EXECUTIVE SUMMARY OF EIA DRAFT

FOR

KUPPAM ROUGH STONE AND GRAVEL QUARRY

Environmental Clearance under EIA Notification – 2006

"B1" CATEGORY – MINOR MINERAL – CLUSTER – NONFOREST LAND

CLUSTER EXTENT = 16.03.00 hectares

At

Kuppam Village, Pugalur Taluk, Karur District, TamilNadu.

ToR issued vide Lr. No. SEIAA-TN/F.No.9422/ToR-1284/2022 dated 08.10.2022

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F. No.
Thiru K. Nallasamy, **S/o. Krishnan** **Door No. 4/71, R.G.Nagar,** **VTC Punnam Post, Punnamchatram,** **Pugalur Taluk. Karur District.**	**2.89.0 hectares** **&** **226/1 (Part)**

Environmental Consultant	Environment Lab
GEO TECHNICAL MINING SOLUTIONS No: 1/213-B, Ground Floor, Natesan Complex Oddapatti, Collectorate Post office, Dharmapuri-636705. TamilNadu. Mob. : +91 9443937841, +917010076633, E-mail: info.gtmsdpi@gmail.com, Website: www.gtmsind.com **NABET ACC. NO: NABET/EIA/2023/IA0067** **Valid till : 29th Dec.2023**	**EKDANT ENVIRO SERVICES (P) LIMITED** **NABL Accredited & Recognised Laboratory** **No.R7/1, AVK Tower, North Main Road, Anna Nagar, West Exten.Chennai-600 101**

Baseline Monitoring Period October 2021 to December 2021

CHAPTER I
INTRODUCTION

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound projects.

As the proposed rough stone mining project, known as P1 falls within the 500m radius cluster of quarries with the total extent of >5 hectares, it is classified under category "B1" and requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The cluster with the extent of 16.03.00 ha. The cluster contains Six proposed projects, known as P1, P2, P3, P4, P5 and P6 one existing project known as E1 and one expired project, known as EX1. The cluster area was calculated as per MoEF & CC Notification S.O. 2269(E) dated 1st July 2016. This EIA report has been prepared by considering the cumulative load of Six proposed quarries in a cluster in Kuppam Village, Pugalur Taluk, Karur District, and Tamil Nadu State.

This EIA draft discusses the cumulative impacts of Karur 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 a cluster with the total extent of 16.03.00 ha in Kuppam Village, Pugalur Taluk, Karur District and Tamil Nadu State. It has been prepared in compliance with ToR issued letter No. SEIAA-TN/F.No.9422/SEAC/ToR-1284/2022 dated 08.10.2022. The proposed project by conducting the baseline monitoring study during the period of October to December 2021

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	**Thiru K. Nallasamy**
Address	S/o. Krishnan Door No. 4/71, R.G.Nagar, VTC Punnam Post, Punnamchatram, Pugalur Taluk. Karur District.
Status	Proprietor

Table 1.2 List of Quarries within 500m Radius

Proposed Quarries					
ID	**Name of the Owner**	**Name of the Village, and Taluk, & S.F. Nos.**	**Extent in (ha)**	**Status**	**Remarks**
P1.	**K. Nallasamy** S/o. Krishnan Door No. 4/71, R.G.Nagar, Punnam Post, Punnamchatram, Pugalur Taluk. Karur District.	Kuppam Village, 226/1(part)	2.89.0	-	Applied area
P2	**Tvl.NTCBlue Metals LLP,** Prop.of.Mr.S.Muthusamy, Rasampalayam, Keelsathambur, Namakkal District - 637 207	Kuppam Village, 76/ l(P)	0.63.00	-	Applied Area
P3	**S. Sadhasivam** S/o. K. Subramaniyam Door No.4./188, Velliampalayam, Punnam chatram post, Pugalur Taluk,Karur district-639136.	Kuppam Village, 211/1&211/2	1.54.00	-	Applied Area
P4	**V. Kavitha** W/o. Mr.P. Vadivel, No.8/42, Npchi Kattur, Kuppam Pugalur Taluk, Karur District.	Kuppam Village, 75/1A,75/1B&75/2	1.88.00	-	Applied Area
P5	**Mr.K. Shanmugam** S/o Karumanagounder Opp to V.S.T. petrol bunk Punnamchathiram, pugalur taluk, Karur district -639136	Kuppam Village, 76/2	0.73.50		Applied Area

P6	**TVL. NTC blue metals LLP** Mr.S.Muthusamy Rasampalayam, Keelasathambur village,Namakkal district-637207	Kuppam Village, 362/2 (part)	2.19.00		Applied Area
		Total	**9.86.50**		
Existing Quarries					
ID	**Name of the Owner**	**Name of the Village, & S.F. Nos.**	**Extent (ha)**	**Lease Period**	
E1	**Tvl. Sri Venkatachalapathy Blue Metals** Pudurpatti, Kuppam (Po) Aravakurichi Taluk Karur District - 639 11	Kuppam Village, 213/1, 214/2A, 2B, 2C, 220/3 (P),221 (P),	4.05.0	23.06.2017 To 22.06.2022	-
		Total	**4.05.0**		
Expired Quarry					
ID	**Name of the Owner**	**Name of the Village, and Taluk, & S.F. Nos.**	**Extent (ha)**	**Lease Period**	
EX1	**Thiru.P. Marappan** S/o palaniyappan, Andipatti kuppam village, Aravakurichi taluk, Karur district.	Kuppam Village, 74&75/3B	2.11.5	14.10.2016 To 13.10.2021	Lease Expired
Total			**2.11.5**		
Cluster Extent			**16.03.0**		

Source:

i. *DD Letter-Rc.No.407/Mines/2021, Dated:20.07.2022*
ii. *DD Letter-Rc.No.619/Mines/2020, Dated:22.06.2021*
iii. *DD Letter-Rc.No.387/Mines/2021, Dated:28.09.2022*
iv. *DD Letter-Rc.No.311/Mines/2021, Dated:16.09.202*
v. *DD Letter-Rc.No.100/Mines/2021, Dated:22.06.2021*

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

CHAPTER II
PROJECT DESCRIPTION

2.0 INTRODUCTION

The quarrying operation is proposed to be carried out by opencast Manual mining method with the bench height and width of 5 m each. The open cast mining manual method mining operation using tractor mounted compressor attached with shovel picas jack hammers is proposed to drilling rough stone and gravel will be loaded manually to the trucks for dispatch to needed to the customers. Details about the proposed projects have been given in Table 2.1.

Table 2.1 Brief Description of the Project

Name of the Quarry	**K. Nallasamy Rough stone and Gravel Quarry**	
Type of Land	Patta land	
Extent	2.89.0 ha	
S.F. No.	226/1(part)	
Toposheet No.	58-E/16 & 58-F/13	
Latitude	10°59'56.71"N to 11°00’04'19"N	
Longitude	77°57'25.46"E to 77°57'32.25"E	
Ultimate Depth of Mining	12 m BGL	
Existing Pit Dimension	Pit 1: 50 m(L) X 19 m(W) X 1 m(D) Pit 2: 48 m(L) X 25 m(W) X 3 m(D) Pit 3: 112 m(L) X 90 m(W) X 9 m(D)	
Geological Resources	Rough stone (m^3)	Gravel(m^3)
	217506	3870
Mineable Reserves	41392	292
Proposed production for 5 years	41392	292
Total No. of Lorry Loads	5 loads of rough stone/day	
Method of Mining	Open cast manual method	
Topography	Undulated	
Machinery proposed	Hand Jack hammer	2
	Compressor	1
	Shovel	10
	Picas	10
Blasting Method	Quarrying operation will be carried out tractor mounted compressor attached with Jack hammers is proposed to drilling and without any blasting the rocks.	
Proposed Manpower Deployment	15 persons	
Project Cost	Rs. 56,65,000	

2.1 LOCATION OF THE PROJECT

The proposed quarry project is located in Kuppam Village, Pugalur Taluk and Karur District, the area lies between Latitudes from $10^0$59’56.71’’N to $11^0$00’04.19’’N and Longitudes from $77^0$57’25.56’’E to $77^0$57’32.25’E. The maximum altitude of the project area is 162 m AMSL. Boundary coordinates of corner pillars of the project site and accessibility details to the location of the project site have been given in Tables 2.2 and 2.3, respectively. The lease area of the project site has been overlaid on Google earth image (Figure 2.1) and the overall view of the project site has been shown in Figure 2.2.

Table 2.2 Corner Geographic Coordinates of Proposed Project

Pillar ID	Latitude	Longitude
1	11° 0'4.19"N	77°57'26.98"E
2	11° 0'3.18"N	77°57'30.97"E
3	11° 0'1.41"N	77°57'30.51"E
4	11° 0'0.79"N	77°57'32.25"E
5	10°59'56.71"N	77°57'30.94"E
6	10°59'57.13"N	77°57'29.56"E
7	10°59'57.94"N	77°57'27.99"E
8	10°59'58.77"N	77°57’26.81’’E
9	10°59'59.28"N	77°57'25.46"E

Table 2.3 Site Connectivity to the Project Area

Nearest Roadways	Karur - Vellakoil Road (NH-81)	4.7km South
	Karur - Kodumudi Road (SH-84)	2.22 km NE
Nearest Town	K.Paramathi	6.90 km SW
Nearest Railway Station	Pugalur	6.6 km NE
Nearest Airport	Tiruchirappalli	86.0 km SE
Nearest Seaport	Tuticorin	249km South

2.3 OPERATIONAL DETAILS FOR PROPOSED PROJECT

Operational details of the project including yearly and daily production, and mine closure have been extracted from mining plans shown in Figure 2.3 and 2.4 and given in Table 2.4. Mine closure budget required for the closure of this project have been provided in Table 2.7.

Table 2.4 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m^3	Gravel in m^3
Geological Resource in m^3	2,17,506	3,870
Mineable Reserves in m^3	41,392	292

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.5.

Table 2.5 Year-Wise Production Details

Year	Rough Stone (m^3)	Gravel m^3
I	8274	292
II	9846	-
III	8280	-
IV	7936	-
V	7056	-
Total	**41392**	**292**

Source: Approved Mining Plan

2.3 LAND USE PATTERN

Land use and land cover information for the proposed project site has been given in Table 2.6.

Table 2.6 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	1.21.10	1.81.60
Infrastructure	Nil	0.03.00
Roads	0.03.0	0.08.00
Drainage, Settling tank	Nil	0.07.50
Green Belt	Nil	0.37.50
Unutilized area	1.61.9	0.51.40
Total	**2.89.0**	**2.89.0**

Source: Approved mining plan

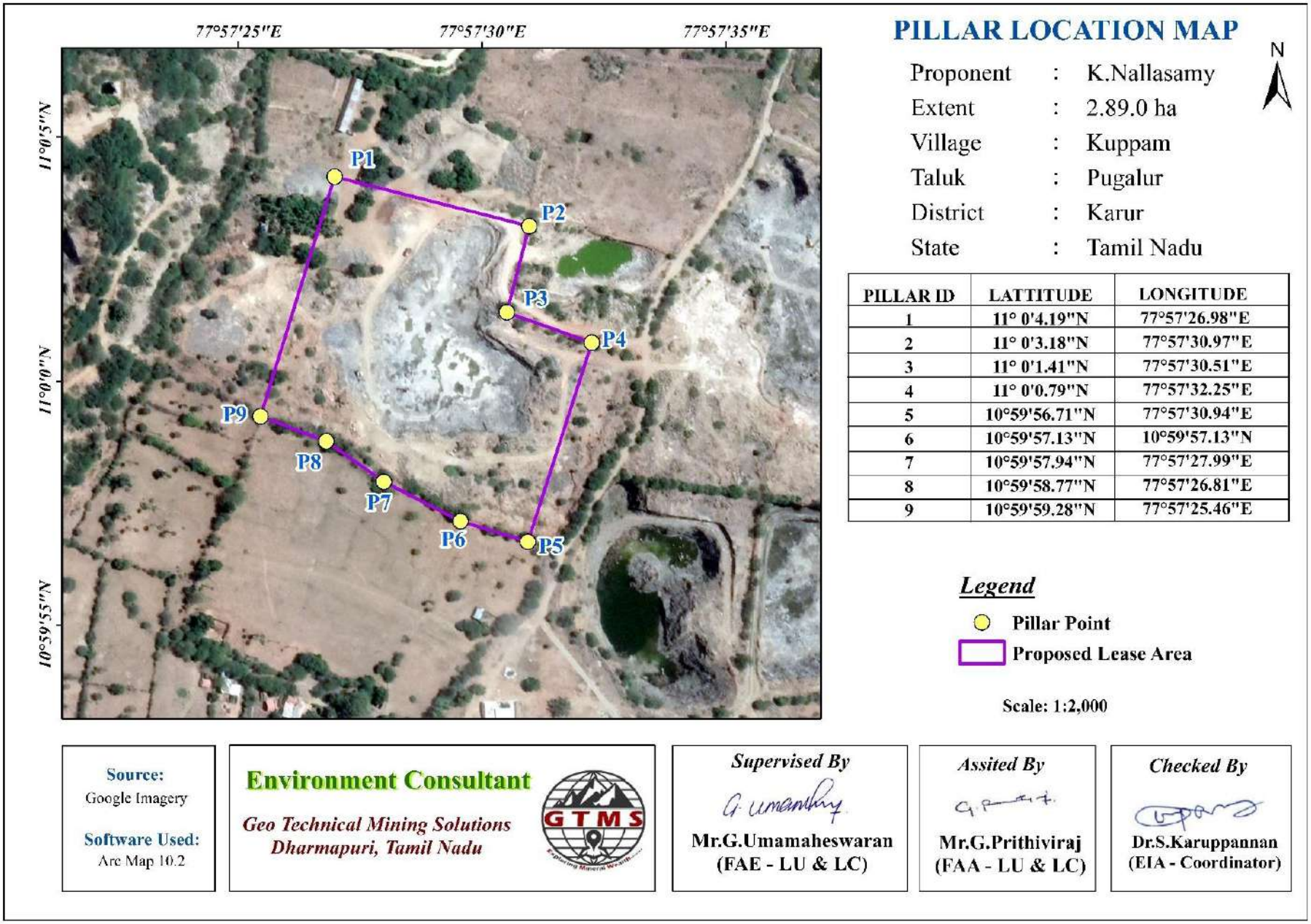
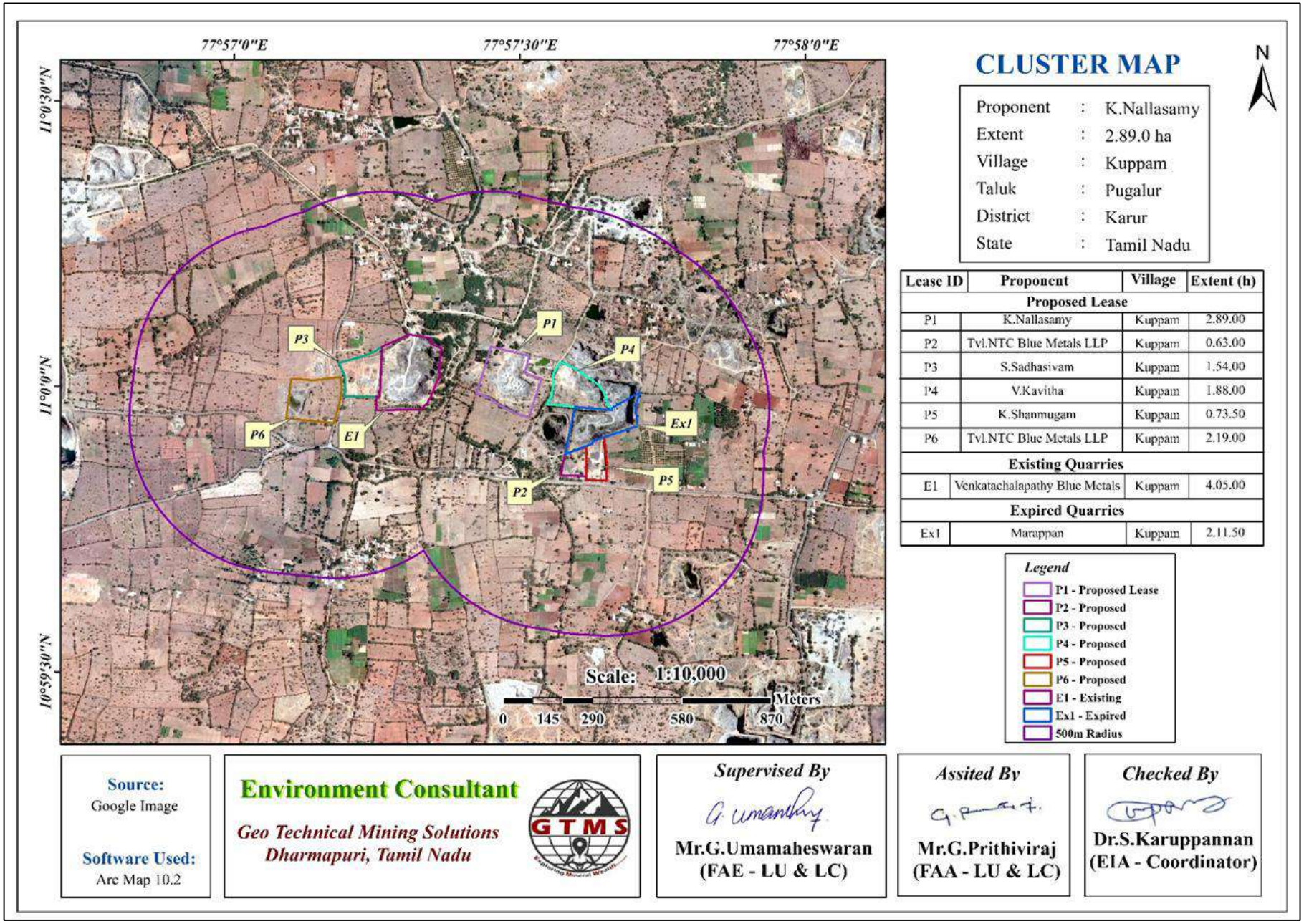


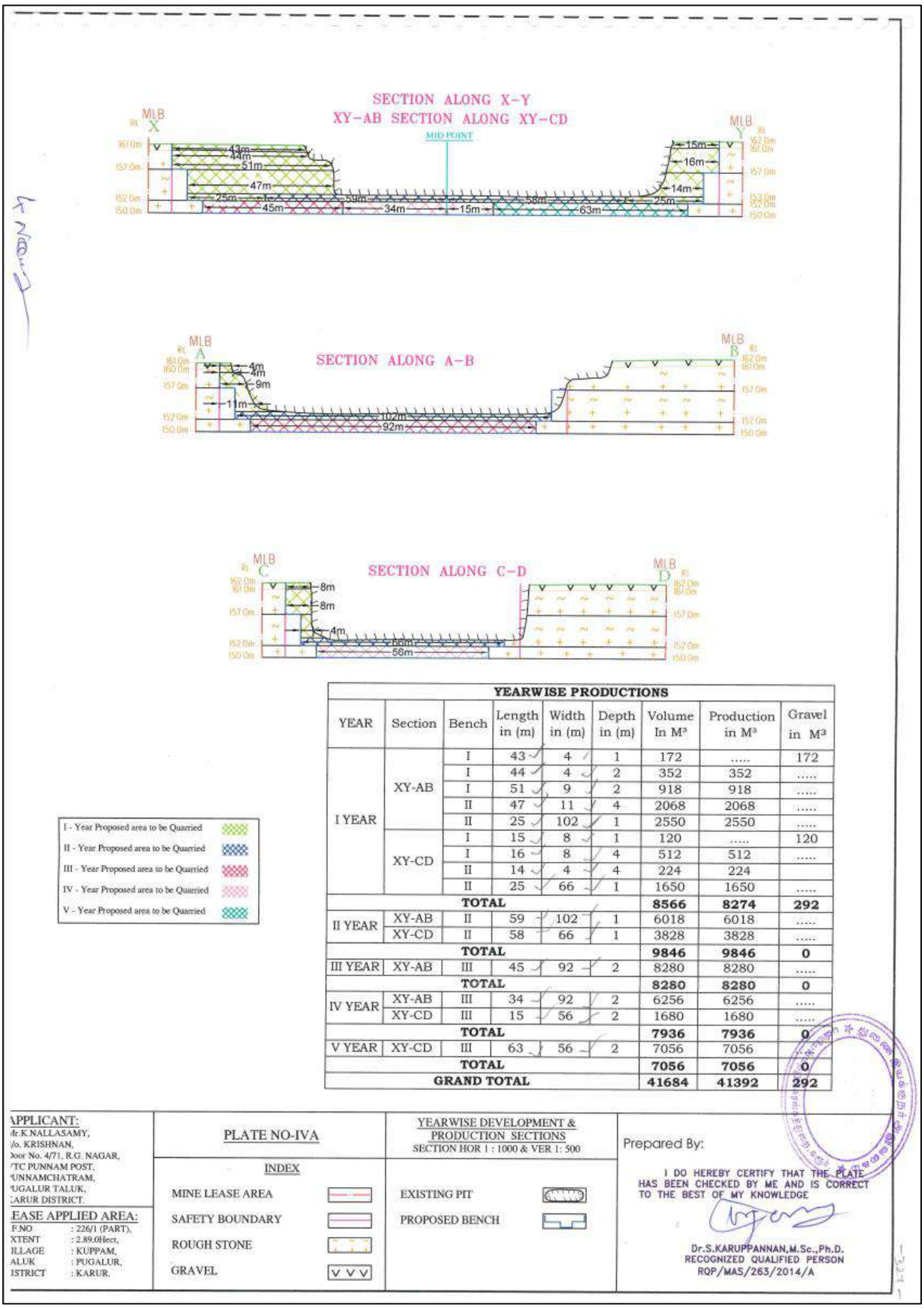
Figure 2.1 Google Earth Image Showing Lease Area with Pillars



Lease ID	Proponent	Village	Extent (h)
Proposed Lease			
P1	K.Nallasamy	Kuppam	2.89.00
P2	Tvl.NTC Blue Metals LLP	Kuppam	0.63.00
P3	S.Sadhasivam	Kuppam	1.54.00
P4	V.Kavitha	Kuppam	1.88.00
P5	K.Shanmugam	Kuppam	0.73.50
P6	Tvl.NTC Blue Metals LLP	Kuppam	2.19.00
Existing Quarries			
E1	Venkatachalapathy Blue Metals	Kuppam	4.05.00
Expired Quarries			
Ex1	Marappan	Kuppam	2.11.50

Figure 2.2 Google Earth Image Showing 500m Radius Limits and the Proposed Project and Existing Quarries

Figure 2.3 Year-Wise Development Production plan



YEARWISE PRODUCTIONS

YEAR	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M³	Production in M³	Gravel in M³
I YEAR	XY-AB	I	43	4	1	172	.....	172
		I	44	4	2	352	352	.....
		I	51	9	2	918	918	.....
		II	47	11	4	2068	2068	.....
		II	25	102	1	2550	2550	.....
	XY-CD	I	15	8	1	120	.....	120
		I	16	8	4	512	512	.....
		II	14	4	4	224	224	
		II	25	66	1	1650	1650	.....
TOTAL						**8566**	**8274**	**292**
II YEAR	XY-AB	II	59	102	1	6018	6018	.....
	XY-CD	II	58	66	1	3828	3828	.....
TOTAL						**9846**	**9846**	**0**
III YEAR	XY-AB	III	45	92	2	8280	8280	.....
TOTAL						**8280**	**8280**	**0**
IV YEAR	XY-AB	III	34	92	2	6256	6256	.....
	XY-CD	III	15	56	2	1680	1680	.....
TOTAL						**7936**	**7936**	**0**
V YEAR	XY-CD	III	63	56	2	7056	7056	
TOTAL						**7056**	**7056**	**0**
GRAND TOTAL						**41684**	**41392**	**292**

Figure 2.4 Year-Wise Development & Production Sections

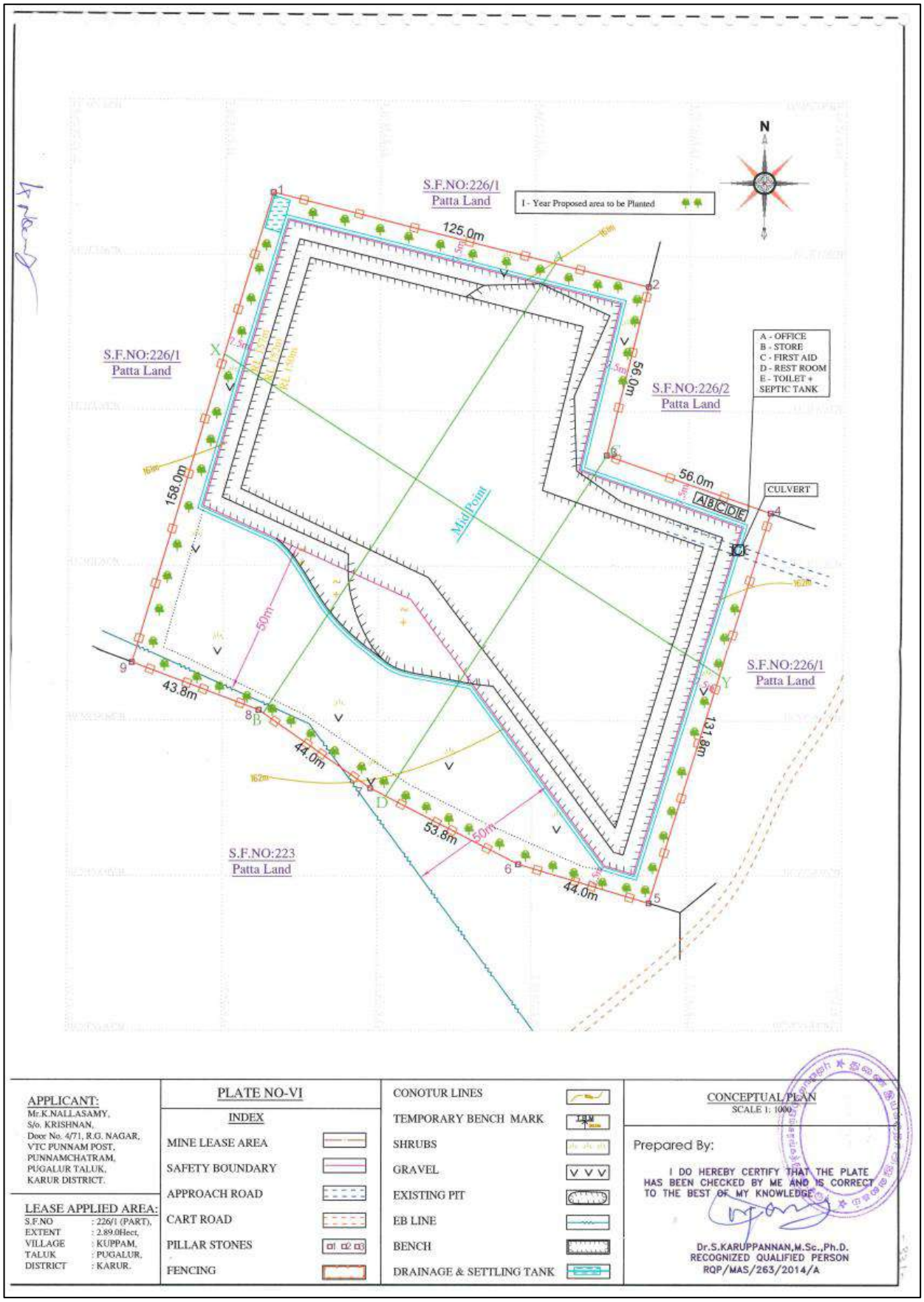
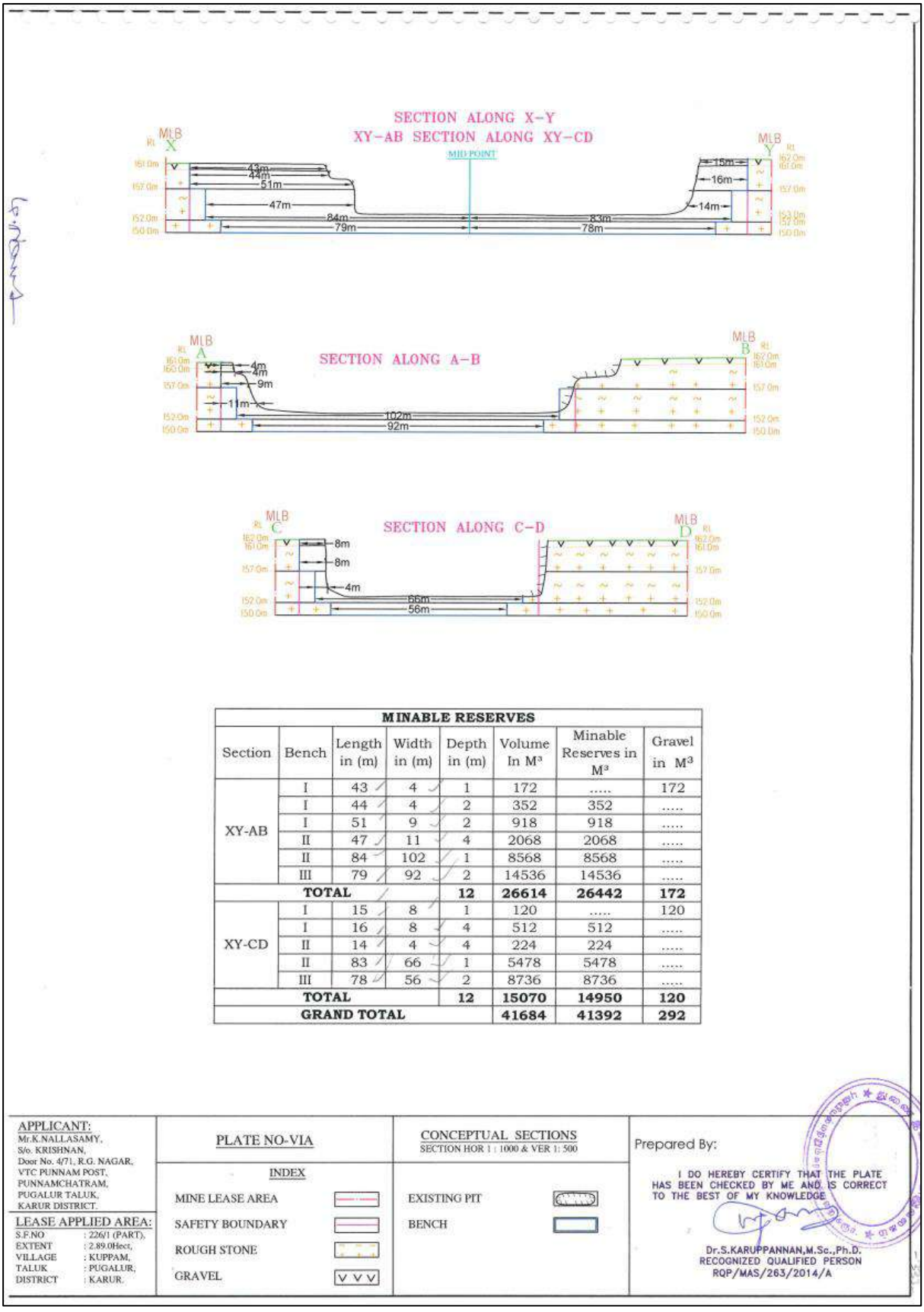


Figure 2.5 Conceptual Plan



MINABLE RESERVES

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M³	Minable Reserves in M³	Gravel in M³
XY-AB	I	43	4	1	172	.....	172
	I	44	4	2	352	352	.....
	I	51	9	2	918	918	.....
	II	47	11	4	2068	2068	.....
	II	84	102	1	8568	8568	.....
	III	79	92	2	14536	14536	.....
TOTAL				**12**	**26614**	**26442**	**172**
XY-CD	I	15	8	1	120	.....	120
	I	16	8	4	512	512	.....
	II	14	4	4	224	224	.....
	II	83	66	1	5478	5478	.....
	III	78	56	2	8736	8736	.....
TOTAL				**12**	**15070**	**14950**	**120**
GRAND TOTAL					**41684**	**41392**	**292**

APPLICANT:
Mr.K.NALLASAMY,
S/o. KRISHNAN,
Door No. 4/71, R.G. NAGAR,
VTC PUNNAM POST,
PUNNAMCHATRAM,
PUGALUR TALUK,
KARUR DISTRICT.

LEASE APPLIED AREA:
S.F.NO : 226/1 (PART),
EXTENT : 2.89.0Hect,
VILLAGE : KUPPAM,
TALUK : PUGALUR,
DISTRICT : KARUR.

PLATE NO-VIA

INDEX
MINE LEASE AREA
SAFETY BOUNDARY
ROUGH STONE
GRAVEL

CONCEPTUAL SECTIONS
SECTION HOR 1 : 1000 & VER 1: 500

EXISTING PIT
BENCH

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

Figure 2.6 Conceptual Sections

Table 2.7 Mine Closure Budget

Activity	Capital Cost	Recurring Cost/Annum
578 plants inside the lease area	115600	17340
867 plants outside the lease area	260100	26010
Wire Fencing	578000	28900
Renovation of Garland Drain	28900	28900
Total	**982600**	**101150**

2.4 METHOD OF MINING

The quarrying operation is proposed to be carried out by opencast Manual mining method with the bench height and width of 5 m each. The open cast mining manual method mining operation using tractor mounted compressor attached with shovel picas jack hammers is proposed to drilling rough stone and gravel will be loaded manually to the trucks for dispatch to needed to the customers. Machineries proposed for this project have been given in Table 2.8.

2.5 PROPOSED MACHINERY DEPLOYMENT

Table 2.8 Proposed Machinery Deployments

S. No.	Type	No Unit	Día of Hole (mm)	Size/Capacity	Make	Motive Power	H. P
1	Hand Jack Hammer	2	32mm	Hand held	-	Diesel	60
2	Compressor	1		400 psi	Atlas Copco	Diesel Drive	42
3	Shovel	10		-	-	-	
4	Picas	10		-	-	-	

Source: Approved Mining Plan

2.5 CONCEPTUAL MINING PLAN/ FINAL 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.

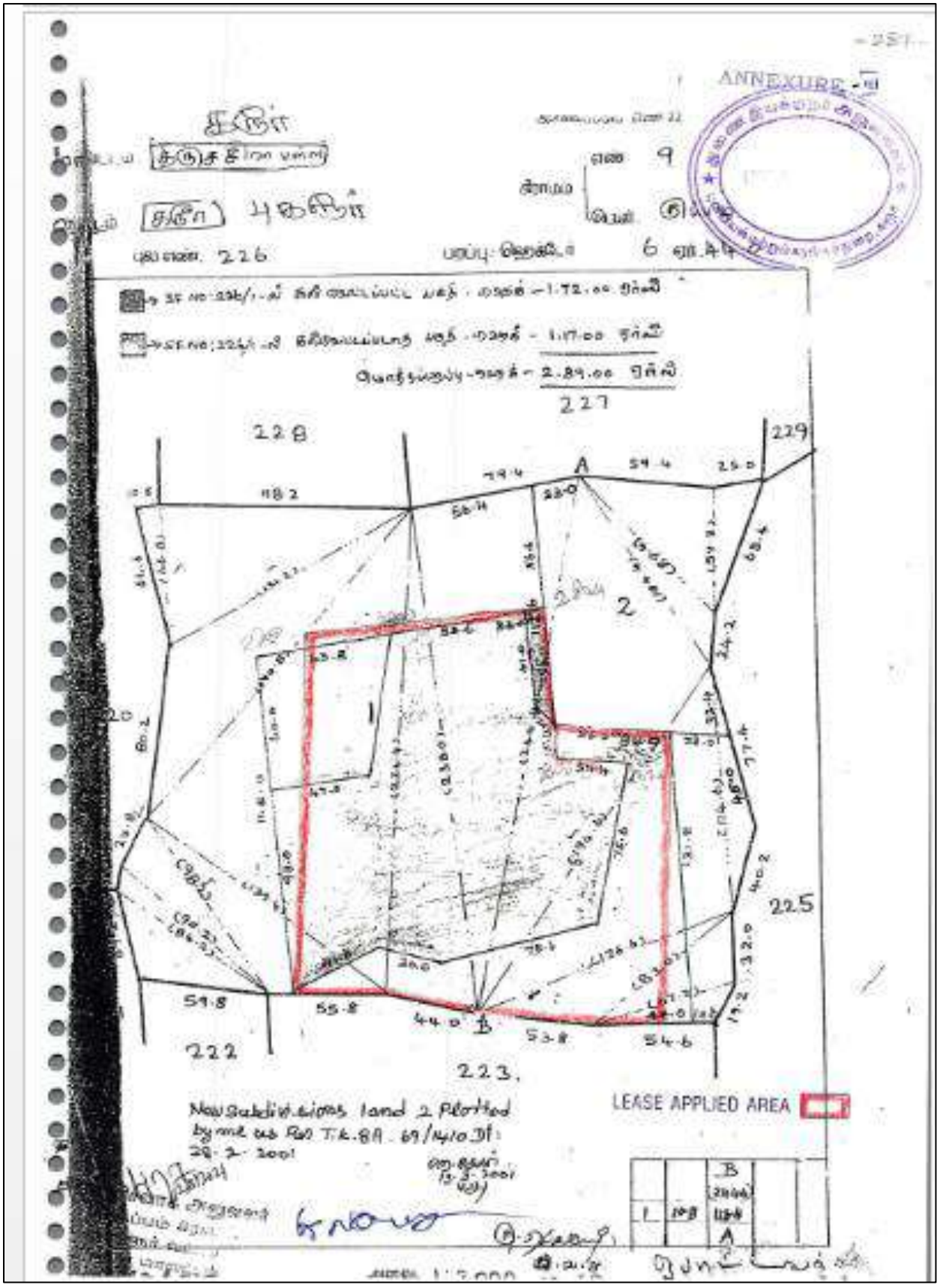


Figure 2.7 An Fmp Sketch Showing Proposed Project Lease Area in Red Colour

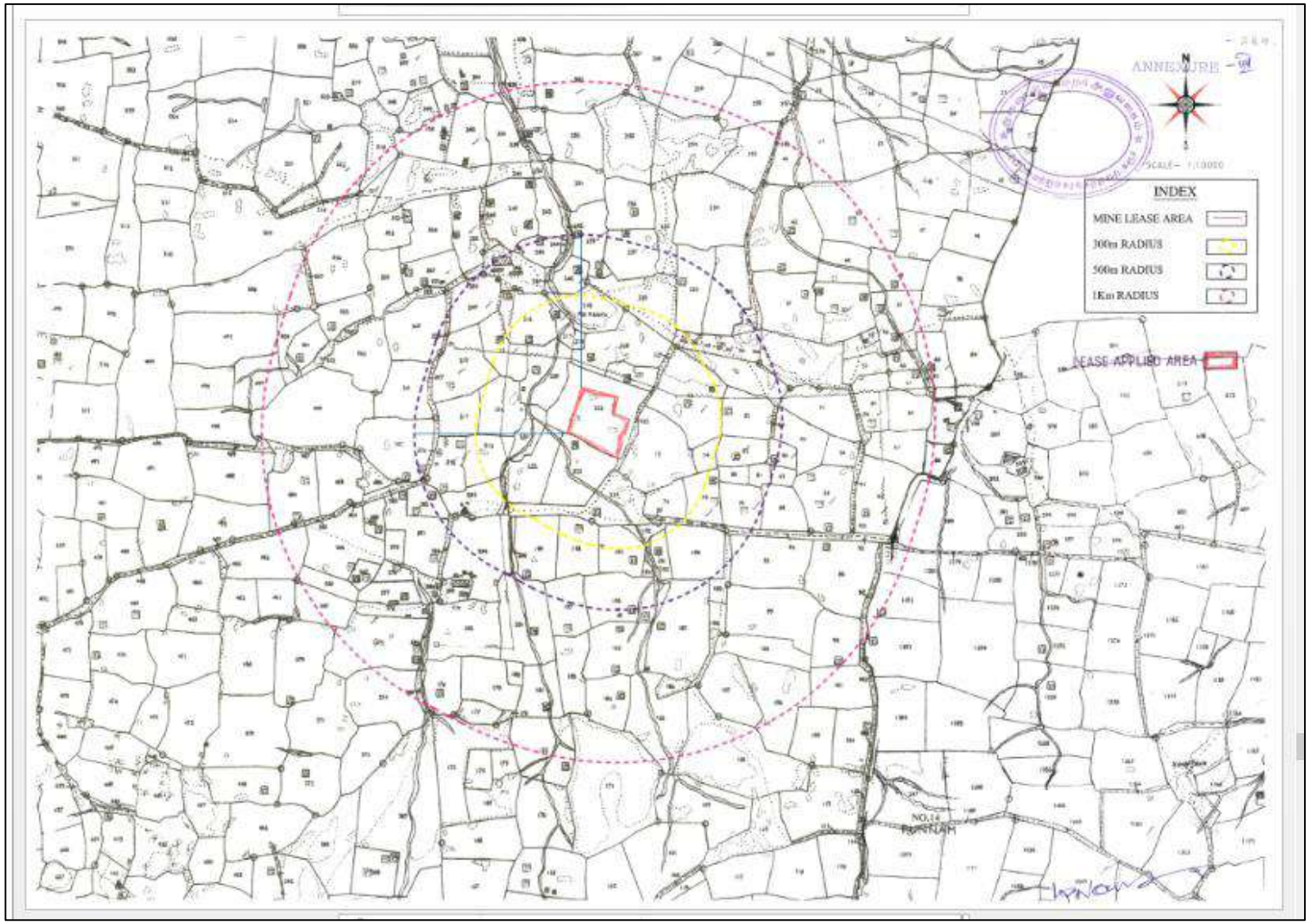


Figure 2.8 Village map showing proposed project lease area

ANNEXURE - VI

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : கரூர் வட்டம் : புகளூர்

வருவாய் கிராமம் : குப்பம் பட்டா எண் : 1397

உரிமையாளர்கள் பெயர்

1. கிருஷ்ணன் மகன் நல்லசாமி

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
226	1	5 - 45.00	15.10	--	--	--	--	2020/0103/14/151346- -- -- 29-12-2020
		5 - 45.00	15.10					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **14/07/018/01397/10840** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 23-03-2022 அன்று 10:53:53 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

Figure 2.8 Land ownership document

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 to December 2021** as per CPCB guidelines. Data on the existing environmental condition were collected by **Ekdant Enviro Services (P) Ltd**, for the main environmental components including land, water, air, ecology, and socio-economy

3.1 LAND ENVIRONMENT

Land use pattern of the area of 10km radius was studied using Sentinel II imagery. LULC types have been identified and given in Table 3.1.

Table 3.1 Land Use / Land Cover Statistics for the Area of 10km Radius

S. No.	Classification	Area(ha)	Area in %
1	Crop land	25434	84
2	Dense forest	653	2
3	Fallow land	361	1
4	Mining/Industrial land	371	1
5	Plantations	2146	7
6	Settlement	167	1
7	Water bodies	1049	3
	Total	**30181**	**100**

3.2 SOIL ENVIRONMENT

Ten 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 texture found in the study area is clay loam and sandy loam.
- pH of the soil varies from 6.09 to 7.26 indicating slightly alkaline nature.
- Electrical conductivity of the soil varies from 399-476 µs/cm and
- The water content varies from 2.18 to 3.80 %.

3.2.2 Chemical Characteristics

- Nitrogen ranges between 76 and 141 mg/kg.
- Phosphorus ranges between 0.89 and 1.90 mg/kg.
- Potassium ranges between 240.3 and 334.9 mg/kg.
- Calcium ranges between 124-182 mg/kg;
- Magnesium ranges between 20.7-34.0 mg/kg.
- Sodium ranges between 322 and 538 mg/kg.
- Dry matter content ranges between 1.01 and 2.97

3.3 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the critical water quality parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

Ground Water

- The pH of the water samples ranges from 7.10 to 8.10.
- TDS are found in the range of 214 - 469 mg/l.
- The total hardness varies between 176 -370 mg/l.
- Calcium varies from 39 to 63 mg/l and magnesium from 16-44 mg/l.
- Sodium various from 111 to 265 mg/l; potassium from 01 -10 mg/l.
- Bicarbonate various from 156-360 mg/l.
- Nitrate various from 10-39 mg/l.
- Chloride varies from 123 to 405 mg/l; sulphate from 66-107 mg/l; and fluoride from 0.2 to 1.0 mg/l.

When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits.

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.

3.4.1 Wind Pattern

Local wind pattern will largely influence the dispersive pattern of air pollutants and noise from the proposed project sites. Wind pattern study requires hourly site-specific data of wind speed and wind direction over a period of 3 months. The wind pattern analysis indicates the following information.

- The measured average wind velocity during the study period is 2.52m/s
- Predominant wind was dominant in the directions ranging from southwest to northeast.

3.4.2 Ambient Air Quality

As per the monitoring data, $PM_{2.5}$ ranges from 20.66 µg/m^3 to 23.58 µg/m^3; PM_{10} from 41.36 µg/m^3 to 44.98 µg/m^3; SO_2 from 6.04 µg/m^3 to 7.96 µg/m^3; NO_2 from 24.11 µg/m^3 to 27.14 µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

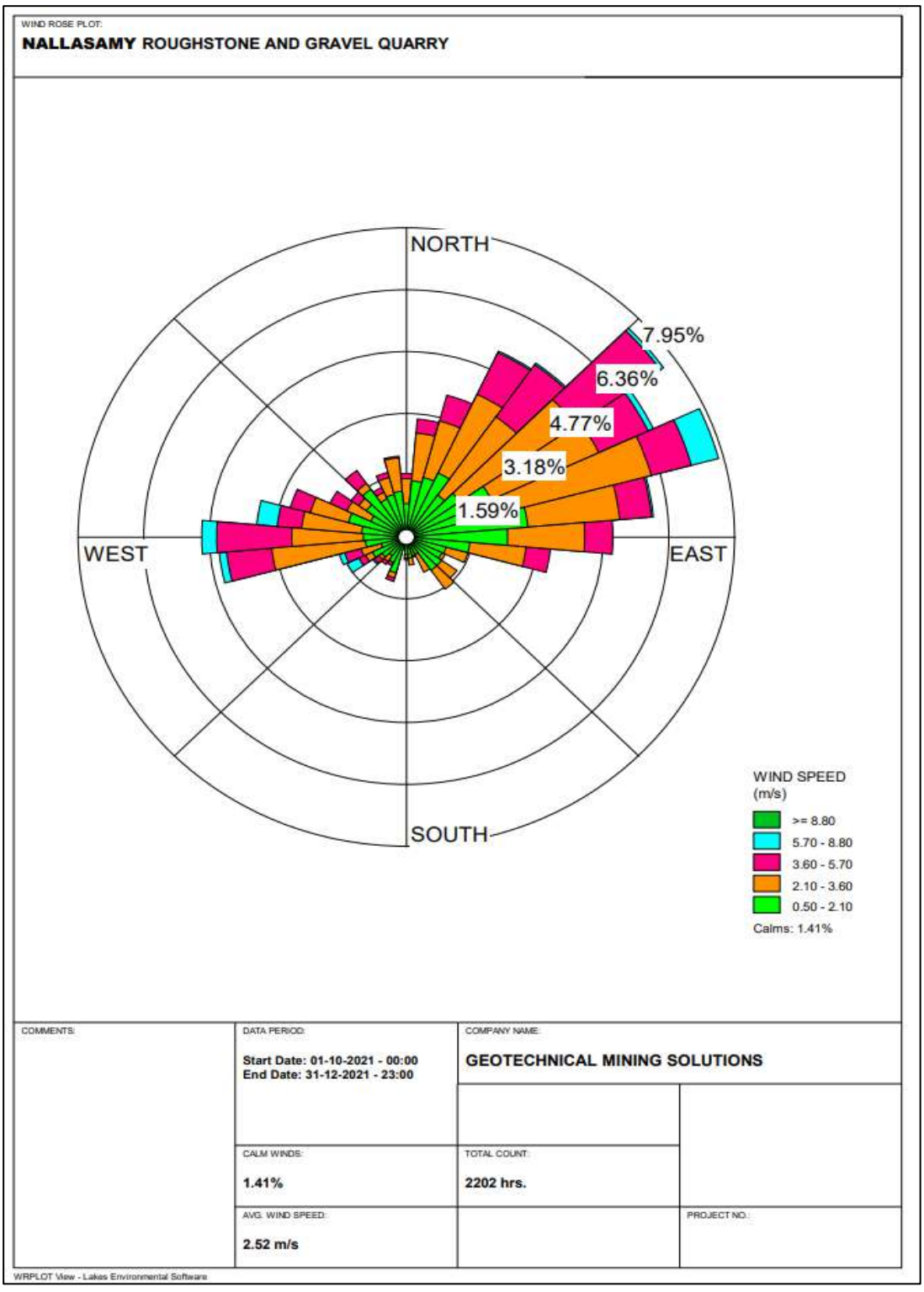


Figure 3.1 Onsite Wind Rose Diagram

3.5 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 locations around the proposed project area. The noise levels in core zone 46.0 dB (A) Leq. during day time and 39.1 dB (A) Leq. during night time and that noise levels in buffer zone varied from 40.1 to 47.2 dB (A) Leq. during day time and from 36.5to 39.3 dB(A)Leq. during night time. Thus, the noise level for industrial and residential area meets the requirements of CPCB. dB(A) Leq. during night time. 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. The study has also been designed to suggest suitable mitigation measures, if necessary, to protect wildlife habitats and conservation of REET species if any.

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. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.7 SOCIO ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as features like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

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

4.1.1 Anticipated Impact

The main anticipated impact on the land environment due to quarrying operation is changes in landscape and land use pattern. The mining activities in the cluster occupies about 16.03.00. ha. 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.

4.1.2 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

4.2.1 Impact on Soil Environment

There is no top soil anticipated in these projects, the surface consists of gravelly formation followed by rough stone which is proposed to excavate completely during the quarrying operation, hence preservation of top soil does not exist. Erosion of top layer (gravel), extracted fine material can result in substantial sediment loading to surface waters and drainage ways. During rainy season surface run off may cause siltation in low lying areas.

4.2.2 Mitigation Measures for Soil Conservation

- *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

4.3.1 Anticipated Impact

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 12m below ground level and water table is found at depths of 55-60 m below ground level.

There is no intersection of surface water bodies in the project area. As there is no proposal for rough stone processing or workshop within the project area there will be no effluent anticipated from the mines.

4.3.2 Mitigation Measures

- Water softening will be adopted to make it fit for drinking purposes. But it can be used for other domestic purposes.
- 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

The air borne particulate matter is the main air pollutant in the opencast mining involving drilling, blasting, and loading.

4.4.1 Anticipated Impact

The emission of sulphur dioxide (SO_2), oxides of nitrogen (NO_2) due to excavation and loading equipment and vehicles plying on haul roads are marginal. But, loading/unloading and transportation of rough stone, wind erosion of the exposed area and movement of vehicles will be the main polluting sources releasing Particulate Matter (PM_{10}) affecting ambient air quality of the area.

Anticipated increase of the air pollutants due to the proponents' quarrying activities and the existing quarrying activities within the area of 500m radius around the project sites have been predicted by modelling using AERMOD software and the modelling results shown in Tables 4.1 to 4.4 will be used in providing mitigation measures.

Table 4.1 Incremental & Resultant GLC of $PM_{2.5}$

Station ID	Distance to core area (km)	Direction	$PM_{2.5}$ concentrations(µg/m^3)			Comparison against air quality standard (60 µg/m^3)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	100	N	23.95	7	30.95	Below standard	26.95	Not significant
AAQ2	3.8	NW	20.02	0.5	20.52	Below standard	1.25	Not significant
AAQ3	2.75	NE	25.25	0.5	25.75	Below standard	2.14	Not significant
AAQ4	0.65	SW	20.96	1	21.96	Below standard	11.91	Not significant
AAQ5	2.2	SW	22.14	0.2	22.34	Below standard	1.14	Not significant
AAQ6	3.75	SW	19.34	0.2	19.54	Below standard	1.22	Not significant
AAQ7	4.15	S	23.07	0	23.07	Below standard	0.00	Not significant
AAQ8	4.0	E	20.67	0.2	20.87	Below standard	1.20	Not significant

Table 4.2 Incremental and Resultant GLC OF PM_{10}

Station ID	Distance to core area (km)	Direction	PM_{10} concentrations(µg/m^3)			Comparison against air quality standard (100 µg/m^3)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	100	N	45.19	12.18	57.37	Below standard	26.95	Not significant
AAQ2	3.8	NW	40	0.5	40.5	Below standard	1.25	Not significant
AAQ3	2.75	NE	46.74	1	47.74	Below standard	2.14	Not significant
AAQ4	0.65	SW	41.98	5	46.98	Below standard	11.91	Not significant
AAQ5	2.2	SW	43.74	0.5	44.24	Below standard	1.14	Not significant
AAQ6	3.75	SW	41.02	0.5	41.52	Below standard	1.22	Not significant
AAQ7	4.15	S	44.98	0	44.98	Below standard	26.95	Not significant
AAQ8	4	E	41.5	0.5	42	Below standard	1.25	Not significant

Table 4.3 Incremental & Resultant GLC of 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	100	N	8.57	4.64	13.2	Below standard	54.14	Not significant
AAQ2	3.8	NW	8.4	0.5	8.9	Below standard	5.95	Not significant
AAQ3	2.75	NE	9.07	0.5	9.5	Below standard	5.51	Not significant
AAQ4	0.65	SW	6.97	1	7.9	Below standard	14.35	Not significant
AAQ5	2.2	SW	5.69	0.1	5.8	Below standard	1.76	Not significant
AAQ6	3.75	SW	5.74	0.1	5.8	Below standard	1.74	Not significant
AAQ7	4.15	S	5.73	0	5.7	Below standard	0.00	Not significant
AAQ8	4.0	E	5.49	0.5	5.9	Below standard	9.11	Not significant

Table 4.4 Incremental & Resultant GLC of NO_X

Station ID	Distance to core area (km)	Direction	NOx concentrations(µg/m^3)			Comparison against air quality standard (80 µg/m^3)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	100	N	25.88	5	30.88	Below standard	19.32	Not significant
AAQ2	3.8	NW	25.86	0.5	26.36	Below standard	1.93	Not significant
AAQ3	2.75	NE	26.58	0.5	27.08	Below standard	1.88	Not significant
AAQ4	0.65	SW	25.61	1	26.61	Below standard	3.90	Not significant
AAQ5	2.2	SW	26.43	0.5	26.93	Below standard	1.89	Not significant
AAQ6	3.75	SW	25.76	0.1	25.86	Below standard	0.39	Not significant
AAQ7	4.15	S	24.72	0	24.72	Below standard	0.00	Not significant
AAQ8	4	E	25.1	0.5	25.6	Below standard	1.99	Not significant

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.

4.4.2 Mitigation Measures

4.4.2.1 Drilling

- Wet drilling will be practiced to control dust at source. Where water is unavailable, suitably designed dust extractor will be provided for dry drilling.
- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- Rough stone 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.

4.4.2.4 Green Belt

- 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.

4.4.2.5 Occupational Health

- 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

4.5.1 Anticipated Impact

Noise pollution poses a major health risk to the mine workers. Drilling, loading and movement of vehicles are the sources of noise in the existing open cast Manual mining projects.

4.5.2 Mitigation Measures

- Sharp drill bits will be used while drilling to reduce noise.

- ❖ 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.

4.6 BIOLOGICAL ENVIRONMENT

4.6.1 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.

4.6.2 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,

- ❖ Plants that grow fast will be preferred.
- ❖ High canopy plants with local varieties will be preferred.
- ❖ Perennial and evergreen plants will be preferred.

Green belt development plan and the cost for the greenbelt development for the proposed project have been given in Table 4.6 and 4.7, respectively.

Table 4.5 Greenbelt Development Plan

	No. of trees proposed for plantation	Survival %	Area to be covered(m^2)	Name of the species	No. of trees expected to be grown
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area			*Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis,* etc.,	
	578	80%	5202		462
	Number of plants outside the mine lease area				
	867	80%	7803		694

Table 4.6 Budget required for greenbelt development

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recuring Cost-per annum
Plantation inside the mine lease area (in safety margins)	578	Site clearance, preparation of land, digging of pits / trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	115600	17340
Plantation outside the area	867	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	260100	26010
Total			**375700**	**43350**

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 Anticipated Impact

The project will generate employment for about 14 persons and indirectly will get employment around 30 persons.

4.7.2 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

6.0 PURPOSE

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 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: Approved Mining Plan

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

This section deals with the cumulative impacts of the mining projects in the cluster area on the environment. For this study, the data provided in the tables 7.1-7.7 were used.

Table 7.1 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	**5 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	41392	8278	28	5
P2	42712	8542	29	5
P3	28430	5686	19	3
P4	22500	4500	15	3
P5	22660	4532	15	3
P6	214845	42969	143	24
Grand Total	**372539**	**74507**	**249**	**43**

Table 7.2 Cumulative Production Load of Gravel

Quarry	**Production for 3 Years (m^3)**	**Yearly Production(m^3)**	**Daily Production (m^3)**	**Number of Lorry Loads Per Day**
P1	292	292	1	1
P2	7888	7888	26	4
P3	16270	5423	18	3
P4	-	-	-	-
P5	9315	9315	31	6
P6	8064	8064	27	5
Grand Total	**41829**	**30982**	**103**	**19**

Table 7.3 Predicted Noise Incremental Values from Cluster

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	440 m	NE	40.2	26.5	45.7	55
Habitation Near P2	530m	N	40.2	42.6	44.6	
Habitation Near P3	880m	E	40.2	20.4	40.2	
Habitation Near P4	450m	NE	40.2	26.3	40.3	
Habitation Near P5	560m	N	40.2	42.1	44.3	
Habitation Near P6	1120m	NE	40.2	36.1	41.6	
Cumulative Noise (dB(A))					**49.4**	

Source: Lab Monitoring Data

Table 7.4 Cumulative Impact Results from the 6 proposed projects

Pollutants	Baseline Data(µg/m^3)	Incremental Values(µg/m^3)						Cumulative Value (µg/m^3)
		P1	P2	P3	P4	P5	P6	
$PM_{2.5}$	23.95	7	6.1	3.81	3.81	3.83	9.54	58.04
PM_{10}	45.19	12.18	9.64	6.28	5.32	5.84	12.24	96.69
SO_2	8.57	4.64	4.79	3.19	2.52	2.54	6.6	32.85
NO_2	25.88	5	5.16	3.43	2.72	2.74	11.56	56.49

Table 7.5 Ground Vibrations At 6 Mines

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	--	440 m	Nil
P2	9.5	530m	0.30
P3	--	880m	Nil
P4	--	450m	Nil
P5	5.0	560m	0.16
P6	47.74	1120m	0.33
Total Vibration			**0.79**

Table 7.6 Socio Economic Benefits From 6 Mines

Location ID	Project Cost	CER
P1	Rs. 56,65,000/-	Rs. 5,00,000
P2	Rs.31,94,000/-	Rs. 5,00,000
P3	Rs.25,78,000/-	Rs. 5,00,000
P4	Rs.46,30,000/-	Rs. 5,00,000
P5	Rs.42,99,500/-	Rs. 5,00,000
P6	Rs.65,95,000/-	Rs. 5,00,000
Grand Total	**Rs. 2,69,61,500/-**	**Rs. 30,00,000**

Table 7.7 Employment Benefits From 6Mines

Location ID	Employment
P1	25
P2	27
P3	23
P4	14
P5	14
P6	27
Grand Total	**130**

Table 7.8 Greenbelt Development Benefits From 6 Mines

CODE	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species	No. of Trees expected to be grown
P1	1445	80%	13000	Neem, Pongamia,etc..	1156
P2	315	80%	2900	Neem, Pongamia,etc..	252
P3	770	80%	7000	Neem, Pongamia,etc..	616
P4	940	80%	8500	Neem, Pongamia,etc..	752
P5	368	80%	3300	Neem, Pongamia,etc..	294
P6	1095	80%	9900	Neem, Pongamia,etc..	876
Total	**4933**	**80%**	**44600**		**3946**

7.4 PLASTIC WASTE MANAGEMENT PLAN

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

7.5.1 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

The proposed project at Kuppam Village aims to produce 41,392m^3 rough stone over a period of 5 Years and 292 m^3 of Gravel over a period of 1 Year. This will enhance the socio-economic activities in the adjoining areas and will result in benefits as below:

- Employment will be increased;
- Socio-Economic welfare will be improved;
- Physical Infrastructure will be improved;
- Social infrastructure will be improved.

CHAPTER IX
ENVIRONMENT MANAGEMENT PLAN

The environment monitoring cell formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level. The said team will:

- Monitor the water/ waste water quality, air quality and solid waste generated;
- Analyse the water and air samples collected through external laboratory;
- Implement and monitor the pollution control and protective measures/devices including financial estimation, installation of air pollution control equipment, waste water treatment plant, etc.;
- Co-ordinate the environment related activities;
- Collect health statistics of the workers and population of the surrounding villages;
- Develop green belt and monitor the progress of the environmental monitoring programme;
- Comply with statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance.

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.