

# **EXECUTIVE SUMMARY**

## **DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT OF ROUGH STONE & GRAVEL QUARRY**

(As per EIA Notification, 2006 dated 14.09.2006 and its amendments)

### **Category: B1 (Cluster)**

Extent : 3.40.5Ha  
S. F. Nos. : 64/3A, 3B, 3D, 65/2A, 65/2B, 65/3A,  
65/6, 66/1A1, 66/1A2, 66/1B2,  
66/2A2, 66/2B1, 66/2B2, 67/3A1,  
65/3B1, 65/3B2, 66/1B1, 66/2A1,  
64/6A, 64/7A, 64/6B, 64/7B  
Village : Sundakottai  
Taluk : Aruppukottai  
District : Virudhunagar

## **PROPONENT**

**Thiru.M.Thiruvappu**

S/o.Muniasamy,  
Devarkurichi Village, Kadaladi Taluk,  
Ramanathapuram District,  
Tamil Nadu- 623 704  
Mobile No: 962908390

## **EIA CONSULTANT**

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# DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.Thiruvappu, Rough Stone and Gravel quarry, Virudhunagar District

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## Executive Summary

### 1. INTRODUCTION

**Thiru. M. Thiruvappu S/o. Muniyasamy** rough stone and gravel quarry over an extent of 3.40.5 hectare is located in S.F.No: 64/3A, 3B, 3D, 65/2A, 65/2B, 65/3A, 65/6, 66/1A1, 66/1A2, 66/1B2, 66/2A2, 66/2B1, 66/2B2, 67/3A1, 65/3B1, 65/3B2, 66/1B1, 66/2A1, 64/6A, 64/7A, 64/6B, 64/7B Sundakottai Village, Aruppukottai Taluk, Virudhunagar District. The area is marked in the survey of India Toposheet No.58K/3. The area lies between northern latitude of 9°28'7.09"N to 9°28'14.50"N and eastern longitude of 78°11'4.71"E to 78°11'11.81"E. The precise area communication letter has been given by Assistant Director, Dept of Geology and Mining, Virudhunagar District vide Roc.No.KV1/666/2020, dated 08.01.2021 for Thiru. M.Thiruvappu S/o. Muniyasamy.

The mining plan was approved by Department of Geology and Mining, Virudhunagar, vide Letter No: Roc.No.KV1/666/2020, dated 13.01.2021. The proposed rate of production of Rough Stone is about 502843 m<sup>3</sup> up to the depth of 39.5m bgl for five years.

As per the Environmental Impact Assessment (EIA) Notification dated 14<sup>th</sup> September 2006, the project falls under 1(a) Mining of minerals, Category – B1 in view of lease area >5 and <250 Ha. Therefore, the applicant applied for ToR through Parivesh website vide online proposal no. SIA/TN/MIN/67926/2021 Dated 29.09.2021. The ToR proposal was placed in 250<sup>th</sup> SEAC meeting, dt 03.03.2022 and 494<sup>th</sup> SEIAA meeting, dated 21.03.2022. Then ToR has been issued by the SEIAA vide Lr.No.SEIAA-TN/F.No.8847/SEAC/TOR-1103/2021 dated 21.03.2022. The draft EIA report has been prepared based on the recommended ToR.

#### 1.1 SCOPE OF THEPROJECT

The proposal for Environmental Clearance of Rough stone and gravel quarry of **Thiru.M.Thiruvappu S/o. Muniyasamy** requires, draft EIA report as per Terms of Reference vide Lr.No.SEIAA-TN/F.No.8847/SEAC/TOR-1103/2021 dated 21.03.2022. The draft EIA report has been prepared based on the recommended ToR.

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### 1.2 PROJECT DESCRIPTION

Table 1.1 Project Details

Project Details				
Proponent	Thiru.M.Thiruvappu, S/o. Muniyasamy			
Total Mine Lease Area	3.40.5 Ha - Rough Stone & Gravel quarry (Patta land)			
Survey No.	64/3A, 3B, 3D, 65/2A, 65/2B, 65/3A, 65/6, 66/1A1, 66/1A2, 66/1B2, 66/2A2, 66/2B1, 66/2B2, 67/3A1, 65/3B1, 65/3B2, 66/1B1, 66/2A1, 64/6A, 64/7A, 64/6B, 64/7B			
Site Location	Sundakottai Village, Aruppukottai Taluk, Virudhunagar District and Tamil Nadu.			
Geographical Co-ordinates	Latitude: 9°28'7.09"N to 9°28'14.50"N Longitude: 78°11'4.71"E to 78°11'11.81"E			
Toposheet No.	58K/3			
Elevation	Elevation of the area is 80m above MSL			
Accessibility				
Nearest Habitation	950m - S			
Nearest Village	Kalaiyarkarisalkulam – 950m - S			
Nearest Town	Aruppukottai –10 km - NW			
Nearest Settlement	Name of Village	Direction	Distance from Mines (Approx.)	Population
	Aladipatti	NE	1.7km	2811
	Bommakottai	SW	1.4km	815
	kurunaikulam	NW	2.4km	641
	kalayarkarisalkulam	South	950m	1971
Nearest Roadway	NH 38 – 9.4km - East side –Madurai - Thoothukudi SH47 – 2.0km - East side – Aruppukkottai - Partibamiyur MDR 621 – 4.64km – South side Reddipatti - Thoppakarai			
Nearest Railway station	Tiruchuli Railway Station– 7.5km –NE			
Nearest Airport	Madurai–42km – NW			
Environmental Sensitiveness				
Interstate Boundary	There is no interstate boundary within 15km radius. Tamil Nadu – Kerala Interstate boundary is located 87 km away from lease area in west direction.			
Coastal Zone	Bay of Bengal is located 46 km away from lease area in SE direction.			
Reserve Forest	There is no Reserve forest and wild life sanctuaries found			

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	within 10km radius. The proposed project site does not attract Forest Conservation Act, 1980.
Wildlife sanctuary	Nil within 10km radius. The Proposed project site does not the Wildlife (Protection) Act, 1972.
Water bodies	<ol style="list-style-type: none"><li>1. A Odai adjacent to northeast side of lease area. Safety distance of 50m has been left.</li><li>2. Lake near lease area – 60m – South and South west</li><li>3. Small odai – 250m - NW</li><li>4. Small Kanmoi – 630m – NW</li><li>5. Nellikulam – 9.63km – E</li><li>6. Parakulam – 4.63km – N</li><li>7. Kandamangalam lake – 4.3km – N</li><li>8. Keelakandamangalam lake – 5.4km – N</li><li>9. Kathrie lake – 7.9km – NE</li><li>10. Gundar river – 5.1km – NE</li><li>11. Aladipatti lake – 1.4km – NE</li><li>12. Kokkulam lake – 7.9km – NE</li><li>13. Soochaneri lake – 8km - NE</li></ol>
Defense Installations	Nil within 10km radius
Quarries around 500m radius (AD Letter furnished)	One existing quarry, two abandoned quarries and five proposed quarries located within the 500m radius from the lease boundary of the proposed project site. AD Cluster Letter: Roc.No: KV1/666/2020 dated 24.09.2021
<b>Mining Details</b>	
<b>Particulars</b>	<b>Details</b>
Method of Mining	Open cast Semi -Mechanized method of mining
Geological resources	1060943m <sup>3</sup>
Mineable reserves	623385m <sup>3</sup> of Rough Stone & 48210m <sup>3</sup> of Gravel
Production (98%)	Rough stone – 502843m <sup>3</sup> for five years or 100569m <sup>3</sup> per annum(Avg)
Top soil	Gravel – 48210m <sup>3</sup> - 2m
Ore: Waste ratio	1: 0.02
Depth of Mining	39.5m bgl (for first five years) and 47m bgl (Ultimate Depth)
Water Table	50 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 years from the date of execution
Existing pit dimension	Nil

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Project Cost	Rs. 50 Lakhs
EMP Cost	Rs. 5 Lakhs
CER Cost	Rs. 1 Lakh

### 1.3 Description of the environment

#### 1.3.1 Base line environmental study

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during January 1<sup>st</sup> 2021 – March 31<sup>st</sup> 2021 to assess the existing environmental scenario in the area. For the purpose of EIA studies, mine lease area was considered as the core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone.

**Table No 1.2 Baseline Data**

Particulars	Details	Standards
<b>Meteorology (January 1<sup>st</sup> 2021 – March 31<sup>st</sup>, 2021)</b>		
Rainfall (Annual)	829 mm	--
Temperature (Annual)	23.78 -33.95°C	--
Wind speed	2.8 m/s	--
Wind Direction	NW to SE directions	
<b>Ambient Air Quality (NAAQS)</b>		
PM <sub>10</sub>	36-59 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>
PM <sub>2.5</sub>	12-25 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>
SO <sub>2</sub>	5-17 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>
NO <sub>x</sub>	10-23 µg /m <sup>3</sup>	80 µg/m <sup>3</sup>
<b>Noise Level (CPCB Standards)</b>		
Day time (6:00 am - 10:00 pm)	Core zone – 45-48 dB (A) Buffer zone – 46-52 dB (A)	<b>Industrial Area</b> Day Time - 75 dB (A) <b>Residential Area</b> Day Time – 55 dB (A)
Night time (10:00 pm - 06:00 am)	Core zone – 36-39 dB (A) Buffer zone – 38-43 dB(A)	<b>Industrial Area</b> Night Time – 70 dB(A) <b>Residential Area</b> Night Time – 45 dB (A)
<b>Water Quality IS 10500:2012 (Desirable limits)</b>		
pH	7.15 – 7.65	6.5 to 8.5

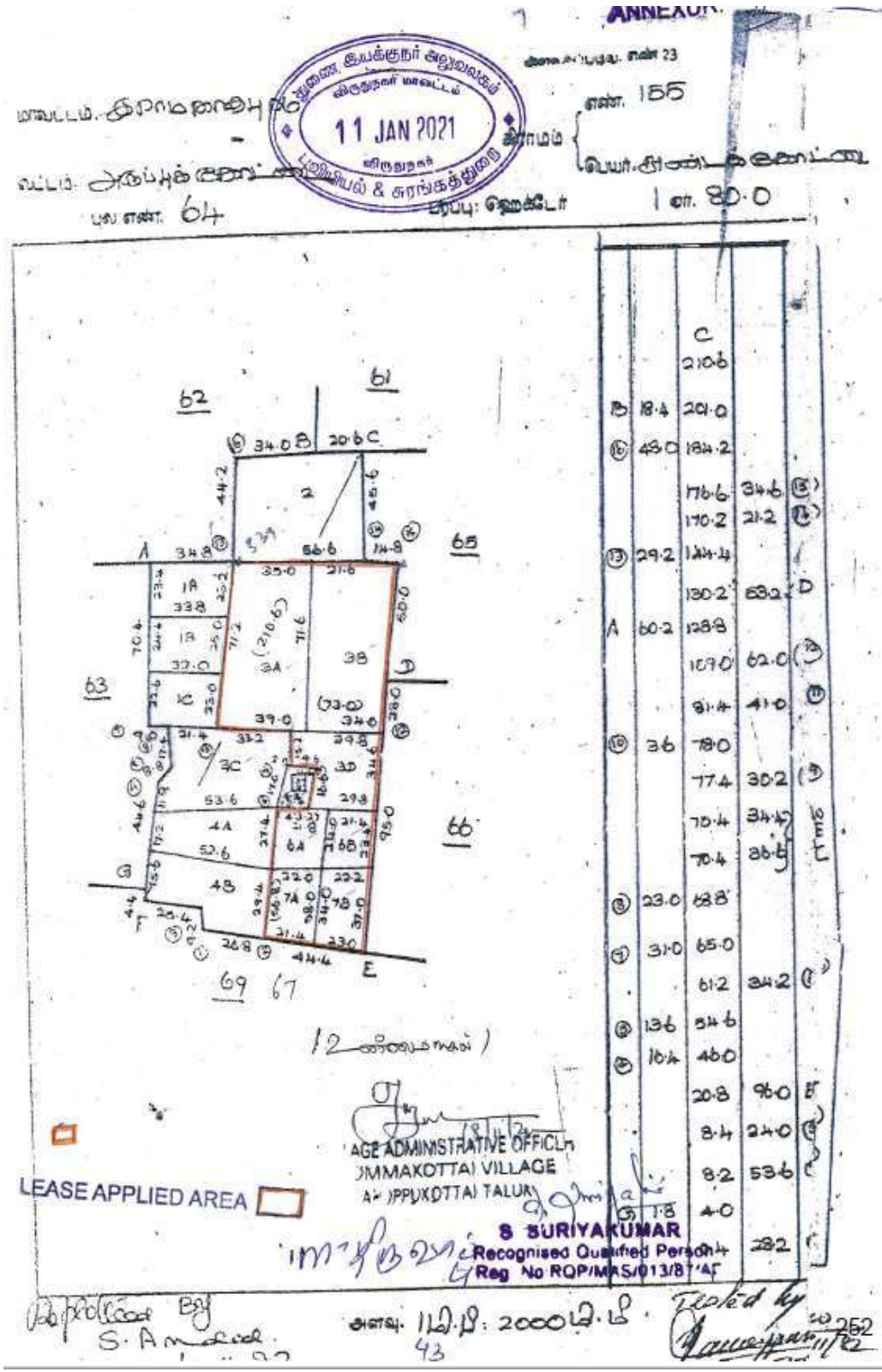
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TDS	298 - 1520 mg/l	500 mg/l
Electrical conductivity at 25°C	432 - 2460 micromhos/cm	-
Total Hardness as CaCO <sub>3</sub>	159-857 mg/l	200 mg/l
Total suspended solids	-	IS:3025:P.16:1984:R.2012
Chlorides Cl	27.4 - 396mg/l	250
Total iron Fe	BDL (DL=0.01)	0.3mg/l
Sulfates SO <sub>4</sub>	11.6-199mg/l	200 mg/l
<b>Soil Quality</b>		
pH	7.28 – 8.05	Neutral
Bulk density	1.12-1.15 g/cc	Favorable physical condition for plant growth.
<b>Hydro Geology</b>		
Depth of Mining	39.5m bgl for first five years and 47m bgl of Ultimate depth	
Water Table	50 m bgl	



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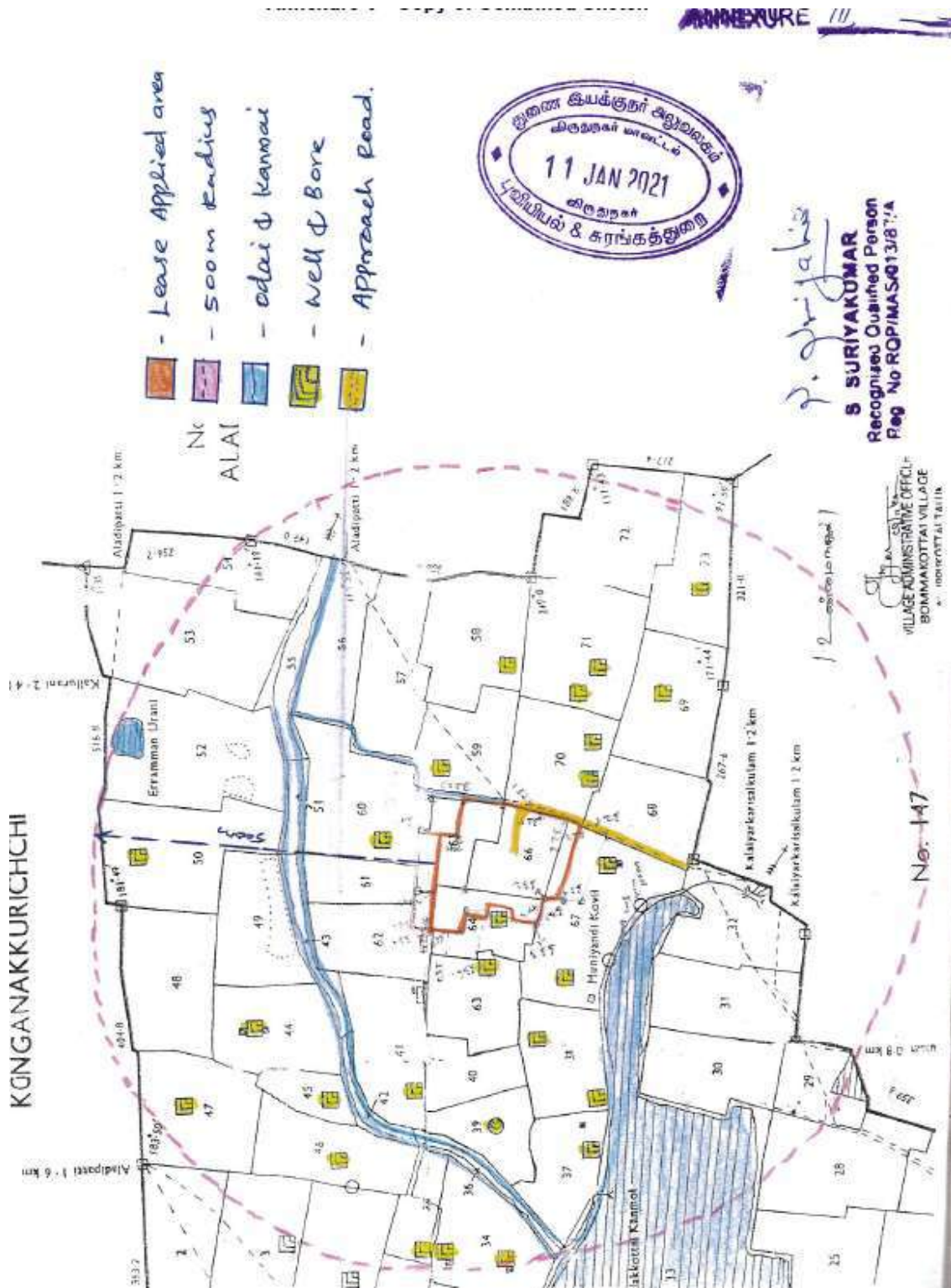






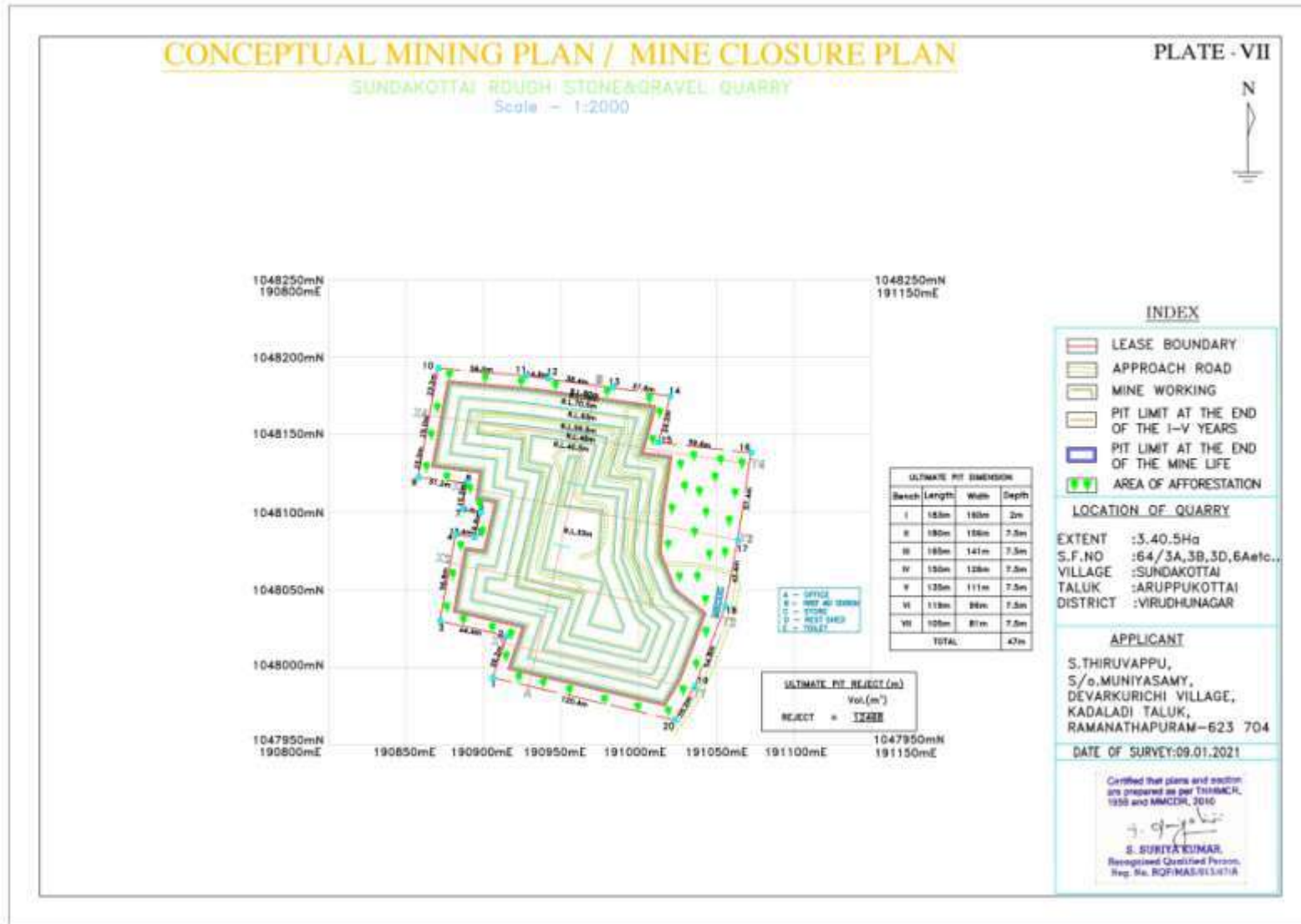


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**Fig No 1.3 Combined sketch of the lease area**

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**Fig No 1.4 Conceptual plan of the proposed project**

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### **1.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

#### **1.4.1 Air Environment**

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by adopting semi-mechanized methods which involves Jack Hammer drilling and blasting, excavation, loading and transportation.

AERMOD - Model was used for prediction of impact of PM<sub>10</sub> during conditions Total predicted 24-h maximum GLC of PM<sub>10</sub> at project site for scenario 1 i.e. loading-unloading, transportation & open pit was 79.07µg/m<sup>3</sup> after superposition of base-line value 59µg/m<sup>3</sup> over the incremental GLC 20.07µg/m<sup>3</sup> due to combined impact of loading, unloading, open pit and transportation over the haul road. Total predicted 24-h maximum GLC of PM<sub>2.5</sub> at project site for scenario 1 was 37.01µg/m after superposition of base-line value 25µg/m<sup>3</sup> over the incremental GLC 12.01µg/m<sup>3</sup>. The predicted incremental GLC of NO<sub>x</sub> for scenario 2 i.e. due to the operation of excavator and movement of vehicle in the project site was found to be 3.31 µg/m<sup>3</sup>. Therefore the total predicted GLC of NO<sub>x</sub> was 26.31µg/m<sup>3</sup>. Maximum Impact of PM<sub>10</sub>, PM<sub>2.5</sub>, and NO<sub>x</sub> was observed close to the source within the lease area due to moderate wind speeds. The overall impact on air quality due to proposed mining project is expected to be low.

#### **1.4.2 Noise Environment**

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, Blasting. Loading and during movement of vehicles.

The noise generated by the mining activity is dissipated within the core zone. This is because of distance involved and other topographical features adding to the noise attenuation. From the results, it can be seen that the ambient noise levels (day time and night time) at all the locations will remain within permissible limits prescribed by CPCB and 90dB (A) norms of DGMS. At present there is no mining activity carried out. However, the expected noise levels are not likely to have any effect. Precaution will be made to keep down the noise exposure level of 85 dB (A) to the operating personnel for 8 hrs duration. The charge per blast of 500kg is well below the Peak Particle Velocity of 5mm/s. But the proponent is proposed to use only 122kg of explosives per blast. However, as per statutory requirement additional control measures needs to be adopted

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to avoid the impacts due to ground vibrations and fly rocks due to blasting.

### **1.4.3 Water Environment**

Mining operations can affect groundwater quality in several ways. The most obvious occurs in the mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Groundwater quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying waste or other material) into ground water. But this Rough stone mine is devoid of any such impacts.

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during mining process. The mining activity will not intersect ground water table as it is 10.5 m above ground water table. The water sample from core zone has high TH, TDS and also contains E.coli in the range of 44MPN/100ml. The water sample from Veppilaseri village is good in all water parameters. Muthuramalingapuram and Kandamangalam village is very poor on parameter TH, TDS and chlorides. Kathalampatti village has TDS and TH slightly higher than the acceptable limits. Based on the Water Quality Index calculated, water qualities from Core zone and kathalampatti villages are good and from Muthuramalingapuram and Kandamangalam village are very poor. The Veppilaseri village has very excellent water quality which can be consumed without any pretreatment. The water from Muthuramalingapuram and Kandamangalam village should be treated before by reverse osmosis process for the better drinking purpose. Boiling of water will remove the microorganisms effectively from waters in core zone and Kandamangalam village making and the water will be aseptically fit for drinking purposes.

### **1.4.4 Soil Environment**

Soil characteristics indicate favorable condition for plant growth. The limited quantity of top soil generated will be dumped along 10m inner boundary of the lease area. The top soil will be used to develop greenbelt within the lease area. Part of top soil will be spread over the non active dumps along the slope and edges to plant tree saplings to form vegetal cover over the dumps. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected. The 48210m<sup>3</sup> of gravel generated upto the depth of 2m will be sold to the local needy customers.

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### **1.4.5 Waste Dump**

The proposed rate of production of Rough stone for five years is about 513105m<sup>3</sup> at the rate of 98% recovery up to permissible depth. The 2% reject of 10262m<sup>3</sup> shall be dumped as per earmarked site in the approved mining plan.

### **1.4.6 Biological Environment**

There are no notified endangered species in the area, which may be affected due to the mining activities; therefore the biological environment will not have significant impact due to mining activity. The impact on the biological environment due to amount of dust generation is minimized by well-developed green belt in and around mining lease area.

### **1.4.7 Land Environment**

Rough stone & gravel quarry project will result in disturbance of the land use pattern of the mine lease area. The land degradation is unavoidable during quarry activities like excavation, overburden dumping, soil extraction etc. So reclamation of mined out land and proper formation of benches will be given due importance as a step for sound land resource management.

The land use analyses show that the area is of predominantly Agriculture followed by buffer zones of the study area, which clearly indicates that the development of agriculture land increases over a period of time. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing agricultural activity around the mining lease area. It is generally agreed that as the total volume of production from year to year may increases. Some fallow land also increases due to seasonal crop production, which shows a positive impact due to mining activity.

### **1.4.8 Socio Economic Environment**

The quarrying activity will definitely increase the employment opportunity (directly as well as indirectly) in the project area. Some of these impacts would be beneficial. The expectation of the people of area is concerned towards employment, education, road and health facilities. The literacy rate may be increased with the economic benefits which may arise from the quarrying activities.

Direct Employment - 20 persons



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Indirect Employment - 40 persons

Indirect employment is that people will keep shops such as tea shops, hotels, spare parts store, mechanic shed, etc. around the quarry depending on the proposed projects. Population rate is increased day by day in India. It is necessary to create employment to all people for their livelihood and country's economic development.

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**Table 1.3 Environmental Management Plan**

S.No	Parameters	Mining Activity	Mitigation measures
1	Air Environment	Drilling	<ul style="list-style-type: none"><li>✓ Dust extractor or wet drilling to be followed to control dust at source of emission</li><li>✓ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator</li></ul>
		Blasting	<ul style="list-style-type: none"><li>✓ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution</li></ul>
		Loading	<ul style="list-style-type: none"><li>✓ Water sprinkling be done before loading by making it moist</li></ul>
		Transportation	<ul style="list-style-type: none"><li>✓ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste</li><li>✓ Overloading will be prevented</li><li>✓ Trucks/Dumpers covered by tarpaulin covers</li></ul>
		DG Sets	<ul style="list-style-type: none"><li>✓ DG sets will be used only during power failure</li><li>✓ Adequate stack height for DG sets will be provided as per CPCB norms</li></ul>
		General measures	<ul style="list-style-type: none"><li>✓ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust.</li></ul>

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			<ul style="list-style-type: none"> <li>✓ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, and goggles as per the MMR, 1961 amendments and circulars of DGMS.</li> <li>✓ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act</li> <li>✓ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.</li> </ul>
2	Water Environment	Surface water	<ul style="list-style-type: none"> <li>✓ Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.</li> </ul>
		Ground water	<ul style="list-style-type: none"> <li>✓ The mining activity will not intersect the ground water table</li> <li>✓ Desilting will be carried out before and immediately after the monsoon season</li> </ul>
		Storm water	<ul style="list-style-type: none"> <li>✓ Pit will be used for Storage of rainwater</li> <li>✓ Rain water will be collected in sump in the mining pit 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 onwards and</li> </ul>

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			<p>such sites where dust likely to be generated and for developing greenbelt.</p> <ul style="list-style-type: none"> <li>✓ The proponent will collect and judiciously utilize the rain water as part of rain water harvesting</li> </ul>
		General measures	<ul style="list-style-type: none"> <li>✓ Regular monitoring and analyzing the quality of water</li> </ul>
3	Noise Environment	Drilling	<ul style="list-style-type: none"> <li>✓ Limiting time exposure of workers to excessive noise</li> </ul>
		Blasting	<ul style="list-style-type: none"> <li>✓ Carrying out blasting only during day time and not on cloudy days</li> <li>✓ Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes.</li> <li>✓ Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment</li> </ul>
		Transportation	<ul style="list-style-type: none"> <li>✓ Proper and regular maintenance of vehicles, machinery and other equipments.</li> <li>✓ The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments.</li> <li>✓ Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles.</li> <li>✓ Adequate silencers will be provided in all the diesel engines of vehicles.</li> </ul>

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			<ul style="list-style-type: none"> <li>✓ Minimum use of horns and speed limit of 10 km/hr in the village area.</li> <li>✓ It will be ensured that all transportation vehicles carry a valid PUC Certificates</li> </ul>
		General measures	<ul style="list-style-type: none"> <li>✓ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas</li> <li>✓ Provision of Quiet areas, where employees can get relief from workplace noise.</li> <li>✓ The development of green belts around the periphery of the mine to attenuate noise.</li> <li>✓ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.</li> </ul>
4	Vibration	Blasting	<ul style="list-style-type: none"> <li>✓ No deep hole blasting envisaged.</li> <li>✓ Small dia shot holes are used for breaking boulders.</li> <li>✓ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios as per studies.</li> <li>✓ If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave's movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone</li> <li>✓ In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has</li> </ul>

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			to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	<ul style="list-style-type: none"> <li>✓ Humus top soil shall be preserved for reuse in afforestation and agriculture</li> <li>✓ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the quarry premises</li> <li>✓ Garland drains will be provided around the mine and dumps to arrest any soil from the quarry area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches</li> </ul>
6	Waste Dump	Stabilization of Dumps	<ul style="list-style-type: none"> <li>✓ The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation</li> <li>✓ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse.</li> </ul>
7	Plantation	Mine lease boundary and waste dump	<ul style="list-style-type: none"> <li>✓ Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise</li> <li>✓ Stabilization of Dump with plantation</li> <li>✓ It is strongly recommended that the loss of plant in each year will be counted and again planted in</li> </ul>

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			<p>subsequent plantation.</p> <ul style="list-style-type: none"><li>✓ The plant should be planted taken from nursery, where the survival rate is high.</li></ul>
8	Land Environment		<ul style="list-style-type: none"><li>✓ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with topsoil.</li><li>✓ Provision of Garland drainage around the dumps</li><li>✓ Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land</li><li>✓ Appropriate measures will be taken for Green belt development.</li><li>✓ The rain water will be stored in the pit which will recharge the ground water as a part of rainwater harvesting scheme for irrigating the nearby agricultural lands.</li></ul>
9	Socio Economic		<ul style="list-style-type: none"><li>✓ Good maintenance practices will be adopted for machinery and equipment, which will help to avert potential noise problems.</li><li>✓ Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.</li><li>✓ Drilling, blasting etc at specified location will be followed with proper schedule.</li><li>✓ Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the</li></ul>

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			<p>core zone.</p> <ul style="list-style-type: none"><li>✓ An emergency preparedness plan will be prepared in advance, to deal with firefighting, evacuation and local communication.</li><li>✓ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards).</li><li>✓ As a part of CSR activities, community welfare activities will be undertaken by the proponent which leads to socioeconomic</li></ul>
10	Occupational Health		<ul style="list-style-type: none"><li>✓ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955</li><li>✓ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B &amp; 45 (A).</li><li>✓ Insurance will be taken in the name of the labourers working in the quarry</li><li>✓ Workers involved in quarrying work shall be provided protective equipment's such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc...</li></ul>

### 1.5 Analysis of Alternatives

The quarrying site is dependent on the geology and mineral deposition of the area. Hence, this project is, mineral and site specific and no alternative site considered for this project.



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### 1.6 Environmental Monitoring Program

Success of any environmental management programme depends upon the efficiency of the organizational set up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters is also necessary to evaluate the effectiveness of the management programme. Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in the Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

**Table No: 1.4 Post Project Environmental Monitoring Program**

S. No.	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub>	6 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, two station on the downwind direction and one in cross wind Direction).	8 hours	Six Month Once	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground and surface water in	–	Six Month Once	Physico–chemical, microbiological characteristics

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		the vicinity.			
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in 6months	Water level monitoring devices may be used
5	Noise	Mine Boundary, High noise generating areas within the lease and at the nearest residential area	24 hours	Monthly Once	Sound level meter
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting operation	Digital Seismograph
7	Soil	Core Zone and Buffer zone (Grab samples)	-	Six Month Once	Physical and Chemical characteristics

### 1.7 Project Benefits

The proponent **Thiru. M. Thiruvappu** is very much conscious of his obligations to society at large. Under plantation programme, it is suggested to develop green belt further all along the boundary of the quarry lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emissions and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community. The quarrying activity will create rural employment. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation of Rough Stone and gravel to destinations, sanitation, supply of goods and services to the quarry and other community services etc. The local population will have preference to get an employment. The proponent will help in socio economic development of the village by providing educational facilities to children, and welfare amenities like drinking water to school; road and medical facilities to villages and

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employment opportunities to nearby villagers. CSR budget is allocated as 2.5% of the profit.

### **1.8 Environmental Management Plan**

The Environmental Management Plan (EMP) must be integrated into the process of quarry planning so that the ecological balance of the area is well maintained and adverse effects are minimized. EMP includes all preventive as well as mitigation measures to minimize the impacts on the environment. The Quarry Plan is for the production of Rough Stone without deep hole drilling and heavy blasting. Only controlled blasting is undertaken. Such limited quarrying activity is not likely to cause any impact adversely on the environment as far as pollution of air, water, land and noise is concerned.

### **1.9 Conclusion**

As discussed, it is safe to mention that the project is not likely to cause significant impacts on the ecology and environment of the area, as adequate preventive measures will be adopted to contain the pollutants within permissible limits. The total operations shall be carried out with ease & minimum risk to the workers. The proposed Environmental Management Plan will keep the area in a safe environment with negligible impact on the environment. Plantation will substantiate the impact due to the quarrying activity. Quarrying activity will help in improving the socio-economic benefits in areas like employment, communication and infrastructure development.