

EXECUTIVE SUMMARY

Tvl. THIRUPATHI BLUE METAL & M. SAND ROUGH STONE AND GRAVEL QUARRIES

NAME OF PROPOSED PROJECT PROPONENTS APPLYING IN CLUSTER

S.Nos	Name of Proposed Proponent	Extent
1	Tvl. Thirupathi Blue Metal & M. Sand	2.85.0 Ha
2	Tvl. Thirupathi Blue Metal & M. Sand	8.00.05 Ha

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

* **CLUSTER EXTENT = 17.64.55 ha**

* Cluster Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

ToR Obtained vide

1. Lr.No. SEIAA-TN/F.No.9534/ToR-1347/2022 Dated: 10.02.2023 –P1
2. Lr.No. SEIAA-TN/F.No.9668/ToR-1351/2022 Dated: 16.02.2023– P2

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS



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Baseline Monitoring Period - March 2023 to May 2023

Environmental Lab

EHS 360 LABS PRIVATE LIMITED

(Approved by ISO/IEC 17025:2017)

Certificate number- TC-9583

10/2, Ground Floor, 50th Street,

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Tamil Nadu, India.

JULY 2023

1. 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 project.

Rough Stone and Gravel are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of proposed & existing quarries of Tvl.Thirupathi Blue metals & M. sand Rough Stone and Gravel Cluster Quarry consisting of Two Proposed and Two Existing Quarries with total extent of Cluster of 17.64.55 Ha in Enthoor Village, Marakkanam Taluk, Viluppuram District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016. Proponent applied for Environmental Clearance to SEIAA, Tamil Nadu and obtained

CODE	Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
P1	Tvl. Thirupathi Blue Metal & M. Sand,	2.85.0	Lr.No. . SEIAA-TN/F.No.9016/SEAC/ToR-1159/2022 Dated: 06.06.2022
P2	Tvl. Thirupathi Blue Metal & M. Sand	8.00.05 ha	Lr No. SEIAA-TN/F.No.9156/SEAC/ToR-1184/2022 Dated:06.07.2022

for carrying out EIA and EMP studies for the rough stone and gravel quarry.

The Baseline Monitoring study has been carried out during Pre Moonsoon season (March 2023 to May 2023) and the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) individually to minimize those adverse impacts..

“Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”

1.1 DETAILS OF PROJECT PROPONENT

Project	P1	P2
Name of the Project	Tvl Thirupathi Blue Metals & M.sand Rough Stone & Gravel	Tvl Thirupathi Blue Metals & M.sand Rough Stone & Gravel
S.F. No.	6/1,7/2,3,4	2/1B,2,3(P),5,3,4/1,2
Extent	2.85.0	8.00.05 ha
Land Type	Patta Land	Patta Land
Village ,Taluk and District	Enthoor Village, Marakkanam Taluk, Viluppuram District	

Name of the Project Proponent	E. Sekar, Managing Partner (Tvl Thirupathi Blue Metals & M.sand)
Address	S/o. Etty, No.32, Bajanai Kovil Street, Natham Kariyacherry Village, Mullikolathur Post, Thirukazhukundram Taluk, Kancheepuram District
Mobile	+91 86088 15555 & 94436 02213
Status	Partnership

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

CODE	Name of the Owner	S.F. Nos	Extent in Ha	Status
P1	Tvl. Thirupathi Blue Metal & M.Sand,	6/1, 7/2, 7/3 and 7/4	2.85.0	TOR obtained vide Lr.No. SEIAA-TN/F.No.9534/SEAC/ToR-1347/2022 Dated: 10.02.2023
P2	Tvl. Thirupathi Blue Metal & M.Sand,	2/1B, 2/2, 2/3 (P), 2/5, 3, 4/1 & 4/2,	8.00.05	TOR obtained vide Lr.No. SEIAA-TN/F.No.9668 /ToR-1351/2022 Dated: 16.02.2023
TOTAL EXTENT			10.85.05	
EXISTING QUARRIES				
CODE	Name of the Owner	S.F. Nos	Extent in Ha	Status
E1	R.Vignesh.	5/1,2,3,4,5,6,7	3.94.0	26.12.2019 to 25.12.2024
E2	Tvl. Sri Balaji Blue metals and M.Sand,	163/1, 163/2 (P)	2.79.0	19.09.2019 to 18.09.2024
TOTAL EXTENT			6.79.50	
Abandoned QUARRY				
EX-1	Sri Balaji Blue metals,	6/1,7/2,3,4	2.85.0	18.04.2013 to 17.04.2018
TOTAL EXTENT			0.69.0	
TOTAL CLUSTER EXTENT			17.64.55	

TABLE 1.3 SALIENT FEATURES OF THE PROPOSAL

Name of the Project	Tvl. Thirupathi Blue Metal & M. Sand Rough Stone & Gravel Quarry	
Toposheet No	57-P/16	
Latitude between	12° 13' 17.9159" N to 12° 13' 29.3407" N	
Longitude between	79° 47' 13.2559" E to 79° 47' 19.9500" E	
Highest Elevation	100m AMSL	
Proposed Depth of Mining	37 m bgl (2 m topsoil +35m Rough Stone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	10,01,221	54,758
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	2,61,972	27,878
Yearwise production after bench reduction	Rough Stone in m ³	Gravel m ³
	2,59,242	27,878
Existing pit Dimension	Pit I: 1978 Area in S. qm x 2m (D) Pit II: 558 Area in S. qm x 2m(D) Pit III: 3812 Area in S. qm x 12m(D) Pit IV: 1282 Area in S. qm x 12m(D)	
Previous EC details	It is previously operated by Sri balaji blue metals from 18.04.2013 to 17.04.2018 Lr.No. SEIAA-TN/F.No.767/EC/1(a)/156 dated: 27.03.2013.	
Ultimate Pit Dimension	359m (L) x 105m (W) x 37m (D)	
Water Level measured in the surrounding area	51m-47m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits almost plain terrain. The area has gentle sloping towards eastern side. The altitude of the area is 100m (max) above mean sea level. The area is covered by 2m thickness of gravel formation. Massive Charnockite is found after 2m of Gravel formation which is clearly inferred from the existing quarrying pit.	
Machinery proposed	Jack Hammer	8 Nos
	Compressor	2 Nos

	Hydraulic Excavator& Rock Breaker	2 Nos
	Tipplers	4 Nos
Blasting method and type of Explosives proposed	Controlled Blasting Method by shot hole drilling (30.-32mm dia hole) and small dia of 25mm slurry explosive are proposed to use for winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	34 Nos	
Project Cost	Rs.54,37,000/-	
CER Cost	Rs.5,00,000/-	
Nearby Water Bodies	odai	500m_NE
	Tank	260m_SW
	Kunnappakkam Lake	800m_E
	Ariyathangal Lake	860m_SW
	Endur Lake	1.3Km_S
	Bramaddesam Lake	3Km_SW
	Munnur Lake	4Km_SE
	Nallavur Lake	8.5Km_SW
	Puthunagara Lake	8.5Km_SW
	Nolambur Lake	6Km_NW
	Kilsevir Lake	4Km_NW
Ongur Stream	8.5Km_NE	
Greenbelt Development Plan	1700 trees will be planned in safety area, approach road and panchayat roads	
Proposed Water Requirement	1.5 KLD	
Nearest Habitation	570m South West	

1.3 STATUTORY DETAILS

Project – P1 –

- The proponent applied for Rough Stone Quarry Lease Dated: 16.08.2019.
- Precise Area Communication Letter was issued by the District Collector, Viluppuram Rc.No.B/G7M/678/2019 , Dated: 28.04.2022
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Viluppuram District, vide Rc.No.B/G7M/678/2019 , Dated: 24.06.2022.
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/402621/2022 Date: 10.10.2022.

Project – P2 –

- The proponent applied for Rough Stone Quarry Lease Dated: 29.04.2022.
- Precise Area Communication Letter was issued by the District Collector, Viluppuram Rc.No.B/G&M/164/2022, Dated: 18.10.2022
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Viluppuram District, vide Rc.No.B/G&M/164/2022, Dated: 17.11.2022.
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No.
- SIA/TN/MIN/411373/2022 Date: 20.12.2022

2.0 PROJECT DESCRIPTION

- The proposed projects are site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarry.

- Rough Stone is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	National Highway (NH-32) Chennai- Tindivanam– 10km - Northwestern State Highway (SH-134) Tindivanam – Marakkanam – 2km - South
Nearest Village	Enthoor – 1.20 Km – NE
Nearest Town	Marakkanam – 16km – NE
Nearest Railway Station	Panchalam Railway Station – 12.0km – NW
Nearest Airport	Chennai Airport – 93km – NE
Seaport	Chennai seaport- 110km - NE

2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

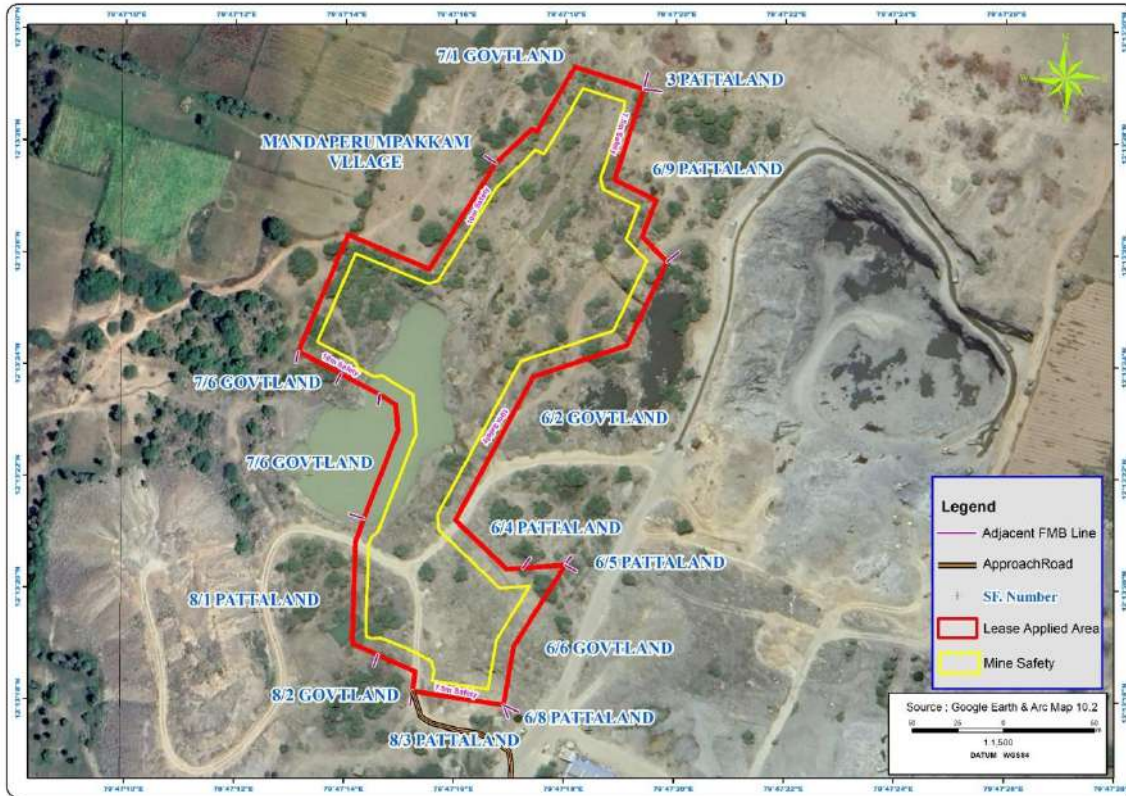
PROJECT – P1			
Description	Present area in (ha)	Area at the end of life of quarry (Ha)	
Area under quarry	0.76.3	2.24.0	
Infrastructure	Nil	0.01.0	
Road	0.01.0	0.03.0	
Green Belt	Nil	0.36.1	
Unutilized area	2.07.7	0.20.9	
Grand Total	2.85.0	2.85.0	
PROJECT – P2			
Description	Present area in (ha)	Area at the of life of quarry (Ha)	Area at the end of life of quarry (Ha)
Area under quarry	Nil	6.98.70	6.98.70
Infrastructure	Nil	0.01.00	0.01.00
Road	Nil	0.02.0	0.02.00
Green Belt	Nil	0.15.00	0.40.00
Unutilized area	8.00.05	0.83.35	0.58.35
Grand Total	8.00.05	8.00.05	8.00.05

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PROJECT – P1		
PARTICULARS	DETAILS	
	Rough Stone in m ³ (5Year Plan period)	Gravel in m ³
Geological Resources	10,01,221	54,758
Mineable Reserves	2,61,972	27,878
Yearwise production after bench reduction	2,59,242	27,878
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day	172 m ³	31
No of Lorry loads (12m ³ per load)	14	3
Total Depth of Mining	37m bgl (2 m topsoil +35m Rough Stone)	
PROJECT – P2		
PARTICULARS	DETAILS	
	Rough Stone in m ³ (5Year Plan period)	Gravel in m ³

Geological Resources	42,37,138	1,59,892
Mineable Reserves	24,07,748	1,40,744
Yearwise production as per ToR	11,55,048	1,40,744
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day	770	156
No of Lorry loads (6m ³ per load)	64	13
Proposed Depth as per Mining plan	55m bgl (2m Gravel + 53m Rough Stone)	

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

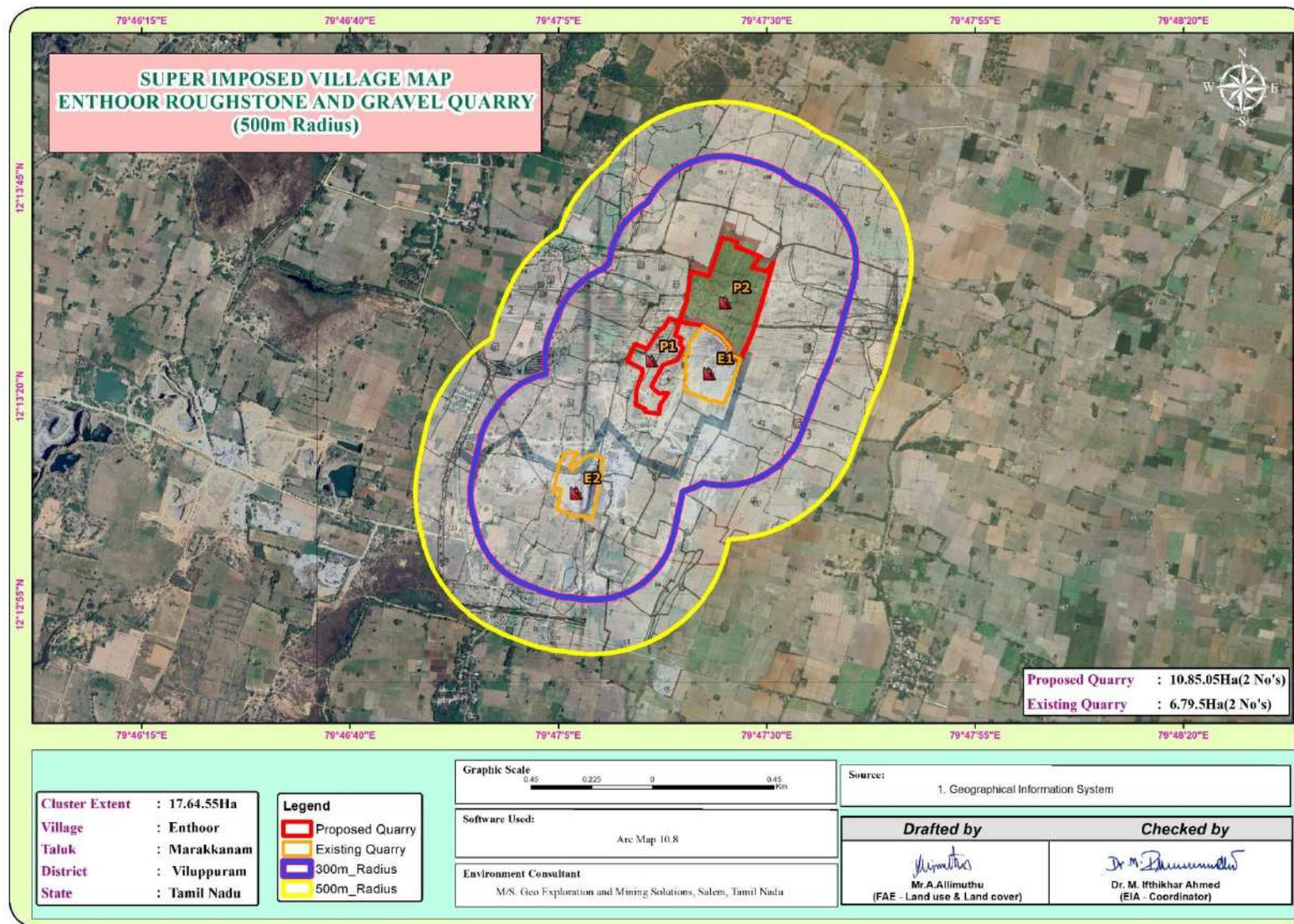


SATELLITE IMAGERY OF P1 –



SATELLITE IMAGERY OF P2-

FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)



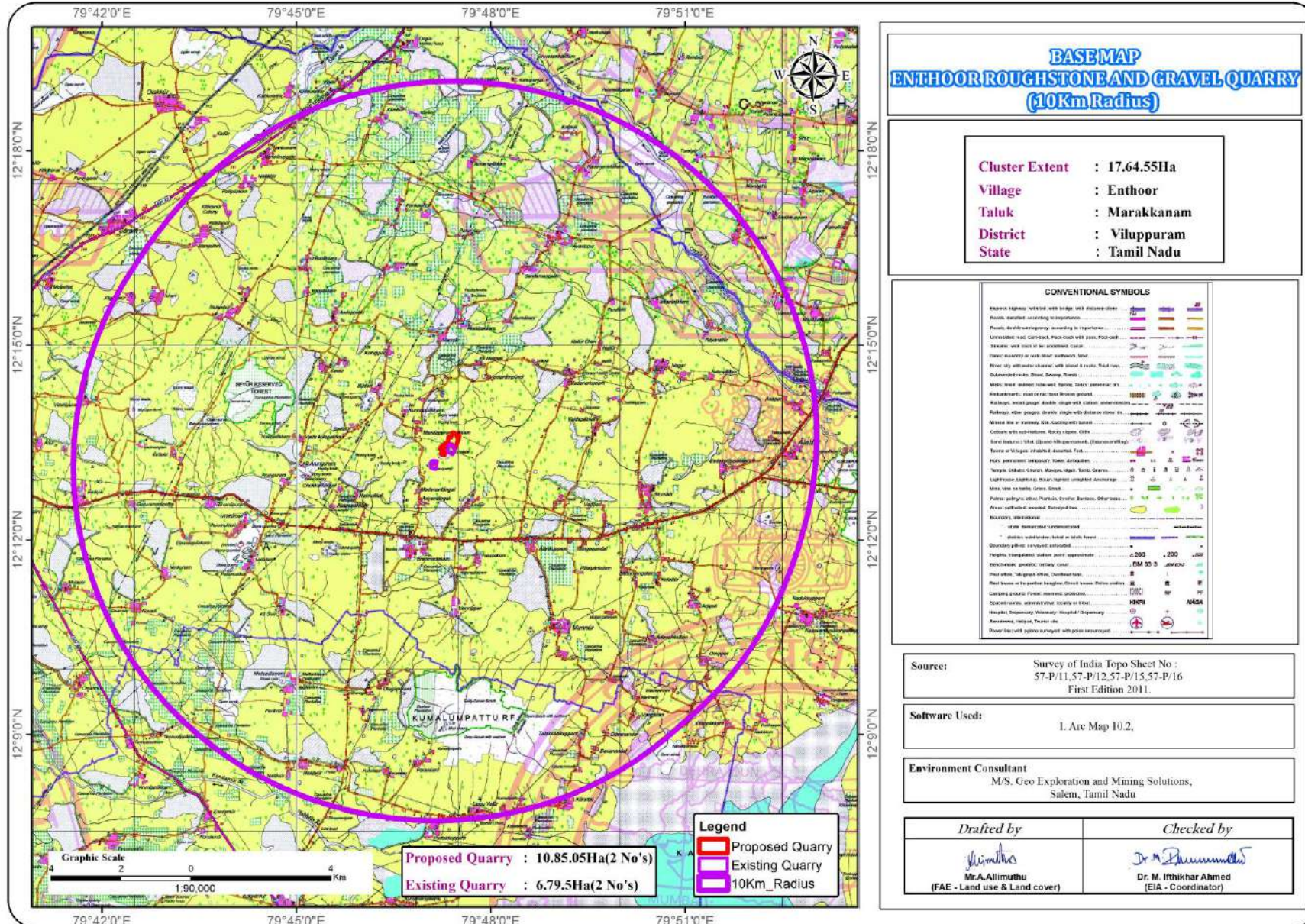
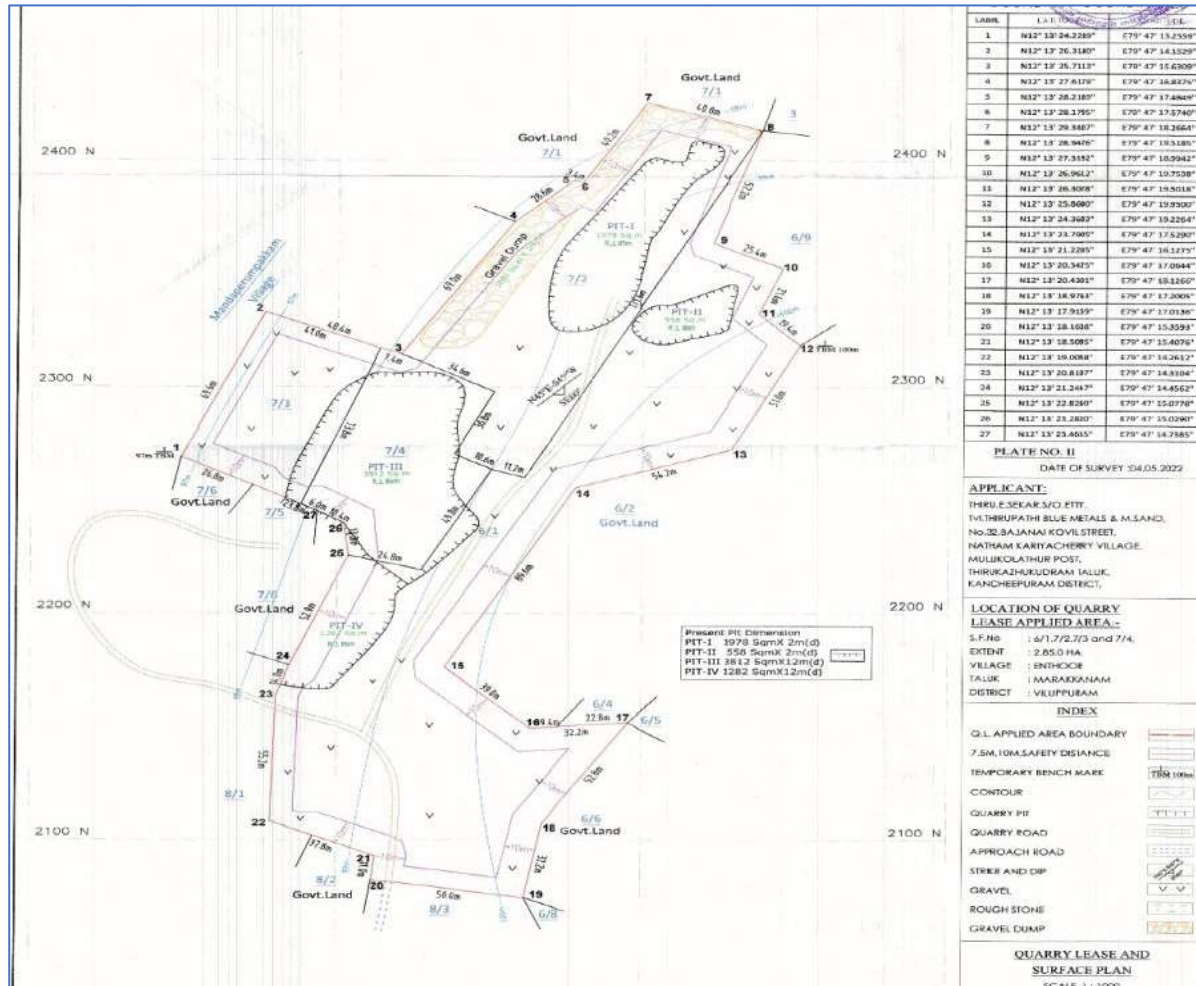
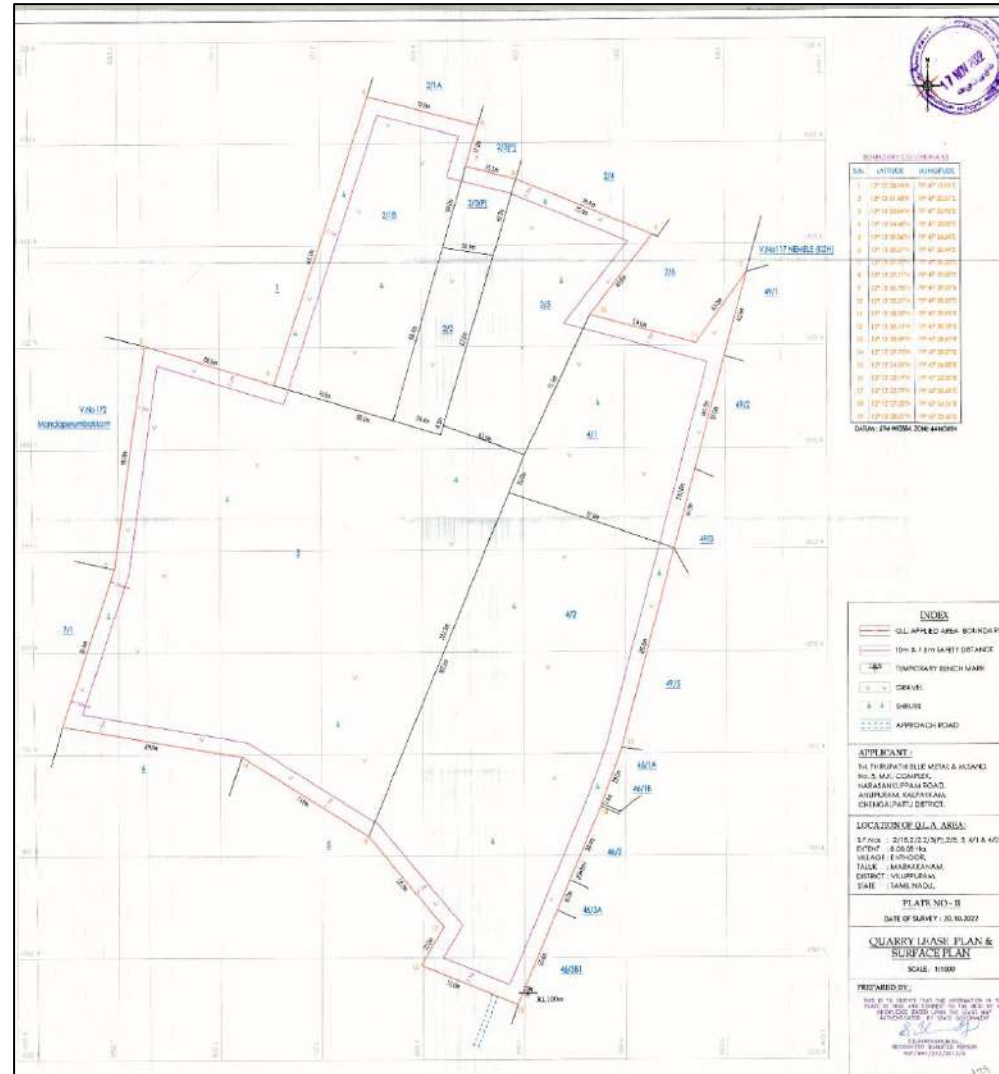


FIGURE – 4: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS OF CLUSTER QUARRIES

P1



P2



2.4 METHOD OF MINING

The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.5 PROPOSED MACHINERY DEPLOYMENT

PROPOSAL – P1		
*Purpose	Quantity	Source
Dust Suppression	0.6 KLD	From Existing bore wells from nearby area
Green Belt development	0.5 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Domestic purpose	0.4 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Total	1.5 KLD	
PROPOSAL – P2		
*Purpose	Quantity	Source
Dust Suppression	1.0 KLD	Source
Green Belt development	0.3 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Domestic purpose	0.3 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Total	1.6 KLD	Water Tankers

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.,

2.7 ULTIMATE PIT DIMENSION

PROPOSAL – P1			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
1	359	105	37
PROPOSAL – P2			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
1	132	196	50
2	186	256	55

3.0 DESCRIPTION OF THE ENVIRONMENT

The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the

background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering October – December 2022 as per CPCB & MoEF & CC guidelines.

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (2 core & 4buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Auto matic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (March 2023 to May 2023)	8 (2 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (2 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrante & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

3.2 LAND ENVIRONMENT

The main objective of this section is to provide a baseline status of the study area covering 10km radius around the proposed mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future

TABLE 3.1: LAND USE / LAND COVER TABLE 10 KM RADIUS

S.No	Classification	Area_Ha	Area_%
BUILTUP			
1	Urban	76.61	0.23
2	Rural	622.50	1.87
3	Mining	302.96	0.91
AGRICULTURAL LAND			
4	Crop Land	20583.23	61.97
5	Agricultural Plantation	3391.15	10.21
6	Fallow Land	2771.53	8.34
FOREST			
7	Forest Plantation	289.92	0.87
8	Scrub Forest	401.31	1.21
BARREN/WASTELAND			
9	Scrub Land	242.22	0.73
10	Salt Affected Area	1109.14	3.34
WATERBODIES			
11	Waterbodies	3423.67	10.31
		33214.24	100.00

LU/LC Interpretation:

A visual interpretation technique has been adopted for land use classification based on the keys suggested in the chapter – V of the guidelines issued by NNRMS Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover.

3.3 SOIL ENVIRONMENT

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium. The standard classifications of soil are presented below in Figure 3.4 and the physico-chemical characteristics of the soil & Test Results

Interpretation & Conclusion

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 Sandy Loam Soil and Bulk Density of Soils in the study area varied between 0.99 – 1.15 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 37.3 to 54.1 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.52 to 8.21
- The available Nitrogen content range between 221 to 478 kg/ha
- The available Phosphorus content range between 0.89 to 2.14 kg/ha
- The available Potassium range between 18.7 to 36.4 mg/kg

3.4 WATER ENVIRONMENT

The study area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

Surface Water

Ph:

The pH varied from 7.21 to 7.38 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids varied from 680 to 699 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 196 – 232 mg/l. Nitrates varied from 8.6 to 11.2 mg/l, while sulphates varied from 75.6 to 86.7 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.11 to 7.52 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 502 - 579 mg/l in all samples. The Total hardness varied between 180 – 204 mg/l for all samples.

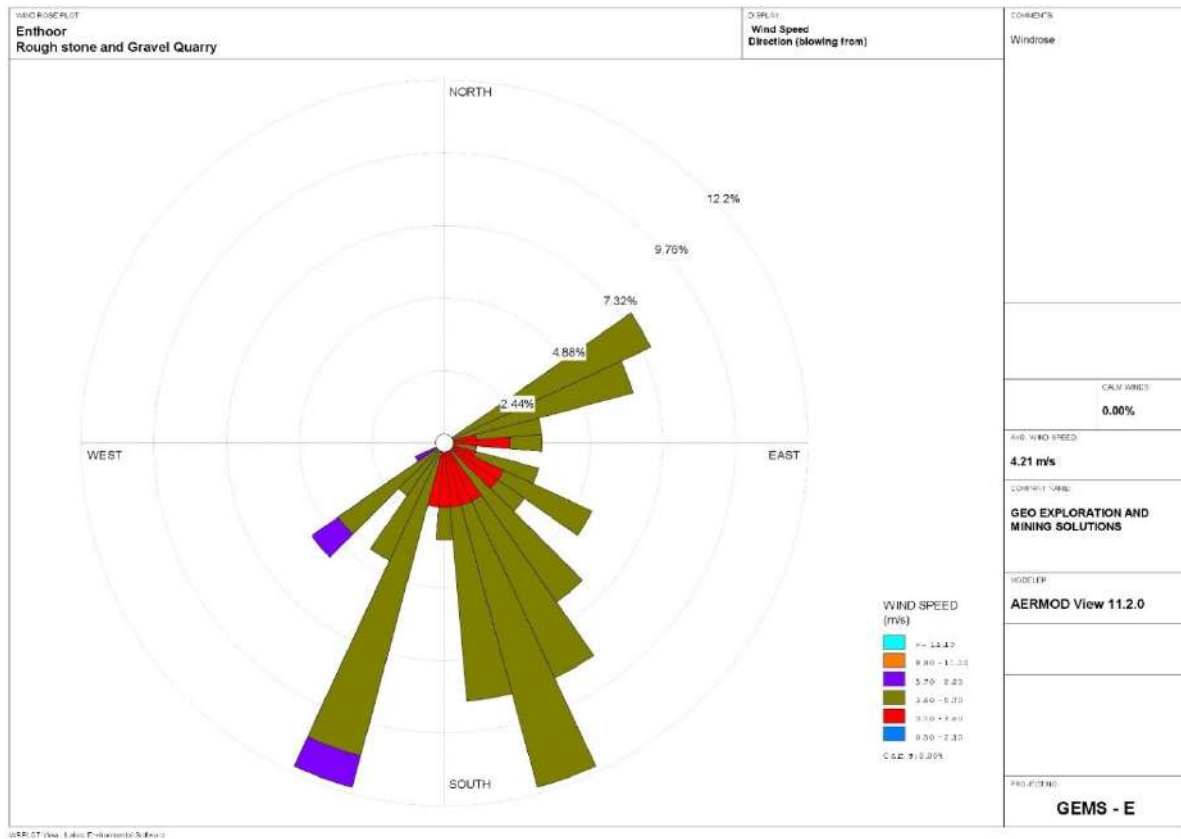
On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.5 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the cluster forms the baseline information. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. The prime

objective of the baseline air quality study was to establish the existing ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed projects in cluster.

FIGURE – 6: WIND ROSE DIAGRAM



Source: Wind Rose plot view, Lake Environmental Software

3.6 SUMMARY OF AMBIENT AIR QUALITY

In the abstract of collected data wind rose were drawn on presented in figure No.3.14 during the monitoring period in the study area

- Predominant winds were from NW – SE.
- Wind velocity readings were recorded between 8.80 to 11.10 m/s
- Calm conditions prevail of about 0.00 % of the monitoring period
- Temperature readings ranging from 26.36 to 31.44 °C
- Relative humidity ranging from 72.19 to 79.03 %
- The monitoring was carried out continuously for three months.

3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. Noise levels recorded in core zone during day time 40.7 dB (A) Leq to 41.7 dB (A) Leq and during night time were from 34.3 dB (A) Leq to 35.1 dB (A) Leq . Noise levels recorded in buffer zone during day time were from 36.8 to 40.8 dB (A) Leq and during night time were from 34.1 to 36.3 dB (A) Leq.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.8 ECOLOGICAL ENVIRONMENT

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. 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.

3.9 SOCIO ECONOMIC ENVIRONMENT

The major developmental activities in mining /Industrial sector are required for economic development as well as creation of employment opportunities (direct and indirect) and to meet the basic/modern needs of the society, which ultimately results in overall improvement of the quality of life through upliftment of social, economic, health, education and nutritional status in the project region, state as well as the country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for new developmental projects. Thus, the study of socioeconomic component incorporating various facets related to prevailing social and cultural conditions and economic status of the Roughstone and Gravel quarry project region is an important part of EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socio economics and parameters of human interest due to the project.

The objectives of the socio-economic impact assessment are as follows:

- a) To study the socio-economic status of the people living in the study area of the project.
- b) To identify the basic needs of the nearby villages within the study area.
- c) To assess the impact on socio-economic environment due to the project.
- d) To provide the employment and improved living standards.
- e) To study the socio-economic status of the people living in the study area Roughstone and Gravel quarry project region
- f) To assess the impact on socio-economic environment due to Roughstone and Gravel quarry project region
- g) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

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 sustainable resource extraction.

4.1 LAND ENVIRONMENT:

ANTICIPATED IMPACT

- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.

- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.
- If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course
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MITIGATION MEASURES

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

IMPACT ON SOIL ENVIRONMENT

Erosion and Sedimentation (Removal of protective vegetation cover; Exposure of underlying soil horizons that may be less pervious, or more erodible than the surface layers; Reduced capacity of soils to absorb rainfall; Increased energy in storm-water runoff due to concentration and velocity; and Exposure of subsurface materials which are unsuitable for vegetation establishment).

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

4.3 WATER ENVIRONMENT

ANTICIPATED IMPACT

- The major sources of water pollution normally associated due to mining and allied operations are:
 - Generation of waste water from vehicle washing.
 - Washouts from surface exposure or working areas
 - Domestic sewage
 - Disturbance to drainage course in the project area
 - Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table

MITIGATION MEASURES

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.

- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water

4.4 AIR ENVIRONMENT

ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.
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MITIGATION MEASURES

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

Advantages of Wet Drilling:-

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

Blasting

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e., at the time lunch hours, controlled charge per hole as well as charge per round of hole
- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & Transportation

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

- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled 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 certificate
- Grading of haul roads and service roads to clear accumulation of loose materials
- .

Green Belt

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

Occupational Health

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- Ambient Air Quality Monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed
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4.5 NOISE ENVIRONMENT

ANTICIPATED IMPACT

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

- Source data
- Receptor data
- Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4-8.

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MITIGATION MEASURES

The following noise mitigation measures are proposed for control of Noise

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;

- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects
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4.6 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

- There is no Wildlife Sanctuary and Biosphere Reserve within 10 km radius of the project site.
- No rare, endemic & endangered species are reported in the buffer zone. However, during the course of mining, the management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.
- Fencing around all the proposed mine lease areas will be constructed to restrict the entry of stray animals
- Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

MITIGATION MEASURES

- All the preventive measures will be taken for growth & development of fauna.
- Creating and development awareness for nature and wildlife in the adjoin villages.

The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm.

The objectives of the green belt cover will cover the following:

- Noise abatement
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

GREENBELT DEVELOPMENT PLAN

PROPOSAL – P1					
Year	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	1700	80%	Safety barrier, Village roads & Approach roads	Neem, Pongamia Vilvam etc.,	1360
PROPOSAL – P2					
Year	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	4800	80%	Safety barrier, Village roads & Approach roads	Neem, Pongamia Vilvam etc.,	3840

4.7 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

- ∞ Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- ∞ Approach roads can be damaged by the movement of tippers
- ∞ Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

∞ .

MITIGATION MEASURES

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Air pollution control measure will be taken 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 mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

No alternatives are suggested as all the mine sites are mineral specific.

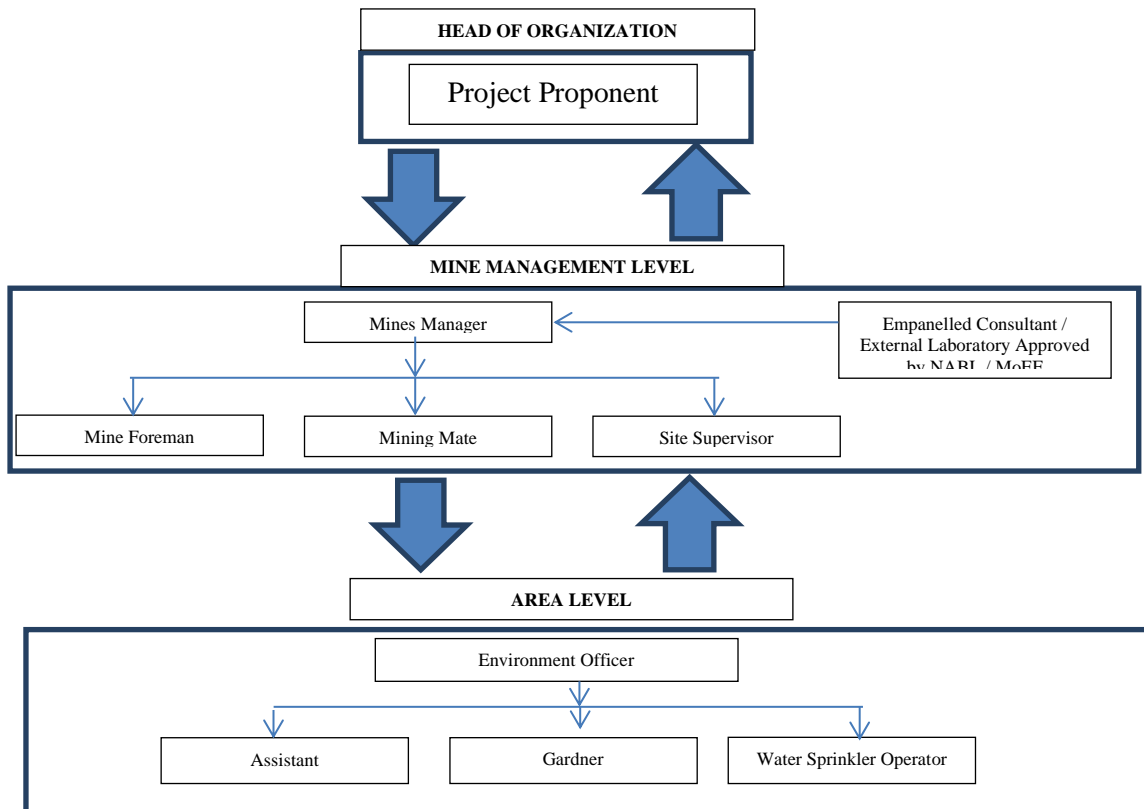
6. ENVIRONMENT MONITORING PROGRAM

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in all the proposed quarries.

The responsibilities of this cell will be:

- Implementation of pollution control measures
- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert's advice when needed.

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

7. ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

The methodology for the risk assessment has been 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 all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for all proposed projects. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

7.2 DISASTER MANAGEMENT PLAN

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated.

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

7.3 CUMULATIVE IMPACT STUDY

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Production for five year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	2,61,972	52,394	174	15
P2	11,55,048	2,31,009	770	64
Total	14,17,020	2,83,403	944	79
E1	6,75,745	1,35,149	450	38
E2	5,05,750	1,01,150	337	28
Total	11,81,495	2,36,299	787	66
Grand Total	25,98,515	5,19,702	1,731	145

CUMULATIVE PRODUCTION LOAD OF GRAVEL IN CLUSTER

Quarry	Production for Three year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	27878	9,292	31	3
P2	140744	46,914	156	14
Total	1,68,622	56,206	187	17
E1	62562	20,854	70	6
E2	62769	20,923	70	6
Total	1,25,331	41,777	140	12
Grand Total	2,93,953	97,983	327	29

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	51.6	42.4	52.1	55
Habitation Near P2	51.0	44.1	51.8	
Habitation Near E1	49.0	43.0	52.8	
Habitation Near E2	50.8	44.7	53.4	

SOCIO ECONOMIC BENEFITS

Location ID	Project Cost	CER
P1	Rs.54,37,000	Rs.5,00,000
P2	Rs. 5,70,44,000	Rs.5,00,000
Total	Rs. 6,24,81,000	Rs.10,00,000
E1	Rs.56,74,000	Rs.5,00,000
E2	Rs.59,97,360	Rs.5,00,000
Total	Rs. 1,16,71,360	Rs.10,00,000
Grand Total	Rs. 7,41,52,360	Rs. 20,00,000

A total of 56 people will get employment due to 2 mines in cluster and already employed at existing mines. Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018 by all the mines.

8. PROJECT BENEFITS

Tvl.Thirupathi Blue Metals Rough Stone & Gravel Quarries for Quarrying at Enthoor Village aims to produce 14,17,020 m³ Rough Stone & 1,68,622 m³ Gravel over a period of 5 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

- ∞ Increase in Employment Potential
- ∞ Improvement in Socio-Economic Welfare
- ∞ Improvement in Physical Infrastructure
- ∞ Improvement in Social infrastructure

9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring cell discussed 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 be responsible for:

- ✚ Monitoring of the water/ waste water quality, air quality and solid waste generated
- ✚ Analysis of the water and air samples collected through external laboratory
- ✚ Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- ✚ Co-ordination of the environment related activities within the project as well as with outside agencies.
- ✚ Collection of health statistics of the workers and population of the surrounding villages.
- ✚ Green belt development.
- ✚ Monitoring the progress of implementation of the environmental monitoring programme.
- ✚ Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10. CONCLUSION

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan 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.