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)

AREA DETAILS

Extent : 3.28.0 Ha
S. F. Nos. : 272/2A, 2B, 2C and 2D
Village : Chettikurichi
Taluk : Kayathar
District : Thoothukkudi

PROJECT PROPONENT

THIRU. S.KANDASAMY
S/o Shanmugam
No.102, Anna new street,
Kalugumalai Taluk,
Thoothukudi District,
Tamil Nadu.

EIA CONSULTANT

AADHI BOOMI MINING & ENVIRO TECH (P) LTD

(QCI/NABET Accredited EIA Organization)

3/216, K.S.V Nagar, Narasothipatti, Alagapuram (PO),
Salem – 636004, Website: www.abmenvirotec.com
Email: abmenvirotech@gmail.com, suriyakumarsemban@gmail.com
Mob: 9842729655, 9443290855.

Executive Summary

1.0 INTRODUCTION

Thiru. S.Kandasamy S/o. Shanmugam, residing at No. 120, Anna New Street, Kalugumalai Taluk, Thoothukudi District, Tamil Nadu has applied for grant of permission for quarrying Rough Stone & Gravel over an Extent of 3.28.0 Ha located in S.F. No. 272/2A, 2B, 2C and 2D, Chettikurichi Village, Kayathar Taluk, Thoothukkudi District, Tamil Nadu for the period of five years.

Based on his application, the Assistant Director, Dept of Geology and Mining, Thoothukudi District has directed the applicant, Thiru.S.Kandasamy vide his precise area communication letter Roc No. G.M.1/861/2022 dated 14.07.2023 to get approved mining plan and obtain Environmental clearance for grant of Rough Stone & Gravel quarry lease.

The mining plan was approved by Assistant Director, Department of Geology and Mining, Thoothukudi vide letter Roc No. G.M.1/861/2022 dated 01.09.2023.

As per the Environmental Impact Assessment (EIA) Notification dated 14th September 2006 and its amendments, the proposed project falls under 1(a) Mining of minerals, Category – B1(Cluster) in view of project's cluster area >5 and <250 Ha. So, this project has to obtain Terms of Reference for conducting EIA studies. Therefore, the applicant applied for ToR through PARIVESH Portal vide online proposal no. SIA/TN/MIN/447362/2023 Dated 07.10.2023. The ToR proposal was appraised in the 443rd SEAC meeting held on 08.02.2024. After detailed discussions, the Authority accepts the recommendation of SEAC and granted Terms of Reference (ToR) along with Public Hearing vide TOR Identification No. TO23B0108TN5752566N.

1.1 SCOPE OF THEPROJECT

The scope of the project is to operate rough stone and gravel quarry after conducting public hearing through TNPCB, Thoothukudi and obtaining environmental clearance from SEIAA/SEAC, Tamil Nadu. The proposed quarry will be operated by adopting environmental management plan prepared by EIA consultant and with compliance of conditions given by SEIAA/SEAC and TNPCB.

1.2 PROJECT DESCRIPTION

Table 1.1 Project Details

<table>
<tr><th colspan="2">Project Details</th></tr>
<tr><td>Proponent</td><td>Thiru. S.Kandasamy S/o. Shanmugam</td></tr>
<tr><td>Total Mine Lease Area</td><td>3.28.0 Ha (Patta Land)</td></tr>
<tr><td>Survey No.</td><td>272/2A, 2B, 2C and 2D</td></tr>
<tr><td>Site Location</td><td>Chettikurichi Village, Kayathar Taluk, Thoothukkudi District, Tamil Nadu</td></tr>
<tr><td>Geographical Co-ordinates</td><td>Latitude: 9°3'50.79"N to 9°3'59.90"N
Longitude: 77°43'51.47"E to 77°43'56.63" E</td></tr>
<tr><td>Toposheet No.</td><td>58 G/12</td></tr>
<tr><td>Elevation</td><td>Elevation of the area is 114m above MSL</td></tr>
<tr><th colspan="2">Accessibility</th></tr>
<tr><td>Nearest Habitation</td><td>Temporary shed of crusher unit - 260m - SW</td></tr>
<tr><td>Nearest Villages</td><td>Chettikurichi – 1.3km - SE</td></tr>
<tr><td>Nearest Settlement</td><td>
<table>
<tr><th>Name of Village</th><th>Direction</th><th>Distance</th><th>Population</th></tr>
<tr><td>Chettikurichi</td><td>SE</td><td>1.6 km</td><td>3420</td></tr>
<tr><td>Cithamparampatti</td><td>NE</td><td>2.8 km</td><td>1421</td></tr>
<tr><td>Kattarankulam</td><td>NE</td><td>4.6 km</td><td>1850</td></tr>
<tr><td>Vellalankottai</td><td>SE</td><td>4.5 km</td><td>1819</td></tr>
</table>
</td></tr>
<tr><td>Nearest Town</td><td>Kalugumalai – 9.4km – NW
Kayathar – 14km - SE</td></tr>
<tr><td>Nearest Roadway</td><td>NH 44 – 7.1km – E (Kashmir to Kanyakumari)
SH 76– 8.6km - N (Nallatinputhur to Puliyangudi)
MDR 160m – 860m – E (Kayathar to Kalugumalai)
Village road – 1.6km – E (Chettikurichi to Gopalapuram)
Approach road is available near to this project site.</td></tr>
<tr><td>Nearest Railway station</td><td>Kumarapuram Railway Station – 11.7km – NE
Kadambur Railway Station – 16km – SE</td></tr>
<tr><td>Nearest Airport</td><td>Thoothukudi Airport–50km – SE</td></tr>
<tr><th colspan="2">Environmental Sensitiveness</th></tr>
<tr><td>Interstate Boundary</td><td>There is no interstate boundary within 15km radius. Tamil Nadu – Kerala Interstate boundary is located 52 km away from lease area in west direction.</td></tr>
<tr><td>Coastal Zone</td><td>Bay of Bengal – 53km - SE.</td></tr>
<tr><td>Reserve Forest</td><td>The project land is not a forest land, it is patta land. There is no Reserve Forest and Protected Forest found within 10km radius.
Kurumalai R.F – 13km – E</td></tr>
</table>

<table>
<tr><td></td><td>Uthumalai R.F – 17km -SW
The proposed project site does not attract Forest Conservation Act, 1980.</td></tr>
<tr><td>Wildlife sanctuary</td><td>Nil within 10km radius.
Gangaikondan Spotted Deer Sanctuary – 26km – S. It is notified Sanctuary by MOEF&CC vide S.O.2773 (E) dated 31/07/2019.
The Proposed project site does not attract the Wildlife (Protection) Act, 1972.</td></tr>
<tr><td>Water bodies</td><td>
<table>
<tr><th>S.No</th><th>Water body name</th><th>Distance</th><th>Direction</th></tr>
<tr><td>1</td><td>A small lake</td><td>740m</td><td>N</td></tr>
<tr><td>2</td><td>Nalanthula lake</td><td>1.3km</td><td>NNW</td></tr>
<tr><td>3</td><td>Mel Nalanthula lake</td><td>1.8km</td><td>NNW</td></tr>
<tr><td>4</td><td>North Konarkottai lake I</td><td>988m</td><td>SW</td></tr>
<tr><td>5</td><td>North Konarkottai lake II</td><td>1.5km</td><td>S</td></tr>
<tr><td>6</td><td>Uppodai River</td><td>2.0km</td><td>E</td></tr>
<tr><td>7</td><td>Water body with weir across River Uppodai</td><td>1.9km</td><td>ENE</td></tr>
<tr><td>8</td><td>A odai</td><td>2.0km</td><td>SW</td></tr>
<tr><td>9</td><td>Olaikulam lake I</td><td>2.7km</td><td>SSW</td></tr>
<tr><td>10</td><td>Olaikulam lake II</td><td>2.9km</td><td>SSW</td></tr>
<tr><td>11</td><td>Vellappaneri lake</td><td>3.8km</td><td>SW</td></tr>
<tr><td>12</td><td>Karisalkulam lake</td><td>3.6km</td><td>NW</td></tr>
<tr><td>13</td><td>A odai</td><td>4.7km</td><td>NE</td></tr>
<tr><td>14</td><td>Water body with weir across Odai</td><td>4.7km</td><td>NE</td></tr>
</table>
</td></tr>
<tr><td>Defense Installations</td><td>Nil within 10km radius</td></tr>
<tr><td>Critically Polluted area</td><td>Nil within 10km radius</td></tr>
<tr><td>Quarries around 500m radius
(AD Letter furnished)</td><td>Three existing quarries and one present proposed quarry are located within the 500m radius from the lease boundary of the proposed project site.
Total Cluster area: 9.56.7 Ha
AD Cluster Letter: Roc No.G.M.1/861/2022, dated 01.09.2023</td></tr>
<tr><td>Seismic zone</td><td>Zone-II, Low damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002</td></tr>
<tr><td colspan="2">Mining Details</td></tr>
<tr><td>Method of Mining</td><td>Open cast Mechanized method of mining</td></tr>
<tr><td>Geological resources</td><td>9,78,900m^3</td></tr>
<tr><td>Mineable reserves</td><td>5,10,300m^3 of Rough Stone & 1,08,616m^3 of Top soil and Gravel</td></tr>
</table>

Production (95%)	Rough stone – 3,01,678m^3 for five years or 60,336m^3 per annum (Avg) Top soil & Gravel – 80,448m^3 for three years or 26,816m^3 per annum
Reject (5%)	15878 m^3
Top soil	Top soil & Gravel – 80,448m^3
Ore: Waste ratio	1: 0.05
Depth of Mining	34m bgl (Ultimate Depth) 0-4m - Top soil & Gravel 4-34m – Rough stone
Water Table	55-60m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	5 Years from the date of execution
Project Cost	Rs. 81 Lakhs
EMP Cost	Rs. 6.75 Lakhs
CER Cost	Rs.5.0 Lakhs

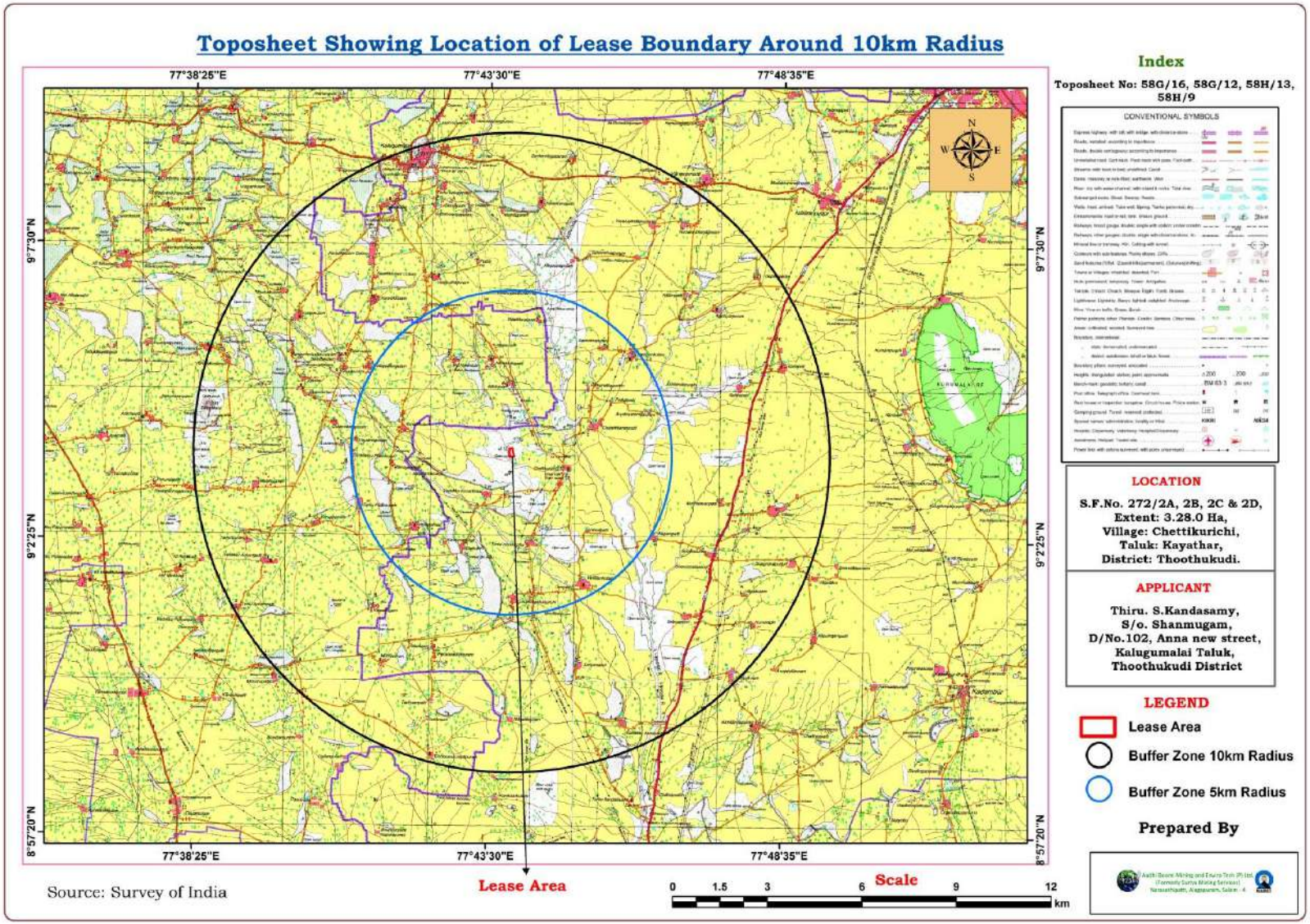


Fig No 1.1 Toposheet showing location of proposed rough stone quarry with 10km radius study area

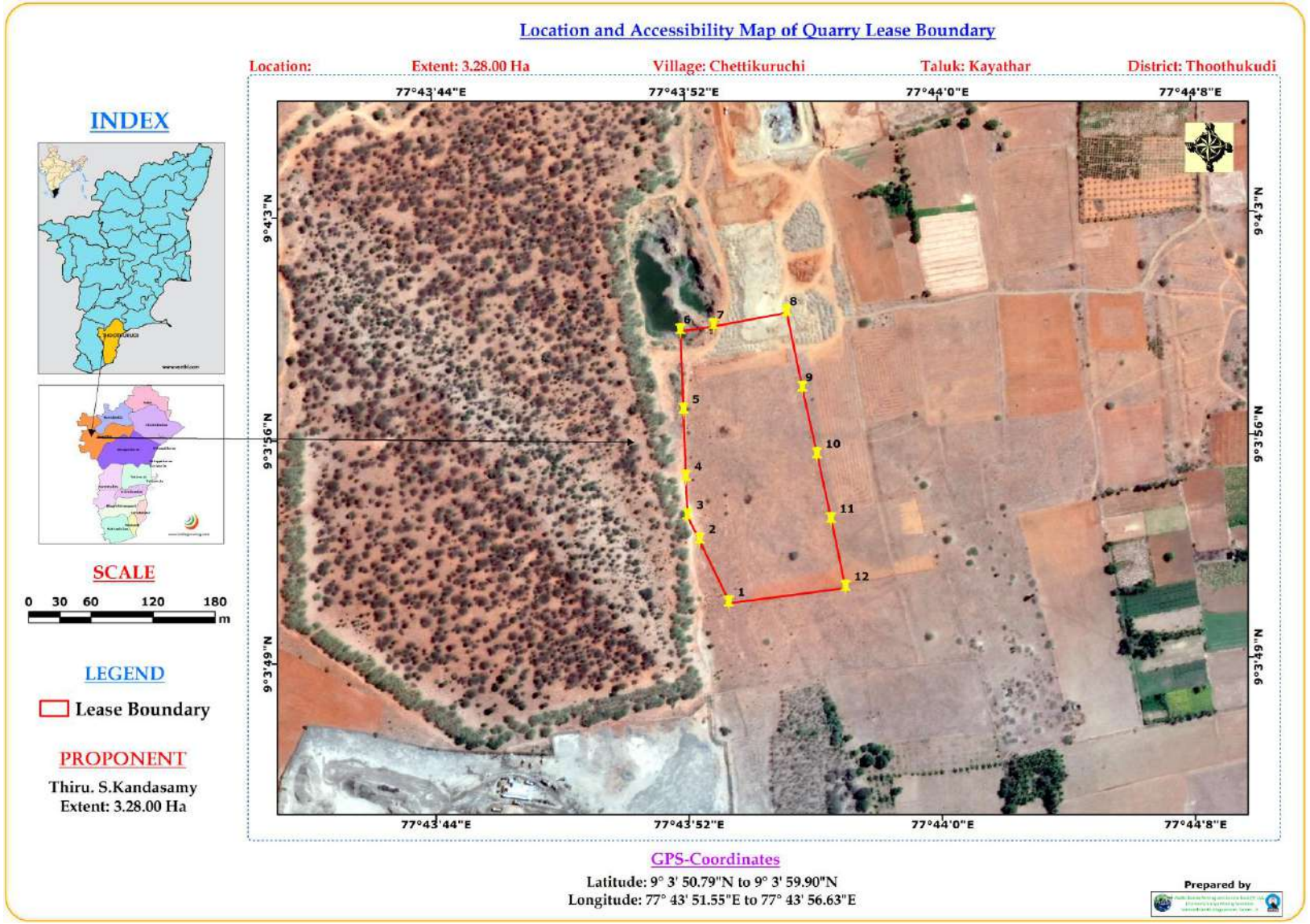


Fig No 1.2 Google earth image showing location and route for proposed rough stone and gravel quarry

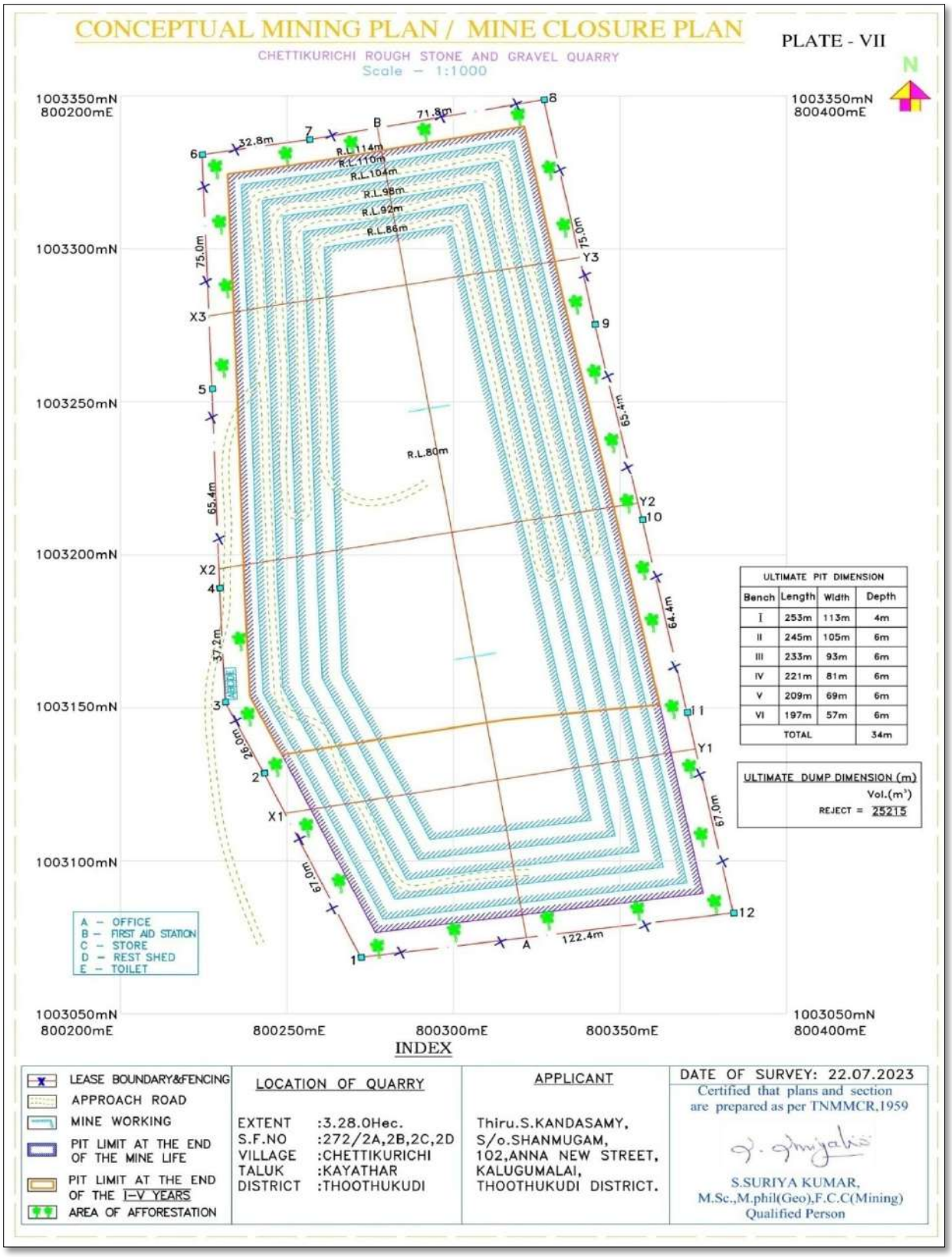


Fig No 1.3 Conceptual mining plan

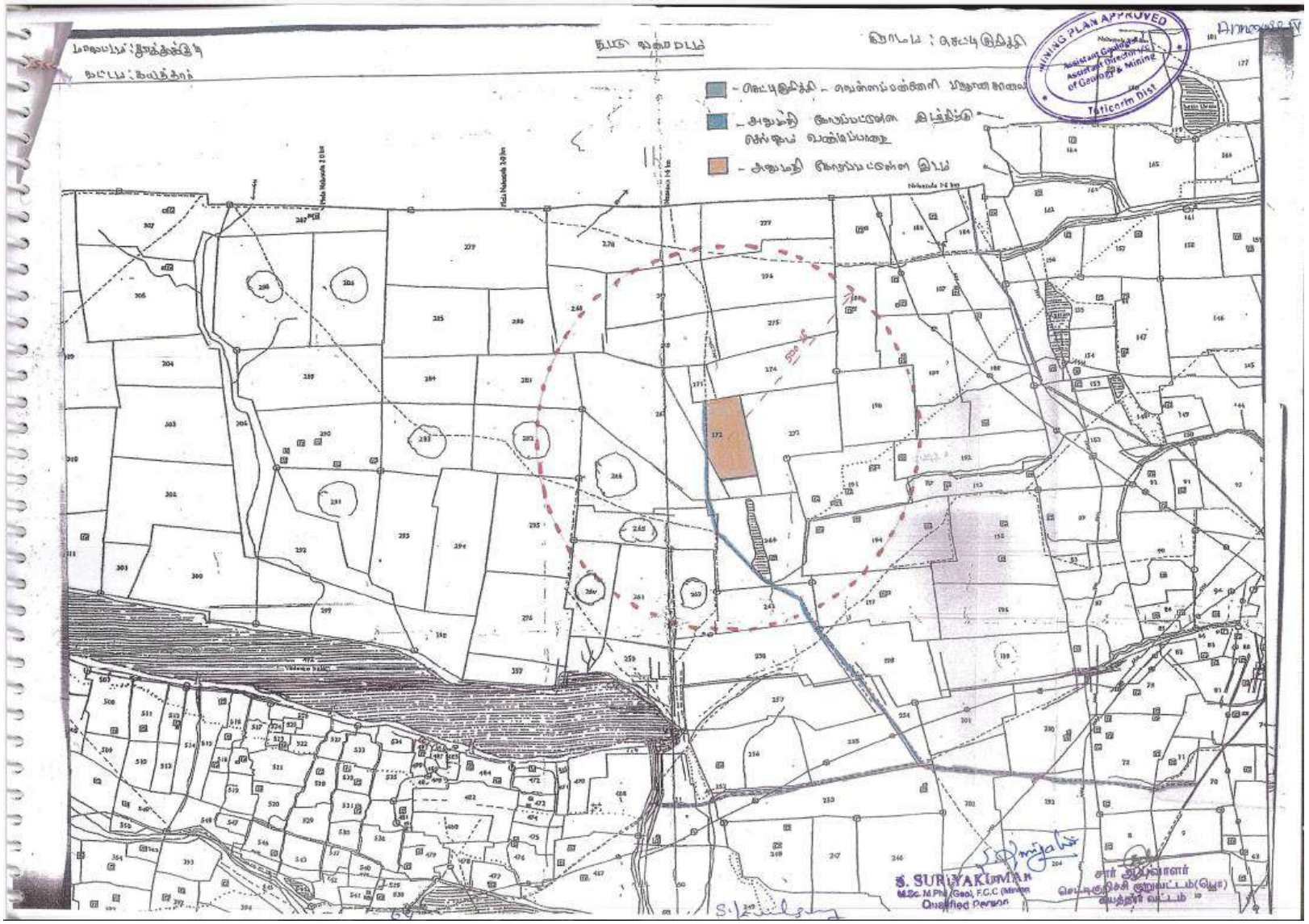


Fig No 1.4 Combined sketch

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 December 1st 2022 – February 28th, 2023 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 (December 1st 2022 – February 28th, 2023)		
Rainfall (Avg.)	211.47 mm (study period)	--
Temperature (Avg.)	26°C	--
Wind speed (Avg.)	5.2 m/s	--
Wind Direction	Predominantly from N, NW, NE	
Ambient Air Quality (NAAQS)		
PM_{10}	39-54 µg/m^3	100 µg/m^3
$PM_{2.5}$	15-36 µg/m^3	60 µg/m^3
SO_2	9-19 µg/m^3	80 µg/m^3
NO_x	11-30 µg /m^3	80 µg/m^3
Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Core zone – 39.9 – 47.2 dB (A) Buffer zone – 39.5 – 45.1 dB (A)	**Industrial Area** Day Time - 75 dB (A) **Residential Area** Day Time – 55 dB (A)
Night time (10:00pm - 06:00 am)	Core zone – 32.4– 39.5 dB (A) Buffer zone – 31.8 – 39.7 dB(A)	**Industrial Area** Night Time – 70 dB(A) **Residential Area** Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	7.15 – 7.89	6.5 to 8.5
TDS	700 - 1064 mg/l	500 mg/l
Electrical conductivity at 25˚C	1198 - 1720 micromhos/cm	-
Total Hardness as $CaCO_3$	200 - 423 mg/l	200 mg/l

Total suspended solids	1 - 2	IS:3025:P.16:1984:R.2012
Chlorides Cl	222 – 430 mg/l	250mg/l
Total iron Fe	0.03-0.08 mg/l	0.3mg/l
Sulfates SO_4	16-90 mg/l	200 mg/l
Soil Quality		
pH	7.12 – 8.2	Neutral to slightly alkaline
Bulk density	1.02-1.22 g/cc	Favorable physical condition for plant growth
Hydro Geology		
Depth of Mining	34m bgl	
Water Table	55-60m bgl	

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 mechanized methods which involves Jack Hammer drilling and blasting, excavation, loading and transportation.

AERMOD - Model was used for prediction of impact of PM_{10} during conditions i) Loading/unloading and transportation of rough stone and weathered rock by trucks on Haul roads ii) During blasting of minerals. Total predicted 24-h maximum GLC of PM_{10} at project site for scenario 1 i.e loading-unloading and transportation and scenario 2 i.e blasting was 67.08µg/m^3 and 56.23 µg/m^3 respectively occurred at the project site after superposition of base-line value 49 µg/m^3 over the incremental 18.08 µg/$m^3$and 7.23 µg/m^3 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 BDL µg/m^3. The total GLC during mining activity was found within the prescribed limit of NAAQS. The mitigation measures for controlling air pollution due to proposed quarry are given in Table No 1.3.

1.4.2 Noise Environment

Noise pollution poses a major health risk to the mine workers. The sources of noise in the open cast proposed rough stone and 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 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 75kg is below the Peak Particle Velocity of 5mm/s for the habitation located at the distance of 1300m. So, ground vibrations due to blasting activities will not cause any impact to the nearest habitations.

The mitigation measures for controlling noise pollution due to proposed mining activity are given in Table No 1.3.

1.4.3 Water Environment

1.4.3.1 Ground Water

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.

The impact due to proposed mining activity 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 the depth of mining is 34m bgl whereas the depth of ground water table is identified as 55-60m bgl.

The ground water samples were collected at 5 locations to identify the present water quality status. TDS from all the water samples exceeds the acceptable limits of 500mg/l and TH in the water sample of Chettikurichi village only was found within the acceptable limit of 200mg/l. The chloride also exceeds the acceptable limits of 250mg/l in all the samples except from Chettikurichi and Ramiyampatti Village. Based on the Water Quality Index calculated, water quality from Chettikurichi and Ramiyampatti Village is found good and water quality from all other locations are found poor. For excellent water quality, the ground water from all the location required to be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate. As the water quality of Chettikurichi village is good, the reject during the R.O treatment of water will be very less.

1.4.3.2 Surface Water

Since major water bodies are located beyond 1km radius of the project site, the possibility of affecting water quality in those water bodies due to proposed mining activity is less.

1.4.4 Soil Environment

For the five-year plan period, the generation of top soil and gravel is estimated as 80,448m^3 upto the depth of 4m from the surface. From this quantity, the generated top soil will be dumped along 7.5m inner boundary of the lease area and generated gravel generated will be sold to the local needy customers. The top soil will be used to develop greenbelt within the lease area.

The management of top soil is given in Table No 1.3.

1.4.5 Waste Dump

The proposed rate of production of rough stone for five years is about 3,10,678m^3 at the rate of 95% recovery up to permissible depth. The 5% reject of 15878m^3 will be dumped within the mining lease area (south side) as per approved mining plan. All rejects dumped will be backfilled at the end of mine life. The management of reject/waste dump is mentioned in Table No 1.3.

1.4.6 Biological Environment

There is no Reserve Forest or any Protected Forest located within 10km radius of the project site and 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 mining activities like excavation, overburden dumping, soil extraction etc. So, reclamation of mined out land and proper formation of benches will be given due importance.

The land use analyses show that the tree plantation is found on the west side of the lease area and existing rough stone quarries are found on north and south side. Minor agricultural activity is carried out within 500m radius in northeast and

southeast side. The dumping of rejects and dust deposition in the adjacent lands may affect the land use around the site.

At the end of the project, the quarried-out pit will be act as water storage pond. The stored water will be used for developing agricultural activity around the mining lease area. It will improve the livelihood of village people.

The mitigation measure for land degradation is mentioned in Table No 1.3.

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 - 21 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.

Table 1.3 Environmental Management Plan

S.No	Parameters	Mining Activity	Mitigation measures
1	Air Environment	Drilling	○ 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	○ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	○ Water sprinkling be done before loading by making it moist
		Transportation	○ 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	○ DG sets will be used only during power failure ○ Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	○ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. ○ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, 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 o Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2	Water Environment	Surface water	o Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	o The mining activity will not intersect the ground water table o Desilting will be carried out before and immediately after the monsoon season
		Storm water	o Pit will be used for Storage of rainwater o 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 such sites where dust likely to be generated and for developing green belt. o The proponent will collect and judicially utilize the rainwater as part of rain water harvesting
		General measures	o Regular monitoring and analyzing the quality of water
3	Noise Environment	Drilling	o Limiting time exposure of workers to excessive noise
		Blasting	o Carrying out blasting only during day time and not on cloudy days o 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	○ 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 engines of vehicles. ○ 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	○ 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	○ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios.

			○ Milli second detonators shall be used preferably 25–50ms per delay to control vibrations ○ 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 and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	○ 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 mine premises ○ Garland drains will be provided around the mine and dumps to arrest any soil from the mine 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	○ 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	○ 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 each year will be counted and again planted in subsequent plantation. ○ The plant should be planted taken from nursery, where the survival rate is high.
8	Land Environment		○ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. ○ 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 rain water harvesting scheme for irrigating the nearby agricultural lands.
9	Socio Economic		○ 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 so as to minimize the environmental impact within the core zone. ○ 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 measures will be taken by Proponent through local Panchayat
10	Occupational Health		○ 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 mines ○ Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc…

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.

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	5 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	Once in six months	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 the vicinity.	–	Once in six months	Phyiso–chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in six months	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)	–	Once in six months	Physical and Chemical characteristics

1.7 Project Benefits

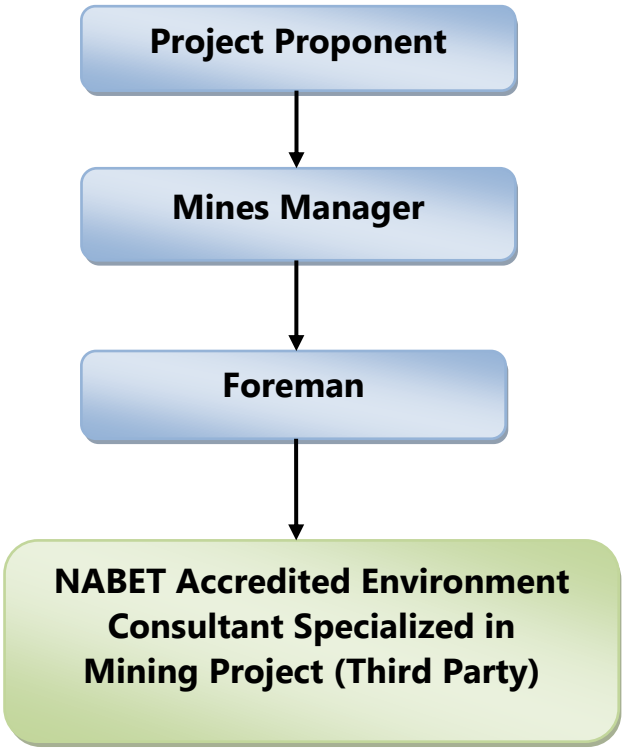
The proponent, **Thiru. S.Kandasmy** is very much conscious of his obligations to society at large. Under plantation programme, it is suggested to develop green belt further all along the boundary of the quarry lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emissions and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community.

The mining 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 to destinations, sanitation, supply of goods and services to the mine and other community services, etc…The local population will have preference to get an employment. Part of the royalty is given to local bodies by the State Govt. for the welfare and development of the village. The proponent helps in socio economic development of the village by providing education facilities to children's, procuring sports equipments, welfare amenities like drinking water to school, road facilities to villages and employment opportunities to nearby villagers. CSR budget is allocated as 2.5% of the profit.

1.8 Environmental Management Cell (EMC)

It is important to have a permanent organizational set up for implementation of environmental management plan. Conscious of this, the project proponent creates Environmental Management Cell.

Environmental Management Cell (EMC) will be headed by Mines Manager supported by adequate number of personnel and third party (Environment Consultant) having sufficient educational and professional qualification and experience to discharge responsibilities related to environmental management including statutory compliance, pollution prevention, environmental monitoring, maintenance of pollution control equipment and green belt development as well as maintenance.



1.5 Chart of Environment Management Cell

1.9 Environmental Policy of the Thiru S.Kandasamy, Rough Stone and Gravel quarry

- The proposed quarry will be operated by adopting effective environmental management plan for the sustainable environment.
- Utilizing optimum natural resources considering future generations.
- Restoration of mined out pit by developing greenbelt around the pit and along the benches and making the pit fit for rain water storage.
- Our EMC aware that the environment is not only for human being; it is also for all living things such as plants, animals, micro flora and fauna, aquatic organisms etc.

- To combat global warming, plantation of 500 saplings will be done in consultation with Forest Department.
- Create and maintain the safe workplaces for the workers to prevent occupational accidents.

1.10 Conclusion

As discussed, it is safe to say that the project is not likely to cause significant impact on the ecology and environment of the area, as adequate preventive measures will be adopted to contain the pollutants within permissible limits. The total operation shall be carried out with ease & minimum risk of 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 mining activity. Mining activity will help in improving the socio–economic benefits in areas like employment, communication and infrastructure development etc.