

Environment management plan

OF

GOPALPUR STONE QUARRY – I

OVER AN AREA OF 2.40 ACRES / 0.971 HECTARES IN VILLAGE –
GOPALPUR, TAHASIL – KEONJHAR, DISTRICT – KEONJHAR, ODISHA

(PLAN PERIOD – 2022-23 TO 2026-27)

PREPARED ON BEHALF OF

**TAHASILDAR
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CHAPTER – 1

INTRODUCTION

Environment Management Plan (EMP) is aimed at mitigating the possible adverse impact of a project and for ensuring to maintain the existing environmental quality. The EMP converses all aspects of planning, construction and operation of the project, which are relevant to environment. It is essential to implement the EMP right from the planning stage and then continuing it throughout the construction and operation stage. Therefore the main objective of the EMP is to identify the project specific activities that would have to be considered for investigation of significant adverse impacts and the mitigation measures required.

The project proponent will take enough care of the quarry area to avoid adverse impacts on the surrounding environment. The present EMP describes the possible environmental impacts on various features like air, water, land, noise, ecology and socio-economic factors. The following aspects have been studied to identify the impacts of the proposed production of the mine. The proposed environmental management measures that will be implemented to avoid the potential impacts associated with the project.

The main objectives of EMP are as follows

- To implement environmental control and protection measures.
- Subsequent environmental monitoring of the efficiency of various control measures.
- Plantation / green belt development.
- Land restoration.
- Development of socio – economic condition of the area.
- To maintain the ecological conditions as before mining.

This EMP has been prepared for Gopalpur Stone Quarry – I over an area of 2.40 Acres / 0.971 Hectares in village – Gopalpur, Keonjhar Tahasil, District – Keonjhar, Odisha for extraction of road metal . The quarry will be auctioned by the Tahasildar, Keonjhar Tahasil after acquiring all statutory permissions from concerned authorities. The lease period will be from 2022-23 to 2026-7 (Five years).

Under provisions, rule 28(4) of the Odisha Minor Mineral Concession (Amendment) Rules, 2016 vide notification S.R.O. No. 443/2014 dated 16/09/2014 and No. 7293 dated 25/09/2014 of Department of Steel and Mines, Government of Odisha, the mining plan in Form – O in respect of the aforesaid quarry has been approved by Joint Director of Geology, Keonjhar central survey vide letter no. 801/CZ dated 19/04/2022 for a period of five years from the execution of the lease deed with the successful bidder.

However, the Hon'ble Supreme Court of India had made observations in its decision that the extractions of minor minerals have significant adverse impacts on environment and

made compulsory to have environmental clearance from the State Government. As there are large numbers of stone quarries less than 5 Ha area in every district of Odisha and all such quarries are categorised as category B2 as per EIA notification 2006 and subsequent amendments thereof of MoEF & CC, Govt. Of India.

Chapter – 2

PROJECT DESCRIPTION

2.1 Project Details

Gopalpur Stone Quarry – I over an area of 2.40 Ac./ 0.971 Ha is located at Gopalpur Village under Keonjhar Tahasil of Keonjhar District of Odisha. The quarry will get auctioned by the Tahasildar, Keonjhar Tahasil for extraction of Road Metal after getting all statutory permissions required from concerned authorities. The lease period will be from 2022-23 to 2026-27.

The annual production of the road metal is being proposed to be 3036 Cum(Max). Mining plan for this quarry has been prepared in conformity under rule 28(4) of OMMC (Amendment) Rules, 2016 and approved by Joint Director Geology, Keonjhar Central Survey and submitted to SEIAA, Odisha for necessary environmental clearance under category B2.

The basic information regarding the quarry is as follows.

Name of the Quarry :	Gopalpur Stone Quarry – I
Location of the Quarry :	Village – Gopalpur Keonjhar Tahasil, Keonjhar
Name of the Applicant :	Tahasildar, Keonjhar Tahasil
Name of the Minor Mineral :	Road Metal
Status of the Mine :	Existing
Total production during lease period:	15165.6 Cum

2.2 Location of the site and site analysis

The proposed lease area is present at a distance of 15 Km from Keonjhar District Headquarter and 10 Km from nearest town Naranpur. It falls under Survey Of India Toposheet No. – F45N10. It is bounded by following co-ordinates.

GPS Co-ordinates		
Sl. No.	Longitude	Latitude
A	85 ⁰ 42' 43.84" E	21 ⁰ 33' 56.74" N
B	85 ⁰ 42' 41.81" E	21 ⁰ 33' 52.18" N
C	85 ⁰ 42' 43.77" E	21 ⁰ 33' 51.42" N
D	85 ⁰ 42' 44.30" E	21 ⁰ 33' 52.57" N
E	85 ⁰ 42' 45.41" E	21 ⁰ 33' 54.29" N
E	85 ⁰ 42' 45.79" E	21 ⁰ 33' 55.90" N

Connectivity

The proposed lease area is well connected to Keonjhar town. The NH – 20 is just 50m distance from the site. The nearest railway station is located at a distance of 10 Km from the site which is Naranpur railway station. Major of the tele tower connections like BSNL, Airtel, Jio etc are available in this area.

Details and approximate distance of National park, Sanctuary, Biodiversity area and inter state boundary situated within periphery of 10 Km from the area to be sanctioned.

No wild life sanctuary is situated within 10 Km radius of the area.

2.3 Topography

The proposed activity is to take place in the non forest Govt. Land in village Gopalpur whose top RL is 459 mRL and lowest RL is 451 mRL. The area under report forms a part of Singhbhum Granite Craton. Here, the country rock granite has been intruded by Dolerite dykes & hence the deposit. More over the rock in this lease hold is mainly boulder type and sometimes in situ types of deposit. This happened because of the physical and chemical effect of weathering and the action of varying temperature and pressure condition. Hence it can't be used for any other purposes other than Road Metal. The Dolerites are outcropped by weathered Granites.

2.4 Drainage and physiography

From the study of the area, no drainage is found passing through the quarry. There is also no quarry present within 500m or 1 Km radius of the proposed quarry.

Mineral Reserve

Based on the surface exposures, the updated geological resources as well as mineable reserve have been estimated in the entire lease area under Proved, Probable and Possible categories. The reserves are as follows.

Geological reserve : **83,337.6 Cum.**

Mineable reserve : **25,649.6 Cum.**

2.5 Project description with process details

Gopalpur Stone Quarry – I is an open cast semi-mechanized mining project, where extraction of Dolerite Stone will be done. The height and the width of the benches will be kept at 3X3m. Machines like Jack Hammer, Excavator, Tippers, Tractors, Hyvas will be used. Development or excavation will be carried out by drilling only. No blasting is proposed. Sizing and sorting will be done manually by local labourers by the help of Hammers, Chisels, Spades etc. At the end of the plan period, the quarry floor level will be kept at 448 mRL.

Machinery to be used during mining operation

Type of Machines	Capacity	No. of Machines
Excavator	0.9 Cu.m.	2
Compressor	450 cft	2
Jack hammer	6kg/sq.m.	2
Tipper/Tractor/Hyva	4/2.5/16/18 Cu.m.	2

2.5.1 Proposed Production

Total production proposed will be 15165.6 Cum of road metal. Details are given below.

YEARWISE PRODUCTION						
YEAR	SECTION CONSIDERED	X-SECTIONAL AREA (m ²)	LENGTH OF INFLUENCE (m)	VOL. OF EXCAVATED ROCK MASS (RoM) (m ³)	VOL. OF WASTE ROCK MASS (m ³)	VOL. OF USUABLE ROCK MASS (m ³)
		A	L	R = A x L	R x 0.2	R x 0.8
2022-23	A-A'	57	66.5	3790.5	758.1	3032.4
2023-24	A-A'	57	66.5	3790.5	758.1	3032.4
2024-25	A-A'	57	66.5	3790.5	758.1	3032.4
2025-26	A-A'	57	66.5	3790.5	758.1	3032.4
2026-27	B-B'	115	33	3795	759	3036
TOTAL				18957	3791.4	15165.6

2.6 Quantity of waste (Liquid and Solid) to be generated and their management / disposal

No liquid waste will be generated due to mining operation work. However 3791.4 Cum of solid waste will be generated throughout the whole lease period, which will be used for approach road development.

2.7 Water requirements and power requirements

Total of 3KLD of water is required for dust suppression and drinking purposes which will be supplied from nearby bore wells. As the mining activity will be done during day time only, hence there is no requirement of power supply.

2.7.1 Effect on ground water level due to mining operation and preventive measures

The area is situated at a height from the general ground level as the lease area is a hillock. Mining proposal given during the plan period is on the whole part of the lease. Direct surface runoff from the mined area may hardly contaminate the adjacent agricultural lands during the plan period as per the field topography.

No survey has been done on effect of mining on water table as the excavation of material during five years will be carried out much above it. By no means, the water table is going to be punctured due to mining.

2.8 Employment generation (Direct and Indirect) due to the project

The nearby areas are mostly dominated by poor people who are mostly employed in agriculture etc. due to quarrying of the lease area, there will be direct engagement of 12 personnel in the mine. Indirect engagement of the local people will be more than double.

2.9 Details of scheme of continuous reclamation and rehabilitation of the land degradation due to mining operation

During the plan period, the mined out land will be 0.408 Ha. Since the quarry is at development stage and the excavation of the road metal from the quarry area has not been completely exhausted, so proposal for reclamation of the mined out land will not be provided at this stage. However, plantation has been suggested over an area of 0.327 Ha during plan period as a reclamation measure. The land use pattern has been given below.

Sl. No.	Type of Land Use	In Ha.
1	Area under Excavation	0.408
2	Area under safety zone / plantation	0.327
3	Area of the temporary dump	0.001
4	Unused land	0.235
Total		0.971 Ha.

2.10 Mine Closure Plan

Since the mining activities in the present quarry are envisaged to be continued only for a period of 5 years, the mine closure plan is submitted in the approved mining plan. After the end of the concession period, the quarry will be converted into water reservoir with barbed fencing arranged.

Chapter – 3

ANTICIPATED ENVIRONMENT IMPACT AND ITS MITIGATIVE MEASURES

3.1 Environment scenario

The environmental parameters are likely to be affected by mining are related to many factors i.e. physical, social, economic, agriculture and aesthetic. Opencast mining involves Drilling, loading and transportation of ore and generated wastes. The excavated road metal will be transported via trucks and tippers to the nearby crushers. The operation may disturb the environment in different ways, such as removal of mass, change of land scape, flora and fauna of the area, surface drainage and change in air, water and soil quality. While the purpose of development and economic upliftment of the people, there is need for establishment of mining industries, but these should be environment friendly. Therefore it is essential to assess the impacts of mining on different environmental parameters, before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area. The likely impacts on different parameters due to mining project are discussed below.

3.2 Environment impacts during construction phase and mitigation measures

There will be no impacts as no construction stage is envisaged in this project.

3.3 Environmental impacts during operation phase and mitigation measures

Some of the impacts identified in various phases of the operation are insignificant and marginal and don't warrant much attention whereas some others are important especially with reference to present context. Therefore objective is to identify those impacts, which are significant and require a detailed analysis for discussion making or formulate adequate mitigative measures. This section deals with an assessment of impact of various mining activities on the existing environmental conditions. The methodology of assessment is based upon identification and description of the project activities as well as environmental components followed by evaluating the impact of mining and associated activities on the environment. The environmental components that are likely to be influenced or modified by the continuation of project activities are :

1. Air Environment
2. Noise Environment

3. Water Environment
4. Soil Environment
5. Land Use
6. Geology
7. Biological Environment
8. Socio – Economic Environment
9. Solid Waste / Overburden
10. Occupational Health And Safety

3.3.1 Impact on ambient air quality and mitigation measures

The opencast mining operation are generally prone to generation of high levels of particulate matters PM₁₀ and to a limited extent of Sulphur dioxide (SO₂) and Nitros Oxide (NO_x) due to fossil fuel based vehicles and machines. Air pollution mainly due to PM₁₀, SO₂, NO_x, may result in irritation and inflammation in eyes and congestion of throat and infection of lungs. The respirable dust has serious impacts on the health of the workers. Lung functions are impaired due to both the respirable and non-respirable dust particles. Chronic exposure leads to respiratory illness like asthma, emphysema, severe dyspnoea and bronchitis in extreme cases pneumoconiosis or the black lung diseases of the miners. The major contribution of air pollution is by excavation, loading and transportation, which will lead to monumetary rise of the above particles. The dust liberated in mining and other related operations is injurious to health if inhaled in sufficient quantity.

The existing ambient air quality will be monitored in regular basis using monitoring stations. The ambient air quality monitoring station has been shown in the approved mining plan. The proposed mine development will be undertaken in environment friendly manner as per stipulated guidelines, activity specific control factors are considered in calculation the emission rates.

Mitigative measures for control of air pollution

The present air quality measurements in the mine area is well within the limits. Due to the proposed production, there will be marginal increase in dust concentration.

Mitigative measures suggested for air pollution control are based on the baseline ambient air quality monitoring data. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that air quality should be monitored on a regular basis as per the standards prescribed by CPCB and in cases of non-compliance appropriate mitigative measures shall be adopted.

The environmental control measures which will be implemented to control the fugitive dust released from the proposed production are given below.

- ✓ Water sprinkling will done before loading by making it moist.

- ✓ Water sprinkling during transportation over approach roads will be done for suppression of dust.
- ✓ Regular maintenance of machinery will be carried out.
- ✓ Overloading will be prevented.
- ✓ Tippers, tractors and Hyvas will be covered in tarpaulin covers.
- ✓ Vehicles with proper pollution clearance certificate from the concerned authorities will be used.
- ✓ Speed of the vehicles will be restricted to 10 KM/Hr to control the fugitive dust emission from the roads.
- ✓ Supply of dust mask and spectacles will be done for mine workers.
- ✓ Plantation will be carried out in the lease area. Apart from that if required, avenue plantation with proper permission from concerned authorities will be carried out at the approach road and vicinity area in village roads.
- ✓ Regular maintenance of the haul roads will be done by removing accumulated loose materials.
- ✓ Periodic air quality monitoring will be done and adequate measures will be taken at the high pollution potential areas.

Conclusion

In this mining project the source of emission of air pollution is drilling, excavation, transportation, loading, hauling operation and handling of stone etc. The proposed mining operations are not anticipated to raise the concentration of the pollutants beyond prescribed limits. However, the measures are suggested to mitigate any harmful impacts of the pollutants.

3.3.2 Impact on Noise environment and mitigative measures

Noise will be produced in the lease area due to movements of vehicles and operation of the machineries. The following are the sources of noise increase in the lease area as well as the surrounding areas.

- ✓ Drilling
- ✓ Operation of HEMM
- ✓ Vehicular movement

Mitigative measures for control of noise pollution

The following steps will be taken as mitigative measures to reduce the impacts of noise pollution.

- ✓ The noise generated by the machinery will be reduced by proper lubrication of the machinery and equipment.

- ✓ Noise levels shall be maintained within prescribed limits in the working zone (for 8hr exposure)
- ✓ Limiting time exposure of workers to excessive noise.
- ✓ The provision of green barrier along the boundary will further reduce the propagation of noise level generated.
- ✓ Ear plugs and ear muffs will be provided to all the miners.
- ✓ Speed of the vehicles will be maintained at 10KM/Hr to reduce the noise level.

Conclusion

The noise generated during all the possible reasons are because of vehicular and drilling effects. Optimum measures will be carried out in order to reduce the impacts of such effects, which will be as per CPCB norms.

3.3.3 Impact on water environment and mitigative measures

Impact on Water Quality

a. Impact on surface Water

As there is no first order nala is flowing through the quarry, hence the surface water will not be affected by mining. Runoff from the mining benches or from overburden during the rainy season is mitigated by guiding the runoff through channel with check collapse in old benches. The rain water pouring on the excavated area will be diverted to the settling ponds by constructing garland drains around the proposed pit. Mine water will be allowed to properly settle in the water sump made for it and clean water only will be allowed to go into the settling ponds. There will be no outside discharge of the liquid effluent from the mine site. It is therefore apparent that, there will be very negligible impact of mining on the surface water regime.

b. Impact on ground water

Ground water pollution can take place only if the mining rejects contain toxic substances, which get leached by the precipitation water and percolate to the ground water table thus polluting it. Any nearby well or other sources of water can be rendered unfit for drinking and even for industrial use. This is not the case with this deposit as the minor mineral does not contain any harmful ingredients. Mining activity will be performed well above the water table, so it will not puncture the water table by any means.

Mitigative measures for control of Water Pollution

Adequate control measures will be adopted to check not only the wash-off from soil erosion but also uncontrolled flow of mine water. The measures to be adopted are as follows

- ✓ During monsoon period, surface runoff around the quarry and dump near the natural drains will follow the garland drains to arrest the eroded sediments, which shall pass through a series of garland drains before being discharged to the natural drainage system.
- ✓ Settling ponds will be constructed on the basis of silt loading slope of the quarry. The overburden dumps will be properly located and protected by boundary wall with deep holes and garland drain surrounding it so that the rain wash material will be arrested.
- ✓ Plantation on the safety zone will be done which will lead the reduction of washing of the loose material.
- ✓ Optimum care will be taken for containment of any toxic material if generated.

Conclusion

The ground water and the surface water will not be affected by the mining process of the said quarry. Optimum measures will be carried out in order to reduce the impacts of such effects, which will be as per CPCB norms.

3.3.4 Impact On Soil Environment And Mitigative measures

In the mining lease area, the soil cover is in thin layer. The soil from the area proposed for mining will be scrapped and will be used for reclamation purposes and afforestation purposes. No major impact on soil of the study area is envisaged due to mining activity as dust suppression will be adopted to control dust emission, no outside discharge from mining lease area.

Mitigative measures to control Soil Pollution

- ✓ Dust suppression will be done on a regular basis to control dust emission.
- ✓ The soil removed from mining area will be simultaneously utilized for reclamation purpose before shifting in to next area.

- ✓ Proper regulations will be followed to control any leakage or spill of any kind of oil.

Conclusion

The proposed project involves exposed rock material. Hence contain a very low portion of soil. However all possible measures will be undertaken if any kind of soil pollution met during the mining activity.

3.3.5 Impacts on Land use and mitigative measures

The land use pattern of the lease area will be changed permanently due to mining operation. At the end of the plan period, out of 0.971 Ha, about 0.408 Ha will be excavated. After the end of the life of the mine, the mine site will be converted into pits which may cause soil erosion, soil degradation etc. stagnant water in the open pit may cause shelter for mosquitoes and other disease causing pathogens which spread Malaria, Chickengunia, Dengue etc.

Mitigative measures

- ✓ The mined out land will be back filled and converted into water reservoir.
- ✓ Regular health check up camps will be arranged.
- ✓ In order to reduce the effects, plantation will be done at a rate of 150 samplings of suitable local species per annum.

Conclusion

The entire excavated land will be back filled and the mined out land will be converted into water reservoir.

3.3.6 Impact on Geology and mitigative measures

The geology of the proposed lease area, basically geomorphology and conversion of land use will be changed due to mining activity. Geomorphic impacts of quarrying is the removal of stone, which may result destruction of active caves and natural sink holes.

Mitigative measures

Impacts can be controlled, mitigated, kept at tolerable levels and restricted to the immediate vicinity of the aggregate operation by employing responsible operational practices.

3.3.7 Impacts on Biological Environment and Mitigative measures

The biological environment involves flora and fauna environment.

Effects on Flora

Due to mining activity, there will be no damage to the major tree species except removal of certain scrubs and bushes as the lease area is completely devoid of trees. Most of the land in the proposed site is undulating terrain with grass patches and small scrubs and bushes. As per the study of the area, there are no endangered, endemic and threatened floral species present in the area. So no adverse impacts will be envisaged on the existing floral species in the area.

Effect on Fauna

As per the study of the area, there are no endangered, endemic and threatened faunal species present. Hence there will be no impact of the faunal environment. However, refuge sites for small terrestrial Fauna such as lizards, frogs and mammal species is limited within the mining area and no significant long term impact is expected for these species due to mining activities.

Scheme of Plantation and development

Plantation will be carried out at the safety zone, side of approach road, dump site etc to control dust emission, air, water and noise pollution and improve aesthetic environment. About 750 numbers of trees will be planted during the plan period at a survival rate of 60%. The dead plants will be replaced by fresh plants to reclaim the original number. The species chosen for green belt will be fast growing with good canopy having dense leaf density. However, if required, avenue plantation will be done in free government lands with proper permission from the concerned authorities.

3.3.8 Impacts on Socio –Economic environment and mitigative measures

Critically analysing the existing environmental status of the socio-economic profile and visualizing the scenario with the project, the impacts of the project would be varied and may generate positive impacts of the mining of road metal quarry in the region that are stated below.

- ✓ The mining activity will provide direct employment to 12 persons.

- ✓ Local work force will be given first preference for employment.
- ✓ The villages and their habitants and domestic animals will not be disturbed from their settlement due to mining operation.
- ✓ Mining activities will benefit the local people due to provision of more infrastructural facilities like development of approach roads within the village area.
- ✓ Awareness programmes shall be arranged on health, hygiene and sanitation.
- ✓ Periodic health checkups will be organised by project authority for the nearby settlements, employees.

3.3.9 Impacts due to Solid Waste / Overburden

The overburden due to mining in the area will generate pile which will change the topography of the area and may divert the rain water runoff channel. Hence, as a mitigative measure, the soil will be simultaneously utilized for back filling purpose.

3.3.10 Impact on Occupational Health and Safety

The possible impacts of mining activity on health is as follows

- ✓ The mining of stone can cause the lung disease and respiratory disorder due to dust exposure.
- ✓ Hearing disorder may be resulted due to noise exposure.
- ✓ The accident at the site due to mining operation may be anticipated.

Mitigative measures

- ✓ Ear plugs, earmuffs, masks, gloves etc will be provided to the workers.
- ✓ Health checkups at a regular basis will be done.
- ✓ Awareness programmes will be committed regarding health and safety of the miners.

Mine Closure Plan

Mine closure plan is one of the most important requirements of the environment management of mining projects. The closure operation is a continuous series of activities from the commencement to decommissioning the project. Therefore progressive mine closure plan with proposed mined out land is specially included in the mining plan for the plan period of five years. The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved.

- ✓ Creation of a positive and sustainable after-use for the site acceptable to mine owners, regulatory agencies and most importantly to the community.
- ✓ Protection of the public health and safety of the surrounding habitats.

- ✓ Minimization of environmental damage.
- ✓ Conservation of valuable attributes and aesthetics.
- ✓ Counter balancing the adverse socio – economic impacts.

Chapter – 4

ENVIRONMENT MANAGEMENT PLAN AND MONITORING PLAN

The EMP has been developed with a view to bring down the levels of impacts as discussed in the last chapter. A large part of the sampling and measurement activities will be concerned with long term monitoring aimed at providing an early warning of any desirable changes or trends in the natural environment that could be associated with mining and allied activities. This is essential to determine where the changes are a response to a cycle of climatic conditions or are due to the mining or allied activities.

In particular, a monitoring strategy is required to ensure that all environmental resources, which may subjected to contamination, are kept under review. Monitoring of the individual elements of the environment is necessary. Monitoring of environmental parameters, compliances, supervision and reporting will be done through outsourcing basis. The routine monitoring programme will be implemented as per CPCB, MoEF and CC guidelines. Environmental monitoring programme will be conducted on outsource basis once in season except monsoon. The environmental monitoring of environmental parameters at site and data thus generated will be regularly furnished to the state regulatory agencies / state pollution control board at the frequency of six months.

Environmental Monitoring Programme (Parameters and Frequency)

Sl. No.	Receptor	Parameters for Monitoring	Monitoring and Reporting Frequency	Location
1	Ambient air quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x and CO	As per CPCB / MoEF & CC requirement i.e. 24 hourly monitoring for one month or twice a week in each season except monsoon season.	At project location & buffer areas.
2	Noise quality	Spot noise level recording Leq(day), Leq(night), Leq(dn)	Periodic / as per CPCB norms i.e. once in season (24 hourly)	At project site location and nearby buffer areas.
3	Water quality	As per drinking water	Once in a	At project

		standards	season except monsoon	location & buffer areas.
4	Soil quality	Analyzed as CPCB method	Once in a season except monsoon	One location in core area.
5	Health	Total health parameters	Initial medical examination and periodic medical examination once in five years	All employees.

4.1 Monitoring of Ambient Air Quality

The concentration of air bourn pollutants in the workspace / work zone environment will be monitored periodically. If concentrations higher than threshold limit values will be observed. The source of fugitive emissions will be identified and necessary measures will be taken as detailed in EMP.

The ground level concentrations of PM₁₀, PM_{2.5}, NO_x and CO in the ambient air will be monitored at regular intervals except monsoon. Monitoring locations will be decided on the meteorology of the area, topography potential of receptors in the core and buffer area locations. Any abnormal rise will be investigated to detect the cause. Greenbelt will be developed for minimizing dust propagation.

4.2 Monitoring of Ground water and Surface water Quality

The monitoring of the groundwater is the most important tool to find out the depletion in the level of the water table. Water table will be monitored at regular interval to check the behaviour pattern of the water table. It is suggested to collect water samples and analyze. Records of analysis will be maintained.

In order to monitor the surface water quality, Samples will be collected from well mixed section of the river (main stream) and will be analyzed. The objective is to collect the water samples in upstream and downstream of nearby rivers and analysed physical, chemical and biological parameters to study the seasonal variation of water quality except monsoon.

4.3 Monitoring of Noise Quality

Potential receptors of noise levels in the core and buffer areas are identified based on the present noise levels and proposed increment. Noise levels in the work zone environment shall be monitored. The frequency will be once in three months (one season)

in the work zone. Noise monitoring will be conducted in three seasons except monsoon with monitoring frequencies once in a season carried on hourly basis for 24 hrs representing site, human settlements, close to high ways, commercial and residential areas and for the industrial area (if any). Similarly, ambient noise level near habitation will also be monitored once in three months. Audiometric tests will be conducted periodically for the employees working close to the high noise source.

4.4 Reporting Schedules of the Reporting Data

It is proposed that voluntary reporting of environmental performance with reference to the EMP will be undertaken. The environmental monitoring cell will co-ordinate all monitoring programmes at the site and the data thus generated will be regularly furnished to the state regulatory agencies / state pollution control board at a frequency of six months. The environmental audit reports will be prepared for the entire year of operation and will be regularly submitted to regulatory authorities.

4.5 Budgetary allocation for Environmental Management Programme

The lessee will be ultimately responsible for ensuring clean environment in and around the quarries and implement environmental protection measures. To evaluate the effectiveness of environmental management programme, regular monitoring of the important environment protection activities will be taken up. A budget as presented below will be used for implementation of EMP shall be utilized for the purpose. The details break up cost for implementing the environmental protection measures is given below.

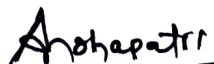
Sl. No.	Particulars	Capital cost in Rs.
1	Pollution control measures Air pollution – dust suppression, plantation in quarry lease area along approach road and maintenance	60,000
2	Noise pollution – maintenance of machinery	10,000
3	Environmental monitoring (Ambient air quality monitoring PM10, PM2.5, SO2, NOX and CO & other parameters as per regulatory norms)	10,000
4	Approach road repair	5,000
5	CSR activities	5,000
6	Miscellaneous	10,000
Total capital cost		1,00,000
Total recurring cost		25,000

Chapter – 5

CONCLUSION

Post project environmental monitoring is an essential tool in Environmental Management Programme to check environmental quality status through monitoring of environmental parameters as per frequency and method recommended by CPCB. It helps environmental planners, policy makers, managements, scientists and technologist to make amendment at the appropriate placers for clean technology and green environment. Mitigation measures are applied at the various stages, fuel technology and house keeping and waste management. Mitigation may be in form of technology up-gradation , design modification or modification in environmental policy. Environment works on cause and effect relationship. Clean technology will provide green environment. Clean mining activity will be required for sustainable growth.

The environmental monitoring cell will co-ordinate all monitoring programmes, environmental awareness programmes, training and its importance in proposed project at the site. Data generated will be furnished as per statutory requirements in CTE / CTO and the environmental conditions. The frequency of monitoring will be one month in each season except monsoon. Half yearly report will be submitted on June and January of each year to the regional office of MoEF & CC, Odisha. The environmental audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities. Objective of entire process will be for overall improvement and reduce the impact of the project / project activities on environment.


Signature of the Tahasildar
29.4.22
With seal
TAHASILDAR
KEONJHAR