

From,

Thiru R. Kathirvelu

No.19C, Vilakkadi Kovil Thoppu Street,
Kancheepuram - 631501

To

District Environmental Engineer (Tiruvannamalai District)

Tamilnadu Pollution Control Board,
541/B, Ashok Nagar, Venkikal,
Thiruvannamalai District -606 604.

Sub: Submission of Draft EIA/EMP report and Summary for Rough stone and Gravel Quarry of Thiru R.Kathirvelu at Survey No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu - Public hearing_ Reg

Ref: ToR granted by SEIAA, Tamil Nadu vide letter SEIAA-TN/F.No.9277/SEAC/ToR 1195/2022 dated 28.11.2022

Sir,

With reference to the above mentioned subject, I am herewith submitting the copies of Draft EIA/EMP report and Summary of EIA/EMP report in English and Tamil along with CD for Rough stone and Gravel Quarry at 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu

As per the terms of reference issued by SEIAA, Tamil Nadu referred to as (1) above, point no. 39 stipulates conduction of public hearing. Hence, I request you to consider conducting a public hearing for my project at the earliest.

Here with enclosed D.D No – dated for public hearing.

Thank you.

Yours Faithfully,



Thiru R.Kathirvelu

Encl: as above

DRAFT EIA / EMP REPORT

FOR

ROUGHSTONE AND GRAVEL QUARRY

Extent	4.42.0 Ha			
Location	Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu			
Land Type	Patta Land			
Production	Year	Roughstone (m3)	Weathered Rock (m3)	Gravel (m3)
	1 – 5	476435	35703	74124
	6-10	5,41,795	--	--
	Total	10,18,230	35,703	74,124
Depth	5 years - 18m bgl, Ulimite Depth – 48m bgl			

- Terms of Reference issued by SEIAA, Tamil Nadu vide SEIAA-TN/F.No.9227/SEAC/ToR 1195/2022/Amendment dated 28.11.2022 and its amendment dated 28.11.2022
- Baseline Monitoring Period – Winter Season (December 2022 to February 2023)

PROJECT PROPONENT

THIRU R.KATHIRVELU

No.19C, Vilakkadi Kovil Thoppu Street, Kanchepeuram - 631501

CONSULTANT

CREATIVE ENGINEERS & CONSULTANTS

NABET ACCREDITED CONSULTANCY, NABL ACCREDITED TESTING LAB

9B/4, Bharathwajar Street, East Tambaram, Chennai-600059.

Ph: 044-22395170, Cell: 09444133619 Email : cecgiri@yahoo.com,



REVISIONS OF EIA/EMP REPORT

Revision number	Report Status	Date of submission
00/APR/23	Draft EIA /EMP Report	15.04.2023

Environmental Impact Assessment & Environmental Management Plan Report for Rough stone and Gravel Quarry of Thiru R.Kathirvelu over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu was prepared by Creative Engineers & Consultants and authorized for submission by Mr. P.Giri, EIA Coordinator, CEO, of Creative Engineers & Consultants on 15.04.2023 after due review by the personnel and consultation with Thiru R.Kathirvelu. Current Revision number of the EIA/EMP report is 00/APR/23, signifying as per the revision mentioned in the above table that this is a draft EIA/EMP report.

PROJECT PROPONENT DECLARATION

I, Thiru R.Kathirvelu received ToR under EIA Notification 2006 from SEIAA, Tamil Nadu vide their SEIAA-TN/F.No.9277/SEAC/ToR 1195/2022 dated 28.11.2022 for mining lease for Rough stone and Gravel Quarry at Survey No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu .

I have entrusted the EIA study to M/s. Creative Engineers & Consultants (CEC), Chennai who have been accredited by the National Accreditation Board for Education & Training (NABET), Quality Council of India with their accreditation valid upto 23.12.2023.

The Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) have been prepared as per the generic structure proposed in the EIA notification 2006, ToR issued by SEIAA, Tamil Nadu. The prescribed ToR along with compliance is also incorporated in the EIA/EMP Report.

This report is prepared based on the information and data obtained from the Mining Plan and other records and the field study carried out by the consultant. The data given in the EIA/EMP report are factually correct to the best of my knowledge.



Thiru R.Kathirvelu



CREATIVE ENGINEERS & CONSULTANTS

(NABET ACCREDITED, NABL ACCREDITED TESTING LABORATORY,
DEPARTMENT OF INDUSTRIES AND COMMERCE REGISTERED COMPANY)

EIA Consultant Undertaking

[In compliance with MoEF Office Memorandum No. J-11013/41/2006-IA.II (I) dated 04.08.2009]

Creative Engineers & Consultants (CEC) is an NABL accredited testing Laboratory, and also NABET accredited Category–A environment consultancy organization for preparing EIA/EMP reports for the sectors Mining of minerals, Thermal power plants, Mineral Beneficiation & Cement plants.

CEC has been accredited by the National Accreditation Board for Education & Training (NABET), Quality Council of India for empanelment of EIA Consultants with accreditation valid upto 23.12.2023.

Thiru R.Kathirvelu received ToR under EIA Notification 2006 from SEIAA, Tamil Nadu vide their SEIAA-TN/F.No.9277/SEAC/ToR 1195/2022 dated 28.11.2022 for mining lease for Rough stone and Gravel Quarry at Survey No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu .

The prescribed TOR is complied with and incorporated in the EIA Report and submitted. This report is based on the information and data obtained from Approved Mining Plan, other records and data from the field study by CEC. The data generated and given in the EIA/EMP Report are factually correct. The sample analyses are carried out through CEC's laboratory.

(P. Giri)

Chief Executive & EIA Coordinator

Creative Engineers & Consultants

Annexure – VII

Declaration by Experts contributing to the EIA Report for

Rough stone and Gravel Quarry of Thiru R.Kathirvelu over an area of 4.42.0Ha in Kaganam village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.

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

EIA coordinator:

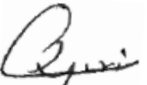
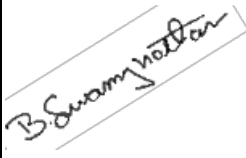
Name: **P.Giri**

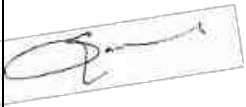



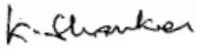
Signature and Date: 



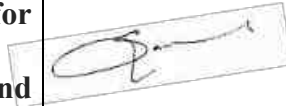

Period of involvement: **May 2022 onwards**


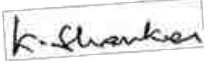
Contact information: **09444133619**

Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP*	P.Giri	<ul style="list-style-type: none"> • Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards. • Identification of sources of air pollution comprising dust, gaseous emission due to mining & other activities • Identification of Impacts & suggestion of mitigation measures Period: May 2022 onwards	
		B.Swamynathan	<ul style="list-style-type: none"> • Data interpretation of Micro meteorological data for wind rose. • Identification of polluting source and suggestion of suitable mitigation measures. Period: December 2022 onwards	

2	WP*	G.Sandhya	<ul style="list-style-type: none"> • Study of the monitored data with respect to the applicable standards. • Identification of Water requirement & Source • Preparation of water balance diagram • Identification of Water polluting sources • Impact of the project on the water quality, both surface and groundwater • Suggestion of Mitigation measures to control water pollution <p>Period: December 2022 onwards</p>	
3	SHW*	P.Giri	<ul style="list-style-type: none"> • Quantification of mineral & waste from mining operation • Waste disposal method evaluation • Providing dump management plan • Providing Surface Runoff Management Structure Requirements. • Identification of Hazardous waste and its details of disposal <p>Period: May 2022 onwards</p>	
4	SE*	R.Baburaj	<ul style="list-style-type: none"> • Identification of villages in the study area and finalization of demographic profile of the villages within the study area. • Preparation of sections relevant to SE functional area in the EIA/EMP report <p>Period: December 2022 onwards</p>	
5	EB*	B.Swamynathan	<ul style="list-style-type: none"> • Perusal of existing data relevant to this project. • Studying the details of flora and fauna, separately for core, buffer zone and forest area based on primary field survey. • Identification of species , Indicating the Schedule of the fauna present in the study area • Assessment of impact on Biological environment and suggestion of mitigative measures • Collecting & providing details of existing and proposed Green belt development /plantation in the core zone <p>Period: December 2022 onwards</p>	
6	HG*	K.Shankar	<ul style="list-style-type: none"> • Study of existing surface drainage arrangements in the core and buffer zone, impact due to mining on these drainage courses and suggestion of mitigative measures 	

			<ul style="list-style-type: none"> • Perusal of site specific ground water table details for the core zone and the study area. • Studied the hydrological aspects of surface and groundwater in study area • Study about impact on the hydrology due to mining operation • Suggesting mitigative measures like RWH for enhancement of ground water level <p>Period: December 2022 onwards</p>	
7	GEO*	K.Shankar	<ul style="list-style-type: none"> • Study of geology of the ML area and the surrounding areas. • Provide details about Mineral composition <p>Period: December 2022 onwards</p>	
8	SC*	B.Swamynathan	<ul style="list-style-type: none"> • Study of soil profile • Assessment of Impact on soil and suggesting plantation scheme. <p>Period: December 2022 onwards</p>	
9	AQ*	G.Sandhya	<ul style="list-style-type: none"> • Quantification of emission particulars • Air quality modelling for post project impact on the air quality prediction of the study area. <p>Analysis of the Isopleth generated</p> <ul style="list-style-type: none"> • Arriving at the post project concentration at the AAQ monitoring locations • Preparation of meteorological data in suitable form for input into the model • Simulation of model for generation of Isopleth and data interpretation. • Studying the impact on AAQ monitoring locations due to the generated emissions. • Preparation of sections relevant to AQ functional area in the EIA/EMP report. <p>Period: December 2022 onwards</p>	
10	NV*	P.Giri	<ul style="list-style-type: none"> • Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards. • Predict the noise level and vibration level due to proposed mining operation based on scientific evaluation. • Suggesting the Mitigation measures to control noise pollution, Suggesting the Mitigation measures to 	

			<p>control ground vibration Period: May 2022 onwards</p>	
11	LU	B.Swamynathan	<ul style="list-style-type: none"> • Collection of Remote sensing satellite data to study the land use pattern. • Primary field survey and limited field verification • Preparation of Land use map using Satellite data of the project area separately for the core zone and the buffer zone and providing the land use pattern. <p>Period: December 2022 onwards</p>	
12	RH*	K.Shankar	<ul style="list-style-type: none"> • Identified Major risks involved in the project • Mitigation measures suggested to avoid risk. • Preparation of onsite and offsite emergency management plan <p>Period: December 2022 onwards</p>	

*One TM against each FAE may be shown

**Please attach additional sheet if required

Declaration by the Head of the accredited consultant organization/ authorized person

I, **P.Giri** hereby, confirm that the above mentioned experts prepared the EIA report for **Rough stone and Gravel Quarry of Thiru R.Kathirvelu over an area of 4.42.0Ha in Kaganam village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.**

I also confirm that EIA Coordinator (EC) has gone through the report, and the consultant organization shall be fully accountable for any misleading information. It is certified that no unethical practices, plagiarism involved in carrying out the work and external data / text has not been used without proper acknowledgement while preparing this EIA report.

Signature:



Name: **P.Giri**

Designation: **Chief Executive**

Name of the EIA consultant organization: **Creative Engineers & Consultants, Chennai – 59**

NABET Certificate No. & Issue Date: **No- NABET/EIA/2023/SA 0187 & date 30.01.2023**



**QUALITY COUNCIL
OF INDIA**
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National Accreditation Board for Education and Training



Certificate of Accreditation

Creative Engineers and Consultants,
9B/4, Bharathwajar street, East Tambaram, Chennai, Tamil Nadu

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
2	Thermal power plants	4	1 (d)	A
3	Mineral beneficiation	7	2 (b)	A
4	Cement Plants	9	3 (b)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated Oct 4, 2022 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/23/2653 dated January 30, 2023. The accreditation needs to be renewed before the expiry date by Creative Engineers and Consultants, following due process of assessment.

Sr. Director, NABET
Dated: January 30, 2023

Certificate No.
NABET/EIA/2023/SA 0187

Valid up to
December 23, 2023

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



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TERMS OF REFERENCE & ITS COMPLIANCE



THIRU.DEEPAK S.BILGI, I.F.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/E.No.9227/SEAC/ToR-1195/2022 Dated :14.07.2022

To

Thiru.R.Kathirvelu
No.19C,
Vilakkadi Kovil Thoppu Street
Kancheepuram-631501

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed Rough stone & Gravel quarry lease over an extent of 2.02.5 Ha at S.F.No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu by Thiru R. Kathirvelu- under project category – “B1” and Schedule S.No. 1(a) – ToR issued along with Public Hearing-preparation of EIA report – Regarding.

- Ref:**
1. Online proposal No.SIA/TN/MIN/76683/2022, dated: 06.05.2022
 2. Your application seeking Terms of Reference submitted on: 06.05.2022
 3. Minutes of the 287th Meeting of SEAC held on 22.06.2022
 4. Minutes of the 532nd meeting of Authority held on 14.07.2022.

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

The project proponent, Thiru.R.Kathirvelu has submitted application seeking ToR for B1 category project in Form-I, for the Proposed Rough stone & Gravel quarry lease over an extent of


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2.02.5 Ha at S.F.No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu and has furnished Pre-feasibility report.

Discussion by SEAC and the Remarks:-

Proposed Rough stone quarry lease over an extent of 2.02.5 Ha at S.F.No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu by Thiru R. Kathirvelu for Terms of Reference (SIA/TN/MIN/172833/2020 Dt.15.09.2020)

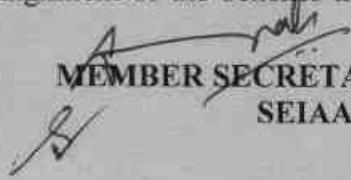
The proposal was placed in this 287th Meeting of SEAC held on 22.06.2022. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

The SEAC noted the following

1. The Project Proponent, Thiru R. Kathirvelu has applied for Terms of Reference for the proposed Rough stone quarry lease over an extent of 2.02.5 Ha at S.F.No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.
2. The proposed quarry/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. As per the mining plan the lease period is 10 years. The mining plan is for the period of five years & production should not exceed 600630 Cu.m of Rough stone, 35703 Cu.m of weathered Rock & 74124 Cu.m of Gravel. The annual peak production is 127185 Cu.m of Rough stone(4th year), 21988 Cu.m of weathered Rock(1st year) & 45288 Cu.m of Gravel(1st year). The ultimate depth is 23m BGL.

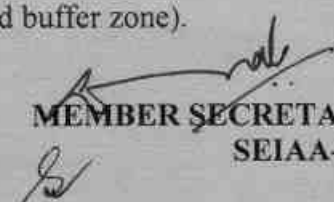
Based on the presentation made by the proponent SEAC recommended to grant of Terms of Reference (TOR) with Public Hearing subject to the following TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. The PP shall include the study report on approach road for the existing & proposed mine lease area in the EIA Report.
2. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the

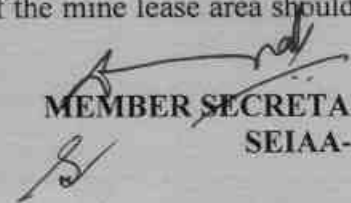

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proposed quarry lease after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.

3. 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.
4. 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.
5. **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.**
6. 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.
7. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
 - a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
 - b. Quantity of minerals mined out.
 - c. Highest production achieved in any one year
 - d. Detail of approved depth of mining.
 - e. Actual depth of the mining achieved earlier.
 - f. Name of the person already mined in that leases area.
 - g. If EC and CTO already obtained, the copy of the same shall be submitted.
 - h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
8. 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).

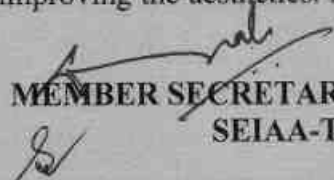

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9. The PP shall carry out Drone video survey covering the cluster, Green belt , fencing etc..
10. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
11. 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.
12. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
13. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
14. 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.
15. 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 and its mitigation measures. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
16. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
17. 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

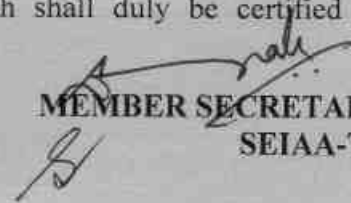

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prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

18. 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.
19. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
20. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
21. Impact on local transport infrastructure due to the Project should be indicated.
22. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
23. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
24. Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.
25. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
26. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
27. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
28. The 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


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- wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
29. 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
 30. 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.
 31. 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.
 32. 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.
 33. 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.
 34. 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.
 35. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
 36. 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.
 37. 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


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MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.

38. 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.
39. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

Appendix -I

List of Native Trees Suggested for Planting

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

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30. *Limoniaacidissima* - Vila maram
31. *Litsea glutinosa* - Pisinpattai
32. *Madhucal longifolia* - Illuppai
33. *Manilkara hexandra* - Ulakkai Paalai
34. *Mimusops selengi* - Magizhamaram
35. *Mitragyna parvifolia* - Kadambu
36. *Morinda pubescens* - Nuna
37. *Morinda citrifolia* - Vellai Nuna
38. *Phoenix sylvestre* - Eachai
39. *Pongamia pinnata* - Pungam
40. *Premna mollissima* - Munnai
41. *Premna serratifolia* - Narumunnai
42. *Premna tomentosa* - Purangai Naari, Pudanga Naari
43. *Prosopis cinerea* - Vannimaram
44. *Pterocarpus marsupium* - Vengai
45. *Pterospermum canescens* - Vennangu, Tada
46. *Pterospermum xylocarpum* - Polavu
47. *Puthranjiv roxburghii* - Puthranjivi
48. *Salvadora persica* - Ugaamaram
49. *Sapindus emarginatus* - Manipungan, Soapukai
50. *Saraca asoca* - Asoca
51. *Streblus asper* - Pirayamaram
52. *Strychnos nuxvomica* - Yetti
53. *Strychnos potatorum* - Therthang Kottai
54. *Syzygium cumini* - Naval
55. *Terminalia bellerica* - Thandri
56. *Terminalia arjuna* - Venmarudhu
57. *Toona ciliata* - Sandhanavembu
58. *Thespesia populnea* - Puvarasu
59. *Walsura trifoliata* - valsura
60. *Wrightia tinctoria* - Vep

Discussion by SEIAA and the Remarks:-

The proposal was placed in the 532nd meeting of Authority held on 14.07.2022. The Authority noted that the proposal was placed in the 287th meeting of SEAC held on 22.06.2022. SEAC has furnished its recommendations to the Authority for granting Terms of Reference (ToR) along with Public Hearing for the project.

After detailed discussions, the Authority accepted the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing under cluster for undertaking the


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combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the ToR as recommended by SEAC & subject specific standard ToR stipulated by MoEF& CC in addition to the following ToR:

1. Considering the environmental impacts due to mining, safety of the working personnel and following the principle of sustainable mining, the ultimate depth of mining is restricted to **18m below ground level and 4,76,435 cu.m of rough stone, 35,703 cu.m of weathered rock and 74,124 cu.m of gravel are permitted for mining over a period of five years** as per the approved mining plan.
2. The scientific studies shall be carried out for any proposed quarry over the existing pit/quarry by the reputed Government Scientific Research / Academic Institutions such as Anna University, NITs, IITs, NIRM, CISR laboratories where the depth of the proposed working (or) ultimate depth of working is extended beyond 40 m below ground level (BGL) in case of flat terrain and the excavation extends beyond 30 m above ground level (AGL) in case of outcrops/hilly terrains for evaluating the stability of slopes. A copy of the report shall be submitted to the SEIAA, the concerned AD/DGM, the concerned DEE/TNPCB and the Director of Mines Safety, Chennai.
3. Detailed study shall be carried out regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
4. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological structures etc.
5. 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.
6. The Environmental Impact Assessment shall study in detail on the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
7. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
8. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.


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


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23. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
- i. Soil health & bio-diversity.
 - ii. Climate change leading to Droughts, Floods etc.
 - iii. Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
 - iv. Possibilities of water contamination and impact on aquatic ecosystem health.
 - v. Agriculture, Forestry & Traditional practices.
 - vi. Hydrothermal/Geothermal effect due to destruction in the Environment.
 - vii. Bio-geochemical processes and its foot prints including environmental stress.
 - viii. Sediment geochemistry in the surface streams.
24. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby water bodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
25. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/unfavorable accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.
26. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.
27. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.

A. STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the


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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


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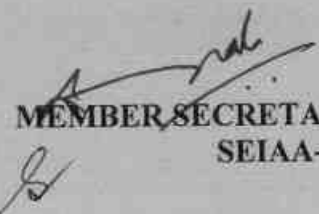
prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

- 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


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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.


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- 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


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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.


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- 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.

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

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

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

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


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

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

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.


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


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Copy to:

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

4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai -34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
6. The District Collector, Tiruvannamalai District.
7. Stock File.





THIRU. DEEPAK S. BILGI, I.F.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU

3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERM OF REFERENCE- AMENDMENT

Lr. No.SEIAA-TN/F.No.9227/TOR- 1195/2022/Amendment/dated: 28.11.2022

To

Thiru.R.Kathirvelu
No.19C, Vilakkadi Kovil Thoppu Street
Kancheepuram-631501

Sir/Madam,

Sub: SEIAA-TN –Proposal Seeking Amendment of Terms of Reference for the proposed Rough stone & Gravel quarry lease over an extent of 4.42.0 Ha at S.F.No.58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu by Thiru R. Kathirvelu – Amendment of Terms of Reference issued- Regarding.

- Ref:**
1. vide SEIAA Lr. No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022 Dated :14.07.2022.
 2. Online proposal No. SIA/TN/MIN/293817/2022 Dt.08.11.2022.
 3. Your Application for Amendment of Terms of Reference dated: 04.05.2022.
 4. Minutes of the 328th SEAC meeting held on 11.11.2022
 5. Minutes of the 573rd SEIAA meeting held on 28.11.2022.

In the reference 1st cited above, the Terms of Reference was accorded to Thiru.R.Kathirvelu for the proposed Rough stone & Gravel quarry lease over an extent of **2.02.5 Ha** at S.F.No.58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.

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Now the Project Proponent, Thiru.R.Kathirvelu has again applied for Amendment of Terms of Reference vide reference 2nd & 3rd cited.


Details of SEAC Remarks:

Amendment of Terms of Reference issued for the proposed Rough stone & Gravel quarry lease over an extent of 4.42.0 Ha at S.F.No.58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu by Thiru R. Kathirvelu (SIA/TN/MIN/293817/2022 Dt.08.11.2022)

The proposal was again placed for appraisal in 328th meeting of SEAC held on 11.11.2022. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, Thiru R. Kathirvelu has applied for Terms of References for the proposed Rough stone & Gravel quarry lease over an extent of 4.42.0 Ha at S.F.No.58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.
2. The proposed quarry/activity is covered under Category "B1" – EIA with Public Hearing of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. The ToR for carrying out the EIA study with public hearing was issued vide SEIAA Lr. No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022 Dated :14.07.2022 was issued **inadvertently for Rough stone & Gravel quarry lease over an extent of 2.02.5 Ha instead of 4.42.0 Ha**.
4. Now, the Project Proponent, Thiru R. Kathirvelu has applied for Amendment of Terms of References issued vide SEIAA Lr.No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022 Dated:14.07.2022 for the proposed Rough stone & Gravel quarry lease over an extent of 4.42.0 Ha at S.F. No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu vide online proposal No. SIA/TN/MIN/293817/2022 Dt.08.11.2022 received this office Lr. Dt: 10.11.2022 for Rough stone & Gravel quarry lease over an extent of 4.42.0 Ha.


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Based on the documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Amendment of Terms of References Dt:14.07.2022 for the proposed Rough stone & Gravel quarry lease **over an extent of 4.42.0 Ha instead of 2.02.05 Ha** subject to all the conditions /ToRs stipulated remains unaltered issued vide SEIAA Lr. No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022 Dated :14.07.2022.

Details of SEIAA Remarks:

The proposal was placed in the 573rd Authority meeting held on 28.11.2022. The Authority after detailed discussion accepts the recommendation of 328th SEAC meeting held on Dt: 11.11.2022 and the Authority has decided to grant amendment of Terms of Reference issued Dt:14.07.2022 for the proposed Rough Stone & Gravel quarry **over an extent of 4.42.0 Ha instead of 2.02.05 Ha** subject to all the conditions/ToRs stipulated remains unaltered issued vide SEIAA Lr. No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022 Dated :14.07.2022.


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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 Principal Secretary to Government, Industries 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 Chairman, TNPC Board, 76, Mount Salai, Guindy, Chennai-32
7. The District Collector, Pudukkottai District
8. The Commissioner of Geology and Mines, Guindy, Chennai-32
9. El Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Spare.

DRAFT EIA/EMP REPORT FOR ROUGH STONE AND GRAVEL QUARRY OF THIRU R.KATHIRVELU OVER AN AREA OF 4.42.0Ha IN KAGANAM VILLAGE, VEMBAKKAM TALUK, TIRUVANNAMALAI DISTRICT, TAMIL NADU.

TOR COMPLIANCE

S.No	ToR Points	Reply	Pg. No
A. ToR in Addition to Standard ToR			
1	The PP shall include the study report on approach road for the existing & proposed mine lease area in the EIA Report.	The lease area can be approached through Sumangali Road which connects to Vembakkam on the northern side of the lease area and Cheyyar on the southern side of the lease area. There will be 8 trips per hour from the proposed project. The existing road can absorb this traffic due to this project. Various mitigation measures as mentioned under section 4.9, Chapter-IV will be implemented.	4-24
2	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the proposed quarry lease after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.	This is a proposed quarry. No mining operations have been carried out in this lease so far.	2-10
3	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.	During the first 5 years, mining operations will be carried out upto 18m as per approved ToR. At the end of the lease period, the ultimate depth of mining will be 48m. Pit slope stability plan is provided under Section 7.7, Chapter-VII.	7-7
4	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/1 Class mines manager appointed by the proponent.	Will be submitted.	--
5	The PP shall present a conceptual design for carrying out only controlled blasting	Controlled blasting will be carried out in this project. Various control measures	4-14



DRAFT EIA/EMP REPORT FOR ROUGH STONE AND GRAVEL QUARRY OF THIRU R.KATHIRVELU OVER AN AREA OF 4.42.0Ha IN KAGANAM VILLAGE, VEMBAKKAM TALUK, TIRUVANNAMALAI DISTRICT, TAMIL NADU.

	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.	will be planned to reduce ground vibratory conditions to sustainable statutory limits:as provided under section 4.4.2.1, Chapter-IV.	
6	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.	Agreed	--
7	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines a) What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? b) Quantity of minerals mined out. c) Highest production achieved in any one year d) Detail of approved depth of mining. e) Actual depth of the mining achieved earlier. f) Name of the person already mined in that leases area. g) If EC and CTO already obtained, the copy of the same shall be submitted. h) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	This is a proposed quarry. No mining operations have been carried out in this lease so far.	2-10
8	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	<ul style="list-style-type: none"> Project coordinates superimposed in satellite imagery and given as Figure No - 2.4 in Chapter – II. The 10km Radius Index plan showing buffer zone is given in 	2-6 3-2



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	should clearly show the land use and other ecological features of the study area (core and buffer zone).	Figure No.3.1 in Chapter – III.	
9	The PP shall carry out Drone video survey covering the cluster, Green belt , fencing etc.,	Will be carried out.	--
10	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.	<ul style="list-style-type: none"> • Photographs of the site are provided in Chapter-II. • Green netting will be carried out around the lease periphery. 	2-6
11	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.	<ul style="list-style-type: none"> • The details of the geological and mineable reserves are provided in Table No.2.3, Chapter-II. • The mining method will be Opencast semi mechanized mining using jackhammer drilling, blasting, excavation through excavator & mineral transport through tippers. • The production schedule during plan period is given in Table No.2.6, Chapter-II. • Anticipated Impacts of the mining operations and mitigation measures are discussed elaborately in Chapter-IV. 	2-9 2-11 4-1
12	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	The organization chart has been provided in Figure No.10.1, Chapter-X.	10-3
13	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies	Details of hydrogeological scenario of this project is provided under section 3.6, Chapter-III.	3-36



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	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.		
14	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data on micro-meteorology, ambient air quality, Water quality, noise level, soil and flora & fauna are collected during Winter Season (December 2022 to February 2023) and detailed in Section 3.3 to 3.5 of Chapter-III. The details of Traffic Study is provided under Section 4.9, Chapter-IV.	4-24
15	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.	The baseline monitoring carried out for this project reflects the cumulative impact of these existing quarries. Considering that the lease period of the existing quarry will be coming to an end shortly, this proposed quarry will serve more as a replacement for the existing quarry to ensure meeting the present Roughstone demands.	7-6
16	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	The non-monsoon water requirement for this project will be 10.0 KLD and the monsoon quantity will be 5.0 KLD. The required water will be procured from outside agencies initially. Later, water collected in the mine pit will be used to meet the needs.	4-8
17	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies,	<ul style="list-style-type: none"> The land use of the study area was studied to demarcate various LULC categories and its details are provided under section 3.4, Chapter- 	3-27



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	human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	<p>III.</p> <ul style="list-style-type: none"> The land use pattern at present and at the end of the quarrying period has been provided under section 4.5.1, Chapter-IV. The post mining land use has been provided in Table No. 4.14. .The post mining land use plan showing afforestation and water body is shown in Figure No- 4.5. 	<p align="center">4-16</p> <p align="center">4-21</p>
18	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.	There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. Hence, there is no external overburden dump involved. Besides, there is no proposal for overburden dump outside the lease area.	2-11
19	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not applicable	--
20	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	<ul style="list-style-type: none"> The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc. Towards surface runoff management, a garland drain will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users. The surface runoff management structures diagram is given in Figure 	4-9



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		No 4.4, Chapter-IV. • The methods for reducing water consumption and rainwater harvesting is provided in section 4.3.4, Chapter-IV.	4-11
21	Impact on local transport infrastructure due to the Project should be indicated.	From this proposed quarry the entire output will be transported to the crusher units for producing stone aggregates of different sizes or construction of roads, bridges, buildings and other buyers etc. Details of the traffic study is provided under section 4.9, Chapter-IV.	4-24
22	A tree survey study shall be carried out (nos., name of the species. age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	The details of flora in the core zone and the buffer zone are provided from Table No.3.20–3.21, Chapter-III.	3-32 & 3-33
23	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Details of Mine Closure Plan is provided under section 7.5, Chapter-VII.	7-4
24	Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.	This draft EIA/EMP report will be exposed to public consultation as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures. The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.	7-1
25	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	Agreed	--
26	The PP shall produce/display the EIA	Agreed	--



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	report, Executive summary and other related information with respect to public hearing in Tamil Language also.		
27	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	The details of flora in the core zone and the buffer zone are provided from Table No.3.20–3.21, Chapter-III.	3-32 & 3-33
28	The purpose of Greenbelt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	In the lease area, safety barrier 7.5m is left as safety zone. Greenbelt / Plantation will be carried out in and around the lease area to enhance the vegetative growth and aesthetic in the area. Details are given in Table No.4.16, Chapter-IV.	4-20
29	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/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.	Agreed	--
30	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.	The disaster management plan has been provided under section 7.3.1, Chapter-VII.	7-3
31	A Risk Assessment and management Plan shall be prepared and included in	Details about Risk Assessment has been provided under section 7.3,	7-1



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	the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Chapter-VII.	
32	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.	Details of occupational health and safety aspects are given under the subsections of Para 4.8, Chapter-IV.	4-22
33	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.	<ul style="list-style-type: none"> • Details of the socio economic survey conducted in the buffer zone has been provided in Para 3.2.4, Chapter-III. • Public health facilities will be further aimed to be developed through CER activities wherein periodic health checkups, medical camps for the locals will be conducted. 	3-8
34	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.	Nearby villages were visited for conducting study to know about socio-economic conditions, including aspirations and requirements of the people for a better living and collected relevant data. The details are provided under section 3.2.4, Chapter-III.	3-8
35	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	There is no litigation pending against the project.	--
36	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.	<ul style="list-style-type: none"> • The proposed Roughstone and Gravel Quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of 	8-1



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		<p>education, health, infrastructural etc.</p> <ul style="list-style-type: none"> • Direct employment to about 32 people and indirect employment to scores of people. • By means of carrying out the socio-economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs.5 Lakhs for various activities under CER for all the three projects together. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited. 	
37	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional office, Chennai (or) the concerned DEE/TNPCB.	Not Applicable	--
38	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.	Will be submitted.	--
39	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Reference besides attracting penal provisions in the Environment (Protection) Act, 1986"	Agreed	--
B. Additional ToR			
1	Considering the environmental impacts due to mining, safety of the working personnel and following the principle of sustainable mining, the ultimate depth of mining is restricted to 18m below ground level and 4,76,435 cu.m of rough stone, 35,703 cu.m of weathered rock and 74,124	The proposed depth of mining as per approved mining plan was 23m. However based on SEIAA recommendation, the depth of mining has been reduced to 18m. The revised production as per approved ToR has	2-12



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	cu.m of gravel are permitted for mining over a period of five years as per the approved mining plan.	been provided in Table 2.7, Chapter-II.	
2	The scientific studies shall be carried out for any proposed quarry over the existing pit/quarry by the reputed Government Scientific Research / Academic Institutions such as Anna University, NITs, IITs, NIRM, CISR laboratories where the depth of the proposed working (or) ultimate depth of working is extended beyond 40 m below ground level (BGL) in case of flat terrain and the excavation extends beyond 30 m above ground level (AGL) in case of outcrops/hilly terrains for evaluating the stability of slopes. A copy of the report shall be submitted to the SEIAA, the concerned AD/DGM, the concerned DEE/TNPCB and the Director of Mines Safety, Chennai.	At the end of the 5 year period, mining will be carried out up to 18m depth. After the plan period, only depthward mining will be carried out upto 48m. Pit slope stability plan is provided under Section 7.7, Chapter-VII.	7-7
3	Detailed study shall be carried out regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	There is an odai at a distance of 50m in the south western side of the lease area. It connects to a Thangal at a distance of 53m on the south western side of the lease area. There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.	4-10
4	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological structures etc.	Provided in Annexure-13	A-29
5	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.	Agreed	--
6	The Environmental Impact Assessment shall study in detail on the carbon emission and also suggest the measures	Considering that the quantum of production is less, only 1 excavator, 5 tippers will be engaged. These	4-3



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	to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	equipments will be properly and regularly maintained. Besides, as mentioned earlier, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 2250 number of plants will be planted in and around the lease area.	
7	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under section 3.5.1, Chapter-III.	3-30
8	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	The post mining land use has been provided in Table No. 4.13. The post mining land use plan showing afforestation and water body is shown in Figure No- 4.4.	4-16 4-9
9	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the nearby water body and Reservoir.	There is no major perennial waterbody in close proximity of the lease area.	4-17
10	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	<ul style="list-style-type: none"> • Soil samples were collected in 3 locations in the core and buffer zone to analyse the physiochemical characteristics of the soil in the area. The soil quality data is provided in Table No.3.18, Chapter-III. • The soil map is provided in Figure No.3.13, Chapter-III. 	3-27 3-26
11	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under section 3.5.1, Chapter-III.	3-30
12	The Environmental Impact Assessment should study impact on standing trees	Replied in Additional ToR Point No 6.	--



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	and the existing trees should be numbered and action suggested for protection.		
13	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	There is an odai at a distance of 50m in the south western side of the lease area. It connects to a Thangal at a distance of 53m on the south western side of the lease area. There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.	4-10
14	The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.	<ul style="list-style-type: none"> • Detailed environmental management plan is provided in Chapter-X. • The environmental management cost is provided under Table No.10.1, Chapter-X. • Disaster management plan is provided under section 7.3.1, Chapter-VII. 	10-1 7-3
15	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Considering that the quantum of production is less, only 1 excavator, 5 tippers will be engaged. These equipments will be properly and regularly maintained. Besides, as mentioned earlier, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 2250 number of plants will be planted in and around the lease area.	4-3
16	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.	4-17
17	The project proponent shall study and furnish the impact of project on	Due to poor soil condition and non-availability of perineal water source, no	4-18



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	plantations in adjoin patta lands, Horticulture, Agriculture and live stock.	major agricultural activity is carried out in and around the lease area. Only patches of plantation are observed in few places in the monsoon season based on water availability.	
18	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	The post mining land use has been provided in Table No. 4.17. The post mining land use plan showing afforestation and water body is shown in Figure No- 4.4.	4-16 4-9
19	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	Detailed environmental management plan is provided in Chapter-X.	10-1
20	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.	<ul style="list-style-type: none"> • An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under section 3.5.1, Chapter-III. • The land use pattern details are provided under section 4.5.1, Chapter-IV. • Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. 	3-30 4-20
21	The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecological risks and impacts of plastic & micro plastic on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.	4-25
22	The project proponent shall study on impact of mining on Reserve forests free ranging wildlife.	There are no reserve forests in the 10Km radius. Details of impact on biological environment is provided under section 4.6.2, Chapter-IV.	4-17



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23	<p>Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following.</p> <p>i. Soil health & bio-diversity. ii. Climate change leading to Droughts, Floods etc. iii. Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people. iv. Possibilities of water contamination and impact on aquatic ecosystem health. v. Agriculture, Forestry & Traditional practices. vi. Hydrothermal/Geothermal effect due to destruction in the Environment. vii. Bio-geochemical processes and its foot prints including environmental stress. viii. Sediment geochemistry in the surface streams.</p>	<p>The impact of mining on biological environment is covered under Table 4.15, Chapter-IV.</p>	4-17
24	<p>Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby water bodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.</p>	<p>Details of hydrogeological scenario of this project is provided under section 3.6, Chapter-III.</p>	3-36
25	<p>To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with</p>	<p>The disaster management plan has been provided under section 7.3.1, Chapter-VII.</p>	7-3



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	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.		
26	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Details about Risk Assessment has been provided under section 7.3, Chapter-VII.	7-1
27	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Details of Mine Closure Plan is provided under section 7.5, Chapter-VII.	7-4
C. Standard ToR			
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.	This is a proposed quarry. No mining operations have been carried out in this lease so far.	2-10
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given	Precise Area Communication letter received from the Assistant Director, Dep. of Geology & Mining, Tiruvannamalai vide Rc.No. 1127/Kanimam/2021 dated 30.03.2022	A-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.	The production capacity, quantity of waste, its management and mining technology in mine plan and EIA, etc., are compatible with one another.	--
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	<ul style="list-style-type: none"> Project coordinates superimposed in satellite imagery and given as Figure No - 2.4 in Chapter – II. The geology and geomorphology map is provided in Figure No.3.17, 3.18, Chapter-III. The Lithology map 	2-6 3-38 3-39



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	features of the study area (core and buffer zone).	and Soil map are provided under Figure No. 3.19, 3.20, Chapter-III. • The 10km Radius Index plan showing buffer zone is given in Figure No.3.1 in Chapter – III.	3-40 3-41 3-2
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.	Replied in Standard ToR point no.4	--
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.	Not Applicable	--
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.	<ul style="list-style-type: none"> • The proponent will frame a well-planned environmental policy. Its details are provided under Section 10.2.1, Chapter-X. • The Mines Manager will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programme, social development schemes, etc in the mine. The organizational chart for the same has been provided in Figure No.10.1, Chapter-X. 	10-1 10-3
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	Various risks likely to arise due to mining activities are detailed under section 7.4, Chapter-VII. This being an opencast mine, subsidence is not	7-4



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	detailed. The proposed safeguard measures in each case should also be provided.	applicable. The impact due to ground vibrations due to blasting is given in para 4.3.2, Chapter-IV.	4-8
9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	The study area chosen for collecting existing environmental status covers 10 km radial distance from the project periphery (Figure No - 3.1). Data given in the report is for the life of the mine.	3-2
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.	<ul style="list-style-type: none"> The land use of the study area was studied to demarcate various LULC categories and its details are provided under section 3.4, Chapter-III. The land use pattern at present and at the end of the quarrying period has been provided under section 4.5, Chapter-IV. At the end of the 5 year period, mining will be carried out up to 18m depth. After the plan period, only depthward mining will be carried out upto 48m. Ultimately the entire mined out area of 3.550 Ha will be left as water body. 0.030 Ha will be the mine roads & infrastructure, 0.400 Ha will be covered with vegetation, and 0.440 Ha will be left as unutilized area. 	3-27 4-16
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.	There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. Hence, there is no external overburden dump involved. Besides, there is no proposal for overburden dump outside the lease area.	2-11
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	There is no forest land in the lease area.	--



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	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.	There is no forest land in the lease area.	--
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	--
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	There is no forest land in the lease 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.	The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.	4-17
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	Replied in Standard ToR point No.16	--



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	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.	A detailed study of flora and fauna composition in the core and buffer zone of the project has been made through primary field surveys. The details are furnished in para 3.5, Chapter III.	3-30
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.	Not Applicable	--
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	Not Applicable	--



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	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 shilling of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	The mining activities will be carried out within the mine lease area only. The entire mine lease area is a patta land in proponent's possession. There is no population within the ML area. Hence, the question of R& R does not arise.	7-4
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.	<ul style="list-style-type: none"> • The baseline data on micro-meteorology, ambient air quality, Water quality, noise level, soil and flora & fauna are collected during Winter Season (December 2022 to February 2023) and detailed in para 3.3 to 3.5 of Chapter-III. • Monitoring stations were selected taking into account, wind direction and location of sensitive receptors. • Free silica composition in PM10 sample has been done and the values are found to be Below Detectable Limit (DL 0.05mg/m³) which is well within the prescribed limit of 5mg/m³. 	3-9 & 3-30



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23	<p>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.</p>	<ul style="list-style-type: none"> • Air quality modeling details are furnished in para 4.2.2 and its continuous sub paras in Chapter-IV of EIA report. • The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. • The model simulations are done for the air pollutant arising from the mining operations, namely, PM10, PM2.5. Ground Level Concentration (GLC) have been computed using hourly meteorological data. • The Isopleths of PM10, PM2.5 concentrations for with control measures scenario have also been drawn and these are given in Figure No.4.1 and 4.2. • It can be seen that the resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM₁₀ are in the range of 57.2 µg/m³ to 84.4 µg/m³ and with respect to PM_{2.5} are in the range of 26.9 µg/m³ to 38.7 µg/m³ which are within the statutory limits in each case. 	<p align="center">4-3 4-6 4-7</p>
24	<p>The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.</p>	<p>The total water requirement for this project will be 10.0 KLD comprising 1.0 KLD for drinking water and domestic use, 8.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The water balance diagram for the same is shown in Figure No 4.3.</p>	<p align="center">4-8</p>



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25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable.	++
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.	<ul style="list-style-type: none"> • The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc. • Towards surface runoff management, a garland drain of length 1200m will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users. The surface runoff management structures diagram is given in Figure No 4.4, Chapter-IV. • The methods for reducing water consumption and rainwater harvesting is provided in section 4.3.4, Chapter-IV. 	4-9 4-11
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.	There is an odai at a distance of 50m in the south western side of the lease area. It connects to a Thangal at a distance of 53m on the south western side of the lease area. There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.	4-10
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 ultimate pit depth of mining is 48m. The ground water table in this area is below this level. Hence, ground water intersection in not envisaged and ground water will not be affected appreciably due to the quarrying operation. Details of hydro geological study are given in Para 3.6, Chapter – III.	3-36



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	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.	Replied above in Standard ToR point No.27.	--
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The area applied for quarry lease exhibits almost plain topography. The ultimate pit depth of mining is 48m. The ground water table in this area is below this level. Hence, ground water intersection in not envisaged and ground water will not be affected appreciably due to the quarrying operation.	2-14
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. Phasc-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.	In the lease area, safety barrier 7.5m around the periphery and 10m safety zone for cart track is left. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2250 trees will be planted in and around the lease area.Details of the same is provided under Table No.4.16, Chapter-IV.	4-20
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	From this proposed quarry the entire output will be transported to the crusher units for producing stone aggregates of different sizes or construction of roads,	4-24



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	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.	bridges, buildings and other buyers etc. Details of the traffic study is provided under section 4.9, Chapter-IV.	
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	This is a proposed project. Site services like mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.	2-14
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.	Mining will be carried out up to 18m depth for 5 years, Subsequently, in the remaining 6th to 10th year, the entire lease area will be mined at a depth of 48m. Ultimately the entire mined out area of 3.550 Ha will be left as water body. 0.030 Ha will be the mine roads & infrastructure, 0.400 Ha will be covered with vegetation, and 0.440 Ha will be left as unutilized area. The post mining land use plan showing afforestation and water body is shown in Figure No- 4.5.	4-20
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	Details of occupational health and safety aspects are given under the subsections of Para 4.8, Chapter-IV.	4-22
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	<ul style="list-style-type: none"> • Details of the socio economic survey conducted in the buffer zone has been provided in Para 3.2.4, Chapter-III. • Public health facilities will be further 	3-8



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	budgetary allocations	aimed to be developed through CER activities wherein periodic health checkups, medical camps for the locals will be conducted.	
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.	Towards the socio-economic development of the surrounding area, the proponent has earmarked an amount of Rs.5 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in the nearby Government schools. In consultation with the locals based on the need & priority it will be implemented. Its details are provided in Para 4.7, Chapter-IV	4-22
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 Environmental Management plan and its implementation, etc., are furnished in Chapter X.	10-1
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	This draft EIA/EMP report will be exposed to public consultation as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures. The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.	7-1
40	Details of litigation pending against the project, if any, with direction /order paced	There is no litigation pending against the project.	--



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	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.	The cost of the project is Rs. Rs.98,68,000/- Towards EMP measures, Rs.29.81 Lakhs is allocated under capital cost. Besides, Rs.28.56 Lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue.	4-22 10-9
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan has been provided under section 7.3.1, Chapter-VII.	7-3
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.	<ul style="list-style-type: none"> • The proposed Rough Stone Quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, health, infrastructural etc. • Direct employment to 32 people and indirect employment to scores of people. • By means of carrying out the socio economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs. 5 Lakhs for various activities under CER. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited. 	8-1



CHAPTER - I



INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 PURPOSE OF THE REPORT:

Thiru. R.Kathirvelu proposes to operate a **Rough Stone and Gravel Quarry** at Survey No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu and has initiated action towards obtaining environmental clearance.

The lease period is 10 years. It is proposed to mine 4,76,435 m³ of Roughstone and 35,703 m³ of Weathered Rock and 74,124 m³ of Gravel for a period of 5 years upto a depth of 18m as per approved ToR as against the mining plan approved quantity of 6,00,630 m³ of Roughstone and 74,124 m³ of Gravel and 35,703 m³ of Weathered Rock for a period of 5 years upto a depth of 23m. During the balance 5 years, 5,41,795 m³ of Roughstone will be mined upto a depth of 48m bgl.

Although the individual lease area of this project is less than 5 Ha, the other existing quarries within the 500m radius cluster along with this subject project works out to >5 Ha. Hence, this proposal is considered under Category – B1 and as per MoEF & CC notification necessitates preparation of EIA/EMP report and public hearing. The details of the quarries located within the 500m radius of the project is given vide **Annexure-3**. A cumulative impact study has been carried out and furnished in **Para 7.3, Chapter-VII**.

This EIA/EMP report is prepared based on standard and additional Terms of Reference issued by SEIAA, Tamil Nadu vide letter no. SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022/Dated 14.07.2022 and its Amendment dated 28.11.2022 and is in conformance of the generic structure prescribed by MOEF&CC in their notification of September 2006 and the approved mining plan. The impact assessment and mitigative measures is carried out for the peak production of the mine lease period and the entire area of quarry operation and can be construed as applicable for the entire lease period.



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1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT:

Table 1.1 Identification of project

1	Project Name	Rough Stone and Gravel Quarry of Thiru R.Kathirvelu			
2	Extent	4.42.0 Ha			
3	Production	Year	Roughstone (m3)	Weathered Rock (m3)	Gravel (m3)
		1 – 5	476435	35703	74124
		6-10	5,41,795	--	--
		Total	10,18,230	35,703	74,124
4	Ultimate Depth	5 years - 18m bgl, Ultimate Depth – 48m bgl			
5	Land Classification	It is patta land in the name of Tvl.SKT Mines vide patta nos.1042 and 1041, wherein applicant is also a partner. The applicant has obtained letter of authorization from other partners			
6	Location	Survey Number: 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6			
		Village: Kaganam			
		Taluk: Vembakkam			
		District: Tiruvannamalai			
		State: Tamil Nadu			

Table 1.2: Identification of Project Proponent

1	Proponent Name	Thiru R.Kathirvelu
2	Address	No. 19C, Vilakkadi Kovil Thoppu Street, Kancheepuram District. Pin code – 631 501
3	Contact Number	7639907437
4	Email-ID	kathirvelur2022@gmail.com

The Proponent can meet the requirement the financial requirement of this project and will ensure that the mining activities are carried out as per statutory requirements.

Table 1.3: Statutory Approvals

S.No	Statutory Approval	Authority	Letter Number and Date	Reference
1.	Precise Area Communication Letter	Deputy Director, Dep. of Geology & Mining, Tiruvannamalai	Rc.No. 1127/Kanimam/2021 dated 30.03.2022	Annexure-1
2.	Mining Plan Approval	Deputy Director, Dep. of Geology & Mining,	Rc.No1127/Kanimam/2021 dated 13.04.2022	Annexure-2



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		Tiruvannamalai		
3.	Details of other quarries within 500m radius	Deputy Director, Dep. of Geology & Mining, Tiruvannamalai	Rc.No1127/Kanimam/2021 dated 13.04.2022	Annexure-2

Based on the conditions of Precise Area Communication letter, a safety distance of 50m for odai and 7.5m safety distance has been left for the adjoining patta lands.

1.3 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION & PROJECT IMPORTANCE

Table 1.4: Brief Description of Nature of project

1.	Sector	1(a), Non-Coal Mining
2.	Type	Fresh Project
3.	Category	B1 (Cluster Situation)
4.	Mineral Mined	Rough stone, Gravel and Weathered Rock
5.	Major/Minor Mineral	Minor
6.	Mining method	Opencast Semi mechanized Mining
7.	End use	The top gravel will be supplied to customers. The mined out rough stone & weathered rock, will despatched to crushers/other buyers.

Table 1.5: Location of the project

S.No	Particulars	Details
1.	Location	Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu
2.	Corner Coordinates	Latitude: 12°44'34.02"N to 12°44'41.99"N Longitude: 79°34'36.73"E TO 79°34'46.50"E
3.	Toposheet Number	57 P /5,6,9,&10

Location details are elaborated in Para 2.3, Chapter-II.

1.3.1 IMPORTANCE TO THE COUNTRY AND REGION:

Rough stone and Gravel from this quarry will meet the domestic demand. There is good demand for the Gravel & stone aggregate, which is the main requisite for the construction/ infrastructure sector. Gravel quarried from this lease will be directly transported to the nearby end users. The boulders will be marketed to the nearby crushers for producing crusher aggregates.

This project in the area will provide both direct and indirect employment opportunities through allied opportunities in logistics, trading, repairing works etc., improved per capita income for



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local people, improved social welfare facilities like infrastructural build-up, improvement in facilities due to the proposed CER activities of the proponent etc.

1.4 SCOPE OF THE STUDY:

Particulars	Details
Proposal no	SIA/TN/MIN/76683/2022
File no	9227/2022
SEAC meeting for issue of TOR	287 th Meeting held on 22.06.2022
SEIAA meeting for issue of TOR	532 nd Meeting held on 14.07.2022
Terms of Reference	Received from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022. Dated:14.07.2022
Baseline Data Collection	Carried out by Creative Engineers & Consultants , Chennai for Summer Season (Dec 2022 to Feb 2023)

Based on the terms of reference, data collection, the Environmental Impact Assessment was carried out for the project area (core zone and the buffer zone (10km radius from the core zone) and the following studies were covered:

- Collection of primary and secondary data relevant to the project.
- One-Season baseline monitoring for environmental parameters such as air, water, noise, soil, flora & fauna, etc. Analysis of parameters in in-house laboratory.
- Documentation of EIA/EMP report with inclusion of relevant studies conducted by other bodies into the EIA/EMP report.
- Identification of significant environmental parameters that are prone to get affected due to pollution. Namely, Air, Water, Noise, Soil, Biological and Land Environment.
- Evaluation and determination of suitable mitigation measures to reduce and control the said pollution.
- Prediction of post project concentration (baseline + incremental) with respect to air environment for core zone and buffer zone.
- Formulation of an Environmental Management plan including administrative aspects for proposed implementation of mitigative measures in time.



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This draft EIA/EMP report will be submitted for public consultation, as per rules and procedures in this respect, as per the EIA notification 2006. The opinions, concerns and objections, if any, of the surrounding public and other stake holders connected, will be taken into consideration and compliance report thereon will be submitted to SEIAA, Tamil Nadu in the final EIA/EMP report.

* * * * *



CHAPTER - II



**PROJECT
DESCRIPTION**

CHAPTER 2

PROJECT DESCRIPTION

2.1 TYPE OF PROJECT:

This proposal involves quarrying of rough stone and gravel by Thiru R.Kathirvelu using mechanized opencast method for the period of 10 years.

2.2 NEED & JUSTIFICATION FOR THE PROJECT:

There is a huge demand for construction material and the entire material produced from this quarry will be used in the local construction / infrastructure sector. Considering the following favorable factors it is practically possible to achieve the proposal within the planned period and this proposal is fully justified.

- Availability of good quality proved reserves
- Techno economic viability of the scheme
- Better approachability to the project and availability of logistic facility in proximity to the site
- Economic and Socio Economic Benefits to the region

2.3 LOCATION:

A brief description of the mining area, along with the location, coordinates, accessibility, etc. has been details below in Table No.2.1.

Table 2.1: Mine site description

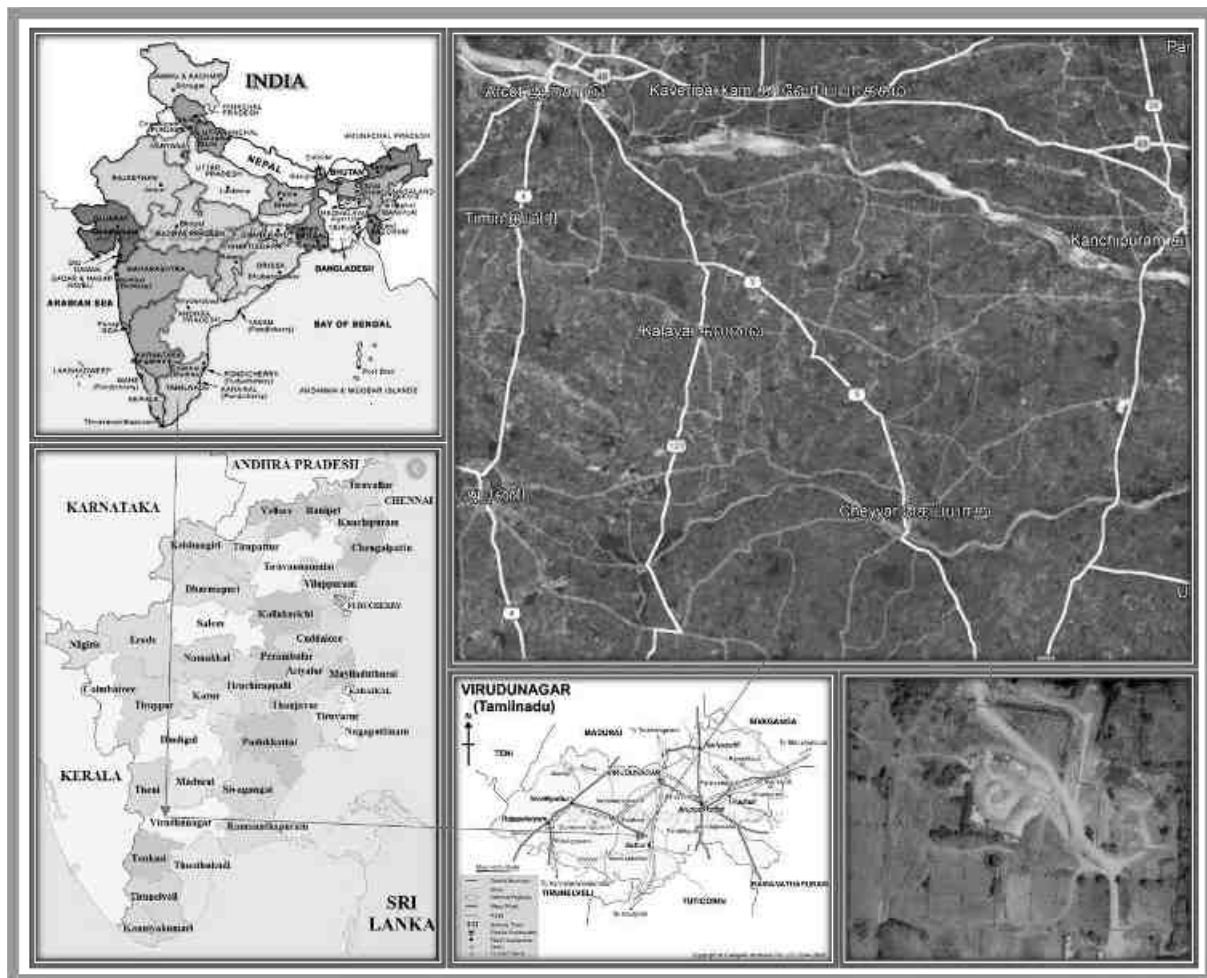
Location	Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu
Survey No.	58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6
Coordinates	Latitude: 12°44'34.02"N to 12°44'41.99"N Longitude: 79°34'36.73"E TO 79°34'46.50"E
Nearest Village	Kaganam – 1.0km (SE)
Nearest Town	Vembakkam – 4.5km - NE
Nearest Highway	(SH-5) Tindivanam – Vembakkam –6.5km (SW)

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Nearest Railway Station	Kanchipuram – 16.5km - E
Nearest Airport	Chennai – 68Km – SE
Accessibility	The lease area can be approached through Sumangali Road which connects to Vembakkam on the northern side of the lease area and Cheyyar on the southern side of the lease area.
Topography	Plain terrain, dry lands with scarce vegetation.
Drainage	There is an odai at a distance of 50m from the lease area and a Thangal at a distance of 53m on the south west side.

Location map is provided in **Figure No.2.1**. The approachability map is provided in **Figure No.2.2**. Corner co-ordinates of the lease area and satellite imagery are shown in **Figure No. 2.3 & 2.4** respectively. Village map for 500m radius from the lease is shown in **Figure No. 2.5**.

Figure 2.1: Location Map



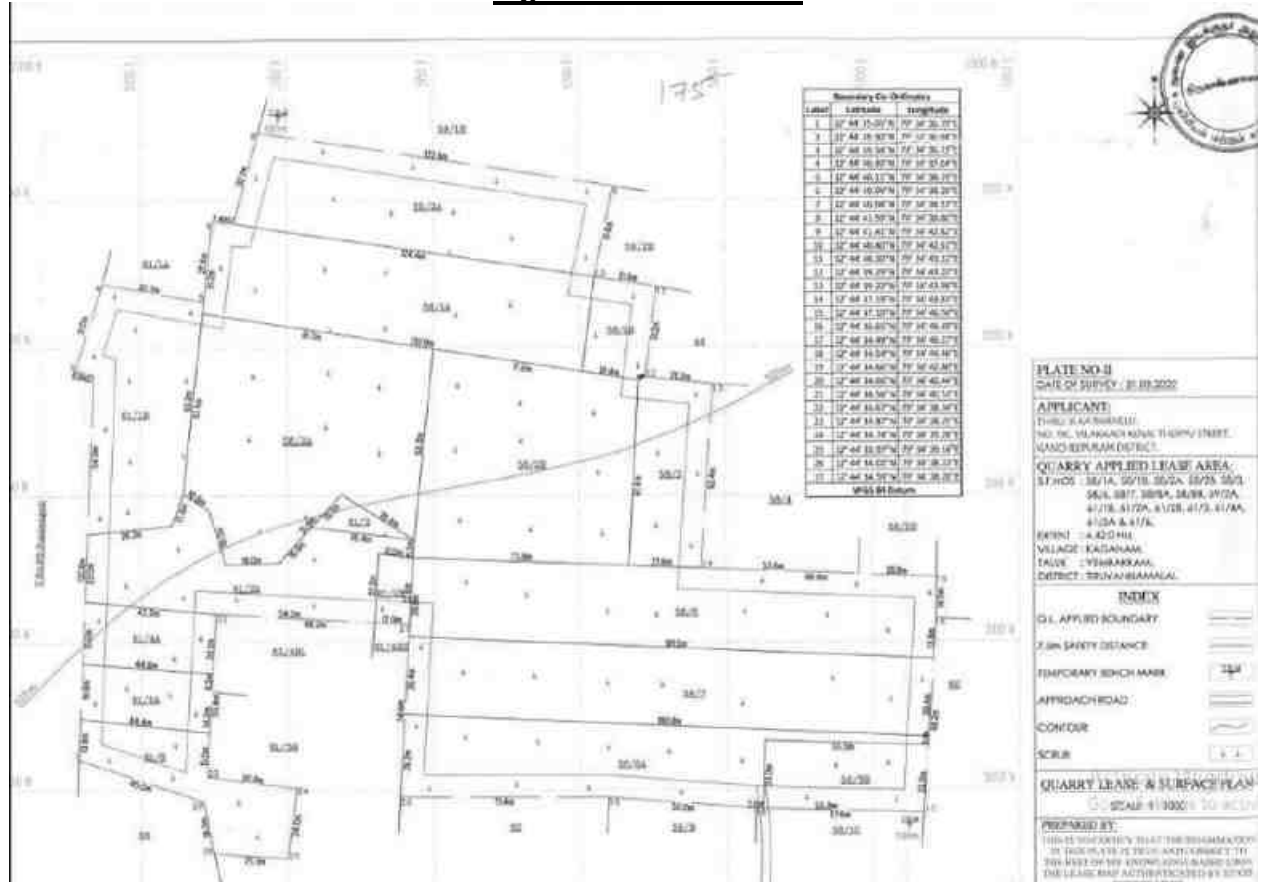
**DRAFT EIA/EMP REPORT FOR ROUGH STONE AND GRAVEL QUARRY OF THIRU.R.KATHIRVEL,
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Figure 2.2: Approachability Map



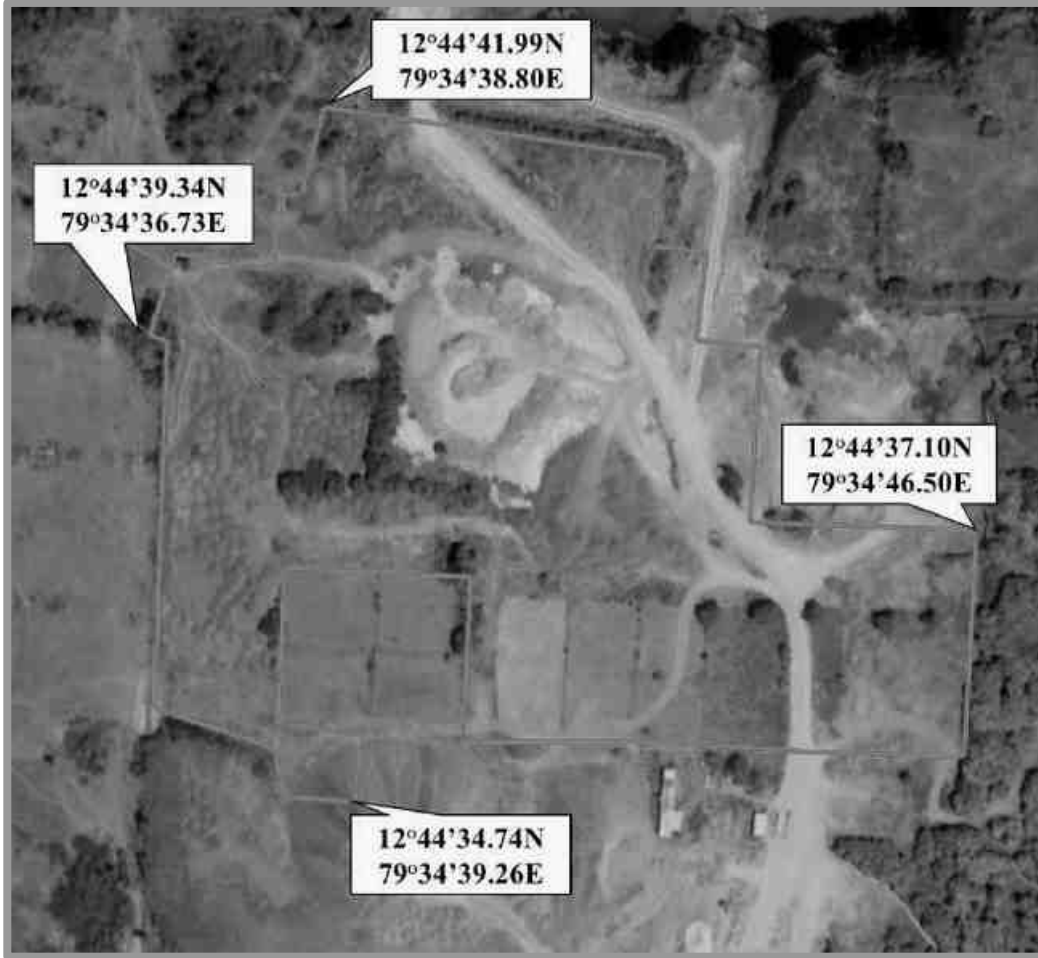
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Figure 2.3: Lease Plan



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Figure 2.4: Satellite Imagery Showing Corner Co-ordinates of the Project Area

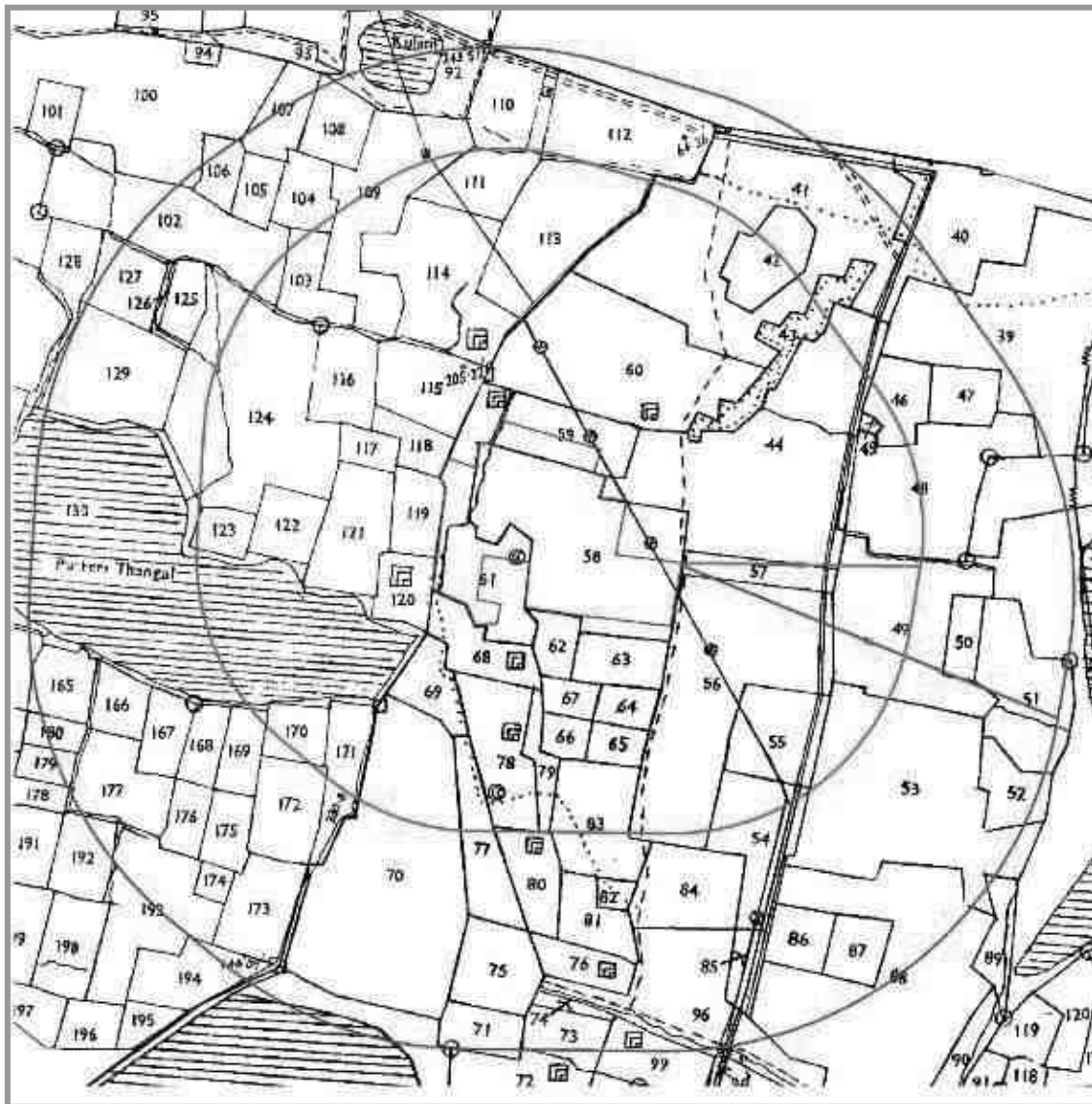


SITE PHOTOGRAPH



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Figure 2.5: Village Map



2.4 LAND CLASSIFICATION:

The lease area of 4.420 Ha is a patta land in the name of Tvl.SKT Mines vide patta nos.1042 and 1041, wherein applicant is also a partner. (**Annexure-IV of mining plan**) The applicant has obtained letter of authorization from other partners. (**Annexure-VII of mining plan**) The survey no. wise area breakup has been provided below:

Table 2.2: Survey Number wise Area Breakup

S.F. No	Area (Hectare)
58/1A	0.405



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58/1B	0.095
58/2A	0.550
58/2B	0.495
58/3	0.170
58/6	0.505
58/7	0.470
58/8A	0.380
58/8B	0.125
59/2A	0.380
61/1B	0.200
61/2A	0.265
61/2B	0.030
61/3	0.025
61/4A	0.095
61/5A	0.085
61/6	0.145
Total	4.420

2.5 GEOLOGY:

The area is underlain by the wide range of metamorphic rocks of peninsular gneissic complex. These rocks are extensively weathered and overlain by the recent valley fills and alluvium at places. The geological formations found in the district are Archaean rocks like Gneisses, Granites, Charnockites basic granulites and calc-gneisses. The younger formations are Quartz veins and pegmatite.

The rock type noticed in the area for lease is Charnockite which contains mostly Quartz and Feldspar with some ferromagnesian minerals. The Charnockite is part of peninsular Gneisses, a high grade metamorphic rock.

Figure 2.6: Geological Succession of the area

	Age	Rock Formation
1	Recent to Sub recent	Alluvium, Gravel
2	Archaean	Charnockite Peninsular Gneiss, and Calc Gneiss

2.6 SIZE AND MAGNITUDE OF THE OPERATION:

- The proposed mining will be done by open cast semi mechanized mining method.
- Life of mine will be 10 years.
- It is proposed to mine 4,76,435 m³ of Roughstone and 35,703 m³ of Weathered Rock and 74,124 m³ of Gravel for a period of 5 years upto a depth of 18m as per approved ToR as against the mining plan approved quantity of 6,00,630 m³ of Roughstone and 74,124 m³ of



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Gravel and 35,703 m³ of Weathered Rock for a period of 5 years upto a depth of 23m. During the balance 5 years, 5,41,795 m³ of Roughstone will be mined upto a depth of 48m bgl.

- There is no waste generation anticipated in this quarry operation since the entire excavated material will be transported to buyers.

2.6.1 RESERVES:

Table 2.3: Geological and Mineable Reserves

S. No	Type of reserves	Rough Stone m ³	Weathered Rock m ³	Gravel m ³
1	Geological Resources	19,83,285	44,073	88,146
2	Mineable reserves up to 23m below ground level	6,00,630	35,703	74,124
3	Mineable reserves up to 48m below ground level	10,18,230	35,703	74,124

The mineable reserves is arrived after considering the safety distance of 10m for cart track and 7.5m safety distance has been left for the adjoining patta lands.

2.6.2 MINING METHOD:

Opencast semi mechanized mining using jackhammer drilling, blasting, excavation through excavator & mineral transport through tippers will be carried out. The top gravel is soft and can be directly excavated. The rough stone below will be blasted and then excavated. Bench height of 5.0m & 5m width is considered.

Table 2.4: Details of Equipments

SI. NO	NAME OF THE EQUIPMENT	CAPACITY	REQUIRED
1	Excavator	0.90m ³ bucket capacity	1
2	Tipper	5/10 tonnes	5
3	Tractor compressor for drilling	175 CFM	1

2.7 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION:

The proponent propose to implement the production immediately after obtaining all the statutory approvals such as CTE, CTO, etc. The proponent will comply with the environmental clearance conditions during mining operations. The schedule of project implementation envisaged for this project is provided below. This is a tentative schedule subject to various factor, hence unforeseen variations may occur.



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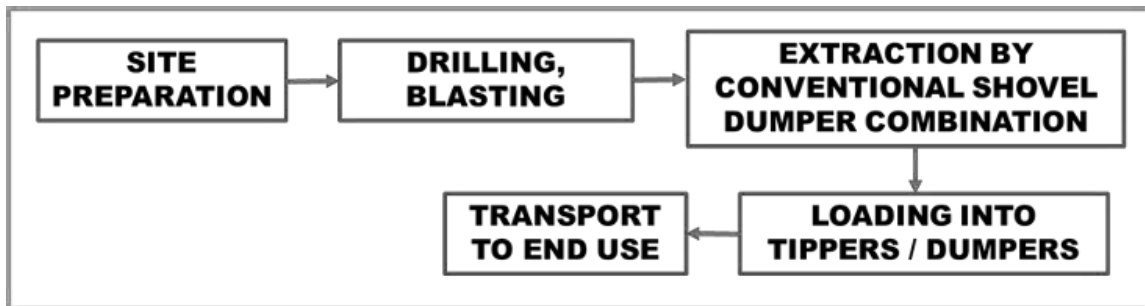
Table 2.5: Proposed Schedule of Implementation

Activities	Months					
	Zero Date	1	2	3	4	5
Obtaining Environmental Clearance						
Obtaining Consent from State Pollution Control Board						
Lease Execution						
Equipment mobilization and Commencement of Mining activity after following all the Statutory Requirements						

2.8 TECHNOLOGY AND PROCESS DESCRIPTION:

The quarry operations involve shallow jack hammer drilling, blasting, excavation, loading and transportation of Roughstone to buyers. The production of Roughstone in this quarry involves jackhammer drilling and blasting. The primary boulders are removed from the pits by excavators and further made to smaller sizes by rock breakers attached in excavators. It is a conventional opencast semi mechanized method of mining. The process flow diagram of this project is provided below.

Figure 2.7: Process Flow Diagram



2.9 PROJECT DESCRIPTION:

2.9.1 PAST PRODUCTION:

This is a proposed quarry. No mining operations have been carried out in this lease so far.

2.9.2 PLAN PERIOD-PRODUCTION & WASTE DISPOSAL:

The proposed depth of mining during plan period as per approved mining plan was 23m. However based on SEIAA recommendation, the depth of mining has been reduced to 18m. The revised production as per approved ToR has been provided below:



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Table 2.6: Production Schedule During Plan Period

Year	Roughstone (m3)	Weathered Rock(m3)	Gravel(m3)
I	109770	21988	45288
II	109780	13715	28836
III	126840	--	--
IV	127185	--	--
V	2860	--	--
Sub Total (Year I to V)	476435	35703	74124
Year VI to X	5,41,795	--	--
Total	10,18,230	35,703	74,124

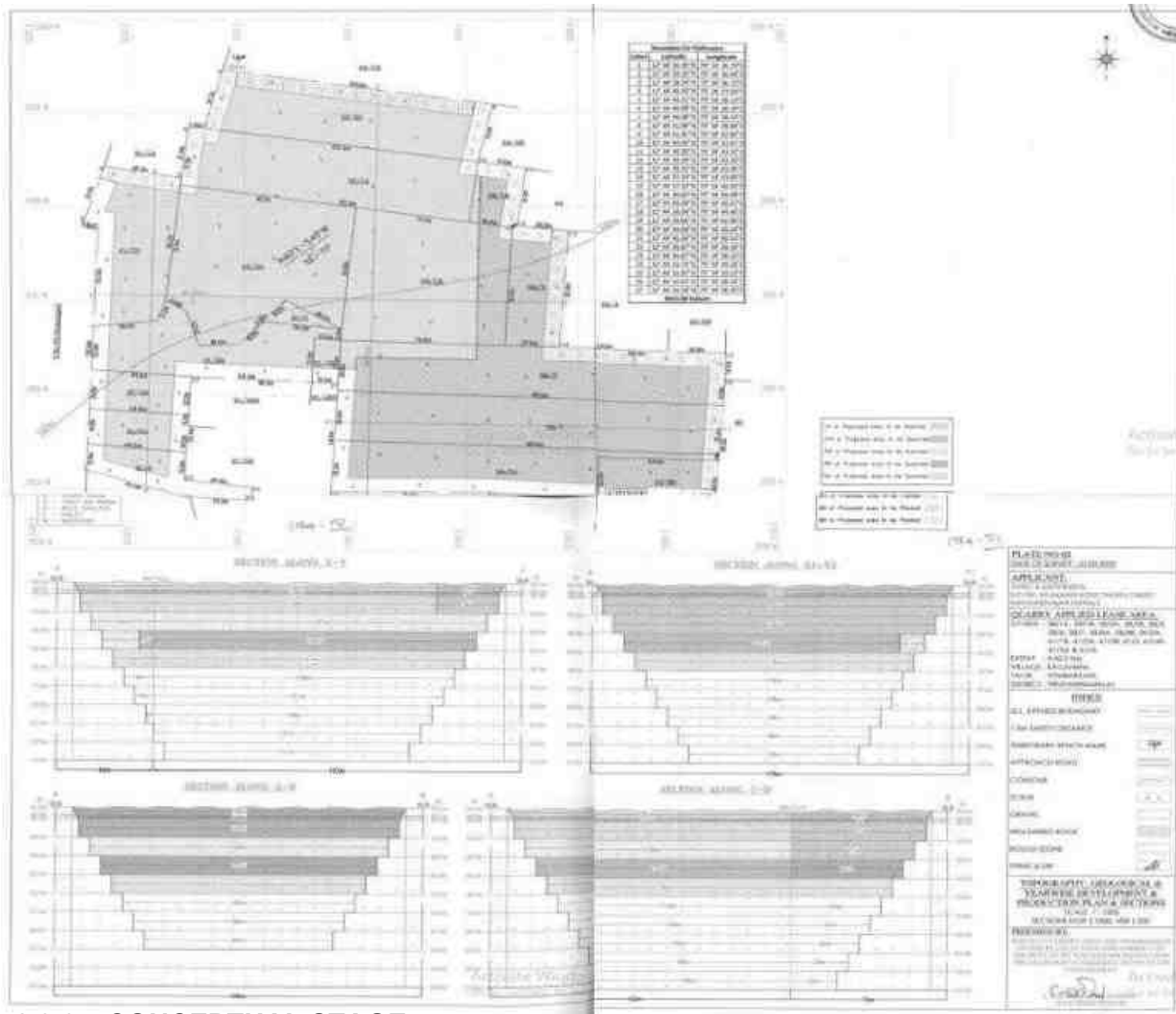
Waste Disposal during Plan Period:

There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. The top overburden in the form of Gravel and weathered rock will be loaded into tipper and marketed to needy customers on payment of necessary Fees to Government. The excavated rough stone will be excavated and loaded into tipper to the needy buyers for producing crusher aggregates, M Sand.



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Figure 2.8: Year wise Plan & Cross Section



2.9.3 CONCEPTUAL STAGE:

During the first 5 years, mining operations will be carried out upto 18m as per approved ToR. At the end of the lease period, the ultimate depth of mining will be 48m.

Table 2.7: Ultimate Pit Dimensions

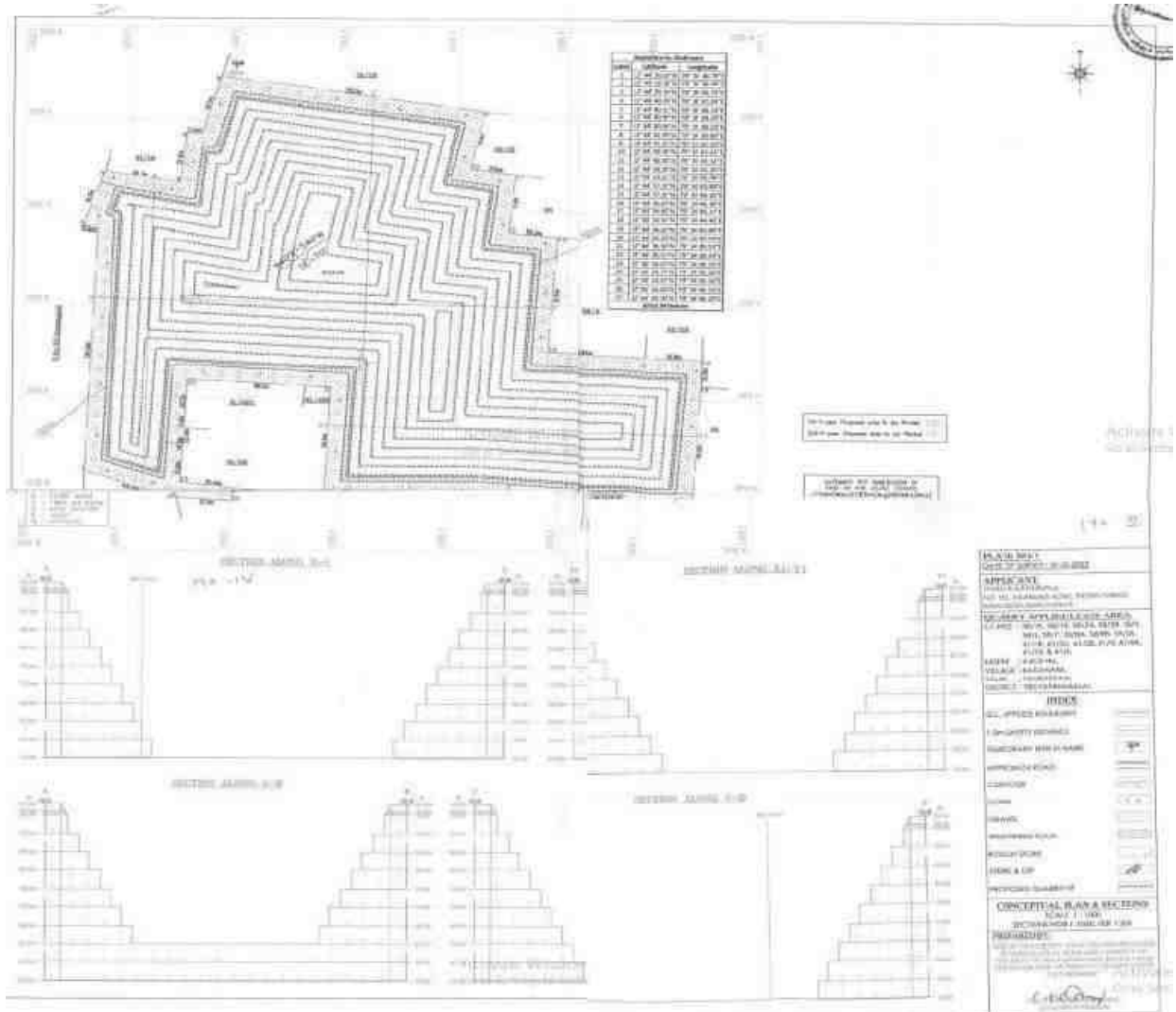
Pit No	Length (max) in m	Width (Avg) in m	Depth(max) in (m)
I	194	183	48m below ground level

The ground water table on the surface in this area is quite deeper. Hence, ground water intersection in not envisaged. The Conceptual Plan & Cross section are shown in **Figure No. 2.11.**



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Figure 2.9: Conceptual Plan & Cross Section



2.9.4 LAND DEGRADATION/UTILIZATION:

The land use pattern at present and at the end of the quarrying period has been provided below.

Table 2.8: Land Use

Sl. No.	Land Use	Present Area (Hect)	Area put in use end of 5 year plan period (Hect)	Area put in use end of 10 year plan period (Hect)
1.	Quarrying Pit	Nil	3.55.0	3.55.0
2.	Infrastructure	Nil	0.01.0	0.01.0
3.	Roads	Nil	0.02.0	0.02.0
4.	Green Belt	Nil	0.40.0	0.40.0
5.	Unutilized	4.42.0	0.44.0	0.44.0
Total		4.42.0	4.42.0	4.42.0



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At the end of the 5 year period, mining will be carried out up to 18m depth. After the plan period, only depthward mining will be carried out upto 48m. Ultimately the entire mined out area of 3.550 Ha will be left as water body. 0.030 Ha will be the mine roads & infrastructure, 0.400 Ha will be covered with vegetation, and 0.440 Ha will be left as unutilized area.

2.9.5 PROJECT REQUIREMENTS:

Table 2.9: Project Requirements

Manpower	32 People directly and more than 50 people indirectly	
Water Requirement and Source	Water Requirement: 10 KLD	
	Details	Quantity (KLD)
	Drinking water and Domestic Use	1.0
	Dust Suppression	8.0
	Green belt	1.5
	Total	10.0
	Source: The required water will be procured initially from outside agencies. Later Rain water harvested in the mine sump can also be used.	
Power Requirement	No electricity needed for mining operation. The minimum power requirement for office, etc will be met from state grid.	
Site Services	This is a proposed project. Site services like mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.	
Project Cost	Rs.98,68,000/-	
Funds allocated for socio-economic development	Rs.5.0 Lakhs is allocated under CER budget.	

2.10 DESCRIPTION OF MITIGATION MEASURES:

Scientific and systematic development of mines will be carried out by the project authorities for preserving as well as improving the environmental conditions in and around the mining lease area. Elaborate analysis on impacts and mitigation measures to be adopted on implementation of this project and the same has been dealt in Chapter- IV.

2.11 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY:

There is no new technology that is being implemented. Opencast method of mining which is the proposed method of mining is a proven technology which is technologically and economically viable. . No major technological failures are anticipated. A disaster management plan shall be put into place to take care of any unforeseen situation.



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2.12 CONCLUSION:

As good environmental preservation is one of the prime motive of the project proponent. It is expected that the project activity will not have any major impact on environmental equilibrium in the study area.

* * * * *



CHAPTER - III

DESCRIPTION OF ENVIRONMENT

**CHAPTER 3
DESCRIPTION OF ENVIRONMENT**

3.1 GENERAL:

The existing environmental baseline data for the various environmental components were collected in the study area for the purpose of assessing the impact on present environment due to the project activities.

Monitoring was carried out systematically and meticulously as per relevant IS codes, CPCB, MoEF&CC guidelines during Winter Season (December 2022 to February 2023) the details of the study are given in this chapter.

For the purposes of this study, the area has been divided into two zones, namely, core and buffer zones. The entire lease area is considered to be the core zone while the buffer zone encompasses a 10km radius from the periphery of the core zone. The details of villages falling in the study area and other features are given in Index Plan in Figure No - 3.1

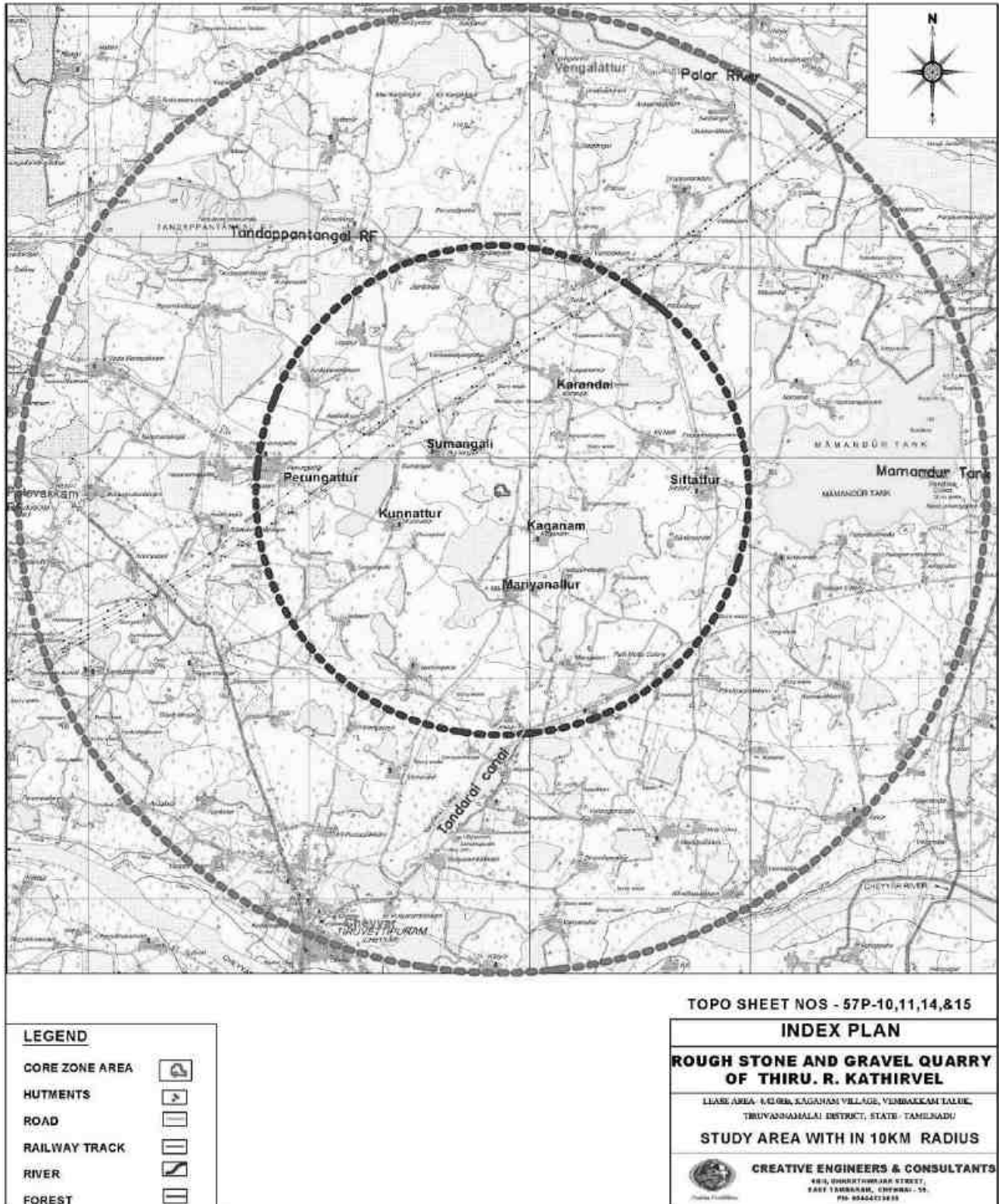
The primary data collection was done by means of field monitoring and the secondary data collection was obtained from published sources and government documents. The details of the baseline data collection which has been elaborated through the course of this chapter has been concised below:

Table 3.1: Type of Baseline Data

S.No	Studies	Parameters / Study	Location
1	Socio Economy	Demographic Data from Census 2011	Core and Buffer Zone
		Sample Survey	Buffer Zone
2	Micro Meteorology	Rainfall Data from IMD, Tiruvannamalai	Tiruvannamalai
		Temperature, Humidity, Wind Speed, Wind Direction	1 Representative Location
3	Ambient Air Quality	PM10, PM2.5, SO2, NOx, CO	1 Core Zone, 4 Buffer Zone
4	Water Quality	Physical and Chemical Parameters	1 Core Zone, 4 Buffer Zone
5	Noise Levels	Ambient Noise	1 Core Zone, 4 Buffer Zone
6	Soil Quality	Physical and Chemical Parameters	1 Core Zone, 2 Buffer Zone
7	Land Use and Land Cover	Land use pattern within 10km study area using RS Satellite	Buffer Zone
		Land use based on Census 2011	Core and Buffer Zone
8	Biological Environment	Flora and Fauna	Core Zone and Buffer Zone
9	Hydrology & Hydro Geology	Hydrogeological profile of the area	Core Zone and Buffer Zone

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Figure 3.1: Study Area Map



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Table 3.2: Environmental Setting of the Study Area

S.No	PARTICULARS	DETAILS
1	Nearest highway	(SH-5) Tindivanam – Vembakkam – 6.5km (SW)
2	Nearest Railway station	Kanchipuram – 16.5km - E
3	Nearest Airport	Chennai – 68Km – SE
4	Nearest major water bodies	odai 50m from mine area Thangal – 53m(SW) Tandarai canal - 2.6km (SE) Mamandur Tank – 5.1km(E) Palar River -9.5km(NE)
5	Nearest town/City	Vembakkam – 4.5km - NE
6	Nearest villages	Sumangali – 1.3km(NW) Kanganam – 1.0km (SE) Karandai – 1.9km(NE)
7	Notified Archaeologically important places, Monuments	Mamandur Cave – 9.4km, E
8	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Nil within 10m radius
9	Reserved / Protected Forests	Tandappantangal RF – 6.5km (NW) Pulavakkam RF – 9.1km (W)
10	Defence Installations	Nil within 10 km radius
11	Seismic Zone	Zone – II (Least Active)
12	Other Industries in the study area	Other than rough stone quarry & crushers there are no other major industries in the area.

3.2 SOCIO-ECONOMIC CONFIGURATIONS OF THE AREA:

3.2.1 GENERAL:

The Socio-Economic details of the study area are collected through:

- Identification of villages falling from the study area map with combined Taluk map.
- Collection of primary data through sample survey, village meetings and discussion.
- Collection of the demographic pattern of villages falling in the area through NIC 2011 census data.



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- Occupational structure of villages falling in the study area through NIC 2011 census data.
- Details of the amenities available in villages falling in the study area through NIC 2011 census data. The findings of the study are illustrated below:

3.2.2 SECONDARY DATA DESCRIPTION:

The proposed Roughstone, and gravel quarry is located in in kaganam Village, Vembakkam Taluk, Tiruvannamalai District. Based on 2011 census data, in the 10km radius there are 81 Rural villages from 2 District & Taluk namely Cheyyar, Tiruvannamalai District & Kancheepuram Taluk under Kancheepuram District. The demographic profile of the study area is given below:

Table 3.3: Social, Economic and Demographic Profile of the Study Area

Details	Population	Percentage
A. Gender-wise distribution		
Male Population	80104	50.10
Female Population	79779	49.90
Total	159883	100
B. Caste-wise population distribution		
Scheduled Caste	31389	19.63
Scheduled Tribes	1728	1.08
Other	126766	79.29
Total	159883	100
C. Literacy Levels		
Total Literate Population	111591	69.80
Others	48292	30.20
Total	159883	100
D. Occupational structure		
Main workers	61775	38.60
Marginal workers	16060	10.10
Total Workers	77835	48.70
Total Non-workers	82048	51.30
Total	159883	100

The total population of these 81 rural villages and 3 urban areas is 159883 in which the male population is 80104 (50.10%) and the female population is 79779 (49.90%). This shows that the



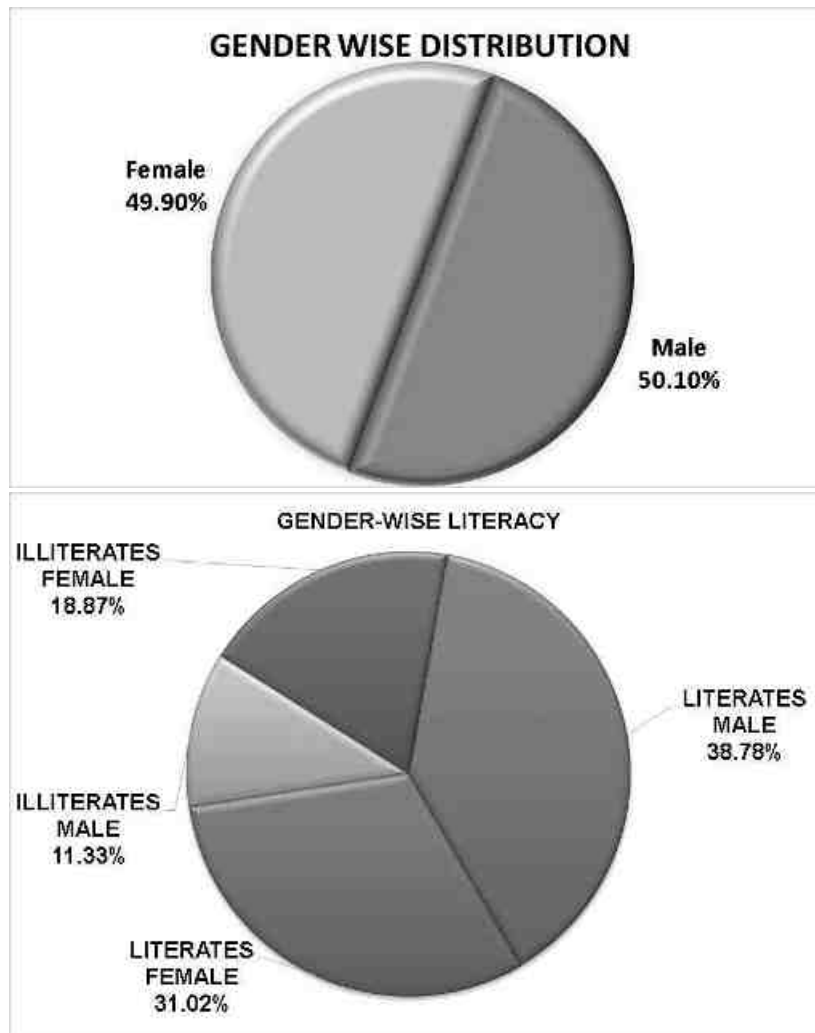
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male and female population ratio is almost equal. Among the total population 1.08% belong to Scheduled Tribes, 19.63% are Scheduled Caste and the balance 79.29 % people belong to other castes. Among the total population, 69.80% of the people are literate.

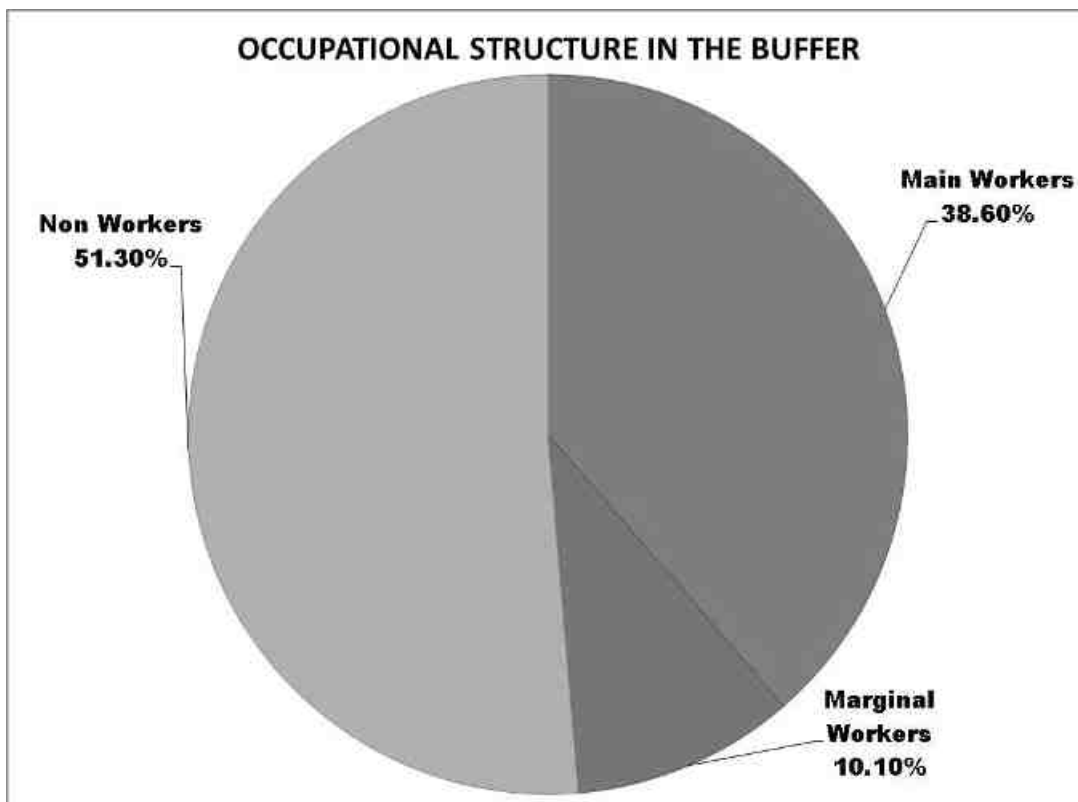
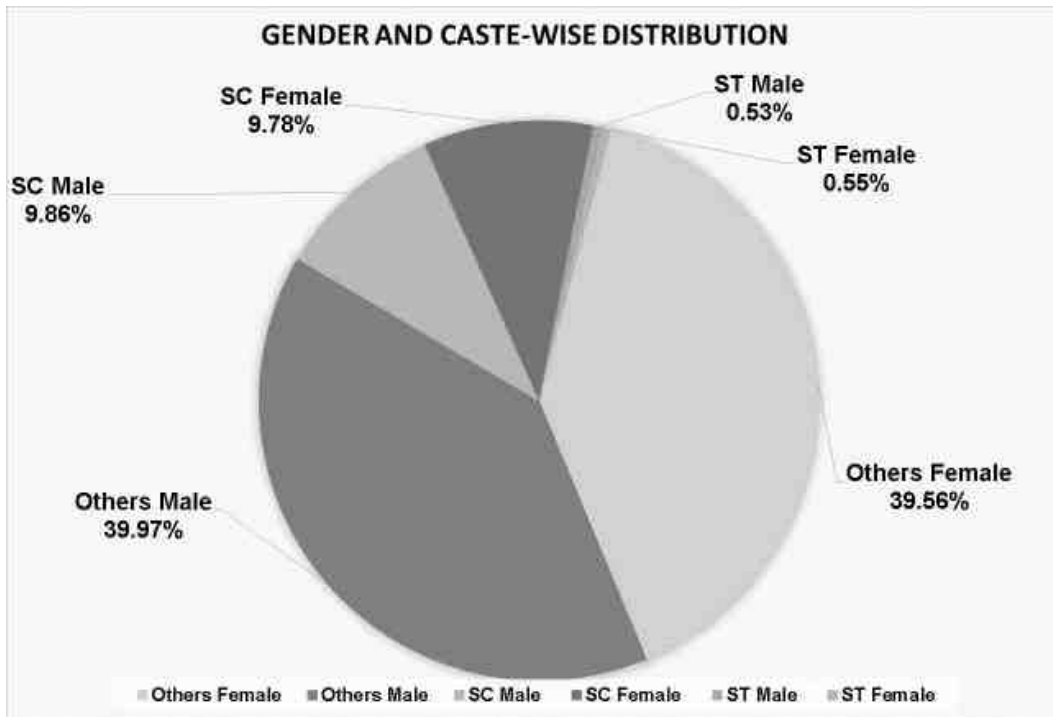
Among the total population, 38.78% are literate males and 31.02% are literate females. This shows that the male literates are slightly more than the female literates.

The village wise population, literacy levels and occupational structure details area given in **Annexures 4 and 5**. The demographic structure within the buffer zone is shown diagrammatically in **Figure No – 3.2**.

Figure 3.2: Demographic Structure in Buffer Zone



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3.2.3 DETAILS OF AMENITIES:

Based on 2011 census data, regarding the educational facilities, there are totally 96 Primary Schools functioning in these 81 rural villages. Among them 6 villages have no primary school, 60 villages have 1 primary schools, 10 villages have 2 primary schools, 4 villages have 3 primary schools, 1 villages has 4 primary schools.

Table 3.4: Primary Schools in the Buffer Zone Rural Villages

S.No	No of Rural Villages	Number of primary schools	Totals
1	6	0	0
2	60	1	60
3	10	2	20
4	4	3	12
5	1	4	4
Total	81		96

Table 3.5: Education Facility Availability

PARTICULARS	Available in village
Govt Primary School	75
Govt Middle School	30
Govt Secondary School	15
Govt Senior Secondary School	6
Govt Arts and Science Degree College	1
Govt Engineering College	0
Govt Medicine College	0
Govt Management Institute	0
Govt Polytechnic	0
Govt Vocational Training School/ITI	0

Better and higher education facilities are available in nearby Tiruvannamalai city corporation.

Table 3.6: Healthcare Amenities Availability

PARTICULARS	Available in village
Community Health Centre	2
Primary Health Centre	5
Primary Health Sub Centre	27
Maternity And Child Welfare Centre	15
TB Clinic	5
Hospital Allopathic	0
Hospital Alternative Medicine	0
Dispensary	5
Veterinary Hospital	5
Mobile Health Clinic	0
Family Welfare Centre	5

Better Healthcare facilities are available in nearby town like Tiruvannamalai City Corporation.



Table 3.7: Infrastructure Facilities

Particulars	Available in village
Tap Water-Treated	66
Covered Well	19
Hand Pump	20
Tube Wells/Borehole	28
Post office	7
bus services	78
Commercial Bank	1
Cooperative bank	8

The details of the educational, medical and infrastructural facilities available in the buffer zone is provided in **Annexures- 6-8**.

3.2.4 SAMPLE SURVEY:

Study of the nearby villages to know about socio-economic conditions, including aspirations and requirements of the people show the following:

- The studied villages have different community people which include different religion and different castes.
- Agriculture is the main occupation in some villages. But it is more along the river side and in lands where bore well facilities are available. Farmers in the locality mainly depend on rain for water source.
- Due to inconsistent rainfall, poor soil condition/ yield, no availability of workers for farming due to better employment opportunities available in SIPCOT/ other places, less economics, locals have migrated to better avenue and only handful of people are in this activity.
- Majority of the people are small farmers. They also work as agriculture laborers. As it is river fed agriculture and the water is available only for four months, during the rest of the time they have less employment opportunities. Other occupations include construction workers, vendors, etc. Nearby SIPCOT industries also provide good employment opportunity for the locals.
- Other allied activities like livestock rearing and poultry farming are also found. People are involved in supply of milk to cooperative societies.

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- Reasonably better amenities like approach road bus facility, electricity, mobile phone connectivity, Public Distribution System , Co operative bank. Scheduled banks etc are available.
- Bore well is the main source for drinking water. There are OHT's, Ground level tanks, public taps are available .
- Private and more improved facilities are available in Kanchipuram.

3.3 EXISTING ENVIRONMENTAL QUALITY

3.3.1 MICRO-METEOROLOGY

3.3.1.1 General:

The meteorological conditions in an area regulate the dispersion of air pollutants being released into the atmosphere. The principal variables are horizontal convective transport i.e. wind speed and direction and vertical convective transport, i.e. mixing height, stability class and topography of the area.

3.3.1.2 Historical Meteorological Data:

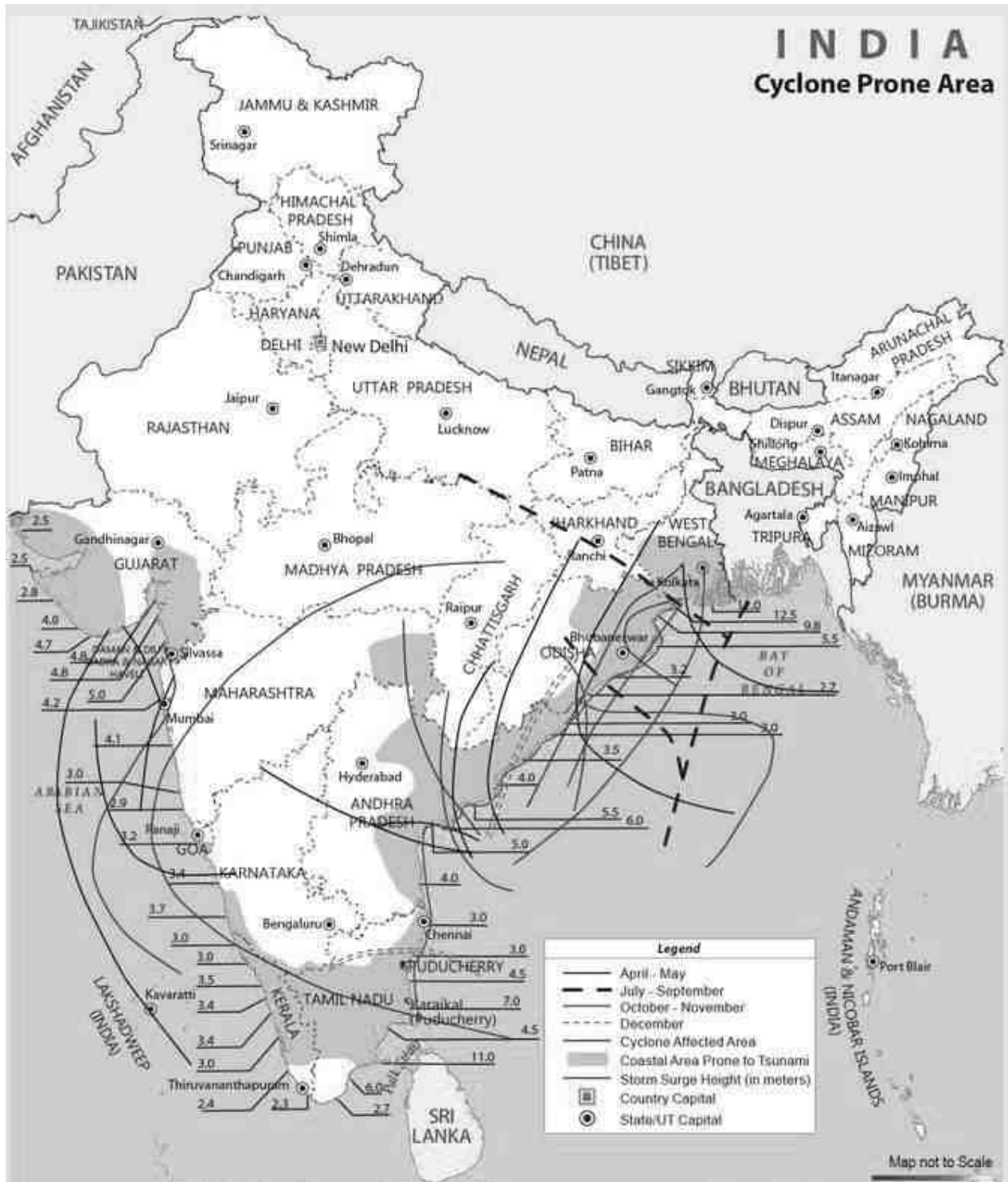
A. Cyclones And Depressions

Cyclonic storms and depressions in Bay of Bengal affect the East Coast of India. Isolated ones, forming in January to March in the South Bay of Bengal move West-North-westwards and hit Tamil Nadu coast. In April and May, cyclonic storms and depressions form in the South and adjoining Central Bay and move initially to the Northwest, then North and then recurve to the Northeast striking the Arakan coasts in April and Andhra Pradesh (AP)-Orissa-West Bengal (WB) – Bangladesh coasts in May. Most of the monsoon (June – September) storms develop in the central and in the north bay and move west – north - westwards affecting AP – Orissa – WB coasts. Post monsoon (October – December) storms form mostly in the south and central Bay, recurve between 150 and 180 N affecting Tamil Nadu – AP – Orissa – WB – Bangladesh coasts. **Figure No - 3.3** depicts the history of cyclonic storms, which have struck the Indian coast during the months of October, November and December during the last 75 years. **(Source: Vulnerability Atlas of India series, above figure accessed from [www.maps of india.com](http://www.maps.ofindia.com)).** East coast is prone to cyclonic storms round the year but mostly these occur prior to SW i.e., in May and after SW monsoon i.e., in October and November.



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Figure 3.3: History of Cyclonic Storms

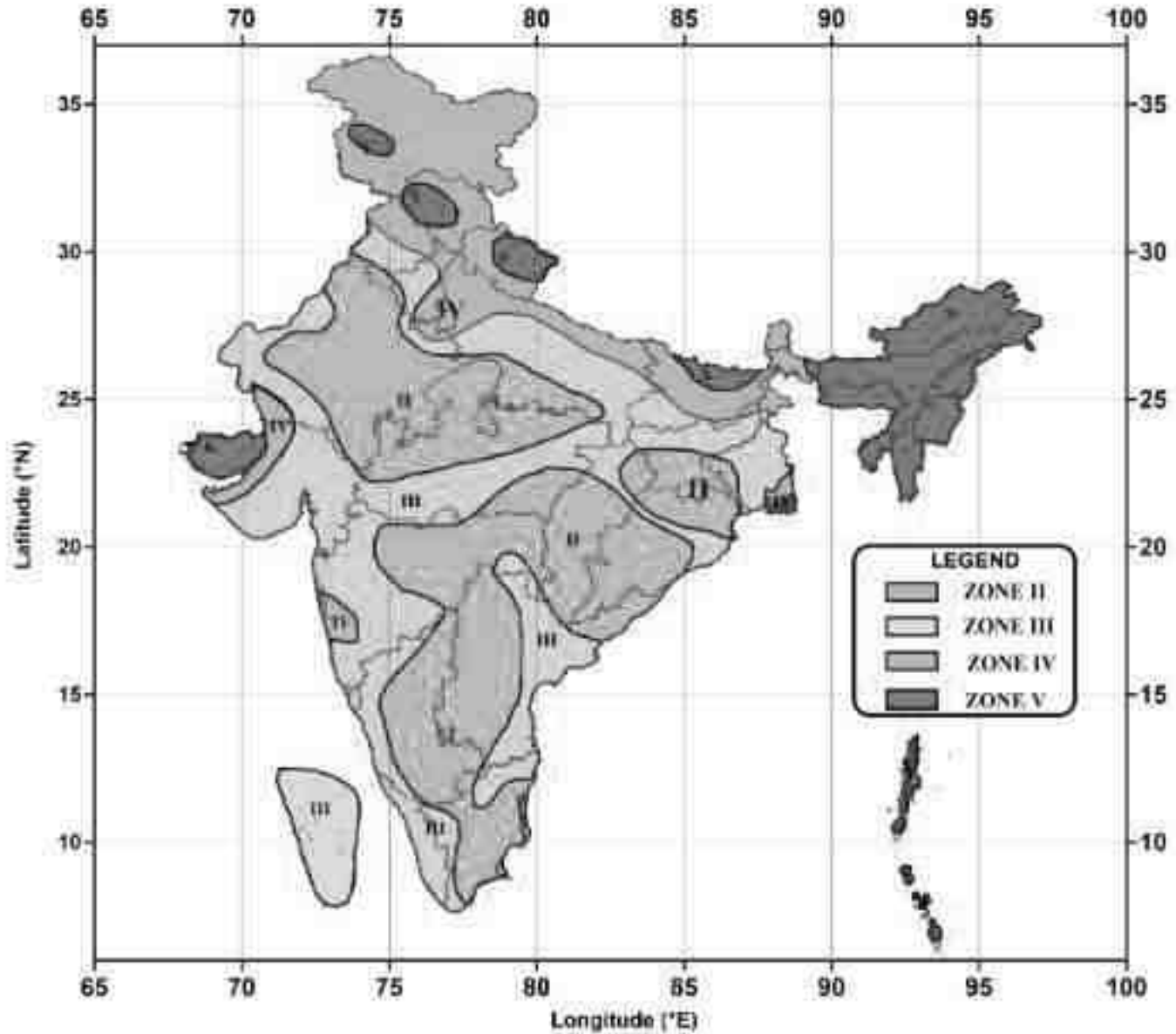


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B. SEISMIC DATA

From the seismic zone map of India as depicted in the **Figure No - 3.4**, it can be seen that the project site and study area falls in the Zone – II and is described as least active zone.

Figure 3.4: Seismic Zone Map of India



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C. Climate and Rainfall Data:

Rainfall:

The average annual rainfall of the study area is 987 mm, out of which 80 percent is received during monsoon. The soils of the study area have an Ustic moisture regime and Hyperthermic temperature regime. Tiruvannamalai District comes under the Eastern Ghats (TN uplands) and Deccan plateau, hot semiarid region with red loamy soil with cropping period of 90 to 150 days. Excepting hills, the district falls in the North Eastern agro climatic zone of Tamil Nadu. The average annual rainfall of the study area is 987.4 mm, out of which 80 percent is received during monsoon. The soils of the study area have an Ustic moisture regime and Hyperthermic temperature regime.

Temparture:

The district's yearly temperature is 30.28°C (86.5°F) and it is 4.31% higher than India's averages. Tiruvannamalai typically receives about 75.94 millimeters (2.99 inches) of precipitation and has 140.09 rainy days (38.38% of the time) annually. Rainfall data collected by Tiruvannamalai Rain gauge station for the period of 2011 to 2020 is given in below Table.

Table 3.8: Average Annual Rainfall Data (2011-2020)

DISTRICT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Cumulative
2011	1.09	25.19	0	47.2	37.68	57.39	170.46	239.2	149.04	149.9	193	76.15	1146.3
2012	2.39	0	2.62	47.38	49.59	71.69	187.16	173.93	99.64	264.36	191.44	143.22	1233.4
2013	0	7.56	17.95	3.04	46.34	41.9	73.97	181.11	157.86	157.5	124.28	27.03	838.54
2014	0.01	8.89	0.6	0.22	89.05	90.36	75.32	162.94	155.85	109.2	78.69	56.61	827.74
2015	0.73	0.07	3.16	91.87	73.38	63.93	92.29	164.96	115.53	139.2	499.19	213.6	1457.9
2016	3.7	0	0	0	93.9	90.75	122	96.41	121.04	61.08	8.78	126.97	724.63
2017	26.63	0	2.86	1.42	31.98	35.92	41.7	208.2	84.97	152.25	55.42	13.99	655.34
2018	0.03	13.7	10.61	1.12	11.05	50.25	48.15	70.14	94.92	156.73	169.16	18.28	644.14
2019	0.19	0.33	0.13	16.83	26.08	47.43	215.32	161.76	236.32	223.58	100.81	102.48	1131.3
2020	12.81	0.04	0	11.64	3.11	59.89	95.31	57.81	144.52	144.98	331.5	211.29	1072.9
Normal	19.3	13.5	13	21.5	73.7	55.8	96.9	139	174.1	200.3	161.3	78.2	1046.6

Source – IMD GRID – Tiruvannamalai report



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Figure 3.5: Monthly Average Rainfall

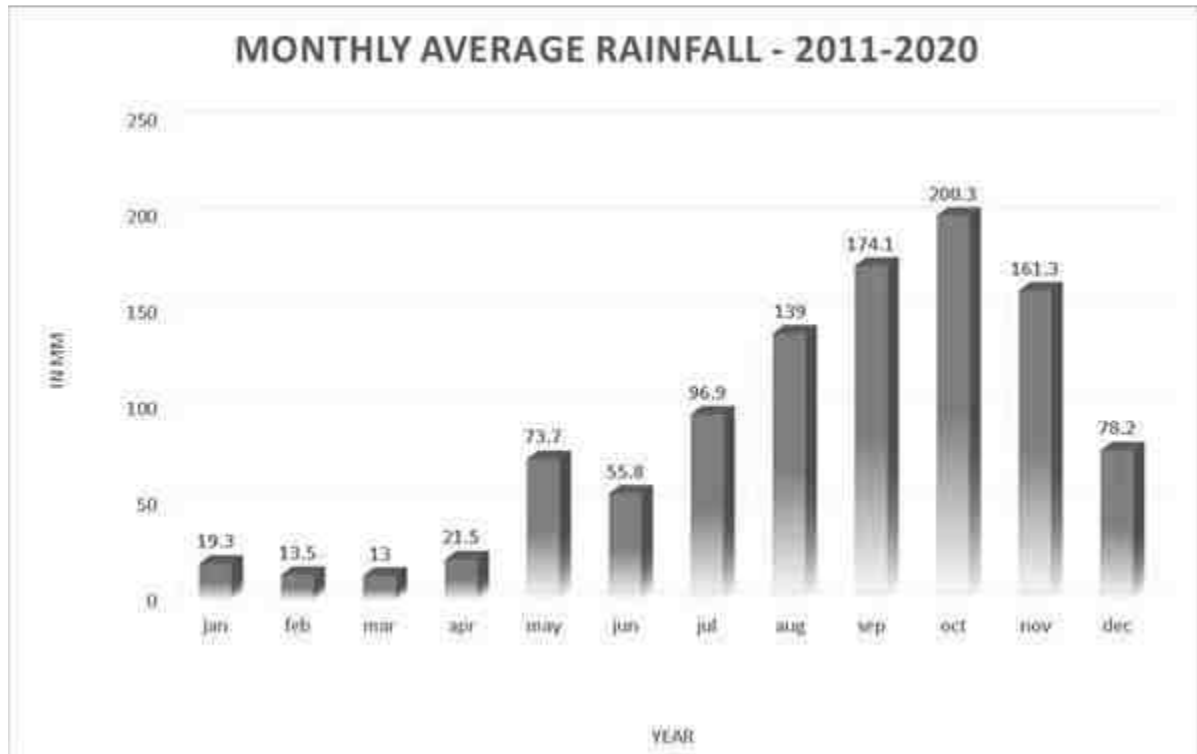
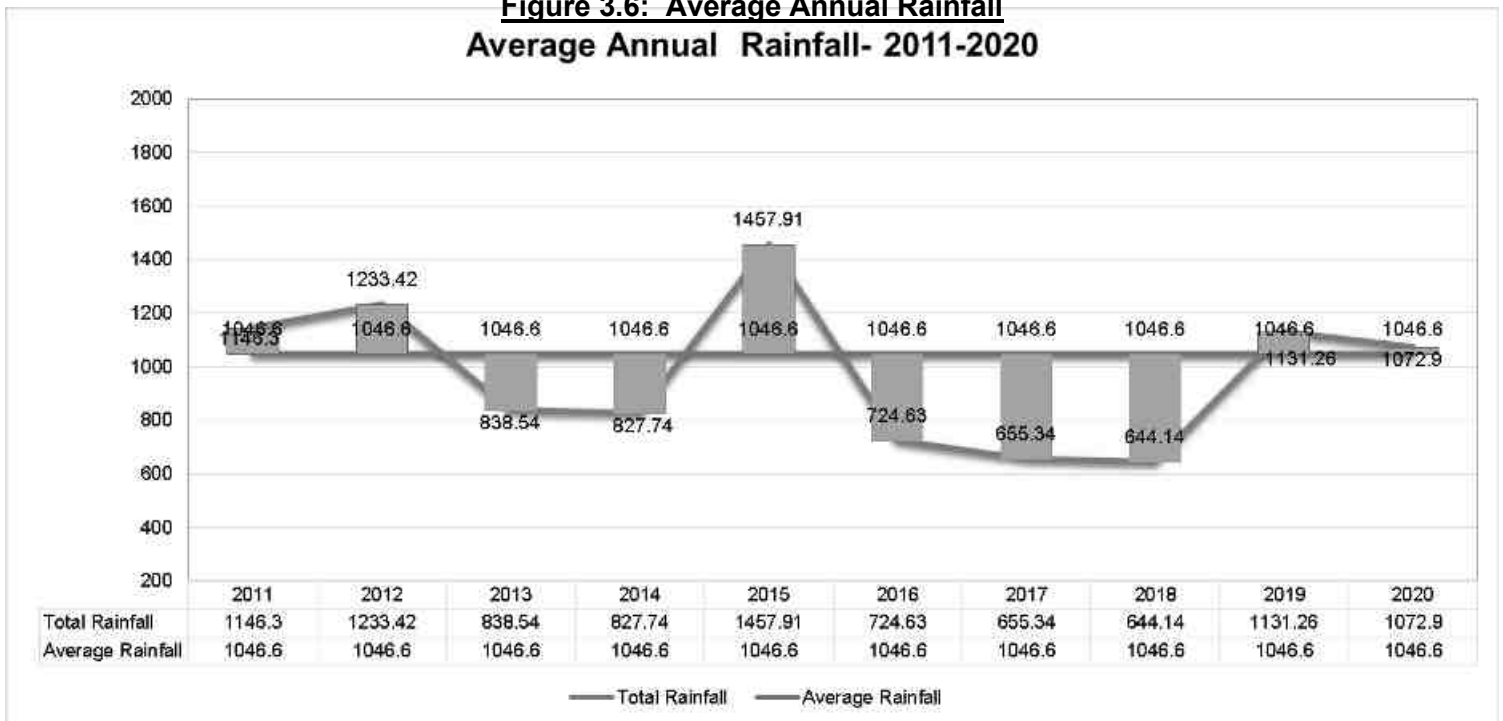


Figure 3.6: Average Annual Rainfall
Average Annual Rainfall- 2011-2020



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3.3.1.3 SITE SPECIFIC METEOROLOGICAL DATA:

Micrometeorology and microclimatic parameters of wind velocity, wind direction, ambient temperature, relative humidity, were collected throughout the monitoring period.

DATA ANALYSIS:

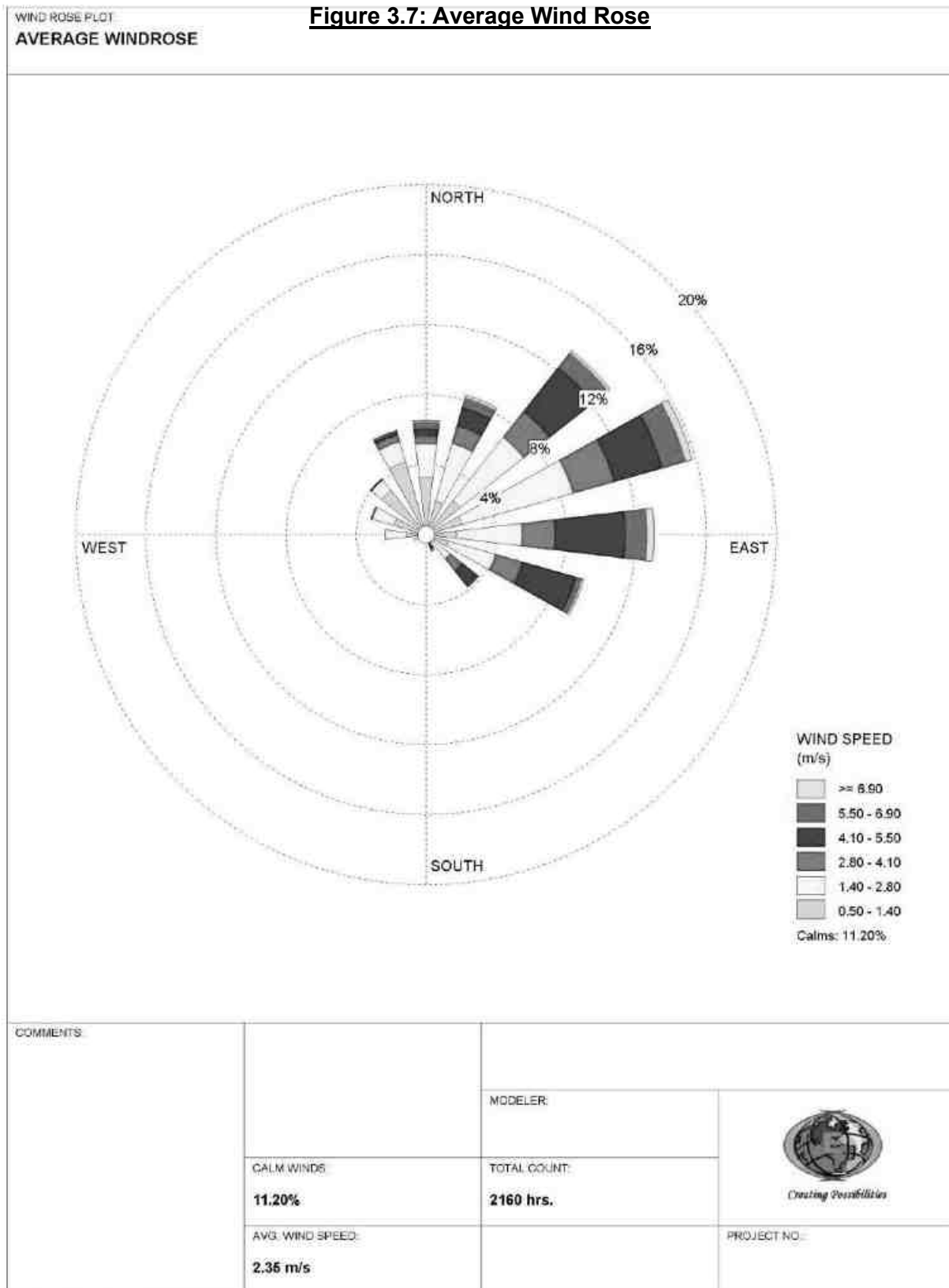
The temperature in the area during the study period ranged from 20.4°C to 34.0°C while the relative humidity varied between 30.6 - 97%. The wind speed during the study period ranged from <1.8 to 37.1 km/h. The predominant wind direction is from ENE. The meteorological data are presented in **Table no – 3.9**. The average wind rose is depicted in **Figure No - 3.7**.

Table 3.9: Meteorological Data

Season: Winter Season (December 2022 to February 2023)			
S.NO	PARAMETERS	MIN	MAX
1	Temperature In °c	20.4	34.0
2	Humidity in %	30.6	97.0
3	Wind speed in km/hr	<1.8	37.1
4	Predominant wind direction from	ENE	

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Figure 3.7: Average Wind Rose



WRPLOT View - Lakes Environmental Software



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3.3.2 AMBIENT AIR QUALITY (AAQ):

Ambient Air quality has been assessed through a network of 5 ambient air quality stations. The following methodology has been considered for design of ambient air quality monitoring network in the area. Based on these criteria, 5 numbers of air sampling stations were selected in the area as shown below in Table No.3.10.

- ❖ Topography / terrain of study area.
- ❖ Populated areas within study area.
- ❖ Residential /sensitive areas within study area.
- ❖ Magnitude of surrounding industries.
- ❖ Representation of regional background levels.
- ❖ Representation of cross sectional distribution in down wind direction.
- ❖ Predominant wind direction and wind pattern.

Table 3.10: Air Quality Monitoring

1.	Monitoring Period	Winter Season (Dec 2022 – Feb 2023)
2.	Monitoring Location	The location map showing Ambient Air Quality study stations are shown in Figure No- 3.9.
3.	Methodology	
	Parameter	Protocol
	a. Particulate Matter (PM10)	Gravimetric (IS 5182: Part 23:2017)
	b. Particulate Matter PM2.5	Gravimetric (IS 5182: Part 24:2019)
	c. Sulphur Dioxide	Colorimetric (West & Gaeke Method) (IS 5182: Part 02: 2017)
	d. Nitrogen Dioxide	Colorimetric(Modified Jacob & Hocheiser Method) (IS 5182: Part 06:2017)
	e. Carbon Monoxide	CO Monitor
	f. Silica	Colorimetric (Molybdate Method) NIOSH 7601 -2003
4.	Monitoring Frequency	2 days in a week, 4 weeks in a month for 3 months in a season.

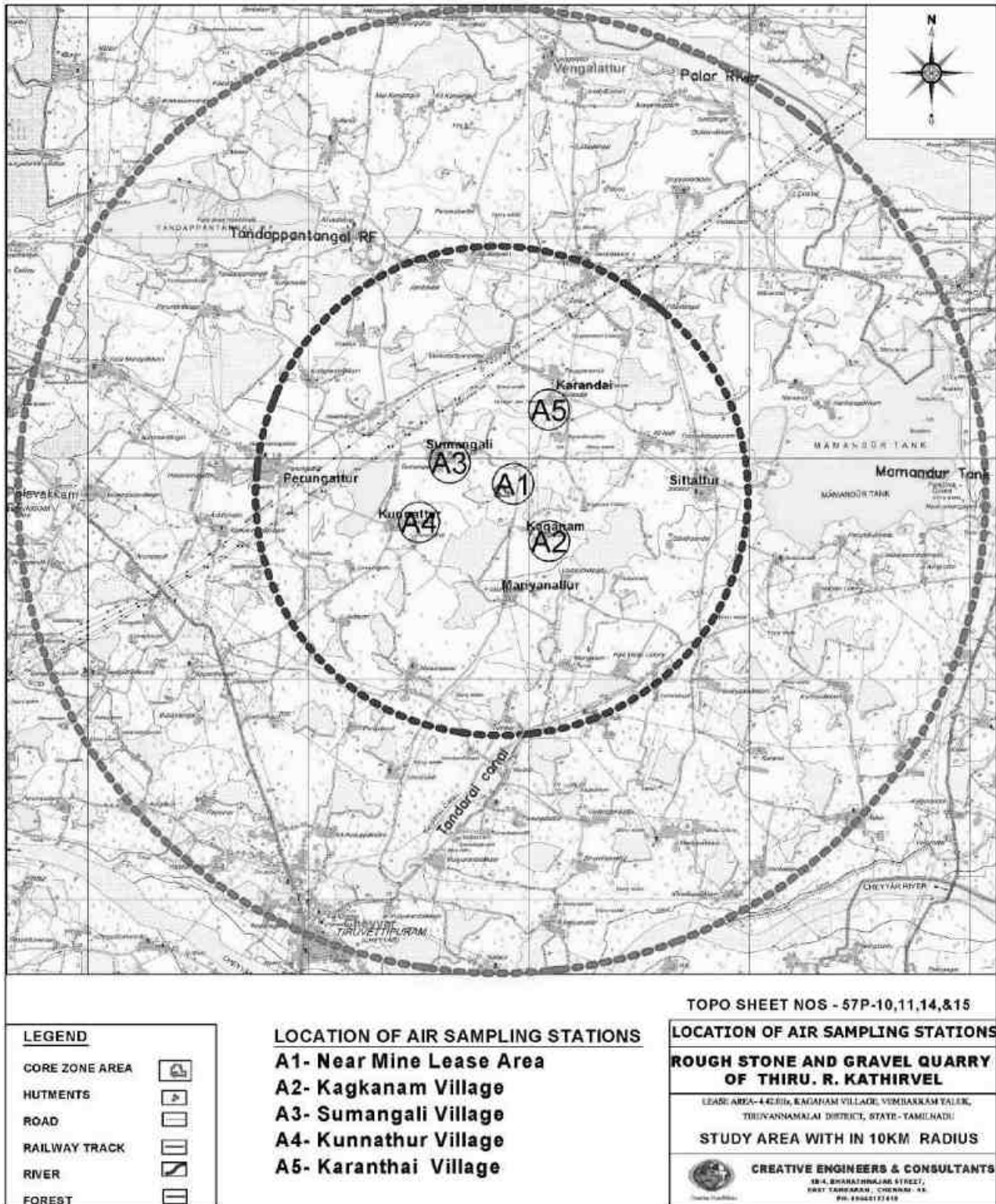
Table 3.11: Air Quality Monitoring Locations

S.NO	LOCATION CODE	LOCATION	DISTANCE FROM CORE ZONE (KM)	DIRECTION
1	A1	Near Mine Lease Area	-	-
2	A2	Kangkanam Village	1.0km	SE
3	A3	Sumangali Village	1.3km	NW
4	A4	Kunnathur Village	2.0km	SW
5	A5	Karanthai Village	1.9km	NE



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Figure 3.8: Ambient Air Quality Study Stations



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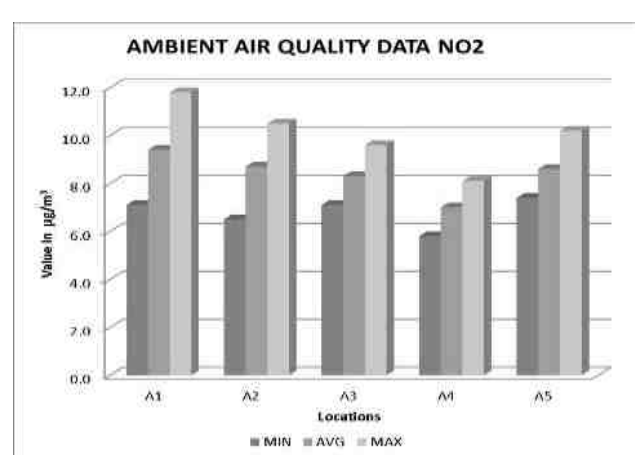
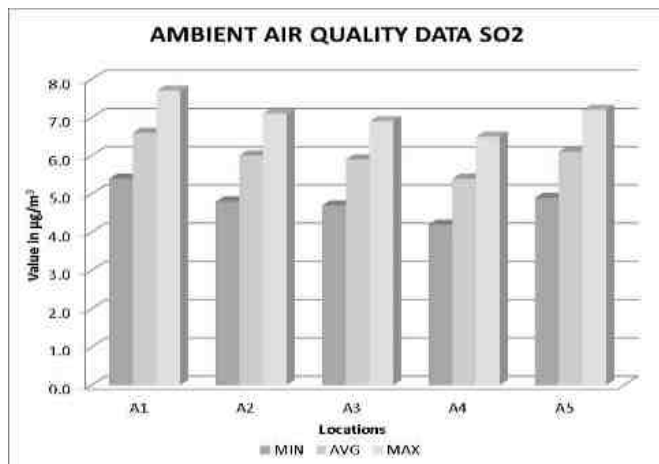
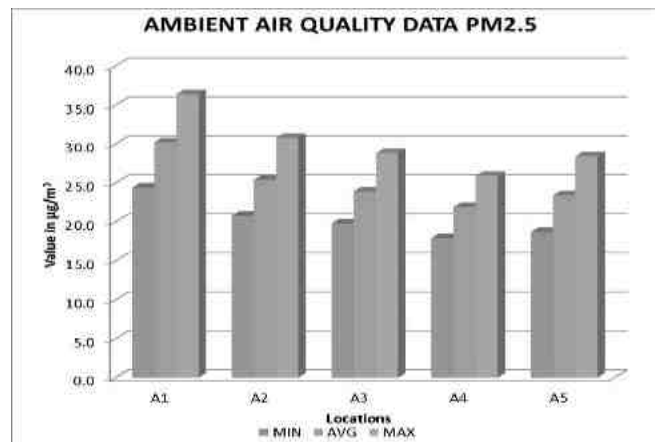
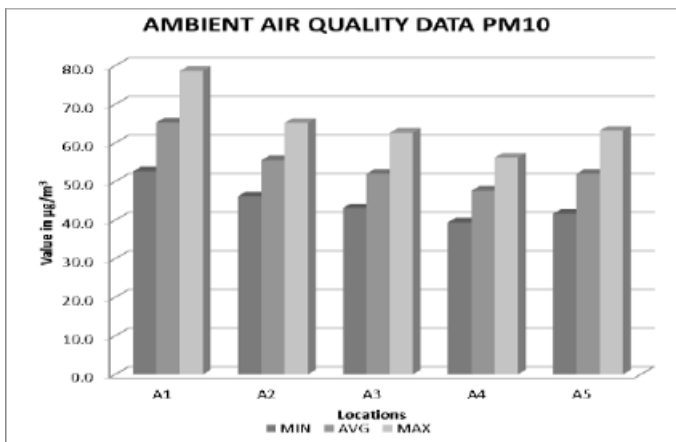
Table 3.12: Ambient Air Quality Data

All Value in $\mu\text{g}/\text{m}^3$

PARAMETERS LOCATIONS	Cat.*	PM ₁₀			PM _{2.5}			SO ₂			NO ₂		
		MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX
A1-Near Mine Lease Area	I	52.6	65.3	78.6	24.4	30.2	36.4	5.4	6.6	7.7	7.1	9.4	11.8
A2-Kagkanam Village	R	46.2	55.5	65.2	20.8	25.4	30.8	4.8	6.0	7.1	6.5	8.7	10.5
A3-Sumangali Village	R	43.1	52.0	62.6	19.8	23.9	28.8	4.7	5.9	6.9	7.1	8.3	9.6
A4-Kunnathur Village	R	39.4	47.6	56.2	17.9	21.9	25.9	4.2	5.4	6.5	5.8	7.0	8.1
A5-Karanthai Village	R	41.6	52.0	63.2	18.7	23.4	28.4	4.9	6.1	7.2	7.4	8.6	10.2
NAAQ Limits		PM₁₀			PM_{2.5}			SO₂			NO₂		
	*	100			60			80			80		
	**	100			60			80			80		

***Note:** Category: * - Industrial, Residential, Rural and other area, ** – Ecologically Sensitive Area (notified by Central Government)

Figure 3.9: Ambient Air Quality Data



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3.3.2.1 Results and Discussion:

The AAQ monitored data for all locations for above parameters are shown in **Table No - 3.12** and in **Figure No - 3.10**. Ambient Air Quality data during the study period is given in **Annexure- 9**. From the table it is seen that, in the ambient air, the PM₁₀ values were in the range of 39.4-78.6 µg/m³. PM_{2.5} values were in the range of 17.9-36.4 µg/m³. SO₂ levels were ranging from 4.2– 7.7 µg/m³. NO₂ levels were ranging from 5.8-11.8 µg/m³.

The existing Ambient Air Quality levels for PM₁₀, PM_{2.5}, SO₂ and NO₂, are within the NAAQ standards prescribed CPCB limits of 100 µg/m³, 60 µg/m³, 80 µg/m³ & 80 µg/m³. The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m³)

3.3.3 WATER ENVIRONMENT:

Assessment of baseline data on water environment includes Identification of water resources, Collection of water samples and Analyzing water samples collected for physico-chemical parameters as per standards. The water sampling was carried out for 5 locations. Details of the same has been provided below:

Table 3.13: Water Quality Monitoring

1.	Monitoring Period		Winter Season (Dec 2022 – Feb 2023)		
2.	Monitoring Location		The location map showing water sampling locations are given in Figure No.3.11.		
	Code	Location	Sample Type	Distance	Direction
	W1	Near Mine Lease Area	Bore Well	-	-
	W2	Kagkanam Village	Borewell	1.0km	SE
	W3	Sumangali Village	Borewell	1.3km	NW
	W4	Kunnathur Village	Borewell	2.0km	SW
	W5	Karanthai Village	Borewell	1.9km	NE
3.	Methodology		Sampling - IS 3025 Part - I		
			Analysis – IS 3025 relevant parts / APHA 23rd Edition		



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Figure 3.10: Location of Water Sampling Stations

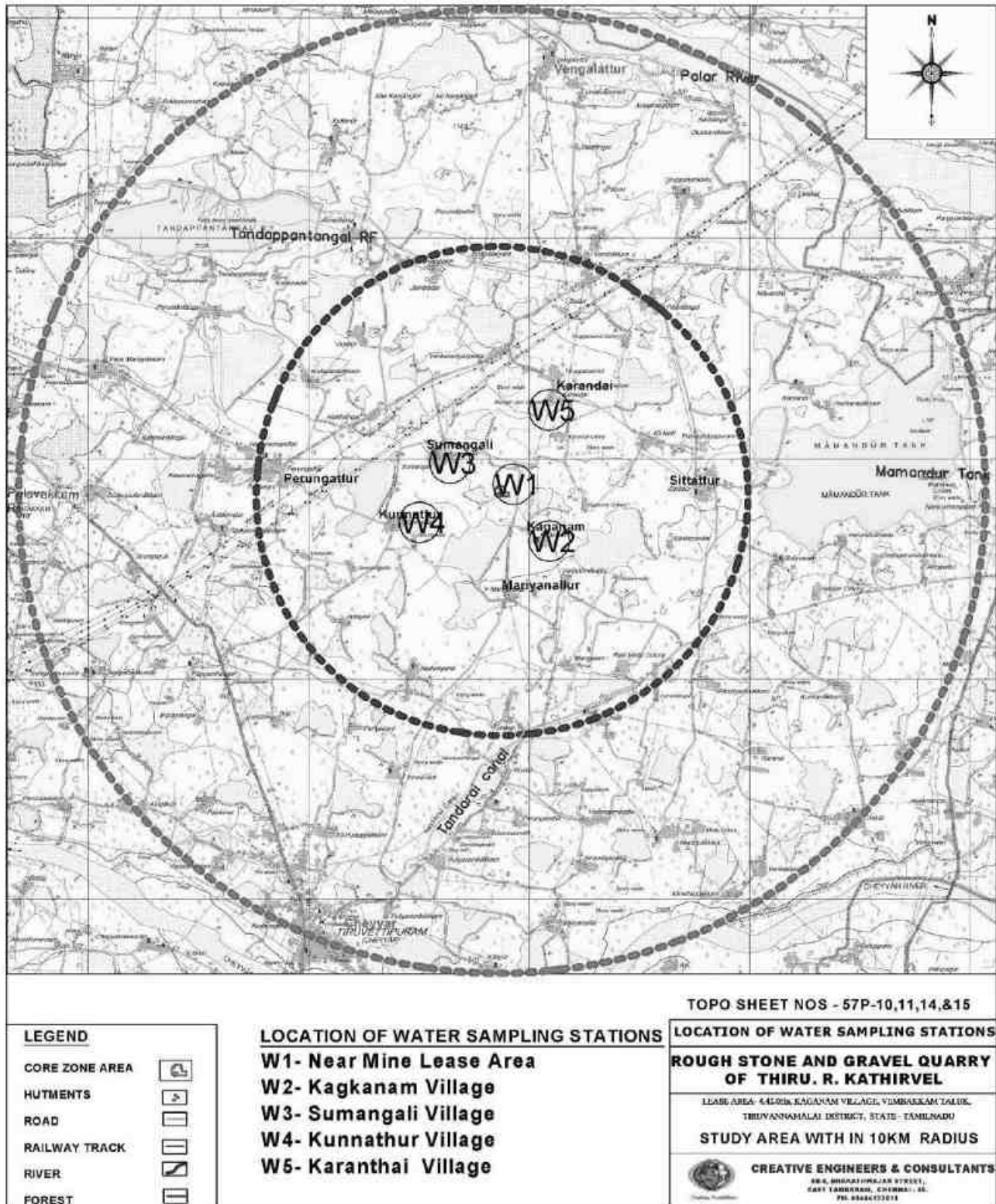


Table 3.14: Summary of Water Quality Data

Season	Dec 2022 – Feb 2023	
Monitoring Locations	5 locations	
Parameters	Range of values	Limits*
pH at 25 °C	7.05 – 7.66	6.5-8.5
Total Dissolved Solids, mg/L	340 – 656	2000
Chloride as Cl-, mg/L	13.7 – 216	1000
Total Hardness (as CaCO ₃), mg/L	184 – 368	600
Total Alkalinity (as CaCO ₃), mg/L	187– 257	600
Sulphates as SO ₄ ²⁻ , mg/L	BDL(D.L - 5.0) – 55.4	400
Iron as Fe, mg/L	BDL(D.L - 0.01)– 0.05	0.3
Nitrate as NO ₃ , mg/L	1.5– 4.65	45
Fluoride as F, mg/L	0.16 – 0.58	1.5

3.3.3.1 Results and Discussion:

The results of the water sample analysis are shown in **Table No - 3.14**. The pH values were ranging in between 7.05 – 7.66 TDS values were in the range of 340 – 656mg/L. Chloride values were ranging from 13.7 – 216mg/L. Iron content was found to be in the range BDL(D.L - 0.01)– 0.05mg/L. The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications. The water quality data is provided in **Annexure-10**.

3.3.4 NOISE ENVIRONMENT:

Opearional phase of this project may lead to increase noise levels from the existing levels at least in and around the project area. As noise level beyond permissible limits will cause adverse impacts on the environment, it has become imperative to assess the noise levels in and around the mine area. Noise level measurements were taken at the 5 locations during the monitoring period. Details of the same are provided below:

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Table 3.15: Noise Level Monitoring

1.	Monitoring Period	Winter Season (Dec 2022 – Feb 2023)		
2.	Monitoring Location	The location map showing noise monitoring locations are given in Figure No.3.12.		
	Code	Location	Distance	Direction
	N1	Near Mine Lease Area	-	-
	N2	Kagkanam Village	1.0km	SE
	N3	Sumangali Village	1.3km	NW
	N4	Kunnathur Village	2.0km	SW
	N5	Karanthai Village	1.9km	NE
3.	Methodology	Noise levels were measured using sound level meter manufactured by (Model No - SL- 4001, Make - Lutron). Sound Pressure Level (SPL) measurements were measured at all locations where ambient air quality monitored; one reading for every hour was taken for 24 hours.		
4.	Monitoring Frequency	Once during monitoring period		



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Figure 3.11: Location of Noise Sampling Stations

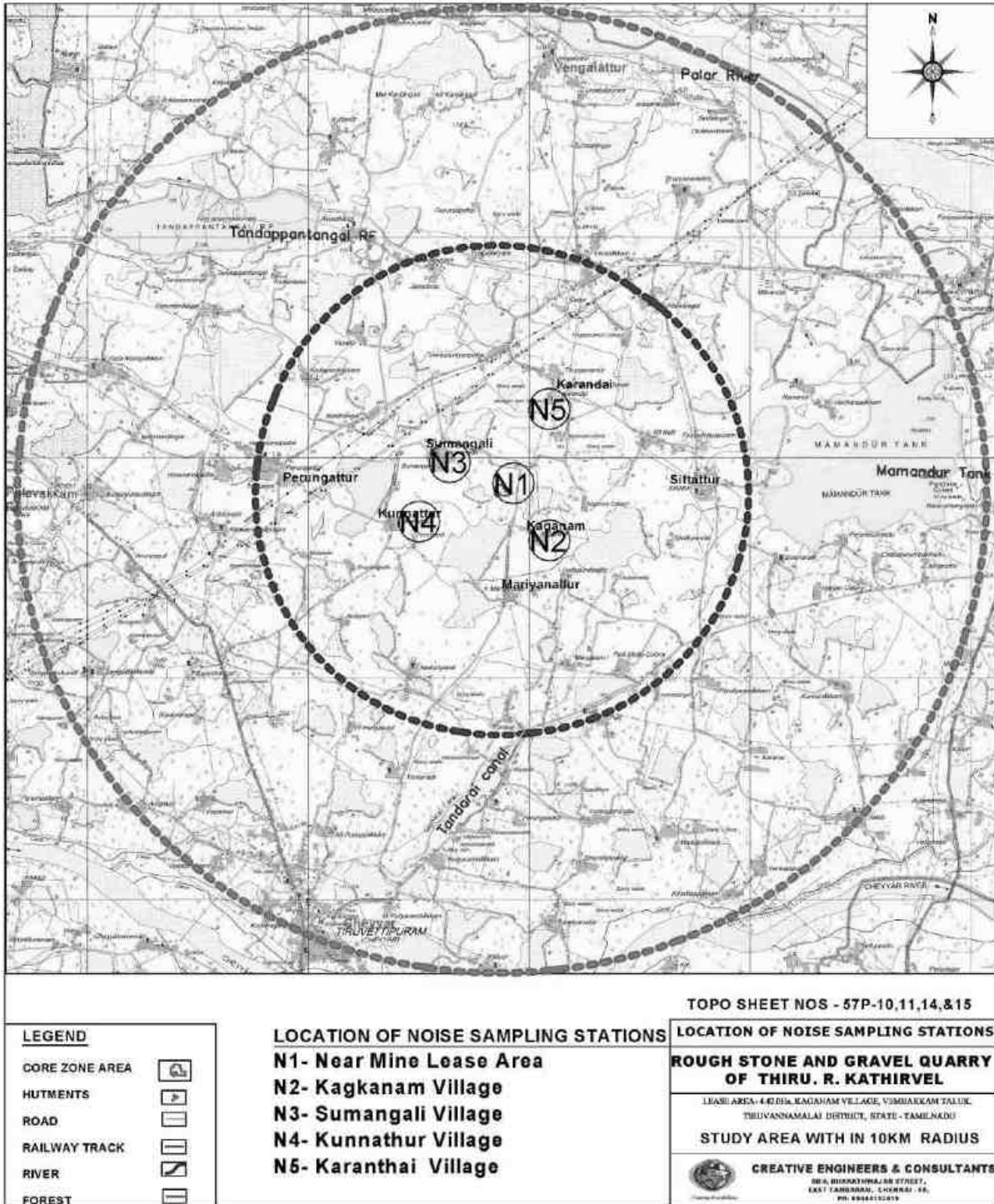
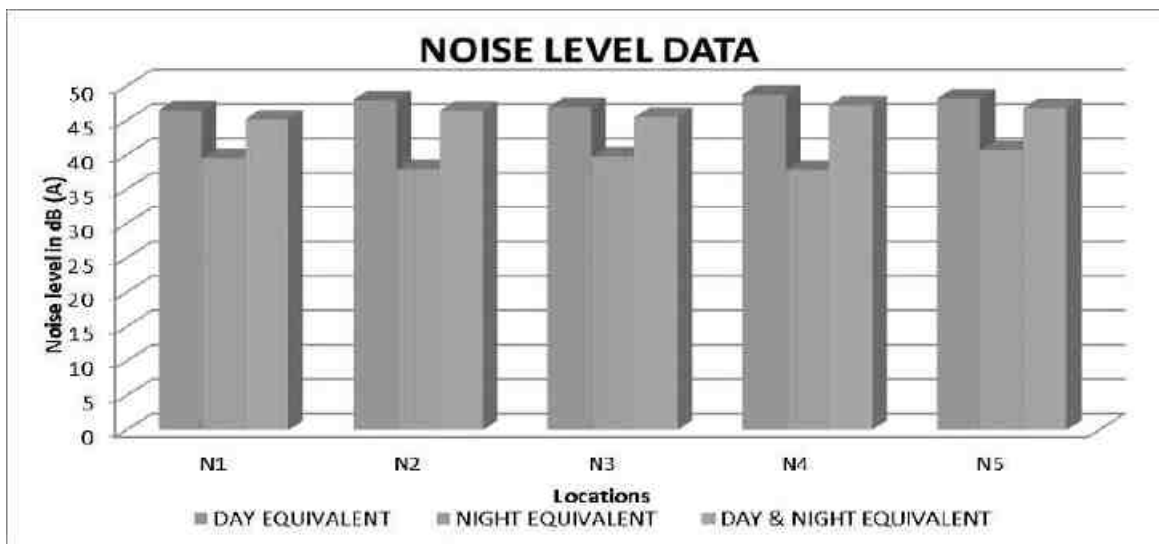


Table 3.16: Ambient Noise Level in dB (A)

Date and time of monitoring	N1	N2	N3	N4	N5
Day Equivalent	46.5	48.0	46.9	48.8	48.2
Night Equivalent	39.6	37.9	39.8	37.8	40.7
Day & Night Equivalent	45.2	46.4	45.5	47.2	46.8
Limits: As per CPCB: Work zone Exposure in 8 hr - 90 dB(A) As per MoEF&CC: Residential: Day equivalent - 55 dB(A); Night equivalent - 45 dB(A)					

Figure 3.12: Noise Level Data



3.3.4.1 Results and Discussion:

The results of noise levels for all locations are given in **Table No-3.15**. The noise values for all above locations are shown in a comparative chart given in **Figure No - 3.13**. In the buffer zone, day Equivalent Noise (Leq-d) noise levels were ranging from 46.5 dB(A) to 48.8 dB(A) and night Equivalent Noise (Leq-d) levels ranged between 37.8 dB(A) to 40.7 dB(A). While comparing with the MOEF&CC Norm of 55 dB(A) for day time and 45 dB(A) for night time, the monitored ambient noise levels were within the limit values for Residential areas.

3.3.5 SOIL CHARACTERISTICS:

Soil samples were collected in 3 locations in the core and buffer zone to analyse the physiochemical characteristics of the soil in the area. Elaborate details of the same has been provided below.

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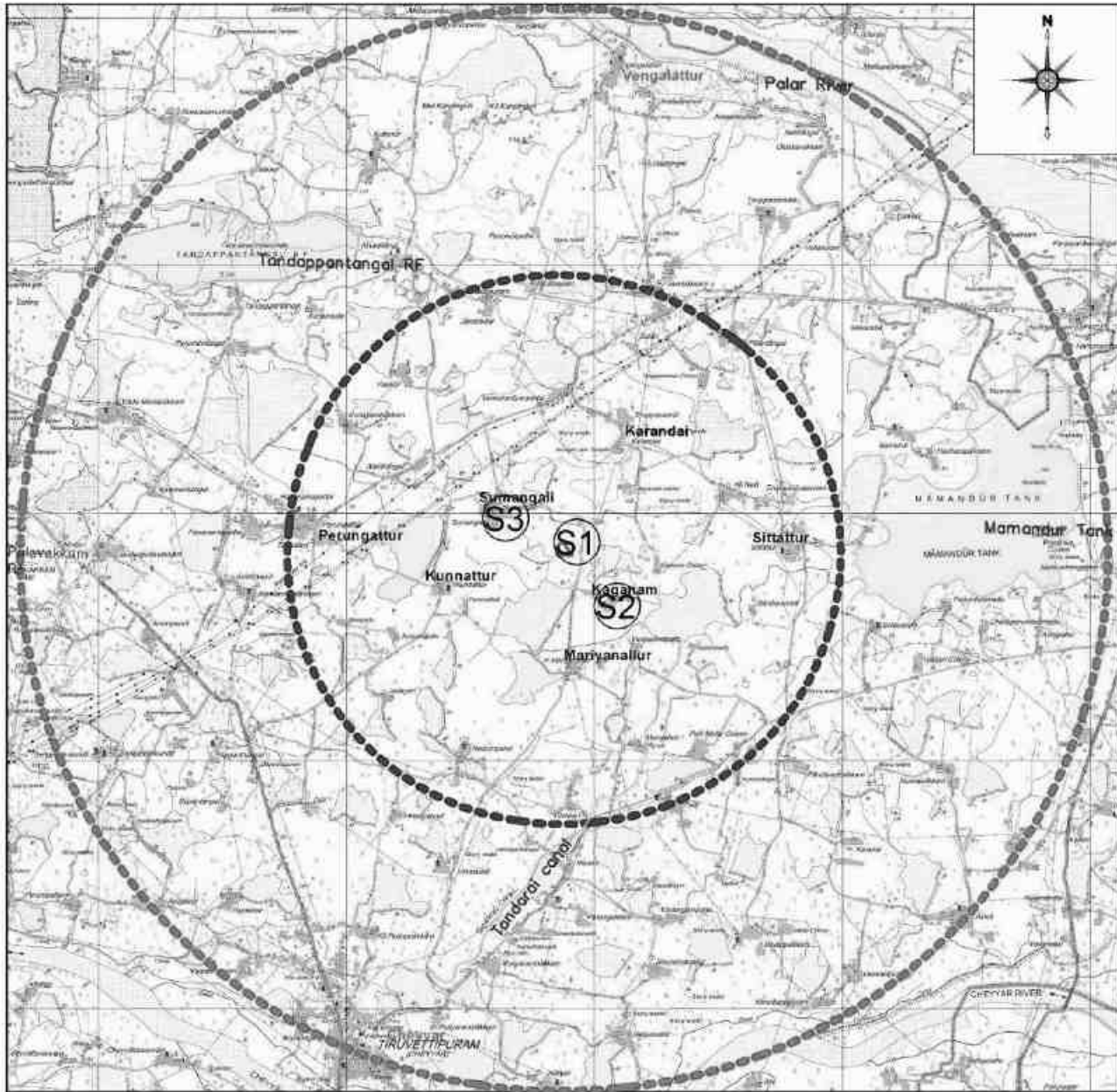
Table 3.17: Soil Quality Monitoring

1.	Monitoring Period	Winter Season (Dec 2022 – Feb 2023)		
2.	Monitoring Location	The location map showing soil sampling locations are given in Figure No.3.14.		
	Code	Location	Distance	Direction
	S1	Near Mine Lease Area	-	-
	S2	Kagkanam Village	1.0km	SE
	S3	Sumangali Village	1.3km	NW
3.	Methodology	Composite soil samples using sampling augers and field capacity apparatus.		
4.	Monitoring Frequency	Once during monitoring period		



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Figure 3.13: Location of Soil Sampling Stations



TOPO SHEET NOS - 57P-10,11,14,&15

NS

LEGEND	
CORE ZONE AREA	
HUTMENTS	
ROAD	
RAILWAY TRACK	
RIVER	
FOREST	

LOCATION OF SOIL SAMPLING STATIONS
S1- Near Mine Lease Area
S2- Kaganam Village
S3- Sumangali Village

LOCATION OF SOIL SAMPLING STATIONS
ROUGH STONE AND GRAVEL QUARRY OF THIRU. R. KATHIRVEL
LEASE AREA- 442.0HA, KAGANAM VILLAGE, VEMBAKKAM TALUK, TIRUVANNAMALAI DISTRICT, STATE- TAMILNADU
STUDY AREA WITH IN 10KM RADIUS
 CREATIVE ENGINEERS & CONSULTANTS 8/1, BHAKTAVATSAL STREET, EAST TIRUPPAPER, CHENNAI - 60. PH- 8548113125



DRAFT EIA/EMP REPORT FOR ROUGH STONE AND GRAVEL QUARRY OF THIRU.R.KATHIRVEL, OVER AN AREA OF 4.42.0HA IN KAGANAM VILLAGE, VEMBAKKAM TALUK, TIRUVANNAMALAI DISTRICT, TAMILNADU.

Table 3.18: Soil Quality Data

S.No	Parameters	Unit	S1	S2	S3
1	pH at 25°C	-	6.96	7.29	7.65
2	Electrical Conductivity	(µmhos/cm)	39.68	78.9	98.54
3	Dry matter content	%	96.54	97.67	94.52
4	Water Content	%	3.46	2.33	5.48
5	Organic Matter	%	0.64	0.89	0.74
6	Soil texture	-	Sandy Clay loam	loam	loam
7	Grain Size Distribution i. Sand	%	54.87	48.97	38.95
8	ii. Silt	%	23.98	32.64	45.74
9	iii. Clay	%	21.15	18.39	15.31
10	Phosphorous	µg/g	1.56	1.78	2.65
11	Sodium	mg/kg	492	428	480
12	Potassium	mg/kg	354	320	362
13	Total Nitrogen	mg/kg	55.6	132	165
14	Total Sulphur	%	BDL(D.L - 0.02)	BDL(D.L - 0.02)	BDL(D.L - 0.02)

3.3.5.1 Results and Discussion:

Results of the soil samples show that the pH values were ranging between 6.96 to 7.65 and Electrical Conductivity values were ranging between 39.68 – 98.54 µmhos/cm. Soils are generally sandy clay loam type. Organic matter values were ranging between 0.64 – 0.89 %.

Total Nitrogen values were ranging between 55.6 - 165 mg/kg. Phosphorus values were ranging between 1.56 – 2.65 µg/g. Potassium values were ranging between 320 -362 mg/kg. Sodium values were ranging between 428- 492 mg/kg. Total Sulphur values were observed to be BDL. The soil quality data for the 3 samples collected and analyzed are provided in **Table No – 3.18.**

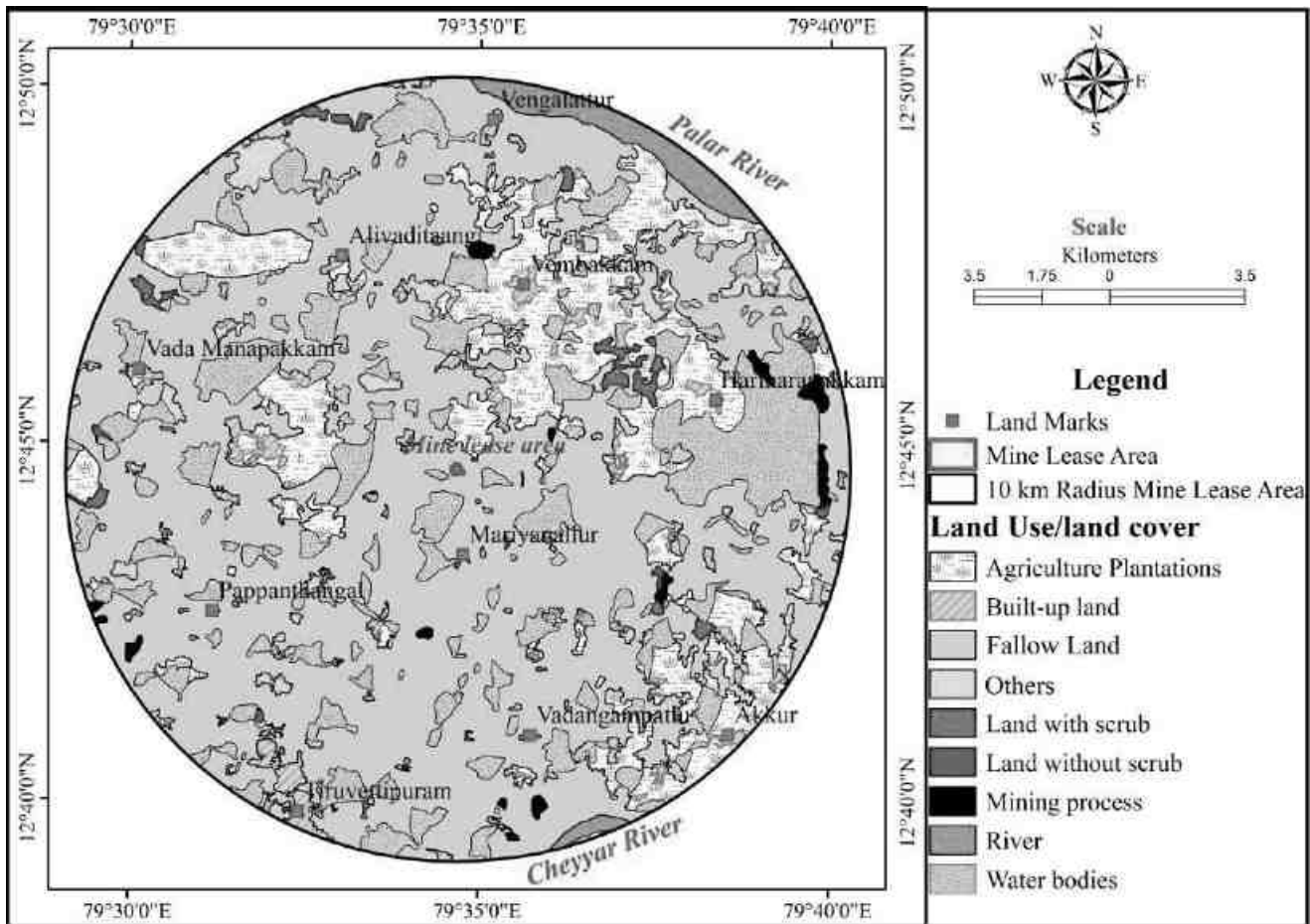
3.4 LAND ENVIRONMENT - LANDUSE & LAND COVER

For preparing an impact statement, aspects of the land conditions are covered under land use. An industrial project / mine can cause changes in land use, soil process in different intensities depending upon the size of the project and distance involved between the industries and the area. Here, land use status for a radius of 10 km has been studied.



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Figure 3.14: Map Showing Land Use Categories around 10km Buffer



Major part of the lease area is fallow land followed by land with scrub, water bodies, mining areas, river and builtup area.

3.4.1 LAND USED BASED ON REVENUE RECORDS:

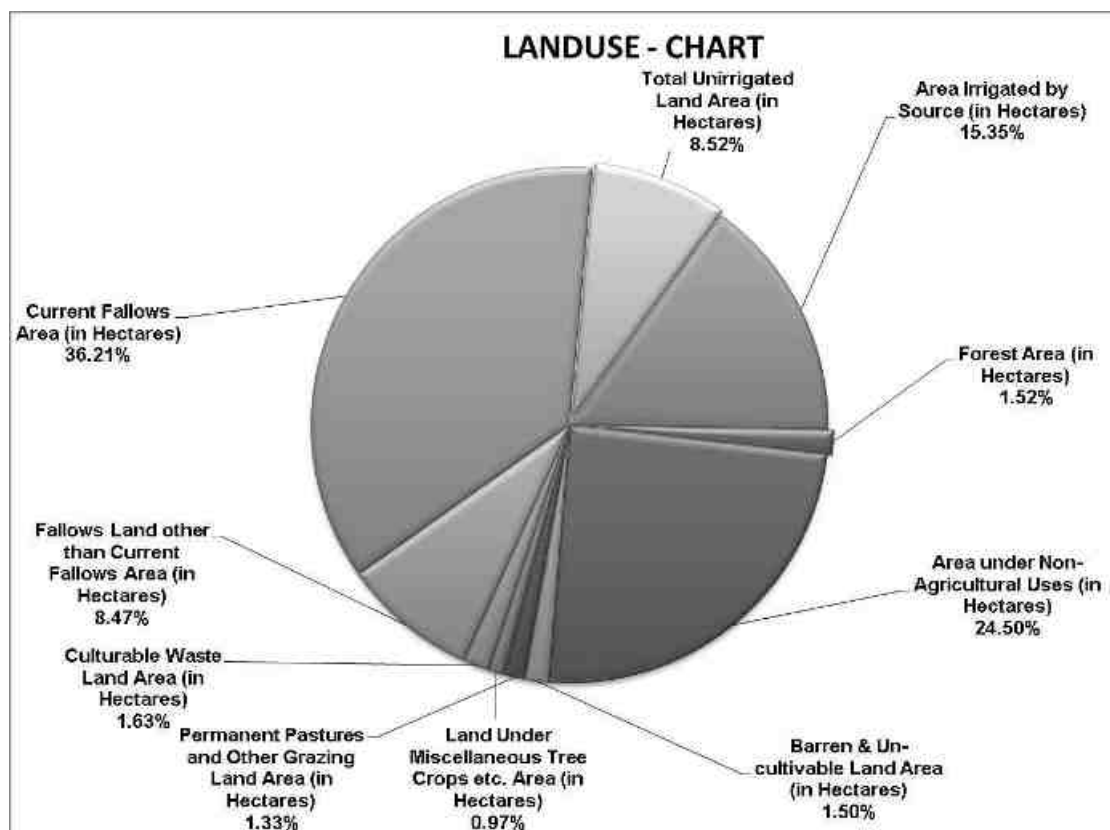
The lease area falls in Kaganam village, vembakkam Taluk, Tiruvannamalai District, Tamil Nadu state and the study area for the land use pattern (10 km radius) has been divided into four zones viz. Zone-I (0-2 km), Zone-II (2-5 km), Zone-III (5-10 km) and Zone-IV (0-10 km) respectively. The land use pattern of the study area falling within 10 km radius around the proposed project area is presented in Table no - 3.21. Village wise land use pattern is provided in **Annexure-11**.

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Table 3.19: Land Use Pattern of the Study Area Falling Within 10 Km Area in (Ha)

Study Area	Total Geographical Area	Forest Area	Area under Non-Agricultural Uses	Barren & Un-cultivable Land Area	Permanent Pastures and Other Grazing Land Area	Land Under Miscellaneous Tree Crops etc. Area	Culturable Waste Land Area	Fallows Land other than Current Fallows Area	Current Fallows Area	Total Un irrigated Land Area	Area Irrigated by Source
0- 2 KM	1275.34	0	378.47	0.4	1.68	5.69	30.94	100.77	536.63	62.6	158.16
2 - 5 KM	7815.89	0	1721.81	64.58	46.88	36.18	183.95	704.91	3205.88	724.16	1127.54
5-10 KM	21755.04	469.58	5456.11	396.68	362.99	257.71	288.03	1805.63	7428.02	1839.92	3450.37
0-10 KM	30846.27	469.58	7556.39	461.66	411.55	299.58	502.92	2611.31	11170.53	2626.68	4736.07

Figure 3.15: Landuse within the Buffer Zone Area



3.5 BIOLOGICAL ENVIRONMENT:

Study of the biological environment of any area comprises of well-planned ecological survey for the floristic and faunal composition of the areas through various scientifically planned techniques. Accordingly the ecological survey for the proposed quarry area including core and buffer zone were carried out to identify various species occurring in the area.

3.5.1 FLORA:

An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. The objective of the survey is as follows:

- ❖ Generate existing data from field observations of various terrestrial floristic occurrences.
- ❖ Collect secondary data from Government records as well as through discussion with Forest officials, knowledgeable public etc.,
- ❖ Compare the data with authentic past records to identify changes, if any.
- ❖ Identify the impact of project operations on the biological aspects.

To accomplish the above objectives, a general ecological survey covering an area of 10 km radius was conducted. The locations were identified for phyto-sociological aspects to assess the current status.

3.5.1.1 Sampling Methodology:

In order to provide representative ecological status for the study area, the 10-km radius buffer area has been divided into four quartiles for biodiversity sampling, i.e., NE (Q-1), NW (Q-2) SW (Q-3) and SE (Q-4). Each of the quartiles have been examined for representative flora on randomly sampled quadrats for trees (10x10 m), shrubs (5x5 m) and herbs (1x1 m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

Phyto-sociological Survey: Phyto-sociological parameters, viz., Abundance (i.e., density), average and minimum stems were measured to determine the distribution and ecological aspects of the species. Abundance is a measure of the density of distribution of an individual species within a given area. It is calculated by summed individuals of a species. Average species number is calculated for all quadrates; similarly, minimum number of individuals

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represented is recorded at quadrats level. A total of 10 quadrats were laid down in core area and a total of 20 quadrats were laid out in four quartiles (5 each) of buffer area.

Quadrats method for flora : Quadrats of 10 × 10m were laid down randomly within core and 10kms buffer area; each quadrat was laid to assess the trees (>5 cm GBH) and 5 × 5 m sub-quadrat nested within the quadrat for shrubs and two plot 1 × 1 m for herbs . The quadrats were laid at a minimum distance of a kilometer apart to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, natural forest area, avenue plantations, house backyards, etc. In each sample quadrat, individuals belonging to tree, shrub and herb species were recorded separately, and have been identified on the field. The prevailing land use and habitat quality has been noted down for each location on the field.

Vegetation Analysis using index: Species diversity will be calculated by using Shannon and Wiener (1963) formula as follows:

$$H' = - \sum_{i=1}^R p_i \ln p_i$$

Whereas,

H' is Shannon index of general diversity,

p_i is often the proportion of individuals belonging to the i th species in the dataset of interest.

Evenness index was calculated as: $E = H'/H_{max}$,

Whereas $H_{max} = \log_2$ (number of species in the plot)

A.CORE ZONE:

The lease area is a non-forest, private land. Major part of lease area is barren fallow land with few bushes. The detailed list of plants found in the core zone are given in Table no – 3.24.

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Table 3.20: List of Floristic Species in the Core Zone

Sl.No	Species Name	Common Name	Family
Trees			
1	Prosopis juliflora	Cimaikkaruvel	Fabaceae
2	Borassus flabellifer	Panaimaram	Areaceae
3	Azadirachta indica	Vembu	Meliaceae
Shrubs			
1	Cassia auriculata	Fabaceae	Aavarampoo
2	Lantana camara	Verbenaceae	Nuni
3	Calotropis gigantea	Apocynaceae	Earukku
Herbs			
1	Achyranthes aspera	Amaranthaceae	Nayuruvi
2	Anisomeles indica	Lamiaceae	Marutti
Grasses			
1	Cyperus rotundus	Cyperaceae	Korai pullu

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C.BUFFER ZONE:

The Dominated species are Prosopis juliflora, Acacia auriculiformis, Acacia nilotica, Albizia lebeck, Azadirachta indica, Borassus flabellifer, Acacia leucophloea etc. The detailed list of plants found in the Bufferzone is given in Table no – 3.25.

Table 3.21: List of Floristic Species in the Buffer Zone

SI.No	Species Name	Family	Local Name
Trees			
1	Cassia fistula	Fabaceae	Konrai
2	Caesalpinia pulcherrima	Fabaceae	Mayilkondrai
3	Mangifera indica	Anacardiaceae	Maamaram
4	Polyalthia longifolia	Annonaceae	Nettilingam
5	Borassus flabellifer	Arecaceae	Panna-maram
6	Cocus nucifera	Arecaceae	Tennai
7	Odaina wodiari L.	Fabaceae	Othiyar
8	Citrus limon	Rutaceae	Lemon
9	Pithecellobium dulce	Mimosaceae	kodukkappuli
10	Thespesia populnea	Malvaceae	Puvarasu
11	Aegle marmelos	Rutaceae	Vilvam
12	Butea monosperma	Fabaceae	Palasu
13	Acacia nilotica	Fabaceae	Karuvelan
14	Pongamia pinnata	Fabaceae	Pungai
15	Samanea saman	Fabaceae	Amaivagai
16	Ficus religiosa	Moraceae	Poarasamaram
17	Saraca asoca	Caesalpiniaceae	Asogam
18	Delonix regia	Cesalpiniaceae	Flame of Forest
19	Prosopis juliflora	Fabaceae	Seemai karuvel
20	Morinda tinctoria	Rubiaceae	Nuna
21	Annona squamosa	Annonaceae	Sithapalzhama
22	Syzygium cumuni	Myrtaceae	Naval
23	Casuarina equisetifolia	Casuarinaceae	Savukku
24	Acacia leucophloea	Fabaceae	Valvelam
25	Artocarpus integrifolia	Moraceae	Pala maram
26	Carica papaya	Caricaceae	Pappali
27	Bauhinia purpurea	Caesalpiniaceae	Mantharai
28	Albizia amara	Fabaceae	Vagai
29	Peltophorum pterocarpum	Fabaceae	Kilukiluppai
30	Madhuca longifolia	Sapotaceae	Iluppai
31	Ficus benghalensis	Moraceae	Aalamaram
32	Murriya koengii	Rutaceae	Kariveppilai
33	Azadirachta indica	Meliaceae	Vembu
34	Acacia auriculiformis	Fabaceae	Pencil tree
35	Areca catechu	Arecaceae	Pakku maram
36	Psidium guava	Myrtaceae	Koyya
37	Tectona grandis	Verbenaceae	Tekku

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38	Acras sapota L.	Sapotaceae	Sapota
39	Tamarindus indica	Fabaceae	Puli
40	Phyllanthus emblica	Euphorbiaceae	Nelli
41	Musa paradisiaca	Musaceae	Valzhlai
42	Phoenix sylvestris	Arecaceae	Eeachamaram
Shrubs			
1	Justicia adhatoda	Acanthaceae	Adathoda
2	Jatropha glandulifera	Euphorbiaceae	Vellaikattukottai
3	Jatropha gossypiifolia	Euphorbiaceae	Vellaikattukottai
4	Tecoma stans	Bignoniaceae	Yellow trumpetbush
5	Ricinus communis	Euphorbiaceae	Amanakku
6	Hibiscus rosa-sinensis	Malvaceae	Semparuthi
7	Canthium parviflorum	Rubiaceae	Karaicceti
8	Lawsonia inermis	Lythraceae	Henna
9	Cassia auriculata	Fabaceae	Aavarampoo
10	Lantana camara	Verbenaceae	Putus
11	Ocimum sanctarum	Amaranthaceae	Thulasi
12	Dodonea viscosa	Sapindaceae	Virali
13	Calotropis gigantea	Apocynaceae	Earukku
14	Ziziphus jujuba	Rhamnaceae	Elanthai
Herbs			
1	Sida acuta	Malvaceae	Palambasi
2	Parthenium hysterophorus	Asteraceae	Parthenium
3	Alternanthera sesilis	Amaranthaceae	Joy weed
4	Cleome viscosa	Amaranthaceae	Ajagandha
5	Anisomeles malabarica	Lamiaceae	Peyimarutti
6	Aloe vera	Asphodelaceae	Chotthu kathalai
7	Ocimum tenuiflorum	Lamiaceae	Thulasi
8	Cleome viscosa	Cleomaceae	Naai velay
9	Tridax procumbens	Asteraceae	Vettukai poondu
10	Phyllanthus niruri	Phyllanthaceae	Keelzhaneeli
11	Argemone mexicana	Papaveraceae	Mexican poppy
12	Leucas aspera	Lamiaceae	Thumbai
13	Andrographis echiodes	Acanthaceae	Gopuram tangi
14	Achyranthes aspera	Amaranthaceae	Nayuruvi
15	Acalypha indica	Amaranthaceae	Kupaimeni keeri
16	Solanum xanthocarpum	Solanaceae	Kandangkattari
17	Cassia tora L.	Caesalpiniaceae	Thagarai
18	Tephrosia purpuria	Fabaceae	Poondu sedi

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Climber			
1	Cissus quadrangularis	Vitaceae	Pirandai
2	Coccinia indica	Cucubitaceae	Kovai
3	Asparagus racemosus	Asparagaceae	Tannir-vittan
Agricultures Crops			
1	Musa paradisiaca	Musaceae	Valzhai
2	Sesbania grandiflora	Fabaceae	Agati
3	Gossypium hirsutum	Malvaceae	Paruththi
Grasses			
1	Kyllinga nemoralis	Cyperaceae	Velutta nirbasi
2	Cyperus rotundus	Cyperaceae	korai pullu
3	Cynodon dactylon	Poaceae	Arugampillu

3.5.2 FAUNA:

3.5.3

Methodology: Both direct and indirect observation methods were used to survey the fauna. Point Survey Method was used to study the Bird diversity. Besides, discussion with local villagers Collection secondary data from Government records, published reports as well as through discussion with Forest officials, knowledgeable public were used for the study.

Observation: There is no Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals are commonly found. The lease and 10 Km buffer zone does not fall in the Western Ghats ESA boundary. No wild mammalian species was directly sighted during the field survey. There is no Schedule I animals in the buffer zone area. The list of fauna within the study area is given in Table No – 3.26.

Table 3.22: List of Fauna in the Buffer Zone

S.No	Common Name	Scientific name	IWPA, Schedule
Mammals			
1	Indian Grey Mongoose	Herpestes edwardsii	II
2	Indian Palm squirrel	Funambus palmarum	IV
Birds			
1	Rose-ringed Parakeet	Psittacula krameri	IV
2	Common Myna	Acridotheres tristis	IV
3	Common Kingfisher	Alcedo atthis	IV
4	Red-vented Bulbul	Pycnonotus cafer	IV
5	Purple-rumped Sunbird	Nectarinia zeylonica	IV
6	Black Drongo	Dicrurus macrocercus	IV
7	Spotted Dove	Streptopelia chinensis	IV
8	Common Crow	Corvus splendens	V



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S.No	Common Name	Scientific name	IWPA, Schedule
9	Indian Cuckoo	Cuculus micropterus	IV
Reptiles			
1	Rat Snake	Ptyas mucosa	II
Amphibians			
1	Common Indian toad	Bufo melanostictus	IV
Butterfly			
1	Common crow	Euploea core	IV

3.6 HYDROGEOLOGICAL STUDY:

This section delves into the study of the hydrogeological scenario of the study area to evaluate the impact of mining activities on the nearby areas. The study area is considered to understand the nature of the general hydrogeological conditions of the area.

3.6.1 PHYSIOGRAPHY AND DRAINAGE:

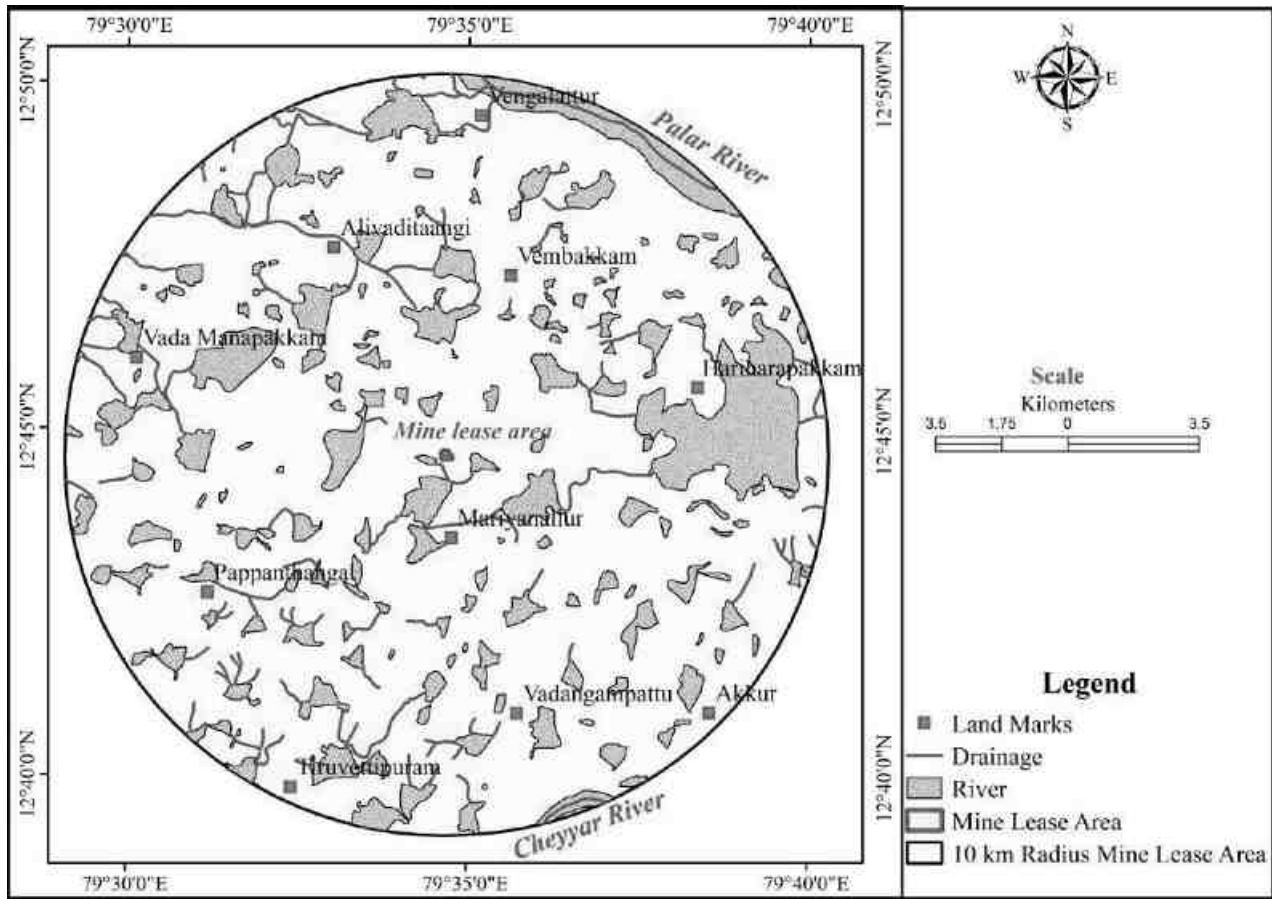
Physiography: The area is a gentle plain terrain with a topography sloping towards seast direction. The land is dry with scarce vegetation.

Drainage: There is an odai adjacent to the lease area on the western side. 50m safety distance is left for the same. Besides, there is also an odai at a distance of 250m (E) and 400m (E). Other water bodies in the area are Nedunkulam Odai – 3.5km-(SW), Kayalkudi River -2.4km (SW), Marugal odai - 7.6km-(SW).Further elaborate details of the same has been provided under section 4.3.3C, Chapter-IV. The drainage map prepared from the survey of India topographic maps shows the presence of few streams running in a dendritic pattern



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Figure 3.16: Drainage Map



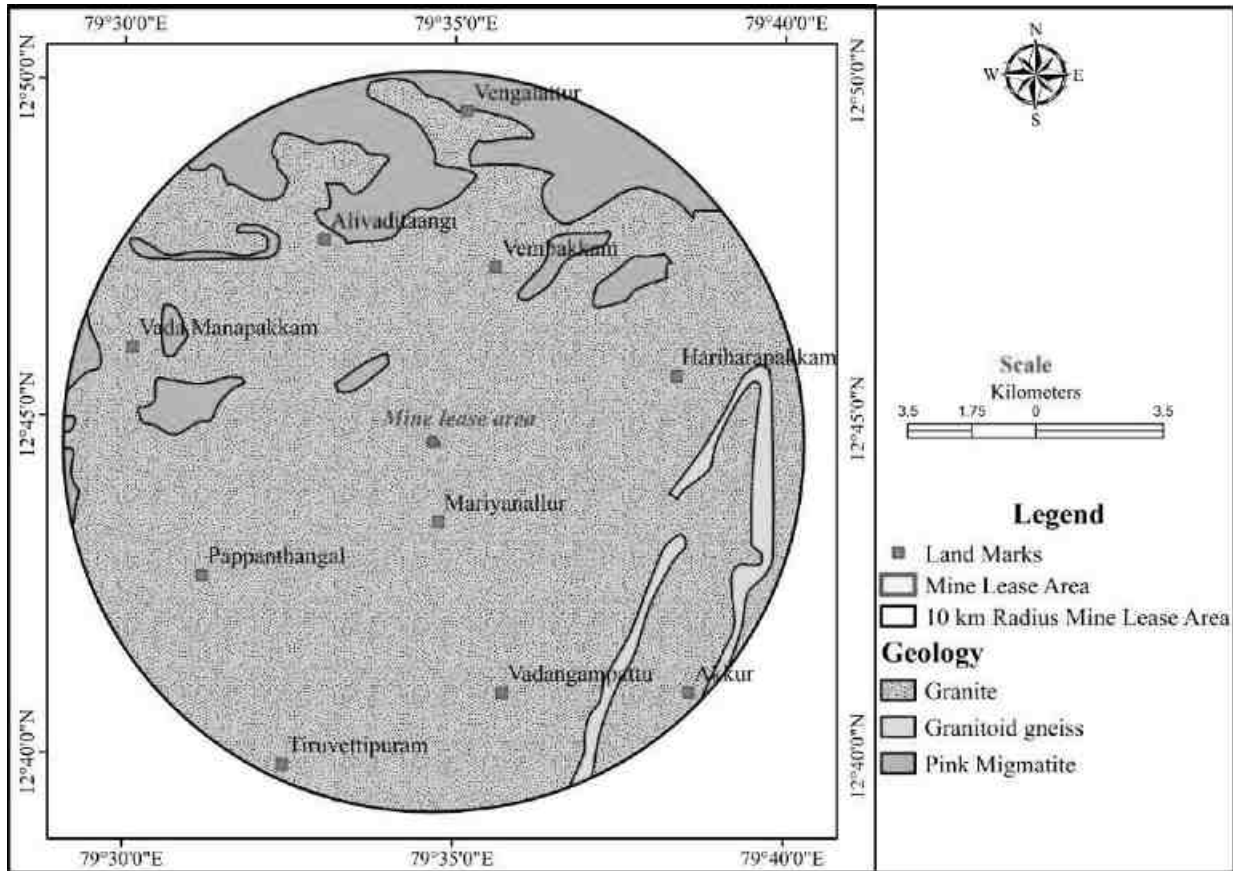
3.6.2 GEOLOGY AND GEOMORPHOLOGY

Geology: The type of rock formation in the study area is composed of Granite, Granitoid gneiss and Pink Magmatite. The lease area falls under Granite category. The geological map is provided below in Figure No.3.22.



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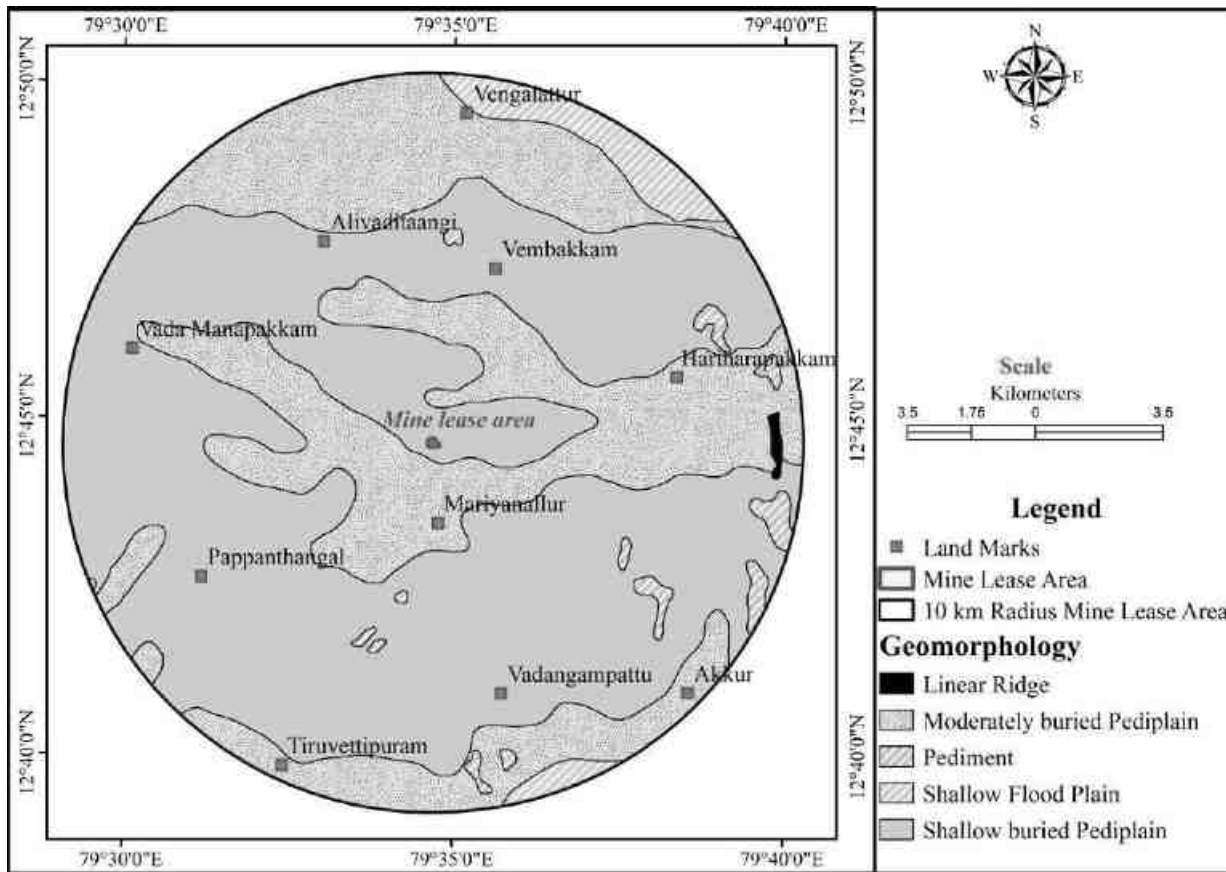
Figure 3.17: Geology Map



Geomorphology: The geomorphology map of the study derived from the satellite imagery using remote sensing and GIS technique. Predominantly the buffer zone is dominated by shallow buried pediplain, moderately buried pediplain, pediment and shallow flood plain. The lease area falls under shallow buried pediplain category.

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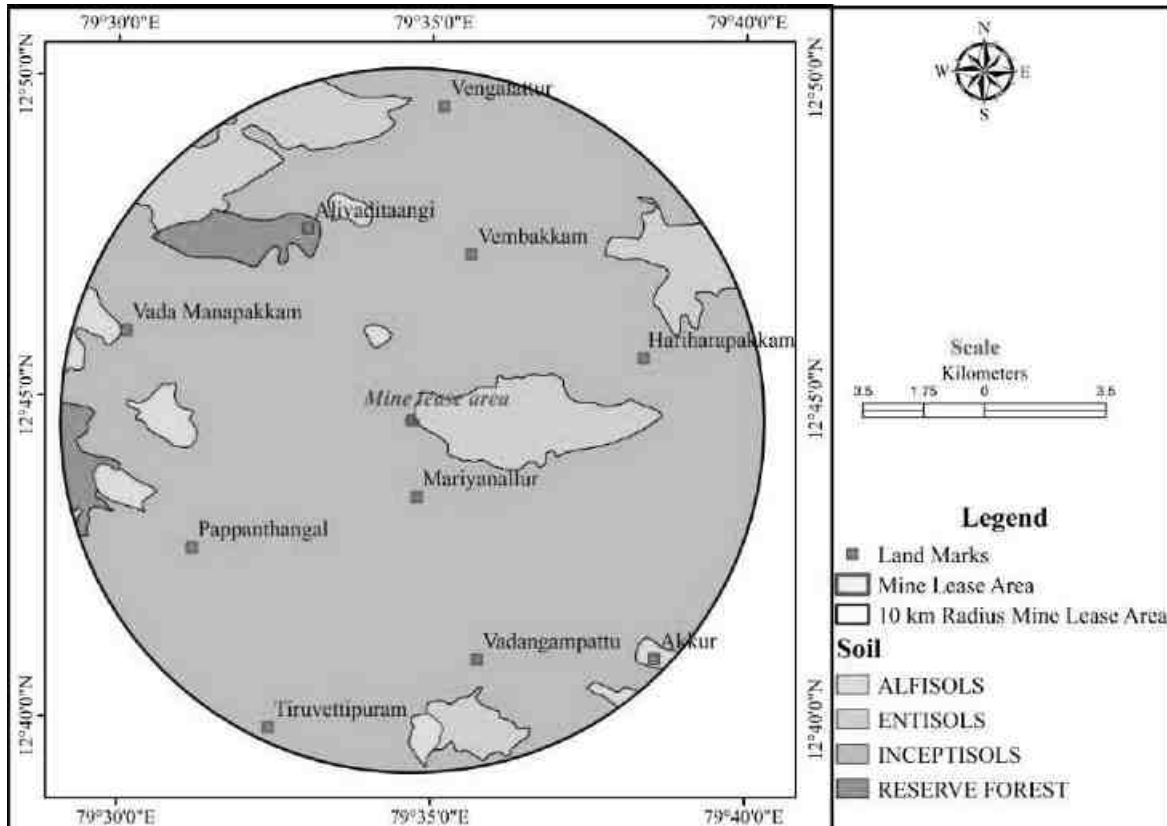
Figure 3.18: Geomorphology Map



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Soil: The study area is characterized by Vertisols, Alfisols, Entisols and Inceptisol. The lease area falls under the category of Alfisols. The soil map is provided in Figure No.3.25.

Figure 3.19: Soil Map



3.6.3 WATER TABLE OF THE AREA:

Based on the depth to water level data obtained from the India-WRIS, Department of Water Resources, Ministry of Jal Shakti for Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu the following is observed.

Table 3.23: General Trend of Depth to Water Level

Year	Depth to Water Level (m bgl)		Wells Monitored	
	Pre-Monsoon	Post-Monsoon	Pre-Monsoon	Post-Monsoon
2015	5.6	0.32	1	1
2016	2.32	2.28	1	1
2017	4.24	-	1	-
2018	4.64	-	1	-
2019	7.24	1.64	1	1
2020	-	1.59		1

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DISTRICT, TAMILNADU.**

Well Inventory Data:

In the study area, wells and borewells were studied which indicate that shallow aquifer is developed through dug wells and deeper aquifer through tube wells. The groundwater has revealed that potential fractures are encountered at deeper levels. Rain water collected in the tanks in the region acts as a good source of water during post monsoon. The water in the wells are available mainly after post monsoon and it reduces during summer.

The occurrence of groundwater mainly in the porous soil are weathered layers, very negligible amount of groundwater percolated through the poorly fractured layer, after that there is no existence of groundwater. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected. From the nearby working mines, no such seepage is also observed.

* * * * *



CHAPTER - IV

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

CHAPTER 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 GENERAL

In this project Semi – Mechanized Open Cast mining will be carried out to quarry out Rough Stone, Gravel and Earth. The identified impacts due to this mine during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc., and the details of the same are elaborated in this chapter. Impact assessment has been carried out for the peak production.

4.2 AIR ENVIRONMENT:

4.2.1 IMPACTS DUE TO PROJECT OPERATION:

The existing ambient air quality in the area has been described in Chapter-III. The proposed mining and allied operations may cause deterioration of air quality due to pollution arising from the project operation if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be:

- ❖ Excavation of material.
- ❖ Movement of HEMM such as Excavators, tippers etc.
- ❖ Loading and unloading operation
- ❖ Transportation

Besides, Gas emission will occur as a result of operation of diesel driven mining equipment, compressors, transporting vehicles, etc.

Particulate matter smaller than 10 microns, referred to as PM₁₀, can settle in the bronchi and lungs and cause health problems like Bronchitis, Emphysema, Bronchial Asthma, Irritation of mucus membranes of eyes, etc. Particles smaller than 2.5 micrometers (PM_{2.5}), tend to penetrate into the lungs and very small particles (<100 nanometers) may pass through the lungs to affect other organs.

Besides the above mentioned fugitive dust emissions, atmospheric pollution can occur as a result of emission of SO₂, NO_x, CO etc., from diesel driven mining equipment, generator sets, etc. Larger suspended particles are generally filtered in the nose and throat and do not cause



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problems. Higher concentration of SO₂, NO_x, CO may cause some health effect on the human beings exposed to it. In case of this mine, the following measures will be adopted to control impact on the air quality due to mining operations in the lease area:

Table 4.1: Impact and Mitigation Measures – Air Environment

S.No	Activity	Consequence	Mitigation Measures
1	Drilling	Dust Emanation	Usage of Drill bits in good condition
			Covering of drill holes with wet cloth
			Usage of sharp drill bits for drilling of holes.
			Provision of dust filters / mask to workers working at highly dust prone and affected areas.
2	Blasting	Instantaneous dust emanation	Well-designed blasting parameter, effective stemming to achieve optimum breakage occurs without generating fines.
			Use of appropriate explosives for blasting and avoiding overcharging of blast holes.
			Avoiding blasting during high wind periods where the fine dust is carried out away easily affecting the ambient air quality.
			Use of controlled blasting techniques with Nonel to keep the dust generation, noise as well as vibration level within the prescribed limits.
3	Excavation and Loading	Dust emanation, Gaseous Emission	HEMM will be operated as per the manufacturer's guidelines
			Enclosures for operator cabin.
			Imparting sufficient training to operators on safety and environmental parameters.
			Proper maintenance of hauling equipments.
			Avoiding overloading of dumpers.
4	Transportation	Dust emanation, Gaseous Emission	Regular wetting of transport road using mobile water tanker.
			Proper maintenance of haul road and other roads
			Setting up of tyre wash facility in the transport road.
			Avoiding overloading of tippers
			Covering of loaded tippers with tarpaulins during transportation
			Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
5	Others	Dust emanation, Gaseous Emission	Development of greenbelt / barriers around mine in the safety zone and carrying out plantation within the lease area.
			Green netting will be carried out around the lease periphery on all sides.



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Due to adoption of all these measures, no major impact on air quality is envisaged due to this proposed opencast mining operation.

Considering that the quantum of production is less, only 1 excavator, 5 tippers will be engaged. These equipments will be properly and regularly maintained. Besides, as mentioned earlier, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 2250 number of plants will be planted in and around the lease area.

The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. Details of the modeling study / estimation including the modeling technique and post project air quality values are elaborated in the following paras.

4.2.2 AIR QUALITY IMPACT PREDICTION:

The model simulations are done for the air pollutant arising from the mining operations, namely, PM₁₀, PM_{2.5}. **Ground Level Concentration** (GLC) have been computed using hourly meteorological data.

Table 4.2: Emission Sources

ACTIVITY	SOURCE TYPE
A. Mining operations	Open pit
B. Transportation	Line

4.2.2.1 Emission Factors

Quantification of particulate emissions has been carried out by the emission factor technique. Emission factor is a statistical average of the rate at which a pollutant is released during an activity. This factor when multiplied by the level of that activity in a given situation will give the overall effect. Fugitive emissions have been predicted by using standard equations given and suggested by AP-42, USEPA(1998), Coal S&T Project and for mining & allied activities and other factors. The modeling is done for the peak production to know the worst scenario. The details of the emission factors used for the same is provided below:



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Table 4.3: Emission Factors

S.No	Activity	PM10	PM2.5	Unit
1	Ore Loading	1.5×10^{-3}	2.1×10^{-4}	Kg/T
2	OB Loading	1.4×10^{-4}	1.5×10^{-5}	Kg/T
3	Hauling inside lease area	0.19	0.019	g/VKT
4	Drilling	0.1	0.04	Kg/hole

4.2.2.2 Emission Rates:

Based on the emission factors, after adopting necessary control measures like dust suppression, Proper maintenance of HEMM, using better quality diesel, using latest equipment, proper maintenance of roads, etc. the expected emission rate due to various operations in this project is calculated and is given below:

Table 4.4: Emission Rate

ACTIVITIES/POLLUTANTS	PM ₁₀ (g/sec)	PM _{2.5} (g/sec)
Ore Loading	0.05	0.01
Drilling	0.23	0.09
Hauling inside lease area	0.23	0.03
Total	0.51	0.13

A. Emission Source Coordinates: The center of mine was assumed (0, 0) in the mathematical modeling.

B. Meteorological Conditions Used In Predictions: The hourly meteorological data has been generated for monitoring season and the same has been used in the predictions.

4.2.2.3 Results and Discussions

The results of the Peak GLC's for various environmental parameters with control measures are given below:

Table 4.5: Peak Incremental Concentration

S.No	Parameters	Peak incremental concentration $\mu\text{g}/\text{m}^3$
1	PM ₁₀	5.87
2	PM _{2.5}	2.36

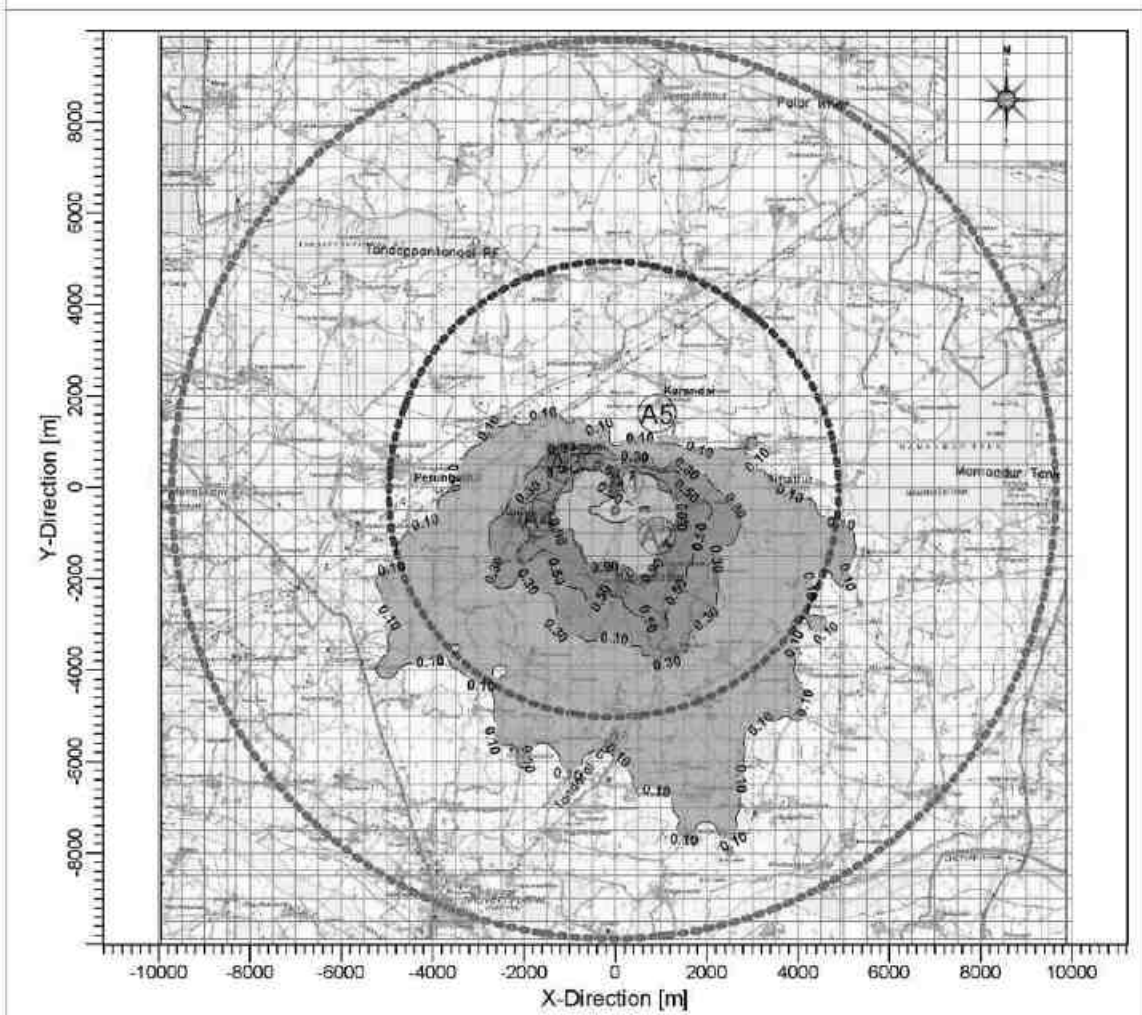
It is observed that the peak incremental concentration for PM₁₀, PM_{2.5} occurring very near the source. At away from the source the values are getting reduced due to dispersion effects. The Isopleths of PM₁₀, PM_{2.5} concentrations for with control measures scenario have also been drawn and these are given in **Figure No.4.1 and 4.2**. The incremental and predicted concentrations at the locations of ambient air quality have been discussed in the following section.



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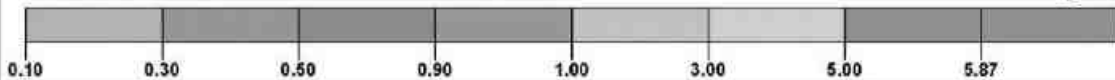
PROJECT TITLE:
kathirvelu- MODEL- PM10

Figure 4.1: Isopleth of GLC Prediction for PM₁₀



PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL

ug/m³



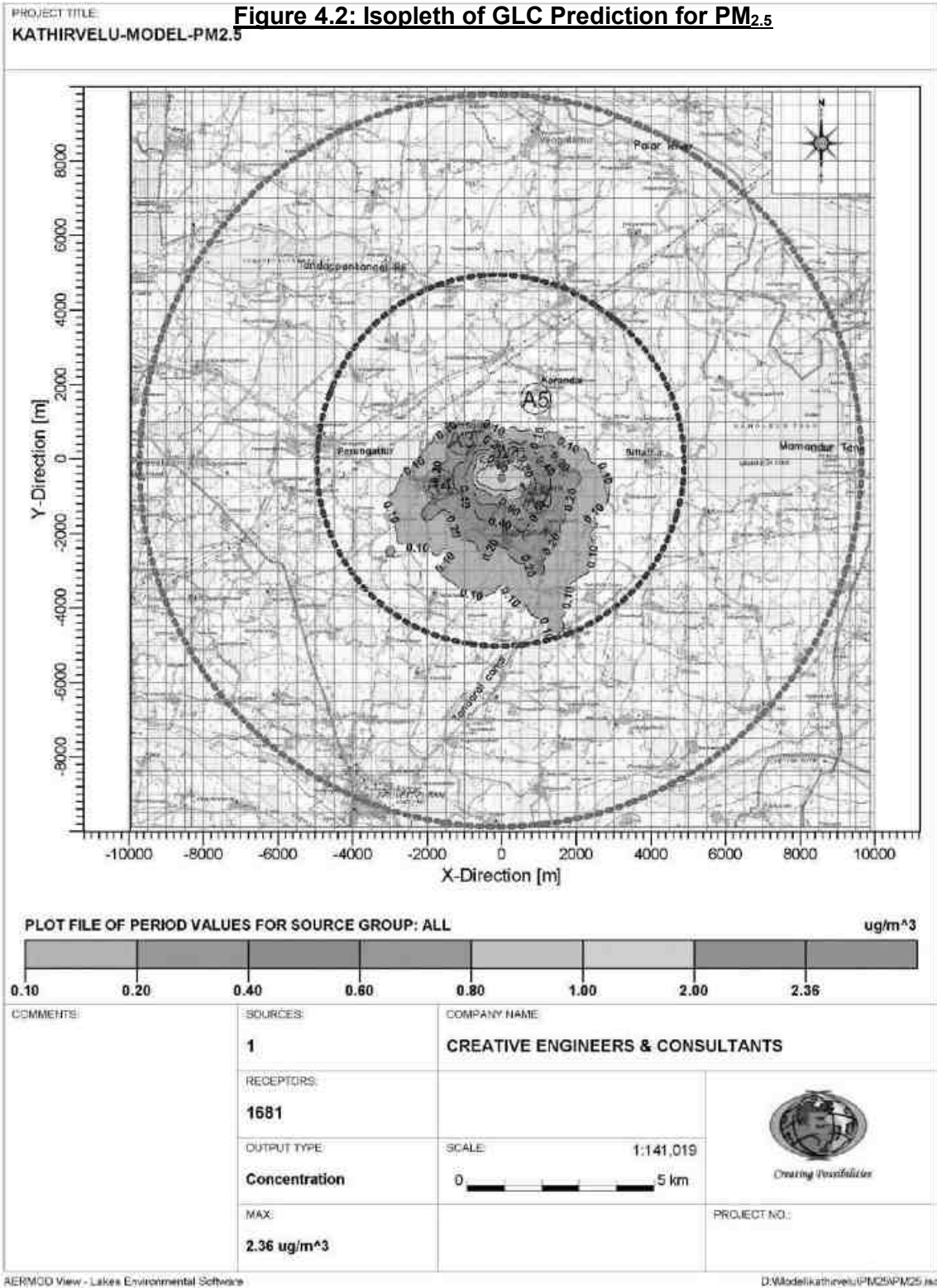
COMMENTS:	SOURCES: 1	COMPANY NAME: CREATIVE ENGINEERS & CONSULTANTS
	RECEPTORS: 1681	 <i>Creating Possibilities</i>
	OUTPUT TYPE: Concentration	
	MAX: 5.87 ug/m³	PROJECT NO: _____

AERMOD View - Lakes Environmental Software

D:\Model\kathirvelu\PM10\PM10.iso



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4.2.2.4 Predicted Ambient Air Quality:

The post project Concentrations of PM₁₀, PM_{2.5}, (GLC) (base line + incremental) after adopting necessary control measures is given in Table No - 4.6 to 4.7.

Table 4.6: Concentrations Of PM₁₀ after Project Implementation

Values in $\mu\text{g}/\text{m}^3$

S. No	Location	Background Concentration	Predicted Incremental Concentration	Post Project Concentration	Statutory Limits
1	A1-Near Mine Lease Area	78.6	5.8	84.4	-
2	A2-Kagkanam Village	65.2	<1.0	76.2	100
3	A3-Sumangali Village	62.6	<1.0	63.6	
4	A4-Kunnathur Village	56.2	<1.0	57.2	
5	A5-Karanthai Village	63.2	<1.0	64.2	

Table 4.7: Concentrations Of PM_{2.5} after Project Implementation

Values in $\mu\text{g}/\text{m}^3$

S. No	Location	Background Concentration	Predicted Incremental Concentration	Post Project Concentration	Statutory Limits
1	A1-Near Mine Lease Area	36.4	2.3	38.7	-
2	A2-Kagkanam Village	30.8	<1.0	31.8	60
3	A3-Sumangali Village	28.8	<1.0	29.8	
4	A4-Kunnathur Village	25.9	<1.0	26.9	
5	A5-Karanthai Village	28.4	<1.0	29.4	

It can be seen that the resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM₁₀ are in the range of 57.2 $\mu\text{g}/\text{m}^3$ to 84.4 $\mu\text{g}/\text{m}^3$ and with respect to PM_{2.5} are in the range of 26.9 $\mu\text{g}/\text{m}^3$ to 38.7 $\mu\text{g}/\text{m}^3$ which are within the statutory limits in each case. For preservation of environment in this mine strict enforcement of management schemes and regular air quality monitoring will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

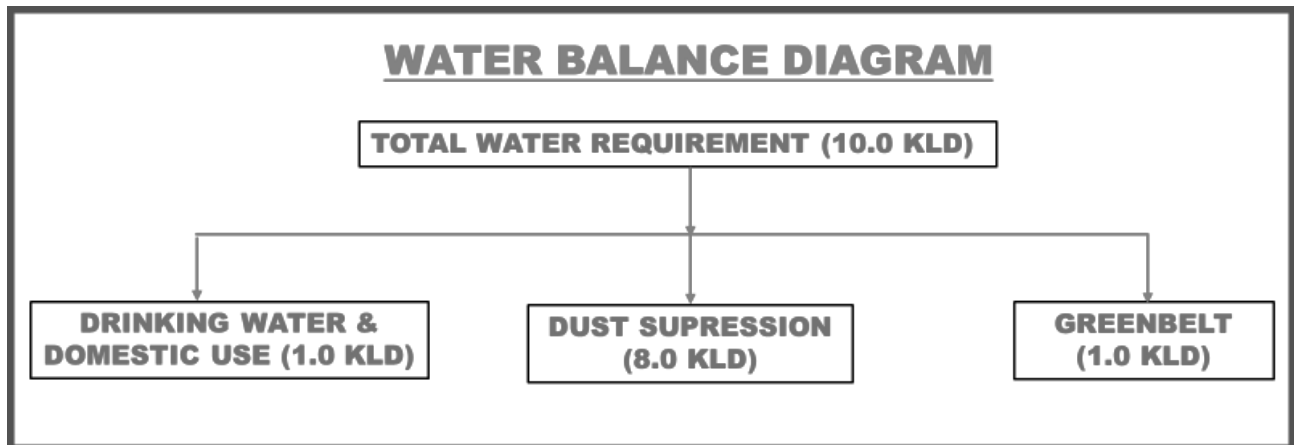


4.3 WATER ENVIRONMENT:

4.3.1 WATER REQUIREMENT:

The total water requirement for this project will be 10.0 KLD comprising 1.0 KLD for drinking water and domestic use, 8.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The water balance diagram for the same is shown in **Figure No 4.3**.

Figure 4.3: Water Balance Diagram



4.3.2 SOURCES OF WATER POLLUTION:

The existing water environment showing water quality at different sampling stations in the area has been described in Chapter-III.

Direct impact on human beings due to poor water quality consequent to mining operation can lead to various water borne diseases like diarrhea, jaundice, dysentery, typhoid, etc. Besides, the polluted water may not be useful for animal or human consumption, vegetation and may affect aquatic life, if effluents are not properly treated to remove the harmful pollutants.

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

- a. Domestic effluent.
- b. Washouts from stockpile if any.
- c. Disturbance to drainage course in the project area
- d. Generation of mine pit water pumped out from deeper workings if any.

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4.3.3 TREATMENT SCHEME:

A. Generation of domestic effluent:

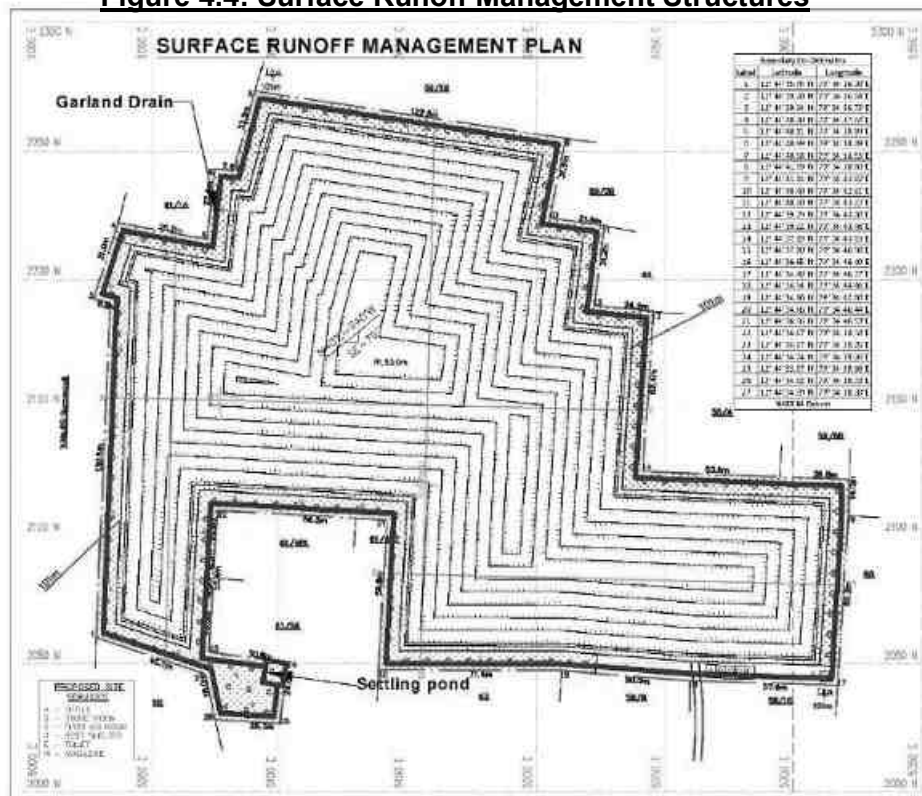
The domestic sewage to be generated from the project will be collected in septic tank with soak pits.

B. Washouts from overburden, ore stockpile, etc.

Since the entire material from the quarry face will be directly dispatched to the consumers, there will not be any stockpiles. There are no waste dumps in this quarry. As such there will not be any wash out due to stock pile or waste dumps.

The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc. Towards surface runoff management, a garland drain of length 1200m will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users. The surface runoff management structures diagram is given in **Figure No 4.4.**

Figure 4.4: Surface Runoff Management Structures



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C. Disturbance to drainage courses

There is an odai at a distance of 50m in the south western side of the lease area. It connects to a Thangal at a distance of 53m on the south western side of the lease area. There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.

D. Generation of mine pit water pumped out from deeper workings if any.

The occurrence and movement of groundwater in hard rock formations are restricted to the porous zones of weathered formations and the open systems of fractures, fissures and joints. Generally, in hard rock regions, occurrence of weathered thickness is discontinuous both in space and depth. Hence recharge of groundwater in hard rock formations is influenced by the intensity and depth of weathering. In the nearby region, the formations are compact with less intergranular porosity and fractures leading to less permeability and transmissivity values and as such the ground water level in this area is deep from surface. The mining area consists of hard compact rock, hence no major water seepage within the mine is expected from the periphery. The ultimate pit depth of mining is 48m. The ground water table in this area is below this level. Hence, ground water intersection is not envisaged and ground water will not be affected appreciably due to the quarrying operation. As mentioned earlier, the rainfall will be collected in the mine floor sump and advantageously used. Excess water if any in the sump will be pumped to settling pond for downstream users.

4.3.3.1 STAGE OF GROUNDWATER DEVELOPMENT

Details of hydrological scenario of the study area were given in para 3.6, Chapter – III. The groundwater resource data of Tiruvannamalai district was obtained from the data provided in the technical report of the Central Ground Water Board, South Eastern Coastal Region – ‘District groundwater brochure, Tiruvannamalai District.’

Table 4.8: Ground Water Resources Estimation– Vembakkam Taluk (M.Cum)

Net Groundwater Availability	Existing Gross Draft for Irrigation	Existing Gross Draft for Domestic and industrial water supply	Existing Gross Draft for all uses	Stage of Ground water Development (%)	Category of Block
2043.19	1357.80	48.17	1405.97	69	Safe



From the table it is seen that the stage of groundwater development of Vembakkam where the study area falls is 69%. In view of this, this area can be categorized as 'Safe' from ground water development point of view. Thus there is scope for further ground water development.

4.3.4 REDUCING WATER CONSUMPTION OVER THE YEARS:

4.3.4.1 GENERAL METHODS:

Use of water will be monitored and used to the minimum required. Awareness will be spread to the employees about the importance of water conservation. Tap and showers will be turned off immediately after use and any leaks will be monitored and immediately controlled. Water requirement for greenbelt and dust suppression can be reduced by choosing the native plants/trees species with low water requirement and which can sustain in such conditions for greenbelt/ plantation and also optimum usage to the required minimum. While the dust suppression itself is an important method of pollution control for air pollution due to dust, the water consumption will be monitored strictly. The water tanker will be examined for any sources of leaks and if found will be immediately sealed so that water can be utilized for dust suppression effectively without loss.

4.3.4.2 RAINWATER HARVESTING PLAN

Since the lease proximate areas are with less water potential and the rainwater is the major source for replenishment of ground water, effective rainwater harvesting and other water augmentation measures are proposed in this project.

- a) Development of garland drain around the quarry connected to settling tank.
- b) Cleaning of drain periodically to prevent siltation
- c) The supernatant clear water from the settling pond will drained regularly.
- d) Utilizing the rainwater harvested in the mine pit to meet the water requirement of the project.
- e) Excess water, if any in consultation with local villagers and in line with government practices shall be provided to the downstream users.



4.4 NOISE AND VIBRATION:

4.4.1 NOISE ENVIRONMENT:

The ambient noise levels in the study area have been discussed in Chapter - III. The data shows that the existing noise levels are within statutory tolerable limits. The impact prediction and control measure for noise environment due to mining and allied activities is described below:

4.4.1.1 IMPACT PREDICTION DUE TO NOISE:

Noise is one of the inevitable causes of pollution in mining operations, largely due to the extensive mechanization adopted. Besides, other operations such as drilling, blasting, movement of vehicles, etc., also produce noise of considerable magnitude in mining operations. The main sources of noise and expected levels are given below in **Table no – 4.9.**

Table 4.9: Main Sources of Noise

Sl. No.	Source	Inside Cabin	Noise level at dB(A) 10 m. from source
1	Shovel	84-91	59-68
2.	Dumpers/Tippers	87-96	75-85
3.	Drill	88- 95	75-83

Prolonged exposure to a high noise level is harmful to the human auditory system and can create mental fatigue, rebellious attitude, annoyance and carelessness, which may lead to neglect of work and also result in accidents. The impact of noise level as per World Health Organization’s 1986 notification is given below in **Table No - 4.10.**

Table 4.10: Impact of Noise Levels

NOISE LEVELS	ADVERSE EFFECTS
90-115 dB	Partial deafness and nervous irritability
> 115 dB	Permanent deafness
Impulsive noise (>90dB)	Frightens livestock grazing in the nearby areas



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OSHA (Occupational Safety and Health Administration), USA and other similar organisations stipulate that noise level up to 90 dB(A) is acceptable for eight hours exposure Leq (Equivalent sound level) (8hrs) per day. The Directorate General of Mines Safety, in circular No. DG (Tech)/18 of 1975, has prescribed the noise level in mining occupations (TLV) for workers, in an 8 hour shift period with unprotected ear as 90 dB(A) or less.

The noise will be felt only near the active sources. There will be considerable reduction in the noise level due to the absorption factor, environmental surroundings and other attenuation factors. As far as absorption factor is concerned, If the ground cover is vegetated or has a soft texture, sound will decrease at the rate of 4.5 dB(A) every time the distance between the source and the observer is doubled. Besides, there will be shielding factor, which takes into account the environmental surroundings. With every 30m of dense land scape vegetation, 5 dB(A) of additional attenuation can be obtained up to a maximum of 10 dB(A). As such at away places the effect of noise will not be felt.

Anticipated noise levels resulting from operation of the various machineries like excavator, tippers, drill have been computed using point source model. Computation of cumulative noise levels at the nearby villages is made based on the assumption that there are no attenuation paths between the source and the boundary.

Noise modeling is carried out using the following formula:

$Lp2 = Lp1 - 20 \log R2/R1$, Where, $Lp1$ and $Lp2$ are sound pressure levels at points located at distances $R1$ and $R2$ respectively from the source. The study results are as follows:

Table 4.11: Post Project Noise Levels

Sl.No	Location	Baseline Day Eq.in dB(A)	Post project noise Eq in dB(A)	Limit dB(A) as per MoEF&CC
1.	North West Corner	46.5	56.6	90
2.	North East Corner	46.5	56.1	90
3	South East Corner	46.5	53.0	90
4	South West Corner	46.5	56.1	90
5	Kagkanam Village	48.0	48.2	55
6	Sumangali Village	46.9	57.2	55
7	Kunnathur Village	48.8	48.9	55
8	Karanthai Village	48.2	48.3	55



From the studies, it is found that the predicted Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor. However, practically there will be attenuation due to vegetation etc., and as such there will not be any adverse noise propagation outside the lease boundary. Since the habitations are also away the effect of noise due to mining operations will not be felt at all in the surrounding villages.

4.4.1.2 CONTROL MEASURES FOR NOISE ENVIRONMENT:

Hence, by following mitigative measures for noise control, the impact on noise levels will be insignificant:

- Planting rows of native trees along roads, around mine area and other noise generating centers to act as acoustic barriers.
- Sound proof operator's cabin for equipments like shovel, tippers, etc.
- Proper and regular maintenance of equipments may lead to less noise generation.
- Providing in-built mechanism for reducing sound emissions.
- Providing earplugs to workers exposed to higher noise level.
- Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.
- Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.
- Provision of green net along the lease periphery on the other sides.

Further green belt and afforestation will be planned and executed to abate noise and dust propagation in the area.

4.4.2 GROUND VIBRATIONAL DUE TO BLASTING EFFECTS:

4.4.2.1 Blasting Study:

Vibrations due to blasting may cause damage to nearby structures, if appropriate control measures are not adopted. Flyrock is another possible damage causing outcome of blasting.



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There are many factors, which influence these, like long explosive column with little stemming column, improper burden, loose material or pebbles near holes and long water columns in the holes.

The following control measures will be planned to reduce ground vibratory conditions to sustainable statutory limits:

- 1) Carrying out controlled blasting using Nonel delay detonator.
- 2) Optimum design for burden and spacing.
- 3) Reducing explosive charge per delay to minimum.
- 4) The peak particle velocity (PPV) of ground vibration will be kept very low through optimally controlled blasting techniques, after necessary field trials.
- 5) To contain fly rocks, stemming column to be less than burden of the hole. Blasting area will also be muffled, if necessary, to stop fly rocks propagation.
- 6) Blasting will not be carried out when strong winds are. Blasting will be done during midday time.
- 7) Controlled blasting to avoid tension cracks which may endanger the stability of bench slopes in the mine.
- 8) Proper care and supervision during blasting by a competent and experienced person to be carried out.

By adoption of above measures, it will be ensured that the ground level vibration due to blasting are maintained within the limits prescribed by DGMS, Dhanbad at the mining areas vide Circular No. 7 dated 29 -08-1997 as given below

Table 4.12: Permissible Peak Particle Velocity (PPV) In Mining Areas

Type of structure	Dominant excitation frequency Hz		
	<8 Hz	8-25 Hz	>25 Hz
In mm/sec			
A. Buildings/structures not belonging to owner			
Domestic houses /structures (Kuchha brick and cement)	5	10	15
Industrial buildings (RCC and framed structures)	10	20	25
Objects of historical importance and sensitive structures.	2	5	10



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B. Building belonging to owner with limited span of life			
Domestic houses/structures (Kuchha brick and cement)	10	15	25
Industrial buildings (RCC and framed structures)	15	25	50

Besides, different blasting time for the projects in the vicinity is suggested and the timing is to be mentioned in the display board in the respective mines entrance.

4.5 LAND ENVIRONMENT:

The lease area of 4.420 Ha is a patta land in the name of Tvl.SKT Mines vide patta nos.1042 and 1041, wherein applicant is also a partner. **(Annexure-IV of mining plan)** The applicant has obtained letter of authorization from other partners. **(Annexure-VII of mining plan)** The present land use pattern, and the post mining land use pattern is shown below:

Table 4.13: Land Use Table

Sl. No.	Land Use	Present Area (Hect)	Area put in use end of 5 year plan period (Hect)	Area put in use end of 10 year plan period (Hect)
1.	Quarrying Pit	Nil	3.55.0	3.55.0
2.	Infrastructure	Nil	0.01.0	0.01.0
3.	Roads	Nil	0.02.0	0.02.0
4.	Green Belt	Nil	0.40.0	0.40.0
5.	Unutilized	4.42.0	0.44.0	0.44.0
Total		4.42.0	4.42.0	4.42.0

4.5.1 LAND RECLAMATION:

There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. Hence, there is no external overburden dump involved. Mining will be carried out up to 18m depth for 5 years, Subsequently, in the remaining 6th to 10th year, the entire lease area will be mined at a depth of 48m. Ultimately the entire mined out area of 3.550 Ha will be left as water body. 0.030 Ha will be the mine roads & infrastructure, 0.400 Ha will be covered with vegetation, and 0.440 Ha will be left as unutilized area.

Table 4.14: Land Use During Post Operational Period

S.No	Description	Land use (Ha.)			
		Plantation	Water body	Others	Total
1	Quarrying Pit	-	3.550	-	3.550
2	Infrastructure	0.010	-	-	0.010



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3	Roads	-	-	0.020	0.020
4	Green Belt	0.400	-	-	0.400
5	Unutilized	0.440	-	-	0.440
	TOTAL	0.850	3.550	0.020	4.420

Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals. In the post mining stage, the rainwater harvested in the mined-out void shall be utilized to meet the water requirement of the project.

4.6 BIOLOGICAL ENVIRONMENT:

4.6.1 EXISTING FLORA AND FAUNA:

The core zone area is a hard rock formation area, with barren patches. Details of flora/fauna pattern in core and buffer zones have been described in chapter - III.

4.6.2 IMPACT OF MINING ON BIOLOGICAL ENVIRONMENT:

The significance of impact on biological environment due to mining and allied activities on various fronts is described below:

Table 4.15: Impact on Biological Environment

S.No	ISSUES	OBSERVATIONS
1	Clearance of vegetation due to mining and allied activities	No clearance of major vegetation is involved.
2	Retardation of tree growth, tip burning, etc, due to deposition of dust and the Particulate matter generated from the mining operation.	Necessary mitigative measures like dust suppression, proper maintenance of equipment's, roads will be carried out to prevent dust generation.
3	Proximity to national park/ wildlife sanctuary/reserve forest/mangroves/Coastline/estuary/sea	The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.
4	Release of effluents into water body that also supplies water to wildlife	There is no proposal to discharge any effluent into nearby water bodies.
5	Proposed project could increase siltation that would affect nearby biodiversity area	Surface runoff management structures like garland drain, settling pond etc. as explained above will be constructed and as such there will not be any appreciable impact on surface water quality which in turn can affect the bio diversity of the area.
6	Activities of the project affects the breeding/nesting sites of birds and animals	In the present ML area, there is no wetland. A migratory bird needs sufficient wetlands with sufficient food, shelter, roosting places and nesting places which is not possible here.



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7	Located near an area populated by rare or endangered species	There are no Schedule 1 animals
8	Risk of fall/slip or cause death to wild animals due to project activities	In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent falling of animals in the mine pits.
9	Project affects the forest-based livelihood/any specific forest product on which local livelihood depends	Not applicable
10	Project likely to affect migration routes	No migration routes are in the area.
11	Project likely to affect flora of an area, which have medicinal value	No such significantly important medicinal value species within the ML area and its nearby region.
12	The project likely to affect wetlands, fish breeding grounds, marine ecology	There are no any wetlands, fish breeding grounds, marine ecology nearby the ML area which will be affected due to this project.
13	Project affects the Agriculture, Forestry and Traditional Practices	Due to poor soil condition and non-availability of perineal water source, no major agricultural activity is carried out in and around the lease area. Only patches of plantation are observed in few places in the monsoon season based on water availability.
14	Impact on soil health and biodiversity	The lease area is covered with grasses and bushes only (Photograph of the site attached in Chapter-II). Besides, there is no waste generation, disposal or stacking involved in this project. As such no loss of soil health and Bio-diversity is expected.
15	Climate change leading to droughts, floods, etc.	<ul style="list-style-type: none"> •As such the production from this lease is very low to cause any appreciable impact.
16	Pollution leading to release of greenhouse gases (GHG) rise in temperature (Hydrothermal/Geothermal effect due to destruction in environment, Bio-geochemical processes and its foot prints including environmental stress) and livelihood of local people.	<ul style="list-style-type: none"> •No adverse impact on the surrounding environment is envisaged since the number of equipments to be used to achieve this small production is very less and the magnitude of operation is of very small level. •Besides, as is it a mining project, no adverse generation of heat is envisaged. •Certified vehicles with low carbon emissions will only be used. These equipments will be properly and regularly maintained. Besides, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 2250 number of plants will be planted in and around the lease area. •Geologically the area in and around the lease area contains charnokite type rock formation containing mostly fallow land. As such there no major vegetation or agricultural activities are observed. •There are no Protected or Eco-Sensitive Zone or



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		<p>forest land nearby wherein it can have an impact.</p> <ul style="list-style-type: none"> •It will be ensured that mining will be carried out adhering to all the statutory rules and regulations and maintaining the environmental quality within the prescribed standards by effective implementation of various mitigative measures. •These mitigative measures will be continued for the entire lease period ensuring no impact on the environment. •As such release of Greenhouse gases (GHG), rise in temperature, affecting livelihood of the local people ,loss of Agriculture, Forestry and Traditional Practices is not envisaged. Such a limited scope will not induce any climatic change leading to droughts, floods etc.
17	Possibilities of water contamination and impact on aquatic ecosystem health and impact on Sediment geochemistry in the surface streams	<ul style="list-style-type: none"> •This being a mining project no process effluent will be generated. •Water generation is expected to be due to <ul style="list-style-type: none"> ✓ Direct rainfall falling within the pit ✓ Rain water draining near the lease area. •Direct rain fall will be collected in the mine floor sump. Water from sump will be pumped to settling pond for downstream users. •Rainwater from the mine periphery will be collected through peripheral garland drain. Garland drain will be connected to a settling pond. Supernatant clear water from settling pond conforming to applicable limits will be let out to downstream users for agricultural or other purposes. •Due to above mentioned reasons and absence of perinial water bodies nearby where in any marine ecosystem is observed, no effect on this front is expected.

There are no migratory corridors, migratory avian-fauna, rare endemic and endangered species. Therefore there shall be no impacts due to mining activity on them. Even though there are no adverse impact on bio diversity and flora/fauna status due to project operations, positive impacts will arise due to well-planned reclamation measures for restoration of land status in the area ultimately to productive land category with elaborately planned green belt development activities.



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4.6.3 CONTROL MEASURES FOR BIOLOGICAL ASPECTS:

To reduce the adverse effects on flora/fauna status of the area due to deposition of dust generated from mining operations, mobile water tanker systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out depending upon the immediate need, priority and availability of land. The plantation will be done along the lease boundary in a phased manner.

4.6.4 GREEN BELT & PLANTATION:

Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2250 trees will be planted in and around the lease area.

Table 4.16: Proposed Plantation

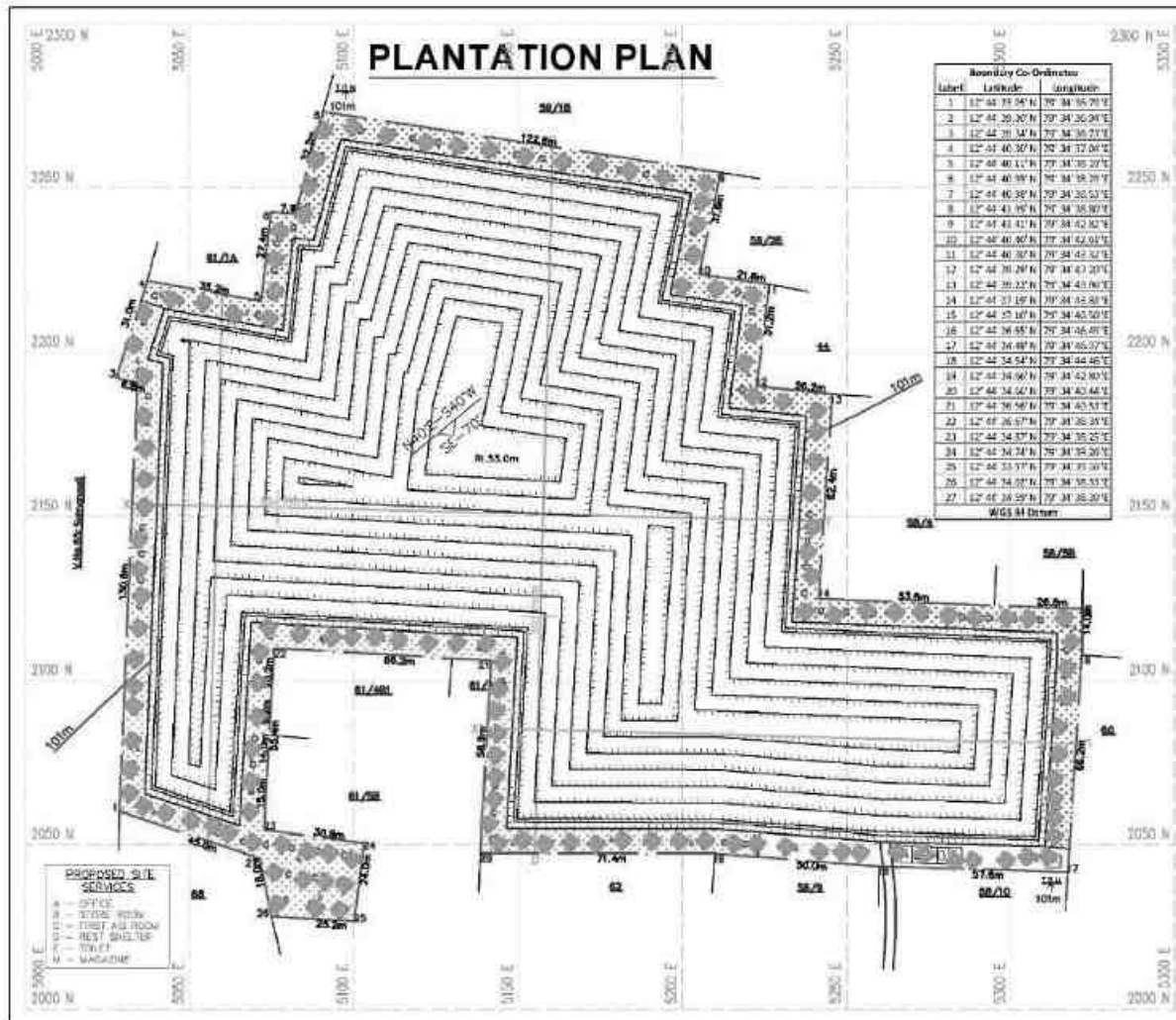
Year	No. of trees proposed to be planted	Name of the species
I	450	Pungai, Vagai, Vembu, Manjal konrai, Naval, Puvarasu, etc.,
II	450	
III	450	
IV	450	
V	450	
Total	2250	

Ultimately the entire mined out area of 3.550 Ha will be left as water body. 0.030 Ha will be the mine roads & infrastructure, 0.400 Ha will be covered with vegetation, and 0.440 Ha will be left as unutilized area. The post mining land use plan showing afforestation and water body is shown in **Figure No- 4.7**.



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Figure 4.5: Mine Closure Plan



4.7 SOCIO ECONOMIC ENVIRONMENT:

The entire lease area is in the proponent’s possession. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here. The cart track and seasonal odai in proximity to the lease area not be disturbed by the proponent and sufficient safety barrier and protective measures has also been considered.

The mining operations in the proposed mine will employ about 32 persons directly and about 50 persons on indirect basis through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and



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standards of living in the area through various service related activities connected with the project operations as shown under.

- Project related logistical operations for transport of Rough Stone, etc,
- Various trading services for consumer goods, spare parts, sundry items, etc.
- Contractual services connected with the project.
- Green belt and horticultural works in the project.
- Casual labor needs for various activities.

Besides, there will be improvement in the following aspects due to project operation:

- ❖ Improvement in infrastructural facilities, providing education aids etc. in nearby schools
- ❖ Betterment of drinking water facilities.
- ❖ Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc from this project directly and also indirectly.

From above details, it is clear that the project operations will have highly beneficial positive impact in the area.

Table 4.17: CER Cost

Project Cost (Rs.)	Rs.98,68,000/-
CER Cost Requirement (2% of the Project Cost) (Rs.)	Rs.1,97,360/-
Revised CER cost allocated (Rs.)	Rs. 5,00,000/-

However, towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in provision of facilities in nearby Government School.

4.8 OCCUPATIONAL HEALTH AND SAFETY:

4.8.1 BASELINE STATUS:

Primary data collection through field survey conducted in the study area reveals that there is no reported incident of any occupational diseases in the area. Hazardous jobs like blasting, loading, etc. are planned to be executed safely and with all precautionary measures as



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prescribed in Metalliferrous Mines Regulations of 1961, so as to minimize hazards and incidences of health problems.

4.8.2 IMPACTS ON OCCUPATIONAL HEALTH DUE TO PROJECT OPERATIONS:

Anticipated occupational illness sequel to mining activities can be as follows:

- Dust related pneumonia
- Tuberculosis
- Rheumatic arthritis
- Segmental vibration
- Miner's Nystagamus

4.8.3 MITIGATIVE MEASURES FOR OCCUPATIONAL HEALTH:

To reduce pollution emanation from the project, following measures are being and will be taken:

- Water sprinkling on haul roads etc.
- Green belt creation to arrest dust and reduce noise propagation.
- Acceptance of good control measures for reducing air pollution, as mentioned earlier in the chapter.
- Control of noise levels through good preventive maintenance of machineries, green belt creation, provision of ear plug to workers, etc.
- In addition to above measures, the following remedial steps are being and will be enforced to ensure minimization of occupational health and safety problems.
- Medical examination of workers by qualified doctors, as per DGMS circulars.
- Regular awareness campaigns amongst staff and workers
- Staff will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

4.8.4 MITIGATIVE MEASURES FOR SAFETY ASPECTS:

The following safety gadgets will be provided to the staff and workers based on their area of operation and work & requirement:



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SI No	Safety Equipments
1.	Helmets
2.	Shoes
3.	Goggles
4.	Dust Mask
5.	Hand Gloves
6.	Reflective Jackets
7.	Ear Muffs
8.	Signal Lights/Flags

4.9 LOGISTICAL SYSTEM:

From this proposed quarry the entire output will be transported to the crusher units for producing stone aggregates of different sizes or construction of roads, bridges, buildings and other buyers etc. The expected peak transport will be as follows:

Table 4.18: Details of Transportation

SI.no	Particulars of activity	Quantity
A	Maximum Material Transported (m ³ /year) - Say	177046
B	No of days in a year	300
C	Transport hours per day	8
D	Truck capacity in T	20
	Trips per hour	8 Trips/hr

From the above table it is seen that there will be about 8 trips per hour. The existing road can absorb this traffic due to this project. However, the following mitigative measures are suggested:

- ❖ Water sprinkling on material in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Plantation on either side of the transport road in consultation with the concerned department.
- ❖ Proper maintenance of transport roads
- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.
- ❖ Keeping traffic regulators at vulnerable locations.
- ❖ Distribution of transport vehicles for avoiding choking of roads



- ❖ Limiting of speed
- ❖ Installation of barriers at vulnerable locations
- ❖ Provision of tyre washing facility at the mine outlet

4.10 WASTE MANAGEMENT:

Solid Waste: Since the entire mined out material will be used there will not be any solid waste generation from this project.

Liquid waste: There is no process effluent generation from this mine. Hence no liquid waste is generated.

Hazardous waste management: In this project the following management practices will be followed:

- Ensuring availability of different colour bins for collection of different types of waste.
- Storing of Hazardous waste material in a separate storage area with impervious containers for waste oil, oil contaminated clothes, used lead acid batteries, scraps, tyre storage etc.
- Ensure that there are no leakages/spillages of hazardous wastes.
- Ensuring that the fire extinguisher system is available at hazardous material storage area.

The hazardous waste if any will be disposed through authorized recyclers or re-processors periodically. The hazardous wastes will be transported in accordance with the provisions of rules. By effective implementation of above said mitigation measures no major impact due to Hazardous waste is expected.

Plastic waste: Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.

* * * * *



CHAPTER - V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

CHAPTER 5
ANALYSIS OF ALTERNATIVES

5.1 ALTERNATE TECHNOLOGY:

This is a proposed Rough Stone and Gravel Quarry in which Semi – Mechanized Open Cast mining will be carried out. It involves jack hammer drilling, blasting, excavation, loading and transportation of Rough stone to the crushing units. As this method is techno economically proven, consideration of an alternate technology is not warranted.

5.2 ALTERNATE SITE:

The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise.

* * * * *



CHAPTER - VI

ENVIRONMENTAL MONITORING PROGRAMME

CHAPTER 6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 GENERAL

In this project, appropriate environmental monitoring programme are framed. Regular, systematic and sustained programme schedules for implementation and monitoring of various control measures are devised with clear cut guidelines of various concerned plans for keeping a continuous surveillance on the various environmental quality parameters in the area.

The monitoring schedules are planned to aim at regular and systematic study of various pollution levels with respect to air and water quality, noise levels etc., to ensure that they conform to the standards laid down by the Environment Protection Act, 1986 and various Central and State Pollution Control Board Limits.

The various methodologies and frequency of studies of all environmental quality parameters will be as per prescribed norms laid down by MOEF&CC and State Pollution Control Board. This being a small quarry operation, the Mines in-charge will take care of all the environmental related works also.

Environmental control measures include components like air, water and soil quality, noise levels, afforestation measures, etc. For monitoring of environment over the life of the mine, a set of stations for study of quality parameters are fixed as per the actual requirements and prevailing conditions of environmental factors, as dictated from time to time, depending on the prevailing pollution levels.

6.2 MONITORING SCHEDULES FOR VARIOUS PARAMETERS

The monitoring schedules are planned for systematic study of various pollution levels with respect to air and water qualities, noise levels, etc. to ensure that they conform to the standards laid down by Environmental Protection Act and various statutory Limits. However, based on the need and priority it may be suitably modified / improved in consultation with local authorities. The monitoring schedules to be adopted in this quarry are given below.



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Table 6.1: Environmental Monitoring Schedule

S.No	Environmental Parameters	Parameters to be monitored	Monitoring area coverage /locations	Frequency of monitoring
1	Air Quality	Sulphur dioxide (SO ₂), Oxides of Nitrogen (NO ₂), Respirable Particulate Matter (PM _{2.5} and PM ₁₀).	2 locations in the buffer zone and 1 work zone locations.	Once in a year in each location.
2	Water Quality	General, Physical, and chemical parameters	Ground Water samples (around the project area) and Mine Pit water samples	Once in a year
3	Water Table Fluctuations	Water Levels	Nearby wells and Borewells	On yearly basis pre and post monsoon level
4	Noise	Leq. Lmax Lmin, Leq Day & Leq Night dB(A)	Work zone locations and buffer zone villages	Once in a year
5	Vibration	Peak Particle Velocity	Mine periphery	Once to arrive at optimum blasting parameters
6	Socio Economic Environment	Socio Economic Survey, Review of implementation of CER activities proposed	Buffer Zone	Yearly basis
7	Occupational Health	Occupational health survey to detect early incidence of diseases, Audiometry Test for workers in noise prone area and review of safety matters.	Staff and Workers involved in the project	Once in a year
8	Greenbelt	Maintenance	Within the lease area	Regularly

6.3 LEGISLATIVE AND REGULATORY FRAME WORK:

The project will have environmental policy declaring its responsibility and commitment to protect the environment and to ensure public safety. The existing policy will be available with all concerned officials of the plant. The following environmental standards as per methodologies prescribed, by MOEF/CPCB/TNPCB will be enforced in this project:

Table 6.2: Environmental Standards

Standards	Issued By	Reference
National Ambient Air Quality Standards	Central Pollution Control Board	Table No. 6.3
Water quality standards per IS	Bureau of Indian Standards	Table No.6.4



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4 THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—Sec. 4]

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C ₆ H ₆) µg/m ³	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m ³	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m ³	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m ³	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

- * Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.
- ** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note. — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman
[ADVT-III/4/184/09/Exy.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998.



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Table 6.4: IS – 10500 :2012 Standards

**Table 1 Organoleptic and Physical Parameters
(Foreword and Clause 4)**

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 3025	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, Hazen units, <i>Max</i>	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate sources
ii)	Odour	Agreeable	Agreeable	Part 5	a) Test cold and when heated b) Test at several dilutions
iii)	pH value	6.5-8.5	No relaxation	Part 11	—
iv)	Taste	Agreeable	Agreeable	Parts 7 and 8	Test to be conducted only after safety has been established
v)	Turbidity, NTU, <i>Max</i>	1	5	Part 10	—
vi)	Total dissolved solids, mg/l, <i>Max</i>	500	2 000	Part 16	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.



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**Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts
(Foreword and Clause 4)**

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, Max	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, Max	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, Max	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, Max	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, Max	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, Max	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl ₂), mg/l, Max	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, Max	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, Max	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, Max	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, Min	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When pro- tection against viral infec- tion is required, it should be minimum 0.5 mg/l Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xii)	Iron (as Fe), mg/l, Max	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, Max	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, Max	0.1	0.3	IS 3025 (Part 59)	Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, Max	0.5	No relaxation	Clause 6 of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO ₃), mg/l, Max	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, Max	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, Max	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO ₄) mg/l, Max	200	400	IS 3025 (Part 24)	May be extended to 400 pro- vided that Magnesium does not exceed 30
xxi)	Sulphide (as H ₂ S), mg/l, Max	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, Max	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as CaCO ₃), mg/l, Max	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, Max	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

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Table 6.5: Noise Level Standards

Area Code	Category of Area	Limits in dB(A) Leq	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note :

1. Day time shall mean from 6 a.m. and 10.0 p.m.
2. Night time shall mean from 10.0 p.m. and 6 a.m.
3. Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority.
4. Mixed categories of areas may be average as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“A”, in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is energy mean of the noise level over a specified period.

Table 6.6: Permissible Noise For Industrial Workers As Laid Down By CPCB

Exposure time (in hr. per day)	Limit in dB(A)
8	90
4	93
2	96
1	99
1/2	102
1/4	105
1/8	108
1/16	111
1/32	114



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Table 6.7: Permissible Peak Particle Velocity (PPV) In Mining Areas

In mm/sec.

Type of structure	Dominant excitation frequency Hz		
	<8 Hz	8-25 Hz	>25 Hz
A. Buildings/structures not belonging to owner			
Domestic houses /structures (Kuchha brick and cement)	5	10	15
Industrial buildings (RCC and framed structures)	10	20	25
Objects of historical importance and sensitive structures.	2	5	10
B. Building belonging to owner with limited span of life			
Domestic houses/structures (Kuchha brick and cement)	10	15	25
Industrial buildings (RCC and framed structures)	15	25	50

The above said monitoring location and the frequency of monitoring shall be suitably modified in consultation with the nodal agency as per the actual requirements and prevailing conditions of the mine and environmental factors, as dictated from time to time, depending on the prevailing pollution levels, if required.

6.4 ENVIRONMENTAL MONITORING COST:

Towards environmental monitoring it is proposed to allocate a budget of Rs. 0.50 Lakh per annum for this project. Further details of the capital and recurring cost of environmental management has been provided in in Table No. 10.2, Chapter-X.

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CHAPTER - VII

ADDITIONAL STUDIES

**CHAPTER 7
ADDITIONAL STUDIES**

7.1 GENERAL:

The additional studies covered for this EIA / EMP report are:

1. Public consultation of the project as per MoEF&CC mandates.
2. Risk Assessment
3. Cumulative Impact Study
4. R&R Plan
5. Mine closure planning

7.2 PUBLIC CONSULTATION:

This draft EIA/EMP report will be exposed to public consultation as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures. The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.

7.3 RISK ASSESSMENT:

For the various risks, likely to arise, detailed analysis of causes and control measures is given in below:

S.No	Factors	Causes of risks	Control measures
1.	Removal of material	a) Bench may slide due to its unconsolidated nature. b) Vibration due to movement of vehicles in the benches.	Overall bench slope angle will be maintained optimally as per DGMS requirement. Working bench width will be more than bench height.
2.	Drilling	a) Due to high pressure of compressed air hoses may burst. b) Down the hole drill rod	• Periodical preventative maintenance and replacement of worn out accessories in the compressor and drill equipment.



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S.No	Factors	Causes of risks	Control measures
		may break due to improper maintenance of rod.	<ul style="list-style-type: none"> As per manufacturers recommendation rod to be replaced and bits will be changed.
3.	Blasting	a) Fly rock, ground vibration, noise etc. b) Improper charging of explosives	<ul style="list-style-type: none"> Burden and spacing will be kept optimum on trial basis. Explosive charge per delay will be minimized. Controlled blasting with Nonel will be used.
4.	Excavation	a) Hauling and loading equipment are in such proximity while excavation b) Swinging of bucket over the body of tipper c) Driving of unauthorized person	<ul style="list-style-type: none"> Operator shall not operate the machine when person & vehicles are in such proximity. Shall not swing the bucket over the cab and operator leaves the machine after ensuring the bucket is on ground. Shall not allow any unauthorized person to operate the machine by effective supervision.
5.	Transportation	a) Operating the vehicle "nose to tail" b) Overloading of material c) While reversal & overtaking of vehicle d) Operator of truck leaving his cabin when it is loaded	<ul style="list-style-type: none"> It will be ensured that all these causes will be nullified by giving training to the operators. No over loading will be done. Audio visual reverse horn will be provided. Proper training will be given.
6.	Fire due to electricity and Oil	a) Due to the short circuit of cables & other electrical parts b) Due to the leakage of inflammable liquid like diesel, oil etc.	<ul style="list-style-type: none"> Electrical parts shall be cleaned frequently with the help of dry air blower All fastening parts and places will be tightening. Suitable fire suppression equipment shall be provided.
7.	Natural calamities	Unexpected happenings	The mine management is capable to deal with the situation.

This being a small rough stone project that too working in a safe area, no major disaster is expected.



7.3.1. DISASTER MANAGEMENT PLAN:

In General, following natural/industrial hazards may occur during normal operation.

- Inundation of mine pit due to flood/excessive rains :
- Slope failure of the pit and waste dumps
- Accident due to heavy mining equipment and
- Blasting and use of Explosives

Mining operation in this lease will be carried out under the management control and direction of a qualified mine manager. The DGMS have been issuing a number of standing orders, model standing orders and circulars to be followed by the mine management in case of disaster. All these orders statutory rules and regulations will be followed. Seismically project site and study area falls in the Zone – II and is described as least active zone. There are no perennial water body near the lease area to cause any flooding. As such no disaster due to this project is envisaged.

In order to take care of above hazard / disasters the following control measures have been adopted.

- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Avoiding mining during heavy monsoon period and marching of all the HEMM to the top benches during rainy period.
- Provision of high capacity standby pumps with generator sets with sufficient quantity of diesel for emergency pumping especially during monsoon.
- All safety precautions and provisions of regulations will be strictly followed during all mining operations
- Prohibiting entry of unauthorized persons.
- Provision of Firefighting and first-aid provisions in the mines.
- Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees for their use.



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- Training and refresher courses for all the employees working in hazardous premises
- Observance of all safety precautions for blasting and storage of explosives as per MMR 1961.
- Working of mine, as per approved plans and regularly updating the mine plans
- Cleaning of mine faces regularly
- Proper storage, usage of explosives through competent persons.
- Regular maintenance and testing of all mining equipment as per manufacturers guidelines
- Suppression of dust on the haulage roads with frequent water sprinkling, etc.
- Increasing the awareness of safety and disaster through competitions, posters and annual safety weeks and environmental weeks, encouraged through suitable rewards and other similar drives.

The management and the EMC will be able to deal with the situations efficiently keeping in view of the likely sources of dangers in the mine.

7.4 REHABILITATION AND RESETTLEMENT (R & R) PLAN:

The mining activities will be carried out within the mine lease area only. The entire mine lease area is a Patta land. There is no population within the ML area. Hence, the question of R& R does not arise.

7.5 MINE CLOSURE PLAN:

In the mine closure stage all necessary measures will be taken as per Act & Rules, There is no proposal for back filling, reclamation and rehabilitation. The quarried pits after the end of life of mine will be properly fenced all around to prevent inherent entry of public and cattle and all the statutory requirements will be fulfilled. As already explained, in the post mining stage the rainwater harvested in the mined out void shall be utilized for irrigation and domestic needs locally. The mine closure plan is provided in **Figure 4.5**.



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7.6 CUMULATIVE IMPACT STUDY:

As mentioned earlier, this Rough Stone and Gravel Quarry is located Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The details of the other quarries located within the 500m radius of the project considered for cumulative impact study now (Annexure-3) has been provided below:

Table 7.1: Details of quarries within 500m radius

S.No	Name and address of the lessee	Quarry location	Extent in Hectare	Lease Status
a. Existing Quarries				
1	Thiru.S.Sridhar, S/o.T.Sivaprakasam, Managing Director, SKT Mines, No.19C,Vilakkadi Koil, Thoppu St, Kanchipuram District.	S.F.Nos:44/11,58/4,5A, 60/2,58/5B,59/1A,1B, 2B,60/3,5,6,7	3.96.5Ha	17.09.2018 to 16.09.2023
b. Abandoned Quarries				
Nil				
C. Proposed Quarries				
1	R.Kathirvelu No. 19C, Vilakkadi Kovil Thoppu Street, Kancheepuram District. Pin code – 631 501	58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6	4.42.0 Ha	Applied area (Rough stone)

From that above it is seen that, although the individual lease area of this project is less than 5 Ha, the other existing and proposed quarries within the 500m radius along with this subject project works out to >5 Ha. As such cluster situation applicable and this EMP is prepared. A map showing the existing and proposed quarries located near the lease area is provided Figure No.7.1 given below:



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Figure 7.1: Vicinity Map



The baseline monitoring carried out for this project reflects the cumulative impact of these existing quarries. Considering that the lease period of the existing quarry will be coming to an end shortly, this proposed quarry will serve more as a replacement for the existing quarry to ensure meeting the present Roughstone demands.

7.7 PIT SLOPE STABILITY PLAN

- Factors affecting slope stability of the mine are
 - Geological structure comprising dip, intervening shear zone formation, clay intrusion, joints / discontinuities, faults etc.,
 - Lithology of formation
 - slope geometry
 - Ground water availability which may cause increased thrust on the faces
- Site specific analysis
 - Proposed area is a hard rocky charnockite terrain comprising top 3m gavel, followed by 2m weathered rock and then hard rock.
 - Since the formation is of homogeneous rock type probability of slope failure is low and can be avoided if proper measures are adopted.
 - There will be a 7.5m wide barrier zone which will form a ridge which can also take care of the top section and as such no risk is envisaged on this front.
 - During future workings the following measures will be ensured:
 - Regular inspection of the mine faces to be carried out by mines manager for ensuring absence of any structural features like faults, joints, dyke, intrusive material in the rock strata which may affect the slope stability and cleared.
 - No loose material or boulders is to be stacked on the mine top or pit benches.
 - Height of the benches should be 5m. Working bench width should be at least 2.5 times the bench height. Ultimate pit bench width will be 5m & slope is kept at 45° to ensure slope stability.
 - Haul road formation will be at 1 in 16 slope with adequate road width.
 - There will be no ground water table intersection.
 - No seepage is expected due to formation. Adequate drainage management system comprising peripheral garland drain, settling pond to regulate monsoon

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water will be created to prevent saturation of compact layers, apparent drainage over the bench slope to avert damages to quarry face and manage the water flow.

The above will ensure safe and stable mine prospects.

CONCLUSION:

No adverse impact on the surrounding environment is envisaged from this project since the number of equipment's to be used to achieve this production is less and the magnitude of operation is of low level.

Certified vehicles with low carbon emissions will only be used. These equipment's will be properly and regularly maintained. Besides, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 2250 number of plants will be planted in and around the lease area.

Geologically the area in and around the lease area contains charnokite type rock formation containing mostly fallow land. As such there no major vegetation or agricultural activities are observed. There are no Protected or Eco-Sensitive Zone or forest land nearby wherein it can have an impact.

It will be ensured that mining will be carried out adhering to all the statutory rules and regulations, appointing statutory personnel's like qualified mines manager, blaster, informing DGMS before commencement of mining operations and maintaining the environmental quality within the prescribed standards by effective implementation of various mitigative measures.

As such release of Greenhouse gases (GHG), rise in temperature, affecting livelihood of the local people, loss of Agriculture, Forestry and Traditional Practices is not envisaged. Such a limited scope will not induce any climatic change leading to droughts, floods etc.

Mine closure plan is prepared for the lease period and already included in the approved mine plan.

Due to absence of perennial water bodies nearby where in any marine ecosystem is observed, no effect on this front is also expected. Hydrological investigation carried out and as given in Para 3.6 of Chapter III & para 4.3 Chapter – IV shows that the all-time ground water table in



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this area is much below the mining level. Hence, ground water intersection in not envisaged for the entire life of the mine and ground water will not be affected due to the quarrying operation. As such there will not be any adverse impact on the ground water regime. Besides, this being a mining project, there will be not be any process effluent. As mentioned earlier, the rainfall will be collected in the mine floor sump and gainfully used as per CGWA requirement. Excess water if any in the sump will be pumped to settling pond and supernatant clear water let out for downstream users.

It will be ensured that mining will be carried out adhering to all the statutory rules and regulations, appointing statutory personnel's like qualified mines manager, blaster, informing DGMS before commencement of mining operations and maintaining the environmental quality within the prescribed standards by effective implementation of various mitigative measures for the entire lease period.

* * * * *



CHAPTER - VIII

PROJECT BENEFITS

CHAPTER 8 PROJECT BENEFITS

The proposed quarry will improve physical and social infrastructures in the area like:

- Direct employment to 32 people.
- Indirect employment to 50 people.
- Financial gains for the governments, through collection of various taxes like royalty, GST, etc.,
- Increase in General Awareness of the People.
- Continual improvements of the local amenities for the local society
- Improvement of the General Living Standard of the People in the Vicinity
- Overall Improvement in HDI (Human Development Index)
- Growth of Allied Industries in the Area.
- Improvement in Per Capita Income.
- Providing certain facilities for the local schools and panchyats

In short, the proposed Rough Stone Quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, medical systems, infrastructural build-up, etc in its own way.

By means of carrying out the socio-economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs.5 Lakhs for various activities under CER. The activities will be implemented once the mining operations commence. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited.

* * * * *



CHAPTER - IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

**CHAPTER 9
ENVIRONMENTAL COST BENEFIT ANALYSIS**

Appendix-III of the MoEF notification S.O. 1533 dated 14.09.2006, which describes the generic structure of Environmental Impact Assessment document, states that the chapter 'Environmental cost benefit analysis' is applicable if it is recommended during scoping stage.

ToR for this project has been received from SEIAA, Tamil Nadu vide their letter No. SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022 dated 14.07.2022 and its Amendment dated 28.11.2022. Environmental cost benefit analysis is not prescribed in the terms of reference. Hence, it is not applicable for this project.

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CHAPTER - X

ENVIRONMENTAL MANAGEMENT PLAN

CHAPTER 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION:

This chapter describes the implementation strategies of the environmental management measures described through the course of this EIA/EMP report for the purpose of mitigating significant impacts due to the proposed mining operations.

10.2 COMPONENTS OF THE ENVIRONMENTAL MANAGEMENT PLAN:

The environmental management plan comprises identification of the major impacts due to project operations and their suitable mitigative measures. (Provided in an elaborate manner in Chapter-IV) Based on the environmental policy of the company, the environmental management cell will oversee the implementation of these mitigative measures. The details of the proponent's environmental policy, environmental management cell and also the budgetary allocation towards various environmental management measures has been elaborated in this chapter.

10.2.1 ENVIRONMENTAL POLICY:

The proponent will frame a well-planned environmental policy. The salient features of this policy will be.

- ❖ Ensuring risk-free and safe mining operations by following all rules and conditions prescribed in the Indian mines Act, metalliferous mining regulation, mineral conservation and development rules, etc,
- ❖ Ensuring environmental preservation by adoption of remedial measures for control of air, water quality, noise status, biological improvements, green belt creation, etc.,
- ❖ Extending CER activities to cater to the needs of local community for various benefits like improvement of physical and social infrastructures for the welfare of local community.



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- ❖ Ensuring that all mining operations such as deployment of HEMM, conduct of drilling and blasting operations, etc are strictly conducted keeping with regulatory standards & maintaining safe working environment in the area.
- ❖ Providing periodical training on safety, Health, & Environment to all employers.
- ❖ Any infringement / violation of any rule or unsafe mining operations should be reported mines manager, should be reported by the foremen/ blaster mate etc, who will take immediate corrective measures for avoiding major disasters. The report will ultimately reach the owner through upwardly hierarchical communicative channels from the lowest level to superior levels in a quick time bound duration.
- ❖ The mines manager will exercise overall control over entire mining and connected operations and all infringements / violations on any count pertaining to unsafe operations, environmental degradation, etc, should be brought to the notice of the owner of the quarry. Remedial measures for such violations and deviations should be taken care by the mines manager to avoid any hazards or disasters in the mine and nearby areas. The persons responsible for such violations will be punished through appropriate disciplinarily penal actions.
- ❖ The EC conditions and stipulations will be strictly observed by Mines manager of the mine in various issues like prescribed environmental monitoring schedules conducting of vibratory studies due to blasting, creation of green belt, management of mined area, occupational health review, etc.
- ❖ Penalty actions will be taken by the proponent in cases of continuous negligence resulting in violations deviations in this respect.
- ❖ A time schedule of once in 90 days for review of all operational factors as mentioned above is to be enforced, for proper and quick corrective actions needed in the matter.

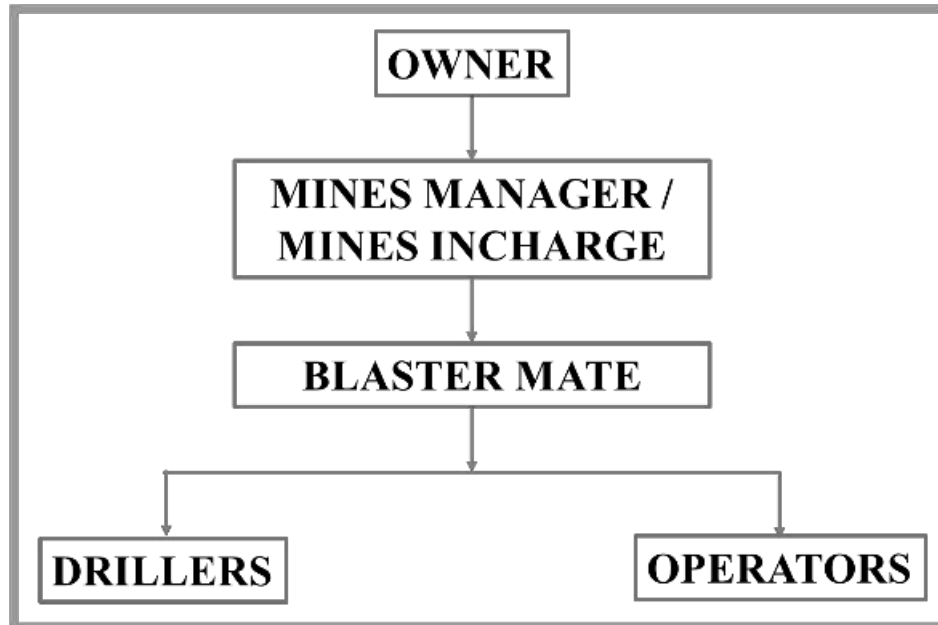
10.2.2 ENVIRONMENTAL MANAGEMENT CELL:

The Mines Manager/Mine Incharge will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level



control, plantation programme, social development schemes, etc in the mine. The organizational chart for the same has been provided below:

Figure 10.1: Organization Chart



The Mines Manager/Mines Incharge in the mine project site will be directly responsible for various environmental activities in the mine. The owner will correlate and oversee the environmental activities and their effective implementation in consonance with the guidelines in the EMP. The Mines Manager/Mines Incharge will oversee the environmental administration at the mine and he will directly supervise all activities of environmental administration on environmental issues. Necessary assistance from sub ordinates, external consultants and laboratories shall be taken.

Environmental control measures will span various factors like land degradation, air, water and soil quality, noise levels, effective land reclamation for excavated areas, afforestation measures, etc. The administrative functions are given below.

- ❖ To observe the implementation of environmental control measures.
- ❖ To study the effects of project activities on the environment.

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- ❖ To ensure implementation of Plantation Programme. Regular monitoring of survival rate of plants is carried out to achieve the desired result.
- ❖ To keep records of monitoring etc., in a systematic way, so as to facilitate easy access, when needed by statutory agencies, etc. Also send prescribed returns to statutory authorities.
- ❖ To ensure that adequate fencing and plantation is carried out in the safety zones.
- ❖ Conducting environmental studies and reporting to SPCB.
- ❖ To interact and liaise with Government Departments.
- ❖ To evaluate the performance of existing pollution control equipment and systems periodically and take timely action to keep the equipment at its optimum performance condition.
- ❖ To take immediate preventive action in case of some unforeseen environmental pollution attributable to the project.
- ❖ Conducting safety audits and programmes to create safety awareness in workers/ staff.
- ❖ Conducting annual health audits to detect any health problems promptly in the workers/staff. This will reduce occupational health problems.
- ❖ Imparting training on safety and conduct safety drills to educate employees. Firefighting equipment and system has to be kept in 'ready-to-fight' condition.
- ❖ Carrying out socio economic study in the surrounding areas to find out the benefits derived by the society due to the project and also to fulfill the deficiency, if any, immediately.
- ❖ Ensuring proper mine closure arrangements



10.2.3 ENVIRONMENTAL MANAGEMENT PLAN:

10.2.3.1 General:

Systematic monitoring systems and well-conceived and efficient Environment Management Plan will ensure that during the project operations, the various environmental parameters, are well within the statutorily sustainable limits. The environmental control measures proposed to keep various environmental parameters of the project in terms of air, water, noise, land, biological environment, etc. has been described below.

10.2.3.2 Air Quality:

With regards to air quality, to mitigate the fugitive and gaseous emission resulting from mining and allied activities, the following control measures are proposed to be undertaken:

- Regular water sprinkling in the transport roads using mobile tankers for dust suppression.
- Controlled blasting techniques with NONEL.
- Provision of dust filters / mask to workers working at highly dust prone and affected areas.
- Covering of drill holes with wet cloth, using sharp drill bits
- Avoiding blasting during high wind periods where the fine dust is carried out away easily affecting the ambient air quality.
- Proper maintenance of haul roads, HEMM and dumpers.
- Covering of loaded tippers with tarpaulins during transportation
- Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
- Besides, there will be good green belt cover will be developed around mine periphery and in safety zone.
- Green netting will be carried out around the lease periphery on all sides.

10.2.3.3 Water Environment:

There will be no process effluent generated from this project. The domestic sewage to be generated will be collected in septic tank with soak pit arrangements. Besides, there will be no waste dumps or stockpiles within the lease area as the entire material will be directly despatched to the consumers.

Surface runoff management structures such as garland drain connected to a settling pond will be constructed around the quarry to collect the rain water. The supernatant clear water from the settling pond will be provided to nearby downstream users. Towards rainwater harvesting, the rainwater harvested in the mine will be used to meet the water requirements during mining and excess water in consultation with villagers and in line with government practices will be out in to the nearby stream or shall be distributed to the nearby villages as per their need.

There is an odai at a distance of 50m in the south western side of the lease area. It connects to a Thangal at a distance of 53m on the south western side of the lease area. There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.

10.2.3.4 Noise Environment:

During the project operations, various control measures as listed below will be carried out to mitigate adverse impact due to the noise generated due to mining and allied activities:

- Good plantation will be carried out in the safety zone areas
- Noise protectors, insulation of operator cabins, installation of silencers in machineries, etc.
- Proper and regular maintenance of equipments
- Providing earplugs to workers exposed to higher noise level.
- Providing in-built mechanism for reducing sound emissions.
- Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.

- Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.

10.2.3.5 Ground Vibration

During the project operations, various control measures as listed below will be carried out to mitigate adverse impact due to the ground vibration caused due to blasting activities:

- ❖ Controlled blasting techniques to maintain the peak particle velocity (PPV) below DGMS prescribed levels.
- ❖ Ideally formulating drilling and charging pattern and ensuring using less charge per delay.
- ❖ To contain fly rocks, stemming column will not be less than burden of the hole. Blasting area will also be muffled, if necessary, to stop fly rocks propagation.
- ❖ Blasting will not be carried out when strong winds are blowing towards the inhabited areas. Blasting will be done during midday time and never at night.
- ❖ Proper care and supervision during blasting by a competent and experienced person.
- ❖ Besides, different blasting time for the projects in the vicinity is suggested and the timing is to be mentioned in the display board in the respective mines entrance.

Further details regarding the same has been provided under section 4.4.2, Chapter-IV.

10.2.2.6 Biological Environment:

The mining lease area and 10km buffer zone are devoid of declared ecologically sensitive features such as national parks, sanctuaries etc. Besides, no Schedule-I animals are observed in the core and buffer zone. There will be no major clearance of vegetation involved in this project. However, good greenbelt and plantation programmes are planned within the lease area.

In the lease area, safety barrier 7.5m around the periphery, 10m for cart track. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone

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area. This will boost the biological, visual and aesthetic outlook of the area. Elaborate details regarding the same is provided under section 4.6.4, Chapter-IV.

10.2.2.7 Socio-Economic Environment:

The proposed project operation will provide positive impacts in the region on the employment area as well as on physical and social infrastructural status. Many other tangible benefits will be gained by the local people in the surrounding areas due to ancillary units, trading operations, contractual needs, casual labor, green belt development, etc. Towards the socio-economic development of the surrounding area, the proponent has earmarked an amount of Rs.5.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner.

10.3 ENVIRONMENTAL POLLUTION CONTROL COST:

In this proposed quarry Implementation of environmental control measures as stated above involves capital as well as recurring expenses. The probable capital and recurring environmental control cost are calculated and given below **Table No – 6.5**

Table 10.1: Environmental Control Cost

			Rs. In lakhs	
S. No	Mitigation Measure	Capital cost	Recurring Cost /Annum	
Air Environment				
1	Water sprinkling	8.00	0.50	
2	Installing wheel wash system near gate of quarry	0.50	0.20	
3	Muffle blasting – To control fly rocks during blasting	0.00	0.05	
4	Wet Drilling with dust extraction	0.25	0.03	
5	Environmental Monitoring	0.00	0.50	
6	Transport Trucks -Monitoring exhaust fumes, covering with tarpaulin, monitoring manually with security guard to avoid overloading and installation of speed governors, Parking area with flaggers for traffic management	2.90	0.74	
7	Road Maintenance - Haul road maintenance Regular sweeping and maintenance of approach road	0.00	0.88	
Sub-Total (A)		11.65	2.90	
Noise Environment				
8	Controlled Blasting using NONEL, provision of blaster shed	0.50	15.92	
Sub-Total (B)		0.50	15.92	
Water Environment				
9	Surface Runoff Management Structures	0.44	0.05	
Sub-Total (C)		0.44	0.05	
Implementation of EC, Mining Plan & DGMS Condition				



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10	Waste Management - Collection and Disposal	0.30	0.22
11	Fencing and Green Net Provision	8.84	0.10
12	Health and Safety - Provision of PPEs, IME, PME, First aid facility	1.28	0.82
13	Sign Boards -safety precaution signages, EC Conditions display board	0.20	0.03
16	Installation of CCTV cameras	0.30	0.05
17	Remuneration of statutory persons	0.00	7.80
Sub-Total (D)		10.92	9.02
Green Belt Development			
34	Plantation Inside the lease area(450 Nos.)	0.90	0.14
35	Plantation Outside the lease area (1800 Nos.)	5.40	0.54
Sub-Total (E)		6.30	0.68
Grand Total		29.81	28.56

Towards EMP measures, Rs.29.81 lakhs is allocated under capital cost. Besides, Rs.28.56 lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue.

10.4 CONCLUSION:

A meticulously well planned Environmental Management Plan, with various programme schedules and timely execution objectives, as above, will ensure that the future environmental quality in the area will be maintained within statutory limits. The environmental management strategy as explained above will prove that industrial growth, if properly planned with all environmental concerns and appropriate remedial measures can go a long way to improve life pattern and living conditions of the local community around the project.

* * * * *



CHAPTER-XI



**SUMMARY AND
CONCLUSION**

CHAPTER 11

SUMMARY & CONCLUSION

11.1 INTRODUCTION:

Thiru. R.Kathirvelu proposes to operate a Rough Stone and Gravel Quarry at Survey No. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu and has initiated action towards obtaining environmental clearance.

The lease period is 10 years. It is proposed to mine 4,76,435 m³ of Roughstone and 35,703 m³ of Weathered Rock and 74,124 m³ of Gravel for a period of 5 years upto a depth of 18m as per approved ToR as against the mining plan approved quantity of 6,00,630 m³ of Roughstone and 74,124 m³ of Gravel and 35,703 m³ of Weathered Rock for a period of 5 years upto a depth of 23m. During the balance 5 years, 5,41,795 m³ of Roughstone will be mined upto a depth of 48m bgl.

Although the individual lease area of this project is less than 5 Ha, the other existing quarries within the 500m radius cluster along with this subject project works out to >5 Ha. Hence, this proposal is considered under Category – B1 and as per MoEF & CC notification necessitates preparation of EIA/EMP report and public hearing. The details of the quarries located within the 500m radius of the project is given vide Annexure-3. A cumulative impact study has been carried out and furnished in Para 7.3, Chapter-VII.

This EIA/EMP report is prepared based on standard and additional Terms of Reference issued by SEIAA, Tamil Nadu vide letter no. SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022/ Dated 14.07.2022 and its Amendment dated 28.11.2022 and is in conformance of the generic structure prescribed by MOEF&CC in their notification of September 2006 and the approved mining plan. The impact assessment and mitigative measures is carried out for the peak production of the mine lease period and the entire area of quarry operation and can be construed as applicable for the entire lease period.

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11.1.1 STATUTORY APPROVALS:

S.No	Statutory Approval	Authority	Letter Number and Date	Reference
1.	Precise Area Communication Letter	Deputy Director, Dep. of Geology & Mining, Tiruvannamalai	Rc.No. 1127/Kanimam/2021 dated 30.03.2022	Annexure-1
2.	Mining Plan Approval	Deputy Director, Dep. of Geology & Mining, Tiruvannamalai	Rc.No1127/Kanimam/2021 dated 13.04.2022	Annexure-2
3.	Details of other quarries within 500m radius	Deputy Director, Dep. of Geology & Mining, Tiruvannamalai	Rc.No1127/Kanimam/2021 dated 13.04.2022	Annexure-3

11.1.2 ENVIRONMENTAL CLEARANCE APPLICATION:

Particulars	Details
Terms of Reference	Received from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.9227/SEAC/ToR-1195/2022. Dated:14.07.2022 and its Amendment dated 28.11.2022
Baseline Data Collection	Carried out by Creative Engineers & Consultants , Chennai for Summer Season (Dec 2022 to Feb 2023)

11.2 SALIENT FEATURES OF THE PROJECT:

Table 11.1: Site Details

Location	Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu
Survey No.	58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6
Coordinates	Latitude: 12°44'34.02"N to 12°44'41.99"N Longitude: 79°34'36.73"E TO 79°34'46.50"E
Nearest Highway	(SH-5) Tindivanam – Vembakkam –6.5km (SW)
Nearest Village	Kaganam – 1.0km (SE)
Nearest Town	Vembakkam – 4.5km - NE
Nearest Railway Station	Kanchipuram – 16.5km - E
Nearest Airport	Chennai – 68Km – SE
Topography	Plain terrain, dry lands with scarce vegetation.
Accessibility	The lease area can be approached through Sumangali Road which connects to Vembakkam on the northern side of the lease area and Cheyyar on the southern side of the lease area.



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Drainage	There is an odai at a distance of 50m from the lease area and a Thangal at a distance of 53m on the south west side.
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Table 11.2: Environment Setting of The Study Area

S.No	PARTICULARS	DETAILS
1	Nearest highway	(SH-5) Tindivanam – Vembakkam – 6.5km (SW)
2	Nearest Railway station	Kanchipuram – 16.5km - E
3	Nearest Airport	Chennai – 68Km – SE
4	Nearest major water bodies	Odai 50m from mine area Thangal – 53m(SW) Tandarai canal - 2.6km (SE) Mamandur Tank – 5.1km(E) Palar River -9.5km(NE)
5	Nearest town/City	Vembakkam – 4.5km - NE
6	Nearest villages	Sumangali – 1.3km(NW) Kanganam – 1.0km (SE) Karandai – 1.9km(NE)
7	Notified Archaeologically important places, Monuments	Mamandur Cave – 9.4km, E
8	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Nil within 10m radius
9	Reserved / Protected Forests	Tandappantangal RF – 6.5km (NW) Pulavakkam RF – 9.1km (W)
10	Defence Installations	Nil within 10 km radius
11	Seismic Zone	Zone – II (Least Active)
12	Other Industries in the study area	Other than rough stone quarry & crushers there are no other major industries in the area.

Table 11.3: Technical Description

PARTICULARS	DETAILS
Geological reserve	Roughstone – 19,83,285cum , Weathered Rock - 44,073cum Gravel-88,146cum
Mineable reserve	Roughstone – 10,18,230cum , Weathered Rock – 35,703cum



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PARTICULARS	DETAILS			
	Gravel-74,124cum			
Method of Mining	Open cast mechanized mining method with drilling, blasting, excavation, loading and transportation of Roughstone to needy buyers.			
Production	Year	Roughstone(m3)	Weathered Rock(m3)	Gravel(m3)
	I	109770	21988	45288
	II	109780	13715	28836
	III	126840	--	--
	IV	127185	--	--
	V	2860	--	--
	Sub Total (Year I to V)	476435	35703	74124
	Year VI to X	5,41,795	--	--
Total	10,18,230	35,703	74,124	
Waste Generation and Management	There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. The top overburden in the form of Gravel and weathered rock will be loaded into tipper and marketed to needy customers on payment of necessary Fees to Government. The excavated rough stone will be excavated and loaded into tipper to the needy buyers for producing crusher aggregates, M Sand.			
Ultimate Depth	5 years - 18m, Ultimate depth – 48m			
Man power	32 People directly and more than 50 people indirectly			
Mode of transport	By Road			
Water requirement	10 KLD			
Source of water	The required water will be procured from outside agencies initially. Later, water collected in the mine pit will be used to meet the needs.			
Power requirement	All the equipment will be diesel operated. No electricity is needed for mining operation. The minimum power requirement for office, etc will be met from state grid.			
Life of the mine	10 Years			
Project cost	Rs.98,68,000/-			



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11.3 EXISTING ENVIRONMENTAL SCENARIO:

11.3.1 GENERAL:

The studies and data collection have been carried out systematically and meticulously as per relevant IS codes, CPCB and MoEF&CC guidelines and as per approved ToR during **Winter Season (December 2022 to February 2023)** For the purpose of this study, the area has been divided into two zones, namely, core and buffer zones. Core zone is considered as the total lease area, while buffer zone encompasses an area of 10 km radius distance from the periphery of core zone.

11.3.2 SOCIO-ECONOMIC STATUS:

The proposed quarry is located in in kaganam Village, Vembakkam Taluk, Tiruvannamalai District. Based on 2011 census data, in the 10km radius the following are present:

Table 11.4: Details of Buffer Zone

Table 11.5: Social, Economic And Demographic Profile of the Study Area

Details	Population	Percentage
A. Gender-wise distribution		
Male Population	80104	50.10
Female Population	79779	49.90
Total	159883	100
B. Caste-wise population distribution		
Scheduled Caste	31389	19.63
Scheduled Tribes	1728	1.08
Other	126766	79.29
Total	159883	100
C. Literacy Levels		
Total Literate Population	111591	69.80
Others	48292	30.20
Total	159883	100
D. Occupational structure		
Main workers	61775	38.60
Marginal workers	16060	10.10
Total Workers	77835	48.70
Total Non-workers	82048	51.30
Total	289873	100

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11.3.2.1 SAMPLE SURVEY:

Nearby villages were visited for conducting sample Village survey on all socio-economic aspects and requirements of the people. The existing socio-economic scenario is studied and CER activities are also suggested to the proponent. The study details are given in **Para 3.2.4, Chapter – III.**

11.3.3 EXISTING ENVIRONMENTAL QUALITY:

Table 11.6: Baseline Data

A) METEOROLOGICAL DATA	Monitoring Location - Near Mine Lease Area		
PARAMETERS	MINIMUM	MAXIMUM	
Temperature in °C	20.4	34.0	
Humidity in %	30.6	97.0	
Wind speed Km/Hr	<1.8	37.1	
Predominant wind direction (From)	ENE		
B) AMBIENT AIR QUALITY	Monitoring Location – 5 locations		
PARAMETER	RESULT (µg/m³)		*LIMIT (µg/m³)
Location	Core Zone	Buffer Zone	
Particulate Matter (Size <10 µm)	52.6 – 78.6	39.4 – 65.2	100
Particulate Matter (Size <2.5 µm)	24.4 – 36.4	17.9 – 30.8	60
Sulphur Dioxide (as SO ₂)	5.4 – 7.7	4.2 – 7.2	80
Nitrogen Dioxide (as NO ₂)	7.1 – 11.8	5.8 – 10.5	80
Conclusion: The existing Ambient Air Quality levels for PM10, PM2.5, SO2 and NO2, are within the NAAQ standards prescribed CPCB limits of 100 µg/m ³ , 60 µg/m ³ , 80 µg/m ³ & 80 µg/m ³ . The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m ³)			
C) WATER QUALITY	Monitoring Location – 5 locations		
PARAMETER	Result	*LIMIT (µg/m³)	
pH at 25 °C	7.05 – 7.66	6.5-8.5	
Total Dissolved Solids, mg/L	340 – 656	2000	
Chloride as Cl ⁻ , mg/L	13.7 – 216	1000	
Total Hardness (as CaCO ₃), mg/L	184 – 368	600	
Total Alkalinity (as CaCO ₃), mg/L	187– 257	600	
Sulphates as SO ₄ ²⁻ , mg/L	BDL(D.L - 5.0) – 55.4	400	
Iron as Fe, mg/L	BDL(D.L - 0.01)– 0.05	0.3	



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Nitrate as NO ₃ , mg/L	1.5– 4.65	45	
Fluoride as F, mg/L	0.16 – 0.58	1.5	
Conclusion: The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications.			
D) NOISE LEVELS		Monitoring Location – 5 locations	
PARAMETER	RESULT dB(A)		*LIMIT (µg/m³)
	Day Equivalent	Night Equivalent	
Core Zone	46.5	39.6	90
Buffer Zone	46.9 – 48.8	37.8 – 40.7	Day Equivalent - 55dB(A), Night Equivalent - 45dB(A)
*Permissible noise for industrial workers as laid down by CPCB (at 8 hrs Exposure Time). While comparing with the MoEF&CC Norms, the monitored ambient noise levels are generally within the limit values.			
E) SOIL QUALITY		Monitoring Location – 3 locations	
PARAMETER	Range of values		
pH	6.96 – 7.65		
Electrical Conductivity (µmho/cm)	39.68 – 98.54		
Organic matter (%)	0.64 – 0.89		
Total Nitrogen (mg/kg)	55.6 – 165		
Phosphorus (mg/kg)	1.56 – 2.65		
Sodium (mg/kg)	428- 492		
Potassium (mg/kg)	320 -362		
Soil is of Sandy Clay Loam type.			

F) LAND ENVIRONMENT:

For the present study on land use pattern in the study area, remote sensing satellite data have been used. Major part of the lease area is fallow land followed by land with scrub, water bodies, mining areas, river and builtup area.

G) BIOLOGICAL ENVIRONMENT:

Flora: The lease area is a non-forest, private land. Major part of lease area is barren fallow land with few bushes (Prosopis juliflora) and grasses.



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Fauna: There is no Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals are commonly found. The lease and 10 Km buffer zone does not fall in the Western Ghats ESA boundary. No wild mammalian species was directly sighted during the field survey. There is no Schedule I animals in the buffer zone area. The detailed list of fauna Species in the buffer zone is given in **Table No - 3.26, Chapter - III.**

H) HYDROGEOLOGICAL STUDY:

In the study area, wells and borewells were studied which indicate that shallow aquifer is developed through dug wells and deeper aquifer through tube wells. The groundwater has revealed that potential fractures are encountered at deeper levels. Rain water collected in the tanks in the region acts as a good source of water during post monsoon. The water in the wells are available mainly after post monsoon and it reduces during summer.

The occurrence of groundwater mainly in the porous soil are weathered layers, very negligible amount of groundwater percolated through the poorly fractured layer, after that there is no existence of groundwater. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected. From the nearby working mines, no such seepage is also observed.

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:

11.4.1 GENERAL:

This is a proposed project and Semi – Mechanized Open Cast mining will be carried out to quarry out Rough Stone & Gravel. The identified impacts due to this mine during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc.

11.4.2 AIR ENVIRONMENT:

The principal sources of air pollution in the area due to mining and allied activities are dust generation in the mine due to various activities such as excavation of material, movement of HEMM, loading, unloading and transportation operations.. Besides, Gas emission also occur as a result of emission of SO₂, NO_x, CO etc., from diesel driven mining equipment, compressors, generator sets, etc. The following measures will be adopted to control impact on the air quality due to mining operations in the lease area:



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Table 11.7: Mitigation Measures – Air Environment

S.No	Activity	Mitigation Measures
1	Drilling	Usage of Drill bits in good condition
		Covering of drill holes with wet cloth
		Usage of sharp drill bits for drilling of holes.
		Provision of dust filters / mask to workers working at highly dust prone and affected areas.
2	Blasting	Well-designed blasting parameter, effective stemming to achieve optimum breakage occurs without generating fines.
		Use of appropriate explosives for blasting and avoiding overcharging of blast holes.
		Avoiding blasting during high wind periods where the fine dust is carried out away easily affecting the ambient air quality.
		Use of controlled blasting techniques with Nonel to keep the dust generation, noise as well as vibration level within the prescribed limits.
3	Excavation and Loading	Proper maintenance of HEMM
		Enclosures for operator cabin.
		Imparting sufficient training to operators on safety and environmental parameters.
		Proper maintenance of hauling equipments.
		Avoiding overloading of dumpers.
4	Transportation	Regular wetting of transport road using mobile water tanker.
		Proper maintenance of haul road and other roads
		Setting up of tyre wash facility in the transport road.
		Avoiding overloading of tippers
		Covering of loaded tippers with tarpaulins during transportation
		Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
5	Others	Development of greenbelt / barriers around mine in the safety zone and carrying out plantation within the lease area.
		Green netting will be carried out around the lease periphery on all sides.

Due to adoption of all these measures, no major impact on air quality is envisaged due to this proposed opencast mining operation.

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The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. Ground Level Concentration (GLC) have been computed using hourly meteorological data for particulate matter PM10 and PM2.5.

The resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM₁₀ are in the range of 57.2 µg/m³ to 84.4 µg/m³ and with respect to PM_{2.5} are in the range of 26.9 µg/m³ to 38.7 µg/m³ which are within the statutory limits in each case.

For preservation of environment in this mine strict enforcement of management schemes will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

11.4.3 WATER ENVIRONMENT:

Water Requirement: The total water requirement for this project will be 10.0 KLD comprising 1.0 KLD for drinking water and domestic use, 8.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose.

The activity / source of pollution, its impact / consequence, proposed control measures are explained below:

Table 11.8: Mitigation Measures – Water Pollution

S.No	Source	Consequence	Mitigation Measures
A	Domestic use	Generation of waste water	The domestic sewage to be generated from the project will be collected in septic tank with soak pits.
B	Rainfall	Runoff from waste dump and stack	Towards surface runoff management, a garland drain of length 1200m will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users.
		Rainwater Harvesting	The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc.
C	Drainage	Disturbance to	There is an odai at a distance of 50m in the south western side of



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	Course	drainage course	the lease area. It connects to a Thangal at a distance of 53m on the south western side of the lease area. There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.
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- Stage of Groundwater Development:** The groundwater resource data of Tiruvannamalai district was obtained from the data provided in the technical report of the Central Ground Water Board, South Eastern Coastal Region – ‘District groundwater brochure, Tiruvannamalai District.’ Based on the report it is seen that this area can be categorized as ‘Safe’ from ground water development point of view.
- Generation of mine pit water:** The occurrence and movement of groundwater in hard rock formations are restricted to the porous zones of weathered formations and the open systems of fractures, fissures and joints. Generally, in hard rock regions, occurrence of weathered thickness is discontinuous both in space and depth. Hence recharge of groundwater in hard rock formations is influenced by the intensity and depth of weathering. In the nearby region, the formations are compact with less intergranular porosity and fractures leading to less permeability and transmissivity values and as such the ground water level in this area is deep from surface. The mining area consists of hard compact rock, hence no major water seepage within the mine is expected from the periphery. The ultimate pit depth of mining is 18m. The ground water table in this area is below this level. Hence, ground water intersection is not envisaged and ground water will not be affected appreciably due to the quarrying operation.

11.4.4 NOISE ENVIRONMENT:

Anticipated noise levels resulting from operation of the various machineries like excavator, tippers, drill have been computed using point source model. Computation of cumulative noise levels at the nearby villages is made based on the assumption that there are no attenuation paths between the source and the boundary. From the studies, it is found that the predicted Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor. However, practically there will be attenuation due to vegetation etc., and as such there will not be any adverse noise propagation outside the lease boundary. Since the habitations are also away the effect of noise due to mining operations will not be felt at all in the surrounding village. Hence, by implementing the following mitigative measures for noise control, the impact on noise levels will continue to be insignificant:



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- Planting rows of native trees along roads, around mine area and other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipments like shovel, tippers, etc.
- Proper and regular maintenance of equipments may lead to less noise generation.
- Providing in-built mechanism for reducing sound emissions.
- Providing earplugs to workers exposed to higher noise level.
- Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.
- Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.
- Provision of green net in lease periphery

Further green belt and afforestation will be planned and executed to abate noise and dust propagation in the area.

11.4.5. VIBRATION:

To reduce ground vibratory conditions, various control measures will be implemented such as keeping PPV below 10mm/s for 8-25hz frequency range, formulating drilling and charging pattern with less explosive charge, initiating sequence and using NONEL, carrying out blasting with minimum charge per delay, avoiding blasting during strong winds etc. By adoption of above measures, it will be ensured that the ground level vibration due to blasting are maintained within the limits prescribed by DGMS, Dhanbad at the mining areas vide Circular No. 7 dated 29 -08-1997. Besides, different blasting time for the projects in the vicinity is suggested and the timing is to be mentioned in the display board in the respective mines entrance. Elaborate details regarding the same are provided under section 4.4.2, Chapter-IV.

11.4.6 IMPACT ON LAND ENVIRONMENT:

The lease area of 4.420 Ha is a patta land in the name of Tvl.SKT Mines vide patta nos.1042 and 1041, wherein applicant is also a partner. **(Annexure-IV of mining plan)** The applicant has obtained letter of authorization from other partners. **(Annexure-VII of mining plan)** Mining will



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be carried out up to 18m depth for 5 years, Subsequently, in the remaining 6th to 10th year, the entire lease area will be mined at a depth of 48m. Ultimately the entire mined out area of 3.550 Ha will be left as water body. 0.030 Ha will be the mine roads & infrastructure, 0.400 Ha will be covered with vegetation, and 0.440 Ha will be left as unutilized area. Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals. In the post mining stage the rainwater harvested in the mined out void shall be utilized.

11.4.7 BIOLOGICAL ENVIRONMENT:

Necessary mitigative measures like dust suppression, proper maintenance of equipment's, greenbelt and plantation etc., will be carried out to prevent dust generation & any further impact on the vegetation. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2250 trees will be planted in and around the lease area.

11.4.8 SOCIO ECONOMIC ENVIRONMENT:

The entire lease area is a private patta land. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here. The mining operations in the proposed quarry will employ about 32 people. Besides through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service related activities connected with the project operations.

Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner. In consultation with the locals based on the need & priority it will be implemented.

11.4.9 OCCUPATIONAL HEALTH AND SAFETY ASPECTS:

In order to ensure minimisation of occupational health and safety problems in the project operation, the following preventive remedial measures will be effectively exercised in the project operations, so as to comply with applicable standards.



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- Medical examination of workers at pre-entry level stage of workers, etc., by qualified doctors, with periodical examination of all workers/staff at least once a year, as per DGMS circulars.
- Regular awareness campaigns amongst staff and workers
- Staff will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

11.4.10 IMPACT ON LOCAL LOGISTICAL SYSTEM DUE TO PROJECT:

From this proposed quarry the entire output will be transported to the consumers like external crusher units for producing stone aggregates of different sizes or construction of roads, bridges, buildings and other buyers etc. There will be about 8 trips per hour. The transport route can easily absorb this negligible traffic due to this project. The following mitigative measures are suggested for mitigation of adverse impacts on the logistical aspect of the project:

- ❖ Water sprinkling on Rough stone in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Proper maintenance of transport roads
- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.

11.4.11 WASTE MANAGEMENT:

Since the entire mined out material will be used there will not be any solid waste generation from this project. There is no process effluent generation from this mine. Hence no liquid waste is generated.

The hazardous waste generated in this mine will be stored in a separate storage area with impervious containers for waste oil, oil contaminated clothes, used lead acid batteries, scraps, tyre storage etc. It will be disposed through authorized recyclers or re-processors periodically. The hazardous wastes will be transported in accordance with the provisions of rules. By effective implementation of above said mitigation measures no major impact due to Hazardous waste is expected.



DRAFT EIA/EMP REPORT FOR ROUGH STONE AND GRAVEL QUARRY OF THIRU R.KATHIRVELU OVER AN AREA OF 4.42.0Ha IN KAGANAM VILLAGE, VEMBAKKAM TALUK, TIRUVANNAMALAI DISTRICT, TAMIL NADU.

Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.

11.5 ENVIRONMENTAL MONITORING PROGRAMME:

The monitoring schedules are planned for systematic study of various pollution levels with respect to air and water qualities, noise levels, etc. to ensure that they conform to the standards laid down by Environmental Protection Act and various statutory Limits.

Monitoring location and the frequency of monitoring shall be suitably modified in consultation with the nodal agency as per the actual requirements and prevailing conditions of the mine and environmental factors, as dictated from time to time, depending on the prevailing pollution levels, if required.

Towards EMP measures, Rs.29.81 Lakhs is allocated under capital cost. Besides, Rs.28.56 Lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue. Further details of the capital and recurring cost of environmental management has been provided in in Table No. 10.2, Chapter-X.

11.6 ADDITIONAL STUDIES:

The additional studies covered for this EIA / EMP report are:

1. Public consultation of the project as per MoEF&CC mandates.
2. Risk Assessment
3. R&R Plan
4. Mine closure plan

This draft EIA/EMP report will be exposed to public consultation as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures. The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.



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Elaborate description in respect of Risk Assessment and Mine closure plan are given in **Chapter - VII**.

Although the individual lease area of this project is less than 5 Ha, the other existing and proposed quarries within the 500m radius along with this subject project works out to >5 Ha. As such cluster situation applicable and this EMP is prepared. The baseline monitoring carried out for this project reflects the cumulative impact of the existing quarry. Considering that the lease period of the existing quarry will be coming to an end shortly, this proposed quarry will serve more as a replacement for the existing quarries to ensure meeting the present Roughstone demands.

11.7 CONCLUSION:

By systematic and scientific mining adhering to all the statutory norms and enforcing and strictly implementing the above said mitigation measures mentioned in this report, no adverse impact is envisaged. The proposed mining project will benefit this region in the fields of potential employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, medical healthcare systems, etc. in its own way and also revenue to Government through royalty, taxes etc. Besides, it will meet the raw material requirement of the construction industry also.

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CHAPTER - XII

DISCLOSURE OF CONSULTANTS ENGAGED

CHAPTER 12

DISCLOSURE OF CONSULTANTS ENGAGED

Creative Engineers & Consultants, Chennai is an **NABL** accredited testing laboratory and **NABET** accredited EIA consultancy. Established over 25 years ago, this company has steadily made good strides in the environmental impact assessment fields, and is also one of the first companies to get accredited by NABET as an Accredited Consultant Organization as early as 2011. Creative Engineers & Consultants has to its credit, successful completion of numerous EIA/EMP reports, grant of environmental clearances and periodic environmental monitoring works. Presently, the company has been accredited by NABET as a 'Category-A' organization for the sectors of Mining of Minerals (opencast only), Thermal Power Plants, Mineral Beneficiation and Cement Plants with the accreditation valid upto 23.12.2023. The team of experienced professionals that are a part of this organization has been detailed below.

Figure 12.1: Disclosure of consultants engaged

EXPERT NAME	QUALIFICATION	POSITION	EXPERIENCE
Mr. P. Giri	AMIE (Mining)	EIA Coordinator & Functional area Expert (AP,NV,HW),	Over 30 years of experience in EIA/EMP report, mine plan preparation, including modeling
Mr. K. Shankar	M.Sc (Geology). PGMEMG	Functional area Expert (GEO, HG, SHW, RH) & IBM approved RQP.	Over 25 years of experience in EIA/EMP report, Mine plan, hydrological report preparation
Dr. N. Radhakrishnan	M.Sc., M.Tech., Ph.D	Functional area Expert (Land use)	Over 25 years of experience in using the advanced spatial analysis techniques in GIS environment. Specialized in Spatial Information Technology and Applications (remote sensing, GIS)
Mr.S.S.Rajendran	M.Sc. (Pharmaceutical Chemistry)	Lab head	More than 9 years of experience in Environmental laboratory.



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TALUK, TIRUVANNAMALAI DISTRICT, TAMIL NADU.**

EXPERT NAME	QUALIFICATION	POSITION	EXPERIENCE
Mr. R. Babu raj	M.A (Sociology), B.Com(Y.L&Cost), ITI, Advance Diploma in Computer application	Functional Area Expert (Socio Economy)	Over 13 years of experience in dispersion modeling, computer applications. Specialized in CAD and computer software, applications. 5years experience in the field of socio economy and its allied report preparation.
Mr. B. Govindaraman	B.Sc.	Field technician	Over 20 years of field monitoring & data collection experience
Dr.B.Swamynathan	M.Sc (Ecology & Environmental Sciences), M.Phill (Botany), Ph.D (Ecology & Environmental Sciences)	EIA Coordinator, FAE (AQ, WP)	More than 6 years of experience in Environment and allied fields.
Ms. G. Sandhya	B. Tech Chemical Engineering M.Tech Environmental Engineering	Functional Area Expert (AQ, WP)	Over 5 years experience in preparation of EIA/EMP reports

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ANNEXURES

ந.க.எண்:1127/கனிமம்/2021



திருவண்ணாமலை மாவட்டம் - வெம்பாக்கம் வட்டம் - காகனம் கிராமம் - புல எண்கள். 44/8B (0.23.0) மற்றும் பலவற்றின் 4.90.0 ஹெக்டேர் பரப்பில் சாதாரணகல் மற்றும் கிராவல் வெட்டியெடுக்க - குவாரி குத்தகை உரிமம் வழங்கக்கோரி திரு.R.கதிர்வேலு, என்பவர் விண்ணப்பம் செய்தது - பரிந்துரை அறிக்கை வரப்பெற்றது - சுரங்கத் திட்டம் (Mining Plan) தயார் செய்து சமர்ப்பிக்க கோருவது - தொடர்பாக.

நாள்:30.03.2022.

அறிவிக்கை

பொருள்: கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - திருவண்ணாமலை மாவட்டம் - வெம்பாக்கம் வட்டம் - காகனம் கிராமம் - புல எண்கள். 44/8B (0.23.0) மற்றும் பலவற்றின் 4.90.0 ஹெக்டேர் பரப்பில் சாதாரணகல் மற்றும் கிராவல் வெட்டியெடுக்க - குவாரி குத்தகை உரிமம் வழங்கக்கோரி திரு.R.கதிர்வேலு, என்பவர் விண்ணப்பம் செய்தது - பரிந்துரை அறிக்கை வரப்பெற்றது - சுரங்கத் திட்டம் (Mining Plan) தயார் செய்து சமர்ப்பிக்க கோருவது - தொடர்பாக.

- பார்வை: 1. திரு.R.கதிர்வேலு, எண்.19சி, விளக்கடி கோவில் தோப்பு தெரு, காஞ்சிபுரம் என்பவர் விண்ணப்பம், நாள் 03.12.2021.
2. இவ்வலுவலக கடிதம் ந.க.எண்.1127/கனிமம்/2021, நாள் 03.12.2021.
3. வருவாய்க்கோட்ட அலுவலர், செய்யார் அவர்களின் கடிதம் ந.க. அ5/5633/2021, நாள்.11.03.2022.
4. உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, திருவண்ணாமலை அவர்களின் புலத்தணிக்கை அறிக்கை நாள்.16.03.2022.
5. அரசாணை (MS)எண்.169 தொழில்துறை (எம்.எம்.சி1) துறை நாள்.04.08.2020.
6. அரசாணை (MS)எண்.208 தொழில்துறை (எம்.எம்.சி1) துறை நாள்.21.09.2020.
7. தொடர்புடைய ஆவணங்கள்.

திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், காகனம் கிராமம் புல எண்கள்.44/8B (0.23.0), 58/1A (0.40.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/4B1 (0.16.0), 61/5A (0.08.5), மற்றும் 61/5B (0.33.0)-ல் 4.90.0 ஹெக்டேர் பரப்பில் சாதாரணகல் மற்றும் கிராவல் வெட்டியெடுக்க 10 ஆண்டுகளுக்கு குவாரிக்குத்தகை உரிமம் வழங்கக்கோரி திரு.R.கதிர்வேலு, என்பவர் அளித்த பார்வை 1-ல் கண்ட விண்ணப்பத்தின் மீது பார்வை 3-ல் கண்ட வருவாய்க்கோட்ட அலுவலர், செய்யார் அவர்களின் மற்றும் பார்வை 4-ல் காணும் திருவண்ணாமலை மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை, துணை இயக்குநர் அலுவலக உதவி புவியியலாளர் ஆகியோர் அளித்த பரிந்துரை அறிக்கைகள் பரிசீலிக்கப்பட்டது.



3. திரு.R.கதிர்வேலு, என்பவர் சாதாரணக்கற்கள் மற்றும் கிராவல் வெட்டியெடுக்க 10 ஆண்டுகளுக்கு குவாரிக்குத்தகை உரிமம் வழங்கக்கூடிய விண்ணப்பித்துள்ள வெம்பாக்கம் வட்டம், காகனம் கிராமம் புல எண்கள் 58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5), மற்றும் 61/6 (0.14.5) 4.42.0 ஹெக்டேர் நிலப்பரப்பில் எவ்வித தடையும் இன்றி குவாரிப்பணி செய்ய வாய்ப்பு உள்ளதால், மேற்படி விண்ணப்பதாரர் திரு.R.கதிர்வேலு, என்பவருக்கு சாதாரணக்கற்கள் மற்றும் கிராவல் மண் வெட்டி எடுக்க குவாரி குத்தகை உரிமம் வழங்க பரிந்துரை செய்யப்பட்ட 4.42.0 ஹெக்டேர் பரப்பினை கற்குவாரி செய்ய உகந்த புலம் (Precise Area) என தீர்மானித்து கீழ்கண்ட நிபந்தனைகளுக்கு உட்பட்டு அறிவிப்பு செய்யப்படுகிறது.

நிபந்தனைகள்

- 1) விண்ணப்ப புலத்திற்கு அருகில் புல எண் 69-ல் செல்லும் ஓடைக்கு 50மீ பாதுகாப்பு இடைவெளி விட வேண்டும்.
- 2) அருகில் உள்ள பட்டா நிலங்களுக்கு 75மீ பாதுகாப்பு இடைவெளி விடவேண்டும்.
- 3) பொதுமக்களுக்கும் அருகிலுள்ள நிலங்களுக்கும் எவ்வித பாதிப்பும் ஏற்படுத்தக்கூடாது.
- 4) குவாரிப்பணி தொடங்குவதற்கு முன்பாக குவாரியை சுற்றி முள் கம்பிவேலி அமைத்து குவாரிப்பணி தொடங்க வேண்டும்.
- 5) முறைப்படியும், விஞ்ஞானபூர்வமாகவும் குவாரிப்பணி செய்யவேண்டும்.
- 6) சான்றிதழ் பெறப்பட்ட போர்மேன், வெடிப்பாளர் மற்றும் சுரங்க மேலாளர் மூலம் முறையே குவாரிப்பணி செய்யப்பட வேண்டும்.
- 7) குவாரிப்பணி தொடங்குவதற்கு முன் சுரங்க பாதுகாப்பு இயக்குநர், சென்னை அவர்களுக்கு தகவல் தெரிவிக்கப்பட வேண்டும்.
- 8) பாறைகளைத் தகர்க்க கைத்துளைப்பான்களை கொண்டு பாறைகளை துளையிட்டு குறைவான வெடிபொருட்கள் பயன்படுத்த வேண்டும்.

3. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதிகள் 41 மற்றும் 42-ன்படி கல் மற்றும் இதர சிறு கனிமங்களுக்கு குவாரி குத்தகை உரிமம் வழங்கும் முன்பு ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்று பெறப்பட வேண்டும் என வரையறுக்கப்பட்டுள்ளது.

4. எனவே, திரு.R.கதிர்வேலு, என்பவர் ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மைச் சான்றினை பெற்று சமர்ப்பிக்கும் பட்சத்தில் வெம்பாக்கம் வட்டம், காகனம் கிராமம் புல எண்கள் 58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5), மற்றும் 61/6 (0.14.5) 4.42.0 ஹெக்டேர் பரப்பில் கற்குவாரி செய்ய தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண் 19(1) மற்றும் 20-ன்கீழ் 10 ஆண்டுகளுக்கு குத்தகை உரிமம் வழங்க உரிய நடவடிக்கை மேற்கொள்ளப்படும் என்ற விவரம் தெரிவிக்கப்படுகிறது.

From
Thiru.A.Perumal, M.Sc., M.Phil.,
Deputy Director,
Geology and Mining,
Tiruvannamalai - 4.

To
Thiru.Kathirvelu,
No.19C, Vilakkadi Kovil Thoppu street
Kancheepuram District.

Rc.No.1127/Kanimam/2021, dated: 13.04.2022

Sir,

Sub: Quarries and Minerals - Minor Mineral Rough Stone - Tiruvannamalai District - Vembakkam Taluk - Kaganam village - Patta S.F.Nos.58/1A (0.40.5), & etc., over an extent **4.42.0** hecets., - Application preferred by **Thiru.R.Kathirvelu** - Precise area communicated - Submission of Mining Plan for approval - Approved - Regarding.

- Ref: 1. Application from Thiru.R.Kathirvelu, Kancheepuram dated.03.12.2021.
2. Precise Area Communication Notice Rc.No.1127/Kanimam/2021, dated.30.03.2022.
3. Mining Plan submitted by Thiru.R.Kathirvelu, Kancheepuram dated.13.04.2022.

In the reference (2)nd cited, the Deputy Director, Geology and Mining Tiruvannamalai has communicated the SF.Nos.58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5), & 61/6 (0.14.5) over an extent **4.42.0** hecets., of Kaganam village, Vembakkam Taluk, as precise area to the applicant **Thiru.R.Kathirvelu** for grant of quarry lease for quarrying Rough Stone and Gravel for a period of 10 years with a direction to produce an approved mining plan in respect of the precise area as per Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959 by incorporating the conditions stipulated in the Deputy Director, Geology and Mining Tiruvannamalai letter dated 30.03.2022.

2. In response to the precise area communication letter issued by the Deputy Director, Geology and Mining, the applicant has prepared the draft Mining Plan for the first 5 years though the precise area been granted for 10 years through the Recognized Qualified Person and submitted for approval vide reference 3rd cited.



3. The draft mining plan submitted in respect of the precise area communication has been examined with reference to the provisions of Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the followings are observed.

- i) The boundary Co-ordinates (GPS-readings) for the entire boundary pillars of the area have been incorporated and shown in the mining plan.
- ii) All the conditions stipulated in the Deputy Director, Geology and Mining Letter Rc.No.1127/Kanimam/2021 dated:30.03.2022 have been incorporated in the mining plan.
- iii) The available geological and mineable resources in the precise area restricted to a depth of **48m below ground level for period of 10 years** is as follows.

Depth in Mts.	Geological reserves in Cu.m	Mineable Reserves in Cu.m
48m (2m Gravel + 1m Weathered Rock + 45m Rough Stone)	Rough Stone : 19,83,285 Weathered Rock : 44,073 Gravel : 88,146	Rough Stone : 10,18,230 Weathered Rock : 35,703 Gravel : 74,124

- iv) The recoverable reserves estimated for the first **5 years in the mining plan for quarrying Rough Stone and Gravel to a depth of 23m below the ground level** is as follows.

Depth in Mts.	Mineable Reserves in Cu.m
23m (2m Gravel + 1m Weathered Rock + 20m Rough Stone)	Rough Stone : 6,00,630 Weathered Rock : 35,703 Gravel : 74,124

4. In the light of the above, in exercise of the powers conferred under Rule 41 (7) of Tamil Nadu Minor Mineral Concession Rules, 1959 the mining plan in respect of Rough Stone quarry of **Thiru.R.Kathirvelu** is approved subject to the following conditions.

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


ii) The approval of the mining plan does not in any way imply the approval of the Government it 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, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under and the Tamil Nadu Minor Mineral Concession Rule s, 1959.




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

iv) 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.

Encl: 2 Copies of Approved Mining Plan.


Deputy Director,
Geology and Mining,
Tiruvannamalai.

Copy submitted to:

- 
1. The Chairman, SEIAA,
Tamil Nadu, 3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.



93 Annexure-1D

From

Thiru.A.Perumal, M.sc., M.phil.,
Deputy Director,
Geology and Mining,
Tiruvannamalai District.

To

Thiru.Kathirvelu,
No.19C,
Vilakkadi Kovil Thoppu street,
Kancheepuram District.

Rc.No. 1127/Kanimam/2021, dated: 13.04.2022

Sir,

Sub: Quarries and Minerals – Minor Mineral Rough Stone – Tiruvannamalai District – Vembakkam Taluk – Kaganam village – Patta S.F.Nos.58/1A (0.40.5), & etc., over an extent **4.42.0** hecets., - Application preferred by **Thiru.R.Kathirvelu** – Precise area communicated – Submission of Mining Plan for approval - Approved - Regarding..

Ref: Thiru.R.Kathirvelu, Kancheepuram District letter dated.13.04.2022.

♦♦♦♦♦

In the reference cited, applicant Thiru.R.Kathirvelu, the applicant of proposed Rough Stone quarry lease in SF.Nos.58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5), & 61/6 (0.14.5) over an extent **4.42.0** hecets., of Kaganam village, Vembakkam Taluk, has requested to furnish the details of quarries located within 500 meters radius from his proposed quarry.

In this regard, the followings are furnished.

i). Existing quarries

Sl. No.	Name of the Owner (Tvl.)	Village & S.F. Nos.	Extent in Hect.	Lease Period	Remarks
1	Thiru. S.Sridhar, S/o. T.Sivaprakasam, Managing Director, SKT Mines, No. 19C, Vilakkadi Koil Thoppu St., Kancheepuram	44/11, 58/4, 5A, 60/2, 58/5B, 59/1A, 1B, 2B, 60/3, 5, 6, 7	3.96.5	17.09.2018 to 16.09.2023	Existing quarry



ii). Abandoned quarries

Sl. No	Name of the Owner (Tvl)	Village & S.F. Nos.	Extent in Hect.	Lease Period	Remarks
Nil					

iii). Present Proposed quarries

Sl. No	Name of the Owner (Tvl)	Village & S.F. Nos.	Extent in Hect.
1	Thiru.Kathirvelu, No.19C, Vilakkadi Kovil Thoppu street, Kancheepuram District.	Kaganam 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A, & 61/6	4.42.0

iv). Future Proposed quarries

Sl. No	Name of the Owner (Tvl)	Village & S.F. Nos.	Extent in Hect.
--Nil--			

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18/4/22
Deputy Director,
Geology and Mining,
Tiruvannamalai.

[Handwritten signature]
13/4/22

POPULATION BREAKUP & LITERACY LEVEL IN THE BUFFER ZONE

Sl.No	No. of Villages	Name of village	Rural / urban	HOUSE HOLDS	POPULATION			POPULATION BELOW 6 AGE GROUP			SCHEDULE CASTE			SCHEDULE TRIBE			LITRERATES			ILLITRERATES		
					TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE
0-2 km,Cheyyar Sub-District, Tiruvannamalai District																						
1	1	Karanthai	Rural	221	881	451	430	108	53	55	596	300	296	12	5	7	690	384	306	191	67	124
2	2	Thenkazhani	Rural	599	2494	1199	1295	243	110	133	3	0	3	0	0	0	1742	965	777	752	234	518
3	3	Kaganam	Rural	203	806	422	384	73	37	36	459	237	222	32	16	16	468	294	174	338	128	210
4	4	Kanagampakkam	Rural	55	231	126	105	25	13	12	0	0	0	0	0	0	146	97	49	85	29	56
		total (A)		1078	4412	2198	2214	449	213	236	1058	537	521	44	21	23	3046	1740	1306	1366	458	908
2-5 km,Cheyyar Sub-District, Tiruvannamalai District																						
5	1	Siruvanjpattu	Rural	107	405	194	211	33	16	17	0	0	0	0	0	0	270	149	121	135	45	90
6	2	Azhividaithangi	Rural	1146	4494	2251	2243	477	259	218	732	359	373	82	42	40	2834	1619	1215	1660	632	1028
7	3	Seleri	Rural	150	548	281	267	80	38	42	81	44	37	4	3	1	366	218	148	182	63	119
8	4	Thiruppanamoor	Rural	574	2233	1104	1129	235	119	116	1010	510	500	22	8	14	1457	797	660	776	307	469
9	5	Thiruvadirayapura m	Rural	159	631	318	313	67	37	30	0	0	0	0	0	0	458	247	211	173	71	102
10	6	Kizhnelli	Rural	402	1580	783	797	150	67	83	265	129	136	0	0	0	852	502	350	728	281	447
11	7	Alanthangal	Rural	134	541	271	270	65	27	38	0	0	0	16	8	8	209	123	86	332	148	184
12	8	Kodaiyampakkam	Rural	204	843	404	439	80	36	44	0	0	0	8	3	5	559	324	235	284	80	204
13	9	Perungattur	Rural	895	3735	1839	1896	404	202	202	941	470	471	13	4	9	2755	1488	1267	980	351	629
14	10	Chithathur	Rural	657	2654	1284	1370	283	142	141	587	276	311	63	30	33	1640	889	751	1014	395	619
15	11	Palli	Rural	688	2722	1348	1374	274	135	139	1165	590	575	39	18	21	1831	1034	797	891	314	577
16	12	Mangalam	Rural	80	314	157	157	31	16	15	87	41	46	8	5	3	243	133	110	71	24	47
17	13	Vadapoondipattu	Rural	240	969	472	497	88	45	43	605	305	300	0	0	0	697	371	326	272	101	171
18	14	Mariyanallur	Rural	131	506	245	261	54	24	30	0	0	0	66	31	35	321	179	142	185	66	119
19	15	Perumpandi	Rural	12	57	30	27	7	4	3	0	0	0	34	19	15	25	14	11	32	16	16
20	16	Nedumpirai	Rural	349	1418	706	712	104	52	52	227	114	113	27	13	14	1063	581	482	355	125	230
21	17	Jaderi	Rural	137	530	270	260	43	25	18	2	1	1	0	0	0	343	220	123	187	50	137
22	18	Thenpoondipattu	Rural	123	525	261	264	60	22	38	308	161	147	0	0	0	315	192	123	210	69	141
23	19	Thumbai	Rural	166	633	321	312	34	24	10	235	120	115	0	0	0	391	240	151	242	81	161
		total (B)		6354	25338	12539	12799	2569	1290	1279	6245	3120	3125	382	184	198	16629	9320	7309	8709	3219	5490
5-10 km,Cheyyar Sub-District, Tiruvannamalai District																						
24	1	Seevaram	Rural	215	880	435	445	86	49	37	178	87	91	16	9	7	557	320	237	323	115	208
25	2	Cheyyanur	Rural	288	1179	573	606	144	72	72	396	191	205	0	0	0	869	464	405	310	109	201
26	3	Vengalathur	Rural	543	2315	1159	1156	249	122	127	685	333	352	0	0	0	1566	878	688	749	281	468
27	4	Umaiyalpuram	Rural	230	884	437	447	105	50	55	3	2	1	0	0	0	500	295	205	384	142	242
28	5	Chettithangal	Rural	73	325	162	163	50	29	21	320	161	159	0	0	0	234	118	116	91	44	47
29	6	Ozhukkavakkam	Rural	62	213	106	107	21	6	15	2	1	1	25	13	12	170	94	76	43	12	31
30	7	Thalikkal	Rural	136	525	245	280	60	25	35	282	136	146	0	0	0	340	182	158	185	63	122
31	8	Vellakulam	Rural	178	830	420	410	101	44	57	149	77	72	0	0	0	597	338	259	233	82	151
32	9	Thiruppanangadu	Rural	437	1863	870	993	217	101	116	909	456	453	55	13	42	1191	631	560	672	239	433
33	10	Vembakkam	Rural	775	3177	1573	1604	357	174	183	644	307	337	13	6	7	2317	1246	1071	860	327	533
34	11	Kuthanur	Rural	846	3509	1780	1729	356	169	187	563	287	276	31	13	18	2152	1303	849	1357	477	880
35	12	Thennampattu	Rural	575	2339	1184	1155	214	101	113	635	321	314	51	21	30	1555	938	617	784	246	538
36	13	Pillanthangal	Rural	316	1308	653	655	128	55	73	253	129	124	16	10	6	818	464	354	490	189	301
37	14	Namandi	Rural	318	2031	1185	846	149	78	71	542	283	259	1	0	1	1431	946	485	600	239	361
38	15	Vada Mavanthal	Rural	456	1930	972	958	226	107	119	228	108	120	33	20	13	1334	760	574	596	212	384
39	16	Perumanthangal	Rural	319	1259	629	630	130	67	63	0	0	0	0	0	0	855	483	372	404	146	258
40	17	Thandappanthangal	Rural	274	1117	561	556	140	77	63	607	311	296	5	2	3	735	422	313	382	139	243
41	18	Vadamanapakkam	Rural	681	2657	1335	1322	265	144	121	569	289	280	8	4	4	1869	1050	819	788	285	503
42	19	Melboodri	Rural	102	431	230	201	54	31	23	9	6	3	16	8	8	291	179	112	140	51	89
43	20	Pullavakkam	Rural	263	1091	551	540	129	62	67	0	0	0	5	2	3	614	374	240	477	177	300
44	21	Kammanthangal	Rural	162	645	323	322	52	30	22	0	0	0	23	13	10	497	269	228	148	54	94

Sl.No	No. of Villages	Name of village	Rural / urban	HOUSE HOLDS	POPULATION			POPULATION BELOW 6 AGE GROUP			SCHEDULE CASTE			SCHEDULE TRIBE			LITRERATES			ILLITRERATES		
					TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F. MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE
45	22	Booderi	Rural	187	764	372	392	89	39	50	0	0	0	0	0	0	462	263	199	302	109	193
46	23	Arathrivetur	Rural	182	740	370	370	76	38	38	0	0	0	0	0	0	430	248	182	310	122	188
47	24	Hasanamapettai	Rural	404	1582	807	775	147	79	68	0	0	0	0	0	0	1337	716	621	245	91	154
48	25	Perumpulimedu	Rural	153	565	288	277	62	32	30	0	0	0	0	0	0	386	226	160	179	62	117
49	26	Chellaperumpulimedu	Rural	130	545	277	268	76	44	32	5	4	1	0	0	0	320	194	126	225	83	142
50	27	Azhinjalpattu	Rural	226	892	426	466	111	47	64	286	133	153	0	0	0	568	307	261	324	119	205
51	28	Narasamangalam	Rural	392	1703	856	847	188	88	100	7	3	4	95	44	51	1045	613	432	658	243	415
52	29	Arasanipalai	Rural	287	1155	581	574	145	73	72	418	208	210	0	0	0	738	417	321	417	164	253
53	30	Mangal	Rural	174	767	377	390	61	26	35	407	204	203	19	9	10	525	297	228	242	80	162
54	31	Mahajanampakkam	Rural	407	1707	892	815	211	114	97	745	397	348	0	0	0	1196	701	495	511	191	320
55	32	Kunnavakkam	Rural	315	1259	643	616	128	76	52	670	341	329	18	8	10	849	487	362	410	156	254
56	33	Pandiyampakkam	Rural	248	937	484	453	98	48	50	356	181	175	7	4	3	664	374	290	273	110	163
57	34	Barathanthangal	Rural	131	515	263	252	58	27	31	0	0	0	69	38	31	351	204	147	164	59	105
58	35	Ramakrishnapuram	Rural	354	1422	694	728	163	81	82	0	0	0	0	0	0	796	447	349	626	247	379
59	36	Sirungattur	Rural	370	1593	809	784	151	78	73	791	402	389	0	0	0	1110	605	505	483	204	279
60	37	Arumparuthi	Rural	152	738	367	371	111	66	45	115	52	63	0	0	0	324	184	140	414	183	231
61	38	Sengattankundil	Rural	386	1636	819	817	198	104	94	531	262	269	43	23	20	1070	577	493	566	242	324
62	39	Pappanthangal	Rural	492	1948	991	957	215	110	105	387	193	194	46	24	22	1340	763	577	608	228	380
63	40	Duli	Rural	291	1154	579	575	144	71	73	220	112	108	24	14	10	781	448	333	373	131	242
64	41	Periyakoil	Rural	132	582	297	285	59	37	22	76	38	38	0	0	0	354	210	144	228	87	141
65	42	Vinnavadi	Rural	303	1235	601	634	128	71	57	38	18	20	0	0	0	836	453	383	399	148	251
66	43	Perungalathur	Rural	447	1777	909	868	182	102	80	454	236	218	25	12	13	1348	736	612	429	173	256
67	44	Vadaelapakkam	Rural	34	144	73	71	22	11	11	0	0	0	0	0	0	89	53	36	55	20	35
68	45	Vadangampattu	Rural	175	644	325	319	66	32	34	0	0	0	59	29	30	366	213	153	278	112	166
69	46	Madipakkam	Rural	291	1262	625	637	138	68	70	841	422	419	58	28	30	955	517	438	307	108	199
70	47	Akkur	Rural	754	2896	1454	1442	315	164	151	583	293	290	96	47	49	1948	1086	862	948	368	580
71	48	Koozhamandal	Rural	409	1750	882	868	173	91	82	99	50	49	0	0	0	1246	707	539	504	175	329
72	49	Kizhneathapakkam	Rural	321	1314	656	658	146	66	80	574	287	287	4	2	2	821	473	348	493	183	310
73	50	Siruveliyanallur	Rural	272	1137	566	571	118	57	61	0	0	0	22	9	13	828	461	367	309	105	204
74	51	Veliyanallur	Rural	357	1538	791	747	157	88	69	407	211	196	3	2	1	895	536	359	643	255	388
75	52	Kazhiyur	Rural	433	1714	844	870	169	91	78	392	188	204	51	25	26	1035	580	455	679	264	415
76	53	Puliyarampakkam	Rural	373	1673	850	823	163	80	83	1030	522	508	0	0	0	1189	680	509	484	170	314
77	54	Painginar	Rural	628	2678	1363	1315	229	116	113	978	500	478	0	0	0	2011	1106	905	667	257	410
78	55	Vadathandalam	Rural	344	1342	670	672	192	94	98	67	31	36	7	3	4	867	505	362	475	165	310
79	56	Perumpallam	Rural	257	1004	494	510	126	56	70	119	52	67	77	40	37	596	354	242	408	140	268
Kancheepuram Sub-District, Kancheepuram District																						
80	1	Kolivakkam	Rural	415	2010	1113	897	171	94	77	421	231	190	1	1	0	1391	867	524	619	246	373
81	2	Iyangarkulam	Rural	766	3012	1526	1486	269	142	127	301	158	143	11	5	6	2084	1164	920	928	362	566
Cheyar Sub-District, Tiruvannamalai District																						
82	1	Tiruvethipuram (M)	Urban	9162	37802	18773	19029	3749	1940	1809	4844	2413	2431	211	105	106	28954	15360	13594	8848	3413	5435
83	2	Dusi (CT)	Urban	1384	5577	2811	2766	559	285	274	73	44	29	49	26	23	3706	2047	1659	1871	764	1107
84	3	Kilpudupakkam (CT)	Urban	1698	6912	3466	3446	672	348	324	877	432	445	9	4	5	5613	3003	2610	1299	463	836
total (C)				31485	130133	65367	64766	13468	6867	6601	24086	12103	11983	1302	636	666	91916	50936	40980	38217	14431	23786
Grand Total (A+B+C)				38917	159883	80104	79779	16486	8370	8116	31389	15760	15629	1728	841	887	111591	61996	49595	48292	18108	30184

*Source: District Primary Census Abstract, Tiruvannamalai District of Tamilnadu State-2011

OCCUPATIONAL STRUCTURE IN THE BUFFER ZONE

Sl.No	No. of Villages	Name of village	Rural / urban	MAIN WORKERS		CULTIVATORS		AGRI LABOURS		HOUSE HOLD		OTHERS		MARGINAL WORKERS		NON WORKERS	
				MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE
0-2 km,Cheyyar Sub-District, Tiruvannamalai District																	
1	1	Karanthai	Rural	107	80	33	30	47	41	1	1	26	8	191	201	153	149
2	2	Thenkazhani	Rural	614	280	92	51	40	75	149	45	333	109	136	347	449	668
3	3	Kaganam	Rural	225	30	24	1	102	18	6	1	93	10	15	106	182	248
4	4	Kanagampakkam	Rural	36	16	3	2	0	0	23	2	10	12	48	34	42	55
		total (A)		982	406	152	84	189	134	179	49	462	139	390	688	826	1120
2-5 km,Cheyyar Sub-District, Tiruvannamalai District																	
5	1	Siruvanjiipattu	Rural	107	102	70	6	18	89	1	0	18	7	7	18	80	91
6	2	Azhividaithangi	Rural	458	146	76	30	66	30	59	5	257	81	961	1067	832	1030
7	3	Seleri	Rural	87	61	40	2	8	24	5	25	34	10	18	17	176	189
8	4	Thiruppanamoor	Rural	623	336	210	74	114	161	17	3	282	98	65	223	416	570
9	5	Thiruvadirayapuram	Rural	197	161	92	106	1	0	38	20	66	35	0	0	121	152
10	6	Kizhnelli	Rural	484	376	152	139	101	148	37	6	194	83	58	61	241	360
11	7	Alanthangal	Rural	141	121	68	61	30	49	7	4	36	7	17	10	113	139
12	8	Kodaiyampakkam	Rural	244	162	71	15	96	136	1	0	76	11	20	91	140	186
13	9	Perungattur	Rural	1019	757	65	17	374	543	66	36	514	161	42	118	778	1021
14	10	Chithathur	Rural	694	194	64	4	246	77	114	10	270	103	97	306	493	870
15	11	Palli	Rural	589	398	127	116	99	149	12	7	351	126	281	366	478	610
16	12	Mangalam	Rural	99	37	80	23	5	6	0	0	14	8	4	10	54	110
17	13	Vadapoondipattu	Rural	244	166	162	36	48	73	7	44	27	13	88	101	140	230
18	14	Mariyanallur	Rural	155	161	22	8	34	83	0	18	99	52	18	9	72	91
19	15	Perumpandi	Rural	4	0	2	0	0	0	0	0	2	0	15	10	11	17
20	16	Nedumpirai	Rural	82	27	4	1	5	1	3	0	70	25	404	444	220	241
21	17	Jaderi	Rural	160	86	22	0	41	35	41	31	56	20	15	82	95	92
22	18	Thenpoondipattu	Rural	165	149	55	53	31	54	2	0	77	42	2	6	94	109
23	19	Thumbai	Rural	212	140	61	12	57	87	3	2	91	39	2	34	107	138
		total (B)		5764	3580	1443	703	1374	1745	413	211	2534	921	2114	2973	4661	6246
5-10 km,Cheyyar Sub-District, Tiruvannamalai District																	
24	1	Seevaram	Rural	237	172	80	61	90	101	2	0	65	10	6	6	192	267
25	2	Cheyyanur	Rural	370	256	49	25	175	198	42	2	104	31	19	28	184	322
26	3	Vengalathur	Rural	459	223	184	73	82	83	34	11	159	56	236	384	464	549
27	4	Umaiypuram	Rural	217	109	122	7	72	102	10	0	13	0	46	132	174	206
28	5	Chettithangal	Rural	95	95	1	1	84	88	0	0	10	6	3	10	64	58
29	6	Ozhukkavakkam	Rural	68	44	2	2	57	36	1	1	8	5	3	3	35	60
30	7	Thalikkal	Rural	17	7	6	3	1	0	3	1	7	3	115	117	113	156
31	8	Vellakulam	Rural	150	119	1	0	92	102	13	0	44	17	102	146	168	145
32	9	Thiruppanangadu	Rural	526	480	80	74	224	305	32	22	190	79	31	66	313	447
33	10	Vembakkam	Rural	812	222	298	91	67	26	20	11	427	94	102	282	659	1100
34	11	Kuthanur	Rural	1113	915	191	156	716	701	20	15	186	43	7	5	660	809
35	12	Thennampattu	Rural	723	708	373	331	198	340	25	1	127	36	19	20	442	427
36	13	Pillanthangal	Rural	199	46	122	16	45	25	4	3	28	2	117	181	337	428
37	14	Namandi	Rural	430	347	77	60	177	242	63	3	113	42	1	3	754	496
38	15	Vada Mavanthal	Rural	436	247	7	8	149	164	133	15	147	60	125	60	411	651
39	16	Perumanthangal	Rural	353	320	10	5	143	285	122	8	78	22	16	26	260	284
40	17	Thandappanthangal	Rural	254	242	82	95	121	123	3	2	48	22	80	81	227	233
41	18	Vadamanapakkam	Rural	746	215	73	16	293	99	100	25	280	75	87	221	502	886
42	19	Melboodri	Rural	112	53	27	2	62	48	3	2	20	1	15	42	103	106
43	20	Pullavakkam	Rural	326	119	101	36	127	74	9	1	89	8	13	86	212	335
44	21	Kammanthangal	Rural	214	60	2	1	37	30	134	10	41	19	6	11	103	251
45	22	Booderi	Rural	221	98	45	13	124	82	1	0	51	3	17	131	134	163
46	23	Arathrivelur	Rural	202	134	21	6	29	81	44	18	108	29	25	29	143	207
47	24	Hasanamapettai	Rural	475	248	39	30	9	10	157	23	270	185	29	30	303	497

Sl.No	No. of Villages	Name of village	Rural / urban	MAIN WORKERS		CULTIVATORS		AGRI LABOURS		HOUSE HOLD		OTHERS		MARGINAL WORKERS		NON WORKERS	
				MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE
48	25	Perumpulimedu	Rural	163	97	74	35	42	43	0	0	47	19	13	51	112	129
49	26	Chellaperumpulimedu	Rural	147	100	60	39	46	49	0	0	41	12	1	1	129	167
50	27	Azhinjalpattu	Rural	106	67	13	3	16	16	0	0	77	48	169	102	151	297
51	28	Narasamangalam	Rural	540	407	104	84	171	228	4	4	261	91	7	24	309	416
52	29	Arasanipalai	Rural	261	106	81	1	117	83	3	4	60	18	44	55	276	413
53	30	Mangal	Rural	110	12	6	0	72	5	1	0	31	7	70	17	197	361
54	31	Mahajanampakkam	Rural	547	345	173	45	116	246	0	0	258	54	6	15	339	455
55	32	Kunnavakkam	Rural	310	163	47	3	162	143	9	0	92	17	42	42	291	411
56	33	Pandiyampakkam	Rural	286	180	115	66	97	100	9	1	65	13	13	9	185	264
57	34	Barathanthangal	Rural	163	132	63	71	18	30	2	1	80	30	3	4	97	116
58	35	Ramakrishnapuram	Rural	391	90	153	5	94	65	52	1	92	19	58	164	245	474
59	36	Sirungattur	Rural	421	222	28	2	230	194	18	1	145	25	40	19	348	543
60	37	Arumparuthi	Rural	191	197	87	88	34	34	63	71	7	4	6	7	170	167
61	38	Sengattankundil	Rural	431	257	312	238	9	8	5	0	105	11	70	23	318	537
62	39	Pappanthangal	Rural	617	264	219	140	74	72	4	3	320	49	5	90	369	603
63	40	Duli	Rural	233	77	29	13	29	22	4	4	171	38	130	226	216	272
64	41	Periyakoil	Rural	180	162	95	124	8	27	0	0	77	11	5	10	112	113
65	42	Vinnavadi	Rural	467	475	305	332	66	99	13	4	83	40	2	2	132	157
66	43	Perungalathur	Rural	111	74	56	13	14	39	1	2	40	20	513	427	285	367
67	44	Vadaelapakkam	Rural	43	31	0	1	24	29	0	0	19	1	0	0	30	40
68	45	Vadangampattu	Rural	176	129	4	0	138	118	0	0	34	11	6	2	143	188
69	46	Madipakkam	Rural	409	345	220	17	146	308	0	0	43	20	3	10	213	282
70	47	Akkur	Rural	650	401	254	138	118	134	24	8	254	121	195	234	609	807
71	48	Koozhamandal	Rural	477	249	219	52	91	157	2	0	165	40	48	44	357	575
72	49	Kizhnethapakkam	Rural	370	191	94	7	136	136	1	0	139	48	55	182	231	285
73	50	Siruveliyallur	Rural	297	111	113	14	62	59	11	1	111	37	55	221	214	239
74	51	Veliyanallur	Rural	491	409	239	219	137	169	11	0	104	21	18	31	282	307
75	52	Kazhiyur	Rural	375	280	93	63	109	144	1	1	172	72	136	220	333	370
76	53	Puliyampakkam	Rural	281	134	49	18	49	41	5	2	178	73	226	183	343	506
77	54	Paingkinar	Rural	690	369	85	10	163	248	17	7	425	104	38	23	635	923
78	55	Vadathandalam	Rural	428	218	68	30	74	96	1	2	285	90	5	13	237	441
79	56	Perumpallam	Rural	302	221	67	58	55	96	20	5	160	62	6	4	186	285
Kancheepuram Sub-District, Kancheepuram District																	
80	1	Kolivakkam	Rural	402	133	33	2	106	73	24	5	239	53	27	23	684	741
81	2	Iyangarkulam	Rural	846	413	15	4	42	49	355	164	434	196	44	124	636	949
Cheyar Sub-District, Tiruvannamalai District																	
82	1	Tiruvethipuram (M)	Urban	9928	3307	251	43	187	302	823	424	8667	2538	641	704	8204	15018
83	2	Dusi (CT)	Urban	1601	723	162	32	165	251	182	89	1092	351	93	236	1117	1807
84	3	Kilpudupakkam (CT)	Urban	1722	555	98	18	67	135	37	5	1520	397	132	108	1612	2783
		total (C)		33918	17125	6077	3140	6458	7393	2677	983	18706	5609	4145	5750	27304	41891
		Grand Total (A+B+C)		40664	21111	7672	3927	8021	9272	3269	1243	21702	6669	6649	9411	32791	49257

*Source: District Primary Census Abstract, Tiruvannamalai & Kancheepuram District of Tamilnadu State-2011

EDUCATIONAL FACILITIES IN THE STUDY AREA

Sl.No	No. of Villages	Name of village	Educational Facilities (A(1)/ NA(2))	Govt Pre - Primary School (Nursery/LKG/UKG) (Numbers)	Govt Primary School (Numbers)	Govt Middle School (Numbers)	Govt Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Govt Engineering College (Numbers)	Govt Medicine College (Numbers)	Govt Management Institute (Numbers)	Govt Polytechnic (Numbers)	Govt Vocational Training School/ITI (Numbers)	Government Non Formal Training Centre (Numbers)	Government School For Disabled (Numbers)
0-2 km,Cheyyar Sub-District, Tiruvannamalai District																
1	1	Karanthai	1	1	1	0	0	0	0	0	0	0	0	0	1	0
2	2	Thenkazhani	1	2	2	2	1	1	0	0	0	0	0	0	1	0
3	3	Kaganam	1	1	2	0	0	0	0	0	0	0	0	0	1	0
4	4	Kanagampakkam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
		total (A)		5	6	2	1	1	0	0	0	0	0	0	4	0
2-5 km,Cheyyar Sub-District, Tiruvannamalai District																
5	1	Siruvanji pattu	1	1	1	0	0	0	0	0	0	0	0	0	1	0
6	2	Azhividaithangi	1	3	4	2	1	0	0	0	0	0	0	0	1	0
7	3	Seleri	2	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4	Thiruppanamoor	1	1	3	1	0	0	0	0	0	0	0	0	1	0
9	5	Thiruvadirayapuram	1	1	1	0	0	0	0	0	0	0	0	0	1	0
10	6	Kizhnelli	1	1	1	0	0	0	0	0	0	0	0	0	1	0
11	7	Alanthangal	1	1	1	0	0	0	0	0	0	0	0	0	1	0
12	8	Kodaiyampakkam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
13	9	Perungattur	1	2	2	1	1	1	0	0	0	0	0	0	1	0
14	10	Chithathur	1	2	2	1	1	1	0	0	0	0	0	0	1	0
15	11	Palli	1	2	3	1	1	0	0	0	0	0	0	0	1	0
16	12	Mangalam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
17	13	Vadapoondipattu	1	1	1	0	0	0	0	0	0	0	0	0	1	0
18	14	Mariyanallur	1	1	1	0	0	0	0	0	0	0	0	0	1	0
19	15	Perumpandi	2	0	0	0	0	0	0	0	0	0	0	0	0	0
20	16	Nedumpirai	1	1	1	1	1	0	0	0	0	0	0	0	1	0
21	17	Jaderi	1	1	1	1	0	0	0	0	0	0	0	0	1	0
22	18	Thenpoondipattu	1	1	1	0	0	0	0	0	0	0	0	0	1	0
23	19	Thumbai	1	1	1	0	0	0	0	0	0	0	0	0	1	0
		total (B)		22	26	8	5	2	0	0	0	0	0	0	17	0
5-10 km,Cheyyar Sub-District, Tiruvannamalai District																
24	1	Seevaram	2	0	0	0	0	0	0	0	0	0	0	0	0	0
25	2	Cheyyanur	1	1	1	0	0	0	0	0	0	0	0	0	1	0
26	3	Vengalathur	1	2	2	1	1	0	0	0	0	0	0	0	1	0
27	4	Umaiypuram	1	1	1	0	0	0	0	0	0	0	0	0	1	0
28	5	Chettithangal	2	0	0	0	0	0	0	0	0	0	0	0	0	0
29	6	Ozhukkavakkam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
30	7	Thalikkal	1	1	1	0	0	0	0	0	0	0	0	0	1	0
31	8	Vellakulam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
32	9	Thiruppanangadu	1	1	1	1	0	0	0	0	0	0	0	0	1	0
33	10	Vembakkam	1	1	1	1	2	1	0	0	0	0	0	0	1	0
34	11	Kuthanur	1	2	2	1	0	0	0	0	0	0	0	0	1	0
35	12	Thennampattu	1	3	3	1	1	0	0	0	0	0	0	0	1	0
36	13	Pillanthangal	1	1	1	1	0	0	0	0	0	0	0	0	1	0
37	14	Namandi	1	1	1	1	1	0	0	0	0	0	0	0	1	0
38	15	Vada Mavanthal	1	1	1	0	0	0	0	0	0	0	0	0	1	0
39	16	Perumanthangal	1	1	1	1	0	0	0	0	0	0	0	0	1	0
40	17	Thandappanthangal	1	1	1	1	0	0	0	0	0	0	0	0	1	0
41	18	Vadamanapakkam	1	2	1	1	1	0	0	0	0	0	0	0	1	0
42	19	Melboodri	1	1	1	0	0	0	0	0	0	0	0	0	1	0
43	20	Pullavakkam	1	1	1	1	0	0	0	0	0	0	0	0	1	0
44	21	Kammanthangal	1	1	0	0	0	0	0	0	0	0	0	0	0	0
45	22	Booderi	2	0	0	0	0	0	0	0	0	0	0	0	0	0

Sl.No	No. of Villages	Name of village	Educational Facilities (A(1)/ NA(2))	Govt Pre - Primary School (Nursery/LKG/UKG) (Numbers)	Govt Primary School (Numbers)	Govt Middle School (Numbers)	Govt Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Govt Engineering College (Numbers)	Govt Medicine College (Numbers)	Govt Management Institute (Numbers)	Govt Polytechnic (Numbers)	Govt Vocational Training School/ITI (Numbers)	Government Non Formal Training Centre (Numbers)	Government School For Disabled (Numbers)
46	23	Arathrivelur	1	1	1	0	0	0	0	0	0	0	0	0	1	0
47	24	Hasanamapettai	1	1	1	1	0	0	0	0	0	0	0	0	1	0
48	25	Perumpulimedu	1	1	1	0	0	0	0	0	0	0	0	0	1	0
49	26	Chellaperumpulimedu	1	1	1	0	0	0	0	0	0	0	0	0	1	0
50	27	Azhinjalpattu	1	1	1	1	0	0	0	0	0	0	0	0	1	0
51	28	Narasamangalam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
52	29	Arasanipalai	1	1	1	0	0	0	0	0	0	0	0	0	1	0
53	30	Mangal	1	1	1	0	0	0	0	0	0	0	0	0	1	0
54	31	Mahajanampakkam	1	2	1	0	0	0	0	0	0	0	0	0	1	0
55	32	Kunnavakkam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
56	33	Pandiyampakkam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
57	34	Barathanthangal	1	1	1	0	0	0	0	0	0	0	0	0	1	0
58	35	Ramakrishnapuram	1	1	1	1	0	0	0	0	0	0	0	0	1	0
59	36	Sirungattur	1	2	2	0	0	0	0	0	0	0	0	0	1	0
60	37	Arumparuthi	1	1	2	0	0	0	0	0	0	0	0	0	1	0
61	38	Sengattankundil	1	1	1	0	0	0	0	0	0	0	0	0	1	0
62	39	Pappanthangal	1	1	1	1	0	0	0	0	0	0	0	0	1	0
63	40	Duli	1	1	1	0	0	0	0	0	0	0	0	0	1	0
64	41	Periyakoil	1	1	1	0	0	0	0	0	0	0	0	0	1	0
65	42	Vinnavadi	1	1	1	0	0	0	0	0	0	0	0	0	1	0
66	43	Perungalathur	1	1	2	2	0	0	1	0	0	0	0	0	1	0
67	44	Vadaelapakkam	1	0	1	0	0	0	0	0	0	0	0	0	1	0
68	45	Vadangampattu	1	1	1	0	0	0	0	0	0	0	0	0	1	0
69	46	Madipakkam	1	1	1	1	0	0	0	0	0	0	0	0	1	0
70	47	Akkur	1	2	1	1	1	1	0	0	0	0	0	0	1	0
71	48	Koozhamandal	1	2	1	1	1	0	0	0	0	0	0	0	1	0
72	49	Kizhnethapakkam	1	2	2	0	0	0	0	0	0	0	0	0	1	0
73	50	Siruveliyallur	1	1	1	1	0	0	0	0	0	0	0	0	1	0
74	51	Veliyanallur	1	1	1	0	0	0	0	0	0	0	0	0	1	0
75	52	Kazhiyur	1	1	1	1	0	0	0	0	0	0	0	0	1	0
76	53	Puliyampakkam	1	2	3	1	1	0	0	0	0	0	0	0	1	0
77	54	Painginar	1	2	1	1	0	0	0	0	0	0	0	0	1	0
78	55	Vadathandalam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
79	56	Perumpallam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
Kancheepuram Sub-District, Kancheepuram District																
80	1	Kolivakkam	1	1	1	0	0	0	0	0	0	0	0	0	1	0
81	2	Iyangarkulam	1	2	1	1	1	1	0	0	0	0	0	0	1	0
		total (C)		67	64	25	10	3	1	0	0	0	0	0	54	0
		Grand Total (A+B+C)		94	96	35	16	6	1	0	0	0	0	0	75	0

*Source: District Primary Census Abstract, Tiruvannamalai & Kancheepuram District of Tamilnadu State-2011

MEDICAL FACILITIES WITHIN THE STUDY AREA

Sl.No	No. of Villages	Name of village	Medical Facilities (A(1)/NA(2))	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	TB Clinic (Numbers)	Hospital Allopathic (Numbers)	Hospital Alternative Medicine (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
0-2 km,Cheyyar Sub-District, Tiruvannamalai District														
1	1	Karanthai	2	0	0	0	0	0	0	0	0	0	0	0
2	2	Thenkazhani	2	0	0	0	0	0	0	0	0	0	0	0
3	3	Kaganam	2	0	0	0	0	0	0	0	0	0	0	0
4	4	Kanagampakkam	2	0	0	0	0	0	0	0	0	0	0	0
		total (A)		0	0	0	0	0	0	0	0	0	0	0
2-5 km,Cheyyar Sub-District, Tiruvannamalai District														
5	1	Siruvanjiipattu	2	0	0	0	0	0	0	0	0	0	0	0
6	2	Azhividaithangi	1	0	0	1	1	0	0	0	0	0	0	0
7	3	Seleri	1	0	0	1	0	0	0	0	0	0	0	0
8	4	Thiruppanamoor	2	0	0	0	0	0	0	0	0	0	0	0
9	5	Thiruvadiraipuram	2	0	0	0	0	0	0	0	0	0	0	0
10	6	Kizhnelli	1	0	0	1	1	0	0	0	0	0	0	0
11	7	Alanthangal	2	0	0	0	0	0	0	0	0	0	0	0
12	8	Kodaiyampakkam	2	0	0	0	0	0	0	0	0	0	0	0
13	9	Perungattur	1	1	1	1	1	1	0	0	1	1	0	1
14	10	Chithathur	1	0	1	1	1	1	0	0	1	1	0	1
15	11	Palli	1	0	0	1	1	0	0	0	0	0	0	0
16	12	Mangalam	2	0	0	0	0	0	0	0	0	0	0	0
17	13	Vadapoondipattu	2	0	0	0	0	0	0	0	0	0	0	0
18	14	Mariyanallur	2	0	0	0	0	0	0	0	0	0	0	0
19	15	Perumpandi	2	0	0	0	0	0	0	0	0	0	0	0
20	16	Nedumpirai	1	0	1	1	1	1	0	0	1	1	0	1
21	17	Jaderi	2	0	0	0	0	0	0	0	0	0	0	0
22	18	Thenpoondipattu	2	0	0	0	0	0	0	0	0	0	0	0
23	19	Thumbai	2	0	0	0	0	0	0	0	0	0	0	0
		total (B)		1	3	7	6	3	0	0	3	3	0	3
5-10 km,Cheyyar Sub-District, Tiruvannamalai District														
24	1	Seevaram	2	0	0	0	0	0	0	0	0	0	0	0
25	2	Cheyyanur	2	0	0	0	0	0	0	0	0	0	0	0
26	3	Vengalathur	1	0	0	1	0	0	0	0	0	0	0	0
27	4	Umaiyalpuram	2	0	0	0	0	0	0	0	0	0	0	0
28	5	Chettithangal	2	0	0	0	0	0	0	0	0	0	0	0
29	6	Ozhukkavakkam	2	0	0	0	0	0	0	0	0	0	0	0
30	7	Thalikkal	2	0	0	0	0	0	0	0	0	0	0	0
31	8	Vellakulam	2	0	0	0	0	0	0	0	0	0	0	0
32	9	Thiruppanangadu	1	0	0	1	1	0	0	0	0	0	0	0
33	10	Vembakkam	1	0	1	1	1	1	0	0	1	1	0	1
34	11	Kuthanur	1	0	0	1	0	0	0	0	0	0	0	0
35	12	Thennampattu	1	0	0	1	1	0	0	0	0	0	0	0
36	13	Pillanthangal	1	0	0	1	0	0	0	0	0	0	0	0
37	14	Namandi	1	0	0	1	0	0	0	0	0	0	0	0
38	15	Vada Mavanthal	2	0	0	0	0	0	0	0	0	0	0	0
39	16	Perumanthangal	2	0	0	0	0	0	0	0	0	0	0	0
40	17	Thandappanthangal	2	0	0	0	0	0	0	0	0	0	0	0
41	18	Vadamanapakkam	1	0	0	1	1	0	0	0	0	0	0	0
42	19	Melboodri	2	0	0	0	0	0	0	0	0	0	0	0
43	20	Pullavakkam	2	0	0	0	0	0	0	0	0	0	0	0
44	21	Kammanthangal	2	0	0	0	0	0	0	0	0	0	0	0
45	22	Booderi	2	0	0	0	0	0	0	0	0	0	0	0
46	23	Arathrivelur	2	0	0	0	0	0	0	0	0	0	0	0

Sl.No	No. of Villages	Name of village	Medical Facilities (A(1)/NA(2))	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	TB Clinic (Numbers)	Hospital Allopathic (Numbers)	Hospital Alternative Medicine (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
47	24	Hasanamapettai	2	0	0	0	0	0	0	0	0	0	0	0
48	25	Perumpulimedu	2	0	0	0	0	0	0	0	0	0	0	0
49	26	Chellaperumpulimedu	1	0	0	1	0	0	0	0	0	0	0	0
50	27	Azhinjalpattu	2	0	0	0	0	0	0	0	0	0	0	0
51	28	Narasamangalam	1	0	0	1	1	0	0	0	0	0	0	0
52	29	Arasanipalai	2	0	0	0	0	0	0	0	0	0	0	0
53	30	Mangal	1	0	0	1	0	0	0	0	0	0	0	0
54	31	Mahajanampakkam	2	0	0	0	0	0	0	0	0	0	0	0
55	32	Kunnavakkam	2	0	0	0	0	0	0	0	0	0	0	0
56	33	Pandiyampakkam	2	0	0	0	0	0	0	0	0	0	0	0
57	34	Barathanthangal	2	0	0	0	0	0	0	0	0	0	0	0
58	35	Ramakrishnapuram	2	0	0	0	0	0	0	0	0	0	0	0
59	36	Sirungattur	1	0	0	1	0	0	0	0	0	0	0	0
60	37	Arumparuthi	2	0	0	0	0	0	0	0	0	0	0	0
61	38	Sengattankundil	2	0	0	0	0	0	0	0	0	0	0	0
62	39	Pappanthangal	1	0	0	1	0	0	0	0	0	0	0	0
63	40	Duli	2	0	0	0	0	0	0	0	0	0	0	0
64	41	Periyakoil	2	0	0	0	0	0	0	0	0	0	0	0
65	42	Vinnavadi	2	0	0	0	0	0	0	0	0	0	0	0
66	43	Perungalathur	1	0	0	1	1	0	0	0	0	0	0	0
67	44	Vadaelapakkam	2	0	0	0	0	0	0	0	0	0	0	0
68	45	Vadangampattu	2	0	0	0	0	0	0	0	0	0	0	0
69	46	Madipakkam	2	0	0	0	0	0	0	0	0	0	0	0
70	47	Akkur	1	1	1	1	1	1	0	0	1	1	0	1
71	48	Koozhamandal	1	0	0	1	1	0	0	0	0	0	0	0
72	49	Kizhnethapakkam	1	0	0	1	0	0	0	0	0	0	0	0
73	50	Siruveliyallur	2	0	0	0	0	0	0	0	0	0	0	0
74	51	Veliyanallur	2	0	0	0	0	0	0	0	0	0	0	0
75	52	Kazhiyur	1	0	0	1	1	0	0	0	0	0	0	0
76	53	Puliyampakkam	2	0	0	0	0	0	0	0	0	0	0	0
77	54	Painginar	1	0	0	1	0	0	0	0	0	0	0	0
78	55	Vadathandalam	2	0	0	0	0	0	0	0	0	0	0	0
79	56	Perumpallam	2	0	0	0	0	0	0	0	0	0	0	0
Kancheepuram Sub-District, Kancheepuram District														
80	1	Kolivakkam	2	0	0	0	0	0	0	0	0	0	0	0
81	2	Iyangarkulam	1	0	0	1	0	0	0	0	0	0	0	0
		total (C)		1	2	20	9	2	0	0	2	2	0	2
		Grand Total (A+B+C)		2	5	27	15	5	0	0	5	5	0	5

*Source: District Primary Census Abstract, Tiruvannamalai & Kancheepuram District of Tamilnadu State-2011

Note : A: Available, NA- Not Available

INFRASTRUCTURAL FACILITIES IN THE STUDY AREA

Sl. No	No. of Villages	Name of village	Tap Water-Treated (Status A(1)/NA(2))	Covered Well (Status A(1)/NA(2))	Hand Pump (Status A(1)/NA(2))	Tube Wells/Borehole (Status A(1)/NA(2))	Spring (Status A(1)/NA(2))	River/Canal (Status A(1)/NA(2))	Tank/Pond/Lake (Status A(1)/NA(2))	Post Office (Status A(1)/NA(2))	Sub Post Office (Status A(1)/NA(2))	Post And Telegraph Office (Status A(1)/NA(2))	Telephone (landlines) (Status A(1)/NA(2))	Mobile Phone Coverage (Status A(1)/NA(2))	Public Bus Service (Status A(1)/NA(2))	Railway Station (Status A(1)/NA(2))	Commercial Bank (Status A(1)/NA(2))	Cooperative Bank (Status A(1)/NA(2))	Agricultural Credit Societies (Status A(1)/NA(2))
0-2 km,Cheyyar Sub-District, Tiruvannamalai District																			
1	1	Karanthai	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
2	2	Thenkazhani	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	1	1
3	3	Kaganam	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	2	2
4	4	Kanagampakkam	2	2	2	1	2	2	2	2	2	2	2	1	1	2	2	2	2
2-5 km,Cheyyar Sub-District, Tiruvannamalai District																			
5	1	Siruvanji pattu	2	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
6	2	Azhividaithangi	1	2	2	2	1	2	2	2	1	2	1	1	1	2	2	2	2
7	3	Seleri	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
8	4	Thiruppanamoor	1	1	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
9	5	Thiruvadira yapuram	2	2	1	1	2	1	2	2	2	2	1	1	1	2	2	2	2
10	6	Kizhneli	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
11	7	Alanthangal	2	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
12	8	Kodaiyampakkam	1	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2
13	9	Perungattur	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
14	10	Chithathur	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2	1
15	11	Palli	1	2	1	1	2	2	2	2	1	2	1	1	1	2	2	1	1
16	12	Mangalam	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
17	13	Vadapoondipattu	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
18	14	Mariyanallur	1	1	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
19	15	Perumpandi	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	2	2
20	16	Nedumpirai	1	1	1	2	2	2	2	1	1	1	1	1	1	2	2	1	1
21	17	Jaderi	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
22	18	Thenpoondipattu	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
23	19	Thumbai	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
5-10 km,Cheyyar Sub-District, Tiruvannamalai District																			
24	1	Seevaram	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
25	2	Cheyyanur	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
26	3	Vengalathur	1	2	1	2	2	2	1	2	1	2	1	1	1	2	2	2	2
27	4	Umaiyalpuram	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
28	5	Chettithangal	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
29	6	Ozhukkavakkam	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
30	7	Thalikkal	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
31	8	Vellakulam	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
32	9	Thiruppanangadu	1	2	2	2	2	1	1	2	1	2	1	1	1	2	2	2	2
33	10	Vembakkam	1	2	2	1	2	1	2	2	1	2	1	1	1	2	1	1	1
34	11	Kuthanur	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
35	12	Thennampattu	1	1	2	1	1	2	2	1	1	1	1	1	1	2	2	1	1
36	13	Pillanthangal	1	1	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2

Sl. No	No. of Villages	Name of village	Tap Water-Treated (Status A(1)/NA(2))	Covered Well (Status A(1)/NA(2))	Hand Pump (Status A(1)/NA(2))	Tube Wells/Borehole (Status A(1)/NA(2))	Spring (Status A(1)/NA(2))	River/Canal (Status A(1)/NA(2))	Tank/Pond/Lake (Status A(1)/NA(2))	Post Office (Status A(1)/NA(2))	Sub Post Office (Status A(1)/NA(2))	Post And Telegraph Office (Status A(1)/NA(2))	Telephone (landlines) (Status A(1)/NA(2))	Mobile Phone Coverage (Status A(1)/NA(2))	Public Bus Service (Status A(1)/NA(2))	Railway Station (Status A(1)/NA(2))	Commercial Bank (Status A(1)/NA(2))	Cooperative Bank (Status A(1)/NA(2))	Agricultural Credit Societies (Status A(1)/NA(2))
37	14	Namandi	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	2	2
38	15	Vada Mavanthal	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
39	16	Perumanthangal	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
40	17	Thandappanthangal	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
41	18	Vadamanapakka m	1	1	1	2	1	2	2	2	1	2	1	1	1	2	2	2	2
42	19	Melboodri	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
43	20	Pullavakkam	1	1	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
44	21	Kammanthangal	1	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2
45	22	Booderi	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2
46	23	Arathrivelur	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
47	24	Hasanamapettai	1	2	1	2	2	2	2	1	1	1	1	1	1	2	2	1	2
48	25	Perumpulimedu	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	1
49	26	Chellaperumpulim edu	1	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2
50	27	Azhinjalpattu	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
51	28	Narasamangalam	2	1	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2
52	29	Arasanipalai	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	2	2
53	30	Mangal	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	1	2
54	31	Mahajanampakka m	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
55	32	Kunnavakkam	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2
56	33	Pandiyampakkam	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
57	34	Barathanthangal	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
58	35	Ramakrishnapura m	1	1	2	1	2	2	2	1	1	1	1	1	1	2	2	2	1
59	36	Sirungattur	1	1	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
60	37	Arumparuthi	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
61	38	Sengattankundil	1	2	2	2	2	2	2	2	1	2	2	1	1	2	2	2	2
62	39	Pappanthangal	1	1	1	1	2	2	2	1	1	1	1	1	1	2	2	2	2
63	40	Duli	1	2	1	1	2	2	2	2	2	2	1	1	1	2	2	2	2
64	41	Periyakoil	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
65	42	Vinnavadi	2	2	2	2	2	2	2	1	1	1	2	1	1	2	2	2	2
66	43	Perungalathur	1	2	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
67	44	Vadaelapakkam	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2
68	45	Vadangampattu	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
69	46	Madipakkam	1	2	2	1	2	2	1	2	1	2	1	1	1	2	2	2	2
70	47	Akkur	1	1	1	1	2	1	2	2	1	2	1	1	1	2	2	1	2
71	48	Koozhamandal	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2
72	49	Kizhneathapakkam	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
73	50	Siruveliyallur	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
74	51	Veliyanallur	1	1	1	1	2	2	2	2	2	2	1	1	1	2	2	2	2
75	52	Kazhiyur	1	1	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
76	53	Puliyarampakkam	1	1	1	1	2	2	2	2	2	2	1	1	1	2	2	2	1

Sl. No	No. of Villages	Name of village	Tap Water-Treated (Status A(1)/NA(2))	Covered Well (Status A(1)/NA(2))	Hand Pump (Status A(1)/NA(2))	Tube Wells/Borehole (Status A(1)/NA(2))	Spring (Status A(1)/NA(2))	River/Canal (Status A(1)/NA(2))	Tank/Pond/Lake (Status A(1)/NA(2))	Post Office (Status A(1)/NA(2))	Sub Post Office (Status A(1)/NA(2))	Post And Telegraph Office (Status A(1)/NA(2))	Telephone (landlines) (Status A(1)/NA(2))	Mobile Phone Coverage (Status A(1)/NA(2))	Public Bus Service (Status A(1)/NA(2))	Railway Station (Status A(1)/NA(2))	Commercial Bank (Status A(1)/NA(2))	Cooperative Bank (Status A(1)/NA(2))	Agricultural Credit Societies (Status A(1)/NA(2))
77	54	Paingkinar	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	1
78	55	Vadathandalam	1	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2
79	56	Perumpallam	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
Kancheepuram Sub-District, Kancheepuram District																			
80	1	Kolivakkam	1	2	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2
81	2	Iyangarkulam	1	2	1	1	2	2	2	2	1	1	1	1	1	2	2	2	2

*Source: District Primary Census Abstract, Tiruvannamalai & Kancheepuram District of Tamilnadu State-2011

Note : A: Available, NA- Not Available

Status: A(1)/NA(2)



CREATIVE ENGINEERS & CONSULTANTS

(NABET ACCREDITED, NABL ACCREDITED TESTING LABORATORY,
DEPARTMENT OF INDUSTRIES AND COMMERCE REGISTERED COMPANY)

AMBIENT AIR QUALITY

Project	:	Rough Stone & Gravel Quarry of Thiru R. Kathirvel
Name of the Location	:	Near Mine Lease Area
Station Code	:	A1

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	06.12.22	70.4	32.5	7.1	10.3
2	07.12.22	64.9	30.1	6.5	9.3
3	17.12.22	55.9	25.7	5.7	7.7
4	18.12.22	58.1	26.8	5.9	8.1
5	20.12.22	57.3	26.5	5.8	7.9
6	21.12.22	69.1	31.9	6.9	10.2
7	31.12.22	74.6	34.5	7.4	11.1
8	26.12.22	65.8	30.2	6.6	9.5
9	02.01.23	52.6	24.4	5.4	7.1
10	03.01.23	59.2	27.5	6.0	8.3
11	12.01.23	71.3	32.9	7.1	10.5
12	13.01.23	63.6	29.4	6.4	9.1
13	16.01.23	75.7	34.9	7.5	11.3
14	17.01.23	68.3	31.6	6.8	9.9
15	26.01.23	53.7	24.8	5.5	7.3
16	27.01.23	60.3	28.1	6.1	8.5
17	30.01.23	78.6	36.4	7.7	11.8
18	31.01.23	73.4	33.9	7.3	10.9
19	10.02.23	54.8	25.3	5.6	7.5
20	11.02.23	61.4	28.5	6.2	8.7
21	13.02.23	76.2	35.2	7.6	11.5
22	14.02.23	72.7	33.6	7.2	10.7
23	24.02.23	66.9	31.1	6.7	9.7
24	25.02.23	62.5	28.9	6.3	8.9
	MIN	52.6	24.4	5.4	7.1
	AVE	65.3	30.2	6.6	9.4
	MAX	78.6	36.4	7.7	11.8

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

Q. P. Prasad

Prepared by



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CREATIVE ENGINEERS & CONSULTANTS

(NABET ACCREDITED, NABL ACCREDITED TESTING LABORATORY,
DEPARTMENT OF INDUSTRIES AND COMMERCE REGISTERED COMPANY)

AMBIENT AIR QUALITY

Project	:	Rough Stone Quarry of Thiru R. Kathirvel
Name of the Location	:	Kagkanam Village
Station Code	:	A2

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	06.12.22	52.6	23.7	5.6	8.1
2	07.12.22	57.4	25.8	6.2	9.3
3	17.12.22	60.6	28.5	6.6	9.9
4	18.12.22	54.2	24.4	5.8	8.5
5	20.12.22	48.6	21.9	5.1	7.1
6	21.12.22	61.4	28.9	6.7	9.8
7	31.12.22	62.2	29.2	6.8	10.2
8	26.12.22	59.6	27.8	6.4	9.7
9	02.01.23	46.2	20.8	4.8	6.5
10	03.01.23	51.3	23.1	5.4	7.7
11	12.01.23	63.9	30.2	7.1	10.4
12	13.01.23	56.6	25.5	6.1	9.1
13	16.01.23	65.2	30.8	7.1	10.5
14	17.01.23	59.8	28.1	6.5	9.9
15	26.01.23	46.9	21.1	4.9	6.7
16	27.01.23	51.8	23.3	5.5	7.9
17	30.01.23	53.4	24.1	5.7	8.3
18	31.01.23	58.2	26.2	6.3	9.5
19	10.02.23	50.2	22.6	5.3	7.5
20	11.02.23	47.8	21.5	5.1	6.9
21	13.02.23	63.3	29.8	6.9	10.3
22	14.02.23	55.8	25.1	6.1	8.9
23	24.02.23	49.4	22.2	5.2	7.3
24	25.02.23	55.2	24.8	5.9	8.7
	MIN	46.2	20.8	4.8	6.5
	AVE	55.5	25.4	6.0	8.7
	MAX	65.2	30.8	7.1	10.5

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

Prepared by



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AMBIENT AIR QUALITY

Project	:	Rough Stone Quarry of Thiru R. Kathirvel
Name of the Location	:	Sumangali Village
Station Code	:	A3

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	08.12.22	58.5	26.9	6.7	9.3
2	09.12.22	54.3	25.0	6.2	8.6
3	15.12.22	59.2	27.2	6.8	9.4
4	16.12.22	56.4	25.9	6.4	8.8
5	22.12.22	53.6	24.7	6.1	8.5
6	23.12.22	47.3	21.8	5.3	7.7
7	29.12.22	52.9	24.3	6.1	8.4
8	30.12.22	57.8	26.6	6.6	9.1
9	04.01.23	62.6	28.8	6.9	9.6
10	05.01.23	55.7	25.6	6.3	8.7
11	11.01.23	44.5	20.5	4.9	7.3
12	12.01.23	49.4	22.7	5.5	7.9
13	18.01.23	45.2	20.8	5.1	7.4
14	19.01.23	50.1	23.0	5.6	8.1
15	25.01.23	43.1	19.8	4.7	7.1
16	26.01.23	48.7	22.4	5.4	7.8
17	01.02.23	51.5	23.7	5.8	8.2
18	02.02.23	45.9	21.1	5.1	7.5
19	08.02.23	60.3	27.7	6.9	9.5
20	09.02.23	57.1	26.3	6.5	8.9
21	15.02.23	43.8	20.1	4.8	7.2
22	16.02.23	52.2	24.0	5.9	8.3
23	22.02.23	46.6	21.4	5.2	7.6
24	23.02.23	50.8	23.4	5.7	8.1
	MIN	43.1	19.8	4.7	7.1
	AVE	52.0	23.9	5.9	8.3
	MAX	62.6	28.8	6.9	9.6

Note: BDL – Below Detectable Limit, DL: Detectable Limit.


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AMBIENT AIR QUALITY

Project	:	Rough Stone Quarry of Thiru R. Kathirvel
Name of the Location	:	Kunnathur Village
Station Code	:	A4

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	08.12.22	55.5	25.5	6.4	8.0
2	09.12.22	49.9	23.2	5.7	7.3
3	15.12.22	52.7	24.2	6.1	7.6
4	16.12.22	48.5	22.3	5.5	7.1
5	22.12.22	40.8	18.8	4.4	6.0
6	23.12.22	44.3	20.4	4.9	6.5
7	29.12.22	42.2	19.4	4.6	6.2
8	30.12.22	47.1	21.7	5.3	6.9
9	04.01.23	39.4	17.9	4.2	5.8
10	05.01.23	45.2	20.8	5.1	6.6
11	11.01.23	54.8	25.2	6.3	7.9
12	12.01.23	49.2	22.6	5.6	7.2
13	18.01.23	42.9	19.8	4.7	6.3
14	19.01.23	46.4	21.3	5.2	6.8
15	25.01.23	40.1	18.4	4.3	5.9
16	26.01.23	45.7	21.1	5.1	6.7
17	01.02.23	51.3	23.6	5.9	7.5
18	02.02.23	47.8	22.1	5.4	7.2
19	08.02.23	56.2	25.9	6.5	8.1
20	09.02.23	53.4	24.6	6.1	7.7
21	15.02.23	41.5	19.2	4.5	6.2
22	16.02.23	43.6	20.1	4.8	6.4
23	22.02.23	54.1	24.9	6.2	7.8
24	23.02.23	50.6	23.3	5.8	7.4
	MIN	39.4	17.9	4.2	5.8
	AVE	47.6	21.9	5.4	7.0
	MAX	56.2	25.9	6.5	8.1

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

Q. P. S.

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AMBIENT AIR QUALITY

Project	:	Rough Stone Quarry of Thiru R. Kathirvel
Name of the Location	:	Karantnai Village
Station Code	:	A5

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	10.12.22	58.7	26.4	6.8	9.3
2	11.12.22	61.4	27.6	7.1	9.6
3	13.12.22	54.2	24.4	6.3	8.8
4	14.12.22	50.6	22.8	5.9	8.4
5	24.12.22	42.5	19.1	5.1	7.5
6	25.12.22	46.1	20.7	5.4	7.9
7	27.12.22	60.5	27.2	7.0	9.5
8	28.12.22	56.2	25.3	6.5	9.1
9	06.01.23	43.4	19.5	5.1	7.6
10	07.01.23	49.7	22.4	5.8	8.3
11	09.01.23	41.6	18.7	4.9	7.4
12	10.01.23	47.2	21.2	5.5	8.0
13	20.01.23	59.6	26.8	6.9	9.4
14	21.01.23	52.4	23.6	6.1	8.6
15	23.01.23	63.2	28.4	7.2	10.2
16	24.01.23	55.1	24.8	6.4	8.9
17	03.02.23	51.5	23.2	6.0	8.5
18	04.02.23	57.8	26.1	6.7	9.2
19	06.02.23	44.3	19.9	5.2	7.7
20	07.02.23	48.8	22.2	5.7	8.2
21	17.02.23	47.9	21.6	5.6	8.1
22	18.02.23	45.2	20.3	5.3	7.8
23	20.02.23	53.3	24.1	6.2	8.7
24	21.02.23	56.9	25.6	6.6	9.1
	MIN	41.6	18.7	4.9	7.4
	AVE	52.0	23.4	6.1	8.6
	MAX	63.2	28.4	7.2	10.2

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

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WATER QUALITY DATA

Project Name	:	Rough Stone Quarry of Thiru R. Kathirvel	
Location Name	:	Location Code	Location Name
		W1	Near Mine Lease Area
		W2	Kagkanam Village
		W3	Sumangali Village
		W4	Kunnathur Village
		W5	Karanthai Village

S. No.	Parameter	Unit	W1	W 2	W 3	W 4	W 5	*Permissible Limits
1	pH	-	7.24	7.66	7.25	7.05	7.56	6.5-8.5
2	Electrical Conductivity	µmhos/cm	910.5	992.7	565	658	1093	-
3	Odor	-	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE
4	Turbidity	NTU	<1	<1	<1	<1	<1	5.0
5	Total Hardness as CaCO ₃	mg/L	289	368	184	204	349	600
6	Calcium Hardness CaCO ₃	mg/L	184	264	100	120	153	-
7	Magnesium Hardness CaCO ₃	mg/L	105	104	84.3	84.0	196	-
8	Calcium Ca	mg/L	73.6	106	40	47.8	61.2	200
9	Magnesium Mg	mg/L	25.2	25.0	20.2	20.2	47.0	100
10	Alkalinity CaCO ₃	mg/L	220	242	187	204	257	600

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S. No.	Parameter	Unit	W1	W 2	W 3	W 4	W 5	*Permissible Limits
11	Chloride Cl ⁻	mg/L	186	216	98.6	13.7	57	1000
12	Sulphate SO ₄ ²⁻	mg/L	55.4	42.1	32.5	BDL (D.L - 5.0)	55	400
13	Iron Fe	mg/L	0.05	0.03	0.03	BDL (D.L - 0.01)	BDL (D.L - 0.01)	0.3
14	Nitrate NO ₃	mg/L	2.89	4.65	3.64	1.5	3.7	45
15	Fluoride F	mg/L	0.45	0.58	0.16	0.38	0.54	1.5
16	Total Dissolved Solids	mg/L	548	596	340	395	656	2000
17	Free Residual Chlorine Cl ⁻	mg/L	BDL (D.L-0.2)	BDL (D.L-0.2)	BDL (D.L-0.2)	BDL(D.L-0.2)	BDL (D.L-0.2)	1.0
18	Manganese Mn	mg/L	BDL (D.L-0.05)	BDL (D.L-0.05)	BDL (D.L-0.05)	BDL (D.L-0.05)	BDL (D.L-0.05)	0.3

Note: * The water quality of the collected ground water samples were found to be within the prescribed permissible limits of IS: 10500:2012 Norms for Drinking in the absence of an alternative source.

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LAND USE PATTERN OF THE STUDY AREA WITHIN 10 KM RADIUS AROUND THE PROPOSED PROJECT AREA

Sl.No	No. of Villages	Name of village	Total Geographical Area (in Hectares)	Forest Area (in Hectares)	Area under Non-Agricultural Uses (in Hectares)	Barren & Uncultivable Land Area (in Hectares)	Permanent Pastures and Other Grazing Land Area (in Hectares)	Land Under Miscellaneous Tree Crops etc. Area (in Hectares)	Culturable Waste Land Area (in Hectares)	Fallows Land other than Current Fallows Area (in Hectares)	Current Fallows Area (in Hectares)	Total Unirrigated Land Area (in Hectares)	Area Irrigated by Source (in Hectares)
0-2 km,Cheyyar Sub-District, Tiruvannamalai District													
1	1	Karanthai	461.83	0	93.14	0	0	0	2.6	52.77	252.67	17.44	43.21
2	2	Thenkazhani	160.47	0	32.07	0	0	1.93	0.14	0	65	11.78	49.55
3	3	Kaganam	452.24	0	125.94	0	1.32	3.76	27.1	40	166.33	31.34	56.45
4	4	Kanagampakkam	200.8	0	127.32	0.4	0.36	0	1.1	8	52.63	2.04	8.95
		total (A)	1275.34	0	378.47	0.4	1.68	5.69	30.94	100.77	536.63	62.6	158.16
2-5 km,Cheyyar Sub-District, Tiruvannamalai District													
5	1	Siruvanjiipattu	250.84	0	41.85	1.15	3.15	0	7.03	27.04	118.07	10.29	42.26
6	2	Azhividaithangi	1364.02	0	176.9	0	8.1	0	30.64	93.08	670.14	166.3	218.86
7	3	Seleri	118.65	0	42.05	0	0	0	0.1	2.2	42.78	4.35	27.17
8	4	Thiruppanamoor	862.04	0	194.07	3.31	12.89	2.35	31.1	150.14	349.84	9.99	108.35
9	5	Thiruvadirayapuram	245.48	0	49.97	15.77	0	0	2.07	0	99.26	38.06	40.35
10	6	Kizhnelli	351.25	0	80.28	0.38	0.15	2.38	0.11	29.4	153.67	26.25	58.63
11	7	Alanthangal	136.54	0	43.81	0	4.61	3.13	1.1	1.12	64.33	6.94	11.5
12	8	Kodaiyampakkam	139.24	0	42.99	0	1.29	0	0	0	77.4	4.32	13.24
13	9	Perungattur	957.48	0	395.22	0	4.07	0.42	1.9	40	467.55	14.45	33.87
14	10	Chithathur	608.67	0	179.94	0	12.61	0	8.5	41.38	257.95	22.2	86.09
15	11	Palli	719.88	0	201.98	0	0	0	0	0	331.63	62.8	123.47
16	12	Mangalam	188.49	0	58.59	0	0	0	0	0	69.38	19.39	41.13
17	13	Vadapoondipattu	163.29	0	27.93	0	0	10.55	0	0	24.35	35.23	65.23
18	14	Mariyanallur	326.28	0	11.21	0	0	0.43	29.46	62.09	124.24	35.14	63.71
19	15	Perumpandi	120.88	0	2.25	21.41	0	0.47	0	45.98	10.85	17.43	22.49
20	16	Nedumpirai	595.5	0	108.66	13.82	0	0	0.72	95.76	184.88	149.1	42.56
21	17	Jaderi	181.67	0	41.92	4.86	0	13.94	1.8	0	84.04	29.74	5.37
22	18	Thenpoondipattu	263.62	0	20.34	3.15	0	2.51	0	55.19	75.36	61.31	45.76
23	19	Thumbai	222.07	0	1.85	0.73	0.01	0	69.42	61.53	0.16	10.87	77.5
		total (B)	7815.89	0	1721.81	64.58	46.88	36.18	183.95	704.91	3205.88	724.16	1127.54
5-10 km,Cheyyar Sub-District, Tiruvannamalai District													
24	1	Seevaram	74.46	0	3.33	0	1.4	0.37	0.63	0	12.24	13.25	43.24
25	2	Cheyyanur	250.06	0	42.57	0.17	64.84	0.66	2.95	0	81.94	3.4	53.53
26	3	Vengalathur	626.83	0	204.11	0	5.19	0	0	91.08	222.01	1.54	102.9
27	4	Umaiyalpuram	256.17	0	47.38	0	0	0	2.11	21.72	146.04	0.91	38.01
28	5	Chettithangal	138.69	0	93.54	0	0.67	0.26	1.08	1.5	25.95	12.55	3.14
29	6	Ozhukkavakkam	231.35	0	116.59	0	8.31	8.06	0.17	5.04	69.29	2.27	21.62
30	7	Thalikkal	276.9	0	71.7	0	0.2	0	9.44	10.33	145.78	23.13	16.32
31	8	Vellakulam	174.41	0	38.19	0	1	0	3.61	0	83.71	9.04	38.86
32	9	Thiruppanangadu	623.32	0	110.48	0	3.15	5.05	39.4	82.7	277.13	49.71	55.7
33	10	Vembakkam	913.91	0	79.85	17.41	5.64	1.81	6.2	198.84	444.44	32.26	127.46
34	11	Kuthanur	1147.18	0	333.3	0	8.2	6.15	0	80.48	435.9	54.11	229.04
35	12	Thennampattu	553.84	0	35.16	0	9.73	12.5	22.1	70	299.09	39.38	65.88
36	13	Pillanthangal	481.33	0	69.33	0	0.4	2.1	30.03	69.11	229.39	33.77	47.2
37	14	Namandi	490.12	0	88.04	168.47	1.4	1.6	2.76	2.49	199.5	4.51	21.35
38	15	Vada Mavanthal	325.61	0	30.8	50.1	5.35	3.4	13.17	2.5	192.66	3.54	24.09
39	16	Perumanthangal	97.34	0	23.27	0	0	1.62	0	30.02	23.66	4.8	13.97
40	17	Thandappanthangal	252.89	0	48.48	0	8.73	0.28	0.15	23.14	103.48	16.48	52.15
41	18	Vadamanapakkam	640.11	0	136.23	0	22.71	2.3	20.82	96.94	157.74	121.13	82.24
42	19	Melboodri	278.4	0	73.63	0	1.14	0	0.43	12.06	65.71	52.93	72.5
43	20	Pullavakkam	475.45	0	268.25	0	0	0	1.09	32.58	66.85	16.3	90.38
44	21	Kammanthangal	124.01	0	39.92	4.01	2.04	0.09	0	13	22.22	7.67	35.06

Sl.No	No. of Villages	Name of village	Total Geographical Area (in Hectares)	Forest Area (in Hectares)	Area under Non-Agricultural Uses (in Hectares)	Barren & Uncultivable Land Area (in Hectares)	Permanent Pastures and Other Grazing Land Area (in Hectares)	Land Under Miscellaneous Tree Crops etc. Area (in Hectares)	Culturable Waste Land Area (in Hectares)	Fallows Land other than Current Fallows Area (in Hectares)	Current Fallows Area (in Hectares)	Total Unirrigated Land Area (in Hectares)	Area Irrigated by Source (in Hectares)
45	22	Booderi	124.41	0	44.52	0	0	0.86	0.05	0	22.72	9.66	46.6
46	23	Arathrivelur	230.07	0	113.09	0	0	7.3	7.2	11.2	30.85	11.27	49.16
47	24	Hasanamapettai	69.51	0	22.05	0	0	1.35	0	17.57	14.06	3.94	10.54
48	25	Perumpulimedu	293.34	0	160.32	0	0	0.36	1.05	12	54.16	7.71	57.74
49	26	Chellaperumpulimedu	150.15	0	73.3	0	0	0	0	2.14	62.2	7.61	4.9
50	27	Azhinjalpattu	231.96	0	135.28	0	0.56	0	1.2	10	74.97	5.89	4.06
51	28	Narasamangalam	178.63	0	25.8	24.22	0	0	0.06	0.53	105.21	2.8	20.01
52	29	Arasanipalai	257.92	0	47.12	0	0	4.7	0.11	9	52.32	39.84	104.83
53	30	Mangal	313.91	0	48.73	5.94	2.1	2.45	19.1	0	179.33	24.97	31.29
54	31	Mahajanampakkam	539.88	0	129.16	0	5.1	0	0	82.44	194.57	39.87	88.74
55	32	Kunnavakkam	351.79	0	90.59	17.76	0	4.86	0.63	0	164.84	17.25	55.86
56	33	Pandiyampakkam	250.05	6.08	76.88	10.11	4.6	6	0	0	90.22	18.41	37.75
57	34	Barathanthangal	185.29	0	13.41	0	3.99	1.65	4.36	37.82	78.7	23.22	22.14
58	35	Ramakrishnapuram	193.84	0	41.81	0.01	10.2	0	0	6.14	54.57	19.99	61.12
59	36	Sirungattur	392.92	0	118.44	0	0	0	0	0	153.05	65.44	55.99
60	37	Arumparuthi	252.24	0	58.92	0	2.2	0	0	3.53	123.77	20.97	42.85
61	38	Sengattankundil	495.86	0	116.86	3.62	0	0.54	0	51.02	190.47	30.4	102.95
62	39	Pappanthangal	467.98	0	81.33	0	3.58	20.38	0	23.93	181.93	89.62	67.21
63	40	Duli	258.72	0	52.94	0	0	0	0	0	73.45	111.48	20.85
64	41	Periyakoil	358.03	0	89.89	11.78	0	0.7	0	1.02	166.8	21.79	66.05
65	42	Vinnavadi	194.18	0	19.16	0	1.2	51.3	0	20.58	78.19	8.77	14.98
66	43	Perungalathur	403.4	0	7.1	10.25	37.12	0	0	44.58	179.01	46.47	78.87
67	44	Vadaelapakkam	242.99	0	76.7	5.18	11.45	40.96	12.64	0	0	31.18	64.88
68	45	Vadangampattu	196.77	0	63.42	11.99	6.15	0	0	0	51.81	17.21	46.19
69	46	Madipakkam	602.4	7.5	157.98	7.8	0	4.16	0	110	196.41	47.97	70.58
70	47	Edaval	60.33	0	14.01	0	0	0.96	0	0.94	4.62	21.3	18.5
71	48	Akkur	784.34	0	192.13	0	16.27	1.64	0	4.5	239.54	160.31	169.95
72	49	Koozhamandal	297.27	0	86.49	0	3.96	0	0	17.03	78.58	46.93	64.28
73	50	Kizhnethapakkam	475.55	0	155.43	0	4.85	2.31	0	52.85	73.04	106.54	80.53
74	51	Siruveliyanallur	101.45	0	14.8	0	0	0	1.83	0	46.05	16.16	22.61
75	52	Veliyanallur	751.68	0	131.48	23.12	17.8	2.71	0	201.88	250.8	65.68	58.21
76	53	Kazhiyur	770.01	0	224.08	4.2	8.36	4.49	0	17.23	190.13	41.33	280.19
77	54	Puliyampakkam	441.03	0	122.72	0	0	42.74	0	33.35	182.65	16.75	42.82
78	55	Painginar	331.34	0	36.66	13.7	10.6	0	7.9	100.29	69.16	59.99	33.04
79	56	Vadathandalam	258.19	0	33.02	0	11.68	0.12	4.6	44.24	28.56	48.31	87.66
80	57	Perumpallam	391.37	0	119.3	6.84	3.36	2.53	4.08	22.76	204.37	4.82	23.31
81	58	Thandappanthangal R.F.	456	456	0	0	0	0	0	0	0	0	0
Kancheepuram Sub-District, Kancheepuram District													
82	59	Kolivakkam	569.4	0	244.98	0	47.26	0	0	0	182.18	23.09	71.89
83	60	Iyangarkulam	398.46	0	262.06	0	0.5	6.39	67.08	23.53	0	2.3	36.6
		total (C)	21755.04	469.58	5456.11	396.68	362.99	257.71	288.03	1805.63	7428.02	1839.92	3450.37
		Grand Total (A+B+C)	30846.27	469.58	7556.39	461.66	411.55	299.58	502.92	2611.31	11170.53	2626.68	4736.07

*Source: District Primary Census Abstract, Tiruvannamalai & Kancheepuram District of Tamilnadu State-2011

தமிழ்நாடு வனத்துறை

பெறுந்

மாவுட்ட ஆட்சித்தண்டலர்,
திருவண்ணாமலை மாவுட்டம்,
திருவண்ணாமலை.

வந்தி

திரு. R. கதிர்வேலு, இ.வ.11.
மாவுட்ட வன அலுவலர்,
திருவண்ணாமலை வனக்கோட்டம்,
திருவண்ணாமலை.

ந.க.எண் 5380/2022/வ. நாள் 17.06.2022.

அன்பு,
கூர்நாள் : கனிமங்களும் குவளிகளும் திருவண்ணாமலை மாவுட்டம்
திரு. R. கதிர்வேலு என்பவரின் மனுவில் கம்முவாரி குத்தகை உரிமம்
கோர்ப்பு. புலத்திலிருந்து 25 கி.மீ தொலைவில் காப்பு காடுகள்,
வனவிலங்கு சரணாலயம், யானை வழிநடங்கள், புலிகள் காப்பகம்
அமைந்துள்ளதா என்ற விவரம் கோர்ப்பது - தொடர்பாக.

1. மாவுட்ட ஆட்சித் தகுதம் ந.க.எண்:1127/கனிமம்/2022
நாள்: 14.06.2022.

2. திரு. R. கதிர்வேலு, எண்.19சி, விளக்கடி கோயில் தோட்டி தெரு, காஞ்சிபுரம்
என்பவர் விண்ணப்பம் நாள்:14.06.2022.

3. வனச்சரக அலுவலர், ஆணை வனச்சரகம் க.எண்.303/2022
நாள்:16.06.2022.

பாலைமலை காணும் கடித்திற் திருவண்ணாமலை மாவுட்டம், வெம்பாக்கம் வட்டம்,
காகை கிராமப் புல எண்கள்:58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0)> 58/2B (0.49.5),
58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0),
61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5) &
61/6 (0.14.5) மொத்தம் 4.420 ஏக்கர் பரப்பில் சாதாரண கற்கள் மற்றும் கிராவல் மண்
வெடிபெருக்க 10 ஆண்டுகளுக்கு குவளிக் குத்தகை உரிமம் வழங்கக்கோரி
விண்ணப்பிக்கப்பட்ட புலத்திலிருந்து 25 கி.மீ சுற்றளவிற்கு காப்புக் காடுகள், வனவிலங்கு
சரணாலயம், யானை வழிநடங்கள், புலிகள் காப்பகம் ஏதேனும் உள்ளனவா? அவ்வாறு
இருந்தால் எவ்வாறு தொலைவில் உள்ளது? என்ற விவரம் கோரப்பட்டது. அது தொடர்பான
விவரங்களை பின்பற்றியு தெரிவித்துக்கொள்கிறேன்.

1. மேற்கண்ட குவளி அளவடி உள்ள இடமானது தண்டப்பந்தாங்கல் காப்புக்காட்டு
எல்லையிலிருந்து சுமார் 6.47 கி.மீ தொலைவில் அமைந்துள்ளது.
2. மேற்கண்ட புலத்திலிருந்து 25 கி.மீ சுற்றளவிற்குள் வனவிலங்கு சரணாலயம், யானை
வழிநடங்கள், புலிகள் காப்பகம் ஏதேனில்லை.

நங்கள் உண்மையுள்ள,
ஒய்/பு.கோ.அருண்னாள்,
மாவுட்ட வன அலுவலர்,
திருவண்ணாமலை வனக்கோட்டம்,
திருவண்ணாமலை.

//உ-ந-உ-ப//

A-28

17/6/22
வரைதொழில் அலுவலர்.



தமிழ்நாடு தமில்நாடு TAMILNADU 21 APR 2023

CW 696114

R. Kathirvelu
Kancheepuram - 631 501

R. SANKAR
STAMP VENDOR
LICENSE NO: 3481/94,
NO. 2, MADLEY ROAD,
T. NAGAR, CHENNAI-12

AFFIDAVIT TO SEIAA, TAMIL NADU

I, Thiru R.Kathirvelu, No. 19C, Vilakkadi Kovil Thoppu Street, Kancheepuram District. Pin code – 631 501.do hereby solemnly declare and sincerely affirm that, we have applied for getting environment clearance to SEIAA, Tamil Nadu for Rough Stone and Gravel Quarry at Survey Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 over an area of 4.42.0Ha in Kaganam Village, Vembakkam Taluk, Tiruvannamalai District. I hereby solemnly declare that:

1. I am the authorized signatory for this project.
2. The blasting operation in the proposed quarries will be carried by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine formeman, III/1 Class mines manager appointed by the proponent.
3. I Will abide the EMP for the entire life of Mine

Notary Sign & Seal



Quarry owner sign & Seal

R. Kathirvelu
27/4/2023
K.KAMARAJ, M.A., B.L.,
ADVOCATE & NOTARY
Aditya Builders
Res & Office - No: 6, Devanathan Colony,
West Mambalam, Chennai - 600 033.
Cell: 93800 46411

R.



MINING PLAN FOR KAGANAM ROUGH STONE AND GRAVEL QUARRY

(Prepared under rule 19(1), 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959)

LOCATION OF THE QUARRY LEASE APPLIED AREA

STATE : TAMIL NADU
 DISTRICT : TIRUVANNAMALAI
 TALUK : VEMBAKKAM
 VILLAGE : KAGANAM
 S.F.NOS : 58/1A, 58/1B, 58/2A, 58/2B,
 58/3, 58/6, 58/7, 58/8A, 58/8B,
 59/2A, 61/1B, 61/2A, 61/2B,
 61/3, 61/4A, 61/5A and 61/6
 EXTENT : 4.42.0Ha.

For

APPLICANT

Thiru. R.Kathirvelu,
No. 19C, Vilakkadi Kovil Thoppu Street,
Kancheepuram District.

PREPARED BY

C.Natarajan, M.Sc.,M.Phil.,
Qualified Person
 No.93/36E2, Subramaniyar Kovil Street,
 Omalur Taluk, Salem District,
 Tamil Nadu, Pin code-636 455.
 Mobile:97502 62927 & 94446 54520.



R.Kathirvelu,
No. 19C, Vilakkadi Kovil Thoppu Street,
Kancheepuram District.
Pin code – 631 501.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of **Rough Stone and Gravel** quarry over an extent of 4.42.0hectares of Patta lands in S.F.Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District Tamil Nadu State has been prepared by

C.Natarajan, M.Sc.,M.Phil.,
Qualified Person


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

C.Natarajan, M.Sc.,M.Phil.,
Qualified Person

No.93/36E2,Subramanியar Kovil Street,
Omalur Taluk, Salem District,
Tamil Nadu, Pin code-636 455.
Mobile:97502 62927 & 94446 54520.

I hereby undertake that all modifications so 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 building on me in all respects.

Signature of the Applicant


R.Kathirvelu

Place:

Date: 31.03.2022

R.Kathirvelu,
No. 19C, Vilakkadi Kovil Thoppu Street,
Kancheepuram District.
Pin code - 631 501.



DECLARATION

The Mining Plan in respect of **Rough Stone and Gravel** quarry over an extent of 4.42.0hectares of Patta lands in S.F.Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State has been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

Signature of the Applicant

R.Kathirvelu

Place:

Date: 31.03.2022



C.Natarajan, M.Sc.,M.Phil.,

Qualified Person

No.93/36E2,Subramaniyar Kovil Street,

Omalur Taluk, Salem District,

Tamil Nadu, Pin code-636 455.

Mobile:97502 62927 & 94446 54520.

CERTIFICATE

This is to certify that, the provisions of Minor Minerals Conservation and Development Rules, 2010 (MMCDR) have been observed in the Mining Plan for the grant of **Rough Stone and Gravel** quarry lease over an extent of 4.42.0hectares of Patta lands in S.F.Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State applied by Thiru.R.Kathirvelu, for fresh quarry lease.

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

Certified

Signature of Qualified Person.

C.Natarajan, M.Sc.,M.Phil.,

Qualified Person

C.NATARAJAN M.Sc.M.Phil.,

Qualified Person

Place: Salem

Date: 01.04.2022



C.Natarajan, M.Sc.,M.Phil.,

Qualified Person

No.93/36E2,Subramanியar Kovil Street,
Omalur Taluk, Salem District,
Tamil Nadu, Pin code-636 455.
Mobile:97502 62927 & 94446 54520.

CERTIFICATE

Certified that, in preparation of Mining Plan for **Rough Stone and Gravel** quarry over an extent of 4.42.0hectares of Patta lands in S.F.Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State for Thiru.R.Kathirvelu, covers all the provisions of Mines Act, Rules, and Regulations etc made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Certified

Signature of Qualified Person.

C.Natarajan, M.Sc.,M.Phil.,

Qualified Person

C.NATARAJAN M.Sc.,M.Phil.,

Qualified Person

Place: Salem

Date: 01.04.2022



CERTIFICATE

Certified that I, C.Natarajan, residing at No.93/36 E2, Subramaniyar Kovil Street, Omalur Taluk, Salem District, Tamil Nadu, Pin Code-636 455. I am a Post graduate in Geology (M.Sc., Geology) from Annamalai university and more than five years of experience in mining Field.

Rule 15(1)(a) and (b) of Minerals (Other than Atomic, Hydro Carbons Energy Minerals) concession Rules 2016 stipulates the eligibility for preparing Mining Plans as "(1)(a) a post graduate degree in Geology granted by a university established" and (1)(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 (1)(a) and (1)(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 in respect of Rough Stone and Gravel quarry lease applied for an extent of 4.42.0Ha of (Patta lands) in S.F.Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6, of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, by Thiru. R.Kathirvelu for a period of Ten years. Since the Mining Plan is prepared as per the provisions contained in Rule 15(1) (a) and (b) of Minerals (Other than Atomic, Hydro Carbons Energy Minerals) concession Rules 2016, the same may be approved by the Competent Authority.


C.Natarajan, M.Sc.,M.Phil.,

Qualified Person

C.NATARAJAN M.Sc.,M.Phil.,
Qualified Person

Place: Salem

Date: 01.04.2022





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9.0	Employment Potentials & Welfare Measures	14
10.0	Environment Management Plan	16
11.0	Mine Closure Plan	19
12.0	Any Other Details Intend to furnish by the Applicant	20

R.



Annexure

S. No.	Description	Annexure NO.
1.0	Precise Area Communication letter issued by the District Collector	I
2.0	Copy of FMB	II
3.0	Copy of village map	III
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7.0	Copy of Consent Document	VII
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LIST OF PLATES

S. No.	Description	Plate No.
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2.0	Environmental Plan	I-A
3.0	Satellite imagery map	I-B
4.0	Topo sketch of Quarry lease applied area for 10Km Radius	I-C
5.0	Key Plan	I-D
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7.0	Topography, Geological, Year wise Development and Production Plan & Section	III
8.0	Progressive Quarry closure Plan & Section	IV
9.0	Conceptual Plan & Section	V



MINING PLAN FOR MINOR MINERALS

ROUGH STONE AND GRAVEL

Over an extent of 4.42.0hectares of Patta land in S.F.Nos. 58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State.

(PREPARED UNDER RULE 19(1), 41 and 42 OF TNMMCR 1959)

1.0 Introduction and Executive Summary;

1. The present Mining Plan is prepared for Thiru.R.Kathirvelu, No. 19C, Vilakkadi Kovil Thoppu Street, Kancheepuram District.
2. The application was processed by the Deputy Director, Department of Geology and Mining, Tiruvannamalai, and passed an order vide Rc.No.1127/Kanimam/2021 dated 30.03.2022 directing the applicant to produce approved Mining Plan under Rule 41(5) of the Tamil Nadu Minor Mineral Concession Rules, 1959 and Environmental Clearance Certificate under Rule 42 from the State Level Environmental Impact Assessment Authority (SEIAA) for the grant of quarry lease to quarry **Rough Stone and Gravel** over an extent of 4.42.0 hectares of Patta lands in S.F.Nos.58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A and 61/6 of Kaganam Village, Vembakkam Taluk, Tiruvannamalai District of Tamil Nadu State for a period of Ten years.
3. Accordingly, Mining Plan is prepared under the provisions of rule 19(1), 41 and 42 as per the amendments under Tamil Nadu Minor Mineral Concession Rules, 1959 by incorporating the conditions imposed in the precise area communication letter.
4. Geological Resources is estimated at 19,83,285m³ of Rough stone 44,073m³ of Weathered Rock and 88,146m³ of gravel formation and Mineable Reserves is estimated at 10,18,230m³ of Rough Stone, 35,703m³ of Weathered Rock and 74,124m³ of gravel formation and after leaving necessary safety distance from the lease boundary as indicated in the precise area letter and relevant mining laws in force.
5. Production Schedule is proposed production of 6,00,630m³ of Rough Stone, 35,703m³ of Weathered Rock and 74,124m³ of gravel formation for the period of first five years.



6. Environmental parameters,

- i) The area does not attract the Forest Conservation Act, 1980 as there is no forest around 6.4km radius.
- ii) There is no interstate boundary around 10Kms radius.
- iii) There is no wild life animal sanctuary within 10Kms radius from the project site area under the Wildlife (Protection) Act, 1972.

Therefore the project seeks clearance only from State Level Environmental Impact Assessment Authority (SEIAA) under B2 Category.

7. Environmental measures to be adopted shall be,

- i) Dust Control at source while drilling and blasting,
- ii) Dust suppression at loading point and transport haul roads,
- iii) Noise Control in blasting, control of fly rock missiles and vibration by doing peak particle velocity with in standard as prescribed by the DGMS and MOEF.
- iv) Unnecessary land degradation should be avoided or damaged land should be reclaimed or rehabilitated.
- v) Avoid uneven rat hole mining and follow scientific and systematic mining by safe bench system of open cast mining.
- vi) Mining near major fracture zones if any should be avoided to control ground water fluctuation in the adjacent agricultural lands.
- vii) Emission test of vehicles should be in tack to maintain minimum emission level of flue gases.
- viii) Noise level should not exceed 80db and the vehicles should use only permitted Air Horn while on road near residential areas.
- ix) Safety zones as prescribed by the Department of Geology and Mining from adjacent infrastructures should be strictly adhere to.
- x) And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.



EXECUTIVE SUMMARY:

a.	Name of the Village Panchayat	:	Kaganam	
b.	Name of the Panchayat Union	:	Vembakkam	
c.	The proposed total Minable Reserves	:	10,18,230m ³ of Rough Stone, 35,703m ³ of Weathered Rock 74,124m ³ of gravel formation	
d.	The proposed quantity of reserves (level of production) for Five years to be mined is(Recoverable reserves)	:	6,00,630m ³ of Rough Stone, 35,703m ³ of Weathered Rock 74,124m ³ of gravel formation	
e.	Total extent of the area	:	4.42.0Ha	
f.	Proposed Period of mining	:	Five Years	
g.	Existing depth	:	It is fresh quarry lease applied area	
h.	Proposed Depth of mining	:	23m depth (below ground level) for the proposed mining plan.	
i.	Method of mining/level of mechanization	:	Opencast, Semi-mechanized Mining with a bench height of 5m and bench width of 5m is proposed.	
j.	Types of Machineries used in the quarry	:	Machineries like Tractor mounted compressor attached with Jack hammers, Excavators are proposed to deploy for quarrying operation.	
k.	Cost of the Project A. Fixed Assets Cost B. Operational Cost C. EMP Cost		Rs. 20,68,000/- Rs. 72,00,000/- Rs. 6,00,000/- Total Project cost(A+B+C)= Rs. 98,68,000/-	
l.	The area applied for lease is bounded by Twenty seven corners and the coordinates are clearly marked in plate no II.			
	Corners	Co- ordinates	Distance between the corners	
		Latitude	Longitude	
	1	12° 44' 35.05"N	79° 34' 36.79"E	1-2 = 130.6m
	2	12° 44' 39.30"N	79° 34' 36.94"E	2-3 = 6.8m
	3	12° 44' 39.34"N	79° 34' 36.73"E	3-4 = 31.0m
	4	12° 44' 40.30"N	79° 34' 37.04"E	4-5 = 35.2m
	5	12° 44' 40.11"N	79° 34' 38.19"E	5-6 = 27.4m
	6	12° 44' 40.99"N	79° 34' 38.29"E	6-7 = 7.4m
	7	12° 44' 40.98"N	79° 34' 38.53"E	7-8 = 32.2m
	8	12° 44' 41.99"N	79° 34' 38.80"E	8-9 = 122.6m



9	12° 44' 41.41"N	79° 34' 42.82"E	9-10 =	31.6m
10	12° 44' 40.40"N	79° 34' 42.61"E	10-11 =	21.6m
11	12° 44' 40.30"N	79° 34' 43.32"E	11-12 =	31.2m
12	12° 44' 39.29"N	79° 34' 43.20"E	12-13 =	26.2m
13	12° 44' 39.22"N	79° 34' 43.96"E	13-14 =	62.4m
14	12° 44' 37.19"N	79° 34' 43.83"E	14-15 =	80.4m
15	12° 44' 37.10"N	79° 34' 46.50"E	15-16 =	14.0m
16	12° 44' 36.65"N	79° 34' 46.49"E	16-17 =	66.2m
17	12° 44' 34.49"N	79° 34' 46.37"E	17-18 =	57.6m
18	12° 44' 34.54"N	79° 34' 44.46"E	18-19 =	50.0m
19	12° 44' 34.66"N	79° 34' 42.80"E	19-20 =	71.4m
20	12° 44' 34.66"N	79° 34' 40.44"E	20-21 =	58.6m
21	12° 44' 36.56"N	79° 34' 40.53"E	21-22 =	66.2m
22	12° 44' 36.67"N	79° 34' 38.34"E	22-23 =	55.4m
23	12° 44' 34.87"N	79° 34' 38.25"E	23-24 =	30.8m
24	12° 44' 34.74"N	79° 34' 39.26"E	24-25 =	24.0m
25	12° 44' 33.97"N	79° 34' 39.16"E	25-26 =	25.2m
26	12° 44' 34.02"N	79° 34' 38.33"E	26-27 =	18.0m
27	12° 44' 34.59"N	79° 34' 38.20"E	27-1 =	45.0m

2.0 General Information:

2.1	a.	Name of the Applicant	:	Thiru. R.Kathirvelu,
	b.	Address of the Applicant with phone No and e-mail id if any	:	No. 19C, Vilakkadi Kovil Thoppu Street, Kancheepuram District. Pin code - 631 501 Cell No.:7639907437
	c.	Status of the Applicant	:	Individual.
2.2	a.	Mineral Which the applicant intends to mine	:	Rough Stone and Gravel.
	b.	Precise area communication letter No.	:	Precise area communication letter received from the Deputy Director, Department of Geology and Mining, Tiruvannamalai, Rc.No. 1127/Kanimam/2021 dated 30.03.2022
	c.	Period of permission / lease granted	:	The Deputy Director, Department of Geology and Mining, Tiruvannamalai, has grant of lease for Ten years.



	d. Name and Address of the RQP preparing Mining Plan	C.Natarajan, M.Sc.,M.Phil., Qualified Person No.93/36E2, Subramaniyar Kovil Street, Omalur Taluk, Salem District, Tamil Nadu, Pin-636 455. Mobile: 9750223535 & 94446 54520.
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3.0 Location:

Details of the Area:

State	District	Taluk	Village	S.F.Nos.	Extent in hectares
Tamil Nadu	Tiruvannamalai	Vembakkam	Kaganam	58/1A, 58/1B, 58/2A, 58/2B, 58/3, 58/6, 58/7, 58/8A, 58/8B, 59/2A, 61/1B, 61/2A, 61/2B, 61/3, 61/4A, 61/5A & 61/6	4.42.0

a.	Classification of the Area (Ryotwari / poramboke / others)	: Patta land
b.	Ownership / Occupancy of the Applied area (Surface rights)	: It is patta land registered in the name of Tvl.SKT Mines vide patta nos.1042 and 1041, the applicant has obtained consent from the pattadars, Please refer Annexure No: IV and VII.
c.	Toposheet No. with Latitude and Longitude	: Topo Sheet No: 57 P/10 : Latitude : 12°44'33.97"N to 12°44'41.99"N : Longitude : 79°34'36.73"E to 79°34'46.50"E
d.	Existence of Public Road / Railway line if any nearby the area and approximate distance	: There is an existing road from the area leads to Karandai-Mariyanallur road on eastern side of the area. The Nearest Railway line is Kancheepuram - Walajah line which is about 20.5Km on the Northeastern side of the area.

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PART - A

4.0 Geology and Mineral Reserves:

4.1	a. Topography	: 1. The area applied for quarry lease exhibits almost plain topography covered by Gravel formation. The massive Charnockite formation is noticed below 2m (Avg) Gravel and 1m weathered rock formation and sloping towards Southeastern side of the area, the altitude of the area is above 101m (maximum) from MSL. 2. No major river is found nearby the lease applied area. 3. Water table is found at a depth of 62m in summer and 59m in rainy seasons. 4. Temperature of the area is reported to be 18°C to a maximum of 42°C during summer. 5. Rainfall of this area is about 800mm to 900 mm during the both NE & SW monsoons.						
	b. General Geology of the Area	: The area is underlain by the wide range of metamorphic rocks of peninsular gneissic complex. These rocks are extensively weathered and overlain by the recent valley fills and alluvium at places. The geological formations found in the district are Archaean rocks like Gneisses, Granites, Charnockites basic granulites and calc-gneisses. The younger formations are Quartz veins and pegmatite. The rock type noticed in the area for lease is Charnockite which contains mostly Quartz and Feldspar with some ferromagnesian minerals. The Charnockite is part of peninsular Gneisses, a high grade metamorphic rock. The strike of the Charnockite formation is N40°E - S40°W with dipping towards SE70°. The general geological succession of the area is given as under. <table border="1"> <thead> <tr> <th>Age</th> <th>Rock Formation</th> </tr> </thead> <tbody> <tr> <td>1. Recent to Sub recent</td> <td>Alluvium, Gravel</td> </tr> <tr> <td>2. Archaean</td> <td>Charnockite Peninsular Gneiss, and Calc Gneiss</td> </tr> </tbody> </table>	Age	Rock Formation	1. Recent to Sub recent	Alluvium, Gravel	2. Archaean	Charnockite Peninsular Gneiss, and Calc Gneiss
Age	Rock Formation							
1. Recent to Sub recent	Alluvium, Gravel							
2. Archaean	Charnockite Peninsular Gneiss, and Calc Gneiss							



4.2		Details of Exploration already carried out if any	:	No exploration was carried out, as the Rough stone formations are clearly visible within the lease applied area.
4.3	a.	Estimation of Reserves	:	<p>The Geological and Recoverable reserves are estimated by cross sectional method.</p> <p>Totally four sections have been drawn, two sections drawn length wise as (X-Y), (X1-Y1), another two sections drawn width wise as (A-B) (C-D) to cover maximum area considered for lease.</p> <p>The Plans and Sections have been drawn with a scale of 1:1000 and 1:500 respectively. Please refer plate No.III.</p>

a. Geological Resources

The quarrying is restricted up to a depth of 48m below ground level only. Availability of Resources is given below.

Table No-1

Section	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel in m ³	Weathered Rock in m ³	Geological Resources of Rough stone in m ³
XY-AB	44	166	2	14608	14608		
	44	166	1	7304		7304	
	44	166	45	328680			328680
					14608	7304	328680
XY-CD	167	143	2	47762	47762		
	167	143	1	23881		23881	
	167	143	45	1074645			1074645
					47762	23881	1074645
X1Y1-CD	179	72	2	25776	25776		
	179	72	1	12888		12888	
	179	72	45	579960			579960
					25776	12888	579960
Grand Total				88146	44073	1983285	
Gravel Formation				:	88,146m ³		
Weathered Rock Formation				:	44,073m ³		
The Geological Resources of Rough stone				:	19,83,285m ³		

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b. Mineable Reserve

The mineable reserve calculated by deducting 7.5m safety distance and 4m loss.

Table No-2

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel in m ³	Weathered Rock in m ³	Mineable Reserves of Rough stone in m ³
XY-AB	I	36	149	2	10728	10728		
	II	34	146	1	4964		4964	
	III	34	145	5	24650			24650
	IV	29	135	5	19575			19575
	V	24	125	5	15000			15000
	VI	19	115	5	10925			10925
	VII	14	105	5	7350			7350
	VIII	9	95	5	4275			4275
	IX	4	85	5	1700			1700
Total						10728	4964	83475
XY-CD	I	158	135	2	42660	42660		
	II	157	133	1	20881		20881	
	III	156	133	5	103740			103740
	IV	151	128	5	96640			96640
	V	146	123	5	89790			89790
	VI	141	118	5	83190			83190
	VII	136	113	5	76840			76840
	VIII	131	108	5	70740			70740
	IX	126	103	5	64890			64890
	X	121	98	5	59290			59290
	XI	111	93	5	51615			51615
Total						42660	20881	696735
X1Y1-CD	I	162	64	2	20736	20736		
	II	159	62	1	9858		9858	
	III	158	62	5	48980			48980
	IV	148	57	5	42180			42180
	V	138	52	5	35880			35880
	VI	128	47	5	30080			30080
	VII	118	42	5	24780			24780
	VIII	108	37	5	19980			19980
	IX	98	32	5	15680			15680
	X	88	27	5	11880			11880
	XI	78	22	5	8580			8580
Total						20736	9858	238020
Grand Total						74124	35,703	1018230



The mineable reserve is computed as 10,18,230m³ of Rough stone, 35,703m³ of Weathered rock formation and 74,124m³ of Gravel formation upto a depth of 48m below ground level only.

Gravel and weathered rock mass will be removed first, after the excavation of weathered rock mass will preserved all along the boundary barrier if market is rise the will be loaded into tipper for needy customer this will be done after paying the necessary Seigniorage Fees to Government.

5.0 Mining:

5.1	Method of Mining	: 1. Opencast method of semi mechanized mining with 5.0m vertical bench width of the bench is not less than bench height. 2. 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 petrogenetic 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.
5.2	Mode of Working	: The rough stone is proposed to quarry 5m bench height and width with conventional opencast semi-Mechanized method. The quarry operation involves shallow jack hammer drilling, slurry blasting, excavation, Loading and transportation of Rough stone to the needy buyers. The production of Rough stone in this quarry involves the following method which is typical for Rough Stone quarrying in contrast to other major mineral mining. Splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy buyers. Occasionally hydraulic excavators are attached with rock breakers for fragmentation to avoid secondary blasting. The primary boulders thus splitted are removed from the pits by excavators and further made to smaller sizes by rock breakers attached in excavators. It is a conventional opencast semi mechanized method of mining.
5.3	Proposed bench height & Width	: Quarrying of Rough Stone is proposed bench height of 5m and bench width of 5m.



5.4	Details of Overburden / Mineral Production proposed for the first 5 years.	of /	: The overburden in the form of Gravel and weathered rock mass after the excavation of weathered rock mass will be preserved all along the boundary barrier if market is rise the will be loaded into tipper for needy customer this will be done after paying the necessary Seigniorage Fees to Government. The excavated rough stone and gravel will be directly loaded into tipper to the needy crushers/other buyers for road project and construction works for filling and leveling of low lying areas.
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The Yearwise Production and Development Table

Table No -3

Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel in m ³	Weathered Rock in m ³	Mineable reserve of Roughstone in m ³
I	XY-AB	I	36	149	2	10728	10728		
		II	34	146	1	4964		4964	
		III	34	145	5	24650			24650
	XY-CD	I	128	135	2	34560	34560		
		II	128	133	1	17024		17024	
		III	128	133	5	85120			85120
Total							45288	21988	109770
II	XY-CD	I	30	135	2	8100	8100		
		II	29	133	1	3857		3857	
		III	28	133	5	18620			18620
	X1Y1-CD	I	162	64	2	20736	20736		
		II	159	62	1	9858		9858	
		III	158	62	5	48980			48980
		IV	148	57	5	42180			42180
Total							28836	13715	109780
III	XY-CD	IV	151	128	5	96640			96640
	XY-AB	IV	29	135	5	19575			19575
		V	17	125	5	10625			10625
	Total								
IV	XY-AB	V	7	125	5	4375			4375
	XY-CD	V	146	123	5	89790			89790
	X1Y1-CD	V	127	52	5	33020			33020
	Total								
V	X1Y1-CD	V	11	52	5	2860			2860
		VI	128	47	5	30080			30080
	XY-CD	VI	141	118	5	83190			83190
	XY-AB	VI	19	115	5	10925			10925
	Total								
Grand Total							74124	35703	600630

The mineable reserve is computed as 10,18,230m³ of Rough stone 35,703m³ of Weathered rock formation and 74,124m³ of Gravel formation upto a depth of 48m but the applicant has proposed to carry out 6,00,630m³ of Rough stone 35,703m³ of Weathered rock formation and 74,124m³ of Gravel formation at the rate of 100% recovery upto a depth of 23m below ground level for the period of first five years.



5.5	Machineries to be used																									
	a. Mining	: It is proposed to use following machineries for quarrying rough stone 1) Tractor mounted compressor with jack hammer 2) Excavator of 0.90m ³ bucket capacity (with Rock breaker attachment).																								
	b. Loading	: Excavator of 0.90m ³ bucket capacity (with Rock breaker attachment).																								
	c. Transportation	: Tipper 5Nos 5/10Ts capacity.																								
5.6	Disposal of Overburden	: The overburden in the form of Gravel and weathered rock mass after the excavation of weathered rock mass will preserved all along the boundary barrier if market is rise the will be loaded into tipper for needy customer this will be done after paying the necessary Seigniorage Fees to Government. Gravel will be directly loaded into tipper to the needy crushers/other buyers for road project and construction works for filling and leveling of low lying areas.																								
5.7	Brief Note on Conceptual Mining Plan for the entire lease period	: Conceptual Mining Plan is prepared with an object of Ten years of systematic development of bench lay outs, selection of ultimate pit limit, depth of quarrying, ultimate pit slope, selection of sites for construction of infrastructures etc. Ultimate pit size is designed based on certain practical factors such as the economical depth of mining, safety zones, permissible areas etc. Ultimate Pit dimension is given as under, <table border="1"> <thead> <tr> <th colspan="4">Ultimate Pit dimension (M) end of mining plan period</th> </tr> <tr> <th>Pit No</th> <th>Length (max) in (m)</th> <th>Width (Avg) in(m)</th> <th>Depth(max) in(m)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>194</td> <td>183</td> <td>23</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">Ultimate pit dimension End of the lease period</th> </tr> <tr> <th>Pit No</th> <th>Length (max) in (m)</th> <th>Width (Avg) in (m)</th> <th>Depth(max) in(m)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>194</td> <td>183</td> <td>48</td> </tr> </tbody> </table> Afforestation has been proposed on all along the boundary barrier by planting trees. All the baseline information studies like Air Quality monitoring, Noise and Vibration monitoring, Water Analysis studies will be carried out every year as per the MOEF norms.	Ultimate Pit dimension (M) end of mining plan period				Pit No	Length (max) in (m)	Width (Avg) in(m)	Depth(max) in(m)	I	194	183	23	Ultimate pit dimension End of the lease period				Pit No	Length (max) in (m)	Width (Avg) in (m)	Depth(max) in(m)	I	194	183	48
Ultimate Pit dimension (M) end of mining plan period																										
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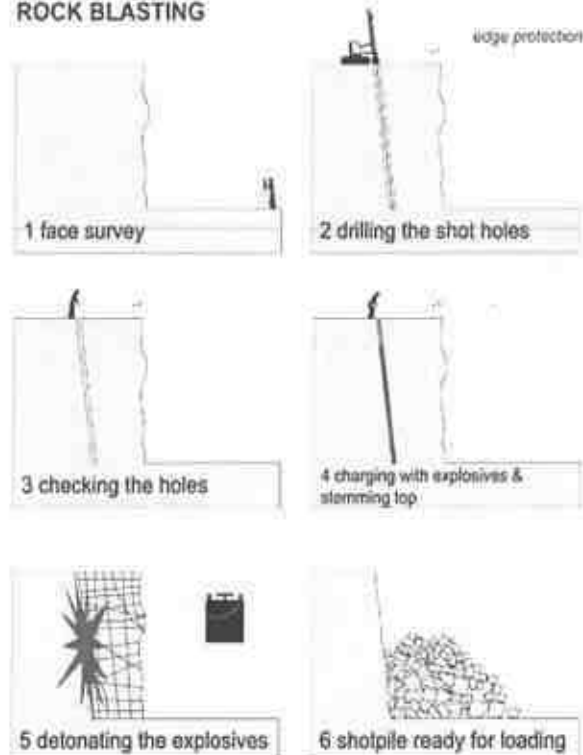


6.0 Blasting:

6.1 Blasting Pattern : The massive formation shall be broken into pieces of portable size by drilling and blasting using jack hammers and shot hole blasting. Powder factor of explosives for breaking such hard rock shall be in the order of 6 to 7 Tonnes per K.g of explosives. Blasting parameters are as follows.

Diameter of the hole	: 32-36 mm
Spacing	: 0.6m
Depth	: 1 to 1.5m
Burden for hole	: 0.6m
Pattern of hole	: ZigZag
Inclination of hole	: 70° from the horizontal.

ROCK BLASTING



6.2 Types of Explosives : Small dia, 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough stone. No deep hole drilling or primary blasting is proposed.



6.3	Measures proposed to minimize ground vibration due to blasting	<p>: Controlled blasting measures will be adopted for minimizing ground vibration and fly rock. Shallow depths jackhammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give shattering effect in rough stone for easy excavation and to control fly rock.</p> <table border="1"> <tr> <td>Number of holes</td> <td>: 346</td> </tr> <tr> <td>Powder factor</td> <td>: 6Ts/Kg of explosives</td> </tr> <tr> <td>Total explosive required</td> <td>: 173Kg slurry explosives</td> </tr> <tr> <td>Charge / hole</td> <td>: 0.5Kg</td> </tr> <tr> <td>Blasting time</td> <td>: 12-2 Pm</td> </tr> </table>	Number of holes	: 346	Powder factor	: 6Ts/Kg of explosives	Total explosive required	: 173Kg slurry explosives	Charge / hole	: 0.5Kg	Blasting time	: 12-2 Pm
Number of holes	: 346											
Powder factor	: 6Ts/Kg of explosives											
Total explosive required	: 173Kg slurry explosives											
Charge / hole	: 0.5Kg											
Blasting time	: 12-2 Pm											
6.4	Storage of Explosives and safety measures to be taken while blasting.	<p>: The applicant will engage an authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory foreman/ mines manager.</p>										
7.0 Mine Drainage:												
7.1	Depth of Water table	<p>: The ground water table is reported as 62m below ground level. In the proposed mining plan only 23m (Below ground level) depth and 48m depth has been envisaged as workable depth for safe & economic quarrying for the entire lease period. Hence the quarrying operation may not affect the ground water.</p>										
7.2	Arrangement and Places where the mine water is finally proposed to be discharged	<p>: The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300lpm and it shall be pumped about periodically by a stand by diesel powered Centrifugal pump motivated with 7.5H.P.Motor. The quality of water is potable and it is not contaminated with any hazardous things. Hence, water stored in the quarry pit will be pumped into the adjacent agricultural fields. Further the water stored in the old pit will also be used for plantation purposes</p>										



8.0 Other Permanent Structures:

8.1	Habitations / Village	:	There are no habitations within a radius of 300m.
8.2	Power lines (HT/LT)	:	There is no Power lines (HT/LT) passing within a radius of 50m.
8.3	Water bodies (River, Pond, Lake, Odai, Channel etc)	:	There is Two Tank situated on Southern and eastern side and is 80m and 460m away from the area. There is seasonal odai passing on Southern side and is 80m away from the area
8.4	Archeological / Historical Monuments	:	There are no Archeological / Historical Monuments within a radius of 500m.
8.5	Road (NH, SH, Village Road etc)	:	The Nearest National Highway (NH-48) Kanchipuram - Vellore which is about 15.6Km on the Northern side of the area. The State Highway (SH-5) Tindivanam - Vembakkam is about 6.5Km on Southwestern side of the area.
8.6	Places of Worship	:	There are no Places of Worship within a radius of 500m.
8.7	Reserved Forest / Forest / Social Forest / Wild Life Sanctuary etc.,	:	There is no Reserved Forest /Wild Life Sanctuary etc within a radius of 1km.
8.8	Any Interstate Border, Protected areas under the Wild Life (Protection) Act, 1972, Critically Polluted Areas as Identified by Central Pollution Control Board and Notified Eco sensitive areas	:	There are No inter State border within a radius of 10Kms.
8.9	Any Other Structures	:	Nil

9.0 Employment Potential & Welfare Measures:

9.1	Employment Potential (Management & Supervisory personal)	:	1.	Skilled	Operator	10No.	
					Mechanic	1 No.	
					Mines manager /Mate	1 No.	
				2.	Semi-skilled	Driver	5 No.
				3.	Unskilled	Musdoor / Labours	15Nos
Total = 32Nos							
Allowing 10% absentee, the no. of men of roll will be around 27.							



			<p>The above man power is adequate to meet the production schedule and the machinery envisaged in the mining plan and to comply the statutory provisions of Mines Safety Regulations.</p> <p>It is been ensured that, child labours under 18 years of age will not be engaged for quarrying operation.</p> <p>Necessary life insurance policies will be taken by the applicant to all the employees up to the end of the lease period.</p>
9.2		Welfare Measures	
	a.	Drinking Water	: Packaged drinking water is available from the nearby approved water vendors in Kaganam village which is about 850m on southeastern side of the area.
	b.	Sanitary facilities	: Semi-permanent latrines & urinals shall be maintained at convenient places for use of labours as per the provisions of Rule (33) of the Mines Rules, 1960 separately for males and females. Washing facilities shall also be arranged as per rule (36) of the Mines Rules, 1960.
	c.	First Aid Facility	: First aid kits are kept in Mines office room, in case of such eventualities the victim will be given first aid immediately at the site and injured person will be taken to the hospital. Hospital is available at distance of 4.5Km (NE) in Vembakkam the competent and Statutory foreman/ permit manager will be in charge of first aid.
	d.	Labour Health	: As per Mines Rule, Periodic medical examination related to occupational health safety will be conducted to all the workers in applicants own cost.
	e.	Precautionary safety measures to the Labourers	: Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc., have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS being a mechanized operation.
			<p>Necessary training will be conducted once in a year to all the employees with the help of qualified and experienced officers to train about the safe and systematic quarrying operation.</p>



PART - B

10.0 Environmental Management Plan:

- 10.1 Existing Land Use Pattern :
1. The area exhibits almost plain topography covered by Gravel and Weathered Rock formation.
 2. Quarrying operation is proposed up to a depth of 23m below ground level for the proposed mining plan period.
 3. Fluctuation of Water table in this area is in between 62m and 59m during a year.
 4. This region receives the average annual rainfall of 800mm to 900mm. The surrounding area is practiced by the seasonal cultivation.

The existing land use pattern is given as under.

Table No-4

Sl. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Quarrying Pit	Nil	3.55.0
2.	Infrastructure	Nil	0.01.0
3.	Roads	Nil	0.02.0
4.	Green Belt	Nil	0.40.0
5.	Unutilized	4.42.0	0.44.0
Total =		4.42.0	4.42.0

- 10.2 Water Regime :
- Water table in this area is noticed at a depth of 62m and presently, in the proposed mining plan only 23m (Below ground level) depth and 48m depth has been envisaged as workable depth for safe & economic quarrying for the entire lease period. hence, it will not affect the ground water depletion of this area.

- 10.3 Flora and Fauna :
- Except acacia bushes, no other valuable trees are noticed in the applied area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.

- 10.4 Climatic conditions :
- Generally subtropical climatic condition prevails throughout the year and there is no sharp variation in climate.

This District receives rain both in south west and north east monsoon.

The average rainfall is about 800mm to 900mm and the temperature ranges from 18°C during winter and to a maximum of 42°C during the summer.



10.5	Human Settlement	<p>: The nearest habitations with the population given as under.</p> <p style="text-align: center;">Table No-5</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>S. No</th> <th>Name of the Village</th> <th>Approximate distance & Direction from lease applied area</th> <th>Approximate population</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Karandai</td> <td>2.0km - NE</td> <td>250</td> </tr> <tr> <td>2.</td> <td>Sumangali</td> <td>1.2km - NW</td> <td>400</td> </tr> <tr> <td>3.</td> <td>Kaganam</td> <td>850m - SE</td> <td>300</td> </tr> <tr> <td>4.</td> <td>Perumpandi</td> <td>2.0Km-SW</td> <td>200</td> </tr> </tbody> </table>	S. No	Name of the Village	Approximate distance & Direction from lease applied area	Approximate population	1.	Karandai	2.0km - NE	250	2.	Sumangali	1.2km - NW	400	3.	Kaganam	850m - SE	300	4.	Perumpandi	2.0Km-SW	200
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2.	Sumangali	1.2km - NW	400																			
3.	Kaganam	850m - SE	300																			
4.	Perumpandi	2.0Km-SW	200																			
10.6	Plan for Air, Dust Suppression	<p>: Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying. Wet drilling and dust extractor arrangements will be provided to drilling units so as to control raise of dust from the site of drilling. Operators, those exposed directly to such conditions will be provide such protective equipment like mask, ear plug, helmet, gloze etc., as per the Mines Act.</p>																				
10.7	Plan for Noise Control	<p>: Quarrying of Rough Stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out to check the noise level in and around the quarry site. Nowhere the noise level should exceed the permissible limit of 80db during the quarry working hours.</p>																				
10.8	Environmental Impact Assessment Statement Describing Impact on mining on the next Five years	<p>: The mining plan proposed is for a small production of Rough stone without involving deep hole drilling and heavy blasting. Such limited mining activity is not likely to cause any impact adversely on environment as far as pollution of air, water and noise is concerned, anyhow environmental impact studies will be conducted as per EIA notification issued by MOEF. It is B2 Category mine.</p>																				



10.9	Proposal for Waste Management	: There is no waste anticipated in this rough-stone quarry operation.																																				
10.10	Proposal of Reclamation of Land affected during mining activities and at the end of mining.	: In the proposed mining plan 23m (Below ground level) depth and 48m depth has been envisaged as workable depth for safe & economic mining during the lease period. Hence, after quarry reaches ultimate pit limit (for this lease period) of 48m depth, fencing will be constructed around the quarried pits to prevent inherent entry of the public and cattle.																																				
10.11	Program for Afforestation	: The 7.5m safety distance along the lease boundary has been identified to be utilized for afforestation. Appropriate native species of Neem/Pungan trees will be planted in a phased manner as described below. <p style="text-align: center;">Table No-6</p> <table border="1"> <thead> <tr> <th>Year</th> <th>No. of trees proposed to be planted</th> <th>Survival %</th> <th>Area to be covered Sq.m</th> <th>Name of the species</th> <th>No of trees expected to be grown</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>40</td> <td>80%</td> <td>800</td> <td>Neem/Pungan</td> <td>32</td> </tr> <tr> <td>II</td> <td>40</td> <td>80%</td> <td>800</td> <td>Neem/Pungan</td> <td>32</td> </tr> <tr> <td>III</td> <td>40</td> <td>80%</td> <td>800</td> <td>Neem/Pungan</td> <td>32</td> </tr> <tr> <td>IV</td> <td>40</td> <td>80%</td> <td>800</td> <td>Neem/Pungan</td> <td>32</td> </tr> <tr> <td>V</td> <td>40</td> <td>80%</td> <td>800</td> <td>Neem/Pungan</td> <td>32</td> </tr> </tbody> </table> <p>Nearly 4000Sq.m area is proposed to use under afforestation by planting 40nos. of Neem/Pungan trees during every year with an anticipated survival rate of 80%. The Quarry landuse, layout and afforestation plan is shown in Plate No.III.</p>	Year	No. of trees proposed to be planted	Survival %	Area to be covered Sq.m	Name of the species	No of trees expected to be grown	I	40	80%	800	Neem/Pungan	32	II	40	80%	800	Neem/Pungan	32	III	40	80%	800	Neem/Pungan	32	IV	40	80%	800	Neem/Pungan	32	V	40	80%	800	Neem/Pungan	32
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V	40	80%	800	Neem/Pungan	32																																	
10.12	Proposed Financial Estimate / Budget for (EMP) Environment Management A.Fixed Asset Cost: 1. Land Cost (400000/1Ha)= 2. First aid room and accessories 3. Labour Shed 4. Sanitary Facility Total=	: Rs. 17,68,000 Rs.1,00,000 Rs.1,00,000 Rs.1,00,000 Rs. 20,68,000/-																																				



B.Operational Cost:		
1. Machineries	:	Rs.70,00,000/-
2. Fencing cost	:	Rs.2,00,000
Total	:	Rs.72,00,000/-
C.EMP Cost:		Budget Provision for the entire quarrying period.
	:	Air Quality Sampling = Rs. 40,000/-
	:	Water Quality Sampling = Rs. 40,000/-
	:	Noise Monitoring = Rs. 20,000/-
	:	Ground vibration test = Rs. 20,000/-
Expenditure		
1. Drinking water facility	:	Rs.1,50,000/-
2. Sanitary Arrangments	:	Rs. 50,000/-
3. Safety kids	:	Rs. 50,000/-
4. Water sprinkling	:	Rs. 1,50,000/-
5. Afforestation	:	Rs. 80,000/-
Total=	:	Rs. 6,00,000/-
Total Project Cost (A+B+C)	:	Rs. 98,68,000/-
CSR Cost(2% of Total Project Cost)	:	Rs. 1,97,760/-

11.0 Mine Closure Plan:


11.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	There is no proposal for back filling, reclamation and rehabilitation. The quarried pits after the end of the life of lease will be fenced to prevent inherent entry of public and cattles.
11.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by using Barbed wire fencing to prevent inherent entry of public and cattle.
11.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	Mitigation measures: Drilling will be carried out by wet drilling mode to control the dust propagation into the air. Blasting will be carried out on limited scale. Mist Water spraying on haul road is proposed to prevent the dust propagation into the air.



12.0 Any Other Details Intend to Furnish by the Applicant:

- (i) Permission will be obtained from the District Mines Office to extract the Rough Stone from the Boundary barriers and for slopes.
- (ii) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (iii) The applicant will endeavor every attempt to quarry the Rough Stone economically without any wastage and to improve the environment and ecology.
- (iv) The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued and relevant mining laws in force.
- (v) Any violation pointed out by the inspecting authorities shall be rectified as per the guidelines of the Department.

Prepared by


C.Natarajan, M.Sc., M.Phil.,
Qualified Person


C.NATARAJAN M.Sc., M.Phil.,
Qualified Person


Place : Salem

Date : 01.04.2022

**This Mining Plan is Approved
Subject to the Conditions/Stipulation
Indicated in The Mining Plan Approval
Letter No. 1127/mines/2021 Dt: 13.4.2022
Office Of The Deputy Director Of
Geology And Mining, Tiruvannamalai.**

This Mining Plan is approved based on incorporation of the particulars specified in the letter of the Commissioner of Geology and Mining, Chennai Lr.No: 3868/LC/2012, Dated: 19-11-2012 and subject to further fulfillment of the conditions laid down under Tamil Nadu Minor Mineral Concession Rules, 1959.


Deputy Director
Dept. of Geology and Mining
Tiruvannamalai.


13/4/22



ANNEXURE 1

144

ந.க.எண்:1127/கனிமம்/2021

திருவண்ணாமலை துணை இயக்குநர் அலுவலகம், புவியியல் மற்றும் சுரங்கத்துறை, திருவண்ணாமலை-4.

நாள்:30.03.2022.

அறிவிக்கை

பொருள்: கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - திருவண்ணாமலை மாவட்டம் - வெம்பாக்கம் வட்டம் - காகனம் கிராமம் - புல எண்கள். 44/8B (0.23.0) மற்றும் பலவற்றின் 4.90.0 ஹெக்டேர் பரப்பில் சாதாரணகல் மற்றும் கிராவல் வெட்டியெடுக்க - குவாரி குத்தகை உரிமம் வழங்கக்கோரி திரு.R.கதிர்வேலு, என்பவர் விண்ணப்பம் செய்தது - பரிந்துரை அறிக்கை வரப்பெற்றது - சுரங்கத் திட்டம் (Mining Plan) தயார் செய்து சமர்ப்பிக்க கோருவது - தொடர்பாக.

- பார்வை:
1. திரு.R.கதிர்வேலு, எண்.19சி, விளக்கடி கோவில் தோப்பு தெரு, காஞ்சிபுரம் என்பவர் விண்ணப்பம், நாள் 03.12.2021.
 2. இவ்வலுவலக கடிதம் ந.க.எண்.1127/கனிமம்/2021, நாள் 03.12.2021.
 3. வருவாய்க்கோட்ட அலுவலர், செய்யார் அவர்களின் கடிதம் ந.க. அ5/5633/2021, நாள்.11.03.2022.
 4. உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, திருவண்ணாமலை அவர்களின் புலத்தணிக்கை அறிக்கை நாள்.16.03.2022.
 5. அரசாணை (MS)எண்.169 தொழில்துறை (எம்.எம்.சி1) துறை நாள்.04.08.2020.
 6. அரசாணை (MS)எண்.208 தொழில்துறை (எம்.எம்.சி1) துறை நாள்.21.09.2020.
 7. தொடர்புடைய ஆவணங்கள்.

திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், காகனம் கிராமம் புல எண்கள்.44/8B (0.23.0), 58/1A (0.40.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/4B1 (0.16.0), 61/5A (0.08.5), மற்றும் 61/5B (0.33.0)-ல் 4.90.0 ஹெக்டேர் பரப்பில் சாதாரணகல் மற்றும் கிராவல் வெட்டியெடுக்க 10 ஆண்டுகளுக்கு குவாரிக்குத்தகை உரிமம் வழங்கக்கோரி திரு.R.கதிர்வேலு, என்பவர் அளித்த பார்வை 1-ல் கண்ட விண்ணப்பத்தின் மீது பார்வை 3-ல் கண்ட வருவாய்க்கோட்ட அலுவலர், செய்யார் அவர்களின் மற்றும் பார்வை 4-ல் காணும் திருவண்ணாமலை மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை, துணை இயக்குநர் அலுவலக உதவி புவியியலாளர் ஆகியோர் அளித்த பரிந்துரை அறிக்கைகள் பரிசீலிக்கப்பட்டது.



3. திரு.R.கதிர்வேலு, என்பவர் சாதாரணக்கற்கள் மற்றும் கிராவல் வெட்டியெடுக்க 10 ஆண்டுகளுக்கு குவாரிக்குத்தகை உரிமம் வழங்கக்கூடாதிருவண்ணாமலை வுல விண்ணப்பித்துள்ள வெம்பாக்கம் வட்டம், காகனம் கிராமம் புல எண்கள் 58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5), மற்றும் 61/6 (0.14.5) 4.42.0 ஹெக்டேர் நிலப்பரப்பில் எவ்வித தடையும் இன்றி குவாரிப்பணி செய்ய வாய்ப்பு உள்ளதால், மேற்படி விண்ணப்பதாரர் திரு.R.கதிர்வேலு, என்பவருக்கு சாதாரணக்கற்கள் மற்றும் கிராவல் மண் வெட்டி எடுக்க குவாரி குத்தகை உரிமம் வழங்க பரிந்துரை செய்யப்பட்ட 4.42.0 ஹெக்டேர் பரப்பினை கற்குவாரி செய்ய உகந்த புலம் (Precise Area) என தீர்மானித்து கீழ்கண்ட நிபந்தனைகளுக்கு உட்பட்டு அறிவிப்பு செய்யப்படுகிறது.

நிபந்தனைகள்

- 1) விண்ணப்ப புலத்திற்கு அருகில் புல எண் 69-ல் செல்லும் ஓடைக்கு 50மீ பாதுகாப்பு இடைவெளி விட வேண்டும்.
- 2) அருகில் உள்ள பட்டா நிலங்களுக்கு 75மீ பாதுகாப்பு இடைவெளி விடவேண்டும்.
- 3) பொதுமக்களுக்கும் அருகிலுள்ள நிலங்களுக்கும் எவ்வித பாதிப்பும் ஏற்படுத்தக்கூடாது.
- 4) குவாரிப்பணி தொடங்குவதற்கு முன்பாக குவாரியை சுற்றி முள் கம்பிவேலி அமைத்து குவாரிப்பணி தொடங்க வேண்டும்.
- 5) முறைப்படியும், விஞ்ஞானபூர்வமாகவும் குவாரிப்பணி செய்யவேண்டும்.
- 6) சான்றிதழ் பெறப்பட்ட போர்மேன், வெடிப்பாளர் மற்றும் சுரங்க மேலாளர் மூலம் முறையே குவாரிப்பணி செய்யப்பட வேண்டும்.
- 7) குவாரிப்பணி தொடங்குவதற்கு முன் சுரங்க பாதுகாப்பு இயக்குநர், சென்னை அவர்களுக்கு தகவல் தெரிவிக்கப்பட வேண்டும்.
- 8) பாறைகளைத் தகர்க்க கைத்துளைப்பான்களை கொண்டு பாறைகளை துளையிட்டு குறைவான வெடிபொருட்கள் பயன்படுத்த வேண்டும்.

3. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதிகள் 41 மற்றும் 42-ன்படி கல் மற்றும் இதர சிறு கனிமங்களுக்கு குவாரி குத்தகை உரிமம் வழங்கும் முன்பு ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்று பெறப்பட வேண்டும் என வரையறுக்கப்பட்டுள்ளது.

4. எனவே, திரு.R.கதிர்வேலு, என்பவர் ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மைச் சான்றினை பெற்று சமர்ப்பிக்கும் பட்சத்தில் வெம்பாக்கம் வட்டம், காகனம் கிராமம் புல எண்கள் 58/1A (0.40.5), 58/1B (0.09.5), 58/2A (0.55.0), 58/2B (0.49.5), 58/3 (0.17.0), 58/6 (0.50.5), 58/7 (0.47.0), 58/8A (0.38.0), 58/8B (0.12.5), 59/2A (0.38.0), 61/1B (0.20.0), 61/2A (0.26.5), 61/2B (0.03.0), 61/3 (0.02.5), 61/4A (0.09.5), 61/5A (0.08.5), மற்றும் 61/6 (0.14.5) 4.42.0 ஹெக்டேர் பரப்பில் கற்குவாரி செய்ய தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண் 19(1) மற்றும் 20-ன்கீழ் 10 ஆண்டுகளுக்கு குத்தகை உரிமம் வழங்க உரிய நடவடிக்கை மேற்கொள்ளப்படும் என்ற விவரம் தெரிவிக்கப்படுகிறது.

5. மேலும், இவ்வறிவிப்பு கிடைக்கபெற்ற 90 நாட்களுக்குள் நிபந்தனைகளையும் குறிக்கும் வகையில் வரைவு சுரங்கத்திட்ட அறிவுரை தயார் செய்து துணை இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை திருவண்ணாமலை அவர்களிடம் ஒப்புதல் பெற சமர்ப்பிக்குமாறும் அறிவுறுத்தப்படுகிறது.



துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
திருவண்ணாமலை.

பெறுநர்:

திரு R.கதிர்வேலு,

எண் 19சி,

விளக்கடி கோவில் தோப்பு தெரு,

காஞ்சிபுரம் மாவட்டம்.

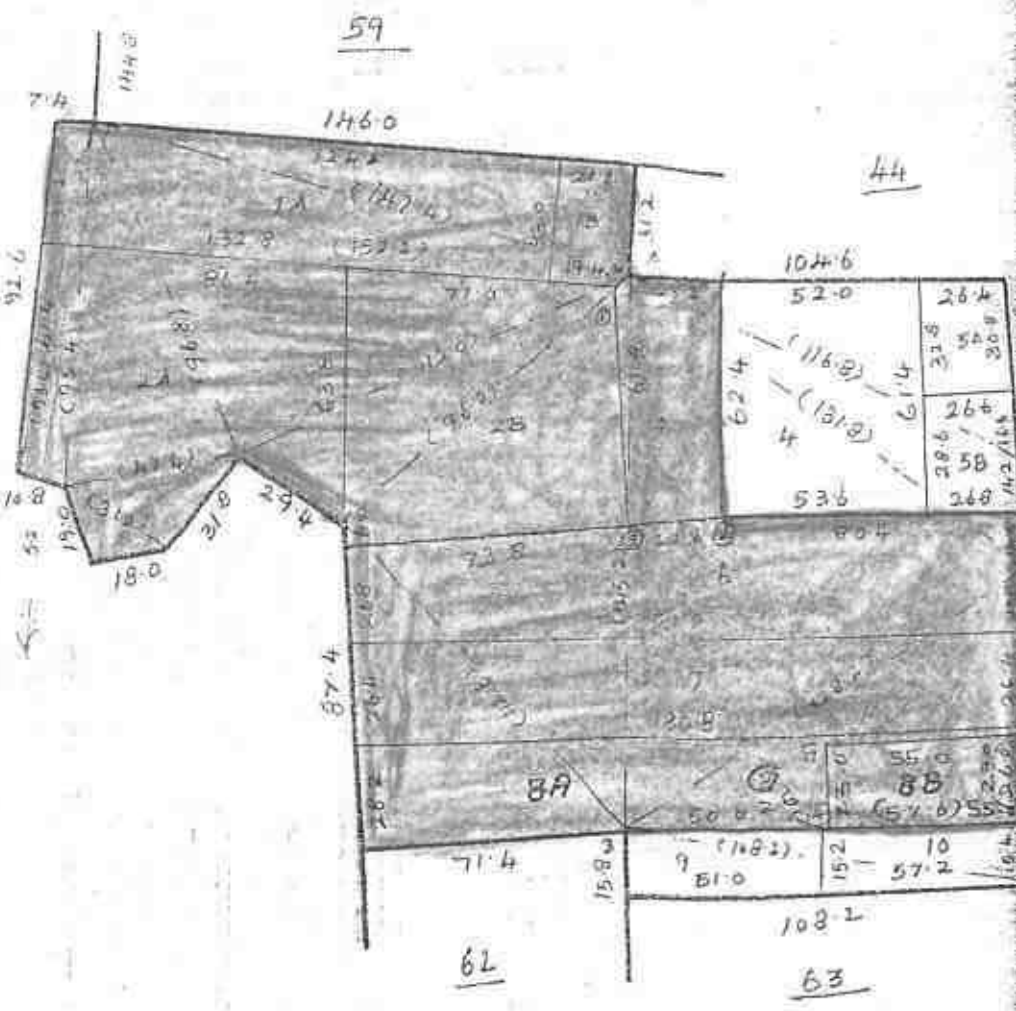
08/03/22



ANNEXURE U

147

பகுதி 82
 பகுதி 8A & 8B
 3 ஏக்கர் 85



LEASE APPLIED AREA

		C
		108.2
4	66	A
		B
		146.0
		62.0
2	26.8	62.0
		26.4
		A

Subdivisions 8A, 8B
 Plotted by Pn BA 92/96
 dt: 2.6.87

R. May
 10/7/89

A
 (1452)
 B

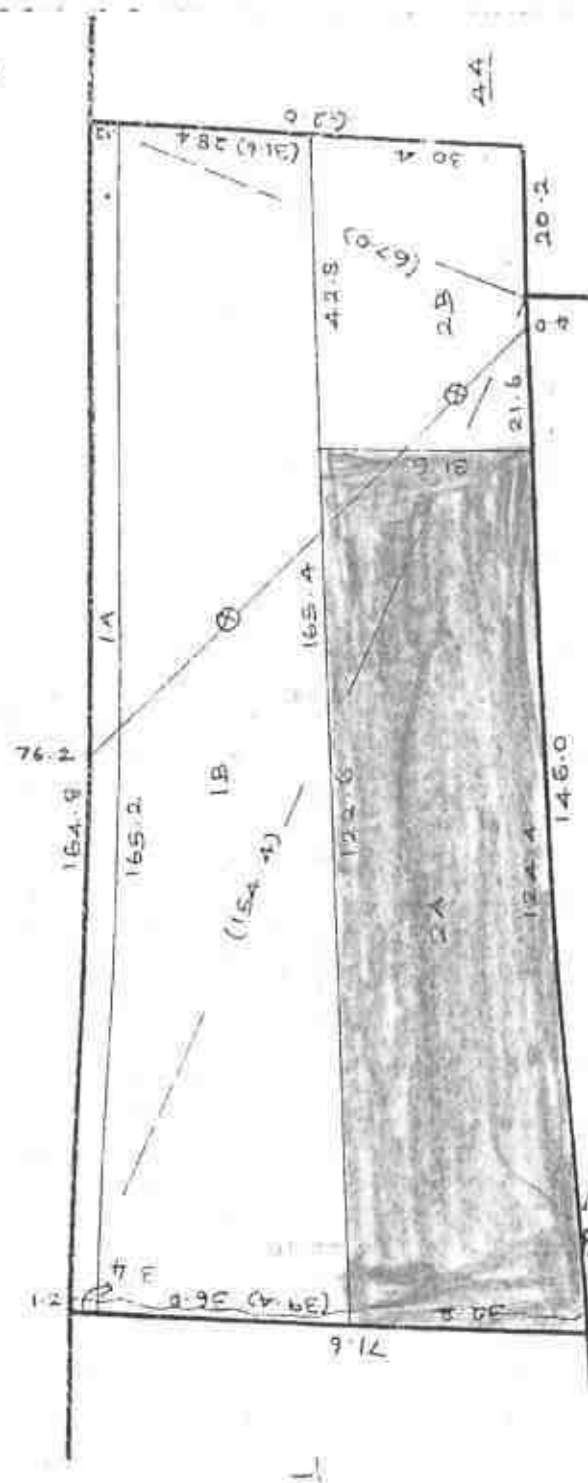
சமீபத்தில் 146 லீ: 2000 6 லீ

Handwritten signature and date: 10/7/89



மாவட்ட நிர்வாக அலுவலகம்
 சம்பளம்/பணி
 தலைவர்/பணி

எண் 82
 கிராமம்
 கிராம நிர்வாக அலுவலகம்
 எண். 09-5



[Signature]
 T. S. Srinivasan

Village Administrative Office,
 81.Karandhai, 82.Kaganam
 Jembakkam Tk T.V.Malai Dist

LEASE APPLIED AREA

[Signature]



தமிழக அரசு

வருவாய்த் துறை

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



செவ்வண்ணாமலை

வட்டம் : செவ்வண்ணாமலை

வருவாய்த் துறை : காலநிலை

பட்டாள எண் : 1041

உரிமையாளர்கள் பெயர்

SKT Mines நிறுவனம்

புள்ளி	வட்டப்பகுதி	புள்ளி		நட்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	
44	13A	0 - 25.00	0.63	--	--	--	--	2018/0103 /06/064371--- -- 23-02-2018
45	8B	0 - 23.00	0.60	--	--	--	--	2021/0105 /06/299795--2021 /06/10/000035SD -- 28-09-2021
53	13	0 - 19.50	0.75	--	--	--	--	2018/0103 /06/064371--- -- 23-02-2018
56	12	0 - 26.50	1.01	--	--	--	--	2018/0103 /06/064580--- -- 03-03-2018
56	13	0 - 32.50	0.25	--	--	--	--	2018/0103 /06/064371--- -- 23-02-2018
56	2A	0 - 56.50	2.17	--	--	--	--	2018/0103 /06/064580--- -- 03-03-2018
56	5	0 - 3.50	0.14	--	--	--	--	2018/0103 /06/064580--- -- 03-03-2018
56	9	0 - 30.50	1.17	--	--	--	--	2018/0103 /06/075305--- -- 27-06-2018
57	1	0 - 49.50	1.31	--	--	--	--	2018/0103 /06/064371--- -- 23-02-2018
58	10	0 - 9.00	0.23	--	--	--	--	2021/0103 /06/215627--- -- 04-05-2021
58	1B	0 - 9.50	0.25	--	--	--	--	2022/0103 /06/267753--402/1421 -- 23-02-2022
58	2A	0 - 55.00	1.43	--	--	--	--	2020/0103 /06/196368--- -- 29-10-2020

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2018/0103	/06/068124---	20-06-2018	--	--	--	0.45	0 - 17.00		58
2018/0103	/06/069989---	25-06-2018	--	--	--	0.21	0 - 8.00		58
2020/0103	/06/196368---	29-10-2020	--	--	--	1.33	0 - 50.50		58
2018/0103	/06/064371---	23-02-2018	--	--	--	0.21	0 - 8.00		58
2018/0103	/06/064371---	23-02-2018	--	--	--	1.42	0 - 54.00		59
2018/0103	/06/064371---	23-02-2018	--	--	--	0.30	0 - 12.50		59
2018/0103	/06/064371---	23-02-2018	--	--	--	0.96	0 - 48.00		60
2018/0103	/06/064371---	23-02-2018	--	--	--	0.35	0 - 17.50		60
2018/0103	/06/064371---	23-02-2018	--	--	--	0.46	0 - 23.00		60
2018/0103	/06/064371---	23-02-2018	--	--	--	0.49	0 - 24.50		60
2020/0103	/06/196368---	29-10-2020	--	--	--	0.41	0 - 20.00		61
2020/0103	/06/196368---	29-10-2020	--	--	--	0.53	0 - 26.50		61
2020/0103	/06/196368---	29-10-2020	--	--	--	0.06	0 - 2.50		61
2020/0103	/06/196368---	29-10-2020	--	--	--	0.19	0 - 9.50		61
2020/0103	/06/196368---	29-10-2020	--	--	--	0.17	0 - 8.50		61
2019/0103	/06/150654---	12-11-2019	--	--	--	1.04	0 - 39.50		62
2018/0103	/06/069989---	25-06-2018	--	--	--	0.85	0 - 32.50		63
2018/0103	/06/064580---	03-03-2018	--	--	--	0.90	34.50		63

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65	-	0 - 32.00	0.84	--	--	--	--	06/10/082/01041/70216
68	-	0 - 77.50	2.04	--	--	--	--	06/10/082/01041/70216
84	LA	0 - 8.00	0.21	--	--	--	--	06/196368/29-10-2020
88	SC	0 - 21.50	0.82	--	--	--	--	2018/0103/06/069989/25-06-2018
		9 - 20.50	24.31					

குறிப்பு2 :



1. மேற்கண்ட நகலம் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டன. இலற்றை நகலம் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் **06/10/082/01041/70216** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இந் நகலங்கள் 13-04-2022 அன்று 09:49:26 AM நேரத்தில் அச்சிடப்பட்டது.
3. டைபிங் கோரலின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்.

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தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

வருவாய் கிராமம் : காகனம்

பட்டா எண் : 1042

உரிமையாளர்கள் பெயர்

1. SKT Mines நிறுவனம்



புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
44	11	0 - 59.50	2.50	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
53	6B	0 - 18.50	0.69	--	--	--	--	2018/0103/06/069988- --- 20-06-2018
54	1A1	0 - 41.50	1.59	--	--	--	--	2018/0103/06/075334- --- 27-06-2018
56	10	0 - 30.00	1.15	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	11	0 - 34.50	1.33	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	1A	0 - 82.50	3.13	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	2B	0 - 49.50	1.90	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	3	0 - 9.50	0.37	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	4	0 - 9.00	0.34	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	6	0 - 3.50	0.14	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	7	0 - 8.00	0.31	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
56	8	0 - 33.00	1.26	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
58	1A	0 - 40.50	1.10	--	--	--	--	2019/0103/06/152990- -402/1421 -- 12-11- 2019
58	2B	0 - 49.50	1.29	--	--	--	--	2019/0103/06/152990- --- 12-11-2019
58	4	0 - 33.00	0.87	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
58	5A	0 - 8.00	0.21	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
58	7	0 - 47.00	1.23	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
58	8A	0 - 38.00	0.30	--	--	--	--	2021/0103/06/218991-



								--- 08-06-2021
58	8B	0 - 12.50	0.36	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
59	2A	0 - 38.00	1.02	--	--	--	--	2019/0103/06/152990- --- 12-11-2019
60	2	1 - 3.50	2.07	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
61	2B	0 - 3.00	0.06	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
61	4B1	0 - 16.00	0.30	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
61	5B	0 - 33.00	0.66	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
61	6	0 - 14.50	0.29	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
61	7	0 - 14.00	0.28	--	--	--	--	2021/0103/06/218991- --- 08-06-2021
63	2	0 - 35.00	0.92	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
66	-	0 - 31.00	0.82	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
67	-	0 - 30.00	0.78	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
83	1	0 - 19.00	0.50	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
83	2A	0 - 6.50	0.17	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
83	2B	0 - 34.00	0.89	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
84	1C	0 - 12.50	0.35	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
84	2	0 - 58.00	1.52	--	--	--	--	2018/0103/06/064373- --- 23-02-2018
		10 - 55.50	30.70					

குறிப்பு 2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 06/10/082/01042/70227 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 02-12-2021 அன்று 12:14:51 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

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1	2	3	4	5	6	7	8	9	10	11	
15	2B	50-2km	σ	4	...	8-2	3	85	0 49-3	0 30	153 சா. சத்யமங்கலம்.
	2C	-2km	σ	4	...	8-2	3	85	0 03-0	0 34	75 சா. சத்யமங்கலம் தரவு.
	3	-3	σ	4	...	8-2	3	85	0 19-5	0 37	430 ச. சத்யமங்கலம் உடைமார்.
	4	-4	σ	4	...	8-2	3	85	0 09-0	0 34	120 கு. சத்யமங்கலம்.
	5	-5	σ	4	...	8-2	3	85	0 03-5	0 14	430 ச. சத்யமங்கலம் உடைமார்.
	6	-6	σ	4	...	8-2	3	85	0 03-5	0 14	430 ச. சத்யமங்கலம் உடைமார்.
	7	-7	σ	4	...	8-2	3	85	0 08-0	0 31	150 கு. சத்யமங்கலம்.
	8	-8	σ	4	...	8-2	3	85	0 33-0	1 26	311 சா. சத்யமங்கலம் மார்.
	9	-9	σ	4	...	8-2	3	85	0 36-5	1 17	35 ச. சத்யமங்கலம்.
	10	-10	σ	4	...	8-2	3	85	0 30-0	1 15	34 சா. சத்யமங்கலம் தரவு.
	11	-11	σ	4	...	8-2	3	85	0 34-5	1 33	34 சா. சத்யமங்கலம் தரவு.
	12	-12	σ	4	...	8-2	3	85	0 26-5	1 11	153 சா. சத்யமங்கலம்.
	13	-13	σ	4	...	8-2	3	85	0 32-5	1 25	510 சா. சத்யமங்கலம் தரவு.
									4 21-5	10 23	
17	1	57-1	σ	4	...	8-3	2	62	0 49-5	1 31	425 சா. சத்யமங்கலம் தரவு.
	2	-2	σ	4	0 04-5	...	
									0 51-0	1 31	
18	1A	58-1km	σ	4	...	8-3	2	62	0 07-0	0 18	271 சா. சத்யமங்கலம் தரவு.
	1B	-1km	σ	4	...	8-3	2	62	0 42-5	1 11	658 சா. சத்யமங்கலம் தரவு (1), சா. சத்யமங்கலம் தரவு (2).

12 மார்ச் 2011
 Village Administrative Office
 81, Karandhai, 82, Kaganam
 Jembakkam Tk T.V. Malai Dis
 பா.க.த.

[Handwritten signature]

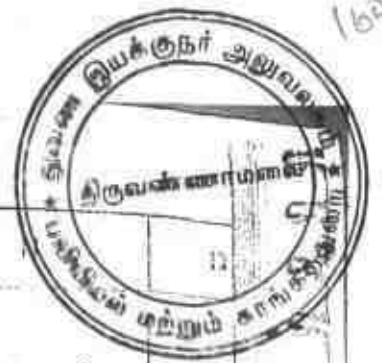


பட்டியல் 3
பேரவையின் அலுவலகப் பிழைகள் குறித்து எழுப்பப்பட்ட கேள்விகளின் விவரம்

வி. எண் (Sl. No.)	கேள்வி (Question)			விடையைக் கொடுத்த நாள் (Date of Reply)	வினாக்கள் (Questions)				
	அ) கேள்வி எண் (A) Question No.	ஆ) கேள்வி (ஆ) (B) Question (B)	இ) கேள்வி (இ) (C) Question (C)		1. வினா எண் (1) Question No.	2. வினா (2) Question	3. வினா (3) Question	4. வினா (4) Question	5. வினா (5) Question
56	ப	014	1097		1	2	3	4	5
61	ப	015	1098						
56	7	010	1091						
58	7	010	1092						
61	7	010	1093						
57	8	010	1094						
57	8	010	1095						
56	8	010	1096						
56	10	015	1099						
64	11	015	1094						
56	11	015	1095						
67	-	010	1096						
66	-	010	1097						

10. 10. 2017
T. M. Malia

Village Administrative Officer,
81 Karanthai, 82, Kaganam,
Jambakkani Tk, T.M. Malia Dist.



1	2	3	4	5	6	7	8	9	10				
58	2B	58-2B	ச	4	...	8-3	5	2	62	0 49-5	1	29	413 ச. சாமசாமி நாயுடு.
	3	-3	ச	4	...	8-3	5	2	62	0 17-0	0	45	313 செ. செழிந்த மாதிரியம்.
	4	-4	ச	4	...	8-3	5	2	62	0 33-0	0	87	309 த. பாலவர்.
	5A	-5A	ச	4	...	8-3	5	2	62			21	
	5B	-5B	ச	4	...	8-3	5	2	62	0 00-0	0	21	46 சி. ச. சாமசாமி மலர்.
	6	-6	ச	4	...	8-3	5	2	62	0 50-5	1	33	191 த. சாதீத அம்மவர்.
	7	-7	ச	4	...	8-3	5	2	62	0 47-0	1	33	74 சி. ச. சாமசாமி மலர்.
	8	-8	ச	4	...	8-3	5	2	62	0 50-5	1	33	74 செ. சாதீத நாயுடு.
	9	-9	ச	4	...	8-3	5	2	62	0 08-0	0	21	282 ச. சாதீத மலர்.
	10	-10	ச	4	...	8-3	5	2	62	0 09-0	0	23	34 செ. சாதீத மலர்.
								5	85-0	10	68		
59	1A	59-1A	ச	4	...	8-3	5	2	62	0 05-0	0	13	310 செ. செழிந்த நாயுடு.
	1B	-1B	ச	4	...	8-3	5	2	62	0 54-0	1	42	161 செ. செழிந்த மலர்.
	2A	-2A	ச	4	...	8-3	5	2	62	0 10-0	1	13	271 செ. சாதீத மலர்.
	2B	-2B	ச	4	...	8-3	5	2	62	0 12-5	0	30	330 செ. செழிந்த நாயுடு.
								1	09-5	2	87		
60	1	60-1	ச	4	...	8-4	6	2	00	1 04-0	2	08	551 செ. சாதீத மலர்.
	2	-2	ச	4	...	8-4	6	2	00	1 03-5	2	07	290 செ. சாதீத மலர்.
	3	-3	ச	4	...	8-4	6	2	00	0 48-0	0	96	330 செ. செழிந்த நாயுடு.
	4	-4	ச	4	...	8-4	6	2	00	0 05-5	0	11	359 செ. சாதீத மலர்.
	5	-5	ச	4	...	8-4	6	2	00	0 17-5	0	35	290 செ. சாதீத மலர்.

Handwritten signature: *[Signature]*
 Village Administrative Office
 81 Kalandhai, 82 Kagan
 S. Sembakkam, Tk TV. Marai

[Handwritten mark]



தமிழ்நாடு தமில்நாடு TAMIL NADU

09/04/2022

SKT MINES
KANCHIPURAM

00AC 815564

C. கலா, B.A. M.A.,
ஸ்டாம்பு வெண்டர்,
உரிமம் எண். 4110/D1/2000
20 O.P. குளம் சிதூ,
காஞ்சிபுரம், தமிழ்நாடு

TO WHOMSOEVER MAY CONCERN
LETTER OF AUTHORIZATION.

We, (1) S.Sridhar, S/o.Sivaprakasam, Partner, SKT MINES, residing at No.25/26, VOC Street, Vedachalam Nagar, Sevilimedu, Kanchipuram Town and District, (2) G.Dhamotharan, S/o.Gangadaran, Partner. SKT MINES, residing at No.333, Guberan Street, Neervallur Village, Kanchipuram Taluk and District are authorized as our agent Thiru.R.Kathirvelu, S/o.Rudhrakotti, residing at No.19C, Vilakkadi Koil Thoppu Street, Kanchipuram Town and District to collect the rents and remit the same to our credit to approach the authorities concern and redress the grievances concern to take any legal actions regarding illegalities irregularities violations of rules and agreement concern by the lessee and in conference to stop the illegal activities by lessee and to represent any subject relating to mining activities on our behalf and We declare that any commission or omission or action taken by our authorized person shall be construed as it they were done by us.



P. ASAITHAMBI, B.A., B.L.,
ADVOCATE / NOTARY PUBLIC
GO. No: 278/2018
No: 28, APPARAO STREET,
BIG KANCHIPURAM.
Cell: 9047748824

(Handwritten signatures)



With above Such authorization and declaration it is herein Signed by Our and likewise the person authorized by our accepted the authorization and declaration herein and to that effect signed herein on the 2nd day of December 2021

SCHEDULE OF PROPERTY

In Thiruvannamali District, Vembakkam Taluk, No.82, Kakkanam Village, bearing Survey Nos.58/1A- Hec.0.40.50, 58/1B - Hec.0.09.5, 58/2A - Hec.0.55.0, 58/2B - Hec.0.49.50, 58/3 - Hec.0.17.0, 58/6 - Hec.0.50.50, 58/7 - Hec.0.47.0, 58/8A - Hec.0.38.0, 58/8B - Hec.0.12.5, 59/2A - Hec.0.38.0, 61/1B - Hec.0.20.0, 61/2A - Hec.0.26.50, 61/2B - Hec.0.03.0, 61/3 - Hec.0.02.50, 61/4A - Hec.0.09.5, 61/5A - Hec.0.08.5, 61/6 - Hec. 0.14.5, Totally Hec.4.42.0.

Their Speciman Signatgure is attested bellow



P.W 9/12/2022
P. ASATHAMBI, B.A., B.L.,
ADVOCATE / NOTARY PUBLIC
GO. No: 278/2018
No: 26, APPARAO STREET,
BIG KANCHIPURAM.
Cell: 9047748824

B. Srinivasan
AS

AS

ANNEXURE (ii)



புதிதாக அமைக்கப்பட்ட
Government of India
தமிழ்நாடு சட்டமன்றப் பேரவை
திருவள்ளூர் மன்றம்
திருவள்ளூர் மன்றம்
திருவள்ளூர் மன்றம்



2302 0459 5910

சாதாரண மனிதனின் அதிகாரம்



Unique Identification Authority of India

தலைநகர்
28, திண்டிவனம், 4-8
பெங்களூர், 560001
080 295392 49991
98451 24 292 49991

ஆற்காடு
340, ஆற்காடு, 10 C, 10C
XCVI, THOMAS STREET
KANCHI, KANCHI
KANCHI, Tamil Nadu
631001

2302 0459 5910



(Handwritten signature)



ANNEXURE IX



Faculty of Science

The Senate of the Annamalai University hereby makes known that V. Narayana has been admitted to the Degree of Master of Science (By Examination) in Zoology, he having been certified by duly appointed Examiners at the examination held in April, 1976 to be qualified to receive the same and that he was placed in the Second Class.

Given under the seal of the University.

Annamalai University
24 December, 1976.

R.
S. Chandrasekhar
Vice-Chancellor

160

CHETTINAD CEMENT CORPORATION LTD.,

(Regd. Office: RANI SEETHAI HALL BUILDING IV & V FLOOR, 603, ANNA SALAI, MADRAS-600006.)
WORKS OFFICE :

21144
PHONE 22744 | KARUR
TELE: 21745
GRAM "CEMENT" Palayur C.E.
Telex: 0456-215.
STD Code: 04324



All Correspondences to
Kumararajah Muthiah Nagar,
OUR CEMENT FACTORY POST 629114
(Karur Taluk, Trichy DL)

T. RAJU., B.E.,
MINES MANAGER & DY. GENERAL MANAGER

22nd September, 1987.

CERTIFICATE.

This is to certify that Mr. C. Natarajan has been working as a Geologist from 14-12-1979 to till date. He has been incharge of supervision of day to day functions in respect of Exploration, Preparation of Geological Plans & Sections, Preparation of Mines Plans, and Quality control and other allied mining activities in the following Pits of our Seethainagar Limestone Mines in Anna District.

<u>Name of the Pit.</u>	<u>Average Raising/day.</u>
1. Alambadi Pit.	- 1,700 T.
2. Mallapuram Pit.	- 900 T.
3. Karikkali Pit.	- 150 T.

Total.	- 2,750 T.

He has got nearly eight years of total experience in our Mines in the above supervisory capacity.

for CHETTINAD CEMENT CORPORATION LTD.,

(T. RAJU).

Mines Manager & Dy. General Manager.

12°44'41.99"N

12°44'33.97"N

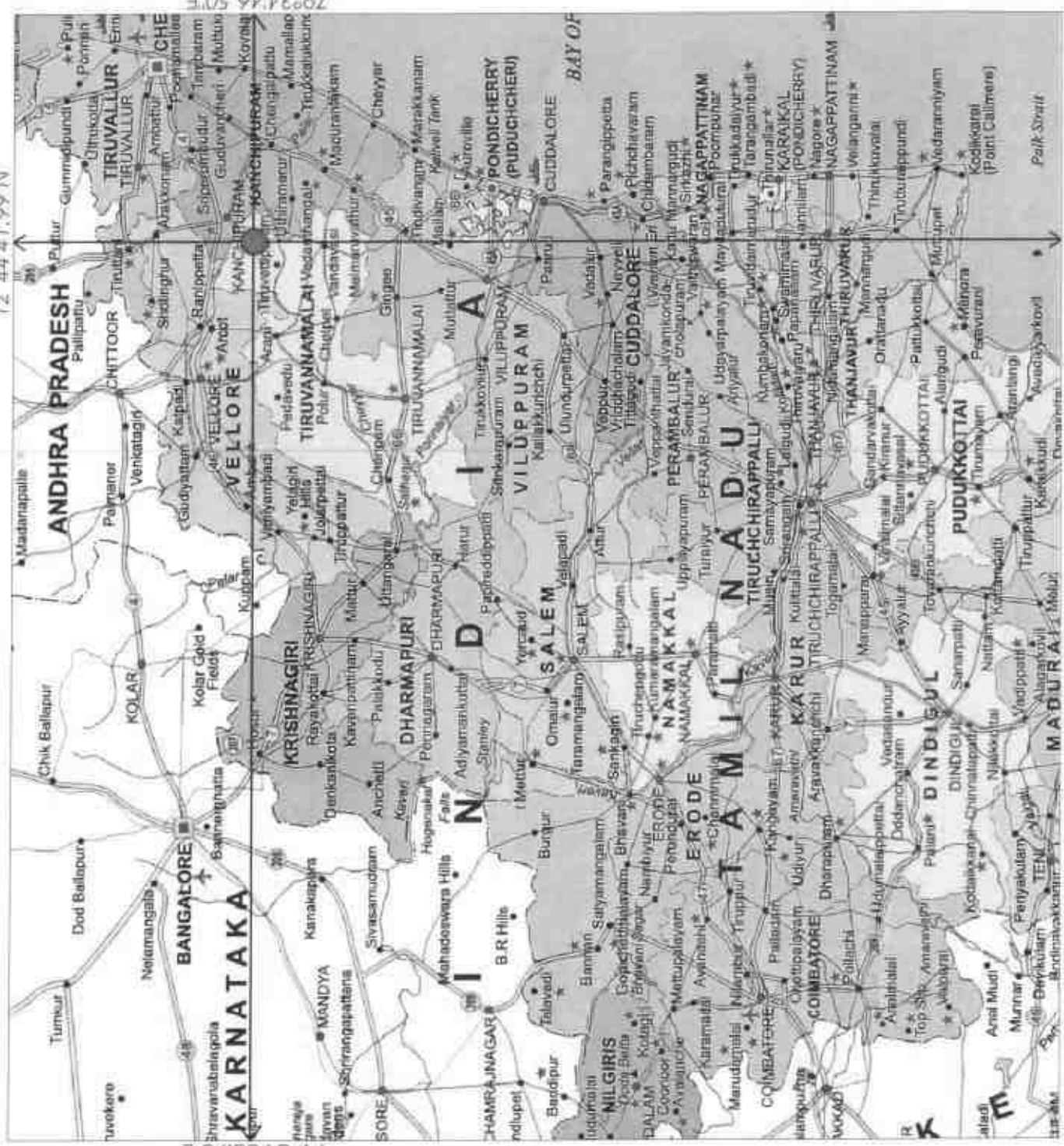


PLATE NO: I

DATE OF SURVEY : 31.03.2022

APPLICANT:

THIRU R.KATHIRVELU,
NO. 19C, VILAKKADI KOVIL THOPPU STREET,
KANCHEEPURAM DISTRICT.

QUARRY LEASE APPLIED AREA:

S.F.NOS : 58/1A, 58/1B, 58/2A, 58/2B, 58/3,
58/6, 58/7, 58/8A, 58/8B, 59/2A,
61/1B, 61/2A, 61/2B, 61/3, 61/4A,
61/5A & 61/6.

EXTENT : 4.420 Hc.

VILLAGE : KAGANAM,

TALUK : VEMBAKKAM,

DISTRICT : TIRUVANNAMALAI.

INDEX

Q. L. A. AREA : ●

TOPO SHEET NO : 57 P / 10

LATITUDE : 12°44'33.97"N to 12°44'41.99"N

LONGITUDE : 79°34'36.73"E to 79°34'46.50"E

LOCATION 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 LEASE MAP AUTHENTICATED BY STATE
GOVERNMENT

GOVERNMENT

C. N. FARASAN, SENIOR Phil.,
QUALIFIED PERSON

167

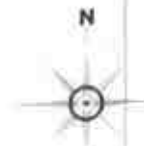
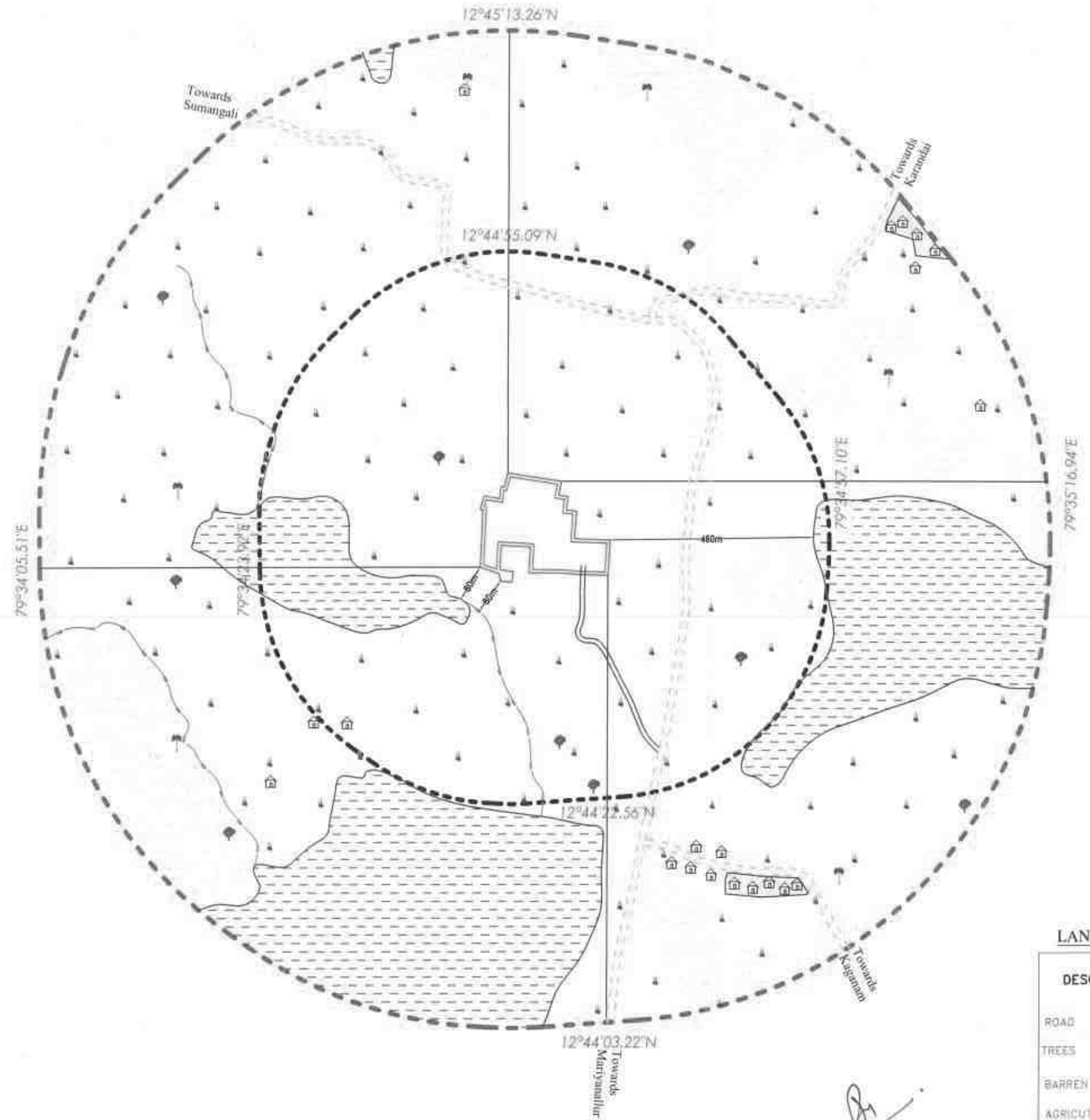


PLATE NO: 1A
DATE OF SURVEY: 11.03.2022

APPLICANT:
THIRU. R.KATHIRVELU
NO. 19C, VILAKKADI KANNANHOPPU STREET,
KANCHEEPURAM DISTRICT

QUARRY LEASE APPLIED AREA:
S.F.NOS : 58/1A, 58/1B, 58/2A, 58/2B, 58/3,
58/6, 58/7, 58/8A, 58/8B, 59/2A,
61/1B, 61/2A, 61/2B, 61/3, 61/4A,
61/5A & 61/6,
EXTENT : 4.42.0 Ha,
VILLAGE : KAGANAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

TOPO SHEET NO : 57 P/ 10
LATITUDE : 12°44'33.97"N to 12°44'41.99"N
LONGITUDE : 79°34'36.73"E to 79°34'46.50"E

Q.L.APPLIED AREA	
7.5m SAFETY	
500M RADIUS	
1KM RADIUS	
APPROACH ROAD	
PANCHAYAT ROAD	
ODAI	
BARREN LAND	
TREES	
SEASONAL AGRICULTURE	
HABITATIONS	
QUARRY PIT	
TANK	

LAND USE PATTERN

DESCRIPTION	AREA IN (%)
ROAD	05
TREES	10
BARREN LAND	40
AGRICUTURE LAND	30
HABITATIONS	10
WATER BODIES	15

ENVIRONMENTAL PLAN
SCALE 1: 10,000

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

C. NATARAJAN, M.Sc., M.Phil.
QUALIFIED PERSON



PLATE NO: 1B
DATE OF SURVEY : 31.03.2022

APPLICANT:
THIRU. R.KATHIRVELU,
NO. 19C, VILAKKADI KOVIL THOPPU STREET,
KANCHEEPURAM DISTRICT.

QUARRY LEASE APPLIED AREA:
S.F.NOS : 58/1A, 58/1B, 58/2A, 58/2B, 58/3,
58/6, 58/7, 58/8A, 58/8B, 59/2A,
61/1B, 61/2A, 61/2B, 61/3, 61/4A,
61/5A & 61/6,
EXTENT : 4.42.0 Ha,
VILLAGE : KAGANAM,
TALUK : VEMBAKKAM,
DISTRICT : TIRUVANNAMALAI.

INDEX

TOPO SHEET NO : 57 P/ 10
LATITUDE : 12°44'33.97"N to 12°44'41.99"N
LONGITUDE : 79°34'36.73"E to 79°34'46.50"E

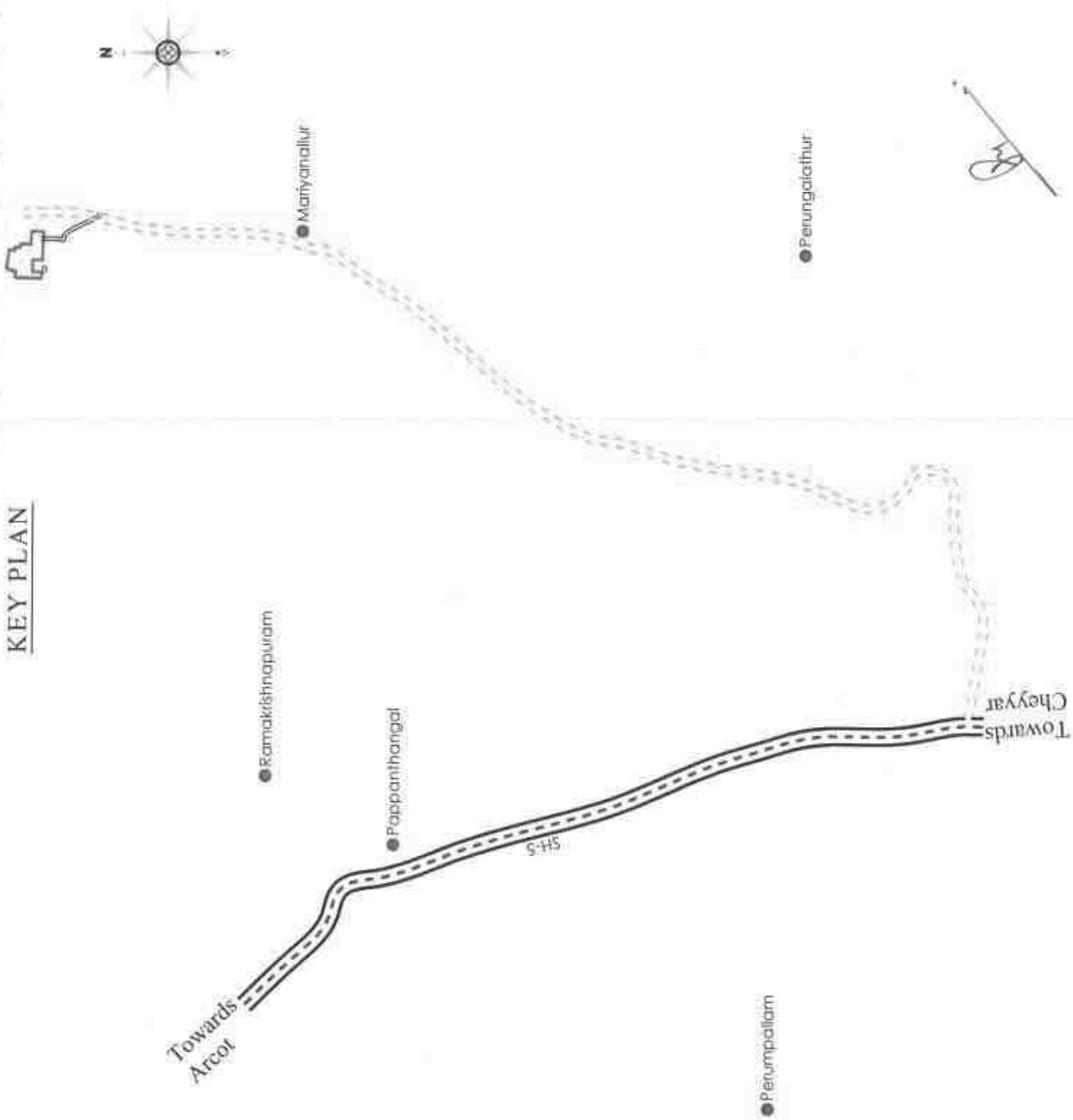
Q.L.APPLIED AREA	
7.5m SAFETY	
500M RADIUS	
1KM RADIUS	
APPROACH ROAD	
PANCHAYAT ROAD	

SATELLITE IMAGERY MAP
SCALE 1: 10,000

PREPARED BY :
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THE BEST OF MY KNOWLEDGE BASED UPON
THE LEASE MAP AUTHENTICATED BY STATE
GOVERNMENT

C. NATARAJAN, M.Sc, M.Phil.,
QUALIFIED PERSON

KEY PLAN



சென்னை மாநகராட்சி
சென்னை மாநகராட்சி
சென்னை மாநகராட்சி

PLATE NO: 10
DATE OF SURVEY: 31.03.2022

APPLICANT:
THIRU. R. KATHIRAVEL,
NO. 19C, VILAKKADI NO. 1, QUARRY TRAIL,
KANCHEEPURAM DISTRICT

QUARRY LEASE APPLIED AREA:
S.F.NOS : 58/1A, 58/1B, 58/2A, 58/2B, 58/3,
58/6, 58/7, 58/8A, 58/8B, 59/2A,
61/1B, 61/2A, 61/2B, 61/3, 61/4A,
61/5A & 61/6,
EXTENT : 4.42.0 Ha,
VILLAGE: KAGANAM,
TALUK : VEMBAKKAM,
DISTRICT: TIRUVANNAMALAI.

INDEX

- Q.L.APPLIED AREA
- 7.5m SAFETY
- APPROACH ROAD
- PANCHAYAT ROAD
- STATE HIGHWAY
- HABITATIONS

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 LEASE MAP AUTHENTICATED BY STATE
GOVERNMENT

C. Natarajan
C. NATARAJAN, M.Phil.
QUALIFIED PERSON



75

Boundary Co-Ordinates		
Label	Latitude	Longitude
1	12° 44' 35.05" N	79° 34' 36.79" E
2	12° 44' 39.30" N	79° 34' 36.94" E
3	12° 44' 39.34" N	79° 34' 36.73" E
4	12° 44' 40.30" N	79° 34' 37.04" E
5	12° 44' 40.11" N	79° 34' 38.19" E
6	12° 44' 40.99" N	79° 34' 38.29" E
7	12° 44' 40.98" N	79° 34' 38.55" E
8	12° 44' 41.99" N	79° 34' 38.80" E
9	12° 44' 41.41" N	79° 34' 42.82" E
10	12° 44' 40.40" N	79° 34' 42.61" E
11	12° 44' 40.30" N	79° 34' 43.32" E
12	12° 44' 39.29" N	79° 34' 43.20" E
13	12° 44' 39.22" N	79° 34' 43.96" E
14	12° 44' 37.19" N	79° 34' 43.83" E
15	12° 44' 37.10" N	79° 34' 46.50" E
16	12° 44' 36.65" N	79° 34' 46.49" E
17	12° 44' 34.89" N	79° 34' 46.37" E
18	12° 44' 34.54" N	79° 34' 44.46" E
19	12° 44' 34.66" N	79° 34' 42.80" E
20	12° 44' 34.66" N	79° 34' 40.44" E
21	12° 44' 36.56" N	79° 34' 40.53" E
22	12° 44' 36.67" N	79° 34' 38.34" E
23	12° 44' 34.87" N	79° 34' 38.25" E
24	12° 44' 34.74" N	79° 34' 39.26" E
25	12° 44' 33.97" N	79° 34' 39.16" E
26	12° 44' 34.02" N	79° 34' 38.33" E
27	12° 44' 34.59" N	79° 34' 38.20" E

WGS 84 Datum

PLATE NO-II
 DATE OF SURVEY : 31.03.2022

APPLICANT:
 THIRU. KRATHIRVELU,
 NO. 19C, VILAKKADI KOVIL THOPPU STREET,
 KANCHEPURAM DISTRICT.

QUARRY APPLIED LEASE AREA:
 S.F.NOS : 58/1A, 58/1B, 58/2A, 58/2B, 58/3,
 58/6, 58/7, 58/8A, 58/8B, 59/2A,
 61/1B, 61/2A, 61/2B, 61/3, 61/4A,
 61/5A & 61/6.

EXTENT : 4.42.0 Hq,
 VILLAGE : KAGANAM,
 TALUK : VEMBAKKAM,
 DISTRICT : TRIVANNAMALAI.

INDEX

Q.L. APPLIED BOUNDARY

7.5m SAFETY DISTANCE

TEMPORARY BENCH MARK

APPROACH ROAD

CONTOUR

SCRUB

QUARRY LEASE & SURFACE PLAN
 Go SCALE at 1:1000's to apply

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

