

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 : 3.00.0Ha
S. F. Nos. : 182/2 (P)
Village : Thirukooranam
Taluk : Gujiliamparai
District : Dindigul

PROPONENT

Thiru M.K.Kungumarajh

S/o. M. Kumaresan,

No.32, M.G.R Nagar

Chinna Andan Kovil Street,

Karur District – 639 301,

Mob: 9489682473.

EIA CONSULTANT

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Executive Summary

1. INTRODUCTION

Thiru. M. K. Kungumarajh Rough stone and Gravel quarry over an extent of 3.00.0 Hectares is located in S.F.No: 182/2 (P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu. The area is marked in the survey of India Toposheet No.58F/14. The area lies between northern latitude of 10°44'36.82" to 10°44'41.38" and eastern longitude of 77°57'17.33"E to 77°57'25.31"E. The precise area communication letter has been given by Assistant Director, Dept of Geology and Mining, Dindigul District vide Rc No. Roc.No.23/2022 (Mines), dated 18.03.2022 for Thiru. M. K. Kungumarajh.

The mining plan was approved by Assistant Director, Department of Geology and Mining, Dindigul vide letter Rc.No.23/2022 (Mines), dated 24.03.2022. The proposed rate of production of Rough Stone is about 152281m³ up to the depth of 20m bgl (depth for five years -14m). The ultimate depth of mining is 20m bgl.

As per the Environmental Impact Assessment (EIA) Notification dated 14th September 2006, the project falls under 1(a) Mining of minerals, Category – B1 in view of lease area >5 and <250 Ha. The proposed area comes under cluster classification, based on the Assistant Director, Dindigul letter vide Roc.No.23/2022, dated 01.04.2022. So this project has to obtain Terms of Reference for conducting EIA studies. There are two existing quarries namely Thiru.D.Sivajeeganesan with an extent of 3.41.0 Ha & Thiru.R.K.Pannerselvam with an extent of 1.58.32 Ha, one abandoned quarry namely Thiru.K.Palanisamy with an extent of 1.15.0 Ha and one present proposed quarry namely Thiru.M.K.Kungumarajh with an area of 3.00.0 Ha located within the 500m radius from the lease boundary of the proposed project. The total cluster area is 9.14.32 Ha.

As per MoEF&CC OM: F.No.L-11011/175/2018-IA-II (M), dated 12.12.2018, the EIA/EMP report has to be prepared for the cluster area based on ToR recommended by SEIAA. Therefore, the applicant applied for ToR through Parivesh website vide online proposal no. SIA/TN/MIN/74776/2022 Dated 04.04.2021. The ToR proposal was placed in 284th SEAC meeting, dt 10.06.2022 and 529th SEIAA meeting, dated 06.07.2022. Then ToR has been issued by the SEIAA vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022.

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1.1 SCOPE OF THE PROJECT

The EIA report of Rough stone & Gravel quarry of **Thiru. M.K. Kungumarajh** has been prepared based on the recommended Standard ToR and Specific ToR issued by SEIAA vide letter no. SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022 for obtaining Environmental Clearance from SEAC/SEIAA.

1.2 PROJECT DESCRIPTION

Table 1.1 Project Details

Project Details				
Proponent	Thiru. M.K.Kungumarajh			
Total Mine Lease Area	3.00.0 Ha - Rough Stone & Gravel quarry (Patta Land)			
Survey No.	182/2 (P)			
Site Location	Thirukoornam Village, Gujiliamparai Taluk, Dindigul District, TamilNadu.			
Geographical Co-ordinates	Latitude: 10°44'36.82"N to 10°44'41.38"N Longitude: 77°57'17.33"E to 77°57'25.31"E			
Toposheet No.	58F/14			
Elevation	Elevation of the area is 173m above MSL			
Accessibility				
Nearest Habitation	98m - NE			
Nearest Villages	Kanchamaranpatti – 905m - SW			
Nearest Settlement	Name of Village	Direction	Distance from Mines (Approx.)	Population
	Thirukoornam	N	1.5 km	2210
	Vellodu	E	2.5 km	3147
	koombur	S	2.5 km	3584
	Pallapatti	N-W	7 km	4807
Nearest Town	Aravakurichi – 5.4km - NW			
Nearest Roadway	NH 44 – 3.5km – South west side –Salem - Dindigul SH 193 – 5.7km - West side – Aravakurichi - Dindigul MDR 37 – 2.2km – North side Aravakurichi – Attamed Village road – Adjacent to lease area - S			
Nearest Railway station	Palayam Railway Station – E- 19km			
Nearest Airport	Trichy International Airport–82km – E			

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Environmental Sensitiveness	
Interstate Boundary	There is no interstate boundary within 15km radius. Tamil Nadu – Kerala Interstate boundary is located 93 km away from lease area in South west direction.
Coastal Zone	Bay of Bengal is located 154 km away from lease area in SE direction.
Reserve Forest	There is no Reserve forest and wild life sanctuaries found within 10km radius. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE 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">1. Godavanar River – 435m – E2. Kodavanar Check dam – 450m – E3. Alamarathupatti lake – 1.3km – NE4. Small odai – 1km – NE5. Amaravathi river – 8.2km – NW6. Nanganji River – 5.1km - W
Defense Installations	Nil within 10km radius
Critically Polluted area	Nil within 10km radius
Quarries around 500m radius (AD Letter furnished)	Two existing quarries, one abandoned quarry and one present proposed quarry are located within the 500m radius from the lease boundary of the proposed project site. Total Cluster area : 9.1432 Ha AD Cluster Letter: Rc.No: 23/2022 (Mines), dated: 01.04.2022
Mining Details	
Method of Mining	Open cast Semi -Mechanized method of mining
Geological resources	419040m ³
Mineable reserves	322936m ³ of Rough Stone & 33360m ³ of Gravel
Production (95%)	Rough stone – 152281m ³ for five years or 30456m ³ per annum(Avg) Gravel – 31958m ³ for three years or 10652m ³ per annum
Top soil	Gravel – 33360m ³ - 2m
Ore: Waste ratio	1: 0.052

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Depth of Mining	14m bgl (for first five years) and 20m bgl (Ultimate Depth)
Water Table	30 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 Years (To be granted)
Project Cost	Rs. 19 Lakhs
EMP Cost	Rs. 5.80 Lakhs
CER Cost @ 2% of Project Cost	Rs. 0.38 Lakh say in 1.0 Lakhs

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 March 1st 2022 – May 31st 2022 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
Meteorology (March 1st 2022 – May 31st, 2022)		
Rainfall (Avg.)	45.2 mm	--
Temperature (Avg.)	22-38°C	--
Wind speed	2.2 m/s	--
Wind Direction	Predominantly from West to East	
Ambient Air Quality (NAAQS)		
PM ₁₀	39-52 µg/m ³	100 µg/m ³
PM _{2.5}	18-33 µg/m ³	60 µg/m ³
SO ₂	4-14 µg/m ³	80 µg/m ³

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NO _x	6-18 µg /m ³	80 µg/m ³
Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Core zone – 45.7-48.2 dB (A) Buffer zone – 40.4- 47.6 dB (A)	Industrial Area Day Time - 75 dB (A) Residential Area Day Time – 55 dB (A)
Night time (10:00 pm - 06:00 am)	Core zone – 35.0 – 37.2 dB (A) Buffer zone – 31.0-36.4 dB(A)	Industrial Area Night Time – 70 dB(A) Residential Area Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	7.24-8.4	6.5 to 8.5
TDS	493-3722 mg/l	500 mg/l
Electrical conductivity at 25°C	882-5794 micromhos/cm	
Total Hardness as CaCO ₃	95-1676 mg/l	200 mg/l
Silica SiO ₂	-	-
Total suspended solids	2-20	IS:3025:P.16:1984:R.2012
Chlorides Cl	668-2003mg/l	250
Total iron Fe	0.01-2mg/l	0.3mg/l
Sulfates SO ₄	13-107mg/l	200 mg/l
Soil Quality		
pH	6.65-8.92	Neutral to slightly alkaline
Bulk density	1.00-1.27 g/cc	Favorable physical condition for plant growth.
Hydro Geology		
Depth of Mining	20m bgl	
Water Table	30m bgl	

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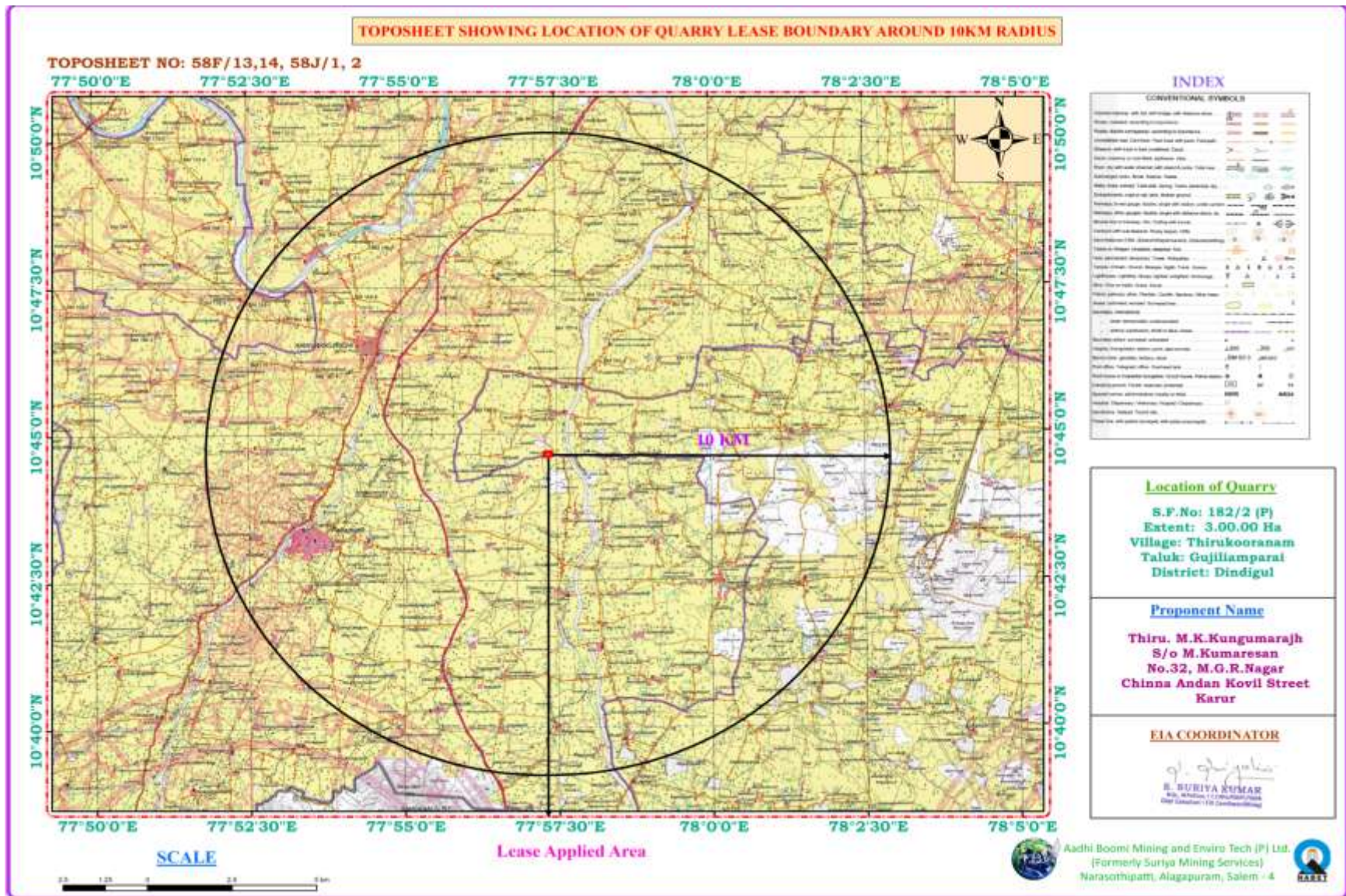


Fig No 1.1 Toposheet showing location of the lease area

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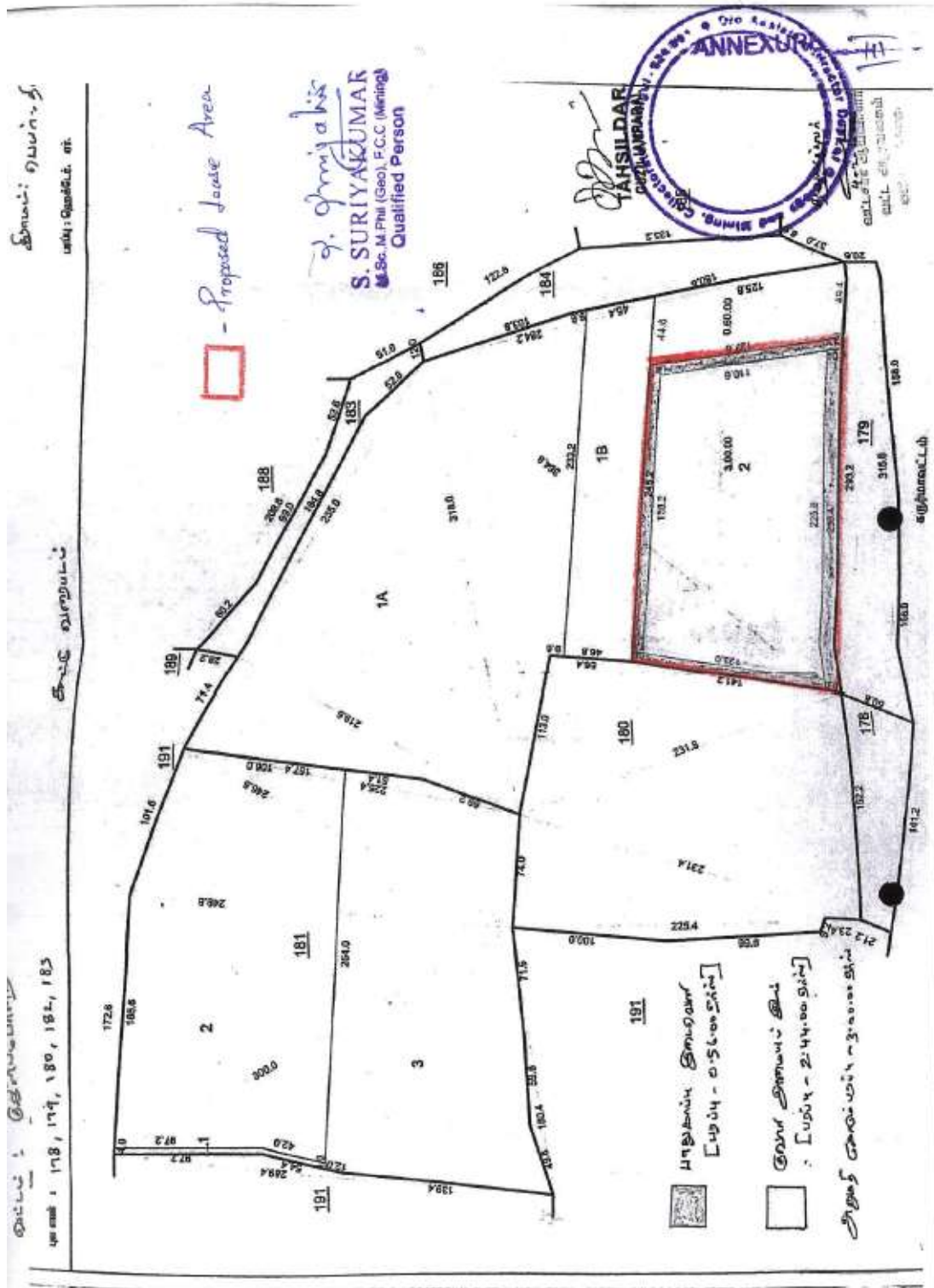


Fig No 1.2 FMB of the lease area

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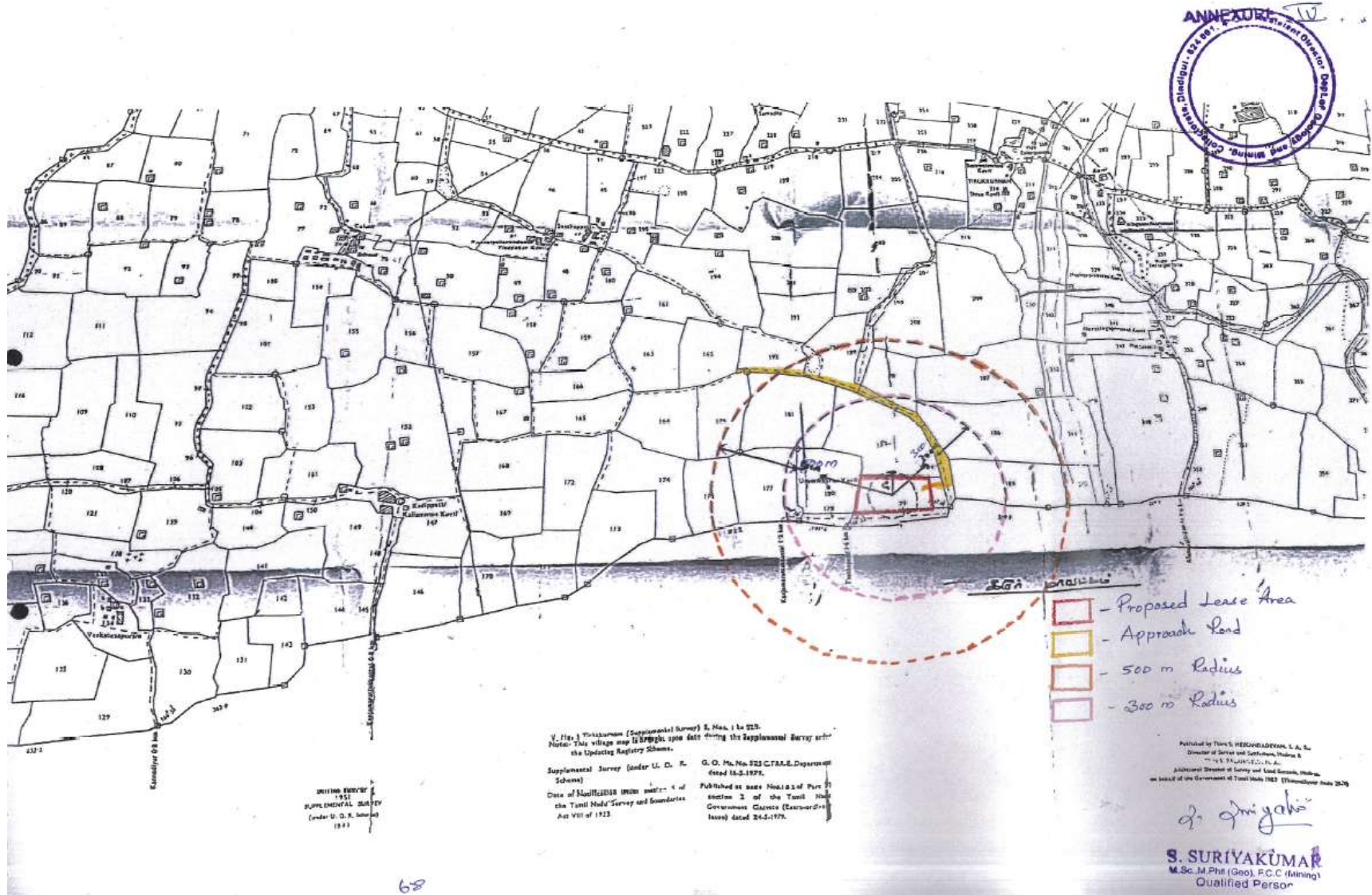


Fig No 1.3 Combined sketch of the lease area

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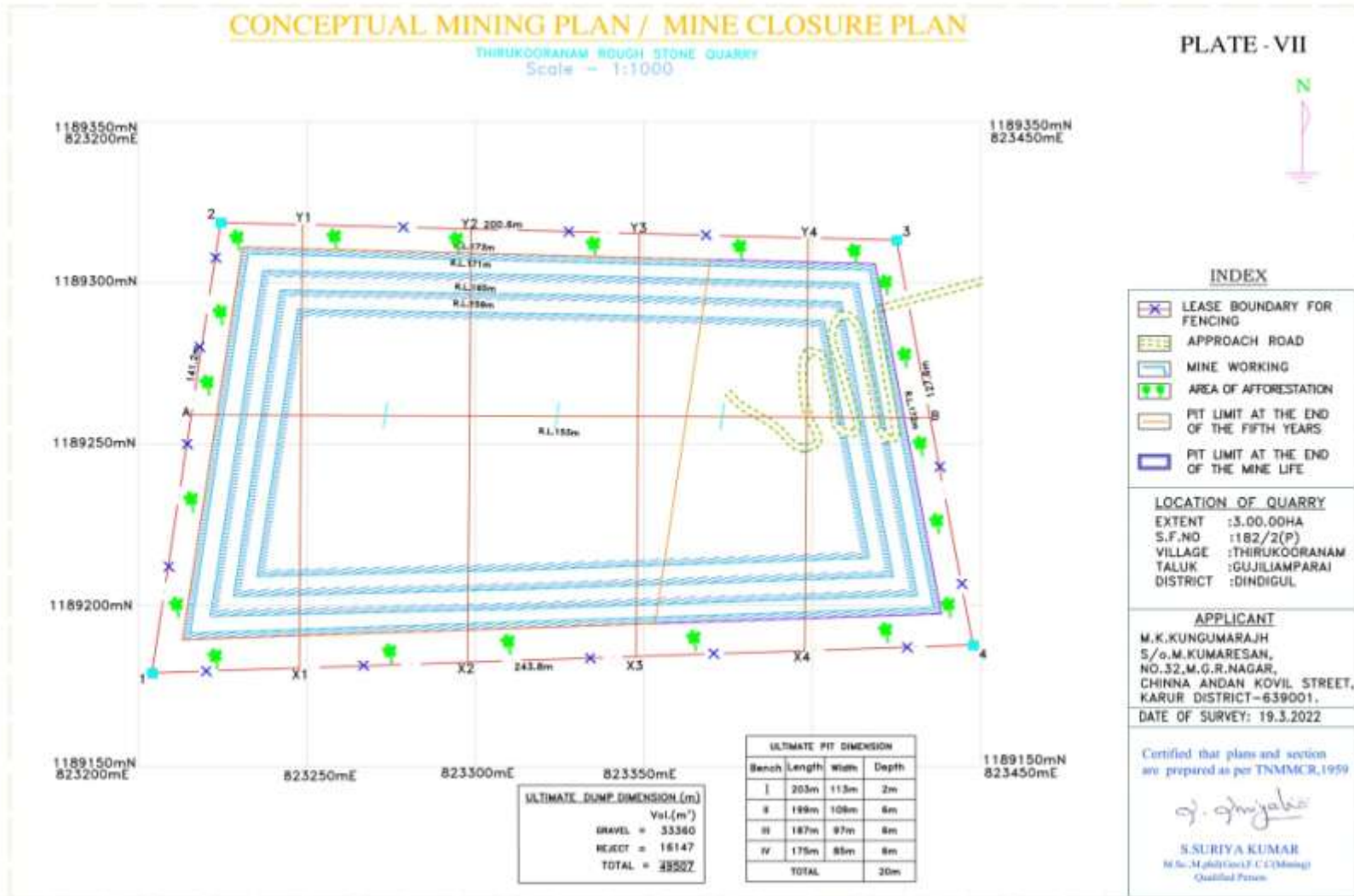


Fig No 1.4 Conceptual plan of the proposed project

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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.

Total predicted 24-h maximum GLC of PM₁₀ at project site for scenario 1 i.e loading-unloading and transportation and scenario 2 i.e blasting was 68.07µg/m³ and 54.18 µg/m³ respectively occurred at the project site after superposition of base-line value 48 µg/m³ over the incremental 20.07 µg/m³ and 6.18 µg/m³ respectively due to combined impact of loading and unloading and transportation over the haul road and due to blasting.

The predicted incremental GLC of SO_x and NO_x for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m³ µg/m³ and 3.31µg/m³ respectively occurred at the project site. Therefore the total predicted GLC of SO_x and NO_x after superposition of base-line value 9µg/m³ and 14µg/m³ respectively over the incremental value will be 10.95µg/m³ and 17.31µg/m³ respectively.

The predicted incremental GLC of SO_x and NO_x for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m³ µg/m³ and 3.31µg/m³. Therefore the total predicted GLC of SO_x and NO_x will be 10.95µg/m³ and 17.31µg/m³ respectively.

Maximum Impact of PM₁₀, SO_x and NO_x was observed close to the source within the lease area due to moderate wind speeds.

1.4.2 Noise Environment

Noise pollution poses a major health risk to the mine workers. The sources of noise in the proposed open cast rough stone & gravel quarry are such as Drilling, Blasting, 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

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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 38kg is above the Peak Particle Velocity below 5mm/s. So the proponent will be advised to use five delays to keep the ground vibration within 5mm/s. However, as per statutory requirement additional control measures needs to be adopted 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 and it is 30m below ground level. The water sample from all the locations including core zone except Pungambadi has high TDS and TH exceeds the permissible limit. Chlorides were found to be high in all the five locations. Total coliform was found in the range of 27 MPN index/100ml to 220MPN index/100ml at 95 percent confidence limit in all the water samples. E.coli was found <2 in all the water samples. Based on the Water Quality Index calculated, water qualities from all location were poor to unfit for drinking. For excellent quality, the water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate. Boiling, chlorination of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

Prolonged consumption of water containing high TH causes Cardio vascular problems, diabetes, skin diseases, rashes, reproductive failure and renal failure. For the excellent quality of drinking the water must be treated with reverse osmosis process to overcome above mentioned such impacts on human body. Boiling of water will remove the

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microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

1.4.4 Soil Environment

The limited quantity of top soil generated will be dumped along 7.5m 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 31958m³ of gravel generated upto the depth of 2m will be sold to the local needy customers.

1.4.5 Waste Dump

The proposed rate of production of Rough stone for five years is about 152281m³ at the rate of 95% recovery up to permissible depth. The 5% reject of 8015m³ 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 quarry activities; therefore the biological environment will not have significant impact due to quarrying activity. The impact on the biological environment due to amount of dust generation is minimized by well-developed green belt in and around the quarry 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

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agricultural activity around the mining lease area. It is generally agreed that as the total volume of production from year to year may increase. 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

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"> ✓ Dust extractor or wet drilling to be followed to control dust at source of emission ✓ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator
		Blasting	<ul style="list-style-type: none"> ✓ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	<ul style="list-style-type: none"> ✓ Water sprinkling be done before loading by making it moist
		Transportation	<ul style="list-style-type: none"> ✓ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste ✓ Overloading will be prevented ✓ Trucks/Dumpers covered by tarpaulin covers
		DG Sets	<ul style="list-style-type: none"> ✓ DG sets will be used only during power failure ✓ Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	<ul style="list-style-type: none"> ✓ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of

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			<p>dust.</p> <ul style="list-style-type: none"> ✓ 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. ✓ 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 ✓ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2	Water Environment	Surface water	<ul style="list-style-type: none"> ✓ Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	<ul style="list-style-type: none"> ✓ The mining activity will not intersect the ground water table ✓ Desilting will be carried out before and immediately after the monsoon season
		Storm water	<ul style="list-style-type: none"> ✓ Pit will be used for Storage of rainwater ✓ 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

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

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			<p>engines of vehicles.</p> <ul style="list-style-type: none"> ✓ Minimum use of horns and speed limit of 10 km/hr in the village area. ✓ It will be ensured that all transportation vehicles carry a valid PUC Certificates
		General measures	<ul style="list-style-type: none"> ✓ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas ✓ Provision of Quiet areas, where employees can get relief from workplace noise. ✓ The development of green belts around the periphery of the mine to attenuate noise. ✓ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.
4	Vibration	Blasting	<ul style="list-style-type: none"> ✓ No deep hole blasting envisaged. ✓ Small dia shot holes are used for breaking boulders. ✓ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios as per studies. ✓ 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 ✓ In spite of all measures periodical testing of vibration

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			and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	<ul style="list-style-type: none">✓ Humus top soil shall be preserved for reuse in afforestation and agriculture✓ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the quarry premises✓ 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
6	Waste Dump	Stabilization of Dumps	<ul style="list-style-type: none">✓ 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✓ 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.
7	Plantation	Mine lease boundary and waste dump	<ul style="list-style-type: none">✓ Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise✓ Stabilization of Dump with plantation✓ It is strongly recommended that the loss of plant in

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

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			<p>so as to minimize the environmental impact within the core zone.</p> <ul style="list-style-type: none"> ✓ An emergency preparedness plan will be prepared in advance, to deal with firefighting, evacuation and local communication. ✓ 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). ✓ As a part of CSR activities, community welfare activities will be undertaken by the proponent which leads to socioeconomic
10	Occupational Health		<ul style="list-style-type: none"> ✓ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955 ✓ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A). ✓ Insurance will be taken in the name of the labourers working in the quarry ✓ Workers involved in quarrying work shall be provided protective equipment's such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc...

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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 _{2.5} , PM ₁₀ , SO ₂ and NO _x	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	–	Six Month Once	Physico–chemical, microbiological characteristics

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		surface water in 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. K. Kungumarajh** 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.
