

Application Form (Draft EIA Report)

For

Proposed Rough stone Quarry – 1.68.0 Ha

at

S.F.Nos. 210/7A of Melur Village, Kulathur Taluk of
Pudukkottai District, Tamil Nadu

Sector No. 1(a) (Sector No. 1 as per NABET)

Category of the Project: B1 Cluster Mining

Baseline Period: January – March 2023

***Environmental Consultant
& Laboratory details:***

Ecotech Labs Pvt Ltd,



No 48, 2nd Main road,
South extension Ram nagar,
Pallikaranai, Chennai -600100.

Proponent details:

Thiru.R Arockiya Raj

S/o Rethinam Pillai,

No.297/7, Sathiyamoorthy

Nagar,

Pudukkottai-622 001

Date:

From
Thiru R Arockiya Raj,
S/o. Rethinam Pillai,
No. 297/7, Sathiyamoorthi Nagar,
Pudukkottai District - 622 001

To
The District Environmental Engineer
Tamilnadu Pollution Control Board,
Plot No:140A, SIPCOT Industrial Complex,
Hosur -635 126.

Sir,

Sub: Public Hearing for the Thiru R.Arockiya Raj Rough Stone and Gravel Quarry over a total extent of 1.68.0 Ha at S.F. Nos.: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District – Request to conduct Public Hearing – Reg.

Ref: ToR issued by SEIAA vide Letter No. SEIAA-TN/F. No. 9484/ToR-1312/2022 Dated: 07.12.2022

With Reference to the above subject, I propose to establish a Thiru R.Arockiya Raj Rough Stone and Gravel Quarry over a total extent of 1.68.0 Ha at S.F. Nos.: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District, Tamilnadu State.

In this regard, we had obtained the Terms of Reference (ToR) from State Environmental Impact Assessment Authority (SEIAA), Tamil Nadu for conducting EIA studies vide letter cited in reference. Further, we have prepared the draft EIA report complying with all the conditions imposed in the TOR issued.

We herewith submitting hard & soft copies of Draft EIA Report, Executive Summaries (English & Tamil) along with necessary enclosures towards conducting public hearing for the Thiru R.Arockiya Raj Rough Stone and Gravel Quarry over a total extent of 1.68.0 Ha at S.F. Nos.: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District, Tamilnadu State.

We have also enclosed a Demand Draft for Rs. _____ /- vide DD No _____ dated _____ as initial Public Hearing fee and agree to pay the difference amount in the publication cost.

We kindly request the TNPCB to make the necessary arrangements for conducting the Public hearing for the Rough stone Quarry.

Thanking you,
Yours Sincerely,

Authorized Signatory

Thiru R Arockiya Raj,
S/o. Rethinam Pillai,
No. 297/7, Sathiyamoorthi Nagar,
Pudukkottai District - 622 001

UNDERTAKING

Thiru R.Arockiya Raj, undertaking that the Environmental Impact Assessment (EIA) Report for Rough Stone and Gravel Quarry over a total extent of 1.68.0 Ha at S.F. Nos.: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District under project category B1 and Schedule S.No.1(a)

TOR issued by the State Expert Appraisal Committee, TN vide Letter No. SEIAA-TN/F. No. 9484/ToR-1312/2022 Dated: 07.12.2022

We, hereby assure that all the information and data provided in the EIA report is accurate, true and correct and owns responsibility for the same.

Place: Krishnagiri

Yours faithfully

Date:

Thiru K Arockiya Raj

Plot No.48A, 2nd Main Road,
Ram Nagar, South Extension,
Pallikaranai, Chennai - 600 100.
GST NO. 33AADCE6103A2ZH
PAN NO. AADCE6103A



Eco Tech Labs Pvt Ltd

Cell No. 98400 87542
Email : info@ecotechlabs.in
Website : www.ecotechlabs.in
CIN : U74900TN2014PTC094895

UNDERTAKING

I, Dr. A. Dhamodharan, Managing Director confirms that this EIA Report of Thiru C Nithin Reddy Rough Stone Quarry over a total extent of 1.68.0 Ha at S.F.Nos.: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District has been prepared at M/s. Ecotech Labs Pvt. Ltd., Chennai.

I also confirm that I shall be fully accountable for any miss-leading information mentioned in this Report.

Signature:

Dr. A. DHAMODHARAN
(NABET APPROVED EIA COORDINATOR)
NABET/EIA/2124/SA 0147
Environmental Consultant
Eco Tech Labs Pvt. Ltd
Plot No.48A, 2nd Main Road, Ram Nagar South Extension,
Pallikaranai, Chennai - 600 100.

Name: Dr. A. Dhamodharan

Designation: Managing Director

Name of the EIA Consultant Organization: M/s. Ecotech Labs Pvt Ltd., Chennai

NABET Certificate No: NABET/EIA/2124/SA 0147


Date:

Place: Chennai

Declaration of Experts contributing to the EIA



Declaration by experts contributing to the EIA report for Rough Stone Quarry (minor mineral) mining project of Thiru. R Arockiya Raj Rough Stone and Gravel Quarry over a total extent of 1.68.0 Ha at S.F. Nos.: 210/7A of Melur Village, Kulathur Taluk of Pudukkottai District, Tamil Nadu.



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




Project	Rough Stone Quarry-1.68.0 Ha
Type & Category	1 (a) Mining of Minerals
Project Proponent	Thiru R Arockiya Raj
Environment Consultant with their Accreditation Status	M/s. Eco Tech Labs Pvt. Ltd., QCI Accredited
NABET Certificate No.	NABET/ EIA/2124/ SA 0147
EIA Coordinator Name	Dr. A. Dhamodharan (Mining of Minerals)
Signature	 Dr. A. DHAMODHARAN (NABET APPROVED EIA COORDINATOR) NABET/EIA/2124/SA 0147 Environmental Consultant Eco Tech Labs Pvt. Ltd Plot No.48A, 2nd Main Road, Ram Nagar South Extn. Pallikaranai, Chennai - 600 100.
Period of Involvement	January - March 2023
Contact Information	M/s. Eco Tech Labs Pvt. Ltd. No. 48, 2nd Main Road, Ram Nagar South Extension Pallikaranai, Chennai - 600 100 Mobile: +91 9789906200 E-mail: dhamo@ecotechlabs.in





Functional Area Experts

The basic fact division that environment and laboratory are accredited by NABL and Ministry of Environment and Forests, India and by other international bodies, stand testimony to its emphasis.

S. No.	Functional areas	Name of the expert/s	Involvement (Period and task)	Signature and date
1	AP	Mrs. K. Vijayalakshmi	Selection of Baseline Monitoring stations based on the wind direction, Interpretation of Baseline data by comparing it with standards prescribed by CPCB against the type of area. Identification of sources of air pollution and suggesting mitigation measures to minimize impact.	
2	WP	Dr. A. Dhamodharan	Selection of baseline Monitoring Locations for Ground water analysis and also identifying nearest surface to be studied, Preparing water balance for the project based on the anticipated occupancy load. Interpretation of baseline data collected, Identification of impacts based on the baseline.	

3	SHW	Dr. A. Dhamodharan	<p>Identification of nature of solid waste generated, Categorization of the generated waste and estimating the quantity of waste to be generated based on the per capita basis. Identification of impacts of SHW on Environment, Suggesting suitable mitigation measures by recommending appropriate disposal method for each category of waste generated.</p>	
4	SE	Mr. S. Pandian	<p>Primary data collection through the census questionnaire, Secondary data interpretation from authenticated sources, Impact assessment & proposing suitable mitigation plan. CSR budget allocation</p>	

5	EB	Dr. A. Dhamodharan	Primary data collection through field survey and sheet observation for ecology and biodiversity, Secondary Collection through various authenticated sources, Prediction of anticipated impacts and suggesting appropriate mitigation measures.	
6	HG	Dr. T. P. Natesan	Field survey for assessing regional and local geology, aquifer distribution, water resource evaluation, change in ground water level throughout the year. Determination of groundwater use pattern, development of rainwater harvesting program, estimation of ground water direction.	
7	GEO	Dr. T. P. Natesan	Field survey for assessing regional and local geology, aquifer distribution. Determination of groundwater use pattern, development of rainwater harvesting program.	

8	SC	Dr. A. Dhamodharan	Interpretation of baseline report, Identification of possible impacts on soil, prediction of soil conservation and suggesting suitable mitigation measures.	
9	AQ	Mrs. K. Vijayalakshmi	Collection of Meteorological data for the baseline study period, Plotting wind rose diagram and thereby selecting the monitoring locations based on the wind pattern, estimation of sources of air emissions and air quality modeling is done. Interpretation of the results obtained, Identification of the impacts and suggesting suitable mitigation measures.	
10	N/V	Ms K. Vijayalakshmi	Selection of monitoring locations, Interpretation of baseline report, Prediction of impacts due to noise pollution and suggestion of appropriate mitigation measures.	
11	LU	Dr. T. P. Natesan	Preparation of land use, land cover maps for the study area using satellite imagery.	

12	RH	Ms K. Vijayalakshmi	Identification of the risk and Interpreting consequence contours. Suggesting risk mitigation measures.	7/10/2
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Declaration by the Head of the accredited consultant organization/ authorized person

I, Dr. A. Dhamodharan, hereby confirm that the above mentioned experts prepared the EIA report of mining project at S.F. Nos.: 210/7A of Melur Village, Kulathur Taluk of Pudukkottai District, Tamil Nadu.

I also confirm that the consultant organization shall be fully accountable for any misleading information mentioned in this statement.

Signature:




Name: Dr.A.Dhamodharan

Designation: Managing Director

Name of the EIA consultant organization: M/s. Eco Tech Labs Private Limited

NABET Certificate No: NABET/EIA/2124/SA 0147

Project	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
Project Proponent	<i>Thiru R Arockiya Raj</i>	
Project Location	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Abbreviation

LU –Land use

AP – Air Pollution monitoring, prevention and control

AQ- Meteorology, Air quality modeling and prediction

WP – Water pollution monitoring, prevention and control

EB- Ecology and Biodiversity

NV- Noise & Vibration

SE- Socio-economics

HG- Hydrology, ground water and water conservation

GEO –Geology

RH – Risk assessment and hazards management

SHW –Solid and Hazardous waste management

SC- Soil conservation

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

EXECUTIVE SUMMARY

1. Project Background:

The Rough Stone and Gravel Quarry over an extent of 1.68.0 Ha, Own Patta land S.F. No: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District. The category of the project is B1 (cluster), the lease area exhibits plain terrain covered by massive charnockite rough stone formation.

The quarry operation is proposed to carry out with conventional open cast mechanized mining with 5.0-meter vertical bench with a bench width of 5.0meter. The Quarry operation involves shallow jack hammer drilling, slurry blasting, loading and transportation.

The quarry operation is proposed up to depth for 17.0m (Max) (Topsoil 2.0m & Rough stone 15.0m). The Total Geological reserve is about 10,87,125 m³ of Rough stone & 33,450 m³ Gravel up to a depth of 67.0m (2.0m Gravel & 65m Rough stone). The Mineable Reserves is computed as 1,94,280 m³ of Rough stone and 24,312 m³ of Gravel formation at the rate of 100% recovery upto a depth of 42.0m(Max) (2.0m Gravel & 40m Rough stone). The recoverable reserves is 1,03,570 m³ (17,261 Lorry Loads) of Rough stone & 24,312 m³ (4,052 Lorry Loads) Gravel up to a depth of 17.0m(Max) (2.0m Gravel and 15m Rough stone) for the period of (Five) 5 Years.

The mining plan was approved by Geology and Mining department of Pudukkottai district letter vide Rc.No.677/2021 (G&M) dated: 02.06.2022 from the date of execution lease dead. The project area does not fall in Hill Area Conservation Authority region. There is no interstate boundaries, CRZ zone, Western Ghats, notified Bird sanctuaries, wildlife sanctuaries as per Wildlife protection Act 1972, within the radius of 15Km.

2. Nature & Size of the Project

The New Rough Stone and Gravel Quarry over an extent of 1.68.0 Hectares land is located Melur Village of Kulathur Taluk, Pudukkottai District.

Mineral intends to quarry : Rough stone and Gravel.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

District : Pudukkottai
Taluk : Kulathur
Village : Melur
S. F. Nos. : 210/7A
Extent : 1.68.0 Hectares

Table 1: Brief Description of the Project

S. No	Particulars	Details
1	Latitude	10°26'40.50"N to 10°26'48.54"N
2	Longitude	78°45'55.90"E to 78°46'00.42"E
3	Site Elevation above MSL	114.0m above MSL.
4	Topography	Plain terrain
5	Land use of the site	Patta land
6	Extent of lease area	1.68.0 Ha
7	Nearest highway	SH 71 – Musiri - Kulithalai - Pudukkottai - Alangudy - Paeravorani - Sethubavachathiram Road -2.8 km - SW NH 336 – Pudukkottai to Trichy – 2 Km - E
8	Nearest railway station	Pudukkottai Railway Station – 9 Km – SE
9	Nearest airport	Tiruchirappalli International Airport – 35.44 Km - N
10	Nearest town / city	Town - Vellanur – 3.5 Km – NE City - Pudukkottai – 7.82 Km - SE District - Pudukkottai – 7.82 Km - SE
11	Rivers / Canal	Nil within 15km radius
12	Lake/Pond	❖ Vellanur local Pond – 1.64 Km - E ❖ Thiruvengainathar Lake – 3.4 Km – S ❖ Kili Kulam – 2.61 Km – NE ❖ Temple Pond – 2 Km – W ❖ Perunjunai Lake – 2.4 Km – SW ❖ Melakulam – 4 Km – SW ❖ Kavinadu Kanmai – 7.27 Km – S ❖ Annavasal Periyakulam Lake – 8.23 Km – NW

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj	Draft EIA Report
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		❖ Vellar river – 10.35 Km – S
13	Hills / valleys	Nil in 15 km radius
14	Archaeologically places	<ul style="list-style-type: none"> ❖ Sundaesvara temple with sub-shrine, Thirukkattalai – 7.9Km – SE ❖ Jain image and the inscription to the south of it on the summit of the sadayapparai, Nathampannai – 4.3km – S ❖ Cave & Jain image, Ammachathiram – 8.41km – N ❖ Jain image, Annavasal – 8 km – W ❖ Siva temple. Ariyur – 4.2 km – SW ❖ Siva and Pillayar temple, Mangudi – 7 km – SW ❖ Jain Tirthankara idol and relics of old Jain Temple – 1.9km – N ❖ Amman koil, Rock-cut Siva temple, Vijayalaya Cholisvaram and the group of subshrines around it, Rock-cut Vishnu shrine – Narthamalai – 6.96 km – N ❖ Rock-cut Jain temple, Natural Cavern with stone beds – Eladipattam – Sittannavasal – 3.6 km – W ❖ Siva Temple, Thodaiyur – 6.9 km – NE Kailasanatha temple, Agastisvara temple – Vellanur – 3.1 km – E
15	National parks / Wildlife Sanctuaries	Nil in 15 km radius
16	Reserved / Protected Forests	<ul style="list-style-type: none"> ❖ Narthamalai Reserve Forest – 6 Km – N ❖ Pudukkottai Reserve Forest – 7 km, SE ❖ Aladukkadu RF – 9.2 Km – N ❖ Perungudipatti RF –9.3Km – NW
17	Seismicity	Proposed Lease area come under Seismic zone-II (Moderate risk area)

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

3. Need for the Project

- ❖ The mining activities as proposed are the backbone of all construction and infrastructure projects as the raw material for construction is available only from such mining. The Rough stone extracted will be transported to be Stone crusher of district Pudukkottai.
- ❖ The raw Rough stone as well as the crushed material of stone is in high demand in real estate, construction projects as well as in building construction projects.
- ❖ Rough stone is quarried for producing crusher aggregates to the nearby building contractors, road contractors and nearby villagers.
- ❖ After quarrying the entire reserves mined out, the area will be used as water reservoir to have an artificial recharge to the nearby wells.
- ❖ No damage to the land is caused, no reclamation or back filling is required.



Figure 1: Location Map of the Project Site

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	



Figure 2: Google Image of the Project Site

4. Charnockite

Generally, the Charnockite is grey to greenish colored, coarse to medium grained, greasy nature with or without garnet. Because of the limited outcrops, the quarry sections are studied to infer the various interrelationships between the litho units. Charnockite is interbanded nature with crystalline carbonate rocks are observed in most of the quarry in the areas of Kunnandavarkoil, Thirumayam, Kulathur, Weathering of the Charnockite on the surface gives a deceptive look of gneiss and in the quarry sections at depth the fresh charnockite is exposed, which are well exemplified in almost all the Charnockite quarry sections.

5. Geological Resources

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

The geological reserves have been calculated based on the cross-section method

Table 2. Geological resources

Geological Resources						
Section	Length in (m)	Width in (m)	Depth in (m)	Volume m ³	Geological Resources of Gravel in m ³	Geological Resources of Rough stone in m ³
XY-AB	113	105	2	23730	23730	
	113	105	65	771225		771225
XY-CD	108	45	2	9720	9720	
	108	45	65	315900		315900
Total					33450	1087125

Table 2.1 Mineable Resources

Mineable Reserves							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Mineable Reserves of Rough stone in m ³
XY-AB	114-112	106	88	2	18656	18656	
	112-107	104	84	5	43680		43680
	107-102	99	74	5	36630		36630
	102-97	94	64	5	30080		30080
	97-92	89	54	5	24030		24030
	92-87	79	44	5	17380		17380
	87-82	69	34	5	11730		11730
	82-77	59	24	5	7080		7080
	77-72	49	14	5	3430		3430
Total						18656	174040
XY-CD	114-112	101	28	2	5656	5656	
	112-107	99	24	5	11880		11880
	107-102	94	14	5	6580		6580
	102-97	89	4	5	1780		1780

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

Total	5656	20240
Grand Total	24312	194280

Table 3. Year wise Production Plan

Yearwise Development & Production Reserves								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Recoverable Reserves of Rough stone in m ³
I	XY-AB	114-112	50	88	2	8800	8800	
		112-107	48	84	5	20160		20160
TOTAL							8800	20160
II	XY-AB	114-112	48	88	2	8448	8448	
		112-107	48	84	5	20160		20160
TOTAL							8448	20160
III	XY-AB	114-112	8	88	2	1408	1408	
		112-107	8	84	5	3360		3360
	XY-CD	114-112	101	28	2	5656	5656	
		112-107	99	24	5	11880		11880
		107-102	94	14	5	6580		6580
TOTAL							7064	21820
IV	XY-AB	107-102	55	74	5	20350		20350
TOTAL								20350
V	XY-AB	107-102	44	74	5	16280		16280
		102-97	15	64	5	4800		4800
TOTAL								21080
GRAND TOTAL							24312	103570

6. Mining

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Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

Opencast mining

The quarry operation is proposed to carry out with conventional open cast mechanized mining with 5.0meter vertical bench with a bench width of 5.0 meter. The Quarry operation involves shallow jack hammer drilling, slurry blasting, loading and transportation.

Process Description

- The reserves and resource are arrived based upon the Geological investigation.
- Removal of Topsoil by Excavators and directly Loaded into Tippers.
- Removal of Rough Stone by Excavators by Drilling and Blasting.
- Shallow Drilling With Jackhammer of 25.5mm Dia.
- Minimum Blasting With Class 3 Explosives.
- Loading of Rough Stone By Excavators Into Tippers.

7. Water Requirement

Total water requirement for the mining project is 2.5 KLD. Domestic water will be sourced from nearby Melur Village and other water will be source from nearby road tankers supply.

Table 4. Water Balance

Purpose	Quantity	Source
Drinking Water	1.5 KLD	Water will be supplied through tankers from Melur village which is about 0.33 Km NE of the project area.
Green belt	0.5 KLD	Other domestic activities through road tankers supply.
Dust suppression	0.5 KLD	From road tankers supply.
Total	2.5 KLD	

8. Manpower

Total manpower required for the project is approximately 27 persons. Workers will be from nearby villages.

Table 5. Man Power

1.	Skilled	Operators- Excavator & Jackhammer	4 Nos
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2.	Semi – skilled	Drivers	4 Nos
3.	Unskilled	Musdoor/Labours, Cleaners & Watch man	15 Nos
4.	Management & Supervisory staff	Second Class Mines Manager (with valid statutory qualification)	1 No
		Mines Foreman (with valid statutory qualification)	1 No
		Mines Mate (with valid statutory qualification)	1 No
		Blaster	1 No
Total			27 Nos

No child less than 18 years will be entertained during quarrying operations.

9. Solid Waste Management

Table 6 Solid Waste Management

S. No	Type	Quantity	Disposal Method
1	Organic	4.86 kg/day	Municipal bin including food waste
2	Inorganic	7.29 kg/day	TNPCB authorized recyclers

As per CPCB guidelines: MSW per capita/day =0.45 kg/day

Table 7 500m Radius Cluster Mine

1) Existing other quarries:

S. No.	Name of the lessee / Permit Holder	Village & Taluk	S. F. No.	Extent	Lease Period
1.	Thiru M Velu, S/o Muthiah, Echanari Thottaivayal, Melur, Sathyamangalam Post, Kulathur Taluk, Pudukkottai District	Melur & Kulathur	207/14B, 207/15A	0.65.5	28.06.2017 to 27.06.2022
2.	Thiru R Natesan, S/o Rengasamy, No.715A, Narkkeerar Vayal, Sathiamangalam Post, Pudukkottai District	Melur & Kulathur	216/1	1.47.5	12.09.2017 to 11.09.2022

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Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

3.	M/s. Sai Hridham Infraa Private Limited, 14/28, Sowrastra Street, Illuppur taluk, Pudukkottai Dt.	Melur & Kulathur	207/21B, 2/07/22B2, 207/23	1.30.5	31.07.2019 to 30.07.2024
4.	Thiru Jayaraj S/o S.K.Rengarajan, No.3/659 of Melmuthudaiyanpatti Village, Vellanur Post, Kulathur Taluk, Pudukkottai District	Melur & Kulathur	40/5B, 40/6B, 40/7A, 40/8A, 40/9A, 40/1B2, 40/11A	0.81.0	29.06.2018 to 28.06.2023
5.	Thiru V Ravichandran S/o R Visvanathan, Plot No.82, Pudhunagar 2 nd street, Machuvadi, Pudukkottai District.	Melur & Kulathur	207/18,207/29	1.27.5	28.07.2017 to 27.07.2022
6.	Thiru M Rajamohamed, S/o Mohamed Ibrahim No.9884, Kalif Nagar, 4 th Street, Pudukkottai	Melur & Kulathur	216/21A1, 216/22B	1.30.5	31.07.2019 to 30.07.2024
7.	Thiru Ramesh Babu S/o Jayaraman, T.S.No.7166/2 of Maharajapuram, Thirukokarnam, Pudukkottai District	Melur & Kulathur	210/19, 210/9B1B	1.50.5	06.11.2019 to 05.11.2024

2) Proposed Area:

S. No.	Name of the applicant	Village & Taluk	S. F. No.	Extent
1.	Thiru.R Arockiya Raj S/o Rethinam Pillai, No.297/7, Sathiyamoorthy Nagar, Pudukkottai	Melur & Kulathur	210/7A	1.68.0
2.	Thiru.R.Muthusamy, S/o. Rengasamy, No.663, Melamuthudaiyanpatti village, Kulathur Taluk, Pudukkottai Dt	Melur & Kulathur	80/20, 80/21 & 80/22	0.82.0

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Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

3	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	80/3,4,5,6,17 & 19	1.68.0
4	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	207/10B2,	0.51.5
5	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	207/12, 207/16, 207/14A1	3.38.5
6	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	207/12, 207/16, 207/14A1	2.52.0

3) Lease Expired:

S. No.	Name of the lessee/ Permit Holder	Village & Taluk	S. F. No.	Extent	Lease Period
1.	Thiru.S.M.Sait, 59, Charles Nagar, Pudukkottai	Melur & Kulathur	216/22A	0.40.5	27.11.2013 to 26.11.2018
2.	S Ganesan S/o Subramaniyan	Melur & Kulathur	207/13A1, 13B, 24,25A,28A	2.63.5	17.06.2009 to 16.06.2014
3.	Thiru.A.Periyasamy, S/O. Adaikalam, T.S.No. 6985, Thirukoharnam, Pudukkottai	Melur & Kulathur	216/15B	0.75.0	19.02.2016 to 18.02.2021
4.	Thiru.R.Muthusamy, S/o. Rengasamy, Melur, Sathiyamangalam Post, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	216/5 & etc.,	0.93.5	23.09.2016 to 22.09.2021
5.	S.M.Sait,	Melur & Kulathur	207/8	0.50.0	20.01.2017 to 19.01.2022

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

	S/o.Mookaiah, Solahar, No.51,52, Charles nagar, Pudukkottai				
6.	G Anthonisamy S/o Gnanampillai, Plat No.321, Periyarnagar, Pudukkottai	Melur & Kulathur	40/1, 40/2	0.36.0	03.04.2009 to 02.04.2014
7.	P.Sannasi S/o Poovan Melur, Kulathur taluk	Melur Kulathur	207/20	1.01.0	01.03.2007 to 28.02.2012

The Total extent of the Existing / Lease expired / Proposed quarries are 19.84.0 Ha.

10. Land Requirement

The total extent area of the project is 1.68.0 Ha, Own Patta land in Melur Village of Kulathur Taluk, Pudukkottai District.

Table 8 Land Use Breakup

S. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Quarrying Pit	Nil	1.11.0
2.	Infrastructure	Nil	0.02.0
3.	Roads	Nil	0.02.0
4.	Green Belt	Nil	0.25.0
5.	Unutilized Area	1.68.0	0.28.0
	Total	1.68.0	1.68.0

11. Human Settlement

There are no habitations within 500m radius. There are villages located in this area within 5km radius of the quarry.

Table 9 Habitation

S.No	Name of the Village	Approximate Distance	Direction From Lease Applied Area	Approximate Habitations
1.	Melur	1.6km	North–East	218
2.	Sittannaval	3.9km	North - West	292
3.	Maruthanthalai	0.8 Km	South - West	274

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4.	Thiruvengavasal	2.6 Km	South - East	165
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12. Power Requirement

The Rough Stone and Gravel Quarry project does not require huge water and electricity for the project.

16 Litre diesel per hour for excavator for mining and loading for Rough stone needed.

13. Scope of the Baseline Study

This chapter contains information on existing environmental scenario on the following parameters.

1. Micro – Meteorology
2. Water Environment
3. Air Environment
4. Noise Environment
5. Soil / Land Environment
6. Biological Environment
7. Socio-economic Environment

13.1 Micro – Meteorology

Meteorology plays a vital role in affecting the dispersion of pollutants, once discharged into the atmosphere. Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data.

- i) Average Minimum Temperature : 33.7 °C
- ii) Average Maximum Temperature. : 24 °C
- iii) Average Annual Rainfall of the area : 922.8 mm

13.2 Air Environment

Ambient air monitoring was carried out on monthly basis in the surrounding areas of the Mine Lease area to assess the ambient air quality at the source. To know the ambient air quality at a larger distance i.e., in the study area of 5 km. radius, air quality survey has been conducted at 5 locations. Major air

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pollutants like Particulate Matter (PM₁₀), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂) were monitored and the results are summarized below.

The baseline levels of PM₁₀ (60 – 34 µg/m³), PM_{2.5} (32 - 14 µg/m³), SO₂ (21 – 5 µg/m³), NO₂ (42 -9 µg/m³), all the parameters are well within the standards prescribed by National Ambient Air Quality during the study period from January to March 2023.

13.3 Noise Environment

Ambient noise levels were measured at 5 locations around the proposed project site. The maximum Day noise and Night noise were found to be 64 dB(A) and 50 dB(A) respectively in Government High School, Mangudi. The minimum Day Noise and Night noise were 55 dB(A) and 43 dB(A) respectively which was observed in Project Site.

13.4 Water Environment

- The average pH ranges from 6.29 - 7.91.
- TDS value varied from 369 mg/l to 935 mg/l
- Hardness varied from 129 to 346 mg/l
- Chloride varied from 81.8 to 254 mg/l

13.5 Land Environment

The analysis results shows that the majority of soil in the project and surrounding area is slightly alkaline in nature and pH value ranges from 5.58 to 8.61 with organic matter 1.02 % to 1.45 %. The concentration of Nitrogen, Phosphorus & Potassium has been found to be in good amount in the soil samples.

13.6 Biological Environment

The proposed Mining lease area is mostly dry barren ground with small shrubs and bushes. No specific endangered flora & fauna exist within the mining lease area.

14. Rehabilitation/ Resettlement

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- The overall land of the mine is private patta land. There are no displacement of the population within the project area and adjacent nearby area. Social development of nearby villages will be considered in this project.
- The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement.

15. Greenbelt Development

1. The development of greenbelt in the peripheral buffer zone of the mine area.
2. Green belt has been recommended as one of the major component of Environmental Management Plan, which will improve ecology, environment and quality of the surrounding area.
3. Local trees like Neem, Pungam, Naval etc will be planted along the lease boundary and avenues as well as over Non-active dumps at a rate of 300 trees per annum with interval 5m.
4. The rate of survival expected to be 80% in this area

Table.10 Plantation/ Afforestation Program

Year	Name of species	Place of planted	No of species	Spacing	Survival
2023	Neem, Pungam, Poovarasu	North	300	5m	80%
2024	Naval, Mantharai, Arasa Maram	South	300	5m	80%
2025	Magizham, Vilvam, Vaagai, Marudha maram	East	300	5m	80%
2026	Usil, Aaththi, Panai	South	300	5m	80%
2027	Illuppai, Eachai, Vanni maram	West	300	5m	80%
Total			1500		

16. Anticipated Environmental Impacts

16.1 Air Environment and Mitigation Measures

1. Water sprinkling will be done on the roads & unpaved roads.
2. Proper mitigation measures like water sprinkling will be adopted to control dust emissions.
3. Plantation will be carried out on approach roads, solid waste site & nearby mine premises.
4. To control the emissions regular preventive maintenance of equipments will be carried out.

16.2 Noise Environment and Mitigation Measures

1. Periodical monitoring of ambient noise will be done as per CPCB guidelines.

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2. No other equipment except the transportation vehicles and excavator for loading will be allowed.
3. Noise generated by these equipments shall be intermittent and does not cause much adverse impact

17. Responsibilities for Environmental Management Cell (EMC)

The responsibilities of the EMC include the following:

- i. Environmental Monitoring of the surrounding area
- ii. Developing the green belt/Plantation
- iii. Ensuring minimal use of water
- iv. Proper implementation of pollution control measures

18. Environmental Monitoring Program

A monitoring schedule with respect to Ambient Air Quality, Water & Wastewater Quality, Noise Quality as per Tamil Nadu State Pollution Control Board (TNPCB), shall be maintained.

19. Project Cost

The total project cost is **Rs. 43,94,000/-** for deployment of machinery and creation of infrastructural facilities like approach road, Mine office / Workers Shed, First Aid Room etc., including electrifications and water supply.

Table .11 Project Cost details

S. No.	Description	Cost
1	Fixed Asset cost	18,94,000
2	Expenditure Cost	25,00,000
	Total	43,94,000

Environmental Management Plan Cost – 18,08,000/-

20. Corporate Environmental Responsibility

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

The Corporate Environment Responsibility (CER) fund will be provided to the below activity.

Table 12 CER Cost

S.No.	CER Activity	CER Cost (Rs.)
1.	Government Panchayat Union Middle School – Provision of <ul style="list-style-type: none"> ➤ Levelling the floor inside the school perimeter by using Earth materials, ➤ Environmental books for library (in Tamil language), ➤ Greenbelt facilities and ➤ Basic amenities such as safe drinking water, furniture, Hygienic Toilet and maintenance of toilet upto lease period. 	5,00,000

21. Benefits of the Project

- There is positive impact on socio-economics of people living in the villages. Mining operations in the subject area has positive impact by providing direct and indirect jobs opportunities.
- The project is environmentally compatible, financially viable and would be in the interest of construction industry thereby indirectly benefiting the masses.
- Quarrying in this area is not going to have any negative impact on the social or cultural life of the villagers in the near vicinity.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

1 Introduction

1.1 Preamble

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the prediction options to the proponent. By using EIA, both environmental & economic benefits can be achieved. By considering environmental effects - prediction & mitigation, early benefits in project planning, protection of the environment, optimum utilization of resources, thus saving overall time & cost of the project.

1.2 General Information on Mining of Minerals

Minerals of Economic importance found in Pudukkottai District are mainly Multicolour Granite, Rough Stone, Red soil, Gravel, Savudu, Pebbles with traces of occurrence of Quartz and Feldspar. Mining activities based on these minerals are very less. However, numerous Rough Stone quarries are under operation for production of construction materials in the areas of Kunnandavarkoil, Thirumayam, Kulathur in the district.

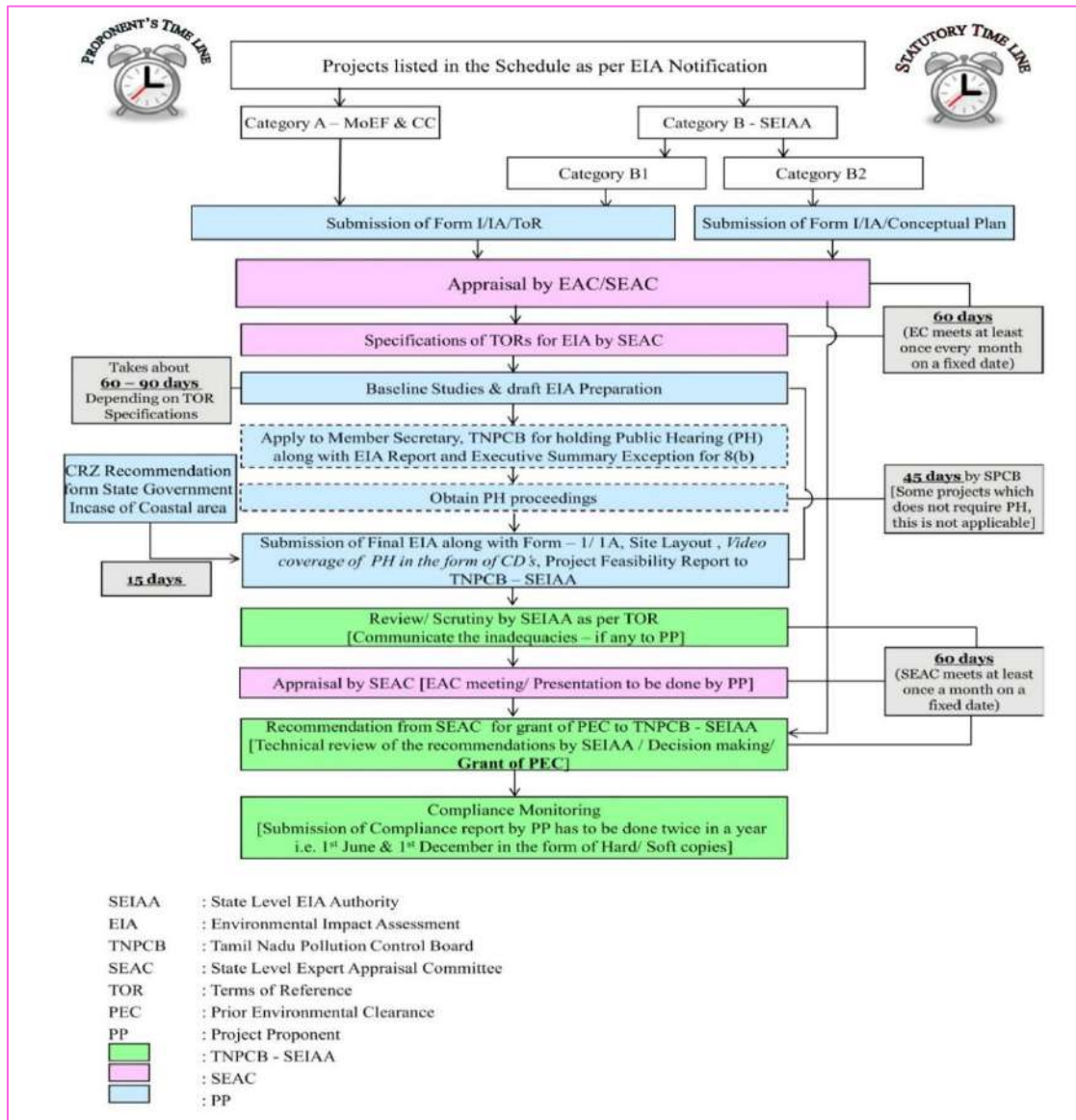
Gneiss rocks are found in the western part of Pudukkottai District. Charnockites and granites rocks are mostly found in the central part including the blocks of Kunnandarkoil, Thirumayam and the southern parts of Pudukkottai Block. The various types of Gneiss rocks are found in the western part of the study area, consisting the blocks of Viralimalai, Annavasal and Ponamaravathy. Quartzite deposits are found in small quantity in some parts of Annavasal and Thirumayam Blocks. In the Blocks of Kulathur, Thirumayam and parts of Pudukkottai crystalline rocks are found.

1.3 Environmental Clearance

As per EIA Notification, 2006 and its subsequent amendments (O.M vide No.F.No.L- 11011/175/2018-IA-II(M) Govt of India MOEF&CC on December 12th 2018) project comes under category B1 cluster & schedule 1(a) under item 1

The proposed project is categorized under Category “B1” 1(a) (Cluster) - {Mining of Minerals} as the 500m radius area is more than 5 Ha including the mine lease area. Hence, the project will be considered at SEAC, Tamil Nadu.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	



1.4 Terms of Reference (ToR)

The terms of Reference have been issued by SEAC TN vide Letter No. SEIAA-TN/F. No. 9484/ToR-1312/2023 Dated: 07.12.2022. 43 additional ToR points were recommended by SEAC TN in addition to the Standard ToR Points. The replies for the same were addressed in this report.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

1.5 Post Environmental Clearance Monitoring

1.5.1 Methodology adopted

Post project monitoring will be carried out as per conditions stipulated in environmental clearance letter issued by SEIAA, consent issued by SPCB as well as according to CPCB guidelines. The lease area is considered as core zone and the area lying within 10 km radius from the lease boundary is considered as buffer zone, where some impacts may be observed on physical and biological environment. In the buffer zone slight impact may be observed and that too is occasional.

Table 1-1: Post Environmental Clearance Monitoring

S. No.	Description	Frequency of Monitoring
1.	Ambient Air Quality Monitoring	Quarterly/ Half Yearly
2.	Water level & Quality Monitoring	Quarterly/ Half Yearly
3.	Noise Level Monitoring	Quarterly/ Half Yearly
4.	Soil Quality Monitoring	Yearly
5.	Medical Check-up	Yearly

1.6 Generic Structure of the EIA Document

Chapter 1: Introduction. This chapter contains the general information on the mining of minerals, major sources of environmental impacts in respect of mining projects and details of environmental clearance process.

Chapter 2: Project Description. In this chapter the proponent should also furnish detailed description of the proposed project, such as the type of the project, need for the project, project location, layout, project activities during construction and operational phases, capacity of the project, project operation i.e., land availability, utilities (power and water supply) and infrastructure facilities such as roads, railways, housing and other requirements. If the project site is near a sensitive area it is to be mentioned clearly why an alternative site could not be considered. The project implementation schedule estimated cost of development as well as operation etc should be also included.

Chapter 3: Analysis of Alternatives (Technology and Site). This chapter gives details of various alternatives both in respect of location of site and technologies to be deployed, in case the initial scoping exercise considers such a need.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Chapter 4: Description of Environment. This chapter should cover baseline data in the project area and study area.

Chapter 5: Impact Analysis and mitigation measures. This chapter describes the anticipated impacts on the environment and mitigation measures. The method of assessment of impacts including studies carried out, modelling techniques adopted to assess the impacts where pertinent should be elaborated in this chapter. It should give the details of the impacts on the baseline parameters, both during the construction and operational phases and suggests the mitigation measures to be implemented by the proponent.

Chapter 6: Environmental Monitoring Program. This chapter should cover the planned environmental monitoring program. It should also include the technical aspects of monitoring the effectiveness of mitigation measures.

Chapter 7: Additional Studies. This chapter should cover the details of the additional studies required in addition to those specified in the ToR and which are necessary to cater to more specific issues applicable to the particular project.

Chapter 8: Project Benefits. This chapter should cover the benefits accruing to the locality, neighbourhood, region and nation as a whole. It should bring out details of benefits by way of improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits.

Chapter 9: Environmental Cost Benefit Analysis. This chapter should cover on Environmental Cost Benefit Analysis of the project.

Chapter 10: Environmental Management Plan. This chapter should comprehensively present the Environmental Management Plan (EMP), which includes the administrative and technical setup, summary matrix of EMP, the cost involved to implement the EMP, both during the construction and operational phase and provisions made towards the same in the cost estimates of project construction and operation. This chapter should also describe the proposed post-monitoring scheme as well as inter-organizational arrangements for effective implementation of the mitigation measures.

Chapter 11: Summary and Conclusions. This chapter gives the summary of the full EIA report condensed to ten A-4 size pages at the maximum. It should provide the overall justification for implementation of the project and should explain how the adverse effects have been mitigated.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Chapter 12: Disclosure of Consultants. This chapter should include the names of the consultants engaged with their brief resume and nature of consultancy rendered.

1.7 Details of Project Proponent

Project Proponent : Thiru. R Arockiya Raj
Status of the Proponent : Private & Individual
Proponent's Name & Address :S/o. Rethinam Pillai,
No. 297/7, Sathiyamoorthi Nagar,
Pudukkottai District - 622 001.

1.8 Brief Description of the Project

1.8.1 Project Nature, Size & Location

As per EIA Notification, 2006 and its subsequent amendments (O.M vide No.F.No.L - 11011/175/2018-IA-II(M) Govt of India MOEF&CC on December 12th, 2018) project comes under category B1 cluster & schedule 1(a) under item 1.

Proposed proposal pertains to rough stone mining project by semi mechanized open cast method on allotted mine lease area at Melur Village, Kulathur Taluk of Pudukkottai District, Tamil Nadu. It is a plain terrain. The total allotted mine lease for the proposed project is 1.68.0 Ha with their maximum production capacity i.e., 103570 m³ of Rough stone and 24312 m³ of Gravel for (Sixty months) Five years only.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

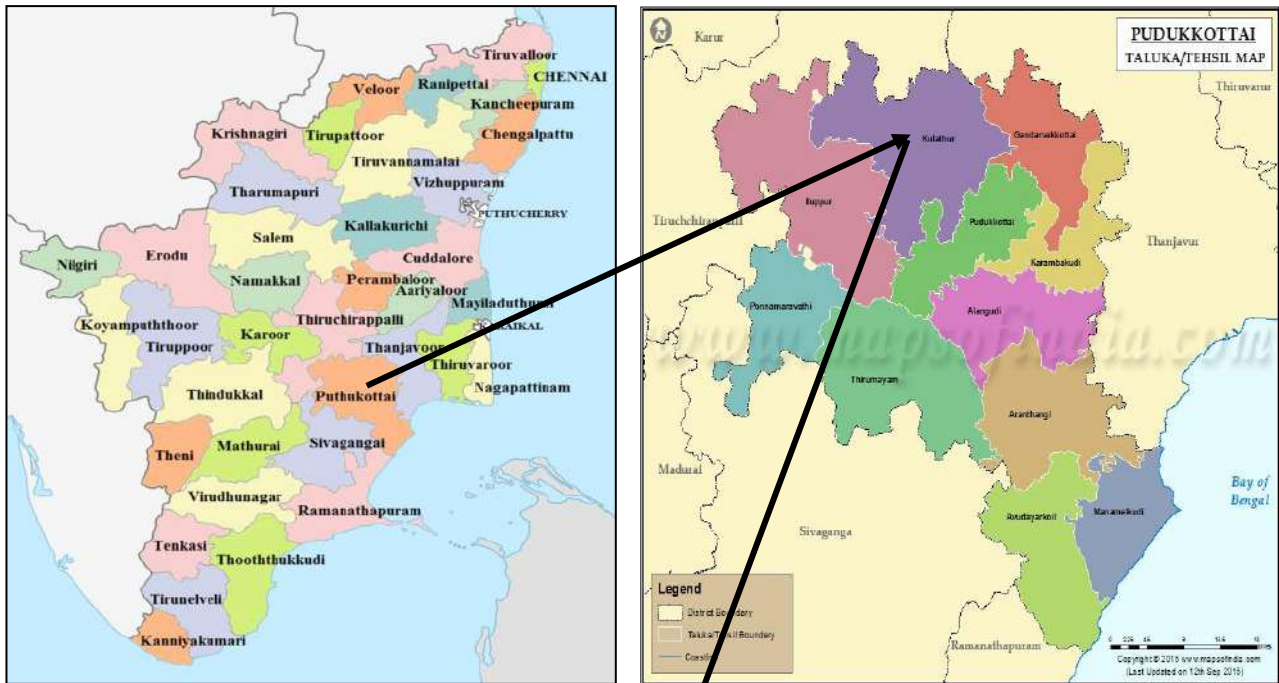


Figure 1-1: Location Map of the Project site

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

2 Project Description

This chapter furnishes detailed description of the proposed project, such as the type of the project, need for the project, project location, layout, project activities during mining, capacity of the project, project operation i.e., land availability, utilities (power and water supply) and infrastructure facilities such as roads, railways, housing and other requirements. The project implementation schedule estimated cost for carrying out entire mining activity is included.

2.1 General

Proposed proposal pertains to rough stone and gravel mining project by open cast mechanized method on allotted mine lease area at Melur Village, Kulathur Taluk of Pudukkottai District, Tamil Nadu. It is a plain terrain. We have obtained fresh mining plan from 2022 to 2027 from Department of Geology and Mining, Pudukkottai District for 1.68.0 Ha land area in the S.F.Nos. 210/7A for a proposed mining depth of 17.0m below ground level and five years production of 103570 m³ of Rough Stone and 24312 m³ of Gravel.

Type of the project:

As per EIA Notification, 2006 and its subsequent amendments (O.M vide No.F.No. L-11011/175/2018-IA-II(M) Govt of India MOEF&CC on December 12th, 2018) project comes under category B1 cluster & schedule 1(a) under item 1. The project required to be appraised at state level by State Environment Impact Assessment Authority, Tamil Nadu. Environment Clearance study will involve preparation of draft EIA report on the basis of baseline & impact assessment study is carried out. Also, before appraisal, under 7(III) of EIA notification 2006, the project involves the Public Consultation and the same will be conducted under SPCB (TN) in Pudukkottai District. The proceedings of the same will be incorporated in the Final EIA Report.

The mines within 500m radius from the project site is listed below.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

Table 2-1: Quarry within 500m Radius

1) Existing other quarries:

S. No.	Name of the lessee / Permit Holder	Village & Taluk	S. F. No.	Extent	Lease Period
1.	Thiru M Velu, S/o Muthiah, Echanari Thottaivayal, Melur, Sathyamangalam Post, Kulathur Taluk, Pudukkottai District	Melur & Kulathur	207/14B, 207/15A	0.65.5	28.06.2017 to 27.06.2022
2.	Thiru R Natesan, S/o Rengasamy, No.715A, Narkkeerar Vayal, Sathiamangalam Post, Pudukkottai District	Melur & Kulathur	216/1	1.47.5	12.09.2017 to 11.09.2022
3.	M/s. Sai Hridham Infra Private Limited, 14/28, Sowrastra Street, Illuppur taluk, Pudukkottai Dt.	Melur & Kulathur	207/21B, 2/07/22B2, 207/23	1.30.5	31.07.2019 to 30.07.2024
4.	Thiru Jayaraj S/o S.K.Rengarajan, No.3/659 of Melmuthudaiyanpatti Village, Vellanur Post, Kulathur Taluk, Pudukkottai District	Melur & Kulathur	40/5B, 40/6B, 40/7A, 40/8A, 40/9A, 40/1B2, 40/11A	0.81.0	29.06.2018 to 28.06.2023
5.	Thiru V Ravichandran S/o R Visvanathan, Plot No.82, Pudhunagar 2 nd street, Machuvadi, Pudukkottai District.	Melur & Kulathur	207/18,207/29	1.27.5	28.07.2017 to 27.07.2022
6.	Thiru M Rajamohamed, S/o Mohamed Ibrahim No.9884, Kalif Nagar, 4 th Street, Pudukkottai	Melur & Kulathur	216/21A1, 216/22B	1.30.5	31.07.2019 to 30.07.2024
7.	Thiru Ramesh Babu S/o Jayaraman, T.S.No.7166/2 of	Melur & Kulathur	210/19, 210/9B1B	1.50.5	06.11.2019 to 05.11.2024

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

	Maharajapuram, Thirukokarnam, Pudukkottai District				
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2) Proposed Area:

S. No.	Name of the applicant	Village & Taluk	S. F. No.	Extent
1.	Thiru.R Arockiya Raj S/o Rethinam Pillai, No.297/7, Sathiyamoorthy Nagar, Pudukkottai	Melur & Kulathur	210/7A	1.68.0
2.	Thiru.R.Muthusamy, S/o. Rengasamy, No.663, Melamuthudaiyanpatti village, Kulathur Taluk, Pudukkottai Dt	Melur & Kulathur	80/20, 80/21 & 80/22	0.82.0
3	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	80/3,4,5,6,17 & 19	1.68.0
4	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	207/10B2,	0.51.5
5	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	207/12, 207/16, 207/14A1	3.38.5
6	Tvl. Sai Hridham Infraa Private Limited, office at 208/6, Muthudaiyanpatti, Melur Village, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	207/12, 207/16, 207/14A1	2.52.0

3) Lease Expired:

S. No.	Name of the lessee/ Permit Holder	Village & Taluk	S. F. No.	Extent	Lease Period
1.	Thiru.S.M.Sait, 59, Charles Nagar, Pudukkottai	Melur & Kulathur	216/22A	0.40.5	27.11.2013 to 26.11.2018

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

2.	S Ganesan S/o Subramaniam	Melur & Kulathur	207/13A1, 13B, 24,25A,28A	2.63.5	17.06.2009 to 16.06.2014
3.	Thiru.A.Periyasamy, S/O. Adaikalam, T.S.No. 6985, Thirukoharnam, Pudukkottai	Melur & Kulathur	216/15B	0.75.0	19.02.2016 to 18.02.2021
4.	Thiru.R.Muthusamy, S/o. Rengasamy, Melur, Sathiyamangalam Post, Kulathur Tk, Pudukkottai Dt.	Melur & Kulathur	216/5 & etc.,	0.93.5	23.09.2016 to 22.09.2021
5.	S.M.Sait, S/o.Mookaiah, Solahar, No.51,52, Charles nagar, Pudukkottai	Melur & Kulathur	207/8	0.50.0	20.01.2017 to 19.01.2022
6.	G Anthonisamy S/o Gnanampillai, Plat No.321, Periyarnagar, Pudukkottai	Melur & Kulathur	40/1, 40/2	0.36.0	03.04.2009 to 02.04.2014
7.	P.Sannasi S/o Poovan Melur, Kulathur taluk	Melur Kulathur	207/20	1.01.0	01.03.2007 to 28.02.2012

The Total extent of the Existing / Lease expired / Proposed quarries are 19.84.0 Ha.

2.1.1 Need for the project:

The said project plays a significant role in the domestic as well as infrastructural market. To achieve a huge infrastructure being envisaged by Government of India, particularly in road and housing sector, there is a need for basic building materials, the rough stone form the primary building material.

Rough stone is one of the most valuable natural building materials. Aggregates are mostly used for building roads and footpaths. Aggregates – stone used for its strong physical properties – crushed and sorted into various sizes for use in concrete, coated with bitumen to make asphalt or used 'dry' as bulk fill in construction. Mostly used in roads, concrete and building products. Aggregates represent about 98% of

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

quarry output, most of which is used in road construction, maintenance and repair. Much of this goes to the production of asphalt; the remainder is used 'dry' without the addition of other materials to provide a sturdy base for roads.

Since Pudukkottai, a city known for its small-scale industries and also the soil in the area near project site is not very fertile making it unsuitable for carrying out agricultural activities. The topography near the project area is dry lands showing only less chance for crop growth and development of vegetation. Rocks and minerals of economic importance found to occur in Pudukkottai District are Multicolour Granite, Rough Stone, Red soil, Gravel, Savudu, Pebbles with traces of occurrence of Quartz and Feldspar. As a result of developmental activities and market demand for minor minerals, mining of minor mineral is vital. In addition to that, geological reserves of rough stone is abundant in the project area which is evident from the mine activities carried out in the nearby sites.

2.2 Brief Description of the project

Table 2-2 Salient Features of the Project

S. No.	Description	Details
1	Project Name	Rough Stone and Gravel Quarry
2	Proponent	Thiru.R Arockiya Raj
3	Mining Lease Area Extent	1.68.0 Ha
4	Location	S.F. Nos. 210/7A Melur Village, Kulathur Taluk, Pudukkottai District.
5	Latitude	10°26'40.50"N to 10°26'48.54"N
6	Longitude	78°45'55.90"E to 78°46'00.42"E
7	Topography	Plain terrain
8	Site Elevation above MSL	≈114.0m above MSL.
9	Topo sheet No.	58-J/15
10	Minerals of Mine	Rough Stone and Gravel
11	Proposed production of Mine	Proposed capacity of Rough stone: 103570 m ³ and Gravel: 24312 m ³
12	Ultimate depth of Mining	17.0 m below ground level
13	Method of Mining	Open cast mechanized mining
14	Water demand	2.5 KLD
15	Source of water	Water will be supplied through tankers supply
16	Manpower	Direct :16 Nos, Indirect :9 Nos

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

17	Mining Lease	Precise Area Communication Letter received from Assistant Director, Dept. Geology and Mining, Pudukkottai vide letter Rc.No.223/2022 (G&M) Mines dated 29.09.2022
18	Mining Plan Approval	Mining Plan was approved by the Assistant Director, Dept. of Geology & Mining, Pudukkottai vide letter Rc.No.677/2021 (G&M) dated 02.06.2022
19	Production details	Geological reserves of Rough Stone: 1087125 m ³ and Gravel: 33450 m ³ . Proposed five year production reserves of Rough Stone: 103570 m ³ and Gravel: 24312 m ³ .
20	Boundary Fencing	7.5m barrier all along the boundary Fencing will be provided.
21	Disposal of overburden	The over burden in the form of Gravel is 24312 m ³ of used for filling and leveling of low lying areas of road projects and other infrastructure development work in and around the district.
22	Ground water	The ground Water Level is noticed at the depth of 70m to 75m BGL by monitoring nearby bore hole, during the climatic conditions, the fluctuations of water level is 70m in Rainy seasons and 75m in Summer seasons of this quarry area. It shall be ensured that quarrying shall not be carried out below ground water table under any circumstances. If ground water table occurs/intervenes within the permitted depth, then also the quarrying shall be stopped.
23	Habitations within 500m radius of the Project Site	There is no Habitation within 500m radius of the project site.
24	Drinking water	Water will be supplied through tankers from Melur Village which is 0.33 km NE from the project site.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	



Figure 2-1: Location Map of the Project Site



Figure 2-2: Google Earth Image and Coordinates of the Project Site

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

2.1.2 Site Connectivity:

The site is connected to Sithannavasal Road – adjacent to site in South side.

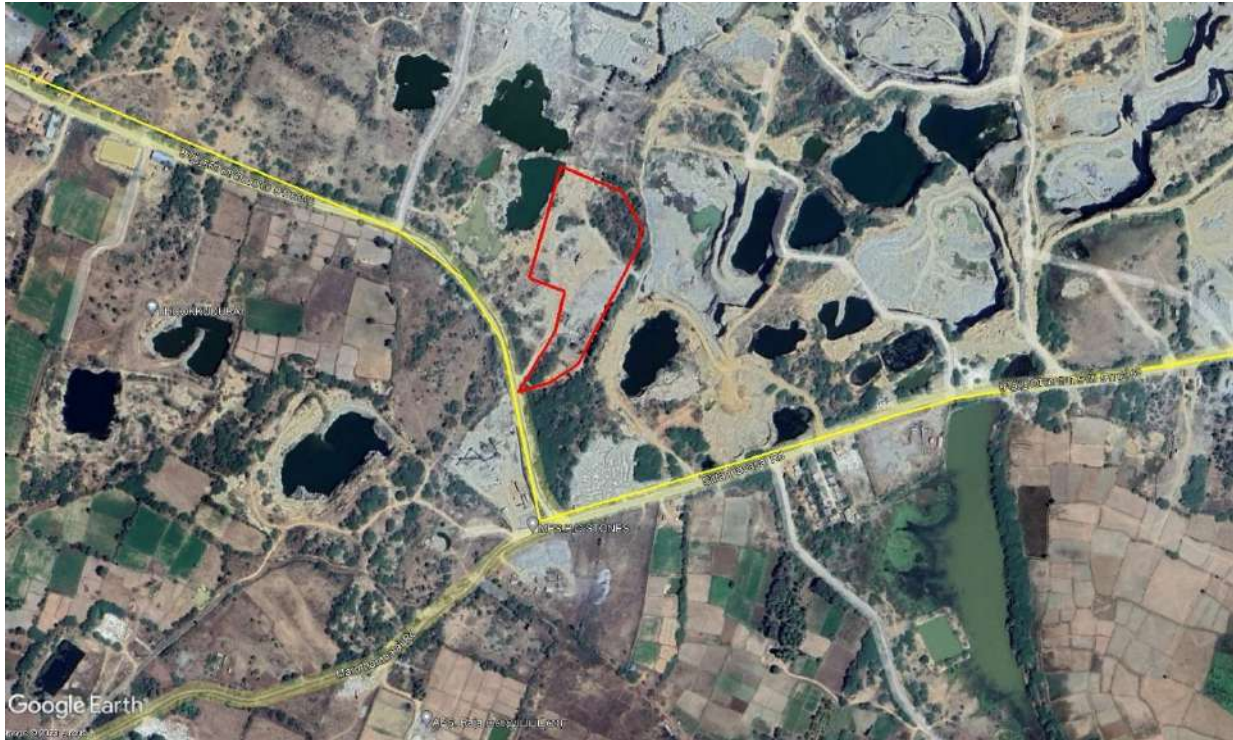


Figure 2-3: Site Connectivity

2.3 Location Details:

Table 2-3: Location Details

S. No	Particulars	Details
1.	Latitude	10°26'40.50"N to 10°27'08.04"N
2.	Longitude	78°46'21.11"E to 78°46'29.30"E
3.	Site Elevation above MSL	114.0 m from MSL
4.	Topography	Plain terrain
5.	Land use of the site	Own Patta land
6.	Extent of lease area	1.68.0 Ha

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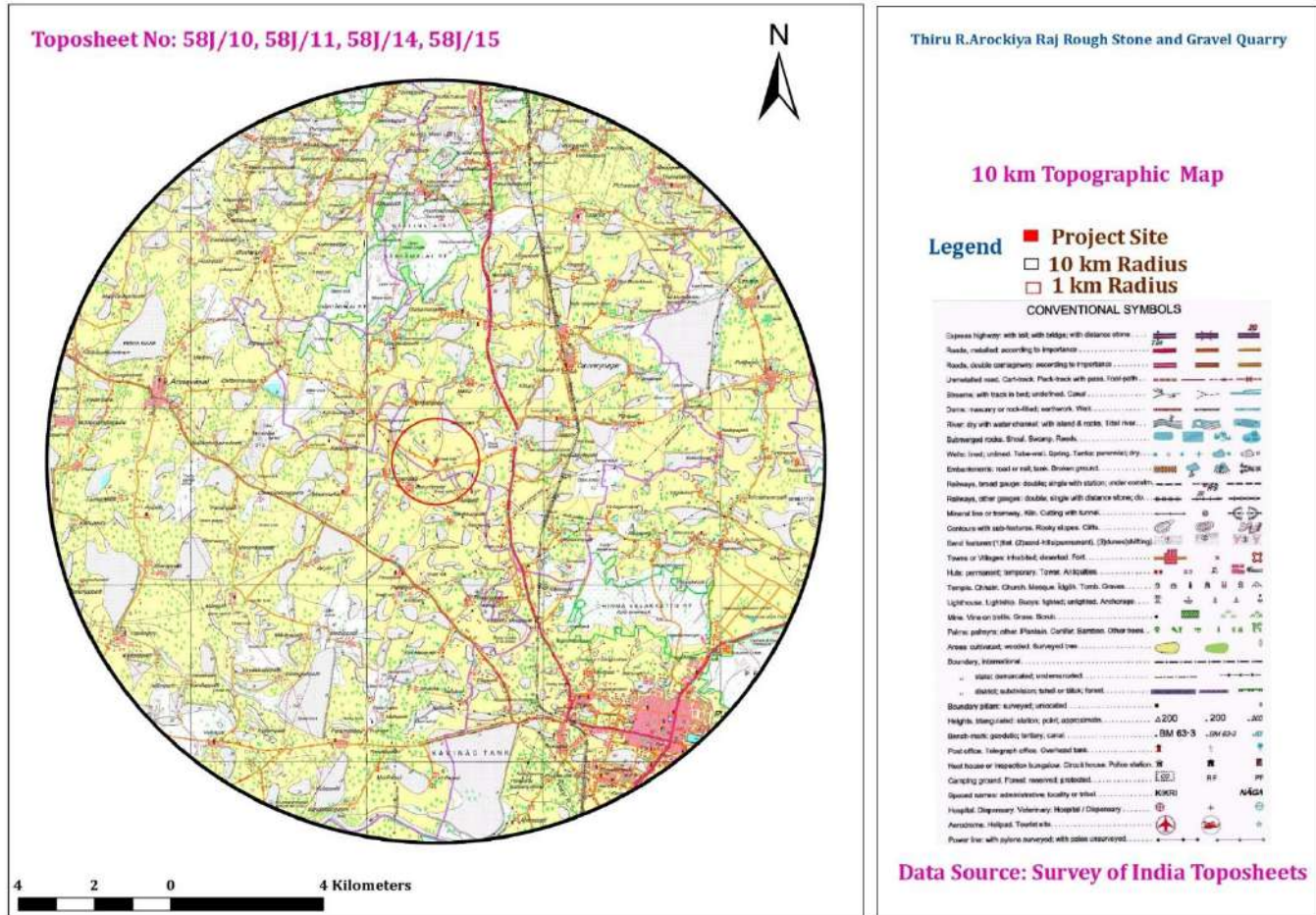


Figure 2-4: Topo Map of Project Site

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

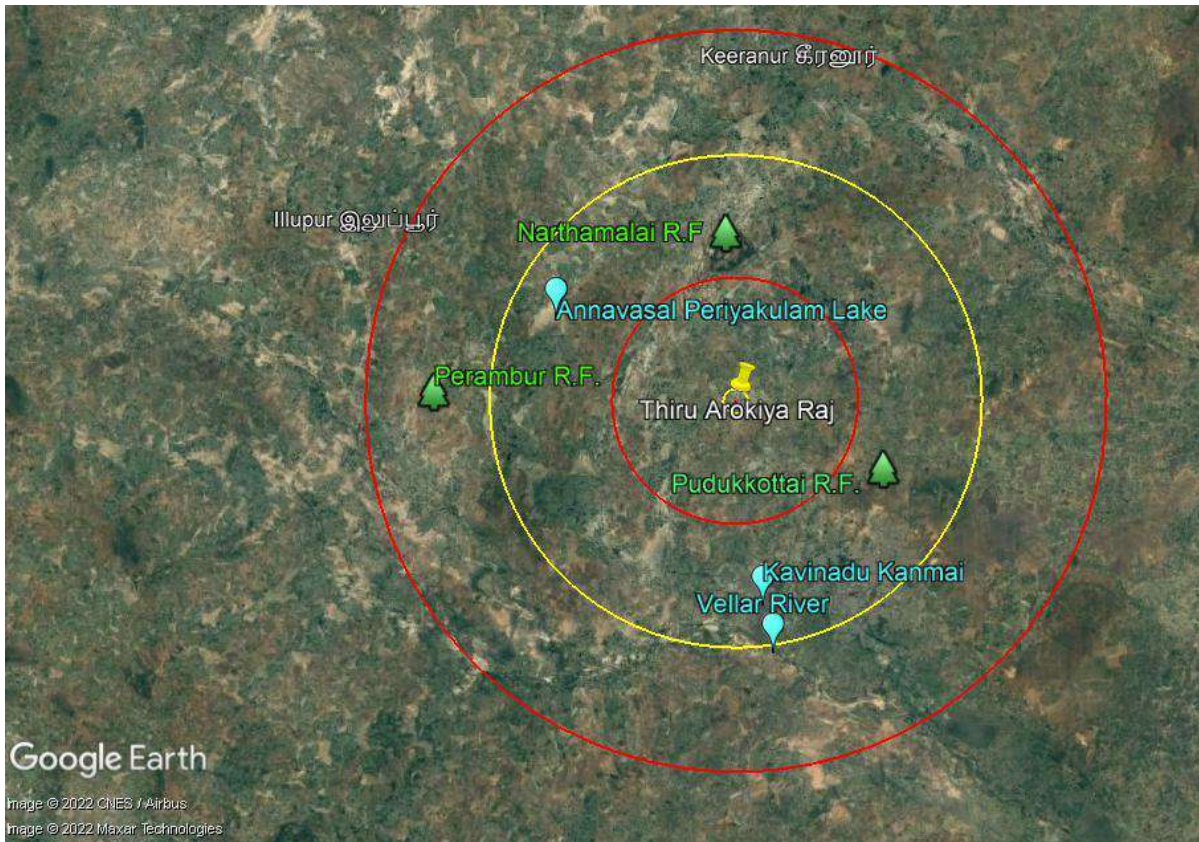


Figure 2-5: Environmental Sensitivity within 15km radius

2.1.3 Site Photographs

The site photographs of the project site are as follows.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	



Figure 2-6: Site Photographs

2.1.4 Land Use Breakup of the Mine Lease Area

The Mine Lease area is undulated terrain. The land use pattern of the mine lease area as follows.

Table 2-4: Land use pattern

S. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Quarrying Pit	Nil	1.11.0
2.	Infrastructure	Nil	0.02.0
3.	Roads	Nil	0.02.0
4.	Green Belt	Nil	0.25.0
5.	Unutilized Area	1.68.0	0.28.0
	Total	1.68.0	1.68.0

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

2.1.5 Human Settlement

There are no habitations within the radius of 500m. The nearby habitations are as follows

Table 2-5: Habitation

S.No	Name of the Village	Approximate distance	Direction from lease applied area	Approximate Habitations
1.	Melur	1.6Km	North–East	218
2.	Sittannavasal	3.9Km	North - West	292
3.	Maruthanthalai	0.8 Km	South - West	274
4.	Thiruvengavasal	2.6 Km	South - East	165

2.4 Leasehold Area

The New Rough Stone and Gravel Quarry mine of 1.68.0 Ha is an own Patta land of Thiru.R Arockiya Raj . The lease area falls in S.F No: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District. There is no reserve forest or protected forest land within the lease area. There is neither human settlement within 500m radius from the lease area.

2.5 Geology

Geologically the entire study area can be divided into hard rock and sedimentary rock regions. The hard rocks are found on the western side and sedimentary formation towards the eastern direction. About 45 per cent of the study area is under hard massive formation of Archean age and the rest 55 per cent comprises of the sedimentary formation ranging from Pre-Cambrian to Quaternary period.

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

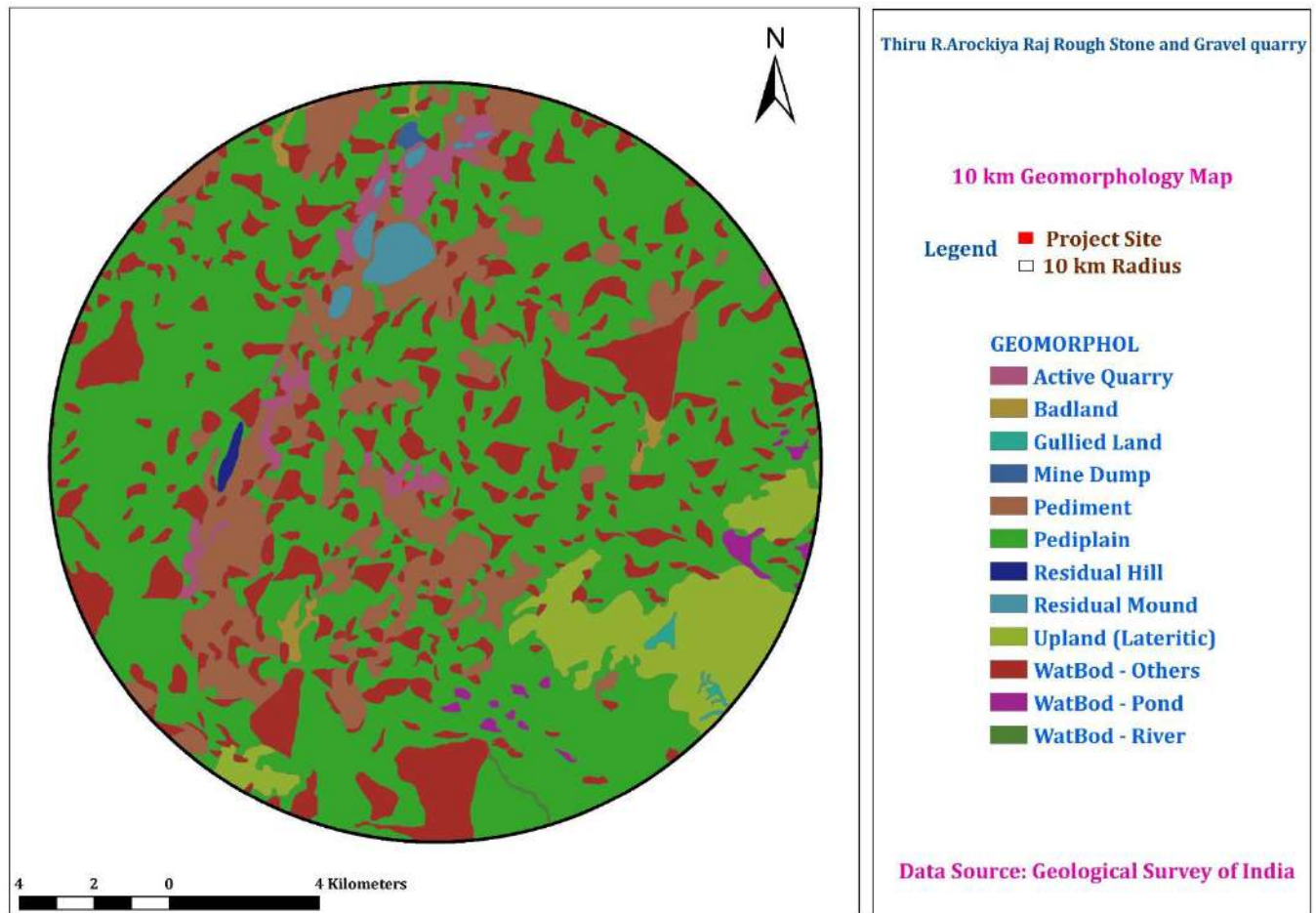


Figure 2-7: Geomorphology

The area applied for quarry lease is undulated terrain sloping towards Northwestern side covered with Rough stone which does not sustain any type of vegetation.

Pudukkottai District 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, Charnockite basic granulites and calc-gneisses. The younger formations are Quartz veins and pegmatite.

Water table is found at a depth of 70m to 75m below ground level. Average annual rainfall is about 800mm to 900mm. The Charnockite is part of peninsular Gneisses, a high-grade metamorphic rock. On regional scale the Charnockite formations trends along NE-SW with a dip of 80° towards NW.

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

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

AGE FORMATION
Recent to Sub recent - Soil, Alluvium
Archean - Granites, basic granulites, Peninsular Gneiss, Calc Gneiss and Charnockites

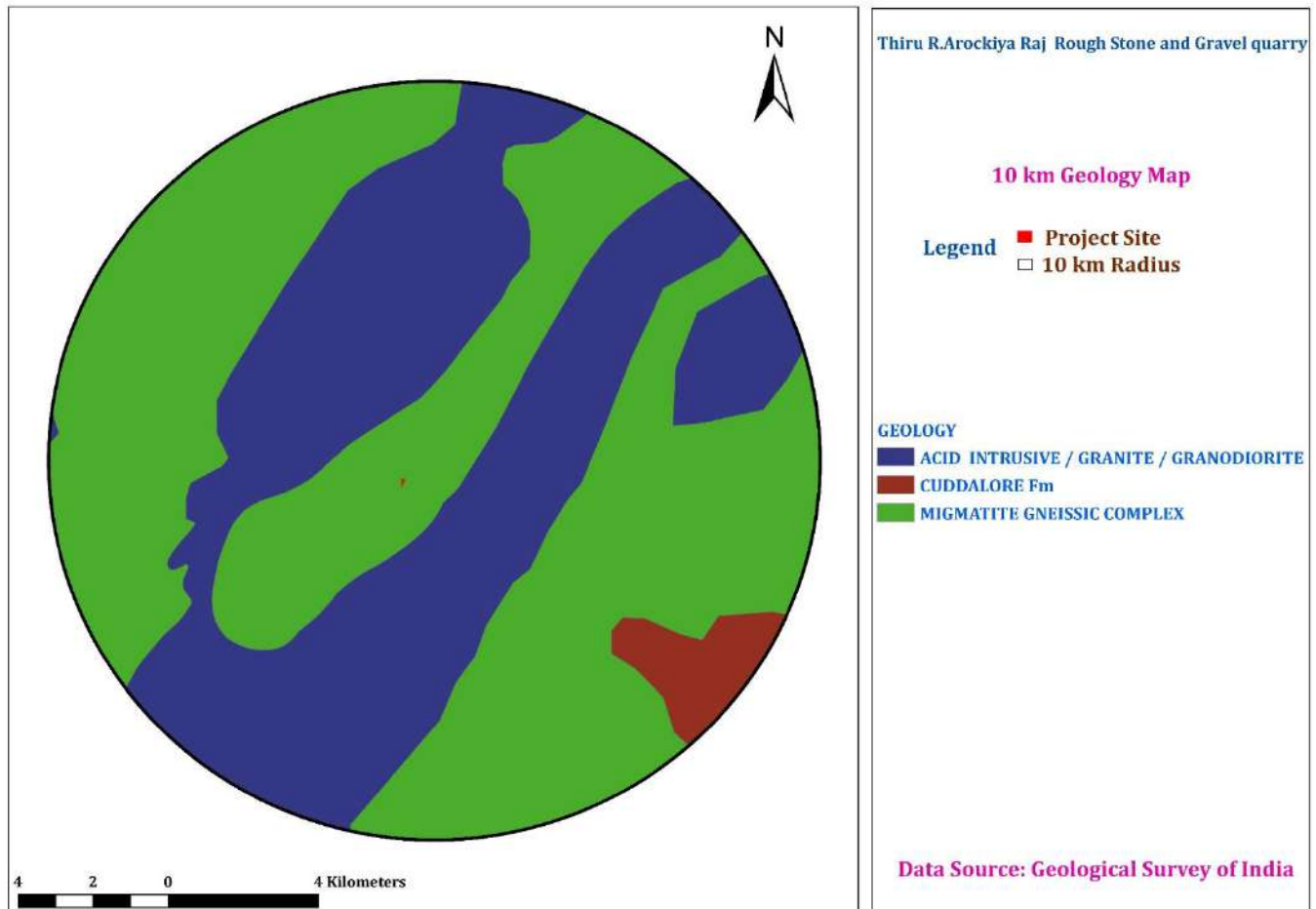


Figure 2-8 Lithology

2.6 Quality of Reserves:

The mining lease area is of 1.68.0 Ha, with production capacity of **103570 m³** of Rough Stone, Due to significant role in the domestic as well as infrastructural market, making the mining of Stone along with associated minor minerals is economically viable.

Table 2-6: Details of Mining

S. No	Particulars	Details
1	Method of Mining	Open Cast mechanized

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

2	Geological Reserves	Rough stone – 1087125 m ³ & Gravel – 33450 m ³
3	Mineable Reserves	Rough stone – 194280 m ³ & Gravel – 24312 m ³
4	Proposed Production schedule for 5 years	Rough stone – 103570 m ³ & Gravel – 24312 m ³
5	Elevation Range of the Mine Site	114m MSL

2.6.1 Estimation of Reserves

The practical method of the systematic geological mapping and delineation of Rough stone (Charnockite) within the field was done and careful evaluation of body luster, physical properties, engineering properties, commercial aspects, etc. The Topographical, Geological plan and sections demarcated the commercial marketable Rough stone (Charnockite) deposit has been prepared in 1:1000 scale and the estimated balance Geological Reserves as 1087125 Cum of Rough Stone.

2.6.2 Geological Reserves

The geological reserves have been calculated based on the cross-section method.

The Geological Resources is estimated as 1087125 m³ of Rough stone & 24312 m³ Gravel up to a depth of 67.0m (2.0m Gravel & 65m Rough stone).

Table 2-7: Geological Reserves

Geological Resources						
Section	Length in (m)	Width in (m)	Depth in (m)	Volume m ³	Geological Resources of Gravel in m ³	Geological Resources of Rough stone in m ³
XY-AB	113	105	2	23730	23730	
	113	105	65	771225		771225
XY-CD	108	45	2	9720	9720	
	108	45	65	315900		315900
Total					33450	1087125

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

2.6.3 Mineable Reserves

The available Mineable Reserves are calculated by deducting the safety distance of 10m for the Government Poramboke Land in S.F.No.209/2 (Western side) and 7.5m for the Adjoining Patta land from the lease area and bench loss as height 5.0m and width 5.0m.

The available Mineable Reserves is computed as 1,94,280 m³ of Rough stone and 24,312 m³ of Gravel formation at the rate of 100% recovery upto a depth of 42.0m (Max) (2.0m Gravel & 40m Rough stone).

Table 2-8: Mineable Reserves

Mineable Reserves							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Mineable Reserves of Rough stone in m ³
XY-AB	114-112	106	88	2	18656	18656	
	112-107	104	84	5	43680		43680
	107-102	99	74	5	36630		36630
	102-97	94	64	5	30080		30080
	97-92	89	54	5	24030		24030
	92-87	79	44	5	17380		17380
	87-82	69	34	5	11730		11730
	82-77	59	24	5	7080		7080
	77-72	49	14	5	3430		3430
Total						18656	174040
XY-CD	114-112	101	28	2	5656	5656	
	112-107	99	24	5	11880		11880
	107-102	94	14	5	6580		6580
	102-97	89	4	5	1780		1780
Total						5656	20240
Grand Total						24312	194280

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

2.6.4 Year wise Production Plan

The Year wise Recoverable Reserves are calculated by deducting the safety distance of 10m for the Government Poramboke Land in S.F.No.209/2 (Western side) and 7.5m for the Adjoining Patta land from the lease applied area and bench loss as height 5.0m and width 5.0m.

Table 2-9: Year wise Production Plan

Yearwise Development & Production Reserves								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Recoverable Reserves of Rough stone in m ³
I	XY- AB	114-112	50	88	2	8800	8800	
		112-107	48	84	5	20160		20160
TOTAL							8800	20160
II	XY- AB	114-112	48	88	2	8448	8448	
		112-107	48	84	5	20160		20160
TOTAL							8448	20160
III	XY- AB	114-112	8	88	2	1408	1408	
		112-107	8	84	5	3360		3360
	XY- CD	114-112	101	28	2	5656	5656	
		112-107	99	24	5	11880		11880
		107-102	94	14	5	6580		6580
TOTAL							7064	21820
IV	XY- AB	107-102	55	74	5	20350		20350
TOTAL								20350
V	XY- AB	107-102	44	74	5	16280		16280
		102-97	15	64	5	4800		4800
TOTAL								21080
GRAND TOTAL							24312	103570

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Chapter 2 Project Description
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

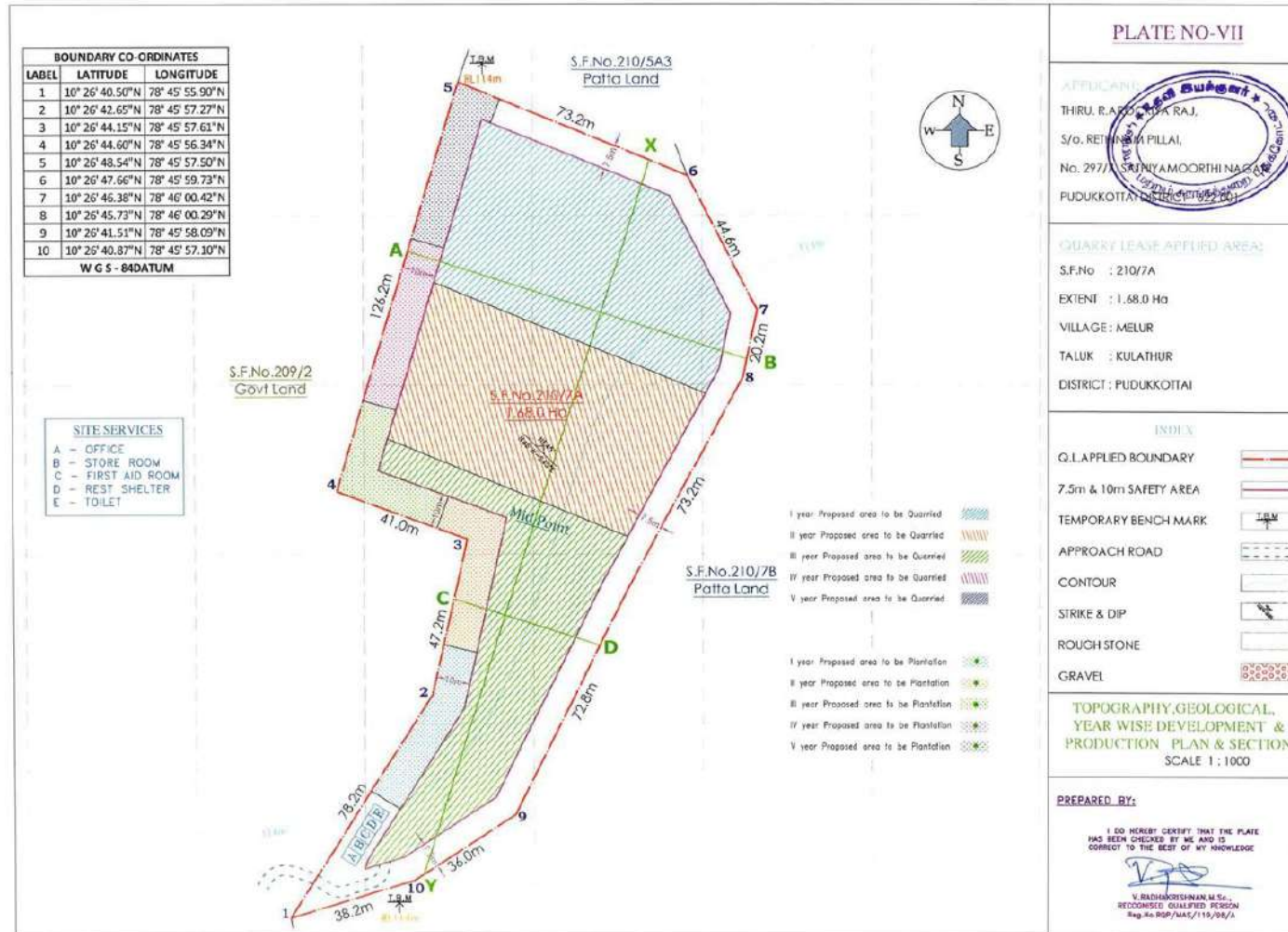


Figure 2-9 Year wise Production Plan

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

2.7 Type of Mining

The proposed project is an open cast semi mechanized mining with one 5.0 m bench for Topsoil & Gravel followed by 5.0m vertical bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of regulations 106(2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence, it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106(2) (b) of MMR-1961, under Mines Act- 1952.

2.7.1 Method of Working:

The rough stone is proposed to quarry at 5m bench height & width with conventional Open cast mechanized method. The quarry operation involves Shallow jack hammer drilling, Slurry Blasting, Loading & transportation of Rough Stone to the nearby crusher units/road formation works. 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 rocks by jackhammer drilling and blasting by manually braking and loading the Rough Stone from pit head to the needy crushing units/civil works for the needy sectors.

2.7.2 Overburden

The over burden in the form of Gravel is 24312 m³ of used for filling and leveling of low-lying areas of road projects and other infrastructure development work in and around the district

2.7.3 Machineries to be used

Type of machineries proposed for quarrying operation for the entire project is listed below.

Table 2-10: List of Machineries used

Type	Dia of hole	Size / Capacity	Make	Motive power
Jack Hammer	32 mm	1.2m to 6m	Atlas copco	Compressed Air
Tipper	-	10/20 Tons	Tata Tipper	Diesel Drive
Hydraulic Excavator	-	0.90m ³	Tata Hitachi - 210	Diesel Drive
Compressor	-	400 psi	Atlas capco	Diesel Drive

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

2.7.4 Blasting:

2.7.4.1 Blasting Pattern:

The quarrying operation will be carried out by Mechanized Opencast method in conjunction with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.

2.7.4.2 Drilling & Blasting:

Drilling and Blasting Parameters are as follows

Table 2-11: Drilling and Blasting Parameters

Parameters	Details
Depth of each hole	1.0m to 1.5m
Diameter of hole	30-32 mm
Spacing between holes	1.2m
Pattern of hole	Zigzag
Charge/Hole	D.Cord with water or 70 gms of gun powder or Gelatine.
Inclination of holes	80° from horizontal
Use of delay detonators	25 milli seconds delays
Detonating fuse	“Detonating” Cord

2.7.4.3 Types of Explosives to be used:

Small diameter of 30-32mm Slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling or primary blasting is proposed.

2.7.4.4 Measures to minimize ground vibration due to blasting:

The quarry is situated more than 0.33km from the nearby villages. Controlled blasting measures will be adopted for minimizing the ground vibration and fly of rocks. Shallow depths jackhammer drilling & 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 of rock.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Table 2-12: Blasting Details

Parameters	Details
Diameter of holes	30-32 mm
Spacing	1.2m
Powder factor	6 to 7 tons/kg of explosives
Pattern of hole	Zig Zag
Charge/hole	140 gms of 25 mm dia cartridge
Blasted at day time	1 to 2.30 PM (or whenever required)

2.7.4.5 Storage & Safety measures taken during blasting:

The project proponent “Thiru. R Arockiya Raj” will engage an authorized explosive agency to carry out the small amount of blasting and it will be supervised by Permit Mines Manager. The copy of the explosive certificate is attached as *Annexure*.

2.8 Man Power Requirements

The manpower requirement to meet out the production Schedule and the machinery strength envisaged in the mining plan and to comply with the statutory provisions of the Mines Safety Regulations is as follows.

Table 2-13: Man Power Requirements

1.	Skilled	Operators- Excavator & Jackhammer	4 Nos
2.	Semi – skilled	Drivers	4 Nos
3.	Unskilled	Musdoor/Labours, Cleaners & Watch man	15 Nos
4.	Management & Supervisory staff	Second Class Mines Manager (with valid statutory qualification)	1 No
		Mines Foreman (with valid statutory qualification)	1 No
		Mines Mate (with valid statutory qualification)	1 No
		Blaster	1 No
Total			27 Nos

No child less than 18 years will be entertained during quarrying operations.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

2.8.1 Water Requirement

Total water requirement for the mining project is 2.5 KLD. Domestic water will be sourced from nearby Melur Village and other water will be source from nearby road tankers supply.

Table 2-14: Water Requirement

Purpose	Quantity	Sources
Drinking Water	1.5KLD	Water will be supplied through tankers from Melur village which is about 0.33 Km NE of the project area.
Green belt	0.5KLD	Other domestic activities through road tankers supply
Dust suppression	0.5KLD	From road tankers supply
Total	2.5 KLD	

2.9 Project Implementation Schedule

The implementation schedule of the proposed Mine Lease of Thiru.R Arockiya Raj (1.68.0 Ha) is as follows.

Table 2-15: Mining Schedule

MINING SCHEDULE					
Activity	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27
Site Clearance					
Excavation - Top Soil Removal/Overburden					
I Year Production – 33684 Cum – Gravel & Rough Stone – 80950 Cum					
II Year Production – 29484 Cum – Gravel & Rough Stone – 81410 Cum					
III Year Production – Rough Stone – 81400 Cum					
IV Year Production - 81750 Cum - Rough Stone					
V Year Production - 81420 Cum - Rough Stone					

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

2.10 Solid Waste Management

Table 2-15: Solid Waste Management

S.No	Type	Quantity	Disposal Method
1	Organic	4.86 kg/day	Municipal bin including food waste
2	Inorganic	7.29 kg/day	TNPCB authorized recyclers

As per CPCB guidelines: MSW per capita/day =0.45 kg/day

2.11 Mine Drainage

The ground Water Level is noticed at the depth of 70m to 75m BGL by monitoring nearby bore hole, during the climatic conditions, the fluctuations of water level is 70m in Rainy seasons and 75m in Summer seasons of this quarry area. It shall be ensured that quarrying shall not be carried out below ground water table under any circumstances. If ground water table occurs/intervenes within the permitted depth, then also the quarrying shall be stopped.

2.12 Power Requirement

This Rough Stone and Gravel Quarry project does not require huge water and electricity for the project.

16 Litre diesel per hour for excavator for mining and loading for Rough Stone needed.

10 Litre diesel per hour for excavator for mining and loading for Gravel needed

2.13 Project Cost

a. Fixed Asset Cost:

Sl. No	DETAILS	Cost of lakhs
i)	Land cost	Rs.13,44,000/-
ii)	Labours Shed	Rs. 1,50,000/-
iii)	Refilling/Fencing cost	Rs. 2,50,000/-
iv)	Sanitary facility	Rs. 1,50,000/-
TOTAL		Rs. 18,94,000/-

b. Operation Cost:

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Machinery cost: **Rs. 25,00,000/-**

c. EMP Cost

Sl. No.	Details	Cost in (Rs.)
1	Air Quality sampling	Rs.2,00,000/-
2	Water quality sampling	Rs.1,00,000/-
3	Noise monitoring	Rs.20,000/-
4	Ground vibration test	Rs.50,000/-
5	Drinking water facility for the labours	Rs.2,70,000/-
6	Sanitary arrangements	Rs.2,10,000/-
7	Safety kits	Rs.1,20,000/-
8	Water sprinkling	Rs.5,40,000/-
9	Afforestation cost	Rs.70,000/-
	Total	Rs.18,08,000/-

A. Fixed Asset Cost	=	Rs. 18,94,000/-
B. Machinery Cost	=	Rs. 25,00,000/-
C. Total EMP Cost	=	Rs. 18,08,000/-

Grand Total project Cost (A+B) = Rs. 62,02,000/-

2.14 Greenbelt

1. The development of greenbelt in the peripheral buffer zone of the mine area.
2. Green belt has been recommended as one of the major components of Environmental Management plan, which will improve ecology, environment and quality of the surrounding area.
3. Local trees like, Neem, Pungam, Naval etc will be planted along the lease boundary and avenues as well as over non-active dumps at a rate of 450 trees per annum with interval 5m.
4. The rate of survival expected to be 80% in this area

Table. 2-17 Plantation/ Afforestation Program

Year	Name of species	Place of planted	No of species	Spacing	Survival
2023	Neem/Pungam	North	300	5m	80%
2024	Naval	South	300	5m	80%
2025	Poovarasu/Pungam	East	300	5m	80%
2026	Naval/Pungam	South	300	5m	80%
2027	Neem	West	300	5m	80%
Total			1500		

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

3 Description of the Environment

3.1 General:

The method of mining for extracting rough stone quarry is required to be selected in such a manner to ensure sustainable development. Mining activities invariably affect the existing environmental status of the site. It has both adverse and beneficial effects. In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans and sustainable resource extraction.

To understand the existing environmental scenario, Baseline data helps in identification, prediction and evaluation of impacts in Environmental Impact assessment. Through field study, baseline data are collected considering various factors of the project. This includes-

- Physical- the area, the soil properties, the geological characteristics, the topography, etc
- Chemical- water, air, noise and soil pollution levels, etc.
- Biological- the biodiversity of the area, types of flora and fauna, species richness, species distribution, types of ecosystems, presence or absence of endangered species and/or sensitive ecosystems etc.
- Socioeconomic- demography, social structure, economic conditions, developmental capabilities, displacement of locals, etc.

3.1.1 Study Area:

The study area for the mining projects is as follows:

- Mine lease area as the “core zone”
- A study area of 10 km radius from the project boundary is designated as buffer Zone and for the study of Socio-economic status, 10 km radius from the boundary limits of the mine lease area has been selected.

We have obtained Terms of Reference from SEIAA vide Lr.No. SEIAA–TN/F.No.9484/ToR- 1312/2022 dated 07.12.2022. The baseline monitoring is carried out in January – March 2023 and the analysis is briefed in the EIA report. The proponent has engaged M/s. Ecotech labs Pvt. Ltd for carrying out the existing baseline study.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

3.1.2 Instruments Used

The following instruments were used at the site for baseline data collection.

1. Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460, APM411.
2. Fine Particulate Matter (FPM) Sampler, APM 550
4. Sound Level Meter Model SL–4010
5. 2000 series watchdog automatic weathering monitoring station

3.1.3 Baseline Data Collection Period:

The baseline data is collected in accordance with the CPCB Guidelines. The Baseline study is carried out from January to March 2023.

3.1.4 Frequency of Monitoring

Table 3-1: Frequency of Sampling and Analysis

Attributes	Sampling	Frequency
Air environment – Meteorological (wind speed, wind direction, rainfall, humidity, temperature)	Project site	1 hourly continuous
Air environment – Pollutants PM 10 PM 2.5 SO ₂ NO _x	5 locations	24 hourly twice a week 4 hourly. Twice a week, One non-monsoon season 8 hourly, twice a week 24 hourly, twice a week
Noise	5 locations	24 hourly Once in 5 locations
Water (Ground water) pH, Temperature, Turbidity, Magnesium Hardness, Total Alkalinity, Chloride, Sulphate, Fluoride, Nitrate, Sodium, Potassium, Salinity, Total nitrogen, Total Coliforms, Fecal Coliforms	5 locations	Once in 5 locations
Water (surface water) pH, Temperature, Turbidity, Magnesium Hardness, Total Alkalinity, Chloride, Sulphate, Fluoride, Nitrate, Sodium,	Sample from nearby lakes/river	One-time Sampling

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

Potassium, Salinity, Total nitrogen, Total Coliforms, Fecal Coliforms		
Soil (Organic matter, Texture, pH, Electrical Conductivity, Permeability, Water holding capacity, Porosity)	5 locations	Once in 5 locations
Ecology and biodiversity Study	Study area covering 10 km radius	One-time Sampling
Socio- Economic study (Population, Literacy Level, employment, Infrastructure like school, hospitals & commercial establishments)	Villages around 10 km radius	One-time Sampling

3.1.5 Secondary data Collection

Apart from the primary data, Secondary data is also used for the collection; collation; synthesis and interpretation.

- Flora & Faunal Study
- Land use study
- Demography and socio-economic analysis
- Meteorological data, from Indian Meteorological Department (IMD)

3.1.6 Study area details

Table 3-2 Study area details

S. No	Description	Details	Source
1.	Project Location	210/7A Ha, Melur Village, Kulathur Taluk, Pudukkottai District, TamilNadu State	Field Study
2.	Latitude & Longitude	Latitude: 10°26'40.50"N to 10°26'48.54"N Longitude: 78°45'55.90"E to 78°46'00.42"E	Topo Sheet
3.	Topo Sheet No.	58 J/15	Survey of India Toposheet
4.	Mine Lease Area	1.68.0 Ha	--
Demography in the study area (as per Census 2011)			

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

5.	Total Population	5931	Census Survey of India																								
6.	Total Number of Households	1602																									
7.	Maximum Temperature (°C)	33.7	IMD																								
8.	Minimum Temperature (°C)	24																									
9.	Ecological Sensitive Areas - Wetlands, watercourses or other waterbodies, coastal zone, biospheres, mountains, forests	<ul style="list-style-type: none"> ❖ Vellanur local Pond – 1.64 Km - E ❖ Thiruvengainathar Lake – 3.4 Km – S ❖ Kili Kulam – 2.61 Km – NE ❖ Temple Pond – 2 Km – W ❖ Perunjunai Lake – 2.4 Km – SW ❖ Melakulam – 4 Km – SW ❖ Kavinadu Kanmai – 7.27 Km – S ❖ Annavasal Periyakulam Lake – 8.23 Km – NW ❖ Vellar river – 10.35 Km – S 	Google Earth/Field Study																								
10.	Densely Populated area	Pudukkottai (7.82 km, SE)																									
11.	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">S. No.</th> <th style="width: 60%;">Places</th> <th style="width: 35%;">Dist. From Project Site</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Schools & Colleges</td> </tr> <tr> <td>1</td> <td>Government Higher Secondary School, Maruthanthalai</td> <td>1.99 Km - SW</td> </tr> <tr> <td>2</td> <td>Government Higher Secondary School, Sathiyamangalam</td> <td>3.34 Km - N</td> </tr> <tr> <td>3</td> <td>Sudharsan Engineering College, Sathiyamangalam</td> <td>2.85 Km - N</td> </tr> <tr> <td colspan="3" style="text-align: center;">Hospitals</td> </tr> <tr> <td>1</td> <td>Government Hospital, Vellanur</td> <td>2.60 Km - NE</td> </tr> <tr> <td>2</td> <td>ESI Hospital, Cauvery Nagar</td> <td>3.26 Km - NE</td> </tr> </tbody> </table>	S. No.	Places	Dist. From Project Site	Schools & Colleges			1	Government Higher Secondary School, Maruthanthalai	1.99 Km - SW	2	Government Higher Secondary School, Sathiyamangalam	3.34 Km - N	3	Sudharsan Engineering College, Sathiyamangalam	2.85 Km - N	Hospitals			1	Government Hospital, Vellanur	2.60 Km - NE	2	ESI Hospital, Cauvery Nagar	3.26 Km - NE	Google Earth/Field Study
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3.1.7 Site Connectivity:

The site is connected to Sithannavasal Road – adjacent to site in South side.

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Figure 3-1: Site Connectivity

3.2 Land use Analysis

3.2.1 Land Use Classification

Land Use / Land Cover - Land Use refers to man's activity and the various uses, which are carried on land. Land Cover refers to natural vegetation, water bodies, rock/soil, artificial cover and others, resulting due to land transformation. The present Land Use/Land Classification map is developed with following objectives. The main objective of the study is to classify the different land use within 10 km from the project boundary.

3.2.2 Methodology

Information of land use and land cover is important for many planning and management activities concerning the surface of the earth (Agarwal and Garg, 2000). Land use refers to man's activities on land, which are directly related to land (Anderson et al., 1976). The land use and the land cover determine the infiltration capacity. Barren surfaces are poor retainers of water as compared to grasslands and forests,

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which not only hold water for longer periods on the surface, but at the same time allow it to percolate down.

The terms ‘land use’ and ‘land cover’ (LULC) are often used to describe maps that provide information about the types of features found on the earth’s surface (land cover) and the human activity that is associated with them (land use). Satellite remote sensing is being used for determining different types of land use classes as it provides a means of assessing a large area with limited time and resources. However, satellite images do not record land cover details directly and they are measured based on the solar energy reflected from each area on the land. The amount of multi spectral energy in multi wavelengths depends on the type of material at the earth’s surface and the objective is to associate particular land cover with each of these reflected energies, which is achieved using either visual or digital interpretation. In the present study the task is to study in detail the land use and land cover in and around the project site. The study envisages different LULC around the proposed project area and the procedure adopted is as below.

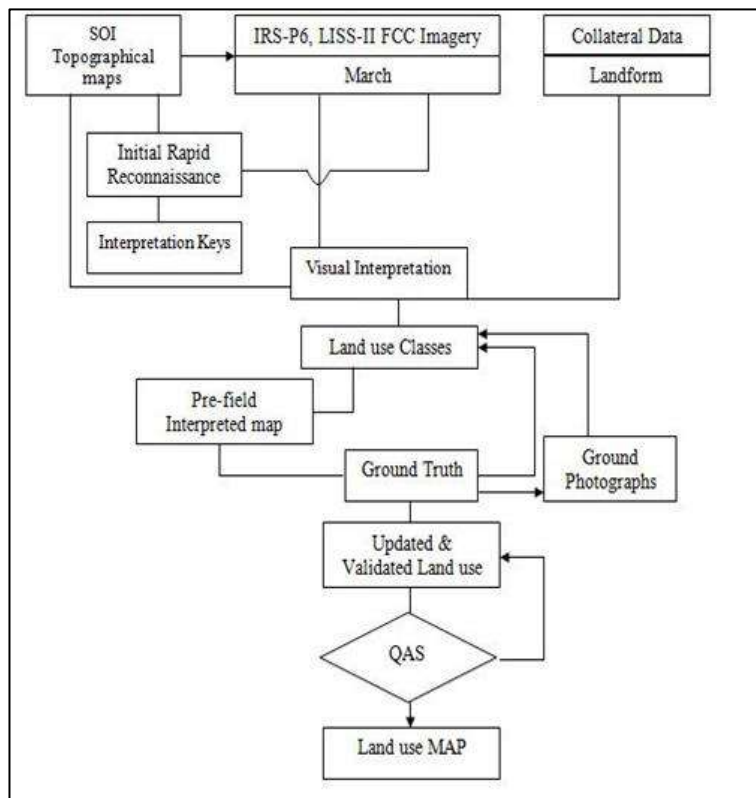


Figure 3-2 Flow Chart showing Methodology of Land use mapping.

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3.2.3 Satellite Data

Sentinal 2 multispectral satellite data of 2020 was utilized for the present study. Details of satellite data is given below. The rectification of imagery was carried out on to bring the digital data on the earth coordinate system by means of ground control point (GCP) assignments/SOI topo sheets.

3.2.4 Scale of mapping

Considering the user defined scale of mapping, 1:50000 Sentinal 2 was used for Land use / Land cover mapping of 10 km radius for proposed site. The description of the land use categories for 10 km radius and the statistics are given for 10 km radius.

3.2.5 Interpretation Technique

Standard on screen visual interpretation procedure was followed. The various Land use / Land cover classes interpreted along with the SOI topographical maps during the initial rapid reconnaissance of the study area. The physiognomic expressions conceived by image elements of color, tone, texture, size, shape, pattern, shadow, location and associated features are used to interpret the FCC imagery. Image interpretation keys were developed for each of the LU/LC classes in terms of image elements.

June 2016 FCC imagery (Digital data) of the study area was interpreted for the relevant land use classes. On screen visual interpretation coupled with supervised image classification techniques are used to prepare the land use classification.

1. Digitization of the study area (10 km radius from the proposed site) from the topo maps
2. In the present study the Sentinal satellite image and SOI topo sheets of 58-J/14 and 58-N/02 have been procured and interpreted using the ERDAS imaging and ARC-GIS software adopting the necessary interpretation techniques.
3. Satellite data interpretation and vectorization of the resulting units
4. Adopting the available guidelines from manual of LULC mapping using Satellite imagery (NRSA, 1989)
5. Field checking and ground truth validation
6. Composition of final LULC map

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The LULC Classification has been done at three levels where level -I being the broad classification about the land covers that is Built-up land, agriculture land, waste land, wet lands, and water bodies. These are followed by level –II where built-up land is divided into towns/cities as well villages. The Agriculture land is divided into different classes such as cropland, Fallow, Plantation, while wastelands are broadly divided into, Land with scrub and without Scrub and Mining and Industrial wasteland. The wetlands are classified into inland wetlands, coastal wetlands and islands. The water bodies are classified further into River/stream, Canal, Tanks and bay. In the present study level II classification has been undertaken. The SOI Topo map is presented in Annexure and Satellite imagery of 10 km radius from the project site is presented Annexure

3.2.6 Field Verification

Field verification involved collection, verification and record of the different surface features that create specific spectral signatures / image expressions on FCC. In the study area, doubtful areas identified in course of interpretation of imagery is systematically listed and transferred on to the corresponding SOI topographical maps for ground verification. In addition to these, traverse routes were planned with reference to SOI topographical maps to verify interpreted LU/LC classes in such a manner that all the different classes are covered by at least 5 sampling areas, evenly distributed in the area. Ground truth details involving LU/LC classes and other ancillary information about crop growth stage, exposed soils, landform, nature and type of land degradation are recorded and the different land use classes are taken the Land use map is presented in Annexure

3.2.7 Description of the Land Use / land cover classes

3.2.7.1 Built-up land

It is defined as an area of human settlements composed of houses, commercial complex, transport, communication lines, utilities, services, places of worships, recreational areas, industries etc. Depending upon the nature and type of utilities and size of habitations, residential areas can be aggregated into villages, towns and cities. All the man-made construction covering land belongs to this category. The built- up in 10 km radius from the proposed project site is as follows.

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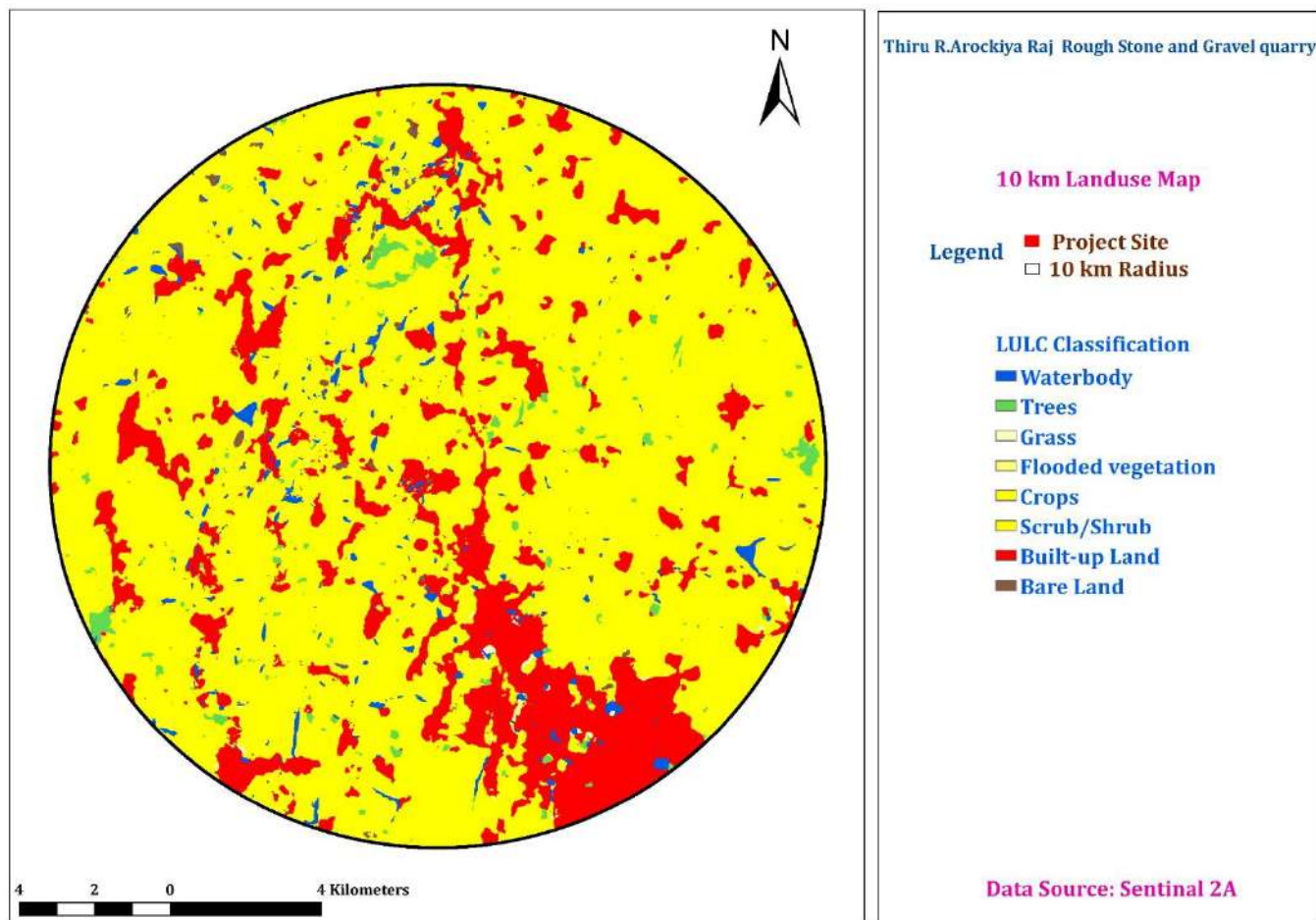


Figure 3-3 Land use classes around 10 km radius from the project site

3.2.7.2 Different Land use classes around 10 km radius from the project site

Table 3-3 Land use pattern in Pudukkottai District

Sl.No	Categories	Area in Sq.Km
1	Water body	1.75
2	Trees	1.29
3	Grass	0.15
4	Flooded Vegetation	0.06
5	Crops	49.57
6	Scrub/Shrub	29.42
7	Built-up area	17.34
8	Barren Land	0.37

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3.2.8 Agricultural land

Agriculture is the primary occupation of Pudukkottai district. Pudukkottai district receives average annual rainfall of 922.8 mm. Paddy and Groundnut is the important crops of Pudukkottai district. 9000 Ha of the area is covered under paddy and Groundnut is being cultivated in 36000 Ha. Major horticulture crops cultivated in this district are fruits crops like mango, guava, jack, sapota and banana, vegetables like brinjal, bhendi, pumpkin and tapioca, spices like chillies, tamarind and turmeric and plantation crops like cashew and cocoa and flowers like tuberose and marigold and rose.

3.2.9 Water bodies

3.3.1 Contour & Drainage

The project site is 114.0m AMSL. The drainage pattern within in the 10 km of the project site is dendritic.

3.3.2 Geomorphology

The geomorphic evolution of the area is mainly controlled by denudational, structural and fluvial processes. The evolution of various landforms has been governed mainly by the varying resistance of geological formations to these processes. Various landforms are occurring in the area, such as erosional plains, residual hills, pediments, buried pediments and deltaic plain. The shallow pediments possess poor to moderate yields with thin soil cover. The buried pediments and deltaic plain possess good ground water potential.

Soils

Black soils are formed in the western part of the district. Red ferruginous lateritic soils are formed on the high grounds, south of Annavasal, west of Illupur, north of Malaipatti around Kulakurichchi near Gandarvakottai, east of Arantangi around Arimalam and Alangudi. Alluvial soils consisting of blackish and brownish sandy and silty soils are observed along the course of the Vellar, Agniyar and Ambuliyar rivers, whereas the beach sands are noticed along the coast of the district.

The geomorphologic study is done within 10 km from the project site. The major formations are

- Denudational Origin- Pediment Pediplain Complex: The groundwater condition in pediments generally varies depending upon the type of underlying folded structures, fracture systems and degree of weathering. Groundwater prospecting in pediments is considered as normal to poor.

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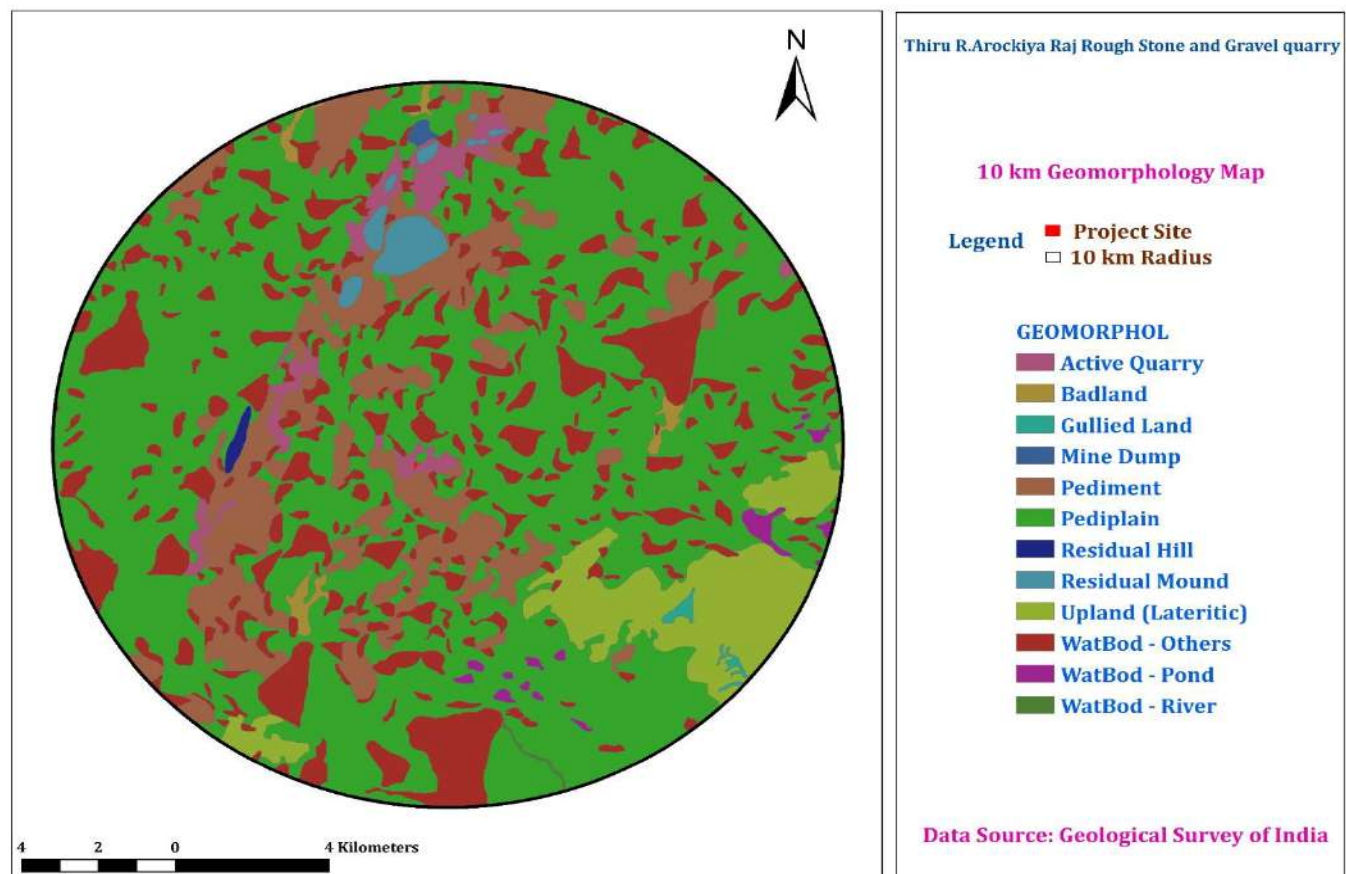


Figure 3-4 Geomorphology within 10km from the project site

3.3.3 Geology:

The geological formation of Pudukkottai District comprises of the hard rocks formed in the Archean age to the sedimentary deposits of the Quaternary period. Geologically the entire study area can be divided into hard rock and sedimentary rock regions. The hard rocks are found on the western side and sedimentary formation towards the eastern direction of the study area. About 45 per cent comprises of the sedimentary formation ranging from Pre-Cambrian to Quaternary period. The various types of hard rocks found here are Charnockites, Hornblende Gneiss, Biotite Gneiss, Granite and Quartzite's. Various types of Gneiss rocks are found in the western part of Pudukkottai District. Charnockites and granites rocks are mostly found in the central part including the blocks of Kunnandavarkoil, Thirumayam and the southern parts of Pudukkottai Block. The various types of Gneiss rocks are found in the western part of the study area, consisting of the blocks of Viarlimalai, Annavasal and Ponamaravathy. Quartzite deposits are found in small quantity in

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some parts of Annavasal and Thirumayam Blocks. In the Blocks of Kulathur, Thirumayam and parts of Pudukkottai crystalline rocks are found.

The sedimentary deposits found in this region consist of shaly sandstone, sand, clay and gravels. The sedimentary deposits formed during the Tertiary period consist of laterite, arenaceous and argillaceous sandstone clay. These deposits are found in the Blocks of Arantangi, Gandarvakottai, Alangudi and Thiruvarankulam. Cretaceous deposits consisting of clay, limestone, sand stone and clayey sand stone are found in some parts of Gandarvakottai, Thirumayam and Pudukkottai. Unconsolidated coastal alluvial deposits consisting of sand gravel and silt are found along the river bed. Silt and clay deposits of Quaternary period are found in the blocks of Avudaiyarkoil and Manalmelkudi. Sand deposits with beach ridges and dunes are identified near the coastal boundary of Pudukkottai District.

3.3.4 Hydrogeology

Geologically in Pudukkottai district is covered by hard rocks and sedimentary regions.

Hard Rock Regions

Around 45% of this district is underlain by hard massive formations of Archaean age. Granitic gneiss, hornblende biotite gneiss, charnockites, pegmatites and quartzites are the various types of rocks encountered in the hard rock region. Kulathur, major part of Thirumayam and parts of Pudukkottai taluk are occupied by crystalline rocks.

Sedimentary Regions

The area occupied by sedimentary formations belonging to 1. Cretaceous 2. Tertiary and 3. Recent ages fall on the eastern half of the district. The total extent occupied by sedimentary formations amounts to 55% of the total geographical area of the district. Tertiary deposits of Pudukkottai district consists of laterite, arenaceous and argillaceous sand stone and clay.

Cretaceous deposits consists of clay, limestone, sand stone and clayey sand stone. The coastal alluvial deposits consists of unconsolidated sands, gravels and clay. Aranthangi, major parts of Gandarvakottai, Alangudi, Avudaiyarkoil and half of Manamelkudi and Pudukkottaitaluks are occupied by tertiary deposits. Minor parts of Gandarvakottai, Thirumayam and half of Pudukkottai taluks are occupied by cretaceous deposits. Half of Manamelkudi and minor parts of Avudaiyarkoil taluks are occupied by Quaternary deposits.

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Drilling of bore holes:

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. The subsurface lithological condition and the aquifer characters can be ascertained by drilling exploratory boreholes and conducting pump tests.

The State Ground and Surface Water Resources Data Centre, during the course of investigation has drilled more than 92 boreholes spread over the entire district to find out the nature and behaviour of the subsurface material and their water holding and water yielding capability. The weathering zone in the district varies from 7 to 22 metres below ground level.

Aquifer Parameters:

Hard rock

The thickness of aquifer in Pudukkottai district varies between 12 m to 45 m below G.L. The intensity and degree of weathering and fracture development in the crystalline formations play a vital role in the development of intergranular porosity. Whenever gneissic formations occur deep and very high intensity of weathering is observed. While in charnockite area weathering is moderate. The aquifer parameter in hard rock region of the district is observed to be as follows:

Parameters	Range
Well yield in LPM	1-2 lpm
Transmissivity (T) m ² /day	5-25 m ² /day
Permeability (K) m/day	3-16 m/day

Sedimentary formations:

Cretaceous formations

The cretaceous formations are the oldest among the sedimentary formations occurring in the district, cropping out along a narrow belt of 6-8 kms width adjoining the archaean complex. These formations are

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found in the eastern parts of Thirumayam taluk and nearly in the half of Pudukkottai, Alangudi and Gandarvakottai. Taluks, consists mainly of coarse grained sand, clay, clayey sandstone associated with kankar and gravel. The aquifer parameter values of the cretaceous formations are given below.

Parameters	Range
Well yield in LPM	3-4lpm
Transmissivity (T) m ² /day	9-47 m ² /day
Permeability (K) m/day	0.5-2.80 m/day

Tertiary formations

The tertiary formations encountered in this district are of Miocene and Pliocene ages and are found in the entire Aranthangi and Avudaiyar koil taluks and also along the eastern parts of the pudukottai and alanguditaluks consisting mainly of sandstones, claybound sands, sandy clay, shales, etc., The aquifer parameters values of tertiary formations are given below:

Parameters	Range
Well yield in LPM	5-10lpm
Transmissivity (T) m ² /day	89-157 m ² /day
Permeability (K) m/day	1.5-3 m/day

Drilling

The drilling types are different according to the formation of the terrain. In general, DTH rigs are used in Hard rock formations for drilling a bore well at a depth ranges from 30m to 200m, according to the extension of joints, fractures, lineaments, etc in an area. In Sedimentary formations, rotary rigs with different rotors used according to the Tube well's diameter. The Bentonite clay is used in rotary rigs to avoid the collapse of the Tube well. The sedimentary tube wells are drilled up to a depth of 30m to 300m depending on the area, yield, etc. In alluvial formations, the hand rotary used for drilling tube wells ranges from 10m to 15m. In river beds, infiltration tube wells used for extraction of groundwater.

In Hard rock, the well designing is simple. The upper top soil and highly weathered zone is cased with PVC pipe and the remaining weathered, Fissured, Jointed portion is left as it is. In Pudukkottai District, the weathered zone ranges from 1.0m to 12.0m. In Granitic gneiss area, the highly weathered portion

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will be more up to 15m but in charnockite area, the weathered zone will extend up to 8.0m to 10.m only. In Sedimentary area, the well construction depends on the occurrence of sand thickness in the referred area. The logger is also used in the construction to identify the area of good quality of water.

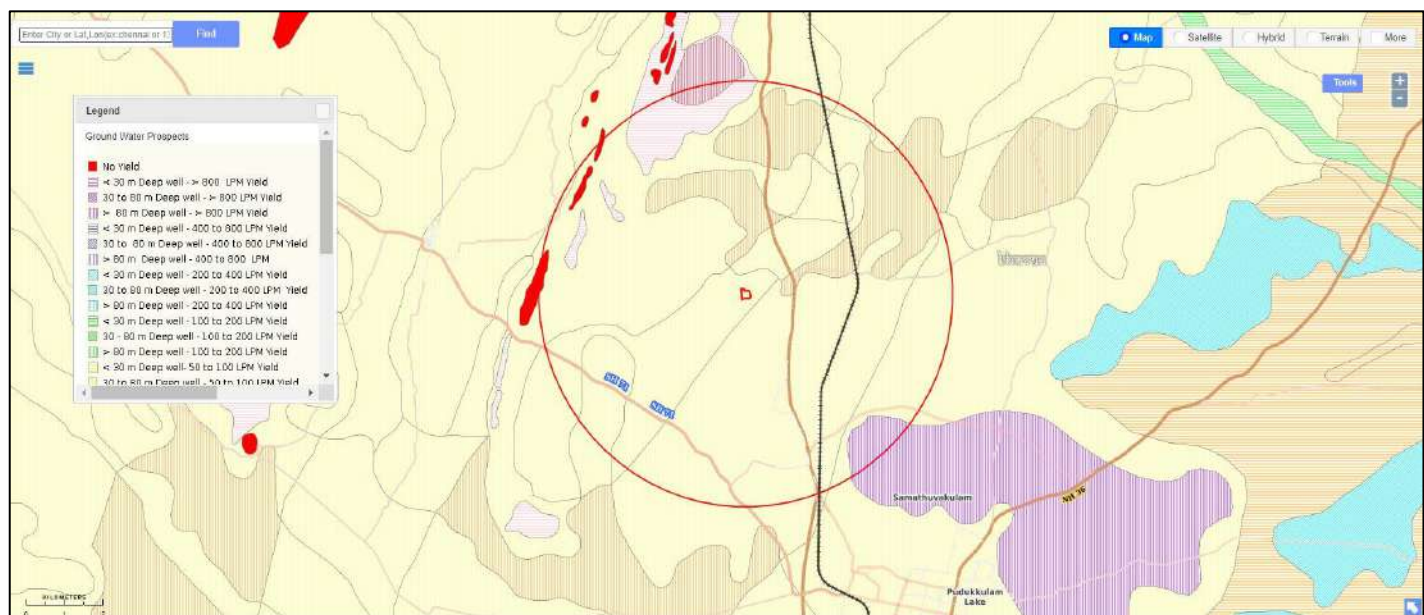


Figure 3-5 Ground water prospects within 5 km radius of the project site

3.3.5 Ground water quality monitoring

Ground water quality monitoring is done in the following locations and analysis will be done for physical, chemical & Biological parameters.

Table 3-4 Ground water Quality Analysis

Environmental Parameters: Ground water Quality Analysis	
Monitoring Period	January to March 2023
Design Criteria	Based on the Environmental settings in the study area
Monitoring Locations	Project Site – GW 1 Sri Karuppar Temple Erayur – GW 2 Government High School, Mangudi – GW 3 Government Higher Secondary School-Irambali - GW 4 Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai – GW5

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Methodology	Water Samples were collected in 5 Litre fresh cans as per IS 3025 Part I and transported to the laboratory in Iceboxes
Frequency of Monitoring	Once in a season

3.3.5.1 Sampling Procedure

Quality of ground water was compared with IS: 10500: 1991 (Reaffirmed 1993 With Amendment NO -3 July 2010) for drinking purposes. Water samples were collected as Grab sample from five sampling locations in a 5-liter plastic jerry can and 250 ml sterilized clean glass/pet bottle for complete physico-chemical and bacteriological tests respectively. The samples were analyzed as per standard procedure / method given in IS: 3025 (Revised Part) and standard method for examination of water and wastewater Ed. 21st, published jointly by APHA.

Table 3-5: Standard Procedure

S. No	Parameters	Test Method
1	pH (at 25°C)	IS:3025(P -11)1983 RA: 2012
2	Electrical Conductivity	IS:3025(P -14) 2013
3	Colour	IS:3025 (P -4)1983 RA: 2012
4	Turbidity	IS:3025(P -10)1984 RA: 2012
5	Total Dissolved Solids	APHA 22 nd Edn.2012-2540-C
6	Total Suspended Solids	IS:3025(P-17)-1984 RA:2012
7	Total Hardness as CaCO ₃	APHA 22 nd Edn.2012-2340-C
8	Calcium as Ca	APHA 22 nd Edn.2012.3500 Ca-B
9	Magnesium as Mg	APHA 22 nd Edn.2012-3500 Mg-B
10	Chloride as Cl	IS:3025(P -32)-1988 RA: 2014
11	Sulphate as SO ₄	APHA 22 nd Edn.2012-4500 SO ₄ -E
12	Total Alkalinity as CaCO ₃	APHA 22 nd Edn.2012-2320-B
13	Iron as Fe	IS:3025(P -53):2003 RA: 2014
14	Silica as SiO ₂	IS:3025(P -35)1988 RA: 2014
15	Fluoride as F	APHA 22 nd Edn.2012-4500-F-D
16	Nitrate as NO ₃	IS:3025(P -34):1988 RA: 2014
17	Sodium as Na	IS:3025(P -45):1993 RA: 2014
18	Potassium as K	IS:3025(P -45):1993 RA: 2014
19	Coliform	IS:1622:1981:RA:2014
20	E.coli	IS:1622:1981:RA:2014

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Table 3-6 Ground water sampling results

S. No	Parameters	Units	GW1	GW 2	GW 3	GW 4	GW 5
1	pH (at 25°C)	-	7.08	7.91	7.54	6.91	6.29
2	Electrical Conductivity	µS/cm	1092	832	1556	680	651
3	Colour	Hazen Unit	5	2	5	2	1
4	Turbidity	NTU	2	BQL (LOQ:1)	4	BQL (LOQ:1)	BQL(LOQ:1)
5	Total Dissolved Solids	mg/L	646	511	935	394	369
6	Total Suspended Solids	mg/L	5	BQL (LOQ:2)	7	BQL (LOQ:2)	BQL(LOQ:2)
7	Total Hardness as CaCO ₃	mg/L	346	255	518	269	129
8	Calcium Hardness as CaCO ₃	mg/L	206	112	345	161	83.8
9	Magnesium Hardness as CaCO ₃	mg/L	140	143	173	108	45.2
10	Calcium as Ca	mg/L	82.5	44.9	138	64.5	34
11	Magnesium as Mg	mg/L	33.9	34.7	42.1	26.2	10.9
12	Chloride as Cl	mg/L	176	122	254	81.8	128
13	Sulphate as SO ₄	mg/L	46.4	21	71.3	43.9	10.3
14	Total Alkalinity as CaCO ₃	mg/L	188	238	201	110	25
15	Iron as Fe	mg/L	BQL (LOQ:0.1)	BQL (LOQ:0.1)	BQL (LOQ:0.1)	BQL (LOQ:0.1)	BQL (LOQ:0.1)
16	Silica as SiO ₂	mg/L	17.2	15.4	26.9	10.2	10.1
17	Fluoride as F	Mg/L	1.36	0.939	0.961	0.625	BQL (LOQ:0.2)

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18	Nitrate as NO ₃	mg/L	11.7	11.4	32.8	20.8	46.4
19	Potassium as K	mg/L	16.2	13.5	38.2	3.7	15.4
20	Sodium as Na	mg/L	149	106	209	76.2	99.2

3.3.6 Interpretation of results:

3.3.6.1 Physical parameters of water:

The basic physical parameters of water include

Colour:

Value observed in Project Site (True/Apparent Color): 5 Hazel unit.

Acceptable and permissible limits: 5 Hazel units and 15 Hazel units respectively. The value in the project site is as same as the acceptable limits prescribed by IS 10500: 2012 (referred as “Standards” from herein).

Odour & Taste:

The water is odourless. The taste of the water is slightly salty which is due to the presence of hardness in water, which is attributed to the presence of calcium and magnesium in the water. As per the standards, the odour and taste should be agreeable.

pH:

Value observed in the Project Site: 7.08

Acceptable and permissible limits: 6.5-8.5. The pH value is the measure of acid – base equilibrium. The value of pH in the project site clearly indicates that water is slightly neutral in nature.

Turbidity:

Value observed in the Project Site: 2

Acceptable and permissible limits: 1 NTU & 5 NTU respectively. The value of turbidity generally indicates the presence of phytoplanktons and other sediments. The value in the project site indicates the water is less turbid and no any physical treatment is required to treat the turbidity of the water.

Total Dissolved Solids:

Value observed in the Project Site: 646 mg/L.

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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Acceptable and permissible limits: 500 mg/L and 2000 mg/L respectively.

The TDS is the presence of the inorganic salts and small amounts of organic matter present in the water. This is mainly due to the result of surface runoff as the cations and anions in the topsoil is carried away by the water. The value in the project site indicates the water is less turbid.

3.3.6.2 Chemical parameters of water:

The chemical parameters of the drinking water include,

Calcium:

Value observed in the Project Site: 82.5 mg/L.

Acceptable and permissible limits: 75mg/L and 200 mg/L respectively.

Calcium is the essential macronutrient. The value of the calcium is within the prescribed permissible standards. The higher level of calcium may cause hardening in domestic equipment and will also reduce the detergent efficiency. Higher levels of calcium will lead to constipation, gas, and bloating. Apart from that, extra calcium may also increase the risk of kidney stones. If the calcium deposit in blood is high, it may lead to hypercalcemia.

Magnesium:

Value observed in the Project Site: 33.9 mg/L.

Acceptable and permissible limits:30 mg/L and 100 mg/L respectively.

The value of Magnesium in the project site is higher than acceptable limit and less than the permissible limit. The increase in the level of magnesium will cause diarrhea and vomiting in children.

Chloride

Value observed in the project site: 176 mg/L.

Acceptable and permissible limits: 250 mg/L and 1000 mg/L respectively.

The chloride level in the project site is within the acceptable and permissible limit. If the level of chloride is more, it may cause galvanic and pitting corrosion, increases level of metals. It imparts bitter taste to the water.

Total Alkalinity as CaCO₃:

Value observed in the project site: 188 mg/L.

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Acceptable and permissible limits: 200 mg/L and 600 mg/L respectively.

Total Alkalinity is the measure of the concentration of all alkaline substances dissolved in the water which includes carbonates, bicarbonates and hydroxides. The value of the total alkalinity is slightly greater in the project site, which will impart soda taste to the water.

Hardness:

Value observed in the Project Site: 346 mg/L.

Acceptable and permissible limits: 200 mg/L and 600 mg/L respectively.

The value of Hardness in the project site is within the acceptable and permissible limit. The increase in the level of hardness may cause corrosion and scaling problems, increased soap consumption and it also contributes to the salty taste of water.

3.3.6.3 Biological parameters of water:

The biological parameters of water includes E- Coli & Coliform

Value observed in the project site: <2 mpn/100ml – e-coli and <2 mpn/100ml – Coliforms

The E- coli and coliform shall not be detectable in any 100 ml sample as per the drinking water standards IS 10500:2012.

E- coli is one of the fecal coliform bacteria. The presence of this indicates the water is feacally contaminated. Without treatment, when consumed, will have water borne diseases like cholera, typhoid and diarrhea.

3.3.7 Surface Water Analysis

Surface water samples were taken from Vellanur local Pond. The results are summarized below.

Table 3-7 Surface Water Sample Results

S. No	Parameters	Units	Project Site
1	pH (at 25°C)	-	7.05
2	Electrical Conductivity	µS/cm	298
3	Colour	Hazen Unit	GREENISH
4	Turbidity	NTU	70
5	Total Dissolved Solids	mg/L	208
6	Total Suspended Solids	mg/L	94
7	Total Hardness as CaCO ₃	mg/L	67.3
8	Calcium Hardness as CaCO ₃	mg/L	40.8
9	Magnesium Hardness as CaCO ₃	mg/L	26.5

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10	Calcium as Ca	mg/L	16.3
11	Magnesium as Mg	mg/L	6.45
12	Chloride as Cl	mg/L	50.3
13	Sulphate as SO ₄	mg/L	48.2
14	Total Alkalinity as CaCO ₃	mg/L	15.5
15	Iron as Fe	mg/L	2.63
16	Silica as SiO ₂	mg/L	4.29
17	Fluoride as F	Mg/L	BQL(LOQ:0.2)
18	Nitrate as NO ₃	mg/L	26.3
19	Potassium as K	mg/L	9.2
20	Sodium as Na	mg/L	37.7
21	Total Kjeldahl Nitrogen as N	mg/L	6.25
22	Biochemical oxygen Demand @ 27°C	mg/L	18.1
23	Chemical Oxygen Demand	mg/L	65.8
24	Dissolved Oxygen	mg/L	3.5

Inference: The surface water quality is compared with the CPCB Water Quality Criteria against A, B, C, D & E class of water. From the test result, it is found that the both the water does not fit Class A (Drinking Water Source without conventional treatment but after disinfection). But they can be used for outdoor bathing as it meets the requirements shown for class B water.

3.3.8 Climatology & Meteorology:

Climate and meteorology of a place can play an important role in the implementation of any developmental project. Meteorology is also the key to understand local air quality as there is an essential relationship between meteorology and atmospheric dispersion involving wind in the broadest sense of the term.

The year may broadly be divided into four seasons:

Winter season	:	December to February
Pre-monsoon season	:	March to May
Monsoon season	:	June to September
Post-monsoon season	:	October to November

i) Climate

High temperature throughout the year. Generally, a dry and hot climate prevails in the district. The district receives the rainfall under the influence of northeast monsoon. The heaviest rainfall in the district used to be received in the month of October was 233.8 mm (Average).

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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

ii) Temperature

The average daily temperature ranges from a maximum of 33.7 °C to a minimum of 24 °C

iii) Rainfall:

The normal rainfall recorded at various rain gauge stations in the area ranged from 833.40 mm (Viralimalai) to 1033.8 mm (Perungalur) with an average of 910.8 mm for the district. There is a gradual increase in precipitation from east to southwest over the district. The rainfall is highest in Southeastern part of the district, which includes the coastal blocks of Manamelgudi and Avudaiyarkoil. It gradually decreases towards the northeast, where the average annual rainfall is found to be the lowest in Malaiyanur.

PUDUKKOTTAI DISTRICT -NORMAL AND ACTUAL RAINFALL (2008 TO 2017)

Unit in mm.

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2016	0	0	0	0	77.7	32.1	50.1	80.7	70.9	80.1	22.1	57.3
2017	53.9	1.3	34.6	0	19.8	54.8	41.7	217.3	93.5	89.3	88.6	29.6
2018	6.5	0.8	7	13.5	73.7	67	93.9	38.5	78.3	124.4	166.2	22.6
2019	0	0	0	6.2	3.9	17	55.6	79.3	193.1	233.8	173.3	113.9
2020	1	0	0.2	23.9	33.6	75.6	158.2	84.2	133.9	107	131.5	197.6

Source: District survey report

Metrological Data

The meteorological data – Temperature, rainfall, Wind Speed, Wind direction are recorded through AWS by setting it up in the site.

vi) Wind Rose Diagram

The wind rose denotes a class of diagrams designed to display the distribution of wind direction at a given location over a period of time. Wind roses are also useful as they project a large quantity of data in a simple graphical plot.

The wind speed & wind direction data are taken and wind rose is plotted for June to August 2022.

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

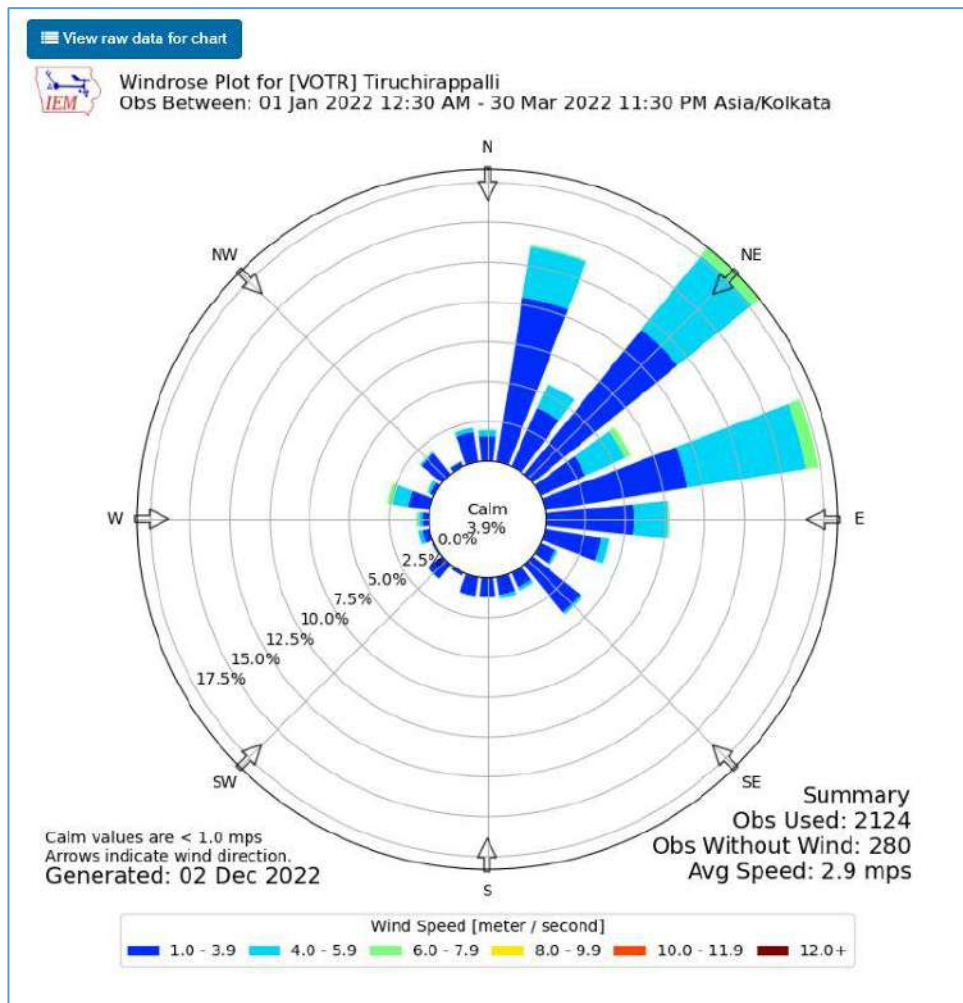


Figure 3-6 Wind rose

3.3.9 Selection of Sampling Locations:

Four Monitoring locations along with the project site is selected based on Wind Direction & Wind Speed. All the monitoring locations are chosen in the downwind direction.

3.3 Ambient Air Quality

Table 3-8: Selection of Sampling Location

Environmental Parameters: <i>Ambient Air</i>	
Monitoring Period	January to March 2023

Project	Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

Design Criteria	The monitoring stations are selected based on factors like topography/terrain, prevailing meteorological conditions like predominant wind direction (January to March 2023), etc, play a vital role in the selection of air sampling stations. Based on these criteria, 5 air sampling station were selected in the area as shown below.		
Monitoring Locations	Location & Code	Distance (km)	Direction
	Project Site - AAQ 1	-	-
	Sri Karuppar Temple Eraiyur – AAQ 2	5.96	Upwind NE
	Government Higher Secondary School-Irumbali – AAQ 3	7.07	Downwind SW
	Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai – AAQ 4	8.34	Crosswind NW
	Government High School, Mangudi AAQ 5	6.02	Crosswind SE
Methodology	Respirable Particulate Matter (PM10) - Gravimetric (IS 5182: Part 23:2006) Particulate Matter PM2.5 - Gravimetric (Fine particulate matter) Sulphur Dioxide - Calorimetric (West & Gaeke Method) (IS 5182: Part 02: 2001) Nitrogen Dioxide - Calorimetric (Modified Jacob & Hocheiser Method) (IS 5182: Part 06:2006)		
Frequency of Monitoring	2 days in a week, 4 weeks in a month for 3 months in a season.		

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R. Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru.R. Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

3.4.1 Ambient Air Quality: Results & Discussion

The test results of the ambient air quality monitored in project site and other four locations is summarized below.

Code	Location	PM 10 ($\mu\text{g}/\text{m}^3$)				PM 2.5 ($\mu\text{g}/\text{m}^3$)				SO2 ($\mu\text{g}/\text{m}^3$)				NOx ($\mu\text{g}/\text{m}^3$)			
		Min	Max	Avg	98 %	Min	Max	Avg	98 %	Min	Max	Avg	98 %	Min	Max	Avg	98 %
AAQ 1	Project Site	34	48	42.5	47.54	14	21	17.7	21.0	5	10	8.0	10.0	9	21	15.6	21.0
AAQ 2	Sri Karuppar Temple Eraiyyur	41	51	46.8	51	17	24	21.0	24.0	6	15	9.6	14.08	12	29	19.5	27.62
AAQ 3	Government Higher Secondary School- Irambali	47	57	51.5	56.08	18	29	23.0	28.08	11	18	13.7	17.54	21	31	24.5	30.08
AAQ 4	Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai	42	54	49.2	53.54	18	26	22.3	25.54	7	15	11.1	14.54	12	27	19.4	26.54
AAQ 5	Government High School, Mangudi	49	60	54.5	59.08	22	32	26.3	30.62	15	21	17.5	21.0	26	42	32.6	41.08
NAAQ Standards - Residential Area		100 ($\mu\text{g}/\text{m}^3$)				60($\mu\text{g}/\text{m}^3$)				80 ($\mu\text{g}/\text{m}^3$)				80 ($\mu\text{g}/\text{m}^3$)			

Table 3-9 Ambient Air Quality

Project	New Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R. Arockiya Raj	Draft EIA Report
Project Proponent	Thiru.R. Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

3.4.2 Interpretation of ambient air quality:

To assess the impact, AAQ were monitored in project site and four locations.

Observation:

The Maximum value of PM10 (60 ($\mu\text{g}/\text{m}^3$), PM 2.5(32 ($\mu\text{g}/\text{m}^3$), SO₂ 21 ($\mu\text{g}/\text{m}^3$), NO_x (42 ($\mu\text{g}/\text{m}^3$) is observed in different places.

Inference:

The monitoring results for PM10, PM2.5, NO_x was found to be high in Kaliasman Kovil, Rakkadanpatti Village which densely populated small rural area where there is no commercial development like industry, college, etc. The only contributing factor to the higher values is due to the vehicular movement. In the absence of vehicular movement, the values of PM10, PM2.5, NO_x was found to be less.

The observed values are all well within the Standards prescribed by NAAQ.

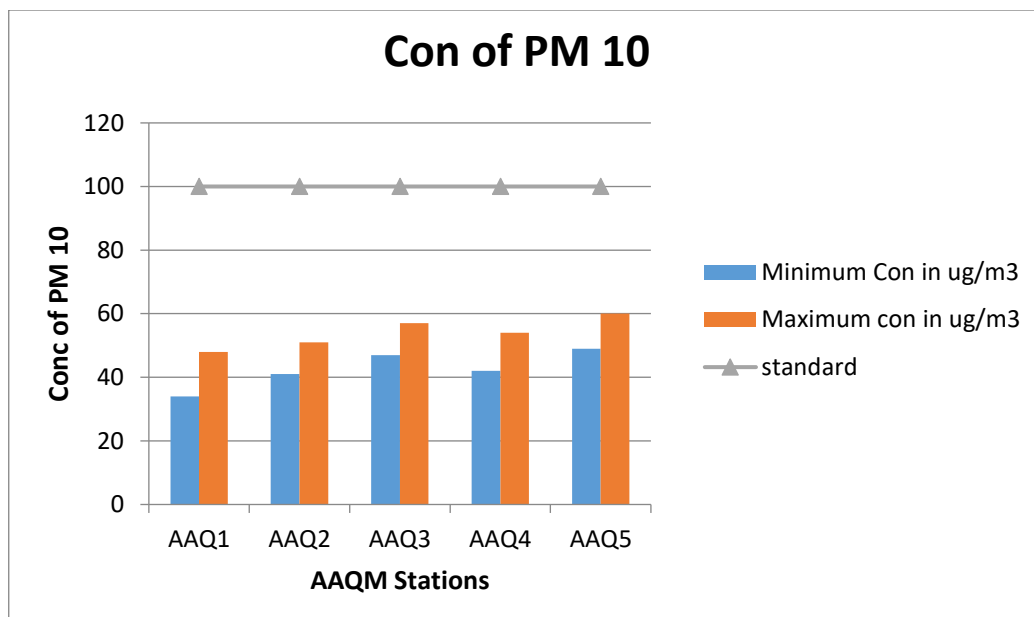


Figure 3-7 Concentration of PM10 ($\mu\text{g}/\text{m}^3$) in Study Area

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Project Proponent	Thiru.R. Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

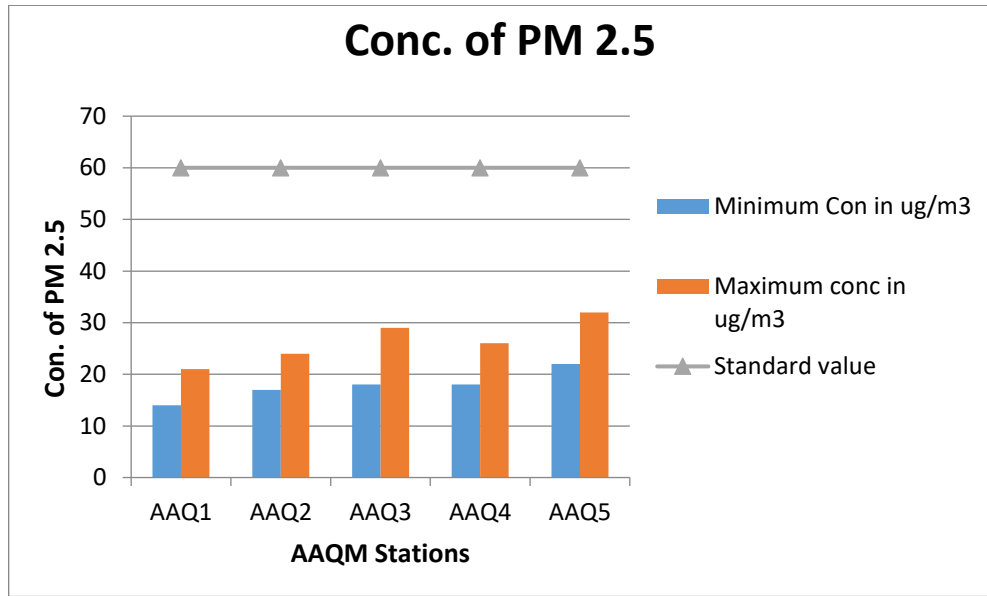


Figure 3-8 Concentration of PM2.5 (µg/m³) in Study Area

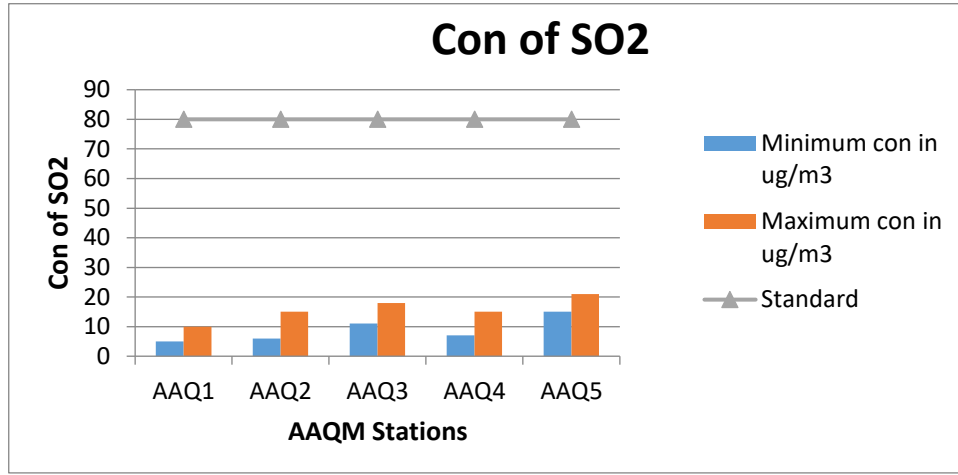


Figure 3-9 Concentration of SOx (µg/m³) in Study Area

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Project Proponent	Thiru.R. Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

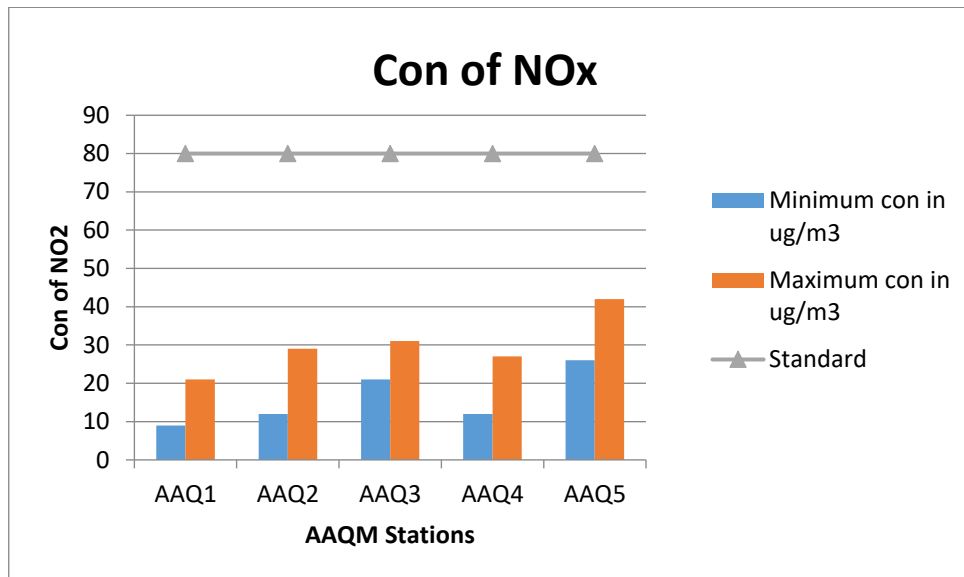


Figure 3-10 Concentration of NOx (µg/m³) in Study Area

3.4 Noise Environment:

Table 3-10 Noise Analysis

Environmental Parameters: Noise Analysis	
Monitoring Period	January to March 2023
Design Criteria	Based on the Sensitivity of the area
Monitoring Locations	Project Site – N1, Sri Karuppar Temple Eraiyur – N2, Government Higher Secondary School-Irumbali – N3, Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai – N4 Government High School, Mangudi - N5
Methodology	Noise level measurements were taken at the selected locations using noise level meter both during day and nighttime. Noise level measurements were taken continuously for 24 hours at hourly intervals
Frequency of Monitoring	Noise samples were collected from 5 locations - Once season

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<i>Project Proponent</i>	<i>Thiru.R. Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Ambient Noise Levels are monitored in the chosen 5 Locations including the project Site and the monitoring results are summarized below.

3.5.1 Day Noise Level (Leq day)

Table 3-11 Day Noise Level (Leq day)

Location	Leq day in dB(A)		
	Max	Min	Average
Project Site	55	41	50
Sri Karuppar Temple Eraiyur	56	45	52
Government Higher Secondary School-Irambali	63	51	58
Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai	59	49	55
Government High School, Mangudi	64	51	59

3.5.2 Night Noise Level (Leq Night)

Table 3-12 Night Noise Level (Leq Night)

Location	Leq Night in dB(A)		
	Max	Min	Average
Project Site	43	35	38
Sri Karuppar Temple Eraiyur	47	39	42
Government Higher Secondary School-Irambali	49	40	45
Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai	46	39	43
Government High School, Mangudi	50	43	47

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Project Proponent	Thiru.R. Arockiya Raj	
Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

Observation:

The maximum Day noise and Night noise were found to be 64 dB(A) and 51 dB(A) respectively in Government High School, Mangudi. The minimum Day Noise and Night noise were 43 dB(A) and 35 dB(A) respectively which was observed in Project Site.

The observed values are all well within the Standards prescribed by CPCB.

3.5 Soil Environment

Soil environment is studied for 10 km radius from the project site. The 10 km radius image shows that the soil is not affected by any kind of erosion.

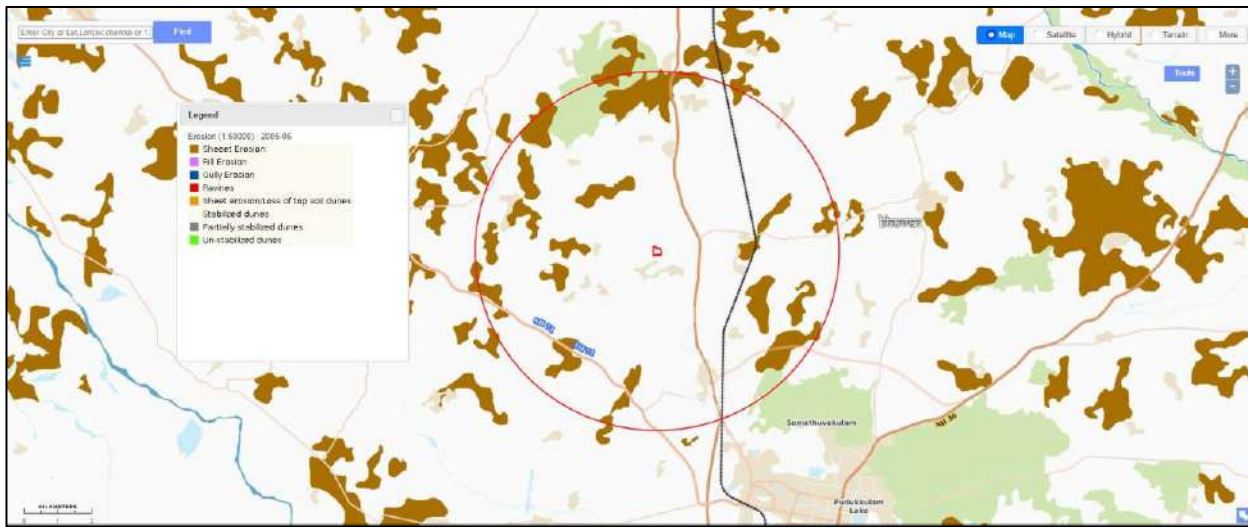


Figure 3-11 Soil Erosion pattern within 5 km radius of the project site

3.6.1 Baseline Data:

The present study of the soil quality establishes the baseline characteristics which will help in future in identifying the incremental concentrations if any, due to the operation Phase of the proposed project. The sampling locations have been identified with the following objectives:

- To determine the impact of proposed project on soil characteristics and
- To determine the impact on soils more importantly from agricultural productivity point of view.

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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Table 3-13 Soil Quality Analysis

<i>Environmental Parameters: Soil Quality Analysis</i>	
Monitoring Period	January to March 2023
Design Criteria	Based on the environmental settings of the study area
Monitoring Locations	Project Site – SQ 1, Government High School, Mangudi – SQ 2, Government Higher Secondary School-Irambali – SQ 3, Sri Karuppar Temple Eraiyur – SQ 4 Siththi Vinayagar Alayam, Viswakarma Nagar Pudukkottai – SQ 5
Methodology	Composite soil samples using sampling augers and field capacity apparatus
Frequency of Monitoring	Soil samples were collected from 5 locations Once in a season

To assess the soil quality of the study area, 5 monitoring stations were selected and the results are summarized below.

Table 3-14 Soil Quality Analysis

S.No	Parameters	Unit	SQ 1	SQ 2	SQ 3	SQ 4	SQ5
1	pH (at 25°C)	-	6.35	5.58	8.61	7.78	7.63
2	Specific Electrical Conductivity	ms/cm	0.10	0.07	0.40	0.21	0.16
3	Water Holding Capacity	ml/L	8.63	7.21	9.98	10.1	8.8
4	Chloride	mg/Kg	95.2	60.7	88.0	73.3	61.3
5	Calcium	mg/Kg	28.5	11.8	54.1	20.3	15.9
6	Sodium	mg/Kg	245	232	287	245	235

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<i>Project Proponent</i>	<i>Thiru.R. Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

7	Pottasium	mg/Kg	192	245	299	266	199
8	Organic matter	%	1.04	1.12	1.32	1.12	1.45
9	Soluble Magnesium	mg/Kg	12.2	14.2	11.5	12.2	19.1
10	Sulphate	mg/Kg	102	128	258	312	143
11	CEC	meq/100 g	7.6	9.1	8.4	8.1	7.6
12	Carbonate	mg/Kg	NIL	NIL	NIL	NIL	NIL
13	BiCarbonate	mg/Kg	232	228	195	142	230
14	TKN	%	0.37	0.39	0.45	0.48	0.49
15	Bulk Density	g/cm ³	1.24	1.26	1.27	1.29	1.27
16	Phosphorous	mg/Kg	159	105	212	256	117
17	Sand	%	56	43	54	50	54
18	Clay	%	2	1	1	7	2
19	Silt	%	42	56	45	43	44
20	SAR	meq/Kg	9.7	10.8	9.2	10.6	9.4
21	Silicon	%	0.092	0.097	0.095	0.099	0.093

3.6.1.1 Physical Properties:

Regular cultivation practices increase the bulk density of soils thus inducing compaction. This results in reduction in water percolation rate and penetration of roots through soils. The soils with low bulk density have favorable physical conditions whereas those with high bulk density exhibit poor physical conditions for agriculture crops. The bulk density of the soil in the study area ranged between 1.24 to 1.29 mg/kg which indicates favorable physical condition for plant growth. The water holding capacity was found in the range of 7.21 ml/l to 10.1 ml/l.

3.6.1.2 Chemical Properties:

Chemical characteristics of soils include pH, exchangeable cations and fertility status in the form of NPK values and organic matter. The value of the pH ranges from 5.58 to 8.61, which it indicates majority of pH of the soil is slightly alkaline. The soil in the project site is sodic in nature, which challenges because

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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

they tend to have very poor structure which limits or prevents water infiltration and drainage. The organic matter varies from 1.02 to 1.45 mg/kg, which indicates the soil is slightly unfertile.

3.6 Ecology and Biodiversity

Ecology and Biodiversity is studied for 10 km radius around the project site. Project site and 2 km around the project site is considered as core zone and from 2 km to 10 km radius, it is considered as buffer zone.

- Primary field survey is carried out for the assessment of flora and fauna in the core zone.
- Secondary data from Journals/Literature were studied and compiled to understand the species present in the buffer zone.

3.7.1 Methods available for floral analysis:

3.7.1.1 Plot Sampling Methods

- Quadrat – 2D shape (e.g., square or rectangle, or other shape) used as a sampling unit.
- Transect
 - Line transects feature only a length dimension, usually defined by a tape stretched across the area to be sampled.
 - Belt transects have a width as well as length.
 - Pace-transects are established when the observer strides along an imaginary line across the sample site and uses their foot placement to determine specific sampling points.

3.7.1.2 Plot less Sampling Methods

- Closest individual method - Distance is measured from each random point to the nearest individual.
- Nearest neighbour method - Distance is measured from an individual to its nearest neighbour.
- Random pairs method - Distance is measured from one individual to another on the opposite side of the sample point.
- Point-centered quarter (PCQ) method - Distance is measured from the sampling point to the nearest individual in each quadrat.

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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

3.7.2 Field study & Methodology adopted:

To assess the suitability of the methodology, random field survey was done. Field survey was conducted around 2 km radius from the project site and five locations were chosen based on the species density. Quadrat method is chosen for the proposed study as compared to other sampling methods, because they are relatively simple to use. Quadrat plots are uniform in size and shape and distributed randomly throughout the sample area, which makes the study design straightforward. They are also one of the most affordable techniques because they require very few materials.

3.7.3 Study outcome:

Phyto-sociological parameters, such as *Density, Frequency, Basal Area, Abundance and Importance Value Index* of individual species (Trees) were determined in randomly placed quadrates of different sizes in the study area. Relative frequency, relative basal area and relative density were calculated and the sum of these three represented Importance Value Index (IVI) for various species. For shrubs, herbs and grasses, *Density, Frequency, Relative Density & Relative Frequency were found.*

Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the study area of 2 km radius. Analysis of the vegetation will help in determining the relative importance of each species in the study area and to reveal if any economically valuable species is threatened in the process.

Table 3-15 Calculation of Density, Frequency (%), Dominance, Relative Density, Relative Frequency, Relative Dominance & Important Value Index

Parameters	Formula
Density	Total No. of individuals of species/ Total No. of Quadrats used in sampling
Frequency (%)	(Total No. of Quadrats in which species occur/ Total No. of Quadrats studied) * 100
Dominance	Total Basal Area /Total area sampled
Abundance	Total No. of individuals of species/ No. of Quadrats in which they occur
Relative Density	(Total No. of individuals of species/Sum of all individuals of all species) * 100
Relative Frequency	(Total No. of Quadrats in which species occur/ Total No. of Quadrats occupied by all species) * 100
Relative Dominance	Dominance of a given species/Total Dominance of all species
Important Value Index	Relative Density + Relative Frequency + Relative Dominance

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Table 3-16 Tree Species in the core Zone

S. No.	Scientific Name	Local Name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Dominance	Relative Density	Relative Frequency	Relative Dominance	IVI	IUCN Conservation Status
1	Ficus Carica	Athi Maram	2	2	6	0.33	33.33	1	0.28	1.68	2.17	4.45	8.31	Least Concern
2	Cassia siamea	ManjalKonrai	3	2	6	0.50	33.33	1.5	0.07	2.52	2.17	1.11	5.81	Least Concern
3	Acacia nilotica	Karuvelai	4	4	6	0.67	66.67	1	0.28	3.36	4.35	4.45	12.16	Least Concern
4	Bambusa vulgaris	Moongil	4	4	6	0.67	66.67	1	0.50	3.36	4.35	7.92	15.63	Not assessed
5	Anacardium occidentale	Cashew	1	1	6	0.17	16.67	1	0.44	0.84	1.09	6.96	8.88	Not assessed
6	Alstonia scholaris	Elilaipalai	2	2	6	0.33	33.33	1	0.27	1.68	2.17	4.31	8.16	Least Concern
7	Psidium guajava	Guava	3	3	6	0.50	50.00	1	0.23	2.52	3.26	3.61	9.39	Not assessed
8	Aegle marmelos	Vilvam	1	1	6	0.17	16.67	1	0.16	0.84	1.09	2.50	4.43	Not assessed
9	Causuarina equisetifolia	Savukku	2	2	6	0.33	33.33	1	0.21	1.68	2.17	3.34	7.20	Not assessed
10	Albizia amara	Wunja	1	1	6	0.17	16.67	1	0.20	0.84	1.09	3.22	5.14	Not assessed
11	Cocos nucifera	Thennai	10	6	6	1.67	100.0	1.67	0.15	8.40	6.52	2.39	17.32	Not assessed
12	Artocarpus heterophyllus	Palaa	2	2	6	0.33	33.33	1	0.18	1.68	2.17	2.85	6.70	Not assessed
13	Bombax ceiba	Sittan	4	4	6	0.67	66.67	1	0.08	3.36	4.35	1.27	8.98	Not assessed
14	Azadirachta indica	Veppam	17	6	6	2.83	100.0	2.83	0.13	14.29	6.52	1.98	22.79	Not assessed
15	Delonix regia	Cemmayir-Konrai	1	1	6	0.17	16.67	1	0.21	0.84	1.09	3.34	5.27	Least Concern
16	Delonix elata	Perungondrai	1	1	6	0.17	16.67	1	0.17	0.84	1.09	2.62	4.54	Least Concern
17	Dalbergia sissoo	Shisham	1	1	6	0.17	16.67	1	0.15	0.84	1.09	2.29	4.21	Not assessed
18	Ficus benghalensis	Alai	2	2	6	0.33	33.33	1	0.08	1.68	2.17	1.19	5.04	Not assessed

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19	Annona squamosa	Sitapalam	1	1	6	0.17	16.67	1	0.23	0.84	1.09	3.61	5.53	Not assessed
20	Pithecellobium dulce	Kodukapuli	1	1	6	0.17	16.67	1	0.14	0.84	1.09	2.18	4.11	Not assessed
21	Ficus religiosa	Arasa maram	3	3	6	0.50	50.00	1	0.09	2.52	3.26	1.35	7.13	Not assessed
22	Couroupita guianensis	Nagalingam	5	3	6	0.83	50.00	1.67	0.14	4.20	3.26	2.18	9.64	Not assessed
23	Musa paradise	Vaazhai	3	3	6	0.50	50.00	1	0.08	2.52	3.26	1.19	6.97	Not assessed
24	Prosopis juliflora	Vaelikaruvai	3	3	6	0.50	50.00	1	0.21	2.52	3.26	3.34	9.13	Not assessed
25	Mangifera indica	Mamaram	7	6	6	1.17	100.0	1.16	0.07	5.88	6.52	1.11	13.52	Data insufficient
26	Mimusops elengi	Magizham	2	2	6	0.33	33.33	1	0.18	1.68	2.17	2.85	6.70	Not assessed
27	Morinda pubescens	Nuna	6	6	6	1.00	100.0	1	0.24	5.04	6.52	3.74	15.31	Not assessed
28	Thespesia populnea	Poovarasam	3	3	6	0.50	50.00	1	0.15	2.52	3.26	2.39	8.18	Not assessed
29	Tectona grandis	Thekku	3	3	6	0.50	50.00	1	0.12	2.52	3.26	1.88	7.66	Not assessed
30	Tamarindus indica	Puli	10	6	6	1.67	100.0	1.66	0.20	8.40	6.52	3.09	18.02	Not assessed
31	Syzygium cumini	naval	5	1	6	0.83	16.67	5	0.11	4.20	1.09	1.79	7.07	Not assessed
32	Carica papaya	Papaya	3	3	6	0.50	50.00	1	0.09	2.52	3.26	1.43	7.21	Not assessed
33	Ziziphus mauritiana	Elandai	1	1	6	0.17	16.67	1	0.28	0.84	1.09	4.45	6.38	Not assessed
34	Citrus medica	Elumichai	2	2	6	0.33	33.33	1	0.23	1.68	2.17	3.61	7.46	Not assessed
Total			119	92					6.35					

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Table 3-17 Shrubs in the Core Zone

S. No.	Scientific Name	Local Name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IUCN Conservation Status
1	Jatropagossypifolia	Kaatamanaku	28	17	24	1.17	0.71	1.65	14.43	17.17	Not Assessed
2	Lantana trifolia	Shrub verbana	10	3	24	0.42	0.13	3.33	5.15	3.03	Not Assessed
3	Robiniapseudoacacia	Black locust	17	5	24	0.71	0.21	3.4	8.76	5.05	Least Concern
4	Lantana camara	Unnichedi	9	6	24	0.38	0.25	1.5	4.64	6.06	Not Assessed
5	Calotropis gigantea	Erukam	14	12	24	0.58	0.50	1.17	7.22	12.12	Not Assessed
6	Stachytarpheurticifolia	Rat tail	15	9	24	0.63	0.38	1.67	7.73	9.09	Not Assessed
7	Datura metal	Ummattangani	5	4	24	0.21	0.17	1.25	2.58	4.04	Not Assessed
8	Hibiscus rosa sinensis	Sembaruthi	3	2	24	0.13	0.08	1.5	1.55	2.02	Not Assessed
9	Tabernaemontanadivaricata	Crepe Jasmine	3	3	24	0.13	0.13	1	1.55	3.03	Not Assessed
10	Chloromolaena odorata	Venapacha	9	6	24	0.38	0.25	1.5	4.64	6.06	Least Concern
11	Euphorbia geniculata	Amman Pacharisi	3	3	24	0.13	0.13	1	1.55	3.03	Not Assessed
12	Catharanthus roseus	Nithyakalyani	3	3	24	0.13	0.13	1	1.55	3.03	Not Assessed
13	Woodfordiafruticosa	Velakkai	3	3	24	0.13	0.13	1	1.55	3.03	Least Concern
14	Morindapubescens	Mannanunai	2	2	24	0.08	0.08	1	1.03	2.02	Not Assessed
15	Acalypha indica	Kuppaimeni	20	8	24	0.83	0.33	2.5	10.31	8.08	Not Assessed
16	Parthenium hysterophorous	Vishapoondur	50	13	24	2.08	0.54	3.85	25.77	13.13	Not Assessed

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Table 3-18 Herbs & Grasses in the core zone

S. No.	Scientific Name	Local Name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IUCN Conservation status
1	Plumbago zeylanica	Chittiramoolam	3	3	30	0.10	0.10	1	1.19	3.23	Not assessed
2	Mimosa pudica	Thottacherungi	6	5	30	0.20	0.17	1.2	2.38	5.38	Least concern
3	Sida acuta	Malaidangi	10	3	30	0.33	0.10	3.33	3.97	3.23	Not assessed
4	Scrophularia nodosa	Sarakkothini	15	7	30	0.50	0.23	2.14	5.95	7.53	Not assessed
5	Helicteresisora	Valampuri	2	2	30	0.07	0.07	1	0.79	2.15	Not assessed
6	Cynodondactylon	Arugu	12	6	30	0.40	0.20	2	4.76	6.45	Not assessed
7	Sporobolus fertilis	Giant Parramatta Grass	9	4	30	0.30	0.13	2.25	3.57	4.30	Not assessed
8	Viburnum dentatum	Viburnum	5	5	30	0.17	0.17	1	1.98	5.38	Least concern
9	Heraculem spondylium	Hog Weed	20	10	30	0.67	0.33	2	7.94	10.75	Not assessed
10	Laportea canadensis	Peruganchori	30	20	30	1.00	0.67	1.5	11.90	21.51	Not assessed
11	Euphorbia hirta	Amman Pacharisi	5	4	30	0.17	0.13	1.25	1.98	4.30	Not assessed
12	Tridax procumbens	Vettukaayathalai	5	4	30	0.17	0.13	1.25	1.98	4.30	Not assessed
13	Tephrosia purpurea	Kavali	20	4	30	0.67	0.13	5	7.94	4.30	Not assessed
14	Sida cordifolia	Maanikham	45	4	30	1.50	0.13	11.25	17.86	4.30	Not assessed
15	Tridax procumbens	Cuminipachai	15	4	30	0.50	0.13	3.75	5.95	4.30	Not assessed
16	Ruellia strepens	Grandinayagam	25	4	30	0.83	0.13	6.25	9.92	4.30	Not assessed
17	Senna occidentalis	Nattamsakarai	25	4	30	0.83	0.13	6.25	9.92	4.30	Not assessed

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3.7.4 Calculation of species diversity by Shannon – wiener Index, Evenness and richness by Margalef:

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

Table 3-19 Calculation of species diversity

Description	Formula
Species diversity – Shannon – Wiener Index	$H = -\sum [(p_i) * \ln(p_i)]$ Where p_i : Proportion of total sample represented by species. i : number of individuals of species i / total number of samples
Evenness	H / H_{max} $H_{max} = \ln(s) =$ maximum diversity possible $S =$ No. of species
Species Richness by Margalef	$RI = S - 1 / \ln N$ Where $S =$ Total Number of species in the community $N =$ Total Number of individuals of all species in the community

3.7.5 Calculation of species diversity by Shannon – wiener Index, Evenness and richness by Margalef for trees

i. Species Diversity

Scientific Name	Common Name	No. of Species	Pi	ln (Pi)	Pi x ln (Pi)
Ficus Carica	Athi Maram	2	0.017857	-4.02535	-0.07188
Cassia siamea	ManjalKonrai	2	0.017857	-4.02535	-0.07188
Acacia nilotica	Karuvelai	4	0.035714	-3.3322	-0.11901
Bambusa vulgaris	Moongil	4	0.035714	-3.3322	-0.11901
Anacardium occidentale	Cashew	2	0.017857	-4.02535	-0.07188
Alstonia scholaris	Elilaipalai	2	0.017857	-4.02535	-0.07188

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Psidium guajava	Guava	3	0.026786	-3.61989	-0.09696
Aegle marmelos	Vilvam	1	0.008929	-4.7185	-0.04213
Causuarina equisetifolia	Savukku	2	0.017857	-4.02535	-0.07188
Albizia amara	Wunja	1	0.008929	-4.7185	-0.04213
Cocos nucifera	Thennai	15	0.133929	-2.01045	-0.26926
Artocarpus heterophyllus	Palaa	2	0.017857	-4.02535	-0.07188
Bombax ceiba	Sittan	4	0.035714	-3.3322	-0.11901
Azadirachta indica	Veppam	10	0.089286	-2.41591	-0.21571
Delonix regia	Cemmayir-Konrai	1	0.008929	-4.7185	-0.04213
Delonix elata	Perungondrai	1	0.008929	-4.7185	-0.04213
Dalbergia sissoo	Shisham	1	0.008929	-4.7185	-0.04213
Ficus benghalensis	Alai	2	0.017857	-4.02535	-0.07188
Annona squamosa	Sitapalam	1	0.008929	-4.7185	-0.04213
Pithecellobium dulce	Kodukapuli	1	0.008929	-4.7185	-0.04213
Ficus religiosa	Arasa maram	3	0.026786	-3.61989	-0.09696
Couroupita guianensis	Nagalingam	5	0.044643	-3.10906	-0.1388
Musa paradise	Vaazhai	3	0.026786	-3.61989	-0.09696
Prosopis juliflora	Vaelikaruvai	3	0.026786	-3.61989	-0.09696
Mangifera indica	Mamaram	8	0.071429	-2.63906	-0.1885
Mimusops elengi	Magizham	2	0.017857	-4.02535	-0.07188
Morinda pubescens	Nuna	6	0.053571	-2.92674	-0.15679
Thespesia populnea	Poovarasam	3	0.026786	-3.61989	-0.09696
Tectona grandis	Thekku	3	0.026786	-3.61989	-0.09696
Tamarindus indica	Puli	8	0.071429	-2.63906	-0.1885
Syzygium cumini	naval	1	0.008929	-4.7185	-0.04213
Carica papaya	Papaya	3	0.026786	-3.61989	-0.09696
Ziziphus mauritiana	Elandai	1	0.008929	-4.7185	-0.04213
Citrus medica	Elumichai	2	0.017857	-4.02535	-0.07188
Total		112			-3.22

H (Shannon Diversity Index) = 1.76

Shrubs

Scientific Name	Common Name	No. of Species	Pi	ln (Pi)	Pi x ln (Pi)
Jatropagossypifolia	Kaatamanaku	28	0.14433	-1.93565	-0.27937
Lantana trifolia	Shrub verbana	10	0.051546	-2.96527	-0.15285
Robiniapseudoacacia	Black locust	17	0.087629	-2.43464	-0.21335
Lantana camara	Unnichi	9	0.046392	-3.07063	-0.14245
Calotropis gigantea	Erukam	14	0.072165	-2.6288	-0.18971
Stachytarphaurticifolia	Rat tail	15	0.07732	-2.55981	-0.19792
Datura metal	Ummattangani	5	0.025773	-3.65842	-0.09429

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Hibiscus rosa sinensis	Sembaruthi	3	0.015464	-4.16925	-0.06447
Tabernaemontanadivaricata	Crepe Jasmine	3	0.015464	-4.16925	-0.06447
Chloromolaena odorata	Venapacha	9	0.046392	-3.07063	-0.14245
Euphorbia geniculata	Amman Pacharisi	3	0.015464	-4.16925	-0.06447
Catharanthus roseus	Nithyakalyani	3	0.015464	-4.16925	-0.06447
Woodfordiafruiticosa	Velakkai	3	0.015464	-4.16925	-0.06447
Morindapubescens	Mannanunai	2	0.010309	-4.57471	-0.04716
Acalypha indica	Kuppaimeni	20	0.103093	-2.27213	-0.23424
Parthenium hysterophorous	Vishapoondur	50	0.257732	-1.35584	-0.34944
Total		194			-2.3656

H (Shannon Diversity Index) =1.97

Herbs

Scientific Name	Common Name	No. of Species	Pi	ln (Pi)	Pi x ln (Pi)
Plumbago zeylanica	Chittiramoolam	3	0.011905	-4.43082	-0.05275
Mimosa pudica	Thottacherungi	6	0.02381	-3.73767	-0.08899
Sida acuta	Malaidangi	10	0.039683	-3.22684	-0.12805
Scrophularia nodosa	Sarakkothini	15	0.059524	-2.82138	-0.16794
Helicteresisora	Valampuri	2	0.007937	-4.83628	-0.03838
Cynodondactylon	Arugu	12	0.047619	-3.04452	-0.14498
Sporobolus fertilis	Giant Parramatta Grass	9	0.035714	-3.3322	-0.11901
Viburnum dentatum	Viburnum	5	0.019841	-3.91999	-0.07778
Heraculem spondylium	Hog Weed	20	0.079365	-2.5337	-0.20109
Laportea canadensis	Peruganchori	30	0.119048	-2.12823	-0.25336
Euphorbia hirta	Amman Pacharisi	5	0.019841	-3.91999	-0.07778
Tridax procumbens	Vettukaayathalai	5	0.019841	-3.91999	-0.07778
Tephrosia purpurea	Kavali	20	0.079365	-2.5337	-0.20109
Sida cordifolia	Maanikham	45	0.178571	-1.72277	-0.30764
Tridax procumbens	Cuminipachai	15	0.059524	-2.82138	-0.16794
Ruellia strepens	Grandinayagam	25	0.099206	-2.31055	-0.22922
Senna occidentalis	Nattamsakarai	25	0.099206	-2.31055	-0.22922
Total		252			-2.56298

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H (Shannon Diversity Index) =2.39

i. Evenness

Details	H	H _{max}	Evenness	Species Richness (Margalef)
Trees	3.22	3.5	0.9	7
Shrubs	2.36	2.77	0.85	2.84
Herbs	2.56	2.83	0.9	2.89

From the above, it can be interpreted that herb community has higher diversity. While the tree community shows less diversity. It is also observed that most of the quadrates have controlled generation of plant species with older strands. Higher herb species diversity can be interpreted as a greater number of successful species and a more stable ecosystem where more ecological niches are available, environmental change is less likely to be damaging to the ecosystem as a whole. Species richness is high for herb community when compared with tree and shrubs.

3.7.6 Frequency Pattern

To understand the frequency pattern, the observed frequency is compared with the Raunkiaer's frequency. Any deviation from Raunkiaer's frequency implies disturbed community. Classes of species in a community and normal value of class according to Raunkiaer.

Table 3-20 Frequency Pattern

Class	Frequency (%)	Normal Value in the class
A	1-20	53
B	21-40	14
C	41-60	9
D	61-80	8
E	81-100	16

Where A>B>C>=<D<E

Raunkiaer's class for the observed species

S. No.	Scientific Name	Local Name	Frequency (%)	Class as per Raunkiaer's Law
1.	Ficus Carica	Athi Maram	33.33	B
2.	Cassia siamea	ManjalKonrai	33.33	B

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3.	Acacia nilotica	Karuvelai	66.67	D
4.	Bambusa vulgaris	Moongil	66.67	D
5.	Anacardium occidentale	Cashew	33.33	B
6.	Alstonia scholaris	Elilaipalai	33.33	B
7.	Psidium guajava	Guava	50.00	C
8.	Aegle marmelos	Vilvam	16.67	A
9.	Causuarina equisetifolia	Savukku	33.33	B
10.	Albizia amara	Wunja	16.67	A
11.	Cocos nucifera	Thennai	100	E
12.	Artocarpus heterophyllus	Palaa	33.33	B
13.	Bombax ceiba	Sittan	66.67	D
14.	Azadirachta indica	Veppam	100	E
15.	Delonix regia	Cemmayir-Konrai	16.67	A
16.	Delonix elata	Perungondrai	16.67	A
17.	Dalbergia sissoo	Shisham	16.67	A
18.	Ficus benghalensis	Alai	33.33	B
19.	Annona squamosa	Sitapalam	16.67	A
20.	Pithecellobium dulce	Kodukapuli	16.67	A
21.	Ficus religiosa	Arasa maram	50.00	C
22.	Couroupita guianensis	Nagalingam	50.00	C
23.	Musa paradise	Vaazhai	50.00	C
24.	Prosopis juliflora	Vaelikaruvai	50.00	C
25.	Mangifera indica	Mamaram	100	E
26.	Mimusops elengi	Magizham	33.33	B
27.	Morinda pubescens	Nuna	100	E
28.	Thespesia populnea	Poovarasam	50.00	C
29.	Tectona grandis	Thekku	50.00	C
30.	Tamarindus indica	Puli	100	E
31.	Syzygium cumini	naval	16.67	A
32.	Carica papaya	Papaya	50.00	C
33.	Ziziphus mauritiana	Elandai	16.67	A
34.	Citrus medica	Elumichai	33.33	B

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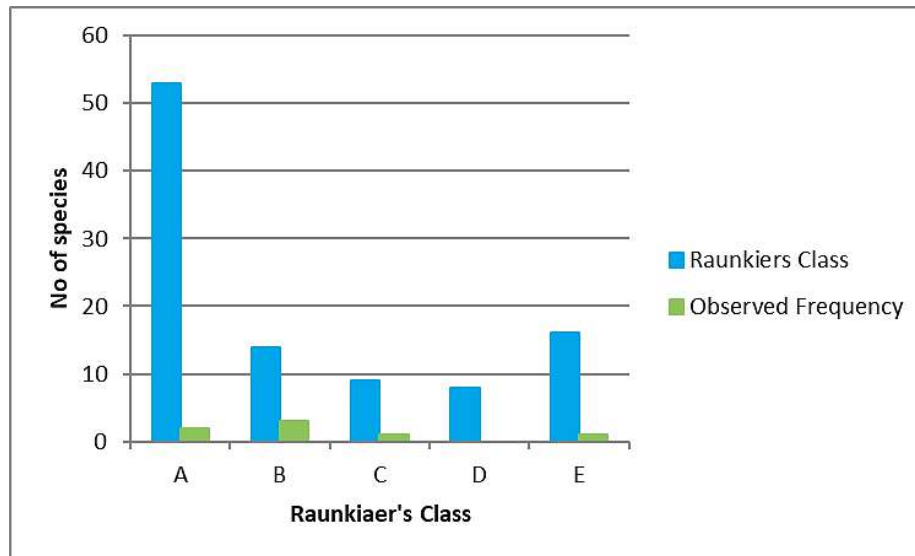


Figure 3-12 Raunkiaer's class for the observed species

Interpretation: The observed frequency is $A < B > C > D < E$, which does not follow Raunkiaer's Distribution Frequency and hence the ecology is disturbed.

3.7.7 Floral study in the Buffer Zone:

Economically important Flora of the study area

Agricultural crops: Paddy, Maize are the main crop grown. Different fruits like Banana, papaya, mangoes, guava and vegetables like brinjal, drumsticks, onion, Coriander also grown by the local people.

Medicinal species: The nearby area is also endowed with the several medicinal species which are commonly available in the shrub forest and waste lands. The common medicinal species of the region are *Asparagus racemosus* (satamulli), *Aegle marmelos* (golden apple), *Azadirachta indica* (Neem) etc.

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

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3.7.8 Faunal Communities

Both direct and indirect observation methods were used to survey the fauna.

- Point Survey Method: Observations were made in each site for 15 minutes duration.
- Road Side Counts: The observer traveled by motor vehicles from site to site, all sightings were recorded (this was done both in the day and night time). An index of abundance of each species was also established.
- Pellet and Track Counts: All possible animal tracks and pellets were identified and recorded (South Wood, 1978).

Additionally, survey of relevant literature was also done to consolidate the list of fauna distributed in the buffer zone.

Based on the Wildlife Protection Act, 1972 (WPA 1972, Anonymous. 1991, Upadhyay 1995, Chaturvedi and Chaturvedi 1996) species were short-listed as Schedule II or I and considered herein as endangered species. Species listed in Ghosh (1994) are considered as Indian Red List species.

Methodology Adopted:

Point Survey method was adopted for this development project where observations were made in each site for 15 minutes duration (10 times).

Study in the core zone:

Point Survey method was adopted for the study within 2 km radius and the following species were observed.

Mammals: No wild mammalian species was directly sighted during the field survey. Discussion with local villagers located around the study area also could not confirm presence of any wild animal in that area. Three striped Palm Squirrel, Common Indian Hare, Common mongoose, Common Mouse etc were observed during primary survey.

Avifauna: Since birds are considered to be the indicators for monitoring and understanding human impacts on ecological systems (Lawton, 1996) attempt was made to gather quantitative data on the avifauna by walk through survey within the entire study area and surrounding areas. From the primary survey, a total of 26 species of avifauna were identified and recorded in the study area. The diversity of avifauna from this region was found to be quite high and encouraging.

The list of fauna species found in the study area is mentioned in Table below.

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Table 3-21 List of fauna species

Scientific Name	Common Name	Schedule of wildlife protection act	IUCN conservation status
Mammals			
Funambulus pennanti	Palm Squirrel	IV	Least Concern
Mus rattus	Indian rat	IV	Not listed
Bandicota bengalensis	Indian mole rat	IV	Least Concern
Funambulus palmarum	Three striped palm squirrel	IV	Least Concern
Herestes edwardsii	Common Mongoose	IV	Not listed
Mus musculus	Common Mouse	IV	Least Concern
Bandicota indica	Rat	IV	Least Concern
Lepus nigricollis	Indian Hare	IV	Least Concern
Felis catus	Cat	Not listed	Not listed
Canis lupus familiaris	Indian dog	Not listed	Not listed
Bos Indicus	Indian Cow	Not listed	Not listed
Bubalus bubalis	Buffalo	I	Not listed
Sus scrofa domesticus	Domestic pig	Not listed	Not listed
Birds			
Milvus migrans	Black kite	IV	Least concern
Saxicoloides fulicatus	Indian Robin	IV	Least concern
Pycnonotus cafer	Red vented Bulbul	IV	Least concern
Phragamaticola aedon	Thick billed warbler	IV	Least concern
Pericrocotus cinnamomeus	Small Minivet	IV	Least concern
Eudynamys scolopaceus	Koel	IV	Least concern
Psittacula krameni	Rose ringed parakeet	IV	Least concern
Dicrurus marcocercus	Black drongo	IV	Least concern
Columba livia	Rock pigeon	IV	Least concern
Corvus splendens	House crow	IV	Least concern
Alcedo atthis	Small blue kingfisher	IV	Least concern
Cuculus canorus	Common Cukoo	IV	Least concern
Reptiles & Amphibians			
Chameleon zeylanicum	Chameleon	IV	Not listed

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Calotes versicolor	Common garden lizard	II	Not listed
Bungarus caeruleus	Common krait	IV	Not listed
Ophisops leschenaultia	Snake eyed lizard	--	Not listed
Bufo melanostictus	Toad	IV	Least concern
Ptyas mucosa	Rat snakes	IV	Least concern
Hemidactylus sp.	House lizard	--	Not listed
Butterflies			
Danaus chrysippus	Plain Tiger	--	Not listed
Papilio demoleus	Common lime	--	Not listed
Euploea core	Common crow	--	Least concern
Danaus genutia	Common tiger	--	Not listed
Eurema brigitta	Small grass yellow	--	Least concern

3.7 Demography and Socio Economics

The demography survey study is done within 10km radius from the project site. The population, Household, Sex ratio, Literacy rate, SC, ST details for all the villages in the study area is listed below:

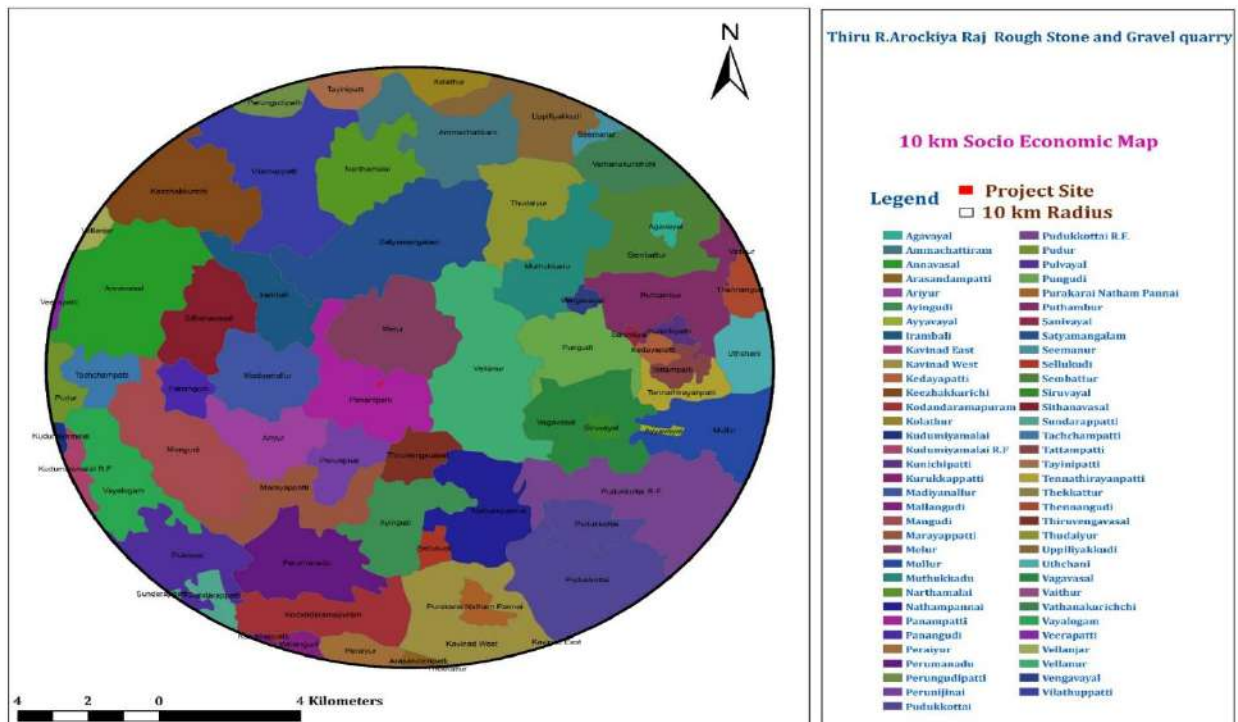


Figure 3-14 Socio economic map surrounding the project site

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Table 3-22: Demography Survey Study

Source: Census of India, 2011

Villages	Household	Population	Sex Ratio		Literacy Rate		SC	ST
			Male	Female	Male	Female		
Melur	602	2534	1230	1304	880	756	512	1
Vellanur	1454	6014	3061	2953	2286	1809	1365	217
Madiyanallur	353	1552	766	786	509	407	349	0
Panampatti	516	2292	1167	1125	810	632	657	0
Thiruvengavasal	142	615	314	301	217	151	86	0
Perunijinai	223	919	448	471	306	238	416	0
Ariyur	261	1194	645	549	503	318	294	3
Marayappatti	389	1757	891	866	593	459	743	0
Ayingudi	600	2582	1328	1254	968	657	1143	0
Poongudi	403	1564	738	826	556	483	657	2
Vagavasal	686	3060	1550	1510	1149	901	576	4
Siruvayal	7	29	16	13	12	8	0	0
Sellukudi	111	470	239	231	164	115	232	0
Pudukkottai R.F.	8	26	12	14	10	10	0	0
Nathampannai (CT)	2261	8915	4454	4461	3617	3194	1535	9

3.8 Traffic Impact Assessment

Traffic data collected continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on each of the two directions for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Total numbers of vehicles per hour under the three categories were determined.

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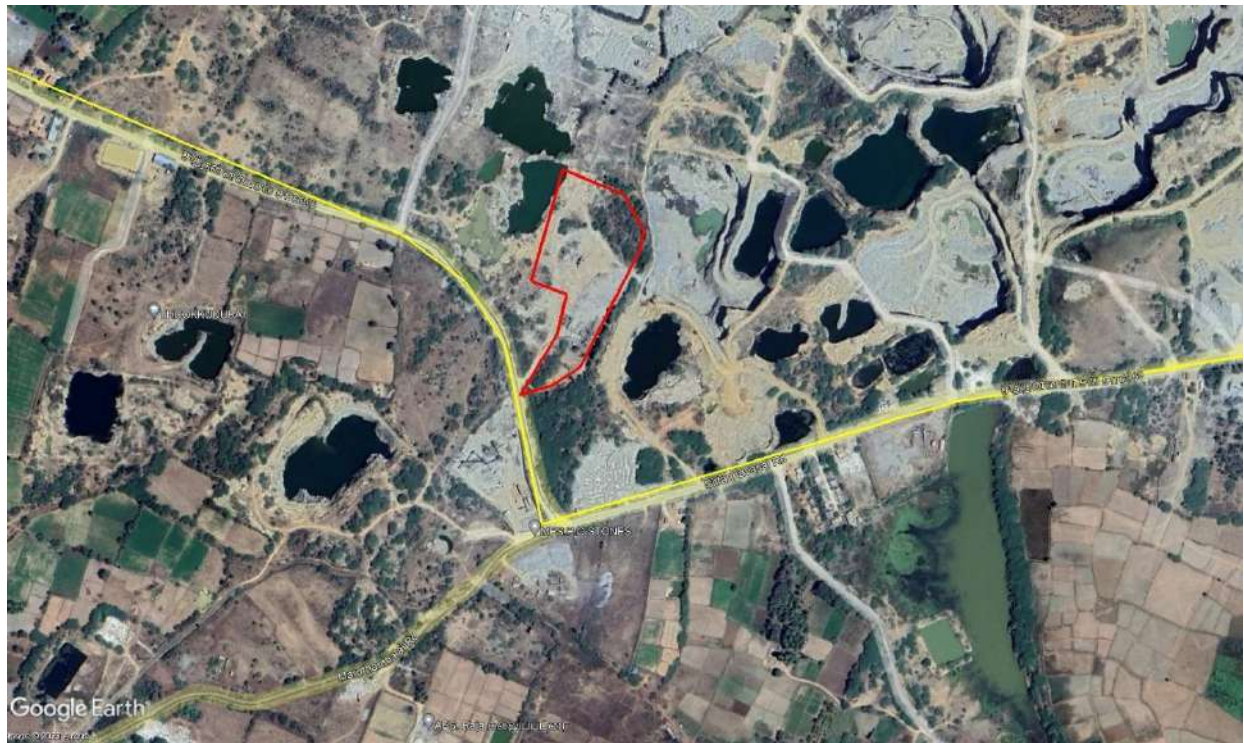


Figure 3-15: Site Connectivity

Table 3-23: No. of Vehicles per Day

S. No	Vehicles Distribution	Number of Vehicles Distribution/Day	Passenger Car Unit (PCU)	Total Number of Vehicle in PCU
		MDR	-	NH-336
1	Cars	601	1	601
2	Buses	274	3	822
3	Trucks	176	3	528
4	Two wheelers	397	0.5	199
5	Three wheelers	286	1.5	429
	Total	1734	-	2579

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Table 3-24: Existing Traffic Scenario and LOS

Road	V (Volume in PCU/hr)	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
NH45	2579/24=107	297	0.36	B

Note: The existing level may be “Very Good” for MDR 833.

V/C	LOS	Performance
0.0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good/ Average/ Fair
0.6-0.8	D	Poor
0.8-1.0	E	Very Poor

<i>Project</i>	<i>New Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R. Arockiya Raj</i>	<i>Draft EIA Report</i>
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4 Anticipated Environmental Impacts & Mitigation Measures

This chapter describes the anticipated impacts on the environment and mitigation measures. The method of assessment of impacts including studies carried out, modeling techniques adopted to assess the impacts where pertinent should be elaborated in this chapter. It should give the details of the impacts on the baseline parameters, both during the construction and operational phases and suggests the mitigation measures to be implemented by the proponent.

4.1 Introduction

An environmental impact is defined as any change to the environment, whether adverse or beneficial, resulting from a facility's activities, products, or services. The anticipation of the possible & potential Environmental impact due to the proposed project is a key step in EIA. Based on the impacts assessed, appropriate mitigation measures should be adopted to maintain the environment with less or no damage.

Environmental Impacts can be group into Primary impacts & Secondary Impacts

Primary Impacts: These impacts are directly attributed by the project.

Secondary Impacts: These are those which are induced by primary impacts and include the associated investments and changed patterns of the social and economic activities by the action.

Assessment of impacts is done for the following Environmental Parameters:

- Land Environment
- Water Environment
- Air Environment
- Noise Environment
- Biological Environment
- Socio Economic Environment

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4.2 LAND ENVIRONMENT:

Aspect	Impact	Mitigation Measures																
<i>Mining of rough stone</i>	<p>The proposed 1.68.0 Ha mine located in Melur Village, Production of rough stone about 103570 m³ and 24312 m³ of Gravel respectively. The quarry operation is proposed to carry out with conventional open cast mechanized mining with 5.0-meter vertical bench and bench width of 5.0 meter. At the end of 5 years, mining lease area will be converted into ultimate pit.</p> <table border="1" data-bbox="617 656 1320 894"> <thead> <tr> <th colspan="4">ULTIMATE PIT DIMENSION</th> </tr> <tr> <th>Pit No.</th> <th>Length (m)</th> <th>Width (m)</th> <th>Depth (m)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>211</td> <td>86</td> <td>43.0m (Bgl)</td> </tr> <tr> <td>II</td> <td>117</td> <td>30</td> <td>33.0m(Bgl)</td> </tr> </tbody> </table>	ULTIMATE PIT DIMENSION				Pit No.	Length (m)	Width (m)	Depth (m)	I	211	86	43.0m (Bgl)	II	117	30	33.0m(Bgl)	<p>The proposed project site is not prone to any kind of soil erosion (Source: Bhuvan).</p> <p>In addition, garland drainage of 1m x 1m will be provided to avoid storm water run-off.</p> <p>It is proposed to plant 450 Nos (per year) of local tree species (Neem, Magizham, Tamarind, Elandhai and Vilvam) along the roads, outer periphery of the mining area which enhances the binding property of the soil.</p> <p>It is proposed to improve the affected land wherever possible for better land use, so as to support vegetation and creation of water reservoir in the ultimate pit after quarrying.</p> <p>The overburden Gravel will be stocked in the area allotted for safety distance and will be used for plantation.</p> <p>The source of dust generation is majorly due to drilling, blasting, loading & unloading of the mined-out mineral, the impact will be</p>
ULTIMATE PIT DIMENSION																		
Pit No.	Length (m)	Width (m)	Depth (m)															
I	211	86	43.0m (Bgl)															
II	117	30	33.0m(Bgl)															

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	<p>The main impact of open cast mining on land-use is land degradation. The land is bound to be excavated for mining of Rough Stone Quarry.</p> <p>Impact on soil of the study area will be minimal as there are no wastewater generated, heavy metal infusion, stack emissions.</p> <p>Impact due to transformation of terrain characteristics over the large area results in soil degradation.</p> <p>Solid waste will be generated from the mining activity as there will be refuse also generation of domestic waste. If it is not properly managed, may cause odor and health problem to the workers.</p>	<p>mitigated by water sprinkling regularly once in 3hrs.</p> <p>The proposed mining activity is carried out in almost plain terrain where the contour level difference is 4m.</p> <p>After removal of minerals, undulating portion will be created. Excavated area or ultimate pit at the end of the mine period will be converted into water reservoir. Two tier tree belts will be planted along the safety distance.</p> <p>The 100% recovery is achieved by extracting the entire mineable reserve. Hence there will be no refuse generation due to the mining activity. Apart from that, a very meagre quantity of domestic waste will be generated in the project, which will be handed over to the local body on daily basis.</p>
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4.3 WATER ENVIRONMENT:

Aspect	Impact	Mitigation Measures
<i>Drilling, Blasting, Loading and unloading, Transportation of the excavated mineral.</i>	<p>The mining in the area may cause ground water contamination due to intersection of the water table and mine runoff.</p> <p>The ground water depletion may occur due to mining activity.</p> <p>Chemicals consisting of nitrate used for blasting may pollute the surface run off.</p>	<p>The water table will not be intersected during mining, as the ultimate depth is limited upto 43 meter below the ground level, whereas the ground water table is at 70 to 75m below the ground level. The municipal wastewater will be disposed into septic tanks of 5 cum and soak pit. No chemicals consisting of toxic elements will be used for carrying out mining activity.</p> <p>The ground water table is at a depth of 70 to 75m BGL, the mining operation will not affect the aquifer. The ultimate pit at the end of the mining operation will be used for rainwater storage, the stored water will be used for green belt development and further the stored water will be used for domestic purposes (other than drinking) after proper treatment.</p> <p>Further, the run-off water will be stored in sumps and after proper treatment; water will be used in the mining operation for dust suppression.</p>

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	Improper management of Domestic wastewater in the Mine lease may create unhygienic conditions in the site thereby causing health impacts to the labours.	Provision of urinals/Latrines along with septic tank followed by soak pit arrangement will be provided in the Mine Lease area for the proper management of wastewater
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4.4 AIR ENVIRONMENT:

Aspect	Impact	Mitigation Measures
<i>Drilling, Blasting, Loading and unloading, Transportation of the excavated mineral.</i>	<p><i>Impacts during Operation Phase</i></p> <p>During mining operation, fugitive dust and other air pollutants like particulate matter (PM₁₀ & PM_{2.5}) will be generated.</p> <p>The main source of pollutants arises due to drilling and blasting. 4 No of Tipper will be used for loading and unloading, 1 No of Excavator (0.90m³ bucket capacity (with rock breaker attachment) will be used for excavation of the mineral which contributes to the generation of fugitive dust. In addition, blasting will be done using explosives leading to the generation of dust.</p>	<p><i>Mitigation Measures during Operation Phase</i></p> <p>It is proposed to plant 2250 Nos of local species (with 450 Nos each year) along the haul roads, outer periphery within the lease area to prevent the impact of dust in consultation with Forest department for the plantation of trees (Neem, Magizham, Tamarind, Elandhai and Vilvam) in two tier to combat air pollution and with herbs (Nerium) in between the tree species.</p> <p>Planning transportation routes of the mined out mineral, so as to reach the nearest paved roads (an approach road) by shortest route connecting to Sithannavasal road.</p> <p>Alternatively, gravelled road may be</p>

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	<p><u>Effect on Human</u></p> <ul style="list-style-type: none"> • Adverse effect on human health of working labourers and neighbouring villagers like effect on breathing and respiratory system, damage to lung tissue, influenza or asthma. • Dust generation due to loading and unloading of mineral and due to transportation can also affect the workers as well as nearby villagers. <p><u>Effect on Plants</u></p> <ul style="list-style-type: none"> • Stomatal index may be minimized due to dust deposit on leaf. 	<p>constructed between mine lease area and nearest paved road connectivity. The speed of trucks plying on the haul road will be limited to 20km/hr to avoid generation of dust.</p> <p>The trucks will be covered by tarpaulin.</p> <p>Overloading will be avoided.</p> <p>Personal Protective Equipments (PPEs) like eye goggles, dust mask, leather gloves, safety shoes & boots will be provided to the workers engaged at dust generation points like excavation and loading points.</p> <p>0.5 KLD of water will be proposed for sprinkling on unpaved roads to avoid dust generation during transportation.</p>
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Air Quality Modeling:

The AERMOD is actually a modeling system with three separate components:

- AERMOD (AERMIC Dispersion Model),
- AERMAP (AERMOD Terrain Preprocessor)
- AERMET (AERMOD Meteorological Preprocessor)

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Special features of AERMOD include its ability to treat the vertical inhomogeneity of the planetary boundary layer special treatment of surface releases, irregularly shaped area sources, a plume model for the convective boundary layer, limitation of vertical mixing in the stable boundary layer, and fixing the reflecting surface at the stack base.

The AERMET is the meteorological preprocessor for the AERMOD. Input data can come from hourly cloud cover observations, surface meteorological observations and twice-a-day upper air soundings. Output includes surface meteorological observations and parameters and vertical profiles of several atmospheric parameters.

The AERMAP is a terrain preprocessor designed to simplify and standardize the input of terrain data for the AERMOD. Input data include receptor terrain elevation data. Output includes, for each receptor, location and height scale, which are elevations used for the computation of airflow around hills.

4.4.1 Source Characterization

A detailed listing of all emission sources and their corresponding modelling input release parameters and emission rates is listed in this report. A general description of how each source type was treated is presented below.

The emission Sources from the proposed operation are.

Point Sources:

Point sources for mining operations are typically include dust collectors, hot water heaters, and emergency generator(s). Since at the present project the following sources are anticipated.

1. Hydraulic excavator – 1.2 Cum Bucket Capacity (with Rock Breaker Attachment)
2. Jack Hammer 25.5mm Dia
3. Tipper
4. Tractor Mounted - Compressor
5. Drilling and excavation with Accessories

Road Sources:

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A road network was developed to depict the anticipated haul truck routes and truck discharge locations during the mine operations. The anticipated emissions from the road sources and corresponding anticipated impact during the monitoring period of January to March 2023 emissions were estimated. Emissions due to haul road and general plant traffic on the unpaved road network were modelled as volume sources. The model volume source parameter for the haul roads initially utilized USEPA developed emission factors for hauling trucking. The haul road sources utilized source to source spacing of 6 meters along the simulated haul roads. The initial lateral dimension of the sources were set to 3m were used as an input to replicated a 2 truck travel adjacent for a typical mining scenario.

The parameters considered for the hauling operation include the following,

- size of haul trucks commonly used.
- degree of dust control/compaction of permanent haul roads

Other fugitive particulate emission sources:

Other fugitive particulate emission sources that were modelled as volume sources include the following:

- Fugitive emissions from trucks unloading at the primary crusher were represented by a single volume source. The release height was set to 0 meters (dump pocket is at grade level).
- Fugitive emissions due to wind erosion is not considered as the mining area is predominately rocky surface with minimal wind erosion. If a wind erosion is anticipated to occur, it would be localized.
- Fugitive emissions from transfer points were represented by single volume sources. The release heights for these sources were set to the actual height of the truck transfer process.

Post Project Scenario

Emissions from operations will result from process equipment and mining operations. Process equipment was modeled at maximum capacity. Emissions from mining were based upon the mining rate and haul truck travel necessary to transport the stones and waste from the pit to the storage area.

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Predicted maximum ground level concentrations considering micro meteorological data of February to April 2021 are superimposed on the maximum baseline concentrations obtained during the study period to estimate the post project scenario, which would prevail at the post operational phase. The overall scenario with predicted concentrations over the maximum baseline concentrations is shown in the following table along with isopleths.

Table 4-1 Controlled emission calculation (24Hour- average modelling inputs)

Activity	Emission Factor		References	
Topsoil handling	Scraper	0.029 Kg TSPM/ average time between spray application	USEPA (2008)	Jose I. Huertas & Dumar A. Camacho & Maria E. Huertas, Standardized emissions inventory methodology for open-pit mining areas, Environmental Science Pollution Research, 2012.
	Bulldozing	15.048 kg PM10/ Hr excavation	USEPA (2008)	
	Loading	2.3237E-04 kg PM10/ average time between spray application	USEPA (2006a)	
	Haulage	0.69718 kg PM10/VKT	USEPA (2006a) Cowherd (1988)	
Rough stone mining	Wet drilling	8.00E-5 lbs PM10/ Ton produce	EPA. August, 2004. Section 11.19.2, Crushed Stone Processing and Pulverized Mineral Processing. In: Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition, AP-42. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.	
	Loading	1.00E-4 lbs PM10/ Ton produce		

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4.5 NOISE ENVIRONMENT:

Aspect	Impact	Mitigation Measures
<i>Drilling, Blasting, Loading and unloading, Transportation of the excavated mineral.</i>	<p>Usage of Equipments (Excavator, Tipper, Jack Hammer), Machinery and trucks used for transportation will generate noise.</p> <p>Noise from the machinery can cause hypertension, high stress level, hearing loss, sleep disturbance etc due to prolonged exposure.</p> <p>Number of vehicles will be increased due to the proposed mining activity hence vehicle may collate which may result in unwanted sound and can also cause impact on human health like breathing and respiratory system, damage to lung tissue, influenza or asthma.</p>	<ul style="list-style-type: none"> • The machinery will be maintained in good running condition so that noise will be reduced to minimum possible level. • Awareness will be imparted to the workers once in six months about the permissible noise level and effect of maximum exposure to those levels. Adequate silencers will be provided in all the diesel engines of vehicles. • It will be ensured that all transportation vehicles carry a valid PUC Certificates. • Speed of trucks entering or leaving the mine will be limited to moderate speed (20km/hr) to prevent undue noise from empty vehicles. <p>The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments.</p> <ul style="list-style-type: none"> • It is proposed to plant 2250 Nos. of local species (Neem, Mandharai, Athi, Tamarind, Ashoka, Casuarinas and Villam) to reduce the impact of noise in the study area. The

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		<p>development of green belts around the periphery of the mine will be implemented to attenuate noise.</p> <ul style="list-style-type: none"> • The trucks will be diverted on two roads viz. SH 71 & NH 336 to avoid traffic congestion. • Health check-up camps will be organized once in six months. • Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas. • Provision of quiet areas, where employees can get relief from workplace noise.
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4.6 BIOLOGICAL ENVIRONMENT:

Aspect	Impacts	Mitigation Measures
Site Clearance	Loss of habitat due to site clearance which may lead to ecological disturbance.	The proposed mining lease is already a dry land hence no site clearance is required. Only few shrubs and herbs like parthenium sp., prosopis juliflora were present.

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Planting of trees	Development of afforestation in the mine lease area will have a positive impact as the land was initially a barren.	7.5m safety distance will be provided all along the boundary of the mine lease area and safety. Around 0.25.0 Ha of land is utilized for greenbelt development (2250 Nos – 5 years). This will attract avifauna thus enhancing the existing ecological environment.
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4.7 SOCIO ECONOMIC ENVIRONMENT:

Aspect	Impact	Mitigation Measures
Proposed implementation of Mining activity	Land acquisition for the implementation of the project may result in loss of assets, which in return will make the PAP to shift, losing their normal routine and livelihood	The proposed project is a own patta land of Thiru. R. Arockiya Raj and the land is vacant where there are no human settlement within 500m radius. Hence the project does not involve Rehabilitation and resettlement
Drilling, Blasting, Loading and Transportation of the mined out mineral	The mining activities may cause dust emission, noise pollution thereby causing disturbance to the local habitat	No human activity is envisaged near the project site. The nearest human settlement is observed in Melur village which is 0.33 km-NE away from the project site.
Grazing and Rearing activities in the nearby villages	The Grazing and rearing of local animals like Sheep, Goat and cows is observed in the nearby villages, which may be affected due to the project as the movement of the vehicles may affect/injure the animals	It is proposed to use gravelled road and nearest paved road and preferred not to use unpaved roads. In addition to that, the speed of trucks will be limited to 20km/hr to avoid any accidents.

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Employment opportunity	The project will improve the livelihood of the local people	After the development of the proposed mine, it will improve the livelihood of local people and also provide the direct and indirect employment opportunities. The rough stone for the infrastructural development in the area will be made available from the local markets at reasonably lower price.
Corporate Environmental Responsibility	The proposed project will help in natural resource augmentation & Community resource development.	As a part of CER, 5 Lakhs will be allocated. Government Panchayat Union Middle School – Provision of <ul style="list-style-type: none"> ➤ Levelling the floor inside the school perimeter by using Earth materials, ➤ Environmental books for library (in Tamil language), Greenbelt facilities and Basic amenities such as safe drinking water, furniture, Hygienic Toilet and maintenance of toilet upto lease period.

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4.8 Other Impacts:

S. No	Aspect	Impact	Mitigation measure
1.	Risk due to the proposed mining	Accidents may occur in the mine area	Proper PPE kit (Safety jacket, Helmet, Safety Shoes, Gloves) etc will be provided to each and every employee in the mine lease concerning the safety of each labour
2.	Blasting	Injury to the labours due to the blasting activity	Alarm system in the form of Siren will be engaged in the project site to caution the blasting activity. In addition to that, the blasting activity will be scheduled at particular time – 1.00 P.M to 2.30 P.M (or whenever required) so that the employees will be aware of the activity. Smoking will be banned in the site and sign boards will be displayed in various places at site.
3.	Screening of Labors	Labours will be checked for health condition before employing them in mining activity	All the labours will be checked and screened for health before employing them. After employing them, periodical medical check-ups will be held once in every six months.

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5 Analysis Of Alternatives

5.1 General

Analysis of alternative is a significant aspect in planning and designing any project. Cost benefit analysis should be worked out along with other parameters while choosing an alternative in such a way that the production is maximum and the mining operation is environment friendly and cost effective. The mine plan and mine closure plan has been approved by the Deputy Director, Department of Mining and Geology, Pudukkottai District prior to submission of the Form-1 and PFR.

ToR issued by the SEIAA-TN vide Letter No. SEIAA-TN/F.No.9484/SEAC/ToR-1312/2023 dated 17.12.2022. The study for alternative analysis involves in-depth examination of site and technology.

5.1.1 Analysis for Alternative Sites and Mining Technology

5.1.1.1 Alternative Site

The proposed project is the mining of Rough Stone and Gravel Quarry and is proposed after prospecting the area. In other words, these can be implemented in the mineral available zone. Since the mining block has been allotted in principle by the State Government, there is no case for studying and exploring any other site as an alternative.

5.1.1.2 Alternative Technology

The open cast mining could be manual/semi-mechanized/mechanized depending upon the geological and topographical setup of the mineral (ROM) to be won and the daily/annual targeted production.

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Table 5-1: Alternative for Technology and other Parameters

S. No.	Particular	Alternative Option 1	Alternative Option 2	Remarks
1.	Technology	Opencast semi mechanized mining	Opencast mechanized mining	Opencast semi mechanized Involving drilling and blasting are preferred. Benefits: Material is hard so to make it loose and to bring it to appropriate size.
2.	Employment	Local employment.	Outsource employment	Local employment is preferred Benefits: Provides employment to local people along with financial benefits. No residential building/ housing is required.
3.	Labour transportation	Public transport	Private transport	Local labours will be deployed from Melur village so they will either reach mine site by bicycle or by foot. Benefits: Cost of transportation of labors will be negligible
4.	Material transportation	Public transport	Private transport	Material will be transported through trucks/trolleys on the contract basis Benefits: It will give indirect employment.
5.	Water	Tanker supplier	Ground water/	Tanker supply will be preferred. Water will be sourced from Melur Village which is located in 0.33 km in NE side from the project site.

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6 Environmental Monitoring Program

6.1 General:

This chapter covers the planned environmental monitoring program. It also includes the technical aspects of monitoring the effectiveness of mitigation measures.

Monitoring is important to measure the efficiency of control measures. Post project monitoring of environmental parameters is of key importance to assess the status of environment. The monitoring program will serve as an indicator for identifying environmental degradation due to operation of the project and help in selection of appropriate mitigation measures to safeguard the environment.

Regular monitoring is as important as control of pollution since the efficacy of control measures can only be determined by monitoring. The project proponent has awarded **M/s. Ecotech Labs Pvt Ltd** for carrying out the post project environmental monitoring (PPM) and timely compliance report submission to various regulatory authorities.

Therefore, a regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality. The objectives of monitoring are to: -

- Verify effectiveness of planning decisions.
- Measure effectiveness of operational procedures.
- Confirm statutory and corporate compliance; and
- Identify unexpected changes.

Table 6-1: Environmental Monitoring Programme

Parameters	Sampling	Frequency	Location
Air environment – Pollutants PM 10 PM 2.5 SO ₂	5 locations	24 hourly twice a week 4 hourly. Twice a week, One non monsoon season 8 hourly, twice a week	Project Site, Sri Karuppar Temple Eraiyyur, Govt High School, Mangudi, Govt Hr Sec School-

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NO _x		24 hourly, twice a week	Irambali, Siththi Vinayagar Alayam, Visvakarma Nagar Pudukkottai
Noise	5 locations	24 hourly Once in 5 locations	Project Site, Sri Karuppar Temple Eraiyur, Govt High School, Mangudi, Govt Hr Sec School-Irambali, Siththi Vinayagar Alayam, Visvakarma Nagar Pudukkottai
Water (Ground water) <ul style="list-style-type: none"> • pH • Temperature • Turbidity • Magnesium Hardness • Total Alkalinity • Chloride • Sulphate • Fluoride • Nitrate • Sodium • Potassium • Salinity • Total nitrogen 	5 locations	Once in 5 locations	Project Site, Sri Karuppar Temple Eraiyur, Govt High School, Mangudi, Govt Hr Sec School-Irambali, Siththi Vinayagar Alayam, Visvakarma Nagar Pudukkottai
Water (surface water) <ul style="list-style-type: none"> • pH • Temperature • Turbidity • Magnesium Hardness 	Sample from nearby lakes/river	One time Sampling	Vellanur Local Kanmoi

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<ul style="list-style-type: none"> • Total Alkalinity • Chloride • Sulphate • Fluoride • Nitrate • Sodium • Potassium • Salinity • Total nitrogen 			
Soil (Organic matter, Texture, pH, Electrical Conductivity, Permeability, Water holding capacity, Porosity)	5 locations	Once in 5 locations	Project Site, Sri Karuppar Temple Eraiur, Govt High School, Mangudi, Govt Hr Sec School-Irambali, Siththi Vinayagar Alayam, Visvakarma Nagar Pudukkottai
Ecology and biodiversity Study	Study area covering 5 km radius	One time Sampling	
Socio- Economic study (Population, Literacy Level, employment, Infrastructure like school, hospitals & commercial establishments)	Villages around 5 km radius	One time Sampling	

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Table 6-2: Monitoring Schedule during Mining

S. No.	Attributes	Parameters	Frequency	Location
1.	Ambient Air Quality at Mine Site & Fugitive Dust Sampling	PM 10 PM 2.5 SO ₂ NO _x	Once in a Month	Project Site
2.	Ground water Quality	Drinking Water Parameters, As per IS - 10500: 2012	Half yearly	Project Site
3.	Surface Water Quality	Class will be assessed as per the CPCB Guidelines	Half yearly	Project Site
4.	Soil Quality	(Organic matter, Texture, pH, Electrical Conductivity, Permeability, Water holding capacity, Porosity)	Half yearly	Project Site
5.	Noise Level Monitoring	Noise level in dB(A) Quarterly/half yearly	Half yearly	Project Site

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7 Additional Studies

7.1 General

This chapter covers the details of the additional studies viz. Risk assessment, Disaster Management, Public Hearing, Rehabilitation and Resettlement.

7.1.1 Public Hearing:

As the proposed mining project falls under 1(a), Category B1 – Cluster Mining (includes

Existing Other Quarries

Thiru M Velu - 0.65.5 Ha

Thiru R Natesan - 1.47.5 Ha

M/s.Sai Hridham Infraa Private Limited – 1.30.5 Ha

Thiru Jayaraj - 0.81.0 Ha

Thiru V Ravichandran - 1.27.5 Ha

Thiru M Rajamohamed - 1.30.5 Ha

Thiru Ramesh Babu - 1.50.5 Ha

Proposed Area

Thiru.R Arockiya Raj - 1.68.0 Ha

Thiru.R.Muthusamy- 0.82.0 Ha

Tvl.Sai Hridham Infraa (P) Ltd – 1.68.0 Ha

Tvl.Sai Hridham Infraa (P) Ltd – 0.51.5 Ha

Tvl.Sai Hridham Infraa (P) Ltd – 3.38.5 Ha

Tvl.Sai Hridham Infraa (P) Ltd – 2.52.0 Ha

Lease Expired:

Thiru.S.M.Sait - 0.40.5 Ha

S Ganesan - 2.63.5 Ha

Thiru.A.Periyasamy - 0.75.0 Ha

Thiru.R.Muthusamy- 0.93.5 Ha

S.M.Sait- 0.50.0 Ha

G Anthonisamy - 0.36.0 Ha

P.Sannasi - 1.01.0 Ha

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The Total extent of the Existing / Lease expired / Proposed quarries are 19.84.0 Ha

Hence under 7(III) of EIA notification 2006 and its subsequent amendments, the project involves the Public Consultation and the same will be conducted under SPCB (TN) in Pudukkottai District. The proceedings of the same will be incorporated in the Final EIA Report.

7.1.2 Risk assessment:

For mining projects to be successful, it should meet not only the production requirements, but also maintain the highest safety standards for all the workers. The industry has to identify the hazards, assess the associated risks and bring the risks to tolerable level regularly. Mining has considerable safety risk to miners. Unsafe conditions and practices in mines lead to a number of accidents and causes loss and injury to human lives, damage property, interrupt production etc. Risk assessment is a systematic method of identifying and analyzing the hazards associated with an activity and establishing a level of risk. The hazards cannot be completely eliminated, and thus there is a need to define and estimate an accident risk level possible to be presented either in quantitative or qualitative way.

7.1.3 Identification of Hazard

7.1.3.1 Blasting Pattern:

The quarrying operation will be carried out by Opencast Mechanized method in conjunction with conventional method of mining using Jack Hammer drilling and blasting for shattering effect and loosen the Rough Stone.

7.1.3.2 Drilling and Blasting:

Drilling and Blasting parameters are as follows:

Diameter of Hole	30-32 mm
Spacing between holes	1.2 m
Depth	1 to 1.5 m
Pattern of hole	Zigzag
Inclination of holes	80° from Horizontal
Use of delay detonators	25 milli-second delays

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Detonating fuse	“Detonating” Cord
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a. Types of explosives to be used:

Small dia of 30-32mm Slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling or Primary blasting is proposed.

b. Measures proposed to minimize ground vibration due to Blasting:

The quarry is situated more than 0.33 km from the nearby villages. Controlled blasting measures will be adopted for minimizing ground vibration and fly of rock. Shallow depths jackhammer drilling & blasting is proposed to be carried out with minimum use of explosive mainly to give the shattering effect in rough stone for easy excavation and to control fly of rocks.

Diameter of Holes	=	30 - 32 mm
Powder factor	=	6 to 7 Tons/Kg of explosives
Depth	=	1 to 1.5 m
Charge/Hole	=	140 gms of 25mm dia cartridge
Blasted at daytime	=	1 to 2.30 PM (or whenever required)

Storage and safety measures to be taken while blasting: The proponent will engage an authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory Foreman/Permit Mines Manager.

Heavy Machineries: The following heavy machineries will be used in the proposed area:

- For Mining – Excavator of 0.90 Cum Bucket capacity (with Rock Breaker attachment), Jack Hammers (32 mm Dia) of 2 Nos.
- Loading Equipment – Excavator of 0.90 Cum Bucket Capacity (with Bucket attachment)
- Transportation (includes within the mine and mine to destination) – Tipper 4 No of 10/20 M.T capacity (from quarry to needy peoples and local crushers)

a. Risk:

Most of the accidents during transport of mined out mineral using other heavy vehicles are often attributed to mechanical failures and human errors.

b. Mitigation measures to minimize the risk.

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- At the time of loading no person will be allowed within the swing radius of the excavation.
- The dumpers/ trucks will stand near the loading equipment and fully braked when the muck is filled in it.
- The truck would be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The workers will be provided with helmets, gloves and safety boots; loading and unloading operations will be carried out only during daylight
- All the mining machineries will be regularly maintained and checked such as brakes, lights and horns to keep in the efficient working order.

7.1.4 General Precautionary measures for the Risk involved in the proposed mine:

- In order to take care of above hazard/disaster, the following control measures will be adopted:
- All safety precautions and provisions of Mine Act,1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited.
- Firefighting and first-aid provisions in the ECC and mining area.
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the workers (27 Nos.) and regular inspection for their use;
- In case of eventuality, first aid will be given by the senior safety office in the mine area initially to the injured person. The safety officer will give notice of accident as per Rule-23 of Mines Act-1952.
- The safety officer (common for 3 mines within 500m radius) will be responsible for coordination between management district authorities/DGMS etc. Regarding general safety as per Rule-181 of MMR 1961, “No person shall negligently or will fully do anything likely to endanger life or limb in the mine, or negligible or will fully omit to do anything necessary for the safety of the mine or of the persons employed there in”. The workers will be provided with protective foot wear and safety helmets.
- Cleaning of mine faces will be regularly done;

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- Handling of explosives, charging and blasting will be carried out by highly skilled labours only;
- Regular maintenance and testing of all mining equipment as per manufacturer’s guidelines;
- Suppression of dust by sprinkling water on the haulage roads;

7.1.5 Safety Team:

The effective implementation of compliance of Safety Rules/ Statutory Provisions will be ensured. The safety officer will be engaged, meeting the requirement of Mines Act and their duties and responsibilities. The safety officer will be responsible for identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. Organizing safety training will be conducted to employees and contractor labors periodically.

7.1.6 Emergency Control Centre

The emergency control center will be provided to handle the emergency. The site main controller, key personnel and the senior officers of the fire and police services will attend it. The center will be equipped to receive and transmit information and directions from and to the incident controller and other areas of the works, as well as outside. The emergency control center will be sited in an area of minimum risk. This common Emergency control center will be used for the mines around the 500m radius.

7.2 Disaster Management:

The possible risks in the case of stone along with associated minor minerals mining projects are fly rock, vibration failure of pit, slope and waste dump, accidents due to transportation. Mining and allied activities are associated with several potential hazards to both the employees and the public at large. Safety of the mine and the employees is taken care of by the mining rules & regulations, which are well defined with laid down procedure for safety, which when scrupulously followed, safety is ensured not only to manpower but also to machines & working environment.

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7.2.1 Emergency Management Plan For Proposed Mines On Site- Offsite Emergency Preparedness Plan:

The emergency plan delineates the procedures for dealing with accidents or unexpected events and natural calamities arising from mining activity. An experience of any accidents that have occurred in other manufacturing/mining projects is considered to prepare this plan. This Emergency plan should be periodically reviewed and modified. It should also be changed based on the observations of emergency mock drills and experience of handling actual emergencies.

Major objectives of this onsite – offsite emergency plan are:

- To take necessary proactive and preventive actions to avoid the emergency.

The main aim of any emergency plan should be to prevent emergency situations.

To train the manpower to handle the emergencies of the following nature:

- Onsite (Within ML boundary)
- Offsite (Outside ML boundary)

7.3.2 Onsite off-site emergency Plan:

1- Emergency on account of:

- Fire
- Explosion
- Major accidents involving man-made collapse of the mining edges.
- Snake bites, attack by honeybees or attack by wild animals.

2- Disaster due to natural calamities like:

- Flood/ heavy rains which can involve natural landslides.
- Earth quake
- Cyclone
- Lightening

7.3.3 Emergency Plan:

- The mining operations should be immediately stopped in case of any emergency. A siren will be sounded during emergency time.

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- An emergency assembly point will be created and all the workers will guide visitors or contractors to approach assembly point.
- Emergency vehicle (Ambulance) will be available in the nearby place, in proximity to the three mines and will rush to the emergency control centre at the blowing of emergency siren. The driver of emergency vehicle will follow the instructions of Incident Controller/Site Main Controller.
- Workers will be trained for the precautions to be taken during natural disasters like heavy rain, floods, earthquake and cyclone.
- All escape routes from mines to the assembly point or any other safe location will be made and the escape plan will be displayed in many places in the mine area

7.3.4 Emergency Control:

- Shut down of mining operations: Raising the alarm or siren followed by immediate safe shut down of the power supply, and isolation of affected areas.
- Treatment of injured: First aid and hospitalization of injured persons
- Protection of environment and property: During mitigation, efforts will be made to prevent impacts on environment and property to the extent possible.
- Preserving all evidences and records: This will be done to enable a thorough investigation of the true causes of the emergency.
- Ensuring safety of personnel prior to restarting of operations: Efforts required will be made to ensure that work environment is safe prior to restarting the work.

7.3 Natural Resource Conservation

There are no natural resources within the premises. The conservation strategies for energy will be followed in the proposed mine lease area. The pollutants of the mine will be minimized by adopting appropriate mitigation measures as mentioned Chapter 5 to prevent the effects on nearest water bodies. No surface runoff from the project site will be let into the nearest water bodies.

7.4 Resettlement and Rehabilitation:

The proposed Mine lease area is a private land of Thiru. R. Arockiya Raj. There is no displacement of the population within the project area and adjacent nearby area and hence Rehabilitation & Resettlement is not applicable.

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8 Project Benefits

8.1 General

This chapter covers the benefits accruing to the locality, neighborhood, region and nation as a whole. It brings out the details of benefits by way of improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits.

8.1.1 Physical Benefits

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas:

- a. **Market:** Generating useful economical resource for construction. Due to demand supply chain, excavated mineral (Rough stone & Gravel) will sold in the market in the affordable price.
- b. **Infrastructure:** The excavated rough stone will be used for *Laying Roads, Building & Construction Projects, Bridges.*
- c. **Enhancement of Green Cover & Green Belt Development:** As a part of reclamation plan, native tree species will be planted along the safety boundary (0.25.0Ha) of the mine lease area. A suitable combination of trees that can grow fast and also have good leaf cover will be adopted to develop the green belt. It is proposed to plant 450 numbers of native species along with some fruit bearing and medicinal trees during the mining plan period.

8.2 Social Benefits

The mining in the area will create rural employment. During site visit, it has been observed that the economic conditions of the villages in the study area is quite normal. After the development of the proposed mine, it will improve the livelihood of local people and also provide the indirect employment opportunities. The rough stone for the infrastructural development in the area will be made available from the local markets at reasonably lower price.

As a part of CER, i.e., 5 Lakhs will be allocated. The detailed agenda, which is to be executed has been framed. The salient features of the programme are as follows:

- Levelling the floor inside the school perimeter by using Earth materials, P
- Environmental books for library (in Tamil language),
- Greenbelt facilities and

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

- Basic amenities such as safe drinking water and furniture to Panchayat Union Primary Schools in Melur Village.

8.3 Project Cost / Investment Details

(a) Project cost / investment cost :

Sl. No	DETAILS	Cost of lakhs
i)	Land cost	Rs.13,44,000/-
ii)	Labours Shed	Rs. 1,50,000/-
iii)	Refilling/Fencing cost	Rs. 2,50,000/-
iv)	Sanitary facility	Rs. 1,50,000/-
TOTAL		Rs. 18,94,000/-

(b) Expenditure/ PRODUCTION COST

Machinery Cost: 25,00,000

(c) EMP (Estimation) Cost :

Sl. No.	Details	Cost in (Rs.)
1	Air Quality sampling	Rs.2,00,000/-
2	Water quality sampling	Rs.1,00,000/-
3	Noise monitoring	Rs.20,000/-
4	Ground vibration test	Rs.50,000/-
5	Drinking water facility for the labours	Rs.2,70,000/-
6	Sanitary arrangements	Rs.2,10,000/-
7	Safety kits	Rs.1,20,000/-
8	Water sprinkling	Rs.5,40,000/-
9	Afforestation cost	Rs.70,000/-
Total		Rs.18,08,000/-

Fixed Asset Cost = Rs.18,94,000/-

Machinery Cost = Rs.25,00,000/-

Total EMP Cost = Rs. 18,08,000/-

GRAND TOTAL PROJECT COST (A+B) = Rs. 62,02,000/-

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<i>Project Proponent</i>	<i>Thiru.R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

9 Environmental Management Plan

9.1 Introduction

This chapter comprehensively presents the Environmental Management Plan (EMP), which includes the administrative and technical setup, summary matrix of EMP, the cost involved to implement the EMP, during various Mining activities and provisions made towards the same in the cost estimates of project. This chapter describes the proposed monitoring scheme as well as inter-organizational arrangements for effective implementation of the mitigation measures.

9.2 Subsidence

Mining will be carried out by opencast semi mechanized mining method with drilling & blasting as per mining plan approved by Department of Mining and Geology, Pudukkottai. Subsidence/slope failures are not envisaged because there are no loose strata overlying the deposit (mineral to be excavated). The bench height will be average 5m. The individual bench slope has been proposed to be kept at 60° from horizontal. Moreover, all safety standards/ safeguards will be implemented as per guidelines prescribed by Director General of Mines Safety.

9.3 Mine Drainage

9.1.1 Storm water Management

The following measures will be taken with respect to the prevailing site conditions.

- Storm water drains with silt traps of size 1m x 1m will be suitably constructed all along the periphery of the pit area to collect the run-off from the mine area and divert into the pit.
- All measures will be taken not to disturb the existing drainage pattern adjacent to the mine lease area.
- The storm water collected from the mine area will be utilized for dust suppression on haul roads, plantation within the premises, etc.,

9.1.2 Drainage

Local workers will be deployed for the project. But, urinals and Latrines will be provided and the same will be connected to septic tank followed by soak pit arrangement. No domestic waste will be deposited into the nearby area. Regular checking will be carried out to find any blockage due to silting or accumulation of loose materials. The drains will also be checked for any damage in lining / stone pitching, etc.

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Project Location	Melur Village, Kulathur Taluk, Pudukkottai District.	

9.1.3 Administrative and Technical Setup

The Environment Management Plan (EMP) will consist of all mitigation measures for each component of the environment due to the activities increased during mining operation to minimize adverse environmental impacts resulting from the activities of the project.

To carry out the above activities, Thiru.R. Arockiya Raj will work in association with M/s. Ecotech Labs Pvt Ltd.

Table 9-1: Impacts and mitigation measures

S. No	Impacts on Environment	Activity /Aspect	Anticipated impacts	Mitigation measures	Budgetary Allocation
1.	Air	Fugitive Emission	During mining operation, fugitive dust and other air pollutants like particulate matter (PM10 & PM 2.5) will be generated.	<ul style="list-style-type: none"> Planting of trees along the safety distance of the Mine Lease Area Water will be sprinkled in the site as dust suppression measure. 	Rs.50,000 Rs.1,50,000
2.	Water	Wastewater Generation	Improper management of Domestic wastewater in the Mine lease may create unhygienic conditions in the site thereby causing health impacts to the labors	<ul style="list-style-type: none"> Provision of urinals/Latrines along with septic tank followed by soak pit arrangement will be provided in the Mine Lease area for the proper management of wastewater. 	Rs.1,00,000
3.	Noise	Mining activities like drilling, blasting, loading and transportation	Noise from the machinery can cause hypertension, high stress level, hearing loss, sleep disturbance etc due to prolonged exposure. Apart from Mining activities like drilling, blasting	<ul style="list-style-type: none"> Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas. 	Rs.20,000

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			may generate noise		
4.	Land	Improper management of Storm water Runoff	Storm water Runoff may result in Soil Erosion	<ul style="list-style-type: none"> Garland drainage of 1m x 1m will be provided to avoid storm water run-off. 	Rs.1,00,000
5.	Social Responsibility	Mining workers	Unhygienic site sanitation facilities may cause health damage to workers.	<p>The objective is to ensure health and safety of the workers with effective provisions for the basic facilities of sanitation, drinking water, safety of equipments or machinery etc. The following will be done in the site</p> <ul style="list-style-type: none"> ✓ By complying with the safety procedures, norms and guidelines (as applicable) as outlined in the National Building Code of India, Bureau of Indian Standards. Rs.25,000 ✓ Provide adequate number of decentralized latrines and urinals Rs.30,000 ✓ Providing Septic tank along with Soak pit arrangement Rs.1,00,000 ✓ Providing First Aid room, conducting frequent health checkups to labor and conducting free medical camps Rs.36,000 ✓ Providing safety helmet, Gloves, Jacket & Boots Rs.50,000 ✓ Providing measures to prevent fires. Fire fighting extinguishers 	

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
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				and buckets of sand will be provided in the construction site	
6.	Building materials resource conservation	Building Material consumption	Use of farfetched construction materials than the locally available construction materials may lead to over exploitation of natural resources & increase in carbon footprint.	<ul style="list-style-type: none"> • Use of locally available construction materials. 	

Table 9-2: Budgetary Allocation for EMP during Mining

Sl. No.	DETAILS	COST in (Rs.)
1	Air Quality sampling	Rs.2,00,000/-
2	Water quality sampling	Rs.1,00,000/-
3	Noise monitoring	Rs.20,000/-
4	Ground vibration test	Rs.50,000/-
5	Drinking water facility for the labours	Rs.2,70,000/-
6	Sanitary arrangements	Rs.2,10,000/-
7	Safety kits	Rs.1,20,000/-
8	Water sprinkling	Rs.7,80,000/-
9	Afforestation cost	Rs.70,000/-
	Total	Rs.18,20,000/-

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru. R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

10 Summary & Conclusion

This chapter summarizes the overall justification for implementation of the project and explains how the potential impacts are mitigated.

10.1 Introduction

Thiru.R. Arockiya Raj site is mining project coming under cluster conditions. The individual mine lease area is 1.68.0 Ha of Rough Stone and Gravel Quarry located at S.F. No: 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District.

10.2 Project Overview

Table 10-1: Project Overview

S. No.	Description	Details
1	Project Name	Rough Stone and Gravel Quarry
2	Proponent	Thiru.R Arockiya Raj
3	Mining Lease Area Extent	1.68.0 Ha
4	Location	S.F. Nos. 210/7A Melur Village, Kulathur Taluk, Pudukkottai District.
5	Latitude	10°26'40.50"N to 10°26'48.54"N
6	Longitude	78°45'55.90"E to 78°46'00.42"E
7	Topography	Plain terrain
8	Site Elevation above MSL	≈114.0m above MSL.
9	Topo sheet No.	58-J/15
10	Minerals of Mine	Rough Stone and Gravel
11	Proposed production of Mine	Proposed capacity of Rough stone: 103570 m ³ and Gravel: 24312 m ³
12	Ultimate depth of Mining	17.0 m below ground level
13	Method of Mining	Open cast mechanized mining
14	Water demand	2.5 KLD
15	Source of water	Water will be supplied through tankers supply
16	Manpower	Direct :16 Nos, Indirect :9 Nos
17	Mining Lease	Precise Area Communication Letter received from Assistant Director, Dept. Geology and Mining, Pudukkottai vide letter

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru. R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

		Rc.No.223/2022 (G&M) Mines dated 29.09.2022
18	Mining Plan Approval	Mining Plan was approved by the Assistant Director, Dept. of Geology & Mining, Pudukkottai vide letter Rc.No.677/2021 (G&M) dated 02.06.2022
19	Production details	Geological reserves of Rough Stone: 1087125 m ³ and Gravel: 33450 m ³ . Proposed five year production reserves of Rough Stone: 103570 m ³ and Gravel: 24312 m ³ .
20	Boundary Fencing	7.5m barrier all along the boundary Fencing will be provided.
21	Disposal of overburden	The over burden in the form of Gravel is 24312 m ³ of used for filling and leveling of low lying areas of road projects and other infrastructure development work in and around the district.
22	Ground water	The ground Water Level is noticed at the depth of 70m to 75m BGL by monitoring nearby bore hole, during the climatic conditions, the fluctuations of water level is 70m in Rainy seasons and 75m in Summer seasons of this quarry area. It shall be ensured that quarrying shall not be carried out below ground water table under any circumstances. If ground water table occurs/intervenes within the permitted depth, then also the quarrying shall be stopped.
23	Habitations within 500m radius of the Project Site	There is no Habitation within 500m radius of the project site.
24	Drinking water	Water will be supplied through tankers from Melur Village which is 0.33 km NE from the project site.

10.3 Justification of the proposed project

The said project plays a significant role in the domestic as well as infrastructural market. To achieve a huge infrastructure being envisaged by Government of India, particularly in road and housing sector, there is a need for basic building materials. The rough stone form the primary building material.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
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<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

Rough stone is one of the most valuable natural building materials. Aggregates are mostly used for building roads and footpaths. Aggregates – stone used for its strong physical properties – crushed and sorted into various sizes for use in concrete, coated with bitumen to make asphalt or used 'dry' as bulk fill in construction. Mostly used in roads, concrete and building products. Aggregates represent about 98% of quarry output, most of which is used in road construction, maintenance and repair. Much of this goes to the production of asphalt; the remainder is used 'dry' without the addition of other materials to provide a sturdy base for roads.

Since Pudukkottai, a city known for its small-scale industries and also the soil in the area near project site is not very fertile making it unsuitable for carrying out agricultural activities. The topography near the lease area is barren dry lands showing only less chance for crop growth and development of vegetation. In addition to that, geological reserves of rough stone is abundant in the lease area which is evident from the mine activities carried out in the nearby sites.

Table 10-2: Anticipate Impacts & Appropriate Mitigation Measures

S. No.	Potential Impact	Mitigation Measure
1	The main impact in the air environment is dust emission during various mining activities such drilling, blasting, excavation, loading and transportation. The dust emission may affect the quality of ambient air in the and around the mine area. The increased emission may cause respiratory & Cardiovascular problems in human health	Proper mitigation measures like water sprinkling on haul roads will be adopted to control dust emissions. To control the emissions regular preventive maintenance of equipments will be carried out on contractual basis. Plantation will be carried out along approach roads & mine premises.
2	Waste water will be generated due to mining activity and from other domestic activities. These may contaminate the ground water	No waste water will be generated from the mining activity of minor minerals as the project only involves lifting of over burden from mine site. The wastewater

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
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	leading to ground water. The mining activity may affect the ground water table	generated from the domestic activity will be disposed off safely through the proposed septic tank. Mining will not intersect ground water table. Hence the water table will not be impacted due to the proposed project
3	Noise will be generated in the mine area during various mining activities such as blasting, drilling, excavation. During transportation of the mined out mineral, there may be noise generation due to the movement of vehicles. This may impact the health condition of the workers by creating headache	Periodical monitoring of noise will be done. No other equipments except the transportation vehicles and Excavator (as & when required) for loading will be allowed at site. Noise generated by these equipments shall be intermittent and does not cause much adverse impact. Plantation will be carried out along approach roads. The plantation minimizes propagation of noise and also arrest dust.
4	Solid waste will be generated from the mining activity as there will be refuse after 95% recovery and also generation of domestic waste	The 100% recovery is achieved by extracting the entire mineable reserve. Hence there will be no refuse generation due to the mining activity. Apart from that, a very meagre quantity of domestic waste will be generated in the project, which will be handed over to the local body on daily basis.

<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru. R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

5	During mining activities, there are chances of workers getting health issues or may be prone to accidents	<p>Dust masks will be provided as additional personal protection equipment to the workers working in the dust prone area.</p> <p>Periodical trainings will be conducted to create awareness about the occupational health hazards due to activities like blasting, drilling, excavation.</p> <p>Workers health related problem if any, will be properly addressed.</p>
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<i>Project</i>	<i>Rough Stone and Gravel Quarry – 1.68.0 Ha by Thiru.R Arockiya Raj</i>	<i>Draft EIA Report</i>
<i>Project Proponent</i>	<i>Thiru. R Arockiya Raj</i>	
<i>Project Location</i>	<i>Melur Village, Kulathur Taluk, Pudukkottai District.</i>	

11. Disclosure of Consultant

10.4 Introduction

This chapter presents the details of the environmental consultants engaged, their background and the brief description of the key personnel involved in the project. Specific studies on the mining project have been carried out by engaging engineers/experts of Ecotech Labs Pvt. Ltd, Chennai. Ecotech Labs Pvt. Ltd (ETL), Chennai is NABET accredited consultancy organization. ETL is equipped with in-house, spacious laboratory, accredited by NABL (National Accreditation Board for Testing & Calibration Laboratories), Department of Science & Technology, Government of India and MoEF & CC.

11.2 Eco Tech Labs Pvt. Ltd – Environment Consultant

Eco Tech Labs Pvt. Ltd is a multi-disciplinary testing and research laboratory in India. Eco Tech labs provides high quality services in environmental consultancy, engineering solution, chemical and microbiological laboratory analysis of food, water and environment (Air, Water, Soil) with highest accuracy.

11.1.1 The Quality policy

- We, at Eco Tech Labs Pvt. Ltd. engaged in providing Environmental consulting services and we are committed to strengthen our capabilities in all areas of our operations in line with customer requirements & expectations, applicable legal requirements & stakeholders expectations.
- We are committed to establish and maintain Quality Management System (QMS) for continual improvement in processes and Services
- We are committed to provide customized solutions in realistic, time bound and cost effective to achieve highest degree of customer satisfaction and Environmental improvement.
 - We shall establish, maintain & periodically review our documented management systems, objectives and performance in consultation with our employees and prevailing best practices.
 - Effective communication of organization's policy and objectives to employees and seeking feedbacks from all our employees and concerned stakeholders for continual improvement.

ANNEXURE I
Terms of Reference



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/F.No.9484/ToR-1312/2022 Dated: 07.12.2022.

To

R. Arockiya Raj
S/oRethinam Pillai
No297/7, Sathiyamoorthy Nagar
Pudukkottai District – 622 001

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference for the proposed Rough stone & gravel quarry lease over an extent of 1.68.0 Ha at S.F.No.210/7A of Melur Village, Kulathur Taluk, Pudukkottai district, Tamil Nadu by Thiru.R. Arockiya Raj- 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/400073/2022, dt:27.09.2022
2. Your application submitted for Terms of Reference dated:29.09.2022
3. Minutes of the 331st SEAC meeting held on 24.11.2022.
4. Minutes of the 576th SEIAA meeting held on 07.12.2022.

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

The proponent Thiru.R.Arockiya Raj has applied for Terms of Reference for the proposed Rough stone & gravel quarry lease over an extent of 1.68.0 Ha at S.F.No.210/7A of Melur Village, Kulathur Taluk, Pudukkottai district, Tamil Nadu.


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Discussion by SEAC and the Remarks:-

The proposal was placed in 331st meeting of SEAC held on 24.11.2022. The details of the project are available in the website (parivesh.nic.in).

The SEAC noted the following:

1. The project proponent, Thiru.R.Arockiya Raj has applied for Terms of Reference for the proposed Rough stone & gravel quarry lease over an extent of 1.68.0 Ha at S.F.No.210/7A of Melur Village, Kulathur Taluk, Pudukkottai district, Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining of Minerals Projects" of the Schedule to the EIA Notification, 2006.
3. As per the mining plan, the lease period is for 10 years. The mining plan is for 5 years. The production for 5 years not to exceed **1,03,570 cu.m of rough stone and 24,312 cu.m of gravel** with an ultimate depth of 17m below ground level.

Based on the presentation and details furnished by the project proponent, **SEAC decided to grant 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 original letter of approval obtained for the Mining Plan prepared for the mine shall be furnished during the EIA appraisal.
2. The bottom bench exists in the Section C-D shall be removed and accordingly the revised quantity are spelt out in the 'modified Production and Development Plan' to be submitted during the EIA appraisal.
3. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc.
4. 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.
5. The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, as the depth of the proposed working is extended beyond 30 m below ground level.


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6. 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.
7. 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.
8. 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.
9. 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.
10. 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).
11. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,
12. The PP shall furnish the revised manpower including the statutory & competent persons as required under the provisions of the MMR 1961 for the prosed quarry based on the volume of rock handled & area of excavation.
13. The proponent shall furnish photographs of adequate fencing, green belt along the periphery


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- including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
14. 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.
 15. 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.
 16. 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.
 17. 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.
 18. 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.
 19. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
 20. 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.


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21. 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.
22. 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.
23. 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.
24. Impact on local transport infrastructure due to the Project should be indicated.
25. 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.
26. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
27. 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.
28. The Public hearing advertisement shall be published in one major National daily and onemost circulated vernaculardaily.
29. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
30. 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.
31. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities.


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- 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.
32. 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
 33. 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.
 34. 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.
 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. 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.
 38. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
 39. 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.
 40. 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.
 41. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit


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stating to abide the EMP for the entire life of mine.

42. 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

No	Scientific Name	Tamil Name	Tamil Name
1	<i>Aegle marmelos</i>	Vilvam	வில்வம்
2	<i>Adenaanthera pavonina</i>	Manjadi	மஞ்சாடி, ஆனைக்குன்றிமணி
3	<i>Albizia lebbek</i>	Vaagai	வாகை
4	<i>Albizia amara</i>	Uoil	உச்சில்
5	<i>Bauhinia purpurea</i>	Mantharai	மந்தாரை
6	<i>Bauhinia racemosa</i>	Aathu	ஆத்தி
7	<i>Bauhinia tomentos</i>	Iruvathu	இருவாத்தி
8	<i>Buchanania axillaris</i>	Kattuma	காட்டுமா
9	<i>Borassus flabellifer</i>	Panai	பனை
10	<i>Butea monosperma</i>	Murukkamaram	முருக்கமரம்
11	<i>Bobax ceiba</i>	Ilavu, Sevvilavu	இலவு
12	<i>Calophyllum inophyllum</i>	Punnai	புனை
13	<i>Cassia fistula</i>	Sarakondrai	சரக்கொன்றை
14	<i>Cassia roxburghii</i>	Sengondrai	செங்கொன்றை
15	<i>Chloroxylon sweetenia</i>	Purasamaram	புரசு மரம்
16	<i>Cochlospermum religiosum</i>	Kongu, Manjallavu	கோங்கு, மஞ்சள் இலவு
17	<i>Cordia dichotoma</i>	Naruvuli	நருவுளி
18	<i>Creteva adansoni</i>	Mavalangum	மாவிஸங்கம்
19	<i>Dillenia indica</i>	Uva, Uzha	உசா
20	<i>Dillenia pentagyna</i>	SiruUva, Sitruzha	சீறு உசா
21	<i>Diospyro sobenun</i>	Karungali	கருங்காலி
22	<i>Diospyro schloroxylon</i>	Vaganai	வாகனை
23	<i>Ficus amplissima</i>	Kalltchi	கல் இச்சி
24	<i>Hibiscus tiliaceou</i>	Aatrupoovarasu	ஆற்றுப்புலரசு
25	<i>Hardwickia binata</i>	Aacha	ஆச்சா
26	<i>Holoptelia integrifolia</i>	Aayili	ஆயா மரம், ஆயிலி
27	<i>Laurea coromandelica</i>	Odhiam	ஒதியம்
28	<i>Lagerstroemia speciosa</i>	Poo Marudhu	பூ மருது
29	<i>Lepisanthus tetraphylla</i>	Neikottaimaram	நெய் கொட்டை மரம்
30	<i>Limonia acidissima</i>	Vila maram	வில்லா மரம்
31	<i>Litsea glutinos</i>	Pisinpattai	கரம்பா பிசின்பட்டை
32	<i>Madhuca longifolia</i>	Iluppai	இலுப்பை
33	<i>Manilkara hexandra</i>	UlakkaiPaalai	உலக்கை பாலை
34	<i>Mimusops elengi</i>	Magizhamaram	மகிழ்மரம்
35	<i>Mitragyna parvifolia</i>	Kadambu	கடம்பு
36	<i>Morinda pubescens</i>	Nuna	நுணா
37	<i>Morinda citrifolia</i>	Vellai Nuna	வெள்ளை நுணா
38	<i>Phoenix sylvestre</i>	Eachai	ஈச்சமரம்
39	<i>Pongamia pumat</i>	Pungam	பங்கம்


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40	<i>Premna mollissima</i>	Murunai	முள்ளை
41	<i>Premna serratifolia</i>	Narumurunai	நறு முள்ளை
42	<i>Premna tomentosa</i>	Malaipoovarasu	மலைப் பூவரசு
43	<i>Prosepis cinerea</i>	Varuu maram	வள்ளி மரம்
44	<i>Pterocarpus marsupium</i>	Vengai	வேங்கை
45	<i>Pterospermum canescens</i>	Vennangu, Tada	வெண்ணாங்கு
46	<i>Pterospermum xylocarpum</i>	Polavu	பூவடு
47	<i>Putranjiva roxburghii</i>	Karipala	கறிபாலா
48	<i>Salvadora persica</i>	Ugaa Maram	ஊகா மரம்
49	<i>Sapindus emarginatus</i>	Manipungan, Soapukai	மணிப்புங்கள் சோப்புக்காய்
50	<i>Saraca asoca</i>	Asoca	அசோகா
51	<i>Strobilus asper</i>	Piray maram	பிராய் மரம்
52	<i>Strychnos nuxvomica</i>	Yetti	எட்டி
53	<i>Strychnos potatorum</i>	Therthang Kottai	தேத்தாள் கொட்டை
54	<i>Syzygium cumini</i>	Naval	நாவல்
55	<i>Terminalia belleric</i>	Thandri	தாந்தி
56	<i>Terminalia arjuna</i>	Ven marudhu	வெண் மருது
57	<i>Toona ciliata</i>	Sandhana vembu	சந்தன வேம்பு
58	<i>Thespesia populnea</i>	Puvarasu	பூவரசு
59	<i>Walsuratrifoliata</i>	valsura	வால்சுரா
60	<i>Wrightia tinctoria</i>	Veppalai	வேப்பாளை
61	<i>Pithecellobium dulce</i>	Kodukkapuli	கொடுக்காய்ப்பளி

Discussion by SEIAA and the Remarks: -

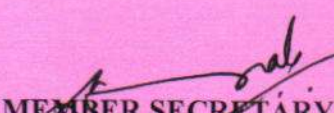
The subject was placed in 576th authority meeting held on 07.12.2022. The authority noted that the subject was appraised in 331st SEAC meeting held on 24.11.2022. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the conditions in 'Annexure B' of this minutes.

Annexure 'B'

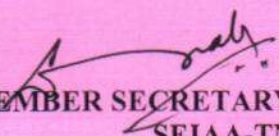
1. Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.
2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,
3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.


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4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.
5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.
6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.
7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.
8. The committee shall furnish the Emergency Management plan within the cluster.
9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.
10. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
 - a) Soil health & bio-diversity.
 - b) Climate change leading to Droughts, Floods etc.
 - c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
 - d) Possibilities of water contamination and impact on aquatic ecosystem health.
 - e) Agriculture, Forestry & Traditional practices.
 - f) Hydrothermal/Geothermal effect due to destruction in the Environment.
 - g) Bio-geochemical processes and its foot prints including environmental stress.
 - h) Sediment geochemistry in the surface streams.
11. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.
12. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.
13. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.


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14. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.
15. Impact on surrounding agricultural fields around the proposed mining Area.
16. Erosion Control measures.
17. Impact on soil flora & vegetation around the project site.
18. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
19. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.
20. 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.
21. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
22. 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.
23. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
24. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
26. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
27. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
28. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.


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29. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.
30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.
31. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.
32. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.
33. The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.
34. 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.
35. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.
36. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.
37. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
38. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.
39. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.


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40. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.
41. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.

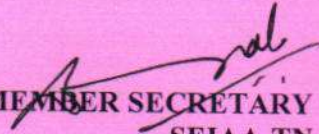
A. STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/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

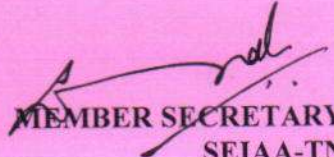

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the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

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


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- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-


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economic aspects should be discussed in the Report.

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


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Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be


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- detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
 - 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
 - 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
 - 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
 - 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
 - 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
 - 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
 - 44) Besides the above, the below mentioned general points are also to be followed:-
 - a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - e) Where the documents provided are in a language other than English, an English translation should be provided.
 - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
 - g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th


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August, 2009, which are available on the website of this Ministry, should be followed.

- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.


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

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

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


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10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of


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animals.

30. Reserve funds should be earmarked for proper closure plan.

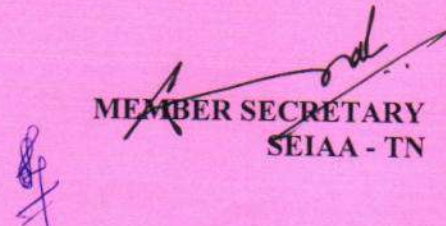
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

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


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- 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, Pudukkottai District.
7. The EO/BDO, Sathiyamoorthy Nagar, Pudukkottai District 622 001
8. Stock File.

ANNEXURE II
ToR Compliance

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

COMPLIANCE OF TOR CONDITIONS

Point wise compliance of ToR points issued by SEIAA, TN vide letter No. SEIAA-TN/F. No. 9484/SEAC/ToR-1312/2022 Dated: 07.12.2022 for Mining of Minor Minerals in the Mine of “Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha at S.F.No. 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State.

ToR Ref.	Description	Response	Page Ref. in EIA Report
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.	<p>This is a fresh mining project of Proposed Rough stone and Gravel quarry.</p> <p>Precise Area Communication Letter received from Assistant Director, Dept. Geology and Mining, Pudukkottai vide letter Rc.No.677/2021 (G&M) dated 15.04.2022.</p> <p>Mining Plan was approved by the Assistant Director, Dept. of Geology & Mining, Pudukkottai vide letter Rc.No.677/2021 (G&M) dated 02.06.2022.</p> <p>As area is being exploited for the first time hence Year-wise production details since 1994 and before 1994 are not relevant or applicable.</p>	<p>Chapter-2</p> <p>Table No.2.9</p> <p>Page No.47</p>

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

		<table border="1"> <thead> <tr> <th>Year</th> <th>Rough stone (m³)</th> <th>Gravel (m³)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>20160</td> <td>8800</td> </tr> <tr> <td>II</td> <td>20160</td> <td>8448</td> </tr> <tr> <td>III</td> <td>21820</td> <td>7064</td> </tr> <tr> <td>IV</td> <td>20350</td> <td>-</td> </tr> <tr> <td>V</td> <td>21080</td> <td>-</td> </tr> <tr> <td>Total</td> <td>103570</td> <td>24312</td> </tr> </tbody> </table> <p>Proposed Production of Rough Stone & Gravel for five years is proposed in the EIA/EMP in chapter no-2.</p>	Year	Rough stone (m ³)	Gravel (m ³)	I	20160	8800	II	20160	8448	III	21820	7064	IV	20350	-	V	21080	-	Total	103570	24312	
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II	20160	8448																						
III	21820	7064																						
IV	20350	-																						
V	21080	-																						
Total	103570	24312																						
2.	A copy of document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	The mine lease area of 1.68.0 hectare in Melur Village for Rough stone and Gravel quarry approved by Assistant Director, Dept. of Geology & Mining, Pudukkottai vide Rc.No.677/2021 (G&M) dated 02.06.2022	Annexure-III																					
3	All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.	All the documents i.e., Mining Plan, EIA and public hearing are compatible with each other in terms of ML area production levels, waste generation and its management and mining technology are compatible with one another. The mining plan of the project site has been submitted to The Assistant Director, Dept. of Geology & Mining, Pudukkottai.	Annexure-VI Chapter- II																					

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet 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).	Details of coordinates of all corners of proposed mining lease area have been incorporated in mining plan and Chapter 2 of EIA/ EMP Report.	Chapter-2, Fig no. 2.2 Page. no. 38
5	Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, important water bodies, streams and rivers and soil characteristics	Topo map as attached in Chapter-2	Chapter-2, Fig no. 2.4 Page. no. 39
6.	Details about the land proposed for mining activities should be given with information as to whether 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	Details about the land proposed for mining activities given in Chapter 2.	Chapter-2 Page 41
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	Noted.	

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

	<p>focus any infringement/deviation/violation of the environmental or forest norms/ conditions?</p> <p>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.</p>		
8	<p>Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.</p>	<p>It is an open cast mining project. Blasting details are incorporated in chapter 2</p>	<p>Chapter-2, Page no.49</p>
9	<p>The study area will comprise of 15 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.</p>	<p>Study area comprises of 15 km radius from the mine lease boundary. Key Plan showing core zone (ML area).</p>	<p>Chapter-2 Fig no. 2.5 Page no.40</p>

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

10	<p>Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated.</p> <p>Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p>	<p>Land Use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, National Park, migratory routes of fauna, water bodies, human settlement and other ecological features has been prepared and incorporated in Chapter-3 of EIA/EMP Report.</p> <p>There is no wildlife sanctuary and national park, migratory routes of fauna in the study area.</p>	<p>Chapter-2, Table no. 2.4 Page no.41</p>
11	<p>Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.</p>	<p>The over burden in the form of Gravel is 24312 m³ of used for filling and levelling of low lying areas of road projects and other infrastructure development work in and around the district</p>	<p>Chapter-2, Page no.48</p>
12	<p>A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area.</p> <p>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</p>	<p>Complied.</p> <p>The proposed mining lease area is not falling under forest land.</p>	

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

	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.	The proposed mining lease area is not falling under forest land.	
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. There is no involvement of forest land in the project area.	
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	Details of flora have been discussed in Chapter-3 of the EIA/EMP Report.	Chapter-3 Pg No. 94

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly detailed mitigative measures required, should be worked out with cost implications and submitted.	There is a relatively poor sighting of animals in the core and buffer areas of the mining lease is anticipated	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves/ (existing as well as proposed), if any, within 10km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	There is no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant Reserves / Critically Polluted areas within 10 km radius of the mining lease area.	
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and	Details biological study (flora & fauna) within 10 km radius of the project site have been incorporated in Chapter-3 of EIA/ EMP Report.	

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

	fauna, 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 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.	No flora & fauna listed in scheduled I have been found in study area so there is no need of conservation plan. However, all care will be taken for protection of flora & fauna, if any in the lease hold area.	Chapter – 3 Pg No. 103
19	Proximity to Areas declared as ‘Critically Polluted’ or the Project areas likely to come under the ‘Aravali Range’, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	The proposed mining lease area is not falling under critically polluted area.	
20	Similarly, for coastal projects, A CRZ map duly authenticated by one of the authorized agencies	There is no Coastal Zone within 15km radius of the project site.	

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

	<p>Similarly, for coastal projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)</p>		
21	<p>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</p>	<p>There is no Rehabilitation and resettlement is involved. Land classified as Patta land.</p>	

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

	<p>located in the mine lease area will be shifted or not. The issues relating to shifting of Village including their R&R and socio-economic aspects should be discussed in the report.</p>		
22	<p>One season (non-monsoon) and (Summer Season), (Post monsoon) primary baseline data on ambient air quality 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.</p> <p>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 500m of the mine lease in the pre- dominant downwind direction.</p> <p>The mineralogical composition of PM10, particularly for free silica, should be given.</p>	<p>Baseline data collected during Pre-Monsoon Season and Monsoon (January to March 2023) has been incorporated in EIA/EMP report.</p> <p>The key plan of monitoring station has been discussed in Chapter-4. Locations of the monitoring stations have been selected keeping in view the pre- dominant downwind direction and location of the sensitive receptors and also that they represent whole of the study area.</p>	Chapter 3

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23	<p>Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided.</p> <p>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 predominant wind direction may also be indicated on the map.</p>	<p>Air quality modelling & Impact of Air quality will be furnished in Final EIA report.</p> <p>Transportation of mineral during operation of mines will be done by road & MDR 833 through dumpers and the impact of movement of vehicles are incorporated in EIA/EMP report.</p> <p>Air quality modelling & Impact of Air quality will be furnished in Final EIA report.</p>	<p>Chapter-4</p> <p>Page No.114</p>
24	<p>The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.</p>	<p>Total water requirement: 2.5 KLD Dust Suppression: 0.5 KLD Domestic Purpose: 1.5 KLD Plantation :0.5 KLD Domestic Water will be sourced from nearby Melur which is about 0.33Km-NE of the area.</p>	<p>Chapter-2</p> <p>Page no.53</p>
25	<p>Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.</p>	<p>Not Applicable</p> <p>Water will be taken from nearby villages</p>	

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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.	At the last stage of mining operation, almost complete area will be worked to restore the land to its optimum reclamation for future use as water reservoir.	
27	Impact of the project on the water quality, both surface and groundwater should be assessed and necessary safeguard measures, if any required, should be provided.	Impact of the project on the water quality & its mitigation measures has been incorporated in Chapter-4 of EIA/EMP report.	Chapter-4 Page No.112
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. 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.	Maximum working depth: 17m The ground water table is reported as 64m below surface ground level in nearby wells of this area. Now, the present quarry shall be proposed above the water table and hence, quarrying may not affect the ground water So mine working will not be intersecting the ground water table.	Chapter-2 Page no. 38
29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact	There is no any stream crossing in the proposed quarry.	Executive Summary

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	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.	Highest elevation: 121.0m from MSL The ground Water Level is noticed at the depth of 70m to 75m BGL.	Chapter-2 Table no. 2.2 Page no. 38
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 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 pollution	Green Belt Development plan is proved given in Chapter 2.	Chapter-2
32	Impact on local transport infrastructure due to the Project	Impact on local transport infrastructure due to the project has	Chapter-3

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	<p>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</p>	<p>been assessed. There shall not be much impact on local transport. Traffic density from the proposed mining activity has been incorporated in EIA/EMP report.</p>	<p>Page No.107</p>
33	<p>Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.</p>	<p>Adequate infrastructure & other facilities shall be provided to the mine workers. Details are given in chapter-2 of EIA/EMP</p>	<p>Chapter-2</p>
34	<p>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.</p>	<p>Conceptual post mining land use and Reclamation and restoration sectional plates are given in Mining Plan followed by Scheme of mining.</p>	<p>Mining plates Annexure VII</p>
35	<p>Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination</p>	<p>Suitable measure will be adopted to minimize occupational health impacts of the project. The project shall have positive impact on local environment. Details are given in</p>	<p>Chapter-10 Pg No. 145</p>

TOR Reply of Proposed Rough stone & Gravel Quarry Over an Extent of 1.68.0 Ha

	and periodical medical examination schedules should be incorporated in the EMP. The project in the mining area may be detailed	chapter-10 of EIA/EMP.	
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.	Suitable measure will be adopted to minimize occupational health impacts of the project.	Chapter-10 Pg No. 145
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.	Suitable measures have been discussed in Chapter 4	Chapter-4 Pg No. 118
38	Detailed environmental management plan 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.	Environment Management Plan has been described in detail in Chapter-9 of the EIA/EMP Report.	Chapter-9 Pg No. 136
39	Public hearing points raised and commitment of the project proponent on the same along with	Public Hearing proceedings will be furnished in Final EIA report	

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	time bound action plan to implement the same should be provided and incorporated in the final EIA/EMP Report of the Project.														
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.	Not applicable No. litigation is pending against the project in any court.													
41	The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">S. No</th> <th style="text-align: center;">Description</th> <th style="text-align: center;">Cost</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Fixed Asset Cost</td> <td style="text-align: right;">18,94,000/-</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Operational Cost</td> <td style="text-align: right;">25,00,000 /-</td> </tr> <tr> <td></td> <td>Total</td> <td style="text-align: right;">43,94,000/-</td> </tr> </tbody> </table> <p>EMP Cost: 18,20,000/-</p>	S. No	Description	Cost	1	Fixed Asset Cost	18,94,000/-	2	Operational Cost	25,00,000 /-		Total	43,94,000/-	Chapter-8 Pg No. 135
S. No	Description	Cost													
1	Fixed Asset Cost	18,94,000/-													
2	Operational Cost	25,00,000 /-													
	Total	43,94,000/-													
42	Disaster Management Plan	Disaster Management and Risk Assessment has been incorporated in Chapter-7	Chapter-7 Pg No. 127												
43	Benefits of the project if the project is implemented should be spelt out. The benefits of the project shall clearly indicate environmental, social economic, employment potential etc.	Benefits of the project has incorporated	Chapter-8 Pg No. 135												
44	Besides the above, the below mentioned general points are also to be followed:														

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(a)	Executive Summary of the EIA/EMP report	Executive Summary of EIA Report is given from page No.15-28	
(b)	All documents to be properly referenced with index and continuous page numbering.	Complied	
(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.	Complied	
(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.	Complied	
(e)	Where the documents provided are in a language other than English, an English translation should be provided.	Complied	
(f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The complete questionnaire has been prepared	
(g)	While preparing the EIA report, the instructions for the proponents and instructions for the	The EIA report has been prepared and complying with the circular issued by MoEF vide O.M.	

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	consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August 2009, which are available on the website of this Ministry, should also be followed.	No. J-11013/41/2006-IA. II(I) dated 4th August 2009.	
(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 with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	There are no changes in prepared EIA as per submitted Form-1 & PFR	
(i)	As per the circular no. J-11011/618/2010-IA. II(I) dated 30.5.2012, report on the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project by the Regional Office of Ministry of Environment & Forests, if applicable.	Will be complied after grant environment clearance from SEIAA, Tamilnadu	

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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 (iii) sections of mine pit and external dumps, if any clearly showing the features of the adjoining area.	All Sectional Plates of Quarry is enclosed in Mining Plan.	
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Additional ToR Compliance

S.No.	Condition	Compliance
1.	The original letter of approval obtained for the Mining plan prepared for the mine shall be furnished during the EIA Appraisal.	Noted.
2.	The bottom bench exists in the Section C-D shall be removed and accordingly the revised quantity are spelt out in the 'modified Production and Development Plan' to be submitted during the EIA appraisal	Agree to comply.
3.	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc.	Noted.
4.	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.	Agree to comply.
5.	The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, as the depth of the proposed working is extended beyond 30 m	The depth of proposed quarry is 17m.

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	below ground level.	
6.	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	The affidavit 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 will be furnished.
7.	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30m from the blast site.	Noted. Agree to comply.
8.	The EIA Coordinator 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 evidence.	It is a fresh quarry and newly operated by the proponent.

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<p>9.</p>	<p>If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,</p> <ul style="list-style-type: none"> a. What was the period of the operation and stoppage of the earlier mines with the last work permit issued by the AD/DD mines? b. Quantity of minerals mines out. c. Highest production achieved in any one year. d. Details 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. 	<p>It is a fresh quarry.</p>
<p>10.</p>	<p>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 feature of the study area (core and buffer zone)</p>	<p>Complied. All corners with coordinates of the mine lease area have attached with EIA report in chapter 2</p>
<p>11.</p>	<p>The Project Proponent shall carry out Drone video survey covering survey covering the cluster, green belt, fencing etc.,</p>	<p>Drone video survey will be submitted in final EIA report.</p>

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12.	The PP shall furnish the revised manpower including the statutory & competent persons as required under the provisions of the MMR 1961 for the proposed quarry based on the volume of rock handled & area of excavation.	
13.	The Project Proponent shall furnish photographs of adequate fencing, green belt along periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Complied. The photographs of fencing and green belt attached as per SEAC recommendation.
14.	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justification, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same	The details of Geological reserves, Mineable reserves and Yearwise production reserves are tabulated in Chapter 2. The mining methodology and impacts are follow as on prescribed norms by Government.
15.	The PP 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.	Complied. Manpower requirements table attached in EIA report chapter 2
16.	The PP shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface Water bodies such as rivers, tanks, canals, ponds etc., within 1km	Hydro geological study report will be submitted along final EIA report.

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	(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.	
17.	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 proponent has furnished 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 details attached in EIA report chapter 3
18.	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.	Noted. Agree to comply.
19.	Rainwater harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted. Agree to comply.
20.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water	Current land use of the study area has attached in EIA report chapter 3.

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	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	Operational and post operational land use will be submitted.
21.	Details of the land for storage of Overburden/Waste dump (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.	The over burden in the form of Gravel is 63168m ³ of used for filling and leveling of low lying areas of road projects and other infrastructure development work in and around the district
22.	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered	The proposed mining lease area is not falling under critically polluted area.
23.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	The ultimate pit at the end of the mining operation will be used for rainwater storage, the stored water will be used for green belt development and further the stored water will be used for domestic purposes (other than drinking) after proper treatment.
24.	Impact on local transport infrastructure due to the Project should be indicated.	Traffic impact assessment has given in EIA report chapter 3.
25.	A tree survey study shall be carried out (nos.,	No tree species were found inside the

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	name of the species, diameter, etc.) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	project site. only few shrubs and thorny bushes were present. Tree survey study details given in EIA report chapter 3.
26.	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Noted. The mine plan and mine closure plan has been approved by the Assistant Director, Department of Mining and Geology, Pudukkottai District
27.	Public hearing points raised and commitments of the PP 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.	Noted and will be complied in Final EIA report.
28.	The Public hearing advertisement shall be published in on major National daily and one most circulated vernacular daily	The Public hearing advertisement will be published in one major National daily and one most circulated vernacular daily.
29.	The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing Tamil Language also.	Noted
30.	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	Noted. Agree to comply

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31.	<p>The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.</p>	<p>Around 2250 (450 per year) trees will be planted around the site. The list of trees to be planted are given below:</p> <p>Neem, Pungam, Poovarasu, Naval, Mantharai, Arasa Maram, Magizham, Vilvam, vaagai, Marudha maram, Thandri, Poovarasu, Quaker buttons, Thethankottai maram, Manjadi, Usil, Aathi, Panai, Uzha, Illuppai, Eachai, Vanni Maram</p>
32.	<p>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 meter wide and in between blocks in an organized manner.</p>	<p>The green belt plan enclosed with mining plates in Annexure VII</p>
33.	<p>A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.</p>	<p>Disaster management plan has prepared and enclosed in Chapter 7.</p>
34.	<p>A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.</p>	<p>Risk assessment and management plan has prepared and enclosed in chapter 7.</p>
35.	<p>Occupational Health impacts of the Project should be anticipated and the proposed preventive</p>	<p>Suitable measure will be adopted to</p>

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	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.	minimize occupational health impacts of the project. The project shall have positive impact on local environment. Details are given in chapter-10 of EIA/EMP.
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.	Public health implication and remedial measures is given in EIA/EMP report.
37.	The Socio-economic studies should be carried out within a 5km 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.	The socio-economic study has been discussed in chapter 3.
38.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No. litigation is pending against the project in any court.
39.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.,	Benefits of the project has incorporated in EIA report chapter 8
40.	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	It is a fresh quarry.

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	previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB	
41.	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	Noted. Agree to comply.
42.	concealing any factual information or submission of false/fabricated data and failure to comply with any of the Condition mentioned above may result in withdrawal of this Terms of conditions besides attracting penal provisions in the Environment (Protection) Act, 1986	Noted.
Annexure 'B'		
1	Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted All the proponents in the cluster is discussed in Chapter-2
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,	Green belt development, water sprinkling, tree plantation is discussed in chapter-2
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Agreed to comply
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	Agreed to comply and will be submitted with final EIA report.

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5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan	Risk management plan is discussed in Chapter-7
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	Agreed to comply. It will be furnished in final EIA report.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	Agreed to comply. It will be furnished in final EIA report.
8	The committee shall furnish the Emergency Management plan within the cluster.	Emergency management plan is discussed in chapter 7.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	Health of workers and staff is discussed in chapter 9.
10	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. <ul style="list-style-type: none"> a) Soil health & bio-diversity b) Climate change leading to Droughts, Floods etc., c) Pollution leading to release Greenhouse 	The biodiversity has been studied and discussed in chapter 3. The soil erosion map 5km surrounding the project site has been given in chapter 3. The detailed study will be carried out and will be enclosed in the Draft EIA Report.

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	<p>gases (GHG), rise in Temperature & Livelihood of the local people.</p> <p>d) Possibilities of water containment and impact on aquatic ecosystem health.</p> <p>e) Agriculture, Forestry & Traditional practices.</p> <p>f) Hydrothermal/Geothermal effects due to destruction in the Environment.</p> <p>g) Bio-geochemical processes and its foot prints including environmental stress</p> <p>h) Sediment geochemistry in the surface streams</p> <p>Sediment geochemistry in the surface streams.</p>	
11	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	<p>Agreed to comply.</p> <p>It will be furnished in final EIA report.</p>
12	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents	Fire safety and evacuation plan is discussed in chapter-7
13	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	<p>Noted.</p> <p>Agree to comply.</p>
14	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	The detailed study will be carried out and will be furnished in the Final EIA Report.
15	Impact on surrounding agricultural fields around the proposed mining area.	There is no agricultural fields around the proposed mining area
16	Erosional Control Measures.	Noted and will be complied in Final EIA report.

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17	Impact on soil flora & vegetation around the project site	Impact on soil flora & vegetation around the project site discussed in Chapter-4
18	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water bodies/ Rivers, & any ecological fragile areas.	<p>There is no Reserve Forest within 1 km radius of the Project Site. Hence our project will not cause any damage to reserve forest. Also, we have received letter from DFO indicating the nearest reserve forest and attached with Annexures.</p> <p>There is no protected areas, National Parks, Corridors and Wildlife pathways near project site.</p>
19	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odal, vaari, canal, channel, river, lake pond, tank etc.	VAO certificate is enclosed as Annexure.
20	As per the MoEF& CC office memorandum F.No 12-65/2017-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 to comply
21	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and	Agreed to comply

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	temperature reduction including control of other emission and climate mitigation activities	
22	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	Obtained and same has been attached as Annexure.
23	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services	Noted and public hearing details will be included along with final EIA report.
24	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Noted and will be complied in Final EIA report.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	Noted. Agree to comply.
26	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The biological environment impacts, and its mitigation measures has been given in Chapter 4
27	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	There is no existing trees in the project site and surrounding the project site. Only thorny shrubs were present.
28	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites	Environmental Impact Assessment study is detailed in Chapter 3.
29	The Environmental Impact Assessment should hold detailed study on EMP with budget for	

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	Green belt development and mine closure plan including disaster management plan.	
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	A Risk Assessment and management Plan will be prepared and included in the final EIA/EMP Report.
31	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	The water environment impacts and its mitigation measures has been given in Chapter 4
32	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	Noted and will be complied in Final EIA report.
33	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	Noted. Agree to comply.
34	The PP 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 landform changes visual and aesthetic impacts	Noted. Agree to comply.
35	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and freshwater systems due to activities, contemplated during mining may be investigated and reported.	Agreed to comply
36	The project proponent shall detailed study on	The biodiversity has been studied and

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	impact of mining on Reserve forests free ranging wildlife.	discussed in chapter 3.
37	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	The EMP details has been given in Chapter 8
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	A disaster management Plan will be prepared and included in the final EIA/EMP Report.
39	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	A Risk Assessment and management Plan will be prepared and included in the final EIA/EMP Report.
40	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued	Mine closure plan has been attached along with mining plates as Annexure.
41	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies	Environment Management Plan has been described in detail in Chapter-10

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	covering the entire mine lease period as per precise area communication order issued	of the Draft EIA/EMP Report.
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ANNEXURE III

Mining Plan Approval Letter, 500m Radius Letter

From
Thiru.K.Vijayaragavan,M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To
Thiru.Arockiya Raj,
S/o.Rethinam Pillai,
No.297/7,
Sathiyamoorthi Nagar,
Pudukkottai

Rc.No. 677/2021 (G&M) dated 02.06.2022

Sir,

Sub: Mines and Quarries – Minor Minerals – Pudukkottai District – Kulathur Taluk – Melur village in S.F.No.210/7A - over an extent of 1.68.0 Hects., of patta lands - Rough stone & Gravel quarry lease – draft mining plan submitted to Thiru.Arockiya Raj - Approval of mining plan - Regarding.

Ref: 1. Application of Thiru.Arockiya Raj, S/o.Rethinam Pillai, Pudukkottai dt.12.11.2022.
2.Precise area communication in Rc.No.677/2021(G&M) dated 15.04.2022.
3. Letter from Thiru.Arockiya Raj, S/o.Rethinam Pillai letter dt.30.05.2022.


In the reference 1st cited, Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7, Sathiyamoorthi Nagar, Pudukkottai has applied for the grant of lease to quarry rough stone & Gravel, over an extent of 1.68.0 hecets in patta lands in S.F.No.210/7A of Melur village, Kulathur Taluk, Pudukkottai District under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

2) The precise area has been communicated to the applicant under reference 2nd cited above, based on the recommendations of the Revenue Divisional Officer, Illuppur and the Assistant Geologist of Geology and Mining, Pudukkottai and Special Revenue Inspector (Mines), Pudukkottai.

3) In exercise of powers delegated under Rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959, I hereby approve the mining plan submitted by Thiru.Arockiya Raj, S/o.Rethinam Pillai for grant of lease to quarry rough stone & gravel, over an extent of 1.68.0 hecets in patta lands in S.F.No.210/7A of Melur village, Kulathur Taluk, Pudukkottai District for a period of five years and the mineable reserves of rough stone and gravel after leaving safety distance is arrived as **103570M³** and **24312M³** to the proposed depth of 17m. This approval is subject to the following conditions:-

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

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


Assistant Director,
Geology and Mining,
Pudukkottai.

Encl: 2 copies of Approved Mining Plan.

Copy submitted to :

21/6/20

1. The Chairman,
State Level Environment Impact Assessment Authority, Chennai
2. The Director of Geology and Mining, Industrial Estate, Guindy,
Chennai- 32.

From

Thiru.K.Vijayaragavan,M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To

Thiru.Arockiya Raj,
S/o.Rethinam Pillai,
No.297/7,
Sathiyamoorthi Nagar,
Pudukkottai .

Sir,

Rc.No.677/2021 (G&M) dated 02.06.2022

Sub : Mines and Minerals - Minor Mineral - Pudukkottai District
- S.F.No.210/7A of Melur village, Kulathur Taluk, over
an extent of 1.68.0 Hects - Rough stone & gravel -Quarry
Lease Application preferred by Thiru.Arockiya Raj - Reg.

Ref : 1. Application of Thiru.Arockiya Raj, S/o.Rethinam Pillai,
Pudukkottai dt.12.11.2022.
2. Precise area communication in Rc.No.677/2021(G&M)
dated 15.04.2022.
3. Letter from Thiru.Arockiya Raj, S/o.Rethinam Pillai
letter dt.30.05.2022.

With reference to your letter in the reference 3rd cited, the details of
existing and lease expired quarries located within 500m radius from the
proposed Rough stone & gravel quarry, over an extent of 1.68.0 Hects in patta
S.F.No.210/7A of Melur village, Kulathur Taluk, Pudukkottai District are as
follows:

1) Existing Other Quarries:

S. No	Name of the Lessee / Permit Holder	Village & Taluk	S.F.No	Extent	Lease period
1.	Thiru.M.Velu, S/o.Muthiah, Echanari Thottaiavayal, Melur, Sathyamangalam post, Kulathur Taluk, Pudukkottai District	Melur Kulathur	207/14B 207/15A	0.65.5	28.06.2017 to 27.06.2022
2.	Thiru.R.Natesan, S/o.Rengasamy, No.715A, Narkkeerar Vayal, Melur, Sathiyamangalam post, Pudukkottai District	Melur Kulathur	216/1	1.47.5	12.09.2017 to 11.09.2022
3.	M/s.Sai Hridham Infra Private Limited, 14/28, Sowrastra Street, Illuppur Taluk, Pudukkottai District	Melur Kulathur	207/21B 207/22B2 207/23	1.30.5	31.07.2019 to 30.07.2024
4.	Thiru.Jayaraj, S/o.S.K.Rengarajan, No.3/659 of Melamuthudaiyanpatti village, Vellanur post, Kulathur Taluk, Pudukkottai District	Melur Kulathur	40/5B, 40/6B, 40/7A , 40/8A, 40/9A, 40/10B2 & 40/11A	0.81.0	29.06.2018 to 28.06.2023

5.	Thiru.V.Ravichandran, S/o.R.Visvanathan, Plot No.82, Pudhunagar 2 nd Street, Machuvadi, Pudukkottai	Melur Kulathur	207/18 207/29	1.27.5	28.07.2017 to 27.07.2022
6.	Thiru.M.Rajamohamed, S/o.Mohamed Ibrahim, No.9884, Kalif Nagar 4th Street, Pudukkottai	Melur Kulathur	210/21	0.91.0	21.01.2019 to 21.01.2024
7.	Thiru.M.Rajamohamed, S/o.Mohamed Ibrahim, No.9884, Kalif Nagar 4th Street, Pudukkottai	Melur Kulathur	216/21A1 & 216/22B	1.30.5	31.07.2019 to 30.07.2024
8.	Thiru.Ramesh Babu, S/o.Jayaraman, T.S.No.7166/2 of Maharajapuram, Thirukokarnam, Pudukkottai District	Melur Kulathur	210/19 &210/9B 1B	1.50.5	06.11.2019 to 05.11.2024

2) Proposed Area

S. No	Name of the applicant	Village & Taluk	S.F.No	Extent
1.	Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7, Sathiyamoorthi Nagar, Pudukkottai	Melur Kulathur	210/7A	1.68.0
2.	Tvl.Sai Hridham Infraa (P) Ltd., Office at 208/6, Muthudaiyanpatti, Melur Village, Sathiyamangalam Post, Kulathur Taluk, Pudukkottai - 622 501	Melur Kulathur	207/10B2	0.51.5
3.	Tvl.Sai Hridham Infraa (P) Ltd., Office at 208/6, Muthudaiyanpatti, Melur Village, Sathiyamangalam Post, Kulathur Taluk, Pudukkottai - 622 501	Melur Kulathur	207/12, 207/16 & 207/14A1	3.38.5
4.	Tvl.Sai Hridham Infraa (P) Ltd., Office at 208/6, Muthudaiyanpatti, Melur Village, Sathiyamangalam Post, Kulathur Taluk, Pudukkottai - 622 501	Melur Kulathur	80/3, 80/4, 80/5, 80/6, 80/17 & 80/19	1.68.0
5.	Thiru.R.Muthusamy, S/o.Rengasamy, No.663, Mela Muthudaiyanpatti village, Vellanur post, Kulathur Taluk, Pudukkottai District	Melur Kulathur	80/20, 80/21 & 80/22	0.82.0
6.	Tvl.Sai Hridham Infraa (p) Ltd., Office at 14/28, Rasi Illam, Sowarastra Street, Illuppur Taluk, Pudukkottai District	Melur Kulathur	206/7, 206/27 206/28 206/29, 206/30, 206/31, 206/32 206/33 and 206/24	2.52.0

3) Lease Expired

S. No	Name of the Lessee / Permit Holder	Village & Taluk	S.F.No	Extent	Lease period
1.	Thiru.S.M.Sait, 59, Charles Nagar, Pudukkottai	Melur Kulathur	216/22A	0.40.5	27.11.2013 to 26.11.2018
2.	S.Ganesan, S/o.Subramaniyan, Trichy	Melur Kulathur	207/13A1 13B, 24, 25A, 28A	2.63.5	17.06.2009 to 16.06.2014
3.	G.Anthonisamy, S/o.Gnanampillai, Plat No.321, Periyarnagar, Pudukkottai	Melur Kulathur	40/1 40/2	0.36.0	03.04.2009 to 02.04.2014
4.	P.Sannasi, S/o.Poovan, Melur, Kulathur Taluk	Melur Kulathur	207/20	1.01.0	01.03.2007 to 28.02.2012
5.	Thiru.A.Periyasamy, S/o.Adaikkalam, T.S.No.6985, Thirukokarnam, Pudukkottai	Melur Kulathur	216/15B	0.75.0	19.02.16 to 18.02.2021
6.	Thiru.R.Muthusamy, S/o.Rengasamy, Melur, Sathiyamangalam post, Kulathur Taluk, Pudukkottai District	Melur Kulathur	216/5 & etc.,	0.93.5	23.09.2016 to 22.09.2021
7.	S.M.Sait, S/o.Mookaiah Solahar, No.51,52, Charlas Nagar, Pudukkottai	Melur Kulathur	207/8	0.50.0	20.01.2017 to 19.01.2022


Assistant Director,
Geology and Mining,
Pudukkottai



சான்று

புதுக்கோட்டை மாவட்டம், குளத்தூர் வட்டம், சத்தியமங்கலம்

கிராம நிர்வாக அலுவலர் அளிக்கும் சான்று.

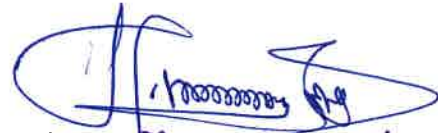
புதுக்கோட்டை மாவட்டம், புதுக்கோட்டை வட்டம், கதவுஎண் 297/7

சத்தியமங்கலம் நகராண்முகவரியில் வசிக்கும்
திரு. சி. ரொகத்தியராஜ் என்பவரின் மகன் திரு. சி. ரெத்தினம் பிள்ளை என்பவர்,

புதுக்கோட்டை மாவட்டம், குளத்தூர் வட்டம், மேலூர் கிராமம்,
சர்வேஎண்: 210/7A

பட்டா நிலத்தில், மொத்தபரப்பு 1.60.0 ஹெக்டர் பரப்பளவில்
Rough Stone & Gravel வெட்டியெடுக்க குவாரி குத்தகை அனுமதி கோரியுள்ளார்.

மேற்கண்ட குவாரி குத்தகை அனுமதி கோரியுள்ள இடத்தை சுற்றி சுமார் 300மீட்டர் சுற்றளவில் கிராம நத்த குடியிருப்பு பகுதிகள், அங்கீகரிக்கப்பட்ட வீட்டு மனைகள், கோயில்கள், புராதான வரலாற்று சின்னங்கள் மற்றும் மின்மயானங்கள் எதுவும் இல்லை குவாரி அனுமதி கோரி விண்ணப்பித்துள்ள புலத்திற்கு வண்டிகள் சென்று வரும் கிராம சாலைகளுக்கு இடையூறுகள் எதுவும் இல்லை, மேலும் பொதுமக்களுக்கோ, அருகில் உள்ள அரசு புறம்போக்கு மற்றும் பட்டாதாரர்களுக்கோ எந்தவித இடையூறுகள் இல்லை என தெரிவித்து கொள்கிறேன்.



கிராம நிர்வாக அலுவலர் அலுவலகம், 26, சத்தியமங்கலம் வட்டம்,
குளத்தூர் தாலுகா
புதுக்கோட்டை மாவட்டம்.

Topographical view of Melur Rough stone & Gravel Quarry lease applied area



Applicant: **Thiru. R.Arockiya Raj**, S/o. Rethinam Pillai, residing at No. 297/7, Sathiyamoorthi Nagar, Pudukkottai District - 622 001 The Rough stone & Gravel quarry over an extent of 1.68.0 hectares of Consent Patta Land in S.F.No. 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District.


Attestation of the Village Administrator
அறிமுகம் திருவாரூர்
25.5 த்தியமங்கலம் வட்டம்,
குளத்தூர் தாலுகா
புதுக்கோட்டை மாவட்டம்.


Signature of the Applicant
(**R.Arockiya Raj**)

Annexure IV
Mining Plan

MINING PLAN FOR MELUR ROUGH STONE & GRAVEL QUARRY



(Prepared under Rule 19 (1), 41 & 42 Tamilnadu Minor Mineral Concession Rules, 1959
And amended Minor Mineral Conservation and Development Rules, 2010)

Lease in Consent Patta Land

(Lease Period: (Ten) 10 Years only

(Mining Plan Period: (Five) 5 Years only

IN

LOCATION OF THE LEASE APPLIED AREA

EXTENT : 1.68.0 Ha

S.F.No : 210/7A

VILLAGE : MELUR

TALUK : KULATHUR

DISTRICT : PUDUKKOTTAI

STATE : TAMIL NADU

Applicant

Thiru. R.Arockiya Raj,

S/o. Rethinam Pillai,

No. 297/7, Sathiyamoorthi Nagar,

Pudukkottai District - 622 001

Prepared by

V.RADHAKRISHNAN.M.Sc.

Recognised Qualified Person

RQP/MAS/119/98/A

No.48/49, Renga Nagar 1ST Cross,

Ayyappa Nagar, K.K.Nagar Post,

Trichy District - 620 021.

Tamil Nadu State.

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LIST OF ANNEXURES

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LIST OF PLATES

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8	Conceptual Plan and Sections	VIII & VIII-A	Plan-1:1000 Sec Hor-1:1000; Ver-1:500


CONSENT LETTER FROM THE MINE OWNER

The Mining Plan in respect of **Rough stone & Gravel quarry** over an extent of **1.68.0 hectares of Consent Patta Land** in S.F.No.210/7A of **Melur Village, Kulathur Taluk, Pudukkottai District** and Tamilnadu State has been prepared by **Thiru.V.Radhakrishnan, M.Sc.,** Registration Number. RQP/MAS/119/98/A

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

V.RADHAKRISHNAN.M.Sc.,
Recognised Qualified Person
Reg.No.RQP/MAS/119/98/A
No.48/49, Renga Nagar 1ST Cross,
Ayyappa Nagar, K.K.Nagar Post,
Trichy District – 620 021.
Tamil Nadu State.

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


Signature of the Applicant
(R.Arockiya Raj)

Place : Pudukkottai

Date : 30.05.2022

Thiru. R.Arockiya Raj,
S/o. Rethinam Pillai,
No. 297/7, Sathiyamoorthi Nagar,
Pudukkottai District - 622 001



DECLARATION

The Mining Plan in respect of **Rough stone & Gravel quarry** over an extent of 1.68.0 hectares of Consent Patta Land in S.F.No. 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District and 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.

7

Signature of the Applicant
(R.Arockiya Raj)

Place : Pudukkottai

Date : 30-05-2022

V.RADHAKRISHNAN.M.Sc.
Recognised Qualified Person,
Reg.No. RQP/MAS/119/98/A
No.48/49, Renga Nagar 1ST Cross,
Ayyappa Nagar, K.K.Nagar Post,
Trichy District – 620 021.
Tamil Nadu State.



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 & Gravel quarry** lease over an extent of 1.68.0hectares of Consent Patta Land in S.F.No. 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District, Tamil Nadu State applied by **Thiru. R.Arockiya Raj**.

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

Certified

Signature of Recognised Qualified Person

V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg. No. RQP/MAS/119/98/A

Place : Trichy

Date : 30-05-2022

V.RADHAKRISHNAN.M.Sc.
Recognised Qualified Person,
Reg.No. RQP/MAS/119/98/A
No.48/49, Renga Nagar 1ST Cross,
Ayyappa Nagar, K.K.Nagar Post,
Trichy District – 620 021.
Tamil Nadu State.



CERTIFICATE

Certified that, in preparation of Mining Plan for **Rough stone & Gravel quarry** over an extent of 1.68.0 hectares of Consent Patta Land in S.F.No. 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District and Tamilnadu State.

Thiru.R.Arockiya Raj 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, Pudukkottai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Certified

Signature of Recognised Qualified Person

V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg. No. RQP/MAS/119/98/A

Place : Trichy

Date : 30.05.2022

CERTIFICATE



Certified that I am V. Radhakrishnan, M.Sc., residing at address No.48/49, Renga Nagar 1ST Cross, Ayyappa Nagar, K.K.Nagar Post, Trichy District - 620 021. Tamil Nadu State, holding a Post Graduate Degree in Geology (M.Sc., Geology) from Annamalai University, Chidambaram and I worked in the field of Geology in s role of Geologist.

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

Accordingly, I am prepared this Mining Plan for the grant of Rough stone & Gravel quarry over an extent of 1.68.0 hectares of Consent Patta Land in S.F.No. 210/7A of Melur Village, Kulathur Taluk, Pudukkottai District, Since the Mining Plan is prepared as per the provisions contained in Rule 15(I)(a) and (I)(b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rule, 2016.

Certified


V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg. No. RQP/MAS/119/38/A

MINING PLAN FOR MINOR MINERAL

ROUGH STONE & GRAVEL QUARRY



(Prepared under 19 (1) 41 & 42 Tamilnadu Minor Mineral Concession Rules, 1959
And amended Minor Mineral Conservation and Development Rules, 2010)

1.0 INTRODUCTION

1. The present Mining Plan and Environmental Management Plan are prepared for **Thiru. R.Arockiya Raj**, S/o. Rethinam Pillai, residing at No. 297/7, Sathiyamoorthi Nagar, Pudukkottai District - 622 001
2. The applicant proposed to quarry Rough stone & Gravel quarry in Consent Patta Land, over an extent of 1.68.0 Ha at S.F.No. 210/7A of Melur Village, Kulathur Taluk, and Pudukkottai District for a period of (Five) 5 Years Rough stone & Gravel only. The excavated Rough stone is used for building's basement stones and also used for crushing units and Gravel is used for filling and leveling of low lying areas of road projects and other infrastructure development work in and around the district.
3. The application was meritoriously processed and precise area communication letter issued by the District Collector, Pudukkottai District has passed an order vide **R.c.No.677/2021 (G&M) dated 15.04.2022**. The applicant to submit the Mining Plan and to get approval from the Assistant Director, Department of Geology & Mining, Pudukkottai District and to obtain Environmental Clearance from State Level Environment Impact Assessment Authority, Tamil Nadu State, as per EIA Notification 2006 and its amendments vide MOEF and Climate Change Notification. S.O.141 (E) dated 15.01.2016.
4. Geological Resources is estimated at 10,87,125m³ of Rough stone and 33,450m³ Gravel upto a depth of 67.0m and Mineable Reserves is estimated at **24,312m³ of Gravel & 1,94,280m³ of Rough stone** upto a depth of **42.0m (max) below ground level**. The proposed quarry area should be maintain the safety distance of **10m for the Government Poramboke Land in S.F.No.209/2 (Western side) and 7.5m for the Adjoining Patta land** from the lease applied area as indicated in precise area communication letter and relevant mining laws in force.



5. **Production Schedule** is proposed an average production of **3,570m³** (17,261 Lorry Loads) of **Rough stone** & **24,312m³** (4,052 Lorry Loads) **Gravel** up to a depth of **17.0m(Max)** (**2.0m Gravel and 15m Rough stone**) for the period of **(Five) 5 Years** only.

6. Safety measures under mechanized loading as per the provisions of Reg.106(2)(b) of Metalliferous Mines Regulation-1961, Labour welfare Amenities as per the Mines Rules -1955 and amended DGMS circular shall be taken care of in preparation of Mining Plan

ENVIRONMENTAL PARAMETERS,

(i) **Forest Conservation Act, 1980:**

1. Reserved Forest – 7.0km - SE

(ii) **Wildlife (Protection) Act, 1972:** The area does not attract the wild life sanctuary around 10Kms radius.

(iii) **The Coastal Regulation Zone (CRZ) Notification 2011:** The area does not attract the Coastal zone around 10kms radius.

(iv) **Infrastructure around 500m radius :** Nil

I. ENVIRONMENTAL MEASURES TO BE ADOPTED SHALL BE,

- 1) Dust Control at source while *wet drilling* and *controlled blasting*.
- 2) Dust suppression at loading point and transport haul roads.
- 3) 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.
- 4) Unnecessary land degradation should be avoided or damaged land should be reclaimed or rehabilitated.
- 5) Avoid uneven rat hole mining and follow scientific and systematic mining by safe bench system of open cast mining.
- 6) Mining near major fracture zones if any should be avoided to control ground water fluctuation in the adjacent agricultural lands.
- 7) Emission test of vehicles should be in tack to maintain minimum emission level of fuel gases.
- 8) Noise level should not exceed *80db* and the vehicles should use only permitted Air Horn while on road near residential areas.
- 9) Safety zones as prescribed by the Department of Geology and Mining from adjacent infrastructures should be strictly to adhere to.
- 10) Any other conditions as stipulated by the concerned authorities should be followed to protect the Environment and Ecology of the area.



2.0. EXECUTIVE SUMMARY



The area applied for lease is a Rough stone & Gravel quarry in Consent Patta Land at Survey Number – 210/7A of Melur Village, Kulathur Taluk, and Pudukkottai District.

- a. The proposed Total Movable Reserves –24,312m³ of Gravel & 1,94,280m³ of Rough stone formation.
- b. **Production Schedule** is proposed an average production of 1,03,570m³ (17,261 Lorry Loads) of **Rough stone & 24,312m³** (4,052 Lorry Loads) of **Gravel** up to a depth of **17.0m(Max)** (2m Gravel and 15m Rough stone) for the period of (Five) 5 Years only
- c. Total extent of the area –1.68.0 Ha
- d. Proposed Lease Period –(Five) 5 Years only
- e. Existing depth of mining – It is a fresh and virgin land
- f. Proposed Depth of mining – 17.0m(Max) (2.0m Gravel and 15m Rough stone)
- g. Method of mining / level of mechanization - Opencast, Semi-mechanized Mining with a bench height of 5.0m & width of 5.0m is proposed and involves shallow Jackhammer drilling, Slurry blasting is proposed for this quarrying operation.
- h. Types of Machineries used in the quarry –Jack hammer 30-32mm dia, Tractor mounted compressor attached with Jack hammer. Excavator of 0.9m³ bucket capacity is attached with Rock breaker is proposed to deploy for quarrying operation. Total consumption of Diesel for Rough stone & Gravel is around= **86,898** Liters of HSD for the entire period of life of the quarry.
- i. No Trees will be uprooted due to this quarrying operation.
- j. The existing road from the main road to quarry is in good condition and the Same will be maintained and utilized for Transportation of Rough stone & Gravel.
- k. There is no Export of this quarrying Rough stone & Gravel.
- l. Topo sketch covering 10Km,500m radius around the proposed area with markings of Habitations, Water bodies like Streams, Rivers, Roads, Major structure like



Bridges, Wells, Archeological, Historical importance, Places of worship is marked and enclosed as Plate No. IV & V

- m. The diagram showing the Mining area, dimensions of the Pit, proposed depth of mining for the mining plan period are enclosed as Plate No -VII
 - n. The lease applied area is 10Km away from the Inter State boundary, protected area under Wildlife Production Act 1972, critically polluted area as identified by CPCB and notified Eco sensitive areas.
 - o. There are no wastages anticipated during this quarry operation, hence waste dump is not proposed in this lease applied area.
 - p. Around 27 Employees are deploying in this quarrying operation.
1. The lease applied area is bounded by all corners and the coordinates are clearly marked in Plate no - VI

Table -1

BOUNDARY CO-ORDINATES		
LABEL	LATITUDE	LONGITUDE
1	10° 26' 40.50"N	78° 45' 55.90"N
2	10° 26' 42.65"N	78° 45' 57.27"N
3	10° 26' 44.15"N	78° 45' 57.61"N
4	10° 26' 44.60"N	78° 45' 56.34"N
5	10° 26' 48.54"N	78° 45' 57.50"N
6	10° 26' 47.66"N	78° 45' 59.73"N
7	10° 26' 46.38"N	78° 46' 00.42"N
8	10° 26' 45.73"N	78° 46' 00.29"N
9	10° 26' 41.51"N	78° 45' 58.09"N
10	10° 26' 40.87"N	78° 45' 57.10"N
W G S - 84DATUM		

PART - A



3.0. GENERAL INFORMATION:

3.1. Name of the Applicant with Address, contact no, email etc.,

Name : **Thiru.R.Arockiya Raj,**
S/o. Rethinam Pillai,
No. 297/7, Sathiyamoorthi Nagar,
District : **Pudukkottai**
State : **Tamilnadu**
Pin code : **622 001**
Contact : **9443168986**

3.2. Status of the Applicant (Individual / Company / Firm)

The applicant is a Private Individual.

3.3. Mineral which the Applicant intends to mine

Rough stone & Gravel only.

3.4. Precise area communication Letter details received from the competent authority of the government.

Precise area communication letter issued from the District Collector, Pudukkottai vide R.c.No.677/2021 (G&M) dated 15.04.2022

3.5. Period of permission / lease to be granted

The applicant has applied permission for Ten years. The Assistant Director, Geology and Mining consider grant for a lease period of (Ten) 10 Years only. Mining plan period is (Five) 5 Years only.

3.6. Name and Address of the RQP/Authorized person for preparing the Mining Plan

Name : **V.RADHAKRISHNAN. M.Sc.,**
Address : **No.48/49, Renga Nagar 1ST Cross,
Ayyappa Nagar, K.K.Nagar Post,
Trichy District – 620 021.
Tamil Nadu State.**
Mobile Number : **8428759872**
Registration Number : **RQP/MAS/119/98/A**

**4.0. LOCATION:**

Table No: 2

State	Tamil Nadu
District	Pudukkottai
Taluk	Kulathur
Village	Melur
S.F.No	210/7A
Extent in (Ha)	1.68.0Hectare

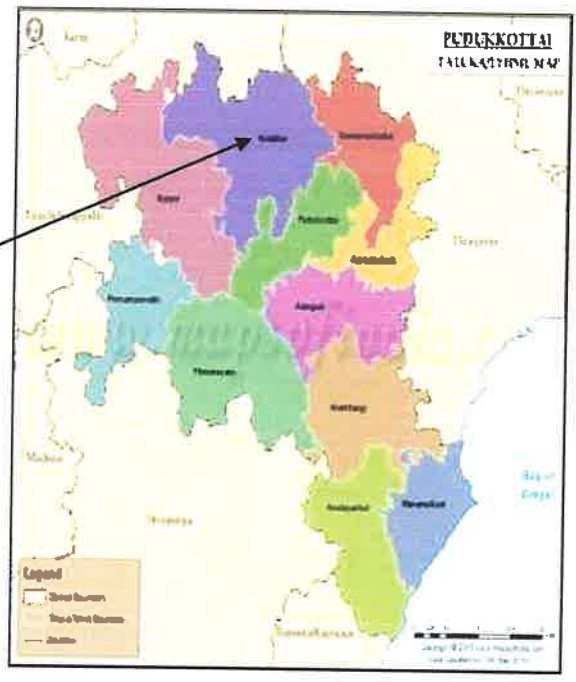
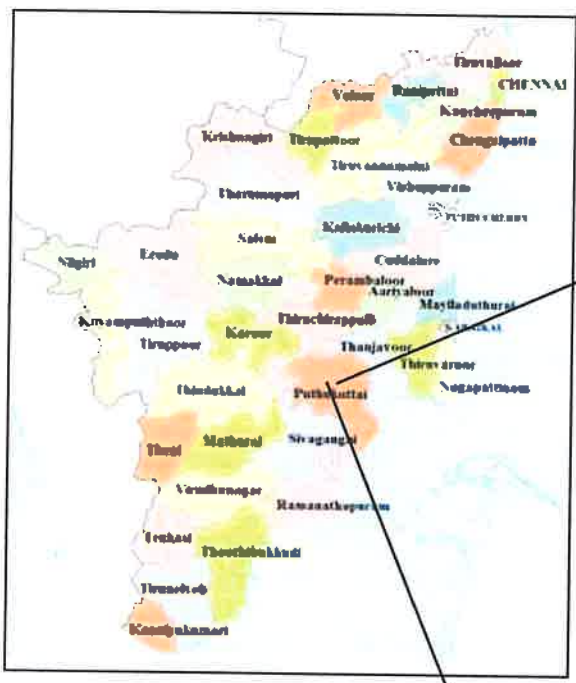
4.1. Details of Existence of public road /railway line, if any nearby and approximate distance.

Table No: 3

S.No	Description	Place	Distance (Km)	Direction
1	Bus stop	Vellanur	3.5	NE
2	Post Office	Vellanur	3.5	NE
3	Police Station	Vellanur	3.5	NE
4	Fire service	Sipcot	3.4	SE
5	Railway Station	Vellanur	4.0	NE
6	Government Hospital	Vellanur	3.5	NE
7	Government School	Vellanur	3.5	NE
8	Airport	Trichy	35.0	NW



Location site of **Thiru. R.Arockiya Raj**, Melur Village, Pudukkottai Taluk, Pudukkottai District.





Classification of the Area (Ryotwari / Poramboke /Patta/ others)

- It is an Applicant Consent Patta Land and non-agricultural land

a. Ownership / Occupancy of the applied area (Surface rights)

- It is Consent Patta land registered in the name of Applicant Thiru. A.Gnanaraj vide Patta No – 1719
- The applicant has got surface rights Please refer Annexure-IV

b. Toposheet No. with Latitude and Longitude

Toposheet No: 58– J / 15

Latitude : 10°26'40.50"N to 10°26'48.54"N

Longitude : 78°45'55.90"E to 78°46'00.42"E

5.0. GEOLOGY AND MINERAL RESERVES

5.1. Topography:

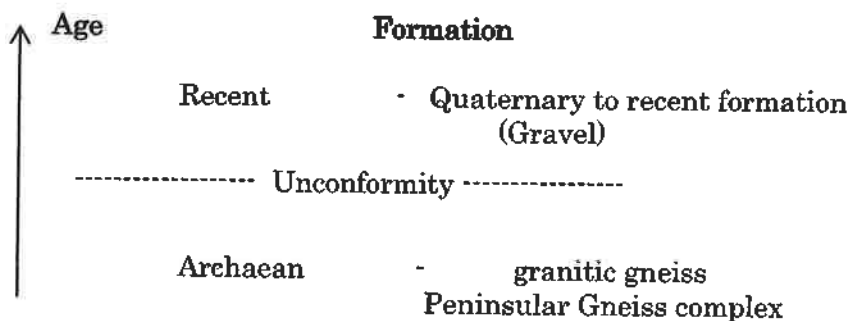
- ❖ The lease applied area is exhibits Plain terrain topography covered by gravel and rough stone formation.
- ❖ The Rough stone and gravel formation is clearly visible to nearby quarried pit of the lease applied area gentle sloping towards southeastern side of the area, the altitude of the area is above 114.0m MSL.
- ❖ No major river is found nearby the lease applied area.
- ❖ Water Level is found at a depth of 70m to 75m below Ground Level, 70m in Rainy seasons and 75m in summer seasons by monitoring nearby bore hole.
- ❖ Temperature of the area is reported to be 18°C to a maximum of 42°C during summer.
- ❖ Rainfall of this area is about 800mm to 900mm during the both NE & SW monsoons.



5.2. General Geology of the area (with plans):

- ❖ 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, granitic gneiss basic granulites and calc-gneisses. The younger formations are Quartz veins and pegmatite.
- ❖ The rock type noticed in the area for lease is granitic gneiss which contains mostly Quartz and Feldspar with some ferromagnesian minerals.
- ❖ The granitic gneiss is part of peninsular Gneisses, a high grade metamorphic rock.
- ❖ The strike of the granitic gneiss formation is N45°W-S45°E with dipping towards SE30°.

The General Geological succession of the area is given as under.



5.3. Details of Exploration already carried out if any:

- ❖ There is no exploration carried out in this applied quarry area.
- ❖ State Geology and Mining Department Government of Tamilnadu has been carried out geological exploration and regional mapping study of the lease area.
- ❖ Geological Survey of India has carried out detailed mapping in Pudukkottai District.
- ❖ Besides the RQP and his Team members made a detailed geological study of the area the massive Rough stone & Gravel formation is clearly inferred from the visible in nearby quarried pit of the lease applied area.

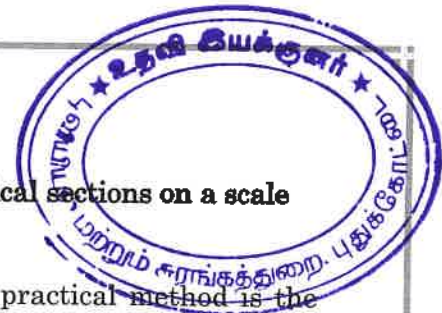


PROPOSED QUARRY SITE PHOTOS



Close View of Lease Applied Area





5.3. a. Estimation of Reserves (Geological Resources with geological sections on a scale of 1:1000)

- ❖ As far as Rough stone & Gravel is concerned, the only practical method is the systematic geological mapping and delineation of Rough stone & Gravel within the field and careful evaluation of body lustre, physical properties, engineering properties, commercial aspects etc.,
- ❖ Totally Three sections have been drawn, One section drawn length wise as (X-Y) another Two Sections drawn width wise as (A-B) & (C-D) to cover maximum area considered for lease.
- ❖ The Topographical, Geological plan and sections demarcated the commercial, marketable Rough stone & Gravel deposit has been prepared in Scale 1:1000 and Sections have been drawn with a scale of Hor 1:1000 and Ver 1:500 respectively.
- ❖ Please refer Plate No. VII, VII-A & VII-B as Rough stone & Gravel are terms of Cubic Meters (Volume) only and not for in terms of Tonnage calculations.

I. GEOLOGICAL RESOURCES :

The Geological Resources is estimated as 10,87,125m³ of Rough stone & 33,450m³ Gravel up to a depth of 67.0m (2.0m Gravel & 65m Rough stone).

Table No: 4

GEOLOGICAL RESOURCES						
Section	Length in (m)	Width in (m)	Depth in (m)	Volume m ³	Geological Resources of Gravel in m ³	Geological Resources of Rough stone in m ³
XY-AB	113	105	2	23730	23730	
	113	105	65	771225		771225
XY-CD	108	45	2	9720	9720	
	108	45	65	315900		315900
TOTAL					33450	1087125



II. AVAILABLE MINEABLE RESERVES:

The available Mineable Reserves are calculated by deducting the safety distance of 10m for the Government Poramboke Land in S.F.No.209/2 (Western side) and 7.5m for the Adjoining Patta land from the lease area and bench loss as height 5.0m and width 5.0m.

Table No-5

MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Mineable Reserves of Rough stone in m ³
XY-AB	114-112	106	88	2	18656	18656	
	112-107	104	84	5	43680		43680
	107-102	99	74	5	36630		36630
	102-97	94	64	5	30080		30080
	97-92	89	54	5	24030		24030
	92-87	79	44	5	17380		17380
	87-82	69	34	5	11730		11730
	82-77	59	24	5	7080		7080
	77-72	49	14	5	3430		3430
TOTAL						18656	174040
XY-CD	114-112	101	28	2	5656	5656	
	112-107	99	24	5	11880		11880
	107-102	94	14	5	6580		6580
	102-97	89	4	5	1780		1780
TOTAL						5656	20240
GRAND TOTAL						24312	194280

The available Mineable Reserves is computed as 1,94,280m³ of Rough stone and 24,312m³ of Gravel formation at the rate of 100% recovery upto a depth of 42.0m(Max) (2.0m Gravel & 40m Rough stone).

6.0. MINING

6.1. Method of Mining (Open cast / Underground)

Opencast method of semi mechanized mining with 5.0m vertical bench height and width 5.0m of the bench is not less than bench height.

However, as far as the quarrying of Rough stone & Gravel is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of mines safety for which necessary provision is available with the regulation 106 (2) (b) of MMR-1961, under Mine Act-1952.

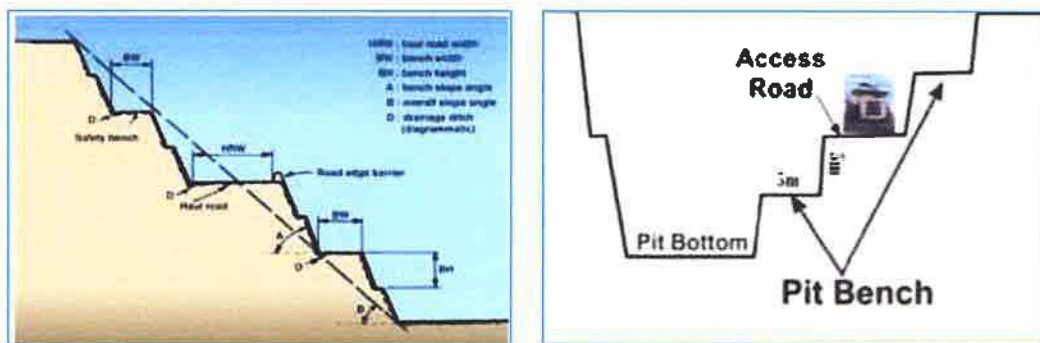


Figure shows Open pit Mining method

6.2. Mode of Working (Mechanized, Semi-mechanized, Manual)

- ❖ The Rough stone is proposed to quarry 5.0m bench height and 5.0m bench width with conventional opencast semi-Mechanized method. The quarrying operation involves manual Jackhammer drilling, Slurry explosives blasting, loading and transportation of Rough stone & Gravel to the nearby crusher units, road formation filling purpose of low lying area for road project works of residential and industrial customers.
- ❖ 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.
- ❖ The splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading of Rough stone & Gravel from pithead to the nearby crushers.
- ❖ The 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.

6.3. Proposed bench Height and Width

- ❖ The quarrying of Rough stone is proposed to the safely bench height of 5.0m and bench width of 5.0m.

6.4. Indicate the overburden/mineral production expected pit wise as detailed as below (Composite plan and section showing pit layout, dumps, disposal of waste if any etc.,)

The excavated Rough stone & Gravel will be directly loaded into Tippers to the needy crushers / Customers site. The Composite Plan, Development Plan and section indicating pit layout, Green belt development are shown in Plate No. VII.

III. RECOVERABLE RESERVES :

The Year wise Recoverable Reserves are calculated by deducting the safety distance of 10m for the Government Poramboke Land in S.F.No.209/2 (Western side) and 7.5m for the Adjoining Patta land from the lease applied area and bench loss as height 5.0m and width 5.0m.

Table No: 6

YEARWISE DEVELOPMENT & PRODUCTION RESERVES								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Recoverable Reserves of Rough stone in m ³
I	XY-AB	114-112	50	88	2	8800	8800	
		112-107	48	84	5	20160		20160
TOTAL							8800	20160
II	XY-AB	114-112	48	88	2	8448	8448	
		112-107	48	84	5	20160		20160
TOTAL							8448	20160
III	XY-AB	114-112	8	88	2	1408	1408	
		112-107	8	84	5	3360		3360
	XY-CD	114-112	101	28	2	5656	5656	
		112-107	99	24	5	11880		11880
		107-102	94	14	5	6580		6580
TOTAL							7064	21820
IV	XY-AB	107-102	55	74	5	20350		20350
TOTAL								20350
V	XY-AB	107-102	44	74	5	16280		16280
		102-97	15	64	5	4800		4800
TOTAL								21080
GRAND TOTAL							24312	103570

- Recoverable Reserves are estimated 1,03,570m³ of Rough stone and 24,312m³ of Gravel up to depth of 17.0m(Max) (2.0m Gravel & 15m Rough stone) for the lease period of (Five) 5 Years only.



Production quantity per day (1Load=6m³approx) (1Year=260 Working days)

Rough stone quantity = 1,03,570m³ / 17,261 Loads
 = 17,261 / 1300 days (5 years)
 = 78m³ or 13 Lorry Loads per day

Gravel quantity = 24,312m³ / 4,052 Loads
 = 4,052 / 780 days (3 years)
 = 30m³ or 5 Lorry Loads per day

The applicant ensures the total quantity of proposed reserves in benches will not exceed the quarrying operation. Besides the Rough stone & Gravel locked up in bench loss will be exploited after obtaining necessary permission from Director General of Mines Safety, Pudukkottai region by submit the relevant documents, appropriate safety plans and its necessary mitigation safety measures.

6.5. MACHINERIES TO BE USED

a. Mining

It is proposed to use the following machineries on rental basis for the development and production work in this quarrying operation,

S.No	Type	Dia Hole mm	Size capacity	Make	Motive Power
1	Jack Hammer	32	1.2m to 6m	Atlas Copco	Compressed air
2	Compressor	-	400psi	Atlas Copco	Diesel Drive

b. Loading

Manual loading (considerable Rough stone & Gravel accumulates the same will be loaded by Hired front end loader like JCB) Excavator of 0.90m³bucket capacity (with Rock breaker attachment)

S.No	Type	Bucket capacity	Make	Motive Power
1	Excavator	0.90m ³	Tata Hitachi - 210	Diesel Drive



c. Transportation

Tippers/Trucks = 4Nos. 10 /20Tons capacity (from the quarry to destination) (customer/other buyers)

S.No	Type	Capacity	Make	Motive Power
1	Tippers	10/20 Tons	Tata Tipper	Diesel Drive

IMAGES OF MACHINERIES



EXCAVATOR



TATA TIPPER



alamy stock photo

JACK HAMMER



6.6. Energy

The Electricity for Mines office and Lights only at nights (working is restricted on day time only between 9 Am to 5 Pm). Diesel (HSD) will be used for quarrying machineries around **86,898 Liters of HSD** will be used for the entire project life. Diesel will be brought from nearby diesel pumps. Lightings on the Night time the power will be taken from nearby electric poles after obtaining permission from concerned authorities.

1. Gravel:

The Excavator will consume = 10 Liters / 1 hour
The Excavator will excavate = 60m³ of Gravel
Gravel quantity = 24,312 / 60= 405 hours
Diesel consume = 405 hours x 10 liters

Total diesel consumption= **4,050 Liters** of HSD will be utilized for this Gravel Quarry.

2. Rough stone :

The Excavator will consume = 16 Liters / 1 hour
The Excavator will excavate = 20m³ of Rough stone
Rough stone quantity = 1,03,570 / 20= 5,178 hours
Diesel consume = 5,178 hours x 16 liters

Total diesel consumption= **82,848 Liters** of HSD will be utilized for this Rough stone Quarry.

Total consumption for Rough stone & Gravel is around = **86,898 Liters** of HSD for the entire period of life

6.7. Disposal of Overburden/Waste

The over burden in the form of Gravel is 24,312m³ of used for filling and leveling of low lying areas of road projects and other infrastructure development work in and around the district.

6.8. Brief Note on Conceptual Mining Plan for the entire lease period

Conceptual Mining Plan is prepared with an object of (Five)5 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

Length in (m)	Width in Avg (m)	Depth in Max (m)
207	48	17.0m (2.0m Gravel & 15m Rough stone)



Afforestation has been proposed on all along the safety barrier by planting native species of Saplings. 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. It is proposed to engage any local institution to monitor the EIA and EMP studies during the course of quarrying operation after the grant of quarry lease.

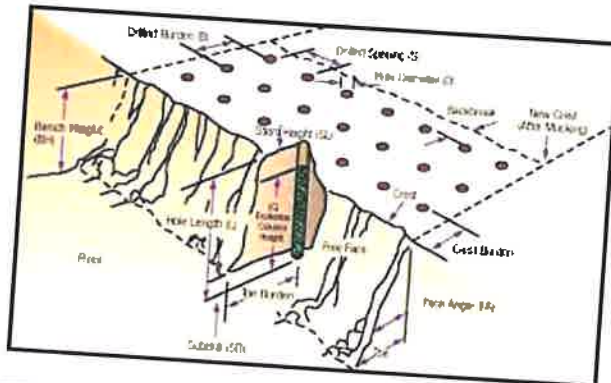
7.0. BLASTING

7.1. 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.

Drilling and blasting parameters are as follows

Diameter of the hole	: 30-32 mm
Spacing between holes	: 1.2m
Depth of each hole	: 1 to 1.5m
Burden for hole	: 1.0m
Inclination of hole	: 80° from the horizontal
Use of delay detonators	: 25 millisecond
Detonating fuse	: Detonating cord
Blasting Design	: Staggered "V" Pattern





7.2. Types of Explosives

Small dia, 45mm 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

7.3. Measures proposed to minimize ground vibration due to blasting

- ❖ Controlled blasting measures will be adopted for minimizing ground vibration and fly of rocks. Shallow depth drilling and smooth blasting is proposed to carry out with minimum usage of explosive mainly to give shattering effect in Rough stone for easy excavation and control of fly rocks.
- ❖ The following steps shall be adopted to control ground vibration due to blasting. The minimum recommended delay time of 8ms was introduced to minimize ground vibration.
- ❖ In case of **electronic detonators**, which are inherently much more accurate **delays** (+/- 0.2 milliseconds delay) to minimizes the **ground vibration reduction in air, reduction over break, improved well fragmentation** and better control of fly-rocks.
- ❖ Use of Ammonium nitrate, fuel oil mixture for shot holes may be avoided because which cause for high fly of rocks in view critical diameter problem. Only high strength explosives like slurry will be used in the form of cartridge.

7.4. Storage of Explosives and safety measures to be taken while blasting.

- ❖ The Applicant is advised to engage an authorized explosive agency to carry out small amount of blasting and it will be supervised by the competent statutory Mining Mate /Foreman /Manager. The explosive agency should have the valid Blaster Certificate.
- ❖ He will blast holes in quarry site. After completion the blasting, the agency will take it out back the remaining quantity of explosives to the temporarily available the Magazine at the quarry site. **The blasting time of the day is proposed to be 1 PM to 2.30PM.**
- ❖ First Aid Box will be keeping ready at all the time in Mines Office room. Necessary precautionary announcement will be carried out before the blasting operation.



8.0. MINE DRAINAGE

8.1. Depth of Water Level

- ❖ The ground Water Level is noticed at the depth of 70m to 75m below Ground Level by monitoring nearby bore hole, during the climatic conditions, the fluctuations of water level is 70m in Rainy seasons and 75m in Summer seasons of this quarry area.
- ❖ The quarry operation is proposed upto a depth of 17.0m (Max) (2.0m Gravel & 15m Rough stone). Hence the quarrying operation may not affect the ground water in any manner.
- ❖ It shall be ensured that quarrying shall not be carried out below ground water table under any circumstances.
- ❖ *If ground water table occurs/intervenues within the permitted depth, then also the quarrying shall be stopped.*

8.2. Arrangement and Places where the mine water is finally proposed to be discharged

- ❖ The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of from seepage shall be less than 300LPM and it will be pumped out periodically by a stand by diesel powered Centrifugal pump with 5HP Motor.
- ❖ The quality of water is potable and no contamination with any hazardous things.
- ❖ Hence, the water stored in quarrying pit will be pumped out the adjacent agricultural fields and further stored in old pit the water is used for Dust suppression/ Plantation purposes.



9.0. ECOLOGY AND BIODIVERSITY

The green belt in the lease area be developed taking into consideration the availability of area as the efficiency of green belt in pollution control mainly depends on tree species, its width, distance from pollution sources, side of the habitat from working place and tree height. The proposed green belt should be designed to control PM10, gaseous pollutants, noise, surface run off and soil erosion etc., While considering the above aspects due care should be taken for selecting the suitable characteristics plant species such as fast growing, locally suitable plant species, resistant to specific pollutant and those which would maintain the regional ecological balance, soil and hydrological conditions.













Flora as observed and identified in the field are covered by mostly Neem, Erukku, Panai trees, Palmira tree are found more on regional scale. The Applicant has developed trees like Neem, Pungam, Teak, Caesarians and Eucalyptus, regional trees etc., with Proper nursery garden and plantation on vacant land. The fauna species observed around the 500m radius of the project site is given in the table.

**List of Flora observed around the quarry site
(Flora Trees & Flora Shrubs)**



Table No: 7






Flora - Trees			
S.No	Tamil Name	Botanical Name	Photograph
1	Neem tree	Azadirachataindica	
2	Panai tree	Borassusflabellifer	
3	MulluMaram	Prosopisjuliflora	
4	Punga Maram	Millettia pinnata	
5	SavukkuMaram	Casuarinacunninghamiana	

Flora - Shrubs			
S.No	Tamil Name	Botanical Name	Photograph
1	Korai	CyperusPangorei	
2	Avaram	Senna articulate	
3	Erukku	Calotropis	
4	Mookuthichedi	Tridaxprocumbens	
5	Musumusukkai	Melothria	

**List of Fauna observed around the quarry site
(Fauna Mammals & Fauna Avian)**



Table No: 8

Fauna Mammals			
S.No	Common Name	scientific name	Photograph
1	Anil	FunambulusPalmarum	
2	Thavalai	Cane toad	
3	Keeri	HerpestesEdwardsii	
4	Rabbit	Oryctolagusuniculus	
Avian Fauna			
1	Crow	CorvusSplendens	
2	Myna	Acridotherestrictis	
3	Chittukuruvi	SaxicoloidesFulicatus	
4	Parunthu	Haliastur Indus	

10.0. OTHER PERMANENT STRUCTURES



10.1. *Habitations / Village Natham (300m)*

- ❖ There are no inhabited sites within the radius of 300m from the boundary of lease area under Rule 36(1-A) (a) TNMMCR 1959.
- ❖ The Nearest Village habitation is Maruthanthalai at the distance of 0.82 km on Southwestern side of the lease area.
- ❖ The applicant ensures the quarrying operation will be carried out without any hindrance to the habitants and adjoining land owners.

10.2. *Power lines (HT/LT) (50m)*

- ❖ There is no HT/LT line within the radius of 50m.

10.3. *Water bodies (River, Pond, Lake, Odai, Channel etc.,) (50m)*

- ❖ There is a Kanmoi located at the distance of 356m on Southeastern side of the lease applied area.

10.4. *Archeological / Historical Monuments (500m)*

- ❖ There are no Archeological / Historical Monuments within a radius of 500m from the boundary of lease applied area.

10.5. *Existence of public road (SH, NH others), Railway line if any (50m)*

- ❖ There is an existing road from the area leads Melur road at the Western side of the area.
- ❖ SH - 71 Panangudi to Pudukkottai is located which is about 2.7 Km on the Southwestern side of the area.
- ❖ NH-336 Trichy to Pudukkottai is located which is about 2.0 Km on the Eastern side of the area.
- ❖ The Nearest Railway line is Vellanur station line which is about 4.0Km on the Northeastern side of the area.

10.6. *Places of Worship (Temples, Church, Mosque etc.,) (500m)*

- ❖ There is no Places of Worship within a radius of 500m.

10.7. *Reserved Forest / Forest / Wild Life Sanctuary etc., (10Km)*

- ❖ Reserved Forest – 7.0km - SE

10.8. *Any Other Structures : Nil*

11.0. EMPLOYMENT POTENTIAL & WELFARE MEASURES



11.1. Employment Potential (Management & Supervisory personal)

The following man powers are proposed carry out the day to day quarrying activities at the proposed production and also comply with the statutory provision of the MMR 1961.

Management and Supervisor:

- | | |
|--|--------|
| 1. Second Class Mines Manager (with valid statutory qualification) | : 1 No |
| 2. Mines Foreman (with valid statutory qualification) | : 1 No |
| 3. Mines Mate (with valid statutory qualification) | : 1 No |
| 4. Blaster | : 1 No |

Laborers, Skilled, Semi-Skilled & Un-skilled

- | | |
|--|---------|
| a. Skilled (Operators- Excavator & Jackhammer) | : 4Nos |
| b. Semi-skilled (Driver) | : 4Nos |
| c. Unskilled (Musdoor/Labours, Cleaners & Watch man) | : 15Nos |

Total : 27Nos

Allowing 10% absenteeism, the no. of men of roll will be around 24 Nos.

It is been ensured that, *Child Labours under 18 Years of age will not be engaged for any quarrying operation.*

Necessary Life Insurance policies will be taken by the applicant to all the employees up to the end of the lease period.

11.2. Welfare Measures

a. Drinking Water

- ❖ Drinking water is available from the nearby agriculture land owners or from water vendors in Maruthanthalai Village which is about 0.82m on Southwestern side of the lease applied 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, 1955 separately for males and females. Washing facilities shall also be arranged as per Rule (36) of Mines Rules, 1955 and it will be maintained periodically.



c. First Aid Facility

- ❖ First Aid station as per provisions under Rule (44) of the Mines Rules, 1955 will be provided and First aid kits kept in mines office room, the qualified first aid personnel should be appointed or nominated to attend emergency first aid treatment.
- ❖ In case of eventuality, the victim will be given first aid immediately at the site and the injured person will be taken to the *Kulathur* is about 4.2Km on Northeastern side. The competent and statutory of Foreman/Mate/Permit Manager will be incharge of the First aid.


d. Labour Health

- ❖ Periodic medical examination has to be arranged for occupational health once in a year in addition to attending medical treatment of occupational injuries under the Rule 45(A), Mines Rules, 1955.

e. Precautionary safety measures to the Laborers

Safety measures will be implemented to prevent access in the excavation area an un authorized persons as per Mine Act 1952 and MMR 1961.

- ❖ *Safety measures will be implemented as per Mines Act 1952, MMR 1961 AND Mines Rules 1955.*
- ❖ *Provisions of MMR 1961 shall be strictly followed and all mine roads shall be wider than the height of bench or equal to the height of the bench and have a gradient of not more than 1 in 16.*
- ❖ *The bench height will be 5.0m.*
- ❖ *Protective equipment like dust mask, ear-plugs/muffs, sand respirator (avoid silica dusts forms-Silicosis), reflector jackets, safety thick shoes, etc., as Personnel Productive Equipment (PPE) as per the circulars and amendments made for Mine Labour under the guidance of DGMS.*
- ❖ *Notice giving warning to prevent inadvertent entry of persons shall be displayed at all conspicuous places and in particular near mine entries.*
- ❖ *Danger signs shall be displayed near the excavations and proper signal bt siren alarm will be provide before blasting time to prevent any accident.*
- ❖ *Security guards will be provided.*
- ❖ Periodically medical checkup will be conducted for all workers for any mine health problems.
- ❖ Proper training and induction will be given by qualified and experienced safety officer to all employees about the safe and systematic quarrying operation.

- 
- ❖ The drillers and workers are sent for vocational training periodically to carry out the quarrying operations scientifically to safeguard the men machinery and mineral and to create awareness of conventional opencast quarrying operation.
 - ❖ In the event of temporary closer, approaches will be fenced off and notice board displayed.

f. Disaster Management and Risk Assessment

This should deal with action plan for risk accident like landslides. Subsidence, flood, fire, seismic activities, tailing dam failure etc. and emergency plan proposed for quick excavation. Ameliorative measures to be taken etc. The capability of applicant to meet such eventualities and the assistance to be required from the local authorities should be described.

- The mechanized mining activities in the area may involve any risk accident due to side falls/collapse, flying stones because of blasting etc.
- The complete mining operation will be carried out under the Management and control of experienced and with Mines Manager having Certificate of Competency to manage the mine granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, TNMCR 1959 and other laws applicable to mine will be strictly complied with.
- During heavy rainfall the mining activities will be suspended.
- All persons in supervisory capacity will be provided with communication facilities.
- Competent Persons will be provided FIRST AID kits which they will always carry.
- The Greenbelt Development will be formed in around the quarried out top benches and panchayat roads of the lease applied area.

g. care and Maintenance during Temporary Discontinuance

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstance following measures shall be taken for care, maintenance and monitoring of conditions.

- Notice of temporary discontinuance of work in mine shall be given to the DGMS as per MMR 1961.
- All the mining machinery shall be shifted to the safe place.
- Entrance to the mine or part of the mine, to be discontinued shall be fenced off. Fencing shall be as per the circular 11/1959 from DGMS.

PART - B



12.0. ENVIRONMENTAL MANAGEMENT

12.1. Existing Land Use Pattern

The area is exhibit Plain Terrain topography. The applied area is dry barren land and devoid of agriculture and habitations and the area is not used for the specific vegetation. The surrounding area is practiced by the seasonal cultivation.

The existing Land use pattern is given as under

Table No-9

S. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Quarrying Pit	Nil	1.11.0
2.	Infrastructure	Nil	0.02.0
3.	Roads	Nil	0.02.0
4.	Green Belt	Nil	0.25.0
5.	Unutilized	1.68.0	0.28.0
	Total	1.68.0	1.68.0

12.2. Water Regime

Water Level in this quarry area is noticed at a depth of 70m to 75m below Ground Level, observed nearby bore hole the quarrying of Rough stone & Gravel is proposed up to a depth of 17.0m(Max) (2.0m Gravel & 15m Rough stone). Hence, it will not affect the quality of ground water depletion of this area.

12.3. Flora and Fauna

The Thorny bushes are placed in quarry area and Neem, Pungam, Panai trees are noticed around the quarry area. Except acacia bushes, no other valuable trees are noticed in the lease applied area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.

12.4. Climatic conditions

The area receives annual rainfall of about 800mm to 900mm and the rainy season is mainly from Oct - Dec receives rain both in south west and north east monsoon. The summer is hot with maximum temperature of 35°C and during Winter encounters a minimum temperature of 18°C.



12.5. Human Settlement

The nearest habitations with the population, approx. distance within 5.0Km radius from the proposed quarry site are as given under,

Table No-10

S. No	Name of the Village	Approximate distance	Direction from lease applied area	Approximate Habitations
1.	Melur	1.6Km	North-East	218
2.	Sttannavasal	3.9Km	North - West	292
3.	Maruthanthalai	0.8 Km	South - West	274
4.	Thiruvengavasal	2.6 Km	South - East	165

12.6. Plan for Air, Dust Suppression

The air quality will be affected by the Suspended Particulate Matter (SPM) generated by the blasting, jack hammer drilling, loading and unloading during the quarrying operation. The following mitigation measures will be carried out, Mist water spraying will be carried out by means of water sprinklers to suppress dust emission in the Haul roads. The native species of Neem, Pungam, Panai etc., will be planted along the lease boundary and Safety buffer zone. The quarried out materials will be fully covered by the Tarpaulin during transportation to avoid the spillage of materials. The Air quality will be monitored periodically as per the norms and mitigate measures carried out to prevent dust and air propagation in to the air Operators, those exposed directly to such conditions will be provide such as (PPE) Personnel Protective Equipment's like Dust mask, Ear plug, Helmet, Gloze etc., as per the Mines Act -1952.

The estimated budget for dust suppression would be around **Rs.5,10,000/-** for the period of 5 Years only.

Image of the water spray Vehicle





12.7. Plan for Noise Control

- ❖ The quarrying of Rough stone will be carried out by Shallow holes of 32mm diameter and 1.5meter depth of wet drilling and conventional low power explosives such as slurry explosives, ordinary safety fuse only. Hence the ground vibration and noise pollution will be very minimum and restricted within the quarry workings. However, periodical noise level monitoring and other mitigation measures will be carried out to reduce the noise level and vibration in and around the quarry site.
- ❖ Nowhere the noise level should exceed the permissible limit of 80db during the quarry working hours.
- ❖ The drivers will be strictly instructed to move the vehicle during the transportation not exceeding 40Km per Hour, Sentries with Red Flag & whistle will be posted in village junction and regulate traffic.
- ❖ The estimated budget for Noise level monitoring would be around Rs.20,000/- for the period of 5 Years only.

12.8. Environmental Impact Assessment Statement Describing Impact on mining on the next Five years

- ❖ The mining plan proposed is for a small production of Rough stone & Gravel 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 of mine.
- ❖ The estimated Cost would be around Rs. 3,70,000/- for a period of 5 Years only.

12.9. Proposal for Waste Management

There are no wastes anticipated during this Rough stone & Gravel quarry operation. The quarried out materials 100% will be utilized.

12.10. Proposal of Reclamation of Land affected during mining activities and at the end of mining (refilling/fencing etc.,)

In the proposed mining plan only a maximum depth of 17.0m (Max) (2.0m Gravel & 15m Rough stone) 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 17.0m (Max) (2.0m Gravel & 15m Rough). type Fencing will be constructed around the quarried pits to prevent inherent entry of the public and cattle

There is no proposal for refilling and rehabilitation. The Barbed wire fencing cost would be around Rs.1,50,000/-



12.11. Program for Afforestation:

The 7.5m & 10m safety distance along the lease boundary has been identified to be utilized for Afforestation in a phased manner as described below

Table – 11

Year	No. of Saplings proposed to be planted	Survival %	Area to be covered Sq.m	Name of the species	No. of Saplings expected to be grown
I	60	80%	500	Neem & Pungam	48
II	60	80%	500	Neem & Pungam	48
III	60	80%	500	Neem & Pungam	48
IV	60	80%	500	Neem & Pungam	48
V	60	80%	500	Neem & Pungam	48

- Nearly 2500 Sq.m area is proposed to use under Afforestation by planting 60Nos of Neem Saplings etc., every year in the spacing interval of (5m X 5m) with an anticipated survival rate of 80%.
- Appropriate native species of Neem, Pungan, Teak and Casuarinas Saplings will be planted approach roads, service roads, nearby villages, village roads, government school etc.,
- Saplings of local plants of regional tress will be planted as per the consultation of the local Forest Department.
- The Quarry Land use, Layout and Afforestation Plan are showing in Plate No. VII.



12.12. Proposed Financial Estimate / Budget for (EMP) Environment Management

Table - 12

S.No	Monitory and Analysis Description	Rate per location	No. of location	Total Charges for monitoring		
				6 months	Per Year	5 Years
1	Ambient Air quality monitoring	5000	4	20000	40000	2,00,000
2	Water sampling and analysis	10000	1	10000	20000	1,00,000
3	Noise level monitoring	500	4	2000	4000	20,000
4	Ground vibration monitoring	2500	2	5000	10000	50,000
Total EMP Cost				37000	74000	3,70,000

The Environment Monitoring EMP Studies Cost would be around **Rs. 3,70,000/-** for a period of 5 Years only.

I. Project Cost & Investment:

1) Land cost

The Land Value as per the Government Guideline cost is Calculated as follows
 $1.68.0 \text{ ha} \times \text{Rs.}8,00,000/\text{ha} = \text{Rs.}13,44,000/-$

2) Refilling/ Fencing

There is no proposal for Refilling, after the excavation of Rough stone & Gravel the quarried out land will be fenced with barbed wire fencing the cost would be around **Rs.1,50,000/-**

3) Laborers shed

Labours are proposed for quarrying Rough stone & Gravel. The machine Operators and workers are from nearby local villages, hence no cost is involved. Rest shelter will be constructed as semi-permanent structure at the cost of **Rs.2,50,000/-**

4) Sanitary facility

Sanitary facility will be constructed as semi-permanent structure, the cost will be around **Rs.1,50,000/-**

II. Machinery to be used :

The Machineries like Jack Hammer, Tractor mounted compressor attached with Jack hammer, Excavator Of 0.9m³ bucket capacity attached with Rock Breaker are proposed to deploy for quarrying operation and Tippers/Trucks of 10/2 Tons capacity will be used for the quarrying transportation for hired basis, the cost will be around **Rs.25,00,000/-**

I. Fixed Asset Cost :-

1. Land cost	= Rs. 13,44,000/-
2. Fencing cost	= Rs. 1,50,000/-
3. Rest shelter	= Rs. 2,50,000/-
4. Sanitary Facility	= Rs. 1,50,000/-

II. Machinery Cost :- = Rs. 25,00,000/-

Total Project Cost = Rs. 43,94,000/-

III. Expenditure :

1) *Drinking Water facility and other utilities for the labourers*

27 Labours at the rate of Rs.4,500/- month for a period of (Five) 5 Years only, the cost will be around **Rs.2,70,000/-**

2) *Sanitary arrangement*

Sanitary maintenance at the cost of Rs.3500/- month the cost will be around **Rs.2,10,000/-** for a period of (Five) 5 Years only.

3) *Safety kits*

Rs.1,20,000 will be spent for the safety kits such as Helmet, Mine Goggles, Ear plugs, Ear muf, Dust Mask, Reflector jackets and safety Shoes.

4) *Water sprinkling (if necessary)*

Rs.9,000/- month will be spent for sprinkling the water on haul roads for Dust suppression; the cost will be around **Rs.5,40,000/-** for a period of (Five) 5 Years only.

5) *Afforestation etc.,*

Afforestation is proposed within safety zones of the lease applied area and plantations will be carried out on the nearby villages and village roads, Govt School after consultation with the Panchayat authorities. The cost estimate is around **Rs.70,000/-**



Expenditure :

1. Drinking water	= Rs. 2,70,000/-
2. Sanitary Arrangements	= Rs. 2,10,000/-
3. Safety kits	= Rs. 1,20,000/-
4. Water Sprinkling	= Rs. 5,40,000/-
5. Afforestation cost	= Rs. 70,000/-

Environment Monitoring / 5 Years :

1) Air Quality Sampling	= Rs. 2,00,000/-
2) Water Quality Sampling	=Rs. 1,00,000/- ¹
3) Noise Level Monitoring	= Rs. 20,000/-
4) Ground vibration test	= Rs. 50,000/-

EMP Cost Total = Rs. 18,08,000/-

(Expenditure Including EMP Studies)

Total Project Cost =Rs.43,94,000/-

EMP Cost =Rs.18,08,000/-

12.13 Corporate Environment Responsibility (CER):

- ❖ The Applicant shall distribute Note books, Stationary items to nearby Govt Primary School and to conduct the Medical camp, Environment awareness program, etc., to nearby villages after consultation with local panchayat authorities.
- ❖ The Applicant shall ensure that a minimum of 2.0% from the Total project cost (Rs.87,880/-) for the entire lease period will be utilized for the CER Activities.
- ❖ *District Mineral Fund @10% of the Royalty shall be given to the Dept. of Geology and Mining.*

13.0. MINE CLOSURE PLAN



13.1. Steps proposed for phased restoration, reclamation of already mined out area

- ❖ This conventional Systematic, Scientific and Eco-Friendly quarrying operation for a depth of 17.0m (Max) (2.0m Gravel & 15m Rough stone) and not required any Backfill, Reclamation and Rehabilitation, the quarried out lands will be used for Water storage/ Recharge purpose.
- ❖ The mined out area will be fenced on top of open cast working with S1 Fencing to arrest the entry of cattle and public in to the quarry site.

13.2. Measures to be under taken on mine closure as per Act & Rules.

Measure will be taken as per Act & Rules. The quarried pit will be fenced by using Barbed wire fencing to prevent inherent entry of public and cattle.

13.3. Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area.

Air Quality:

- ❖ (Air quality will be degrade due to drilling, blasting, mining operation and transportation)
- ❖ 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 roads is proposed to prevent the dust propagation into the air.

Noise and Vibration:

- ❖ (The noise will be formed due to the drilling, blasting, loading and movement of Vehicles, Machineries)
- ❖ The applicant has proposed to plant native species of Neem, saplings all along safety area to prevent Noise besides wet drilling will be practiced to prevent dust and spillage.
- ❖ All the Vehicles, Machineries will be maintained in good conditions as per RTO and TNPCB Norms to prevent Noise, Smoke and Vibration to maintain Noise levels below 80 dB(decibel).



Water Regime:

- ❖ The quarrying operation has proposed upto a maximum depth of **17.0m (Max)** (2.0m Gravel & 15m Rough stone) is well above the ground water table (Summer 75m and Rainy seasons 70m) for a period of 5 Years only. Hence the ground water table will not affect in any manner.
- ❖ The seepage and rain water stored in quarrying pit will be drained out by 5 H.P motor pump and will be discharged through filter media to boundary barrier for afforestation and excess water will be sprayed on haul roads to prevent dust propagation in to the atmosphere.
- ❖ The Rough stone & Gravel quarry will not produce any harmful toxic effluence in the form of Solid, Liquid or Gas.

Human Health and Safety:

- ❖ All the labors are provided with Safety Equipment's like safety Helmet, Goggles, Ear muff, Ear Plug, Safety Jackets, Hand gloves, Thick Shoes etc., at applicant cost, as per the specifications of the Director of Mines Safety.
- ❖ The competent qualified person Foreman/Permit Mines Manager will provide First Aid will take care of small and minor injuries. If any accident happens, the Victim will be taken to the nearby hospital by the own vehicle which is always kept in the mines office. The nearest hospital is about 7.5Km on southeastern side of *Pudukkottai*.



14.0. ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- i. This Mining Plan for Rough stone & Gravel quarry is prepared under amended Rules 19(1), 41 & 42 of Tamilnadu Minor Mineral Concession Rules 1959.
- ii. The measures will be taken as per Mines Act & Mine Rules and Regulations and orders made there under shall be complied with, so that the safety of mine, machinery and mine workers will be protected.
- iii. It is expected that the mining will be done skillful, systematically, scientifically, and Eco-friendly quarrying operation.
- iv. There is no deep hole drilling and heavy blasting of this lease area.
- v. The Applicant will endeavor every attempt to quarry the Rough stone & Gravel economically without any wastage and to improve the environment and ecology.
- vi. Any violation pointed out by the inspecting authorities shall be rectified as per the guidelines of the Department.

Prepared by



Signature of Recognised Qualified Person

V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg. No. RQP/MAS/119/98/A

Place : Trichy

Date : 30-05-2022

This mining plan is approved in exercise of the powers conferred under Rule 41(2) and (5) TNMMCR 1959 and subject to the conditions / stipulations indicated in the mining plan approved letter Rc.No: 677/2021(G&M) Dated: 05.06.2022



ASSISTANT DIRECTOR
GEOLOGY AND MINING
PUDUKKOTTAI

From

Thiru.K.Vijayaragavan, M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To

Thiru.Arockiya Raj,
S/o.Rethinam Pillai,
No.297/7, Sathiyamoorthi Nagar,
Pudukkottai

ANNEXURE: 3



Rc.No. 677/2021 (G&M) dated 15.04.2022

Sir,

Sub: Mines and Minerals - Minor Mineral - rough stone - Pudukkottai District - Kulathur Taluk - Melur village S.F.No.210/7A - over an extent of 1.68.0 Hects. of Patta lands - Application preferred to Thiru.Arockiya Raj, S/o.Rethinam Pillai for grant of quarrying permission for Rough Stone & Gravel - Precise area communicated - Regarding.

Ref: 1. Application of Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7, Sathiyamoorthi Nagar, Pudukkottai dt.12.11.2022.
2. Land availability report of the Revenue Divisional Officer, Illuppur Rc.No.7515/2021/25/ dt.25.01.2022.
3. Technical report of the Assistant Geologist (G&M), Pudukkottai report dated 19.03.2022.
4. Other connected records.

One Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7, Sathiyamoorthi Nagar, Pudukkottai has applied for grant of quarrying lease to quarry Rough Stone & Gravel, over an extent of 1.68.0 hecets in patta lands comprised in S.F.No.210/7A of Melur village, Kulathur Taluk, Pudukkottai District for a period of ten years, under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

2) The Revenue Divisional Officer, Illuppur and the Assistant Geologist (Mines), Pudukkottai have furnished their reports, recommending for the grant of Rough Stone & Gravel quarry lease to the applicant submitted to the certain conditions vide in the reference 2nd and 3rd cited respectively.

3) Based on the recommendation of the Revenue Divisional Officer, Illuppur and Assistant Geologist (Mines), Pudukkottai, an extent of 1.68.0 hecets in patta lands in S.F.No.210/7A of Melur village, Kulathur Taluk, Pudukkottai District is considered as "precise area" for the grant of Rough Stone & Gravel quarry lease for a period of **ten years** under Rule 19 & 20 of Tamil Nadu Minor Mineral Concession Rules 1959 subject to the following conditions:

1.7.5m safety distance should be allowed and maintained to the adjacent patta lands.

2.10m safety distance should be allowed and maintained to the Government poramboke Road in S.F.No.209/2 on the western side of the applied area.

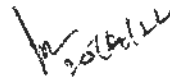
4) As per Rules 41 & 42 of TNMMCR 1959, "Mining Plan and Environmental Clearance are pre-requisite for grant of quarry lease to the Minor Minerals like gravel.

5) Hence the applicant Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7, Sathiyamoorthi Nagar, Pudukkottai is hereby directed to produce the draft Mining Plan before the Assistant Director, (G&M), Pudukkottai for approval within a period of 3 months from the date of receipt of this precise area communication and to obtain Environment Clearance to proceed further in this regard.


Assistant Director,
Geology and Mining,
Pudukkottai

Copy to :

The Chairman,
State Level Environment Impact Assessment Authority,
Chennai.


20/08/11

401 270 210

மாவட்டம்: கரையார்
மண்டலம்: சேலம்

ANNEXURE: 11

T-K8A 186/1A19 மார்ச் 26.11.09



401 270 210
T-K8A 186/1A19 மார்ச் 26.11.09
உள்ளகத்துறை 9818, 21
திட்டம் 51/1421 மார்ச் 19.8.11.09
உறுதிப்படுத்தல்
207
முடிவு 9818, 9812 முதலிய
பின்புலம் 6593/1427
மார்ச் 24/18

உள்ளகத்துறை சேலம்
உள்ளகத்துறை
2818
237/1428
15.11.2018

316
30/11/18
211
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சேலம்
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1:20000

15.10.05



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : புதுக்கோட்டை

வட்டம் : குளத்தூர்

வருவாய் கிராமம் : மேலூர்

பட்டா எண் : 1719

உரிமையாளர்கள் பெயர்

1. அந்தோனிசாமி

மகன்

ஞானராஜ்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
210	7A	1 - 68.00	6.24	--	--	--	--	2020/0103 /22/140185--- -- 18-12-2020
		1 - 68.00	6.24					

குறிப்பு 2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 22/11/028 /01719/10808 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 22-01-2021 அன்று 10:46:29 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின் 2D barcode படப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

அ-பதிவேடு விவரங்கள்



மாவட்டம் : புதுக்கோட்டை

வட்டம் : குளத்தூர்

கிராமம் : மேலூர்

1. புல எண்	210	9. மண் வயனமும் ரகமும்	7 - 2
2. உட்பிரிவு எண்	7A	10. மண் தரம்	4
3. பழைய புல உட்பிரிவு எண்	210-7	11. தீர்வை (ரூ - ஹெ)	3.71
4. பகுதி	P	12. பரப்பு (ஹெக்டேர் - ஏர்)	1 - 68.00
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	6.24
6. நிலத்தின் வகை	பஞ்சை	14. பட்டா எண்	1719
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	1.ஞானராஜ்

குறிப்பு 1:



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 20808 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

₹ 100



भारत INDIA

INDIA NON JUDICIAL

தமிழ்நாடு தமிழ்நாடு TAMILNADU

M. Alagammai CH 541573

நாள் : 11.11.2021
 வாரிசுபெற்று பெயர் : R. ஆரோக்கிய ராஜ்
 உயர் :
 தொகை : 100% புதுக்கோட்டை.

எம். அழகம்மா, அத்திரை நகர் விடுபள்ளியாள் உரிமம்: 1/97. முன்பு ராஜ் வீத புதுக்கோட்டை.

குத்தகை ஒப்பந்தப்பத்திரம்

புதுக்கோட்டை மாவட்டம், புதுக்கோட்டை டவுன் எண்.321, பெரியார் நகர் என்ற முகவரியில் வசிக்கும் அந்தோணிசாமி மகன் ஞானராஜ் (1வது பார்ட்டி)

புதுக்கோட்டை மாவட்டம், புதுக்கோட்டை டவுன் சத்தியமூர்த்தி நகர் எண்.297/7 என்ற முகவரியில் வசிக்கும் ரெத்தினம்பிள்ளை மகன் ஆரோக்கியராஜ் (2வது பார்ட்டி) அவர்களுக்கு எழுதிக் கொடுத்த குத்தகை ஒப்பத்தம்.



A. Gnanraj

V. Venkataramanan
 VENKATARAMANAN
 ADVOCATE & NOTARY
 1154, EAST BRIDGE STREET,
 CHENNAI

சென்னை

.2.

அடியிற் கண்ட 1-வது பார்ட்டிக்கு சொந்தமான சொத்து விபரத்தில் உள்ள புதுக்கோட்டை மாவட்டம், குளத்தூர் தாலுகா, மேலூர் கிராமம் புல எண் 210/7Aல் மொத்த பரப்பு 1-68.00 விஸ்தீரனமுள்ள நிலத்தில் 2வது பார்ட்டி பெயரில் மாவட்ட ஆட்சித்தலைவர் புதுக்கோட்டை அவர்களிடம் கல்குவாரி குத்தகை உரிமம் பெற்று கற்கல் வெட்டி எடுப்பதற்கு சம்மதம் தெரிவித்து மாவட்ட ஆட்சியரின் ஆணையிட்ட நாளது தேதியிலிருந்து 15 (பதினைந்து) வருட காலத்திற்கு குத்தகைக்கு கொடுக்க சம்மதிக்கிறோம். கீழ்க்கண்ட சொத்தில் எவ்வித வில்லங்கம் ஏதும் இல்லை என உறுதி கூறுகிறோம். கற்கல் வெட்டி எடுப்பதற்கு சம்மதம் தெரிவித்து

சொத்து விபரம்

மாவட்டம்	தாலுகா	கிராமம்	புல எண்	பரப்பு
புதுக்கோட்டை	குளத்தூர்	மேலூர்	210/7A	1-68.00
		மொத்தம்		1-68.00

A. Guhuj
1-வது பார்ட்டி

J. Sany
2-வது பார்ட்டி

சாட்சிகள்

1.



V. VENKATARAMANAN
ADVOCATE & NOTARY
154, EAST 3RD STREET,
PUDUKKOTTAI.
G.O. Ms. No. 117 (ev) Dt: 1-8-2000



आयकर विभाग
INCOME TAX DEPARTMENT



भारत सरकार
GOVT. OF INDIA



स्थायी लेखा संख्या कार्ड
Permanent Account Number Card

AMNPA8758L

नाम/ Name
R AROCKIYARAJ

पिता का नाम/ Father's Name
RETHINAM

जन्म की तारीख/ Date of Birth
23/07/1965

हस्ताक्षर/ Signature



18052017

इस कार्ड के खोने / पाने पर कृपया सूचित करें / लीडए -
आयकर पैन सेवा इकाई, एनएसडीएल
5वीं मंजिल, मन्त्री स्टर्लिंग, प्लॉट नं. 341, सर्वे नं. 997/8,
मॉडल कॉलोनी, दीप बंगला चौक के पास,
पुणे - 411 016.

If this card is lost / someone's lost card is found,
please inform / return to:

Income Tax PAN Services Unit, NSDL,
5th floor, Mantri Sterling,
Plot No. 341, Survey No. 997/8,
Model Colony, Near Deep Bungalow Chowk,
Pune - 411 016.

Tel: 91-20-2721 8080, Fax: 91-20-2721 8081
e-mail: tininfo@nsdl.co.in



சமூக அடையாளம்
Government of India



ஆரோக்கிய ராஜ் ரெ
Arockia Raj R
பிறந்த நாள்/DOB: 23/07/1965
ஆண்/ MALE

3300 7930 4623

VID : 9108 9911 3148 7699

எனது ஆதார். எனது அடையாளம்

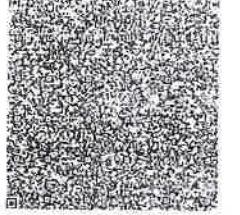


சமூக அடையாளம் அமைப்பு (UIDAI)
Unique Identification Authority of India



முகவரி:
S/O ச ரெத்தினம் பிள்ளை, 2977
சத்தியமூர்த்தி நகர், புதுக்கோட்டை,
புதுக்கோட்டை
தமிழ்நாடு - 622001

Address:
S/O S Rethinam Pillai, 2977 Sathiyamoorthi
Nagar, Pudukkottai, Pudukkottai,
Tamil Nadu - 622001



3300 7930 4623

VID : 9108 9911 3148 7699



1947

help@uidai.gov.in

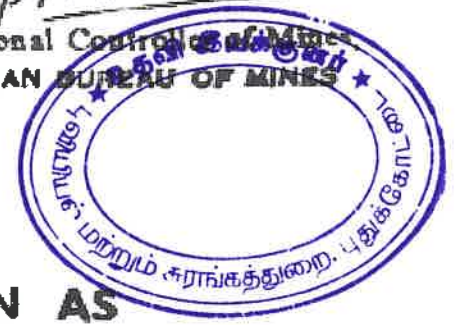
www.uidai.gov.in

20.04.2010



Suprabhushetta

Regional Controller of Mines
INDIAN BUREAU OF MINES



CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON TO PREPARE MINING PLANS

(Under Rule 22C of Mineral Concession Rules, 1960)

Shri V. Radhakrishnan resident

of Katheri Village, Valayakaranur Post, Salem District, PIN-638183, son

of D. Venugopal , having given satisfactory

evidence of his qualifications and experience is hereby granted recognition under Rule 22C of the Mineral Concession Rules, 1960 as a Qualified Person to prepare Mining Plans.

His registration number is RQP / MAS / 129 / 98 / A

This recognition is valid for a period of two years ending 20.04.2000.

Place : Chennai-70.

Date : 21.04.1998

M. R. A. *Murugan*
Regional Controller of Mines 21-4-98
Indian Bureau of Mines
Chennai.

75 नवील 19-04-2020
Reviewed up to.....


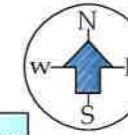

Regional Controller of Mines
INDIAN BUREAU OF MINES

PLATE NO-I



APPLICANT:

THIRU. R.AROCKIYA RAJ

S/o. RETHINAM PILLAI,

No. 297/7, SATHIYAMOORTHINAGAR,

PUDUKKOTTAI DISTRICT - 622 001

QUARRY LEASE APPLIED AREA:

S.F.No : 210/7A

EXTENT : 1.68.0 Ha

VILLAGE : MELUR

TALUK : KULATHUR

DISTRICT : PUDUKKOTTAI

INDEX

Q. L. A. AREA : ●

TOPO SHEET NO: 58 - J / 15

LATITUDE : 10°26'40.50"N to 10°26'48.54"N

LONGITUDE: 78°45'55.90"E to 78°46'00.42"E

LOCATION PLAN

Not To Scale

PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg.No.RQP/MAS/119/98/A



10°26'48.54"N

10°26'40.50"N

78°45'55.90"E

78°46'00.42"E

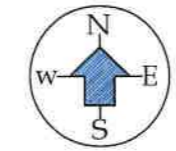
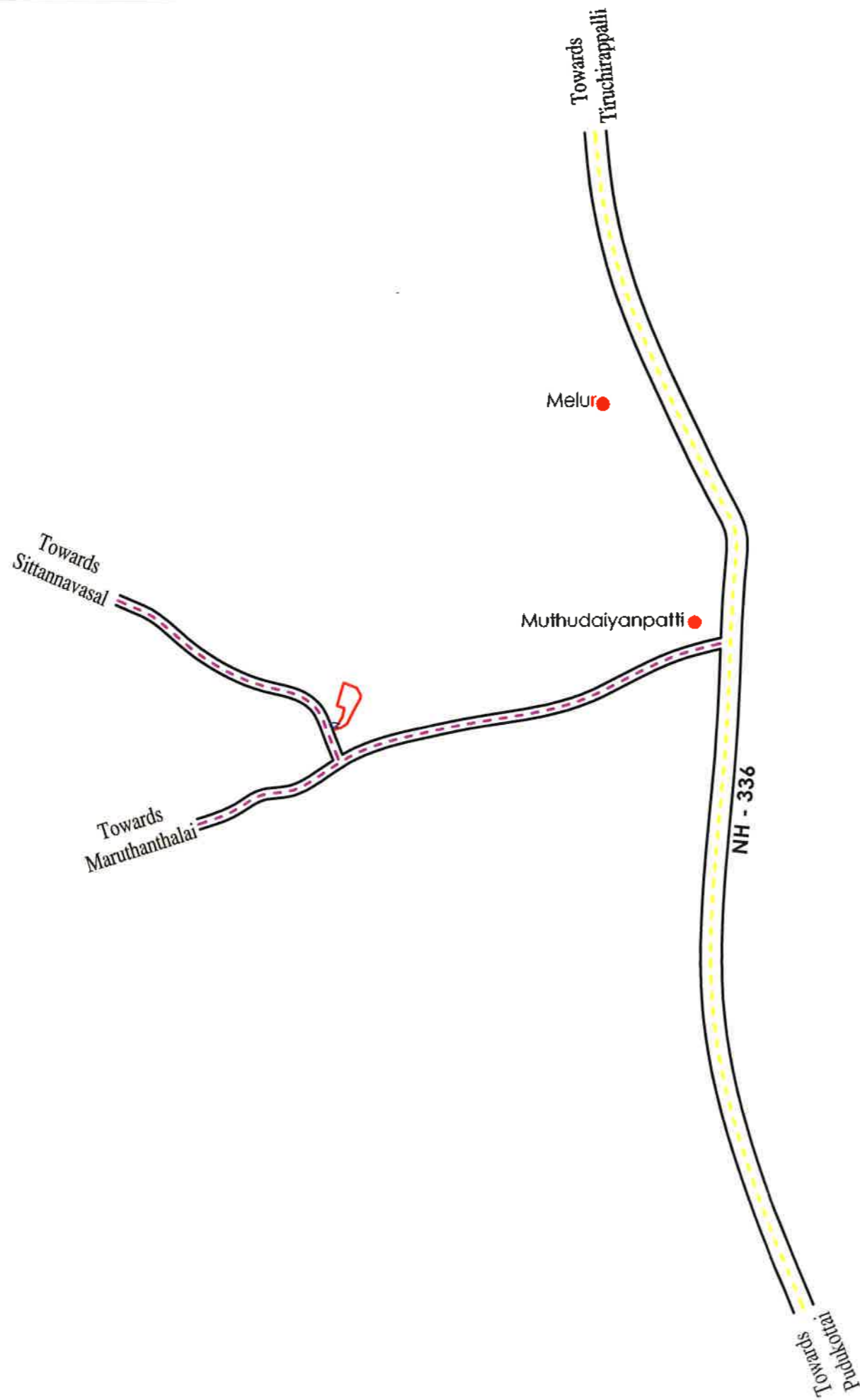


PLATE NO-II

APPLICANT:

THIRU. R.AFOGKIYA RAJ,
 S/o. RETHINAM PILLAI,
 No. 297/7, SATIYAMOORTHINAGAR,
 PUDUKKOTTAI DISTRICT - 622 001



QUARRY LEASE APPLIED AREA:

S.F.No : 210/7A
 EXTENT : 1.68.0 Ha
 VILLAGE : MELUR
 TALUK : KULATHUR
 DISTRICT : PUDUKKOTTAI

INDEX

Q.L.APPLIED AREA	
NATIONAL HIGHWAY	
PANCHAYAT ROAD	
APPROACH ROAD	
HABITATIONS	

KEY PLAN

Not To Scale

PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

V. RADHAKRISHNAN, M.Sc.,
 RECOGNISED QUALIFIED PERSON
 Reg.No.RQP/MAS/119/98/A

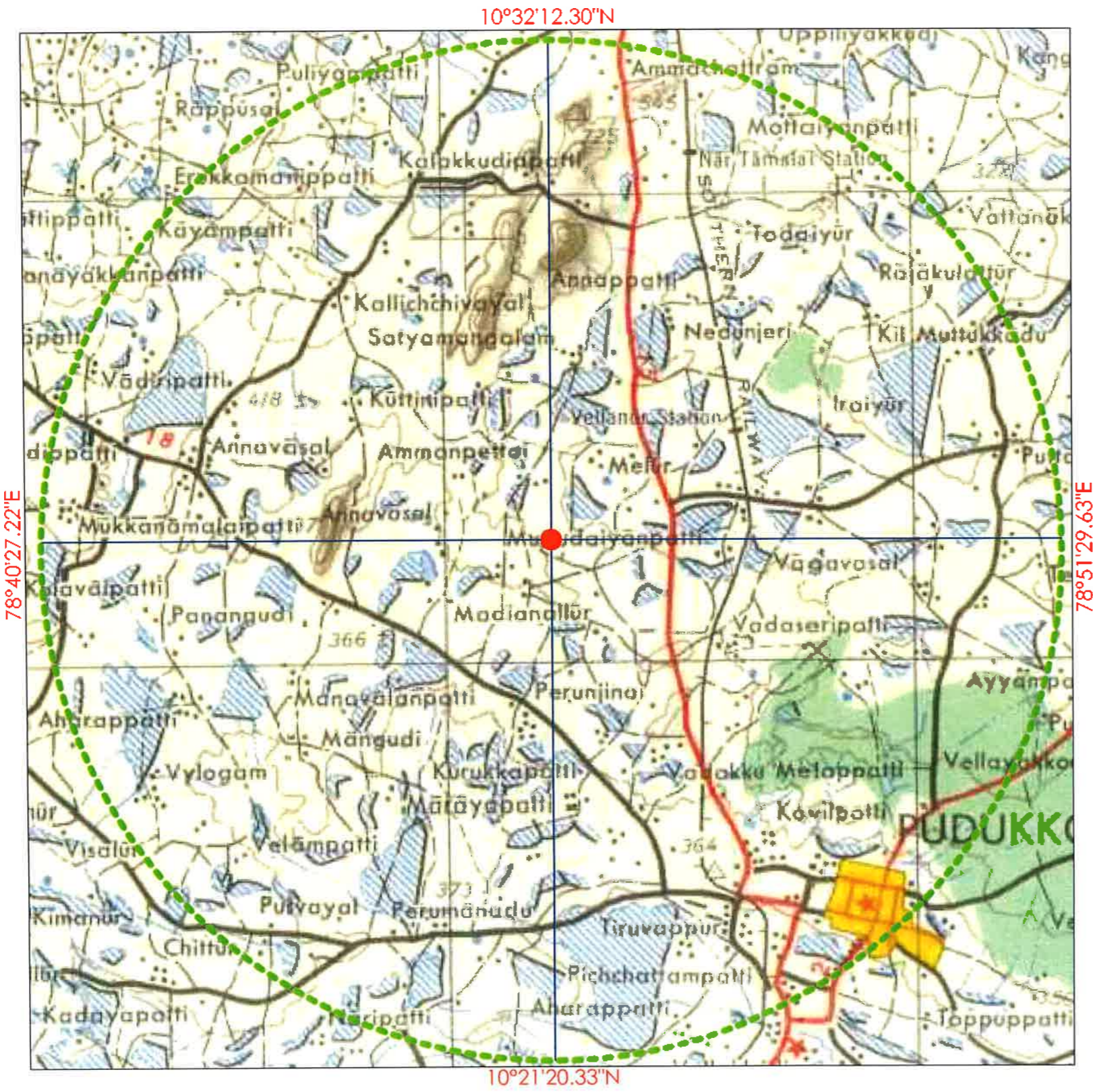
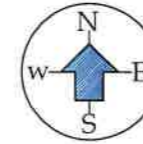




PLATE NO-III

APPLICANT:
 THIRU. R.AROCKIYA RAJ
 S/o. RETHINAM PILLAI
 No. 297/7, SATHIYANGORTHI NAGAR,
 PUDUKKOTTAI DISTRICT, 622 001



QUARRY LEASE APPLIED AREA
 S.F.No : 210/7A
 EXTENT : 1.68.0 Ha
 VILLAGE : MELUR
 TALUK : KULATHUR
 DISTRICT : PUDUKKOTTAI

INDEX

TOPO SHEET NO: 58 - J / 15
 LATITUDE : 10°26'40.50"N to 10°26'48.54"N
 LONGITUDE: 78°45'55.90"E to 78°46'00.42"E
 Q.L.APPLIED AREA 
 10KM RADIUS 

Roads installed according to importance, distance stone	unmetalled - 4m	metalled - 4m	bridge
Canal track, Pack-track and pass, Foot-path with bridge			
Bridge with pier without, Causeway, Ford or Ferry			
Structure with track in both directions	CSM		
Dune-masonry or rock-filled earthen Weir			
River bank, sloping steep, 3 to 6 slope, over 6 slope			
dry with water-channel, with stand & near to tidal river			
Submerged rocks, Shoal, Swamp, Reeds			
Wells, hand-dug, tube-well, Spring, Tanks, perennating, dry			
Embankments, road or rail, bank, Broken ground			
Railways, broad gauge, double ends with station, meter gauge			
other gauge			
Light-railway or tramway, Telegraph line, Cutting with tunnel			
Casuarina with sub-trees, Rocky slopes, Cliffs			
Solid features (Hills, peaks, hills and cones, mounds, hills, etc.)			
Towns or Villages, inhabited, deserted, Port			
Marked monument, temporary, Tower, Antiquities			
Temple, Chattri, Church, Mosque, Idols, Tombs, Graves			
Lighthouse, Lightship, Buoy, Lighted, unlighted, Anchorage			
Min. line on level, Grass, Scrub			
Palms, palms, other, Plantain, Cane, Bamboo, Other trees			
Boundary, international			
State demarcated, un-demarcated			
district, sub-division, taluk or other forest			
Boundary, other, surveyed, un-surveyed, village, trypanation			
Height, triangulated, section, bench, approximate	200	200	300
Bench-mark, fixed, century, canal	B.M. 433	48833	43
Post office, telegraph office, Combined office, Police station	40	10	45
Bus-garage, bus or travel, Inspector, Rest house	08	10	45
Circular house, Captains ground, forest, reserved, private	CH	CC	68
Spaced in line, administrative, locality or tribal	KIKRI		NAGA

TOPO SKETCH OF QUARRY LEASE APPLIED AREA
 SCALE: 1:100000


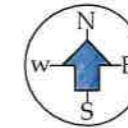
PREPARED BY:
 I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

 V. RADHAKRISHNAN, M.Sc.,
 RECOGNISED QUALIFIED PERSON
 Reg.No. RQP/MAS/119/98/A

PLATE NO-IV



APPLICANT:

THIRU. R.AROCKIYA RAO
 S/o. RETHINAM FILELA,
 No. 297/7, SATHIYAMOORTHY NAGAR,
 PUDUKKOTTAI DISTRICT - 622 001



QUARRY LEASE APPLIED AREA:

S.F.No : 210/7A
 EXTENT : 1.68.0 Ha
 VILLAGE : MELUR
 TALUK : KULATHUR
 DISTRICT : PUDUKKOTTAI

INDEX

TOPO SHEET NO : 58 - J / 15
 LATITUDE : 10°26'40.50"N to 10°26'48.54"N
 LONGITUDE: 78°45'55.90"E to 78°46'00.42"E

Q.LEASE APPLIED AREA	
300m RADIUS	
500m RADIUS	
1Km RADIUS	
APPROACH ROAD	
VILLAGE ROAD	

SATELLITE IMAGERY

SCALE 1 : 10000

PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE
 HAS BEEN CHECKED BY ME AND IS
 CORRECT TO THE BEST OF MY KNOWLEDGE

V.RADHAKRISHNAN, M.Sc.,
 RECOGNISED / QUALIFIED PERSON
 Reg.No.RQP/MAS/119/98/A









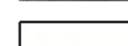





PLATE NO-V


APPLICANT:
 THIRU. R.AROCKIYA RA
 S/o. RETHINAM PILLAI,
 No. 297/7, SATHYAMOORTHY NAGAR,
 PUDUKKOTTAI DISTRICT - 622 001

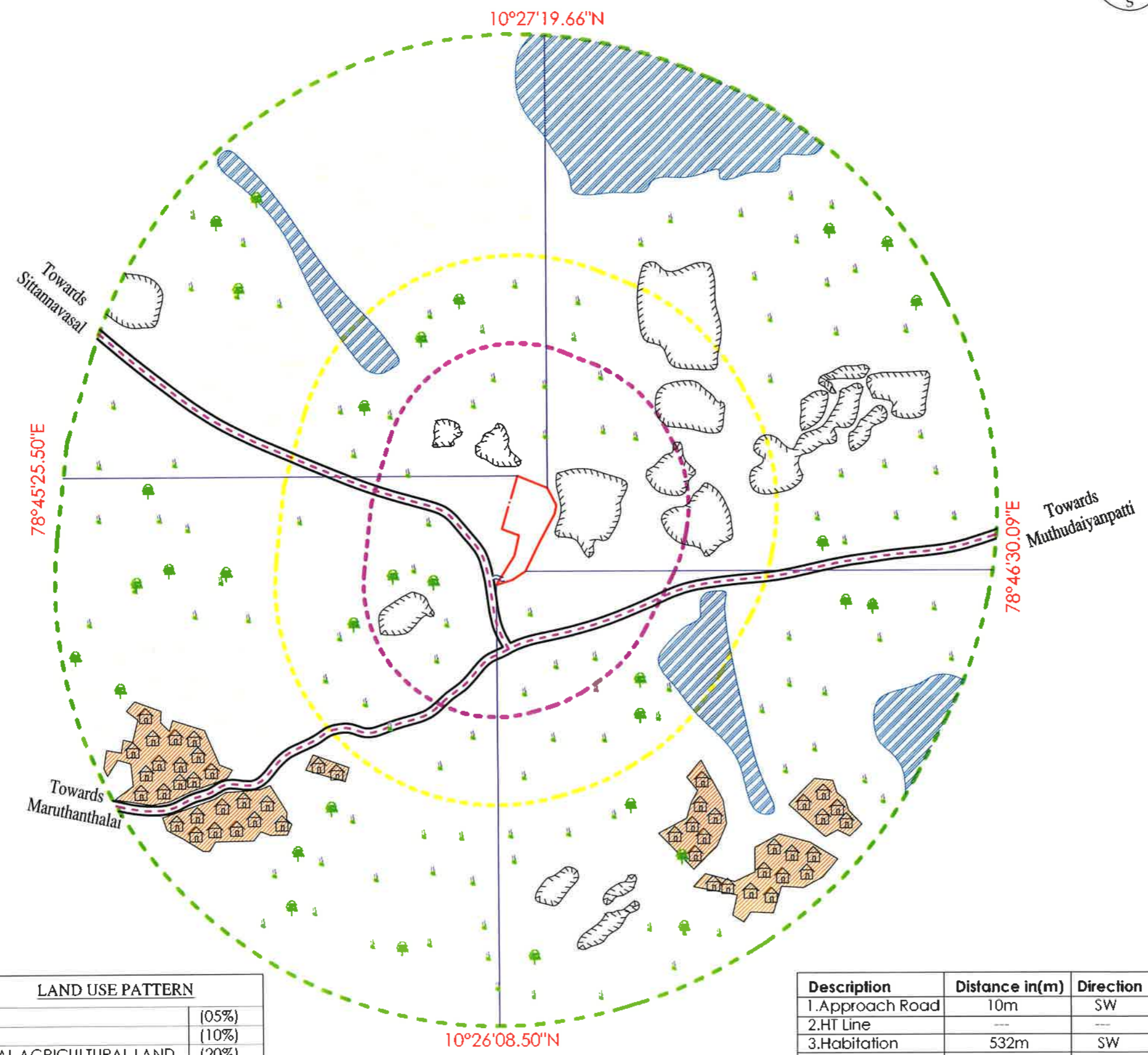
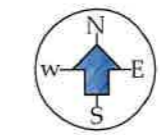
QUARRY LEASE APPLIED AREA
 S.F.No : 210/7A
 EXTENT : 1.68.0 Ha
 VILLAGE : MELUR
 TALUK : KULATHUR
 DISTRICT : PUDUKKOTTAI

INDEX
TOPO SHEET NO : 58 - J / 15
 LATITUDE : 10°26'40.50"N to 10°26'48.54"N
 LONGITUDE: 78°45'55.90"E to 78°46'00.42"E

- Q.L.APPLIED AREA 
- 300m RADIUS 
- 500m RADIUS 
- 1Km RADIUS 
- APPROACH ROAD 
- VILLAGE ROAD 
- BARREN LAND 
- TREES 
- AGRICULTURAL LAND 
- QUARRY PIT 
- HABITATIONS 
- KANMOI 

ENVIRONMENTAL PLAN
 SCALE 1: 10000

PREPARED BY:
 I DO HEREBY CERTIFY THAT THE PLATE
 HAS BEEN CHECKED BY ME AND IS
 CORRECT TO THE BEST OF MY KNOWLEDGE

 V. RADHAKRISHNAN, M.Sc.,
 RECOGNISED QUALIFIED PERSON
 Reg.No.RQP/MAS/119/98/A



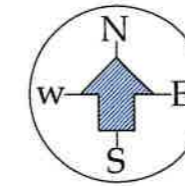
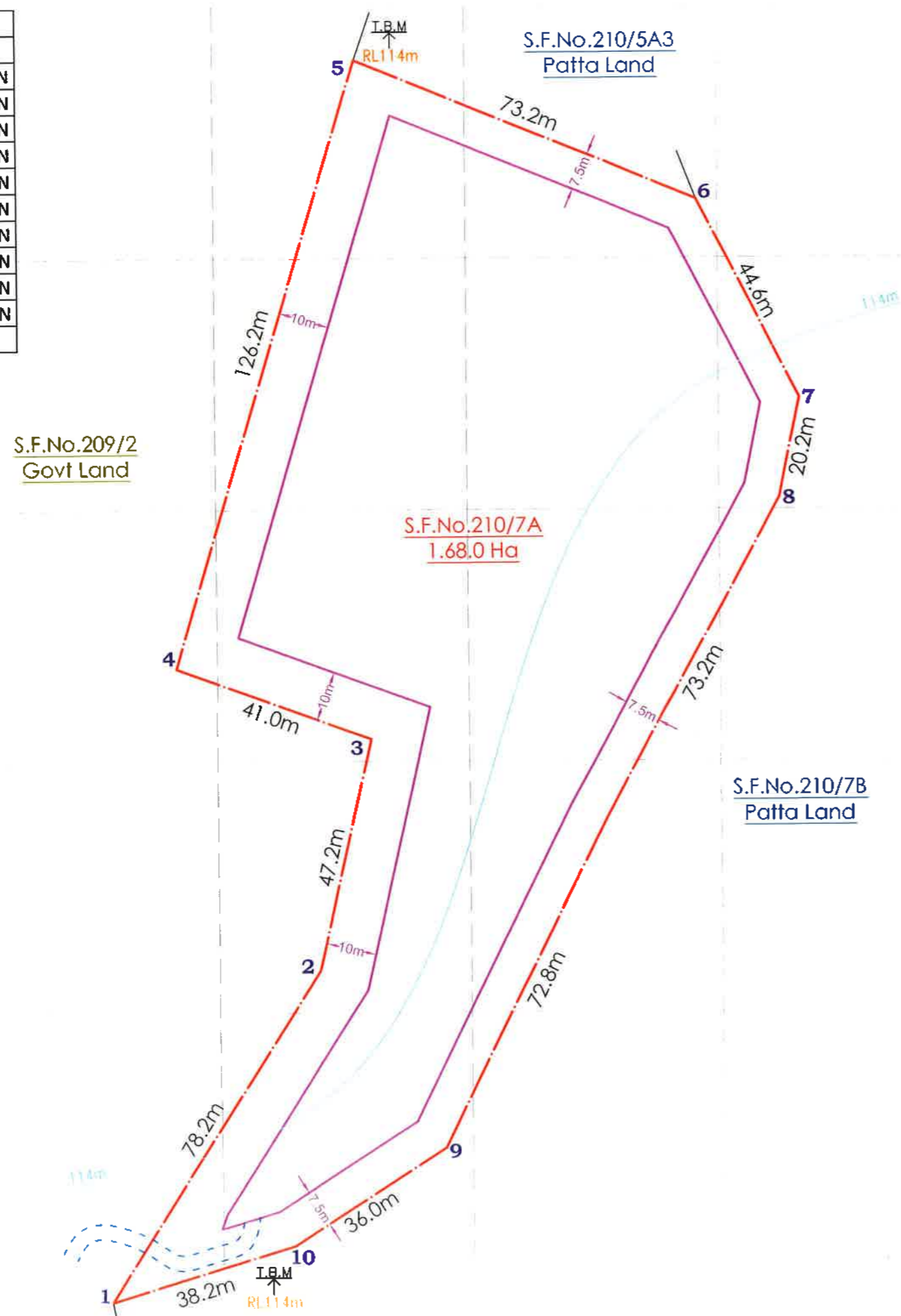
LAND USE PATTERN	
ROAD	{05%}
TREES	{10%}
SEASONAL AGRICULTURAL LAND	{20%}
BARREN LAND	{45%}
KANMOI	{20%}

Description	Distance in(m)	Direction
1. Approach Road	10m	SW
2. HT Line	---	---
3. Habitation	532m	SW
4. Vari	---	---
5. Kanmoi	356m	SE

PLATE NO-VI

BOUNDARY CO-ORDINATES		
LABEL	LATITUDE	LONGITUDE
1	10° 26' 40.50"N	78° 45' 55.90"N
2	10° 26' 42.65"N	78° 45' 57.27"N
3	10° 26' 44.15"N	78° 45' 57.61"N
4	10° 26' 44.60"N	78° 45' 56.34"N
5	10° 26' 48.54"N	78° 45' 57.50"N
6	10° 26' 47.66"N	78° 45' 59.73"N
7	10° 26' 46.38"N	78° 46' 00.42"N
8	10° 26' 45.73"N	78° 46' 00.29"N
9	10° 26' 41.51"N	78° 45' 58.09"N
10	10° 26' 40.87"N	78° 45' 57.10"N

W G S - 84 DATUM



APPLICANT

THIRU. R.AROCKIYA RAJ,
 S/o. RETHINA M.PILLAI,
 No. 297/7, SATHIYANDURTHI NAGAR,
 PUDUKKOTTAI DISTRICT - 622 001



QUARRY LEASE APPLIED AREA:

S.F.No : 210/7A
 EXTENT : 1.68.0 Ha
 VILLAGE : MELUR
 TALUK : KULATHUR
 DISTRICT : PUDUKKOTTAI

INDEX

- Q.L.APPLIED BOUNDARY
- 7.5m & 10m SAFETY AREA
- TEMPORARY BENCH MARK
- APPROACH ROAD
- CONTOUR

QUARRY LEASE & SURFACE PLAN

SCALE 1 : 1000

PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

V.RADHAKRISHNAN, M.Sc.,
 RECOGNISED / QUALIFIED PERSON
 Reg.No.RQP/MAS/119/98/A

PLATE NO-VII

APPLICANT:

THIRU. R.AROCKIA RAJ,

S/o. RETHINAM PILLAI,

No. 297/1 SATHIYAMOORTHI NAGAR

PUDUKKOTTAI DISTRICT - 622 001



QUARRY LEASE APPLIED AREA:

S.F.No : 210/7A

EXTENT : 1.68.0 Ha

VILLAGE : MELUR

TALUK : KULATHUR

DISTRICT : PUDUKKOTTAI

INDEX

Q.L.APPLIED BOUNDARY	
7.5m & 10m SAFETY AREA	
TEMPORARY BENCH MARK	
APPROACH ROAD	
CONTOUR	
STRIKE & DIP	
ROUGH STONE	
GRAVEL	

**TOPOGRAPHY, GEOLOGICAL,
YEAR WISE DEVELOPMENT &
PRODUCTION PLAN & SECTION**
SCALE 1 : 1000

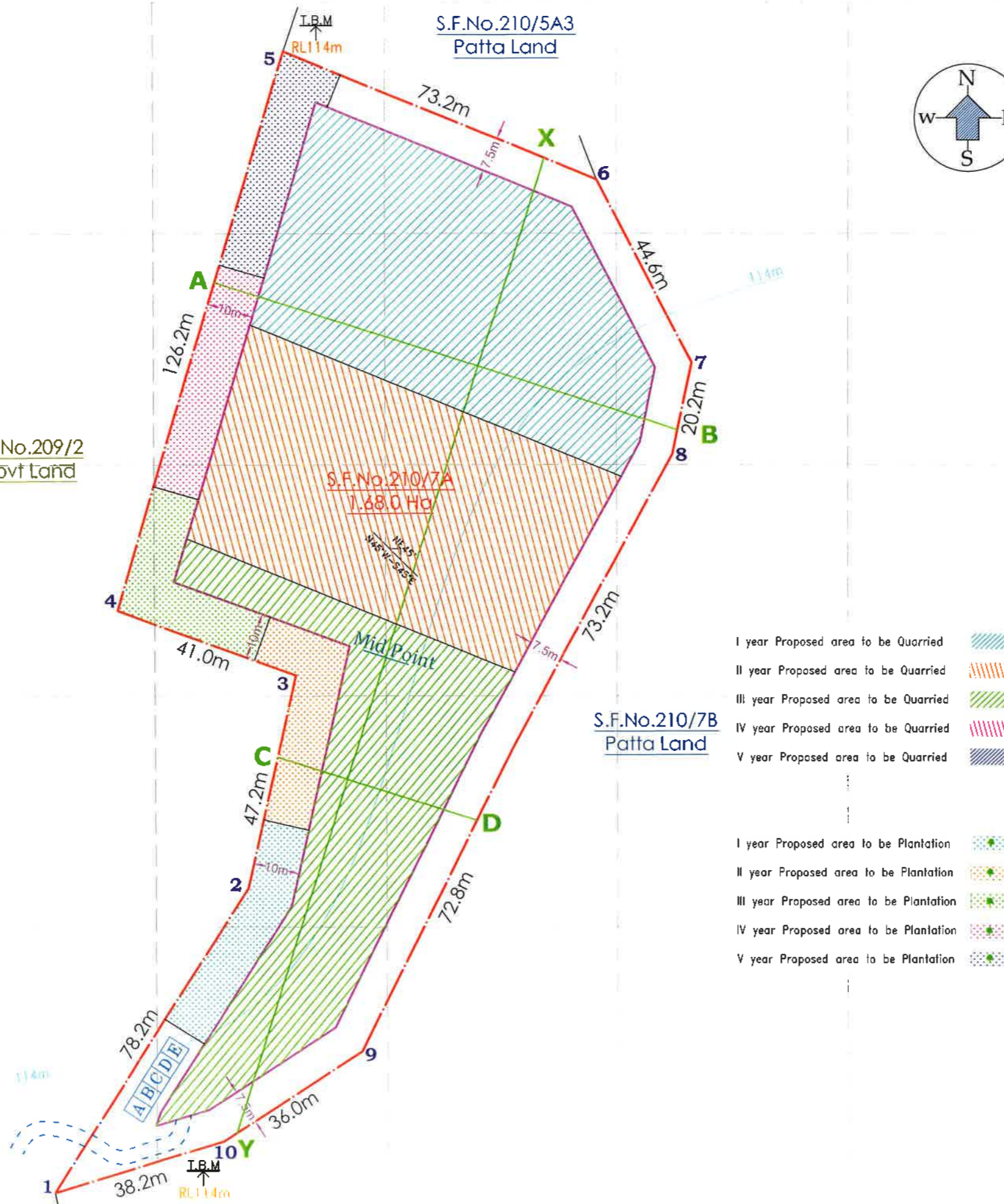
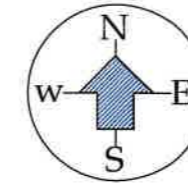
PREPARED BY:

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V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
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BOUNDARY CO-ORDINATES		
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1	10° 26' 40.50"N	78° 45' 55.90"E
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W G S - 84 DATUM



SITE SERVICES

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

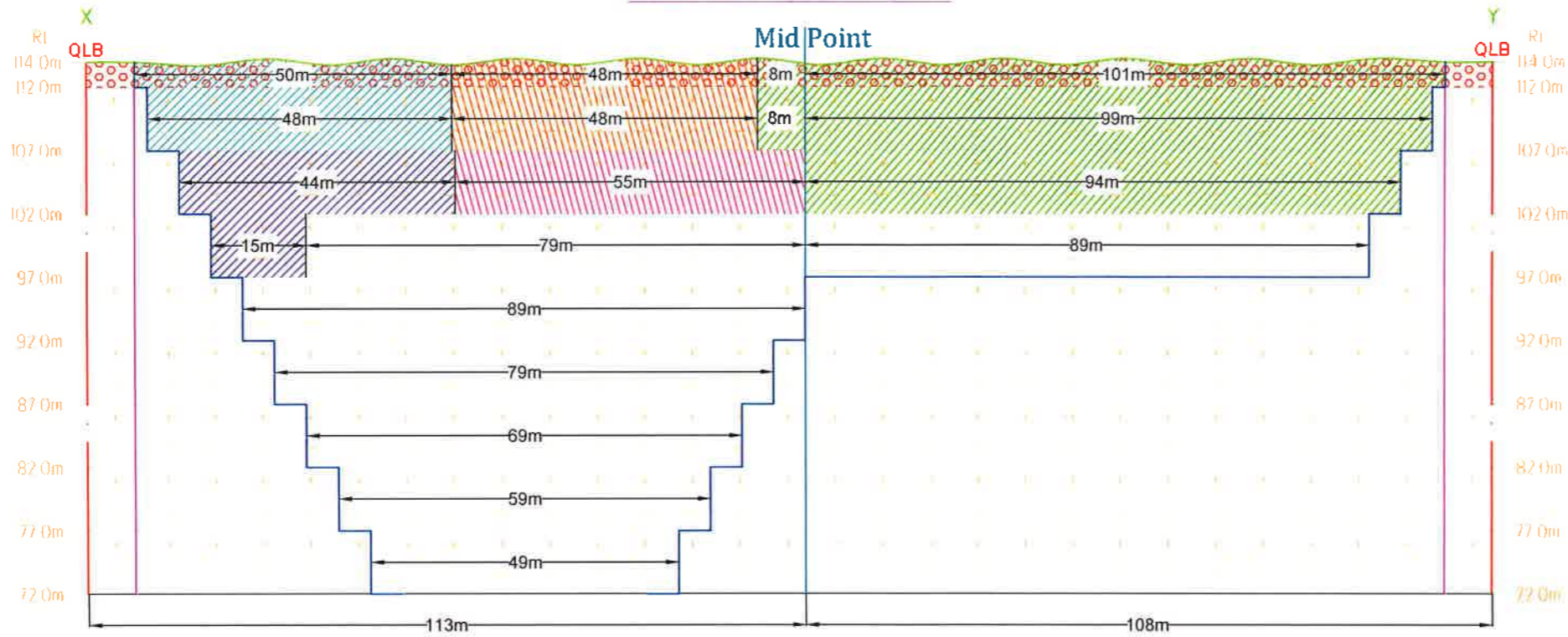
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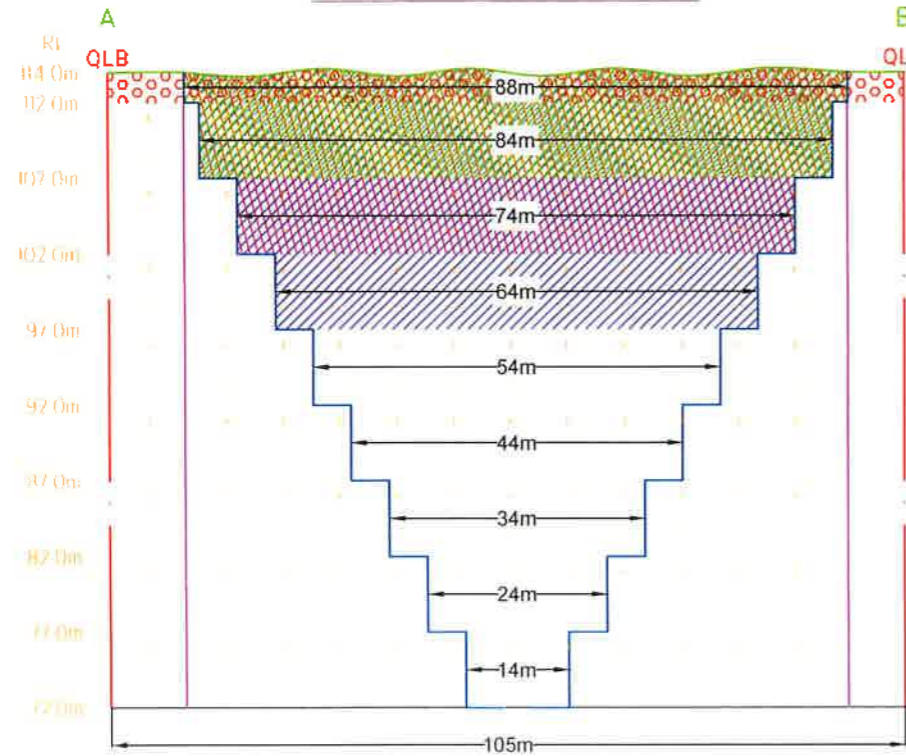
TOPOGRAPHY, GEOLOGICAL, YEAR WISE DEVELOPMENT & PRODUCTION PLAN & SECTION



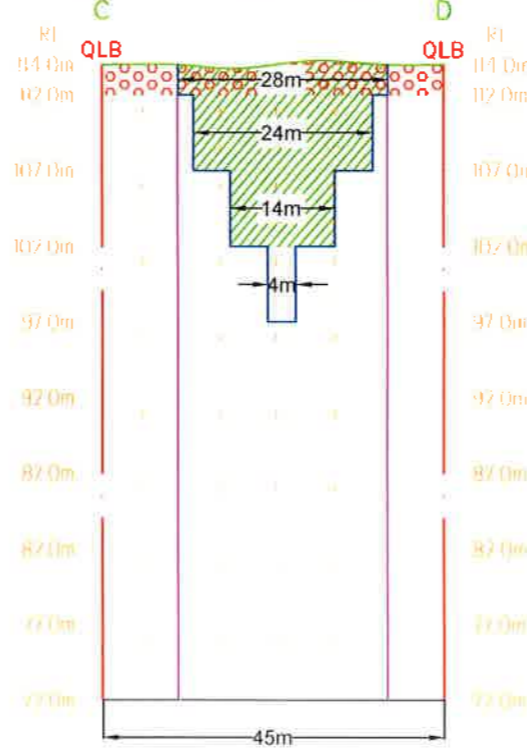
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG C-D



- I year Proposed area to be Quarried
- II year Proposed area to be Quarried
- III year Proposed area to be Quarried
- IV year Proposed area to be Quarried
- V year Proposed area to be Quarried

PREPARED BY:

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V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg.No.RQP/MAS/119/98/A

PLATE NO-VII-B
RESERVES ESTIMATION



GEOLOGICAL RESOURCES						
Section	Length in (m)	Width in (m)	Depth in (m)	Volume m ³	Geological Resources of Gravel in m ³	Geological Resources of Roughstone in m ³
XY-AB	113	105	2	23730	23730	
	113	105	65	771225		771225
XY-CD	108	45	2	9720	9720	
	108	45	65	315900		315900
TOTAL					33450	1087125

MINEABLE RESERVES							
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Mineable Reserves of Rough stone in m ³
XY-AB	114-112	106	88	2	18656	18656	
	112-107	104	84	5	43680		43680
	107-102	99	74	5	36630		36630
	102-97	94	64	5	30080		30080
	97-92	89	54	5	24030		24030
	92-87	79	44	5	17380		17380
	87-82	69	34	5	11730		11730
	82-77	59	24	5	7080		7080
	77-72	49	14	5	3430		3430
TOTAL						18656	174040
XY-CD	114-112	101	28	2	5656	5656	
	112-107	99	24	5	11880		11880
	107-102	94	14	5	6580		6580
	102-97	89	4	5	1780		1780
TOTAL						5656	20240
GRAND TOTAL						24312	194280

YEARWISE DEVELOPMENT & PRODUCTION RESERVES								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Recoverable Reserves of Rough stone in m ³
I	XY-AB	114-112	50	88	2	8800	8800	
		112-107	48	84	5	20160		20160
TOTAL							8800	20160
II	XY-AB	114-112	48	88	2	8448	8448	
		112-107	48	84	5	20160		20160
TOTAL							8448	20160
III	XY-AB	114-112	8	88	2	1408	1408	
		112-107	8	84	5	3360		3360
	XY-CD	114-112	101	28	2	5656	5656	
		112-107	99	24	5	11880		11880
		107-102	94	14	6580		6580	
TOTAL							7064	21820
IV	XY-AB	107-102	55	74	5	20350		20350
TOTAL								20350
V	XY-AB	107-102	44	74	5	16280		16280
		102-97	15	64	5	4800		4800
TOTAL								21080
GRAND TOTAL							24312	103570

PREPARED BY:

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V. RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg.No.RQP/MAS/119/98/A

PLATE NO-VIII

APPLICANT:

THIRU. R.AROCKIYA RA
 S/o. RETHINAM PILLAI,
 No. 297/7, SATHIYAMOORTHI NAGAR,
 PUDUKKOTTAI DISTRICT - 622 001



QUARRY LEASE APPLIED AREA:

S.F.No : 210/7A
 EXTENT : 1.68.0 Ha
 VILLAGE : MELUR
 TALUK : KULATHUR
 DISTRICT : PUDUKKOTTAI

INDEX

- Q.L.APPLIED BOUNDARY
- 7.5m , 10m & 50m SAFETY AREA
- TEMPORARY BENCH MARK
- APPROACH ROAD
- CONTOUR
- STRIKE & DIP
- ROUGH STONE
- GRAVEL
- S1 FENCING
- WATER STORAGE
- PROPOSED QUARRY AREA

**CONCEPTUAL, AFFORESTATION,
 MINE CLOSURE PLAN & SECTION**
 Scale 1 : 1000

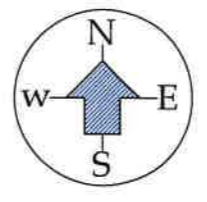
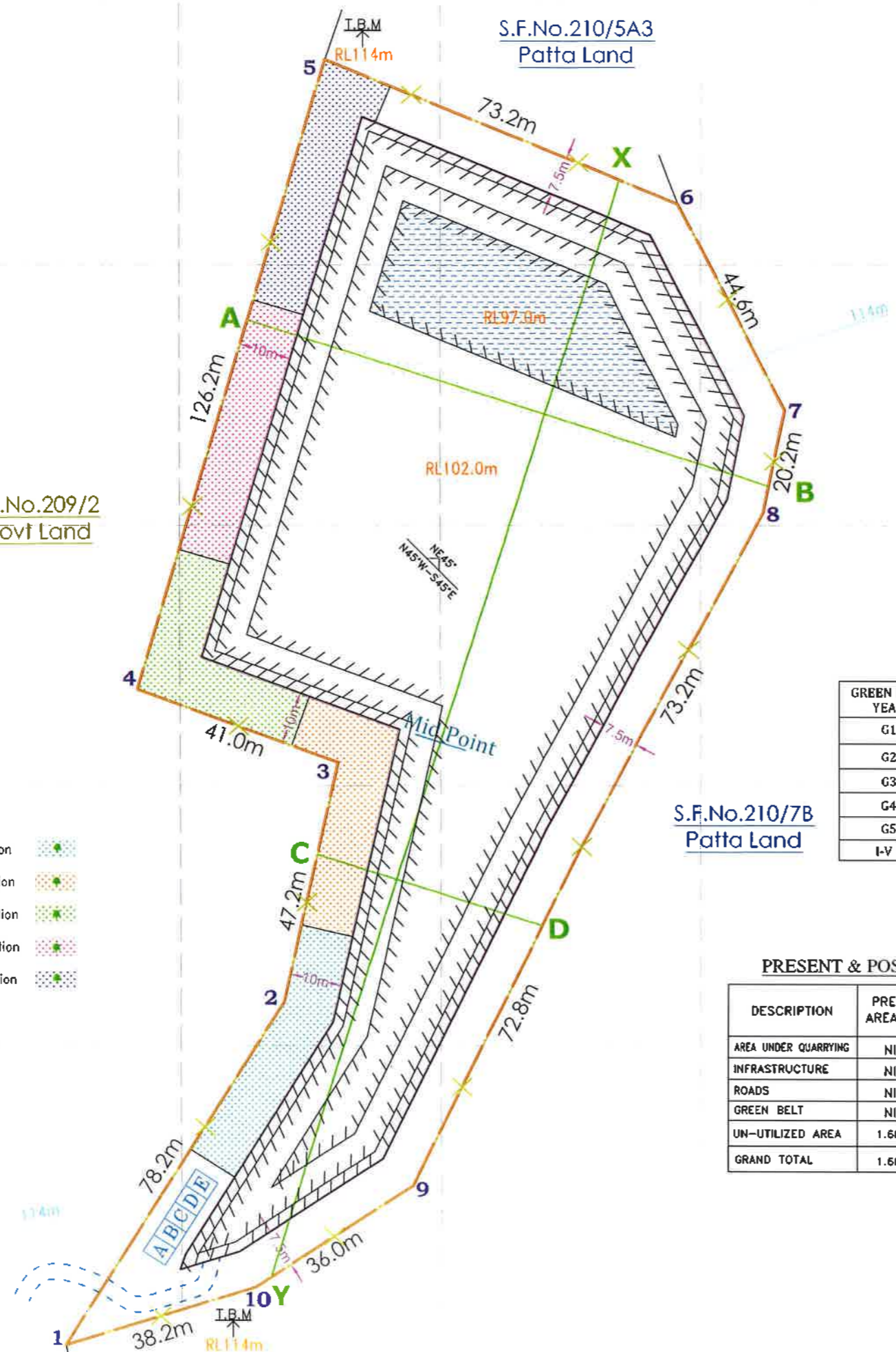
PREPARED BY:

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 CORRECT TO THE BEST OF MY KNOWLEDGE

V.RADHAKRISHNAN, M.Sc.,
 RECOGNISED QUALIFIED PERSON
 Reg.No.RQP/MAS/119/98/A

BOUNDARY CO-ORDINATES		
LABEL	LATITUDE	LONGITUDE
1	10° 26' 40.50"N	78° 45' 55.90"E
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W G S - 84 DATUM



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

- I year Proposed area to be Plantation
- II year Proposed area to be Plantation
- III year Proposed area to be Plantation
- IV year Proposed area to be Plantation
- V year Proposed area to be Plantation

GREEN BELT YEAR	LENGTH (M)	WIDTH (M)	TOTAL (Ha)
G1	50.0M	10M	0.05.0
G2	50.0M	10M	0.05.0
G3	50.0M	10M	0.05.0
G4	50.0M	10M	0.05.0
G5	50.0M	10M	0.05.0
I-V YEAR TOTAL (Ha)			0.25.0

PRESENT & POST LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Ha)	AREA IN USE DURING THE QUARRYING PERIOD (Ha)	COLOR CODE
AREA UNDER QUARRYING	NIL	1.11.0	
INFRASTRUCTURE	NIL	0.02.0	
ROADS	NIL	0.02.0	
GREEN BELT	NIL	0.25.0	
UN-UTILIZED AREA	1.68.0	0.28.0	
GRAND TOTAL	1.68.0	1.68.0	

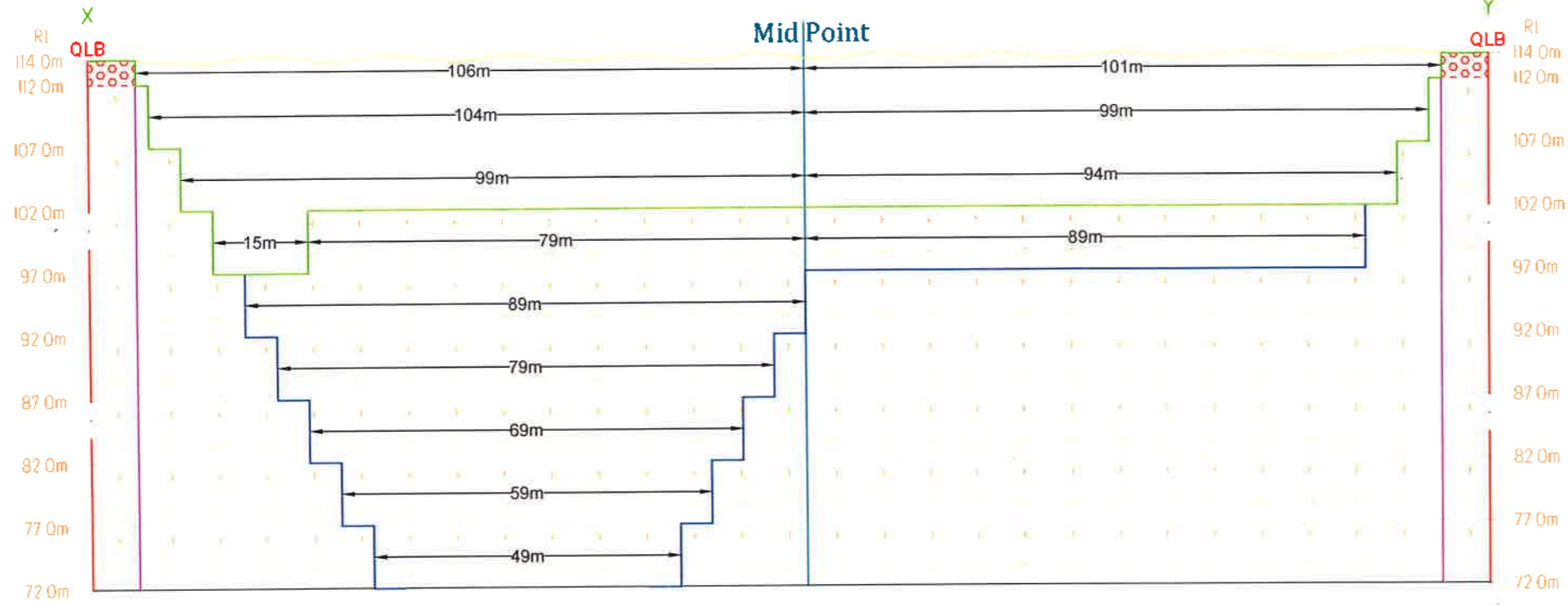
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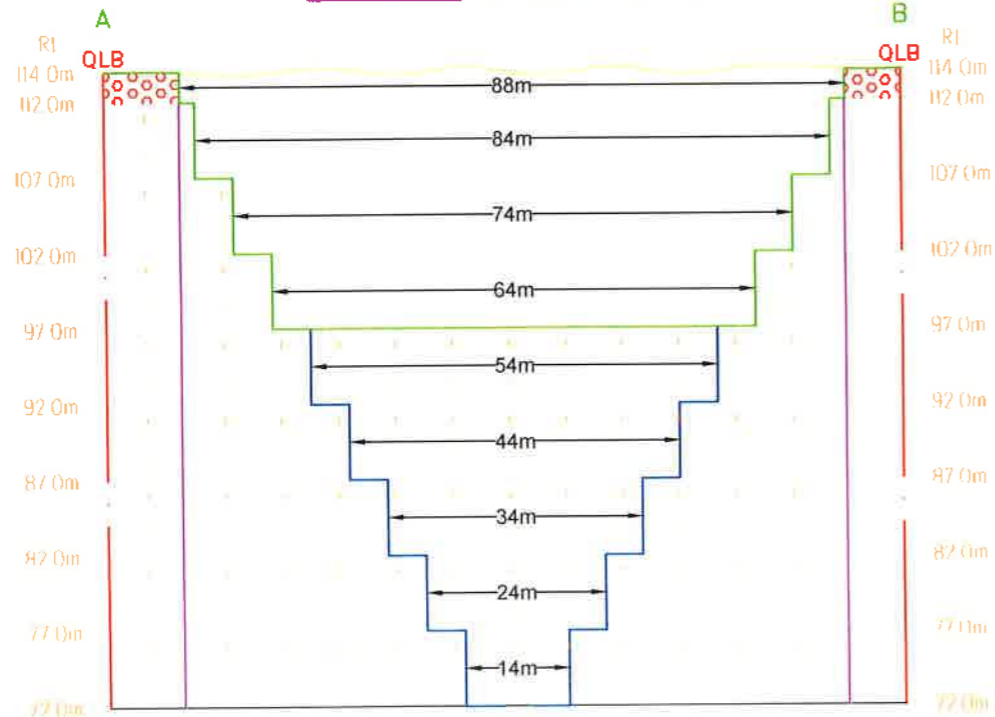
CONCEPTUAL PLAN & SECTION



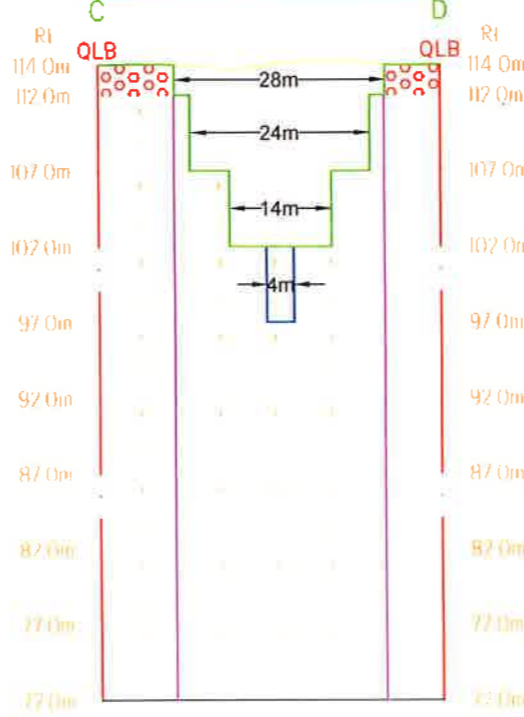
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG C-D



ULTIMATE PIT DIMENSION
L207m X W48 (Avg) X D17.0m (BGL)

PREPARED BY:

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V. Radhakrishnan
V.RADHAKRISHNAN, M.Sc.,
RECOGNISED QUALIFIED PERSON
Reg.No.RQP/MAS/119/98/A

Annexure V
Precise area letter

From

Thiru.K.Vijayaragavan, M.Sc.,
Assistant Director,
Geology and Mining,
Pudukkottai.

To

Thiru.Arockiya Raj,
S/o.Rethinam Pillai,
No.297/7, Sathiyamoorthi Nagar,
Pudukkottai

ANNEXURE: 1

Rc.No. 677/2021 (G&M) dated 15.04.2022

Sir,

Sub: Mines and Minerals - Minor Mineral - rough stone -
Pudukkottai District - Kulathur Taluk - Melur village
S.F.No.210/7A - over an extent of 1.68.0 Hects. of Patta
lands - Application preferred to Thiru.Arockiya Raj,
S/o.Rethinam Pillai for grant of quarrying permission
for Rough Stone & Gravel - Precise area communicated
- Regarding.

Ref: 1. Application of Thiru.Arockiya Raj, S/o.Rethinam Pillai,
No.297/7, Sathiyamoorthi Nagar, Pudukkottai
dt.12.11.2022.
2. Land availability report of the Revenue Divisional
Officer, Illuppur Rc.No.7515/2021/25/ dt.25.01.2022.
3. Technical report of the Assistant Geologist (G&M),
Pudukkottai report dated 19.03.2022.
4. Other connected records.

One Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7,
Sathiyamoorthi Nagar, Pudukkottai has applied for grant of quarrying lease
to quarry Rough Stone & Gravel, over an extent of 1.68.0 hecets in patta lands
comprised in S.F.No.210/7A of Melur village, Kulathur Taluk, Pudukkottai
District for a period of ten years, under Rule 19(1) of Tamil Nadu Minor
Mineral Concession Rules, 1959.

2) The Revenue Divisional Officer, Illuppur and the Assistant
Geologist (Mines), Pudukkottai have furnished their reports, recommending
for the grant of Rough Stone & Gravel quarry lease to the applicant
submitted to the certain conditions vide in the reference 2nd and 3rd cited
respectively.

3) Based on the recommendation of the Revenue Divisional Officer,
Illuppur and Assistant Geologist (Mines), Pudukkottai, an extent of 1.68.0
hecets in patta lands in S.F.No.210/7A of Melur village, Kulathur Taluk,
Pudukkottai District is considered as "precise area" for the grant of Rough
Stone & Gravel quarry lease for a period of **ten years** under Rule 19 & 20
of Tamil Nadu Minor Mineral Concession Rules 1959 subject to the
following conditions:

1.7.5m safety distance should be allowed and maintained to the
adjacent patta lands.

2.10m safety distance should be allowed and maintained to the Government poramboke Road in S.F.No.209/2 on the western side of the applied area.


4) As per Rules 41 & 42 of TNMMCR 1959, "Mining Plan and Environmental Clearance are pre-requisite for grant of quarry lease to the Minor Minerals like gravel.

5) Hence the applicant Thiru.Arockiya Raj, S/o.Rethinam Pillai, No.297/7, Sathiyamoorthi Nagar, Pudukkottai is hereby directed to produce the draft Mining Plan before the Assistant Director, (G&M), Pudukkottai for approval within a period of 3 months from the date of receipt of this precise area communication and to obtain Environment Clearance to proceed further in this regard.


25/4/22
Assistant Director,
Geology and Mining,
Pudukkottai

Copy to :

The Chairman,
State Level Environment Impact Assessment Authority,
Chennai.


20/4/22

ANNEXURE VI
NABET CERTIFICATE



National Accreditation Board for Education and Training



Certificate of Accreditation

Eco Tech Labs Pvt Ltd.,

48, 2nd Main Road, Ram Nagar South Extension, Pallikaranai, Chennai- 600100, T.N.

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 Open cast only	1	1 (a) (i)	B
2	Thermal power plants	4	1(d)	A
3	Coal washeries	6	2 (a)	B
4	Metallurgical industries - Ferrous only	8	3 (a)	B
5	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
6	Airports	29	7 (a)	A
7	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
8	Building and construction projects	38	8 (a)	B
9	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated Apr. 20, 2021 and supplementary minutes dated Oct.19, 2021 posted on QCI-NABET website

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/22/2217 dated Jan. 19, 2022. The accreditation needs to be renewed before the expiry date by Eco Tech Labs Pvt. Ltd., Chennai following due process of assessment.

NABET

Sr. Director, NABET
Dated: Jan. 19, 2022

Certificate No.
NABET/EIA/2124/SA 0147

Valid up to
Sep. 15, 2023

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

