

EXECUTIVE SUMMARY

For

MENALLUR ROUGH STONE & GRAVEL QUARRY

Over an extent of 4.30.0Ha.

At

S. F. No's: 134/15A, 134/15B, 134/17, 134/18, 134/19, 136/1, 136/2, 136/3A, 136/3B, 136/3C, 136/4, 136/5, 136/6, 136/7, 136/8, 136/9, 136/10, 143/1A, 143/1B, 143/1C, 143/1D, 143/2, 143/3, 143/4, 143/5, 143/6, 143/7A, 143/7B, 143/8, 143/10, 143/11, 144/2, 144/3, 144/4 and 144/5

**Menallur Village,
Vembakkam Taluk,
Tiruvannamalai District,
Tamil Nadu State.**

Applicant

**Thiru.T.Ponnambalam
S/o. Thiru.Thangavelu,
No:12, Balakrishnan Street,
Srinivasa Nagar, Chennai.
Pin Code– 600063.**

(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**

SEPTEMBER 2021

EXECUTIVE SUMMARY

➤ **Project Description**

The total extent area of the quarry is 4.30.0. Ha, situated at S.F. 134/15A, 134/15B, 134/17, 134/18, 134/19, 136/1, 136/2, 136/3A, 136/3B, 136/3C, 136/4, 136/5, 136/6, 136/7, 136/8, 136/9, 136/10, 143/1A, 143/1B, 143/1C, 143/1D, 143/2, 143/3, 143/4, 143/5, 143/6, 143/7A, 143/7B, 143/8, 143/10, 143/11, 144/2, 144/3, 144/4 and 144/5 Menallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State.

The Assistant 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.223/Kanimam/2020, dated: 27.01.2021.**

Subsequently, submitted the mining plan for the subject area and the same was approved by Assistant director of Geology and mining, Tiruvannamalai vide **RC No.223/Kanimam/2020, dated: 12.02.2021.**

Projects termed under Schedule of 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, **TN SEIAA vide File No. 8414/2021.**

The proposal was appraised during 213th SEAC meeting held on 11.06.2021 and 447th SEIAA meeting held on 05.07.2021 and ToR was issued vide **Letter No. SEIAA-TN/F.No.8414/SEAC/ToR-976/2021, dated: 05.07.2021** for the preparation of EIA/EMP report.

The draft EIA/EMP report will be submitted for Public Hearing (PH). After completion of Public Hearing, the minutes issued will be incorporated in the EIA report along with action plan by the proponent. Final EIA will be submitted to TNSEAC for further appraisal of the project for obtaining Environment Clearance.

➤ **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, there are no environmental sensitive areas within 15km radius. 2no's of water bodies are located within 3km radius from the project site. Thus the project does not attract the special conditions and general conditions as per EIA Notification.

Table-1 Environmental Sensitive areas within 15km of the project

S. No.	Areas	Distance & Direction from project boundary			
1	List of Monuments, Heritages & Memorials	<u>Monuments:</u>			
		S. No	Name	Distance (~km)	Direction
		1	Jvarahareshwara Temple Kanchipuram	11.18	N
		2	Kailasanathar Temple	11.3	N
		3.	Irvatanesvara Temple Kanchipuram	11.51	N
		4.	Piravathaneswara Temple Kanchipuram	11.5	N
		5.	Sri Matangeswara Temple Kanchipuram	10.43	N
		6.	Vaikunta Perumal Temple Kanchipuram	10.57	N
		7.	Vaikunta Perumal temple with adjacent land comprised in part of survey plot No.878/286 Uttiramerur	14.61	SSE
		8.	Dolmen intact Uttiramerur	13.68	SSE
		9.	Megalithic cists Tetturai	14.82	SSW
		10.	Megalithic cists and cairns Nedungal	14.82	SSW
		11.	Megalithic cists and cairns Nedungal	14.7	SSW
		12.	Megalithic cists and cairns Perunagar	14.01	SSW
		13.	Megalithic cists and cairns Nedungal	14.61	SSW
		14	Megalithic cists and cairns circles Settopattu	11.48	SW
		15.	Rock cut caves Narasamangalam	4.66	W
		16.	Rock cut caves sculptures and inscriptions Mamandur	4.75	W
		17.	Rock cut shrine Kuranganil muttam	3.35	NNW
18	Sri Mukteswara Temple Kanchipuram	10.78	N		
<u>Heritages & Memorials:</u>					

		<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>Kamakshi Amman Temple</td> <td>10.94</td> <td>N</td> </tr> <tr> <td>2</td> <td>Ekambareswarar Temple</td> <td>11.58</td> <td>N</td> </tr> <tr> <td>3.</td> <td>Sunnat Jama'ath Juma Masjid</td> <td>9.28</td> <td>N</td> </tr> <tr> <td>4.</td> <td>Varadaraja Perumal Kovil</td> <td>8.64</td> <td>N</td> </tr> <tr> <td>5.</td> <td>Sri Kachabeswarar Temple</td> <td>10.69</td> <td>N</td> </tr> <tr> <td>6.</td> <td>Sri Thiru Makaraleswarar Temple Magaral</td> <td>5.3</td> <td>ESE</td> </tr> <tr> <td>7.</td> <td>Sri Sundara Varadararaja Perumal Temple Uthiramerur</td> <td>14.52</td> <td>SSE</td> </tr> <tr> <td>8.</td> <td>Shri Vanasundareswarar Temple Manampathy</td> <td>13.11</td> <td>SSW</td> </tr> <tr> <td>9.</td> <td>Thiruppanamoor Digambar Jain Temple</td> <td>13.22</td> <td>W</td> </tr> <tr> <td>10.</td> <td>Sri 1008 Bhagwan Mahaveer Digambar Jain Temple</td> <td>13.63</td> <td>WNW</td> </tr> <tr> <td>11.</td> <td>Perarignar Anna Ninaivu Illam Kanchipuram</td> <td>9.5</td> <td>N</td> </tr> <tr> <td>12.</td> <td>Thalapureeswarar Temple/Padal Petra Temple Thiruppanangadu</td> <td>12.21</td> <td>WNW</td> </tr> </tbody> </table>	S. No	Name	Distance (~km)	Direction	1	Kamakshi Amman Temple	10.94	N	2	Ekambareswarar Temple	11.58	N	3.	Sunnat Jama'ath Juma Masjid	9.28	N	4.	Varadaraja Perumal Kovil	8.64	N	5.	Sri Kachabeswarar Temple	10.69	N	6.	Sri Thiru Makaraleswarar Temple Magaral	5.3	ESE	7.	Sri Sundara Varadararaja Perumal Temple Uthiramerur	14.52	SSE	8.	Shri Vanasundareswarar Temple Manampathy	13.11	SSW	9.	Thiruppanamoor Digambar Jain Temple	13.22	W	10.	Sri 1008 Bhagwan Mahaveer Digambar Jain Temple	13.63	WNW	11.	Perarignar Anna Ninaivu Illam Kanchipuram	9.5	N	12.	Thalapureeswarar Temple/Padal Petra Temple Thiruppanangadu	12.21	WNW
S. No	Name	Distance (~km)	Direction																																																			
1	Kamakshi Amman Temple	10.94	N																																																			
2	Ekambareswarar Temple	11.58	N																																																			
3.	Sunnat Jama'ath Juma Masjid	9.28	N																																																			
4.	Varadaraja Perumal Kovil	8.64	N																																																			
5.	Sri Kachabeswarar Temple	10.69	N																																																			
6.	Sri Thiru Makaraleswarar Temple Magaral	5.3	ESE																																																			
7.	Sri Sundara Varadararaja Perumal Temple Uthiramerur	14.52	SSE																																																			
8.	Shri Vanasundareswarar Temple Manampathy	13.11	SSW																																																			
9.	Thiruppanamoor Digambar Jain Temple	13.22	W																																																			
10.	Sri 1008 Bhagwan Mahaveer Digambar Jain Temple	13.63	WNW																																																			
11.	Perarignar Anna Ninaivu Illam Kanchipuram	9.5	N																																																			
12.	Thalapureeswarar Temple/Padal Petra Temple Thiruppanangadu	12.21	WNW																																																			
2	list of water bodies and Reserve Forests	<p><u>Water Bodies :</u></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>Odai</td> <td>Adjacent to site</td> <td>N</td> </tr> <tr> <td>2</td> <td>Odai near Mavur</td> <td>1.83</td> <td>N</td> </tr> <tr> <td>3</td> <td>Palar R</td> <td>5.44</td> <td>N</td> </tr> <tr> <td>4</td> <td>Vegavati River</td> <td>8.05</td> <td>NNE</td> </tr> <tr> <td>5</td> <td>Cheyar R</td> <td>5.08</td> <td>SE</td> </tr> <tr> <td>6</td> <td>Odai near Adavapakkam</td> <td>6.83</td> <td>ESE</td> </tr> <tr> <td>7</td> <td>Canal near Silambakkam</td> <td>7.27</td> <td>S</td> </tr> <tr> <td>8</td> <td>Odai near Hariharapakkam</td> <td>6.82</td> <td>WNW</td> </tr> <tr> <td>9</td> <td>Uttiramerur Tank</td> <td>10.27</td> <td>SSE</td> </tr> <tr> <td>10</td> <td>Odai near Gowriammanpettai</td> <td>14.48</td> <td>NNE</td> </tr> <tr> <td>11</td> <td>Tandarai Canal</td> <td>12.04</td> <td>W</td> </tr> <tr> <td>12</td> <td>Mamandur Tank</td> <td>4.84</td> <td>W</td> </tr> </tbody> </table> <p><u>Reserve Forest:</u></p>	S. No	Places	Distance (~km)	Direction	1	Odai	Adjacent to site	N	2	Odai near Mavur	1.83	N	3	Palar R	5.44	N	4	Vegavati River	8.05	NNE	5	Cheyar R	5.08	SE	6	Odai near Adavapakkam	6.83	ESE	7	Canal near Silambakkam	7.27	S	8	Odai near Hariharapakkam	6.82	WNW	9	Uttiramerur Tank	10.27	SSE	10	Odai near Gowriammanpettai	14.48	NNE	11	Tandarai Canal	12.04	W	12	Mamandur Tank	4.84	W
S. No	Places	Distance (~km)	Direction																																																			
1	Odai	Adjacent to site	N																																																			
2	Odai near Mavur	1.83	N																																																			
3	Palar R	5.44	N																																																			
4	Vegavati River	8.05	NNE																																																			
5	Cheyar R	5.08	SE																																																			
6	Odai near Adavapakkam	6.83	ESE																																																			
7	Canal near Silambakkam	7.27	S																																																			
8	Odai near Hariharapakkam	6.82	WNW																																																			
9	Uttiramerur Tank	10.27	SSE																																																			
10	Odai near Gowriammanpettai	14.48	NNE																																																			
11	Tandarai Canal	12.04	W																																																			
12	Mamandur Tank	4.84	W																																																			

		S. No	Places	Distance (~km)	Direction
		1	Marudam RF	9.61	SE
3	State, National boundaries	Nil			
4	Highways	<ul style="list-style-type: none"> • SH-116 (Kanchipuram-Vandavasi)~3.61km (W) • NH-48(Delhi-Chennai)~14.35km (N) 			
5	Defence installations	None within 15km radial distance from the site boundary.			
6	list of habitations	S. No	Name of the villages	Distance (~km) & Direction	Approximate population as per the census 2011
		1	Menallur	0.33,N	1,444
		2	Girijapuram	0.33,NNW	243
		4	Punaitangal	0.64,NE	277
		3	Bagavantapuram	1.07,SSW	777
		5	Chinna Elacheri	1.33,S	2080
7	Seismicity	The area under study falls in Zone-III (Low risk Zone)			

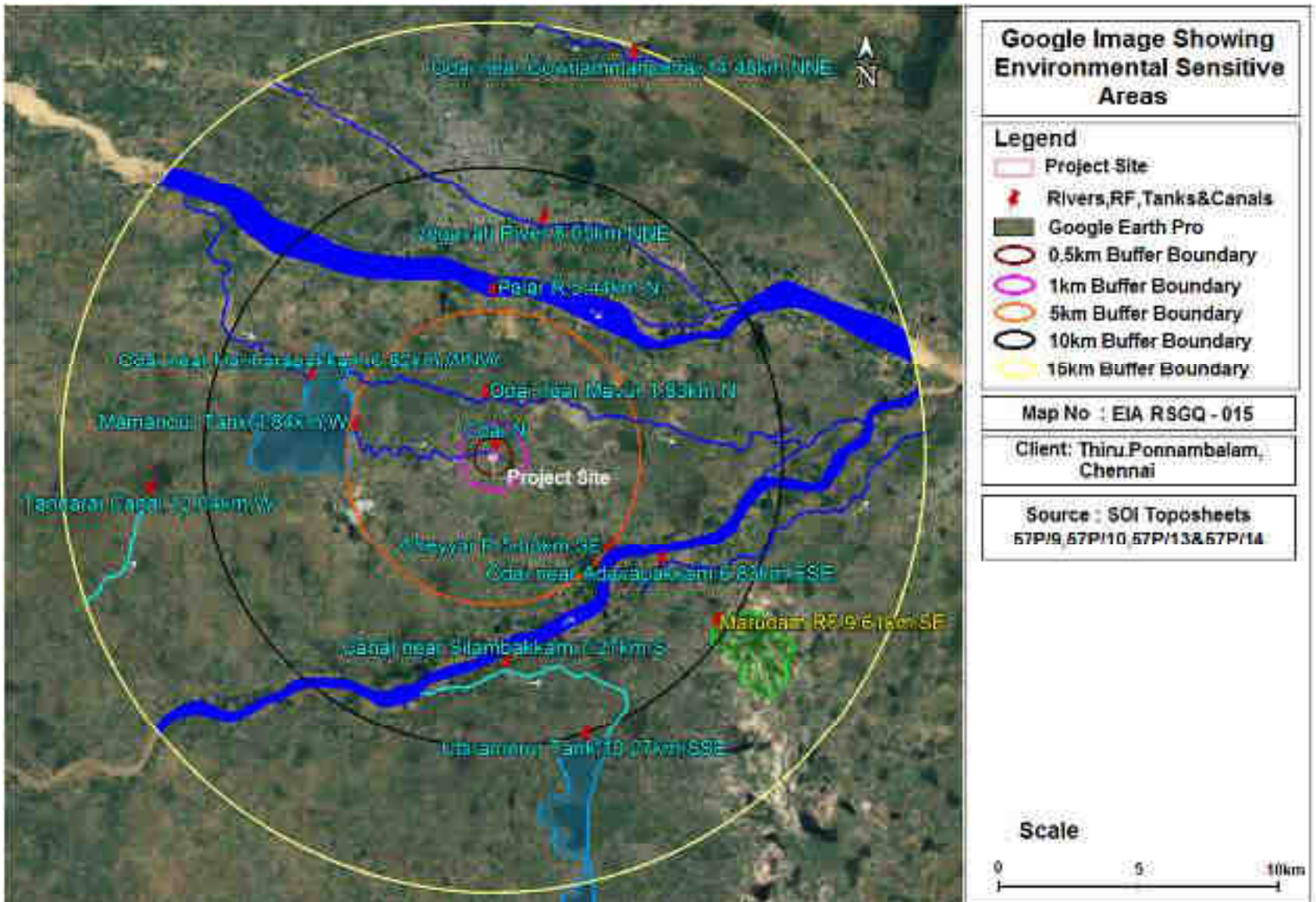


Figure-1 Google image for Environmental Sensitive areas demarcated within 15km radius of the project site

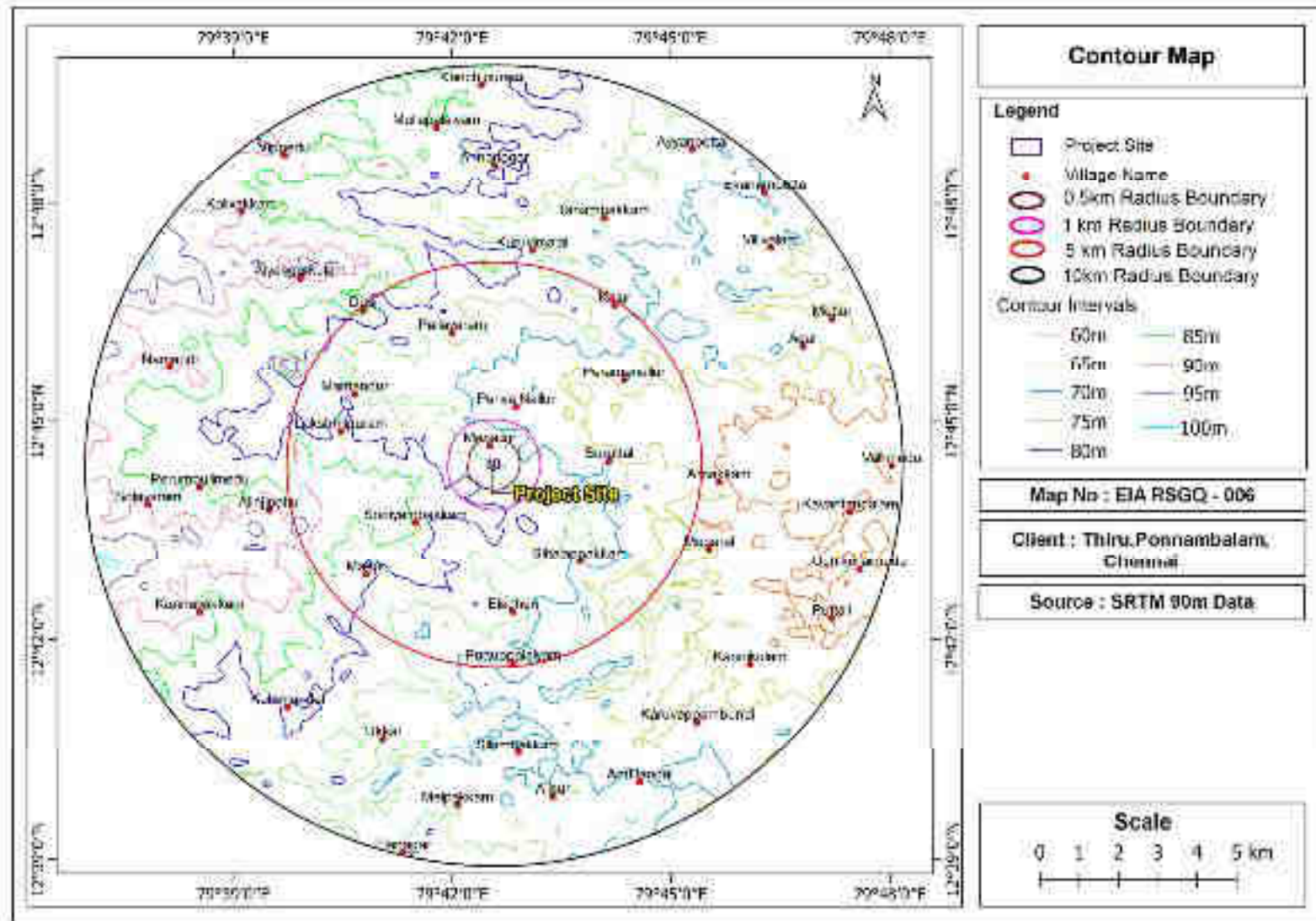


Figure 2 Contour Map of the Project Site

➤ **Rough Stone & Gravel Quarry Reserves**

- The estimated Geological Reserves of Rough Stone estimated based on the Geological cross sections was 19,34,190m³ of Rough stone, 85,964 m³ of Weathered rock and 42,982m³ of Gravel.
- The Mineable Reserves have been arrived as 6,04,175m³ of Rough Stone, 58,886m³ of Weathered rock and 42,982m³ of Gravel.
- The Proposed production capacity* is restricted to 3,54,815m³ of Rough Stone, 28,385 m³ of Weathered rock and 58,886m³ of Gravel for five years as per the ToR issued.

***Note:**

As per the Mining Plan and ToR application the production capacity was 4,13,770m³ of Rough Stone, 28,385 m³ of Weathered rock and 58,886m³ of Gravel, the depth of mining is 23m from below ground level for 5 years but in the proposed quarrying activity the production capacity and the depth of mining will be restricted as per the ToR issued by SEIAA, TN.

➤ **Summary of the Magnitude of Operation**

- The Rough Stone quarrying operation is proposed to be carried out by open cast semi mechanized method by formation of benches. Benches are proposed with a height of 5m & 5m width. Major machineries are Compressor, Jack hammer, and excavator is used in proposed quarry. Tippers and dumpers will be used for transportation.
- The Proposed production capacity is 33,54,815m³ of Rough Stone, 28,385 m³ of Weathered rock and 58,886m³ of Gravel for five years as per the ToR issued.
- The mineable reserves have been computed 6,04,175m³ of Rough Stone, 58,886m³ of Weathered rock and 42,982m³ of Gravel for five years.
- The effective geological reserves and mineable have been worked out 19,34,190m³ of Rough stone, 85,964 m³ of Weathered rock and 42,982m³ of Gravel.
- The depth of the mine will be 18m as per the ToR issued.

➤ **Project Requirements**

I. Land requirement:

- The Menallur Rough Stone and Gravel Quarry is over an extent of 4.30.0.Ha.
- Lease area located at S. F. No.134/15A, 134/15B, 134/17, 134/18, 134/19, 136/1, 136/2, 136/3A, 136/3B, 136/3C, 136/4, 136/5, 136/6, 136/7, 136/8, 136/9, 136/10, 143/1A, 143/1B, 143/1C, 143/1D, 143/2,143/3, 143/4, 143/5, 143/6, 143/7A, 143/7B, 143/8, 143/10, 143/11, 144/2, 144/3, 144/4 and 144/5 Menallur Village, Vembakkam Taluk, Tiruvannamalai District, TamilNadu State, lies in the latitude of 12°44'19.91"N to 12°44'28.81"N and longitude of 79°42'29.61"E to 79°42'39.61"E.

- The lease area topography is plain terrain; site elevation is ~103m (max) MSL. 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-2**.

Table-2 Quarry Lease area breakup

S. No	Description	Area to be required at present Mining Plan Period (Ha.)
1	Quarrying pit	2.91.0
2	Infrastructure	0.01.0
3	Roads	0.02.0
4	Green Belt	0.30.0
5	Unutilized	1.06.0
Total		4.30.0

II. Quarry Reserves

Table-3 Rough stone & Gravel Quarry Reserves

S. No	Description	Rough Stone (m ³)	Gravel (m ³)	Weathered rock (m ³)
1	Geological Resource	19,34,190	85,964	42,982
2	Mineable Reserves	6,04,175	58,886	28,385
3	Production capacity	3,54,815	58,886	28,385

III. Water Requirement

- The total water requirement is 4.0KLD (Drinking & Domestic purpose-0.5KLD, Dust suppression -2.0 KLD & for Greenbelt- 1.5KLD). 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-4 Water requirement breakup

S. No	Description	Water Requirement(KLD)
1	Drinking & Domestic purpose	0.5
2	Dust suppression	2.0
3	Green Belt	1.5
Total		4.0

IV. Power & Fuel Requirement

- No power is required during mining operations. Working is restricted on day time only between 9AM to 6PM.
- 3,63,522liters of HSD for the entire project life will be brought from nearby diesel

pumps.

Table-5 Power & Fuel Requirement

S. No	Details	Gravel (Liters)	Rough stone (Liters)	Weathered Rock (Liters)	Source
1	Diesel Requirements approx. (Litres of HSD for 5 years)	9,810	3,31,008	22,704	HP/BPCL/ IOCL/Reliance

V. Manpower

Manpower requirement for the proposed project is 27 Nos.

Table -6 Manpower requirement of the Project

S. No	Description	No of persons (Direct)
Skilled		
1	Operator	10
2	Mechanic	1
3	Mines manger/Mate	1
Semi – skilled		
1	Driver	5
Unskilled		
1	Musdoor/Labours	10
Total		27

VI. Solid Waste Generation & Management

❖ Municipal Solid Waste Management

Table -7 Municipal Solid Waste generation & Management

S. No	Type	Quantity Kg/day	Disposal method
1	Organic	7.29	Municipal bin including food waste
2	Inorganic	4.86	TNPCB authorized recyclers
Total		12.15	

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

❖ **Hazardous Waste Management**

Table -8 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-9 Nearest Human Settlement

S. No	Name of the villages	Distance (~km) & Direction	Approximate population as per the census 2011
1	Menallur	0.33,N	1,444
2	Punaitangal	0.68,NE	277
3	Chinna Elacheri	1.33,S	2080
4	Bagavantapuram	1.07,SSW	777
5	Girijapuram	0.33,NNW	243

➤ **Industries**

The details of Industries within 15km radius from the project site are given in **Table -10**.

Table -10 Industries within 15km radius from the project site

S.no	Industries	Distance (~km)	Direction
1	SIPCOT Industrial Park	4.13	WSW
2	Forech India Private Ltd	5.52	WSW
3	Ashley Alteams India Ltd	6.12	WSW
4	Rockman Industries Limited	5.95	WSW
5	Nobel Steel Pvt Ltd	10.34	S
6	AM Breweries Pvt Ltd	9.44	E
7	TNWC RO Kancheepuram	9.43	N
8	Aluminium Ingot Factory	9.51	WSW

➤ **Project Cost**

The total capital investment on the project is Rs. 1,08,70,000/- including EMP cost is 6,00,000/-

The Capital investment of the Project is given in **Table-11**.

Table-11 Capital Investment on the Project

S. No	Description of the Cost	Amount in Rs.
➤	Fixed Cost	
1	Land Cost	17,20,000/-
2	First aid room and accessories	1,00,000/-
3	Labourers shed	1,00,000/-
4	Sanitary facilities	1,00,000/-
	Total	20,20,000/-
➤	Operational	
1	Machinery to be used	80,00,000/-
2	Fencing Cost	2,50,000/-
	Total	82,50,000/-
➤	EMP Cost	
1	Air Quality Sampling	40,000/-
2	Water Quality Sampling	40,000/-
3	Noise Monitoring	20,000/-
4	Ground Vibration	20,000/-
	Expenditure	
1	Drinking water facility	1,50,000/-
2	Sanitary Arrangements	50,000/-
3	Safety Kits	50,000/-
4	Water Sprinkling	1,50,000/-
5	Afforestation	80,000/-
	Total EMP Cost	6,00,000/-
	Total Cost of the Project (A+B+C)	1,08,70,000/-

➤ **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 Menallur 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 (May to July 2021) within the study area.

Summary of Baseline Studies:

- Site has a Plain terrain with level ~103m MSL.
- The project site falls under Zone- III (Low Risk Zone) as per IS 1893 (Part- I).
- The predominant wind direction is West during study period.
- Max Temperature: 40°C Min Temperature:23°C & Avg Temperature: 30.86°C
- Max Relative Humidity:100 % Min Relative Humidity:32.27 % & Avg Relative Humidity: 66.39 %
- Average Wind Speed :3.52 m/s

Table-12 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	160	139	299	500	86.88
PM ₁₀	64	28	92	100	43.75
PM _{2.5}	35	17	52	60	48.57
SO ₂	15	1	16	80	6.67
NO _x	27	27	54	80	100.00

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 51 $\mu\text{g}/\text{m}^3$ to 54 $\mu\text{g}/\text{m}^3$ (NAAQ standard 100 $\mu\text{g}/\text{m}^3$).
- PM_{2.5} values varied from 24 $\mu\text{g}/\text{m}^3$ to 30 $\mu\text{g}/\text{m}^3$ (NAAQ standard 60 $\mu\text{g}/\text{m}^3$).
- SO₂ levels varied from 10 $\mu\text{g}/\text{m}^3$ to 12 $\mu\text{g}/\text{m}^3$ (NAAQ standard is 80 $\mu\text{g}/\text{m}^3$).
- NO_x ranged between 17 $\mu\text{g}/\text{m}^3$ to 22 $\mu\text{g}/\text{m}^3$ (NAAQ standard is 80 $\mu\text{g}/\text{m}^3$).

Noise Environment

- In industrial area day time noise levels was about 59.7 dB(A) and 53.4 dB(A) during night time, which is within the prescribed limit by CPCB (75 dB (A) Day time & 70 dB (A) Night time).

- In residential area day time noise levels varied from 47.6 dB(A) to 50.2 dB(A) and night time noise levels varied from 40.1 dB(A) to 41.9 dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise levels in Residential area is within the limit prescribed by CPCB (55 dB (A) Day time & 45 dB (A) Night time).

Ground Water Quality

- The prevailing status of water quality at 8 locations for ground water has been assessed during the study period. Groundwater samples are within the permissible limits specified for drinking water quality standards as per IS: 10500 (2012).
- The average pH ranges from 7.26 to 8.15.
- TDS value varied from varied from 623 mg/l – 1037 mg/l
- The sulphate content of the ground water of the study area is varied between 12.5 mg/l – 62.8 mg/l meeting the acceptable limit of the IS 10500: 2012.

Surface Water Quality

- Surface water sample are within the limits as per ISI-IS2296-1982 Class C (Drinking water source with conventional treatment followed by disinfection).
- pH ranges from 7.26 to 8.15
- Total Dissolved Solids range from 623 mg/l to 1037 mg/l..
- Chloride ranges from 96.8 mg/l to 207.62mg/l.
- The sulphate content in the surface water of the study area varies between 15.2 mg/l – 97.04 mg/l.
- Total hardness ranges between 149.4 mg/l to 403 mg/l
- The BOD value ranges from 4.2 mg/l to 32.6 mg/l
- COD value 13.5 to 92.1 mg/l.
- The concentration of heavy metals like As, Cd, Cr, Pb, Mn, Hg, Ni and Se at all locations are within the limits of IS 2296:1992(Class-C: Drinking water with conventional treatment followed by disinfection.)

Soil Quality

- Soil sampling was carried out at eight (08) locations in the study area. It is observed that, Soil types are Sandy Clay Loam, Loam, Loam sand, and clay and the soil samples are slightly alkaline in nature.
- The pH of the soil samples ranged from 7.03 to 8.23.
- Conductivity of the soil samples ranged from 86 to 269 µmhos/cm.
- Nitrogen content in the collected soil samples ranged from 169 mg/kg to 721 mg/kg.

- Phosphorous content ranged from 28 mg/kg to 126.5 mg/kg.
- Potassium content ranges from 157 mg/kg to 283 mg/kg.

Biological Environment

- The Rough Stone and Gravel quarry is located at Menallur 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.
- There is one Reserve Forest which is located at a distance of 9.62km from the project site.
- Therefore, no management plan is required.

Socio-economic Conditions:

The project is located at Menallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. As per the 2011 Census, the total population of Tiruvannamalai district was 2464875 and it is ranked 13th place in terms of the highest population in Tamil Nadu. The population density of Tiruvannamalai district was 398 persons per sq.km. The 2011 Census states that, the Tiruvannamalai district has 20.08 % urban population and 79.92 % rural population. The child sex ratio in the district during 2011 census was 930 and this was 948 in 2001 census. The literacy rate in the district has increased in 2011 census compared to 2001 census. As per 2011 Census, the literacy rate of the district was 74.21%. The literacy rate for males was 83.11%, higher than female literacy (65.32%) in the district.

➤ 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.

- Menallur Rough Stone & Gravel Quarry is a Patta land, over an extent of 4.30.0.Ha, at Menallur Village, Vembakkam Taluk, Tiruvannamalai District, TamilNadu State. There are no R&R issues as it is a patta land.
- The lease area topography is Plain terrain with site elevation is ~103mMSL. Menallur Rough Stone & 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 160µg/m³, PM₁₀ is 64µg/m³, PM_{2.5} is 35µg/m³, SO₂ is 15µg/m³ and NO_x is 27µg/m³, 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 recycler as per the Hazardous and Other wastes (Management and Transboundary 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 -13 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 site 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 and weathered rock, after the excavation weathered rock mass will be preserved all along the boundary barrier. The excavated gravel after will be

directly loaded into tipper to the needy buyers for road project and construction works for filling and leveling of 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 0.30.0Ha hectare land was allotted for greenbelt development during 5 years of mining plan. Mr.T.Poonmbalam has proposed to plant 50 No's of trees per year and Rs. 80,000/- will be spent 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 benefitted mutually at Menallur 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.
- 2 % (Rs. 2,17,400) on total cost will be allocated for CER activities as per MoEF&CC Office memorandum dated 1stMay, 2018.

➤ **Benefits of the Proposed Project**

- The quarrying activities in this belt will benefit to the local people 27 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.
