

EXECUTIVE SUMMARY

ROUGH STONE AND GRAVEL QUARRIES

IN CLUSTER OVER AN EXTENT OF 9.51.5 ha

At

Nalmukkal Village, Marakkanam Taluk, Viluppuram District, Tamil Nadu State

Total No of Proposed Quarries = 1 Number = 3.35.0 ha

Proponent 1

**Thiru. N. Gopinath,
Kancheepuram**

3.35.0 Ha

Total No of Existing Quarries = 2 Numbers = 6.16.5 ha

Lessee 1

**Thiru. M. Babu,
Tindivanam**

3.94.0 Ha

Lessee 2

**Thiru. T. K. Kumar,
Viluppuram**

2.22.5 Ha

PREPARED BY

M/s. Geo Exploration and Mining Solution,

Accredited for Sector 1, 28 & 38 Category 'A'
Quality Council of India – National Accreditation Board for Education & Training, New Delhi
Certificate No : NABET/EIA/1821/RA 0123

1. INTRODUCTION –

This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of Nalmukkal Rough Stone and Gravel Cluster Quarries consisting of One Proposed and Two Existing Quarries with total extent of Cluster of 9.51.5 ha in Nalmukkal Village, Marakkanam Taluk, Viluppuram District Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

This Cumulative EIA / EMP report is prepared to evaluate the environmental impacts of the project in line with the requirements of EIA notification SO 1533(E) dated 14.9.2006 and amendments made thereof.

Project Identification:-**TABLE 1.1: PROPOSED PROJECTS IN THE CLUSTER**

Description/Details	P1
Name of the Quarry	Thiru. N. Gopinath Rough Stone & Gravel Quarry
S.F.No's	33/5, 37/3, 37/4, 37/5, 37/6 and 37/7
Extent	3.35.0 ha
Classification of Land	Patta Land
Village	Nalmukkal
Taluk	Marakkanam
District	Viluppuram
State	Tamil Nadu
Latitude Between	12°13'01.79"N to 12°13'10.65"N
Longitude Between	79°46'13.93"E to 79°46'22.23"E.

Source: Approved Mining Plan

TABLE: 1.2: IDENTIFICATION OF THE PROJECT PROPONENT

CODE	P1
Project Proponent Details	Thiru. N. Gopinath, S/o. Natarajan, No. 191, Nattamaikkarar Street, Polampakkam Village, Cheyyur Taluk, Kanchipuram District, Tamil Nadu Phone - +91 76397 12128
Status	Individual

Source: Approved Mining Plan

2. PROJECT DESCRIPTION –

- The Project area is located 2.5 km North East of the Nalmukkal Village, Nalmukkal village is located Tindivanam – Marakkanam State Highway (SH 134). The area is marked in the Survey of India, Toposheet No. 57-P/16.

TABLE 1.3: FEATURES AROUND THE CLUSTER

Nearest Village	Nalmukkal– 1.0km- South (Population – 940)
Nearest Town	Tindivanam – 13.0km - West
Nearest Roadway	Kunnappakkam – Brammadesam road – 1.0km – East (NH 66) Pondicherry – Tiruvannamalai – 10.0km South west (SH 134) Tindivanam – Marakkanam 2.0km South
Nearest Railway	Chennai - Viluppuram Railway line – 10.5 km – North West
Nearest Airport	Chennai Airport – 98 km – North East
Seaport	Chennai 110 km North East side

Source: Survey of India Toposheet

TABLE 1.4: RESOURCES AND RESERVES

PARTICULARS	DETAILS	
	Rough Stone (5Year Plan period)	Gravel (3 Years Plan period)
Geological Resources	13,15,560 m ³	65,778 m ³
Mineable Reserves	6,22,300 m ³	53,148 m ³
Proposed production for five years	6,22,300 m ³	53,148 m ³
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Days	
Production per day	415 m ³	59 m ³
No of Lorry loads (12m ³ per load)	34 Nos	5 Nos
Proposed Depth for Mining Plan Period	40 m	2 m
Total Depth of Mining	42 meters	

Source: Approved Mining Plan

FIGURE 1.1: SATELLITE IMAGERY CLUSTER QUARRIES

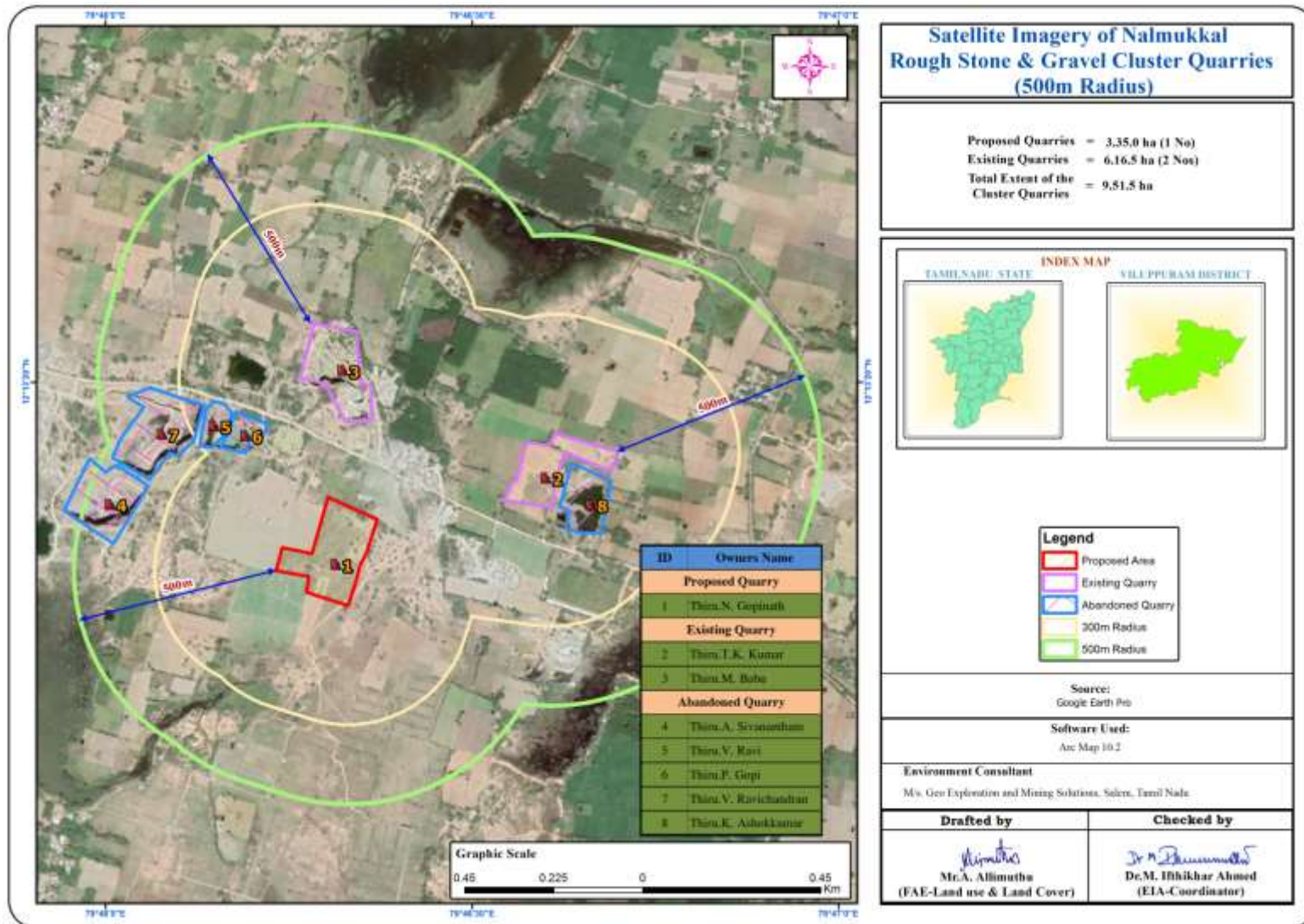
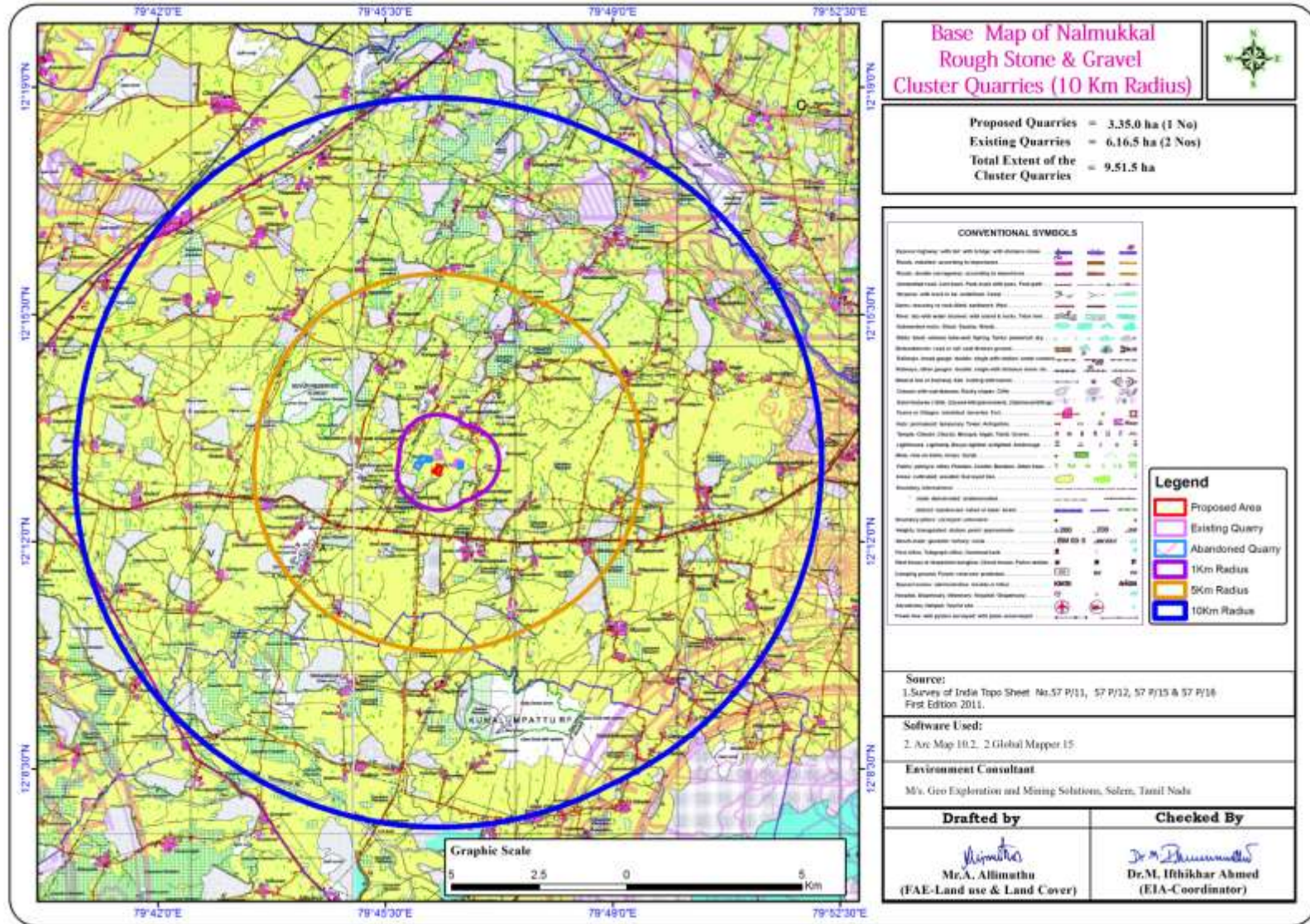


FIGURE 1.2: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS FROM CLUSTER QUARRIES



3. DESCRIPTION OF THE ENVIRONMENT –

Baseline data was generated for various environmental parameters including Air, Water (surface and groundwater), Land and Soil, Ecology and Socio-economic status to determine quality of the prevailing environmental settings. The Base Line Study was conducted during winter season December 2019 – February 2020

3.1 Land Environment

Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover. As the mining is proposed to be carried out by opencast mechanized mining method, studies on land environment of eco-system play an imperative role in identifying susceptible issues and taking appropriate action to uphold ecological equilibrium in the region

TABLE 3.1: LAND USE / LAND COVER TABLE 10 KM RADIUS

Sl.No	Classification	Area In Ha	Area in %
1	Agriculture Fallow	3259.00	10.12
2	Agriculture Plantation	3220.97	10.00
3	Barren Scrub	234.79	0.73
4	Builtup Mining	335.98	1.04
5	Builtup Rural	623.45	1.94
6	Builtup Urban	42.26	0.13
7	Lakes Ponds	3082.64	9.57
8	River stream	73.03	0.23
9	Salt affected Land	960.98	2.98
10	Forest Plantation	296.86	0.92
11	Forest Scrub	419.77	1.30
12	Crop Land	19651.50	61.03
Total		32201.23	100.00

Built-up area = 665.71 ha ie., 2.07%

Agriculture land = 22872.47 ha ie., 71.03%

Barren land = 4454.77 ha ie., 13.83%

This small percentage of Mining Activities shall not have any significant impact on the environment.

Soil Environment

Five soil sampling locations were selected and analysed.

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay Loam Soil and Bulk Density of Soils in the study area varied between 1.02 – 1.4 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 15.4-51 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline in nature with pH range 7.38 to 8.59
- The available Nitrogen content range between 131.2 to 184 kg/ha
- The available Phosphorus content range between 1.03 to 1.73 kg/ha
- The available Potassium range between 51 to 62 mg/kg

3.2 Water Environment –

6 Ground water and 2 Surface water samples were collected to assess the water quality. The ground water samples were drawn from bore wells of villages being used for domestic needs. Surface water samples were taken from lakes and mine pit.

Ground Water –

- The pH was varying from 7.07 to 7.77
- The TDS values is ranging from 576 to 956 mg/l
- Hardness values is ranging from 251.6 to 415.6 mg/l

Surface Water (Mine pit water) –

- The pH value is 7.15 to 7.44
- The TDS values is 667 to 790mg/l
- Hardness values is 231mg/l to 417.9mg/l

The heavy metal content has been found to be well within the limit. The physio-chemical and biological analysis revealed that these waters are well within the prescribed limits as per CPCB standard.

3.3 Air Environment –

As per monitoring data, PM₁₀ ranges from 30.6 µg/m³ to 66.7 µg/m³, PM_{2.5} data ranges from 18.6 µg/m³ to 47.8 µg/m³, SO₂ ranges from 3.4 µg/m³ to 14.7 µg/m³ and NO₂ data ranges from 10.2 µg/m³ to 23.2 µg/m³.

The minimum & maximum concentrations of PM₁₀ were found to be 30.6 µg/m³ in Munnur village & 66.7 µg/m³ in core zone respectively. The average concentrations were ranged between 31.9 and 65.2 µg/m³. The minimum & maximum concentrations of PM_{2.5} were found to be 18.6 µg/m³ in Munnur village & 47.8 µg/m³ in core zone respectively. The average concentrations were ranged between 20.4 and 46.7 µg/m³.

3.4 Noise Environment –

- Baseline noise levels were monitored at 9 locations, using continuous noise measurement device. Day levels were monitored during 6 AM to 10 PM and the night levels during 10 PM to 6 AM.
- The day equivalents during the study period are ranging between 49.8 – 55.5 dB (A)
- The night equivalents were in the range of 37.7 – 39.2 dB (A).
- From the results, it can be seen that the Day equivalents and the Night equivalents were within the Ambient Noise Standards of Industrial / Commercial / Residential Area.

3.5 Biological Environment –

Ecological survey has been carried out to understand baseline ecological status, important floristic elements and fauna structure.

There is no medicine plants in the vicinity of the project area and no schedule I fauna mentioned as per Wild Life Protection Act 1972 or under threatened category of the IUCN Red List of Threatened Species.

3.6 Socio Economics –

Sample survey was carried out to collect qualitative information about the socio-economic environment of the area. The Study area has all basic amenities such as roads, drinking water facilities, township, education institution, temples, medical facilities and electricity facilities and was evident during the site visit.

Though agriculture is the main occupation in the surrounding villages, it has provided employment opportunities to only 50-60% of the families. The remaining population is depended on the other type of employment opportunities mainly as laborers.

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: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.
- If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

Mitigation measures

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative 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 soil 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 safety barrier and other safety provided) so as to help minimise 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 Water Environment

Anticipated Impact

- The major sources of water pollution normally associated due to mining and allied operations are:
 - Generation of waste water from vehicle washing.
 - Washouts from surface exposure or working areas
 - Domestic sewage
 - Disturbance to drainage course in the project area
 - Mine Pit water discharge
 - Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table

Mitigation measures

- Garland drains, settling tank will be constructed along the individual mining leases. The Garland drains of the individual leases will be connected to settling tank and after settling the water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting

- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic analysis of quarry pit water and ground water quality in nearby villages
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- De-silting will be carried out before and immediately after the monsoon season
- Regular monitoring and analysing the quality of water in open well, bore wells and surface water

4.3 Air Environment–

Anticipated Impact

- During mining, at various stages activities such as excavation, drilling, blasting, 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.

Advantages of Wet Drilling:-

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting include Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e. at the time lunch hours, controlled charge per hole as well as charge per round of hole
- 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

Haul Road & 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 below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & 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 & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt –

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

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 & tipper drivers
- Ambient Air Quality Monitoring will be conducted six month once to assess effectiveness of mitigation measures proposed

4.4 Noise Environment**Anticipated Impact**

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, Blasting, and Loading and during movement of vehicles.

Mitigation measures

- 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;
- Green Belt/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.

4.5 Biological Environment**Anticipated Impact**

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km.

There are no migratory corridors, migratory avian-fauna, rare endemic and endangered species. There are no wild animals in the area. No breeding and nesting site were identified in project site. No National park and Wildlife Sanctuary found within 10km radius. The dumps / bunds around the mine itself act as a good barrier for entry of stray animals. In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

Mitigation measures

To reduce the adverse effects on natural flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

4.6 Socio Economic Environment.**Anticipated Impact**

Employment generation due to the project will provide direct employment for about 94 persons.

Mitigation Measures

- Good maintenance practices will be adopted for plant 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.
- Appropriate 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, DMF, NMET etc, from this project directly and indirectly.

5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The site has been selected based on geological investigation and exploration as below:

- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility
- Socio – economic background.

The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

6 ENVIRONMENT MONITORING PROGRAM –

Usually an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment. The Objective of Monitoring -

- To check or assess the efficiency of the controlling measures;
- To establish a data base for future impact assessment studies.

7 ADDITIONAL STUDIES - RISK ASSESSMENT & HAZARD –

The components associated with risk and hazard in this mining case include drilling & blasting, waste dump, heavy earth moving machinery and explosive storage. Measures to reduce and avoid any incidents occurring from the above mentioned components shall be planned and implemented as soon as the mine starts commissioning; this includes measures to avoid the above discussed risk factors. Proper risk management plan will be proposed to avoid any kind of accident/ disaster.

8 PROJECT BENEFITS –

- Improvement in physical infrastructure
- Improvement in Social Infrastructure
- Employment Potential
- Proponents will carry out CSR activities like community awareness program, health camps, Medical aid, family welfare camps etc.,
- A massive plantation will be done in the mine area to mitigate the ill-effects of mining and to improve the vicinity and environment of mine and its surrounding area.

9 ENVIRONMENT MANAGEMENT PLAN –

The Environmental Management Plan (EMP) is a site specific plan developed based on the base line environmental status, mining methodology and environmental impact assessment. In each of the areas of impact, measures have to be taken to reduce potentially significant adverse impacts and where these are beneficial in nature, such impacts are to be enhanced/ augmented so that the overall adverse impacts are reduced to as low level as possible.

The proponents shall organize an Environment Monitoring Cell which is responsible for the management and implementation of the environmental control measures. Basically, this department shall supervise the monitoring of environmental pollution levels like ambient air quality, water quality, soil quality and noise level by appointing approved external agencies.

The working conditions in the mines are governed by the enactments of the Director General of Mines Safety (DGMS). The proponent shall take all necessary precautions regarding health and safety of workers as per the guidelines of the Mines Act, sanitary facilities shall be provided within the lease area carry out periodic health check-up of workers.

10 CONCLUSION –

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for continuous monitoring and immediate rectification at site. Due to the mining activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Environmental Clearance shall be granted at the earliest.