

# EXECUTIVE SUMMARY

## PROJECT PROPONENTS

<b>Proponent 1</b>
<b>M/s. Globle Enterprises</b>
<b>1.44.5 Ha</b>

### **M/s. GLOBLE ENTERPRISES BLACK GRANITE CLUSTER QUARRY**

**S.F. Nos: 6/4A**

Extent – 1.44.5 Ha

Anumanthapuram Village, Denkanikottai Taluk, Krishnagiri District,  
Tamil Nadu State

**“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON FOREST LAND**  
**\* CLUSTER EXTENT =11.51.5 Ha**

**Complied as per ToR Obtained vide**

ToR - Lr.No. SEIAA-TN/F.No.9215/SEAC/TOR-1246/2022 Dated: 05.09.2022

**Project Proponent**  
**M/s. GLOBLE ENTERPRISES,**  
**Represented by – Thiru. Sudheesh Varadaraj – Managing Partner**  
Varaganapalli Village, Nagamangalam Post,  
Denkanikottai Taluk,  
Krishnagiri - 635 113.

**Environmental Consultant**



**GEO EXPLORATION AND MINING SOLUTIONS**

Old No. 260-B, New No. 17,  
Advaita Ashram Road, Alagapuram,  
Salem – 636 004, Tamil Nadu, India

Accredited for sector 1, 28 & 38 Category ‘A’  
Certificate No : NABET/EIA/1821/RA0123

Phone: 0427-2431989,

Email: ifthiahmed@gmail.com, geothangam@gmail.com

Web: [www.gemssalem.com](http://www.gemssalem.com)



**ENVIRONMENTAL LAB**

**EHS 360 LABS PRIVATE LIMITED,**

10/2 Ground floor, 50<sup>th</sup> street, 7<sup>th</sup> Avenue,  
Ashok Nagar, Chennai – 600 083.

Baseline Monitoring Period - December 2022-February 2023

**APRIL 2023**

\* Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

## 1. INTRODUCTION

Granite is the major requirements for construction and ornamental stone industries. This EIA report is prepared for M/s. Globle Enterprises applied for Black Granite Quarry in S.F.Nos. 6/4A at an extent of 1.44.5 Ha Anumanthapuram Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu. consisting of 3 (three) Proposed (including this proposal) and 1 (One) Existing Quarry with total extent of Cluster of. 11.51.5 ha. Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

This EIA report is prepared by considering Cumulative load of proposed & existing multi-colour Granite falling in the cluster situation (Three Proposed and One Existing Quarries) total extent of Cluster quarries 11.51.5 Ha the cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

Environmental Impact Assessment (EIA) study is a process, used to identify the Environmental, Social and Economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing.

This EIA Report is prepared in compliance with ToR obtained vide letter No.

- **Lr.No. SEIAA-TN/F.No.9215/SEAC/TOR-1246/2022 Dated: 05.09.2022.**

The Baseline Monitoring study has been carried out during Winter season Dec 2022 to February 2023 considering the provisions of MoEF & CC Office Memorandum Dated: 29.08.2017 and MoEF & CC Notification S.O. 996 (E) Dated: 10.04.2015.

**“Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”**

### 1.1 DETAILS OF PROJECT PROPONENT –

Name of the Project Proponent	:	M/s. Globle Enterprises Varaganapalli Village,
Address	:	Denkanikottai Taulk, Nagamangalam Post, Krishnagiri, Tamilnadu
State	:	Tamilnadu
Pin code	:	635 113
Mobile No	:	+91 9786594885

M/s.Globle Enterprises is a Partnership firm. Thiru Sudheesh Varadaraj S/o.Thiru.T.Varadaraj is the Managing partner authorized signatory on behalf of the firm.

**1.2 QUARRY DETAILS WITHIN 500 M RADIUS**

<b>PROPOSED QUARRIES</b>				
<b>CODE</b>	<b>Name of the Owner</b>	<b>S.F. Nos</b>	<b>Extent</b>	<b>Status</b>
P1	<b>M/s.Globle Enterprises</b> (Black Granite) Varaganapalli Village, Nagamangalam Post, Denkanikottai Taluk, Krishnagiri District – 635 113.	6/4A	<b>1.44.5</b>	Obtained ToR vide <b>Lr.No. SEIAA- TN/F.No.9215/SEAC/TOR- 1246/2022 Dated: 05.09.2022</b>
P2	<b>M/s.Globle Enterprises</b> (Black Granite) Varaganapalli Village, Nagamangalam Post, Denkanikottai Taluk, Krishnagiri District – 635 113.	6/4B, 7/1B(Part), 7/1C(Part), 7/2, 12/1,12/2A(Part), 13/1A1B (Part), 13/1B(Part)	3.93.50	Public Hearing Conducted on 10.08.2021
P3	<b>M/s.Globle Enterprises</b> (Multi-colour granite) Varaganapalli Village, Nagamangalam Post, Denkanikottai Taluk, Krishnagiri District – 635 113.	7/1A2,7/1C(Part), 13/1A1B(Part), & 13/1A2	2.27.5	Public Hearing Conducted on 10.08.2021
<b>Total</b>			<b>7.65.5</b>	
<b>EXISTING QUARRIES</b>				
<b>CODE</b>	<b>Name of the Owner</b>	<b>S.F. Nos</b>	<b>Extent</b>	<b>Period of Lease</b>
E1	<b>M/S.TAMIN</b>	14/1, 273/3	3.86.0	7.12.2005 to 06.12.2035
<b>Total</b>			<b>3.86.0 Ha</b>	
<b>TOTAL CLUSTER EXTENT</b>			<b>11.51.5 Ha</b>	

**TABLE 1.3 SALIENT FEATURES OF THE PROPOSED PROJECTS**

Name of the Quarry	M/s. Globle Enterprises – Black Granite quarry		
Lease period	20 years		
Mining Plan Period	5 Years		
Life of the Mine	20 years		
Existing Depth	NIL		
Previous lease particulars	It is a Patta land registered name of the company vide patta no. 1694		
Proposed Depth for five years plan period	40m (2m Topsoil + 3m Weathered Rock +35m Black Granite)		
Ultimate Depth	117m(L) x 83m (W) x 40m (D)		
Toposheet No	57 H/15		
Latitude between	12°27'34.7635" N to 12°27'39.2453" N		
Longitude between	77°50'04.8129" E to 77°50'09.9792" E		
Topography	Elevated terrain with gradient towards Northwest side. The highest elevation is 876-894m AMSL		
Machinery proposed	Jackhammer	6	
	Compressor	2	
	Hydraulic drilling machine	-	
	Hydraulic/Crawler crane	1	
	Mobile crane	-	
	Excavator	1	
	Tipper	2	
	Diesel Generator	1	
	Diamond wire saw	1	
	Water pump	-	
Water tanker	-		

Proposed manpower deployment	35
Project cost	Rs.2,32,04,000/-
EMP Cost	Rs. 3,80,800/-
CER cost	Rs. 5,00,000/-

### 1.3 STATUTORY DETAILS

- The proponent applied for Granite Quarry Lease, Dated: 20.02.2021
- Precise Area Communication Letter was issued by Additional chief Secretary to Government, Industries (MME.2) Department, Secretariat, Chennai vide G.O.No.4809/MME.2/2021-1 dated: 31.01.2022 for a period of 20 years.
- Mining plan got approved from the Director of Geology and Mining Industrial Estate Guindy, Chennai Vide Rc. No. 1338/MM4/2021, dated: 21.03.2022.
- Proponent applied for ToR to get Environmental Clearance vide online Proposal No. SIA/TN/MIN/76134/2022 Dated: 25.04.2022.
- The proposal was placed in 304th SEAC meeting held on 21.08.2022 and the committee recommended for issue of ToR.
- The proposal was considered in 549th SEIAA meeting held on 05.09.2022 and issued ToR vide Lr.No. SEIAA-TN/F.No.9215/SEAC/TOR-1246/2022 Dated: 05.09.2022

## 2. PROJECT DESCRIPTION

Proposed Quarry in Anumanthapuram Village, Denkanikottai Taluk, Krishnagiri District and Tamil Nadu State falls under Cluster Situation as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 11.51.5 ha consisting of three quarries. As the extent of cluster is more than 5 ha, the proposal falls under B1 Category as per the Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018, and requirement for EIA, EMP and Public Consultation for obtaining Environmental Clearance.

### For the project P1

- The area is fresh land, no mining activities carried out before, Topography of the area is elevated and slightly undulated terrain with gentle gradient towards North side. No major vegetation or trees within the project area, the project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarry.
- Multi-Colour Granite quarry operation will be carried out by opencast mechanized method involving Eco-friendly Diamond Wire Saw Cutting, Heavy earth moving machineries like Excavators Trucks for Granite exploitation. Shot hole drilling with controlled blasting using slurry explosives for removal of overburden and Weathered portions during initial stage of quarry operation.

## 2.1 SITE CONNECTIVITY TO THE PROJECT AREA

<b>Nearest Roadway</b>	Village approach road – East District road – 0.7Km-SW Denkanikottai major district road – 2km-NE (SH-17A)– Mathigiri –Denkanikottai road - 9Km-NW
<b>Nearest Village</b>	Anumanthapuram Village – 1 km- South
<b>Nearest Town</b>	Denkanikottai – 9 km - NW
<b>Nearest Railway Station &amp; Railway Line</b>	Kelamangalam – 18 km - N Salem – Bangalore line 18 km - N
<b>Nearest Airport</b>	Bangalore Airport – 65 km – North West
<b>Seaport</b>	Chennai 270 km North East

## 2.2 LAND USE PATTERN OF THE PROPOSED PROJECTS

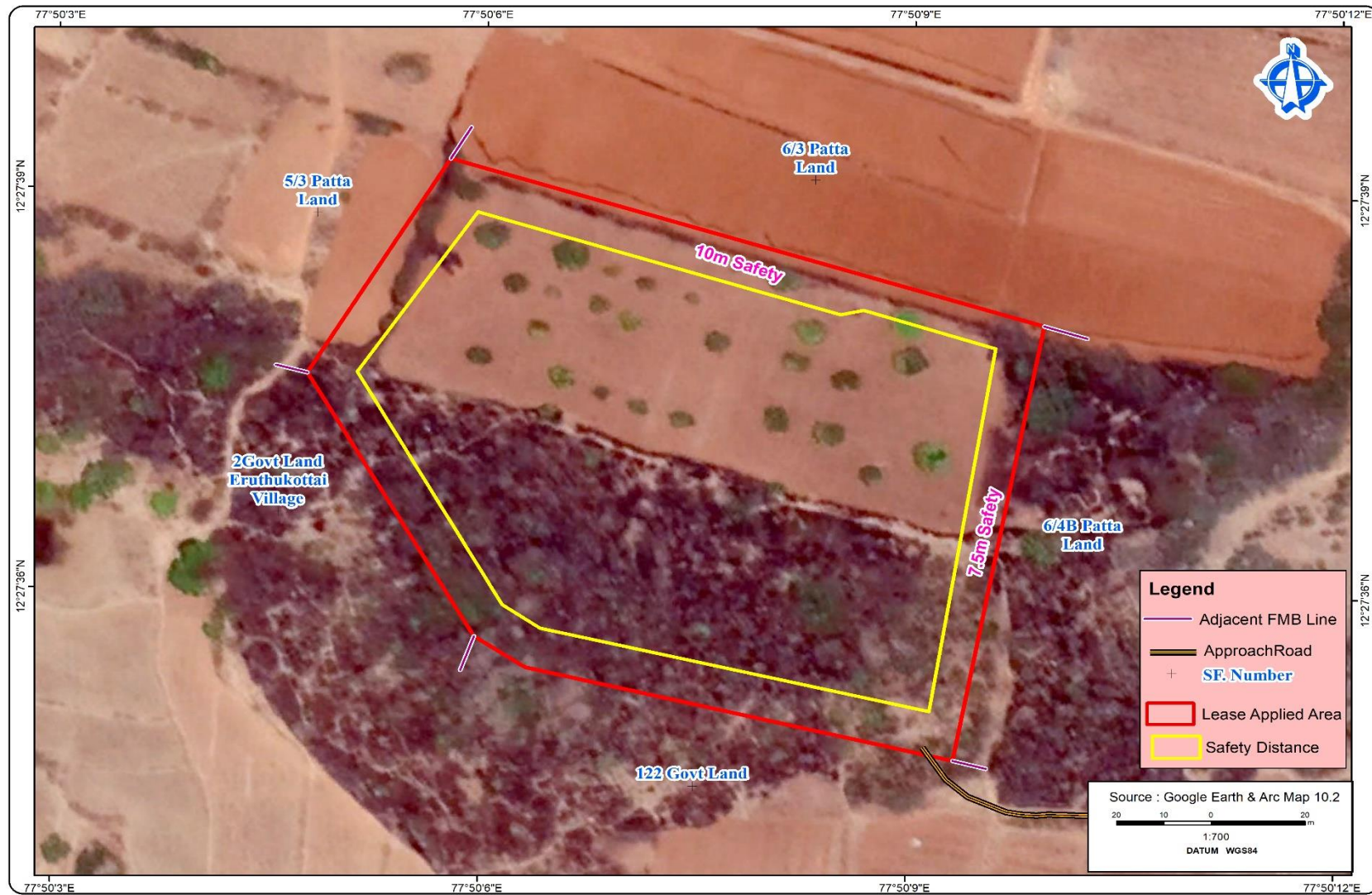
Description	Present area in Ha	Area to be required during the present plan period (ha)	Area at the end of Life of Quarry (Ha)
Area under quarry	Nil	0.62.0	0.97.3
Waste dump	Nil	0.25.0	Backfilled
Infrastructure	Nil	0.01.0	0.02.0
Roads	Nil	0.01.0	0.02.0
Green Belt	Nil	0.10.6	0.38.4
Stocking blocks	1.44.5	0.44.9	0.04.8
<b>Total</b>	<b>1.44.5</b>	<b>1.44.5</b>	<b>1.44.5</b>

## 2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

Description	Details
<b>Geological Resources ROM</b>	2,78,600
Granite Recovery (30 % in m <sup>3</sup> )	83,580
Granite Waste (70 % in m <sup>3</sup> )	1,95,020
Weathered rock(m <sup>3</sup> )	43,308
Side Burden(m <sup>3</sup> )	2,26,660
Top Soil in m <sup>3</sup>	28,872
<b>Mineable Reserves ROM</b>	69,300
Granite Recovery (30 % in m <sup>3</sup> )	20,790
Granite Waste (70 % in m <sup>3</sup> )	48,510
Weathered rock (m <sup>3</sup> )	24,129
Side Burden (m <sup>3</sup> )	39,165
Top Soil in m <sup>3</sup>	18,726
<b>Proposed Production for five years plan period ROM</b>	17,100
Granite Recovery (30% in m <sup>3</sup> )	5,130
Granite Waste (70 % in m <sup>3</sup> )	11,970
Weathered rock(m <sup>3</sup> )	14,592
Top Soil in m <sup>3</sup>	11,716
Number of Working Days	300
Production of ROM per day in five-year plan period	11
Production of Granite per day	3
Total Waste per day (Granite waste+ Weathered Rock)	18
No of Lorry Loads per day for Transportation to Granite cutting units	1
No of Lorry loads for dump	1
Number of Working Days	300 Days

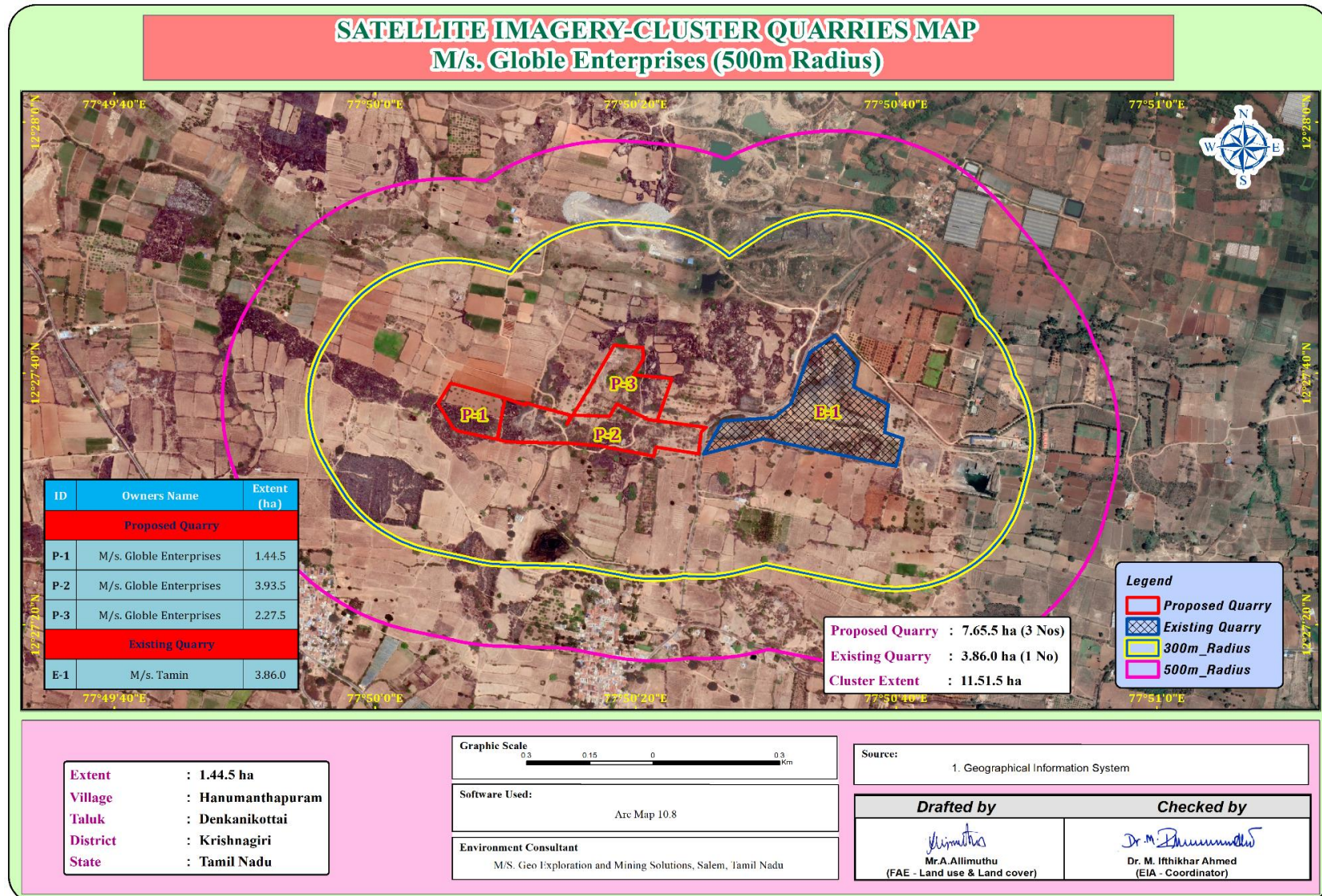


**FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA**



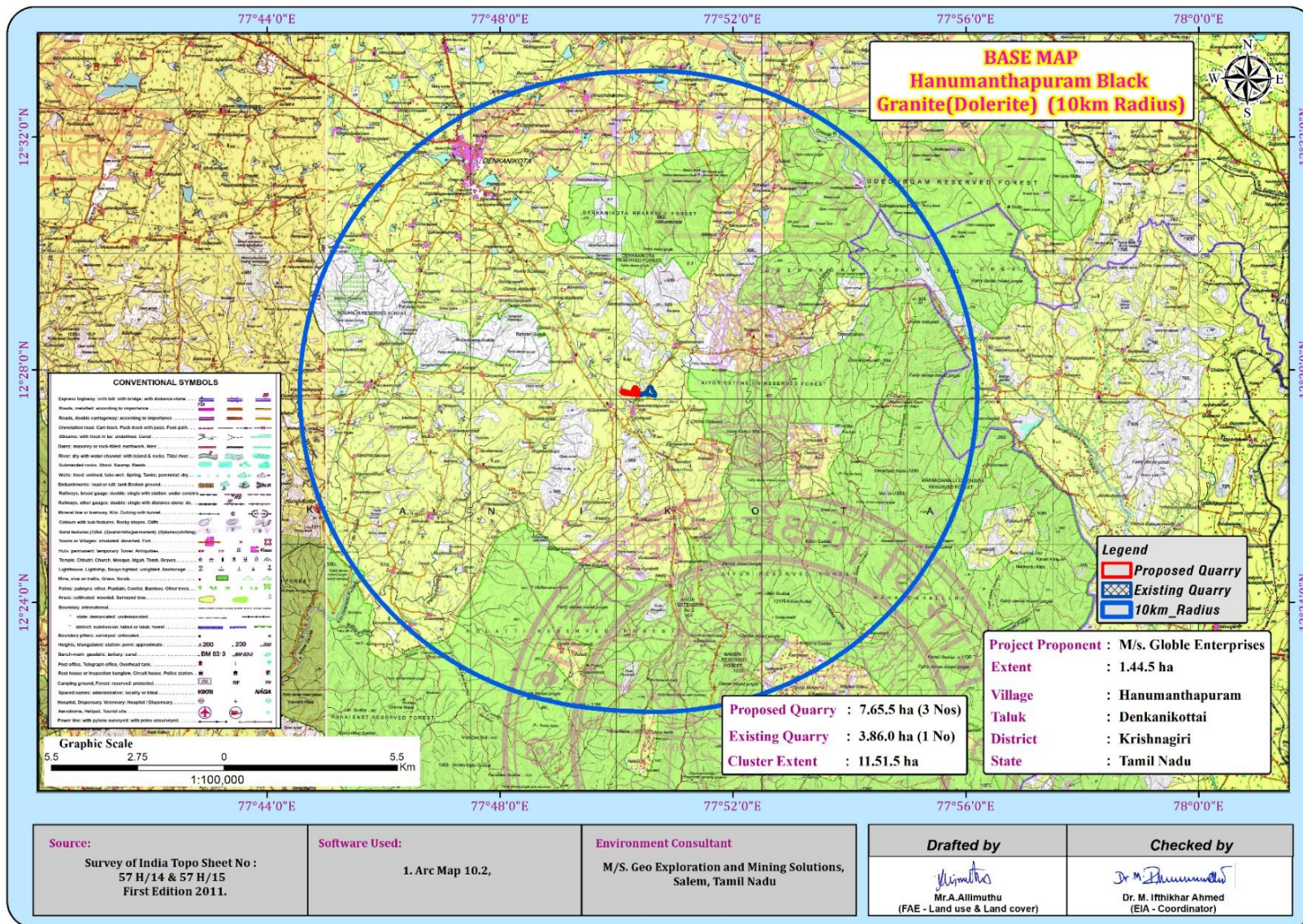


**FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)**



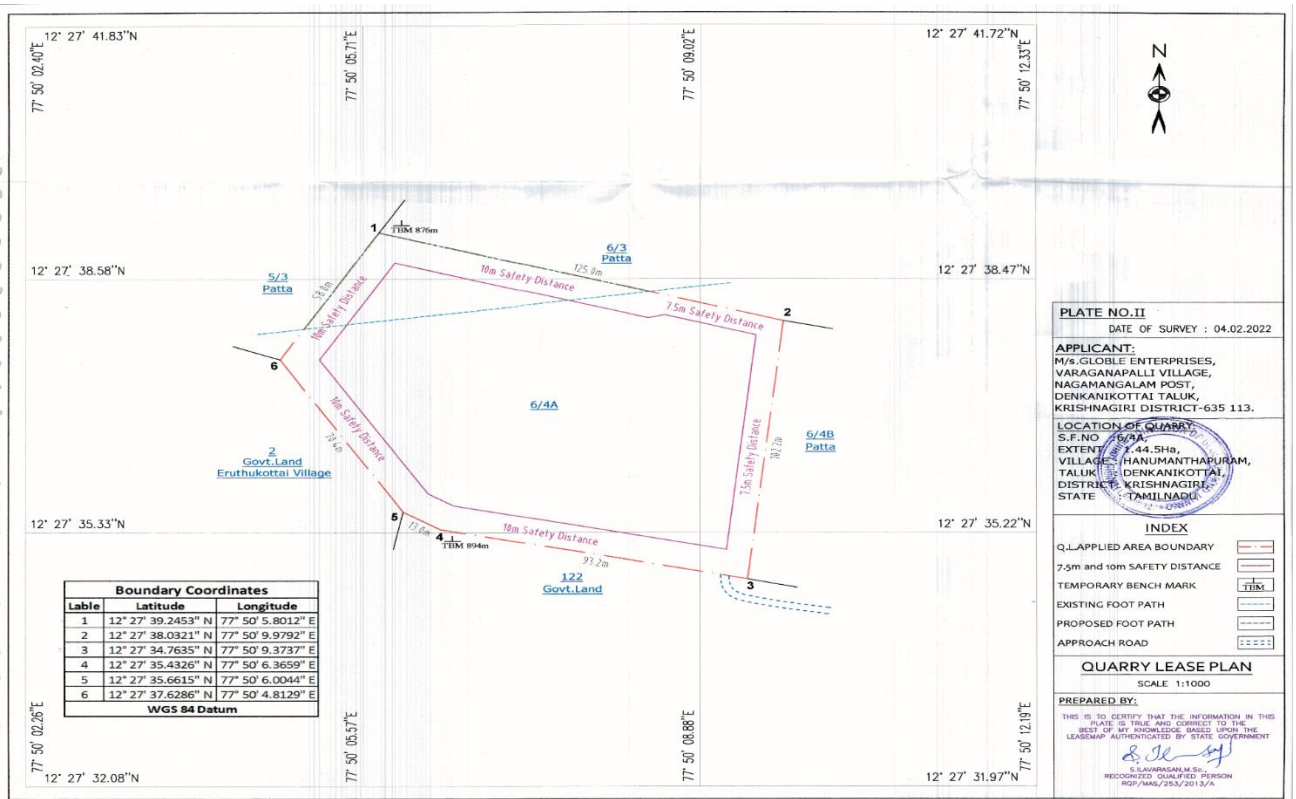


**FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS**





**FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN FOR P-1**



**FIGURE – 5: PHOTOGRAPHS OF THE PROJECT AREA**



## 2.4 METHOD OF MINING

The method of mining is Opencast mechanized method

- Eco-friendly dimensional wire saw cutting for liberation and splitting up of blocks from parent sheet rocks
- Splitting of rock body of considerable volume from the parent rock formation by carefully avoiding visibly seen defects such as patches veins, etc., is done by adopting the method of “Diamond wire cutting” along the horizontal as well as two vertical sides on the front face of the formation
- Jackhammer drilling with 32mm dia, this huge portion is further split into several blocks of required dimensions, only slurry explosives are used for secondary fragmentation and handling of waste.
- Hydraulic Excavator coupled with tippers is deployed for the formation of benches and loading
- There is no mineral processing or ore beneficiation proposed
- Proposed bench height is 5m and 5m width with 90<sup>0</sup> slope
- The waste material generated during quarrying activity includes rock fragments of different sizes, and waste chips during dressing of the blocks. The waste materials are taken in tippers and proposed to be dumped in the respective approved places ear-marked for the purpose and the same will be utilized for backfilling in the northern side of the lease area during conceptual stage.

## 2.5 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
		P1		
1	Jack hammer	6	1.2m to 6m	Compressed air
2	Compressor	2	140cfm/400psi	Diesel Drive
3	Diamond wire saw	1	20m <sup>3</sup> /day	Diesel Generator
4	Diesel Generator	1	125kva	Diesel Drive
5	Hydraulic Drilling machine	2	32	Diesel
6	Hydraulic Crane	2		Drive
7	Jet burner	-	-	Diesel
8	Crawler Crane	1	275	Generator
9	Excavator	1	275	Diesel Drive
10	Mobile Crane	-	40	Diesel Drive
11	Tipper	2	20 tonnes	Diesel Drive

## 2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- ✚ At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- ✚ After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem
- ✚ Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- ✚ The principle closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non-contaminating, and capable of sustaining an agreed post-mining land use.

## 2.7 ULTIMATE PIT DIMENSION

Length in m	Width in m	Depth in m
117	83	40

## 3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering November 2022 & February 2023 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by EHS 360 Labs Private Limited, – An accredited by ISO/IEC 17025:2017 (NABL) Laboratory.

### 3.1 ENVIRONMENT MONITORING ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM10, PM 2.5, SO2, NO2	Continuous 24 hourly samples twice a week for three months at 8 locations (2Core & 6 Buffer)
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 3 ground water and 3 surface water locations once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was



5	Noise levels	Noise levels in dB(A)	7 locations (2Core & 5 Buffer) – data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 5 locations (1 Core & 4 Buffer) during study period
7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk analysis done for the risk associated with mining.

### 3.2 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. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

**Table 3.1: Land Use / Land Cover Table 10 Km Radius**

S.No	CLASSIFICATION	AREA_HA	AREA_%
<b>BUILTUP</b>			
1	URBAN	348.60	1.03
2	RURAL	162.49	0.48
3	MINING	39.20	0.12
<b>AGRICULTURAL LAND</b>			
4	CROP LAND	14680.41	43.27
5	PLANTATION	266.92	0.79
6	FALLOW LAND	908.75	2.68
<b>FOREST</b>			
7	SCRUB FOREST	446.25	1.32
8	EVERGREEN/SEMI EVERGREEN	9651.62	28.45
9	FOREST DECIDUOUS	5454.89	16.08
<b>BARREN/WASTE LANDS</b>			
10	SCRUB LAND	1367.78	4.03
11	BARREN ROCKY	117.89	0.35

WETLANDS/ WATER BODIES			
12	WATER BODIES/LAKE	479.31	1.41
<b>TOTAL</b>		33924.12	100.00

- ⊗ The 10 km radius study area mainly comprises of crop land & Agriculture Plantation land accounting of 42.27% & 0.79% of the total study area. The study area also consists of fallow land of 2.68%.
- ⊗ Water Bodies such as ponds/ lakes comprises of 1.4% of the core and buffer area. such as Odai, Kulam comprises at 200m and 190m in E direction, Nemileri kulam 2km in NE and Jarakalatti Tank at 4km in NW direction and Panchapali dam is about 9.5km-E of the total study area.
- ⊗ The Scrub land accounts of 4%. As per the primary survey, it was observed the scrub land is mainly occupied by the stony waste and left-over domestic waste generated by the nearby areas.
- ⊗ 0.12% of the total study area is occupied by the mine industries of captive mines. The area occupied by Mainly Black granite of the total buffer area. As also observed within the primary survey, the 10 km buffer area is also occupied by the medium scaled granite and marble and small Brick kiln industries also located in the study area.
- ⊗ 1.51% of the area is covered under the human Settlement. The nearest village within the 3 km radius from the project site boundary is observed to be villages like Irudhukotai, Nemrelli, Santhanapalli and Hanumanthapuram etc.,

### 3.3 SOIL ENVIRONMENT

#### 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 0.96– 1.17 g/cc The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 45.5 – 48.8 %. And 40.5-44.7%.

#### Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.66 to 8.98
- The available Nitrogen content range between 310 to 400kg/ha
- The available Phosphorus content range between 1.21 to 2.9 kg/ha
- The available Potassium range between 24.0 to 41.2 mg/kg

Whereas, the micronutrient as zinc (Zn) and iron (Fe) were found in the range of 1.21 to 2.32 mg/kg; 2.03 to 2.75 mg/kg.

### 3.4 WATER ENVIRONMENT

The study area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

#### Surface Water

##### Ph:

The pH varied from 7.11 to 7.52 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

##### Total Dissolved Solids:

Total Dissolved Solids varied from 602 to 796 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

##### Other parameters:

Chloride varied between 160 mg/l and 210 mg/l. Nitrates varied from 7.6 to 15.2 mg/l, while sulphates varied from 65.1 to 80.4 mg/l.

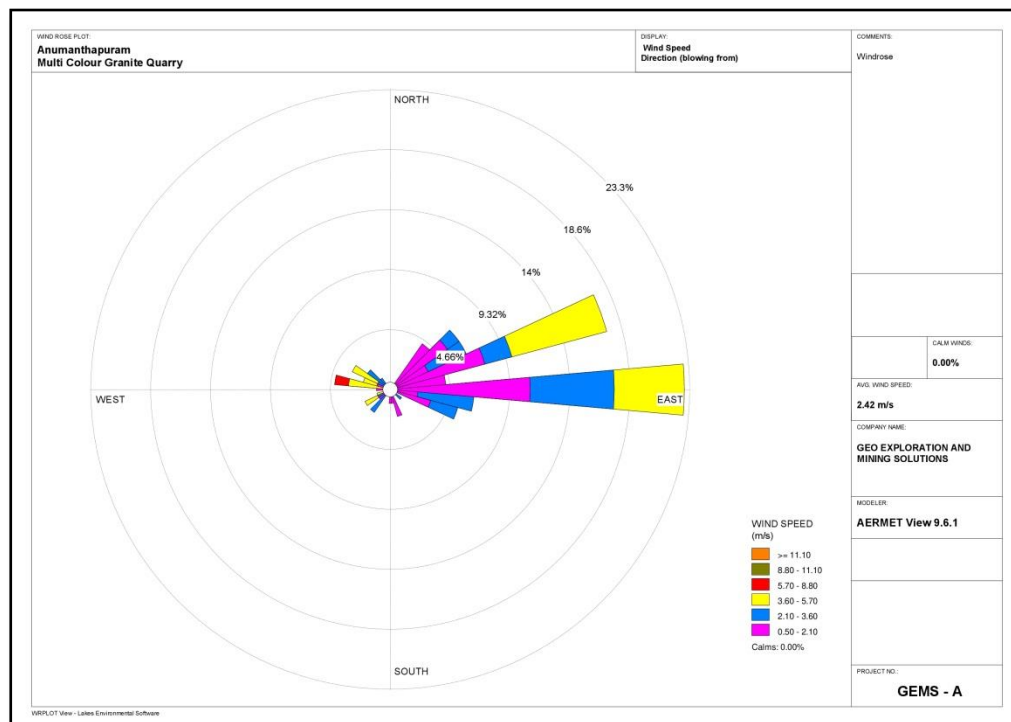
#### Ground Water

The pH of the water samples collected ranged from 7.05 to 7.99 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 465-569 mg/l in all samples. The Total hardness varied between 140.5–207.60 mg/l. On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

### 3.5 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.



**FIGURE – 10: WIND ROSE DIAGRAM**

### 3.6 SUMMARY OF AMBIENT AIR QUALITY

The results of ambient air quality monitoring for the period (December -February 2023) are presented in the report. Data has been compiled for three months.

From the above data, the concentration of main criteria pollutants has been observed that maximum concentration of PM<sub>10</sub> is 47.2 µg/m<sup>3</sup> recorded at Project area and minimum is 41.6 µg/m<sup>3</sup> recorded at Jarakalatti Village. The concentration of PM<sub>2.5</sub> varies from 20.0 – 21.2µg/m<sup>3</sup> Minimum concentration was recorded at Nemileri Village and Maximum concentration of PM<sub>2.5</sub> recorded at Project area. SO<sub>2</sub> concentration level ranged from 5.0 – 6.0 µg/m<sup>3</sup> and NO<sub>2</sub> concentration ranged from 19.5– 23.3 µg/m<sup>3</sup> in the study area. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

### 3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 41.6 – 43 dB (A) Leq and during night time were from 35.7 – 35.9 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 37.3– 41.6 dB (A) Leq and during night time were from 35.1 – 37.4 dB (A) Leq.

The values of noise observed in some of the areas are primarily owing to quarrying activities due to cluster of quarries within 500m radius, movement of vehicles and other anthropogenic activities. Noise monitoring results reveal that the maximum & minimum noise levels at day time were recorded in the range of 48.3 dB(A) Leq in core zone and 37.2

dB(A) Leq in minimum core zone area and 41.2 dB(A) in Bikkanapalli Village & 31.2 dB(A) in Marasandram Village at night time. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

### **3.8 ECOLOGICAL ENVIRONMENT**

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10 km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area.

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence this small operation over short period of time will not have any significant impact on the surrounding flora and fauna.

### **3.9 SOCIO ECONOMIC ENVIRONMENT**

It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

The socio economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day to day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed project will aim to provide preferential 70 persons to the local people there by improving the indirect employment opportunity in the area were around 100 persons in turn the social standards will improve.

## **4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

### **4.1 LAND ENVIRONMENT:**

#### **ANTICIPATED IMPACT**

The main anticipated impact on the Land Environment due to quarrying operation is change in Landscape, change in Land – use Pattern. The total area applied for quarry lease is 1.44.5 Ha, the total extent of the cluster is 11.51.5 Ha (Cluster area is calculated as per MoEF

& CC Notification – S.O. 2269 (E) Dated: 01.07.2016) including existing and proposed quarries. The proposed project area is proponent own patta land, No forest land involved in this lease applied area. The ultimate depth of the proposed project is quarrying is varying from 38m below the ground level and will not intersect the ground water table. The project is site specific.

## **MITIGATION MEASURES**

Due to the quarrying activities in the project the land use pattern will be altered. In order to minimize the adverse effects, the following control measures will be implemented:

- In the Granite quarrying operation the degradation of land is insignificant, after completion of the quarrying operation the land will be allowed to collect rain water which will act as temporary reservoir, this Granite does not produce any toxic effluents in the form of solid, liquid or gas
- The periphery of the mining lease area will be converted to a greenbelt to prevent Noise and sound propagation to the nearby lands
- Construction of garland drains all around the quarry pit 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

Barbed wire fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

## **4.2 Soil Environment**

### **Impact on Soil Environment**

There is generation of topsoil is about 18,726m<sup>3</sup> for the entire period and 11,716m<sup>3</sup> during this five-year mining plan period. The top soil will be preserved all along the safety barrier and utilized for construction of bund and afforestation purpose. The total waste to be produced during this Mining plan period is around 11,970 m<sup>3</sup> (Granite waste 70%) the same will be temporarily dump on the southwestern side with Dimensions of 117m(L) x 83m (W) x 40m (D). As and when there is accumulation of waste, the same is loaded into the tipper by loading machines and dumped in the respective places ear-marked for the purpose.

### **Mitigation measures for Soil Conservation**

- The top soil will be preserved in the safety barrier and kept in moisture condition. The preserved top soil will be utilized for greenbelt development in the safety barrier and utilized for plantation on the top bench
- Garland drains will be constructed around the project area to arrest any soil from the quarry area being carried away by the rainwater. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches

## **4.3 WATER ENVIRONMENT**

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during quarrying process. For the quarrying activity



water will be utilized for wire saw cutting (which will be recycled), water sprinkling on haul roads and greenbelt development. The quarrying activity will not intersect ground water table as ultimate depth of the quarry is 40m and water table is found at a depth of 62m summer and 57m rainy season BGL.

## MITIGATION MEASURES

The following mitigation measures are suggested for water management

The quarrying operation will be carried out well above the water table. There is no intersection of surface water bodies (Streams, Canal, Odai etc.) in the proposed project areas. During rainy season rain water will be collected in the quarry pit and later used for greenbelt development and for the water sprinkling in the haul roads. There is no proposal for discharging of quarry pit water outside the project areas. With respect to Turbidity, Total Iron and Silica, Pre-treatment methods like settling or filtration, Water Softening (Ion Exchange) shall be adopted to make it fit for drinking purposes. But it can be used for other domestic purposes

- Rainwater will be collected in sump in the mining pit 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
  - Construction of garland drains to divert surface run-off into the quarrying area
  - Retaining walls with weep hole will be constructed around the dump to arrest silt wash off
  - 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
  - Wastewater 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

The air borne particulate matter is the main air pollutant in this opencast mining. The mining operation will be carried out by jackhammer drilling (35mm dia) and Hydraulic Excavators will be utilized for excavation of Granite.

### ANTICIPATED IMPACT

The air borne particulate matter generated by quarrying operation, and transportation. The emissions of Sulphur dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of Granite and overburden, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate

Matter (PM<sub>10</sub>) affecting Ambient Air of the area. Prediction of impacts on air environment has been carried out taking into consideration proposed production of 69,300 cbm (ROM) on air environment and net increase in emissions by Open pit source modelling in AERMOD Software.

Anticipated incremental concentration due to this quarrying activity and net increase in emissions due to quarrying activities within 500 meters around the project area is predicted by Open Pit Source modelling using AERMOD Software.

## **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 check-ups, 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, 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

- ✚ None of the plants will be cut during operational phase of the mine.
- ✚ There shall be negligible air emissions or effluents from the project site. 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.

Wild life is not commonly found in the cluster area and its immediate environs because of lack of vegetal cover and surface water. Except few domestic animals, reptiles, hares and some common birds are observed in the study area.

##### MITIGATION MEASURES

The project site has a land to develop greenbelt within the lease area, along roads and other vacant areas. The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. Although, the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality by plantation services. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

- Plants that grow fast will be preferred.
- Preference for high canopy covers plants with local varieties.
- Perennial and evergreen plants will be preferred.

The development of Green Belt is an important aspect for any plant because:

- It helps in noise abatement for the surrounding area.
- It maintains the ecological balance.
- It increases the aesthetic value of site.

##### GREENBELT DEVELOPMENT PLAN

<i>Year</i>	<i>No.of trees proposed to be planted</i>	<i>Survival %</i>	<i>Area to be covered sq.m</i>	<i>Name of the species</i>	<i>No. of trees expected to be grown</i>
I	30	80%	212	Neem, Pongamia Pinnata, Mango	24
II	30	80%	212		24
III	30	80%	212		24
IV	30	80%	212		24



V	30	80%	212	Casuarina	24
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#### 4.6 SOCIO ECONOMIC ENVIRONMENT

##### ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 35 persons and indirectly will get employment around 100 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.

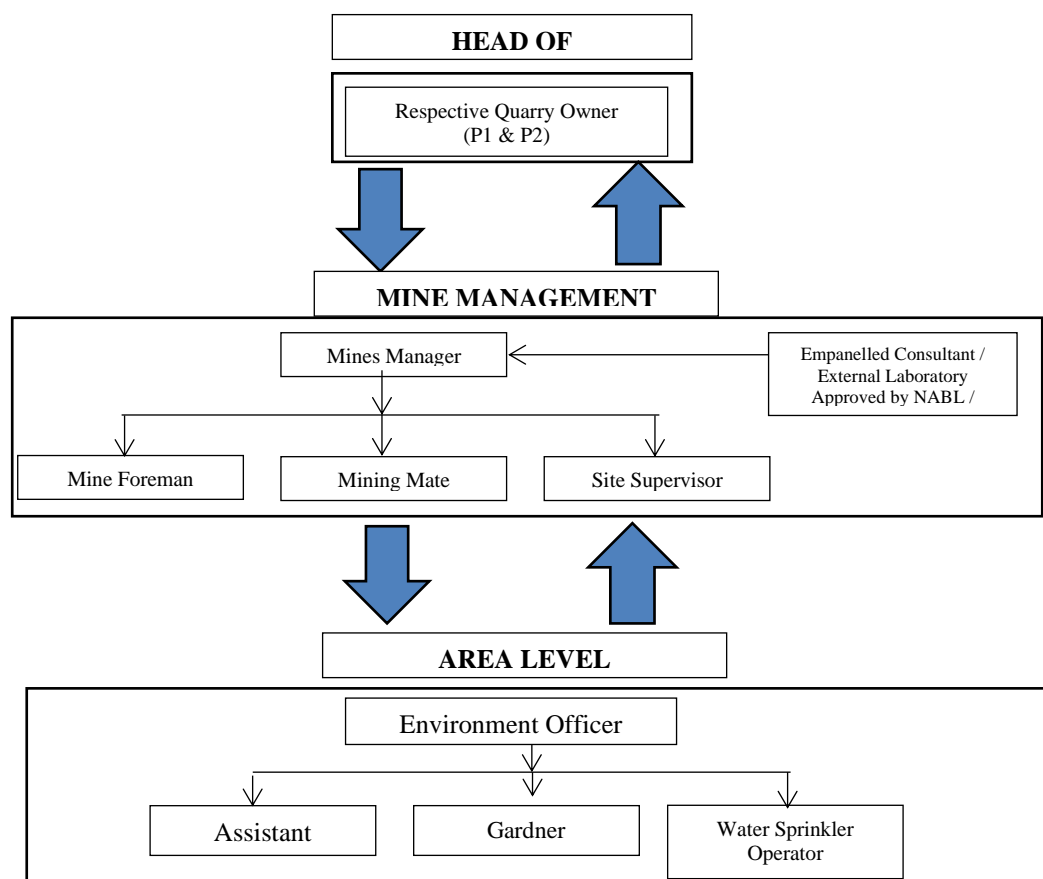
#### 6. ENVIRONMENT MONITORING PROGRAM

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

## 6.1 ENVIRONMENTAL MONITORING CELL



## 6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

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 <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
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 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
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## 7. ADDITIONAL STUDIES

### 7.1 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31<sup>st</sup> December, 2002. 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. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

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. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

### 7.2 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 achieve the following:

- ✚ Rescue and medical treatment of 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

### 7.3 CUMULATIVE IMPACT STUDY

#### CUMULATIVE PRODUCTION LOAD OF GRANITE

Quarry	Mineable Reserves ROM In m <sup>3</sup>	Mineable Reserves of Granite	Proposed production for five year period	Production of ROM Per Day	Production of Granite Per day in m <sup>3</sup>	Weathered rock per day in m <sup>3</sup>	Topsoil per day in m <sup>3</sup>	Number of Lorry loads per day (ROM)
P1	69,300	20,790	17,100	46	11	16	20	1
P2	267315	40097	11719	52	8	-		9
P3	148460	44538	20100	45	13	26	15	8
E1	284350	48158	21150	48	16	-	-	11
<b>Total</b>	<b>7,69,425</b>	<b>1,53,583</b>	<b>70,069</b>	<b>191</b>	<b>48</b>	<b>42</b>	<b>35</b>	<b>29</b>

#### PREDICTED NOISE INCREMENTAL VALUES

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	43.0	46.8	48.3	55
Habitation Near P2	43.2	48.1	49.3	
Habitation Near P3	43.7	47.2	48.8	
Habitation Near E1	43.8	47.5	49.6	

### SOCIO ECONOMIC BENEFITS FROM 3 MINES

Location code	Employment	Project Cost	CER
P1	35	2,32,04,000/-	5,00,000
P2	35	3,07,65,000/-	5,00,000
P3	35	2,85,87,500/-	5,00,000
E1	40	3,48,51,000/-	5,00,000
<b>Total</b>	<b>145</b>	<b>11,74,07,500 /-</b>	<b>20,00,000/-</b>

## 8. PROJECT BENEFITS

Black Granite Quarry of M/s. Globle Enterprises 20,790 m<sup>3</sup> of Granite @ 30% recovery (ROM 69,300m<sup>3</sup> for the entire period- Life of the mine) for Life of Mine of 20 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

- Increase in Employment Potential
- Improvement in Socio-Economic Welfare
- Improvement in Physical Infrastructure
- Improvement in Social infrastructure

## 9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring Cell discussed formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

- ✚ Monitoring of the water/ waste water quality, air quality and solid waste generated
- ✚ Analysis of the water and air samples collected through external laboratory
- ✚ Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- ✚ Co-ordination of the environment related activities within the project as well as with outside agencies
- ✚ Collection of health statistics of the workers and population of the surrounding villages
- ✚ Green belt development.
- ✚ Monitoring the progress of implementation of the environmental monitoring programme



- ✚ Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

## 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 regular monitoring and immediate rectification at site. Due to the cluster quarrying activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Prior Environmental Clearance shall be granted at the earliest.