EXECUTIVE SUMMARY OF
DRAFT 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 = 18.31.0 hectares

Tmt. K. Rani Rough Stone & Gravel Quarry

At

Kuppam Village, Pugalur Taluk, Karur District

ToR issued vide Letter No. SEIAA-TN/F.No. 9159/SEAC/ToR-1183/2022 dated 05.07.2022

Name and Address	Extent & S.F.No.
Tmt. K.Rani W/o.Mr.Kamaraj R.G.Nagar, Punnam Village Punnamchatram Post Pugalur Taluk Karur District	0.84.5 ha & S. F. No. 545/2

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

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NABET ACC. NO: NABET/EIA/2023/IA0067
Valid till : 29th Dec.2023

ENVIRONMENTAL LAB
EXCELLENCE LABORATORY

Baseline Study Period – October 2022 to December 2022

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.,18.31.0 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, one existing projects, known as E1, and two expired projects, known as 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, as shown in Figure 1.1. This EIA draft discusses the cumulative impacts of 4 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 in Kuppam Village, Pugalur Taluk, Karur District and Tamil Nadu State. It has been prepared in compliance with ToR issued vide Lr.No. SEIAA-TN/F.NO.9159/TOR-1183/2022 dated 05.07.2022 for the proposed project by conducting baseline study during the period of October to December 2022. Details of the project proponent and the list of quarries within the cluster of 500 m radius have been provided in Tables 1.1 and 1.2, respectively.

Table 1.1 Details of Project Proponent

Name of the Project Proponent	**Tmt.K. Rani**
Address	W/o. Mr. Kamaraj R.G.Nagar, Punnam Village, Punnamchatram Post, Pugalur Taluk, Karur-639136.
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. and Village**	**Extent (ha)**	**Status**
P1	Tmt. K. Rani	545/2 Kuppam	0.84.5	Proposed Area

P2	Tvl. NTC Blue Metals	544/1,544/2 544/3,545/1 Kuppam	2.15.0	Applied Area
P3	Tvl. NTC Blue Metals	543/1,543/2, 543/3,557/2(P) Kuppam	2.28.5	Applied Area
P4	Tvl. New Star Blue Metals	553/2(Part) Kuppam	1.62.0	Applied Area
Existing Quarry				
E1	Thiru.C.Chinnusamy	551/1(part) Kuppam	2.00.0	21.2.2018 to 20.2.2023
Expired Quarries				
EX1	Thirumalai Blue Metals	1238/2	4.80.0	14.10.2016 to 13.10.2021
EX2	Tvl. New Star Blue Metals	533/1, 534/1,550/C3	4.61.0	02.12.2016 to 01.12.2021
Total Cluster Extent			**18.31.0**	

Source:

i. DD Letter: Rc.No.291/Mines/2021, Dated:04.04.2022.

ii. DD Letter: Rc.No.571/Mines/2021, Dated:22.06.2022

iii. DD Letter: Rc.No.435/Mines/2021, Dated:22.06.2022

iv. DD Letter: Rc.No.482/Mines/2021, Dated:20.07.2022

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

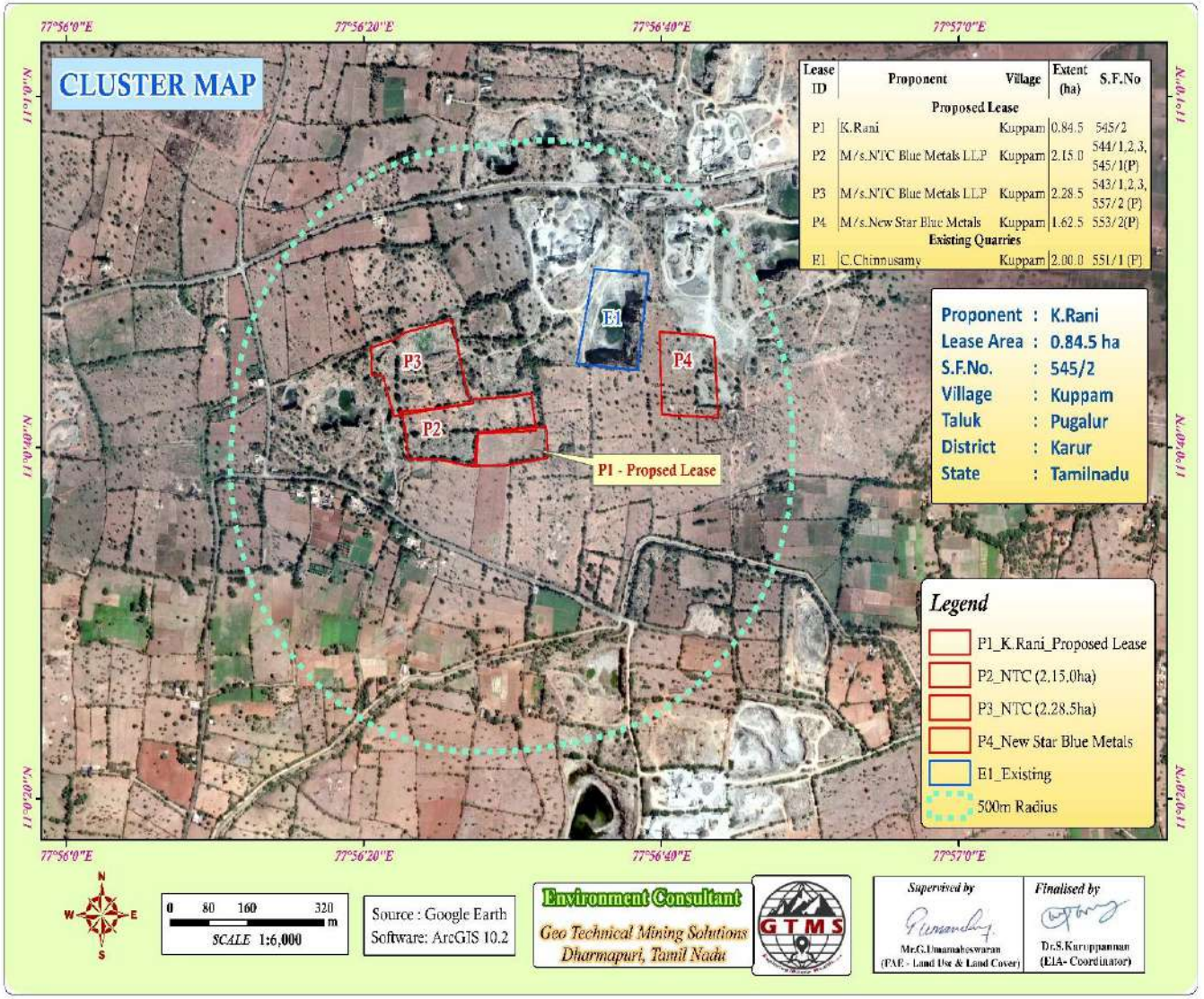


Figure 1.1 Google earth image showing 500m radius limits and the proposed project and existing quarries within the limit

CHAPTER II

PROJECT DESCRIPTION

2.0 INTRODUCTION

The proposed project deals with excavation of rough stone which is primarily used in construction projects. The method adopted for rough stone excavation is a manual open cast 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 11°0'38.94"N to 11°0’41.21"N and from longitudes from 77°56'27.52"E to 77°56'32.36"E in Kuppam Village, Pugalur Taluk, Karur District and Tamilnadu state. The project site is fall in patta land with the extent of 0.84.5 ha leased for the project proponent K. Rani. The proponent had applied for quarry lease on 15.07.2021 to extract rough stone and obtained the precise area communication letter issued by Department of Geology and Mining, Karur vide Rc.No.291/Mines/2021, Dated 04.04.2022. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director of Geology and Mining, Karur (Rc.No.291/Mines/2021, Dated 28.03.2022).

According to the approved mining plan, about 34060 m^3 of rough stone and about 6075 m^3 of topsoil will be mined up to the depth of 25 m BGL in the first five years. It is the quantity that has been mentioned in this EIA report. To achieve the estimated production, 3 jack hammers, 1 compressor, 1 excavator with bucket/rock breaker, and 1 tipper will be deployed. To operate the machineries and to break the rough stone to preferred dimension, about 16 persons will be employed. At the end of the quarry life, the dimension of the ultimate pit will be 128 m*44m*25 m and about 0.51.22 ha of land will have been utilized for quarrying, 0.01.0 ha for infrastructures, 0.02.0 ha for roads, 0.11.24 ha for green belt development, and the remaining 0.19.04 ha will have been left as unutilized area. The final mine closure plan shows that about Rs. 287300 with the annual recurring cost of Rs. 25350 will be spent towards mine closure.

Boundary coordinates of corner pillars of the project site and accessibility details to the location of the project site are given in Tables 2.1 & 2.2, respectively. The lease area of the project site has been overlaid on Google earth image, as shown in Figure 2.1.

Table 2.1 Corner Geographic Coordinates of Proposed Project

PILLAR ID	LATITUDE	LONGITUDE
1	11°0'41.21"N	77°56'32.23"E
2	11°0'40.93"N	77°56'32.31"E
3	11°0'39.42"N	77°56'32.36"E
4	11°0'38.98"N	77°56'29.42"E
5	11°0'38.94"N	77°56'27.52"E
6	11°0'40.85"N	77°56'27.66"E
7	11°0'40.71"N	77°56'27.68"E

Table 2.2 Site Connectivity to the Project Area

Type of Features	Name/Location	Distance (km)	Direction
Nearest Roadways	Karur-Kodumudi Road (SH-84)	2.5Km	N
	Karur-K.Paramathi Road(NH-81)	4.5Km	S
Nearest Town	K.paramathi	12.53Km.	NE
Nearest Railway Station	kodumudi	10.0Km	NW
Nearest Airport	Coimbatore	85.0Km	W
Nearest Seaport	Tuticorin	253.0Km	S

2.3 DETAILS OF RESERVES

Reserves were calculated using cross-section method after leaving the safety distance, as shown in Figures 2.3 and 2.3. 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	Topsoil in m^3
Geological Resource in m^3	188350	11400
Mineable Reserves in m^3	55640	6075
Proposed production for 5 years	34060	6075

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 (m^3)	Gravel (m^3)
I	6990	2625
II	6821	1650
III	6819	1800
IV	6630	-
V	6800	-
Total	**34060**	**6075**

2.3 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	0.51.22
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.11.24
Unutilized area	0.84.50	0.19.04
Total	**0.84.50**	**0.84.50**

Source: Approved mining plan

2.4 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.

2.5 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	Capacity	Make	Motive Power
1	Jack Hammers	3	1.2 m to 2 m	---	Compressed Air
2	Compressor	1	400 psi	Atlas Copco	Diesel Drive
3	Excavator	1	300 HP	Tata Hitachi	Diesel Drive
Haulage & Transport Equipment					
4	Tipper	3	15 tons	Benz	Diesel Drive

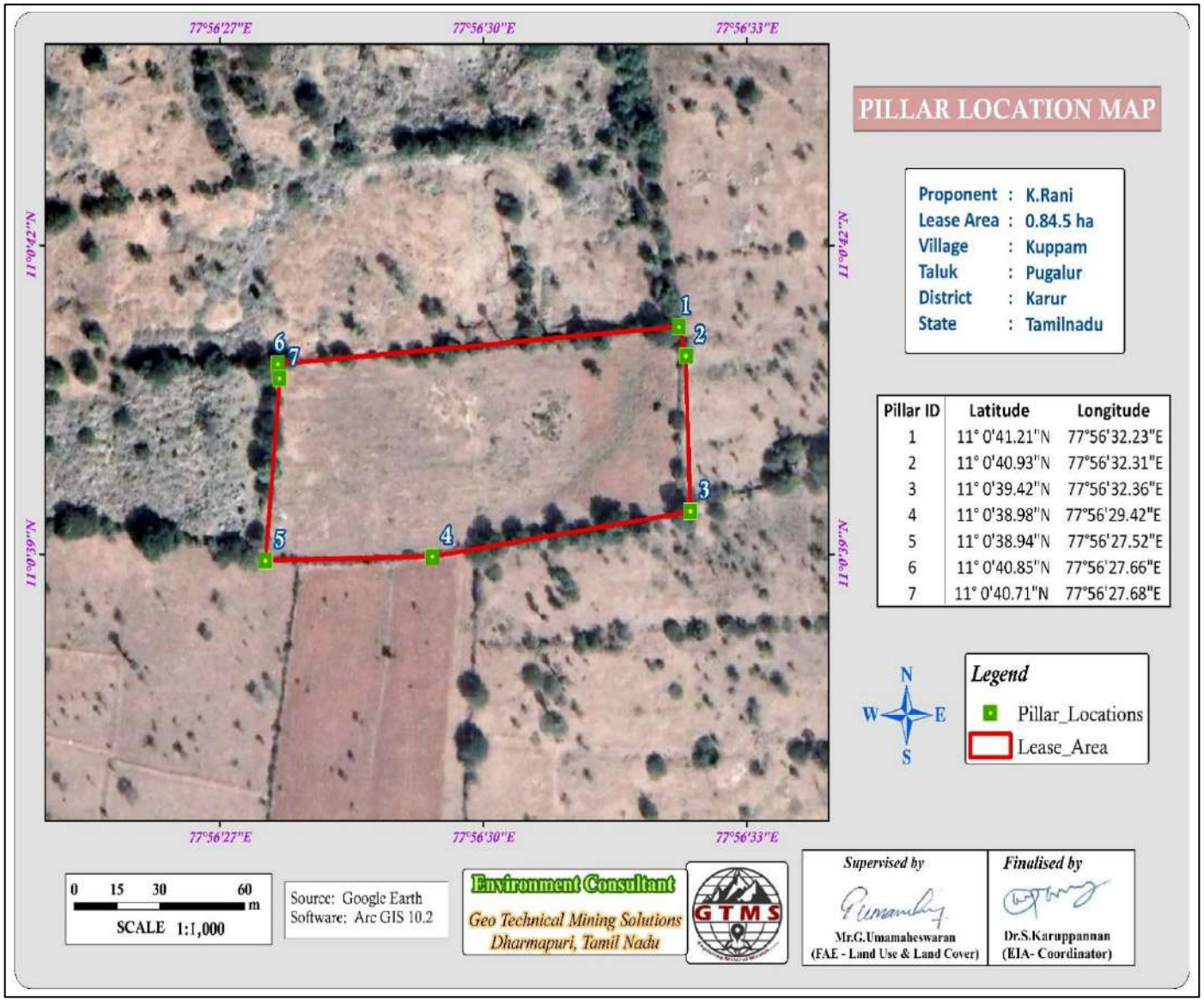
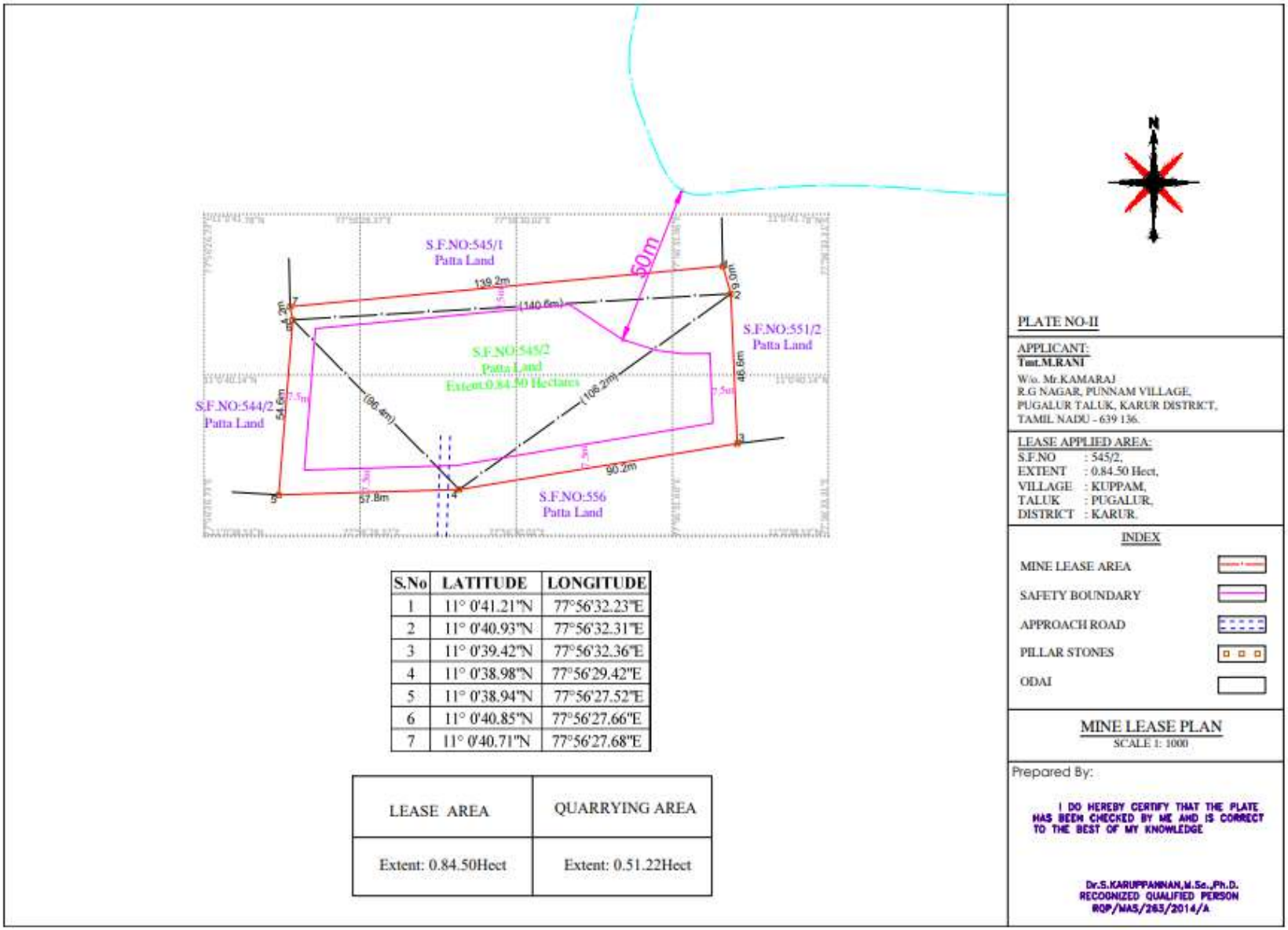


Figure 2.1 Google Earth Image Showing Lease Area with Pillars



S.No	LATITUDE	LONGITUDE
1	11° 0'41.21"N	77°56'32.23"E
2	11° 0'40.93"N	77°56'32.31"E
3	11° 0'39.42"N	77°56'32.36"E
4	11° 0'38.98"N	77°56'29.42"E
5	11° 0'38.94"N	77°56'27.52"E
6	11° 0'40.85"N	77°56'27.66"E
7	11° 0'40.71"N	77°56'27.68"E

LEASE AREA	QUARRYING AREA
Extent: 0.84.50Hect	Extent: 0.51.22Hect

Figure 2.2 Mine Lease Plan

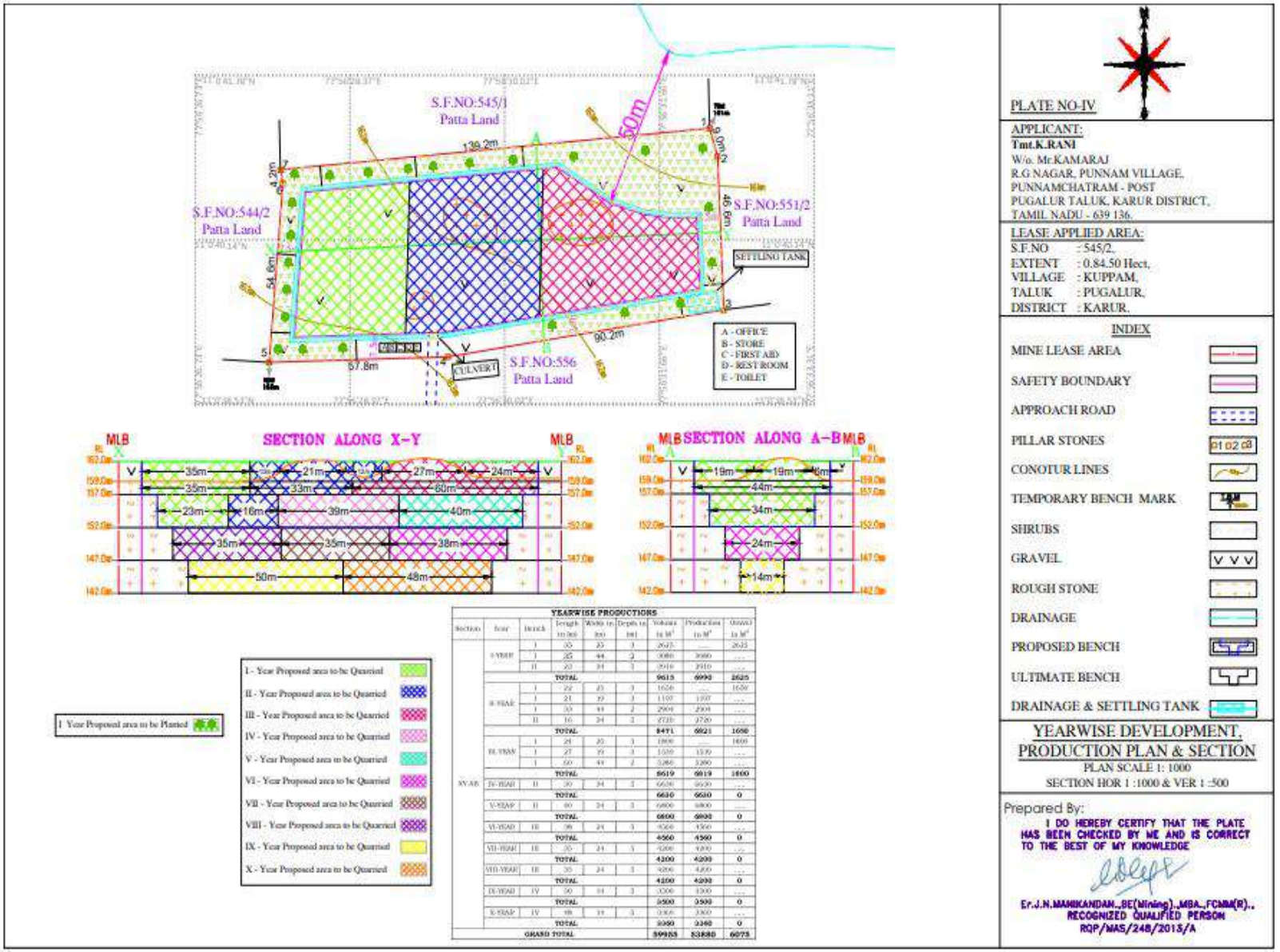
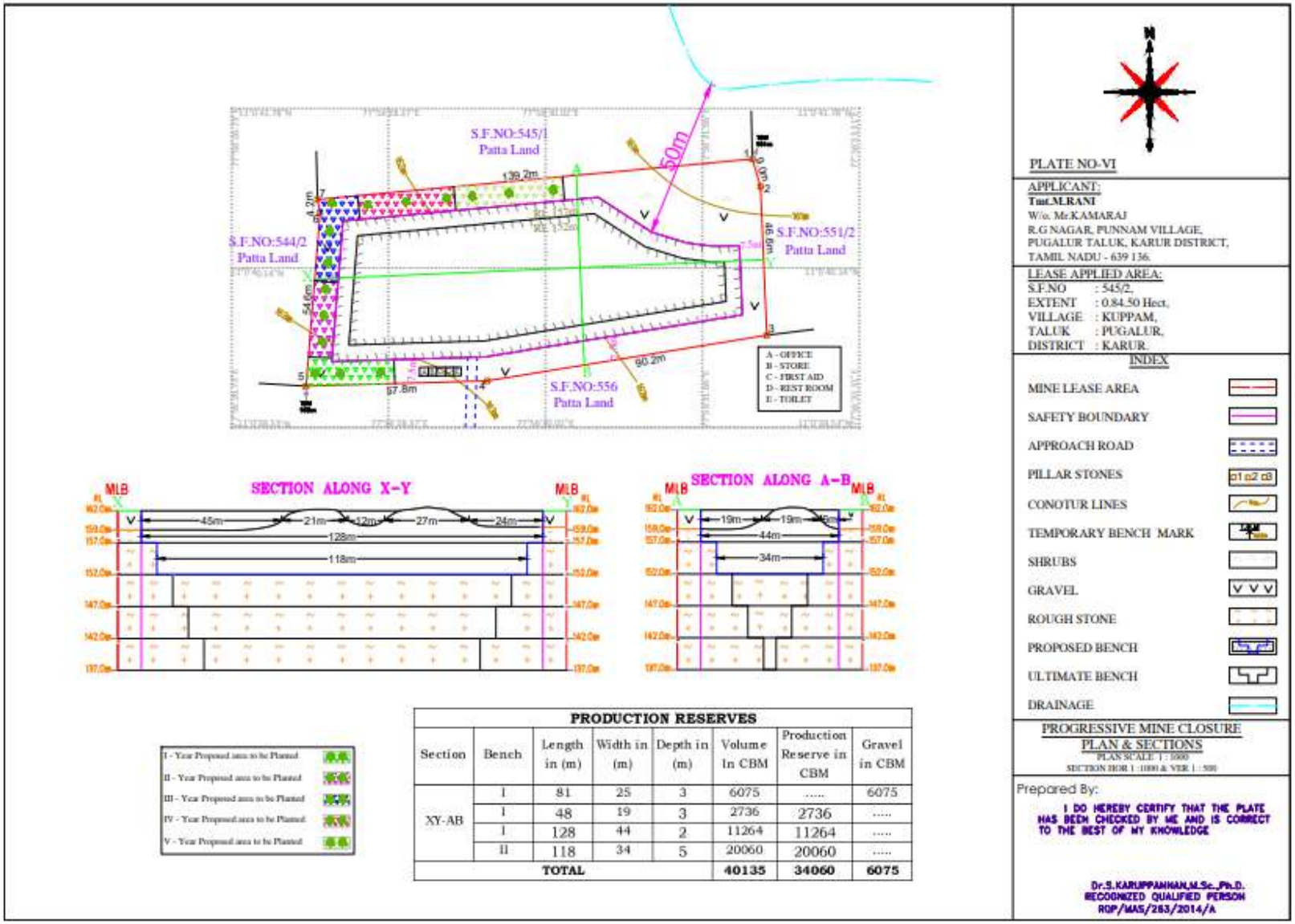


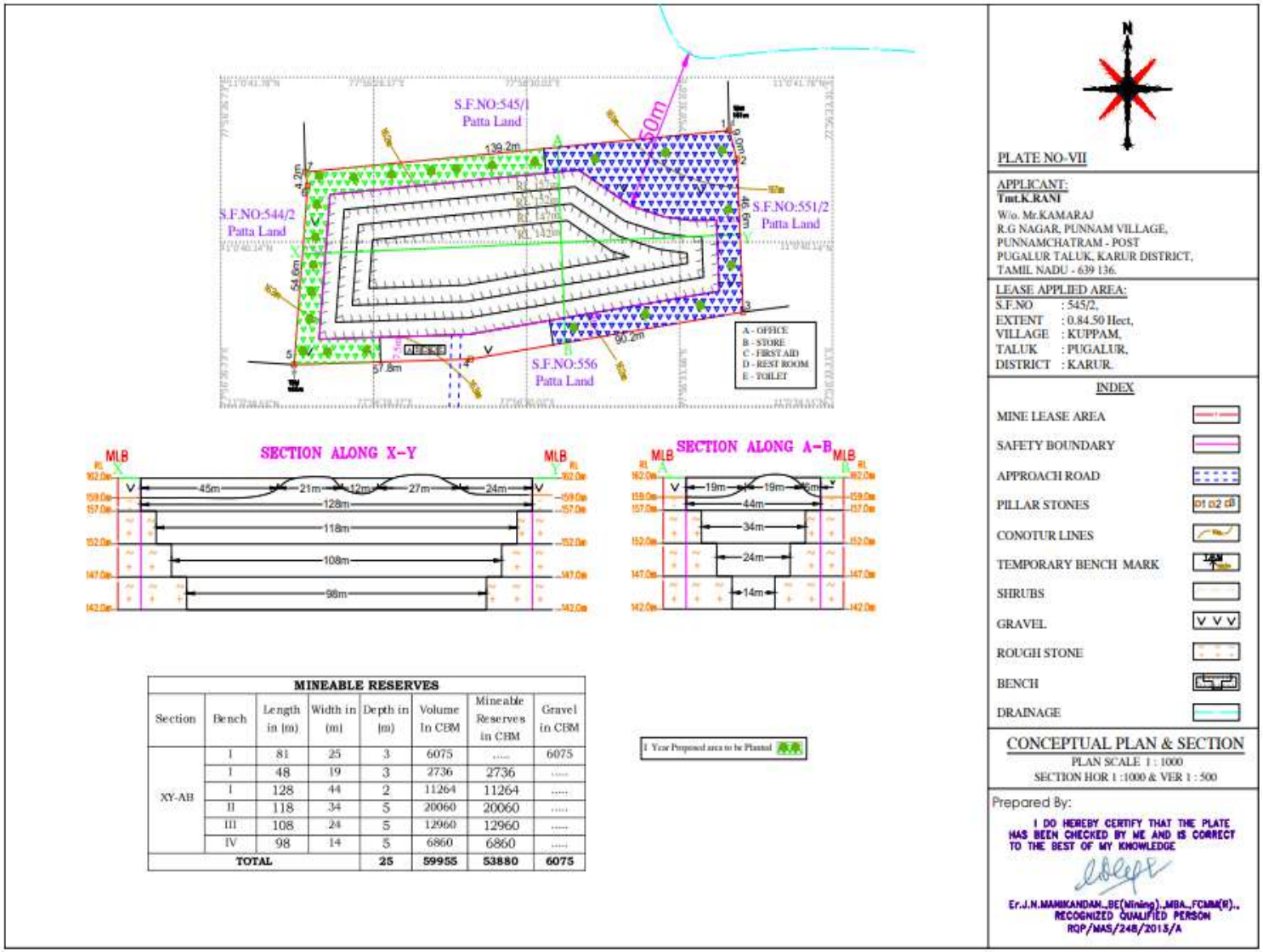
Figure 2.3 Year-Wise Development & Production Plan



PRODUCTION RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Production Reserve in CBM	Gravel in CBM
XY-AB	I	81	25	3	6075	.....	6075
	I	48	19	3	2736	2736	.....
	I	128	44	2	11264	11264	.....
	II	118	34	5	20060	20060	.....
TOTAL					**40135**	**34060**	**6075**

Figure 2.4 Conceptual Final Mine Closure Plan & Section



MINEABLE RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Mineable Reserves in CBM	Gravel in CBM
XY-AB	I	81	25	3	6075	.....	6075
	I	48	19	3	2736	2736	.....
	I	128	44	2	11264	11264	.....
	II	118	34	5	20060	20060	.....
	III	108	24	5	12960	12960	.....
	IV	98	14	5	6860	6860	.....
TOTAL				25	59955	53880	6075

1 Year Proposed area to be Planted

Figure 2.5 Conceptual Final Mine Closure Sections

2.6 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 human's 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 2.7.

Table 2.7 Mine Closure Budget

Activity	Capital Cost (Rs.)	Recurring Cost/Annum (Rs.)
169 plants inside the lease area	33800	5070
254 plants outside the lease area	76050	7605
Wire Fencing	169000	8450
Renovation of Garland Drain	8450	4225
Total	**287300**	**25350**

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 October through December, 2022 as per CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Excellence Laboratory for the environmental attributes including soil, water, noise, by an NABL accredited and MoEF notified Excellence Laboratory for ambient 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 satellite imagery. LULC types and their extent are given in Table 3.1.

Table 3.1 Land Use / Land Cover Statistics for the Area of 5km Radius

S. No.	Classification	Area (Hectare)	Area (%)
1	Crop Land	6427	84.87
2	Dense Forest	100	1.32
3	Fallow Land	32	0.43
4	Mining/Industrial lands	174	2.30
5	Plantations	751	9.91
6	Settlements	5	0.07
7	Water Bodies	83	1.09
Total Area		**7572**	**100**

Source: Sentinel II Satellite Imagery

3.2 SOIL ENVIRONMENT

Eight locations were selected for soil sampling on the basis of soil types, vegetative cover, and industrial and residential activities to assess the existing soil conditions such as physical and chemical properties in and around the project site.

3.2.1 Physical Characteristics

The soil samples in the study area show loamy textures varying between sandy loam and sandy clay loam. PH of the soil varies from 6.5 to 7.7 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 143 to 247 µs/cm. Bulk density ranges between 1.12 and 3.8.

3.2.2 Chemical Characteristics

Nitrogen ranges between 0.04 and 1.1 %. Phosphate ranges between 0.14 and 3.8 %. Potassium ranges between 0.12 and 0.26 %. Calcium ranges between 161 and 513 mg/kg. Organic matter content ranges between 0.35 and 2.0 %.

3.3 WATER ENVIRONMENT

Surface Water

Noyyal River is the prominent surface water resources present in the study area. This river was ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 4.48 km NW of Noyyal River. One surface water sample, known as SW1 were collected from the Noyyal River to assess the baseline water quality. 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.

Nine groundwater samples, known as BW01, BW02, BW03, BW04, BW05, BW06, BW07, OW01 and OW02 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. Results for ground water samples in the Table 3.6 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 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 April through June, 2022 (Pre-Monsoon Season) and from October through December, 2022 (Post Monsoon Season). Average depths to the static water table in open wells range from 10.1 to 14.1 m BGL in pre monsoon and 11.5 to 16.3 m BGL in post monsoon. The average depths to static potentiometric surface in bore wells for the period of March through May, 2022 (Pre-Monsoon Season) vary from 63.8 to 66.3 m and from 62.3 to 65.8 m for the period of October through December, 2022 (Post-Monsoon Season). The groundwater flow studies indicate that in the two monsoon seasons groundwater flows towards the bore well number 5 and 7 located in northwestern and northern direction of the proposed project site.

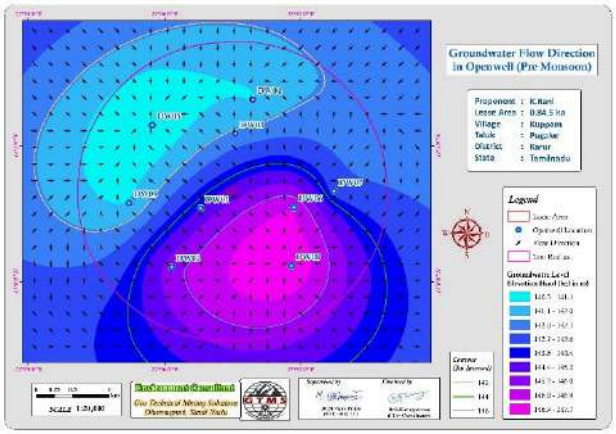


Figure 3.1 Open well static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season

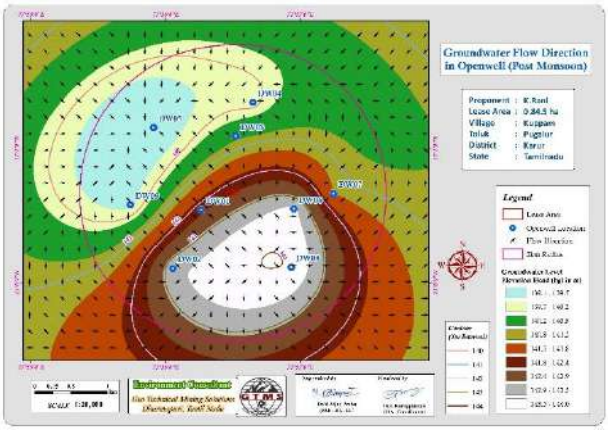


Figure 3.2 Open well static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

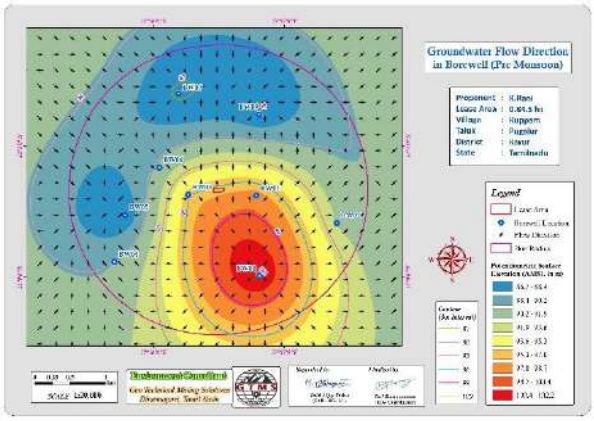


Figure 3.3 Borewell static groundwater elevation map showing the direction of groundwater flow during pre-monsoon season

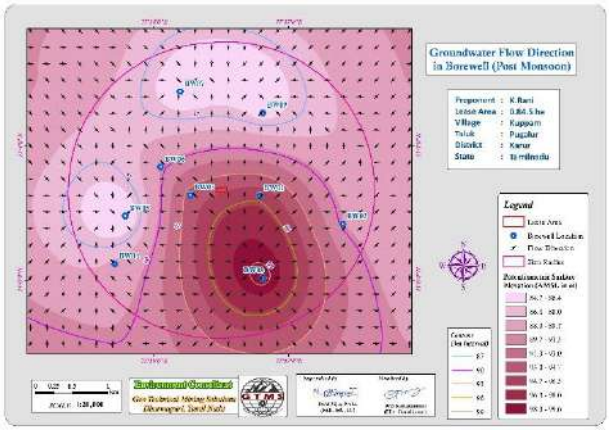


Figure 3.4 Borewell static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

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 from 10 locations, PM_{10} ranges from 36.8 µg/m^3 to 42.2 µg/m^3; $PM_{2.5}$ from 17.4 µg/m^3 to 22.8 µg/m^3; SO_2 from 7 µg/m^3 to 10.5 µg/m^3; NO_2 from 14.3 µg/m^3 to 20.4 µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

Ambient noise levels were measured at 12 locations around the proposed project area. Noise levels recorded in core zone during day time was 41.7 dB (A) Leq and during night time was 34.7 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 32.6 to 42.2 dB (A) Leq. and during night time from 29.8 to 36.6 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

Socio-economic study is an essential part of environmental study. It is a measure of an individual's or family's or group of people's economic and social position based on education, income, health, and occupation. Socio-economic most important determinant of livelihoods as levels of knowledge, skill and income conditions which mean for their living. The study found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area, which will in turn improve the social standards.

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

Of the total area, mining area covers only 174 ha accounting for 2.30 %, of which lease area of 0.84.5 ha contributes only about 0.01%. Some of the impacts are anticipated due to the mining as discussed below.

Anticipated Impact

- The main anticipated impact on the land environment due to quarrying operation is changes in landscape and land use pattern.
- The size of lands used for mining is insignificant when compared to the size of other LULCs. This small size of mining activities shall not have any significant impact on the land environment. While speaking the impact of the mining project on groundwater resources, the mining activity will not reach the groundwater aquifers. Therefore, it will not affect groundwater quality and quantity.

Mitigation Measures

The mining activity will be progressively implemented along with other mitigative measures as discussed below:

- Garland drains will be constructed all around the quarry pit and a check dam will be constructed at the suitable location in lower elevations to prevent erosion due to surface runoff during heavy rainfall and to collect the storm water for various uses.
- Green belt will be developed in safety zone. The water stored in the quarry will be used for greenbelt.
- Thick plantation will be done on unutilized area, top benches, safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into greenbelt area and temporary reservoir.
- Natural vegetation surrounding the quarry will be retained to minimize dust emissions.
- Proper fencing will be established at the conceptual stage and security will be posted round the clock to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

Anticipated Impact

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 all around the project boundary to prevent surface flows from entering the quarry area. The water from garland drainage system 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 ponds trap sediments and reduce suspended sediment loads before runoff is discharged from the quarry sites. Sedimentation ponds will 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.
- *Retention of vegetation* – Retain existing vegetation or replant the vegetation at the site wherever possible. *Monitoring and maintenance* –Erosion control systems will be maintained to make sure seamless performance of the systems during rainy season.

4.3 WATER ENVIRONMENT

Anticipated Impact

- As the proposed project acquires 2.0 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.
- The impact of mining on the water quality is insignificant because of no use of chemicals or hazardous substances during quarrying process.
- The quarrying activity will not intersect ground water table as the proposed depth is 25 m below ground level and water table is found at depths of 60 m below ground level.
- There is no intersection of surface water bodies in the project area.
- As there is no proposal for rough stone and gravel processing or workshop within the project area there will be no effluent anticipated from the mines.

Mitigation Measures

- Rainwater will be collected in the mining pit and the water will be pumped out to surface settling tank of the dimension of 15m x 10m x 3m to remove suspended solids if any. The water stored in the settling tank will be used for dust suppression, greenbelt development and rainwater harvesting.
- A drainage network, known as garland drains will be constructed to divert surface run-off into the quarrying area.
- The quality of water in the quarry will be analysed periodically.

- ❖ Domestic sewage from site office and latrines in the mining site will be discharged to septic tanks followed by soak pits.
- ❖ Wastewater from the mining site will be treated in settling tanks before using it for dust suppression and tree plantation purposes.
- ❖ Desilting will be carried out before and immediately after the monsoon season.
- ❖ The quality of water in open and bore wells, and surface water bodies will be monitored regularly.

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 & Resultant GLC of PM_{10}

Station ID	Distance to core area (km)	Direction	PM_{10} Concentrations ($\mu g/m^3$)			Comparison against air quality standard (100 $\mu g/m^3$)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.05	NE	42.6	7.7	50.3	Below Standard	18.08	Not Significant
AAQ2	0.23	E	39.5	5	44.5		12.66	
AAQ3	0.77	S	39.8	1	40.8		2.51	
AAQ4	1.28	SW	37.0	0.5	37.5		1.35	
AAQ5	4.28	W	34.9	0	34.9		0.00	
AAQ6	4.67	W	37.0	0	37		0.00	
AAQ7	4.34	SW	39.7	0	39.7		0.00	
AAQ8	4.09	E	46.8	0.5	47.3		1.07	
AAQ9	4.74	S	39.3	0.5	39.8		1.27	
AAQ10	2.03	N	39.8	0.5	40.3		1.26	

Table 4.2 Incremental and Resultant GLC of $PM_{2.5}$

Station ID	Distance to core area (km)	Direction	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			Comparison against air quality standard (60 $\mu g/m^3$)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.05	NE	21.1	5.5	26.6	Below Standard	26.07	Not Significant
AAQ2	0.23	E	21.6	1	22.6		4.63	
AAQ3	0.77	S	20.4	1	21.4		4.90	
AAQ4	1.28	SW	16.0	0.5	16.5		3.13	
AAQ5	4.28	W	18.0	0	18		0.00	
AAQ6	4.67	W	19.1	0	19.1		0.00	
AAQ7	4.34	SW	18.0	0	18		0.00	
AAQ8	4.09	E	25.3	0.5	25.8		1.98	
AAQ9	4.74	S	21.0	0.5	21.5		2.38	
AAQ10	2.03	N	21.2	0.5	21.7		2.36	

Table 4.3 Incremental & Resultant GLC of SO_2

Station ID	Distance to core area (km)	Direction	SO_2 Concentrations ($\mu g/m^3$)			Comparison against air quality standard (80 $\mu g/m^3$)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.05	NE	8.4	4.09	12.49	Below Standard	48.69	Not Significant
AAQ2	0.23	E	8.9	1	9.9		11.24	
AAQ3	0.77	S	9.5	0.5	10		5.26	
AAQ4	1.28	SW	7.4	0.1	7.5		1.35	
AAQ5	4.28	W	8.4	0	8.4		0.00	
AAQ6	4.67	W	10.0	0	10		0.00	
AAQ7	4.34	SW	7.7	0	7.7		0.00	
AAQ8	4.09	E	9.1	0.5	9.6		5.49	
AAQ9	4.74	S	9.2	0.5	9.7		5.43	
AAQ10	2.03	N	8.9	0.5	9.4		5.62	

Table 4.4 Incremental & Resultant GLC of NO_X

Station ID	Distance to core area (km)	Direction	NOx Concentrations ($\mu g/m^3$)			Comparison against air quality standard (80 $\mu g/m^3$)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.05	NE	16.3	5	21.3	Below Standard	30.67	Not Significant
AAQ2	0.23	E	16.9	1	17.9		5.92	
AAQ3	0.77	S	16.6	0.5	17.1		3.01	
AAQ4	1.28	SW	11.0	0.5	11.5		4.55	
AAQ5	4.28	W	17.0	0	17		0.00	
AAQ6	4.67	W	19.1	0	19.1		0.00	
AAQ7	4.34	SW	14.0	0	14		0.00	
AAQ8	4.09	E	26.6	0.5	27.1		1.88	
AAQ9	4.74	S	18.2	0.5	18.7		2.75	
AAQ10	2.03	N	16.0	0.5	16.5		3.13	

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

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- Rough stone and gravel will be properly covered with tarpaulin and transported during the day time.
- The speed of tippers plying on the haul road will be limited to below 20 km/hr to avoid generation of dust.
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of vehicles and other machines will be done to improve combustion process and reduce the emission of pollutants.
- The haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC (Pollution Under Control) certificate.

- ❖ Trees will be planted all along the main haul roads and haul roads will often be levelled to prevent the generation of dust due to movement of tippers.
- ❖ Green belt of adequate width will be developed around the project areas.
- ❖ Dust masks will be provided to the workers and their use will be strictly monitored.
- ❖ Annual medical check-ups, trainings and campaigns will be arranged to create awareness about the importance of wearing dust masks among all mine workers and tipper drivers.
- ❖ Ambient air quality monitoring will be conducted six months once to assess the effectiveness of mitigation measures proposed for the projects.

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 (NTC, Rani)	100	41.7	39.36	43.70
New star blue metals lease	240	40.3	31.76	40.87
Amaravathi lease	800	40.0	21.30	40.06
Kuppam	1560	35.4	15.50	35.44
Puthurpatti	1140	32.6	18.22	32.76
Andisangilipalayam	1320	36.2	16.95	36.25
Velampalayam	4310	40.3	6.67	40.30
Athipalayam	4620	40.8	6.07	40.80
Munnur	4210	40.8	6.87	40.80
Punna chatram	4090	42.2	7.13	42.20
Karudayampalayam	4820	41.2	5.70	41.20
Kunthanipalayam	2100	41.7	12.92	41.71
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.

The peak particle velocity produced by the charge of 72 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 0.9 mm/s
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 BIOLOGICAL ENVIRONMENT

Anticipated Impact

- ❖ None of the plants will be cut during operational phase of the projects.
- ❖ There shall be negligible air emissions or effluents from the project sites. Dust generation during loading will be a temporary effect and is not anticipated to affect the surrounding vegetation significantly.
- ❖ Most of the land in the buffer area consists of crop lands, grass patches and small shrubs. Hence, there will be no effect on the flora.
- ❖ Wildlife except few domestic animals, reptiles, hares and some common birds is not found in the cluster and its immediate surrounds because of lack of vegetal cover and surface water.

Mitigation Measures

The proposed projects will develop the green belt within the lease area, along roads and other vacant areas to provide a barrier between the source of pollution and the surrounding areas. Although the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality by plantation. During green belt development, about 420 saplings will be planted by the project proponent both inside and outside the lease area in about three months. For this program, Rs.109200 will be invested as capital and Rs. 12600 excluding 5% inflation will be spent annually for green belt maintenance.

4.7 SOCIO ECONOMIC ENVIRONMENT

Anticipated Impact

- ❖ The project will generate employment for about 16 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 & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in m BGL
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Peak particle velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and chemical characteristics
8	Greenbelt	Within the project area	Daily	Monthly	Maintenance

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

6.2 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 treat 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 projects will allocate Rs. 20,00,000/- towards CER as recommended by SEAC.
- The Four proposed projects will directly provide jobs to 76 local people, in addition to indirect jobs.
- The Four proposed projects will plant about 3312 trees in and around the lease area.
- The Four proposed projects will add 663 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 16 local people and indirect employment for 10 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 Kuppam Village. CSR budget is allocated as 2.5% of the profit.
- Rs. 5,00,000 will be allocated for CER.

CHAPTER IX

ENVIRONMENT MANAGEMENT PLAN

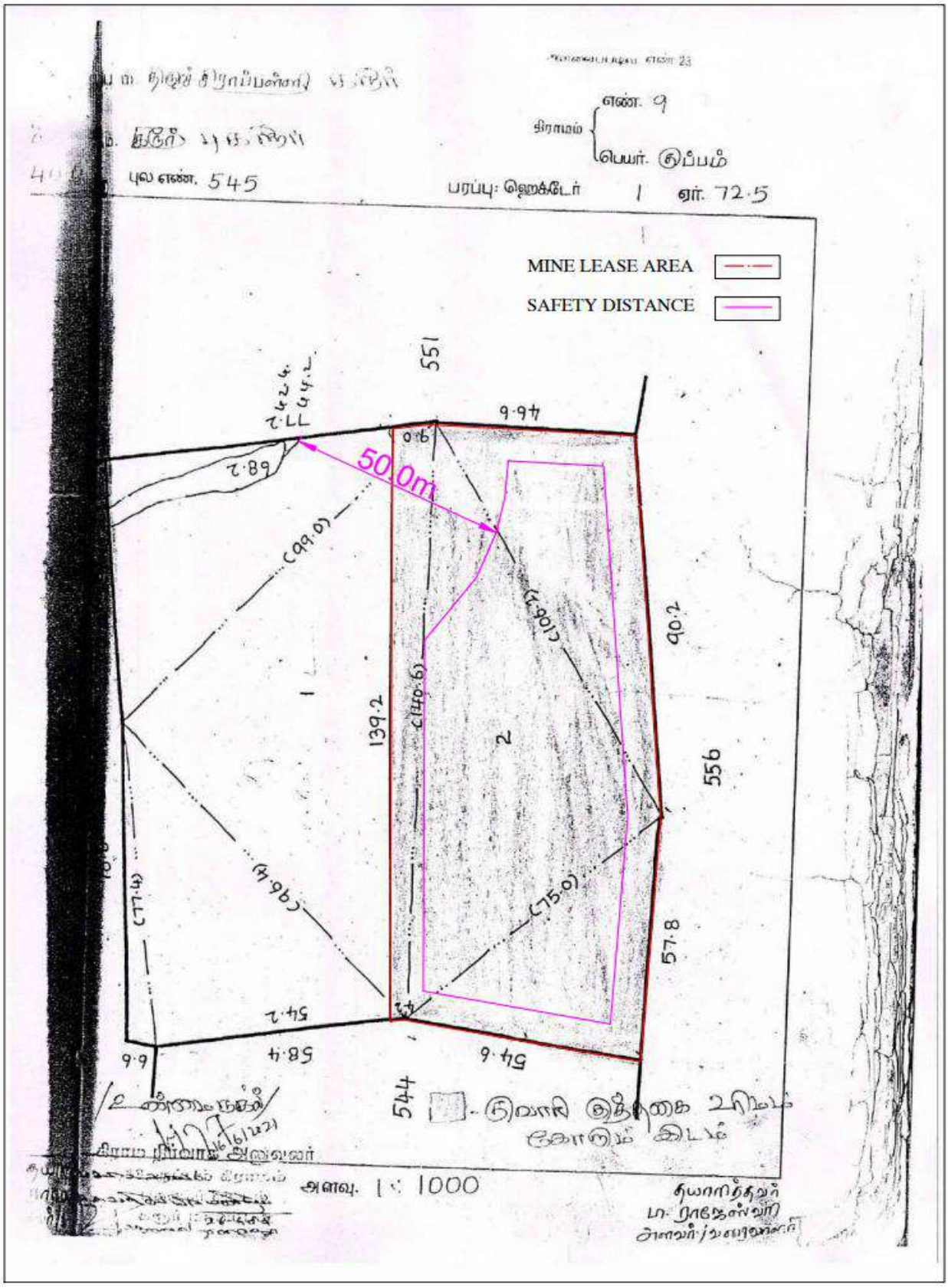
In order to implement the environmental protection measures, an amount of Rs. 14,85,000 as capital cost and recurring cost as Rs. 10,58,110 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be Rs. 73,31,726.

CHAPTER X
CONCLUSION

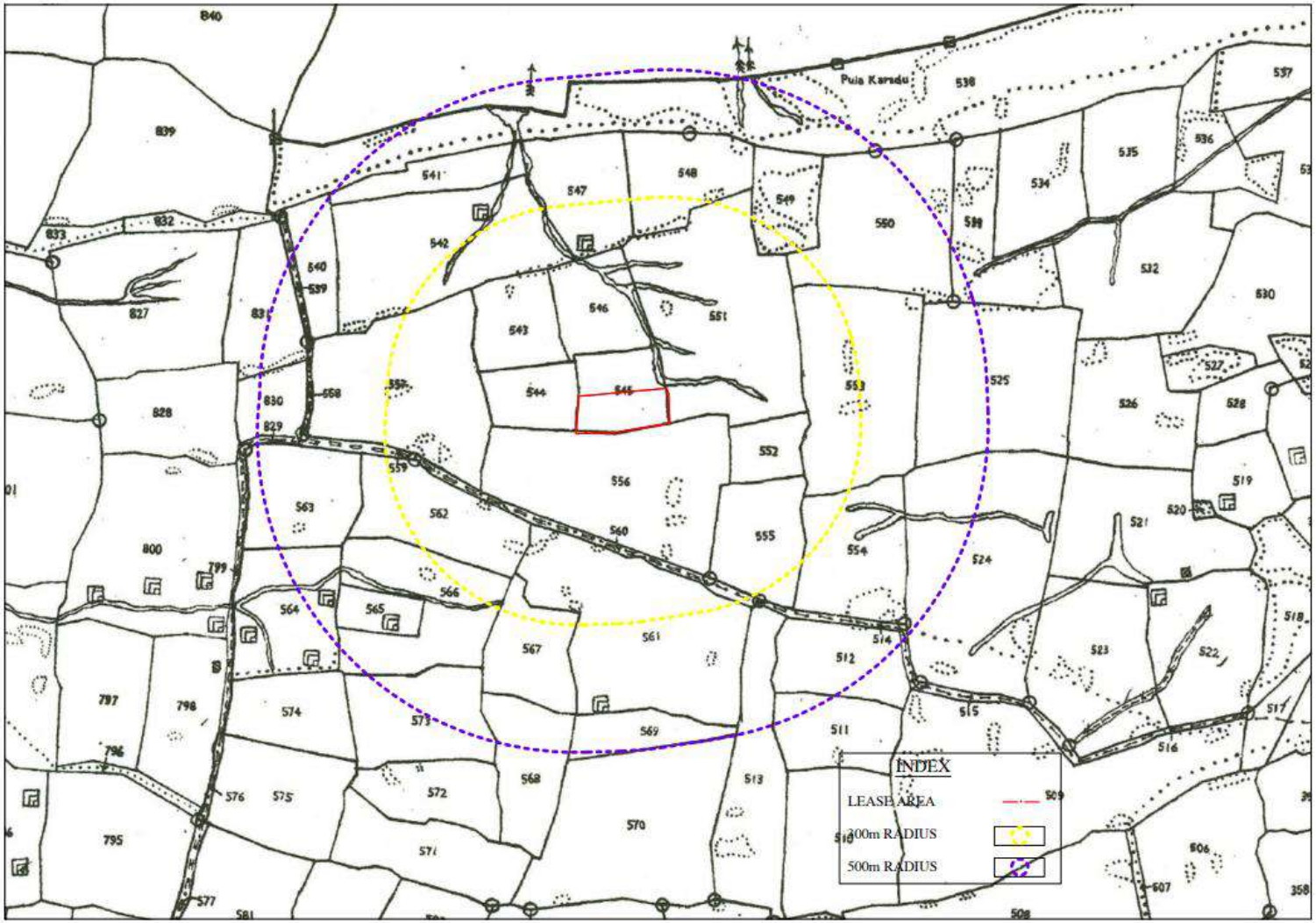
Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental issues, environmental management plan (EMP) was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic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

LAND DOCUMENTS

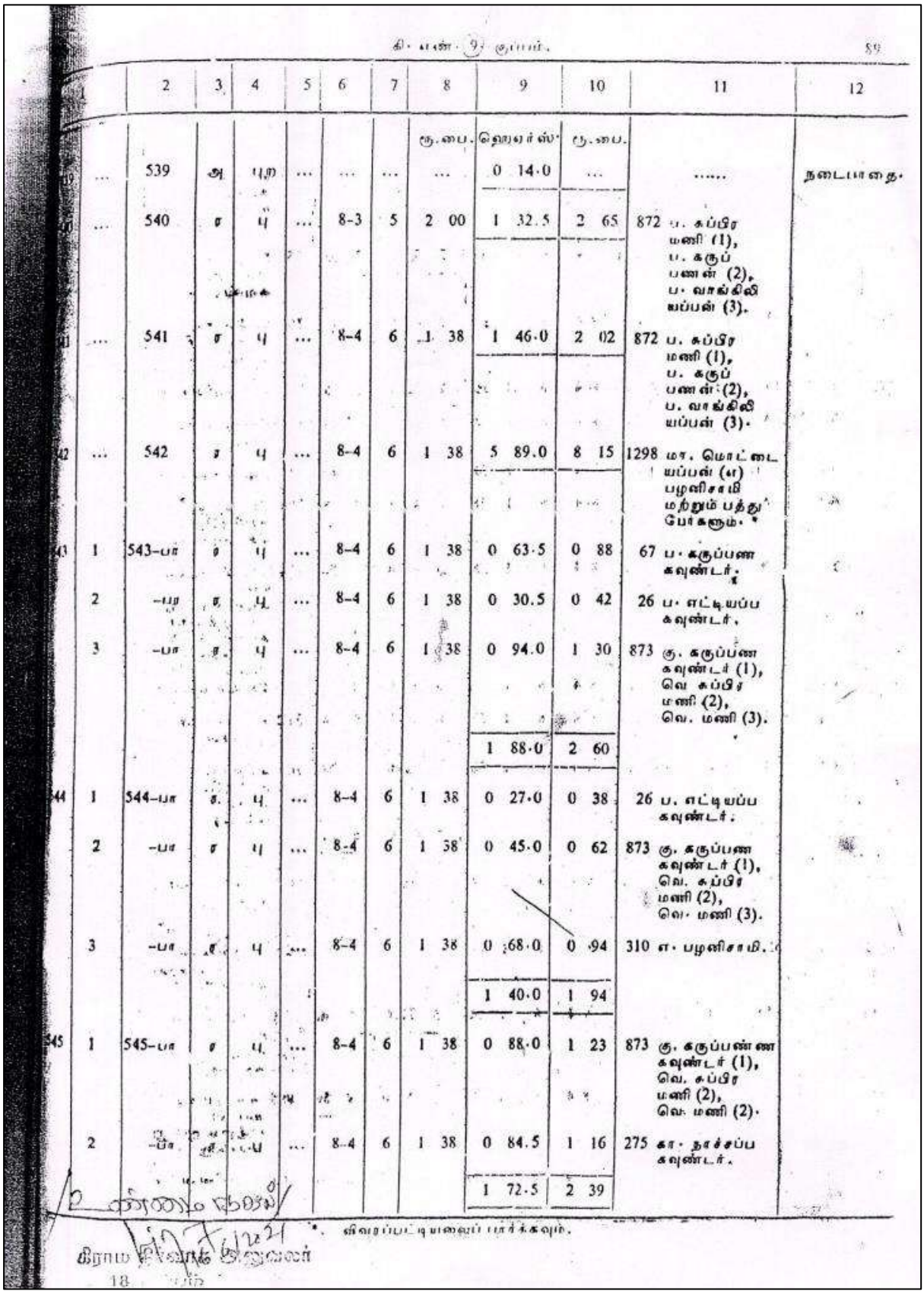
Some of the important land related documents are shown in below.



An FMP sketch showing proposed lease area in red colour



Village map showing proposed lease area in red colour



1	2	3	4	5	6	7	8	9	10	11	12
							ரூ.பை.	ஹெக்டர் ஸ்	ரூ.பை.		
39	...	539	அ	புற	...	...	...	... 0 14·0	...	.....	நடைபாதை.
40	...	540	ர	பு	...	8-3	5	2 00	1 32.5	2 65	872 ப. கப்பிர மணி (1), ப. கருப் பணன் (2), ப. வாக்கிலி யப்பன் (3).
41	...	541	ர	பு	...	8-4	6	1 38	1 46·0	2 02	872 ப. கப்பிர மணி (1), ப. கருப் பணன் (2), ப. வாக்கிலி யப்பன் (3).
42	...	542	ர	பு	...	8-4	6	1 38	5 89.0	8 15	1298 மா. மொட்டை யப்பன் (எ) பழனிசாமி மற்றும் பத்து போகளும்.
43	1	543-பா	ர	பு	...	8-4	6	1 38	0 63·5	0 88	67 ப. கருப்பண கவுண்டர்.
	2	-பா	ர	பு	...	8-4	6	1 38	0 30.5	0 42	26 ப. எட்டியப்ப கவுண்டர்.
	3	-பா	ர	பு	...	8-4	6	1 38	0 94.0	1 30	873 கு. கருப்பண கவுண்டர் (1), வெ. கப்பிர மணி (2), வெ. மணி (3).
									1 88·0	2 60	
44	1	544-பா	ர	பு	...	8-4	6	1 38	0 27·0	0 38	26 ப. எட்டியப்ப கவுண்டர்.
	2	-பா	ர	பு	...	8-4	6	1 38	0 45·0	0 62	873 கு. கருப்பண கவுண்டர் (1), வெ. கப்பிர மணி (2), வெ. மணி (3).
	3	-பா	ர	பு	...	8-4	6	1 38	0 68·0	0 94	310 எ. பழனிசாமி.
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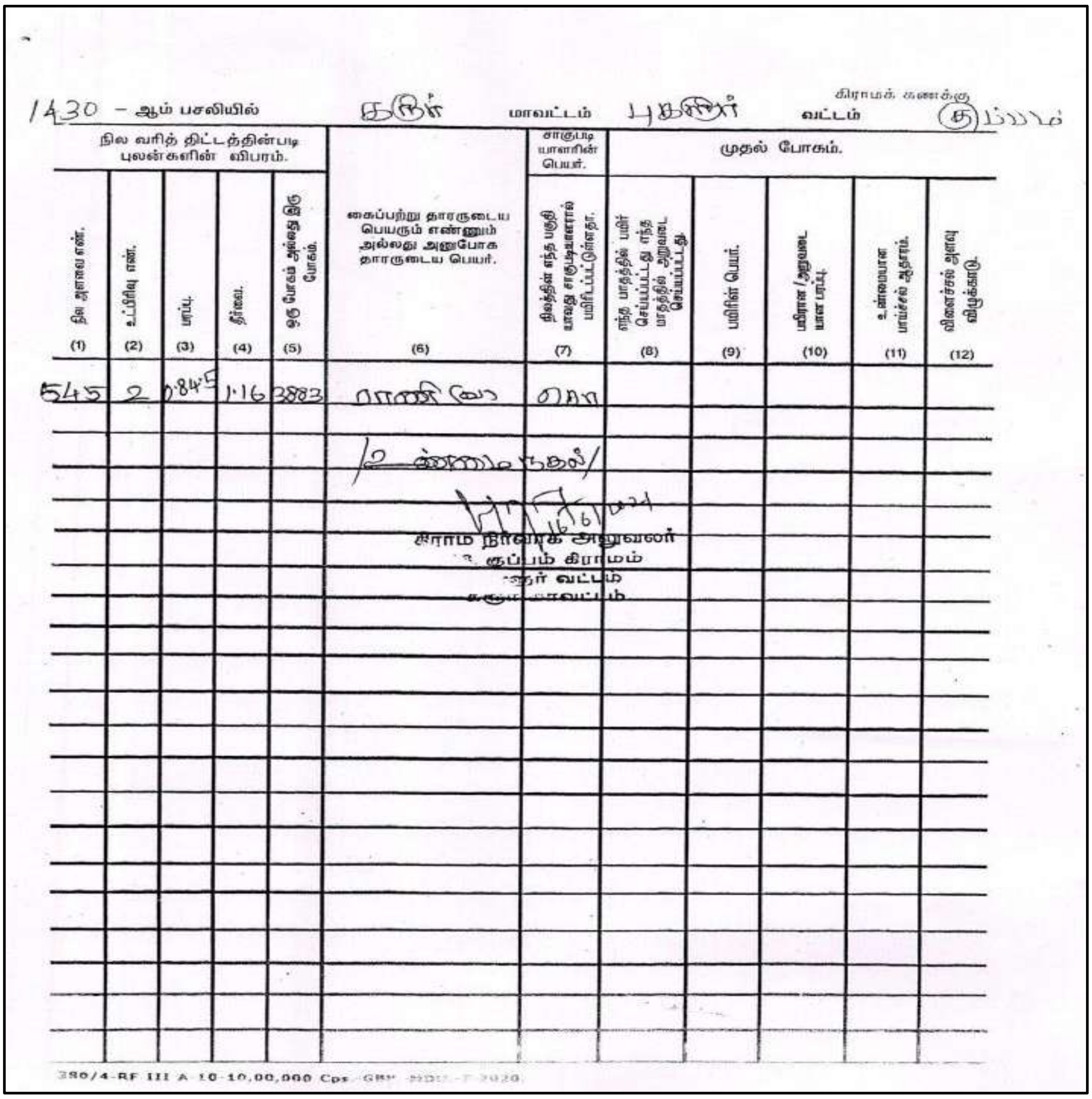
	2	-பா	ர	பு	...	8-4	6	1 38	0 84.5	1 16	275 கா. நாச்சப்ப கவுண்டர்.
									1 72·5	2 39	

* விவரப்பட்டியலைப் பார்க்கவும்.

கிராம நிர்வாக அலுவலர்

18

A Register Document



1430 – ஆம் பசலியில் [illegible] மாவட்டம் [illegible] வட்டம் கிராமக் கணக்கு [illegible]

நில வரித் திட்டத்தின்படி புலன்களின் விபரம்.						சாகுபடியாளரின் பெயர்.	முதல் போகம்.				
நில அளவை எண்.	உட்பிரிவு எண்.	பரப்பு.	தீர்வை.	ஒரு போகம் அல்லது இரு போகம்.	கைப்பற்று தாரருடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரருடைய பெயர்.	நிலத்தின் எந்த பகுதியாவது சாகுபடியாளரால் பயிரிடப்பட்டுள்ளதா.	எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	பயிரின் பெயர்.	பயிரான / அறுவடையான பரப்பு.	உண்மையான பாய்ச்சல் ஆதாரம்.	விளைச்சல் அளவு விழுக்காடு.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
545	2	0.845	1.16	3883	[illegible]	[illegible]					

கிராம நிர்வாக அலுவலர்
[illegible] கிராமம்
[illegible] வட்டம்
[illegible] மாவட்டம்

380/4-RF III A 10-10,00,000 Cps. [illegible] 2020.

Adangal Document