EXECUTIVE SUMMARY OF
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
AND ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

Schedule Sl. No. 1 (a) (i): Mining Project

"B1" CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

CLUSTER EXTENT = 13.57.0 hectares

KOVUNDAMPALAYAM STONE AND GRAVEL QUARRY

At

Katchaikatti Village, Vadipatti Taluk, Madurai District

ToR Letter No. SEIAA-TN/F.No.9858/SEAC/ToR-1441/2023 Dated 10.05.2023.

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.
Thiru. B. Karuppaiah, **S/o. Bose,** **No. 209 A, Vilakkulam,** **Puliyangulam,** **Melapidayur,** **Sivagangai District - 630606**	**2.01.5 ha &** **1199/1B, 1199/1C, 1199/1D,** **1199/1E, 1199/1F, 1199/1H,** **1199/1I, 1199/1J,** **1199/1K, 1193/1, 1193/2**

ENVIRONMENTAL CONSULTANT

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Valid till: Dec 31, 2023

ENVIRONMENTAL LAB

ACCURACY ANALABS AND
ENVIRO FARMERS LABS & TECHNOLOGIES

Baseline Study Period – March through May 2023

CHAPTER I

INTRODUCTION

As the proposed rough stone and gravel mining project, known as P1 falls within the 500 m radius cluster of quarries with the total extent of >5 ha (**i.e., 13.57.0 ha**), it is classified under category "B1" and requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The Cluster contains Four proposed projects, known as P1, P2, P3 and P4. Two Expired Projects known as EX1 and EX2. Only One Existing Project known as E1. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269 (E) Dated 1st July 2016, as shown in Figure 1.1.

This EIA draft discusses the cumulative impacts of four proposed projects in a cluster on the environment and provides a detailed Environmental Management Plan (EMP) to minimize the adverse impacts of those projects situated in the cluster falling in Katchaikatti Village, Vadipatti Taluk, Madurai District and Tamil Nadu State. In compliance with ToR obtained vide Letter No. SEIAA-TN/F.No.9858/SEAC/ToR-1441/2023 Dated 10.05.2023, this EIA report has been prepared for the project proponent, Thiru.B.Karuppaiah applied for rough stone and gravel quarry lease in the Patta land falling in S.F.No. 1193/1, 1193/2, 1199/1B, 1199/1C, 1199/1D, 1199/1E, 1199/1F, 1199/1H, 1199/1I, 1199/1J & 1199/1K over an extent of 2.01.5 ha in Katchaikatti Village, Vadipatti Taluk, Madurai District and Tamil Nadu. This EIA report takes into account the rough stone quarries within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains four proposed projects, known as P1, P2, P3 and P4 and one existing project known as E1 and two expired project EX1 and EX2. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016. The total extent of all the quarries is 13.57.0 ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

Table 1.1 Details of Project Proponent

Name of the Project Proponent	**Thiru.B. Karuppaiah**
Address	S/o.Bose, No. 209 A, Vilakkulam, Puliyangulam, Melapidayur, Sivagangai District - 630606
Status	Proprietor

Table 1.2 Details of Quarries within the Cluster Area of 500 m Radius

Proposed Quarries					
Code	**Name of the Owner**	**S.F. No**	**Village**	**Extent (ha)**	**Status**
P1	Thiru.B. Karuppaiah	1199/1B, 1199/1C, 1199/1D, 1199/1E, 1199/1F, 1199/1H, 1199/1I, 1199/1J, 1199/1K, 1193/1, 1193/2	Katchaikatti	2.01.5	Proposed Area
P2	Thiru.A.D. Meenatchi Sundaram	168/25 (0.58.5), 1171/3 (0.84.0), 1171/5 (0.19.5)	Katchaikatti	1.62.0	Applied Area
P3	Thiru.R. Kannan	1168/7 (0.65.0), 1168/9 (0.90.5), 1168/19 (0.35.5)	Katchaikatti	1.91.0	Applied Area
P4	M/s. Concretia Rock Product (Pvt) Ltd	1185/1 (0.85.0), 1185/7A (0.66.5), 1185/8 (0.28.0)	Katchaikatti	1.79.5	Applied Area
Existing Quarry					
E1	Thiru.Inbaraj.M	1135/7 (0.21.5), 1159/2A (0.91.5), 1159/3 (0.16.0), 1159/4 (0.08.0), 1159/5 (0.06.5), 1159/6 (0.08.0), 1216/1 (0.44.0), 1216/2 (0.26.0), 1138 (0.52.0), 1135/1A2 (0.09.0),	Katchaikatti	3.66.0	20.09.2019 to 19.09.2024

		1135/1B2 (0.13.5), 1135/2B (0.23.5), 1135/5 (0.26.5), 1135/6 (0.20.0)			
Expired Quarries					
EX1	Tmt.Selvi. G	1169/6B (0.12.5), 1169/6I (0.10.5), 1169/6J (0.10.5), 1169/6K (0.19.0), 1169/6L (0.06.5), 1169/6M (0.08.0)	Katchaikatti	0.67.0	10.04.2017 to 09.04.2022
EX2	Thiru, Rajesh	1185/2 (0.25.0), 1185/3 (0.39.0), 1185/4 (0.20.0), 1185/5 (0.19.5), 1185/6 (0.15.5), 1185/7B (0.71.0)	Katchaikatti	1.90.0	28.08.2017 to 27.08.2022
	Total Cluster Extent			**13.57.0**	---

Source:

AD Letter - Roc.No.831/Mines/2022-2, Dated:08.02.2023.

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

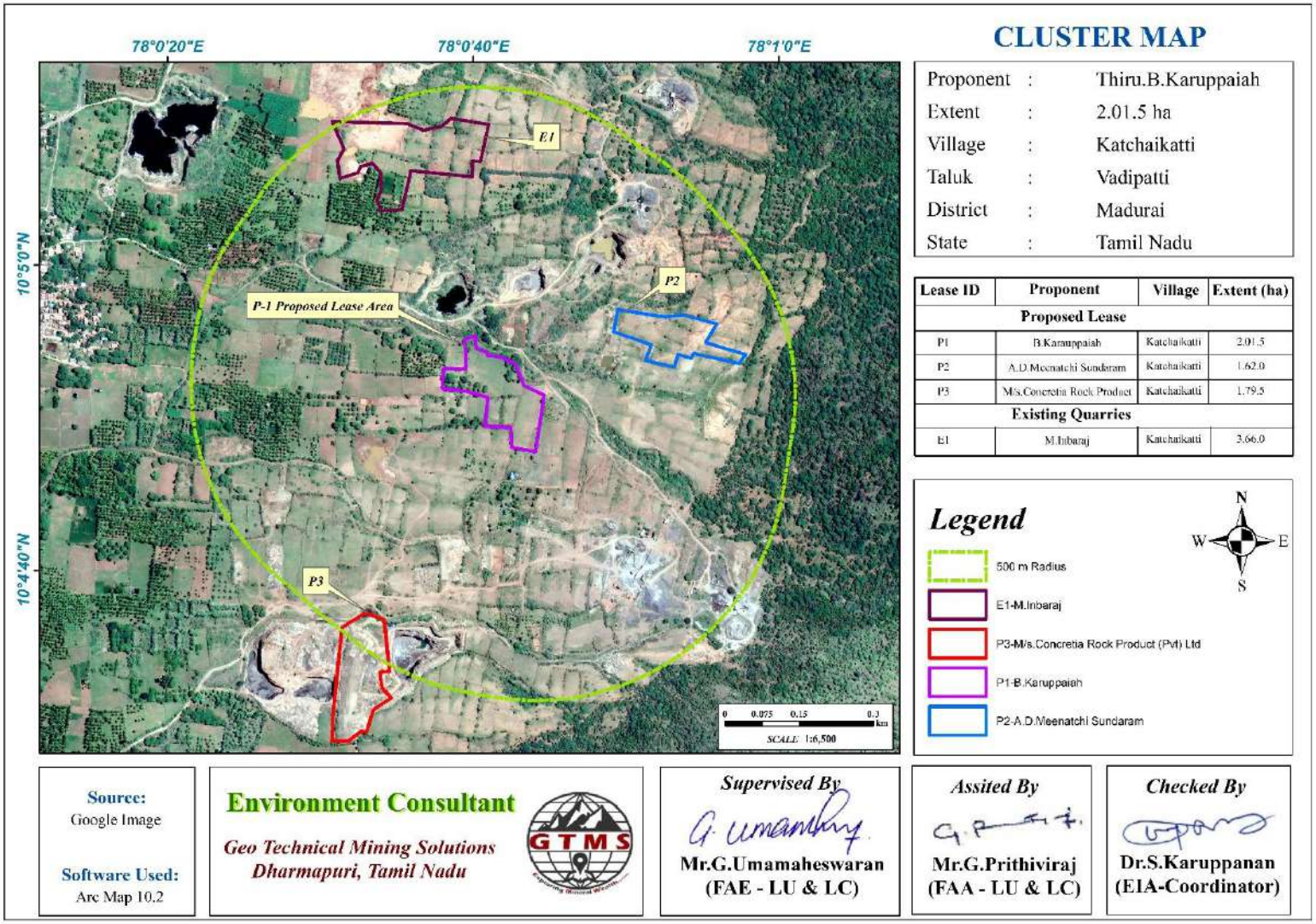


Figure 1.1 Google Earth Image Showing 500m Radius Limits and the Proposed Project and Existing Quarries within the Limit

CHAPTER II

PROJECT DESCRIPTION

The proposed project deals with excavation of rough stone and gravel, which is primarily used, in construction projects. The method adopted for rough stone and gravel excavation is a manual open cast semi mechanized mining method involving formation of benches with 5 m height and 5 m width and secondary blasting. The proposed project area is located between latitudes from 10°4’47.79’’N to 10°4’55.37’’N and from longitudes from 78°0’37.99’’E to 78°0’44.65’’E in Katchaikatti Village, Vadipatti Taluk, Madurai District and Tamil Nadu. The project site is a Patta land with the extent of 2.01.5 ha leased for the project proponent, Thiru.B. Karuppaiah. The proponent had applied for quarry lease on 28.04.2022 to extract rough stone and gravel obtained the precise area communication letter issued by Department of Geology and Mining, Madurai vide Rc.No.831/Mines/2022, dated:05.01.2023. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Assistant Director of Geology and Mining, Madurai Roc.No.831/Mines/2022-2, dated:08.02.2023.

According to the approved mining plan, about 156188 m^3 of rough stone and 27862 m^3 gravel will be mined up to the depth of 20 m BGL in five years. To achieve the estimated production, 3 Jack Hammers, 1 compressor, 1 excavator with bucket/rock breaker, and 4 tippers will be deployed. To operate the machineries and to break the rough stone to preferred dimension, about 19 persons will be employed. At the end of the quarry life, the dimension of the ultimate pit will be 93 m*65 m*30 m and about 2.01.5 ha of land is unutilized. Whereas, at the end of the mine life, about 1.46.92 ha of land will have been quarried; about 0.42.11 ha of land will be used for green belt development and 0.02.0 will be used for road and 0.03.0 ha will be used for infrastructures.

The final mine closure plan shows that about **Rs**.**685100** capital cost with the annual recurring cost of **Rs.60450** will be spent towards mine closure.

Table 2.1 Corner Geographic Coordinates of Proposed Project

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	10° 4'55.37"N	78° 0'40.14"E	12	10° 4'49.50"N	78° 0'40.73"E
2	10° 4'54.54"N	78° 0'40.20"E	13	10°4'51.33"N	78° 0'40.96"E
3	10° 4'54.28"N	78° 0'40.90"E	14	10° 4'51.72"N	78° 0'39.60"E
4	10° 4'54.07"N	78°0'40.93"E	15	10° 4'51.89"N	78°0'37.99"E

5	10° 4'53.99"N	78° 0'41.68"E	16	10° 4'52.59"N	78° 0'38.00"E
6	10° 4'53.59"N	78° 0'42.74"E	17	10° 4'53.23"N	78° 0'38.10"E
7	10°4'52.10"N	78° 0'43.33"E	18	10° 4'53.19"N	78° 0'39.53"E
8	10°4'51.47"N	78° 0'44.65"E	19	10° 4'54.37"N	78° 0'39.54"E
9	10°4'47.79"N	78° 0'44.07"E	20	10° 4'54.79"N	78° 0'39.48"E
10	10° 4'48.08"N	78° 0'42.54"E	21	10° 4'55.14"N	78° 0'39.45"E
11	10° 4'49.36"N	78° 0'42.48"E	-	-	-

Table 2.2 Site Connectivity to the Project Area

Nearest Roadways	MDR – 568 Vadipatti - Palamedu	1 km W
Nearest Town	Vadipatti	4.2 km W
Nearest Railway Station	Madurai	45.0 km SW
Nearest Airport	Madurai	60 km SW
Nearest Seaport	Thoothukudi	200 km S
Nearest Villages	Kutladampatti	1.75km N
	Poochampatti	1.39km S
	Ramayanpatti	0.94km E
	Kuttimeykipatti	5.0km W

2.1 DETAILS OF RESERVES

Reserves were calculated using cross-section method after leaving the safety distance as shown in Figure 2.1 & 2.2. Details of resources and reserves of the project are given in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m^3	Gravel in m^3
Geological Resource in m^3	568120	40580
Mineable Reserves in m^3	184603	27862
Proposed production for 5 years m^3	156188	27862

Based on the year wise development and production plan and sections, as shown in Figures 2.3 & 2.3a, the year wise production results are given in Table 2.4.

Table 2.4 Year-Wise Production Details

Year	Rough Stone in (m^3)	Gravel in (m^3)
I	32296	13624
II	34007	14238
III	27970	--
IV	34645	--
V	27270	--
Total	**156188**	**27862**

2.2 LAND USE PATTERN

Land use and land cover information for the proposed project site has been given in Table 2.5.

Table 2.5 Land Use Data at Present, During Scheme of Mining, and at the End of Mine Life

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under quarry	Nil	1.46.92
Infrastructure	Nil	0.03.0
Roads	Nil	0.02.0
Green Belt	Nil	0.42.11
Drainage & Settling Tank	Nil	0.07.47
Unutilized area	2.01.5	Nil
Total	**2.01.5**	**2.01.5**

Source: Approved mining plan

2.3 METHOD OF MINING

The quarrying operation is proposed to be carried out by opencast semi mechanized mining method involving drilling, blasting, and formation of benches. Machineries proposed for this project have been given in Table 2.6.

2.4 PROPOSED MACHINERY DEPLOYMENT

List of machineries proposed for the quarrying operation is given in Table 2.6.

Table 2.6 Proposed Machinery Deployments

S. No.	Type	No of Unit	Size /Capacity	Make	Motive Power
1	Jack Hammers	3	Hand held	-	Diesel Drive
2	Compressor	1	Air	-	Diesel Drive
3	Hydraulic Excavator	1	2.9-4.5 m^3	-	Diesel Drive
4	Tipper	4	-	-	Diesel Drive

Table 2.7 Conceptual Blasting Design

Blasthole Diameter (D) in mm	32
Burden (B) in m	1.5
Spacing (S) in m	1.30
Subdrill in m	0.45
Charge length (C) in m	0.64
Stemming	1.5
Hole Length (L) in m	2.6
Bench Height (BH) in m	2.1
Mass of explosive/hole in g	400
Stemming material size in mm	3.2
Burden stiffness ratio	1.43
Blast volume/hole in m^3	4.16
Production of rough stone/day in m^3	116
Number of blastholes/day	28
Blasthole pattern	Staggered
Mass of explosive /day in kg	11.13
Powder factor in kg/m^3	0.10
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL
Fly rock distance in m	19

Table 2.8 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	**Rough Stone (156188m^3)**	**Gravel (27862m^3)**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m^3/hr)	20	60	---
Time Required (hours)	7809	464	---
Total Diesel Consumption for 5 years (litre)	124950	4644	**129594**
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	**---**	**---**
Number of Drillholes/day	28	**---**	**---**
Total Diesel Consumption for 5 years (litre)	15120	**---**	**15120**
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m^3	6	6	---
Number of Trips / days	19	3*	---
Number of Trips / 5 years	26031	4644	---
Total Diesel Consumption for 5 years (litre)	520627	92873	**613500**
Total Diesel Consumption by Excavator, Compressor and Tipper			**758214**

** Number of truck loads for gravel has been normalized for 5 years.*

Table 2.9 Capital Requirement Details

S. No.	**Description**	**Cost (Rs.)**
1	Fixed Asset Cost	14,50,000/-
2	Machinery Cost	20,00,000/-
3	EMP Cost	22,05,300/-
Total Project Cost		**56,55,300/-**

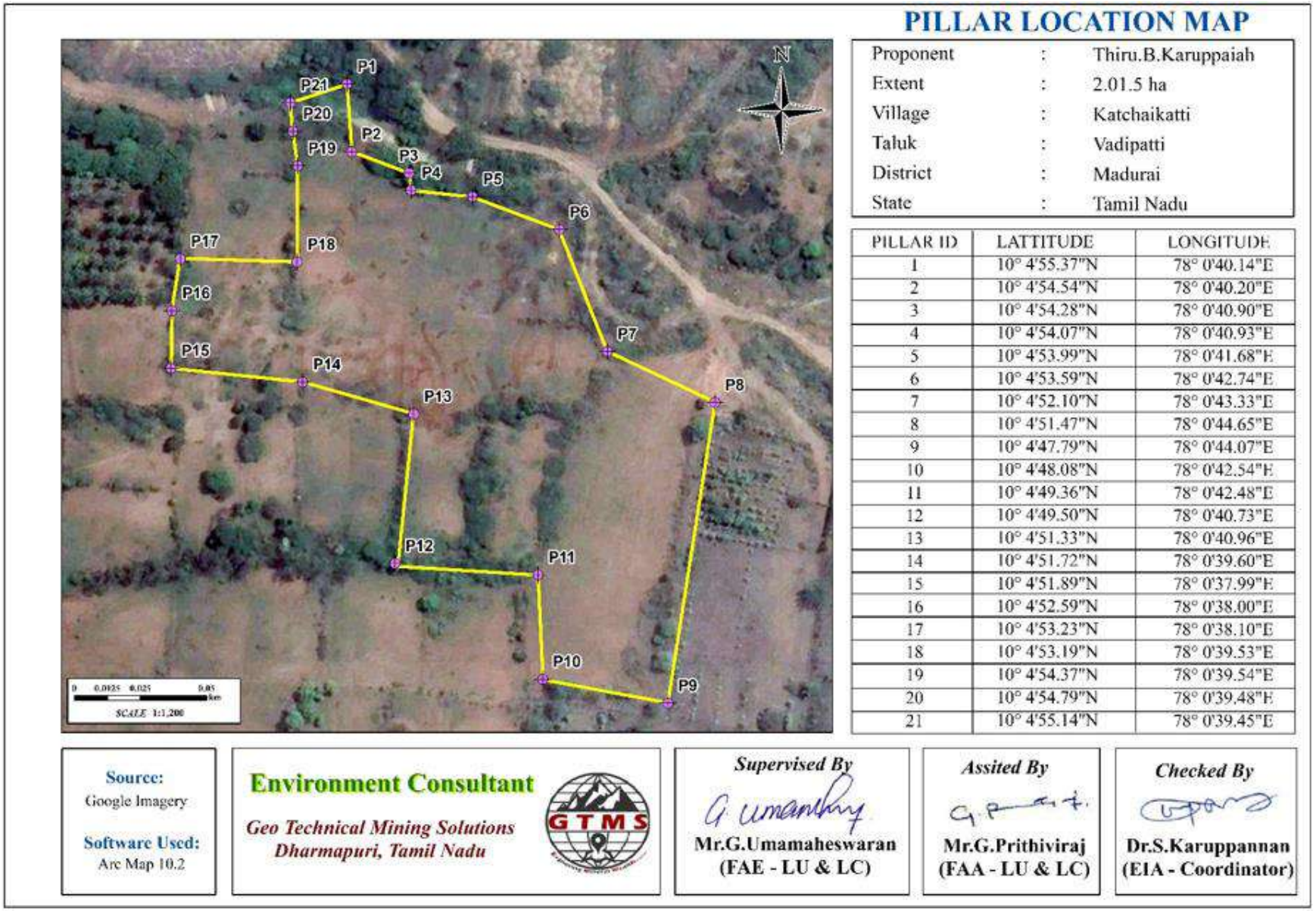


Figure 2.1 Google Earth Image Showing Lease Area with Pillars

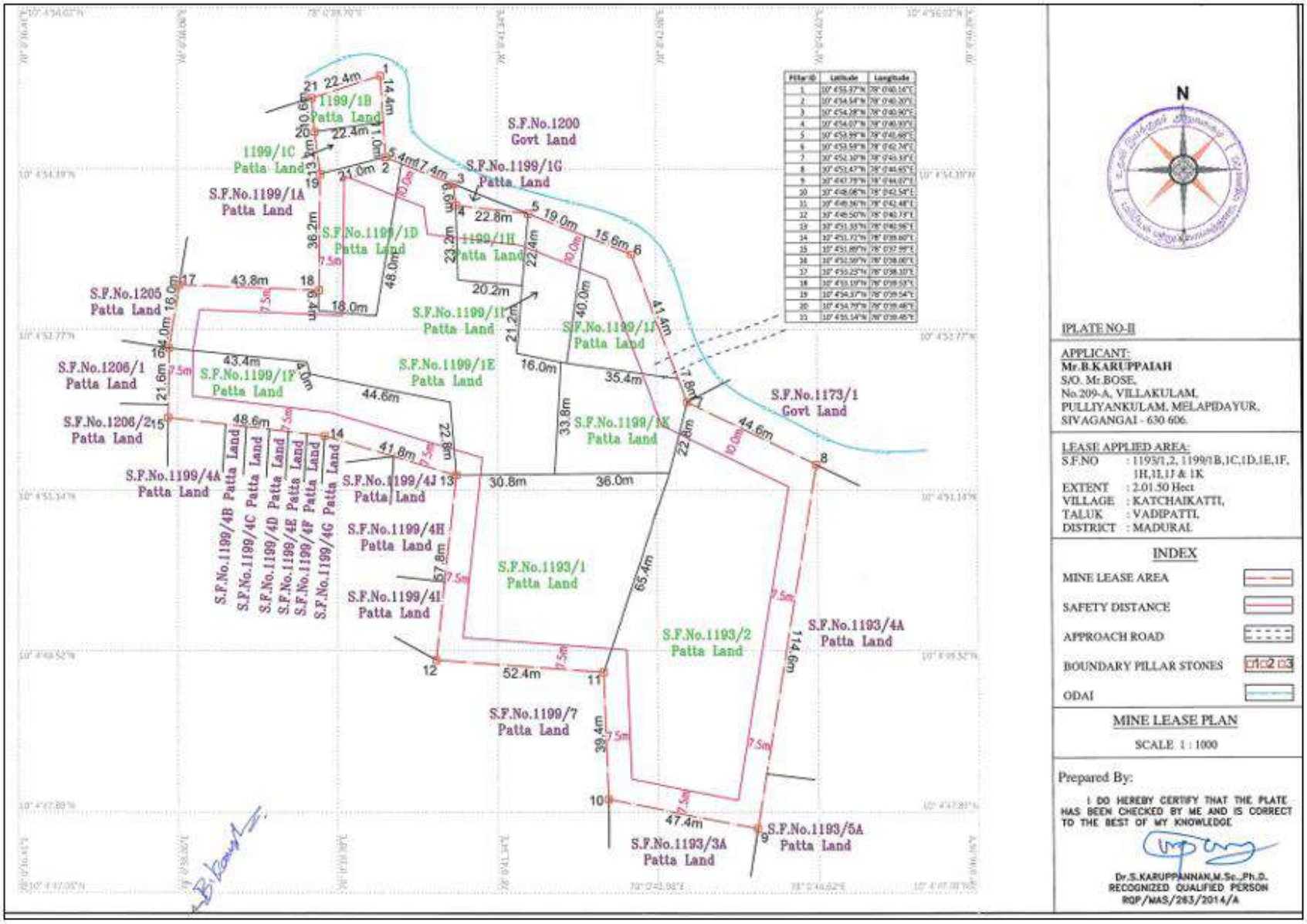


Figure 2.2 Mine Lease Plan

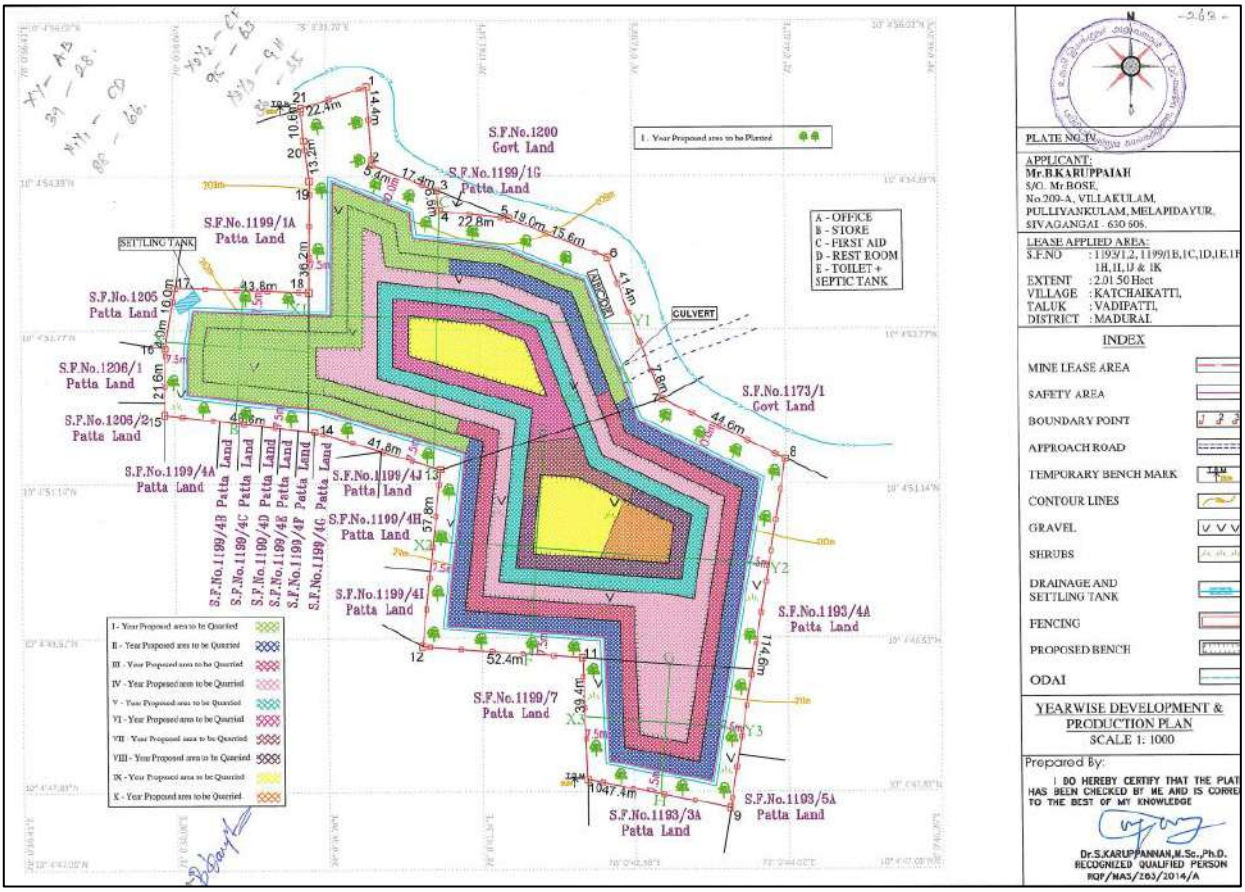


Figure 2.3 Yearwise Development and Production Plan

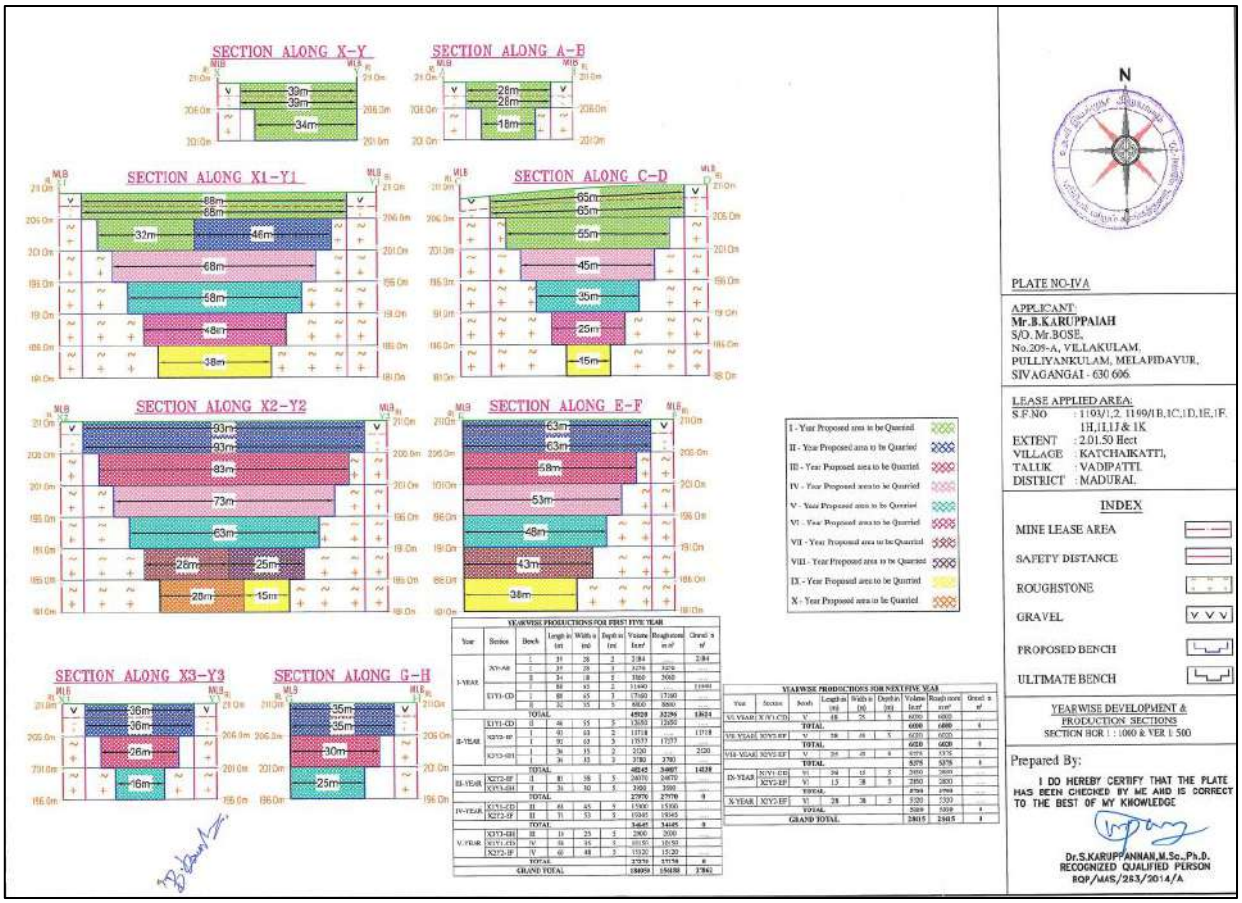


Figure 2.3a Yearwise Development and Production Sections

2.5 CONCEPTUAL MINE CLOSURE PLAN

- Mine closure is a process of returning a disturbed site to its natural state for other productive uses to minimize adverse effects on the environment or threats to humans' health and safety.
- The objective of the mine closure plan is to transform quarries to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting, and non-contaminating.
- At the end of mining life, the mine pit will act as an artificial reservoir for collecting rain water and will help to meet the water demand during drought season.
- After mine closure, the greenbelt will be developed along the safety barrier and over top benches. Water from the pit will be used to the greenbelt development and maintenance. Budgetary provision for mine closure is provided in Table 2.10.

Table 2.10 Mine Closure Budget

Activity	Capital Cost	Recurring Cost/Annum
403 plants inside the lease area	80600	12090
605 plants outside the lease area	181350	18135
Wire Fencing (2.01.5 ha)	403000	20150
Renovation of Garland Drain (2.01.5 ha)	20150	10075
Total	**685100**	**60450**

CHAPTER III
DESCRIPTION OF THE ENVIRONMENT

3.0 INTRODUCTION

Field monitoring studies were carried out to evaluate the existing environmental condition of the project site during March to May, 2023 as per CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Accuracy Analabs Laboratory for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

3.1 LAND ENVIRONMENT

Land use pattern of the area of 5 km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 3.1.

Table 3.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Crop Land	5001.96	64.61
2	Dense Forest	506.19	6.54
3	Fallow Land	131.46	1.70
4	Land with or Without Scrub	557.97	7.21
5	Mining/Industrial lands	70.80	0.91
6	Plantations	1372.59	17.73
7	Settlements	100.88	1.30
Total		**7741.84**	**100.0**

Source: Sentinel II Satellite Imagery

3.2 SOIL ENVIRONMENT

Eight locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. The physical and chemical characteristic results of soil samples are provided below.

Physical Characteristics

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 6.41 to 7.27 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 3.45 to 4.33 µs/cm. Bulk density ranges between 0.61to 0.99g/cm3.

Chemical Characteristics

Nitrogen ranges between 1.57 and 2.13 %. Phosphate ranges between 2.03 and 3.64 %. Potassium ranges between 3.48 and 5.25 %. Calcium ranges between 1579 and 2516 mg/kg. Total carbon ranges between 23.7 and 31.5 %.

3.3 WATER ENVIRONMENT

Surface Water

Kuttalampatti waterfalls and Canal near in mine lease area are the two prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 0.01 km N of Canal Near and 4.89 km NNW of Kuttalampatti waterfalls. Two surface water samples, known as SW1 and SW2 were collected from the two surface water bodies to assess the baseline water quality summarizes surface water quality data of the two samples.

Result for surface water sample indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

Ground Water Resources

Groundwater in the study area occurs in the crystalline rocks of Archaean age and recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose.

Five groundwater samples, known as BW01, BW02, BW03, BW04 and OW01 collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water. Ground water sampling locations and their distance and direction from the lease area and the spatial occurrence of water sampling locations summarizes ground water quality data of the nine samples.

Results for ground water samples indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2023 (Pre-Monsoon Season) and from October through December, 2022 (Post Monsoon Season).

The open well water level data thus collected onsite. According to the data, average depths to the static water table in open wells range from 15.2 to 18.5 m BGL in pre monsoon and 12.2 to 15.8 m BGL in post monsoon. The bore well data thus collected onsite and the average depths to static potentiometric surface in bore wells for the period of October through December 2022 (Post-Monsoon Season) vary from 63.8 to 66.3 m and from 62.3 to 65.8 m for the period of March through May, 2023 (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

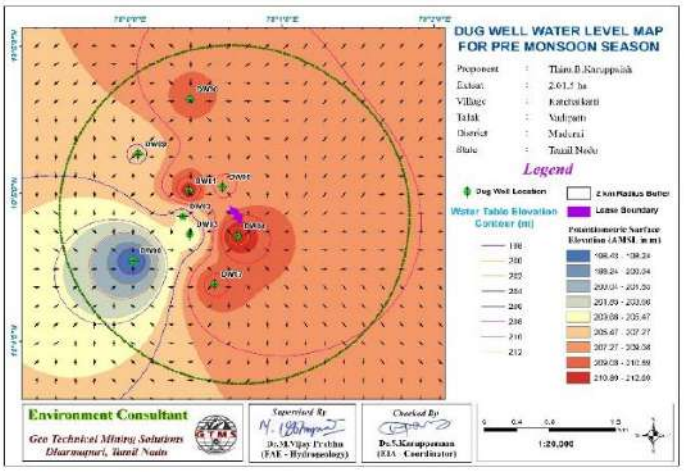


Figure 3.1 Open well static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season

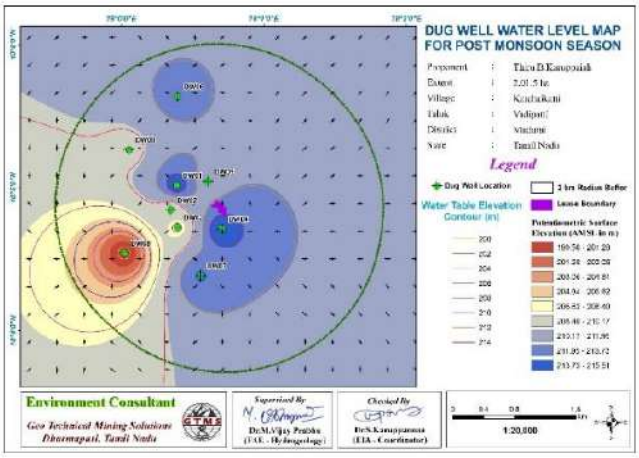


Figure 3.2 Open well static groundwater elevation map showing direction of groundwater flow during post-monsoon season

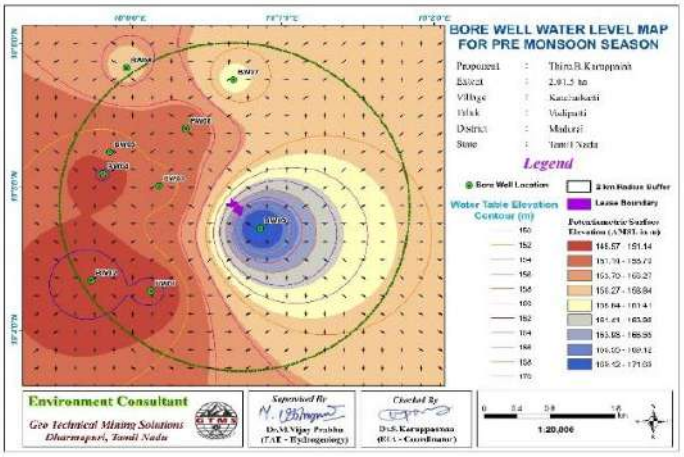


Figure 3.3 Borewell static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season

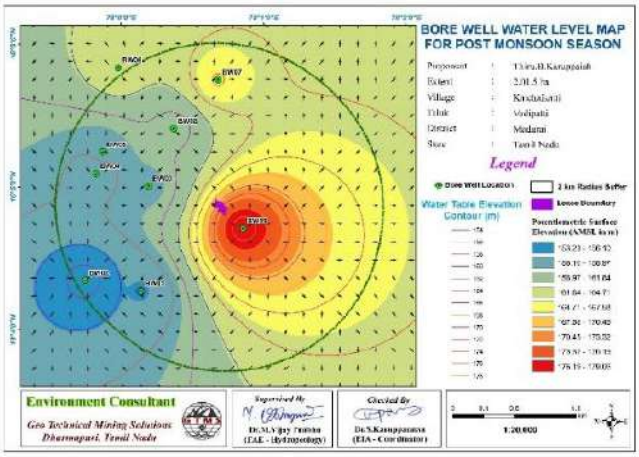


Figure 3.4 Borewell static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

3.4 AIR ENVIRONMENT

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality. The baseline studies on air environment include identification of specific air pollutants and their existing levels in ambient air. The ambient air quality in the study area of 5 km radius around the proposed quarry sites provides the baseline ambient air quality information.

Ambient Air Quality

As per the monitoring data, $PM_{2.5}$ ranges from 16.9 µg/m^3 to 21.1 µg/m^3; PM_{10} from 36.3 µg/m^3 to 40.2µg/m^3; SO_2 from 5.9 µg/m^3 to 8.2 µg/m^3; NO_X from 18.1 µg/m^3 to 22.0 g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

41.6 dB (A) Leq during day time and 34.3 dB (A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 39.2 to 47.5 dB (A) Leq and during night time from 35.2 to 42.1 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

3.6 BIOLOGICAL ENVIRONMENT

The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area and identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora and fauna in the core zone as well as buffer zone. From the study of biological environment, it is concluded that there was no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species were found in vulnerable, endangered or threatened category as per IUCN and that there is no endangered red list species found in the study area.

3.7 SOCIO ECONOMIC ENVIRONMENT

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

3.8 TRAFFIC DENSITY

Table 3.2 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	1.14 Km-NW	Village Road
TS2	Dindigul to Madurai (NH-44)	3.77 Km-SW	Dindigul to Madurai (NH-44)

Source: On-site monitoring by GTMS FAE & TM

Table 3.3 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	82	246	48	48	78	39	333
TS2	109	327	63	63	93	46	436

Source: On-site monitoring by GTMS FAE & TM

3.9 SITE SPECIFIC FEATURES

Table 3.4 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	None	Nil within 25 km radius
		None	Nil within 25 km radius
2	Reserve Forest	Waguthumalai	0.63km E
		Sirumalai	4.42km NW
		Kulasekarankottai	5.58km NW
		Sembatti	7.49km NE
		Mettupatti	15.67km SW
		Vikramangalam	15.89km SW
		Mannadimangalam	12.59km SW
		Uthappanaichanur II	19.39km SW
		Kiluvamalai	13.48km E
		Alagarmalai	18.19km E
		Perumalai	15.96km NE
		Chempulimalai	24.86km NE
		Kodimangalam A Blk	12.03km SE
		Kodimangalam B Blk	13.17km SE
		Kadavakurichi	20.20km E
		Viralipatti	5.16km E

3	Lakes/Reservoirs/ Dams/Streams/Rivers	Vaigai River	10.72 km S
		Sathiar Dam	8.19 km E
		Thathappanakkanpatty Kanmai	3.21 km E
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Critically Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 INTRODUCTION

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 for sustainable resource extraction.

4.1 LAND ENVIRONMENT

Anticipated Impact

- Permanent or temporary change on land use and land cover.
- Change in topography of the mine lease area will change at the end of the life of the mine.
- Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- Degradation of the aesthetic environment of the core zone due to quarrying

- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- ❖ Siltation of water course due to wash off from the exposed working area

Mitigation Measures

- ❖ The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.
- ❖ Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- ❖ Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- ❖ Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- ❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- ❖ In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimize dust emissions.
- ❖ Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

Anticipated Impact

Following impacts are anticipated due to mining operations:

- Removal of protective vegetation cover
- Exposure of subsurface materials which are unsuitable for vegetation establishment

No top soil is produced during the project operation. However, some of the important common mitigation measures is provided below:

Mitigation Measures

- ❖ Run-off diversion – Garland drains will be constructed around the project boundary to prevent surface flows from entering the quarry works areas and will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.

- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.3 WATER ENVIRONMENT

Anticipated Impact

- Generation of waste water from vehicle washing.
- Washouts from surface exposure or working areas
- Domestic sewage
- Disturbance to drainage course in the project area
- Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining.
- As the proposed project acquires 5.9 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not deplete aquifer beneath the lease area.

Mitigation Measures

- Garland drainage system and settling tank will be constructed along the proposed mining lease area. The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage.
- Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 10 m x 3 m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system

- Benches will be provided with inner slopes and through a system of drains and channels, rain water will be allowed to descent into surrounding drains to minimize the effects of erosion and water logging arising out of uncontrolled descent of water
- The water collected will be reused during storm for dust suppression and greenbelt development within the mines
- Interceptor traps/oil separators will be installed to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- Flocculating or coagulating agents will be used to assist in the settling of suspended solids during monsoon seasons
- Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted.
- Domestic sewage from site office and urinals/latrines provided in ML is discharged in septic tank followed by soak pits
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- De-silting will be carried out before and immediately after the monsoon season
- Regular monitoring (once every 6 months) and analysing the quality of water in open well, bore wells and surface water.

4.4 AIR ENVIRONMENT

Anticipated Impact

Anticipated increase of the air pollutants due to quarrying activities have been predicted using AERMOD software and the results shown in Tables 4.1 to 4.4 will be used in providing mitigation measures.

Table 4.1 Incremental and Resultant $PM_{2.5}$

Station ID	Distance to core area (km)	Direction	$PM_{2.5}$ concentrations(µg/m³)			Comparison against air quality standard (60 µg/m³)	Magnitude of Change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	---	---	21.1	5.95	27.05	Below standard	28.20	Not significant
AAQ2	0.78	W	21.6	0.5	22.1		2.31	
AAQ3	1.95	SW	20.4	0	20.4		0.00	
AAQ4	4.84	WSW	16.0	0	16		0.00	
AAQ5	4.26	S	18.0	0	18		0.00	
AAQ6	2.83	NW	19.1	0.5	19.6		2.62	
AAQ7	4.90	NE	18.0	0	18		0.00	

Table 4.2 Incremental and Resultant PM_{10}

Station ID	Distance to core area (km)	Direction	PM_{10} concentrations(µg/m³)			Comparison against air quality standard (100 µg/m³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	---	---	42.6	11.9	54.5	Below standard	27.93	Not significant
AAQ2	0.78	W	39.5	0.5	40		1.27	
AAQ3	1.95	SW	39.8	0	39.8		0.00	
AAQ4	4.84	WSW	37.0	0	37		0.00	
AAQ5	4.26	S	34.9	0	34.9		0.00	
AAQ6	2.83	NW	37.0	0.5	37.5		1.35	
AAQ7	4.90	NE	39.7	0	39.7		0.00	

Table 4.3 Incremental & Resultant SO_2

Station ID	Distance to core area (km)	Direction	SO_2 concentrations(µg/m^3)			Comparison against air quality standard (80 µg/m^3)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	---	---	8.4	4.66	13.06	Below standard	55.48	Not significant
AAQ2	0.78	W	8.9	0.5	9.4		5.62	
AAQ3	1.95	SW	9.5	0	9.5		0.00	
AAQ4	4.84	WSW	7.0	0	7		0.00	
AAQ5	4.26	S	8.4	0	8.4		0.00	
AAQ6	2.83	NW	10.0	0.5	10.5		5.00	
AAQ7	4.90	NE	7.3	0	7.3		0.00	

Table 4.4 Incremental & Resultant NO_X

Station ID	Distance to core area (km)	Direction	NO_X concentrations(µg/m^3)			Comparison against air quality standard (80 µg/m^3)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	---	---	16.3	5.92	22.22	Below standard	36.32	Not significant
AAQ2	0.78	W	16.9	0.5	17.4		2.96	
AAQ3	1.95	SW	16.6	0	16.6		0.00	
AAQ4	4.84	WSW	11.0	0	11		0.00	
AAQ5	4.26	S	17.0	0	17		0.00	
AAQ6	2.83	NW	19.1	0.5	19.6		2.62	
AAQ7	4.90	NE	14.0	0	14		0.00	

The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective

mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further.

Mitigation Measures

Drilling

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

Advantages of Wet Drilling

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

Blasting

- Suitable time of blasting will be chosen according to the local conditions and water will be sprinkled on blasting face.
- Blasting will be avoided when temperature inversion is likely to occur and strong wind blows towards residential areas.
- Controlled blasting will be carried out using suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone.
- Blasting will be restricted to a particular time of the day i.e., at the time of lunch hours.
- Before loading of material water will be sprayed on blasted material.
- Dust mask will be provided to the workers and their use will be strictly monitored.

Haul Road and Transportation

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- Water sprinkling on haul roads and loading points will be carried out twice a day

- ❖ Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process and reduces pollution
- ❖ The un-metaled haul roads will be compacted weekly before being put into use
- ❖ Overloading of tippers will be avoided to prevent spillage
- ❖ It will be ensured that all transportation vehicles carry a valid PUC certificate
- ❖ Haul roads and service roads will be graded to clear accumulation of loose materials

Green Belt

- ❖ Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers
- ❖ Green belt of adequate width will be developed around the project site

Occupational Health

- ❖ Dust mask will be provided to the workers and their use will be strictly monitored
- ❖ Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers
- ❖ Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed

4.5 NOISE ENVIRONMENT

Anticipated Impact

Table 4.5 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level (dBA)	Total (dBA)
Core area	100	41.6	57.16	57.28
Ramayanpatti	680	40.7	40.51	43.62
Chockalingapuram	1980	40.4	31.23	40.90
Vadipatti	4870	47.5	23.41	47.52
Thanichiyam	4210	39.2	24.67	39.35
Semminipatti	2790	39.8	28.25	40.09
T. Mettupatti	4910	39.5	23.34	39.60
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas. By adopting suitable mitigation measures, the noise levels due to the project can be controlled further.

Table 4.6 Predicted PPV Values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	11	680	0.101	19	0.02	121

Table 4.10 Predicted PPV Values due to Blasting at 100-500 m radius

Location ID	Maximum Charge in kgs	Radial Distance in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	11	100	2.169	19	0.24	141
		200	0.715		0.10	134
		300	0.374		0.06	130
		400	0.236		0.04	127
		500	0.165		0.03	125

The peak particle velocity produced by the charge of 11 kg is well below that of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Mitigation Measures

- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise.
- Sound insulated chambers will be provided for the workers working on machines producing higher levels of noise.
- Silencers / mufflers will be installed in all machineries.
- Green belt will be developed around the project area and along the haul roads to minimize propagation of noise.
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of heavy machines and persons working near the heavy machines and their use will be ensured though training and awareness.
- Regular medical check–up and proper training will be provided to personnel to create awareness about adverse noise level effects.
- The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations

- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ Blasting shelter will be provided as per DGMS guidelines
- ❖ Blasting operations will be carried out only during day time
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ❖ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire
- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251 mm/s
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 BIOLOGICAL ENVIRONMENT

Anticipated Impact

- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region.
- Carbon released from quarrying machineries and tippers during quarrying would be 1505 kg per day, 406403 kg per year and 2032014 kg over five years, as provided in Table 4.8.

Table 4.8 Carbon Released During Five Years of Rough Stone and Gravel Production

	Per day	Per year	Per five years
Fuel consumption of excavator	96	25919	129594
Fuel consumption of compressor	11.2	3024	15120
Fuel consumption of tipper	454	122700	613500
Total fuel consumption in liters	562	151643	758214
Co_2 emission in kg	1505	406403	2032014

Mitigation Measures

- During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers
- Green belt of adequate width will be developed around the project site

Carbon Sequestration

- To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 24 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- As per the greenbelt development plan as recommended by SEAC), about 1008 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 89 kg of the total carbon, as provided in Table 4.9.

Table 4.9 CO_2 Sequestration

CO_2 sequestration in kg	89	24156	120779
Remaining CO_2 not sequestered in kg	1416	382247	1911235
Trees required for environmental compensation	15927		
Area required for environmental compensation in hectares	32		

4.7 SOCIO ECONOMIC ENVIRONMENT

Anticipated Impact

- The project will generate employment for about 14 persons
- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- Approach roads can be damaged by the movement of tippers

Mitigation Measures

- Good maintenance practices will be adopted for plant machinery and equipment to avert potential noise problems.
- Green belt will be developed in and around the project sites as per Central Pollution Control Board (CPCB) guidelines.
- Appropriate air pollution control measure will be provided to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per the mines act and rules.
- Both the State and the Central governments will be benefited through financial revenues by way of royalty, tax, DMF, NMET etc. from the projects directly and indirectly.

4.8 OCCUPATIONAL HEALTH MEASURES

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

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

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

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The mineral deposits are site specific in nature; hence question of seeking alternate sites do not arise for the projects.

CHAPTER VI

ENVIRONMENT MONITORING PROGRAM

Regular monitoring program of environmental components is essential to take into account the changes in the environmental components as shown in Table 6.1. The Objectives of monitoring is:

- To check or assess the efficiency of the controlling measures;
- To establish a data base for future impact assessment studies.

Table 6.1 Post Environmental Clearance Monitoring Schedule

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 locations (1 core & 1buffer)	24 hours	Once in 6 months	Fugitive dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in BGL
5	Noise	2 locations (1Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night

6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 locations (1 core & 1 Buffer)	–	Once in 6 months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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

6.2 BUDGETARY PROVISION FOR EMP

The cost in respect of monitoring of environmental components has been shown in Table 6.2.

Table 6.2 Environment Monitoring Budget

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

Source: Field Data

CHAPTER VII

ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

Risk assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad vide circular no.13 of 2002 dated 31st December 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and assess the risk levels of those hazards in order to prioritize those that need an immediate attention. Further, mechanisms responsible for these hazards are identified and control measures are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a qualified competent mine manager certified by the DGMS, Dhanbad.

7.2 DISASTER MANAGEMENT PLAN

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

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

7.3 CUMULATIVE IMPACT STUDY

- The results on the cumulative impact of the four proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.
- PPV resulting from four proposed projects is well below the permissible limit of Peak Particle Velocity of 8 mm/s.
- The four proposed project will allocate Rs.10,00,000/- towards CER as recommended by SEAC.
- The four proposed projects will directly provide jobs to about 35 local people.
- The proposed projects will plant about 3671 saplings in and around the lease area.
- The proposed projects will add 315 PCU per day to the nearby roads.

7.4 PLASTIC WASTE MANAGEMENT PLAN

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

Objective

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

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

CHAPTER VIII

PROJECT BENEFITS

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

- Direct employment to 19 local people
- Rain water harvesting structures to augment the water availability for irrigation and plantation and ground water recharge
- Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- Strengthening of existing community facilities through the Community Development Program
- Skill development & capacity building like vocational training

- Awareness program and community activities, like health camps, medical aids, sports & cultural activities, plantation etc.,
- CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Katchaikatti Village. CSR budget is allocated as 2.5% of the profit.
- Rs. 20,00,000 will be allocated for CER.

CHAPTER IX
ENVIRONMENT MANAGEMENT PLAN

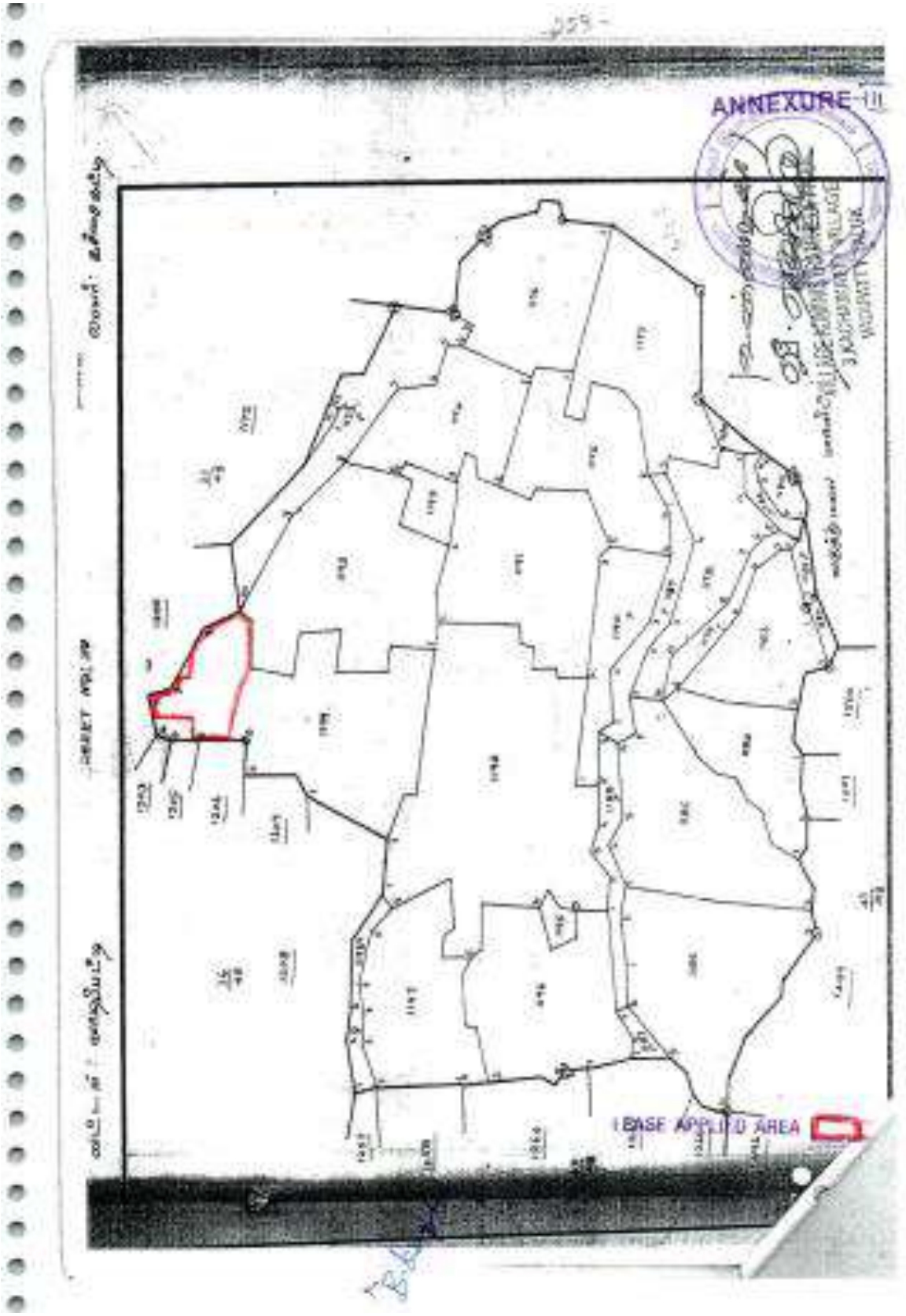
In order to implement the environmental protection measures, an amount of **Rs.2970454** as Mine Closure cost and recurring cost as **Rs.1588936** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 11818840.**

LAND DOCUMENTS

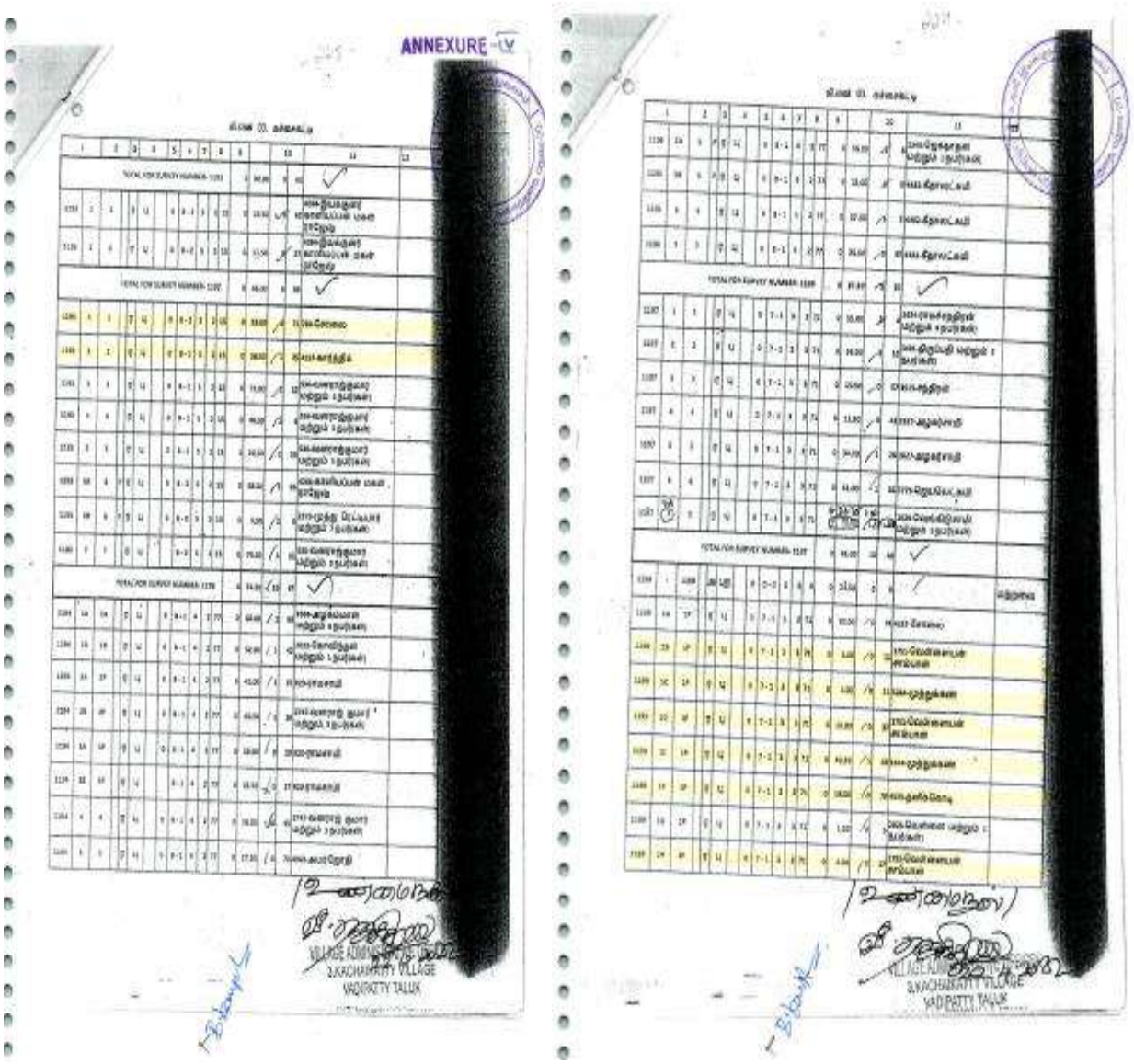
Some of the important land related documents are shown in below.

An FMP sketch showing proposed lease area in red colour

An FMP sketch showing proposed lease area in red colour



An FMP sketch showing proposed lease area in red colour



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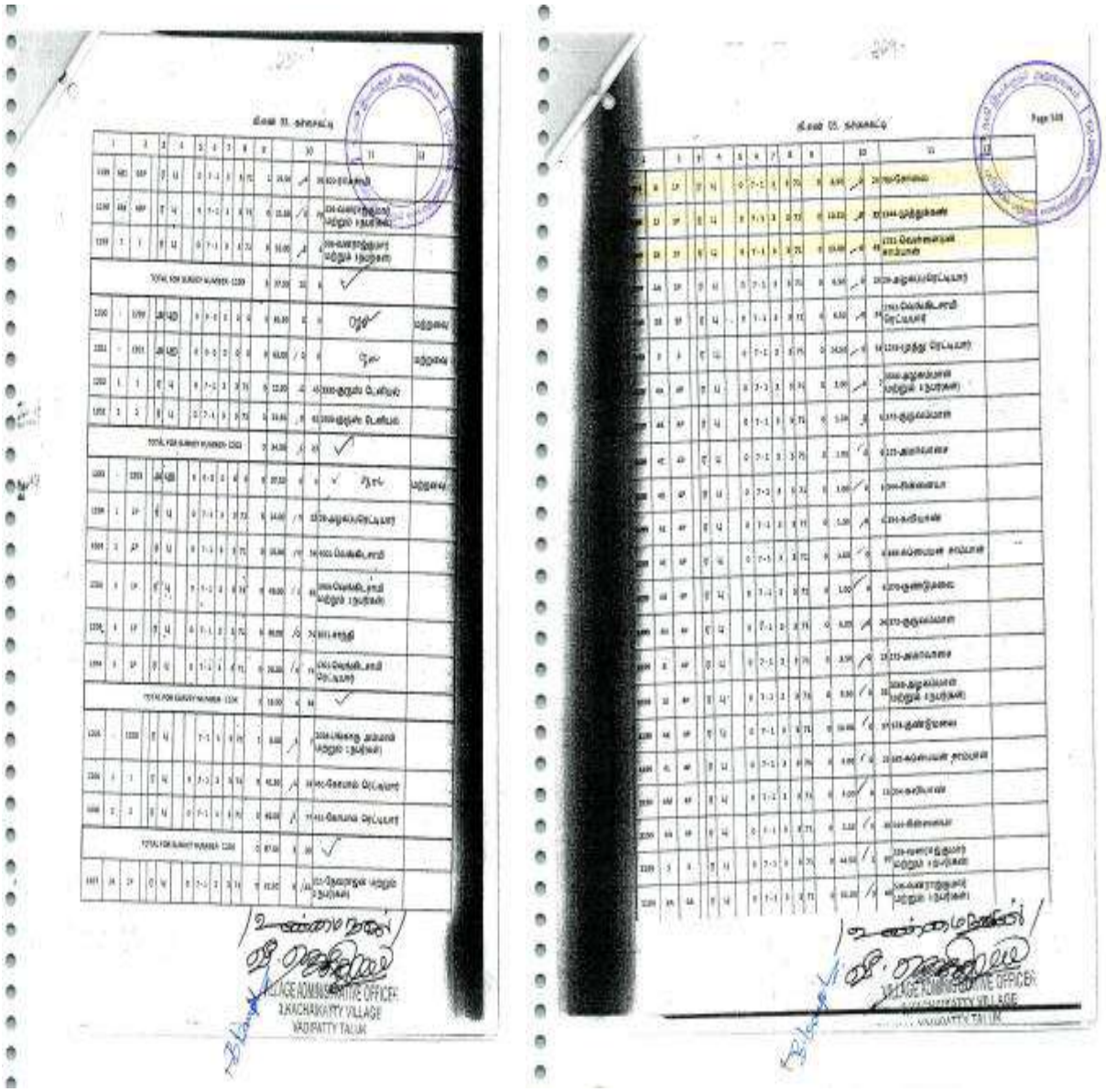

A Register Document

ANNEXURE-V

பட்டா எண் : 6445

[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
1193	1	0 - 33.00	0.71	—	—	—	—	2022/0103/24/207626 - - 22-04-2022
1193	2	0 - 58.50	1.25	—	—	—	—	2022/0103/24/207626 - - 22-04-2022
1199	1B	0 - 3.00	0.11	—	—	—	—	2022/0103/24/203969 - - 24-03-2022
1199	1C	0 - 3.00	0.11	—	—	—	—	2022/0103/24/202664 - - 24-03-2022
1199	1D	0 - 10.00	0.20	—	—	—	—	2022/0103/24/203969 - - 24-03-2022
1199	1E	0 - 40.50	1.58	—	—	—	—	2022/0103/24/202664 - - 24-03-2022
1199	1F	0 - 19.00	0.78	—	—	—	—	2022/0103/24/205983 - - 21-04-2022
1199	1H	0 - 4.50	0.17	—	—	—	—	2022/0103/24/203969 - - 24-03-2022
1199	1I	0 - 6.50	0.24	—	—	—	—	2022/0103/24/204056 - - 05-04-2022
1199	1J	0 - 10.50	0.29	—	—	—	—	2022/0103/24/202664 - - 24-03-2022
1199	1K	0 - 13.00	0.48	—	—	—	—	2022/0103/24/203969 - - 24-03-2022
		2 - 1.50	6.12					

1. [illegible] https://eservices.tn.gov.in [illegible]

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