

**EXECUTIVE SUMMARY OF ENVIRONMENTAL
IMPACT ASSESSMENT
AND
ENVIRONMENT MANAGEMENT PLAN**

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

Schedule Sl. No. 1 (a) (i): Mining Project

“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

CLUSTER EXTENT = 15.15.85hectares

At

Mennallur Village, Vembakkam Taluk,
Tiruvannamalai District, Tamil Nadu

ToR Identification No. TO24B0108TN5158721N Dated: 12.01.2025, File No.11530

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.Nos.	Mineral Production
T.Ponnambalam, S/o. Thangavelu, No.12, Balakrishnan Street, Srinivasa Nagar, Chennai, Tamil Nadu-600063.	1.34.50 Ha &135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5	Rough Stone-386102m ³ Gravel-23528m ³

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS



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Valid till: 31.12.2026



ENVIRONMENTAL LAB

CREATIVE ENGINEERS AND CONSULTANTS

(NABL Accredited Testing Laboratory)

Baseline study period-December 2022 – February 2023

JANUARY-2025



GEO TECHNICAL MINING SOLUTIONS

EXECUTIVE SUMMARY

1. INTRODUCTION

As the proposed rough stone and gravel mining project (B1) falls within the quarry cluster of 500 m radius with the total extent of 15.15.85ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No. 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over the extent of 1.34.50ha is situated in the cluster falling in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The projects involved in the calculation of cluster extent are of two proposed quarries and three existing quarries.

2. PROJECT DESCRIPTION

The proposed project area is located between Latitudes 12°44'23.84"N to 12°44'28.80"N and Longitudes from 79°42'32.15"E to 79°42'35.65"E in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. According to the approved mining plan, about 386102m³ of rough stone and 23528m³ of gravel will be mined up to the depth of 50 m BGL in the five years. The quarrying operation is proposed to be carried out by open cast semi-mechanized mining method involving drilling and formation of benches of the prescribed dimensions.

3. DESCRIPTION OF THE ENVIRONMENT

The environmental consultant for both the clusters are the same. The monitoring of ambient air quality, noise levels, water quality and soil analysis for the nearby cluster were done in post monsoon season from December 2022 to February 2023 through the third party NABL accredited laboratory. The baseline monitoring done for 5km radius (TERMS OF REFERENCE [TOR] FOR EIA REPORT FOR ACTIVITIES / PROJECTS REQUIRING ENVIRONMENTAL CLEARANCE Prepared by Administrative Staff College of India, Bellavista, Khairatabad, AUGUST 2009, Page No.86) not varied as much. Therefore, we utilize the baseline data for this cluster which is collected for the adjacent cluster in the year 2022 & 2023 between December 2022 to February 2023 as per the Office Memorandum F. No. IA3-22/10/2022IA.III [E 177258] issued by Government of India Ministry of Environment, Forest and Climate Change (IA Division) dated 8th June 2022. Field monitoring studies to evaluate the base line status of the project site were carried out covering **December 2022 to February 2023** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Creative Engineers and Consultants** for the environmental attributes soil, water, air, noise and FAEs of Geo Technical Mining Solutions for ecology and biodiversity, geology, hydrogeology, traffic, and socio-economy.

3.1 Land Environment

Land use pattern of the area of 5 km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 1.

Table.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Crop land	5752.63	71.80
2	Water bodies	750.55	9.37
3	Plantation	158.23	1.97
4	Mining/Industrial Area	135.23	1.69
5	Bulit Area	988.23	12.33
6	Bare Ground	55.23	0.69
7	Rangeland	172.3	2.15
Total		8288.7	100.0

3.2 Soil Environment

Soil samples show that the pH values were ranging between 6.55 to 7.49 and Electrical Conductivity values were ranging between 66.48 – 95.7 $\mu\text{mhos/cm}$. Soils are generally Silty clay loam type. Organic matter values were ranging between 0.66 – 0.86%. Total Nitrogen values were ranging between 172 - 228mg/kg.

3.3 Water Environment

Ground Water Resources and Quality

The pH values were ranging in between 7.38 – 7.81, TDS values were in the range of 520 – 1246 mg/L. Chloride values were ranging from 84.50 – 386mg/L. Iron content was found to be in the range BDL (D.L-0.01)-0.05mg/L. The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications.

3.4 Air Environment

As per the monitoring data, $\text{PM}_{2.5}$ ranges from $23.2\mu\text{g/m}^3$ to $29.4\mu\text{g/m}^3$; PM_{10} from $50.7\mu\text{g/m}^3$ to $64.2\mu\text{g/m}^3$; SO_2 from $4.6\mu\text{g/m}^3$ to $6.5\mu\text{g/m}^3$; NO_x from $6.7\mu\text{g/m}^3$ to $12.5\mu\text{g/m}^3$. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index

The AQI shows that the air quality of the study area falls within good category 57 causing minor breathing discomfort to sensitive people.

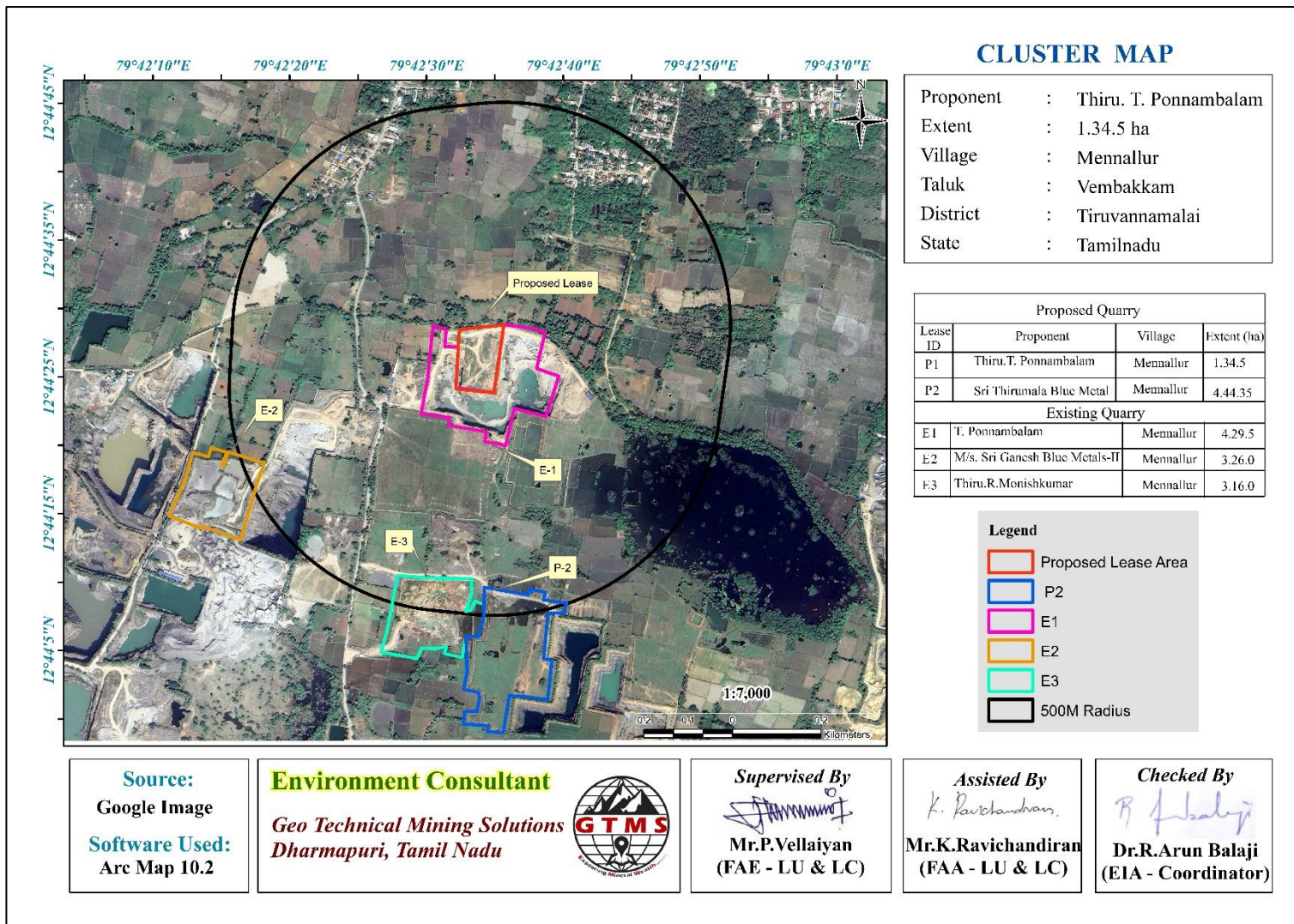


Figure 1. Google Earth Image Showing in cluster map

3.5 Noise Environment

Noise level in core zone was 50.3 dB (A) Leq during day time and 39.9dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 45.5 to 51.3dB (A) Leq and during night time from 39.9to 45.3dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

3.6 Biological Environment

The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

Flora in core zone

The mine lease area contains total of 16 species belonging to 12 families have been recorded from the mine lease area. 2 shrubs, 14 herbs were identified. There are no trees in mine lease area. The floral analysis indicates that there are no threatened (Vulnerable, Endangered & Critically Endangered) species recorded from the core project site.

Flora in 300 m radius zone

The 300m radius It contains a total of 34 species belonging to 21 families have been recorded from the buffer zone. 6 Trees (17%), 5 Shrubs (17%) and 22 Herbs and Climbers, Creeper, Grass & Cactus 20 (64%) were identified. Details of flora with the scientific name details and of diversity species Richness index were mentioned in Table 3.23-25 and Figure 3.26. There is no threatened species in 300 m radius.

Flora in 10 km radius buffer zone

Similar type of environment occurs in both core and buffer zone but more floral diversity noticed in buffer zone compared with core zone area. Buffer area contains a total species belonging to 40 families have been recorded. The floral (130) varieties among them 52 Trees, 34 Shrubs, 29 Herbs, 8 Climbers, 7 Grass were identified.

Fauna in Core Zone

There are no faunal species in mine lease area. It is an existing mine lease

Fauna in 300m radius

The 25 varieties of species observed in the core zone. Among them numbers of Insects 8 (32%), Reptiles 3 (12%), Mammals 5 (20%) and Avian 9 (36%). A total of 25 species belonging to 22 families have been recorded from the core mining lease area. Number of species decreases towards the mining area this might be due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and eight species are

under schedule IV according to Indian wild life Act 1972. A total 9 species of birds were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Fauna in 10km radius

A total of 47 species belonging to 34 families were recorded in the buffer zone. Based on habitat classification the majority of species were Birds 18 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), 4 Mammals (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 schedule IV species according to Indian wild life Act 1972. There are no critically endangered, vulnerable and endemic species observed.

3.7 Socio Economic Environment

The proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of people's standard of living.

4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Land Environment

Anticipated Impact

- ✚ Permanent or temporary change on land use and land cover.
- ✚ Change in topography of the mine lease area will change at the end of the life of the mine.
- ✚ Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- ✚ Degradation of the aesthetic environment of the core zone due to quarrying
- ✚ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- ✚ Siltation of water course due to wash off from the exposed working area

Mitigation Measures

- ✚ The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.
- ✚ Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- ✚ Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt

- ✚ Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- ✚ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- ✚ In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m, 10m safety barrier and other safety provided) so as to help minimize dust emissions.
- ✚ Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 Soil Environment

Anticipated Impact

- ✚ Removal of protective vegetation cover
- ✚ Exposure of subsurface materials which are unsuitable for vegetation establishment

Mitigation Measures

- ✚ Run-off diversion – Garland drains will be constructed around the project boundary to prevent surface flows from entering the quarry works areas and will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- ✚ Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- ✚ Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- ✚ Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.3 Water Environment

Anticipated Impact

- ✚ Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas

- ✦ As the proposed project acquires 3.0 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

Mitigation Measures

- ✦ Rain water from mine pit will be treated in settling tanks before being used for dust suppression and tree plantation purposes
- ✦ Domestic sewage from site office will be discharged in septic tank and then directed to soak pits
- ✦ Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- ✦ The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- ✦ Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- ✦ Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program.

4.4 AIR ENVIRONMENT

Anticipated Impact

Anticipated increase of the air pollutants due to quarrying activities have been predicted using AERMOD software. The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further

Mitigation Measures

- ✦ To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar
- ✦ Controlled blasting will be carried out using suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone
- ✦ Blasting will be restricted to a particular time of the day i.e., at the time of lunch hours
- ✦ Before loading of material water will be sprayed on blasted material
- ✦ Dust mask will be provided to the workers and their use will be strictly monitored
- ✦ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation

- ✚ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ✚ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- ✚ The un-metalled haul roads will be compacted weekly before being put into use
- ✚ It will be ensured that all transportation vehicles carry a valid PUC certificate
- ✚ Haul roads and service roads will be graded to clear accumulation of loose materials
- ✚ Planting of trees all along main mine haul roads and around the project site will be practiced to prevent the generation of dust
- ✚ Dust mask will be provided to the workers and their use will be strictly monitored

4.5 Noise Environment

Anticipated Impact

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas. The peak particle velocity produced by the charge of 27.5kg is well below that of 0.3 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Mitigation Measures

- ✚ The blasting operations in the cluster quarries will use shallow holes and delay detonators to reduce the ground vibrations
- ✚ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be used during blasting
- ✚ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ✚ Blasting shelter will be provided as per DGMS guidelines
- ✚ Blasting operations will be carried out only during day time
- ✚ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ✚ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ✚ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed
- ✚ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ✚ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire

- ✚ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ✚ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ✚ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 Biological Environment

Anticipated Impact

- ✚ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ✚ The Number of plants in the mining lease area is given in Chapter 3 which vegetation in the lease area may be removed during mining.
- ✚ Carbon released from quarrying machineries and tippers during quarrying would be 3406kg per day, 919506kg per year and 4597530kg over five years

Mitigation Measures

- ✚ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ✚ Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- ✚ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 16124kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ✚ As per the greenbelt development plan as recommended by SEAC (Table 4.11), about 670 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 37641kg of the total carbon.

4.7 Socio Economic Environment

Anticipated Impact

- ✚ Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area
- ✚ Approach roads can be damaged by the movement of tippers
- ✚ Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

Mitigation Measures

- ✚ Good maintenance practices will be adopted for all 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
- ✚ Air pollution control measure will be taken to minimize the environmental impact within the core zone
- ✚ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules
- ✚ Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc., from this project directly and indirectly

4.8 Occupational Health

- ✚ All the persons will undergo pre-employment and periodic medical examination
- ✚ Employees will be monitored for occupational diseases by conducting medical tests: General physical tests, Audiometric tests, Full chest, X-ray, Lung function tests, Spirometric tests, Periodic medical examination – yearly, Lung function test – yearly, those who are exposed to dust and Eye test
- ✚ Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost.
- ✚ The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

5 Environment Monitoring Program

Table. 2 Environment Monitoring Program

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM _{2.5} , PM ₁₀ , SO ₂ and NO _x .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer	-	Once in 6 months	Depth in m BGL

		zone around 1 km at specific wells			
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Peak particle velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and chemical characteristics
8	Greenbelt	Within the project area	Daily	Monthly	Maintenance

Source: *Guidance of manual for mining of minerals, February 2010*

6 ADDITIONAL STUDIES

6.1 Risk Assessment

The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project.

6.2 Disaster Management Plan

The objective of the disaster management plan is to make use of the combined resources of the mine and the outside services to:

- ✚ Rescue and treat casualties;
- ✚ Safeguard other people;
- ✚ Minimize damage to property and the environment;
- ✚ Initially contain and ultimately bring the incident under control;
- ✚ Secure the safe rehabilitation of affected area; and
- ✚ Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

6.3 Cumulative Impact Study

- ✚ The results on the cumulative impact of the two proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- ✚ The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time
- ✚ PPV resulting from two proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s

- ✚ The proposed two projects will allocate Rs. 10,00,000/- towards CER as recommended by SEAC
- ✚ The proposed two projects will directly provide jobs to 53 local people, in addition to indirect jobs
- ✚ The proposed two projects will plant 2895 about trees in and around the lease area.
- ✚ The proposed two projects will add 561PCU per day to the nearby roads.

7. Project Benefits

Various benefits are envisaged due to the three proposed mine and benefits anticipated from the proposed project to the locality, neighbourhood, region and nation as a whole are:

- ✚ Direct employment to 20 local people
- ✚ Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- ✚ Strengthening of existing community facilities through the Community Development Program
- ✚ Skill development & capacity building like vocational training.
- ✚ Rs. 5,00,000 will be allocated for CER.

8 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs.5345405** as capital cost and recurring cost as **Rs.2188866** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs.17440269**