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- NONFOREST LAND- FRESH QUARRY

CLUSTER EXTENT = 8.87.10hectares

Rough Stone and Gravel Quarry

At

Kammarajapuram Village, Walajabad Taluk, Kancheepuram District, Tamil Nadu State.

TOR File No. 13267 and ToR Identification No. TO25B0108TN5329454N, Dated: 05.03.2026

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and address	Extent & S.F.No.	Production in m^3 & Tons
S. ASHOK KUMAR, S/o. Sekar, No. 83, V.V. Kovil Street, Walajabad Taluk, Kancheepuram District - 631605.	3.48.0ha & S.F.No's. 290/1A, 290/2B1, 291/1A, 291/1B, 291/1C1, 291/1C2, 291/1D1, 291/1D2, 291/2A, 291/2B, 291/2D, 292/1A, 292/1B, 292/2A, 292/2B & 292/2C	Rough Stone- 5,81,360m^3 & 15,98,740MT Gravel- 1,42,240m^3 & 2,84,480MT Depth- 50m (BGL)

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

No: 1/213-B, Ground Floor, Natesan Complex
Oddapatti, Collectorate Post office,
Dharmapuri-636705. Tamil Nadu.
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com
NABET ACC. NO: NABET/EIA/23-26/RA 0319
Valid till: 31.12.2026

ENVIRONMENTAL LAB

EKDANT ENVIRO SERVICES (P) LIMITED
NABL Accredited and Recognised Laboratory
No. R7/1,avk Tower, North Main Road, Anna Nagar,
West Exten, Chennai – 600 101
NABL Certificate Number: TC- 11742,
Valid Until: 31/05/2025,
Baseline Study Period- January to March- 2026

APRIL- 2026

EXECUTIVE SUMMARY

1 INTRODUCTION

The proposed rough stone & gravel mining project (P1) falls within the cluster of 500m radius with the total extent of 8.87.0ha and 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. 290/1A, 290/2B1, 291/1A, 291/1B, 291/1C1, 291/1C2, 291/1D1, 291/1D2, 291/2A, 291/2B, 291/2D, 292/1A, 292/1B, 292/2A, 292/2B & 292/2C, over the extent of 3.48.0ha is situated in Kammarajapuram Village, Walajabad Taluk, Kancheepuram District and Tamil Nadu. The quarries involved in the calculation of cluster extent is two proposed quarries.

2 PROJECT DESCRIPTION

- The proposed project area is located between Latitudes from 12°44'59.17"N to 12°45'5.56"N to 12°46'26.21"N and Longitudes from 79°47'48.19"E to 79°47'56.83"E in Kammarajapuram Village, Walajabad Taluk, Kancheepuram District and Tamil Nadu.
- The mining plan approved for quarrying 581360m^3 & 1598740MT of rough stone and 142240m^3 & 284480MT of gravel to the ultimate depth of 50m (BGL) for 10 years.
- The quarrying operation is opencast semi mechanized involving drilling, blasting and formation of benches of the prescribed dimensions.

3 DESCRIPTION OF THE ENVIRONMENT

Baseline data were collected for 5km radius from the proposed area during January to March 2026 as per CPCB guidelines. The data were collected by both the FAE's and NABL accredited and MoEF notified **Ekdant Enviro Services (P) Limited** for the environmental attributes including soil, water, noise, air 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.

Table.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Water bodies	167.72	2.03
2	Plantation	23.26	0.28
3	Crop land	6625.75	80.37
4	Mining/ Industrial area	30.23	0.37
5	Built-up land	716.44	8.69
6	Bare ground	38.91	0.47
7	Fallow land	641.39	7.78
Total		**8243.71**	**100.0**

Source: Sentinel II Satellite Imagery

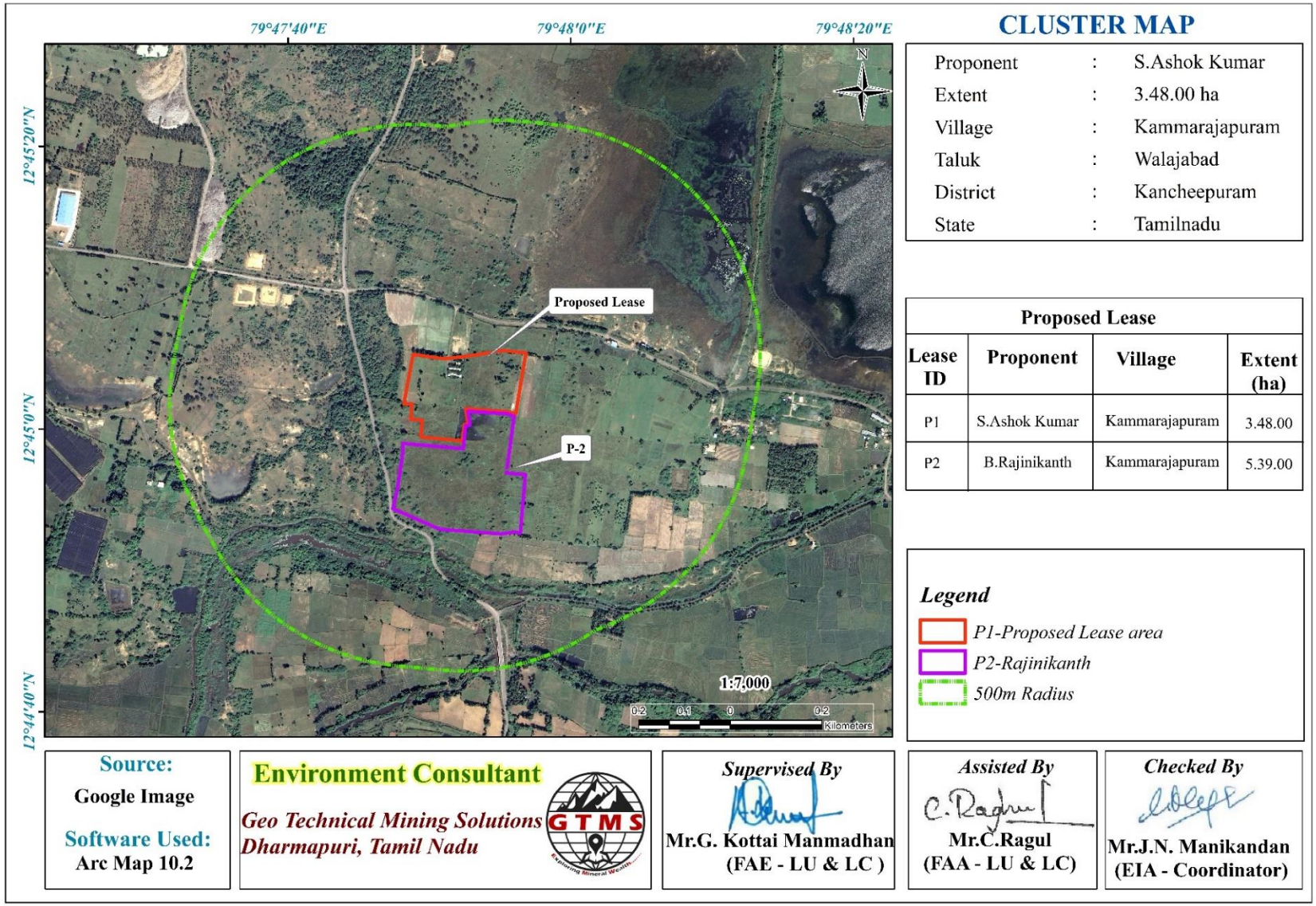


Figure 1 Location of the proposed rough stone and gravel quarries in the cluster of 500m radius

3.2 Soil Environment

The soil is nutrient-rich, well-balanced, and structurally suitable for agriculture. No corrective measures are immediately necessary, but continued monitoring and sustainable land management practices are recommended to maintain soil health.

Physical Characteristics & Chemical Characteristics

1. Soil pH and Electrical Conductivity (EC):

- **pH ranged from** 7.56 to 7.90 indicating that the soil is **neutral to slightly alkaline**, which is favourable for most crops.
- **EC** value ranged from 63.70 to 151.40µS/cm, suggesting low salt concentration and non- saline soil across the sampling area.

2. Physical Properties

- **Density** values ranged from 1.20 to 1.30 g/cc, which are within the typical range for loamy soils and support good root penetration and aeration.

3. Soil Fertility Status:

- **Total Organic matter** levels ranged from 0.49 to 1.24g/100g, classifying soils as low to moderately fertile in terms of organic matter.
- **Nitrogen (N)** content varied from 0.019 to 0.033g/100g indicating moderate nitrogen availability.
- **Potassium (K)** ranged from 0.52 to 1.84mg/kg moderate fertility potential in terms of potassium

4. **Base Elements and Cation Ratios:**

- **Calcium (Ca)** levels were highest with 22.40mg/kg and lowest with 14.80mg/kg.
- **Magnesium (Mg)** ranged from 4.89 to 14.60mg/kg.

Conclusion:

The soils in the study area are generally non-saline, neutral to slightly alkaline, and moderately fertile with low contamination levels. They exhibit good permeability, porosity, and suitable textural classes for agriculture and greenbelt development. The absence of heavy metals confirms that baseline soil conditions are unpolluted and safe for reclamation and vegetation growth.

3.3 Water Environment

The study aims to establish a baseline understanding of the current water quality both surface and groundwater in the area recognizing the crucial role these resources play in its development. This involves assessing the existing water quality to understand its suitability for various uses and to identify potential issues or areas of concern.

Ground Water Quality Result

Physical Parameters:

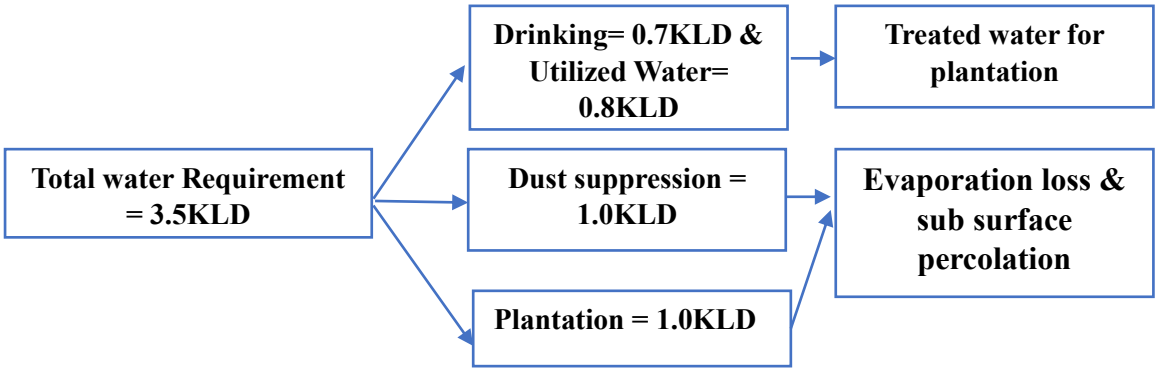
- The **pH** value ranges from 6.95 to 7.76. The World Health Organization (WHO) and the Bureau of Indian Standards (BIS) recommend a pH range of 6.5 to 8.5 for drinking water and the values are within the acceptable limits.
- **Turbidity** is measured by a nephelometric turbidimeter. NTU is the current standard for measure the intensity of scattered light caused by these particles rather than the amount of light transmitted through the sample. The **turbidity** value is less than 1 NTU in open well and bore well water. In surface water it is 5NTU.
- The **TDS levels** ranged from 820mg/L to 1040mg/L. In bore well, water the TDS is higher than the WHO recommendation of 500mg/l for drinking water. High TDS levels can affect the taste of water potentially making it salty or bitter. In the long-term excessive TDS can irritate the stomach and according to some health sources may lead to kidney stones and cardiac issues.

Chemical Parameters:

- The **calcium** levels range from 67.0mg/L to 116.0mg/L which is within the permissible limit of 200mg/L but slightly above the acceptable limit of 75mg/L. High calcium levels can cause scaling in domestic equipment, reduced detergent efficiency and potential health issues like constipation, gas and bloating.
- The **magnesium** levels range from 35.0mg/L to 41.0mg/L which is within both the acceptable and permissible limits. However, elevated magnesium levels can cause diarrhoea and vomiting in children.
- The **chloride** levels range from 160.0mg/L to 236.0mg/L which is within the acceptable and permissible limits of 250mg/L and 1000mg/L respectively. Chloride levels exceeding permissible limits can cause a bitter taste in the water and contribute to corrosion.
- The **total alkalinity** levels ranging from 256.0mg/L to 452.0mg/L are slightly above the acceptable limit of 200mg/L but within the permissible limit of 600mg/L. Excessive alkalinity can impart a soda taste to the water.
- The **hardness** levels ranging from 316.0mg/L to 460.0mg/L, are within the permissible limit but higher than the acceptable limit. Hardness can lead to corrosion and scaling problems, increased soap consumption and a salty taste.

Inference: The surface water quality is compared with the CPCB Water Quality Criteria against A, B, C, D & E class of water. From the test result it is found that both the water does

not fit Class A (Drinking Water Source without conventional treatment but after disinfection). But they can be used for outdoor bathing as it meets the requirements shown for class B water. 3.5KLD (3500liters per day) water requirement for drinking, domestic, dust suppression and plantation.



3.4 Air Environment

As per the monitoring data $PM_{2.5}$ ranges from 17.56µg/m^3 to 20.13µg/m^3, PM_{10} from 45.72µg/m^3 to 50.59µg/m^3, SO_2 from 4.87µg/m^3 to 6.09µg/m^3, NO_X from 8.02µg/m^3 to 9.16g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index (AQI)

The AQI shows that the air quality of the study area falls within good category 51 causing minimal impact to human health.

3.5 Noise Environment

Noise level in core zone was 52.8dB (A) Leq during day time and 41.3dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 46.5 to 48.3dB (A) Leq and during night time from 38.3 to 40.0dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

3.6 Biological Environment

Biological study of the ecosystem is essential to understand the impact of rough stone quarry on existing flora and fauna of the study area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if any. A survey was conducted to study the flora and fauna in 10km radius by direct and indirect sightings/ data. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made, and all the available information was recorded.

Flora Composition in Core Zone

The core zone presents in tree, shrubs, herbs and grasses. Taxonomically total of 18 species belonging to 12 families 31 Plant have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were Herbs 5 followed by Trees 5 Shrubs 4 and Climbers 2. The result of core zone of flora studies shows that Fabaceae and Solanaceae are the main dominating species in the study area it mentioned in Table 3.22 & 3. 23. No species found as threatened category.

Flora Composition in buffer Zone

There are 139 different species identified in the buffer zone. Among the identified, floral (139) species were 30 trees, 19 herbs & climbers, 20 shrubs, 13 Creepers & grasses. According to the findings of the buffer zone flora studies, the dominant species in the study area are Fabaceae, Asteraceae, and Euphorbiaceae, as shown in Table 3.25. Apart from the proposed project area, there is agricultural land. Horticulture and agricultural land are untouched. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Details of flora with the scientific name were mentioned in Table 3.25. A list of floral species has been prepared based on a primary survey (site observations) and discussion with local people.

Fauna in Core Zone

A total of 24 varieties of species were observed in the Core zone (Table.3.27). 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. Details of fauna in core zone with the scientific name were mentioned in Table 3.27.

Fauna in Buffer Zone

A total of 50 species belonging to 36 families have been recorded from the buffer zone area (Table.3.28). Based on habitat classification the majority of species were Birds 15 (30%), followed by Insects 14 (28%), Reptiles 13 (26%), Mammals 5 (10%) and Amphibians 3 (6%). There are 7 Schedule II species and 27 species are under schedule IV according to Indian wild life Act 1972. A total fifteen species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable and endemic species were 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

- Converting barren land of 3.48.0hectares to rough stone mining creates a significant and usually irreversible change in land use and land cover involving the physical alteration of the land's surface, potential deforestation, loss of biodiversity, altered topography from pits and spoil dumps.
- Heavy vehicle movement causes significant problems to nearby agriculture and human habitation. These pollutants can degrade soil quality and introduce heavy metals into the environment.
- During transportation the tippers damage the bituminous roads. The primary damage is caused by the fourth power law (*The law posits that if you double an axle's load, the damage caused to the pavement increases by a factor of 2x4 or 16 times*) where pavement damage increases with the fourth power of the axle load. The immense weight of heavy payloads on an axle exerts a concentrated and repetitive stress on the road surface leading to permanent strain, premature failure and a cumulative damage.
- Rain drops hitting stone crushing waste can break apart the particles and flowing water detaches them from the surface transports and redeposits these particles especially from sloped surfaces. This a form of splash erosion followed by sheet erosion which can lead to environmental issues.

Mitigation Measures

- After mining there is a huge void of 2.85.0hectares upto a depth of 50m is useful for rain water storage structure has an advantage for local farmers. The artificial pond boundary shall be fences to avoid any mishaps.
- Union ministry of road transport and highways on July 16th 2018 increased the maximum cap of axle load limit by 20 to 25 percent cross various categories to keep the limit "at par with international standards".

4.2 Soil Environment

Anticipated Impact

- The fertility status of the soil near by the lease area may affect due to extra dust deposition on the soil. Dust deposition from a lease area can harm soil fertility

by physically blocking soil pores, reducing aeration and water infiltration, and potentially altering the soil's chemical properties. This damage to the topsoil negatively impacts plant growth by interfering with photosynthesis and nutrient uptake ultimately decreasing crop production.

- Topsoil will be scraped from the area of 2.85.0hectares in the project site will store in safety area left for 7.5meters in the east side as shown in mining plan.

Mitigation Measures

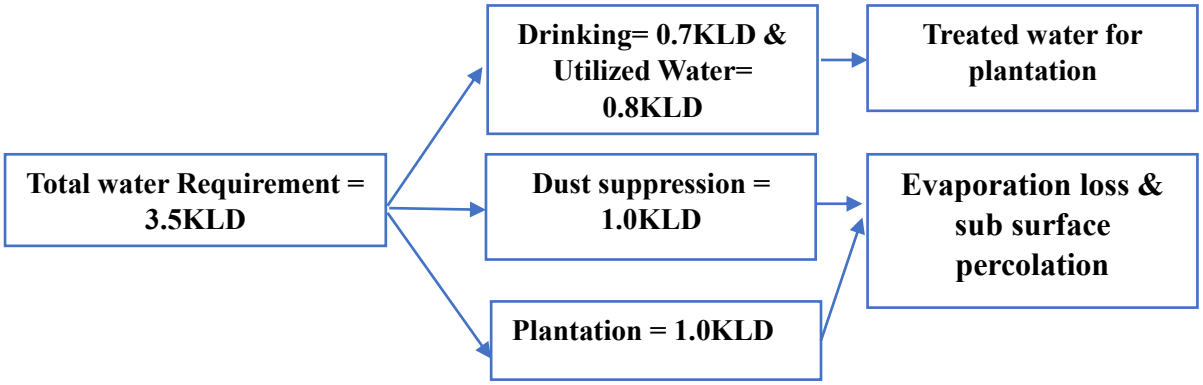
- When stock piling of top soil is done the mound should not be higher than 1.0m and Weathered Rock 3.0m.
- To minimize surface runoff and erosion the topography of a graded surface should be designed to create terraces or benches that follow land contours which intercept sheet flow. Additionally, a bulldozer's tracks can be used to create a fine-scale roughened surface perpendicular to the slope and stockpiles should be constructed with a rough surface to improve drainage, reduce erosion and encourage revegetation.
- Efforts will be made to minimize the storage time to prevent nutrient loss.
- To protect the quality of stockpiled topsoil immediate re-vegetation is crucial. Temporary seeding should be done within 30 days of stockpile formation to control erosion, prevent weed growth and maintain healthy soil microbes.
- If the stockpile will not be reused within 12 months it must be stabilized with permanent vegetation to ensure long-term erosion and weed control.
- The stored topsoil will be utilized for plantations in later phases during the progressive and final closure of the mine.

4.3 Water Environment

Anticipated Impacts

- 3.5KLD water requirement for drinking, domestic, dust suppression and plantation.
- The domestic effluents being generated during mine operation.
- Major impact of opencast mining on groundwater regime is quality deterioration. The proposed mining activities shall be carried out upto a depth of 50m from average ground level. The specific water table depth in the core and buffer zone is between 60m and 65meters below ground level.

Water Balance Chart of the Mine



Mitigation Measures

- The hard rock itself has very few interconnected pore spaces, limiting the amount of water it can store or transmit. Groundwater flow and storage occur primarily in secondary openings such as joints, cracks and fissures. The thickness of the weathered layer, where more significant porosity can develop, is typically limited to 1-3meters, particularly in low-lying topographic areas. The groundwater in these shallow zones is under unconfined (or water table) conditions, meaning it is directly connected to the surface and not confined by impermeable layers.
- The storm water discharge coming out of quarries and dump through a network of garland drains is expected to contain solid particles. These solid particles shall be removed by settling in the settling pond before being used for dust suppression and plantation. Hence, there shall be no change in drainage system due to this mining project in buffer zone.
- Domestic sewage from site office will be discharged in MAK Anaerobic bacteria digestion bio-septic tank. The treated water will be utilized for watering and maintaining the green belt.
- Groundwater development efforts would need to focus on the weathered and fractured zones near the surface in the buffer zone.
- Periodic (every 6 month once) analysis of ground water level and quality from the open well OW2 and bore well BW2 as shown in Figure 3.10 to 3.13 to find the change due to quarrying.
- The average annual rainfall of the project area is 883.15mm to 1564.32mm and the runoff coefficient factors have been taken as per guidelines of Manual on Norms and Standards for Environmental Clearances by MoEF & CC, Govt. of India.

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

Haul Road and Transportation

- There will be transportation of rough stone from the area to the crusher which is located at a distance of about 3km. Considering average annual production of 398660tons per annum i.e. 1476 tons per day of stone there will be movement of around 89 trucks per day for transportation of the stone. This will create additional traffic load to the road and also additional emission due to vehicular movement.
- 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-metaled 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.

Common Mitigation Measures

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

- Optimizing blast design to minimize ground noise.
- Constructing noise barriers or enclosing noisy equipment can help reduce noise propagation.
- Proper maintenance and operation of mining equipment can help minimize noise generation.
- 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 though training and awareness
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects

Ground Vibrations

Noise and Vibration:

- 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.
- Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251mm/s.
- 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.
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region. There are no trees in mine lease area.
- Carbon released from quarrying machineries and tippers during quarrying would be 892kg per day, 240840kg per year and 2408400kg 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.

- None of the plants in the lease area will be cut during operational phase of the mine. we recommend uprooting and planting of the 10 trees along the 7.5 m safety zone to prevent environmental pollution during quarrying. As the survival rate due to uprooting was only 30%, 100 seedlings will be procured at the rate of 10 seedlings per tree and planted in 7.5 m safety zone.
- Existing roads will be used and new roads will not be constructed to reduce impact on flora.
- Green belt of adequate width will develop around the project site. Dust catching species like *Alstonia scholaris, Bombax ceiba, Terminalia arjuna, Cassia fistula, Bombax ceiba, Azadirchta indica, Nyctanthes arbor-tristis, Psidium guajava, Tectona grandis* etc will be planted in green belt.
- 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 29504kg of carbon per year. Therefore, we recommend 500 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 4.14) about 1740 trees (Table 4.15) will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 7074000kg 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, Spiro metric 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 11.2 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 (1 SW & 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 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 5mm/s.
- The project will allocate Rs. 5,00,000/- towards CER as recommended by SEAC
- The project will directly provide jobs to 23 local people, in addition to indirect jobs
- The project will plant 1740 about trees in and around the lease area.
- The project will add 459PCU per day to the nearby roads.

7 Project Benefits

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

- Direct employment to 23 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. 28.50Lakhs** as capital cost and recurring cost as **Rs.24.22Lakhs** as recurring cost/ annum is proposed considering present market price for the proposed project. After the adjustment of 5% inflation per year the overall EMP cost for 10 years will be **Rs. 333.01Lakhs** as shown in Table 10.2.

9 CONCLUSION:

The environmental impact assessment (EIA) study for a proposed mining operation exposed the potential negative impacts such as

- **Dust emission impact:**

  The project is expected to have a negligible impact on overall dust emissions, with levels remaining less than 0.5% of the existing levels.
- **Blasting restriction:**

  Blasting with slurry mixtures should be minimized to avoid causing shockwaves and damage to nearby properties and populations.
- **Erosion control measures:**

  Terracing, planting vegetation and soil stabilization techniques should be implemented to manage erosion.
- **Dust suppression equipment:**

  Dust suppression machines should be readily available on site to minimize dust generation during material handling.
- **Green belt development**

  Creating a vegetative barrier that absorbs gaseous and particulate pollutants reduces noise levels and mitigates soil erosion. By planting native tree species with their vast leaf surfaces, green belts effectively reduce pollutant concentrations in the ambient air and improve the aesthetic environment making them crucial for controlling the impacts of activities like proposed mining operations.
- **Comprehensive environmental management:**

  All recommended environmental management practices should be implemented throughout the project lifecycle.