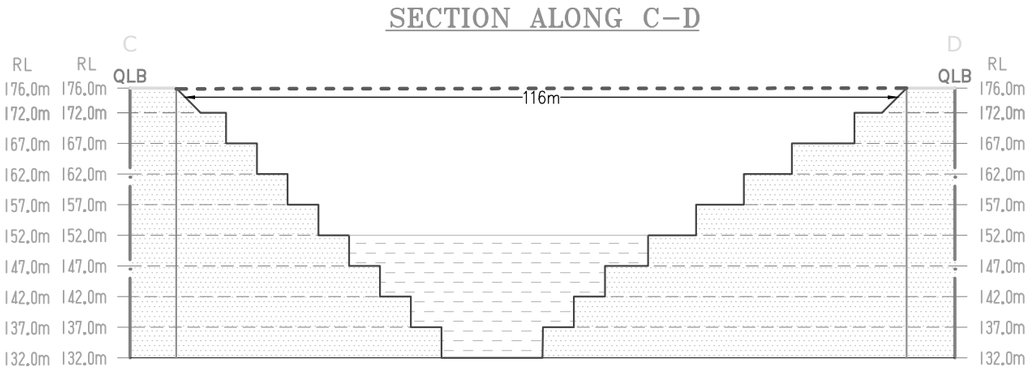
SITE SERVICES

A – OFFICE
B – STORE ROOM
C – FIRST AID ROOM
D – REST SHELTER
E – TOILET

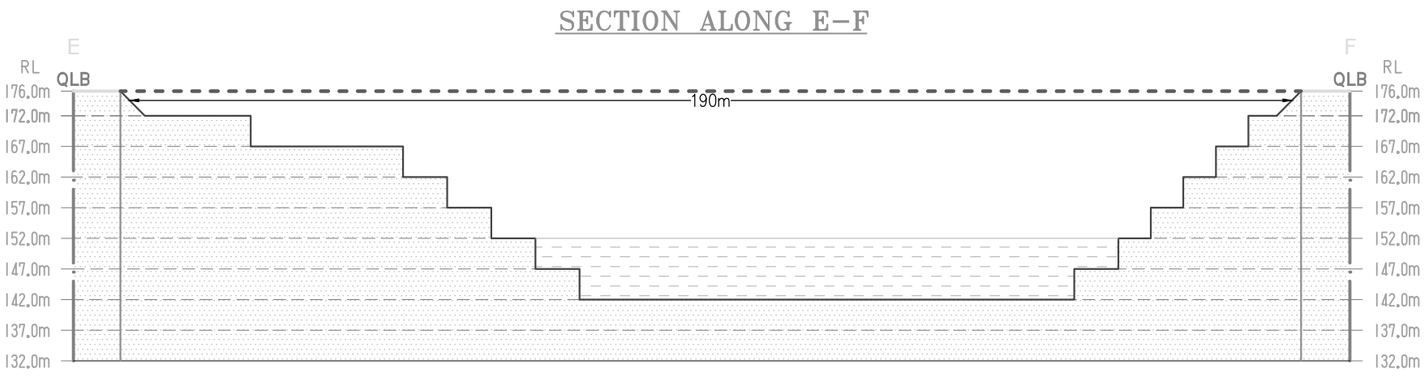
SECTION ALONG A-B



SECTION ALONG C-D



SECTION ALONG E-F



INDEX

- Q.L.APPLIED AREA BOUNDARY
- 7.5m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- APPROACH ROAD
- QUARRY PIT
- QUARRY ROAD
- EXISTING LANDFORM
- OLD SURFACE LEVEL
- FINISHED SURFACE LEVEL
- RAIN WATER STORAGE
- FENCING
- PROPOSED GARLAND DRAIN
- REHABILITATED LANDFORM

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

PLATE No. IV

DATE OF SURVEY : 15.09.2025

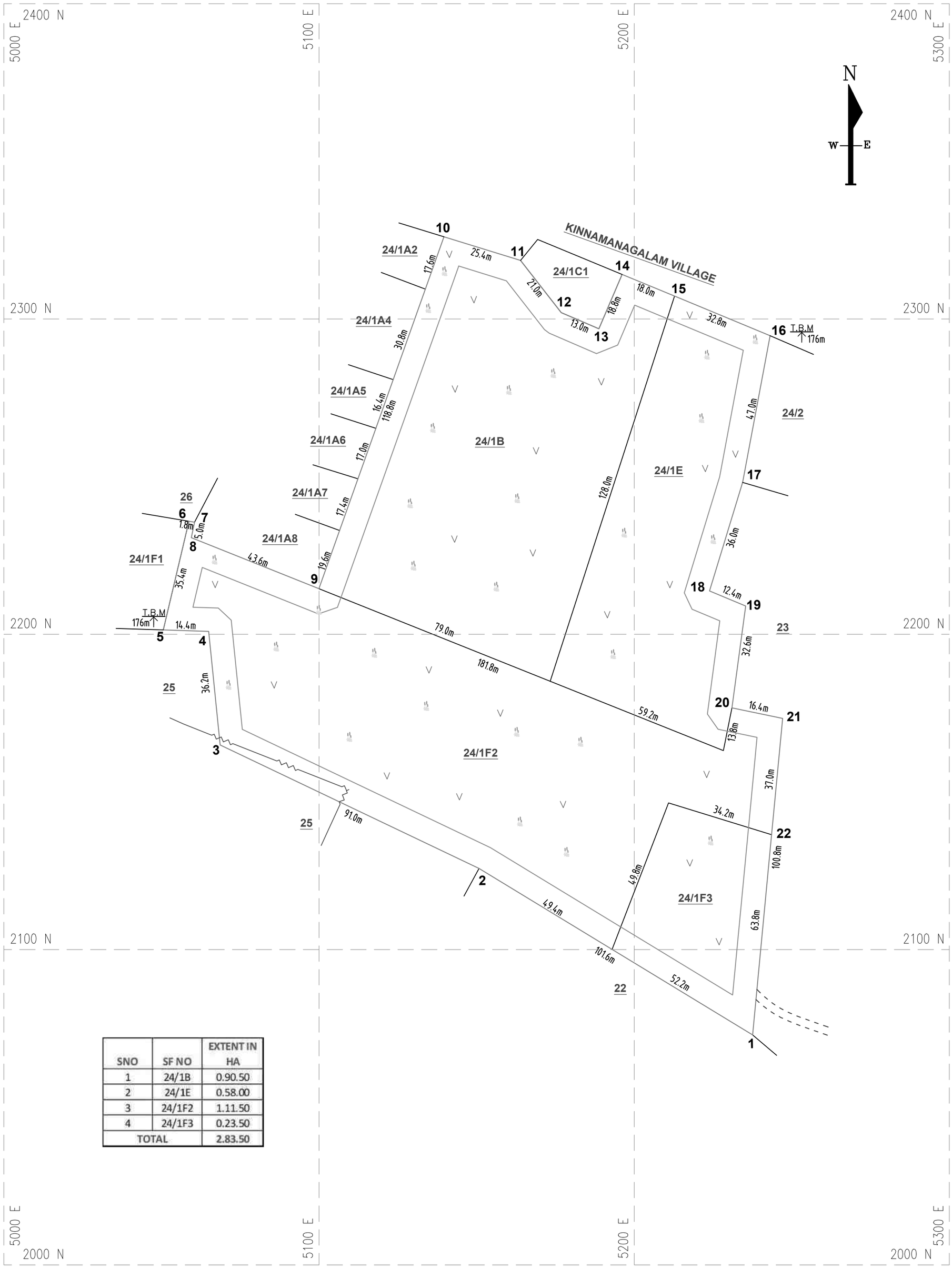
PROGRESSIVE QUARRY CLOSURE PLAN & SECTIONS

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 LEASE MAP AUTHENTICATED BY STATE GOVERNMENT

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(I)(a)and(b)of MCR,2016



SNO	SF NO	EXTENT IN HA
1	24/1B	0.90.50
2	24/1E	0.58.00
3	24/1F2	1.11.50
4	24/1F3	0.23.50
TOTAL		2.83.50

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	9° 55' 00.2645"N	77° 59' 53.3613"E
2	9° 55' 02.0067"N	77° 59' 50.5310"E
3	9° 55' 03.3042"N	77° 59' 47.8480"E
4	9° 55' 04.4764"N	77° 59' 47.7397"E
5	9° 55' 04.4956"N	77° 59' 47.2679"E
6	9° 55' 05.6135"N	77° 59' 47.5442"E
7	9° 55' 05.6033"N	77° 59' 47.6023"E
8	9° 55' 05.4442"N	77° 59' 47.5685"E
9	9° 55' 04.9057"N	77° 59' 48.8913"E
10	9° 55' 08.5231"N	77° 59' 50.2254"E
11	9° 55' 08.2725"N	77° 59' 51.0191"E
12	9° 55' 07.7305"N	77° 59' 51.4381"E
13	9° 55' 07.5597"N	77° 59' 51.8281"E
14	9° 55' 08.1188"N	77° 59' 52.0750"E
15	9° 55' 07.8900"N	77° 59' 52.6184"E
16	9° 55' 07.4731"N	77° 59' 53.6085"E
17	9° 55' 05.9628"N	77° 59' 53.3095"E
18	9° 55' 04.8462"N	77° 59' 52.9549"E
19	9° 55' 04.6874"N	77° 59' 53.3287"E
20	9° 55' 03.6380"N	77° 59' 53.1773"E
21	9° 55' 03.5247"N	77° 59' 53.7028"E
22	9° 55' 02.3280"N	77° 59' 53.5775"E

DATUM : UTM – WGS84, ZONE 43N

INDEX

- Q.L.APPLIED AREA BOUNDARY
- 7.5m SAFETY DISTANCE
- T.B.M TEMPORARY BENCH MARK
- GRAVEL
- SHRUBS
- APPROACH ROAD
- POWER LINE(To be Shifted)

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

PLATE No. II

DATE OF SURVEY : 15.09.2025

QUARRY LEASE PLAN & SURFACE PLAN

SCALE. 1:1000

PREPARED BY :

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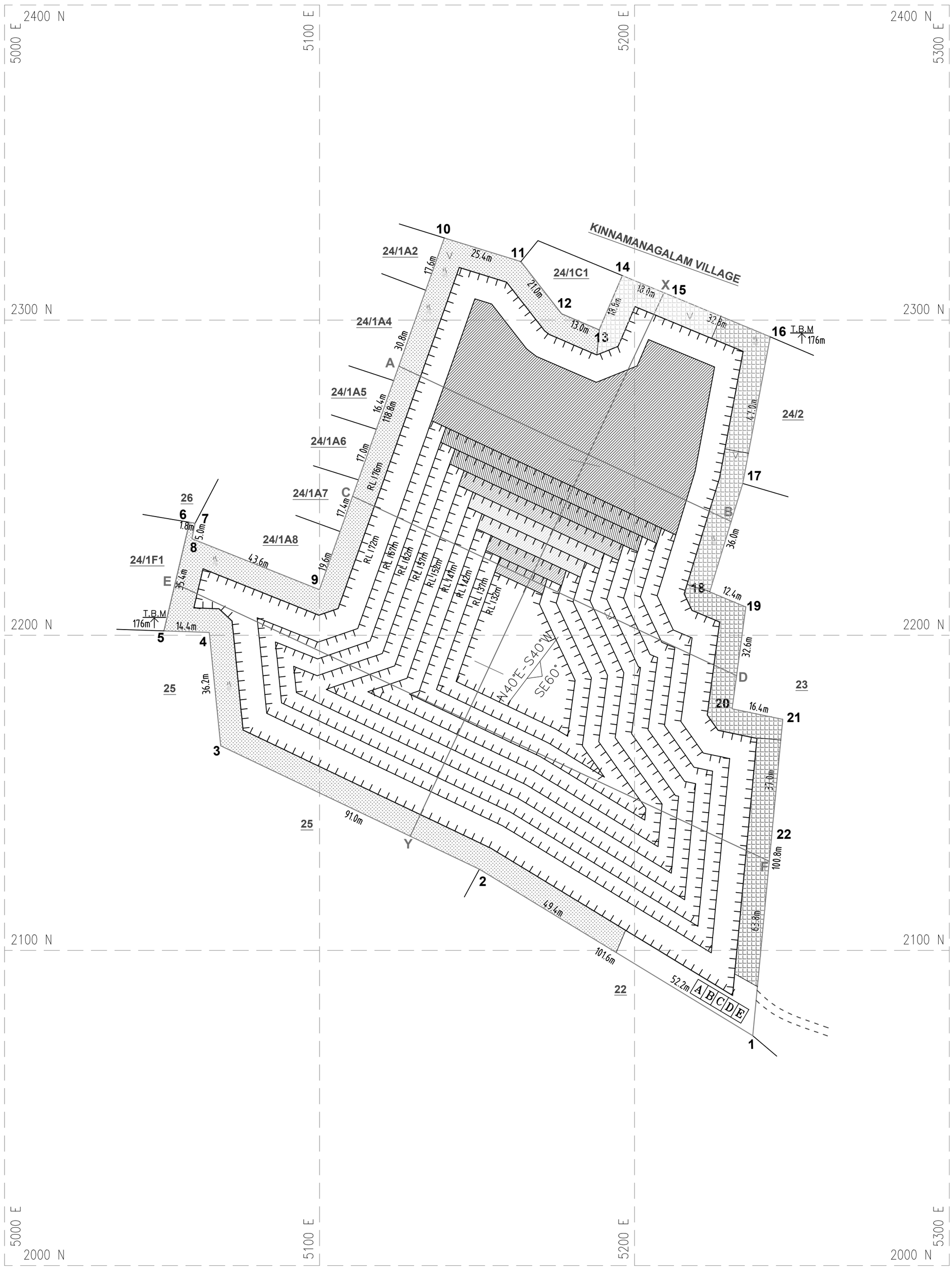
M.Santhosh

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(1)(a)and(b)of MCR,2016

96A



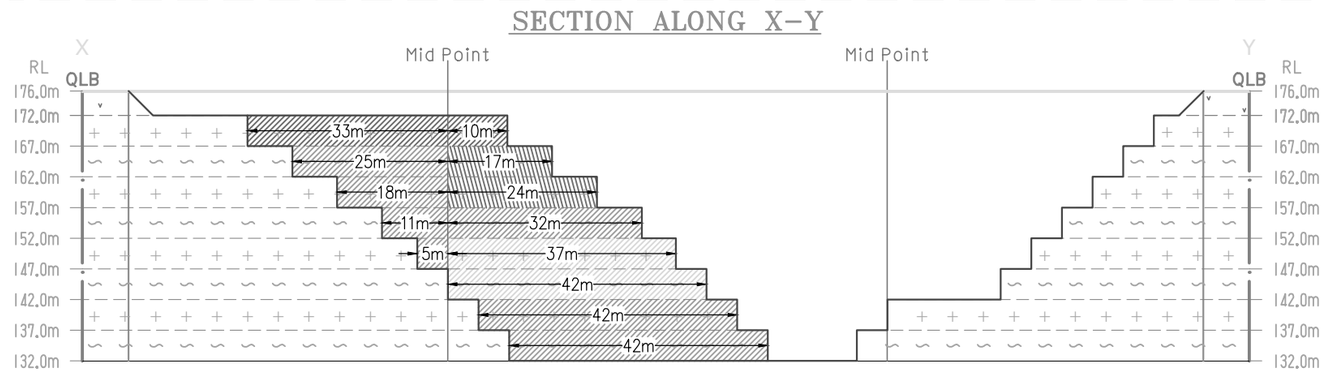
N
W E

VI- yr Proposed area to be Quarried
VII - yr Proposed area to be Quarried
VIII - yr Proposed area to be Quarried
I - yr Proposed area to be Quarried
- yr Proposed area to be Quarried

1st-V yr Proposed area to be Plantation

VI - yr Proposed area to be Planted
VII - yr Proposed area to be Planted
VIII - yr Proposed area to be Planted
I - yr Proposed area to be Planted
- yr Proposed area to be Planted

SECTION ALONG X-Y



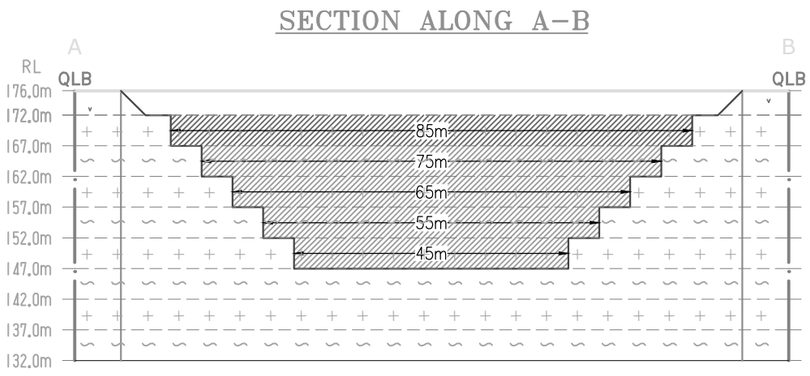
1st V YEAR PROPOSED PIT DIMENSION (MA)

XY-AB 51m X 98m X 29m(d)
XY-CD 72m X 116m X 44m(d)
XY-EF 50m X 190m X 34m(d)

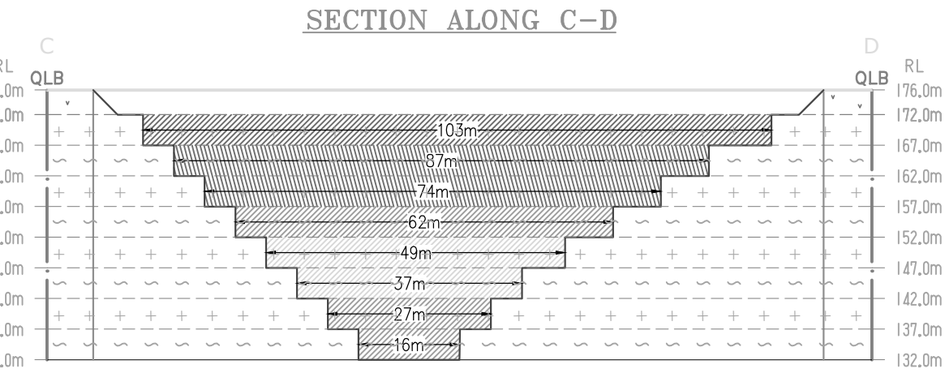
SITE SERVICES

A – OFFICE
B – STORE ROOM
C – FIRST AID ROOM
D – REST SHELTER
E – TOILET

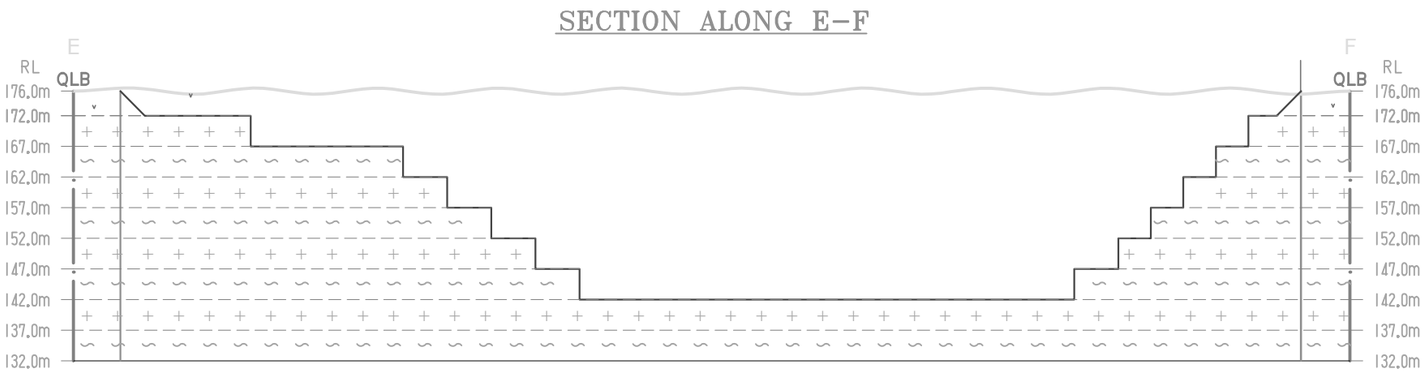
SECTION ALONG A-B



SECTION ALONG C-D



SECTION ALONG E-F



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- SHRUBS
- APPROACH ROAD
- ROUGH STONE
- GRAVEL
- QUARRY PIT
- QUARRY ROAD
- STRIKE AND DIP

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

PLATE No. III-A

DATE OF SURVEY : 15.09.2025

TOPOGRAPHY, GEOLOGICAL PLAN YEAR ISE DEVELOPMENT & PRODUCTION PLAN & SECTIONS

SECOND 'V' YEAR

SCALE. 1:1000

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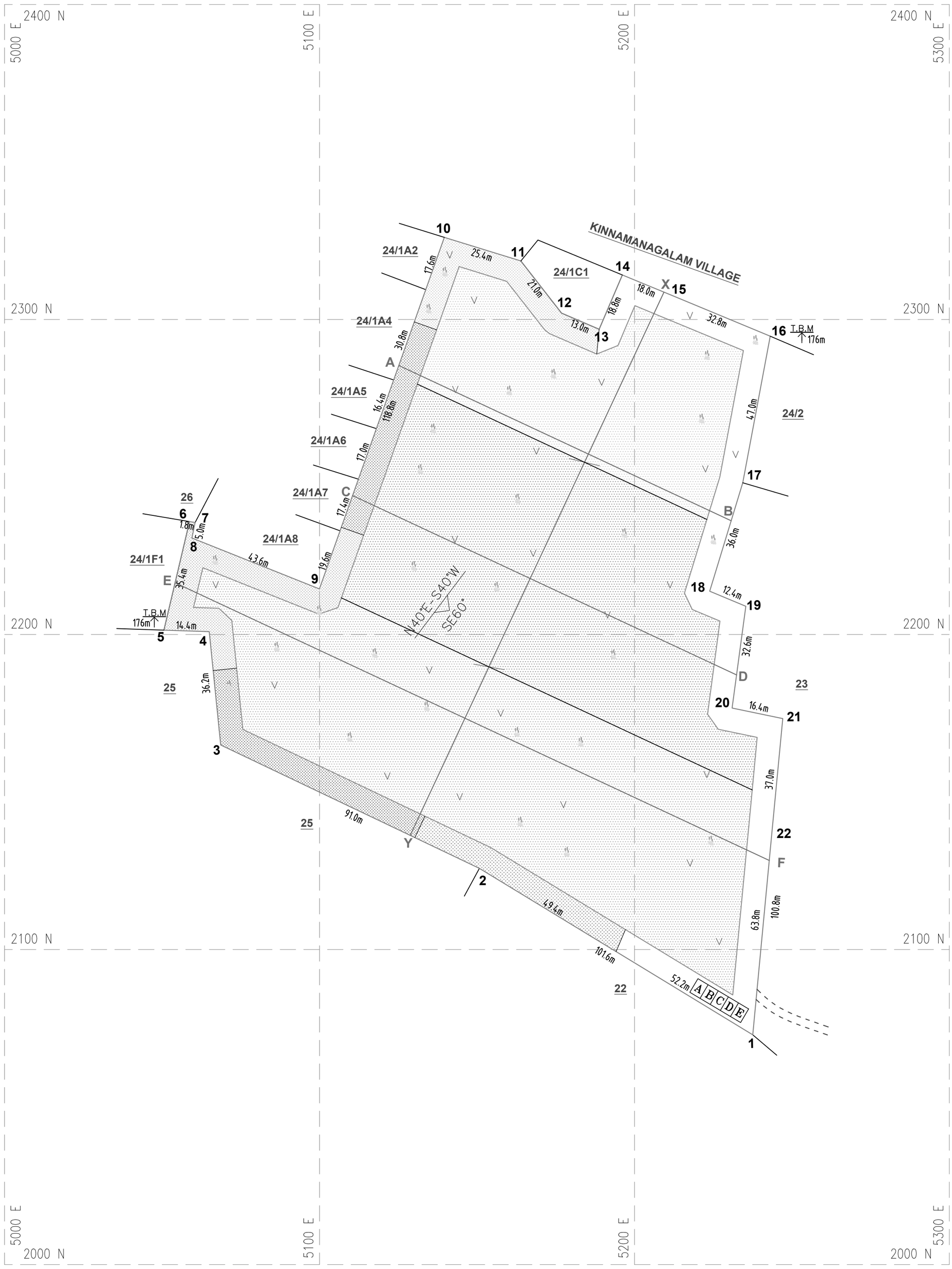
M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(I)(a)and(b)of MCR,2016



INDEX

- Q.L.APPLIED AREA BOUNDARY
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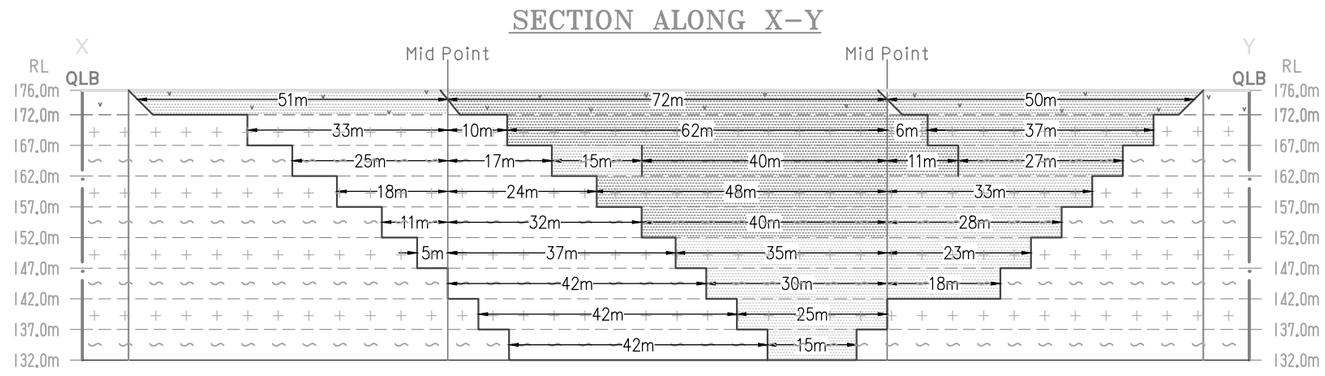
- GRAVEL
- SHRUBS
- APPROACH ROAD
- ROUGH STONE
- GRAVEL
- STRIKE AND DIP

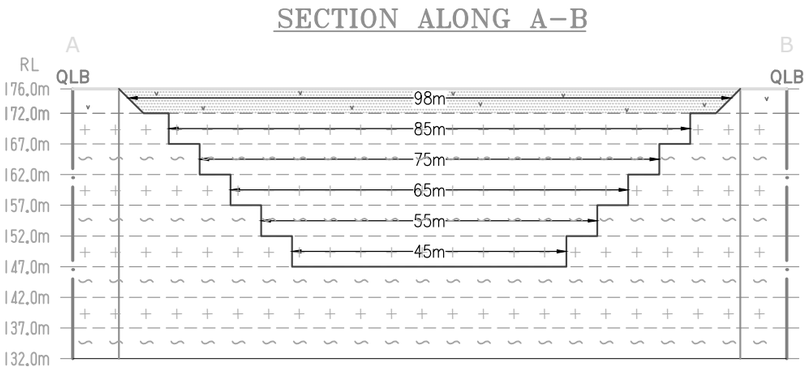
SECTION ALONG X-Y



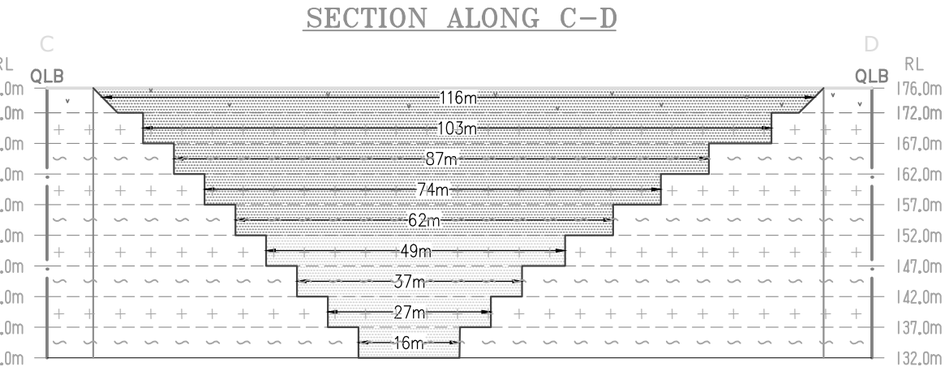
SITE SERVICES
(Proposed)

A – OFFICE
B – STORE ROOM
C – FIRST AID ROOM
D – REST SHELTER
E – TOILET

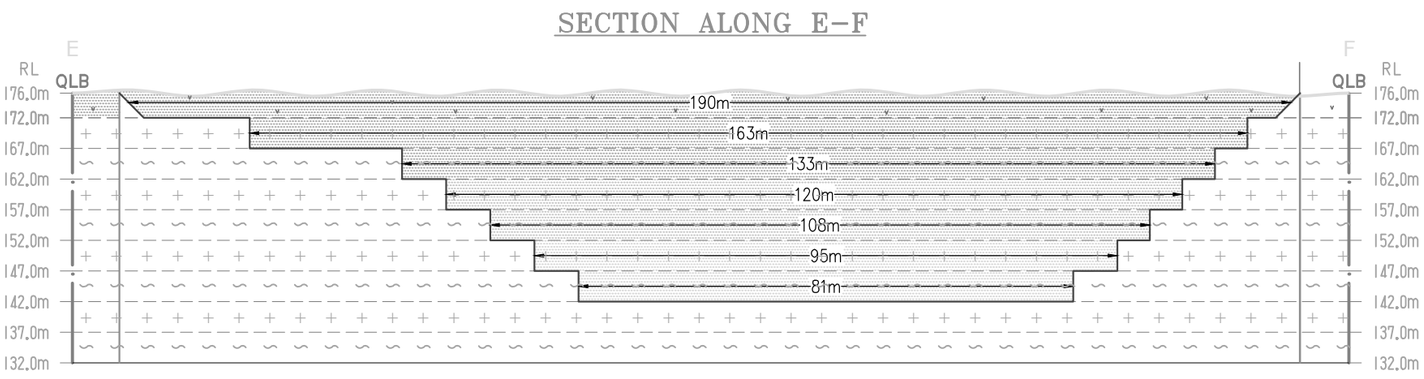
SECTION ALONG A-B



SECTION ALONG C-D



SECTION ALONG E-F



1st V YEAR PROPOSED PIT DIMENSION (MA)

XY-AB 51m X 98m X 4m(d)
XY-CD 72m X 116m X 44m(d)
XY-EF 50m X 190m X 34m(d)

APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

PLATE No. III

DATE OF SURVEY : 15.09.2025

TOPOGRAPHY, GEOLOGICAL PLAN YEAR ISE DEVELOPMENT & PRODUCTION PLAN & SECTIONS

FIRST 'V' YEAR

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M.SANTHOSHKUMAR,M.Sc.,
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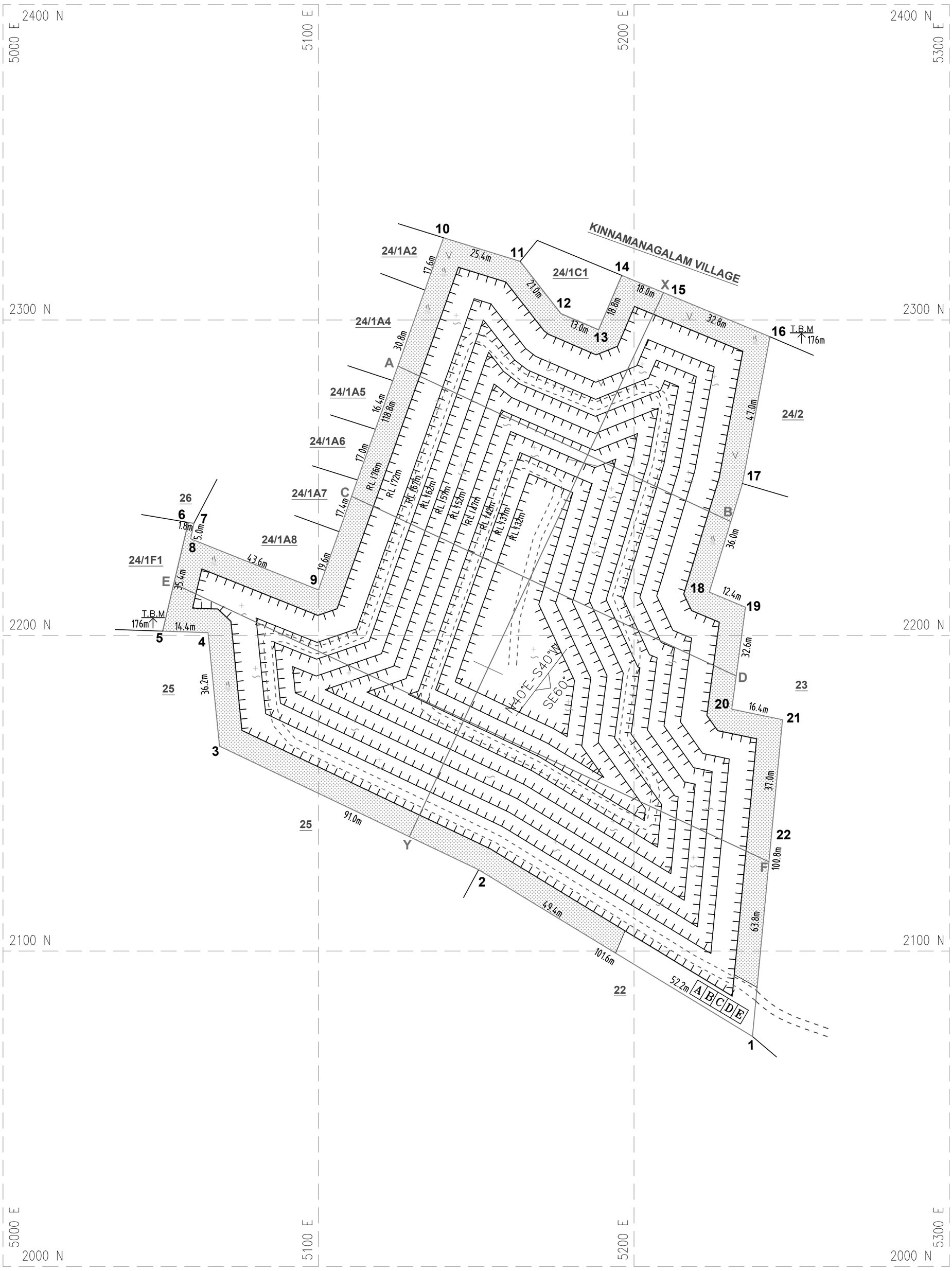
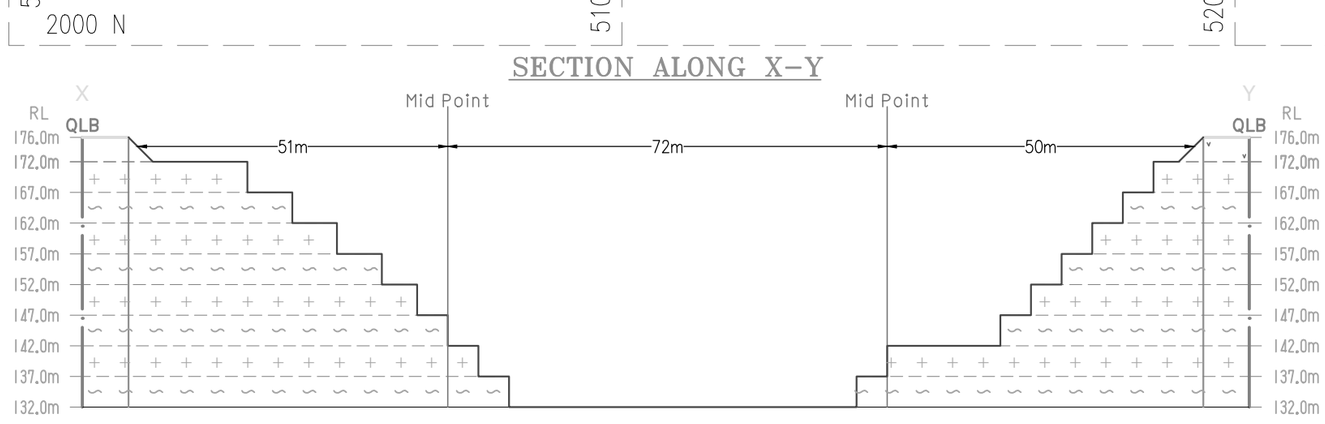


N
W E

SECTION ALONG X–Y

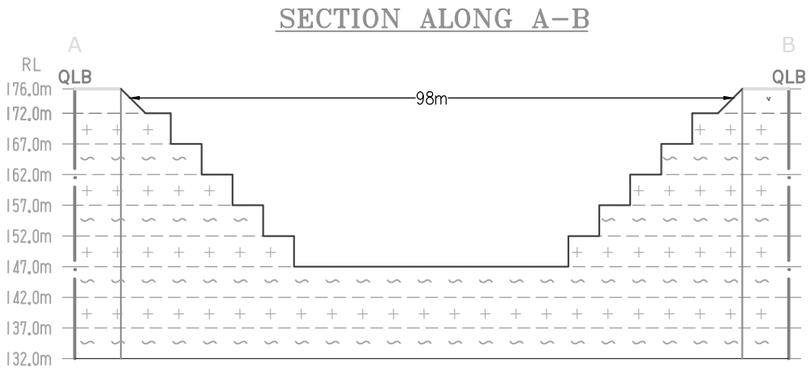


ULTIMATE PIT DIMENSION (MAX)
XY-AB 51m X 98m X 29m(d)
XY-CD 72m X 116m X 44m(d)
XY-EF 50m X 190m X 34m(d)

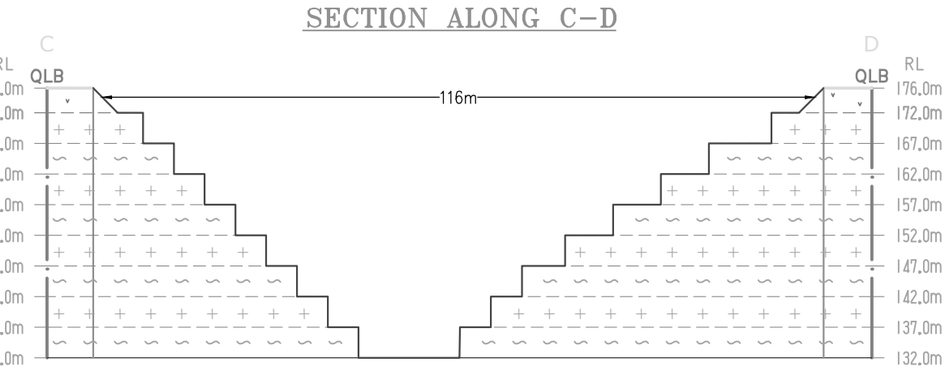
Proposed area to be Plantation

SITE SERVICES
A – OFFICE
B – STORE ROOM
C – FIRST AID ROOM
D – REST SHELTER
E – TOILET

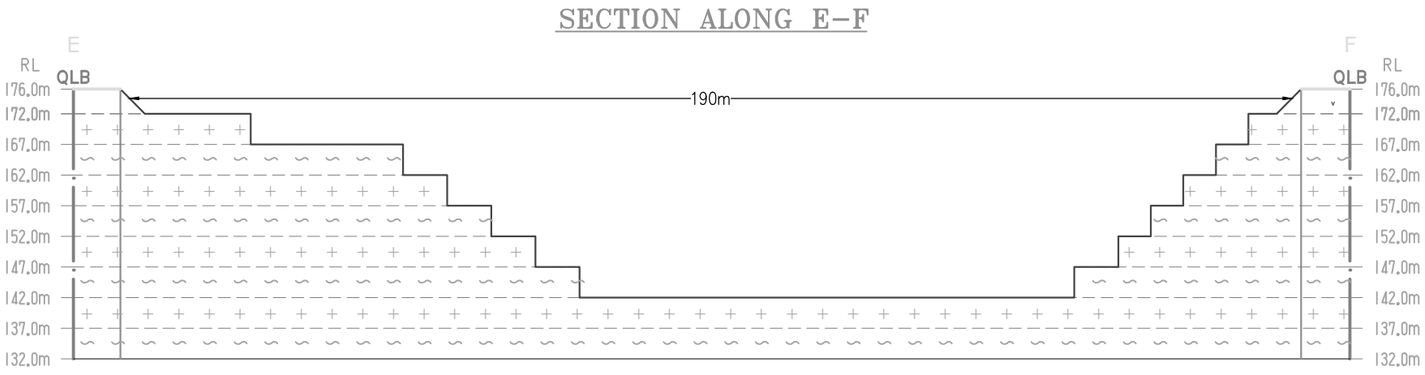
SECTION ALONG A–B



SECTION ALONG C–D



SECTION ALONG E–F



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APPLICANT:

Thiru.K.SURESH,
S/O.KOVIL PILLAI,
350 F2,MASTER PLAN,
COMPLEX ROAD,GOVT ITI BACK SIDE,
THENI-625 531.

LOCATION OF Q.L.A AREA:

S.F.No : 24/1B,24/1E,24/1F2 & 24/1F3,
EXTENT : 2.83.50 HA.
VILLAGE : THENPALANJI,
TALUK : THIRUPARANKUNDRAM,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

PLATE No. V

DATE OF SURVEY : 15.09.2025

CONCEPTUAL PLAN & SECTIONS

SCALE. 1:1000

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M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(I)(a)and(b)of MCR,2016

HYDRO - GEOLOGICAL STUDIES AT THIRU. K. SURESH, ROUGH STONE & GRAVEL QUARRY IN THENPALANZHI VILLAGE, THIRUPPARANKUNDRAM TALUK, MADURAI DISTRICT, TAMIL NADU.

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HYDRO - GEOLOGICAL STUDIES AT THIRU. K. SURESH, ROUGH STONE & GRAVEL QUARRY IN THENPALANZHI VILLAGE, THIRUPPARANKUNDRAM TALUK, MADURAI DISTRICT, TAMIL NADU.

1 INTRODUCTION

Proprietor of **Thiru. K. Suresh** in Rough stone and Gravel quarry Over an extent of 2.83.5 hectares of Patta land in S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3 of Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu state on the hydrological regime of thearea, 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 Thenpalanzhi Village.

1.1. Scope of Study

The current study focuses on investigating both shallow and deeper aquifers using electrical resistivity Vertical Electrical Sounding (VES) method to measure the apparent resistivity in the study area. Specifically, the study aims to estimate the groundwater level in Thenpalanzhi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu, including the proposed leasehold area and its surroundings. The study encompasses analysis of water level, sand type, rock type, and basement rock characteristics within the study area. Ultimately, the main objective is to ascertain the water table and flow dynamics of the lease area and its vicinity. **(Fig.1).**

1.2. Profiles in the Study Area.

Name of the Lessee	: **Thiru. K. Suresh**
Survey No	: S.F.Nos. 24/1B, 24/1E, 24/1F2 and 24/1F3
Extent	: 2.83.5 hectares.
Village	: Thenpalanzhi Village,
Taluka	Thirupparankundram Taluk,
District	: Madurai
State	: Tamil Nadu

2. STUDY AREA DESCRIPTION

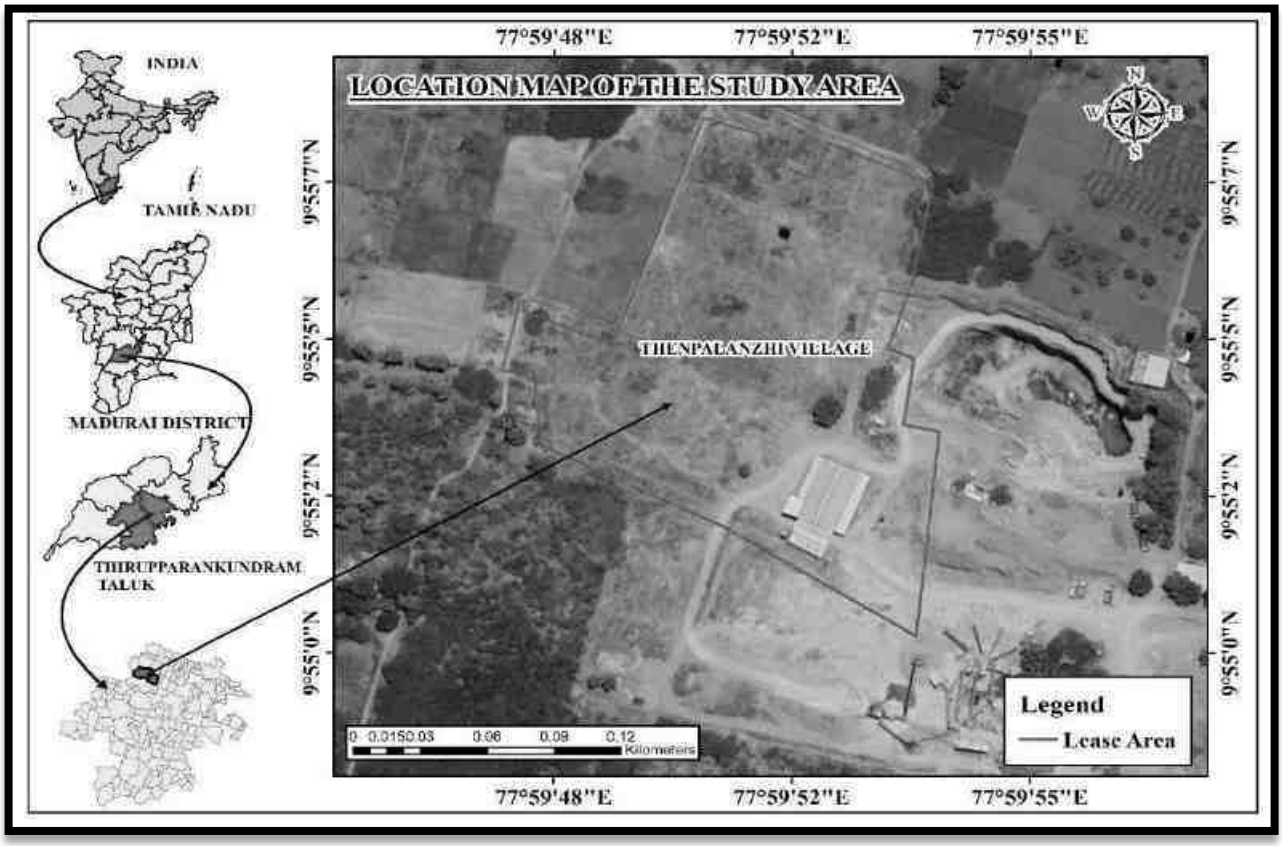

Figure.1. Shows proposed mine lease area

The lease applied area is located about 14km Southwestern side of Madurai town, 6km Northwestern side of Thirupparankundram town and 1.3km Northwestern side of Thenpalanzhi hamlets.

The lease applied area falls in the Toposheet No: **58G/13** Latitude between: **09°55'00.2645”N to 09°55'08.5231”N** and Longitude between: **77°59'47.2679''E to 77°59'53.7028”E** on WGS datum-1984

Madurai —9km, Northeast→ Thirupparankundram —5km, Northwest→ Thenpalanzhi —1.3km, Northwest→ Lease applied area

2.1 Topography of the Lease Area and Its Surrounding Environments:

The lease applied area is situated in flat terrain. The gradient of the area towards Southern side and altitude of the area is 176m above from Mean Sea Level. The area is covered by gravel having an average thickness of 4m and followed by Massive Charnockite which is clearly inferred from the adjacent existing quarry pit.

The Water level in the surrounding area is 96m below from general ground profile which is observed from private borewells. Average annual rainfall is about 827mm.

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° 30' - 10° 16' and east longitudes 77° 15' - 78° 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 ± 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 (mafic ultra-mafic).

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

5. The younger acid intrusive comprises granite and pegmatite. In the metasedimentary group, rocks of arenaceous, calcareous, and argillaceous composition have undergone metamorphism under the granulite facies. This group includes quartzite, calc gneiss/diopside granulite, marble, garnet-sillimanite gneiss (Khondalite), with occasional bands of garnetiferous quartzo-feldspathic gneiss (leptynite) and garnet cordierite gneiss. These rocks are found as individual bands, enclaves, or tectonic slices within the predominantly charnockite-migmatite region. Quartzite, a significant member of the metasedimentary group, occupies the crests of linear ridges with variable thickness ranging from less than a meter to 150 meters.

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 SE 60°.

The general geological sequences of the rocks in this area are given below:

AGE		FORMATION
Recent	-	Quaternary formation (Gravel)
---------Unconformity----------		
Archaean	-	Charnockite
		Peninsular Gneiss complex

4. 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, 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 inthe proposed site. The DDR 3 equipment was used for data collection **(Fig.3)**

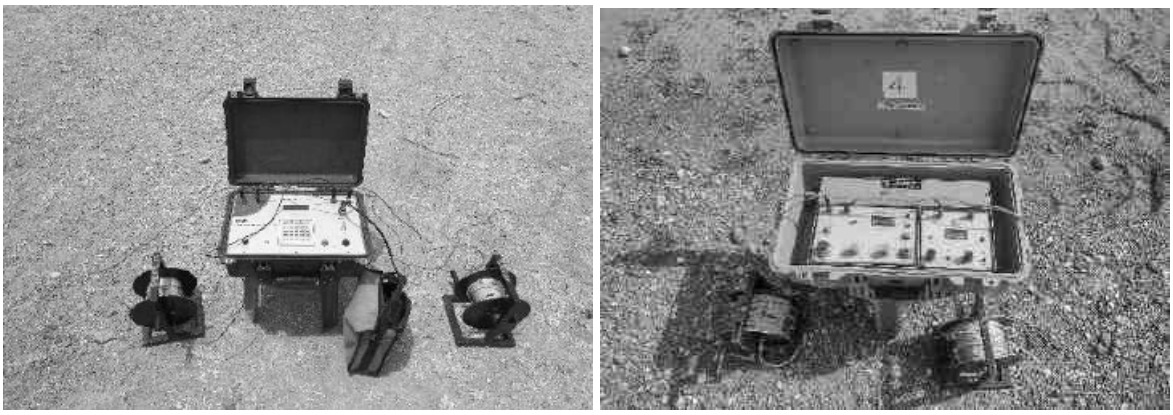

Figure 3. Electrical resistivity survey Instruments.

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:

$$R = Rs * L/A \text{ (in Ohm)}$$

Where Rs 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:

$$Rs = (A/L) * (dV/I) \text{ (in Ohm m)}$$

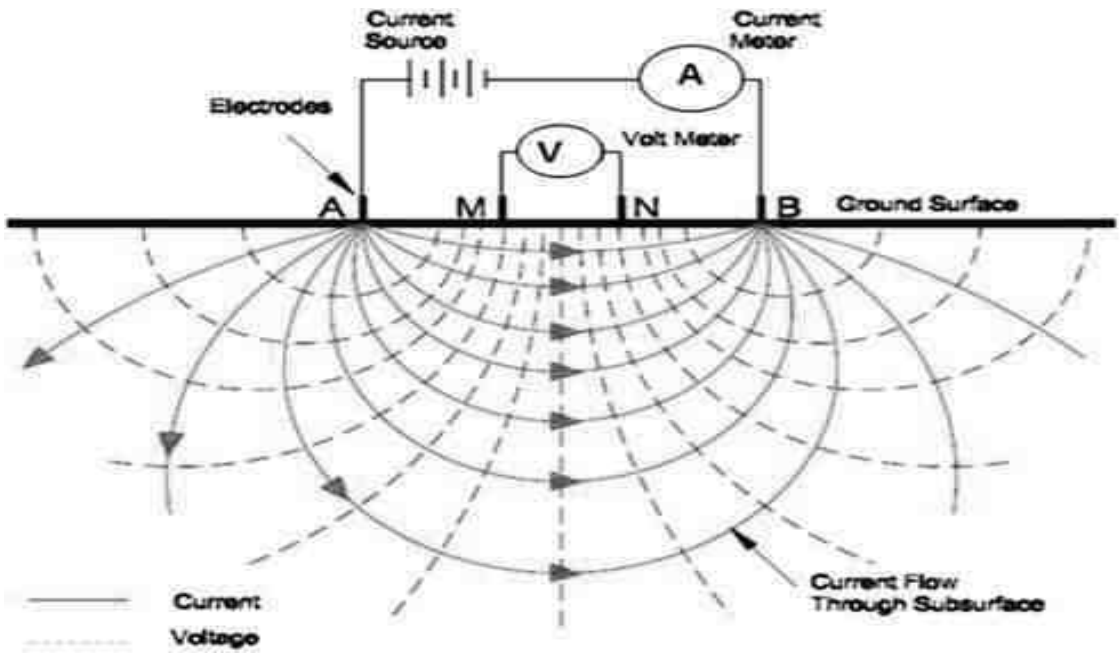

Figure 4. Schematic Diagram of Electrical resistivity principle

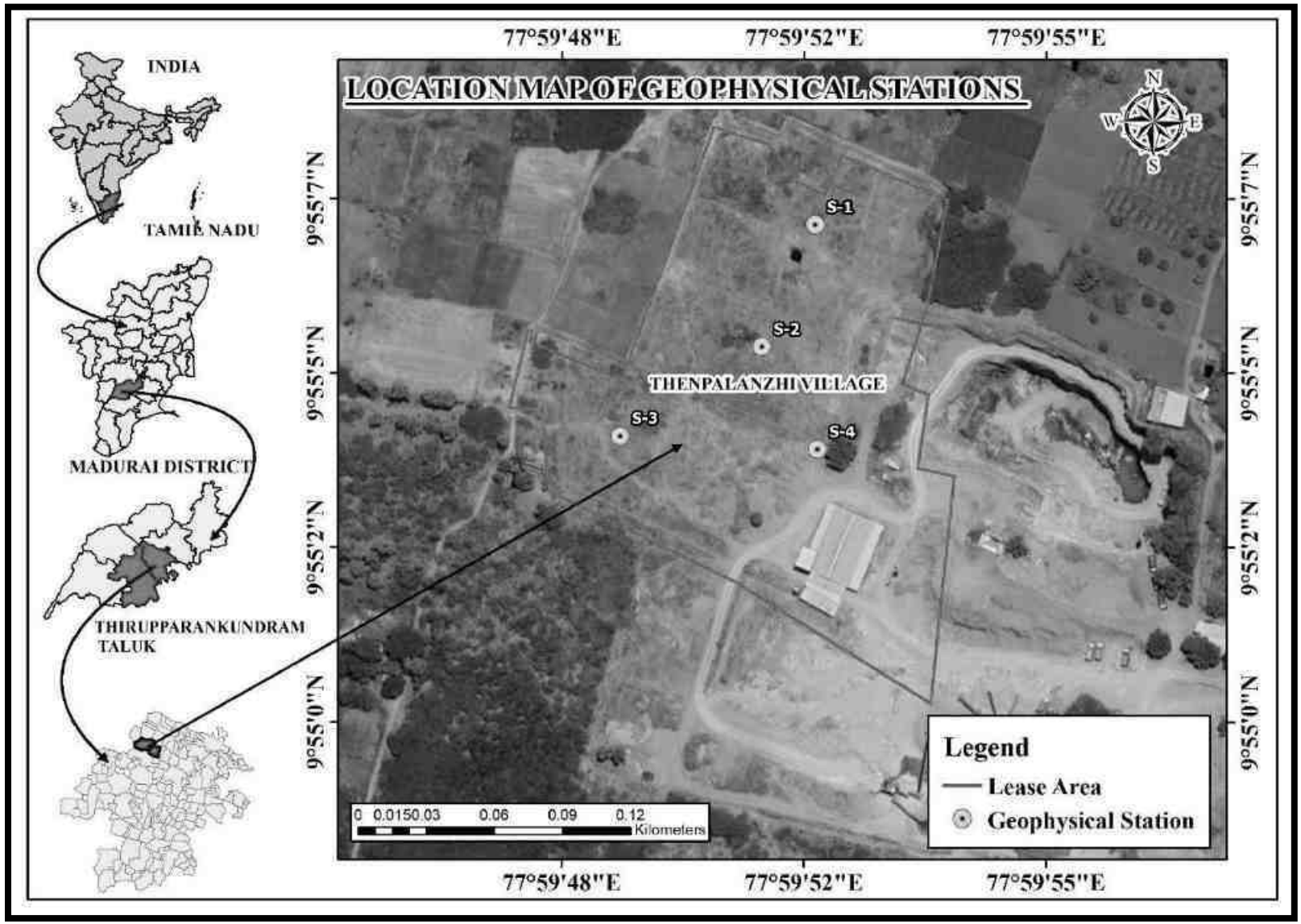

Figure 5. Geophysical survey location in the lease area

6. GEOPHYSICAL DATA INTERPRETATION & GRAPH

Table 1 Geophysical data of Station 1

S. No	*Ab/2*	*Mn /2*	*K*	*R*	*Rho*
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

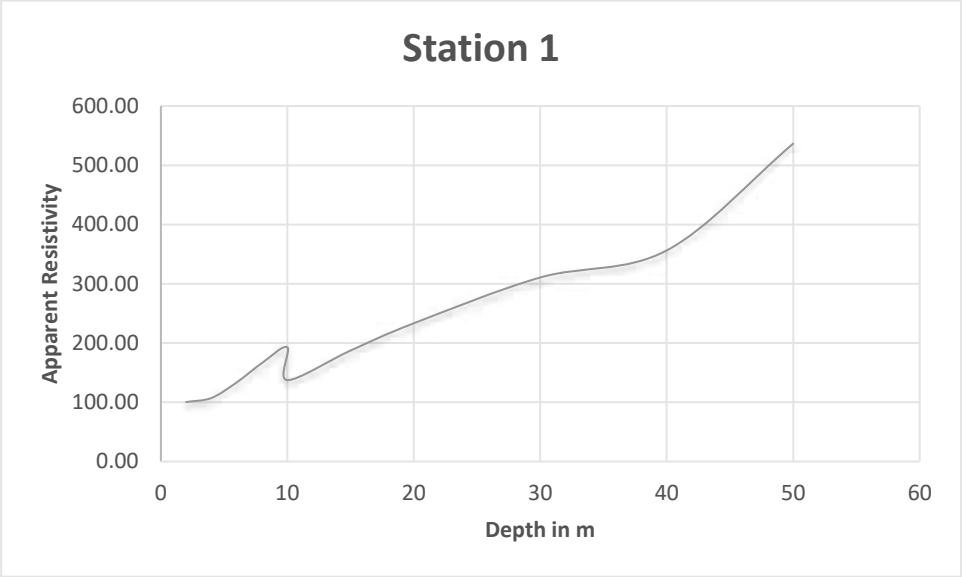

Figure 6 Graphical Representation of Geophysical data Station 1

110A

Table 2 Geophysical data of Station 2

S. No	Ab/2	Mn /2	K	R	Rho
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

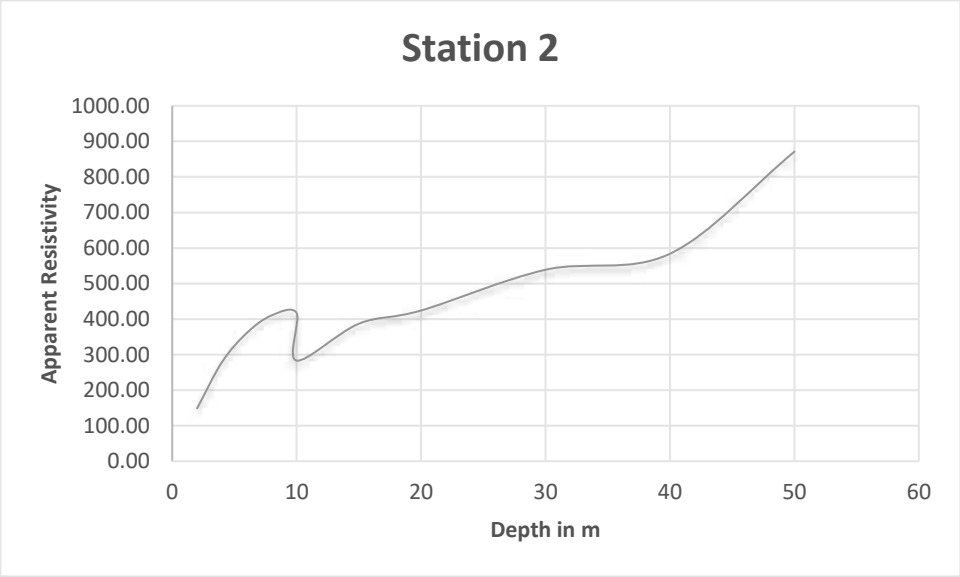

Figure 7 Graphical Representation of Geophysical data Station 2

Table 3 Geophysical data of Station 3

S. No	Ab/2	Mn/2	K	R	Rho
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

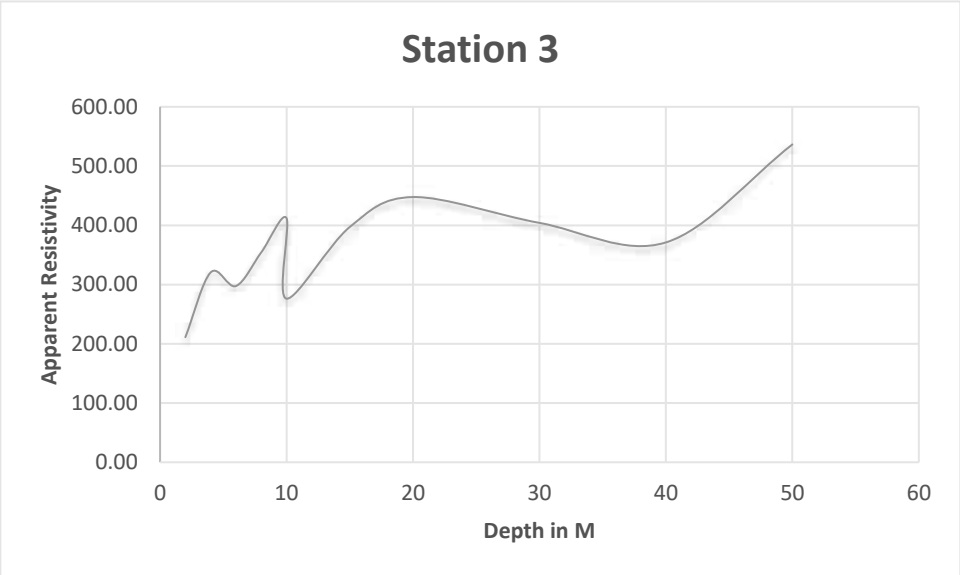

Figure 8 Graphical Representation of Geophysical data Station 3

112A

Table 4 Geophysical data of Station 4

S. No	Ab/2	Mn/2	K	R	Rho
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

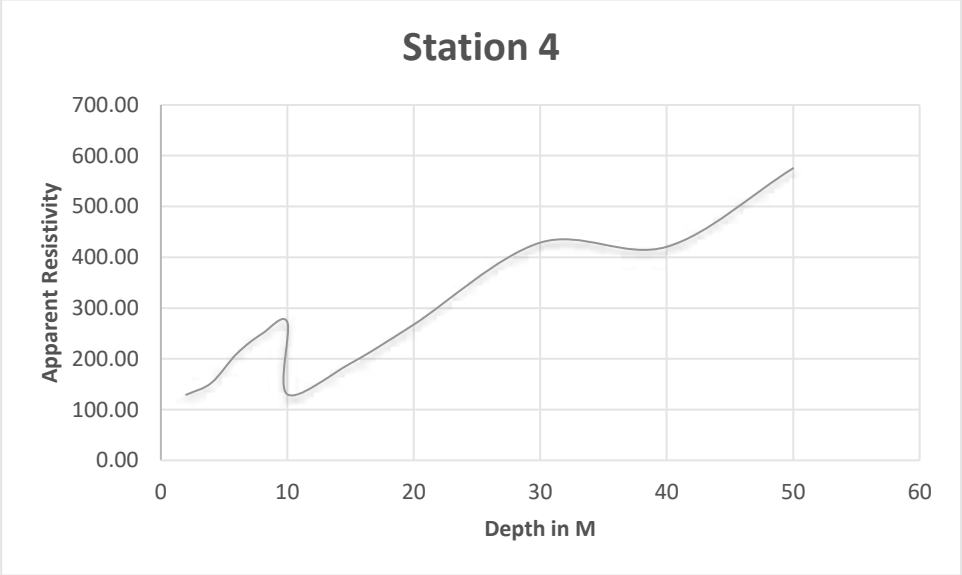

Figure 9 Graphical Representation of Geophysical data Station 4

113A

7.CONCLUSION

- The lease applied area is situated in flat terrain. The gradient of the area towards Southern side and altitude of the area is 176m above from Mean Sea Level.
- The geological study of the given area covered by gravel 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 4m (Average) - Top Soil / Gravel**
    - **5m to 44m (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 is found within the weathered / fractured metamorphic terrain. Currently the aquifers are located at **96 meters** below ground level (BGL). However, considering the approved mining plan depth, which is **44meters** 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, Advaitha Ashram Road,
Alagapuram, Salem – 636 004, Tamil Nadu.

File No.: 11829
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
****

Dated **13/05/2025**

To,

Thiru.M RAJASEKAR
Old No.11.03.22, New No.1.34A, Pandiyan Nagar, 3rd Karisalkulam, Vilangudi Post, Madurai District, Tamil Nadu, Karisalkulam, MADURAI, TAMIL NADU, 625018
suriyawork18@gmail.com

Subject: Grant of prior Environmental Clearance (EC) to the proposed Mining Project under the provisions of EIA Notification 2006-as amended regarding

Sir/Madam,

SEIAA-TN – Proposed Rough Stone and Gravel quarry lease over an extent of 4.14.89Ha at S.F.Nos: 20/3, 21/1, 22/1B2A and 23/5, Thenpalanchi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu by Thiru. M. Rajasekar– under Category "B2" of Item 1(a) "Mining of Minerals Projects" of the Schedule to the EIA Notification, 2006 issue of Environmental Clearance – Regarding.

Ref:

1. Your Application for Environmental Clearance dated: 11.02.2025
2. Online Proposal No. SIA/TN/MIN/523313/2025, Dated: 12/02/2025
3. Minutes of the 547th meeting of SEAC held on 04.04.2025
4. Minutes of the 818th Authority meeting held on 08.05.2025

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC25C0108TN5417652N
(ii) File No.	11829
(iii) Clearance Type	Mining EC Under 5 Ha
(iv) Category	B2
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Thiru. M. Rajasekar Rough Stone and Gravel Quarry Project, Extent:4.14.89 Ha, S.F.Nos.20/3,21/1,22/1B2A and 23/5, Thenpalanchi Village, Thirupparankundram Taluk, Madurai District
(ix) Location of Project (District, State)	MADURAI, TAMIL NADU

(x) Issuing Authority SEIAA

(xii) Applicability of General Conditions No

1.In view of the particulars given in the Para 1 above, the project proposal interalia including Form-2(Part A & B)/EMP Reports were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

2.The above-mentioned proposal has been considered by SEIAA in the meeting held on 08.05.2025. The minutes of the meeting and all the project documents are available on PARIVESH portal which can be accessed from the PARIVESH portal by scanning the QR Code above.

3.The SEAC, based on information submitted viz: Form2 (Part A, B)EMP report etc., & clarifications provided by the project proponent and after detailed deliberations on all technical aspects and compliance thereto furnished by the Project Proponent, recommended the proposal for grant of Environment Clearance under the provision of EIA Notification, 2006 and as amended thereof subject to stipulation of Specific and Standard EC conditions as detailed in the point below.

4.The SEIAA has examined the proposal in accordance with the provisions contained in the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and based on the recommendations of the SEAC hereby accords Environment Clearance for the instant proposal Thiru. M. Rajasekar under the provisions of EIA Notification, 2006 and as amended thereof subject to compliance of the Specific and Standard EC conditions as given in Annexure (2)

5.The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

6.The Environmental Clearance to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable,to the project.

7.The PP is under obligation to implement commitments made in the Environment Management Plan, which forms part of this EC.

8.Salient features of the proposal are as follows:

S.No	Particulars	Details furnished
1	Name of the Owner/Firm	Thiru. M. Rajasekar, S/o. Marimuthu Pillai, Old No. 11.03.22, New No. 1.34A, Pandiyan Nagar, 3rd Karisalkulam, Vilangudi Post, Madurai District – 625 018.
2	Type of quarrying	Rough Stone and Gravel
3	S.F No. of the quarry site	20/3, 21/1, 22/1B2A and 23/5
4	Village in which situated	Thenpalanchi
5	Taluk in which situated	Thirupparankundram
6	District in which situated	Madurai
7	Extent of quarry (in ha.)	4.14.89Ha
8	Latitude & Longitude of all corners of the quarry site	09°54’53.95” N to 09°55’02.20” N 77°59’55.17” E to 78°00’04.32” E
9	Topo Sheet No.	58 G/13 and 58 K/01
10	Type of mining	Open Cast Mechanized Method Mining
11	Details of Environmental Setting.	**Nearest Reserve Forest** : Kodimangalam RF – 3.73km – NE **Nearest Wild Life Sanctuary:** Srivilliputhur Tiger Reserve – 28.5Km – SW **Nearest Habitation**: 420m-NE **Nearest Roads:** i)Madurai-Theni(NH-85)-2.5Km-N ii)SH-Tirumangalam-Silukuvarpatti(SH-73)-2.6 Km-East.

		Nearest Water Bodies: i)Periyakanmoi – S ii)Tank-360m-SE
12	Details of Previous History:	It is a fresh lease area
13	Period of current mine plan	10 Years
14	Production (Quantity in m^3)	**3,04,340 m^3 of rough stone & 43,426 m^3 of gravel**
15	Depth of mining	**52m BGL**
16	Depth of water table	68m – 73m BGL
17	Man Power requirement	29 Nos
18	Water requirement: 1. Drinking & Domestic 2. Dust Suppression 3. Green belt	**1.9 KLD** 0.4 KLD 0.7 KLD 0.8 KLD
19	Power requirement	2,50,712 Liters of HSD will be utilized for entire life
20	Precise area communication approved by the Assistant Director, Department of G&M.	Rc. No. 1020/Mines/2024, Dated: 19.12.2024
21	Mining Plan approved by Deputy Director, Department of G&M.	Rc. No. 1020/Mines/2024-2, Dated: 25.01.2025
22	500m cluster letter issued by the Deputy Director of Dept. of Geology and Mining.	Rc. No. 1020/Mines/2024-2, Dated: 25.01.2025
23	VAO Certificate Regarding Structures within 300m Radius	Letter dated 06.02.2025
24	Project Cost	Rs. 113 Lakhs as per Mining plan
25	EMP cost (in Rs. Lakhs).	Rs. 8.62 lakhs
26	CER cost (in Rs. Lakhs).	Rs.3 Lakhs
27	**Validity:** **This Environmental Clearancc is accorded for the quantity of 3,04,340 m^3 of rough stone & 43,426 m^3 of gravel up to the depth of 52m BGL and the annual peak production should not exceed 51,090 m^3 of rough stone & 14,560 m^3 of gravel.. The Environmental Clearance issued is valid as per the approved mine plan period and as per MoEF&CC's notification S.O.1533(E) dated.14.09.2006 and S.O. 1807(E) dated 12.04.2022.**	

9.General Instructions:

(i)The project proponent shall prominently advertise it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days indicating that the project has been accorded environment clearance and the details of SEIAA website where it is displayed.

(ii)The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn must display the same for 30 days from the date of receipt.

(iii)The project proponent shall have a well laid down environmental policy duly approved by the Board of Directors (in case of Company) or competent authority, duly prescribing standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms / conditions.

(iv)Action plan for implementing EMP and environmental conditions along with responsibility matrix of the project proponent (during construction phase) and authorized entity mandated with compliance of conditions (during operational phase) shall be prepared. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Six monthly progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six-Monthly Compliance Report.

(v)Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance

and attract action under the provisions of Environment (Protection) Act, 1986.
The Regional Office of this SEIAA shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
(vi)Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
10.This issue with an approval of the Competent Authority. For information on deliberations, refer to the minutes of SEAC and SEIAA available in the PARIVESH Portal.

Copy To

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

Annexure 1

Specific EC Conditions for (Mining Of Minerals)

1. Seiaa Specific Conditions :

S. No	EC Conditions
1.1	1. The validity of the Environmental Clearance shall be for a period of 10 years or until the expiry of the land lease deed, whichever is earlier. 2. Keeping in view of MoEF &CC's notification S.O.1533(E) dated.14.09.2006 and S.O. 1807(E) dated 12.04.2022, this Environmental Clearance is valid as per the approved mine plan period. 3. The EC granted is subject to review by District Collector, Mines Dept. and TNPCB on completion of every 5 years and also during the mine plan period, till the project life so as to review the EC conditions and to ensure that they have all been adhered to and implemented. 4. The project proponent shall submit a Certified Compliance Report obtained from RO of MoEF&CC to the monitoring, regulatory and other concerned authorities including SEIAA, while seeking a renewal of the mining plan to cover the project life. 5. There should be regular monitoring of air quality, water quality, ground water level and noise quality and reports regarding the same should be submitted to TNPCB, SEIAA & RO of MoEF&CC once in every 6 months. 6. The proponent shall strictly adhere to the mining plan and half yearly and annual returns shall be submitted to the Director of Geology and Mining Department with copy marked to TNPCB, SEIAA & RO of MoEF&CC. 7. Biodiversity in and around the project area should be monitored frequently and detailed biodiversity report should be submitted every year to SEIAA & RO of MoEF&CC. 8. The progressive and final mine closure plan including the green belt implementation and Environmental norms should be strictly followed as per the EMP and as per the amount committed

S. No	EC Conditions
	and approved in EC for EMP. Status of progressive mine closure and green belt implementation should be included in the half yearly compliance report submitted to TNPCB, SEIAA & RO of MoEF&CC. 9. As per the OM vide F. No. IA3-22/1/2022-IA-Ill [E- 172624] Dated: 14.06.2022, the Project Proponents are directed to submit the six-monthly compliance on the Environmental conditions prescribed in the prior Environmental clearance letter(s) through newly developed compliance module in the PARIVESH Portal from the respective login. A copy of the half yearly compliance report should be mailed to envcompseiaatn@gmail.com. 10. The amount allocated for EMP should be kept in a separate account and both the capital and recurring expenditures should be done year wise for the works identified, approved and as committed. The work & expenditure made under EMP should be elaborated in the bi-annual compliance report submitted and also should be brought to the notice of concerned authorities during inspections. 11. The plantation of saplings shall be carried out in the earmarked greenbelt area as a part of the tree plantation campaign "Ek Ped Ma Ke Naam" and the details of the same shall be uploaded in the MeriLiFE Portal (https://merilife.nic.in).

2. Seac Conditions - Site Specific

S. No	EC Conditions
2.1	1. The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds, before obtaining the CTO from the TNPCB. 2. Tree plantation & fencing and installation of garland drainage with siltation tank around the mine lease area shall be completed before execution of the mine lease. 3. The PP shall **register promptly through online in the Shram Suvidha Portal** which is the official portal of Ministry of Labour & Employment, Govt of India to obtain **Labour Identification Number** (LIN) **before obtaining the CTO from the TNPCB**. 4. The project proponent shall maintain 7.5m three-tiered greenbelt in safety zone and such plantation should not be disturbed. 5. As accepted by the Project Proponent the CER cost is **Rs. 3 Lakhs** and the amount shall be spent towards Panchayat Union Middle School, Thenpalanchi Village, Madurai South Taluk, Madurai District for the activities as committed before obtaining CTO from TNPCB. 6. The PP shall ensure that the loaded trucks are covered with a tarpaulin cover to avoid the spillage & dust pollution while transportation. 7. The PP shall abide by all the conditions as stipulated in accordance with the provisions of MMR 1961 and DGMS Circular No.7 of 1997 while carrying out the controlled blasting operations through a statutorily competent persons appointed by him. 8. **The PP shall not carry out the deep hole larger diameter blasting** and the secondary blasting of oversize fragments /boulders during the life of the lease period. 9. The PP shall only carry out the NONEL-based (or) Electronic Detonator based blasting operation for controlling the environmental impacts with keeping the security guards at a radial distance of 500 m by ensuring that all persons within such area have taken proper shelter. 10. The PP shall regularly carry out the controlled blasting operation by adopting line drilling and muffle technique using rubber blasting mats (or) cable/wire blasting mats designed exclusively to reduce fly rock, and to enhance safety for personnel, equipment, and surrounding structures by containing and suppressing projectile. 11. The PP shall not employ any external agency for carrying out the blasting operation and he shall also install the temporary magazines approved by the concerned licensing authority before the execution of the lease, for storing the authorized explosives & detonators separately in accordance

S. No	EC Conditions
	with the Explosive Rules, 2008. 12. For the safety of the persons employed in the quarry, the PP shall carry out the scientific studies to assess the slope stability of the working benches and existing quarry wall during the 4th year or when the depth exceeds 30m whichever is earlier, 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 Dept of Mining Engg-Anna University Chennai. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation. 13. The proponent shall make necessary arrangements to suppress the dust pollution caused during the quarrying & truck transportation by continuous mode of water spraying. 14. The PP shall fulfil the requirements of the provisions of Mines Act 1952, the regulations of MMR 1961 and the DGMS Circulars, the Environment Act & Rules, 1986, Explosives Act 1884, Explosive rules 1983 and other laws, orders pertaining to the geometry of quarry and its operation without any deviation.

3. Special Mitigation Measures For The Quarries Located Within 1 Km From The Reserve Forests

S. No	EC Conditions
3.1	1. Since the R.F is located very close to the proposed quarry site, the PP shall develop Green Belt (Thick Tree plantation in two to three rows) along the boundary of the mine lease area before obtaining the CTO from the TNPCB. 2. The proponent shall construct and maintain proper fencing all around the boundary of the proposed working quarry adjacent to the direction of the location of the Reserved Forest before the commencement of the operation and shall furnish the photographs showing the same before obtaining the CTO from TNPCB. 3. The PP shall take steps so that the overburden, waste rock, rejects and fines generated during the mining operations shall be stored in separate dumps positioned in opposite direction to the location of the reserved forest. 4. The PP shall ensure that such waste/reject dumps shall be properly secured to prevent escape of material there from in harmful quantities which may cause degradation of environment and to prevent causation of floods. 5. The PP shall select the site for dumps on impervious ground to ensure minimum leaching effects due to precipitations. 6. The PP shall take necessary steps that wherever possible, the waste rock, overburden etc. shall be back-filled into the mine excavations with a view to restoring the land to its original use as far as possible. 7. Wherever back-filling of waste rock in the area excavated during mining operations is not feasible, the PP shall take adequate steps in discussion with the concerned DFO to suitably terrace the waste dumps ensuring the stability through vegetation to consolidate the green belt development in the areas adjacent to the reserved forest location. 8. The PP shall carry out the scientific investigations in order to keep the ground and noise vibrations caused by blasting operations and movement of HEMM such as Excavators, Trucks within safe limit. 9. The PP shall not perform secondary breakage involving the drilling & blasting in the quarrying operations and it can be replaced with non-conventional methods such as noise-controlled rock breakers, usage of non-explosive expansive materials/chemicals, Hydraulic Splitting based on the suitable scientific studies carried out by any reputed scientific and academic institutions.

S. No	EC Conditions
	10. The PP shall take adequate steps to control the air pollution due to fines, dust, smoke or gaseous emissions during the quarrying operations within 'Permissible Limits' specified under the environmental laws. 11. The Quarrying and Mining activities shall be restricted in the Eco-sensitive Zone of 60 m from the boundary of the Reserved area and hence the PP shall not even indulge in constructing the haul roads in these areas. 12. No development on existing steep hill slopes or slopes with a high degree of erosion shall be permitted. Hence, the PP shall not carry out the quarrying on steep hill slopes with a gradient of 20^0 or more or areas with a high degree of erosion on forestland. 13. The PP shall give an affidavit at the time of lease execution that there will be no felling of trees (or) any encroachment will not be made on these Reserved Forest lands and also within the Eco- sensitive Zone of 60 m without the prior permission of the State Government in case of reserve forest land as per the procedures laid down by the State Government. 14. The PP shall not use plastic carry bags within the quarry area. 15. The PP shall ensure that all the haul roads within the quarry lease shall be provided with adequate number of road side drains and these drains shall be kept free form blockage for runoff disposals. This run off from the road side drainage shall relate to the natural drainage system in the area. 16. The PP shall adhere to the provisions of the MoEF had issued Notification No. S.O. 1545 dated 25th June 2009 regulating certain activities in the eco-sensitive zone to conserve and protect the reserved forest area from ecological and environmental point of view.

4. Special Mitigation Measures For The Quarries Located In Close Proximity To The Windmills

S. No	EC Conditions
4.1	

Sl. No	Existing (or) Virgin Quarry	
	Wind Mills located at a distance of 150 m to 300 m	**Wind Mills located beyond 300 m Up to 500 m**
1.	Appointment of I/II Class Mines Manager Certificate of Competency under MMR 1961.	Appointment of I/II Class Mines Manager Certificate of Competency under MMR 1961.
2.	Special precautions are to be taken during blasting within danger zone such as posting guards, etc.	Blast design parameters should be mentioned in mining plan/scheme. and may be reviewed by a competent mining engineer.
3.	Blast design parameters should be mentioned in mining plan/scheme.	MCPD and total charge should be fixed such that it should nott exceed 1.3 kg and 26.50 kg respectively.
4.	The recommendations of scientific organisation need to be incorporated in the mining plan/scheme before its approval.	Fresh scientific study may be conducted if mine management wants to increase the MCPD and total explosive charge above the quantity of 1.30 kg and 26.50 kg respectively. Continuous monitoring using seismograph should also be done in such cases by the mine management.
5.	Engagement of blasting in-charge having Diploma/Degree in mining engineering	Engagement of blasting in-charge having Diploma/Degree in mining engineering for day-to-day

S. No	EC Conditions

	for day-to-day blasting.	blasting.
6.	Training of the blasting crew on controlled blasting practices before engaged in operation.	Training of the blasting crew on controlled blasting practices before engaged in operation.
7.	Submission of monthly report on blast design pattern and detailed explosive consumption as well as volume of rock excavation to a statutory body viz. DGMS, DMG, PESO or SPCB.	Submission of monthly report on blast design pattern and detailed explosive consumption as well as volume of rock excavation to a statutory body viz. DGMS, DMG, SPCB. Report of recorded ground vibration need to be added in monthly report.
8.	Report of recorded ground vibration need to be added in monthly report which shall be sent to all the statutory body viz. DGMS, DMG, SPCB.	Report of recorded ground vibration need to be added in monthly report which shall be sent to all the statutory body viz. DGMS, DMG, SPCB.
9.	Small diameter emulsion cartridge of 25 mm diameter (125 gm weight per cartridge) shall be used. However, ANFO explosives may also be used as main explosive charge.	Small diameter emulsion cartridge of 25 mm diameter (125 gm weight per cartridge) shall be used. However, ANFO explosives may also be used as main explosive charge.
10.	Electronic (or) Non-electric detonators (Nonel) shall be used in all the blasts for in-hole explosive initiation and surface hole-to-hole firing.	Non-electric detonators (Nonel) shall be used in all the blasts for in-hole explosive initiation and surface hole-to-hole firing.
11.	Max. number of holes in a round: 30.	Max. number of holes in a round: 40 to 60.

5. Seiaa Standard Conditions :

S. No	EC Conditions
5.1	**a) EC Compliance:** 1. The Environmental Clearance is accorded based on the assurance from the project proponent that there will be full and effective implementation of all the undertakings given in the Application Form, Pre-feasibility Report, mitigation measures as assured in the Environmental Impact Assessment/ Environment Management Plan and the mining features including Progressive Mine Closure Plan as submitted with the application. 2. All the conditions as presented by the proponent in the PPT during SEAC appraisal should be addressed in Full. 3. The proponent shall submit Compliance Reports on the status of compliance of the stipulated EC conditions including results of monitored data. It shall be sent to the respective Regional Office of Ministry of Environment, Forests and Climate Change, Govt. of India and also to the Office of State Environment Impact Assessment Authority (SEIAA). 4. Concealing the factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986. **b) Applicable Regulatory Frameworks:** 5. The project proponent shall strictly adhere to the provisions of Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment(Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, Minor Mineral Conservation &Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006, Wildlife Protection Act,

S. No	EC Conditions
	1972, Forest Conservation Act, 1980, Biodiversity Conservation Act, 2016, the Biological Diversity Act, 2002, Biological diversity Rules, 2004 & TN Forest Act, 1882 and Rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter. **c) Safe mining Practices:** 6. The AD/DD, Dept. of Geology & Mining shall ensure operation of the proposed quarry after the submission of slope stability study conducted through the reputed research & Academic Institutions such as NIRM, IITs, NITS Anna University, and any CSIR Laboratories, etc., and ensure strict compliance and implementation of bench wise recommendations/action plans as recommended in the scientific slope stability study. 7. A minimum buffer distance specified as per existing rules and statutory orders shall be maintained from the boundary of the quarry to the nearest dwelling unit or other structures, and from forest boundaries or any other ecologically sensitive and archeologically important areas or the specific distance specified by SEIAA in EC as per the recommendations of SEAC depending on specific local conditions. **d) Water Environment– Protection and mitigation measures:** 8. The proponent shall ensure that the activity does not disturb the water bodies, neighboring open wells, bore wells and natural flow of surface and groundwater, nor cause any pollution, to water sources in the area nor effect the water quality and water quantity in the water sources. 9. Water level in the nearest dug well in the downstream side of the quarry should be monitored regularly and included in the Compliance Report. 10. Quality of water discharged from the quarry should be monitored regularly as per the norms of State Pollution Control Board and included in the Compliance Report. 11. Rain Water Harvesting facility should be installed as per the prevailing provisions of TNMBR/TNCDBR, unless otherwise specified. Maximum possible solar energy generation and utilization shall be ensured as an essential part of the project. 12. Regular monitoring of flow rates and water quality upstream and downstream of the springs and perennial nallahs flowing in and around the mine lease area shall be carried out and reported in the compliance reports to SEIAA. At any stage, if it is observed that ground water table is getting depleted due to the mining activity; necessary corrective measures shall be carried out. 13. Garland drains and silt traps are to be provided in the slopes around the core area to channelize storm water. De-silting of Garland canal and silt traps have to be attended on a daily basis. A labour has to be specifically assigned for the purpose. The proponent shall ensure the quality of the discharging storm water as per the General Effluent Discharge Standards of CPCB. **e) Air Environment– Protection and mitigation measures:** 14. The activity should not result in CO2 release and temperature rise and add to micro climate alternations. 15. The proponent shall ensure that Monitoring is carried out with reference to the quantum of particulate matter during excavation; blasting; material transport and also from cutting waste dumps and haul roads. **f) Soil Environment– Protection and mitigation measures:** 16. The proponent shall ensure that the operations neither result in loss of soil biological properties and nutrients nor deplete the indigenous soil seed bank and disturb the mycorrizal fungi, soil organism, soil community and result in eutrophication of soil and water. Further, the activities should not disturb the soil properties and seed and plant growth. Soil amendments as required to be carried out, to improve soil health. 17. Bio remediation using microorganisms should be carried out to restore the soil Environment to enable carbon sequestration. 18. The proponent shall ensure that the mine restoration is done using mycorrizal VAM, vermin composting, Biofertilizers and the topsoil is protected and used in planting activities, site restoration and establishment of green belt in the area to ensure soil health and biodiversity conservation. 19. The top soil shall be temporarily stored at earmarked place (s) and used for land reclamation and

S. No	EC Conditions
	plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. At critical points, use of geotextile shall be undertaken for stabilization of the dump. Protective wall or gabions should be made around the dump to prevent erosion / flow of sediments during rains. The entire excavated area shall be backfilled. 20. Activities should not result in invasion of site by exotic and alien plant and animal species and disturb the native biodiversity and soil micro flora and fauna. **g) Noise Environment– Protection and mitigation measures:** 21. The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines. The activity of the proponent should not effect the biological clock of the villages resulting in stress, sleeping disorders affecting health. **h) Biodiversity - Protection and mitigation measures:** 22. The proponent should ensure that there is no disturbance to the agriculture plantations, social forestry plantations, waste lands, forests, sanctuary or national parks. There should be no impact on the land, water, soil and biological Environment and other natural resources due to the mining activities. 23. No trees in the area should be removed and all the trees numbered and protected. In case trees fall within the proposed quarry site the trees may be transplanted in the Greenbelt zone. The proponent shall ensure that the activities in no way result in disturbance to forest and trees in vicinity. The proponent shall ensure that the activity does not disturb the movement of grazing animals and free ranging wildlife. The proponent shall ensure that the activity does not disturb the biodiversity, the flora & fauna in the ecosystem. The proponent shall ensure that the activities do not disturb the resident and migratory birds. The proponent shall ensure that the activities do not disturb the vegetation and wildlife in the adjoining reserve forests and areas around. Also, the activities should not disturb the agro biodiversity, agro farms, green lands and grazing fields of all types. Actions to be taken to promote agroforestry, mixed plants to support biodiversity conservation in the mine restoration effort. 24. The proponent shall ensure that all mitigation measures listed in the EIA/EMP are taken to protect the biodiversity and natural resources in the area. **i) Climate Change:** 25. There should be least disturbance to landscape resulting in land use change, contamination and alteration of soil profiles leading to Climate Change. 26. Operations should not result in GHG releases and extra power consumption leading to Climate Change. 27. Mining through operational efficiency, better electrification, energy use, solar usage, use of renewable energy should try to decarbonize the operations. 28. Mining should not result in water loss from evaporation, leaks and wastage and should support to improve the ground water. 29. Mining activity should be flood proof with designs and the drainage, pumping techniques shall ensure climate-proofing and socio-economic wellbeing in the area and vicinity. **j) Reserve Forests & Protected Areas:** 30. The activities should provide nature-based support and solutions for forest protection and wildlife conservation. 31. The project activities should neither result in forest fires, encroachments nor create forest fragmentation and disruption of forest corridors and alter the geodiversity and geological heritage of the area. 32. There should be no disturbance to the freshwater flow from the forest impacting the water table and wetlands. 33. The project proponent should support all activities of the forest department in creating awareness to local communities on forest conservation.

S. No	EC Conditions
	34. The activities should not result in temperature rise due to increased fossil fuels usage disrupting the behaviour of wildlife and flora. 35. The activities should support and recognise the rights and roles of indigenous people and local communities and also support sustainable development. 36. The project activities should support the use of renewables for carbon capture and carbon storage in the project site and forest surrounds. 37. The project activities should not result in changes in forest structure, habitats and genetic diversity within forests. **k) Green Belt Development:** 38. The proponent shall ensure that in the green belt development more indigenous trees species as suggested in Appendix of SEAC Minutes are planted and that the area is restored and rehabilitated with native trees . **l) Workers and their protection:** 39. The project proponent is responsible for implementing all the provisions of labour laws applicable from time to time to quarrying /Mining operations. The workers on the site should be provided with on-site accommodation or facilities at a suitable boarding place, protective equipment such as ear muffs, helmet, etc. 40. The proponent has to provide insurance protection to the workers and the working hours and wages shall be implemented/enforced as per the Mines Act, 1952 in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease. **m) Transportation:** 41. No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a bypass road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the Environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centres. 42. The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt- conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions. **n) Storage of wastes** 43. The project proponent shall store/dump the waste generated within the earmarked area of the project site for mine closure as per the approved mining plan. **o) CER/EMP:** 44. The CER should be fully Implemented and fact reflected in the Half-yearly compliance report. 45. The EMP shall also be implemented in consultation with local self-government institutions & Govt. departments as indicated in SEAC meeting. **p) Directions for Reclamation of mine sites:** 46. The mining closure plan should strictly adhere to appropriate soil rehabilitation measures to ensure ecological stability of the area. Reclamation/Restoration of the mine site should ensure that the Geotechnical, physical, chemical properties are sustainable that the soil structure composition is

S. No	EC Conditions
	buildup, during the process of restoration. The proponent shall ensure that the mine closure plan is followed as per the mining plan and the mine restoration should be done with native species, and site restored to near original status. The proponent shall ensure that the area is ecologically restored to conserve the ecosystems and ensure flow of goods and services. 47. A crucial factor for success of reclamation site is to select sustainable species to enable develop a self-sustaining eco system. Species selected should easily establish, grow rapidly, and possess good crown and preferably be native species. Species to be planted in the boundary of project site should be un palatable for cattle's/ goats and should have proven capacity to add leaf-litter to soil and decompose. The species planted should be adaptable to the site conditions. Should be preferably pioneer species, deciduous in nature to allow maximum leaf-litter, have deep root system, fix atmospheric nitrogen and improve soil productivity. Species selected should have the ability to tolerate altered pit and toxicity of and site. They should be capable of meeting requirement of local people in regard to fuel fodder and should be able to attract bird, bees and butterflies. The species should be planted in mixed association. 48. Top soil with a mix of beneficial microbes (Bacteria/Fungi) to be used for reclamation of mine spoils. AM Fungi (Arbuscular mycorrhizal fungi), plant growth promoting Rhizo Bacteria and nitrogen fixing bacteria to be utilized. Soil and moisture conservation and water harvesting structures to be used where ever possible for early amelioration and restoration of site. Top soil is most important for successful rehabilitation of mined sites. Topsoil contains majority of seeds and plant propagation, soil microorganism, Organic matter and plant nutrients. Wherever possible the topsoil should be immediately used in the area of the for land form reconstruction, to pre mining conditions. 49. Over burdens may be analyzed and tested for soil characteristics and used in the site for revegetation. Wherever possible seeds, rhizome, bulbs, etc., of pioneering spices should be collected, preserved and used in restoring the site. Native grasses seeds may be used as colonizers and soil binders, to prevent erosion and allow diverse self- sustaining plant communities to establish. Grasses may offer superior tolerance to drought, and climatic stresses. 50. Reclamation involves planned topographical reconstruction of site. Care to be taken to minimize erosion and runoff. Topsoil should have necessary physical, chemicals, ecological, properties and therefore should be stored with precautions and utilized for reclamation process. Stocked topsoil should be stabilized using grasses to protect from wind. Seeds of various indigenous and local species may be broad casted after topsoil and treated overburden are spread. Alkaline soils, acidic soils, Saline soils should be suitably treated/amended using green manure, mulches, farmyard manure to increase organic carbon. The efforts should be taken to landscape and use the land post mining. The EMP and mine closure plan should provide adequate budget for re-establishing the site to pre-mining conditions. Effective steps should be taken for utilization of over burden. Mine waste to be used for backfilling, reclamation, restoration, and rehabilitation of the terrain without affecting the drainage and water regimes. The rate of rehabilitation should be similar to rate of mining. Efforts should to taken to aesthetically improve the mine site. Action taken for restoration of the site should be specifically mentioned in the EC compliances.

Standard EC Conditions for (Mining of minerals)

1. Statutory Compliance

S. No	EC Conditions
1.1	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.

S. No	EC Conditions
1.2	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
1.3	This Environmental Clearance (EC) is subject to orders/ judgment of Honble Supreme Court of India, Honble High Court, Honble NGT and any other Court of Law, Common Cause Conditions as may be applicable.
1.4	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).
1.5	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.
1.6	State Pollution Control Board/Committee shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tehsildar's Office for 30 days.
1.7	The Project Proponent shall follow the mitigation measures provided in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area."
1.8	A copy of EC letter will be marked to concerned Panchayat / local NGO etc. if any, from whom suggestion / representation has been received while processing the proposal.
1.9	The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of Judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors.
1.10	The Project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India &Ors before commencing the mining operations.
1.11	The Project Proponent shall inform the MoEF&CC for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred. PP needs to apply for transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.
1.12	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.
1.13	The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board/Committee and web site of the Ministry of Environment, Forest

S. No	EC Conditions
	and Climate Change (www.parivesh.nic.in). A copy of the advertisement may be forwarded to the concerned MoEFCC Regional Office for compliance and record.
1.14	The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Government. In this regard, Project Proponent should essentially implement the directions of the Hon'ble Supreme Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/ protected against felling and plantation of such trees should be promoted.
1.15	The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.

2. Air Quality Monitoring And Preservation

S. No	EC Conditions
2.1	The project proponent use leak proof trucks/dumpers carrying mineral and cover them with tarpaulin.
2.2	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.
2.3	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality /fugitive emissions to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
2.4	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986. 9) The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g., PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to S02 and NOx emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120 each). covering upwind and downwind directions.

3. Water Quality Monitoring And Preservation

S. No	EC Conditions
3.1	Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with State Groundwater

S. No	EC Conditions
	Department. A report on amount of water recharged needs to be submitted to Regional Office MoEFCC annually.
3.2	In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from SGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from SGWA and MoEFCC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro-geological study of the area.
3.3	The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.
3.4	Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry and State Groundwater Department / State Pollution Control Board.
3.5	Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J- 20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.
3.6	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
3.7	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.
3.8	The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF&CC and State Pollution Control Board/Committee.
3.9	The project proponent shall practice rainwater harvesting to maximum possible extent.
3.10	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.
3.11	Adhere to Zero Liquid Discharge

S. No	EC Conditions
3.12	The Project Proponent shall undertake regular monitoring of natural water course/ water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease including upstream and downstream. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. The parameters to be monitored shall include their water quality vis-à-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/ or alteration be made to water bodies during mining operations without justification and prior approval of MoEFCC. The monitoring of water courses/ bodies existing in lease area shall be carried out four times in a year viz. pre- monsoon (April May), monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Regional Director, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on six-monthly basis.

4. Noise Monitoring And Prevention

S. No	EC Conditions
4.1	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.
4.2	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.

5. Noise And Vibration Monitoring And Prevention

S. No	EC Conditions
5.1	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.
5.2	The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The workers engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/ laborers are working without personal protective equipment.
5.3	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.

6. Energy Conservation Measures

S. No	EC Conditions
6.1	Provide LED lights in their offices and residential areas.
6.2	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly;

7. Mining Plan

S. No	EC Conditions
7.1	The land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The excavation vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to the MoEFCC and its concerned Regional Office.
7.2	The Project Proponent shall adhere to approved mining plan, inter alia, including, total excavation (quantum of mineral, waste, over burden, inter burden and top soil etc.); mining technology; lease area; scope of working (method of mining, overburden & dump management, O.B& dump mining, mineral transportation mode, ultimate depth of mining, concurrent reclamation and reclamation at mine closure; land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life; etc.).

8. Land Reclamation

S. No	EC Conditions
8.1	Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and Top Soil/OB/Waste dumps to prevent run off of water and flow of sediments directly into the water bodies (Nallah/ River/ Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/ sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.
8.2	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.
8.3	The Overburden (O.B.), waste and topsoil generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB / waste dumps / topsoil dump like height, width and angle of slope shall be governed as per the approved Mining Plan and the guidelines/circulars issued by D.G.M.S. The topsoil shall be used for land reclamation and plantation.
8.4	Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB

S. No	EC Conditions
	dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps shall be constructed at the corners of the garland drains.

9. Waste Management

S. No	EC Conditions
9.1	The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.
9.2	Kitchen waste shall be composted or converted to biogas for further use.(to be decided on case to case basis depending on type and size of plant)

10. Green Belt And Emp

S. No	EC Conditions
10.1	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.
10.2	Green belt shall be developed in an area equal to 33% of the plant area with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant

11. Transportation

S. No	EC Conditions
11.1	No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a 'bypass' road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers. [If applicable in case of road transport].
11.2	The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression

S. No	EC Conditions
	arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.

12. Public Hearing And Human Health Issues

S. No	EC Conditions
12.1	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
12.2	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.
12.3	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
12.4	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
12.5	Project Proponent shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, safe drinking water, medical health care, crèche for kids etc. The housing may be provided in the form of temporary structures which can be removed after the completion of the project related infrastructure. The domestic waste water should be treated in order to avoid contamination of underground water.

13. Green Belt

S. No	EC Conditions
13.1	The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.

14. Corporate Environment Responsibility

S. No	EC Conditions
14.1	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to

S. No	EC Conditions
	be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
14.2	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest /wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest I wildlife norms / conditions and / or shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
14.3	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.
14.4	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.

15. Miscellaneous

S. No	EC Conditions
15.1	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponents website permanently.
15.2	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
15.3	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
15.4	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
15.5	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
15.6	44) The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
15.7	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the

S. No	EC Conditions
	Government who in turn has to display the same for 30 days from the date of receipt.
15.8	The project proponent shall monitor the criteria pollutants level namely; PM10, S02, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.
15.9	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC)/SEIAA-TN.
15.10	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
15.11	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.
15.12	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.
15.13	Concealing factual data failure to comply with any or submission of false/ fabricated data and of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
15.14	The Project Proponent shall prepare digital map (land use & land cover) of the entire lease area once in five years purpose of monitoring land use pattern and submit a report to concerned Regional Office of the MoEF&CC.
15.15	The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
15.16	The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MOEFCC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.
15.17	The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
15.18	In pursuant to Ministrys O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Honble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, the mining lease holder shall after ceasing mining operations, undertake regrassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.

S. No	EC Conditions
15.19	The concerned Regional Office of the MoEF&CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MoEF&CC officer(s) by furnishing the requisite data / information / monitoring reports.
15.20	A separate 'Environmental Management Cell' with suitable qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall directly report to Head of the Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF&CC.
15.21	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

AFFIDAVIT FURNHSED BY THE PROPONENT

I, Thiru. M. Rajasekar, S/o. Marimuthu Pillai, Old no. 11.03.22, New No. 1.34A Pandiyan Nagar, 3rd Karisalkulam, Vilangudi Post, Madurai District – 625 018. Solemnly declare and sincerely affirm that:

I have applied for getting Environment Clearance from SEIAA, Tamil Nadu State for quarrying of Rough Stone and Gravel quarry project over an Extent of 4.14.89 Ha of Patta land in S.F. Nos: 20/3, 21/1, 22/1B2A and 23/5 of Thenpalanchi Village, Thirupparankundram Taluk, Madurai District, Tamil Nadu State.

1. I swear to state and confirm that within 10km area of the quarry site, I have applied for environment clearance, none of the following is situated:
    a. Critically polluted areas as notified by the central pollution control board constituted under water (Prevention and Control of Pollution) Act, 1974.
    b. Eco-Sensitive areas as notified.
    c. Interstate Boundary.
2. I will spend the amount of Rs. 3 Lakhs towards Corporate Environment Responsibility for: Panchayat Union Middle School and the details are as follows:

CER:

Panchayat Union Middle School, Thenpalanchi Village, Madurai South Taluk, Madurai District.

Sl. No.	Description	Cost breakup
1	Construction of New Toilet	**Rs.3,00,000/-**
2	Providing R.O purifier to the school	
3	Renovation of School Roof	
	Total	**Rs.3,00,000/-**

3. The total area of following quarries located within 500m radius from the periphery of my quarry site details as shown below:

(i) Existing Quarries:

S. No.	Name of the Owner	Village	S.F. No	Extent	Collectors Proceedings No & date	Lease Period
NIL						

(ii) Details of Expired/abandoned Quarries:

S. No.	Name of the Owner	Village	S.F. No	Extent in Hect.	Collectors Proceedings No & date	Lease Period
1.	Rajasekar. M, S/o. Marimuthu Pillai, Door No. 208, LIG Colony, Poonga Nagar Residence, K.K.Nagar, Madurai District.	Thenpalanki/ Thirupparankundram	23/2B (0.18.0), 23/2E (0.90.0), 23/2F (0.36.0), & 23/3 (0.17.0)	1.61.0	Roc No. 1237/2018 dt: 10.09.2019	13.09.2019 to 12.09.2024

(iii) Details of Proposed Quarries:

S. No.	Name of the Owner	Village	S.F. No	Extent in Hect.
1.	Thiru. M. Rajasekar, S/o. Marimuthu Pillai, Old no. 11.03.22, New No. 1.34A, Pandiyan Nagar, 3rd Karisalkulam, Vilangudi Post, Madurai District - 625018	Thenpalanji/ Thirupparankundram	20/3 (1.76.5), 21/1(0.65.68), 22/1B2A (1.24.71) & 23/5 (0.48.0)	4.14.89

4. There will not be hindrance or disturbance to the people living during quarrying activities and transportation of the mineral.
5. There is no approved habitation within 300m radius from the periphery of my quarry.
6. I swear that afforestation will be carried out during the course of quarrying operation and maintained.
7. The required insurance will be taken in the name of the laborers working in my quarry site.

8. The existing road from the main road to quarry is in good condition and the same is being maintained and utilized for Transportation of Rough stone.
9. I will not engage any child labor in my quarry site and I aware that engaging child labor is punishable under the law.
10. All types of safety / protective equipment will be provided to all the laborers working in my quarry.
11. No permanent structures, temples etc., are located within 500m radius from the periphery of my quarry.

REVISED EMP BUDGET

	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Haul road maintenance & Water sprinkling	Lump sum fund allocation for daily maintenance of haul roads and thrice a day water sprinkling by fixed sprinklers or water tankers	0	50000
	Muffle blasting – To control fly rocks during blasting	Lump sum fund allocation Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure	Lump sum fund allocation for ensuring wet drilling by covering drill holes with wet gunny bags and spraying water while drilling	0	10000
	No overloading of trucks/tippers/tractors	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Enforcing speed limits of 20 km/hr within ML area	Lump sum fund allocation	0	5000

		Manual Monitoring through Security guard		
	Regular monitoring of exhaust fumes as per RTO norms	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	5000

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 / Competent Person	0	0
	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	0
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 made in Operating Cost	0	0
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Provision made in Operating Cost	0	0
	3. Greenbelt development under safety zone during the Scheme period	Provision made in Operating Cost	0	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure 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	100000
	Workers will be provided with Personal Protective Equipment's	Lumpsum fund allocation	50000	15000
	Health check-up for workers will be provisioned	IME & PME Health check up for all the employees will be covered batch wise.	0	50000
	First aid facility will be provided	Lumpsum fund allocation	0	5000
	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 vehicles /HEMMs. Flaggers will be deployed for traffic management	Lumpsum fund allocation	50000	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Appointment of Competent person for ensuring the safety operation	Provision made in operational cost	0	0
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Lumpsum fund allocation	300000	0
			5,60,000	**3,02,000**

DETAILS OF QUARRIES LOCATED WITHTN 5OOM RADILS FROM THE PROPOSED QUARRY:

The Project Proponent has submitted a copy of the letter obtained from the Deputy Director Department of Geology and Mining, Madurai District in his Rc. No. 1020/Mines/2024-2, Dated: 25.01.2025 has stated that the details of other quarries (Proposed / Existing / Abandoned Quarries) within a radius 500m from the boundary of the proposed quarry site as follows:

(i) Existing Quarries:

S. No.	Name of the Owner	Village	S.F. No	Extent	Collectors Proceedings No & date	Lease Period
NIL						

(ii) Details of Expired/abandoned Quarries:

S. No.	Name of the Owner	Village	S.F. No	Extent in Hect.	Collectors Proceedings No & date	Lease Period
1.	Rajasekar. M, S/o. Marimuthu Pillai,	Thenpalanki/ Thirupparankundram	23/2B (0.18.0), 23/2E (0.90.0), 23/2F (0.36.0),	1.61.0	Roc No. 1237/2018 dt: 10.09.2019	13.09.2019 to 12.09.2024

	Door No. 208, LIG Colony, Poonga Nagar Residence, K.K.Nagar, Madurai District.		& 23/3 (0.17.0)			

(iii) Details of Proposed Quarries:

S. No.	Name of the Owner	Village	S.F. No	Extent in Hect.
1.	Thiru. M. Rajasekar, S/o. Marimuthu Pillai, Old no. 11.03.22, New No. 1.34A, Pandiyan Nagar, 3rd Karisalkulam, Vilangudi Post, Madurai District - 625018	Thenpalanji/ Thirupparankundram	20/3 (1.76.5), 21/1(0.65.68), 22/1B2A (1.24.71) & 23/5 (0.48.0)	4.14.89

SEAC STANDARD CONDITIONS:

Category	Conditions	
1. General	1.1.	Prior approval shall be secured from the SEIAA for any modification / change in the Project mentioned in the Environmental Clearance (EC).
	1.2.	The Environmental Clearance (EC) shall be renewed in accordance with EIA Notification, 2006 vide S.O.2944 (E) dated: 14.09.2016, as amended from time to time.
	1.3.	The EC does not exempt the Proponent and/or his appointed contractors and operator from securing other government approvals or preclude other agencies/departments from enforcing their rules and regulations.
	1.4.	CTO from TNPCB shall be obtained and complied with.
	1.5.	A copy of the EC shall be kept at the Project site at all times. The Project Owner and/or its appointed contractors and operator shall allow access, and provide assistance to the authorised SEIAA officers

		and engineers in carrying out inspections, incident investigations, taking of pictures, and in obtaining relevant information such as onsite sources of emissions and effluent discharges at any time.
	1.6.	Any environment-related incidents and complaints shall be reported to SEIAA within twenty-four (24) hours. The incident report shall describe the likely cause, the time of occurrence, and the conditions under which an incident occurred, the extent of impact, and the remedial actions undertaken.
	1.7.	A Half-Yearly Compliance Report (HYCR), including environmental protection measures implementation and monitoring, and a brief description with photo documentation shall be submitted to SEIAA and IRO, MoEF&CC.
	1.8.	The EC Holder shall send 'Notice of Opening', to the Director of Mine Safety, Chennai Region, as required under the section 16 of the Mines Act 1952 before commencement of mining operations.
	1.9.	While transporting the mined material, the ECH shall ensure that there is no over loading of trucks/trippers/tractors. Every load transported should be weighed in an approved weighing station and the details should be maintained by the ECH.
2. Land	2.1	Topsoil shall be segregated, stockpiled, and protected from wind and water erosion, or contaminants. The segregated top soil shall not be disturbed by surface operations, such as roads and areas upon which support facilities are to be sited.
	2.2	As per the directions contained in the OM F.No.22-34/2018-IA.III dated 16th January 2020 issued by MoEF & CC, the ECH shall, undertake re-grassing the mining area and any other area which may have been disturbed due to his mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The compliance of this direction shall be included in the Half Yearly Compliance Report.
	2.3	The ECH must not carry out any activity: • Within 60 m from the Reserve Forest.

		• Within the notified environmentally sensitive area of notified protected areas. • Within 1 km of protected areas where the environmentally sensitive area has not been notified.
	2.4	The ECH must design, install and maintain adequate erosion and sediment control structures wherever necessary to prevent or minimise erosion of disturbed areas and the sedimentation and/or blockage of any watercourse, waterway, or water body.
	2.5	The ECH shall undertake in a phased manner restoration, reclamation and rehabilitation of lands affected by the quarrying operations and shall complete this work before the conclusion of such operations as per the Environmental Management Plan & the approved Mine Closure Plan.
	2.6	The ECH must not carry out any activity within 300m of an identified historical and archaeological site.
3. Water	3.1	Monitoring of drainage water should be carried out at different seasons by an NABL accredited lab and any discharged water into the natural stream should meet CPCB standards.
	3.2	Ground water quality monitoring should be conducted once in every six months and the report should be submitted to TNPCB. As a part of Ground Water Management, the ECH shall carry out the scientific studies **to assess the existing hydrogeological conditions (water table in the core & buffer zones) and impacts of the quarrying operation on the ground water level present in the core zone**, during the 2nd year of the mining operation, by involving any one of the reputed Research and Academic Institutions. A copy the report shall be submitted to the SEIAA, MoEF&CC, TNPCB, WRD and DMS, Chennai.
	3.3	The ECH shall construct a garland drain of appropriate size, gradient and length around the proposed quarry incorporating garland canal, silt traps, siltation pond and outflow channel connecting to a natural drain prior to the commencement of mining. Garland drain, silt-traps, siltation ponds and outflow channel should be de-silted periodically

		and geo-tagged photographs of the process should be included in the HYCR.
	3.4	The operation of the quarry should not affect the agricultural activities & water bodies near the project site and a 50 m safety distance from water body should be maintained without carrying any activity.
4. Air	4.1	The ECH must not cause any release of dust that is not in conformity with the National Ambient Air Quality Standards.
	4.2	The following measures along with any other measures shall be implemented by the ECH to control dust pollution. • Installing pollution control equipment (e.g. fitting bag filters or a cyclone to dust generating equipment). • Altering work practices to avoid or minimise the generation of dust. • Scheduling activities during times when they will have least impact. • Spraying water on roads and tracks. • Re-vegetating disturbed areas as soon as possible.
	4.3	The ECH shall ensure that the loaded trucks are **covered** to avoid the spillage & dust pollution while transportation.
	4.4	The ECH shall use the jack hammer drill machine fitted with the dust extractor for the drilling operations such that the fugitive dust is controlled effectively at the source.
5. Noise & Vibration	5.1	Appropriate measures should be taken for control of noise levels below 85 dBA in the work environment. (i) Workers engaged in operations of HEMM, etc. should be provided with Ear plugs/muffs, (ii) Noise levels should be monitored regularly (on weekly basis) near the major sources of noise generation within the core zone.
	5.2	The ECH must ensure that the ground vibration (peak particle velocity) shall not exceed the threshold limits prescribed by DGMS vide the DGMS Circular No. 7, of 1997.
	5.3	The ECH shall monitor the whole-body vibration level of all the machineries deployed and shall undertake adequate measures to

		reduce whole-body vibration (WBV) exposure to eliminate the adverse occupational health hazards/impacts caused to the operators. The report on the periodic monitoring shall be included in the HYCR.
	5.4	The ECH shall carry out blasting in such a manner that the blast-induced ground vibration level (Peak Particle Velocity) measured in the houses/structures located at a distance of 300 m shall not exceed 2.0 mm/s and no fly rock shall travel beyond 20 m from the site of blasting.
	5.5	Proper barriers to reduce noise level and dust pollution should be established by providing greenbelt along the boundary of the quarrying site.
	5.6	The ECH shall ensure that the blasting operations shall be carried out with a prior notice to the habitations situated around the proposed quarry. The ECH also should post sentries/guards adequately to ensure safety to the public.
	5.7	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.** The plant species of native origin with dense/moderate canopy should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
	5.8	Taller/one-year-old saplings raised in appropriate size of bags (preferably eco-friendly bags) should be planted in proper spacing as per the advice of local forest authorities/botanists/horticulturists with regard to site specific choices.
	5.9	The ECH shall maintain a register of all the trees planted and the survival rate.
	5.10	Adequate water sprinkling arrangements shall be in place on the haulage road for fugitive dust suppression. Fugitive emission measurements should be carried out during the mining operation at regular intervals and submit the consolidated report to TNPCB once in six months.

	5.11	If a credible, supported complaint is made that noise or vibration is adversely impacting human noise receptors, then the ECH shall consult with affected stakeholders to develop mitigation strategies to resolve the complaint.
6. Social & OHS	6.1	The ECH shall comply with the provisions of the Mines Act, 1952, MMR 1961 and Mines Rules 1955 for ensuring safety, health and welfare of the people working in the mines and the surrounding habitants.
		The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds, before obtaining the CTO from the TNPCB.
	6.2	The proponent shall install the 'S3 (or) G2' type of fencing with reflectors all around the boundary of the proposed working quarry with gates for entry/exit before the commencement of the operation as recommended in the DGMS Circular, 11/1959 and shall furnish the photographs showing the same before obtaining the CTO from TNPCB.
	6.3	The ECH shall ensure that the persons employed in the quarry whether permanent, temporary or contractual are provided with adequate PPEs before engaged in mining operations.
	6.4	The ECH shall use only the road indicated in the mining plan for transportation purposes. ECH shall monitor the condition of the road at all times and if the roads are damaged, ECH shall approach the District Collector for the maintenance of haulage road/village / Panchayat Road under DMF.
	6.5	During the operation of mine, the ECH shall take adequate safety precautionary measures while the vehicles pass through schools / hospitals.
	6.6	The ECH shall ensure that the blasting operations are carried out by the blaster/Mine Mate/Mine Foreman **duly employed** by him/her in accordance with the provisions of MMR 1961.

	6.7	The ECH shall register promptly through online in the **Shram Suvidha Portal** which is the official portal of Ministry of Labour & Employment, Govt of India to obtain **Labour Identification Number (LIN)** before obtaining the CTO from the TNPCB.
	6.8	The ECH shall **annually** carry out an Occupational Health Survey (OHS) **in accordance with the guidelines & period of examination laid in the DGMS (Tech.) (S&T) Circular No. 01 of 2011**, on OHS of the persons working in mines prone to generate the airborne dust, under Section 9A of Mines Act, 1952 and a copy of the annual compliance certificate shall be submitted to the SEIAA, IRO, MoEF&CC, TNPCB, AD/Mines-DGM and DMS, Chennai.
	6.9	The ECH shall install a 'Bio-toilet' and Rest shelter facility for the persons employed in the mine before obtaining the CTO from the TNPCB.
7. Financial	7.1	The ECH shall ensure that the funds earmarked for environmental protection measures are kept in a separate bank account and such funds should not be diverted for other purposes. Year-wise expenditure should be included in the HYCR.
	7.2	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 adhere to the EMP as committed.
8. Others	8.1	The ECH shall ensure that the provisions of the MMDR Act, 1957 & Tamil Nadu Minor Mineral Concession Rules 1959 are compiled by carrying out the quarrying operations in a skillful, scientific and systematic manner keeping in view proper safety of the labour, structure, the public and public works located in that vicinity of the quarrying area and in a manner to preserve the environment and ecology of the area.
	8.2	The ECH shall abide by the production schedule specified in the approved mining plan and if any deviation is observed, it will render the ECH liable for legal action in accordance with Environment and Mining Laws.
	8.3	The PP to erect Display board as Appendix-II

Abbreviations:

ECH	=	Environment Clearance Holder
HYCR	=	Half Yearly Compliance Report.
CTO	=	Consent to Operate
DMF	=	District Mining Fund
IRO	=	Integrated Regional Office of MoEF&CC
CPCB	=	Central Pollution Control Board
WRD	=	Water Resources Department
DMS	=	Director of Mine Safety
OHS	=	Occupational Health and Safety
NABL	=	National Accreditation board for Testing and Calibration Laboratories

STANDARD CONDITIONS

Part-A: Conditions to be Complied before commencing mining operations:-

1. **The project proponent shall advertise in at least two local newspapers widely circulated in the region, one of which shall be in the vernacular language informing the public that**
   I. **The project has been accorded Environmental Clearance.**
   II. **Copies of clearance letters are available with the Tamil Nadu Pollution Control Board.**
   III. **Environmental Clearance may also be seen on the website of the SEIAA.**
   IV. **The advertisement should be made within 7 days from the date of receipt of the clearance letter and a copy of the same shall be forwarded to the SEIAA.**
2. Mining activity should be reviewed by the District Collector after three years and decide for further extension.
3. NOC from the Standing committee of the NBWL shall be obtained, if protected areas are located within 10 Km from the proposed project site.
4. The project proponent shall comply the conditions laid down in the Section V, Rule 36 of Tamil Nadu Minor Minerals Concession Rules 1959.
5. **A copy of the Environment Clearance letter shall be sent by the proponent to the concerned Panchayat, Town Panchayat / Panchayat union/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom**

suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the proponent and also kept at the site, for the general public to see.

6. Quarry lease area should be demarcated on the ground with wire fencing to show the boundary of the lease area on all sides with red flags on every pillar shall be erected before commencement of quarrying.
7. The proponent shall ensure that First Aid Box is available at site.
8. The excavation activity shall not alter the natural drainage pattern of the area.
9. The excavated pit shall be restored by the project proponent for useful purposes.
10. The proponent shall quarry and remove only in the permitted areas as per the approved Mining Plan details.
11. The quarrying operation shall be restricted between 7AM and 5 PM.
12. The proponent shall take necessary measures to ensure that there shall not be any adverse impacts due to quarrying operation on the nearby human habitations, by way of pollution to the environment.
13. A minimum distance of 50mts. from any civil structure shall be kept from the periphery of any excavation area.
14. Depth of quarrying should be as per approved mining plan.
15. The mined out pits should be backfilled where warranted and area should be suitably landscaped to prevent environmental degradation. The mine closure plan as furnished in the proposal shall be strictly followed with back filling and tree plantation.
16. Wet drilling method is to be adopted to control dust emissions. Delay detonators and shock tube initiation system for blasting shall be used so as to reduce vibration and dust.
17. Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
18. Blasting shall be carried out after announcing to the public adequate through public address system to avoid any accident.

    A study has to be conducted to assess the optimum blast parameters and blast design to keep the vibration limits less than prescribed levels and only such design and parameters should be implemented while blasting is done. Periodical monitoring of the vibration at specified location to be conducted and records kept for inspection.
19. The Proponent shall take appropriate measures to ensure that the GLC shall comply with the revised NAAQ norms notified by MoEF& CC, GoI on 16.11.2009.

20. The following measures are to be implemented to reduce Air Pollution during transportation of mineral
    i. Roads shall be graded to mitigate the dust emission.
    ii. Water shall be sprinkled at regular interval on the main road and other service roads to suppress dust
21. The following measures are to be implemented to reduce Noise Pollution
    i. Proper and regular maintenance of vehicles and other equipment
    ii. Limiting time exposure of workers to excessive noise.
    iii. The workers employed shall be provided with protection equipment and earmuffs etc.
    iv. Speed of trucks entering or leaving the mine is to be limited to moderate speed of 25 kmph to prevent undue noise from empty trucks.
    v. All noise generating machinery the compressor, generator to be enclosed in acoustic enclosure so as to reduce noise in working area.
22. Measures should be taken to comply with the provisions laid under Noise Pollution (Regulation and Control) (Amendment) Rules, 2010, dt: 11.01.2010 issued by the MoEF& CC, GoI to control noise to the prescribed levels.
23. Suitable conservation measures to augment groundwater resources in the area shall be planned and implemented in consultation with Regional Director, CGWB. Suitable measures should be taken for rainwater harvesting.
24. Permission from the competent authority should be obtained for drawl of ground water, if any, required for this project.
25. Topsoil, if any, shall be stacked properly with proper slope with adequate measures and should be used for plantation purpose.
26. The following measures are to be adopted to control erosion of dumps:-
    i. Retention/ toe walls shall be provided at the foot of the dumps.
    ii. Worked out slopes are to be stabilized by planting appropriate shrub/ grass species on the slopes.
27. Waste oils, used oils generated from the EM machines, mining operations, if any, shall be disposed as per the Hazardous& other wastes (Management, and Trans Boundary Movement) Rules, 2016 and its amendments thereof to the recyclers authorized by TNPCB.

28. Concealing the factual data or failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
29. Rain water harvesting to collect and utilize the entire water falling in land area should be provided.
30. Rain water getting accumulated in the quarry floor shall not be discharged directly to the nearby stream or water body. If it is to be let into the nearby water body, it has to be discharged into a silt trap on the surface within the lease area and only the overflow after allowing settling of soil be let into the nearby waterways. The silt trap should be of sufficient dimensions to catch all the silt water being pumped out during one season. The silt trap should be cleaned of all the deposited silt at the end of the season and kept ready for taking care of the silt in the next season.
31. The lease holder shall undertake adequate safeguard measures during extraction of material and ensure that due to this activity, the hydro-geological regime of the surrounding area shall not be affected. Regular monitoring of ground water level and quality shall be carried out around the mine lease area during the mining operation. If at any stage, if it is observed that the groundwater table is getting depleted due to the mining activity; necessary corrective measures shall be carried out. District Collector/mining officer shall ensure this.
32. No tree-felling shall be done in the leased area, except only with the permission from competent Authority.
33. To take up environmental monitoring of the proposed quarry site before, during and after the mining activities including vibration study data, water, air & flora/fauna environment, slurry water generated/disposed and method of disposal, involving a reputed academic Institution.
34. It shall be ensured that the total extent of nearby quarries(existing, abandoned and proposed) located within 500 meter radius from the periphery of this quarry is not exceeding 5 hectares within the mining lease period of this application.
35. It shall be ensured that there is no habitation is located within 300 meter radius from the periphery of the quarry site and also ensure that no hindrance will be caused to the people of the habitation located within 300m radius from the periphery of the quarry site.
36. Free Silica test should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF& CC, GOI.

37. Air sampling at intersection point should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF& CC, GOI.
38. Bunds to be provided at the boundary of the project site.
39. The project proponent shall undertake plantation/afforestation work by planting the native species on all side of the lease area at the rate of 400/Ha. Suitable tall tree saplings should be planted on the bunds and other suitable areas in and around the work place.
40. Floor of excavated pit to be levelled and sides to be sloped with gentle slope (Except for granite quarries) in the mine closure phase.
41. The Project Proponent shall ensure a minimum of 2.5% of the annual turnover will be utilized for the CSR Activity
42. The Project Proponent shall provide solar lighting system to the nearby villages.
43. Earthen bunds and barbed wire fencing around the pits with green belt all along the boundary shall be developed and maintained.
44. Safety equipments to be provided to all the employees.
45. Safety distance of 50m has to be provided in case of railway, reservoir, canal/odai
46. The Assistant/Deputy Director, Department of Geology & mining shall ensure that the proponent has engaged the blaster with valid Blasting license/certificate obtained from the competent authority before execution of mining lease.
47. The proponent shall furnish the Baseline data covering the Air, Water, Noise and land environment quality for the proposed quarry site before execution of mining lease.
48. The proponent shall erect the pillars in accordance with the Rules for depicting GPS details in the earmarked boundary of the quarry site to monitor electronically before execution of mining.
49. The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.
50. The proponent has to display the name board at the quarry site showing the details of Proponent, lease period, extent, etc., with respect to the existing activity before execution of mining.
51. Heavy earth machinery equipments if utilized, after getting approval from the competent authority.
52. The Proponent shall ensure that the project activity including blasting, mining transportation etc should in no way have adverse impact to the other forests, such as

reserve forests and social forests, tree plantation and bio diversity, surrounding water bodies etc.

53. The proponent shall provide Green Belt development at the rate of not less than 400 trees/Hectare. The tree saplings shall be not less than 3m height.
54. The fugitive emissions should be monitored during the mining activity and should be reported to TNPCB once in a month and the operation of the quarry should no way impact the agriculture activity & water bodies near the project site.
55. All the commitment made by the project proponent in the proposal shall be strictly followed.
56. The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.

Part B: General Conditions:

1. EC is given only on the factual records, documents and the commitment furnished in non judicial stamp paper by the proponent.
2. The Proponent shall obtain the Consent from the TNPC Board before commencing the activity.
3. No change in mining technology and scope of working should be made without prior approval of the SEIAA, Tamil Nadu.
4. No change in the calendar plan including excavation, quantum of mineral (minor mineral) should be made.
5. Effective safeguard measures, such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.
6. Effective safeguards shall be adopted against health risks on account of breeding of vectors in the water bodies created due to excavation of earth.
7. A berm shall be left from the boundary of adjoining field having a width equal to at least half the depth of proposed excavation.
8. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.

9. Vehicular emissions shall be kept under control and be regularly monitored. The mineral transportation shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.
10. Access and haul roads to the quarrying area should be restored in a mutually agreeable manner where these are considered unnecessary after extraction has been completed.
11. All Personnel shall be provided with protective respiratory devices including safety shoes, masks, gloves etc. Supervisory people should be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.
12. Periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly. The workers shall be provided with personnel protective measures such as masks, gloves, boots etc.
13. Workers/labourers shall be provided with facilities for drinking water and sanitation facility for Female and Male separately.
14. The project proponent shall ensure that child labour is not employed in the project as per the sworn affidavit furnished.
15. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Chennai.
16. The Environmental Clearance does not absolve the applicant/proponent of his obligation/requirement to obtain other statutory and administrative clearances from other statutory and administrative authorities.
17. This Environmental Clearance does not imply that the other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would be considering the project on merits and be taking decisions independently of the Environmental Clearance
18. The SEIAA, Tamil Nadu may alter/modify the above conditions or stipulate any further conditions in the interest of environment protection.
19. The SEIAA, Tamil Nadu may cancel the Environmental Clearance granted to this project under the provisions of EIA Notification, 2006, at any stage of the validity of this Environmental Clearance, if it is found or if it comes to the knowledge of this

SEIAA, TN that the project proponent has deliberately concealed and/or submitted false or misleading information or inadequate data for obtaining tphe Environmental Clearance.

20. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.
21. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006, Wildlife Protection Act, 1972, Forest Conservation Act, 1980, Biodiversity Conservation Act, 2016, the Biological Diversity Act, 2002 and Biological diversity Rules, 2004 and Rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter.
22. Any other conditions stipulated by other Statutory/Government authorities shall be complied.
23. Any appeal against this Environmental Clearance shall lie with the Hon'ble National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
24. The Environmental Clearance is issued based on the documents furnished by the project proponent. In case any documents found to be incorrect/not in order at a later date the Environmental Clearance issued to the project will be deemed to be revoked/ cancelled.

Signature Not Verified

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

Date: 13/05/2025

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TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. – 625531

Test Certificate No : CML/25-26/T099808 Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ-1 Project Area - 9°55'7.47"N 77°59'50.36"**

Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/34 & 18.11.2026

Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/13 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	60.1	30.4	19.1	4.9	18.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	61.8	32.6	19.0	5.0	17.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	62.8	32.3	20.2	5.2	18.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	63.2	33.7	22.0	5.3	19.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	61.7	32.4	23.3	4.6	20.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	63.5	31.2	22.0	4.7	21.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	60.4	32.7	23.9	5.1	19.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	62.1	33.6	21.5	5.7	20.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9:00	61.0	31.0	20.2	5.9	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	63.9	33.4	21.1	5.3	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	62.3	33.6	20.8	5.2	20.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	61.5	31.6	23.7	5.4	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	63.9	32.8	22.7	5.6	19.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	63.7	33.8	22.4	5.0	20.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	61.1	32.4	23.7	4.8	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	63.9	31.2	20.9	4.5	22.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	61.0	30.3	22.2	4.6	21.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	62.2	33.0	23.5	4.7	20.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	60.2	32.9	19.7	6.3	19.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	61.9	33.2	20.2	6.5	20.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	60.1	33.6	22.9	6.0	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	63.9	30.5	19.1	6.1	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	60.4	33.9	21.6	6.3	20.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	62.6	30.0	22.1	6.1	21.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	61.7	31.7	23.5	6.4	22.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	62.0	30.5	24.1	5.9	21.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0); **Pb**: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
M. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. - 625531

Test Certificate No : CML/25-26/T099809 Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ-2 Near Existing Quarry - 9°54'55.00"N 78° 0'3.34"E**

Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/36 & 18.11.2026

Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/15 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	60.5	32.1	21.5	5.7	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	62.9	33.5	20.0	6.1	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	63.1	34.9	23.9	5.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	64.9	33.7	22.4	5.1	22.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	62.3	34.2	23.5	5.2	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	64.8	33.3	22.9	4.8	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	64.2	32.2	23.2	4.9	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	63.0	33.9	22.4	5.8	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9:00	62.8	31.1	23.1	5.1	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	61.5	33.7	22.9	5.0	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	64.8	35.5	23.5	5.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	63.4	33.7	23.6	5.4	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	61.2	34.5	21.9	6.7	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	62.9	33.9	22.0	7.0	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	63.0	30.6	21.8	5.6	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	64.5	36.2	19.8	6.2	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	63.3	37.9	19.0	5.9	21.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	61.3	33.9	19.4	6.8	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	60.5	36.3	22.9	5.1	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	62.5	33.4	23.1	5.2	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	61.1	35.1	22.9	5.3	25.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	63.8	36.9	19.1	7.4	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	61.3	33.9	21.6	6.5	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	62.1	34.1	22.6	5.9	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	63.9	35.5	22.5	5.3	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	62.8	34.2	23.0	5.7	25.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0); **Pb**: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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Email : test@mettexlab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. - 625531

Test Certificate No : CML/25-26/T099810 Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ-3 Meenakshipatti (School) - 9°55'34.42"N 78° 0'6.31"E**

Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/37 & 18.11.2026

Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/16 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	60.9	31.9	18.3	5.8	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	62.4	32.0	19.2	5.1	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	63.8	33.5	21.0	6.9	22.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	64.0	33.3	22.5	5.6	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	62.3	32.4	22.2	6.1	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	63.1	33.6	20.9	6.9	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	64.4	32.8	22.0	7.0	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	63.1	33.1	23.2	6.5	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9.00	65.9	35.3	22.2	6.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	65.2	34.1	23.5	6.8	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	63.9	33.4	22.6	7.1	26.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	64.0	32.9	23.5	6.9	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	65.0	33.4	23.0	7.1	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	64.1	34.5	25.1	6.3	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	65.1	32.9	24.6	5.4	25.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	63.2	33.1	23.2	6.8	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	62.9	31.0	24.0	5.3	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	63.9	34.1	22.9	6.9	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	64.3	33.5	22.2	6.3	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	65.4	30.9	20.9	5.5	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	64.0	32.9	21.5	6.2	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	62.2	35.9	20.1	6.4	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	63.0	32.6	24.0	7.5	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	64.5	33.1	23.5	7.3	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	65.5	33.9	22.1	6.5	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	66.8	32.8	23.9	7.2	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0);
Pb: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)
Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days from completion date of testing , except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and Customer.

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Email : test@mettexlab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. - 625531

Test Certificate No : CML/25-26/T099811 Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ-4 Thenpalanzhi (Residential) - 9°54'17.61"N 77°59'52.71"E**

Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/11 & 18.11.2026

Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/05 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	64.3	37.5	21.1	5.9	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	65.0	38.9	22.6	6.3	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	62.7	39.6	23.7	5.4	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	63.7	37.9	20.8	4.7	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	62.5	38.0	24.5	4.6	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	63.6	36.1	20.8	5.2	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	64.4	35.5	23.3	5.8	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	63.8	37.7	22.6	5.6	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9:00	64.0	38.1	21.2	5.0	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	62.2	33.2	23.0	5.2	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	64.0	36.4	21.1	4.5	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	63.9	37.9	20.8	5.8	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	64.2	39.0	20.6	5.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	62.0	38.1	23.5	6.1	22.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	62.3	39.9	23.9	6.4	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	64.1	36.7	22.7	4.6	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	62.9	32.9	20.3	5.8	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	65.5	33.3	19.1	6.5	21.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	63.3	37.4	22.3	6.3	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	64.5	34.9	19.6	5.1	21.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	62.8	35.6	21.8	6.9	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	63.2	39.1	19.9	7.0	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	65.9	32.4	21.6	6.9	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	64.4	35.9	22.1	6.2	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	63.3	32.8	24.7	5.8	21.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	65.0	32.9	23.5	5.9	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0); **Pb**: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. - 625531

Test Certificate No : CML/25-26/T099812 Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ-5 Kannanur (Residential) - 9°57'7.89"N 77°57'6.78"E**

Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/04 & 18.11.2026

Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/06 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	64.1	32.9	19.0	5.1	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	63.6	34.6	20.1	6.2	21.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	65.5	35.9	22.2	6.8	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	62.9	33.6	21.3	7.5	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	64.7	39.1	22.9	6.0	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	65.2	32.9	20.0	5.7	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	64.9	37.4	21.1	6.8	22.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	63.9	36.8	22.9	7.2	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9:00	66.0	32.2	23.0	5.9	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	62.7	34.5	19.5	5.2	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	64.0	37.9	19.7	6.8	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	63.4	33.3	20.5	7.3	22.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	62.8	35.9	22.2	7.4	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	64.7	40.0	21.3	5.6	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	65.8	38.8	19.9	5.6	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	63.9	35.5	21.1	6.6	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	62.7	36.9	22.2	5.3	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	65.1	38.7	21.5	5.9	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	62.0	39.1	20.0	6.9	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	63.1	34.8	19.0	5.2	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	64.5	32.3	21.1	5.9	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	65.8	39.7	22.5	6.7	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	63.3	33.5	22.9	64	21.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	66.0	35.5	19.0	7.1	20.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	62.5	34.8	21.4	5.7	22.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	64.1	32.7	22.8	6.6	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0); **Pb**: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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Phone : +91 44 22323163, 22311034, 42179490, 42179491 I CIN : U74999TN2008PTC069459
Email : test@mettexlab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. - 625531

Test Certificate No : CML/25-26/T099813 Test Certificate Date : 02.01.2026
Location of Sampling : **AAQ-6 Kilakuyilkudi (Residential) - 9°54'43.31"N 78° 2'31.74"E**
Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)
Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/03 & 18.11.2026
Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/12 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	64.5	32.1	19.0	5.0	22.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	63.3	37.8	20.1	6.1	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	65.1	36.6	22.2	6.2	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	62.8	35.5	20.0	6.9	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	66.0	38.8	22.1	5.7	22.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	64.4	33.3	21.5	6.1	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	63.9	34.8	23.0	6.3	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	62.2	39.1	22.5	5.9	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9:00	65.5	35.4	21.5	5.2	22.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	64.1	32.2	23.3	6.0	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	65.2	39.1	21.7	6.1	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	65.9	37.5	22.2	6.3	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	62.0	38.3	22.5	5.7	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	63.1	33.5	19.9	6.6	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	64.9	39.2	19.1	5.8	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	62.4	34.7	19.8	6.0	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	63.3	37.3	20.2	6.9	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	65.4	35.8	21.1	7.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	64.4	38.9	22.2	6.3	21.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	62.9	32.2	23.0	7.0	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	62.1	33.4	20.1	5.5	22.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	65.8	39.2	22.7	6.8	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	63.3	33.5	21.1	6.4	22.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	62.2	34.8	19.0	6.9	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	64.1	33.5	22.4	5.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	66.0	39.9	21.1	5.8	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0); **Pb**: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)
Remarks: The values observed for the pollutants given above are within the CPCB standards

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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CHENNAI METTEX LAB PRIVATE LIMITED®

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Phone : +91 44 22323163, 22311034, 42179490, 42179491 I CIN : U74999TN2008PTC069459
Email : test@mettexlab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. - 625531

Test Certificate No : CML/25-26/T099814 Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ-7 Karadikal (Residential) - 9°54'12.16"N 77°57'25.41"E**

Sampling Plan &Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID &Calibration Due Date: CML/ENV/RDS/02 & 18.11.2026

Sampling Instrument ID &Calibration Due Date: CML/ENV/FDS/19 & 19.11.2026

Ambient AirMonitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	CO	Pb	Ni	As	C_6H_6	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	µg/m³	ng/m³	ng/m³	µg/m³	ng/m³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	9:00 - 9:00	62.2	32.2	21.9	6.5	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	9:30 - 9.30	63.8	33.6	19.0	5.2	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	9:00 - 9:00	64.9	35.9	22.2	6.1	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	9:30 - 9.30	65.2	38.8	23.0	5.9	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	9:00 - 9:00	66.0	36.9	19.0	6.3	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	9:30 - 9.30	63.0	32.7	19.1	6.8	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	9:00 - 9:00	64.9	37.9	21.5	7.4	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	9:30 - 9.30	62.2	38.5	22.4	5.5	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	9:00 - 9:00	63.9	40.0	20.1	5.6	21.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	9:30 - 9.30	62.2	32.2	19.9	5.1	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	9:00 - 9:00	63.0	35.5	20.2	6.9	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	9:30 - 9.30	65.6	39.1	22.5	7.0	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	9:00 - 9:00	62.7	38.8	19.0	6.9	21.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	9:30 - 9.30	64.4	33.3	20.2	6.5	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	9:00 - 9:00	65.5	40.0	19.9	5.1	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	9:30 - 9.30	65.9	36.5	22.3	6.0	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	9:00 - 9:00	64.1	36.6	21.0	7.0	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	9:30 - 9.30	63.3	39.2	19.4	6.8	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	9:00 - 9:00	62.6	38.9	22.3	5.9	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	9:30 - 9.30	64.7	34.4	19.3	7.3	21.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	9:00 - 9:00	65.5	33.7	20.0	6.6	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	9:30 - 9.30	63.3	35.1	19.1	5.9	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	9:00 - 9:00	66.1	32.9	20.6	6.0	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	9:30 - 9.30	64.1	34.9	22.1	7.5	21.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	9:00 - 9:00	63.3	33.8	20.7	5.8	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	9:30 - 9.30	62.2	35.9	22.4	7.0	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;**DL**: Detection Limit ; **NH_3**: BDL (DL:20); **O_3**: BDL (DL:20); **CO**: BDL (DL:1.0); **Pb**: BDL (DL:0.1); **Ni**: BDL (DL:1.0); **As**: BDL (DL:1.0); **C_6H_6**: BDL (DL:1.0); **BaP**: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. – 625531

Test Certificate No : CML/25-26/T099815 Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring

Location of Sampling : N1 – Core Zone - 9°55'5.04"N 77°59'49.33"E
Location of Sampling : N2 -Near Existing Quarry- 9°54'54.89"N 78° 0'2.99"E

Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981
Sampling Instrument : CML/ENV/SLM/003 & CML/ENV/SLM/009

Sampling Date : 15.10.2025						
Loction	N1 – Core zone			N2 - Near Existing Quarry		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	37.4	40.3	39.1	33.4	37.2	35.7
07:00-08:00	32.7	35.9	34.6	32.4	36.6	35.0
08:00-09:00	42.1	45.3	44.0	33.9	37.4	36.0
09:00-10:00	40.2	42.3	41.4	40.2	42.3	41.4
10:00-11:00	41	43.6	42.5	41	43.6	42.5
11:00-12:00	41.3	42.5	41.9	41.3	42.5	41.9
12:00-13:00	33.4	41.3	38.9	42.3	44.9	43.8
13:00-14:00	31.4	42.3	39.6	43.3	45.1	44.3
14:00-15:00	39.7	43.6	42.1	42.1	44.5	43.5
15:00-16:00	38.2	40.3	39.4	40.1	42.3	41.3
16:00-17:00	35.2	38.2	37.0	35.7	39.4	37.9
17:00-18:00	36.5	39.6	38.3	34.5	38.2	36.7
18:00-19:00	32.4	34.2	33.4	35.8	40.1	38.5
19:00-20:00	36.8	38.6	37.8	36.8	39.8	38.6
20:00-21:00	36.9	39.7	38.5	36.9	39.7	38.5
21:00-22:00	37.6	39.9	38.9	37.6	40.6	39.4
22:00-23:00	33.2	36.2	35.0	35.1	39.4	37.8
23:00-00:00	31.2	35.2	33.6	31.4	34.6	33.3
00:00-01:00	32.6	34.2	33.5	32.7	36.8	35.2
01:00-02:00	33.2	35.2	34.3	31.6	36.4	34.6
02:00-03:00	35.1	38.8	37.3	32.4	36.4	34.8
03:00-04:00	33.7	35.4	34.6	33.7	35.4	34.6
04:00-05:00	32.4	34.8	33.8	35.4	38.5	37.2
05:00-06:00	33.4	35.6	34.6	33.4	37.2	35.7
Result	Day Means		**39.0**	Day Means		**39.6**
	Night Means		**34.5**	Night Means		**35.1**

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

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. – 625531

Test Certificate No : CML/25-26/T099816 Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring
Location of Sampling : N3 – Meenakshipatti (School) - 9°55'35.03"N 78° 0'7.40"E
Location of Sampling : N4 – Thenpalanzhi (Residential) - 9°54'17.62"N 77°59'54.18"E
Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981
Sampling Instrument : CML/ENV/SLM/003& CML/ENV/SLM/009

Sampling Date : 26.11.2025						
Loction	N3 – Meenakshipatti (School)			N4 - Thenpalanzhi (Residential)		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	39.2	40.1	39.7	40.2	42.1	41.3
07:00-08:00	38.4	40.2	39.4	41.1	43.3	42.3
08:00-09:00	39.4	43.2	41.7	42.1	45.3	44.0
09:00-10:00	38.9	40.2	39.6	40.2	42.3	41.4
10:00-11:00	38.2	41.5	40.2	41	43.6	42.5
11:00-12:00	36.2	40.6	38.9	41.3	42.5	41.9
12:00-13:00	38.3	41.8	40.4	42.3	44.9	43.8
13:00-14:00	35.6	41.2	39.2	43.3	45.1	44.3
14:00-15:00	36.1	40.6	38.9	42.1	44.5	43.5
15:00-16:00	36.8	40.3	38.9	40.1	42.3	41.3
16:00-17:00	35.7	42.3	40.1	41.1	43.5	42.5
17:00-18:00	34.5	42.1	39.8	34.5	42.1	39.8
18:00-19:00	37.6	43.5	41.5	37.6	43.5	41.5
19:00-20:00	41.5	43.2	42.4	36.8	39.8	38.6
20:00-21:00	40.5	42.5	41.6	36.9	42.3	40.4
21:00-22:00	41.2	43.6	42.6	37.6	45.2	42.9
22:00-23:00	38.9	40.1	39.5	30.2	43	40.2
23:00-00:00	33.5	35.2	34.4	31.4	36.6	34.7
00:00-01:00	35.2	38.6	37.2	32.7	37.2	35.5
01:00-02:00	33.4	35.6	34.6	31.2	36.4	34.5
02:00-03:00	32.2	36.4	34.8	32.4	35.8	34.4
03:00-04:00	30.2	32.6	31.6	30.4	37.9	35.6
04:00-05:00	32.1	34.5	33.5	32.4	38.8	36.7
05:00-06:00	34.2	36.1	35.3	31.2	36.5	34.6
Result	**Day Means**		**40.3**	**Day Means**		**41.9**
	Night Means		**34.5**	**Night Means**		**35.2**

Note: CPCB Norms Residential Area Day Time:55 dB(A); Night Time:45 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorized by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. – 625531

Test Certificate No : CML/25-26/T099817 Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring
Location of Sampling : N5 Kannanur (Residential) - 9°57'7.94"N 77°57'7.49"E
Location of Sampling : N6 Kilakuyilkudi (Residential) - 9°54'43.00"N 78° 2'31.87"E
Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981
Sampling Instrument : CML/ENV/SLM/003 & CML/ENV/SLM/009

Sampling Date : 10.12.2025						
Loction	N5 – Kannanur (Residential)			N6 - Kilakuyilkudi (Residential)		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	39.2	42.1	40.9	38.6	42.1	40.7
07:00-08:00	38.7	43.3	41.6	38.2	43.2	41.4
08:00-09:00	39.1	45.3	43.2	39.7	45.1	43.2
09:00-10:00	38.6	42.3	40.8	39.4	42.1	41.0
10:00-11:00	41	43.6	42.5	40	44.3	42.7
11:00-12:00	41.3	42.5	41.9	40.3	42.1	41.3
12:00-13:00	42.3	44.9	43.8	41.5	43.1	42.4
13:00-14:00	43.3	45.1	44.3	42.8	44.8	43.9
14:00-15:00	42.1	44.5	43.5	40.6	41.2	40.9
15:00-16:00	40.1	42.3	41.3	41.2	42.3	41.8
16:00-17:00	41.1	43.5	42.5	40.3	42.1	41.3
17:00-18:00	42.1	44.2	43.3	41.5	43.1	42.4
18:00-19:00	40.3	42.1	41.3	42.3	43.5	42.9
19:00-20:00	41.5	43.2	42.4	41	43.1	42.2
20:00-21:00	40.5	42.5	41.6	40.5	42.3	41.5
21:00-22:00	41.2	43.6	42.6	41.3	44.2	43.0
22:00-23:00	38.9	40.1	39.5	40.2	42.1	41.3
23:00-00:00	33.5	35.2	34.4	37.2	39.1	38.3
00:00-01:00	35.2	38.6	37.2	35.1	37.2	36.3
01:00-02:00	33.4	35.6	34.6	34.2	36.4	35.4
02:00-03:00	32.2	36.4	34.8	33.2	35.2	34.3
03:00-04:00	30.2	32.6	31.6	31.2	33.5	32.5
04:00-05:00	32.1	34.5	33.5	30.4	34.6	33.0
05:00-06:00	34.2	36.1	35.3	31	36.4	34.5
Result	Day Means		42.2	Day Means		42.0
	Night Means		34.5	Night Means		34.9

Note: CPCB Norms Residential Area Day Time:55 dB(A); Night Time:45 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

---------- *End of Report* ----------

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 I CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: Mr. K.Suresh, Extent: 2.83.5ha

S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3, Thenpalanji Village, Thirupparankundram Taluk.

Site Location: Mr. K. Suresh

S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt. – 625531

Test Certificate No : CML/25-26/T099818 Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring
Location of Sampling : N7- Karadikal (Residential) - 9°54'11.77"N 77°57'25.66"E
Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981
Sampling Instrument : CML/ENV/SLM/003 & CML/ENV/SLM/009

Loction	N7 - Karadikal (Residential)		
Parameter	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)
06:00-07:00	39.6	44.9	43.0
07:00-08:00	38.7	41.7	40.5
08:00-09:00	39.4	43.2	41.7
09:00-10:00	38.7	44.2	42.3
10:00-11:00	38.2	42.3	40.7
11:00-12:00	37.8	43.7	41.7
12:00-13:00	37.2	42.6	40.7
13:00-14:00	39.7	43.6	42.1
14:00-15:00	37.2	42.1	40.3
15:00-16:00	38.2	40.3	39.4
16:00-17:00	39.5	42.7	41.4
17:00-18:00	36.5	40.8	39.2
18:00-19:00	40.6	44.8	43.2
19:00-20:00	36.8	41.5	39.8
20:00-21:00	36.9	40.8	39.3
21:00-22:00	37.6	40.6	39.4
22:00-23:00	39.5	44.3	42.5
23:00-00:00	32.8	36.4	35.0
00:00-01:00	35.3	39.8	38.1
01:00-02:00	38.6	42.1	40.7
02:00-03:00	34.1	39.4	37.5
03:00-04:00	30.2	33.7	32.3
04:00-05:00	32.4	34.8	33.8
05:00-06:00	30.6	34.4	32.9
Result	Day Means		**41.0**
	Night Means		**35.7**

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099819
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646111/001

Sample Description : **Surface Water (SW-1) - Thenpalanzhi Lake**
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical	**Group:** Water	
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	8.03
Conductivity @ 25°C	IS 3025 Part 14:2013	1290.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	3 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	748.0 mg/l
Total Hardness as $CaCO_3$	IS 3025 Part 21:2009 (EDTA titrimetric method)	220.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	55.5 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	20.4 mg/l
Total Alkalinity as $CaCO_3$	IS 3025 Part 23:2023	205.6 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	250.6 mg/l
Sulphate as SO_4	IS 3025 Part 24/Sec 1-2022	52.6 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.50 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24th Edn. 2023:4500 F,D	0.49 mg/l
Nitrate as NO_3	IS 3025 Part 34:1988 (Chromotropic acid method)	16.3 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

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Email : test@mettexlab.com I Web : www.mettexlab.com

Lab No: 2646111/001 T.C No: CML/25-26/T1099819 Dated : 02.01.2026

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C_6H_5OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
BOD @ 27°C for 3 days	IS 3025 Part 44:2023	15.3 mg/l
Chemical Oxygen Demand	IS 3025 Part 58:2023	50.2 mg/l
Dissolved Oxygen	IS 3025 Part 38:1989 (Azide Modification)	7.5 mg/l
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H_2S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	23.3 mg/l
Discipline: Biological	**Group:** Water	
Total Coliform	APHA 24th Edn. 2023-9221 B	1600 MPN/100ml
Escherichia coli	APHA 24th Edn. 2023-9221 F	210 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number.		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646111/002

Sample Description (as stated by customer) : **Surface Water (SW-2) - Pullanari Kanmaai**

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099820
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

TEST	PROTOCOL	RESULTS
Discipline: Chemical	**Group:** Water	
Colour	IS 3025 Part 4:2021	6 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.98
Conductivity @ 25°C	IS 3025 Part 14:2013	1130.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	4 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	655.0mg/l
Total Hardness as $CaCO_3$	IS 3025 Part 21:2009 (EDTA titrimetric method)	208.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	52.2 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	19.4 mg/l
Total Alkalinity as $CaCO_3$	IS 3025 Part 23:2023	198.7 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	225.4 mg/l
Sulphate as SO_4	IS 3025 Part 24/Sec 1-2022	52.1 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.39 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24th Edn. 2023:4500 F,D	28 mg/l
Nitrate as NO_3	IS 3025 Part 34:1988 (Chromotropic acid method)	16.3 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

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Email : test@mettexlab.com I Web : www.mettexlab.com

Lab No: 2646111/002 T.C No: CML/25-26/T1099820 Dated : 02.01.2026

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C_6H_5OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
BOD @ 27°C for 3 days	IS 3025 Part 44:2023	12.2 mg/l
Chemical Oxygen Demand	IS 3025 Part 58:2023	40.1mg/l
Dissolved Oxygen	IS 3025 Part 38:1989 (Azide Modification)	6.7 mg/l
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H_2S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	30.4 mg/l
Discipline: Biological	**Group:** Water	
Total Coliform	APHA 24th Edn. 2023-9221 B	1600 MPN/100ml
Escherichia coli	APHA 24th Edn. 2023-9221 F	170 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number.		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099821
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646111/003

Sample Description : Ground Water (OW-1) – Near Project Area
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical	**Group:** Water	
Colour	IS 3025 Part 4:2021	5
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.75
Conductivity @ 25°C	IS 3025 Part 14:2013	1187.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	1 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	688.0 mg/l
Total Hardness as $CaCO_3$	IS 3025 Part 21:2009 (EDTA titrimetric method)	188.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	45.6 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	18.4 mg/l
Total Alkalinity as $CaCO_3$	IS 3025 Part 23:2023	201.4 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	223.3 mg/l
Sulphate as SO_4	IS 3025 Part 24/Sec 1-2022	46.8 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.38 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24th Edn. 2023:4500 F.D	0.46 mg/l
Nitrate as NO_3	IS 3025 Part 34:1988 (Chromotropic acid method)	7.7 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

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Email : test@mettexlab.com I Web : www.mettexlab.com

Lab No: 2646111/003 T.C No: CML/25-26/T1099821 Dated : 02.01.2026

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C_6H_5OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H_2S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological	**Group:** Water	
Total Coliform	APHA 24th Edn. 2023-9221 B	210 MPN/100ml
Escherichia coli	APHA 24th Edn. 2023-9221 F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number,< 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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CHENNAI METTEX LAB PRIVATE LIMITED®

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Phone : +91 44 22323163, 22311034, 42179490, 42179491 I CIN : U74999TN2008PTC069459
Email : test@metteslab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099822
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646111/004

Sample Description : Ground Water (OW-2) – Karadikal (Residential)
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical	**Group:** Water	
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.62
Conductivity @ 25°C	IS 3025 Part 14:2013	1093.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	2 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	634.0 mg/l
Total Hardness as $CaCO_3$	IS 3025 Part 21:2009 (EDTA titrimetric method)	172.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	42.4 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	16.5 mg/l
Total Alkalinity as $CaCO_3$	IS 3025 Part 23:2023	166.2 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	215.6 mg/l
Sulphate as SO_4	IS 3025 Part 24/Sec 1-2022	43.3mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.37 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24th Edn. 2023:4500 F,D	0.31 mg/l
Nitrate as NO_3	IS 3025 Part 34:1988 (Chromotropic acid method)	7.8 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

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Email : test@mettexlab.com I Web : www.mettexlab.com

Lab No: 2646111/004 T.C No: CML/25-26/T1099822 Dated : 02.01.2026

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C_6H_5OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H_2S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological	**Group:** Water	
Total Coliform	APHA 23rd Edn. 2017:9221B	150 MPN/100ml
Escherichia coli	APHA 23rd Edn. 2017:9221F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099823
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646111/005

Sample Description : Ground Water (BW-1) – Near Project Area
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical	**Group:** Water	
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.23
Conductivity @ 25°C	IS 3025 Part 14:2013	890.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	1 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	516.0 mg/l
Total Hardness as $CaCO_3$	IS 3025 Part 21:2009 (EDTA titrimetric method)	148.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	34.2 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	15.5 mg/l
Total Alkalinity as $CaCO_3$	IS 3025 Part 23:2023	127.5 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	165.5 mg/l
Sulphate as SO_4	IS 3025 Part 24/Sec 1-2022	35.7 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.28 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24th Edn. 2023:4500 F,D	0.26 mg/l
Nitrate as NO_3	IS 3025 Part 34:1988 (Chromotropic acid method)	BDL (DL:1.0 mg/l)
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

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Email : test@mettexlab.com | Web : www.mettexlab.com

Lab No: 2646111/005 T.C No: CML/25-26/T1099823 Dated : 02.01.2026

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C_6H_5OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H_2S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological	**Group:** Water	
Total Coliform	APHA 23rd Edn. 2017:9221B	130 MPN/100ml
Escherichia coli	APHA 23rd Edn. 2017:9221F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number,< 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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Email : test@mettexlab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646111/006

Sample Description : Ground Water (BW-2) - Kilakuyilkudi
(as stated by customer)

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099824
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

TEST	PROTOCOL	RESULTS
Discipline: Chemical	**Group:** Water	
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.20
Conductivity @ 25°C	IS 3025 Part 14:2013	µmhos/cm
Turbidity	IS 3025 Part 10:2023	1 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	mg/l
Total Hardness as $CaCO_3$	IS 3025 Part 21:2009 (EDTA titrimetric method)	136.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	32.6 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	16.5 mg/l
Total Alkalinity as $CaCO_3$	IS 3025 Part 23:2023	115.8 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	168.5 mg/l
Sulphate as SO_4	IS 3025 Part 24/Sec 1-2022	36.9 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.34mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24th Edn. 2023:4500 F,D	0.27 mg/l
Nitrate as NO_3	IS 3025 Part 34:1988 (Chromotropic acid method)	BDL (DL:1.0 mg/l)
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

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Email : test@mettexlab.com | Web : www.mettexlab.com

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C_6H_5OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H_2S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological	**Group:** Water	
Total Coliform	APHA 23rd Edn. 2017:9221B	170 MPN/100ml
Escherichia coli	APHA 23rd Edn. 2017:9221F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number,< 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099825
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646112/001

Sample Description : Soil–1 – Project Area
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.01
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	266 µmhos/cm
03	**Texture :**		
	Clay	Gravimetric Method	27.7 %
	Sand		37.1 %
	Silt		35.2 %
04	Water Holding Capacity	By Gravimetric Method	43.3 %
05	Bulk Density	By Cylindrical Method	1.01 g/cm^3
06	Porosity	By Gravimetric Method	39.1 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	58.8 mg/kg
08	Magnesium as Mg		26.6 mg/kg
09	Manganese as Mn		29.3 mg/kg
10	Zinc as Zn		1.27 mg/kg
11	Boron as B		1.08 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	168 mg/kg
13	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	0.025 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	21.1 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Reaff: 2019)	1.30 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	212 mg/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		1.05 mg/kg
21	Iron as Fe		7.63 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.18 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.27 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	25.9 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
SELVAKUMAR
Technical Manager
Authorised Signatory

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CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 I CIN : U74999TN2008PTC069459
Email : test@mettexlab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646112/002

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099826
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Sample Description : Soil-2 – Meenakshipatti (Residential)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (electrometric method)	78
02	Conductivity @ 25°C	IS 14767 - 2000	215 µmhos/cm
03	**Texture :**		
	Clay	By Gravimetric Method	29.3 %
	Sand		36.8 %
	Silt		32.9 %
04	Water Holding Capacity	By Gravimetric Method	46.1%
05	Bulk Density	By Cylindrical Method	1.02 g/cm^3
06	Porosity	By Gravimetric Method	49.7 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	50.7 mg/kg
08	Magnesium as Mg		28.9 mg/kg
09	Manganese as Mn		24.3 mg/kg
10	Zinc as Zn		3.61 mg/kg
11	Boron as B		1.62 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	94.0 mg/kg
13	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	0.018 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	28.8 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982	2.92 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	369 mg/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		1.32 mg/kg
21	Iron as Fe		8.18 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.25 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.31 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	24.8 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
SELVAKUMAR
Technical Manager
Authorised Signatory

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Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646112/003

Sample Description : Soil –3 - Thenpalanzhi (Residential)
(as stated by customer

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099827
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (electrometric method)	6.69
02	Conductivity @ 25°C	IS 14767 - 2000	159 µmhos/cm
03	**Texture :**		
	Clay	By Gravimetric Method	28.8 %
	Sand		38.5 %
	Silt		32.7 %
04	Water Holding Capacity	By Gravimetric Method	46.4 %
05	Bulk Density	By Cylindrical Method	0.98 g/cm^3
06	Porosity	By Gravimetric Method	36.7 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	56.6 mg/kg
08	Magnesium as Mg		24.8 mg/kg
09	Manganese as Mn		20.6 mg/kg
10	Zinc as Zn		3.45 mg/kg
11	Boron as B		1.07 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	76.8 mg/kg
13	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	0.022 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	19.7 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982	4.13 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	352 mg/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		1.23 mg/kg
21	Iron as Fe		8.98 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.01 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.17 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	28.9 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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Email : test@metteylab.com I Web : www.mettexlab.com

TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099828
Date Of Receipt : 23.12.2025
Analysis Commenced On: 23.12.2025
Analysis Completed On : 02.01.2026

Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646112/004

Sample Description : Soil – 4 - Kannanur (Agriculture)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (electrometric method)	6.38
02	Conductivity @ 25°C	IS 14767 - 2000	381.0 µmhos/cm
03	**Texture :**		
	Clay	By Gravimetric Method	29.0 %
	Sand		37.2 %
	Silt		33.8 %
04	Water Holding Capacity	By Gravimetric Method	49.8 %
05	Bulk Density	By Cylindrical Method	1.21 g/cm^3
06	Porosity	By Gravimetric Method	43.3 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	65.6 mg/kg
08	Magnesium as Mg		33.6 mg/kg
09	Manganese as Mn		28.7 mg/kg
10	Zinc as Zn		4.78 mg/kg
11	Boron as B		2.12 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	151.8 mg/kg
13	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	0.024 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	32.3 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982	4.24 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	476.5 mg/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		1.47 mg/kg
21	Iron as Fe		9.21 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	3.46 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.01 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	40.9 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

T.C Date : 02.01.2026
T.C No : CML/25-26/T1099829
Date Of Receipt : 23.12.2025
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Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646112/005

Sample Description : Soil – 5 - Kilakuyilkudi (Residential)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (electrometric method)	5.93
02	Conductivity @ 25°C	IS 14767 - 2000	297 µmhos/cm
03	**Texture :**		
	Clay	By Gravimetric Method	31.2 %
	Sand		35.9%
	Silt		32.9%
04	Water Holding Capacity	By Gravimetric Method	44.6 %
05	Bulk Density	By Cylindrical Method	1.12 g/cm^3
06	Porosity	By Gravimetric Method	46.2 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	59.2 mg/kg
08	Magnesium as Mg		27.5 mg/kg
09	Manganese as Mn		26.8 mg/kg
10	Zinc as Zn		2.16 mg/kg
11	Boron as B		1.04/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	116 mg/kg
13	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	0.017 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	27.7 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982	2.41 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	242.8 mg/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		0.97 mg/kg
21	Iron as Fe		8.03 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.17 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.26 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	22.1 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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TEST REPORT

ISSUED TO : Mr. K. Suresh, Extent: 2.83.5ha
S.F.No : 24/1B, 24/1E, 24/1F2 and 24/1F3,
Thenpalanji Village,
Thirupparankundram Taluk.

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Site Location: Mr. K. Suresh
S/o. Kovil Pillai, No : 350 F2, Master Plan Complex Road, Govt. ITI Back Side, Theni Tk & Dt.– 25531

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646112/006

Sample Description : Soil – 6 - Karadikal (Agriculture)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (electrometric method)	6.42
02	Conductivity @ 25°C	IS 14767 - 2000	289 µmhos/cm
03	**Texture :**		
	Clay	By Gravimetric Method	31.0 %
	Sand		35.9 %
	Silt		33.1 %
04	Water Holding Capacity	By Gravimetric Method	41.9 %
05	Bulk Density	By Cylindrical Method	1.03 g/cm^3
06	Porosity	By Gravimetric Method	39.8 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	62.6 mg/kg
08	Magnesium as Mg		3.8 mg/kg
09	Manganese as Mn		27.9 mg/kg
10	Zinc as Zn		3.24 mg/kg
11	Boron as B		1.34 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	82.8 mg/kg
13	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	0.016 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	22.7 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982	2.09 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	295.7 mg/kg
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEP 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		1.03 mg/kg
21	Iron as Fe		9.98 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.12 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.23 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	31.7 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

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भारतीय गुणवत्ता परिषद्
QUALITY COUNCIL OF INDIA
QCI Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Exploration and Mining Solutions, Salem

No. 17, Advaitha Ashram Road, Fairlands, Salem, Tamil Nadu – 636 004

*Geo Exploration and Mining Solutions, Salem is Re-Accredited (RA3) **as Category-A organization** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations (Version 3), for the preparation of EIA/EMP reports in the sectors listed below, as per the specified categories*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	Mineral beneficiation	7	2 (b)	A
3.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
4.	Building and construction projects	38	8 (a)	B

Note: Names of approved experts and sectors are mentioned in RAAC minutes dated August 21, 2025, 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/25/3827 dated August 25, 2025. The accreditation needs to be renewed before the expiry date by Geo Exploration and Mining Solutions, Salem following due process of assessment.

Valid up to
August 06, 2028

Issue Date
August 25, 2025

Varinder S Kanwar

Prof (Dr) Varinder S Kanwar
(CEO – NABET)

Certificate No.
NABET/EIA/25-28/RA 0424

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.