

EXECUTIVE SUMMARY OF EIA DRAFT FOR ROUGH STONE QUARRY LEASE

At

Kothapetta Village, Krishnagiri Taluk, Krishnagiri District
“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

*** CLUSTER EXTENT = 20.19.0 Hectares**

ToR obtained vide Lr.No. SEIAA-TN/F.No.8519/SEAC/ToR-992/2021, Dated 28.07.2021 - P1
Tmt.SA. Sumithashankr

ToR obtained vide Lr.No. SEIAA-TN/F.No.8687/SEAC/ToR-1067/2022 Dated 01.03.2022 P2
M/s.MA Quality Stone

NAME OF PROPOSED PROJECT PROPONENTS APPLYING IN CLUSTER

Code	Name	Extent & S.F. No
P1	Tmt.SA. Sumithashankr W/o.ShankarRaj No.252, Metbanda Village Venkatapuram Krishnagiri Taluk, Krishnagiri District – 635001	1.20.0 ha & 56/1(Part – 5)
P2	M/s.MA Quality Stone 58 B, Gandhi Nagar Krishnagiri District – 635001.	3.70.0 ha & 87/1B2 (Part)

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Valid till : 29th Dec.2023

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 projects (P1& P2) fall within the 500m radius cluster of quarries with the total extent of >5 hectares, they are classified under category “B1” and require submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing.

This EIA draft discusses the cumulative impacts of the 2 proposed projects (P1& P2) and the 2 existing projects (E1 & E2) and 2 abundant quarries for provides a detailed Environmental Management Plan (EMP) to minimize the adverse impacts of those projects situated in a cluster with the total extent of 20.19.0 ha in Kothapetta Village, Krishnagiri Taluk, Krishnagiri District and Tamil Nadu State. It has been prepared in compliance with ToR issued vide letter No. **SEIAA-TN/F.No.8519/SEAC/ToR-992/2021, dated 28.07.2021** – Tmt.SA.Sumithashankar for the proposed project (P1) and letter No. **SEIAA-TN/F.No.8687/SEAC/ToR-1067/2022 dated 01.03.2022** – M/S MA Quality Stone for the proposed project (P2) by conducting the baseline monitoring study during the period of October-December 2021.

Details of project proponents and the quarries within the cluster of 500m radius have been provided in Tables 1.1 and 1.2.

Table 1.1 Details of Project Proponents

Code	P1	P2
Name	Tmt.SA.Sumithashankr	M/S MA Quality Stone
Address	W/o. Shankar Raj, No.252, Metbanda Village, Venkatapuram, Krishnagiri Taluk & District-635001 Tamil Nadu State	58B, Gandhi Nagar Krishnagiri Taluk & District-635001
Status	Proprietor	Company

Table 1.2 Quarry Details within 500m Radius

PROPOSED QUARRIES						
CODE	Name of the Owner	Village	S.F. Nos	Extent	GO.No & Date	Status
P1	Tmt. Sa. Sumitha Shankr, W/o Shankar Raj, 252, Metbanda Village, Venkatapuram Panchayat, Krishnagiri (Po), Taluk District.	Kothapetta	56/1(Part – 5)	1.20.0 ha	Roc.49/2016 (Mines – 2) Dated 18.08.2016	01.09.2016 to 31.08.2026 (Scheme for next five years)
P2	M/s.MA Quality stone, No.58 – B, Gandhi Nagar, Krishnagiri taluk, District - 635001	Krishnagiri taluk, kothapetta village	87/1B2 (Part)	3.70.0 ha	Roc.No.1179/2020/M dated:22.02.2021	Proposed quarry
TOTAL				4.90.0 ha		
EXISTING QUARRIES						
CODE	Name of the Owner		S.F. Nos & Village	Extent	GO.No & Date	Lease Period
E1	Tmt. K.M. Vijaya, W/o Madhiazhagan, No.58B Gandhi Nagar, Krishnagiri Town and Taluk.	Krishnagiri taluk, kothapetta village	78/1B	4.00.0 ha	Roc.419/2018/M Dated 30.05.2018	30.5.2018 to 29.5.2023
E2	M/s. Devarajaa M. Sand, No. 58 B Gandhi Nagar, Krishnagiri Town and Taluk	Krishnagiri taluk, kothapetta village	78/1A (Part) 78/1B (Part)	4.00.0 ha	Roc.418/2018/M Dated 30.05.2018	31.5.2018 to 30.5.2023
TOTAL				8.00.0ha		
TOTAL CLUSTER EXTENT				12.9.0 ha		
DETAIL OF ABANDONED / OLD QUARRIES						
CODE	Name of the Owner		S.F. Nos & Village	Extent	GO.No & Date	Lease Period
EX1	Tmt.Qummarunnisa, W/o.Abdul Jaffer, No.2, Rahamatulla, St,Krishnagiri Dt.	Krishnagiri taluk, kothapetta village	87/1B1(Part),87/1B2	4.75.0	Roc.No.08/2013/Mines dated: 05.02.2016	02.03.2016 to 01.03.2021
EX2	Thiru G. Ganesan, Avdhanapatti Village, Agraharam Post, Krishnagiri taluk	Kothapetta	56/1 (P – D)	2.54.0	Roc.No.611/2009/Mines - 2 dated: 14.05.2015	14.05.2015 to 13.05.2020
TOTAL				7.29.0ha		
TOTAL CLUSTER EXTENT				20.19.0 ha		

Source: i). AD Letter – Rc.No.96/2021- Mines, dated 10.03.2022

ii). AD Letter – Rc.No.1179/2020 – Mines, dated 10.03.2022

- Note: Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016
- EX1 and EX2 have been taken into the calculation of cluster extent. But they have not been included in the cumulative studies as they are inactive.

CHAPTER II

PROJECT DESCRIPTION

2.0 INTRODUCTION

The proposed projects are site specific and there are no alternative areas required for these projects. There is no effluent generation/discharge from the proposed projects. Proposed project P1 method of mining is opencast manual method, the quarry operation involves equipment's like hammer and chisel and slurry blasting like expanding chemicals (Calcium carbide) will be used for liberate the required size of foundation stones and jelly from the parent rock mass. Proposed project P2 method of mining is opencast semi mechanized mining involving drilling and blasting, and hydraulic excavators. Have been given in Table 2.1 and 2.2

Table 2.1 Brief Description of the Project (P1)

Name of the Quarry	Tmt.SA.Sumithashankr - Rough Stone Quarry	
Toposheet No	57-L/02	
Latitude between	12°32'53.25"N to 12°32'57.45"N	
Longitude between	78°12'29.71"E to 78°12'35.28"E	
Highest Elevation	525m to 531m AMSL	
Proposed Depth of Mining	40m [10m above ground level + 30m below ground level] for a first 5 years	
Geological Resources	Rough Stone in m ³ - 4,73,598	
Mineable Reserves	Rough Stone in m ³ - 1,79,843	
Existing Pit Dimension	Nil	
Ultimate Pit Dimension	63m (L) x 46m (W) x 40m (D)	
Water Level in the surrounds area	70m bgl	
Method of Mining	Opencast Manual Method, the quarry operation involves equipment's like hammer and chisel and slurry blasting like expanding chemicals (Calcium carbide) will be used for liberate the required size of foundation stones and jelly from the parent rock mass.	
Topography	The Project area is exhibiting undulated terrain. The gradient is towards North-eastern side and altitude of the area is ranges between 525 m to 531m above from Mean Sea level.	
Machinery Proposed	Tippers	3 Nos
Blasting Method	The quarrying operation is proposed to carried out by Manual Opencast Method in conjunction with conventional method of mining to splitting of rock mass of considerable volume from the parent rock mass by hammer, chisel and	

	slurry explosives like expanding chemical to loosen the rough stone and further made to smaller sizes by manually with Handy hammer and chisel and loading the rough stone by manually from pithead to the needy customer. No deep hole drilling and heavy blasting involved in this manual quarry operation.	
Proposed Manpower Deployment	30 Nos	
Project Cost	Rs.92,31,000/-	
CER Cost @ 2% of Project Cost	Rs. 1,84,620/-	
Nearby Water Bodies	Periya lake	1.5km South
	Kathinayanapalli lake	2.9km East
	Krishnagiri dam	4.9 SW
Greenbelt Development Plan	The plantation is nearly 1,406 sq.m area is proposed to use under Greenbelt by planting 150 Number of tree saplings during every year with an anticipated survival rate of 80% in the 7.5 m and 10m Safety Zone.	
Proposed Water Requirement	3.5 KLD	
Nearest Habitation	Kallukurikki- 1km NE	

Table 2.2 Brief Description of the Project – P2

Name of the Quarry	M/s. MA Quality Stone Rough Stone Quarry.		
Toposheet No.	57-L/2		
Latitude Between	12°33' 04.6251"N to 12° 32' 53.7570"N		
Longitude Between	78°12'46.0552"E to 78°12' 57.5020"E		
Highest Elevation	520m AMSL		
Proposed Depth of Mining	50 m (1m Topsoil + 49m Rough Stone) 45m AGL +5m BGL		
Geological Resources	Rough Stone in m ³	Mine waste in m ³	Topsoil in m ³
	7,35,007	36749	7713
Mineable Reserves	Rough Stone in m ³	Mine waste in m ³	Topsoil in m ³
	650251	32511	5836
Production first 5 years	500977	26368	12
Existing Pit Dimension	Nil		
Ultimate Pit Dimension	402m (L) x 101m (W) (Avg) x 50m (D)		
Water Level in the surrounds area	70-75 m BGL		
Method of Mining	Opencast semi mechanized mining method involving drilling and blasting		
Topography	The Project area is exhibits elevated terrain with the gentle slope towards South eastern. Side. The average elevation of		

	the area is 520m above mean sea level.	
Machinery proposed	Jack Hammer	6 Nos
	Compressor	2 Nos
	Hydraulic Excavator	1 No
	Tippers	2Nos
Blasting Method	Jack Hammer drilling and controlled Blasting is proposed	
Proposed Manpower Deployment	15 Nos	
Project Cost	Rs.66,40,000/-	
CER Cost @ 2% of Project Cost	Rs.1,32,800/-	
Nearby Water Bodies	Periya lake	1.8km-South
	Kathinayanapalli lake	2.3km East
	Krishnagiri dam	5.4km SW
Greenbelt Development Plan	560trees will be planted in the 7.5 m, safety zones covering an area of in 5000 m ²	
Proposed Water Requirement	3.2 KLD	
Nearest Habitation	Kallukurikki –1.0Km - North	

2.1 LOCATION OF THE PROJECT

All the proposed quarry projects fall in Kothapetta Village, Krishnagiri Taluk and Krishnagiri District. The project area is located about 3km North-western side of Krishnagiri and 1km North-eastern side of Bangalore – Salem (NH-7) National Highway Road, the Proposed project area located along Kothapetta Village at a distance of 1km North-eastern side.

The proposed project (P1) area is marked in the Survey of India. Toposheet No 5-L/02. Latitude between: 12°32'53.25"N to 12°32'57.45"N and Longitude between: 78°12'29.71"E to 78°12'35.28"E. The proposed project (P2) area is marked in the Survey of India. Latitude between: 12°33' 04.6251"N to12° 32' 53.7570"N and Longitude between: 78°12'46.0552"E to78°12' 57.5020"E have been given in Tables 2.3 and 2.4. The lease area of the project sites googles earth image as in Figures 2.1 and 2.2 and the overall view of the project sites has been shown in Figure 2.3.

Table 2.3 Boundary Co-Ordinates of Proposed Projects (P1&P2)

Boundary Co-Ordinates of Project Site – P1		
Corner Pillar Nos.	Latitude	Longitude
1	12°32'53.25" N	78°12'29.71" E
2	12°32'55.26" N	78°12'29.89" E
3	12°32'55.87" N	78°12'31.65" E
4	12°32'55.24" N	78°12'32.25" E

5	12°32'57.45" N	78°12'33.10" E
6	12°32'57.37" N	78°12'34.13" E
7	12°32'56.16" N	78°12'35.28" E
8	12°32'55.08" N	78°12'34.78" E
9	12°32'54.01" N	78°12'34.28" E
Boundary Co-Ordinates of Project Site – P2		
Corner Pillar Nos.	Latitude	Longitude
1	12°33'3.6761" N	78°12'46.0552" E
2	12°33'4.6251" N	78°12'47.7907" E
3	12°32'58.9647" N	78°12'53.1805" E
4	12°32'59.4118" N	78°12'56.4576" E
5	12°32'57.9026" N	78°12'56.7320" E
6	12°32'57.0662" N	78°12'57.5020" E
7	12°32'56.7570" N	78°12'56.5139" E

Source: Approved Mining Plan

Table 2.4 Accessibility details to the site

Site Connectivity for P1	
Nearest Roadway	(NH-44) Bangalore – Salem – 1km- Southwestern side (SH-131) Barghur – Tirupattur 14km -East
Nearest Village	Kallukurichi-1km – Northeast
Nearest Town	Krishnagiri-2.5km – Southeast
Nearest Railway	Rayakottai- 19.km-SW
Nearest Airport	Bangalore Airport - 82.0km – NW
Seaport	Chennai-233km - Northeast
Site Connectivity for P2	
Nearest Roadway	(NH-44) Bangalore – Salem – 1.5km- Southwestern side (SH-131) Barghur – Tirupattur 13km -East
Nearest Village	Kallukurichi –1.0 Km-North
Nearest Town	Krishnagiri-2.4km – South
Nearest Railway	Rayakottai- 20.km-SW
Nearest Airport	Bangalore Airport - 82.0km – NW
Seaport	Chennai-232km - Northeast

2.2 OPERATIONAL DETAILS FOR PROPOSED PROJECTS

Operational details of the projects including geological resources, mineable reserves, and yearly and daily production have been extracted from mining plans as shown in Figures 2.4 and 2.5 and given in Table 2.5.

Table 2.5 Operational Details for Proposed Projects-P1&P2

Operational Details for Project – P1			
Particulars	Details		
	Rough Stone in m³		Top Soil in m³
Geological Resources	4,73,598		-
Mineable Reserves	1,79,843		-
Production for 5 Year Plan Period	1,79,843		-
Mining Plan Period	5 Years		
Number of Working Days	300 Days		
Production Per Day (m ³)	120	-	
No. of Lorry Loads (6m ³ Per Load)	20	-	
Total Depth of Mining	40m [10m above ground level + 30m below ground level]		
Operational Details for Project – P2			
Particulars	Details		
	Rough Stone in m³	Mine waste in m³	Top Soil in m³
Geological Resources	7,35,007	36,749	7713
Mineable Reserves	6,50,251	32,511	5836
Production for 5 Year Plan Period	500977	26,368	12
Approved Mining Plan Period		5 years	
Number of Working Days		300 days	
Production Per Day (m ³)	333	17	-
No. of Lorry loads (6 m ³ Per Load)	56	3	-
Total Depth of Mining		50 m (1m Topsoil + 49m Rough Stone) 45m AGL +5m BGL	

Source: Approved Mining Plan

2.3 LAND USE PATTERN

Land use and land cover information for the area of 10 km radius was extracted from LISS III and has been given in Table 2.6.

Table 2.6 Land Use and Land Cover Pattern for the Proposed Projects- P1 & P2

LAND USE PATTERN OF PROPOSED PROJECT – P1		
Description	Present area in (hectares)	Area at the end of life of quarry (hectares)
Area under quarry	0.29.00	0.81.60
Infrastructure	Nil	0.01.00
Roads	0.01.00	0.01.00
Green Belt	Nil	0.14.06
Un – utilized area	0.90.00	0.22.34
Grand Total	1.20.00	1.20.00
LAND USE PATTERN OF PROPOSED PROJECT – P2		
Description	Present area in (hectares)	Area at the end of life of quarry (hectares)
Area under quarry	Nil	3.18.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.01.0
Green Belt	Nil	0.50.0
Un – utilized area	3.70.0	Nil
Grand Total	3.70.0	3.70.0

Source: Approved mining plan

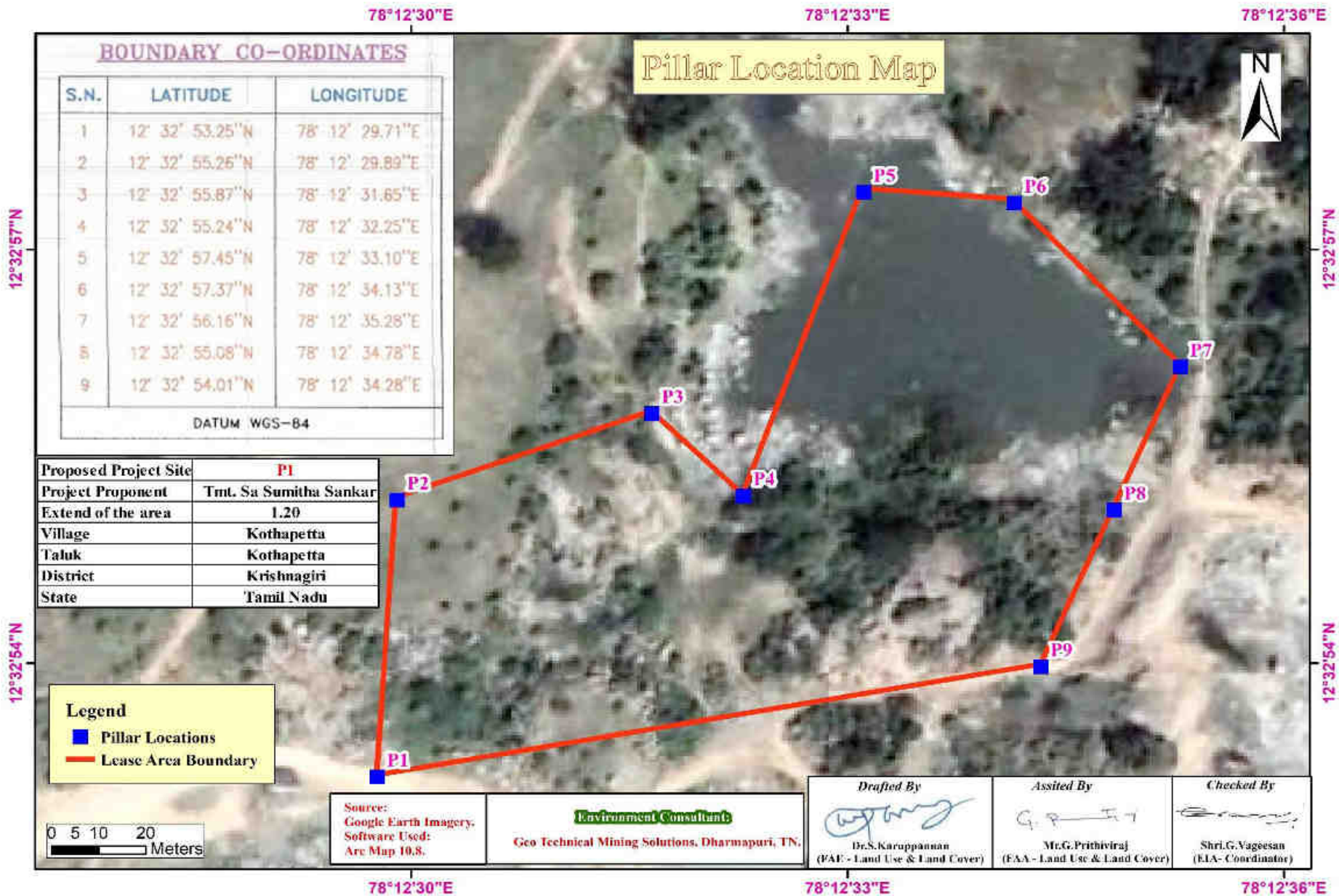


Figure 2.1 Google Image Showing the Proposed Project P1 Lease Boundary with Geo Coordinates of Pillar

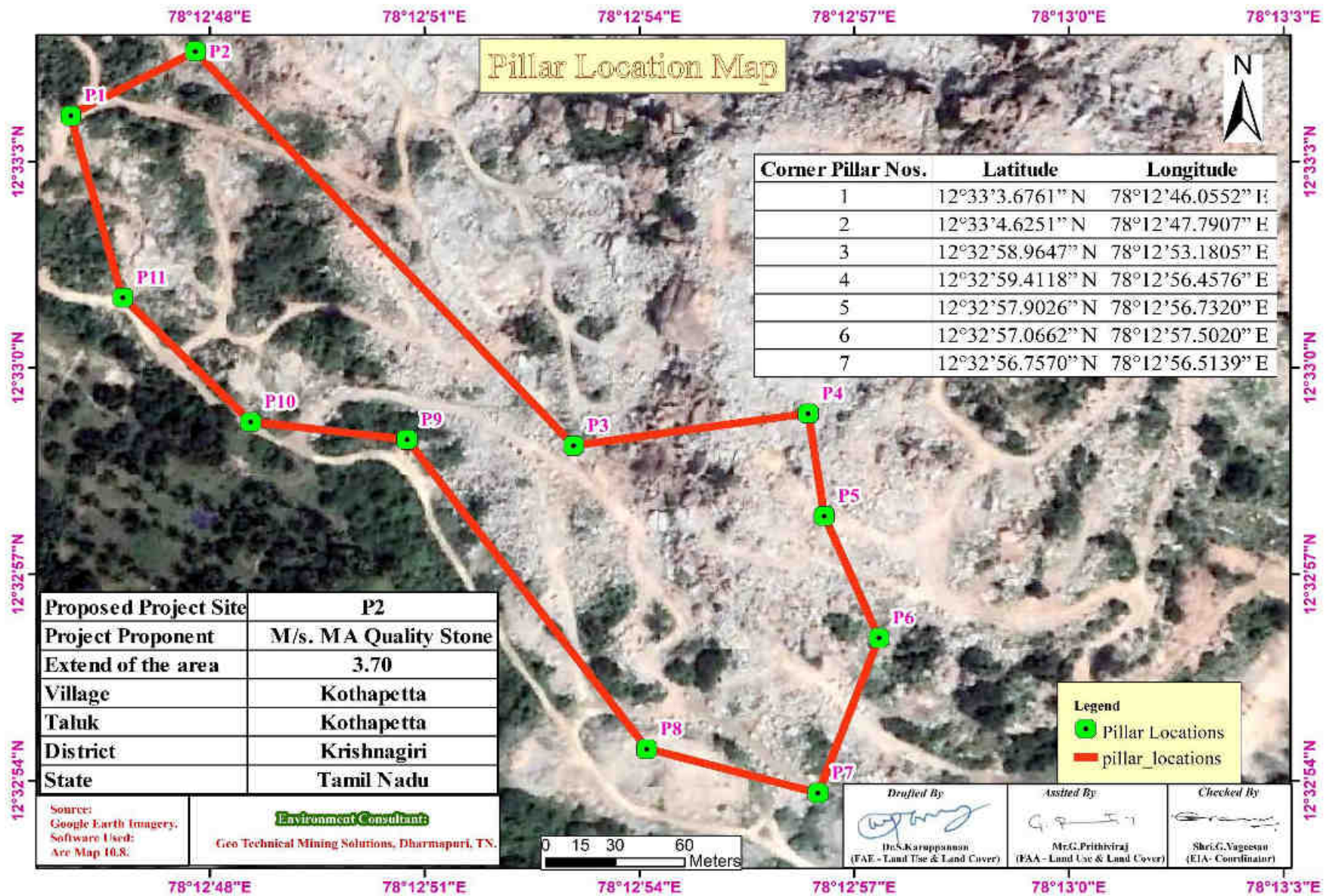


Figure 2.2 Google Image Showing the Proposed Project P2 Lease Boundary with Geo Coordinates of Pillar

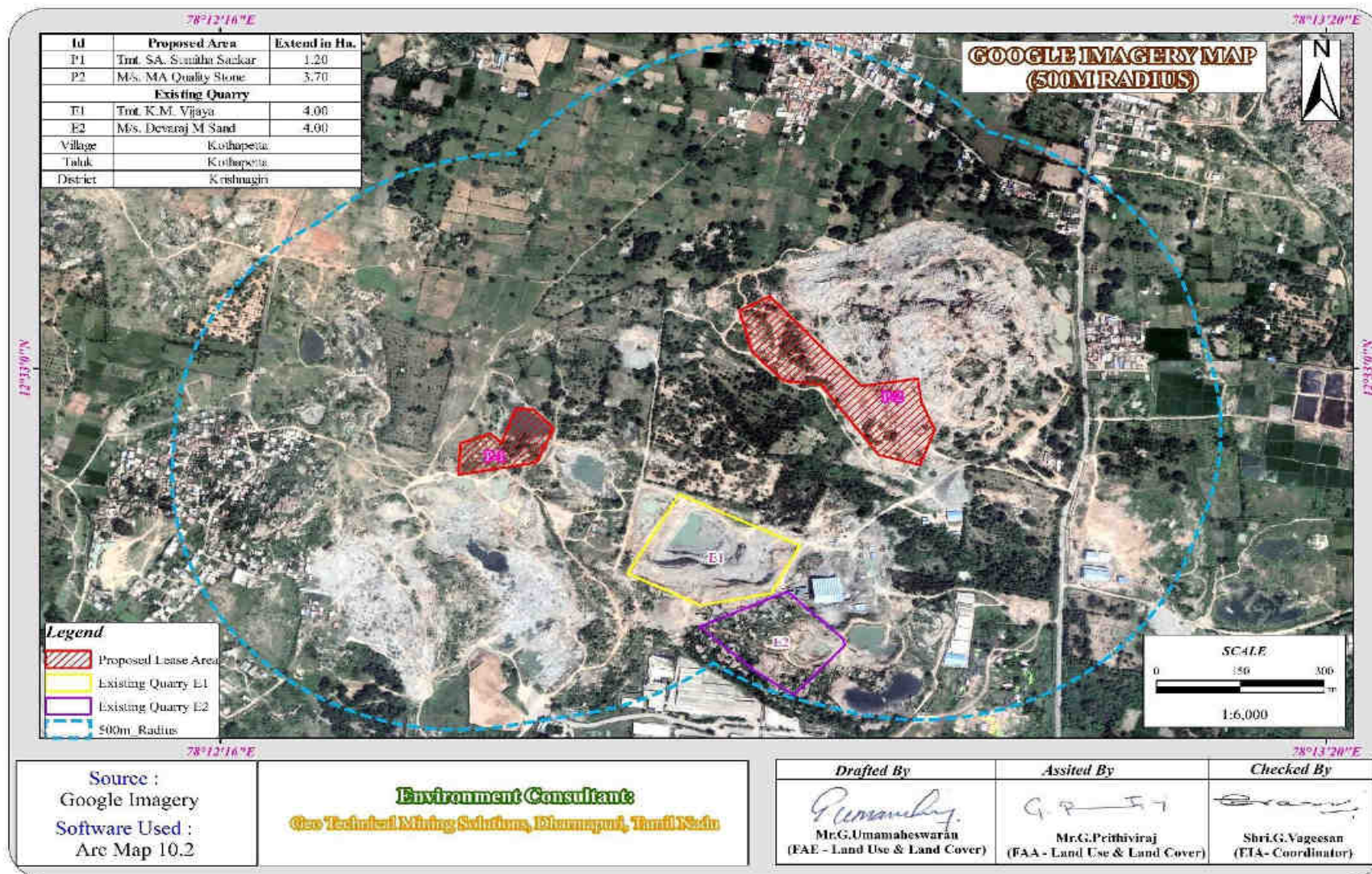


Figure 2.3 Google Earth Image Showing Cluster Of Quarries Within 500m Radius From The Proposed Projects-P1&P2

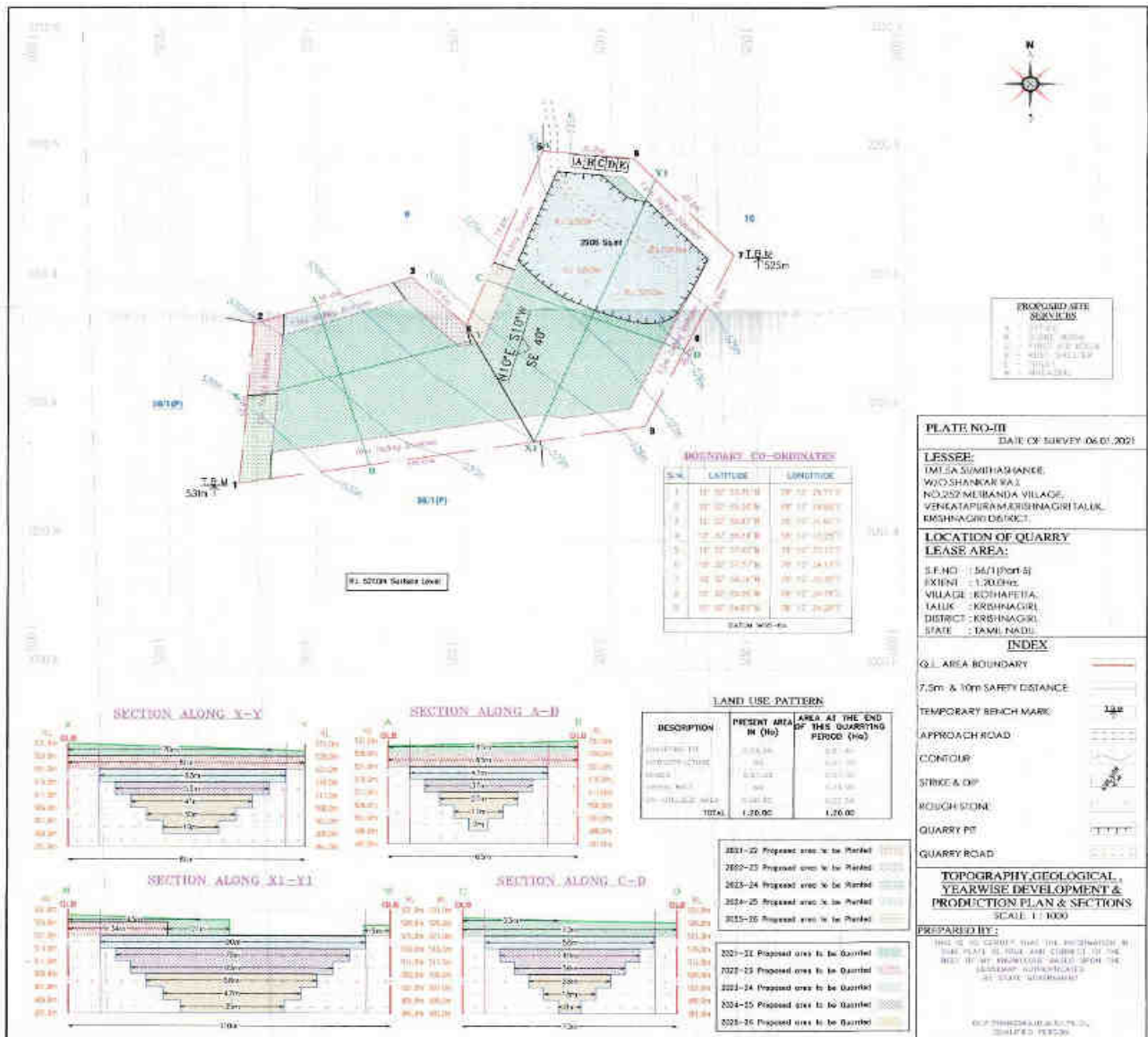


Figure 2.4 Topography, geological plan, year-wise development & production plan and sections P1

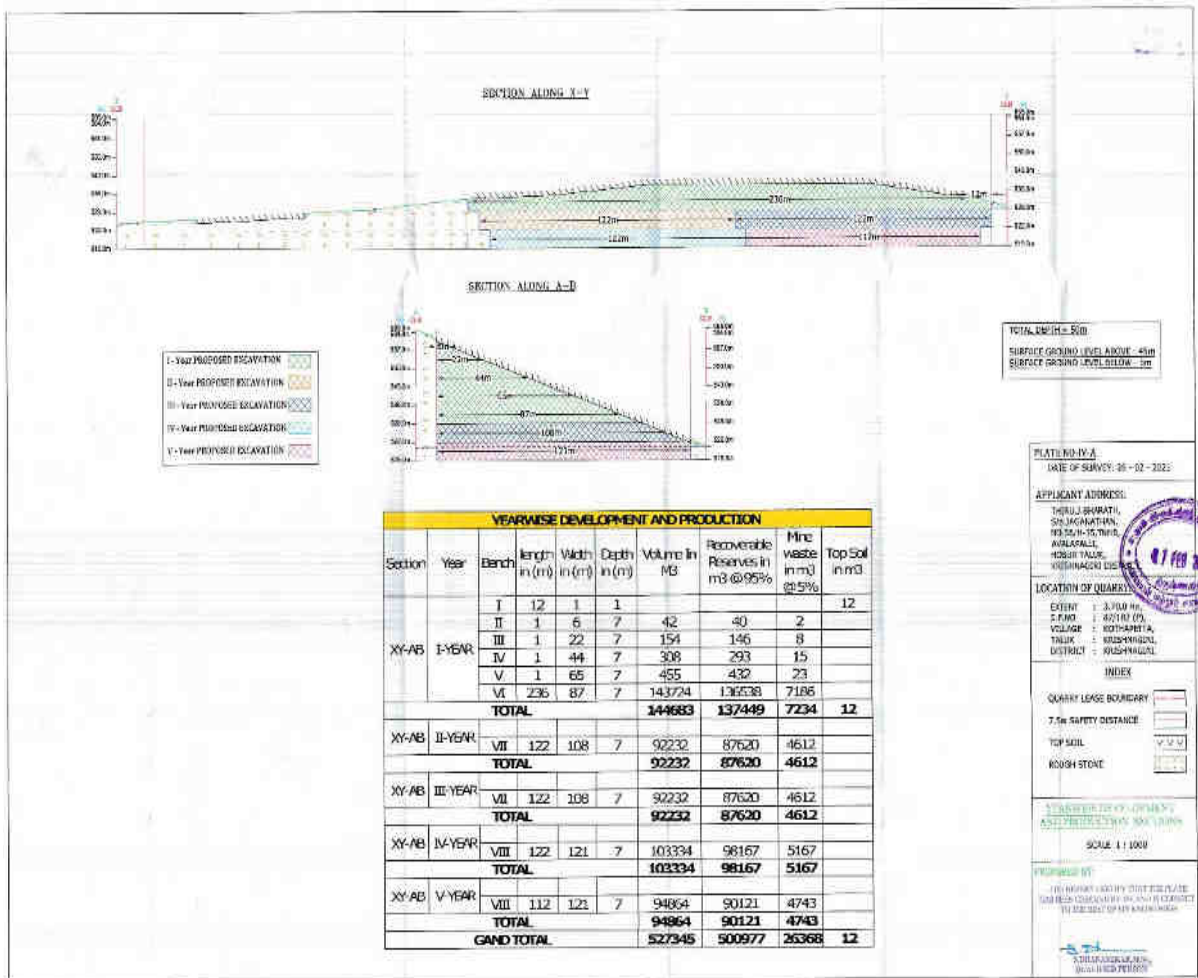
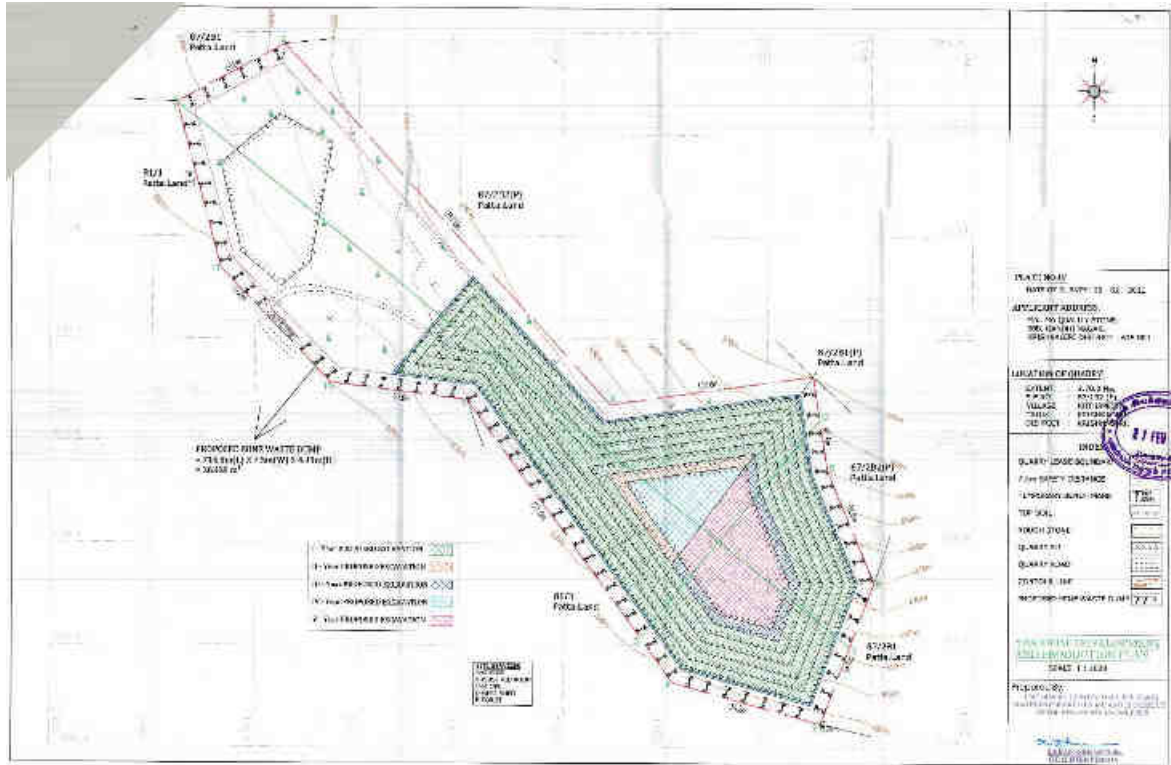


Figure 2.5 Year-Wise Development Production Plan & Section -P2

2.4 METHOD OF MINING

Proposed project P1 method of mining is opencast manual method, the quarry operation involves equipment's like hammer and chisel and slurry blasting like expanding chemicals (Calcium Carbide) will be used for liberate the required size of foundation stones and jelly from the parent rock mass. Proposed project P2 method of mining is opencast semi mechanized mining involving drilling and blasting, and hydraulic excavators.

2.5 PROPOSED MACHINERY DEPLOYMENT

Table 2.7 Proposed Machinery Deployment

PROPOSED PROJECT – P1				
S. No	Type	Nos	Size/Capacity	Motive Power
1	Tipper	3	10 Tonnes	Diesel Drive
PROPOSED PROJECT – P2				
S. No	Type	Nos	Size/Capacity	Motive Power
1	Jack hammer	6	25.5mm/60HP	Compressed air
2	Hydraulic Excavator	1	1.2m ³ /120HP	Diesel Drive
3	Tipper	2	10Tonnes/110HP	Diesel Drive

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- At the end of mining life, the mine pit will act as artificial reservoir for collecting rain water and helps to meet out the demand or crisis during drought season.
- After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem.
- 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 health and safety.
- The objective of mine closure is to transform mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting, and non-contaminating.

CHAPTER III
DESCRIPTION OF THE ENVIRONMENT

3.0 INTRODUCTION

Field monitoring studies were carried out to evaluate the base line status of the project sites during October 2021 –December 2021 as per CPCB guidelines. Environmental monitoring data were collected by Excellence Laboratory for the 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 through LISS III image of Bhuvan (ISRO). The LULC information thus obtained from the LU/LC map has been provided in Table 3.1.

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

S. No.	LULC Category	LU/LC Area (ha)	LU/LC Area (%)
1.	Barren Rocky/Stone waste/sheet rock area	24.7	0.10
2	Crop Land	12491.0	40.2
3	Dense Forest	308.1	1.0
4	Fallow land	1897.1	6.10
5	Land affected by salinity/salinity coastal	173.1	0.60
6	Land with or without scrub	11410.6	36.7
7	Manmade features	879.9	2.8
8	Mining/Industrial wastelands	65.2	0.20
9	Plantations	3344.1	10.80
10	Settlements	310.4	1.0
11	Water Bodies	196.1	0.6
Total		31100.32	100

3.2 SOIL ENVIRONMENT

Physical Characteristics

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is clay to clay loam. The bulk density of soils in the study area varies between 1.01 and 1.35 g/cc. The water holding capacity varies from 41.1 to 46.6 and porosity from 28 to 40%.

Chemical Characteristics

- The nature of soil is slightly alkaline to strongly alkaline with pH ranging from 7.23 to 8.53°C
- The nitrogen ranges between 167 and 210 kg/ha
- The phosphorus ranges between 0.64 and 1.21kg/ha
- The potassium ranges between 21.3 and 40 mg/kg

3.3 WATER ENVIRONMENT

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

3.3.1 Surface Water

The pH varies from 7.27 to 7.51, while turbidity is found within the acceptable limits. TDS including carbonates, bicarbonates, chlorides, phosphates, nitrates, calcium, magnesium, and sodium in the surface water varies from 425 to 459 mg/l. Chloride varies from 70.2. to 79.3.mg/l; nitrate varies from 5 to 6.1 mg/l, whereas sulphate from 17.3. to 24.1mg/l.

3.3.2 Ground Water

The pH (6.86 to 7.75) of the water samples falls within the acceptable limit of 6.5 to 8.5. Sulphates and chlorides of water samples from all the sources are within the acceptable limits as per the water quality standard. Turbidity in the water samples meets the requirement. TDS are found in the range of 364- 460mg/l in all samples. The total hardness varies between 110.77 and 180.76 mg/l for all samples. 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 10 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 dispersion pattern of air pollutants and noise from the proposed project sites. Analysis of wind pattern requires hourly site-specific data of wind speed and direction over a period of 3 months.

- The measured average wind velocity during the study period is 3.03m/s
- Predominant wind direction during the study period is northeast to southwest

3.4.2 Ambient Air Quality

Ambient air quality was monitored for the period of October 2021 – December 2021. As per the monitoring data, PM₁₀ ranges from 35.8 µg/m³ to 46.8 µg/m³; PM_{2.5} from 22.5 µg/m³ to 26.9 µg/m³; SO₂ from 5.1µg/m³ to 9.6 µg/m³; NO₂ from 15.6 µg/m³ to 28.4 µg/m³. 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 8 locations around the proposed project area. Noise levels recorded in core zone during day time was Project -P1 47.7. dB (A), Project - P2 46.9. dB (A) Leq and during night time was 40.3 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 36.5 to 46.1 dB (A) Leq and during night time from 35 to 39.7 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

3.6 ECOLOGICAL 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.

3.6.1 Flora

The result of flora in core zone shows that Fabaceae and Lamiaceae, Amaranthaceae are the main dominating species in the study area. No species are found in threatened category. The result of flora in buffer zone shows that Fabaceae and Poaceae, Euphorbiaceae are the main dominating species in the study area. There is no rare, endangered and threatened flora species in mining area and their surrounding area.

3.6.2 Fauna

The faunal survey was carried out as per the methodology to identify and count Mammals, Birds, Reptiles, Amphibians and Butterflies. Majority of the flat landscape around project unit is occupied by agriculture fields. It contains a total of 53 species belonging to 37 families have been recorded from the buffer zone. The floral (94) varieties among them thirty-seven Trees 37 (39%) Nineteen Herbs 19 (20%) and fourteen shrubs 14 (14%) and Climbers eleven 11 (12%), Five Creeper 5 (5%), Three Grass 7 (8%), one Cactus 1 (1%) were identified.

From the study of biological environment, it is concluded that there is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species 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 total extent of the cluster quarries is **20.19.0 ha** including existing and proposed quarries in patta and govt porampoke land. The proposed depth of the quarrying for (P1) is 40m (10m above ground level 30m below ground level) & (P2) is 50m (45m above ground Level and 5m below ground level. Ground water will not intersect the water table in this depth.

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 pits and a check dam will be constructed at the strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- Green belt will be developed in safety zone. The water stored in the quarry will be used for greenbelt.
- Thick plantation will be carried out 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 topsoil proposed project (P1). The proposed project (P2) area is covered by thin layer of Topsoil formation and the average thickness is about 0.5 to 1m, the excavated Topsoil will be used for landfilling purposes.

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 or re-plant 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 project P1 depth is 40m (10m above ground level + 30m below ground level) and water table is found at a depth of 70m below ground level in rainy season and 75m below ground level in summer season.

The quarrying activity will not intersect ground water table as the proposed project P2 depth is 50m (45m above ground level + 5m below ground level) and water table is found at a depth of 70-75m below ground level in rainy season and 80m below ground level in summer season

There is no intersection of surface water bodies in the projects 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 15 m 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.
- De-silting will be carried out before and immediately after the monsoon season.
- The quality of water in open wells, 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 (SO₂), oxides of nitrogen (NO_x) 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 (PM₁₀) 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 will be used in providing mitigation measures as discussed below.

4.4.2 Mitigation Measures

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.

Blasting

- Blasting time will be determined according to the local conditions.
- Blasting will be avoided when temperature changes suddenly and strong wind blows towards residential areas.

- Controlled blasting will be done and the blasting will be restricted to a particular time of the day (i.e., at the time lunch hours).
- Before loading of rough stone, water will be sprayed on the blasted rough stone.
- Dust mask will be provided to the workers and their use will be strictly monitored.

Haul Road and Transportation

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- 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 & 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.

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.

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, blasting, loading and movement of vehicles are the sources of noise in the existing open cast mining projects.

4.5.2 Mitigation Measures

- Sharp drill bits will be used while drilling to reduce noise.
- Secondary blasting will be avoided and rock breaker will be used for breaking boulders.
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system (NONEL).
- 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 through 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 for the proposed projects have been given in Table 4.1.

Table 4.1 Greenbelt Development Plan- P1&P2

Year	No. of trees proposed to be planted	Survival %	Area to be covered in m ²	Name of the species	No. of trees expected to be grown	
	Plantation under safety zone (In Nos.)					
I	30	80%	280	<i>Azadirachta indica</i>	24	
II	30	80%	280		24	
III	30	80%	280		<i>Albizia lebbeck</i>	24
IV	30	80%	280		<i>Delonix regia</i>	24
V	30	80%	280		<i>Tectona grandis</i>	
Year	Plantation in quarry approach road and village road (In Nos)			<i>Nerium indicum, etc.,</i>		
I	80	80%				64
II	80	80%				64
III	80	80%				64
IV	80	80%				64
V	80	80%				64
Proposed Project Site – P2						
	No. of trees proposed to be planted	Survival %	Area to be covered in m ²	Name of the species	No. of trees expected to be grown	
	Plantation under safety zone (In Nos.)					
I	112	80%	1000	<i>Azadirachta indica</i>	89	
II	112	80%	1000		89	
III	112	80%	1000		<i>Albizia lebbeck</i>	89
IV	112	80%	1000		<i>Delonix regia</i>	89
V	112	80%	1000		<i>Tectona grandis</i>	
	Plantation in quarry approach road Side (In Nos)			<i>Nerium indicum, etc.,</i>		
I	12	80%	20			9
II	12	80%	20			9
III	12	80%	20			9
IV	12	80%	20			9
V	12	80%	20			9

Source: Conceptual Plan of Approved Mining plan & proposed by FAE's & EIA Coordinator

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 Anticipated Impact

The projects including P1 and P2 will generate employment for about 45 persons and indirectly will get employment around 40 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.

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 for P1 and P2

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

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 were used.

Table 7.1 Cumulative Production Load of Rough Stone

Quarry	Production for five years plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	1,79,843	35,969	120	20
P2	5,00,977	1,00,195	334	56
Total	6,80,820	1,36,164	454	76
E1	4,56,960	91,392	305	51
E2	5,03,440	1,00,688	336	56
Total	9,60,400	1,92,080	641	107
Grand Total	16,41,220	3,28,244	1095	183

Table 7.2 Predicted Noise incremental Values from Cluster

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	42.3	51.5	51.9	55
Habitation Near P2	47.1	50.6	52.1	
Habitation Near E1	42.3	40.5	44.3	
Habitation Near E2	42.3	44.3	46.3	

Source: Lab Monitoring Data

Table 7.3 Ground Vibrations At 4 Mines

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	52	340m SW	1.051
P2	48	320m NE	1.086
E1	44	740m NW	0.265
E2	48	860m NW	0.223

Source: Blasting Calculations

Table 7.4 Nearest Habitation from Each Mine

Location ID	Distance & Direction
Habitation Near P1	340m SW
Habitation Near P2	320m NE
Habitation Near E1	740m NW
Habitation Near E2	860m NW

Table 7.5 Socio Economic Benefits From 4 Mines

	Project Cost	CER @ 2%
P1	Rs.92,31,000/-	Rs.1,84,620/-
P2	Rs. 66,40,000/-	Rs.1,32,800/-
Total	Rs. 1,58,71,000/-	Rs. 3,17,420/-
E1	Rs.30,30,000/-	Rs.60,600/-
E2	Rs.30,00,000/-	Rs.60,000/-
Total	Rs.60,30,000/-	Rs 1,20,000/-
Grand Total	Rs. 2,19,01,000/-	Rs. 4,37,420/-

CHAPTER VIII

PROJECT BENEFITS

The proposed projects, P1 & P2 at Kothapetta Village aims to produce cumulatively 6,80,820 m³ rough stone over a period of 5 years. 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.