

EXECUTIVE SUMMARY

For

PALLI ROUGH STONE & GRAVEL QUARRY

Over an extent of 1.05.5 Ha of Patta land

At

S. F. Nos : 51/4 & 51/5A1B

Palli Village, Cheyyar Taluk,

Tiruvannamalai District,

Tamil Nadu State.

Applicant

**Thiru.S.Sivasuriyamadhava Raja,
S/o.Subramaniyan,**

No:9/13, Shanmuga Nagar,

Mannivakkam, Chennai.

Pin Code– 600048.

(Project termed under Schedule 1(a) Mining of Minor Minerals 'B2' category as per EIA Notification 2006 and its Amendments thereafter and as per the O.M issued vide F.No. L-11011/175/2018-IA-II (M), dated: 12.12.2018 considering the cluster the project is termed under Schedule 1(a) Mining of Minor Minerals 'B1' category)

EIA Consultant

HUBERT ENVIRO CARE SYSTEMS PRIVATE LIMITED, CHENNAI

November 2022

EXECUTIVE SUMMARY

➤ Project Description

The total extent area of the quarry is 1.05.5.Ha, situated at 51/4 & 51/5A1B Palli Village, Cheyyar Taluk, Tiruvannamalai District, TamilNadu State.

The Assitant Director of Tiruvannamalai had issued the precise area communication letter to produce the approved Mining Plan within a period of 90 days as per Rule 8-C (3b) of Tamil Nadu Minor Mineral Concession Rules, 1959 vide **RC No.09/Kanimam/2018, dated: 14.12.2018.**

Subsequently, submitted the Mining Plan for the subject area and the same was approved by Assitant director of Geology and Mining, Tiruvannamalai vide **RC No.09/Kanimam/2018, dated: 24.01.2019.** Mining plan approval letter is enclosed as **Annexure-3** and the approved Mining plan is enclosed as **Annexure-4.**

The proposal was appraised during 250th SEAC meeting held on 03.03.2022, Minutes received on 19.03.2022 and 494th SEIAA meeting held on 21.03.2022 and ToR was issued vide **Letter No. SEIAA-TN/F.No.8835/SEAC/ToR-1101/2021, dated: 21.03.2022** in which the production capacity of the proposed quarry is 99,440 m³ of Rough Stone and 14,322 m³ of Gravel and the depth was upto 42.0 m (Max) for the preparation of EIA/EMP report.

➤ Management Commitment

Project Proponent will firmly address all the EC conditions and its requirements once obtained from SEIAA, TN and will execute the Environmental Management Plan.

➤ Environmental Sensitive Areas

As seen in **Table-I** below, No major Environmental Sensitive areas are located within 15km Radius from the project site. Thus the project does not attract the special conditions and general conditions as per EIA Notification.

Table-1 Salient Features within15km of the project

S. No	Particulars	Details
1.	Latitude & Longitude	12°43'13.58"N, 79°36'39.41"E)
2.	Site Elevation above MSL (m)	~ 101-104m
3.	Topography	Plain Topograpghy
4.	Lease area Topo Sheet details	57-P/10
5.	Land classification	Patta Land (Patta no.1432)

6.	Nearest highway	NH-48(Delhi-Chennai) is at distance of ~ 16.88km (NNE), SH-116 (Kanchipuram-Vandavasi) is at ~ 6.07 km (ESE).																																																																
7.	Nearest Railway station	Nathapettai Railway station ~16.88 km (NE)																																																																
8.	Nearest Airport	Chennai International Airport ~ 64.69 km (ENE)																																																																
9.	Nearest Town / City	Nearest Town - Cheyyar(Tiruvettipuram) ~ 9 km (SW)																																																																
10.	Areas which are important or sensitive for ecological reasons – Wetlands, Watercourses or other water bodies, coastal zone, biospheres, mountains, forests	<p>Waterbodies:</p> <table border="1"> <thead> <tr> <th>S. No</th> <th>Places</th> <th>Distance (~km)</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Pond near Project Site</td> <td>0.08</td> <td>W</td> </tr> <tr> <td>2</td> <td>Lake near Sanarpandai</td> <td>1.04</td> <td>NNW</td> </tr> <tr> <td>3</td> <td>Lake near Palli Mettu Colony</td> <td>1.57</td> <td>SW</td> </tr> <tr> <td>4</td> <td>Lake near Sumangali</td> <td>6.34</td> <td>WNW</td> </tr> <tr> <td>5</td> <td>Anakkavur Eri</td> <td>12.23</td> <td>SW</td> </tr> <tr> <td>6</td> <td>Thandarai canal</td> <td>1.43</td> <td>WNW</td> </tr> <tr> <td>7</td> <td>Mamandur Tank</td> <td>2.55</td> <td>NE</td> </tr> <tr> <td>8</td> <td>Cheyyar river</td> <td>6.19</td> <td>S</td> </tr> <tr> <td>9</td> <td>Odai near Nattapettai</td> <td>7.56</td> <td>NE</td> </tr> <tr> <td>10</td> <td>Palar river</td> <td>9.74</td> <td>NNE</td> </tr> <tr> <td>11</td> <td>Canal near Anumantandalam</td> <td>10.04</td> <td>SE</td> </tr> <tr> <td>12</td> <td>Vengavati</td> <td>14.64</td> <td>NW</td> </tr> </tbody> </table> <p>Reserve Forest:</p> <table border="1"> <thead> <tr> <th>S. No</th> <th>Name</th> <th>Distance(~km)</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Tandappan tangal R.F</td> <td>10.81</td> <td>NW</td> </tr> <tr> <td>2</td> <td>Pulavakkam R.F</td> <td>12.68</td> <td>W</td> </tr> </tbody> </table>	S. No	Places	Distance (~km)	Direction	1	Pond near Project Site	0.08	W	2	Lake near Sanarpandai	1.04	NNW	3	Lake near Palli Mettu Colony	1.57	SW	4	Lake near Sumangali	6.34	WNW	5	Anakkavur Eri	12.23	SW	6	Thandarai canal	1.43	WNW	7	Mamandur Tank	2.55	NE	8	Cheyyar river	6.19	S	9	Odai near Nattapettai	7.56	NE	10	Palar river	9.74	NNE	11	Canal near Anumantandalam	10.04	SE	12	Vengavati	14.64	NW	S. No	Name	Distance(~km)	Direction	1	Tandappan tangal R.F	10.81	NW	2	Pulavakkam R.F	12.68	W
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11.	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	There is no protected sensitive species identified within the 15km radius.																																																																
12.	Environmental Sensitive areas: National parks / Wildlife Sanctuaries/etc/ Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Nil																																																																
13.	Seismic Zone	Zone-III (Moderate Damage Risk Zone)																																																																
14.	Defense Installations	Nil within 15 km radius of the project boundary																																																																
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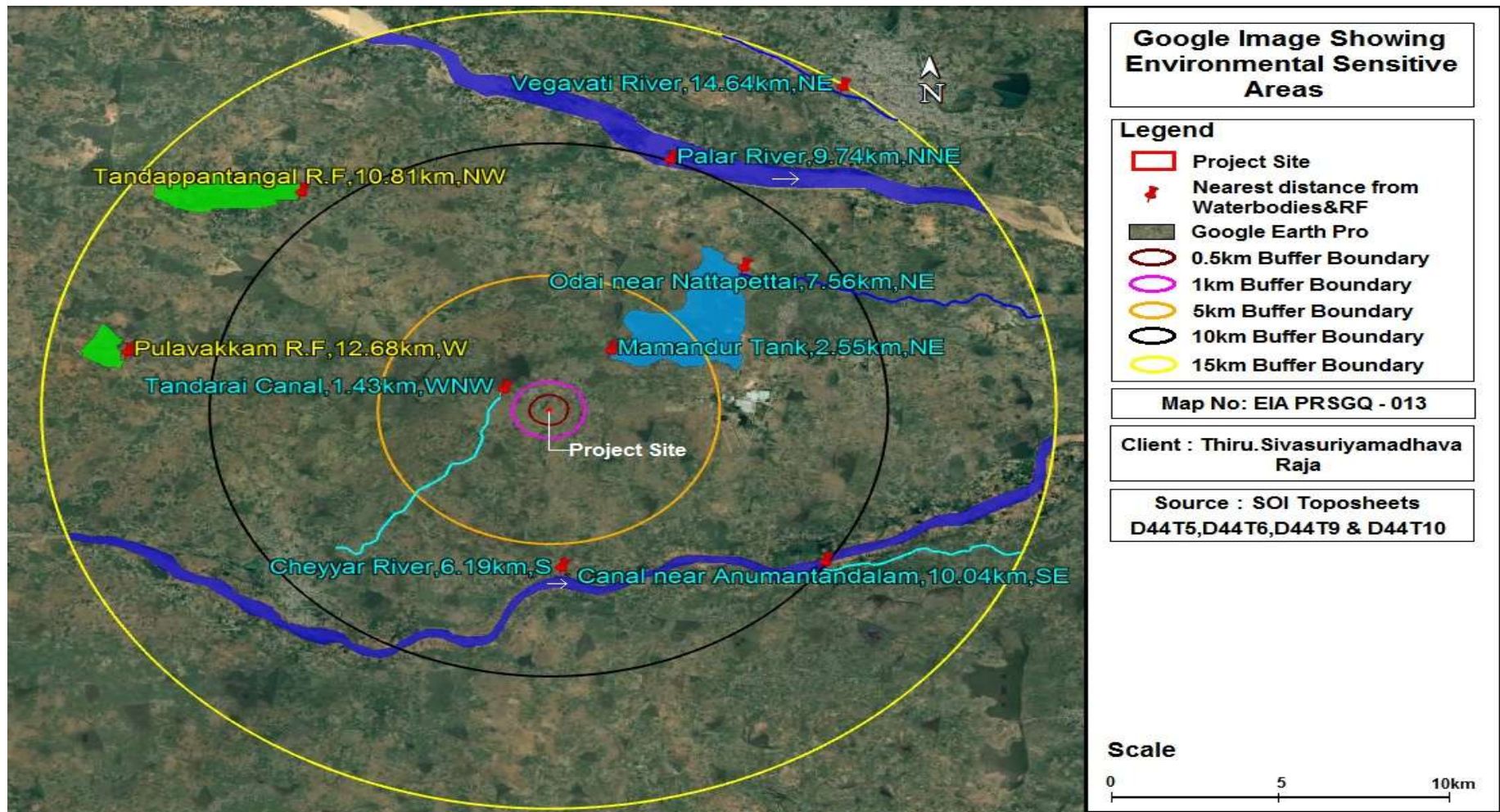


Figure-1 Google image for Environmental Sensitive areas demarcated within 15km radius of the project site

Rough Stone Quarry Reserves

- The estimated Geological Reserves of Rough Stone estimated based on the Geological cross sections was 5,20,800 m³ of Rough Stone and Gravel.
- The Mineable Reserves have been arrived 99,440 m³ of Rough Stone and 14,322 m³ of Earth.
- The Proposed production capacity is restricted to 99,440 m³ of Rough Stone and 14,322 m³ of Gravel for five years.

Table -2 Project Summary

S. No	Particulars	Details
1.	Project Location	51/4 & 51/5A1B Palli Village, Cheyyar Taluk, Tiruvannamalai District, TamilNadu State
2.	Land classification	Patta Land
3.	Extent of lease area (Ha.)	1.05.5
4.	Geological Reserves m ³	Rough stone and Gravel : 5,20,800
5.	Mineable Reserves m ³	Rough stone : 99,440 Gravel : 14,322
6.	Proposed Production capacity	Rough stone : 99,440 Gravel : 14,322
7.	Depth of Mining	42.0 m (Max)
8.	Method of Mining	Open cast semi mechanized method
9.	Water Requirement (kLD)	2.5
10.	Source of Water	Local suppliers
11.	Fuel requirements (litres of HSD for 5 years)	81,942
12.	Manpower (Nos.)	18
13.	Municipal Solid Waste Generation (kg/day)	8.1
14.	Waste Oil generation (Litres/Year)	3.0
15.	Project Cost in Lakhs	27,67,500/-

Table -3 Summary Project Reserves

S. No	Description	Rough Stone (m ³)	Gravel (m ³)
1	Geological Reserves	5,20,800	
2	Mineable Reserves	99,440	14,322
3	Production capacity	99,440	14,322

Table-4 Geological Resources

Geological Reserves					
Section	Length in (m)	Width in (m)	Depth in (m)	Volume m ³	Geological Reserves in m ³
XY - AB	112	93	50	520800	520800
Total					520800

Table-5 Mineable Resources

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel Formation in m ³	Mineable Reserve of Rough stone in m ³
XY-AB	I	93	77	2	14322	14322	--
	II	88	72	5	31680	--	31680
	III	78	62	5	24180	--	24180
	IV	68	52	5	17680	--	17680
	V	58	42	5	12180	--	12180
	VI	48	32	5	7680	--	7680
	VII	38	22	5	4180	--	4180
	VIII	28	12	5	1680	--	1680
	IX	18	2	5	180	--	180
Total							99440
Grand Total						14322	99440

Table-6 Year wise production and development details

Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume in m ³	Gravel in m ³	Recoverable Reserve of Rough stone in m ³
I	XY-AB	I	59	77	2	9086	9086	--
		II	60	72	5	21600	--	21600
Total							9086	21600
II	XY-AB	I	34	77	2	5236	5236	-
		II	28	72	5	10080	--	10080
		III	35	62	5	10850	--	10850
Total							5236	20930
III	XY-AB	III	43	62	5	13330	--	13330
		IV	25	52	5	6500	--	6500
Total							--	19830
IV	XY-AB	IV	43	52	5	11180	--	11180
		V	58	42	5	12180	--	12180
Total							--	23360

V	XY-AB	V	48	32	5	7680	--	7680
		VI	38	22	5	4180		4180
		VII	28	12	5	1680		1680
		IX	18	2	5	180		180
Total							--	13720
Grand Total							14322	99440

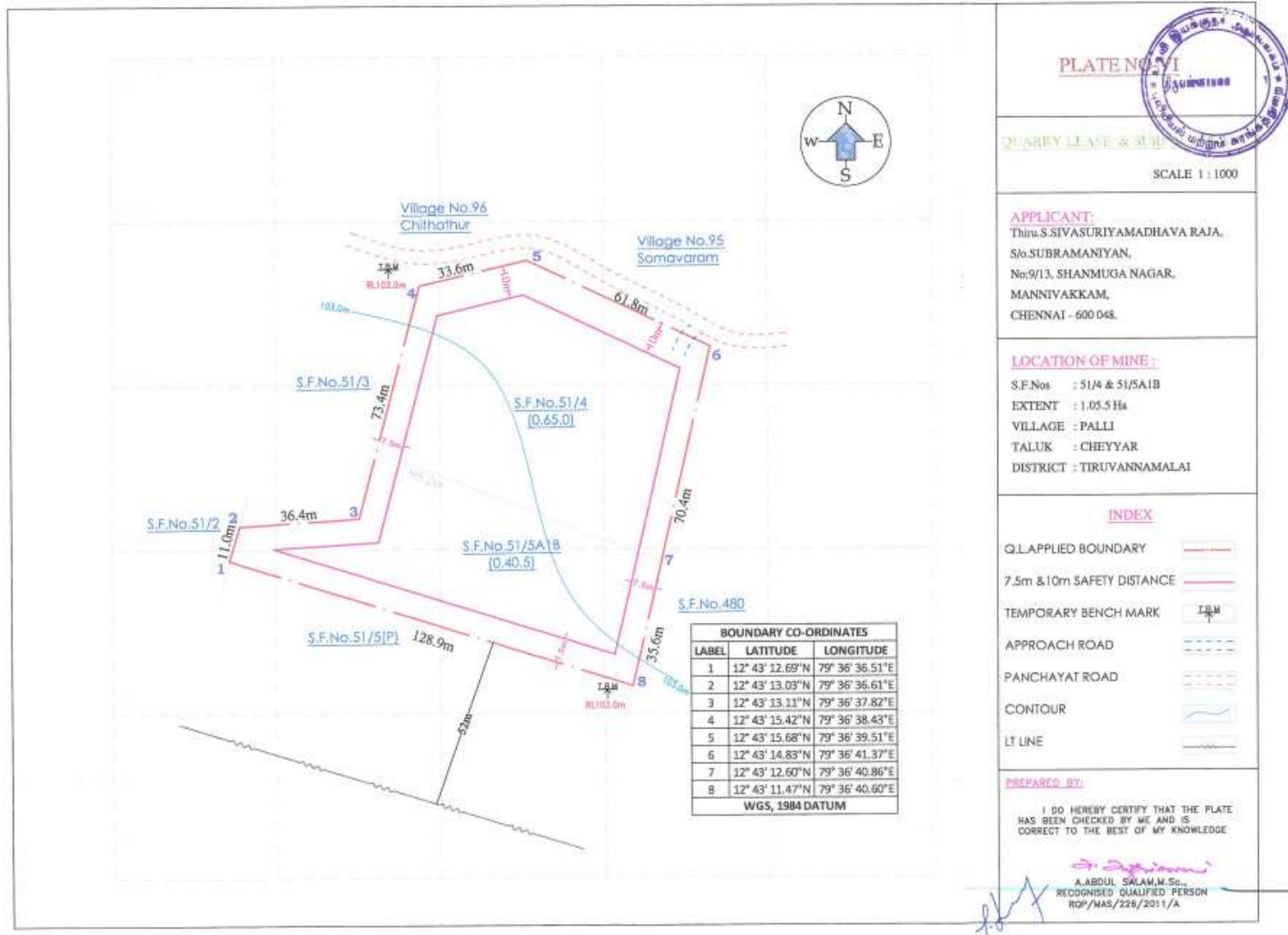


Figure-2 Quarry Lease & Surface Plan of the Quarry

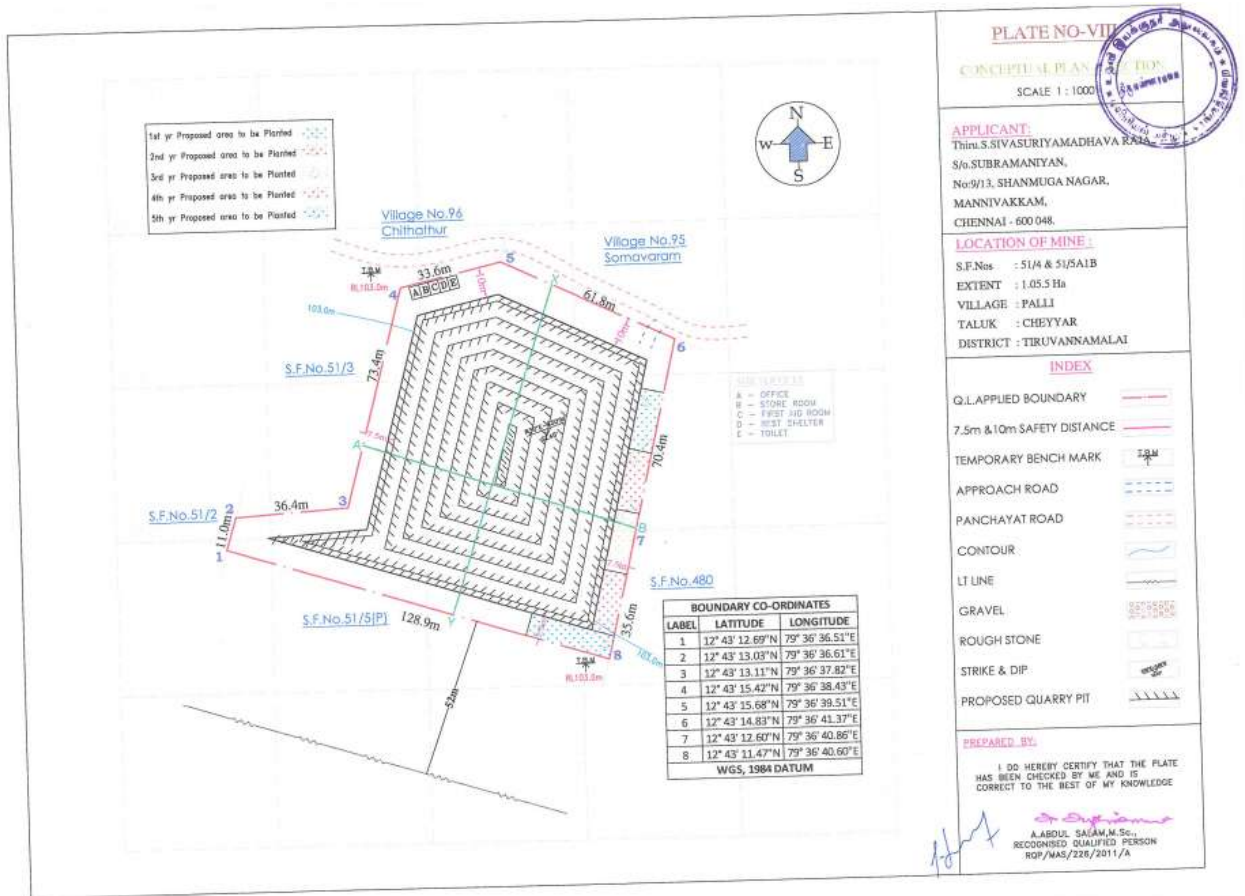


Figure-3 Conceptual Plan & Section of the Quarry

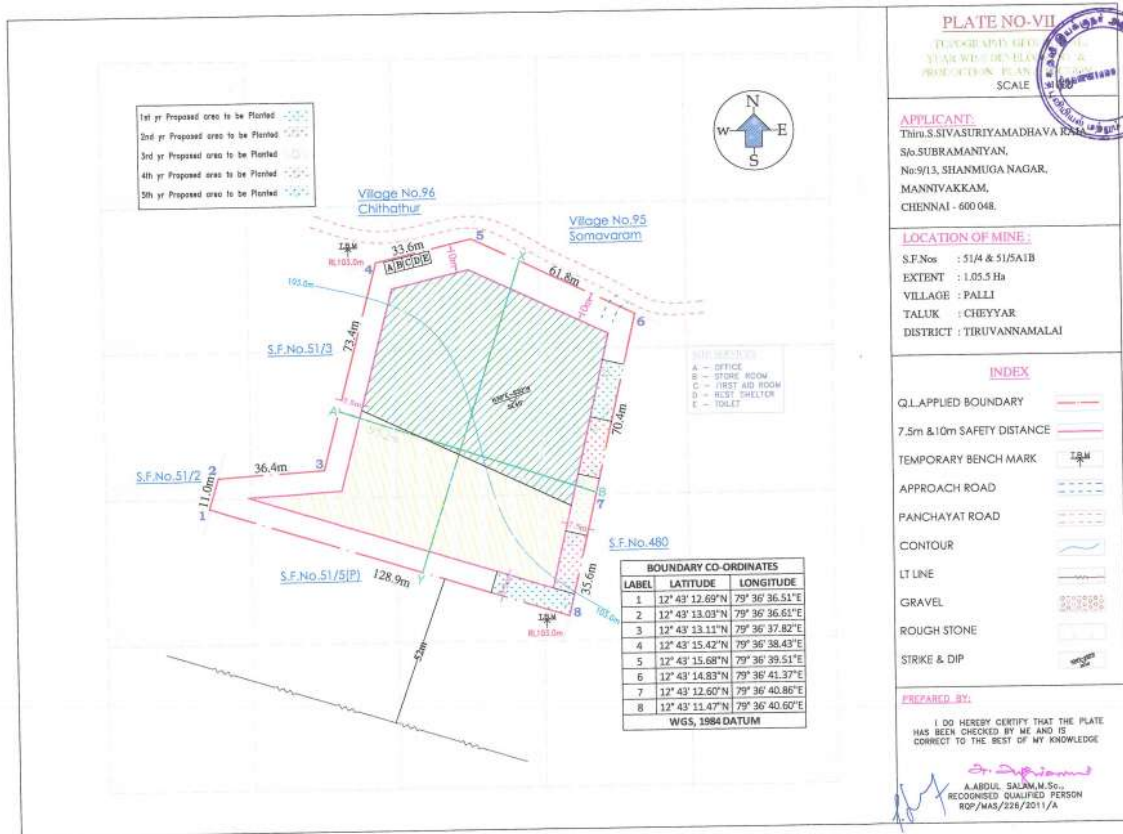


Figure-4 Year wise Production Plan & Section of the Quarry

❖ Proposed Quarry Details:

Table- 7 Salient features of Proposed Quarry Details

S. No	Particulars	Details
1.	Project Location	51/4 & 51/5A1B Palli Village, Cheyyar Taluk, Tiruvannamalai District, TamilNadu State
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3.	Extent of lease area (Ha.)	1.05.5
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10.	Source of Water	Local suppliers
11.	Fuel requirements (litres of HSD for 5 years)	81,942
12.	Manpower (Nos.)	18

13.	Municipal Solid Waste Generation (kg/day)	8.1
14.	Waste Oil generation (Litres/Year)	3.0
15.	Project Cost in Lakhs	27,67,500/-

Summary of the Magnitude of Operation

The Palli Rough Stone & Gravel Quarry operations are carried out by opencast semi mechanized method by formation of benches with a height of 5m & 5m width. Proposed production capacity is 99,440 m³ of Rough Stone and 14,322 m³ of Gravel, the depth of mining is up to 42.0 m (Max) from below ground level for five years as per mining plan.

The total quantity of reserves has been computed on the geological cross sections up to the depth of 42.0 m (Max) from below ground level with 5,20,800 m³ of both Rough stone and Gravel and the mineable reserves is computed as 99,440 m³ of Rough Stone and 14,322 m³ of Gravel as per the mining plan.

➤ Project Requirements

I. Land requirement:

- The Palli Rough Stone & Gravel quarry is over an extent of 1.05.5 Ha.
- Lease area located at S. F. No. 51/4 & 51/5A1B Palli Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State ,lies in the latitude of 12° 43' 11.47" N to 12° 43' 15.68" N and longitude of 79° 36' 36.51" E to 79° 36' 41.37" E.
- The lease area topography is plain topography; site elevation is ~101 -104MSL. The area is marked in the survey of India Topo sheet No. 57-P/10.The lithology of the mining lease will be submitted on final EIA report. Land use Patterns is given in

Table-8

Table-8 Quarry Lease area breakup

S. No	Description	Present Area (Hectare)	Area in use during the quarrying period (Hectare)
1	Quarrying pit	Nil	0.72.0
2	Infrastructure	Nil	0.01.0
3	Roads	Nil	0.01.0
4	Green Belt	Nil	0.10.0
5	Unutilized	1.05.5	0.21.5
Total		1.05.5	1.05.5

II. Quarry Reserves

Table-9 Rough stone Quarry Reserves

S. No	Description	Rough Stone	Gravel (m ³)
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		(m ³)	
1	Geological Reserves	5,20,800	
2	Mineable Reserves	99,440	14,322
3	Production capacity	99,440	14,322

III. Water Requirement

- The total water requirement is 2.5KLD (Drinking & Domestic purpose – 1.0 KLD, Dust suppression -1.0 KLD & for Greenbelt- 0.5 KLD). The total water requirement will be met from private tankers.
- The Rough Stone and gravel quarry will not produce any toxic effluent in the form of solid, liquid or gas.
- No wastewater will be discharged by quarry operation. Domestic wastewater will be disposed to Septic Tank followed by soak pit.

Table-10 Water requirement breakup

S. No	Description	Water Requirement (KLD)
1	Drinking & Domestic purpose	1.0
2	Dust suppression	1.0
3	Green Belt	0.5
Total		2.5

IV. Power & Fuel Requirement

- No power is required during mining operations. Working is restricted on day time only between 9AM to 6PM.

Table-11 Power & Fuel Requirement

S. No	Details	Gravel (Liters)	Rough stone (Liters)	Source
1	Diesel Requirements approx. (Litres of HSD for 5 years)	2,390	79,552	Nearby Diesel pumps

V. Manpower

Manpower requirement for the proposed project is 18 Nos.

Table -12 Manpower requirement of the Project

S. No	Description	No of persons (Direct)
Skilled		
1	Operator	2
2	Mechanic	1
3	Mines manager/Mate	1
Semi – skilled		

1	Driver	2
Unskilled		
1	Musdoor/Labours	7
2	Cleaners	2
3	Office Boy	1
Management & Supervisory Staff		2
Total		18

VI. Solid Waste Generation & Management

❖ Municipal Solid Waste Management

Table -13 Municipal Solid Waste generation & Management

S. No	Type	Quantity Kg/day	Disposal method
1	Organic	4.86	Municipal bin including food waste
2	Inorganic	3.24	TNPCB authorized recyclers
Total		8.1	

As per CPHEEO guidelines: MSW per capita/day =0.45

❖ Hazardous Waste Management

Table -14 Hazardous Waste Generation and Management

Waste Category No	Description	Quantity (L/Year)	Mode of Disposal
5.1	Waste Oil	3.0	Will be Collected in leak proof containers and disposed to TNPCB Authorized Agencies for Reprocessing/Recycling

VII. Nearest Human Settlement

The detail of nearest human settlement from the project site is provided in **Table-9**.

Table-15 Nearest Human Settlement

S. No	Name of the villages	Distance (~km) & Direction	Approximate population as per the census 2011
1	Chithathur	2.5 km, NE	1,444
2	Kanagam	1.5 km, NW	243
3	Kunnavakkam	3.8 km, SE	277
4	Pali	1.5km, SW	777

➤ Project Cost

The total capital investment on the project is Rs. 66,74,000/- including EMP cost is

1,20,000/- . The Capital investment of the Project is given in **Table-20**.

Table-16 Capital Investment on the Project

S. No	Description of the Cost	Amount in Rs.
➤ Fixed Cost		
1	Land Cost	5,27,500/-
2	Labourers shed	1,00,000/-
3	Sanitary facilities	1,00,000/-
Total		7,27,500/-
➤ Operational		
1	Machinery to be used	15,00,000/-
Total		15,00,000/-
➤ EMP Cost		
1	Air Quality Sampling	1,00,000/-
2	Water Quality Sampling	1,00,000/-
3	Noise Monitoring	20,000/-
Expenditure		
1	Drinking water facility	1,20,000/-
2	Safety Kits	40,000/-
3	Water Sprinkling	1,00,000/-
4	Afforestation	60,000/-
Total EMP Cost		5,40,000/-
Total Cost of the Project (A+B+C)		27,67,500/-
CER cost (2% of Total project cost)		69,000/-

➤ Mine Closure Plan:

- There is no proposal for back filling reclamation and rehabilitation. The Quarried pits after the end of the life of lease will be fenced using Barbed wire fencing to prevent inherent entry of public and cattle.
- Measures will be taken as per the Acts and Rules.
- Drilling will be carried out by wet drilling mode to control the dust propagation into the air.
- Blasting will be carried out on limited scale. Mist water spraying on haul road is proposed to prevent the dust propagation into the air.

➤ Description of Environment

Project Influence Area (PIA)/Study Area:

An area covering 10 km radius from Palli Rough Stone and Gravel quarry boundary has been earmarked as study area for baseline studies.

Study Period:

The baseline environmental surveys were carried out during (November 2021 to January 2022) within the study area.

Summary of Baseline Studies:

- Site has a plain topography with level ~101 - 104m maximum from the MSL.
- The project site falls under Zone- III (Moderate Damage Risk Zone) as per IS 1893 (Part- I).
- The predominant wind direction is West during study period.
- Min Temperature : 28.66 0C, Max Temperature : 33. 0C, Avg Temperature :21 0C
- Average Relative Humidity: 84.50%
- Average Wind Speed: 2.31 m/s.

Table-17 Total maximum GLCs from emissions

Pollutant	Max. Base Line Conc. ($\mu\text{g}/\text{m}^3$)	Estimated Incremental Conc ($\mu\text{g}/\text{m}^3$)	Total Conc. ($\mu\text{g}/\text{m}^3$)	NAAQ standard	% contribution of concentration above Base line
TSPM	183	27	210	500	14.79
PM ₁₀	73	6	79	100	8.22
PM _{2.5}	35	4	39	60	11.43
SO ₂	10	0.5	10.5	80	5.00
NO _x	28	0.8	28.8	80	2.86

Ambient Air Quality Monitoring

The ambient air quality has been monitored at 8 locations for 12 parameters as per NAAQS, 2009 within the study area. Maximum concentrations of all the parameters are well within the National Ambient Air Quality Standards (CPCB, NAAQS, 2009):

- PM₁₀ ranged between 42.1 to 72.8 $\mu\text{g}/\text{m}^3$ (NAAQ standard 100 $\mu\text{g}/\text{m}^3$).
- PM_{2.5} values varied from 18.6 to 34.9 $\mu\text{g}/\text{m}^3$ (NAAQ standard 60 $\mu\text{g}/\text{m}^3$).
- SO₂ levels varied from 5.5 to 10.3 $\mu\text{g}/\text{m}^3$, (NAAQ standard is 80 $\mu\text{g}/\text{m}^3$).
- NO_x ranged between 15.3 to 28.2 $\mu\text{g}/\text{m}^3$ (NAAQ standard is 80 $\mu\text{g}/\text{m}^3$).

Noise Environment

- In Industrial Zone (Near Project Site) day time noise levels was about 60.3 dB(A) and during night time noise levels was about 50.1 dB(A) and the prescribed limit by CPCB is 75 dB (A) Day time & 70 dB (A) Night time.

- In residential areas day time noise levels varied from 50.7 dB (A) to 56.1 dB (A) and night time noise levels varied from 41.5 dB(A) to 45.7 dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise levels is within the prescribed limit by CPCB (55 dB(A) Day time & 45 dB(A) Night time).

Ground Water Quality

- The ground water results of the study area indicate that the pH range varies between 7.18 and 7.80. It is observed that the pH range is within the permissible limit of IS 10500:2012.
- The Total Dissolved Solids range of the collected ground water sample is varied between 372 mg/l – 878 mg/l. All the samples are within the permissible limit of IS 10500: 2012.
- The acceptable limit of the chloride content is 250mg/l and permissible limit is 1000 mg/l. The chloride content in the collected ground water samples in the study area ranges between 77.6 mg/l – 187.8 mg/l. It is observed that all the samples are within the permissible limit of IS 10500:2012.
- The acceptable limit of the sulphate content is 200mg/l and permissible limit is 400mg/l. the sulphate content in the collected ground water samples in the study area is varied between 33.1 mg/l – 77.9 mg/l. It is observed that all the samples are meeting the acceptable limit of the IS 10500: 2012.
- The Total hardness ranges is between 104 mg/l – 251 mg/l for ground water samples

Surface Water Quality

- pH in the collected surface water samples varies between 7.34 to 8.03 where all the samples are within the limit of IS 2296:1992
- The Total Dissolved Solids (TDS) value of collected surface water sample ranges from 638 mg/l to 1262 mg/l.
- The Total hardness value of the collected surface water sample ranges between 169.9 mg/l to 366.1 mg/l.
- BOD value of the collected surface water sample ranges from 9.3 mg/l to 12.9 mg/l.
- COD value of collected surface water varies from 30.5 to 56.2 mg/l.

Soil Quality

- The pH of the soil samples ranged from 6.87 to 8.03.
- Conductivity of the soil samples ranged from 84 to 229 µmhos/cm.

- Nitrogen content in the collected soil samples ranged from 130.5 mg/kg to 292.6 mg/kg.
- Phosphorous content ranged from 30.71 mg/kg to 97.28 mg/kg.
- Potassium content ranges from 78.49 mg/kg to 143.57 mg/kg..

Biological Environment

- The Rough Stone and gravel quarry is located at Palli village. The proposed project will not have any impact of terrestrial ecology of the area. Quarry area will be developed with greenbelt by planting native species to maintain the good environment.
- There is no extinct flora and fauna species found in the study area. Observed species comes under least concern as per IUCN status
- There is no National Park, Wildlife Sanctuary, Biosphere Reserve, Wildlife corridors and Tiger/Elephant Reserve found within 10 km radius of the project site.
- Therefore, no management plan is required.

Socio-economic Conditions:

The project is located at Palli Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State. In 2011, Tiruvannamalai had population of 2,464,875 of which male and female were 1,235,889 and 1,228,986 respectively. In 2001 census, Tiruvannamalai had a population of 2,186,125 of which males were 1,095,859 and remaining 1,090,266 were females. Tiruvannamalai District population constituted 3.42 percent of total Maharashtra population.

Anticipated Environmental Impacts with Mitigation Measures

Anticipated impacts on the environmental and social attributes, which are likely to arise due to quarry operations have been identified, predicted and evaluated.

- Palli Rough Stone and Gravel Quarry is Patta land, over an extent of 1.05.5 Ha, at Palli Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State. There are no R&R issues as it is Patta land.
- The lease area plain topography with site elevation is ~101-104m maximum MSL. Palli Rough Stone and Gravel quarry will be provided with self-sufficient infrastructure like office, Toilets, to minimize impact/strain on the existing infrastructure.
- All the necessary Air pollution control measures will be adopted to control the fugitive emissions, particulates, SO₂ and NO_x.
- The impact on air environment was studied through air quality modeling studies. The 1st highest 24hour average concentrations of NO_x, PM₁₀, PM_{2.5} and SO₂ at all receptor locations are found to be well within the National Ambient Air Quality Standards (NAAQS), 2009. The maximum concentration observed due to proposed

mining for TSPM is $183\mu\text{g}/\text{m}^3$, PM10 is $73\mu\text{g}/\text{m}^3$, PM2.5 is $35\mu\text{g}/\text{m}^3$, SO_2 is $10\mu\text{g}/\text{m}^3$ and NO_x is $28\mu\text{g}/\text{m}^3$, respectively. So it can be concluded that even after operation of quarry the impact envisaged is moderate.

- Baseline study showed that the noise levels in both Industrial area and in Residential area are observed that the day equivalent and night equivalent noise levels at all locations are within the prescribed CPCB standards. The designed equipment with noise levels not exceeding beyond the requirements of Occupational Health and Safety Administration Standard will be employed.
- The water demand for the project will be met from private tankers. Proper garlands will be provided around the quarry. Domestic sewage will be disposed to septic tank followed by soak pit. Septic Tank will be cleaned periodically. There is no effluent generation due to mining activities.
- The solid waste generated may impact soil quality, water quality and public health if not regulated properly. Municipal Solid Wastes including food waste are disposed to municipal bin. Waste Diesel oil will be properly disposed through authorized recyclers per the Hazardous and Other wastes (Management and Trans boundary Movement) Rules 1989 and subsequent amendment in 2016. Top soil will be stored and used for afforestation within lease area.
- To reduce the adverse effects on flora/fauna status that are found in project area due to deposition of dust generating from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation.

➤ **Risk Identification & Management**

❖ **Identification of Hazards in Open Cast Mining**

There are various factors, which can cause disaster in the mines. These hazards are as follows:

- Drilling
- Blasting
- Overburden handling
- Heavy Machinery

❖ **Safety Measures at the quarry**

- Adequate care has been taken in deciding the size of the bench for the working pit.
- The benches are properly sloped at an angle of 60 degree to avoid any spillage of benches.
- Adequate drainage system at the top of the pit and also on the benches shall be made to prevent erosion of the benches.

- The quarries will be protected by garland drains around the periphery for storm water drainage.

➤ **Post Project Environmental Monitoring**

Table -18 Post Project Environmental Monitoring Program

S. No	Area of Monitoring	Number of Sampling Stations	Frequency of Sampling	Parameters to be Analysed
1.	Meteorology	One	Hourly and Daily basis.	Wind speed and direction, Temperature, Relative Humidity, Atmospheric pressure, Rainfall.
2.	Ambient Air Quality	2 Stations (In downwind)	Twice a week:24 hourly period	PM ₁₀ , PM _{2.5} , SO ₂ , and NO ₂
3.	Noise	2 (two within site premises and two outside premises)	Once every season	Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time.
4	Exhaust from DG set	Stack of DG set	Quarterly	PM ₁₀ , PM _{2.5} , SO ₂ & CO
5	Vehicular Emissions	Parking area	Periodic monitoring of vehicles	Air emission and noise, PCU
6	Soil	Two Locations within the Project Site	Yearly Once	Physico chemical properties, Nutrients, Heavy metals
7	Terrestrial Ecology	Within 10km, around the project	Once in three years	Symptoms of injuries on plants
8	Surface/ Ground water quality	Two Locations Within Project Site	Yearly Once	As per ISO 10500 Standard parameters

➤ **Disposal of Waste:**

The overburden in the form of Gravel formation upto a depth of 2.0 m below ground level is dumped along the lease boundary as Gravel bund and used for filling and leveling of the low lying areas.

➤ **Occupational Health Measures**

- Adoption of dust suppression measures like spraying water, use of drill with dust collection system or wet drills etc.
- Plantation.

- Avoid blasting during unfavorable wind & atmospheric conditions.
- Use of personal protective equipment. Compliance with DGMS circulars.
- Emergency response plan that includes installation of emergency response equipment to combat events such as fire.
- All personnel required to handle hazardous materials will be provided with personal protective equipment suitable for the hazardous material being handled.
- On-site first aid facilities will be provided and employees will be extended to the local community in emergencies.

➤ **Greenbelt Development**

An area of 0.10.0 hectare land was allotted for greenbelt development during 5 years of mining plan, Palli rough stone and gravel quarry proposed to plant 40 No's of trees per year and Rs.60,000/- will spend for proposed greenbelt development and maintenance

➤ **Analysis of Alternatives**

The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise. No R&R, no Sensitive area etc., making the site suitable for the mining of rough stone & gravel. The site meets the requirement of all critical factors that are important for success of mining in the state and could be a pre-eminent location.

➤ **Environment Monitoring Programme**

Environmental monitoring programme has been formulated for the environmental attributes (Air, Water, Noise, and Soil) and the same will be implemented as per CPCB guidelines. The effective implementation and close supervision of the environmental management to mitigate the environmental impacts due to mining activities.

➤ **Emergency Management Plan**

The salient features of Disaster Management Plan include

- Emergency shutdown procedure
- Fire protection system
- Emergency safety equipment & Reporting and response to emergency
- Emergency Help from nearby industries and tie up with nearby industries

➤ **Corporate Environmental Responsibility**

- The site has no Relocation and Rehabilitation.
- Most villages have benefited mutually at Palli where the mining industry has provided indirect jobs for labor and villages provide accommodation for the labor and staff.
- Supportive industries like food supply and essential shops promote economic growth

in the villages.

- Rs. 5.0 lakhs on total cost will be allocated for CER activities

- **Benefits of the Proposed Project**
 - The quarrying activities in this belt will benefit to the local people 18 Nos.
 - Improvement in Per Capita Income can be expected.
 - The socio - Economic conditions of the village and distance will enhance due to the project, hence the project should be allowed after considering all the parameters.
 - It can thus be concluded that the project is environmentally compatible, financially viable and would be in the interest of construction industry thereby indirectly benefiting the masses.
