EXECUTIVE SUMMARY

THIRU. P. VELMANI MULTI COLOUR GRANITE QUARRY

At

Singanallur & Pandiyampalayam Village, Perundurai Taluk, Erode District, Tamil Nadu State

TOTAL CLUSTER EXTENT =6.48.0 Ha

PROJECT PROPONENT

Proponent Name	S.F.No	Extent (Ha)
Thiru. P. Velmani, S/o. Palanigounder, D.No. 109, Narasingapuram Post, Nethaji Nagar, Attur Taluk, Salem District Pin code - 636 106.	S.F.Nos. 108/1, 108/2, 108/3, 108/4, 108/5, 108/6, 108/7, 108/8, 108/9, 108/10, 108/11, 108/12, 108/13, 108/14, 108/15, 108/16, 108/17 of Singanallur village and S.F.No. 614/1 of Pandiyampalayam Village	4.31.0 ha

"B1" CATEGORY – MINOR MINERAL – CLUSTER - NON-FOREST LAND-PATTA LAND-EXISTING QUARRY

Complied as per ToR Obtained vide

File No: 10565/ TO23B0108TN5334094N Dated :01/04/2024

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS
Old No. 260-B, New No. 17,
Advaitha Ashram Road, Alagapuram,
Salem – 636 004, Tamil Nadu, India
Accredited for sector 1 Category 'A',31 & 38 Category 'B'
Certificate No: NABET/EIA/2225/RA0276
Phone: 0427-2431989,
Email: ifthiahmed@gmail.com, geothangam@gmail.com
Web: www.gemssalem.com

Laboratory

GLOBAL LAB AND CONSULTANCY SERVICES
Approved by ISO:9001:2015, NABL, FSSAI, Experts in QHSE
S.F No:92/3A2, Geetha Nagar, Alagapuram Pudur, Salem-636016

Baseline Monitoring Period - Oct-Dec2023

APRIL 2024

* 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 by considering Cumulative load of all proposed & existing quarries around Thiru. P. Velmani Multi Colour Granite Quarry (Total Cluster - 6.48.0 Ha) lease at S.F.Nos. 108/1, 108/2, 108/3, 108/4, 108/5, 108/6, 108/7, 108/8, 108/9, 108/10, 108/11, 108/12, 108/13, 108/14, 108/15, 108/16, 108/17 of and 614/1 of over an extent of 4.31.0 ha in Singanallur and Pandiyampalayam Village, Perundurai Taluk, Erode District, Tamil Nadu State, consisting of 1 Proposed and 1 Existing Quarries with total extent of Cluster of 6.48.0 ha. 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. This EIA Report is prepared in compliance with ToR obtained

TABLE 1.1: TOR OBTAINED PROJECT

Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
Thiru. P. Velmani	4.31.0 ha	File No: 10565/ TO23B0108TN5334094N Dated :01/04/2024

Source: ToR Letter of the respective Proposal project proponent.

The Baseline Monitoring study has been carried out during Post monsoon season Oct2023 to Dec2023 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

PROPOSAL	
Name of the Project Proponent	**Thiru. P. Velmani Multi colour granite quarry**
Address	D.No. 109, Narasingapuram Post, Nethaji Nagar, Attur Taluk, Salem District.
Mobile	+91 98434 70959 and 85080 90389
Email	kkastones2019@gmail.com

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRY				
CODE	**Name of the Owner**	**S.F.Nos & Village**	**Extent**	**Status**
P1	Thiru. P. Velmani	108/1, 108/2, 108/3, 108/4, 108/5, 108/6, 108/7, 108/8, 108/9, 108/10, 108/11, 108/12, 108/13, 108/14, 108/15, 108/16, 108/17 of Singanallur village and S.F.No. 614/1 of Pandiyampalayam Village	4.31.0	**ToR obtained File No: 10565/ TO23B0108TN5334094N Dated :01/04/2024**
TOTAL			**4.31.0Ha**	
EXISTING QUARRY				
CODE	**Name of the Owner**	**S.F. Nos & Village**	**Extent**	**Period of Lease**
E1	Thiru.R.Rahman	607/1,	2.17.0	05.05.2021 – 04.05.2041
TOTAL			**2.17.0Ha**	
ABANDONED/LEASE EXPIRED QUARRY				
CODE	**Name of the Owner**	**S.F. Nos & Village**	**Extent**	**Status**

-	
Total Cluster Quarries Extent	**6.48.0Ha**

TABLE 1.3 SALIENT FEATURES OF THE PROPOSED PROJECT

Name of the Quarry		**Thiru.P. Velmani,**
Lease period		20 years
Mining Lease area		4.31.0 Ha
Location		108/1, 108/2, 108/3, 108/4, 108/5, 108/6, 108/7, 108/8, 108/9, 108/10, 108/11, 108/12, 108/13, 108/14, 108/15, 108/16, 108/17 of Singanallur village and S.F.No. 614/1 of Pandiyampalayam Village, Perundurai Taluk, Erode District, Tamilnadu.
Scheme of Mining Plan Period (2023-2028)		5 Years
Life of the Mine		20 years
Existing Depth		10m
Previous lease particulars		It is a Patta land
Proposed Depth for scheme of mining plan period		28.5 (2m topsoil + 3m Weathered rock + 23.5m Multi Colour granite)
Ultimate Depth		343m(L) x 107m (W) x 28.5m (D)
Toposheet No		58 E/11
Latitude between		11°22'41.74"N to 11°22'54.83"N
Longitude between		77°31'01.64"E to 77°31'07.28"E
Topography		The area is situated an undulated terrain Altitude – 253m to 257m above from MSL Slope - towards Eastern
Water table		52-47m
Machinery proposed	Jackhammer	7
	Compressor	2
	Crawler crane	1
	Excavator	2
	Tipper	2
	Diesel Generator	1
	Diamond wire saw	2

Proposed manpower deployment	39
A. Operational cost	Rs.3,23,16,000/-
B.EMP Cost	Rs. 3,80,000/-
Total Project cost	Rs.3,26,96,000
CER cost	Rs. 5,00,000/-
Nearest Habitation	610m-NW
Nearest R.F	Nagalur R.F-19km-NW
Nearest Wildlife sanctuary	Sathyamangalam Tiger Resrve-20km-NW Vellode Bird Sanctuary-19.5km-SE

Source: Approved mining plan.

1.3 STATUTORY DETAILS

SCREENING –

- Proponent applied for Multicolour Granite quarry lease Dated 07.12.2017.
- The quarry lease was granted vide G.O. (3D) No.46, Industries (MME.2) Department Dated: 15.10.2018 for a period of twenty years (Refer Annexure No.I). The quarry lease deed was executed on 16.11.2018 and the lease period is valid up to 15.11.2038.
- The mining plan was prepared in respect of Multi Colour granite quarry and the same was approved by the Commissioner, Department of Geology and Mining, Guindy, Chennai vide letter No.976/MM5/2018 dated 31.05.2018.
- The first scheme of mining for the period of 2023-2024 to 2027-2028 vide letter no R.C No.3308/MM4/2023 dated 12.05.2023.
- Proponent applied for ToR to get Environmental Clearance vide online Proposal No. SIA/TN/MIN/453275/2023 dated 24.11.2023.

SCOPING –

- The proposal was placed in 441st SEAC meeting held on 31.01.2024 and the committee recommended for issue of ToR.
- The proposal was considered in 698th SEIAA meeting held on 19.02.2024 and issued ToR vide File No: 10565/ TO23B0108TN5334094N Dated :01/04/2024

2. PROJECT DESCRIPTION

Proposed/Existing Quarry in Singanallur and Pandiyampalayam Village, Perundurai Taluk, Erode 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 6.48.0 ha consisting of two 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

- The area is Existing land, mining activities carried out before, Topography of the area is elevated and slightly undulated terrain with gentle gradient towards South Eastern 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/Existing quarry.
- 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

Nearest Roadway	NH-544- Coimbatore – Salem – 11km – SE SH-173- Erode - Thingalur – 4.5km – SE
Nearest Village	Singanallur – 1.5km-SE
Nearest Town	Perundurai- 13km - SE
Nearest Railway Station	Erode Railway Station- 23km-SE
Nearest Airport	Coimbatore Airport– 65km-SW
Seaport	Cochin 210 km SW

2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

Description	Present Area (Ha.)	Area required during this Scheme period(Ha)	Area at the end of life of quarry (Ha)
Area under Quarry	1.09.41	0.18.55	3.07.50
Waste dump	1.40.92	Nil	Backfilled
Site Services	*Nil	*Nil	*Nil
Road	0.02.00	0.01.00	0.04.00
Green Belt	Nil	0.14.20	1.05.10
Stocking Blocks	1.78.67	1.44.92	0.14.40
Total	**4.31.00**	**1.78.67**	**4.31.00**

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

Description	**Details**
Geological Resources ROM	9,76,465
Granite Recovery (30 % in m^3)	2,92,939
Granite Waste (70 % in m^3)	6,83,525
Weathered rock(m^3)	99,022
Top Soil in m^3	64,960
Mineable Reserves ROM	3,99,286
Granite Recovery (30 % in m^3)	1,19,786
Granite Waste (70 % in m^3)	2,79,500
Weathered rock (m^3)	52,912
Top Soil in m^3	37,172
Proposed Production for five years plan period ROM	59,570
Granite Recovery (30% in m^3)	17,871
Granite Waste (70 % in m^3)	41,699
Weathered rock(m^3)	4,212
Top Soil in m^3	3,648
Number of Working Days	300
Production of ROM per day in five-year plan period	40
Production of Granite per day	12
Total Waste per day (Granite waste+ Weathered Rock)	31

Source: Approved Mining Plan

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

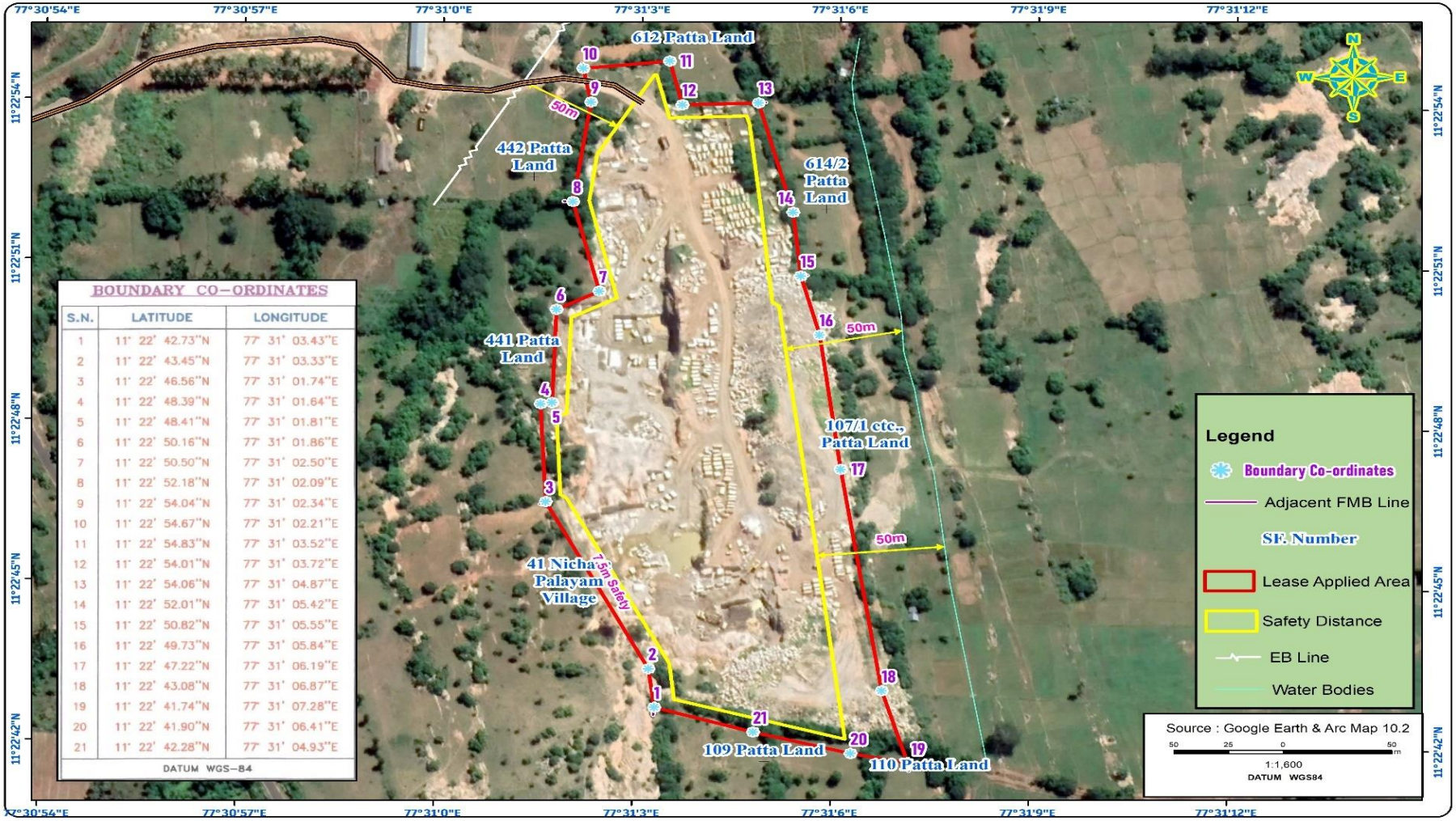
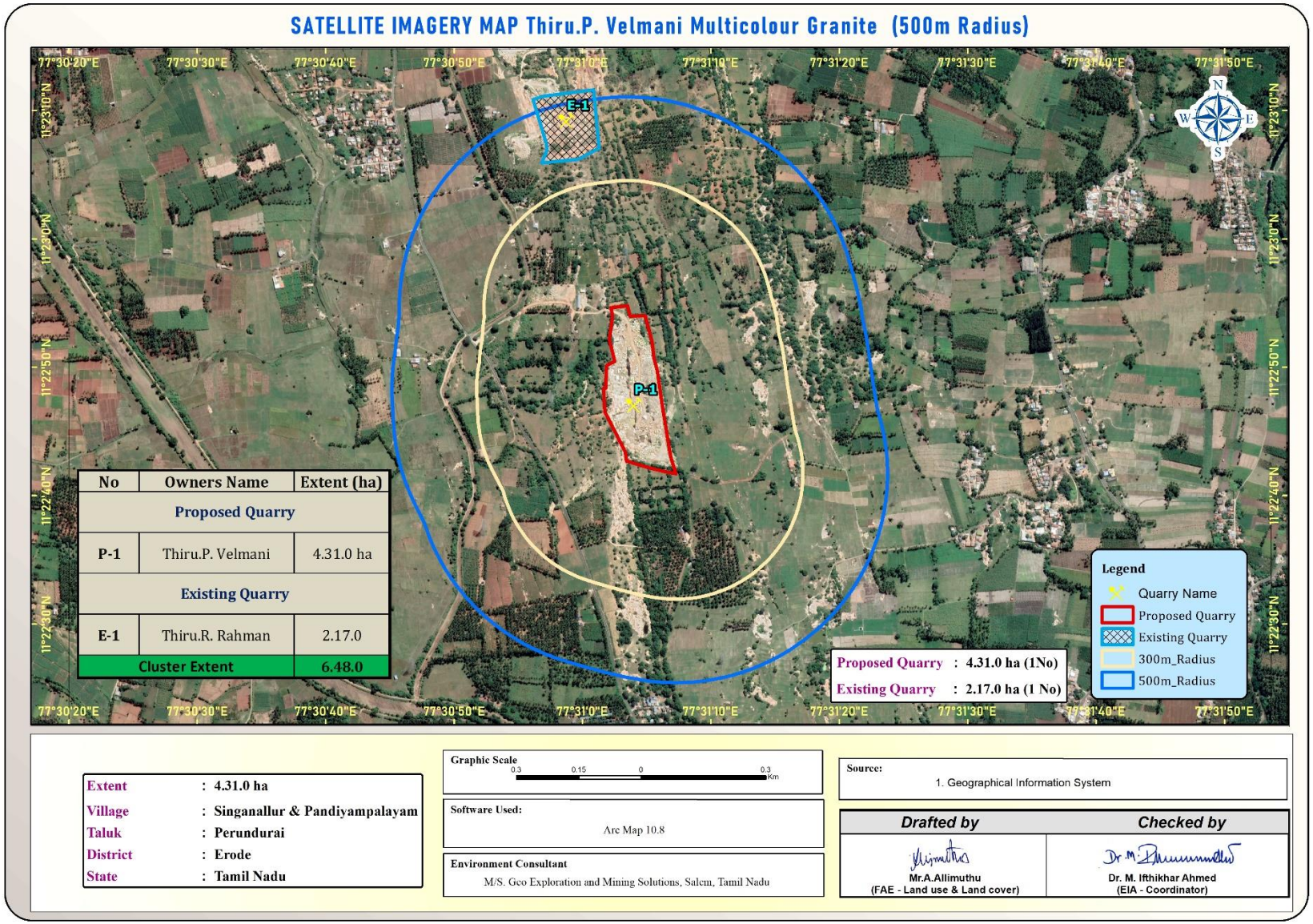


FIGURE – 3: GOOGLE IMAGE SHOWING CLUSTER (500m QUARRIES)



No	Owners Name	Extent (ha)
Proposed Quarry		
P-1	Thiru.P. Velmani	4.31.0 ha
Existing Quarry		
E-1	Thiru.R. Rahman	2.17.0
Cluster Extent		6.48.0

FIGURE – 4: TOPOSHEET MAP COVERING 10 KM RADIUS

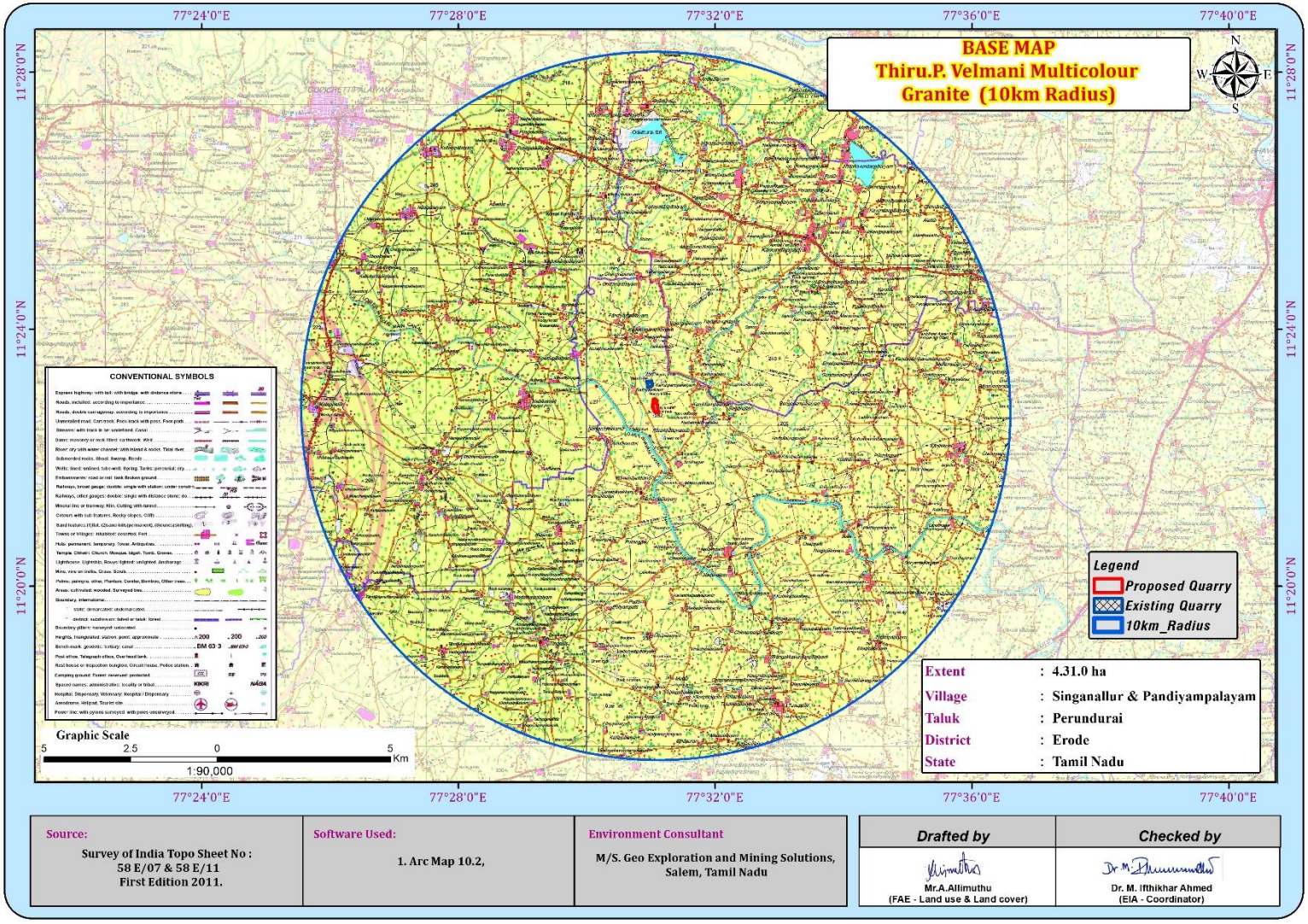


FIGURE – 5: QUARRY LEASE PLAN & SURFACE PLAN

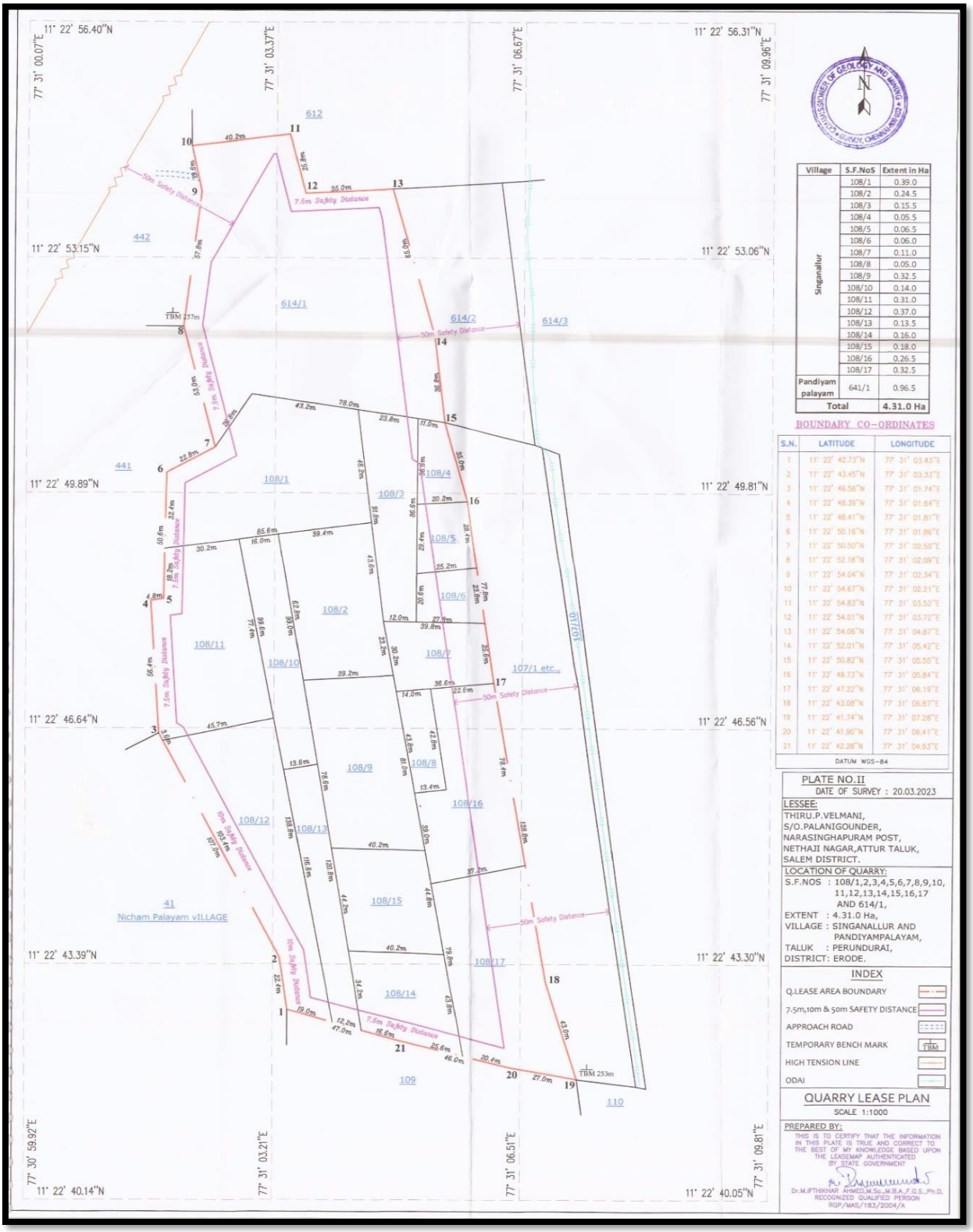


Figure 6: PHOTOGRAPHS OF THE PROJECT AREA

Figure 7: FENCING PHOTOGRAPHS

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 90^0slope
- 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

Drilling Equipment's					
Type	**No of Unit**	**Dia of Hole mm**	**Size capacity**	**Make**	**Motive Power**
Compressor	2	-	450/150 psi	Atlas Capco	Diesel Drive
Jack hammer	7	32	1.2m to 6m	Atlas Copco	Compressed air
Diesel Generator	1	-	125kva	Kirloskar	Diesel
Diamond Wire saw	2	-	20m3/day	Optima	Diesel Generator

Loading Equipment				
Type	**No of Unit**	**Capacity**	**Make**	**Motive Power**
Excavator	2	300	Tata Hitachi	Diesel Drive
Crawler Crane	1	855	Tata P&H	Diesel Drive

Haulage within the Mine & Transport Equipment				
Type	No of Unit	Capacity	Make	Motive Power
Tipper	2	20 tonnes	Tata	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**
343	107	28.5

3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering Oct 2023 & Dec2023 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by Global Lab and Consultancy Services, – An accredited by ISO/IEC 17025:2017 (NABL) Laboratory.

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio - Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data & Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (October – December 2023)	7 (1 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (1 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

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_%
	BUILTUP		
1	RURAL	2849.54	8.79
2	URBAN	107.64	0.33
3	MINING	33.79	0.10
	AGRICULTURAL LAND		
4	CROP LAND	24573.60	75.79
5	FALLOW LAND	478.76	1.48
6	PLANTATION	2486.76	7.67
	BARREN/WASTE LANDS		
7	SCRUB LAND	1093.33	3.37
8	BARREN ROCKY	98.01	0.30
	WETLANDS/ WATER BODIES		
9	WATER BODIES/LAKE	703.33	2.17
TOTAL		32424.76	100.00

Source: Bhuvan, NRSC

- The 10 km radius study area mainly comprises of crop land & Agriculture Plantation land accounting of 75.79% & 7.67% of the total study area. The study area also consists of fallow land of 1.48%.
- Water Bodies such as ponds/ lakes comprises of 2.17% of the core and buffer area.
- The Barren Rocky land occupies with 0.30% of the total study area and Scrub land is about 3.37%
- 0.10% of the total study area is occupied by the mine industries of captive mines. The area occupied by Mainly Multicolor 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.
- 9.12% 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 Pandiampalayam, Singanallur, K.Velampalayam villages 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 14.11% to 18.15%

and Bulk Density of Soils in the study area varied between 1.01– 1.08 g/cc. The Water Holding Capacity of the soil samples is found to be medium i.e., ranging from 30 – 43%.

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.83 to 8.14
- The available Nitrogen content range between 107.05 to 244.5 kg/hc
- The available Phosphorus content range between 14.7 to 16 mg/kg
- The available Potassium range between 1.0 to 1.22 meq/l
- Whereas, the micronutrient as zinc (Zn) and iron (Fe) were found in the range of 2.0 to 13.0 mg/kg; 5.50 to 24.50mg/kg.

Observation:

- The pH of the Soil indicates that the soil is Neutral and arid region and ideal for plant growth.

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 7.6 to 8.01while 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 511 to 542 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 176.6 mg/l and 190.5mg/l. Nitrates varied from BDL (DL :2.0) while sulphates varied from 37.9 to 38 mg/l.

Ground Water

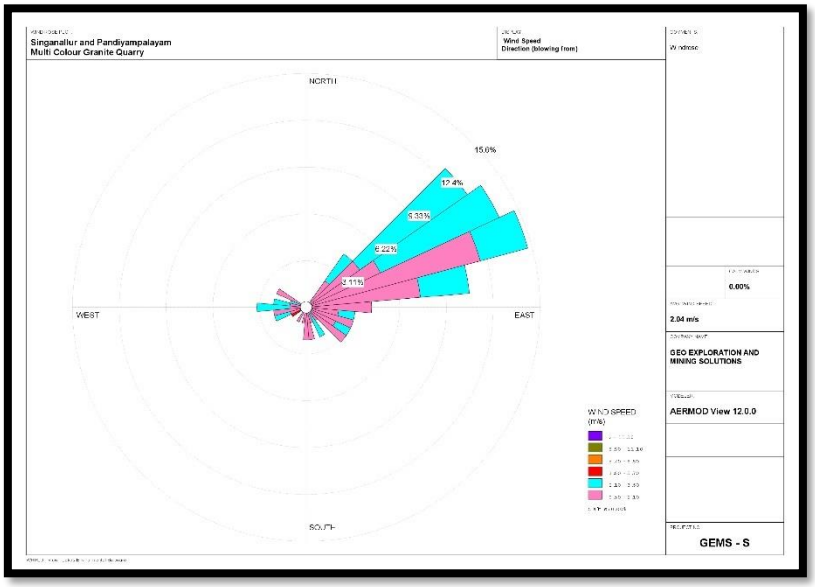
The pH of the water samples collected ranged from 7.28 to 7.80 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 454-1120mg/l in all samples. The Total hardness varied between 137.3–570mg/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 (Oct-Dec2023) are presented in the report. Data has been complied for three months.

As per monitoring data, PM_{10} ranges from 38 µg/m^3 to 44.8 µg/m^3, $PM_{2.5}$ data ranges from 16.6 µg/m^3 to 23.7 µg/m^3, SO_2 ranges from 4.1µg/m^3 to 8.8µg/m^3 and NO_2 data ranges from 17.6 µg/m^3 to 23.1 µg/m^3. 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 47.3 dB (A) Leq and during night time were from 34.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 46.3 to 48.6 dB (A) Leq and during night time were from 34.2 to 38.4 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.8 ECOLOGICAL ENVIRONMENT

There is Nagalur R.F-19km-NW, there is not found National Parks, Eco sensitive areas, wild life sanctuaries within the radius of 10km. 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 39 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 4.31.0 Ha, the total extent of the cluster is 6.48.0Ha (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 Patta Land, no forest land involved in this lease applied area. The ultimate depth of the proposed project is quarrying is varying from 28.5m 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

Erosion and Sedimentation (Removal of protective vegetation cover; Exposure of underlying soil horizons that may be less pervious, or more erodible than the surface layers; Reduced capacity of soils to absorb rainfall; Increased energy in storm-water runoff due to concentration and velocity; and Exposure of subsurface materials which are unsuitable for vegetation establishment).

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 28.5m and water table is found at a depth of 52m summer and 47m 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 (Tank, Canal, Odai etc.,) in the proposed project area. 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 judicially 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.

4.4 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_2), Oxides of Nitrogen (NOx) 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_{10}) affecting Ambient Air of the area. Prediction of impacts on air environment has been carried out taking into consideration proposed production of cluster mines 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 500meters 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

- Blasting will be carried out only to remove the overburden and weathered portion
- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Controlled blasting includes 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

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 taurpaulin
- 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 months once to assess effectiveness of mitigation measures proposed.

4.5 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 though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.6 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

Year	***No.of trees proposed to be planted***	***Survival %***	***Area to be covered sq.m***	***Name of the species***	***No. of trees expected to be grown***
I	2160	120%	Along 7.5m safety distance, panchayat road.	Neem, Pongamia Pinnata.	2590

4.7 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

From the primary Socio-economic survey & through secondary data available from established literature and census data 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area. There is no habitation within 300 m of the proposed mining lease area. Therefore, no major impact is anticipated on the nearby habitation during the entire life of the mine.

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
- Air pollution control measure will be taken to minimize the environmental impact within the core zone
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc., from this project directly and indirectly
- From above details, the quarry operations will have highly beneficial positive impact in the area

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The quarrying operation like drilling, blasting, excavation, loading & transportation are being carried out. The site has been selected based on geological investigation and exploration as below:

- Transportation facility for materials & manpower
- Overall impact on environment and mitigation feasibility
- Socio – economic background.

Enough infrastructures exists and lesser resources are required to be deployed. Since, any further construction for infrastructure is not required and hence does not affect the environment considerably. The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

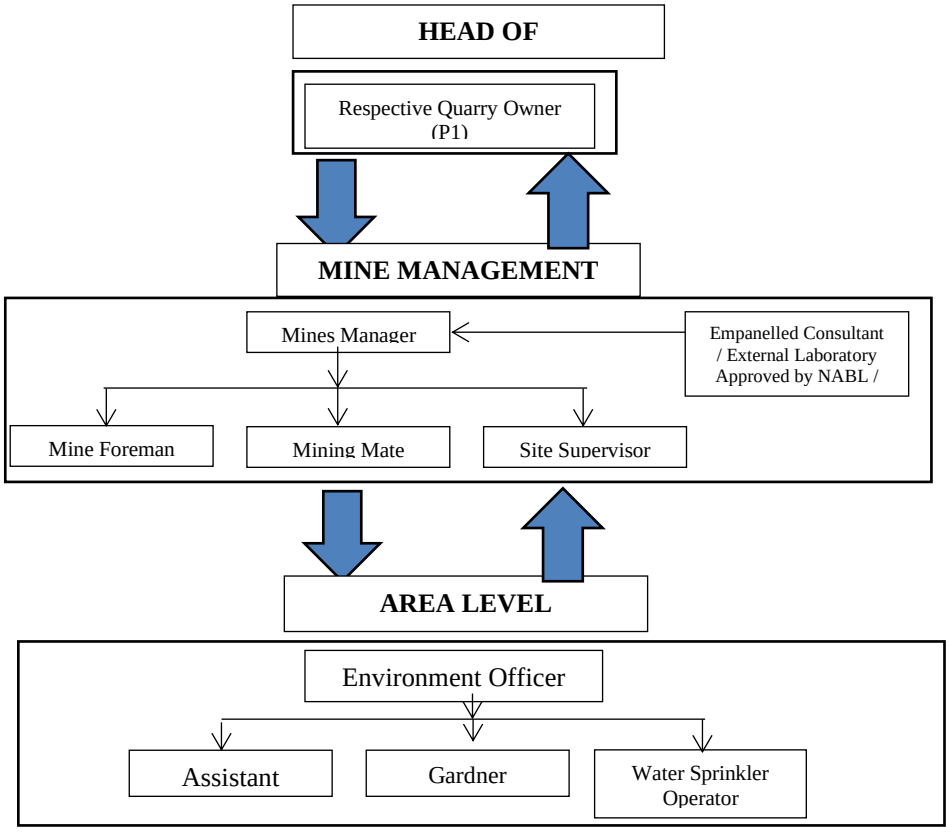
6. ENVIRONMENT MONITORING PROGRAM

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, PM2.5, PM10, SO2 and NOx.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in 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

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 31st 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^3	Mineable Reserves of Granite in m^3	Proposed production of ROM for five-year period in m^3	Production of ROM Per Day in m^3	Production of Granite Per day in m^3	Number of Lorry loads of Granite per day
P1	3,99,286	1,19,786	59,570	40	12	1
E1	-	-	10,400	7	7	1
Total	3,99,286	1,19,786	**69.970**	**47**	**19**	**2**

Source: Approved Mining Plan

SOCIO ECONOMIC BENEFITS FROM CLUSTER QUARRIES

Location code	Employment	Project Cost	CER
P1	39	Rs.3,26,96,000	Rs.5,00,000/-
E1	32	Rs. 2,51,26,000	Rs.5,00,000/-
Total	**71**	**Rs. 5,78,22,000**	**Rs.10,00,000**

8. PROJECT BENEFITS

Thiru. P. Velmani Multi Colour Granite Quarry of 17,871m^3 of Granite @ 30% recovery (ROM 59,570m^3 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
- To meet out the demand supply gap of Granite and enhance the foreign exports

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.

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