EXECUTIVE SUMMARY

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT UNDER VIOLATION CASE

PROJECT PROPONENT: M/S KARTHIK RAJA EXPORTS
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BLACK GRANITE QUARRY

Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
S.F No	1/12, 2/3A, 4/1B & 123/9B2	1/6, 2/2A, 2/3B1 & 2/3B2	1/10, 1/11, 1/13A, 1/13B, 1/14, 1/16, 2/1 & 2/2A
Village	Semangalam and Kunnam	Semangalam	Semangalam
Taluk & **District**	Vanur Taluk & Villuppuram District		

CONSULTANT

AADHI BOOMI MINING & ENVIRO TECH (P) LTD

(Formerly known as SURIYA MINING SERVICES)

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1.0 Executive Summary

M/S. KARTHIK RAJA EXPORTS was granted mining lease for quarrying Black granite in of Semangalam & Kunnam Villages, Vanur Taluk, Villupuram District, Tamil Nadu. The mining lease particulars are enclosed below.

Table 1: Mining Lease Particulars

Lease area/Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
S.F No	1/12, 2/3A, 4/1B & 123/9B2	1/6, 2/2A, 2/3B1 & 2/3B2	1/10, 1/11, 1/13A, 1/13B, 1/14, 1/16, 2/1 & 2/2A
Village	Semangalam and Kunnam	Semangalam	Semangalam
Taluk & District	Vanur & Villuppuram		
Type of Land	Patta		
Mining Plan Approval	Letter No: 11015/ MM5/2010 dated 10.02.2011 (2011 – 2016)	Letter No: 11363/ MM5/2009, dated 05.03.2010 (2010 – 2015)	Letter No: 16059/ MM5/2003 dated 17.02.2006 (2006 – 2011)
G.O Grant	G.O (3D) No.23 Industries (MMB-1) Dept. dt 28.02.2011	G.O (3D) No. 14 Industries (MMB-2) Dept. dt 17.03.2010	G.O (3D) No.35 industries MMB-1) Dept dt 27.02.2006
Period of Lease	20 years (28.02.2011- 27.02.2031)	20 years (26.03.2010 - 25.03.2030)	20 years (27.03.2006 - 26.03.2026)
1st Scheme of Mining	2016-17 to 2020-2021 submitted for approval	2016-17 to 2020-2021 submitted for approval	2011 to 2016
2nd Scheme of Mining	Nil	Nil	2016-17 to 2020-2021 submitted for approval

In this project, the total area of Cluster with in 500m radius from the periphery of this quarry is reported as 22.75.0 Ha with 11 No. of quarries. In such a cluster situation a common Environment Impact Assessment (EIA) and Environmental Management Plan (EMP) for the entire cluster of quarries is enough to capture all the possible externalities. The common EIA/EMP data can be used for all quarries fall under this cluster. These reports shall capture carrying capacity of the cluster, transportation and related issues, replenishment and recharge issues, geo-hydrological study of the cluster area. In view of the above common Public Hearing is enough for the entire cluster.

M/S. KARTHIK RAJA EXPORTS continued to operate the mines without obtaining Environment Clearance (EC) after 15.01.2016 under EIA Notification, 2006 and considered as a violation case.

Table 2: Identification of Violation			
Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
Production Period	2010 – 2021	2010 – 2021	2006 – 2021
Production achieved after 15.01.2016	155.618 cu.m	117.232 cu.m	97.471 cu.m
Date of operation after 15.01.2016	02.03.2016 – 10.01.2017	07.04.2016 – 24.11.2016	21.03.2016 - 26.12.2016

1.1 SCOPE OF THE PROJECT

The proposal for Environmental Clearance of existing Black Granite quarry **of M/S. KARTHIK RAJA EXPORTS under violation case** requires EIA/EMP including Ecological damage assessment, remediation plan, natural resource augmentation and community resource augmentation as per Terms of Reference letter issued by SEIAA/SEAC, Tamil Nadu.

Table 3: Chronology Of Events (Violation)			
Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
MoEFCC Notification S.O 804(E) dated 14.03.2017			
Proposal No	IA/TN/MIN/67905/2017	IA/TN/MIN/67847/2017	IA/TN/MIN/67845/2017
Applied Date	06.09.2017	02.09.2017	02.09.2017
Appraisal Committee	New Delhi	New Delhi	New Delhi
MoEFCC Notification No. S.O 1030 (E) dated 08.03.2018			
Proposal No	SIA/TN/MIN/23297/2018	SIA/TN/MIN/23304/2018	SIA/TN/MIN/23298/2018
Applied Date	02.04.2018	02.04.2018	02.04.2018
Appraisal Committee	Tamil Nadu	Tamil Nadu	Tamil Nadu
STATE EXPERT APPRAISAL COMMITTEE (SEAC) MEETING			
Meeting No	109	109	107
Date	26th April 2018	26th April 2018	13th April 2018
ToR Letter	Lr.No.SEIAA-TN/ F.No.6216/TOR-371/2018	SEIAA-TN/ F.No.6217/TOR-372/2018	Lr.No. SEIAA-TN/ F.No.6218/TOR-341/2018
Date of Issue of ToR	18.05.2018	18.05.2018	14.05.2018

1.2 PROJECT DESCRIPTION

Table 4: Project Details

Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
Geographical Co-ordinates	Latitude: 12°04'50.1" N to 12°04'54.3"N Longitude: 79°41'29.5"E to 79°41'40.3"E	Latitude: 12°04'48.9" N to 12°04'55.4"N Longitude: 79°41'29.5" E to 79°41'39.3"E	Latitude: 12°04'50.6" N to 12°04'56.3"N Longitude: 79°41'31.8" E to 79°41'37.3"E
Toposheet No.	57 P/12	57 P/12	57 P/12
Elevation	39m above MSL	45m above MSL	45m above MSL
Project Cost	Rs 41, 00,000	Rs 27, 50,000	Rs 32, 50,000
EMP Cost	Rs 3.50 Lakhs	Rs 3.50 Lakhs	Rs 3.50 Lakhs
Accessibility			
Nearest Habitation	Elavampattu – 2km - East		
Nearest Town	Vanur – 11km – South East		
Nearest Roadway	Village Road (Karasanur to Adhanapattu) – 1.6km - West SH 136 – 2.2km – South West		
Nearest Railway station	Thindivanam – 17 km – North West		
Nearest Airport	Chennai -114km – North East		
Environmental Sensitiveness			
Interstate Boundary	Puducherry Union Territory – 7km – South		
Coastal Zone	Bay of Bengal – 22km - East		
Reserve Forest	Nil within 10km radius		
Wildlife sanctuary	Nil within 10km radius		
Water bodies	Osudu Lake – 13km - South		
Habitations	i. Kunnam – 1.5km – North – 1742 Population ii. Elavampattu – 2km – East - 1953 Population iii. Semangalam – 2km – South East – 2127 Population iv. Karasanur – 2km – South West - 1545 Population		
Defense Installations	Nil within 10km radius		
Quarries around 500m radius (AD Letter furnished)	11 Quarries found around 500m radius (22.75.0 Ha) R.C.No:A/G&M/922/2015 dated 19.01.2017		
Seismic Zone	Zone-II, Low damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002		

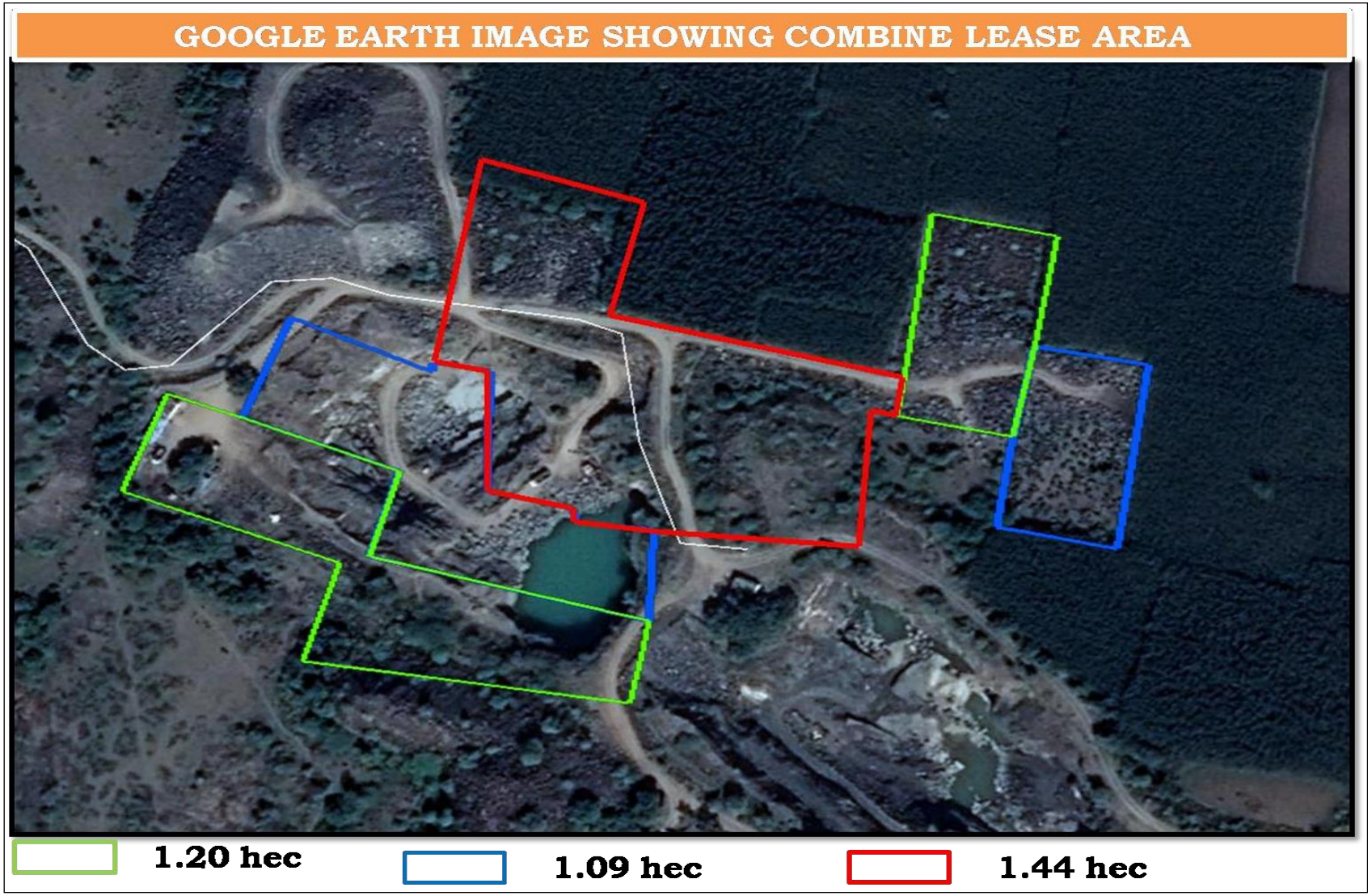

Fig.1: Google Image showing the Mining Lease area of 1.20.0 Ha, 1.09.0 Ha and 1.44.5 Ha

Table 5: Mining Details			
Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
Method of Mining	Hydraulic excavators and Compressed operated jack hammers were used for cutting the rocks. Close spaced drilling of 0.2m was adapted along a straight line and changed with low explosive to avoid feather cracks.		
Geological resources	11910 m^3	173765m^3	217200m^3
Mineable reserves	4197 m^3	34975m^3	143675m^3
Production	198 m^3 per annum 10% (recovery)	116m^3 per annum 5% (recovery)	704 m^3 per annum 5% (recovery)
Topsoil	Nil	5328m^3	13756m^3
Granite Rejects	5346m^3 (90%)	10970m^3 (95%)	66880m^3 (95%)
Depth of Mining	32m (Proposed)	27m (Proposed)	32m (Proposed)
Water Table	35m bgl	35m bgl	35m bgl
Existing Depth	140m x 70m x 0-18m (45-27mRL)	28m x 13m x 0-16m (45-29m RL)	30m x 39m x 0-16m (45-29m RL)
Road design	1: 10 inside the pit and ramp 1:16 for transport		
Overall Pit Slope	45°		
Present Scheme Period	2016 - 2021	2016 - 2021	2016 - 2021
Employment Potential			
Skilled (Operator + Wiresaw operator)	1+2 = 3	1+1 = 2	1+2 = 3
Semi skilled (Driver+driller)	2+4 = 6	2+5 = 7	2+5 = 7
Unskilled (Cleaner)	1	3	3
Supervisor and Clerk cum record keeper	2	3	3
Mines manager	1	1	1
Mining Mate	1	1	1
Blaster cum mate	1	1	1
Total	**15**	**18**	**19**
Water Requirement			
Drinking	0.2 KLD	0.5 KLD	0.2 KLD
Domestic purposes	0.8 KLD	0.5 KLD	0.8 KLD
Green belt	2.0 KLD	3.0 KLD	2.0 KLD
Water sprinkling on haul roads	0.8 KLD	2.0 KLD	0.8 KLD
Wet drilling operation	0.2 KLD	0.5 KLD	0.2 KLD
Source	**Water Vendors**		

Infrastructure in Mines			
Toilet	1	1	1
First Aid Station	1	1	1
Rest Shelter	1	1	1
Canteen	Nil	Nil	Nil

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 the pre-monsoon season (March 1st –May 31st, 2018) 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 6: Baseline Data

Particulars	Details	Standards
Meteorology (March 1st –May 31st, 2018)		
Rainfall (Avg.)	33.3 mm	--
Temperature (Avg.)	32.3 °C	--
Wind speed	8.9 mph	--
Wind Direction	NE & NNW directions	
Ambient Air Quality (NAAQS)		
PM_{10}	33.65 - 45.8 µg/m^3	100 µg/m^3
$PM_{2.5}$	17.65 - 26.86 µg/m^3	60 µg/m^3
SO_2	3.58 - 6.34 µg/m^3	80 µg/m^3
NO_x	6.12 - 8.55 µg /m^3	80 µg/m^3
Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Core zone - 35.5-42.7 dB (A) Buffer zone - 39.2 - 49.4 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 - 32.1- 36.8dB (A) Buffer zone - 30.0 - 39.0 dB(A)	**Industrial Area** Night Time – 70 dB(A) **Residential Area** Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	6.95 to 7.55	6.5 to 8.5
TDS	410-1090 mg/l	500 mg/l
Total Hardness as $CaCO_3$	226-861 mg/l	200 mg/l

Soil Quality		
pH	7.34-8.18	Neutral to moderately alkaline
Bulk density	1.32 – 2.19 g/cc	Favorable physical condition for plant growth.
Hydro Geology		
Depth of Mining	32m	Quarrying activity 3m above ground water table
Water Table	35m 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 semi–mechanized methods which involves drilling, blasting, wire–saw cutting, excavation, loading, hauling and unloading. Apart from above, there will be other activities associated viz transportation of granite and waste, stocking of rejects and dump management within the mine lease area that may contribute to wash out, slope failure, leachates and other related pollution. The existing Ambient Air Quality status (AAQ) has been monitored for parameters PM_{10}, $PM_{2.5}$, SO_2 and NOx at 5 different locations maximum covering 2km radius. Ambient air quality monitoring was carried out at a frequency of two days per week at each location for three months at 8 hour continuously.

From the results of ISCST3 model, it is concluded the cumulative worst case concentration of PM_{10} due to mining activities are complying with the national ambient air quality standards (NAAQS 2009). The concentrations of SO_2 and NO_x generated from mining area expected to be low due to absence of any major source. It should be noted that the predicted concentrations are due to mining area due to simultaneous operations of mines. 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, Drilling, Blasting, Operation of HEMM and Vehicular Movement. A preliminary reconnaissance was undertaken to identify the major noise generating sources in the area. Five locations (Core Zone & 5 in Buffer Zone) were identified based on the activities in the study area, traffic and sensitive areas like hospitals and schools maximum covering a radius of 3.5km.

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 100kg is well below the Peak Particle Velocity below 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. Six water samples from various locations in and around the project site maximum covering 3.5 km radius were collected for assessment of the physicochemical and bacteriological quality to know the baseline status of ground and surface water.

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. Comparatively the quality of water sample from Karasanur village is worse than other sources on chemical testing and the water from Valadavur village is worse than other sources Microbiological testing. Based on the Water Quality Index calculated, Water Samples from Core Zone, Karasanur & Sengamalam are not suitable for drinking, Water Samples from Valudavur & Kunnam Villages are poor quality and the water sample from Elvampattu is Good for drinking.

1.4.4 Soil Environment

Soil samples were collected from six sampling locations around the project area for analysis of the physico–chemical characteristics of the soil quality. Soil characteristics indicate favorable condition for plant growth. No Top soil shall be removed for the plan period. Waste dump will accommodate the top soil at the end of life of mine.

1.4.5 Waste Dump

The waste rocks to be generated from the mine will be fragmented gneisses and rejects of Granite with patches, cracks and small size blocks. The site selected for dumping waste and Granite rejects on the barren area and stable, therefore no chance for instability of dumps and washouts.

Table 7: Design of Dumps

Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
Place / Location	Eastern side	North Eastern side	Northern side
Approach to Dump from the mine distance and safety standards.	173m – Eastern side	155m – North Eastern side	80m – Northern side
Area of extent occupied	0.13.24 Ha	0.26.0 Ha	0.14.2 Ha
Dimension of Dump and No. of terrace with heights [benches]	Reject (40m x 35m x 3.818m) Terrace - Nil	65.0 (m) * 40.0 (m) * 4.0 (m) Terrace - Nil	60.0 (m) * 30.0 (m) * 20.0 (m) Terrace - Nil
Volume / Quantity added to Waste / Dump during the violated period.	1400M^3 during violation period	1055m^3 during violation period	926m^3 during violation period
Number and type of equipments deployed in Dump.	Hydraulic Excavator (1.7 m^3) – 1 Tipper (10 MT) - 1	Hydraulic Excavator (1.7 m^3) – 1 Tipper (10 MT) - 1	Hydraulic Excavator (1.7 m^3) – 1 Tipper (10 MT) - 1
Provision of Garland drains around the Dumps.	No. It is under construction.	No. It is under construction.	No. It is under construction.
Any vegetation made on the slopes.	No. (To be planted as per approved SOM)	No. (To be planted as per approved SOM)	No. (To be planted as per approved SOM)

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 quarrying 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

The black granite quarry 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. Stagnant water in the mine pit leads to development of agriculture and afforestation in the buffer zone over a period of time by pumping water in the mine pit which shows a positive impact due to quarrying activity.

Table 8: Land Use Pattern of the Core zone

Land Use / Lease area (Ha)	1.09.0 Ha		1.20.0 Ha		1.44.5 Ha	
	Existing LU	Proposed LU	Existing LU	Proposed LU	Existing LU	Proposed LU
Area under mining	0.54.88	0.54.88	0.16.3	0.36.40	0.20.0	0.86.60
Waste Dump	---	0.13.24	---	0.26.00	---	0.14.20
Road	0.02.25	0.03.25	0.01.00	0.02.00	0.01.00	0.02.00
Green belt & Safety area	0.11.86	0.11.86	---	0.10.00	---	0.10.00
Infrastructure	0.03.10	0.03.10	---	0.01.00	---	0.01.00
Virgin area	0.36.91	0.22.67	1.02.7	0.44.60	1.23.5	0.30.70
Total	**1.09.0**	**1.09.0**	**1.20.0**	**1.20.0**	**1.44.5**	**1.44.5**

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. It is not out of place to mention that another two mines, which in the vicinity and both are too at small level. The expectation of the people of the area is concerned towards employment, education, and health facilities. The literacy rate may be increased with the economic benefits may arises from the mining activities.

The proponent help 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.

Table 9: CSR Cost Estimation

Lease area/ Particulars	**1.09.0 Ha**	**1.20.0 Ha**	**1.44.5 Ha**
Sale value	Rs 21500 per m^3	Rs 21500 per m^3	Rs 21500 per m^3
Production cost	Rs 17172 per m^3	Rs 17172 per m^3	Rs 17172 per m^3
Profit	Rs 4328 per m^3	Rs 4328 per m^3	Rs 4328 per m^3
Production	198 cu.m /year	116 cu.m /year	700 cu.m /year
Total Profit	Rs. 8,56,944	Rs. 5,02,048	Rs. 30,29,600
CSR @ 2.5 % Profit (As per the Companies Act, 2013 and CSR Rules, 2014)	Rs. 21, 423/Year	Rs. 12, 550/Year	Rs. 75, 725/Year
CSR for Plan period	**Rs 1,07,115**	**Rs 62,750**	**Rs 3,78,700**
Total	**Rs 1,24,255**	**Rs 72,790**	**Rs 4,39,292**

Table 10: 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 ○ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2	Water Environment	Surface water	○ Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	○ The mining activity will not intersect the ground water table

			○ Desilting will be carried out before and immediately after the monsoon season
		Stormwater	○ 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 judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. ○ The proponent will collect and judicially utilize the rainwater as part of rain water harvesting
		General measures	○ Regular monitoring and analyzing the quality of water
3	Noise Environment	Drilling	○ Limiting time exposure of workers to excessive noise
		Blasting	○ 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	○ 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. o The development of green belts around the periphery of the mine to attenuate noise. o Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.
4	Vibration	Blasting	o Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios. o Milli second detonators shall be used preferably 25–50ms per delay to control vibrations o Diamond wire saw cutting and chemical blasting shall be used to cut the blocks into saleable dimensions o 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 o 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	o Humus top soil shall be preserved for reuse in afforestation and agriculture o Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the quarry premises o 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	o 1m height parapet shall be constructed for dumps more than 6m height along the toe to prevent and control wash out from dumps entering into natural system through rain water o 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 o Dump should be terraced for every 5m height and stabilized

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 fire fighting, 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 quarry ○ Workers involved in quarrying work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc…

1.5 Analysis of Alternatives

The mining 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

Environmental Monitoring program will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB. For, Environment Monitoring Program budget allocated is Rs 1, 46,080.

Table: 11 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	Once in 6months	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 a year	Phyiso–chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	Monthly once in every monitoring wells	One sample per well per month	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 a year	Physical and Chemical characteristics

1.7 Project Benefits

The proponent **M/s Karthik Raja Exports**, is very much conscious of their obligations to society at large. Under plantation program, it is suggested to develop green belt further all along the boundary of quarry lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emission 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 of granite to destinations, sanitation, supply of goods and services to the mine and other community services, etc… Part of the royalty is given to local bodies by the State Govt. for the welfare and development of the village.

1.8 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 ecological damage is limited within the core zone such as failure of formation of benches, dump stabilization, failure of fencing around the quarry. Thus the damage has been assessed and the mining activity no way damaged the environment in the buffer zone. **Bank Guarantee of Rs 10,50,000 (Rupees Ten lakh fifty thousand rupees only)** has to be taken from a nationalized bank in Rs 200 judicial stamp paper and submitted to the Tamil Nadu Pollution Control Board, Chennai. The above measures will be implemented in a phased manner only after obtaining Environment clearance from SEIAA, Tamil Nadu and Consent to Operate from TNPCB. The proponent will not repeat such violations in future. The proposed Environmental Management Plan will keep the area in a safe environment with negligible impact on the environment. Overall quarrying activity will help in improving the socio–economic benefits in areas like employment, communication and infrastructure development etc…