

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

“BI” CATEGORY-MINOR MINERAL-CLUSTER-NONFOREST LAND-FRESH QUARRY

CLUSTER EXTENT = 6.80.0 hectares

At

Mangalam Village, Cheyyar Taluk,

Tiruvannamalai District, Tamil Nadu State

TOR File No. 12919 and ToR Identification No. TO25B0108TN5903858N Dated: 27.11.2025

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and address	Extent & S.F.No.	Production in m ³ & Tons
M/s.MSH Blue Metal Director Mr.Jeevith Kumar, No. 11/1, 3rd East Street, Poonga Nagar, Sothupakkam Village, Cheyyur Taluk, Chengalpattu District – 603 319	1.98.0 ha & S.F. Nos. 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7	Rough stone 340500m ³ & 936375Ts Gravel 30600m ³ & 61200Ts

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

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NABET ACC. NO: NABET/EIA/23-26/RA 0319

Valid till: 31.12.2026



ENVIRONMENTAL LAB

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Chennai – 600101.

Baseline Study Period – Oct through Dec 2025

EXECUTIVE SUMMARY

1 INTRODUCTION

As the proposed rough stone mining project (B1) falls within the quarry cluster of 500m radius with the total extent of 6.80.0ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F. No's. 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 over the extent of 1.98.0ha is situated in the cluster falling in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu. The quarries involved in the calculation of cluster extent are two proposed quarry and one existing quarries.

2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes from 12°42'51.09"N to 12°42'56.90"N Longitudes from 79°35'3.00"E to 79°35'7.47"E in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu. According to the approved mining plan, about 340500m³ & 936375 tons of rough stone and gravel is about 30600m³ & 61200 tons will be mined up to the ultimate depth of 52m (2m AGL + 50m BGL) in the ten years. The quarrying operation is proposed to be carried out by open cast mechanized mining method involving drilling, blasting, and formation of benches of the prescribed dimensions.

3 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Ekdant Enviro Services (P) Ltd** for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.

3.1 Land Environment

Land use pattern of the area of 5km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 1.1.

Table.1.1 LULC Statistics of the Study Area

S. No.	LU/LC Type	Extend (ha)	Percentage
1	Water Bodies	1309.70	16.10
2	Vegetation cover	15.96	0.20
3	Crop Lands	5291.90	65.05
4	Mining area	53.96	0.66
5	Built-up Area	798.35	9.81
6	Barren Land	21.19	0.26
7	Fallow land	644.22	7.92
Total		8135.27	100.0

Source: Sentinel II Satellite Imagery

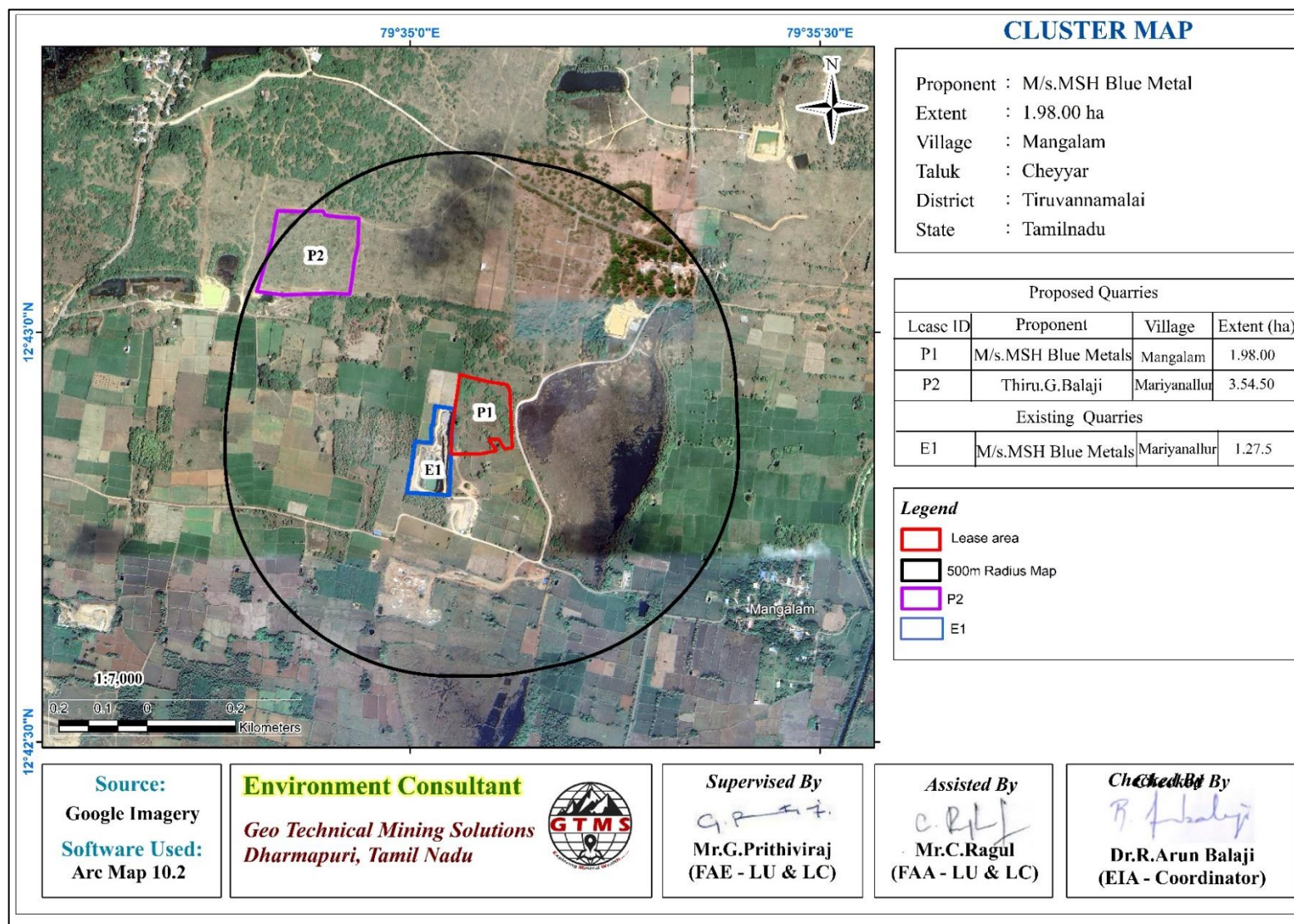


Figure 1 Location of Proposed and Existing Quarries in the Cluster of 500m Radius

3.2 Soil Environment

1. Essential Macronutrients (Ca, Mg, P, K)

- Calcium and Magnesium levels are robust and well-balanced. These minerals contribute positively to a stable soil structure and ensure good supply for most crops.
- Phosphorous is in the high/optimal range (around 46 mg/kg is excellent) suggesting the soil can support good root development without immediate P amendments.
- Potassium is the most significant deficiency observed. The extremely low values (2.08-4.66 mg/kg) indicate that plant health, disease resistance and fruit/flower development will be severely limited without immediate fertilization.

2. Micronutrients & pH Interaction

The high alkaline pH (8.1-8.7 from previous data) directly impacts the availability of certain micronutrients:

- Iron levels are low which is typical for alkaline soils as the iron becomes chemically "locked up" and unavailable to plants. This could lead to chlorosis.
- Copper and Zinc levels are surprisingly high or adequate despite the high pH which is a positive indicator for these specific nutrients.

3. Heavy Metals and Safety

The heavy metal analysis confirms the soil is safe and uncontaminated.

- Levels of Lead are very low compared to regulatory limits.
- Chromium is undetectable across all samples.
- Nickel is within background environmental levels.

Organic Matter Levels

- S3 (3.84%): **Excellent.** For a sandy loam 3.84% is considered very high and ideal. Sandy soils naturally struggle to hold organic matter so reaching nearly 4% indicates excellent soil health likely due to consistent organic amendments or natural vegetation.
- S6 (1.28%): **Low but Typical.** While 1.28% is on the lower side it is very common for cultivated mineral soils which typically range from 1% to 6%. It is not bad but it has less buffer for nutrients and water than S3.

Sample	OM %	Rating for Sandy Loam	Recommendation
S3	3.84%	Very Good / Optimal	Maintain with light mulching or cover crops.
S1, S2, S4, S5	~1.3% - 2.4%	Fair / Moderate	Good for standard growth, but could benefit from more compost.
S6	1.28%	Low	Priority for adding manure, compost, or green manure.

Water Retention: S3 (3.84%) will act like a sponge holding significantly more water during dry spells than S6. Just a 1% increase in OM can drastically improve how long a crop survives without rain.

Nutrient "Gas Tank": Organic matter is the primary source of Nitrogen and Phosphorus. The analysis showed critically low Nitrogen the higher OM in S3 provides a natural "slow-release" fertilizer that S6 lacks.

pH Stability: The soil is currently alkaline (pH 8.1–8.7). Higher organic matter helps buffer the pH preventing it from swinging even higher and locking out more nutrients.

3.3 Water Environment

This data shows a progression across seven samples generally moving from Good/Moderate quality (Samples 1-3) to Higher Mineral/Saline content (Samples 4-7). Overall, the water is chemically safe for most uses but borders on Hard to Very Hard.

- **pH (7.17 – 7.82):** Perfectly balanced. It is slightly alkaline which is ideal as it is non-corrosive to your pipes.
- **Iron (0.13 – 0.28 mg/l):** All samples are below the 0.3 mg/l threshold. You shouldn't see orange staining or a metallic taste.
- **Appearance & Odor:** Agreeable and Clear are positive. While slightly turbid is noted the NTU levels (0.4 – 1.2) are mostly within the acceptable range for general use.

Salinity & Conductivity (The salty trend)

There is a clear spike in minerals starting at Sample 4:

- **TDS (Total Dissolved Solids):** Samples 1-3 are excellent (~350 mg/l). Samples 4-7 (up to 712 mg/l) exceed the excellent drinking water threshold (500 mg/l). While safe the water may taste slightly flat or mineral-heavy.
- **Chlorides:** Samples 5 and 7 (224–238 mg/l) are approaching the EPA Secondary Standard of **250 mg/l**. High chlorides can increase the risk of corrosion in metal pipes and impart a salty taste.

Residual Chlorine

- **Result:** BLQ (Below Limit of Quantitation).
- **Interpretation:** There is no detectable chlorine in this water. This means there is no ongoing disinfection. If this is well water or stored water it is vulnerable to bacterial growth. To be clear we should perform a **Microbiological Test** (Total Coliform/E. coli) to ensure it is safe to drink.

- **For Drinking:** The water is chemically acceptable though Samples 4-7 may taste a bit heavy. Ensure a bacteria test is performed since chlorine is absent.
- **For Appliances:** Consider a water softener if using Samples 4-7 to prevent limescale damage.
- **For Irrigation:** These levels are generally safe though the Electrical Conductivity (EC) in Sample 7 (1206 $\mu\text{S}/\text{cm}$) is getting high for salt-sensitive plants.

Hardness

Groundwater (Samples 1-3) and surface water (Samples 4-7) both fall into the Hard and very hard categories respectively, though they follow an unusual trend.

Source Type	Hardness Range (mg/l)	Classification as per IS 10500:2012	Typical Domestic Impact
Groundwater	138 – 166	Hard	Minor soap scum, manageable scale in kettles.
Surface Water	196 – 240	Very Hard	Significant scaling in pipes/heaters, high soap consumption.

The surface water being harder (up to 240 mg/l) suggests that in dry seasons evaporation can concentrate minerals in surface water leading to higher hardness compared to deeper protected groundwater.

3.4 Air Environment

As per the monitoring data, $\text{PM}_{2.5}$ ranges from $19.6\mu\text{g}/\text{m}^3$ to $22.8\mu\text{g}/\text{m}^3$; PM_{10} from $40.1\mu\text{g}/\text{m}^3$ to $44.0\mu\text{g}/\text{m}^3$; SO_2 from $6.1\mu\text{g}/\text{m}^3$ to $8.0\mu\text{g}/\text{m}^3$; NO_x from $7.1\mu\text{g}/\text{m}^3$ to $13.3\mu\text{g}/\text{m}^3$. 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 42 causing minimal impact to human health.

3.5 Noise Environment

Noise level in core zone was 62.4dB(A) Leq during day time and 54.1dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 51.0 to 48.4dB (A) Leq and during night time from 38.2 to 40.8dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

3.6 VIBRATION MONITORING

- ✚ Ground Vibration and noise levels were recorded from the instruments the figure 3.33 it can be observed that the vertical Peak Particle Velocity (PPV) recorded was 0.139mm/s at nearby bare land at distance of 100m.
- ✚ Air Over-Pressure (AOP) was 124dB and 0.03kPa at nearby Study area at distance of 100m.

3.7 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. A list of the IUCN Red List analysed plant species recorded inside the proposed 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.

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

A total of 26 varieties of species were observed in the Core zone (Table.3.28). Among them are 8 Insects, 5 Reptiles, 4 Mammals and 9 Avian. A total of 26 species belonging to 20 families were recorded from the core area. The study shows that number of species decreases towards the mining area. This might be due the lack of vegetation. None of these species in the core zone are threatened or endemic. The survey was conducted to identify species listed in IUCN Red List. According to the field data, any species are not of Schedule I and nine species are of schedule IV. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Fauna in Buffer Zone

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.

3.8 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

- ✚ Change in land use and land cover and topography of the mine lease area
- ✚ Problems to human habitations due to dust and noise caused by movement of heavy vehicles
- ✚ Soil erosion and sediment deposition in the nearby water bodies during the rainy season
- ✚ Siltation of water course due to wash off from the exposed working area
- ✚ Deterioration of soil quality in the surrounding area due to runoff from the project area
- ✚ Decrease in the agricultural productivity of the surrounding land due to soil quality degradation

Mitigation Measures

- ✚ Construction of garland drains, settling pits, and check dams to prevent runoff and siltation
- ✚ Runoff water will be discharged into the settling tanks to reduce suspended sediment loads before runoff is discharged from the quarry site
- ✚ The vegetation will be retained at the site wherever possible
- ✚ Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season

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 3.5KLD 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

- ✚ During mining at various stages of activities such as excavation, drilling and transportation of materials, particular matter (PM), gases such as sulphur dioxide, oxides of nitrogen from vehicular exhaust are the main air pollutants.
- ✚ Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- ✚ The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- ✚ Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area

Mitigation Measures

Drilling

- ✚ 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.

Haul Road and Transportation

- ✚ 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
- ✚ Water sprinkling on haul roads and loading points will be carried out twice a day
- ✚ Main source of gaseous pollution will be from vehicle used for transportation of mineral. Therefore, weekly maintenance of machines improves combustion process and reduces pollution.
- ✚ The un-metalled haul roads will be compacted weekly before being put into use.
- ✚ Overloading of tippers will be avoided to prevent spillage.
- ✚ 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

Green Belt

- ✚ Planting of trees all along mine haul roads outside the lease and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers.
- ✚ Green belt of adequate width will be developed around the project site.

Occupational Health

- ✚ Dust mask will be provided to the workers and their use will be strictly monitored
- ✚ Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers.
- ✚ Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed

4.5 Noise Environment

Anticipated Impact

- ✚ Mining operations generate significant noise impacting both worker health and nearby communities.
- ✚ These impacts can range from annoyance and sleep disturbance to structural damage and hearing loss. Effective management of noise is crucial to mitigate these adverse effects.

Sources of Noise in Mining:

- ✚ **Drilling and Blasting:** Prolonged exposure to high-intensity noise from drilling and blasting can lead to hearing loss and other auditory problems
- ✚ **Heavy Machinery:** Excavators, haul trucks, and other equipment used in mining operations generate substantial noise.
- ✚ **Loading and Transportation:** The movement and handling of materials within the mine site contribute to noise pollution.

Mitigation Measures

The following noise mitigation measures are proposed for control of noise:

- ✚ Usage of sharp drill bits while drilling which will help in reducing noise
- ✚ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- ✚ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- ✚ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system

- ✚ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ✚ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- ✚ Silencers / mufflers will be installed in all machineries
- ✚ Greenbelt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- ✚ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness
- ✚ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects

4.6 Ground Vibrations

Anticipated Impact

- ✚ Mining operations generate significant noise and vibration impacting both worker health and nearby communities.
- ✚ These impacts can range from annoyance and sleep disturbance to structural damage and hearing loss. Effective management of noise and vibration is crucial to mitigate these adverse effects.

Sources of Noise and Vibration in Mining:

- ✚ Drilling and Blasting: A primary source of both noise and ground vibrations, with the intensity dependent on the amount of explosives, atmospheric conditions and proximity to the blast.
- ✚ Heavy Machinery: Excavators, haul trucks, and other equipment used in mining operations generate substantial noise.
- ✚ Loading and Transportation: The movement and handling of materials within the mine site contribute to noise pollution.

Common Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe 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
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ 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.

4.7 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 718kg per day, 194005kg per year and 970026kg over ten 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 19911kg 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 990 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 2602462kg of the total carbon.

4.8 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.

4.9 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

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 zone around 1 km at specific wells	-	Once in 6 months	Depth in m BGL
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 four 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 four proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- The cluster projects will allocate Rs. 15,00,000/- towards CER as recommended by SEAC
- The cluster projects will directly provide jobs to 69 local people, in addition to indirect jobs
- The cluster projects will plant 3401 about trees in and around the lease area

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 PLANS

In order to implement the environmental protection measures, an amount of **Rs. 51,77,860** as capital cost and recurring cost as **Rs. 21,06,920** 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 10 years will be **Rs. 3,21,36,372.**