EXECUTIVE SUMMARY

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

M/S. APPLE GRANITES MULTI COLOUR GRANITE QUARRY

At

Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu

TOTAL CLUSTER EXTENT =8.29.0 HA

PROJECT LOCATION	PROPOSED PRODUCTION
299/1(P), 299/2A(P), 299/2B(P), 301(P), 302/2(P) and 302/3(P) Extent: 2.97.0 ha Kallai Village, Kulithalai Taluk, Karur District	Reserves: 38,898m^3 of ROM (Granite Recovery @ 50% is 19,449m^3) Annual Peak Production Capacity - 7,794.3m^3 of ROM Ultimate Depth = 23m BGL (2m Topsoil + 1m Weathered rock + 20m Multi Colour Granite)

Project Proponent

M/s. Apple Granites,

Thiru. R. Subburaman - Managing Director

No. 95/2, Perur Udaiyappatty,

Gudalur Village, Kulithalai Taluk,

Karur District.

Tamil Nadu – 639 120

Complied as per ToR Obtained vide

Lr No.SEIAA-TN/F.No.10261/SEAC/ToR-1562/2023 Dated:27.09.2023

Environmental Consultant	Laboratory
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	**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 2023 to Dec 2023

JANUARY 2025

1. INTRODUCTION

The project proponent M/s. Apple Granites, Multicolour Granite Quarry Extent 2.97.0Ha in S.F.No 299/1(P), 299/2A(P), 299/2B(P), 301(P), 302/2(P) and 302/3(P), Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu State.

- Proponent applied for Multicolour Granite Quarry on 04.08.2014
- Lease granted vide G.O. Number G.O(3D). NO.3 Industries (MMB.2) Department Dated 25.01.2018 for a period of 20 years (21.02.2018 to 20.02.2038).
- The Mining plan was prepared for the period of 5 Years. The Mining Plan was approved by the Commisioner of Geology and Mining Department, Guindy, Chennai vide letter Rc.No. 269/MM2/2017 Dated 21.09.2017. The Mining plan period is 2018-19 to 2022-23.
- Scheme of Quarrying approved letter Rc.No. 8445/MM2/2022 dated 11.01.2023 for a period of five years.
- The Scheme of Mining plan has been approved for the quantity of 38,898m^3 of ROM (Granite Recovery @ 50% is 19,449m^3) 3,009m^3 of Weathered Rock and 7,020m^3 of Topsoil up to the depth of 23m(2m Topsoil + 1m Weathered rock + 20m Multi Color Granite).
  As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1

Category (cluster quarries - 1 proposed quarry and 2 existing quarries forming Cluster Category {Total Extent of the Cluster is 8.29.0Ha}- Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016).

- Proponent applied for Terms of Reference vide Proposal No. SIA/TN/MIN/430899/2023, Dated:26.05.2023 and the ToR was granted vide Lr No.SEIAA-TN/F.No.l026l/SEAC/ToR-1562/2023 Dated:27.09.2023.

Based on the ToR Baseline Monitoring study has been carried out for one season (**Post Monsoon**) i.e., **Oct – Dec2023** and this EIA and EMP report is prepared for considering cumulative impacts arising out of these projects, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) to minimize those adverse impacts.

- Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound project

TABLE 1.1: TOR OBTAINED PROJECT

Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
M/s. Apple Granites	2.97.0	ToR vide Lr No. SEIAA-TN/F.No. l026l/SEAC/ToR-1562/2023 Dated:27.09.2023

Source: ToR Letter of the Proposal project proponent.

"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. Apple Granites** (Thiru. R. Subburaman - Managing Director)
Address	No. 95/2, Perur Udaiyappatty, Gudalur Village, Kulithalai Taluk, Karur District- 639 120
Mobile	+91 94430 5450
E-Mail	applegranites@yahoo.com
Aadhar No	8997 9055 5433
Status	Lease deed registered

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRY				
CODE	**Name of the Owner**	**S.F. Nos**	**Extent**	**Status**
P-1	**M/s. Apple Granites** S.F.No. 299/1, 2 Kallai Village, Kulithalai Taluk, Karur District	299/1(P), 299/2A(P), 299/2B(P), 301(P), 302/2(P) and 302/3(P)	**2.97.0Ha**	Obtained ToR vide Lr No.SEIAA-TN/F.No.l026l/SEAC/ ToR-1562/2023 Dated:27.09.2023
		Total	**2.97.0Ha**	
EXISTING QUARRIES				
E-1	M/s. V.B.S. Exports	349/part 303/2A(P) 302/1(P)	2.80.5Ha	21.02.2018 to 20.02.2038 (Last permit obtained on 21.07.2022)
E-2	Thiru. K. Sakthivel	351	2.51.5Ha	05.09.2017 to 04.09.2037 (Last permit obtained on 22.03.2022)
		Total	**5.32.0Ha**	
TOTAL CLUSTER EXTENT			**8.29.0Ha**	

TABLE 1.3 SALIENT FEATURES OF THE PROPOSED PROJECT

Name of the Quarry	M/s. Apple Granites Multi Colour Granite Quarry
SF.no	299/1(P), 299/2A(P),299/2B(P), 301(P), 302/2(P) and 302/3(P)
Extent	2.97.0Ha
Village & Taluk	Kallai Village, Kulithalai Taluk
Lease period	20 years
Scheme of Mining Plan Period	5 Years
Life of the Mine	19 years
Existing Depth	10m
Previous History and CCR	Previous Mining plan period – 2018 -19 to 2022 – 23 EC.No: Lr. No. DEIAA-DIA/TN/MIN/9629/2017-KRR/EC.No.88/201/Mines Dated: 18.01.2018 CCR Letter No: EP/12.1/2023-24/SEIAA/57/TN/913 date 28.07.2023
TNPCB Clearance details	No.F.0848KAR/RS/DEE/TNPCB/KAR/W/2022 Dated: 16.02.2022
Land use classification	It is a Patta land, Classified as Punjai and the entire land is covered by Granite boulders and sheet rock.
Previous lease particulars	It is Patta land, registered in the name of Thiru. A. Meganathan, S/o. Angathevar, Thiru.R.Sudalaimuthu, S/o. S.Ramasamy, Thiru.K.Paramasivam, S/o. Krishnasamy and Thiru.R.Subburaman, S/o.Ramasamy vide patta no.1826. The

<table>
<tr><td colspan="2"></td><td>Pattadhars has given consent letter to the company for quarrying operations for a period of 35 years</td></tr>
<tr><td colspan="2">Proposed Depth for five years plan period</td><td>23m(2m Topsoil + 1m Weathered rock + 20m Multi Colour Granite)</td></tr>
<tr><td colspan="2">Ultimate depth of Mining</td><td>23m(2m Topsoil + 1m Weathered rock + 20m Multi Colour Granite)</td></tr>
<tr><td colspan="2">Existing Pit Dimension</td><td>
<table>
<tr><th>Pit</th><th>RL</th><th>Ex Pit RL</th><th>Area in m^2</th><th>Total Depth (m)</th></tr>
<tr><td>Depth – 1</td><td>117</td><td>107</td><td>1276</td><td>10</td></tr>
<tr><td>Depth - 2</td><td>117</td><td>111</td><td>204</td><td>6</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Ultimate Pit Dimension</td><td>153m(L) x 98m (W) x 23m (D)</td></tr>
<tr><td colspan="2">Toposheet No</td><td>58-J/05</td></tr>
<tr><td colspan="2">Latitude between</td><td>10°47’26.9261’’N to 10°47’34.8130’’N</td></tr>
<tr><td colspan="2">Longitude between</td><td>78°26’54.0048’’E to 78°27’02.6395’’E</td></tr>
<tr><td colspan="2">Topography</td><td>The area is exhibits flat terrain. The gradient is gentle towards South side and altitude of the area is 116m to 122m above from MSL. The Multi-Colour granite is covered with 2.0m thickness of soil and 1m weathered rock.</td></tr>
<tr><td colspan="2">Ground water level</td><td>The water level is found to occur at a depth of 64m in summer and 59m in rainy season below from the ground level.</td></tr>
<tr><td rowspan="7">Machinery proposed</td><td>Jackhammer</td><td>4</td></tr>
<tr><td>Compressor</td><td>1</td></tr>
<tr><td>Crawler crane</td><td>1</td></tr>
<tr><td>Excavator</td><td>2</td></tr>
<tr><td>Tipper</td><td>1</td></tr>
<tr><td>Diesel Generator</td><td>1</td></tr>
<tr><td>Diamond wire saw</td><td>2</td></tr>
<tr><td colspan="2">Proposed manpower deployment</td><td>48</td></tr>
<tr><td colspan="2">Project cost</td><td>Rs.2,64,79,000/-</td></tr>
<tr><td colspan="2">CER cost</td><td>Rs. 5,00,000/-</td></tr>
<tr><td colspan="2">Nearby Water Bodies</td><td>• Tank-80m_SW
• Nallur Tank-2.5Km_NE
• Canal-2.8Km_E
• Odai-3Km_NW
• Gudalur Lake-3km_SW
• Tank-4Km_SE
• Kavalaivaari Canal-6.2Km_NE
• Kalugur Eri-7.8Km_SW</td></tr>
<tr><td colspan="2">Nearest Habitation</td><td>360 m – South</td></tr>
<tr><td colspan="2">Nearest Reserve Forest</td><td>Viramalai R.F. 10.67 Km – South West</td></tr>
<tr><td colspan="2">Nearest Wild Life Sanctuary</td><td>Kadavur Slender Loris Santuary -30km-SW</td></tr>
</table>

Source: Approved mining plan.

1.3 STATUTORY DETAILS

SCREENING

- Proponent applied for Multicolour Granite Quarry on 04.08.2014
- Lease granted vide G.O. Number G.O(3D). NO.3 Industries (MMB.2) Department Dated 25.01.2018 for a period of 20 years (21.02.2018 to 20.02.2038).
- The Mining plan was prepared for the period of 5 Years. The Mining Plan was approved by the Commissioner of Geology and Mining Department, Guindy, Chennai vide letter Rc.No. 269/MM2/2017 Dated 21.09.2017. The Mining plan period is 2018-19 to 2022-23.
- Scheme of Quarrying approved letter Rc.No. 8445/MM2/2022 dated 11.01.2023 for a period of five years.
- Proponent applied for Terms of Reference vide Proposal No.SIA/TN/MIN/430899/2023, Dated:26.05.2023

SCOPING

- The proposal was placed in 407th SEAC meeting held on 07.09.2023 and the committee recommended for issue of ToR.

- The proposal was considered in 658th SEIAA meeting held on 26.09.2023 & 27.09.2023 and issued ToR vide Lr No.SEIAA-TN/F.No.l026l/SEAC/ToR-1562/2023 Dated:27.09.2023.

2. PROJECT DESCRIPTION

Applied Proposed Quarry in Kallai Village, Kulithalai Taluk, Karur 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 8.29.0ha 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.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	NH81 - Trichy – Karur– 13.0km-NE SH-71 Musiri – Pudukkottai – 6.0km-West
Nearest Village	Kulanthaipatty – 360m - South
Nearest Town	Kulithalai- 14.0km - NE
Nearest Railway Station	Pettavaitalai Railway Station - 13.0km – NE
Nearest Airport	Trichy Airport - 29km- East
Seaport	Cuddalore-177km-NE

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 quarry (Ha)***
Area under Quarry	0.14.7	0.36.6	1.34.7
Waste dump	0.56.4	Nil	Back Filking
Infrastructure	Nil	Nil	Nil
Roads	0.01.0	0.01.0	0.03.0
Green Belt	Nil	0.42.3	0.68.5
Stocking Blocks	2.24.9	1.45.0	0.90.8
Grand Total	**2.97.0**	**2.24.9**	**2.97.0**

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

Description	**Details**
Geological Resources ROM	2,02,268
Granite Recovery (50% in m^3)	1,01,134
Granite Waste (50% in m^3)	1,01,134
Weathered rock(m^3)	25,096
Side Burden(m^3)	3,19,708
Top Soil in m^3	50,192
Mineable Reserves ROM	1,47,068
Granite Recovery (50% in m^3)	73,534
Granite Waste (50% in m^3)	73,534
Weathered rock (m^3)	12,044
Side Burden (m^3)	40,888
Top Soil in m^3	27,028
Proposed Production for five years plan period ROM	38,898
Granite Recovery (50% in m^3)	19,449
Granite Waste (50 % in m^3)	19,449
Weathered rock(m^3)	3,009
Top Soil in m^3	7,020
Number of Working Days	300
Production of ROM per day in five-year plan period	26
Production of Granite per day in m^3	13

Total Waste per day (Granite waste)	13
No of Lorry Loads per day for Transportation to Granite cutting units in m^3	1
No of Lorry loads for dump	1

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

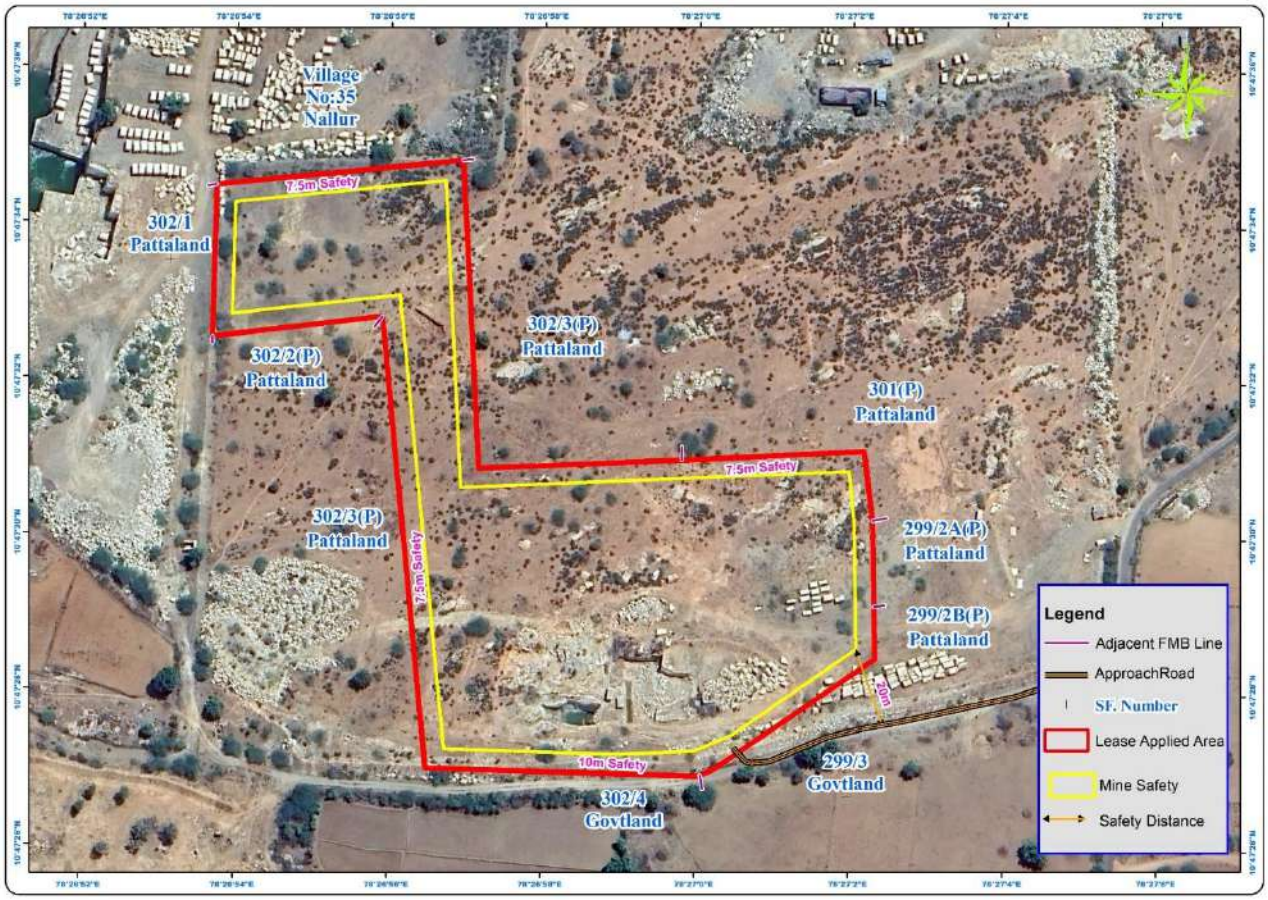


FIGURE – 3: GOOGLE IMAGE SHOWING CLUSTER (500m QUARRIES)

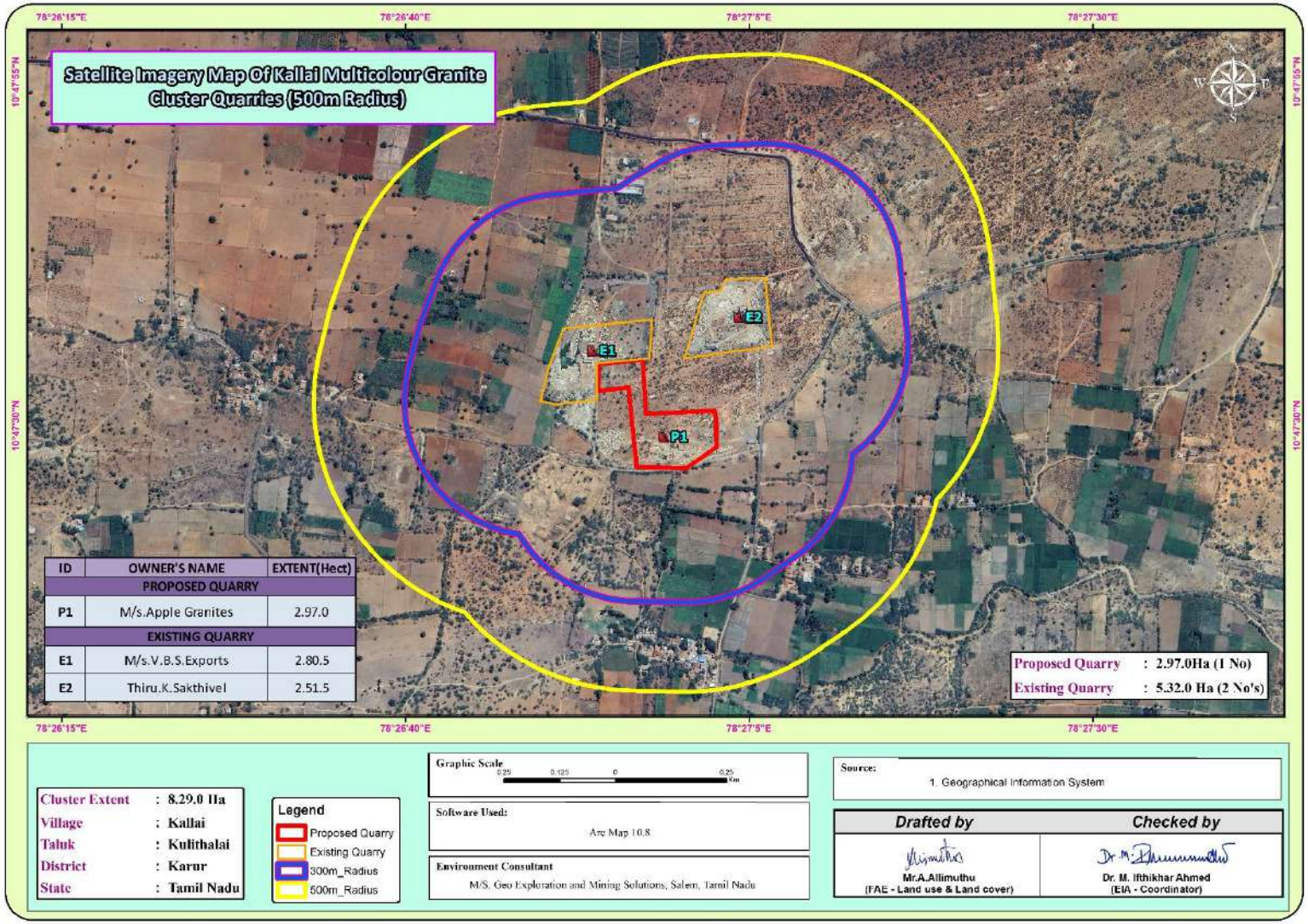


FIGURE – 4: TOPOSHEET MAP COVERING 10 KM RADIUS

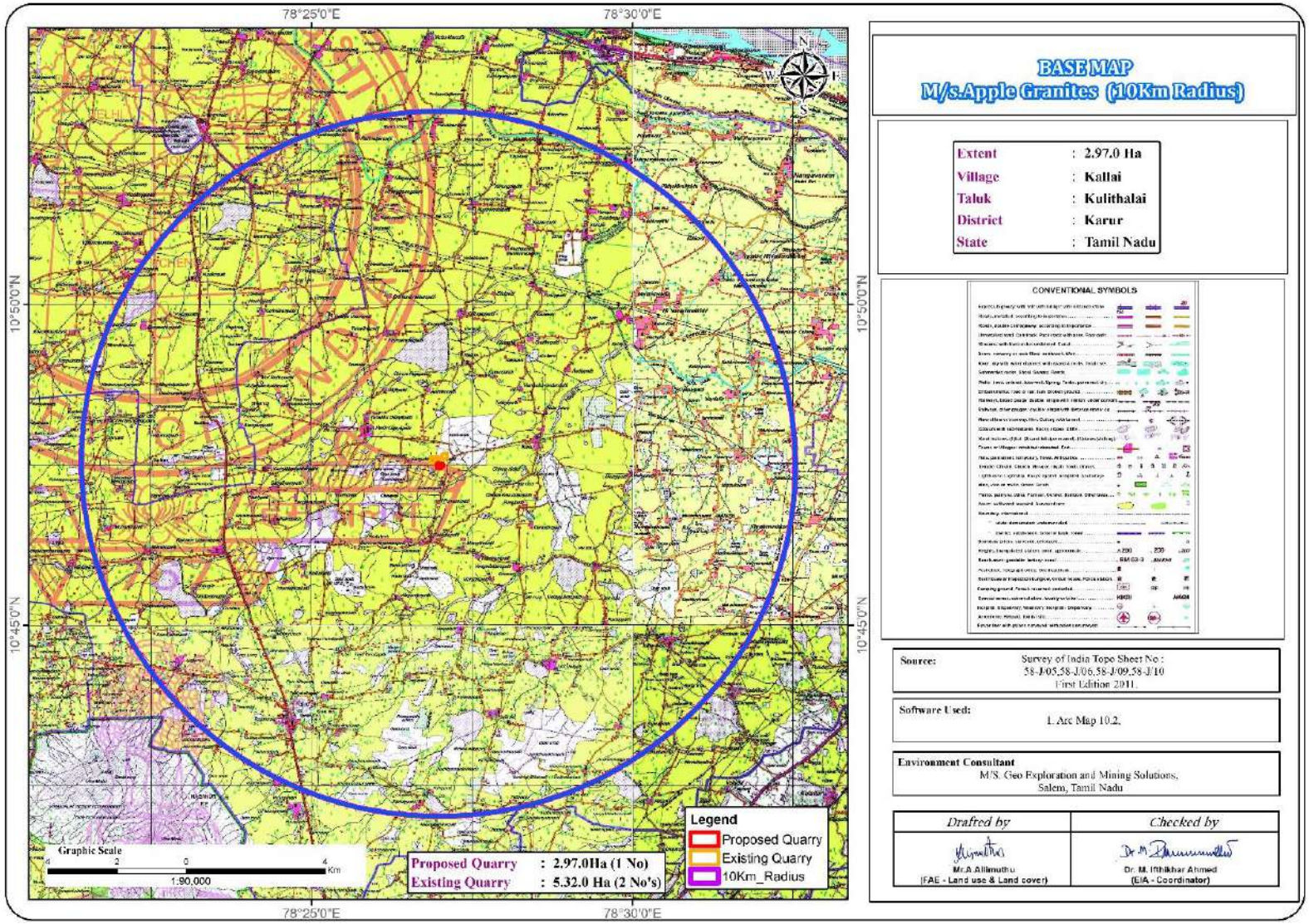


FIGURE – 5: QUARRY LEASE PLAN & SURFACE PLAN

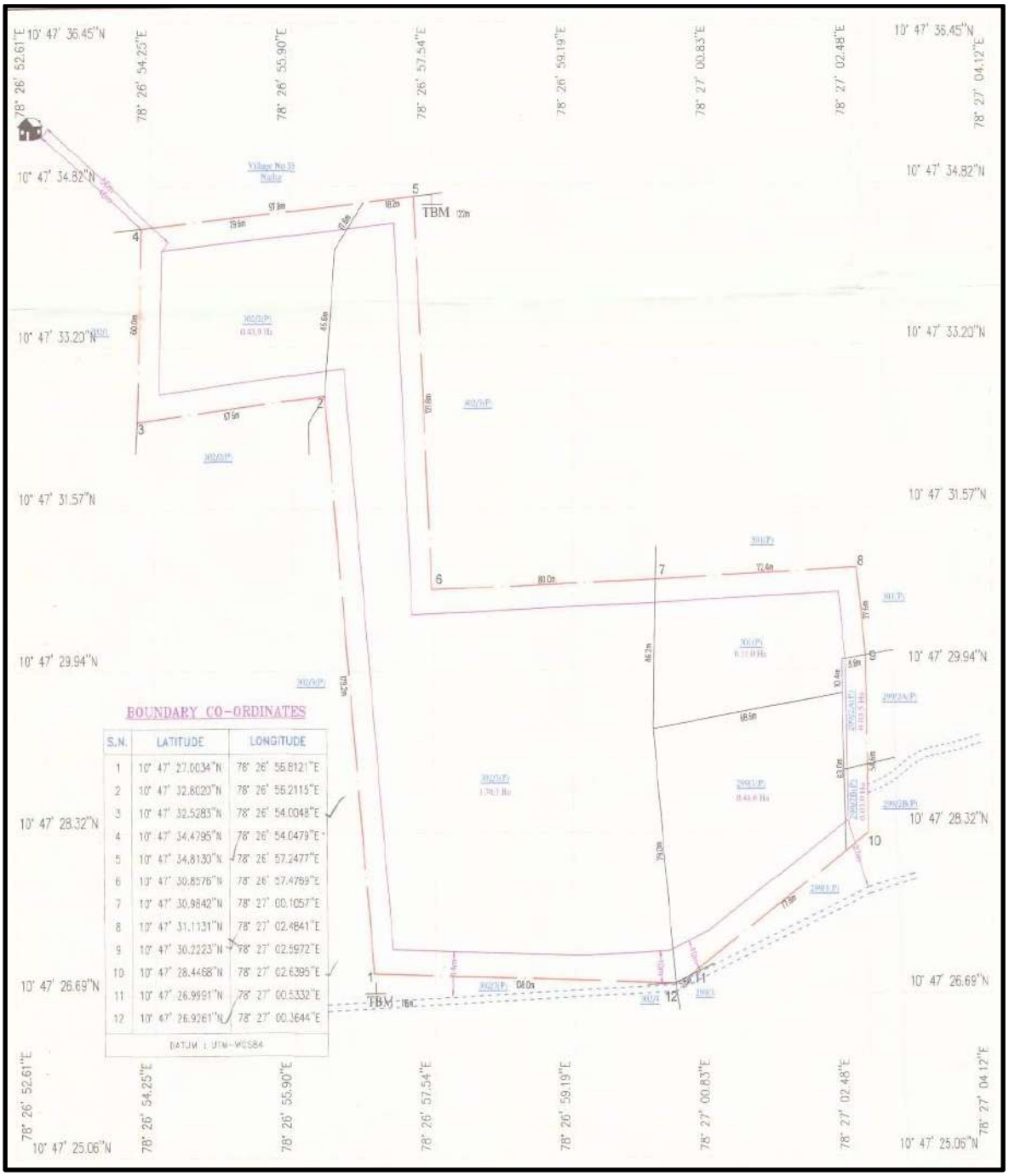


FIGURE:6 PHOTOGRAPHS OF THE PROJECT AREA

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 60^0slope
- 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.

PROPOSED MACHINERY DEPLOYMENT

Drilling Equipment's					
Type	No of Unit	Dia of Hole mm	Size capacity	Make	Motive Power
Jack Hammer	4	32	1.2m to 6m	Atlas Copco	Compressed air
Compressor	1	-	450/150psi	Atlas Copco	Diesel drive
Diamond Wire Saw	2	-	20m^3/day	Optimo	Diesel Generator
Diesel Generator	1	-	125kva	Kirloskar	Diesel

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

Haulage within the Mine & Transport Equipment				
Type	No of Unit	Capacity	Make	Motive Power
Tipper	1	20 tonnes	Tata	Diesel Drive

2.7 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.

2.8 ULTIMATE PIT DIMENSION

Length in m	Width in m	Depth in m
153	98	23

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-Dec 2023 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 & 5buffer 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 (Oct–Dec2023)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (1 core & 7 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	Urban	147.17	0.46
2	Rural	1972.69	6.11
3	Mining	156.43	0.48
AGRICULTURAL LAND			
4	Crop Land	22868.13	70.86
5	Agriculture Land	608.60	1.89
6	Fallow Land	1049.18	3.25
BARREN/WASTE LANDS			
7	Barren Rocky	43.58	0.14
8	Grazing Land	972.06	3.01
9	Scrub Land	3290.70	10.20
WETLANDS/ WATER BODIES			
10	Waterbodies	1162.09	3.60
TOTAL		32270.62	100.00

Source: Bhuvan, NRSC

- The 10 km radius study area mainly comprises of crop land & Agriculture Plantation land accounting of 70.76% & 3.17% of the total study area. The study area also consists of fallow land of 7.40%.
- Water Bodies such as ponds/ lakes comprises of 7.60% of the core and buffer area. such as Pungar stream at 2.5km and Panjapatty Lake 6.5km in S direction, Canal 4.5km- NW and Cauvery River at 7.3km -N direction of the total study area.
- The Scrub land accounts of 4.32%. 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.
- 0.49% of the total study area is occupied by the mine area. The area occupied by Mainly Multicolored 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.

- 6.73% 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 Pudupatty, Kallai, M.Pudupatty South etc.,

3.3 SOIL ENVIRONMENT

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density and water holding capacity. The soil texture found in the study area is Clay Loam Soil and Bulk Density of Soils in the study area varied between 1.13– 1.97 g/cc. The Water Holding Capacity between 42.6%-47.8%.

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.93 to 8.84
- The available Nitrogen content range between 376.32 to 464.128 kg/ha
- The available Phosphorus content range between 7.0 to 13.2 Mg/Kg
- The available Potassium range between 1.17 to 1.49 meq/l
- Whereas, the micronutrient as zinc (Zn) and iron (Fe) were found in the range of 14.97 to 23.74 mg/kg; 09.87to 40.43mg/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.

Ph:

The pH varied from 7.61 to 7.77 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 518 to 582 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 99.97 mg/l- 117.96mg/l. Nitrates varied from BDL(DL:2.0) while sulphates varied from 19.96mg/l to 30.4mg/l.

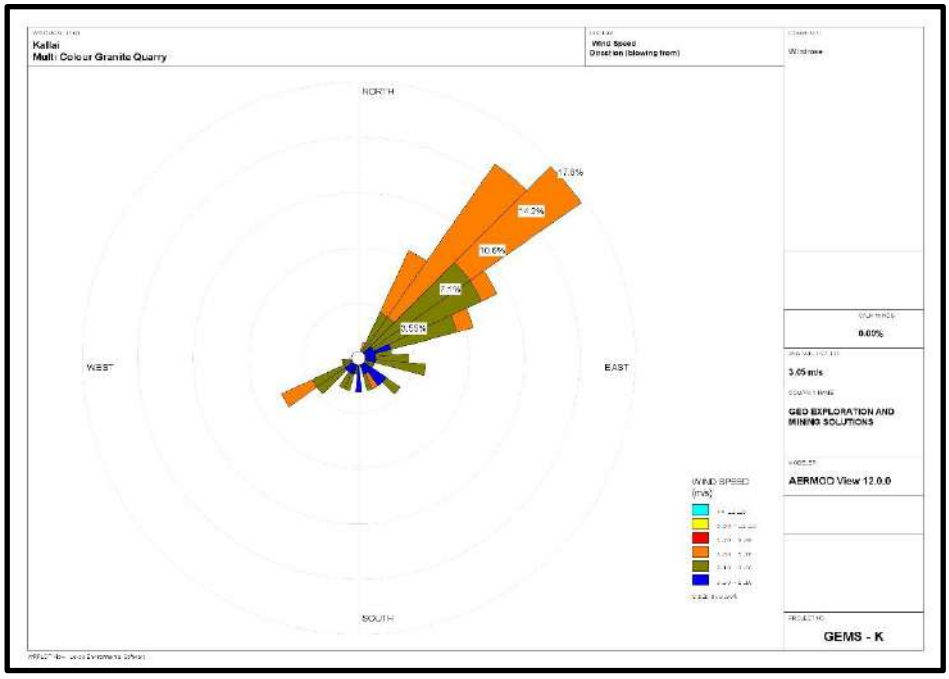
Ground Water

The pH of the water samples collected ranged from and within the acceptable limit of 6.97 to 7.22. 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. Total Dissolved Solids were found in the range of 615 to 675mg/l in all samples. Total hardness varied between 240-272mg/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 – 7: WIND ROSE DIAGRAM



3.6 SUMMARY OF AMBIENT AIR QUALITY

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

From the above datas, the concentration of main criteria pollutants has been observed in PM10 concentration varies from 40.0-41.0µg/m3 Minimum and 48µg/m3 Maximum level. The concentration of PM2.5 varies from 16.6-17.1µg/m3 Minimum and 19.1-21.2µg/m3 Maximum level. SO2 concentration level ranged from 4.0-4.4µg/m3 Minimum and 6.9-7.7µg/m3 Maximum level and NOx concentration ranged from 15.4-18.2µg/m3 Minimum and 21.9-23.8µg/m3 Maximum level. 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 and existing project area. Noise levels recorded in core zone during day time were from 45.88 dB (A) Leq and during night time were from 36.87 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 43.1– 46.6 dB (A) Leq and during night time were from 35.1 – 36.2dB (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 46.6 dB(A) Leq in Core area and 43.1 dB(A) Leg in Kulandaipatti village. Results reveal that maximum & minimum Night time is 49.6 dB(A) in Core area & 30.2 dB(A) in Kulandaipatti village at Minimum 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 48 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

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

MITIGATION MEASURES

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.,
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt.
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 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

ANTICIPATED IMPACTS

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 encountered at the depth between 59m - 64m. The maximum depth proposed out of proposed projects is 23m BGL for the entire period. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area

MITIGATION MEASURES

- 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

4.3 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_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 (ROM) on air environment and net increase in emissions by Open pit source modelling in 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.

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

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

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

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

MITIGATION MEASURES

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested conceding the area/site requirements and needed performance of specific species. The details of year wise proposed plantation program are given in Table 4.13.

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas

In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly in proposed areas falls in the cluster earmarked for plantation program as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

The objectives of the green belt cover will cover the following:

- Noise abatement
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

Impact and Mitigation Measures: The proposed project could result due to migrant workers, worker camps, induced development etc. Due to the migrant workers, there would impact on the existing infrastructure facilities in the surrounding villages. The impact of the proposed project on socio economic conditions of the study area is as follows.

Impacts		Mitigation measures
Positive	**Negative**	
It would generate employment opportunities to the local people and reduce the migrants to outside ➢ Increase of floating population. ➢ Increase in demand of services includes hotels, lodges, public transport (including taxis), etc. ➢ Economic up liftment of the area. ➢ Rapid growth of sector will result in increase of incomes in the area. ➢ Expanding of services like retail shops, banks, automobile workshops, school, health care, etc. ➢ The project would also trigger many direct and indirect benefits for economic advancement and social development of project area.	➢ There will be structural changes in occupation and alternative works will be performed. ➢ Expecting release of surreptitiously air Pollution during the operation period. ➢ Loss of cultivable lands. ➢ Increase in the cost of man power in the agriculture sector due to Industrial/Mining services wage rates. This has affected cultivation. ➢ Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.	➢To prevent the air, water and noise pollution for this implements the adequate scientific measures (treat) as per the pollution control regulatory standards. ➢Employment facilities to the local people on the priority bases to the impacted families who lost their land due to the proposed Project. ➢Periodical monitoring of the families in surrounding villages. Regular medical check-up and developing infrastructure. ➢Initiating Skill development programs for better opportunities for the educated youth. ➢ Dust and air control twice time using water sprinkler. ➢ Greenbelt will be developed in and around the project site

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.

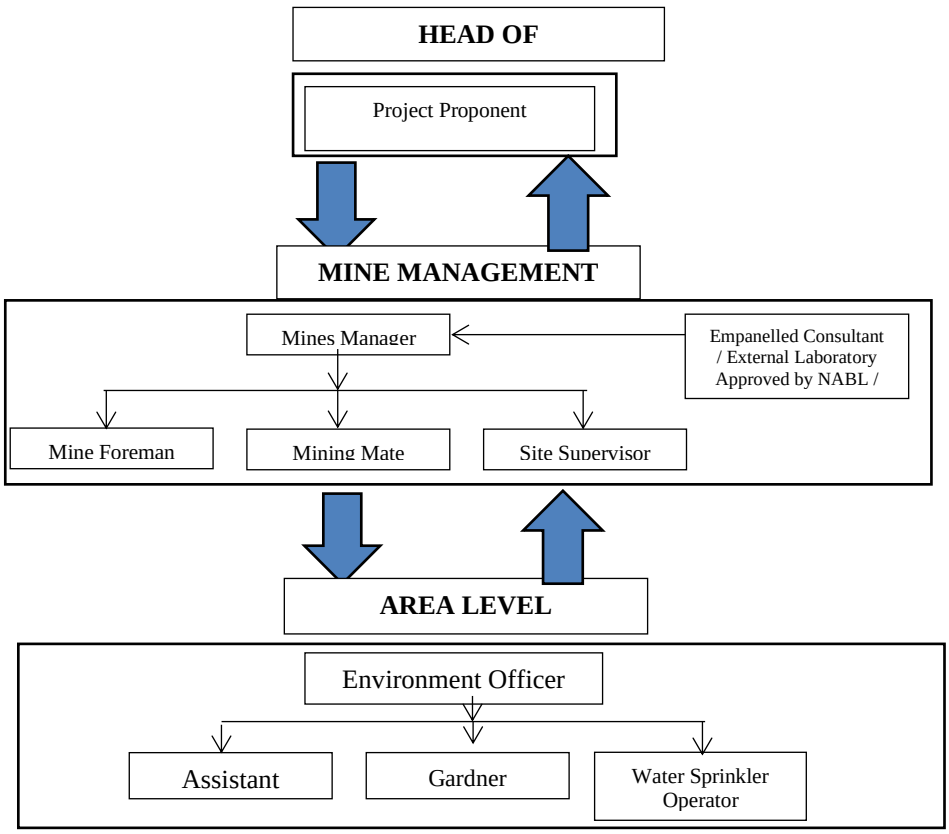
6. ENVIRONMENT MONITORING PROGRAM

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 & 1Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (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 (1Core & 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	Proposed production ROM for five-year period	Production of ROM Per Day	Proposed production Granite for five-year period	Production of Granite Per day in m^3	Weathered rock in Production m^3	Weathered rock per day in m^3	Topsoil in Production m^3	Topsoil per day in m^3	Number of Lorry loads per day (ROM)
P1	1,47,068	75,534	38,898	26	19,449	13	3,009	2	7,020	5	2
Total	**1,47,068**	**75,534**	**38,898**	**26**	**19,449**	**13**	**3,009**	**2**	**7,020**	**5**	**2**
E1	222885	100298	55135	37	24361	16	8950	6	20720	14	3
E2	224125	191078	106122	71	25138	17	17082	11	7437	5	5
Total	**447010**	**291376**	**161257**	**108**	**49499**	**33**	**26032**	**17**	**28157**	**19**	**8**
Grand Total	**594,078**	**366910**	**200155**	**134**	**68,948**	**46**	**29,041**	**19**	**35177**	**24**	**10**

Source: Scheme of Mining Plan

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	57.9	54.1	59.4	55
Habitation Near E1	-	-	-	
Habitation Near E2	47.5	39.9	48.2	

SOCIO ECONOMIC BENEFITS FROM CLUSTER QUARRIES

Location code	Employment	Project Cost	CER
P1	48	Rs.2,64,79,000/-	5,00,000/-
E1	40	Rs.2,98,45,000/-	5,00,000/-
E2	40	Rs.76,19,000/-	5,00,000/-
Total	**128**	**Rs. 6,39,43,000/-**	**15,00,000/-**

8. PROJECT BENEFITS

There is one applied proposed project for M/s. Apple Granites Multi Colour Granite Quarry village aims to Proposed production 38,898m^3 (ROM for five-year period) for Life of Mine of 20Years. 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.