

# DRAFT ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

## FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

Schedule Sl. No. 1(a) (i): Mining Project

**“B1” CATEGORY- MINOR MINERAL- CLUSTER- NONFOREST LAND-  
FRESH QUARRY**

CLUSTER EXTENT= 06.97.2Hectares

ROUGH STONE MINING PROJECT

At

**Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District,  
Tamil Nadu State**

TOR File No. 13458 and ToR Identification No. TO25B0108TN5969959N

Dated: 07.04.2026

### NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

| Name and address                                                                                                                       | Extent & S.F.No.                     | Production in m <sup>3</sup> & Tons                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Tvl. RVM Blue Metals,</b><br>S.F.No. 264/1,<br>Pudurchekkadi Village,<br>Thandarampattu Taluk,<br>Tiruvannamalai District – 606708. | 2.00.2Hect &<br>S.F.No: 51 (Part- 4) | Rough stone<br>3,04,295m <sup>3</sup> & 836811Ts<br>Topsoil<br>3448m <sup>3</sup> or 6896Ts<br>Depth- 65m<br>(45m AGL + 20m BGL) |

### ENVIRONMENTAL CONSULTANT GEO TECHNICAL MINING SOLUTIONS



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NABET ACC. NO: NABET/EIA/23-26/RA 0319

Valid till: 31.12.2026

### ENVIRONMENTAL LAB

#### ACCURACY ANALABS

**Plot No 13E, First Floor, Sathya Nagar, Sri Chelliamman Nagar,  
Dindigul Collectorate, Dindigul, Tamil Nadu, 624004.**

Baseline Study Period- December- 2025 through February 2026

MAY- 2026

## TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.13458

ToR Identification No. TO26B0108TN5969959N, dated. 07/04/2026

M/s. RVM Blue Metals Rough Stone Quarry

### 1. Seac Conditions - Site Specific

| S.No | Terms of Reference |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Remarks                                                                                                            |
|------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 1.1  | 1                  | A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: | The PP will form a CMC and submit the affidavit including these conditions during the final EIA appraisal meeting. |
|      | (i)                | Copy of the agreement forming CMC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |
|      | (ii)               | The Organization chart of the Committee with defining the role of the members                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                    |
|      | (iii)              | The 'Standard Operating Procedures' (SoP) executing the planned activities                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                    |
|      | 2                  | The PP shall ensure the installation of CCTV at the proposed quarry site and submit the photographic /video evidence during the EIA presentation.                                                                                                                                                                                                                                                                                                                                                                | The Photocopy of CCTV installation will be included in final EIA report.                                           |

### 2. SEIAA Specific Conditions:

|     |                                                                                                                                                                                                                     |                                                                                                                          |
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| 2.1 | After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing for the total production quantity of 3,04,295m <sup>3</sup> of | The proponent thanking the authorities for granting the ToR with Public Hearing. (Revised proposed production and depth) |
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|  | Rough Stone and the annual peak production shall not exceed 34,020m <sup>3</sup> of Rough Stone for the depth of 65m (45m AGL + 20m BGL). as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions & SEIAA Specific & Standard conditions. | Will undergo a combined EIA study and prepare the EMP as per the recommendations. |
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### 3. Seiaa Standard Conditions:

| S.No | Terms of Reference                  |                                                                                                                                                                                      | Remarks                                                                                                                                |
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|      | <b>Cluster Management Committee</b> |                                                                                                                                                                                      |                                                                                                                                        |
| 3.1  | 1                                   | Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.                      | A cluster management committee including all the proponents will be constituted by the proponent.                                      |
|      | 2                                   | The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc. | The members of the cluster management committee will coordinate among themselves in effective implementation of EMP.                   |
|      | 3                                   | The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.            | The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease and updated every year. |
|      | 4                                   | Detailed Operational Plan must be submitted which must include the                                                                                                                   | The detailed operational plan including cluster quarry details, blasting                                                               |

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|  |   | <p>blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.</p>                                                                                                                            | <p>frequency, haul road usage and transportation network has been provided in <b>Section 3.8 under Chapter III</b> of the EIA Report (<b>Page No. 93–96</b>). The cluster quarry configuration and surrounding quarry details within 500 m radius are presented in <b>Figure 2.3 (Page No. 10). Cluster Quarry Map</b>. The predicted ground vibration levels due to blasting operations in the proposed and nearby quarries are furnished in <b>Table 7.7</b>.</p> |
|  | 5 | <p>The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.</p>                                         | <p>The committee will frame the risk management plan including the evacuation plan in a holistic manner. However, quarrying will be stopped during the rainy conditions.</p>                                                                                                                                                                                                                                                                                        |
|  | 6 | <p>The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail in the EIA report.</p> | <p>It will be advised by the proponent to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.</p>                                                                                                                                                                          |
|  | 7 | <p>The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry</p>                                                                                                                                                                                | <p>The proper action plan regarding the restoration will be framed and followed by the committee.</p>                                                                                                                                                                                                                                                                                                                                                               |

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|  |                                            | falling under the cluster in a holistic manner.                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                     |
|  | 8                                          | The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.                                                                                       | The health status of workers and the local people will be monitored and updated periodically.                                                                                                                                                                                                                       |
|  | <b>Agriculture &amp; Agro-Biodiversity</b> |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                     |
|  | 9                                          | Impact on surrounding agricultural fields around the proposed mining Area.                                                                                                                                                          | 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, as shown in Section 4.6 under Chapter IV in the EIA report page 112. |
|  | 10                                         | Impact on soil, flora & vegetation around the project site.                                                                                                                                                                         | The details on flora have been provided in Section 3.6 under Chapter III in the EIA report page 68-81.<br><br>There is no schedule I species of animals observed within study area.<br><br>There is no endangered red list species found in the study area.                                                         |
|  | 11                                         | Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP. | Details of vegetation in the lease area have been provided in Section 3.6 under Chapter III in the EIA report page-68-81. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV in the EIA report page 112.                                                                    |
|  | 12                                         | The Environmental Impact Assessment should study the                                                                                                                                                                                | The ecological impacts and measures have been provided in Section 4.6 under                                                                                                                                                                                                                                         |

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|  |                | biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.          | Chapter IV in the EIA report page 112-113.                                                                                                                                                                                                               |
|  | 13             | Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.                | All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 98-117.                                         |
|  | 14             | The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. | The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV in the EIA report page 99,100.                                                                                                                          |
|  | <b>Forests</b> |                                                                                                                                                       |                                                                                                                                                                                                                                                          |
|  | 15             | The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.                                                | The project proponent will do barbed wire fencing work around the lease area to prevent wildlife from entering the site.<br><br>A full-time watchman has been appointed in advance to restrict the movements of the local people nearby the quarry site. |
|  | 16             | The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.         | The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV in the EIA report page 112-113.                                                                                                               |
|  | 17             | The Environmental Impact Assessment should study impact on standing trees and the existing trees                                                      | The impacts of the project on standing trees and the existing trees have been                                                                                                                                                                            |

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|  |                          | should be numbered and action suggested for protection.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | discussed in Section 4.6 under Chapter IV in the EIA report page 120,121.                                                                                                                                                                           |
|  | 18                       | The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.                                                                                                                                                                                                                                                                                                                                                   | There are no such areas nearby project site. Protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.36 under Chapter III in the EIA report page 96.                    |
|  | <b>Water Environment</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                     |
|  | 19                       | Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. | The detailed hydro-geological study is carried out and results are discussed in chapter-III of EIA report page-44-55.                                                                                                                               |
|  | 20                       | Erosion Control measures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Garland drainage structures will be constructed around the lease area to control the erosion and afforestation will be done in order to restore the stability of the terrain, discussed in Section 4.6 under Chapter IV in the EIA report page 112. |

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| 21 | Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.                                                                                   | The impacts have been discussed and provided in Chapter IV of EIA report page 98-117.                                                                             |
| 22 | The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.                                                                                                                                               | An analysis for food chain in aquatic ecosystem is discussed in Section 3.6.2 under Chapter 3 in the EIA report page 79.                                          |
| 23 | The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.                                                                                                                                | The impacts of the proposed project on the surrounding environment are discussed in Chapter IV in the EIA report page 98-117.                                     |
| 24 | The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. | The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 3.6.2 under Chapter III in the EIA report page 79. |
| 25 | The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.                                                                                                                | The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV in the EIA report page 106,107.                                       |
| 26 | The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.                                                                                                                                                   | The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV in the EIA report page 101-103.                                   |
| 27 | The EIA shall include the impact of mining activity on the following:                                                                                                                                                                                                 |                                                                                                                                                                   |

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|  |                       | a. Hydrothermal / Geothermal effect due to destruction in the Environment.                                                                                                                                                                                                     | The average geothermal gradient of earth is 25 <sup>0</sup> C/km. As the proposed depth of mining is 45m below the local ground level, the temperature will increase by 1.25 <sup>0</sup> C at the depth of mining. So, there will be no effect on environment. |
|  |                       | b. Bio-geochemical processes and its foot prints including environmental stress.                                                                                                                                                                                               | No Bio-geochemical processes are anticipated as the quarrying is of hard rock type.<br><br>At the end of life of mine, the proposed quarry shall be left as an artificial reservoir structure to collect rain water and will enrich the ecosystem.              |
|  |                       | c. Sediment geochemistry in the surface streams                                                                                                                                                                                                                                | There will be no effect on sediment geochemistry and are discussed in the Table 3.4 under Chapter III in the EIA report page 56.                                                                                                                                |
|  | <b>Energy</b>         |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                 |
|  | 28                    | The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.                                                                                                                                          | The measures taken to control noise, air, water, and dust are furnished in Chapter IV of the EIA report page 98-117.                                                                                                                                            |
|  | <b>Climate Change</b> |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                 |
|  | 29                    | The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. | The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV in the EIA report page 112,113.                                                                                                            |

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|  | 30                       | The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features. | Those aspects have been discussed in Chapter IV of the EIA report page 98-117.                                                                                                                                                        |
|  | 31                       | Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.                                                                                                     | There will be no such emission impact to local livelihood from this quarry project. All the vehicles used for transportation of the quarry materials will be maintained regularly to keep the GHGs emission within statutory limits.  |
|  | <b>Mine Closure Plan</b> |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                       |
|  | 32                       | Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.                                                                                                | This is a fresh lease; a progressive mine closure plan has been given in chapter IV, page-98,117.<br><br>The budget details for the progressive mine closure plan are shown in Table 10.1 under Chapter X in the EIA report page 138. |
|  | <b>EMP</b>               |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                       |
|  | 33                       | Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.                              | A detailed Environment Management plan has been given as Chapter X in the EIA report page 138-144.                                                                                                                                    |
|  | 34                       | The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.                                          | Environment Management plan with budget has been furnished in Tables 10.1 & 10.2 under Chapter X in the EIA report page 138-139.                                                                                                      |
|  | <b>Risk Assessment</b>   |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                       |

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|  | 35                              | To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.                                                                                                                                                                                                                                          | The risk assessment and management plan for this project has been prepared and provided in Section 7.2 under Chapter VII in the EIA report page 124-126. |
|  | <b>Disaster Management Plan</b> |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                          |
|  | 36                              | To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. | The disaster management plan for this project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 126,128.            |
|  | <b>Others</b>                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                          |
|  | 37                              | The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.                                                                                                               | The VAO certificate is included as Annexure pages--269.                                                                                                  |
|  | 38                              | As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be                                                                                                                                                                   | The concerns raised during the public consultation will be submitted in final EIA report.                                                                |

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|  |    | part of the Environment Management Plan.                                                                                                                                                                                                                                                                            |                                                                                                           |
|  | 39 | The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported. | The plastic waste management has been discussed in Section 7.5 of Chapter VII in the EIA report page 133. |

#### **Standard Terms of Reference for (Mining of minerals)**

| <b>S.No</b> | <b>Terms of Reference</b>                                                                                                                                                                                                                                                                                                              | <b>Remarks</b>                                                                                                                                                             |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1         | Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. | Not applicable, this a fresh quarry lease.                                                                                                                                 |
| 1.2         | A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.                                                                                                                                                                                                                   | The proposed site for quarrying is a private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed as Annexure, pages- 162-270. |
| 1.3         | All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining                                                                                                                               | All documents are in the name of lessee.                                                                                                                                   |

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|     | technology etc. and should be in the name of the lessee.                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                  |
| 1.4 | All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).                                | All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, is shown in Figure 2.2 of Chapter II, page-9.                                      |
| 1.5 | Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.                                                                           | Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, is shown in Chapter III of EIA report, pages-23 - 98.                                |
| 1.6 | Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.                                                                                                 | The lease area was inspected by the officers of Department of Mining and Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government. |
| 1.7 | It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? | The proponent has framed Environmental Policy and the same has been furnished in Section 10.1 under Chapter X, pp.158.                                                                           |

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|      | <p>The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1.8  | <p>Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.</p>                                                                                                                                      | <p>It is an opencast quarrying operation proposed to operate in Manual method. The Rough Stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 45<sup>0</sup> bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.</p> |
| 1.9  | <p>The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period</p>                                                                                                                                                                                  | <p>The study area considered for this study is of 10 km radius for air, soil, water, and noise level sample collections, ecology and biodiversity studies. All data contained in the EIA report is for life of the mine / Lease period.</p>                                                                                                                                                                                                                                         |
| 1.10 | <p>Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human</p>                                                                                                                                                                                                                   | <p>Land use of the study area delineating the features has been discussed in Section 3.1.2 under Chapter III, pp.22-26.</p>                                                                                                                                                                                                                                                                                                                                                         |

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|      | settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.                                                                                                                                                                                                                                                                                                                                                                      | The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III, p.96.<br><br>Land use plan of the project area showing pre- operational, operational and post-operational phases are discussed in Table 2.9 under Chapter II, p.18. |
| 1.11 | Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Not Applicable, the rough stone excavation is of 100% recovery, no dump or overburden will remain in or around the lease area.                                                                                                                                                   |
| 1.12 | A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the State Expert Appraisal Committees | Not applicable, as No forest land involved. The details have been given in Table 3.36 under Chapter III, p.96.                                                                                                                                                                   |
| 1.13 | Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A                                                                                                                                                                                                                                                                                                                                                                                                                           | Not applicable, as the proposed project area does not involve any forest land.                                                                                                                                                                                                   |

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|      | copy of the forestry clearance should also be furnished                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                             |
| 1.14 | Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated                                                                                                                                                                                                                                                                                 | Not Applicable.<br><br>The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP).                                           |
| 1.15 | The vegetation in the RF / PF areas in the study area, with necessary details, should be given.                                                                                                                                                                                                                                                                                                                                                                     | No Reserve Forest is found nearby the study area. The details of reserve forest within 10km have been tabulated in Table 3.36 under Chapter III, p.96.                                                                                                                                                      |
| 1.16 | A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.                                                                                                                               | There is no any wildlife/protected area around the periphery of the project area.<br><br>Information regarding wildlife /protected area within 10km has been given in Table 3.36 under Chapter III, p.96.<br><br>Impact on Fauna and mitigation measures are given in section 4.6 under chapter III, p.112. |
| 1.17 | Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the | The details of National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from the periphery of the project area furnished in Table 3.36 of Chapter III, p.96.                                                                                                 |

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|      | Standing Committee of National Board of Wildlife and copy furnished.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                        |
| 1.18 | A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. | A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.6 of Chapter III, pp.68-81. |
| 1.19 | Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered                                                                                                                                                                                                                                                                                                        | Not Applicable.<br>Project area / Study area is not included in 'Critically Polluted' Area and does not come under 'Aravalli Range'.                   |
| 1.20 | Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Not Applicable<br>The project doesn't attract the C.R.Z. Notification, 2018.                                                                           |

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|      | location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                            |
| 1.21 | R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report | <p>Not Applicable.</p> <p>There are no approved habitations of SCs/STs and any other weaker sections in the lease area.</p> <p>Therefore, no R&amp;R Plan required.</p>                                                                                    |
| 1.22 | One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Baseline data were collected for the period of December 2025 - February 2026 as per CPCB notification and MoEF &amp; CC Guidelines.</p> <p>Primary baseline data and the results have been discussed in Sections 3.1-3.9 of Chapter III, pp. 23-96.</p> |

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|      | collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site- specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given |                                                                                                                                                                                                         |
| 1.23 | Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map           | Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been discussed in Section 4.4 under the Chapter IV, pp.104-109. |
| 1.24 | The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be                                                                                                                                                                                                                                                                                                                                                                                                                                                | The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II, p.20.                                                                             |

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|      | provided. Fresh water requirement for the Project should be indicated.                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                             |
| 1.25 | Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided                                                                            | <p>Not Applicable.</p> <p>Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater / seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis.</p> <p>Drinking water will be bought from the approved local water vendors.</p>                               |
| 1.26 | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided                   | <p>Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression.</p> <p>The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for nearby villages during droughts.</p> |
| 1.27 | Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided                                      | Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV, pp. 101-103.                                                                                                                                                                                                      |
| 1.28 | Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect | <p>Not Applicable.</p> <p>The ground water table is found at the depth of 65-60 m below ground level. The ultimate depth of quarry is 65m (45m AGL + 20m BGL). Therefore, the mining</p>                                                                                                                                                                                    |

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|      | groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from State Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished            | activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2.2 under Chapter III, pp.35-39.                                                   |
| 1.29 | Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out                                                                                                                                                                                                       | Not Applicable.<br><br>There are no streams, seasonal or other water bodies passing within the project area.<br><br>Therefore, no modification or diversion of water bodies is anticipated.                               |
| 1.30 | Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.                                                                                                                                                                                                                                | The highest elevation of the project area is 245m. Ultimate depth of the mine is 65m (45AGL + 20m BGL). Depth to the water level in the area is 65-60m BGL.<br><br>Schematic diagram is included in chapter III, page-45. |
| 1.31 | A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be | Greenbelt development plan has given in Section 4.6 under Chapter IV, pp.112.                                                                                                                                             |

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|      | covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                     |
| 1.32 | Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines. | Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area.<br><br>Details are provided in Section 3.8 under Chapter III, p.93-95. |
| 1.33 | Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Infrastructure & other facilities which are to be provided for mine workers has been discussed in Section 2.5.6 of Chapter II, page.20.                                                                                                                                                                             |
| 1.34 | Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.                                                                                                                                                                                                                                                                                                                                                                                                           | Progressive mine closure plan has been prepared for this project and is given in Section 4.10 under Chapter IV, page 116,117.                                                                                                                                                                                       |

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| 1.35 | Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. | Occupational health impacts of the project and preventive measures have been explained in Section 4.8 of Chapter IV, pp.114-116.                                                                                                                                                                                                |
| 1.36 | Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.                                                                                                                                                          | No public health implications are anticipated due to this project. The workers will be provided with face masks, helmets, rain coats, first aid kits etc. Regular health check-up will be conducted and medications will be provided, if needed.<br>CSR & CER details are given in section 8.6, 8.7-chapter VIII, page-136,138. |
| 1.37 | Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.                                                                                                                                           | No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1, 8.2 under Chapter VIII, p.136.                                                                       |
| 1.38 | Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any,                                                                                                                                                                                      | A detailed Environment Management Plan has prepared and provided in Tables 10.1 & 10.2 of Chapter X, page-140-141.                                                                                                                                                                                                              |

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|      | occupational health impacts besides other impacts specific to the proposed Project                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1.39 | Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project | The minutes of public hearing will be included in final EIA report.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1.40 | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given                                                                                                        | No litigation is pending in any court against this project.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1.41 | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out                                                                                                                | Project Cost is Rs.303.93lakhs/-<br>CER Cost is Rs. 5,00,000/-<br><br>In order to implement the environmental protection measures, an amount of Rs. 46.89lakhs as capital cost and recurring cost as Rs. 20.07lakhs as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 10 years will be Rs. 303.93lakhs, as shown in Tables 10.1 & 10.2 under Chapter X, pp.147. |
| 1.42 | A Disaster management Plan shall be prepared and included in the EIA/EMP Report                                                                                                                                                                        | The disaster management plan for this project has been prepared and provided in Section 7.3 of Chapter VII, page127,129.                                                                                                                                                                                                                                                                                                                                                                                                 |

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| 1.43 | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.                                                       | Benefits of the project in all aspects is given as Chapter VIII in EIA report page-133-138.                                                                 |
| 1.44 | Besides the above, the below mentioned general points are also to be followed                                                                                                                                                                   |                                                                                                                                                             |
| a)   | All documents to be properly referenced with index and continuous page numbering                                                                                                                                                                | All the documents are properly referenced with index and continuous page numbering.                                                                         |
| b)   | Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated                                                                                                    | List of tables and source of the data collected have been mentioned.                                                                                        |
| c)   | Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. | All the original Baseline sample analysis/testing reports will be included in final EIA report.                                                             |
| d)   | Where the documents provided are in a language other than English, an English translation should be provided.                                                                                                                                   | All the documents provided are in English language only.                                                                                                    |
| e)   | The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.                                                                                                         | The questionnaire will be included in final EIA report.                                                                                                     |
| f)   | While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are                                                | Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 <sup>th</sup> August, 2009 have been followed while preparing this EIA report. |

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|    | available on the website of this Ministry, should be followed.                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                   |
| g) | Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. | No changes are made in the basic scope and the project parameters.                                                                |
| h) | As per the circular no. J 11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.                                                                                                                                         | It is a new lease area; this condition is not applicable.                                                                         |
| i) | The EIA report should also include;<br><ul style="list-style-type: none"> <li>(i) surface plan of the area indicating contours of main topographic features, drainage and mining area,</li> <li>(ii) geological maps and sections,</li> <li>(iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.</li> </ul>                                                                                                             | All the plans including surface & geological plans, and progressive closure plan have been included as Annexures, pages-.256-268. |

## SEAC Standard Conditions

| S.No | Terms of Reference |                                                                                                                                                                               | Remarks                                                                                   |
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| 2.1  | 1                  | In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:                               | As it is a fresh quarry, these conditions are not applicable.                             |
|      |                    | (i) Original pit dimension                                                                                                                                                    |                                                                                           |
|      |                    | (ii) Quantity achieved vs EC Approved Quantity                                                                                                                                |                                                                                           |
|      |                    | (iii) Balance Quantity as per Mineable Reserve calculated.                                                                                                                    |                                                                                           |
|      |                    | (iv) Mined out Depth as on date Vs EC Permitted depth                                                                                                                         |                                                                                           |
|      |                    | (v) Details of illegal/illicit mining                                                                                                                                         |                                                                                           |
|      |                    | (vi) Violation in the quarry during the past working.                                                                                                                         |                                                                                           |
|      |                    | (vii) Quantity of material mined out outside the mine lease area                                                                                                              |                                                                                           |
|      |                    | (viii) Condition of Safety zone/benches                                                                                                                                       |                                                                                           |
|      |                    | (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.                                                    |                                                                                           |
|      | 2                  | Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.    | The VAO certificate is attached as Annexure, page no-.269.                                |
|      | 3                  | The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall | There are no any structures or occupants or any sheds in 500m radius of the project site. |

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|  |   | be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.                                                                                                                                       |                                                                                                        |
|  | 4 | The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.                                                                                                                                                                                                                                                         | Detailed hydrological study report will be submitted in the final EIA report.                          |
|  | 5 | The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.                                                                                                                                                                                                                                                                                                                                      | The Bio-diversity study report from the reputed institution will be submitted in the final EIA report. |
|  | 6 | The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc, up to a radius of 25 km from the proposed site.                                                                                                                                                                                                                                                                                          | The DFO letter will be submitted in the final EIA report.                                              |
|  | 7 | In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / | This is a fresh lease area, no benches are formed.                                                     |

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|  |    | Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC. |                                                                                                                 |
|  | 8  | However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.                                                                                    | This is a fresh lease area; the Slope Stability report will be submitted once the mining depth reaches 30m BGL. |
|  | 9  | The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.                                                                             | The affidavit for blasting will be enclosed in the final EIA report.                                            |
|  | 10 | The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.                                                     | A conceptual design of blasting has given in Section 2.5.1 under Chapter II in the EIA report page 15-17.       |
|  | 11 | The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either                                                                                                                                                                                                                      | This is the only quarry in name of the lessee.                                                                  |

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|  |    | in the same location or elsewhere in the State with video and photographic evidences.                                                                                                                                                                                                                                                                  |                                                                                                                                                                                 |
|  | 12 | If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,                                                                                                                                                             | Not applicable, it is a fresh quarry lease.                                                                                                                                     |
|  | 13 | What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?                                                                                                                                                                                                                                | As it is a fresh quarry lease, these conditions are not applicable.                                                                                                             |
|  | 14 | Quantity of minerals mined out.                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                 |
|  |    | <ul style="list-style-type: none"> <li>Highest production achieved in any one year.</li> </ul>                                                                                                                                                                                                                                                         |                                                                                                                                                                                 |
|  |    | <ul style="list-style-type: none"> <li>Detail of approved depth of mining.</li> </ul>                                                                                                                                                                                                                                                                  |                                                                                                                                                                                 |
|  |    | <ul style="list-style-type: none"> <li>Actual depth of the mining achieved earlier.</li> </ul>                                                                                                                                                                                                                                                         |                                                                                                                                                                                 |
|  |    | <ul style="list-style-type: none"> <li>Name of the person already mined in that leases area.</li> </ul>                                                                                                                                                                                                                                                |                                                                                                                                                                                 |
|  |    | <ul style="list-style-type: none"> <li>If EC and CTO already obtained, the copy of the same shall be submitted.</li> </ul>                                                                                                                                                                                                                             |                                                                                                                                                                                 |
|  |    | <ul style="list-style-type: none"> <li>Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.</li> </ul>                                                                                                                                                                                          |                                                                                                                                                                                 |
|  | 15 | All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). | All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.2 under Chapter II in the EIA report page 7. |

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|  | 16 | The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.                                                                                                                                                                                                                                                                            | The drone video will be submitted during final presentation.                                                                                                                                                                                                                         |
|  | 17 | The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.                                                                                                                 | Photographs of adequate fencing, green belt along the periphery of the project area and the photographs showing nearby water bodies will be included in final EIA Presentation.                                                                                                      |
|  | 18 | The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.                                                                   | The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project.<br><br>The details reserve estimation has been shown in Table 2.5 under Chapter II in the EIA report page 15. |
|  | 19 | The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment. | The chart including the role of statutory officials is prepared and given in section -2.8, page no-22.                                                                                                                                                                               |
|  | 20 | The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open                                                                                                                                                                                                     | The hydro-geological study is discussed in the Section 3.3.2 under Chapter III in the EIA report page 44-55.                                                                                                                                                                         |

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|  |    | <p>wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.</p> |                                                                                                                                                                                                                                    |
|  | 21 | <p>The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality &amp; flora/fauna including traffic/vehicular movement study.</p>                                                                                                                                                                                                     | <p>The baseline data was collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed in Chapter III of EIA report, page 23-97.</p> |
|  | 22 | <p>The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control &amp; health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.</p> | <p>Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 124-135.</p>                                                                                      |
|  | 23 | <p>Rain water harvesting management with recharging details along with water balance</p>                                                                                                                                                                                                                                                                                                                                                            | <p>As part of rainwater harvesting measures, the rain water from</p>                                                                                                                                                               |

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|  |    | (both monsoon & non-monsoon) be submitted.                                                                                                                                                                                                                                                                                                                                                                                               | <p>garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.</p> <p>The detailed rain water harvesting along with water balance is discussed in Section- 3.2.3.1 Chapter III, page- 44-55.</p>                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. | <p>Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1.2 under Chapter III in the EIA report page 25-27.</p> <p>The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 96.</p> <p>Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.9 under Chapter II in the EIA report page 18.</p> |
|  | 25 | Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land                                                                                                                                                                                                                                                                                                                    | The rough stone is of 100% recovery without any wastes or rejects. So, no dumps have been                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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|  |    | area, distance from mine lease, its land use, R&R issues, if any, should be provided.                                                                                                                                                                                                                                                                                                                        | proposed inside or outside the lease area. Hence, R&R may not require.                                                                                                  |
|  | 26 | Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered. | Not Applicable.<br>Project area / Study area is not declared in 'Critically Polluted' Area.                                                                             |
|  | 27 | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.                                                                                                                                                                                                                       | As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks. |
|  | 28 | Impact on local transport infrastructure due to the Project should be indicated.                                                                                                                                                                                                                                                                                                                             | Details regarding impact of the project on traffic and transport infrastructure are given in Section 3.8 under Chapter III in the EIA report page 93-95.                |
|  | 29 | A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.                                                                                                                                                                                                            | A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.6 under Chapter III in the EIA report page 68-81.           |

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| 30 | A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.                                                                                                                                                                                                                                                                                                                                                                                                 | A progressive mine closure plan has given in section 4.10, chapter IV, page-116,117.<br><br>The budget details for the progressive mine closure plan are shown in Table 10.1 under Chapter X in the EIA report page 140. |
| 31 | As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.                                                                                                                                                                                                                                                              | The EIA coordinator and the FAE for ecology and biodiversity visited the study area and educated the local students about the importance of protecting the biological environment.                                       |
| 32 | The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner. | A detailed greenbelt development plan has been provided in Chapter IV in the EIA report page 98-117.                                                                                                                     |
| 33 | Taller/one year old Saplings raised in appropriate size of bags; preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The                                                                                                                                                                                                                                                                                           | The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-friendly bags should be purchased and planted with the                                             |

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|  |    | proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.                                                                                                                                                                                                       | spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.<br><br>The green belt development plan including planting procedure is discussed in page- 112 |
|  | 34 | A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.                                                                                                                                                                                                                        | The disaster management plan for the project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 127,128.                                                                             |
|  | 35 | A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.                                                                                                                                                                                                             | Risk assessment plan for the project has been prepared and provided in Section 7.2 under Chapter VII in the EIA report page 124.                                                                                         |
|  | 36 | Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. | Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV in the EIA report 114-114.                                                              |
|  | 37 | Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial                                                                                                                                                                                                                        | No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under                                                                   |

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|  |    | measures should be detailed along with budgetary allocations.                                                                                                                                                                                                                                                                                         | Chapter VIII in the EIA report page 136,137.                                                                                                                                                                                                                                  |
|  | 38 | The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation. | No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1, 8.2 under Chapter VIII in the EIA report page 136. |
|  | 39 | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.                                                                                                                                                                                                      | No litigation is pending in any court against this project.                                                                                                                                                                                                                   |
|  | 40 | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.                                                                                                                                                             | The benefits of the project in all these aspects are discussed in the Chapter VIII in the EIA report page 136-138.                                                                                                                                                            |
|  | 41 | If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.          | It is fresh lease area and the condition is not applicable.                                                                                                                                                                                                                   |
|  | 42 | The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.                                                                                                                                                                                                   | A detailed environment management plan has been prepared following the suggestion made by SEAC, is                                                                                                                                                                            |

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|  |    |                                                                                                                                                                                                                                                                                       | <p>added as Chapter X in the EIA report page 140-147.</p> <p>The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted in final EIA report.</p>                                                                                                                                                                |
|  | 43 | <p>Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.</p> | <p>This EIA report has been prepared keeping in mind that, fact concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.</p> |

#### **Standard Terms of Reference**

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| 1. | <p>Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.</p> | <p>Not applicable, it is fresh quarry lease.</p>                                                                                                   |
| 2. | <p>A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.</p>                                                                                                                                                                                                                   | <p>The proposed site for quarrying is a private land.</p> <p>A copy of the document showing that the proponent is the rightful lessee has been</p> |

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|    |                                                                                                                                                                                                                                                                                                                                 | enclosed along with the approved mining plan in Annexure pages-235-270.                                                                                                                          |
| 3. | All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.                                                               | All documents are in the name of lessee.                                                                                                                                                         |
| 4. | All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). | All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, is shown in Figure 2.2 of Chapter II in the EIA report page 9.                     |
| 5. | Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.                                            | Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, are shown in Chapter III in the EIA report page 23-96.                               |
| 6. | Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.                                                                  | The lease area was inspected by the officers of Department of Geology and Mining along with revenue officials and found that the land is fit for quarrying under the policy of State Government. |

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| 7. | It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report | The Environmental Policy is discussed in the Section 10.1 of Chapter X in the EIA report page 140.                                                                                                                                                                                                                                                                                                                                                                |
| 8. | Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 45° bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance. |
| 9. | The study area will comprise of 10 km zone around the mine lease from lease periphery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The study area considered for this study is of 10km radius for air, soil, water, and                                                                                                                                                                                                                                                                                                                                                                              |

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|     | and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.                                                                                                                                                                                                                                                                                                                      | noise level sample collections, ecology and biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.                                                                                                                                                                                                                                                                                       |
| 10. | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. | <p>Land use of the study area delineating features has been discussed in Section 3.1.2 under Chapter III in the EIA report page 25-27.</p> <p>The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 96.</p> <p>Land use plan of the project area showing pre- operational, operational and post-operational phases are tabulated in Table 2.9 under Chapter II in the EIA report page 18.</p> |
| 11. | Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.                                                                                                                                                                                                                                                          | It is not applicable, rough stone is of 100% recovery and no dumps have been proposed outside the lease area. The entire quarried out rough stone will be transported to the needy customers. No raise of R&R                                                                                                                                                                                                                                                              |
| 12. | Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office                                                                                 | <p>It is not applicable as there is no forest land involved within the proposed project area.</p> <p>The details of RF nearby the lease area is given in Table 3.36 under Chapter III in the EIA report page 96.</p>                                                                                                                                                                                                                                                       |

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|     | of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.                          |                                                                                                                                                                                                              |
| 13. | Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.                           | It is not applicable, as the proposed project area does not involve any forest land.                                                                                                                         |
| 14. | Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.                                                                                                            | Not Applicable.<br>The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area.                |
| 15. | The vegetation in the RF / PF areas in the study area, with necessary details, should be given.                                                                                                                                                                                                 | There is no any reserve forest in the study area.<br>The details of reserve forest nearby are listed in the Table 3.36 under Chapter III in the EIA report page 96.                                          |
| 16. | A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out | There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.36 under Chapter III in the EIA report page 96. |

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|     | with cost implications and submitted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |
| 17. | <p>Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.</p>                                                                                                                                                                                            | <p>There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/ Elephant Reserves within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.36 under Chapter III in the EIA report page 96.</p> |
| 18. | <p>A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.</p> | <p>A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.6 under Chapter III in the EIA report page 68-81.</p>                                                                                           |

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| 19. | Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.                                                                                                         | Not Applicable.<br><br>Project area / Study area is not listed in 'Critically Polluted' Area and does not come under 'Aravalli Range'.                                           |
| 20. | Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).                                                                                                                                                                      | Not Applicable.<br><br>The project doesn't attract the C.R.Z. Notification, 2018.                                                                                                |
| 21. | R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may | Not Applicable.<br><br>There are no approved habitations of SCs/STs and other weaker sections in the lease area.<br><br>Therefore, R&R Plan / Compensation Plan is not required. |

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|     | be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspect should be discussed in the Report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                               |
| 22  | One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given. | <p>Baseline data were collected for the period of Dec 2025-Feb 2026 as per CPCB notification and MoEF &amp; CC Guidelines.</p> <p>Primary baseline data and the results have been included and discussed in Sections 3.1-3.9 of Chapter III in the EIA report page 23-96.</p> |
| 23. | Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in</p>                                                                                                                  |

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|     | the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map | Section 4.4 under the Chapter IV in the EIA report page 104-109.                                                                                                                                                                                                                                                                                              |
| 24. | The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.                                                                                                                           | The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II in the EIA report page 20.                                                                                                                                                                                                               |
| 25. | Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.                                                                                                                                                                                                    | Not Applicable.<br>Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater /seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved local water vendors.                                   |
| 26. | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.                                                                                                                                           | Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for nearby villages during droughts. |

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| 27. | Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.                                                                                                                                                                                                                                                                                                                                                                                                                                 | Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 of Chapter IV in the EIA report page 101-105.                                                                                                                                                                                    |
| 28. | Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished. | <p>The ground water table is found at the depth of 60-65m below ground level.</p> <p>The ultimate depth of quarry is 65m (45m AGL + 20mBGL). Therefore, the mining activity will not intersect the ground water table.</p> <p>Data regarding the occurrence of groundwater table have been provided in Section 3.2.2 under Chapter III in the EIA report page 28-39.</p> |
| 29. | Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Not Applicable.</p> <p>There are no streams, seasonal or other water bodies passing within the project area.</p> <p>Therefore, no modification or diversion of water bodies is anticipated.</p>                                                                                                                                                                       |
| 30. | Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>The highest elevation of the project area is 94m.</p> <p>Ultimate depth of the mine is 65m 40m AGL + 20m BGL). Depth to the water level in the area is 60-65m below the ground level.</p>                                                                                                                                                                             |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                         |
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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Schematic diagram is included in chapter III, page -55.                                                                                                                                                                                                                                                                                 |
| 31. | A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up. Front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution. | Greenbelt development plan has been prepared and given in Section 4.6 under Chapter IV in the EIA report page 112, 113.                                                                                                                                                                                                                 |
| 32. | Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of                                                                                                                                                                                                                                       | Traffic density survey was carried out to analyses the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Section 3.8 under Chapter III in the EIA report page 93-96. |

|     |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Transportation study as per Indian Road Congress Guidelines.                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |
| 33. | Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.                                                                                                                                                                                                                                                                      | Infrastructure & other facilities which are to be provided for mine workers after the grant of quarry lease has been discussed in Section 2.5.6 under Chapter II in the EIA report page 20.                                                                                                                                    |
| 34. | Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.                                                                                                                                                                                                                    | Progressive mine closure plan has been prepared for this project and is given in Section 4.10 under Chapter II in the EIA report page 116,117.                                                                                                                                                                                 |
| 35. | Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. | Occupational health impacts of the project and preventive measures have been explained in Section 4.8 under Chapter IV in the EIA report page 114-115.                                                                                                                                                                         |
| 36. | Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.                                                                                                                                                          | <p>No public health implications are anticipated due to this project.</p> <p>The workers will be provided with face masks, helmets, rain coats, first aid kits etc.</p> <p>Regular health check-up will be done for workers and medical camps were conducted for local people and medications will be provided, if needed.</p> |

|     |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                           |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                                                                                                                                           | The CSR & CER details are given in section 8.6, 8.7-chapter VIII, page-136,137.                                                                                                                                                                           |
| 37. | Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.                                          | No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1-8.7 under Chapter VIII 136-138. |
| 38. | Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project. | A detailed Environment Management Plan has been prepared and provided in Table 10.1 & 10.2 under Chapter X in the EIA report page 140-141.                                                                                                                |
| 39. | Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.                                   | The minutes of public hearing and the responses of proponent will be included in final EIA report.                                                                                                                                                        |
| 40. | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given                                                                                                                                           | No litigation is pending in any court against this project.                                                                                                                                                                                               |
| 41  | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.                                                                                                                                                  | Project Cost is Rs. 303.93lakhs<br>CER Cost is Rs. 5,00,000/-<br>In order to implement the environmental protection measures, an amount of Rs.                                                                                                            |

|     |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                                                                                                   | 46.89lakhs as capital cost and recurring cost as Rs. 20.07lakhs as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 10 years will be Rs. 303.93lakhs and shown in Tables 10.1 & 10.2 of Chapter X, pp 147. |
| 42. | A disaster management plan shall be prepared and included in the EIA/EMP Report.                                                                                                                                                                  | The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 127-128.                                                                                                                                                                                                                                  |
| 43. | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.                                                         | Benefits of the project details have been given as Chapter VIII in the EIA report page 136-138.                                                                                                                                                                                                                                                                   |
| 44  | Besides the above, the below mentioned general points are also to be followed:                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                   |
| a)  | All documents to be properly referenced with index and continuous page numbering.                                                                                                                                                                 | All the documents have been properly referenced with index and continuous page numbering.                                                                                                                                                                                                                                                                         |
| b)  | Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.                                                                                                     | List of tables and source of the data collected have been mentioned.                                                                                                                                                                                                                                                                                              |
| c)  | Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. | All original Baseline sample analysis/testing reports will be submitted in the final EIA report.                                                                                                                                                                                                                                                                  |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                             |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| d) | Where the documents provided are in a language other than English, an English translation should be provided.                                                                                                                                                                                                                                                                                                                                                                            | All the documents provided here are in English language.                                                                                                    |
| e) | The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.                                                                                                                                                                                                                                                                                                                                                  | The questionnaire will be submitted in the final EIA report.                                                                                                |
| f) | While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.                                                                                                                                                                                                                    | Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 <sup>th</sup> August, 2009 have been followed while preparing this EIA report. |
| g) | Changes, if any made in the basic scope and project parameters (as submitted in Form- I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation | No changes are made in the basic scope and the project parameters.                                                                                          |
| h) | As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of                                                                                                                                                                                                                   | As it is a new lease area, this condition is not applicable.                                                                                                |

|    |                                                                                                                                                                                                                                                                                                         |                                                                                                                                   |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|    | Ministry of Environment, Forest and Climate Change, as may be applicable.                                                                                                                                                                                                                               |                                                                                                                                   |
| i) | The EIA report should also include;<br>(i) surface plan of the area indicating contours of main topographic features, drainage and mining area,<br>(ii) geological maps and sections and, sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area. | All the plans including surface & geological plans, and progressive closure plan have been included as Annexures, pages- 235-270. |

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## **CHAPTER I**

### **INTRODUCTION**

#### **1.0 PREAMBLE**

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. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14<sup>th</sup> September 2006 and its subsequent amendments the projects are categorized into A, B1 & B2 to determine the level of scrutiny and process. The mining projects whose extent is  $\geq 5$  ha or the cluster of quarries (if homogeneous mineral) within 500m radius extent is greater than 5ha falls under category B1. These projects require preparation and submission of an EIA report after public consultation to SEIAA to obtain environmental clearance as per the Office Memorandum F.No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

#### **1.1 PURPOSE OF THE REPORT**

The purpose of the report is to evaluate the project's potential environmental, social and economic effects of the before it is implemented adhering to the guidelines outlined in the MoEF & CC Notification, S.O. 996 (E) dated 10.04.2015 and MoEF & CC Office Memorandum dated 29.08.2017.

#### **1.2 ENVIRONMENTAL CLEARANCE**

The Environmental Clearance process for the project will comprise of four stages. These stages are screening, scoping, public consultation & appraisal.

##### ***Screening***

The project had applied in PARIVESH 2.O proposal no. proposal no. SIA/TN/MIN/570399/2026, Dated: 26.02.2026 to obtain terms of reference.

##### ***Scoping***

The mechanism for issuing online system generated Standard ToR as well as reference to SEAC has been enabled on the PARIVESH Portal on the acceptance of the complete application online. The concerned Member Secretary of SEAC shall refer the project to the concerned SEAC for prescribing additional ToR as per the circular F.No. IA 3-22/15/2022-IA-III [Computer No 178038] Dated: 6<sup>th</sup> May 2022.

### ***Public Consultation***

In this stage, an application along with the draft EIA and EMP report will be made to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) and request to conduct Public Hearing as per EIA notification 2006. The outcome of the public hearing Details given in Final EIA Report.

### ***Appraisal***

In this stage, the final EIA report will submit in PARIVESH 2.0 to SEIAA, TN. Based on the recommendations of SEAC the SEIAA, TN will grant EC or castoff.

### **1.3 TERMS OF REFERENCE (ToR)**

The total extent of quarries within the 500m radius is greater than 5ha. The details of the quarries within the cluster are given in Table 1.1.

**Table 1.1 Details of quarries within the cluster of 500m radius**

| <b>Proposed Quarries</b>    |                          |                |                |                    |                 |
|-----------------------------|--------------------------|----------------|----------------|--------------------|-----------------|
| <b>Code</b>                 | <b>Name of the Owner</b> | <b>S.F. No</b> | <b>Village</b> | <b>Extent (ha)</b> | <b>Status</b>   |
| P1                          | Tvl.RVM Blue Metals      | 51 (P-4)       | Allappanur     | 2.00.20            | Applied lease   |
| <b>Existing Quarry</b>      |                          |                |                |                    |                 |
| E1                          | R. Amutha                | 51 (P)         | Allappanur     | 2.00.0             | Existing Quarry |
| E2                          | G. Dakshinamoorthy       | 51 (P)         | Allappanur     | 2.00.0             |                 |
| E3                          | J. Gunasekaran           | 51 (P-3)       | Allappanur     | 0.97.0             |                 |
| <b>Total Cluster Extent</b> |                          |                |                | <b>6.97.2</b>      |                 |

*Source: DD Letter - Rc.No. 728/Mines/2025 dated:20.02.2026.*

The file was appraised in 693<sup>th</sup> SEAC meeting on 17.03.2025 and issued terms of reference (ToR) identification no **TO26B0108TN5969959N** on **07.04.2026** by SEIAA, TN.

## 1.4 POST ENVIRONMENT CLEARANCE MONITORING

- The project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and the details of the website where it is displayed.
- The project proponent will submit a half-yearly compliance report of the stipulated environmental conditions to Regional Office, MoEF & CC & SEIAA on 1<sup>st</sup> June and 1<sup>st</sup> December of every year.

## 1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

The prior environmental clearance granted for a project or activity may be transferred as per the provisions of para 11 of the Environmental Impact Assessment Notification, 2006 and its subsequent amendments and the office memorandum File No. IA3-22/19/2023-IA.III [E226246] Dated: 3<sup>rd</sup> November 2023.

## 1.6 IDENTIFICATION OF THE PROJECT PROPONENT

The details of the project proponent are given in Table 1.2 below.

**1.2 Details of Project Proponent**

| Name of the Project Proponent | Tvl.RVM Blue Metals                                                                                     |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
| Address                       | S.F.No. 264/1,<br>Pudurchekkadi Village,<br>Thandarampattu Taluk,<br>Tiruvannamalai District – 606 708. |
| Status                        | Proponent                                                                                               |

## 1.7 BRIEF DESCRIPTION OF THE PROJECT

The method adopted for rough stone excavation is open cast semi mechanized method involving formation of benches with 5m height and 5m width and the overall bench slope is less than 65°. The quarry operation involves shallow jackhammer drilling, slurry blasting, excavation, loading and transportation.

The overall extent of the project site is 2.00.20ha and it is located Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu.

The proposed project deals with excavation of rough stone which is primarily used in construction projects. The increasing demand for rough stone fueled by a booming construction industry presents a valuable opportunity. This project will not only meet the rising demand for rough stone but also create jobs for the surrounding villages.

## **1.8 SCOPE OF THE STUDY**

The main scope of the EIA study is to quantify the cumulative impact of the quarries in the cluster and formulate the effective mitigation measures. The baseline monitoring study has been carried out during the period of **December- 2025 to February- 2026** for various environmental components such as land, soil, air, water, noise, ecology, etc. to assess the anticipated impacts of the cluster on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project.

## **1.9 Legislation Applicable to Mining of Mineral Sector**

A few important legislations are given below:

- ❖ The Mines Act, 1952
- ❖ The Mines and Mineral (Development and Regulation) Act, 1957
- ❖ Mines Rules, 1955
- ❖ Mineral Concession Rules, 1960
- ❖ Mineral Conservation and Development Rules, 1988
- ❖ State Minor Mineral Concession Rules, 1960
- ❖ Granite Conservation and Development Rule, 1999
- ❖ The Water (Prevention and Control of pollution) Act, 1974
- ❖ The Air (Prevention and Control of pollution) Act, 1981
- ❖ The Environment (Protection) Act, 1986
- ❖ The Forest (Conservation) Act, 1988
- ❖ The Wildlife (Protection) Act, 1972.

## CHAPTER II

### PROJECT DESCRIPTION

#### 2.0 DECSRIPTION OF THE PROJECT

The proponent Tvl. RVM Blue Metals Projects is involved in the mining and its auxiliary activities. The proponent had applied for quarry lease on 20.02.2026 to extract rough stone quarry. The precise area communication letter was issued by Deputy Director of Geology and Mining, Tiruvannamalai vide (Roc.No.728/Mines/2025, Dated 13.02.2026). The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Tiruvannamalai (Rc.No.728/Mines/2025 Dated. 20.02.2026). The project area and the proposed excavation details were given in Table 2.1.

**Table 2.1 Proposed project area and excavation details**

|                                  |                                                                                                                                                                                                          |                 |                |              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|--------------|
| Name of the Quarry               | Tvl. RVM Blue Metals, Rough stone quarry                                                                                                                                                                 |                 |                |              |
| Type of Land                     | Government Land- Tender Cum Action                                                                                                                                                                       |                 |                |              |
| Extent                           | 2.00.2Ha                                                                                                                                                                                                 |                 |                |              |
| Toposheet No                     | 57-L/16                                                                                                                                                                                                  |                 |                |              |
| Location of Project Site         | 12°05'53.31"N to 12°06'0.23"N<br>78°56'34.10"E to 78°56'40.20"E                                                                                                                                          |                 |                |              |
| Highest Elevation                | 45m AMSL                                                                                                                                                                                                 |                 |                |              |
| Proposed depth of Mining         | 65m (45m AGL + 20m BGL)                                                                                                                                                                                  |                 |                |              |
| Geological Resources             | Rough Stone in m³                                                                                                                                                                                        |                 | Top Soil in m³ |              |
|                                  | m³                                                                                                                                                                                                       | Tons (m³* 2.75) | m³             | Tons (m³* 2) |
|                                  | 835270                                                                                                                                                                                                   | 2296992         | 4212           | 8424         |
| Mineable Reserves                | 304295                                                                                                                                                                                                   | 836811          | 3448           | 6896         |
| Proposed reserves for five years | 304295                                                                                                                                                                                                   | 836811          | 3448           | 6896         |
| Method of Mining                 | Open- Cast Mechanized mining                                                                                                                                                                             |                 |                |              |
| Topography                       | Flat Topography                                                                                                                                                                                          |                 |                |              |
| Machinery proposed               | Jack Hammer                                                                                                                                                                                              |                 | 2              |              |
|                                  | Compressor                                                                                                                                                                                               |                 | 1              |              |
|                                  | Tipper                                                                                                                                                                                                   |                 | 8              |              |
|                                  | Hydraulic Excavator                                                                                                                                                                                      |                 | 1              |              |
| Blasting Method                  | The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. |                 |                |              |
| Proposed Manpower Deployment     | 20 Nos                                                                                                                                                                                                   |                 |                |              |
| Project Cost                     | Rs.2,64,49,000/-                                                                                                                                                                                         |                 |                |              |
| CER Cost                         | Rs. 5,00,000/-                                                                                                                                                                                           |                 |                |              |
| Proposed Water Requirement       | 3.5 KLD                                                                                                                                                                                                  |                 |                |              |

## 2.1 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Allappanur villages, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu as shown in Figure 2.1.

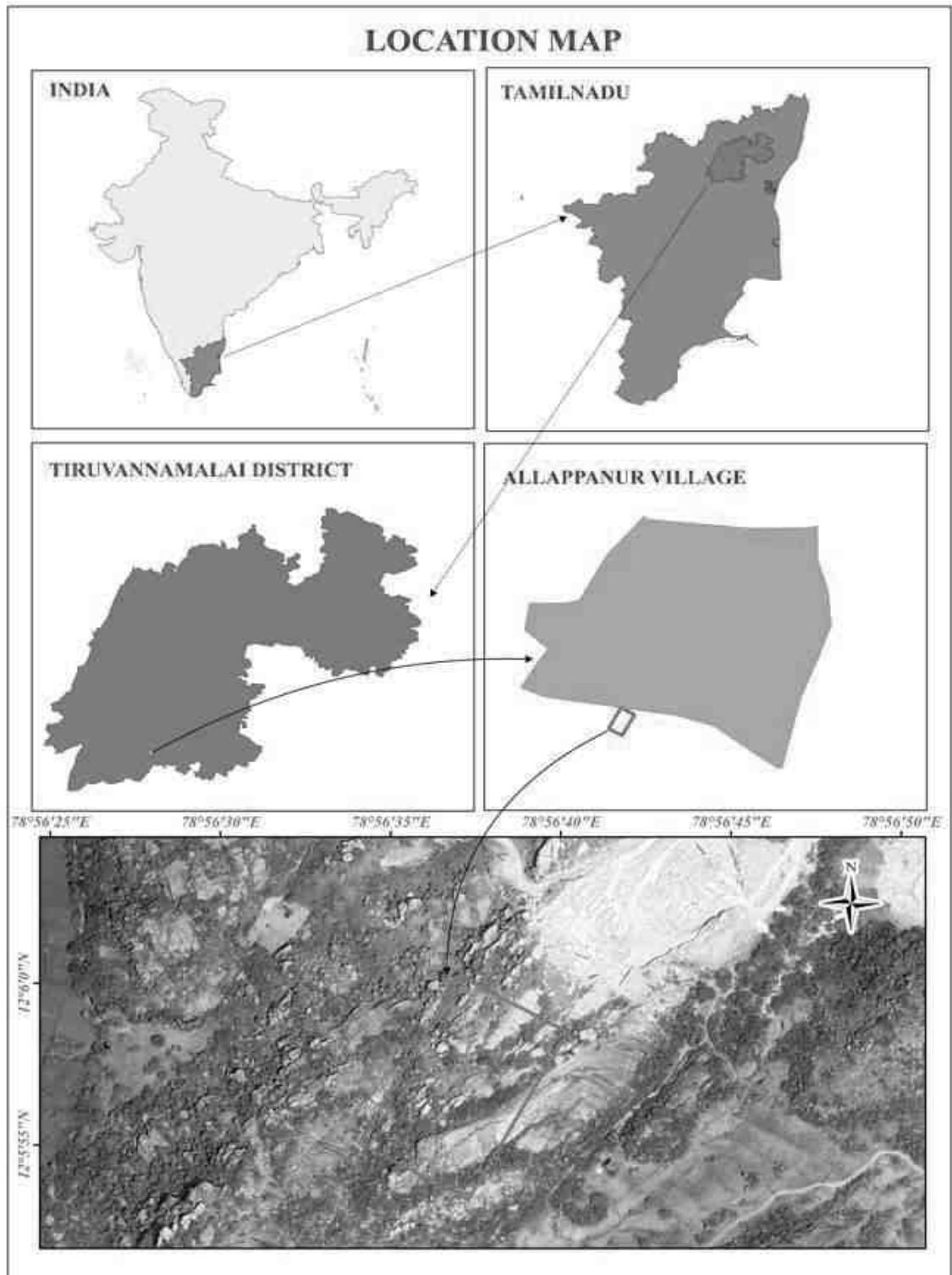


Figure 2.1 Key Map Showing Location of Project Site

To reach the site, start from Thandarampattu in SH-6A– (Thiruvannamalai to Thanipadi road) upto 5.82km, from Goosanpadi towards north via Thenmudiyanur and Allappanur villages upto 0.92km will find the site in the right side. Accessibility details to the proposed project site have been given in Table 2.2.

**Table 2.2 Site Connectivity to the Project Area**

|                         |                                    |               |
|-------------------------|------------------------------------|---------------|
| Nearest Roadways        | NH- 179B<br>Thiruvannamalai- Harur | 15.46km- NE   |
|                         | SH - 6A<br>Thiruvannamalai- Harur  | 5.89km- North |
| Nearest Town            | Thiruvannamalai                    | 19.0km- NE    |
| Nearest Railway Station | Thiruvannamalai                    | 21.19km- NE   |
| Nearest Airport         | Pondicherry                        | 92.24km- SE   |
| Nearest Seaport         | Chennai                            | 180km- NE     |
| Nearest Village         | Thondamanur                        | 1.4km- South  |
|                         | Thenmudiyanoor                     | 2.8km- North  |
|                         | Agarampallipattu                   | 1.6km- East   |
|                         | Kodanallur                         | 2.5km- West   |

## 2.2 LEASEHOLD AREA

The details of the field survey number, subdivision and their extent and the overall extent of the proposed project site is given in Table 2.3.

**Table 2.3 Lease hold area details**

| Survey No           | Sub Division | Total Extent in Hect | Patta No.                        | Village and Name of the Land Owner | Mine lease Applied S.F.No. | Mine lease Applied area out of total area in hect. |
|---------------------|--------------|----------------------|----------------------------------|------------------------------------|----------------------------|----------------------------------------------------|
| 51                  | -            | 92.94.0              | --                               | Govt Poramboke land                | 51 (P-4)                   | 2.00.2                                             |
| <b>Total Extent</b> |              | <b>92.94.0</b>       | <b>Applied lease area extent</b> |                                    |                            | <b>2.00.2</b>                                      |

The proposed project is site specific. There is no mineral beneficiation or processing proposed inside the project area. There is no forest land involved in the proposed area and is devoid of major vegetation and trees. The overall extent of the project area is 2.00.2Ha as per the precise area communication letter vide Roc.No.728/Mines/2025 Dated 13.02.2026 issued by Dept of Geology and Mining, Tiruvannamalai District lies near the Allappanur village, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu. The breakup of the existing land use for mining and ancillary feature is given in Table 2.3a.

**Table 2.3a Present Land use pattern of the project area**

| Sl. No. | Land Use                 | Present area (Hect.) |
|---------|--------------------------|----------------------|
| 1.      | Area under Mining        | Nil                  |
| 2       | Infrastructure           | Nil                  |
| 3       | Roads                    | Nil                  |
| 4       | Unutilized               | 2.00.2               |
| 5       | Green Belt               | Nil                  |
| 6       | Settling Tank & Drainage | Nil                  |
|         | <b>Grand Total</b>       | <b>2.00.2</b>        |

**2.2.1 Geo Coordinates**

This area is typically covered under the G43V16 sheet index (the modern OSM equivalent for the older 57 L/16 numbering). The lease area allotted in the hillock of height 45m maximum. The boundary corner and the intermediate stone geographic coordinates is given in Table 2.4 and shown in Figure 2.5. The quarries within the cluster of 500m radius as per the letter Rc.No.728/Mines/2025 dated: 20.02.2026 is enclosed as Annexure II is shown in Figure 2.3.

**Table 2.4 Geographic coordinates of the Project area**

| Pillar ID | Latitude     | Longitude     |
|-----------|--------------|---------------|
| 1         | 12°5'58.50"N | 78°56'40.20"E |
| 2         | 12°5'53.31"N | 78°56'37.28"E |
| 3         | 12°5'55.05"N | 78°56'34.10"E |
| 4         | 12°6'0.23"N  | 78°56'37.01"E |
| 5         | 12°5'59.29"N | 78°56'38.74"E |

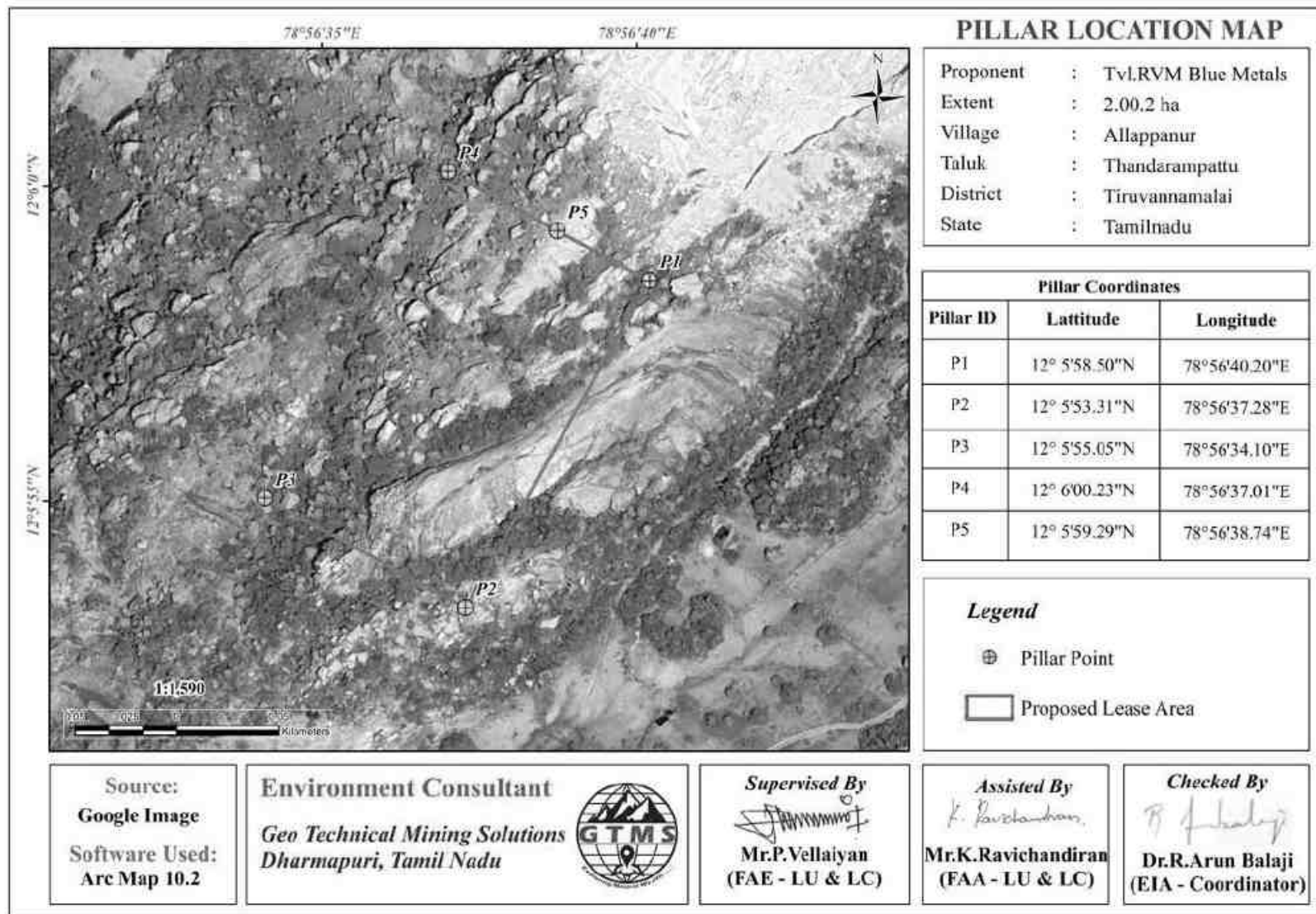


Figure 2.2 Google Earth Image Showing Pillar Coordinates of Lease Area

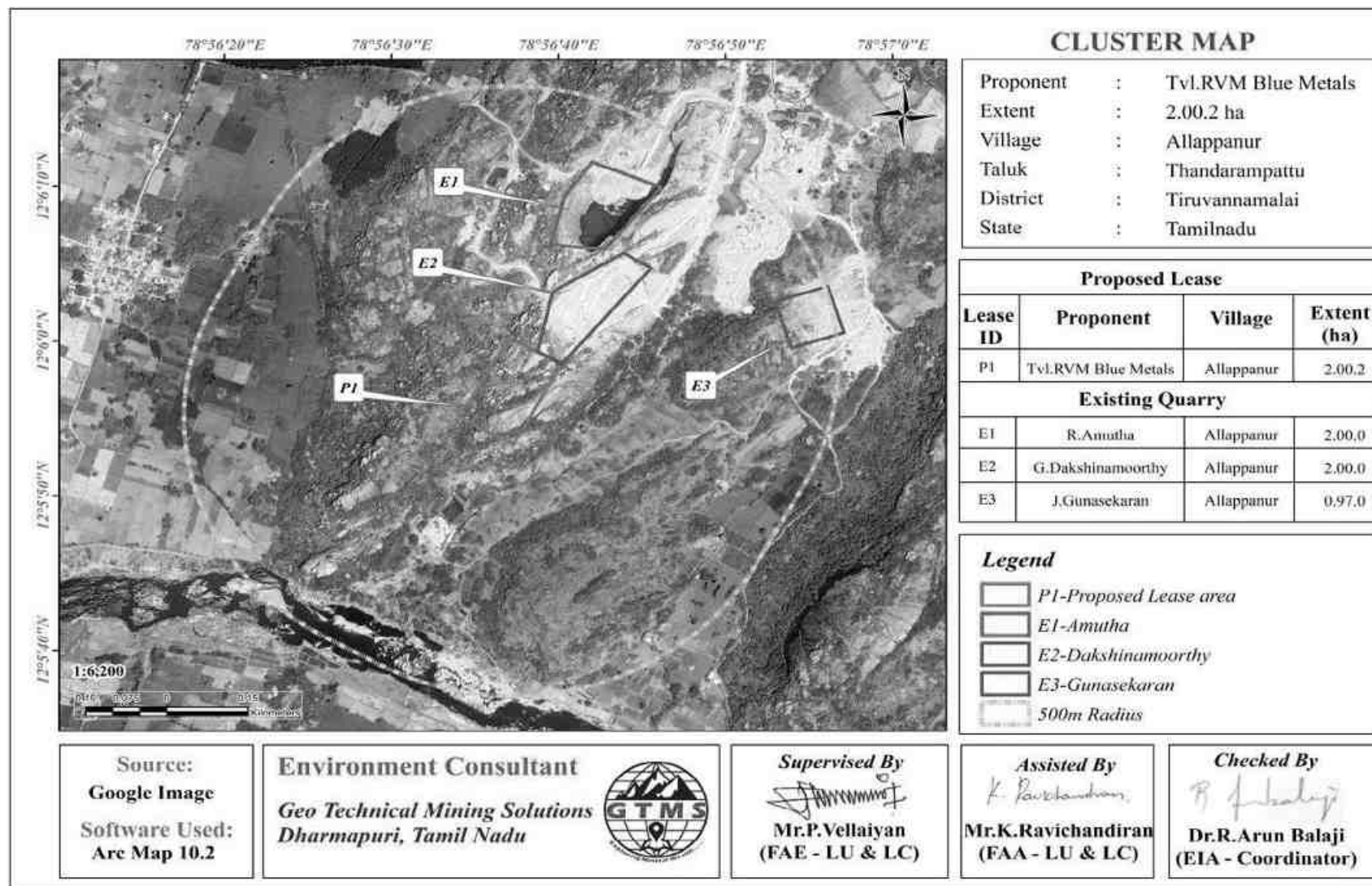


Figure 2.3 Google Earth Image of the cluster



Figure 2.4 Surface & Geological Plan

## 2.3 GEOLOGY

The entire district is underlain by the rocks belonging to hard crystalline rock masses of Archean age. General characteristics of the rocks of this series has recorded that the rocks are in general bluish grey or darkish in colour and extremely fresh in appearance with an even grained granular structure. Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic ortho pyroxene granite of the series. The alkali feldspar may be intermediate between microcline and orthoclase, the fine micro perthitic texture being common.

Order of superposition of the proposed lease.

| Age                  | Group             | Rock Formation |
|----------------------|-------------------|----------------|
| Recent to Sub recent | ----              | Gravel         |
| Archean              | Charnockite Group | Charnockites   |

The topsoil available at a depth of 0.5m followed by gravel exists up to a depth of 0.5m and the rough stone occurs at a depth of 20m below ground level.

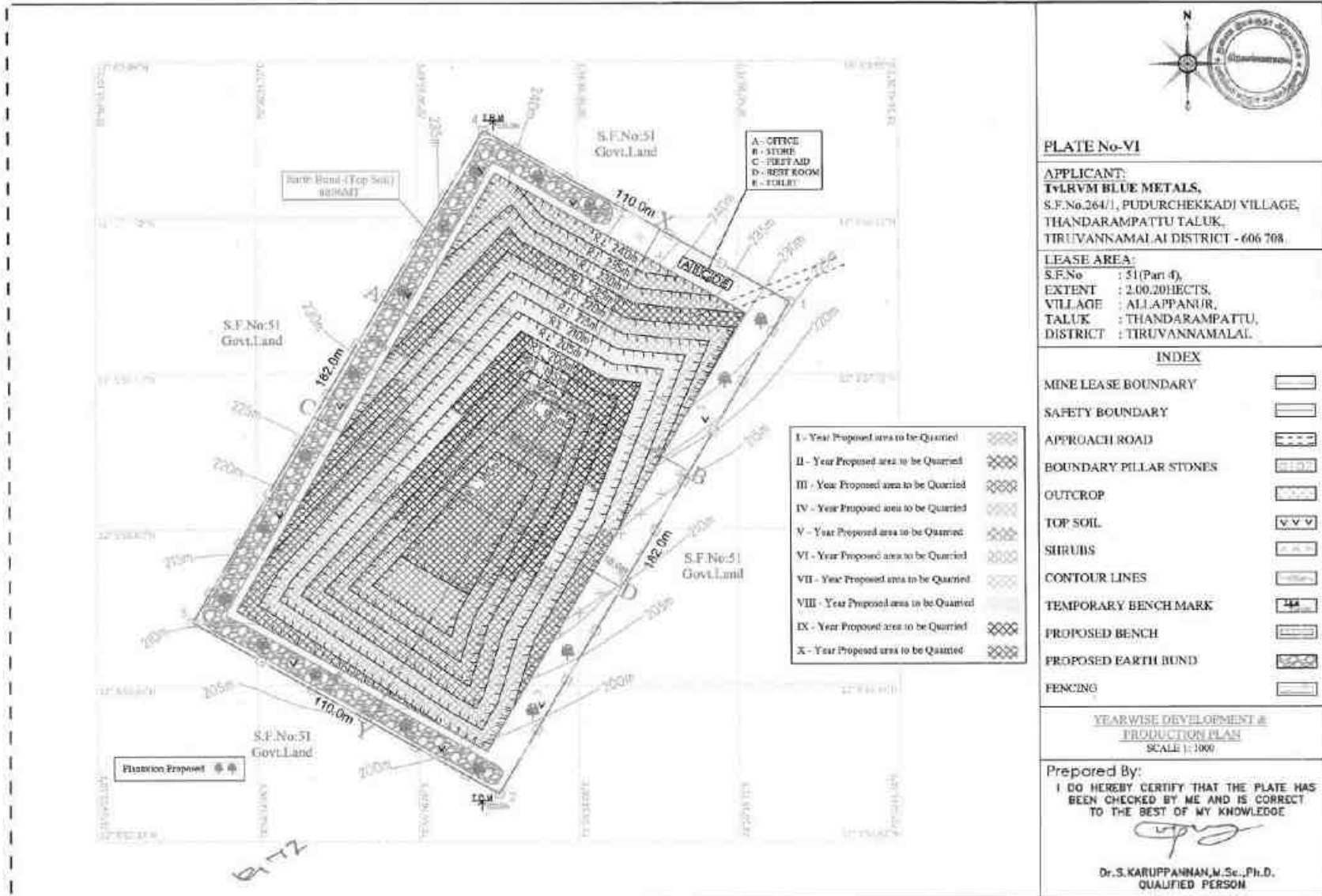
## 2.4 QUANTITY OF RESERVES

The resources and reserves of rough stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety margins, as shown in Figure 2.5 and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 65m (45m AGL + 20m BGL) considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The results of geological resources and reserves is given in Table 2.5 and the approved year wise development plan is enclosed as Figure 2.5 & 2.5a.

**Table 2.5 Estimated Resources and Reserves of the Project**

| Resource Type                                          | Rough Stone in m <sup>3</sup> & Tons | Top Soil in m <sup>3</sup> & Tons |
|--------------------------------------------------------|--------------------------------------|-----------------------------------|
| Geological Resource in (m <sup>3</sup> & Ts)           | 835270 & 2296992                     | 4212 & 8424                       |
| Mineable Reserves in (m <sup>3</sup> & Ts)             | 304295 & 836811                      | 3448 & 6896                       |
| Proposed production for 10 years (m <sup>3</sup> & Ts) | 304295 & 836811                      | 3448 & 6896                       |

*Source: Approved Mining Plan & ToR*



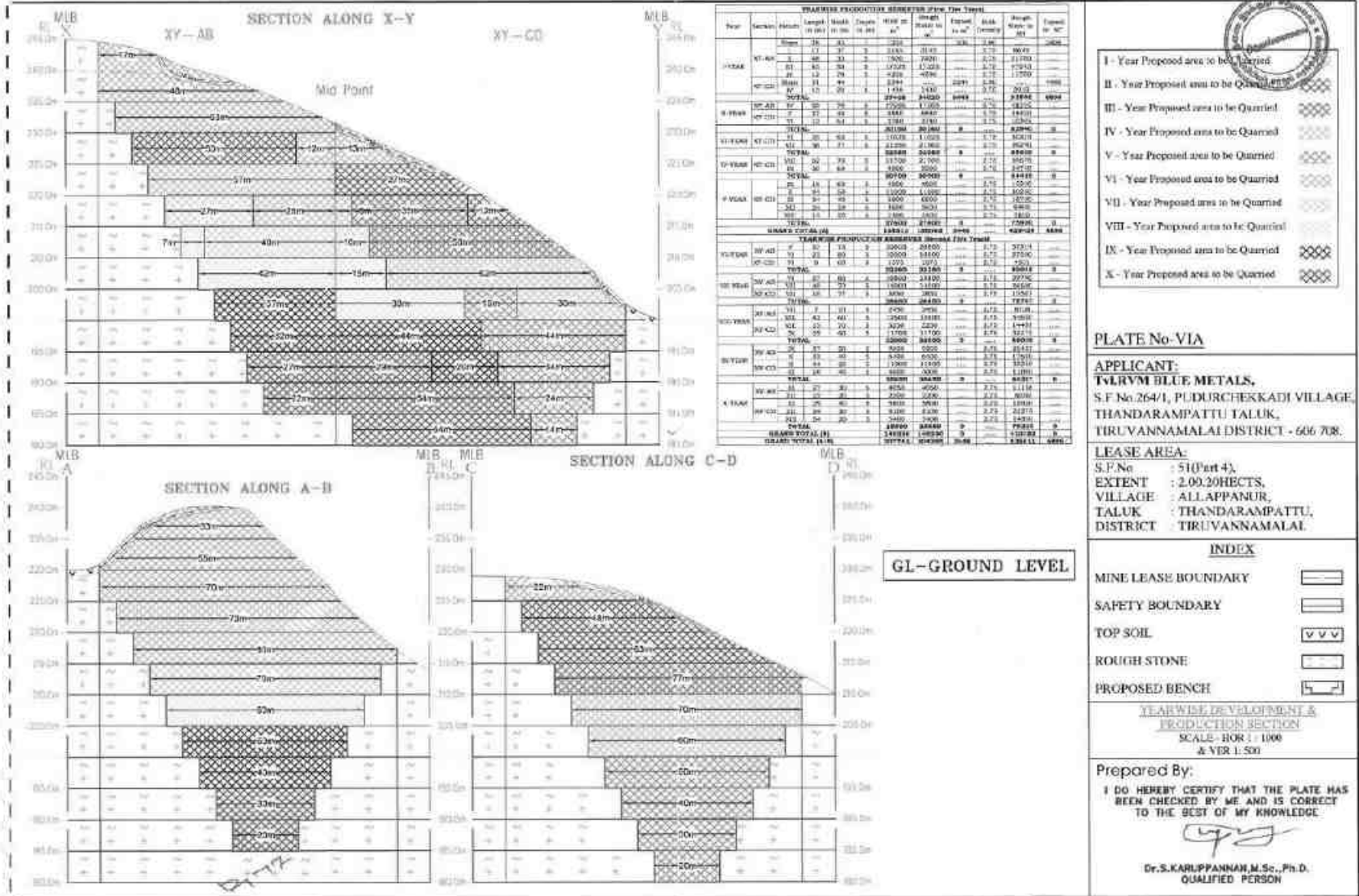


Figure 2.5a Year wise Development & Production Section

## **2.5 MINING METHOD**

The Quarrying operation is proposed to be carried out by open cast semi-mechanized mining method with the bench height and width of 5m each. The open cast semi-mechanized method involving drilling and blasting is proposed to extract rough stone and gravel. The extracted rough stone will be loaded manually to the trucks for dispatch to the customers. In this project, NONEL blasting will be adopted to extract rough stone.

### **2.5.1 Conceptual Blasting Design**

In this project, NONEL blasting will be employed to win rough stone. This method will involve closed spaced perimeter holes to reduce the overbreak/backbreak on a blast. The objective of the blasting design is to prevent fly rocks from damaging the nearby structures.

#### **Rules of Thumb for Blast Design**

Based on practical experience and technical information, a set of rules for blasting have been provided as below (Chapter 8 (nps.gov)). These rules will be applied to blast rocks in the proposed project.

**Rule 1: The detonation velocity (VOD) of the explosive should be close to the same value of the sonic velocity (VSO) of the rock to be blasted.**

The sonic velocity of a rock is considered to be a reliable indicator of its structural integrity and resistance to fragmentation. As the VOD of the explosive approaches close to the VSO of the rock, the blasting would result in relatively smaller size of fragmentation with uniformity. There is no value in using an explosive that has a VOD greatly in excess of the VSO of the rock, since there is little or no improvement in fragmentation above the VSO. When selecting an explosive to match up the VSO of a rock mass, variance of < 10% in the velocities is acceptable.

**Rule 2: Generally, select the densest explosive possible.**

When the density of explosives is higher, the potential energy of the explosives can be greater and the more of it can be placed within a borehole of a given size.

**Rule 3: Select explosives according to the characteristics of the rock formation to be blasted.**

When planes of separation in the rock are smaller than the degree of fragmentation required, the rock can often be blasted by using lower density and lower detonation velocity explosives.

**Rule 4: When using slurry or water gel explosives, always determine the critical temperature below which the explosive will fail to reliably detonate.**

Almost all slurry explosives have a critical temperature below which they may not detonate, or may not sustain detonation in elongated columns. The explosives should not be used when the temperature of the explosive at time of loading is below that critical temperature.

**Rule 5: The distance between holes (spacing) should not be greater than one-half the depth of the borehole.**

When the distance between holes in a row is greater than one-half the depth of the hole, the angles of breakage intersect above the bottom of the holes. This causes both a great deal of vertical throw and a very uneven bottom.

**Rule 6: Stemming should be equal to the burden.**

Stemming is useful to confine and maximize efficient use of the explosive's energy. It also reduces noise as much as possible. If the stemming is greater than the burden, the rock at the top of the borehole will have less cracking from reflection and refraction of compressive and tensile waves. Therefore, stemming should be equal to burden. Drill fines can be used for loading the borehole.

**Rule 7: Subdrill (if necessary) should be between 0.3 and 0.5 of spacing/burden.**

Subdrill should be equal to 0.3 of burden. It will work when there is row-for-row delay. In blasts where the delay system is both row-for-row and hole-for-hole, the subdrill should be determined by the largest dimension, which can be the spacing or the burden. An average subdrill of 0.4 of spacing is best to use for planning purposes. Based on the above-mentioned rules, blasting design has been conceptualized is given in Table 2.6.

**Table 2.6 Conceptual Blasting Design**

|                               |      |
|-------------------------------|------|
| Blast hole Diameter (D) in mm | 32   |
| Burden (B) in m               | 1.5  |
| Spacing (S) in m              | 1.3  |
| Sub drill in m                | 0.45 |
| Charge length (C) in m        | 0.64 |
| Stemming                      | 1.5  |
| Hole Length (L) in m          | 2.6  |
| Bench Height (BH) in m        | 2.1  |

|                                                 |           |
|-------------------------------------------------|-----------|
| Mass of explosive/hole in g                     | 400       |
| Stemming material size in mm                    | 3.2       |
| Burden stiffness ratio                          | 1.43      |
| Blast volume/hole in m <sup>3</sup>             | 4.16      |
| Production of rough stone/day in m <sup>3</sup> | 113       |
| Number of blast holes/day                       | 27        |
| Blast hole pattern                              | Staggered |
| Mass of explosive /day in kg                    | 10.84     |
| Powder factor in kg/m <sup>3</sup>              | 0.10      |
| Loading density                                 | 0.63      |
| Type of explosives                              | Slurry    |
| Diameter of packaging in mm                     | 25        |
| Initiation system                               | NONEL     |
| Fly rock distance in m                          | 19        |

**Statutory Provision & Precaution during Blasting: -**

- Blasting permission from DGMS will be taken by the proponent within 6 months from the date of execution of mine.
- Control blasting will be carried out by using delay detonators during multi rows blasting
- No secondary blasting will be carried out.
- Stemming column will be half of the depth of hole with coarse sand.
- Only Statutory designated Blaster will supervise the blasting operation.
- All persons in the radius of minimum 300m from the blasting site will be removed by siren.
- Blasting operation will be carried out during day time only particularly at noon time.

**2.5.2 Magnitude of Operation**

Based on the results of estimated production the details about the size of operation had provided in Table 2.7.

**Table 2.7 Operational Details for Proposed Project**

|                                        | <b>Rough Stone (m<sup>3</sup>) &amp; Ts /<br/>10 years</b> |
|----------------------------------------|------------------------------------------------------------|
| Proposed production                    | 304295                                                     |
| Number of Working Days                 | 270                                                        |
| Production /Day (m <sup>3</sup> ) & Ts | 113                                                        |
| No. of Lorry Loads                     | 19                                                         |

### 2.5.3 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.8.

**Table 2.8 Machinery Details**

| S. No.                                   | Type         | No. of Unit | Size/Capacity            | Dia of Hole (mm) | Motive Power |
|------------------------------------------|--------------|-------------|--------------------------|------------------|--------------|
| 1                                        | Jack Hammers | 2           | Hand Held                | 32mm             | Diesel       |
| 2                                        | Compressor   | 1           | AIR                      | ---              | Diesel       |
| 3                                        | Excavator    | 1           | 2.9 – 4.5 m <sup>3</sup> | ---              | Diesel       |
| <b>Haulage &amp; Transport Equipment</b> |              |             |                          |                  |              |
| 4                                        | Tipper       | 8           | ---                      | ---              | Diesel       |

### 2.5.4 Post mining land use

The land use at present, at the end of plan period & at the end of conceptual period is given in Table 2.9 below

**Table 2.9 Land Use at the end of mine Life**

| Description             | Present Area (ha) | Area at the end of life of quarry (ha) |
|-------------------------|-------------------|----------------------------------------|
| Area under quarry       | Nil               | 1.46.0                                 |
| Infrastructure          | Nil               | 0.02.0                                 |
| Roads                   | Nil               | 0.05.0                                 |
| Unutilized              | 2.00.2            | 0.07.2                                 |
| Green Belt & Earth Bund | Nil               | 0.40.0                                 |
| <b>Total</b>            | <b>2.00.2</b>     | <b>2.00.2</b>                          |

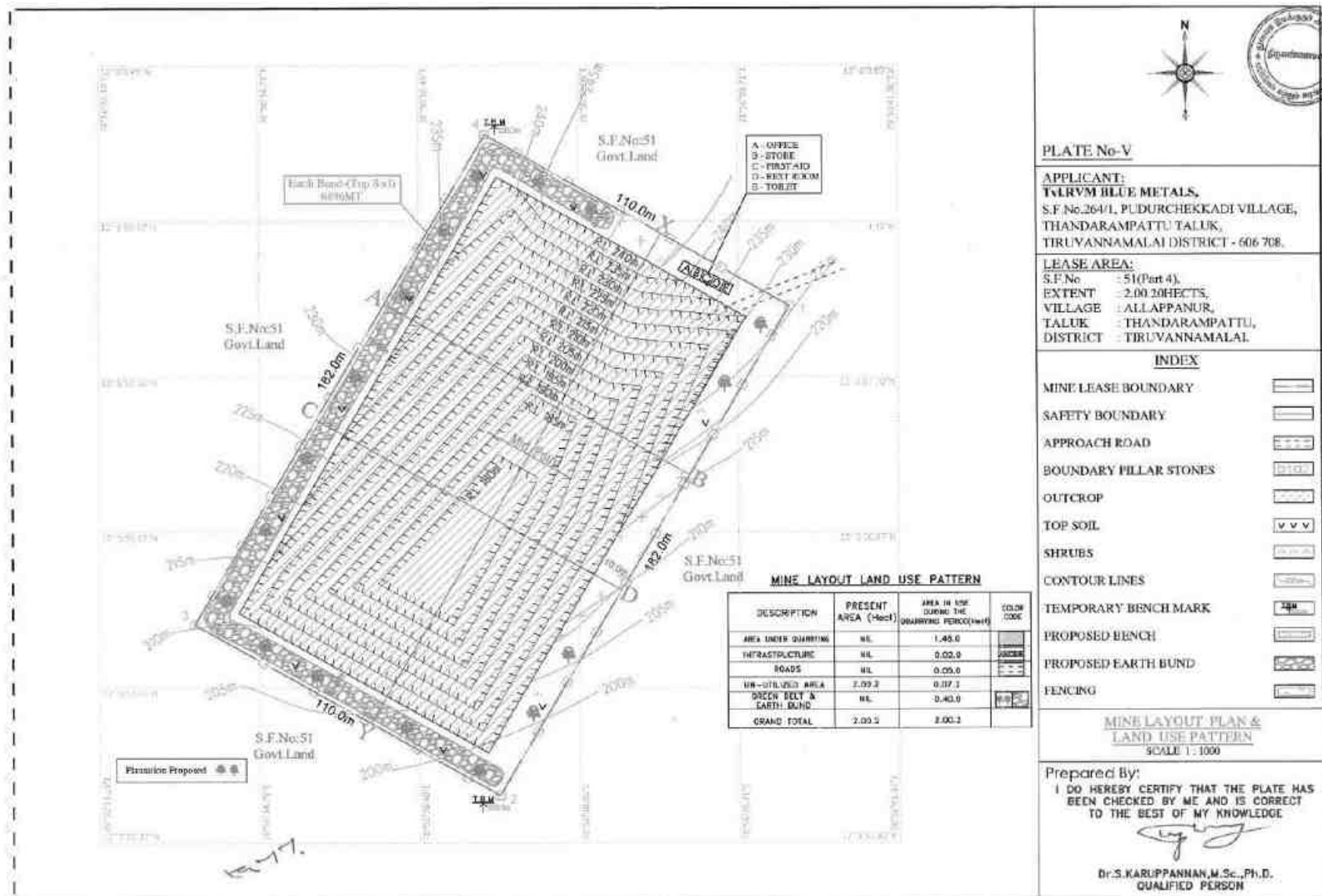


Figure 2.6 Mine Layout Plan and Land Use Pattern

### 2.5.5 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. The ultimate pit dimension is provided in Table 2.10.

**Table 2.10 Ultimate Pit Dimension**

| Pit | Length (m) | Width (m) | Depth (m) |
|-----|------------|-----------|-----------|
| I   | 88         | 80        | 65        |

*Source: Approved Mining Plan & ToR*

### 2.5.6 Infrastructures

Infrastructures like mines office, temporary rest shelters for workers, latrine and urinal facilities have been proposed as per the mine rule and will be established after the grant of quarry lease. There is no proposal for the mineral processing or ore beneficiation plants in this project.

#### ***Other Infrastructure Requirement***

No workshops are proposed inside the project area. Hence, there will not be any process effluent generation from the proposed lease area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. As there is no toxic effluent expected to generate in the form of solid, liquid or gaseous form.

### 2.5.7 Water Requirement

Details of water requirement in 3.5 KLD is given in Table 2.11.

**Table 2.11 Water Requirement for the Project**

| Purpose                   | Quantity       | Source                                         |
|---------------------------|----------------|------------------------------------------------|
| Dust Suppression          | 1.2 KLD        | Existing bore wells nearby the lease area      |
| Green Belt development    | 1.3 KLD        | Existing bore wells nearby the lease area      |
| Drinking & utilized water | 1.0 KLD        | Existing bore wells and approved water vendors |
| <b>Total</b>              | <b>3.5 KLD</b> |                                                |

*Source: Prefeasibility Report*

### 2.5.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12 Around **12,98,626 litres of HSD** will be used for rough stone extraction during 10 years plan period. The diesel will be brought to the site from nearby diesel pumps.

**Table 2.12 Fuel Requirement Details**

| <b>Fuel Requirement for Excavator</b>                               |                                               |                                          |                                 |
|---------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|---------------------------------|
| <b>Details</b>                                                      | <b>Rough Stone<br/>(304295 m<sup>3</sup>)</b> | <b>Top Soil<br/>(3448 m<sup>3</sup>)</b> | <b>Total Diesel<br/>(litre)</b> |
| Average Rate of Fuel Consumption (1/hr)                             | 16                                            | 10                                       | ---                             |
| Working Capacity (m <sup>3</sup> /hr)                               | 20                                            | 60                                       | ---                             |
| Time Required (hours)                                               | 15215                                         | 57                                       | ---                             |
| Total Diesel Consumption for 10 years (litre)                       | 243436                                        | 570                                      | <b>244006</b>                   |
| <b>Fuel Requirement for Compressor</b>                              |                                               |                                          |                                 |
| Average Rate of Fuel Consumption/hole (litre)                       | 0.4                                           | ---                                      | ---                             |
| Number of Drill holes/day                                           | 27                                            | ---                                      | ---                             |
| Total Diesel Consumption for 10 years (litre)                       | 29160                                         | ---                                      | <b>28620</b>                    |
| <b>Fuel Requirement for Tipper</b>                                  |                                               |                                          |                                 |
| Average Rate of Fuel Consumption/Trip (litre)                       | 20                                            | --                                       | ---                             |
| Carrying Capacity in m <sup>3</sup>                                 | 6                                             | --                                       | ---                             |
| Number of Trips / days                                              | 19                                            | --                                       | ---                             |
| Number of Trips / 10 years                                          | 51300                                         | --                                       | ---                             |
| Total Diesel Consumption for 10 years (litre)                       | 1026000                                       | --                                       | <b>1026000</b>                  |
| <b>Total Diesel Consumption by Excavator, Compressor and Tipper</b> |                                               |                                          | <b>1298626</b>                  |

**2.5.9 Capital Requirement**

The project proponent will invest Rs.2,64,49,000/- to the project. The breakup summary of the investment has been given in Table 2.13.

**Table 2.13 Capital Requirement Details**

| <b>S. No.</b>             | <b>Description</b>      | <b>Cost (Rs.)</b>    |
|---------------------------|-------------------------|----------------------|
| 1                         | Fixed Asset Cost        | 2,16,35,000/-        |
| 2                         | Machinery cost (Rental) | 25,00,000/-          |
| 3                         | EMP Cost                | 23,14,000/-          |
| <b>Total Project Cost</b> |                         | <b>2,64,49,000/-</b> |

Source: *Approved Mining Plan*

**2.6 MANPOWER REQUIREMENT**

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community. Number of employees required for this project have been provided in Table 2.14.

**Table 2.14 Employment Potential for the Proposed Project**

| <b>S. No.</b> | <b>Category</b> | <b>Role</b>  | <b>Nos.</b> |
|---------------|-----------------|--------------|-------------|
| 1.            |                 | Mine manager | 1           |

|              |                |                  |           |
|--------------|----------------|------------------|-----------|
|              | Highly Skilled | Mine Engineer    | 1         |
|              |                | Mine Geologist   | 1         |
|              |                | Blaster          | 1         |
| 2.           | Unskilled      | Musdoor/ Labours | 16        |
| <b>Total</b> |                |                  | <b>20</b> |

*Source: Prefeasibility Report*

## 2.7 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO and CTE will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the environmental clearance will be compiled before the start of mining operation. Expected time schedule for the quarrying operation is given in Table 2.15.

**Table 2.15 Expected Time Schedule**

| S. No.                                                                                                | Particulars                                                                                             | Time Schedule (in Months) |                 |                 |                 |                 |                 |                 | Remarks if any                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                       |                                                                                                         | 1 <sup>st</sup>           | 2 <sup>nd</sup> | 3 <sup>rd</sup> | 4 <sup>th</sup> | 5 <sup>th</sup> | 6 <sup>th</sup> | 7 <sup>th</sup> |                                                                                                                                                  |
| 1                                                                                                     | Baseline Environmental Study for preparing EIA report based on the Standard and Specific ToR Conditions |                           |                 |                 |                 |                 |                 |                 | Soil, Water, Air, Noise, Socio Economics, Ecological Biodiversity and Traffic studies to be carried out by NABL accredited Laboratory and FAE's. |
| 2                                                                                                     | Draft EIA Report                                                                                        |                           |                 |                 |                 |                 |                 |                 | Submission to TNPCB                                                                                                                              |
| 3                                                                                                     | Public Hearing Meeting                                                                                  |                           |                 |                 |                 |                 |                 |                 | Minutes will be provided by the Tamil Nadu Pollution Control Board.                                                                              |
| 4                                                                                                     | Final EIA Report (including Public reviews)                                                             |                           |                 |                 |                 |                 |                 |                 | Submission to PARIVESH 2.0 Portal for obtaining EC                                                                                               |
| 5                                                                                                     | SEIAA Meeting                                                                                           |                           |                 |                 |                 |                 |                 |                 | For environmental clearance                                                                                                                      |
| <b>Note:</b> Time line may vary; subjected to rules and regulations /& other unforeseen circumstances |                                                                                                         |                           |                 |                 |                 |                 |                 |                 |                                                                                                                                                  |

*Source: Anticipated based on Timelines framed in EIA Notification & CPCB Guidelines.*

## CHAPTER III

### DESCRIPTION OF THE ENVIRONMENT

#### 3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering **December 2025 through February 2026 with CPCB** guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Accuracy Analabs (OBC) Private Limited** for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio- economy.

#### *Study Area*

The study area has been divided into two zones: core zone and buffer zone. Core zone is considered as lease area and buffer zone as 10 km radius from the periphery of the cluster. Both core and buffer zones are taken as the study area. The data was collected from the study area to understand the existing environment conditions of the above-mentioned environmental components. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1.

**Table 3.1 Monitoring Attributes and Frequency of Monitoring**

| Attribute               | Parameters                                                      | Frequency of Monitoring            | No. of Locations                                                | Protocol                                                                                     |
|-------------------------|-----------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Land Use/<br>Land Cover | Land-use<br>Pattern within<br>10 km radius of<br>the study area | Once during<br>the study<br>period | Study Area                                                      | Satellite Imagery &<br>Primary Survey                                                        |
| *Soil                   | Physico-<br>Chemical<br>characteristics                         | Once during<br>the study<br>period | 5<br>(1 in core & 4 in<br>buffer zone)                          | IS 2720<br>Agriculture Handbook<br>- Indian Council of<br>Agriculture Research,<br>New Delhi |
| *Water<br>Quality       | Physical,<br>Chemical and<br>Bacteriological<br>Parameters      | Once during<br>the study<br>period | 5<br>(2 surface water<br>& 2 ground<br>water, waste<br>water 1) | IS 10500& CPCB<br>Standards                                                                  |

|                        |                                                                                                     |                                                          |                               |                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|
| Meteorology            | Wind speed<br>Wind direction<br>Temperature<br>Cloud cover<br>Dry bulb temperature<br>Rainfall      | 1 hourly continuous mechanical/automatic weather station | 1                             | Site specific primary data & secondary data from IMD Station                        |
| *Ambient Air Quality   | PM <sub>10</sub> PM <sub>2.5</sub> SO <sub>2</sub><br>NO <sub>x</sub>                               | 24 hours, twice a week                                   | 5<br>(1 core & 4 buffer)      | IS 5182 Part 1-23<br>National Ambient Air Quality Standards, CPCB                   |
| *Noise Levels          | Ambient noise                                                                                       | Hourly observation for 24 hours per location             | 5<br>(1 core & 4 buffer zone) | IS 9989<br>As per CPCB Guidelines                                                   |
| Ecology                | Existing flora and fauna                                                                            | Through field visit during the study period              | Study area                    | Primary Survey by Quadrate & Transect Study<br>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.                           |

*\*All monitoring and testing have been carried out as per the Guidelines of CPCB and MoEF & CC.*

### 3.1 LAND ENVIRONMENT

#### 3.1.1 Geology & Geomorphology

##### Geology:

**Rock Types:** The area is dominated by metamorphic rocks of Archaean age, predominantly Charnockite and Granitic Gneiss.

**Minor Minerals:** The region contains intrusions of dolerite dykes (black granite). Other geological features include patches of epidote-hornblende gneiss and magnetite quartzite.

**Subsurface:** The area is part of a hard rock aquifer system, which is crucial for groundwater storage.

The geology of the study area and the proposed area is shown in **Figure 3.3**.

##### Geomorphology:

**Topography:** Thandarampattu has a varied elevation, ranging from approximately 113 to 1,022 meters above sea level.

**Landforms:** The Western portion is part of the Eastern Ghats, including the Javadu hills, forming a rugged terrain. The eastern part consists of pediplains and rolling topography.

**Drainage:** The area drains toward the east, following the general slope of the district, with rivers like the Thenpennaiyar playing a key role in the landscape.

**Soil Type:** Red loamy soils are predominant in the district and the taluk area.

The lease area occurs in shallow weathered pediplain of nearly level terrain with low gradient. These are covered with shallow weathering material ranging from 0 to 5 m. The top soil is generally red soil. The core area soil is fine loamy mixed typic haplustalfs and fine mixed typic rhodustalfs classified in USDA soil taxonomy.

Soils (Alfisols) that are fertile (argillic horizon) have reddish hues (Rhodustalfs have redder tops) fine-loamy texture and are found in semi-arid regions with specific moisture/temperature characteristics indicating important differences in colour, mineralogy (mixed) and management needs for agriculture. Most of the study area is occupied by this unit. The geomorphology of the study area is given in **Figure 3.4**.

### 3.1.2 Land Use/ Land Cover

The study area (5km radius, approximately **8159.38 ha**) around the proposed mine site was classified into seven **LULC Classes** using Sentinel- II imagery. The distribution is dominated by **crop land**, which accounts for over two-thirds of the area.

#### Areal Coverage by LULC Class

- Crop Land: The dominant feature, comprising the maximum area of 6301.85ha (77.23%).
- Fallow Land: FL The second largest class covering 1007.28 ha (12.35%).
- Built-up Area: Accounts for 382.51 ha (4.69%) of the landscape.
- Water Bodies: Including major flows and small tanks totalling 85.24 ha (1.04%).
- Mining Area: Covers 49.55 ha, representing the least percentage of the total area (0.61%).
- Sparse Vegetation: Covers 332.95 ha (4.08%).

**Table 3.2 LULC Statistics of the Study Area**

| S. No.       | Classification   | 2025             |            |
|--------------|------------------|------------------|------------|
|              |                  | Area in Hectares | Area in %  |
| 1            | Water Bodies     | 85.24            | 1.04       |
| 2            | Plantation cover | 332.95           | 4.08       |
| 3            | Crop Lands       | 6301.85          | 77.23      |
| 4            | Built-up Area    | 382.51           | 4.69       |
| 5            | Mining area      | 49.55            | 0.61       |
| 6            | Fallow land      | 1007.28          | 12.35      |
| <b>Total</b> |                  | <b>8159.38</b>   | <b>100</b> |

Source: Sentinel II Satellite Imagery

The LULC changes within a 5km radius study area between 2020 and 2025 is given in Table 3.2a. The data suggests a notable shift from agricultural land toward industrial/ mining activities and urban development alongside a significant increase in water bodies formed by reclaimed mining pits.

### Key LULC Change Observations (2020 – 2025)

**Table 3.2a Comparison of LULC 2020 - 2025**

| LULC Class       | 2020<br>Area (ha) | LULC<br>2020 in % | 2025<br>Area (ha) | LULC<br>2025 in % | Change Trend            |
|------------------|-------------------|-------------------|-------------------|-------------------|-------------------------|
| Water Bodies     | 13.00             | 0.16              | 85.24             | 1.04              | Increase                |
| Plantation cover | 123.82            | 1.52              | 332.95            | 4.08              | Increase                |
| Crop Lands       | 6555.75           | 80.35             | 6301.85           | 77.23             | Significant<br>Decrease |
| Built-up Area    | 316.49            | 3.88              | 382.51            | 4.69              | Significant<br>Increase |
| Mining area      | 15.00             | 0.18              | 49.55             | 0.61              | Increase                |
| Fallow land      | 1135.32           | 13.91             | 1007.28           | 12.35             | Significant<br>Decrease |
| <b>Total</b>     | <b>8159.38</b>    | <b>100</b>        | <b>8159.38</b>    | <b>100</b>        | --                      |

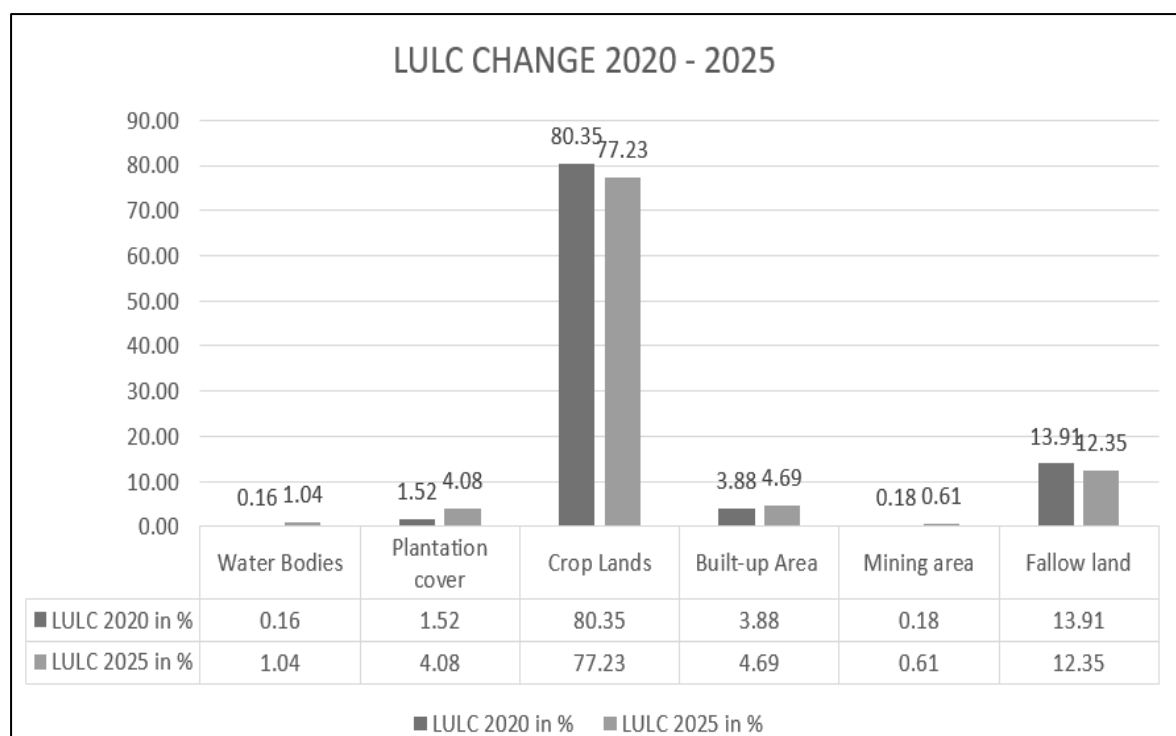
*\*Approximation based on 2020 percentage of total area (~8199.38 ha).*

Source: Sentinel II Satellite Imagery

### Interpretation of Changes

The change in LULC in the year 2020 and 2025 in Figure 3.3 and Figure.3.3a shows a

- **Shift in Economy:** The decrease in crop lands by over 6555.75 ha and increase in mining/industrial areas is attributed to a changing occupational structure. The study suggests that less profitable farming with uncertain yields is driving people towards other economic activities like mining and related industries.
- **Economic Growth Indicators:** The rise in built-up areas is cited as evidence of an increase in the regional economy level fuelled by demand for building materials (stones and sand) for infrastructure development.
- **Land Use Optimization:** The reduction in barren and fallow lands indicates that previously unproductive areas are being utilized for productive activities.
- **Innovative Water Management:** The significant increase in unclassified water bodies (a rise of over 3.4 percentage points) is clarified as the use of mined-out open pits as effective rainwater harvesting structures.



**Figure 3.0 Change in LULC chart 2020 and 2025.**

#### **Shortcomings:**

- A study finds rural settlement growth causes 3.5 times more biodiversity loss than that associated with urban expansion.
- Low-density expansion fragments natural habitats more widely than urban development. Rural expansion tends to be scattered and low-density, spreading indirect impacts (like habitat fragmentation, noise, and light) over a much larger landscape than compact urban growth.
- Rural growth has spread faster into Key Biodiversity Areas than urban expansion.
- Rural expansion often enables small-scale but widespread illegal logging, quarrying, and resource harvesting, whose cumulative impact degrades ecosystems.
- Environmental impact assessments and land-use planning largely focus on cities, industries and large infrastructure projects. Rural settlement growth remains poorly regulated even when it occurs in biodiversity-rich landscapes

#### **3.1.3 Topography**

The terrain is often described as undulating to plain, with gentle slopes generally toward the southwestern side.

- **Elevation and Slope:** The area sits at an average elevation of roughly 190m-200m above Mean Sea Level.

- **Hills/Major Elevations:** The area is essentially consists of plains and rocky outcrops, it is close to the hilly regions of the Jawadhu Hills, which are a major part of the Eastern Ghats in the district.
- **Soil Composition:** the predominant soil found in this region is red loamy soil, along with ferruginous and sandy loam.

The project site is predominantly flat with its maximum elevation of 200 meters located on the north side of the site. The slope is towards south side and falls in Toposheet no. **57- L/16** and the topo-map is given in Figure 3.2.

#### 3.1.4 Drainage Pattern

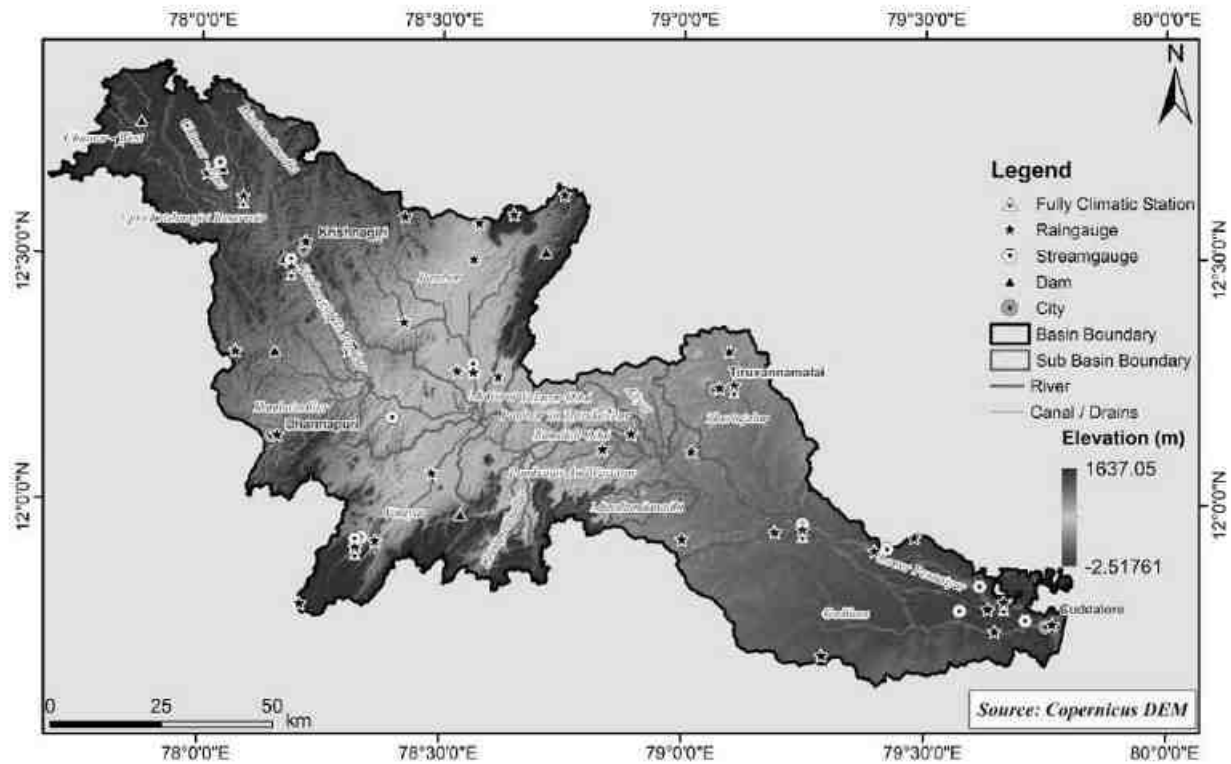
"The study area's drainage pattern is influenced by two major seasonal rivers. The drainage pattern is concordant and is characterized by a **dendritic to sub-dendritic system** with first-order streams."

*(A dendritic drainage pattern is the most common type and resembles the branching pattern of a tree. It typically forms in regions with homogeneous (uniform) underlying rock material where erosion occurs at a similar rate in all directions and the river channel follows the general slope of the terrain. The term "sub-dendritic" suggests a variation of this pattern likely still following the general slope and rock characteristics but perhaps with minor structural influences not significant enough to form a completely different pattern like trellis or rectangular.)*

#### Key Drainage Features of the Study Area

- **Major Water Flows:** The major water flow in Thandarampattu taluk is the Thenpennai River (Pennaiyar), which hosts the Sathanur Dam. Other significant water sources in the region include the Pambanar and Varattar tributaries, along with seasonal flows from the Jawadhu Hills. These, along with numerous tanks, support irrigation in the area:
- Thandarampattu Taluk in Tiruvannamalai District is primarily situated within the **Pambanar and Varattar sub-basin**, which is part of the larger Pennaiyar (Thenpennaiyar) River Basin. The area is characterized by seasonal flows during the northeast monsoon and features key water infrastructure including the Sathanur Reservoir, located in this taluk, which acts as a crucial source for irrigation and drinking water.
- Though the majority of the drainage region is in Tamil Nadu it also includes sections of **Karnataka and Andhra Pradesh** in the southeast and southwest respectively.

- However, droughts in **Karnataka and Tamil Nadu** have been reduced by the construction of several small and medium **irrigation reservoirs**.
- Water availability for both surface and **groundwater irrigation** has improved as a result of this.



**Pennaiyar Basin Boundary Map**

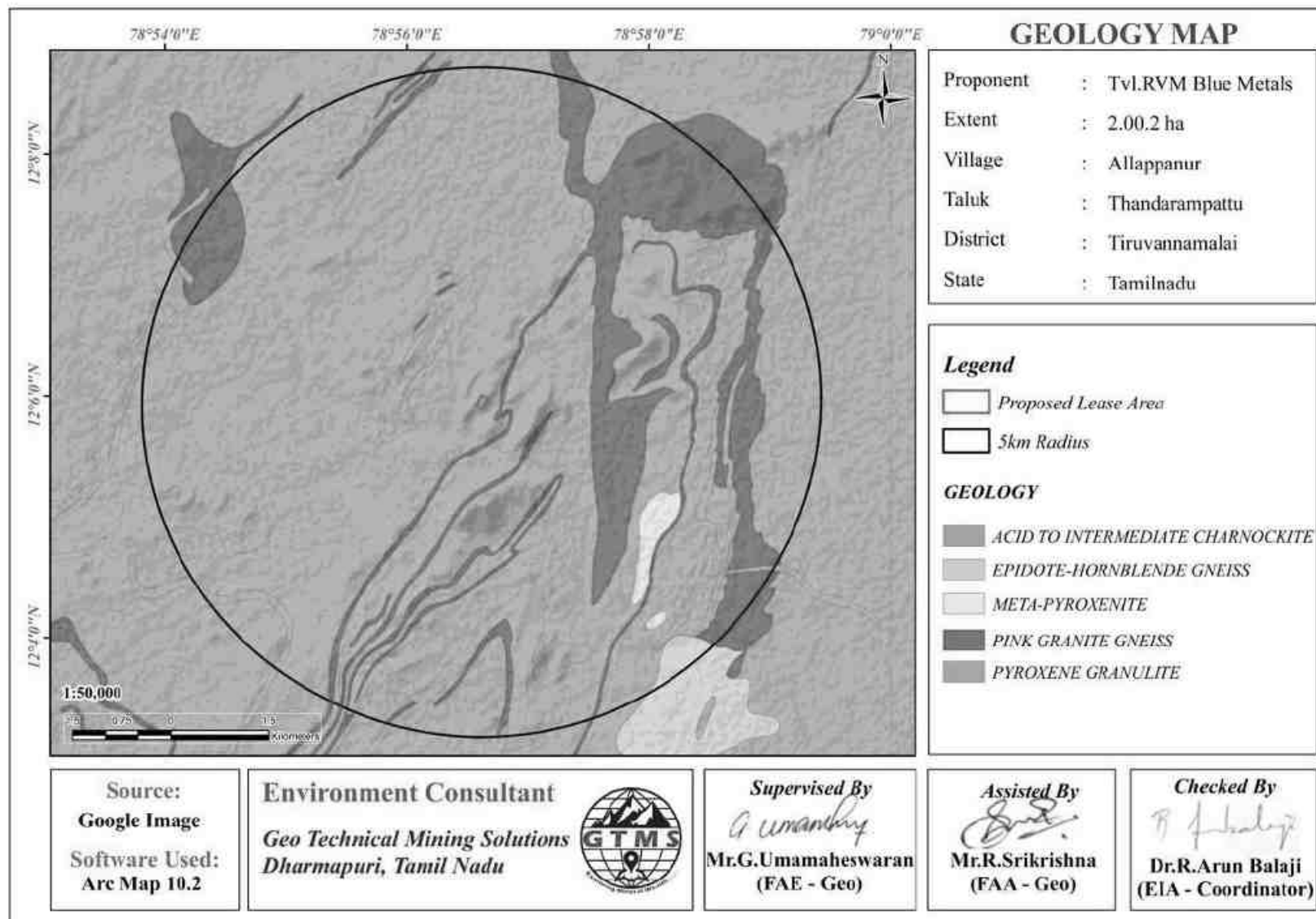
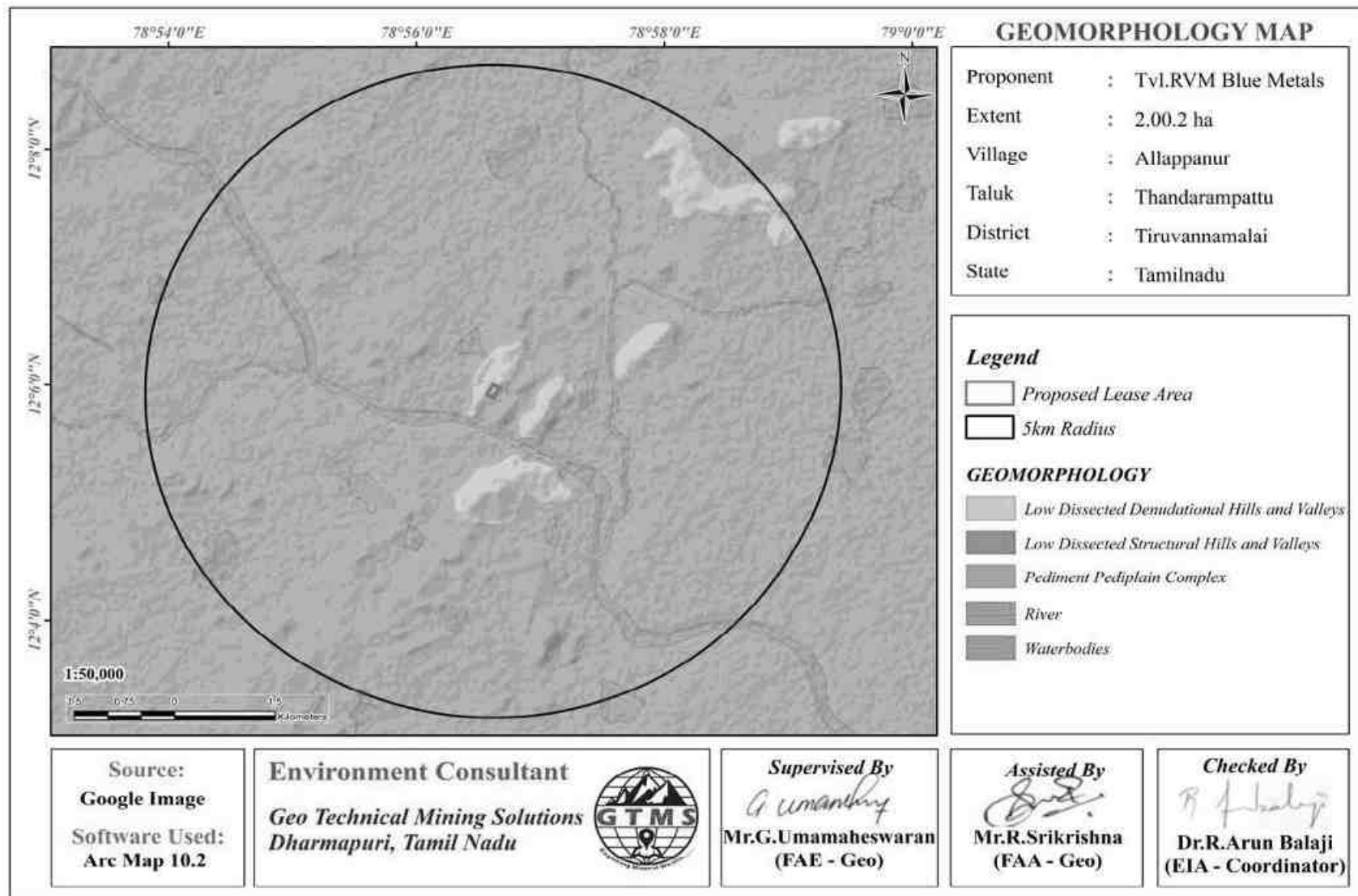


Figure 3.1 Geology Map with 5km Radius around Proposed Project Site



**Figure 3.2 Geomorphology Map with 5km Radius around Proposed Project Site**

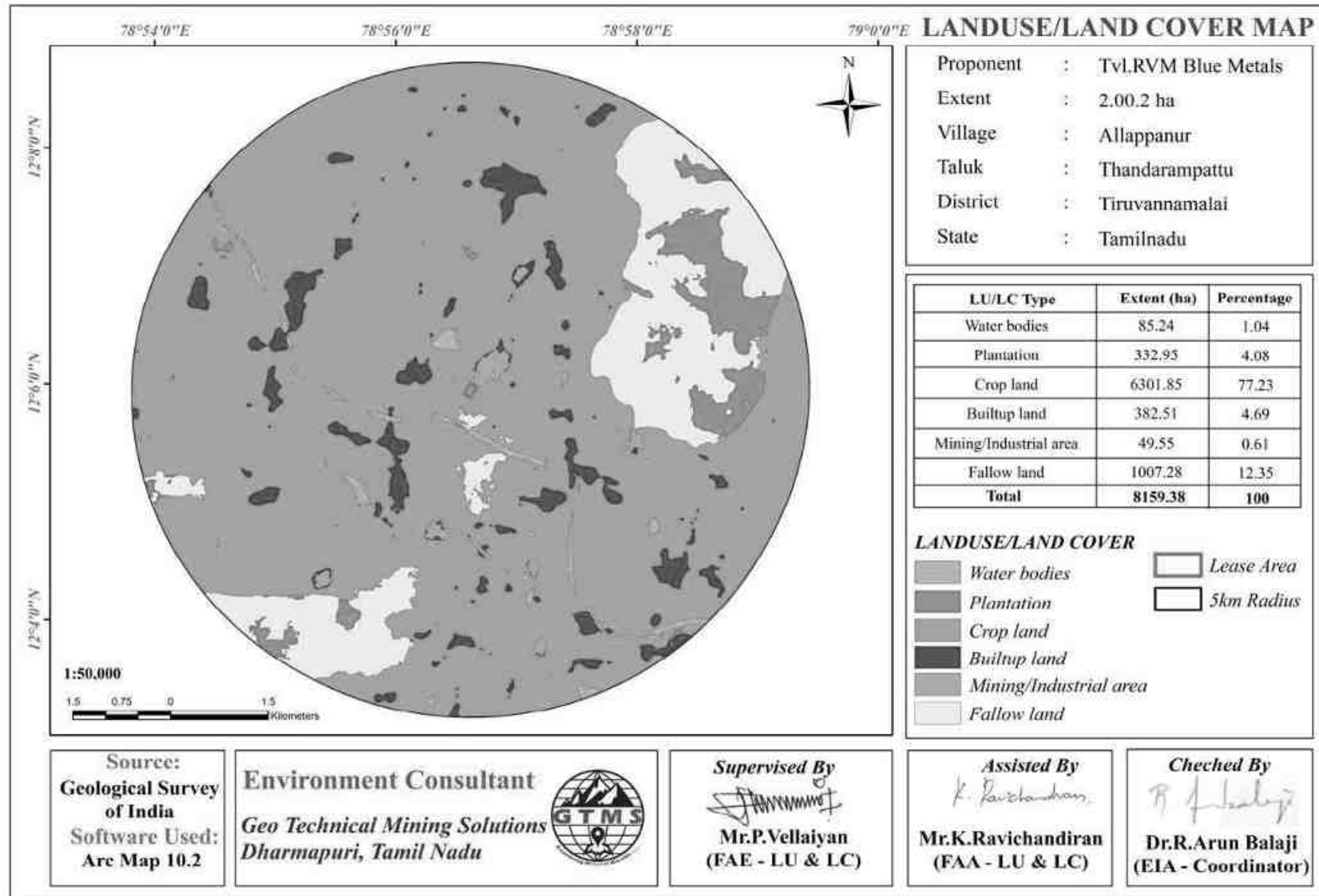


Figure 3.3 LULC Map with 5km Radius around Proposed Project Site

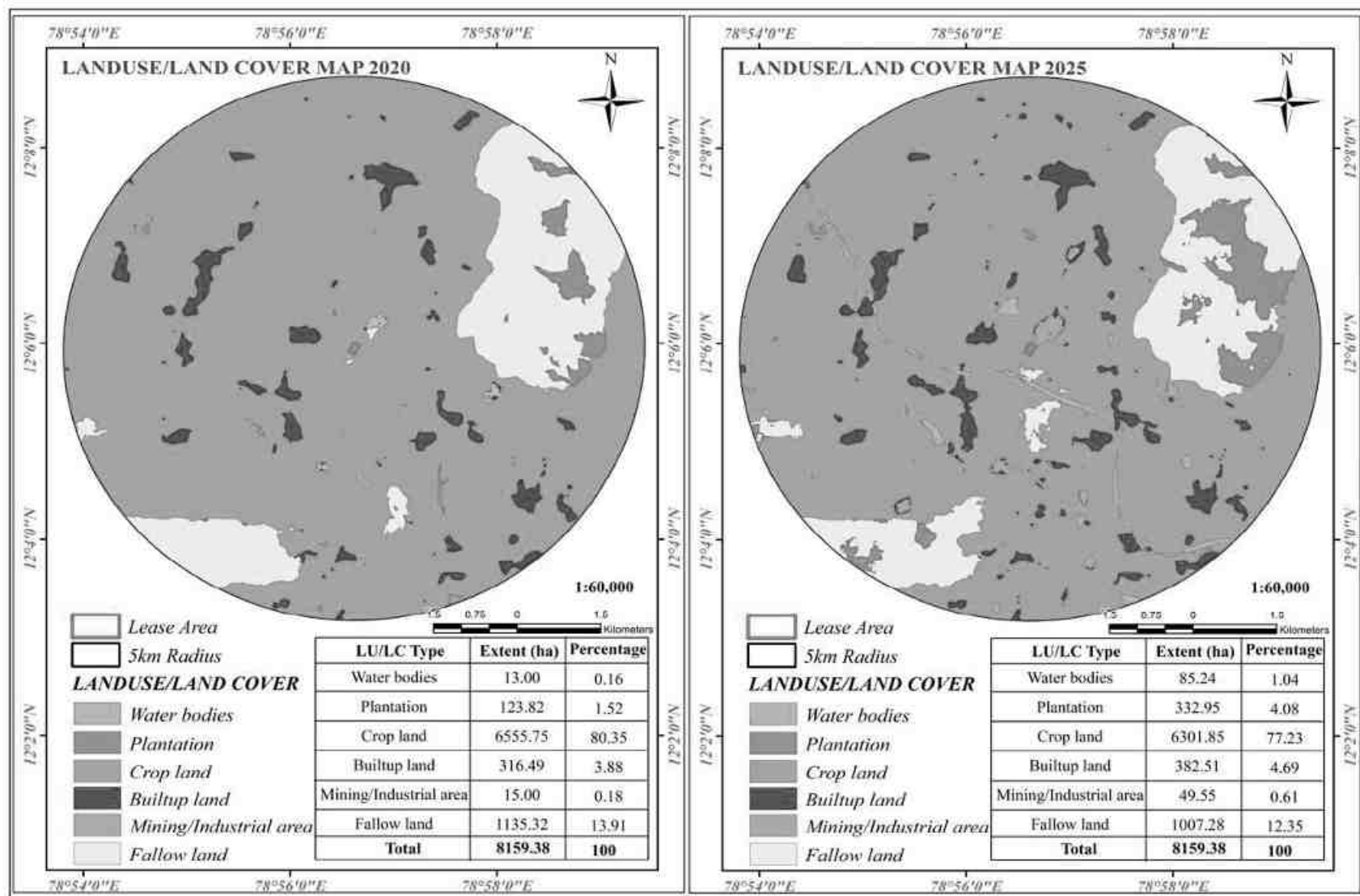


Figure 3.3a Comparison Map of LULC with 5km Radius around Proposed Project Site (2020 & 2025)

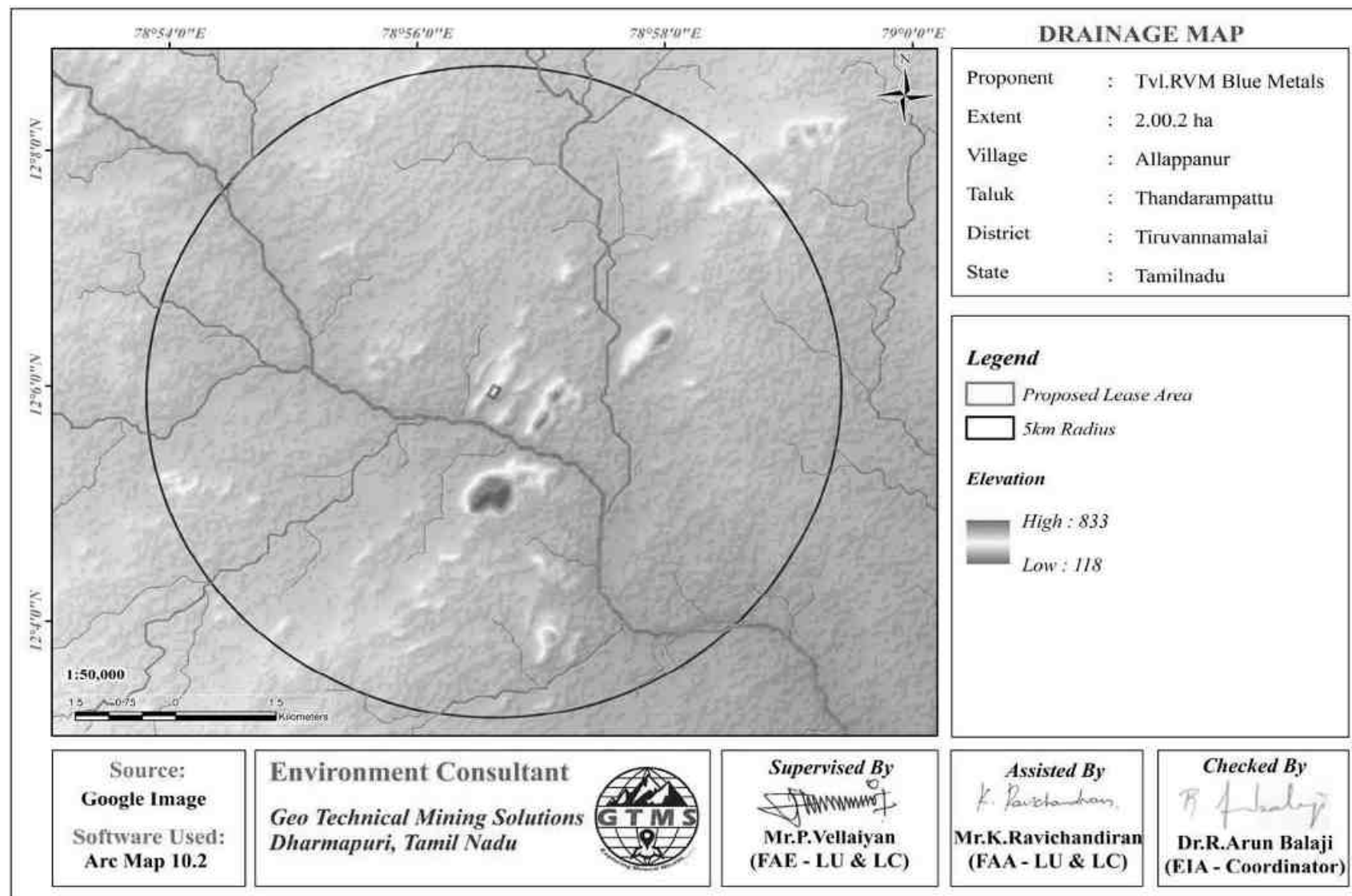


Figure 3.4 Drainage Map with 5km Radius around Proposed Project Site

### 3.1.5 Seismic Sensitivity

The proposed lease area is situated in a Seismic Zone II, as defined by National Centre for Seismology ([Official Website of National Centre of Seismology](#)). The Zone III is defined as the region where only minor damage is expected from seismic events. In this respect, the proposed lease area is located in a low earthquake hazard area.

### 3.2 SOIL ENVIRONMENTAL

The composite soil samples were collected from the 5 locations of the study area and analysed for different parameters. Auger instrument is used to collect samples at the desired depth typically 90cm. The soil samples were placed in rigid paper bags, labelled and then subjected to air drying and sieving in the laboratory. This process ensures the samples are suitable for assessing macro and micronutrients as well as physicochemical properties. The locations of the sampling sites were given in Table 3.3 and shown in Figure 3.5.

**Table 3.3 Soil Sampling Locations**

| Location Id | Monitoring Locations | Distance in m | Direction | Coordinates   |               |
|-------------|----------------------|---------------|-----------|---------------|---------------|
|             |                      |               |           | Latitude      | Longitude     |
| S1          | Core                 | 0.12          | North     | 12° 6'3.96"N  | 78°56'35.63"E |
| S2          | Allappanur           | 0.59          | West      | 12° 6'4.81"N  | 78°56'17.45"E |
| S3          | Kadambadi            | 1.43          | NE        | 12° 6'18.23"N | 78°57'22.92"E |
| S4          | Royandapuram         | 1.22          | SW        | 12° 5'30.07"N | 78°56'3.11"E  |
| S5          | Thondamanur          | 1.98          | SE        | 12° 5'1.73"N  | 78°57'16.58"E |

*Source: On-site monitoring/ sampling Accuracy Analabs (OBC) Private Limited, in association with GTMS.*

#### 3.3.1 Physical Characteristics & Chemical Characteristics

##### 1. Soil pH and Electrical Conductivity (EC):

- **pH** ranged from 7.15 to 7.85 indicating that the soil is **neutral to slightly alkaline**, which is favourable for most crops.
- **EC** value ranged from 0.27 to 0.38dS/cm, suggesting low salt concentration and non-saline soil across the sampling area.

##### 2. Physical Properties

- **Moisture** values ranged from 8.65 to 9.39%, which are within the typical range for loamy soils and support good root penetration and aeration.

##### 3. Soil Fertility Status:

- **Organic matter** levels ranged from 2.32 to 4.23% by weight, classifying soils as low to moderately fertile in terms of organic matter.

- **Nitrogen (N)** content varied from 37.0 to 45.0mg/kg by mass indicating moderate nitrogen availability.
- **Potassium (K)** ranged from 59.0 to 75.0mg/kg by mass moderate fertility potential in terms of potassium.
- **Phosphorous (P)** ranged from 14.0 to 18.0mg/kg by mass moderate fertility potential in terms of Phosphorous.

#### 4. Base Elements and Cation Ratios:

- **Manganese (Mg)** ranged from 70.0 to 96.4mg/kg.
- **Zinc (Zn)** ranged from 0.7 to 1.5mg/kg.

#### Conclusion:

The soils in the study area are generally non- saline, neutral to slightly alkaline and moderately fertile with low contamination levels. They exhibit good permeability, porosity, and suitable textural classes for agriculture and greenbelt development. The absence of heavy metals confirms that baseline soil conditions are unpolluted and safe for reclamation and vegetation growth.

**Table 3.4 Soil Quality of the Study Area**

| S. No                      | Parameters                    | Unit  | S1   | S2   | S3   | S4   | S5   |
|----------------------------|-------------------------------|-------|------|------|------|------|------|
| <b>Physical Parameters</b> |                               |       |      |      |      |      |      |
| 1                          | pH @25 <sup>0</sup> C         | -     | 7.85 | 7.43 | 7.69 | 7.15 | 7.47 |
| 2                          | Electrical Conductivity       | dS/m  | 0.38 | 0.27 | 0.36 | 0.32 | 0.33 |
| 3                          | Organic Carbon                | %     | 1.9  | 1.6  | 1.4  | 1.8  | 1.9  |
| 4                          | Moisture                      | %     | 9.16 | 8.75 | 9.39 | 8.65 | 9.31 |
| 5                          | Organic Matter                | mg/kg | 3.15 | 3.34 | 4.23 | 2.32 | 3.21 |
| 6                          | Available Nitrogen            | mg/kg | 39   | 45   | 37   | 43   | 44   |
| 7                          | Available Phosphorous         | mg/kg | 14   | 17   | 15   | 17   | 18   |
| 8                          | Available Potassium           | mg/kg | 71   | 75   | 59   | 71   | 69   |
| 9                          | Iron                          | mg/kg | 3.3  | 2.5  | 3.2  | 3.1  | 2.8  |
| 10                         | Manganese                     | mg/kg | 4.2  | 4.1  | 5.1  | 3.8  | 4.5  |
| 11                         | Zinc                          | mg/kg | 0.7  | 1.2  | 0.8  | 1.5  | 0.9  |
| 12                         | Copper                        | mg/kg | 0.6  | 0.6  | 0.6  | 1.1  | 1.6  |
| 13                         | Sodium Absorption Ratio (SAR) | -     | 8    | 6    | 8    | 8    | 10   |

Source: Sampling Results by Accuracy Analabs (OBC) Private Limited, in Association with GTMS

**Table 3.4a Assigning Scores to Soil Quality Indicators**

| S. No. | OM   | PH | EC | Total Score | Recommendation                                  |
|--------|------|----|----|-------------|-------------------------------------------------|
| S1     | 3.15 | 6  | 5  | 14.15       | The soil requires major and immediate treatment |
| S2     | 3.34 | 6  | 5  | 14.34       |                                                 |
| S3     | 4.23 | 6  | 5  | 15.23       |                                                 |
| S4     | 2.32 | 9  | 5  | 16.32       |                                                 |
| S5     | 3.21 | 6  | 5  | 14.21       |                                                 |

Organic Matter- (%- 0.1 to 2.0- 15), (2.5 to 3.5- 20), (3.5 to 5.0- 25), Bulk Density- (0.64 to 0.92- 6), (0.92 to 0.98- 3), (0.98> - 1) pH- (5.8 to 7.3- 9), (7.3 to 8.0- 6), (8.0> - 3), Electrical Conductivity-dS/m (<0.98- 5), (0.98 to 1.71- 3), (1.71> - 1)

OM (Organic Matter) BD (Bulk Density) pH (Potential of Hydrogen) EC (Electrical Conductivity) Source: PSS-2262\_Soil\_Quality\_Monitoring.pdf (okstate.edu) .

### **Agricultural Suitability Evaluation**

Due to the dominant sandy loam texture, low organic matter content, and favourable drainage characteristics, the soil is more suitable for horticultural crops than for conventional wet-paddy cultivation.

| Feature              | Paddy Suitability                             | Horticulture Suitability                          |
|----------------------|-----------------------------------------------|---------------------------------------------------|
| Texture (Sandy Loam) | Low (Poor water retention)                    | High (Good drainage and aeration)                 |
| pH (7.35 – 8.53)     | Moderate (Paddy prefers acidic 5.5–6.5)       | High (Suitable for citrus, pomegranate, guava)    |
| Organic Matter       | Critically Low (Requires heavy organic input) | Low (Manageable with regular compost application) |
| Nutrients (NPK)      | Deficient (Requires heavy fertilization)      | Deficient (Requires balanced nutrient management) |

### **Stress Relaxation Behaviour of Soil**

Based on the sandy loam texture, very low organic matter content (<0.36%), and moderate cation exchange capacity (19.3– 22.5meq/100g), the soil is expected to exhibit rapid initial stress relaxation followed by a relatively high residual stress.

Unlike organic-rich soils, which continue to relax over extended periods due to elastic organic matrices, the present soils show limited long-term stress dissipation capacity.

## Impact of Vehicular Movement on Soil Sample S1

The cumulative stress generated by repeated vehicle movement over soil sample S1 (Sandy Loam to Silt) significantly degrades soil quality by increasing the silt fraction and reducing particulate organic matter, which directly affects plant growth and soil functionality.

### Increase in Silt and Particulate Matter

Vehicle- induced stress physically alters soil texture through particle crushing and aggregate fragmentation:

- High dynamic stress from vehicle tires, concentrated within the top 0–20cm soil layer, acts as a mechanical milling force.
- Larger sand grains (67% in S1) and coarse particles collide and fracture under repeated pressure.
- This process shifts the grain-size distribution toward finer silt-sized particles.

### Impact on Plant Growth

The gradual transformation toward a denser and silt-rich soil structure creates unfavourable growth conditions:

- Increasing silt content fills remaining macropores, rapidly increasing bulk density (1.0–1.08g/cc).
- Higher soil strength restricts root elongation, leading to root impedance and shallow root systems.
- Fine pore dominance reduces aeration and drainage, causing oxygen deficiency (hypoxia) in the root zone.

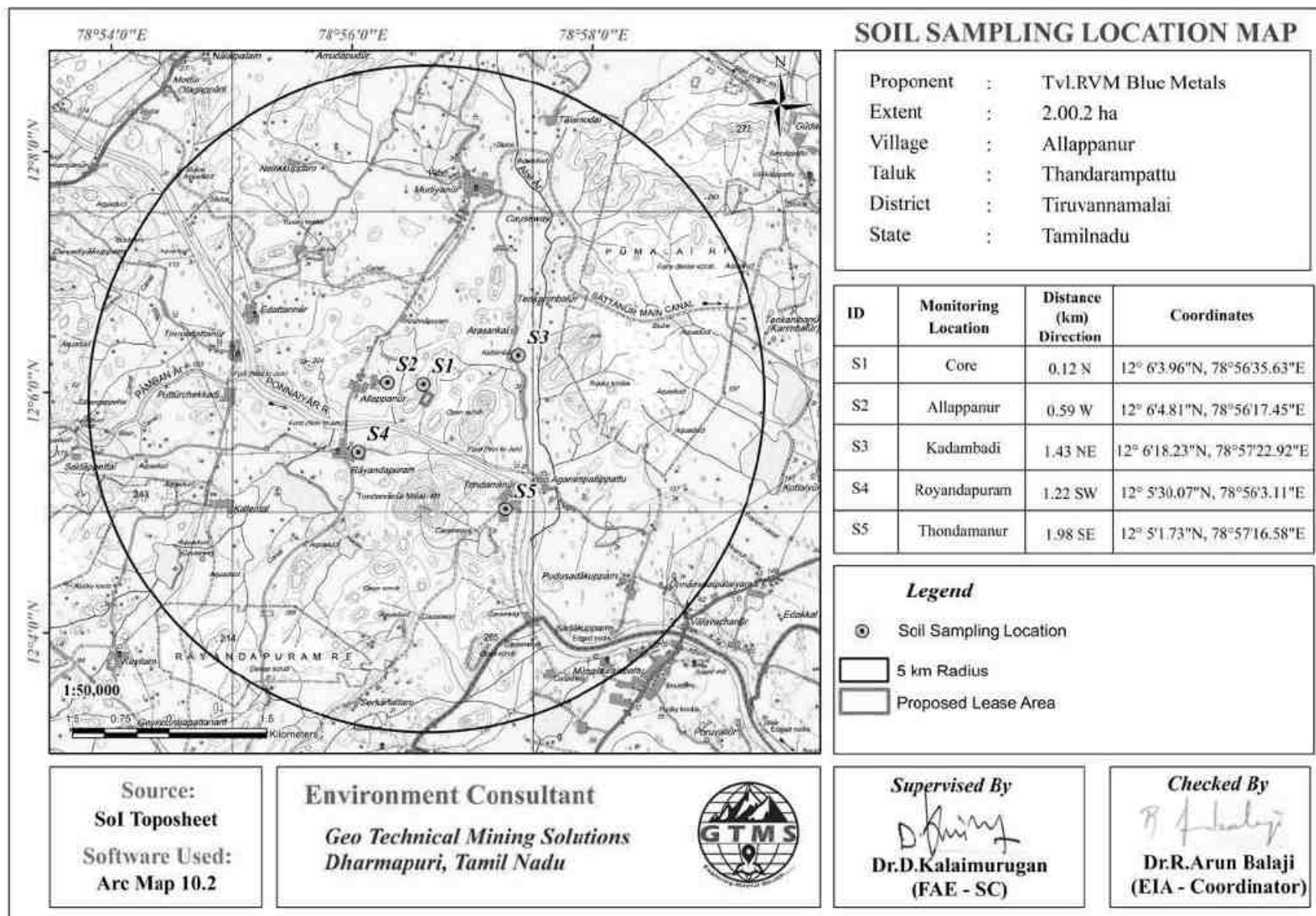
### Preventive Measures for Soil Protection

To minimize siltation and compaction effects:

- **Surface contact pressure should be maintained below 150kPa**
- Vehicle movement should be avoided when soil moisture is high (7–10%), as wet soil conditions act as a lubricant
- Moist soils accelerate particle breakdown and promote deep- seated compaction

#### Summary of Vehicular Stress Effects on Soil Sample S1

| Soil Component | Change Due to Stress                        | Effect on Plant Growth            |
|----------------|---------------------------------------------|-----------------------------------|
| Silt Content   | Increases due to grain crushing             | Restricts root penetration        |
| Bulk Density   | Increases rapidly                           | Reduces air and water movement    |
| Organic Matter | Fragmentation and accelerated decomposition | Loss of nutrient-holding capacity |
| Pore Structure | Loss of macropores                          | Causes root hypoxia               |



**Figure 3.5 Map Showing Soil Sampling Locations within 5km Radius around Proposed Project Site**

### 3.3 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the baseline quality of surface and ground water.

**Table 3.5 Water Sampling Locations**

| Sampling ID | Location         | Distance (km) | Direction | Coordinates   |               |
|-------------|------------------|---------------|-----------|---------------|---------------|
|             |                  |               |           | Latitude      | Longitude     |
| SW1         | Allappanur Lake  | 0.56          | North     | 12° 6'17.60"N | 78°56'31.79"E |
| SW2         | Thenpennai River | 0.46          | South     | 12° 5'40.43"N | 78°56'28.67"E |
| OW1         | Allappanur       | 0.62          | West      | 12° 6'0.09"N  | 78°56'13.88"E |
| OW2         | Kadambadi        | 1.23          | NE        | 12° 6'15.29"N | 78°57'17.26"E |
| OW3         | Thondamanur      | 2.09          | SE        | 12° 4'58.70"N | 78°57'18.89"E |

*Source: On-site monitoring/sampling Accuracy Analabs (OBC) Private Limited. Ltd, in association with GTMS.*

#### 3.3.1 Ground and Surface Water Quality– Resources & Results

The water quality assessment was carried out based on the analytical results presented in Table 3.6 and evaluated with reference to **IS 10500:2012 (Drinking Water Standards)** and **IS 11624:2019 (Indian Standard for Irrigation Water)**. The samples include surface water (SW2 – Thenpennai River, SW2- Allappanur Lake), Open well (OW1), Open well (OW2) and Open well (OW3).

Overall, **groundwater samples (OW1)** exhibit comparatively better and more stable quality than the **surface water samples (SW1 and SW2)**, while the shows slightly higher turbidity and dissolved solids but remains within permissible limits for irrigation use.

#### General Water Quality Interpretation

- **Safety Rating:** All samples comply with the **permissible limits of IS 10500:2012** for drinking water, except for marginal exceedances in turbidity, total hardness and iron in surface water samples.
- **pH:** The pH values range from **6.53 to 7.37**, indicating **neutral to slightly alkaline nature**, well within the acceptable range (6.5–8.5). This pH is suitable for drinking, domestic use and irrigation.
- **TDS & Taste:** TDS values range from **486 to 718 mg/L**. Surface water (SW2) and wastewater (WW) slightly exceed the acceptable limit of 500 mg/L but remain well below the permissible limit of 2000 mg/L. Such levels may impart a mildly mineralized taste but do not pose health risks.

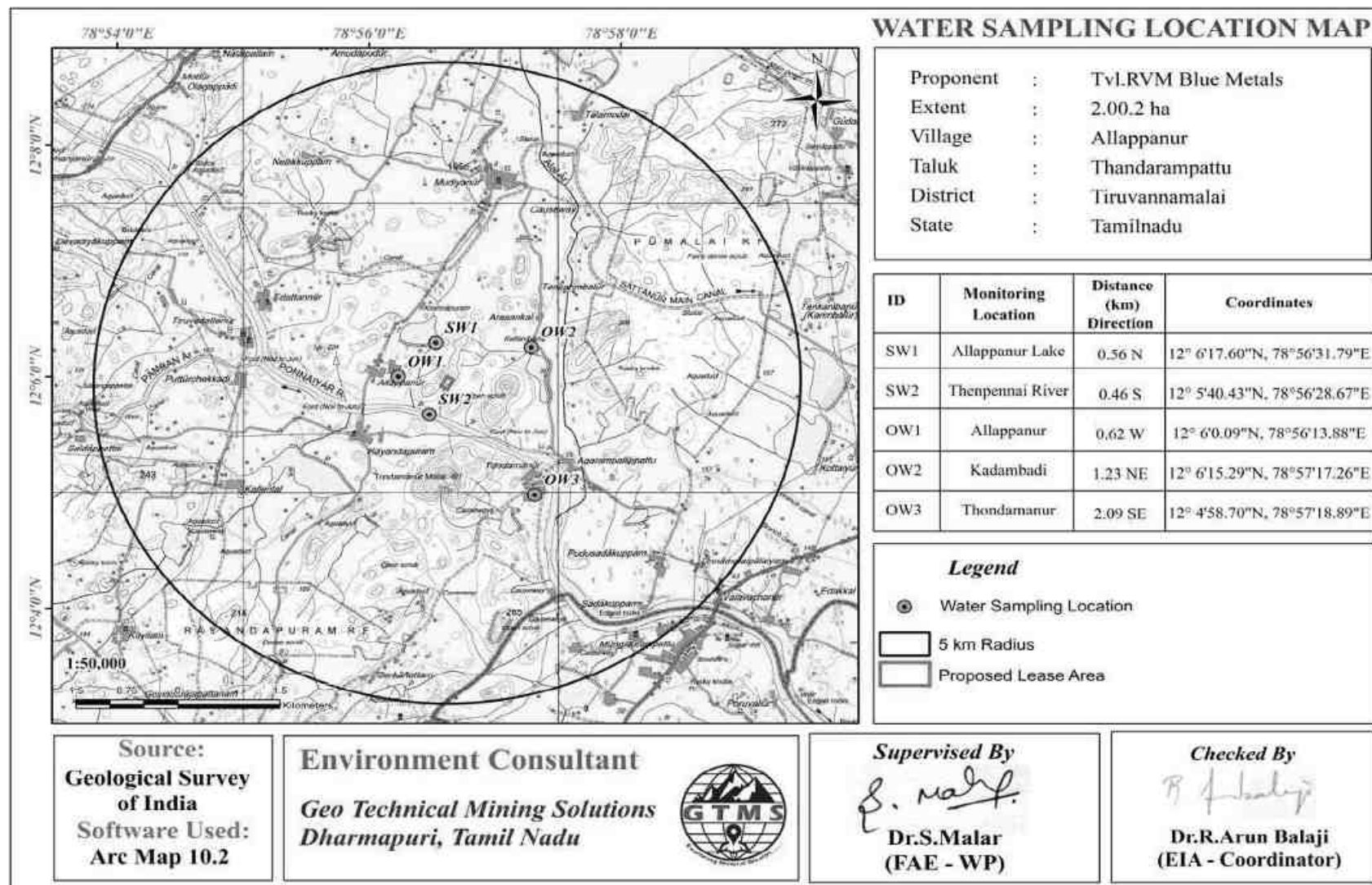
•Hardness: Total hardness varies from 171 to 241 mg/L, classifying the water as moderately hard to hard. SW2 and OW1 marginally exceed the acceptable limit of 200 mg/L but remain far below the permissible limit of 600mg/L.

•Health Perspective: Calcium and magnesium concentrations are within safe limits and contribute essential minerals without causing excessive scaling or health issues.

#### **Interpretation of Water Quality Results (Based on IS 10500:2012)**

| <b>Parameter</b>         | <b>Observed Range (All Samples)</b> | <b>Acceptable Limit</b> | <b>Permissible Limit*</b> | <b>Status &amp; Interpretation</b>                                |
|--------------------------|-------------------------------------|-------------------------|---------------------------|-------------------------------------------------------------------|
| pH @ 25°C                | 6.53 – 7.37                         | 6.5 – 8.5               | No relaxation             | Safe – All samples within ideal range                             |
| Turbidity (NTU)          | 0.7 – 2.1                           | 1.0                     | 5.0                       | Exceeds acceptable in SW2 & WW; may indicate suspended matter     |
| Colour (Hazen)           | 5 – 10                              | 5                       | 15                        | Marginal exceedance in OW1 & WW; aesthetic concern only           |
| TDS (mg/L)               | 486 – 718                           | 500                     | 2000                      | Exceeds acceptable in SW2, OW1 & WW; safe under permissible limit |
| Calcium (as Ca) (mg/L)   | 58.8 – 85.0                         | 75                      | 200                       | Slight exceedance in SW2 & OW1; contributes to hardness           |
| Total Hardness (mg/L)    | 171 – 241                           | 200                     | 600                       | Exceeds acceptable in SW2 & OW1; classified as hard water         |
| Chloride (mg/L)          | 136 – 215                           | 250                     | 1000                      | Safe in all samples                                               |
| Fluoride (mg/L)          | 0.16 – 0.51                         | 1.0                     | 1.5                       | Safe – Ideal range                                                |
| Nitrate (mg/L)           | 6.7 – 12.3                          | 45                      | No relaxation             | Safe – No health risk                                             |
| Iron (mg/L)              | 0.11 – 0.36                         | 0.3                     | No relaxation             | Slight exceedance in SW2; may cause staining                      |
| Total Coliform / E. coli | Absent                              | Absent                  | Absent                    | Satisfactory – No fecal contamination                             |

\*Permissible limit applies in the absence of an alternate source.



**Figure 3.6 Map Showing Water Sampling Locations within 5km Radius around Proposed Project Site**

**Table 3.6 Surface and Ground Water Quality Result**

| S. No. | Parameters                | Units      | Results     |                  |                 |             |               |
|--------|---------------------------|------------|-------------|------------------|-----------------|-------------|---------------|
|        |                           |            | SW1         | SW2              | OW1             | OW2         | OW3           |
| 1      | Location                  | -          | Allappanur  | Thenpennai River | Nearby Suruttal | Menallur    | Vadakalpakkam |
| 2      | pH                        | -          | 7.05        | 7.25             | 7.42            | 7.30        | 7.34          |
| 3      | Colour                    | Hazen      | BGl (1.0)   | BGl (1.0)        | BGl (1.0)       | BGl (1.0)   | BGl (1.0)     |
| 4      | Odour                     | Odourless  | Agreeable   | Agreeable        | Agreeable       | Agreeable   | Agreeable     |
| 5      | Temperature               | °C         | 25          | 25               | 25              | 25          | 25            |
| 6      | Taste                     | Agreeable  | Agreeable   | Agreeable        | Agreeable       | Agreeable   | Agreeable     |
| 7      | Turbidity                 | NTU        | BQL (1.0)   | BQL (1.0)        | BQL (1.0)       | BQL (1.0)   | BQL (1.0)     |
| 8      | Electrical Conductivity   | µs/cm      | 576         | 680              | 838             | 938         | 1160          |
| 9      | Total Dissolved Solids    | mg/L       | 379         | 420              | 598             | 670         | 747           |
| 10     | Aluminium as Al           | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 11     | Barium as Ba              | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 12     | Boron as B                | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 13     | Calcium as Ca             | mg/L       | 66          | 61               | 130             | 75          | 121           |
| 14     | Chloramines               | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 15     | Chloride as Cl            | mg/L       | 92          | 80               | 161             | 112         | 169           |
| 16     | Copper as Cu              | -          | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 17     | Fluoride as F             | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 18     | Iron as Fe                | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 19     | Magnesium as Mg           | mg/L       | 28          | 21               | 41              | 42          | 41            |
| 20     | Manganese as Mn           | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 21     | Nitrate as NO3            | mg/L       | 12          | 15               | 24              | 31          | 32            |
| 22     | Sulphate (as SO4)         | mg/L       | 41          | 6                | 75              | 64          | 72            |
| 23     | Sulphide (as H2S)         | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 24     | Total Hardness (as CaCO3) | mg/L       | 240         | 252              | 320             | 343         | 449           |
| 25     | Zinc (as Zn)              | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 26     | Cadmium (as Cd)           | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 27     | Lead (as Pb)              | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 28     | Mercury (as Hg)           | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 29     | Nickel (as Ni)            | mg/L       | BQL (0.001) | BQL (0.001)      | BQL (0.001)     | BQL (0.001) | BQL (0.001)   |
| 30     | Total Coliform            | MPN/100 ml | Absent      | Absent           | Absent          | Absent      | Absent        |
| 31     | Escherichia Coli          | MPN/100 ml | Absent      | Absent           | Absent          | Absent      | Absent        |
| 32     | Total Plate Count         | Cfu/ml     | Absent      | Absent           | Absent          | Absent      | Absent        |

Source: Sampling Results by Accuracy Analabs (OBC) Private Limited. Ltd in association with GTMS.

### Irrigation Water Suitability (IS 11624:2019)

- **Electrical Conductivity (EC):** EC values range from **850 to 1213  $\mu\text{mhos/cm}$** , placing the water in **medium salinity class**. This category is suitable for most crops with normal soil management practices.
- **Specific Ions:** Chloride, sulphate and nitrate concentrations are low and pose **no risk of leaf burn**, even under sprinkler irrigation.
- **Organic Pollution:** BOD values are below detection limits in all samples, indicating **no organic contamination**.

### Paddy & Crop Suitability Assessment

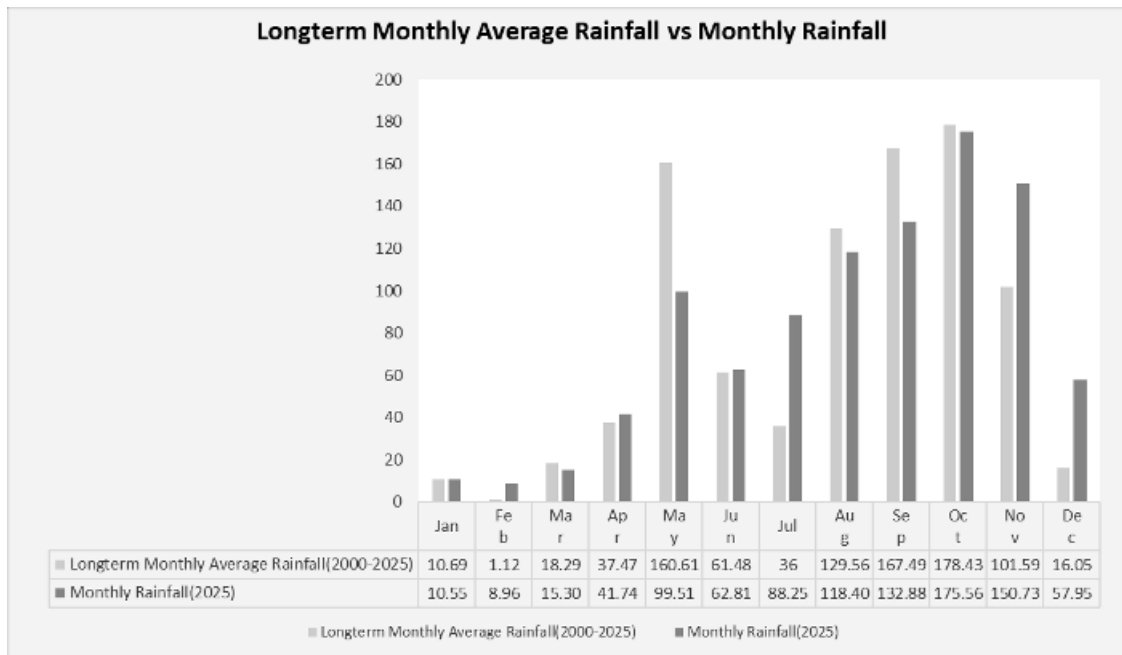
| Parameter                  | SW / GW Range | Recommended Limit (Paddy) | Suitability   |
|----------------------------|---------------|---------------------------|---------------|
| EC ( $\mu\text{mhos/cm}$ ) | 850 – 1213    | <1500                     | Excellent     |
| TDS (mg/L)                 | 486 – 718     | <600 (Ideal)              | Good to Ideal |
| pH                         | 6.53 – 7.37   | 6.5 – 8.4                 | Normal        |
| Iron (mg/L)                | $\leq 0.36$   | <5.0                      | Highly Safe   |
| Fluoride (mg/L)            | $\leq 0.51$   | <1.0                      | Safe          |
| Calcium & Magnesium        | Moderate      | Balanced                  | Healthy       |

### 3.3.2 Hydrogeological Studies

The area within 2 km radius consists of numerous open wells and deep wells. Groundwater level data were collected both from open wells and bore wells for two monsoon seasons as discussed in the following section.

#### ***Rainfall***

Rainfall data for the study area were collected for the period of 2000-2025([POWER | Data Access Viewer \(nasa.gov\)](#)). Long term monthly average rainfall was estimated from the data of 2000-2025 and compared with the monthly rainfall for the year 2025, shown in Figure 3.7. The Figure 3.7 shows that rainfall is generally high in the months of September through November in every year. Particularly, rainfall in July through August and October, December of 2022 is higher than the previous years.



**Figure 3.7 Long-Term Monthly Average Rainfall Vs Monthly Rainfall**

### 3.3.3 Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 8 open wells and 8 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2025 (Pre-Monsoon Season) and from October through December 2025, (Post Monsoon Season).

#### Groundwater Levels data 2025 Data

- Open Wells:
  - Pre-Monsoon (March–May): 10.97 to 13.90m BGL
  - Post-Monsoon (October–December): 10.76 to 13.5m BGL
- Bore Wells:
  - Pre-Monsoon (March–May): 61.6 to 64.8 m BGL.
  - Post-Monsoon (October–December): 53.1 to 56.3 m BGL.

#### Groundwater Flow Direction

- **Open Wells:** Groundwater generally flows towards the **West** (Open Well 4) and the **Southeast** (Open Well 6) relative to the proposed project site.
- **Bore Wells:** Groundwater flows towards the **Southwest** (Bore Well 5) of the project site.

## **Water Management Strategy**

- **Daily Requirement:** Estimated at **3.5KLD** for drinking, domestic use, green belt maintenance, and dust suppression.
- **Supply:** Drinking water will be outsourced or treated via an onsite RO plant.
- **Harvesting:** A garland drain system will connect excavated pits to collect rainwater. Rooftop harvesting from labour sheds will also be implemented to recharge the aquifer and reduce dependency on local wells.

## **Monitoring Recommendation**

Open wells 2 & 5 and bore well 8 have been identified as primary locations for water quality monitoring because their positions downstream of the flow direction make them most susceptible to potential contaminants from mining activities.

## **Water Balance management & artificial recharge in site**

The following eco-friendly water management plan will be implemented:

### **1. Water Demand and Supply**

- The total water requirement is 3.5KLD covering drinking, domestic needs, green belt maintenance and dust suppression.
- To ensure safety drinking water will be sourced from external vendors or processed through an on- site RO- plant.

### **2. Rainwater Harvesting & Storage**

Excavated pits near the site will be interconnected via a garland drain system to capture surface runoff.

Rainwater from labour sheds and permanent structures will be diverted into the excavated pits.

Captured water will be prioritized for non-potable uses such as dust suppression and green belt irrigation to minimize the extraction of local groundwater.

### **3. Artificial & Natural Recharge**

Harvesting structures are specifically planned for the Northeast section of the site, aligning with the bore well groundwater flow direction.

Soil resistivity data indicates specific porous and permeable zones within the site. These areas will be preserved to facilitate natural aquifer recharge during monsoon seasons.

#### 4. Impact Mitigation

By reducing dependency on the 16 monitored wells (9 open, 9 bore) within the 2 km radius this strategy aims to maintain the local water balance and prevent depletion of the static water table which averaged between 10.97m and 54.4m BGL in 2025.

**Table 3.7 Pre-Monsoon Water Level of Open Wells within 2 km Radius**

| Station ID | Depth to Static Water Table BGL (m) |          |           |         | Latitude      | Longitude     |
|------------|-------------------------------------|----------|-----------|---------|---------------|---------------|
|            | Mar-2025                            | Apr-2025 | May- 2025 | Average |               |               |
| OW01       | 12.9                                | 13.4     | 14.7      | 13.67   | 12° 6'17.36"N | 78°57'0.31"E  |
| OW02       | 10.9                                | 11.3     | 11.7      | 11.30   | 12° 6'24.45"N | 78°56'36.18"E |
| OW03       | 13.5                                | 13.9     | 14.3      | 13.90   | 12° 6'12.80"N | 78°56'18.31"E |
| OW04       | 11.8                                | 12.3     | 13.2      | 12.43   | 12° 5'51.32"N | 78°56'12.08"E |
| OW05       | 10.5                                | 10.9     | 11.5      | 10.97   | 12° 5'30.94"N | 78°56'29.84"E |
| OW06       | 12.4                                | 12.7     | 13.2      | 12.77   | 12° 5'30.69"N | 78°57'12.76"E |
| OW07       | 11.4                                | 11.6     | 11.9      | 11.63   | 12° 6'1.30"N  | 78°57'26.19"E |
| OW08       | 11.7                                | 12.5     | 13.2      | 12.47   | 12° 6'39.18"N | 78°55'56.41"E |
| OW09       | 12.47                               | 12.5     | 13.2      | 12.72   | 12° 5'19.82"N | 78°56'10.94"E |

**Table 3.8 Post-Monsoon Water Level of Open Wells within 2 km Radius**

| Station ID | Depth to Static Water Table BGL(m) |           |          |         | Latitude      | Longitude     |
|------------|------------------------------------|-----------|----------|---------|---------------|---------------|
|            | Oct-2025                           | Nov- 2025 | Dec-2025 | Average |               |               |
| OW01       | 13.6                               | 13.2      | 12.5     | 13.1    | 12° 6'17.36"N | 78°57'0.31"E  |
| OW02       | 11.7                               | 11.4      | 10.8     | 11.3    | 12° 6'24.45"N | 78°56'36.18"E |
| OW03       | 14.2                               | 13.7      | 12.6     | 13.5    | 12° 6'12.80"N | 78°56'18.31"E |
| OW04       | 12.6                               | 12.1      | 11.6     | 12.1    | 12° 5'51.32"N | 78°56'12.08"E |
| OW05       | 11.3                               | 10.9      | 10.1     | 10.8    | 12° 5'30.94"N | 78°56'29.84"E |
| OW06       | 13.1                               | 12.8      | 11.7     | 12.5    | 12° 5'30.69"N | 78°57'12.76"E |
| OW07       | 11.5                               | 11.2      | 10.5     | 11.1    | 12° 6'1.30"N  | 78°57'26.19"E |
| OW08       | 12.6                               | 12.4      | 11.9     | 12.3    | 12° 6'39.18"N | 78°55'56.41"E |
| OW09       | 12.6                               | 12.4      | 11.9     | 12.3    | 12° 5'19.82"N | 78°56'10.94"E |

**Table 3.9 Pre-Monsoon Water Level of Bore Wells within 2 km Radius**

| Station ID | Depth to Static Potentiometric Surface BGL(m) |          |           |         | Latitude      | Longitude     |
|------------|-----------------------------------------------|----------|-----------|---------|---------------|---------------|
|            | Mar- 2025                                     | Apr-2025 | May- 2025 | Average |               |               |
| BW01       | 60.9                                          | 63.3     | 65.8      | 63.3    | 12° 6'2.28"N  | 78°56'10.36"E |
| BW02       | 60.4                                          | 63.7     | 64.1      | 62.7    | 12° 6'37.45"N | 78°56'25.47"E |
| BW03       | 62.8                                          | 63.2     | 63.9      | 63.3    | 12° 6'23.53"N | 78°57'23.30"E |

|      |      |      |      |      |               |               |
|------|------|------|------|------|---------------|---------------|
| BW04 | 61.2 | 65.8 | 67.4 | 64.8 | 12° 5'44.35"N | 78°57'19.12"E |
| BW05 | 61.2 | 64.8 | 65.3 | 63.8 | 12° 5'26.26"N | 78°56'3.05"E  |
| BW06 | 60.6 | 65.8 | 66.3 | 64.2 | 12° 5'35.86"N | 78°55'33.28"E |
| BW07 | 58.9 | 63.9 | 65.4 | 62.7 | 12° 5'17.31"N | 78°57'28.92"E |
| BW08 | 59.3 | 62.5 | 63.1 | 61.6 | 12° 5'20.28"N | 78°56'39.43"E |
| BW09 | 59.3 | 62.5 | 63.1 | 61.6 | 12° 6'24.89"N | 78°56'44.36"E |

*Source: Onsite monitoring data*

**Table 3.10 Post- Monsoon Water Level of Bore Wells within 2 km Radius**

| Station ID | Depth to Static Potentiometric Surface BGL(m) |          |          |         | Latitude      | Longitude     |
|------------|-----------------------------------------------|----------|----------|---------|---------------|---------------|
|            | Oct-2025                                      | Nov-2025 | Dec-2025 | Average |               |               |
| BW01       | 59.7                                          | 54.2     | 51.5     | 55.1    | 12° 6'2.28"N  | 78°56'10.36"E |
| BW02       | 59.7                                          | 53.5     | 51.9     | 55.0    | 12° 6'37.45"N | 78°56'25.47"E |
| BW03       | 58.8                                          | 53.4     | 51.8     | 54.7    | 12° 6'23.53"N | 78°57'23.30"E |
| BW04       | 57.1                                          | 56.8     | 52.2     | 55.4    | 12° 5'44.35"N | 78°57'19.12"E |
| BW05       | 58.7                                          | 54.2     | 52.9     | 55.3    | 12° 5'26.26"N | 78°56'3.05"E  |
| BW06       | 59.8                                          | 55.2     | 51.7     | 55.6    | 12° 5'35.86"N | 78°55'33.28"E |
| BW07       | 57.2                                          | 53.9     | 51.2     | 54.1    | 12° 5'17.31"N | 78°57'28.92"E |
| BW08       | 56.4                                          | 52.1     | 50.9     | 53.1    | 12° 5'20.28"N | 78°56'39.43"E |
| BW09       | 57.8                                          | 52.1     | 50.1     | 53.3    | 12° 6'24.89"N | 78°56'44.36"E |

*Source: Onsite monitoring data*

According to the data average depth to the static water table in open wells range from 10.97 to 13.90m BGL in pre-monsoon and 10.8 to 13.5m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depth to static potentiometric surface in bore wells for the period of October 2025 through December 2025 (Post Monsoon Season) vary from 52.1 to 56.7m and from 52.6 to 56.8 m for the period of March through May, 2025 (Pre-Monsoon Season).

Groundwater flows naturally from areas of high hydraulic head to low hydraulic head a process governed by the hydraulic gradient and influenced by the aquifer's hydraulic conductivity. Groundwater velocity is higher when the hydraulic gradient or hydraulic conductivity is greater. A potentiometric map uses contour lines to represent equipotential hydraulic head and groundwater flow is always perpendicular to these equipotential lines moving from higher to lower head values shown in Figures 3.8-3.9 for open wells and 3.10-3.11 for bore wells.

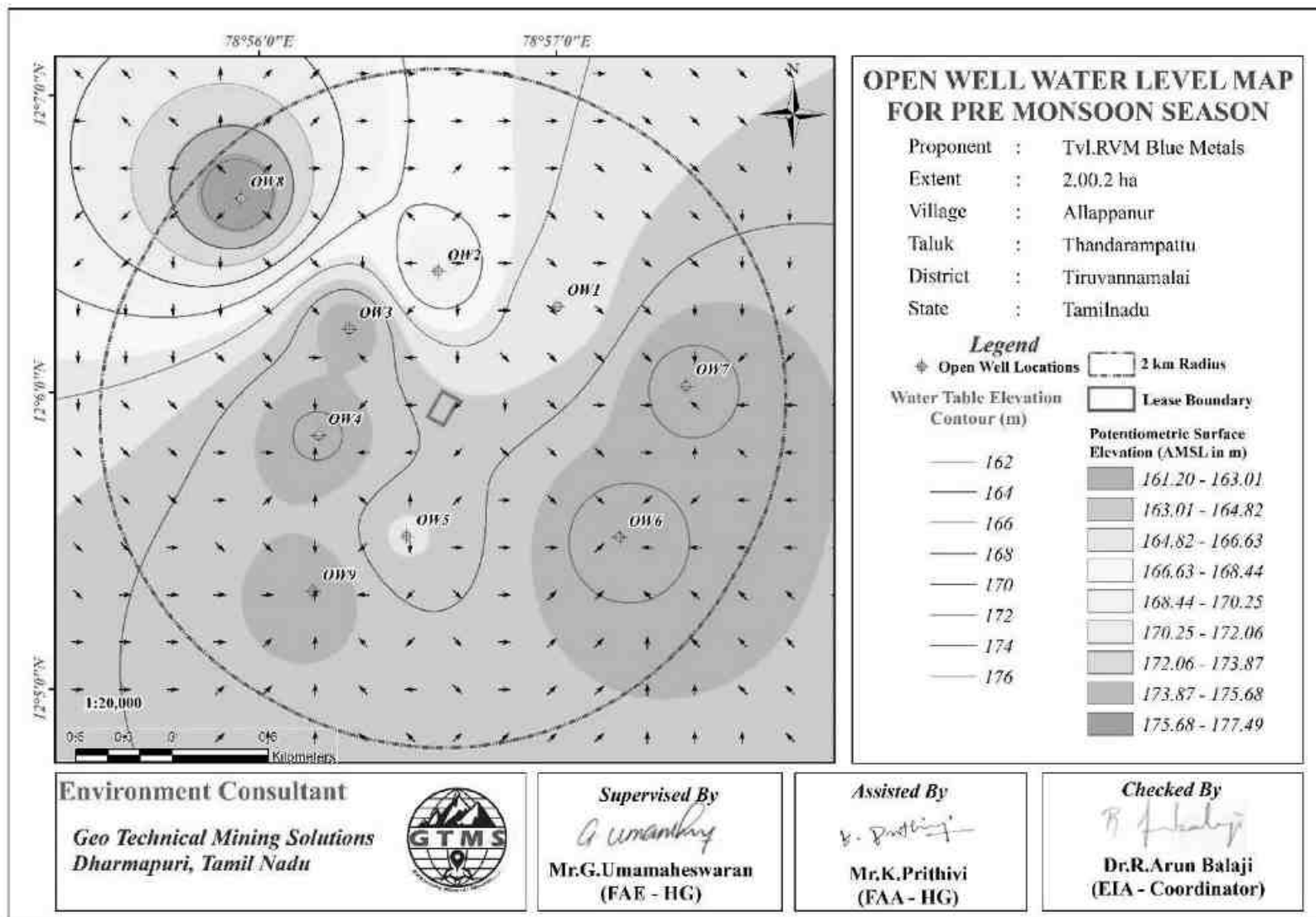


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

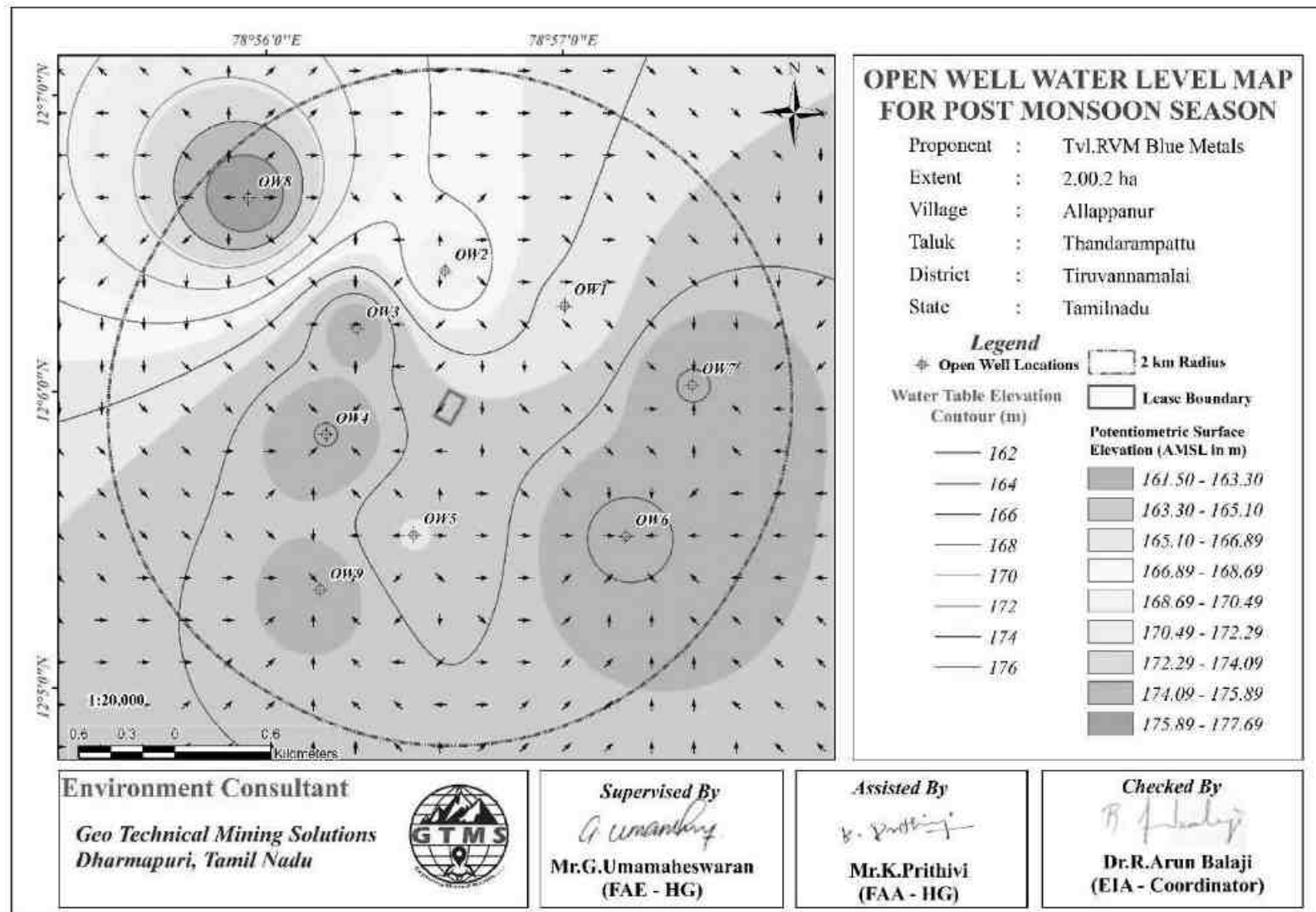


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

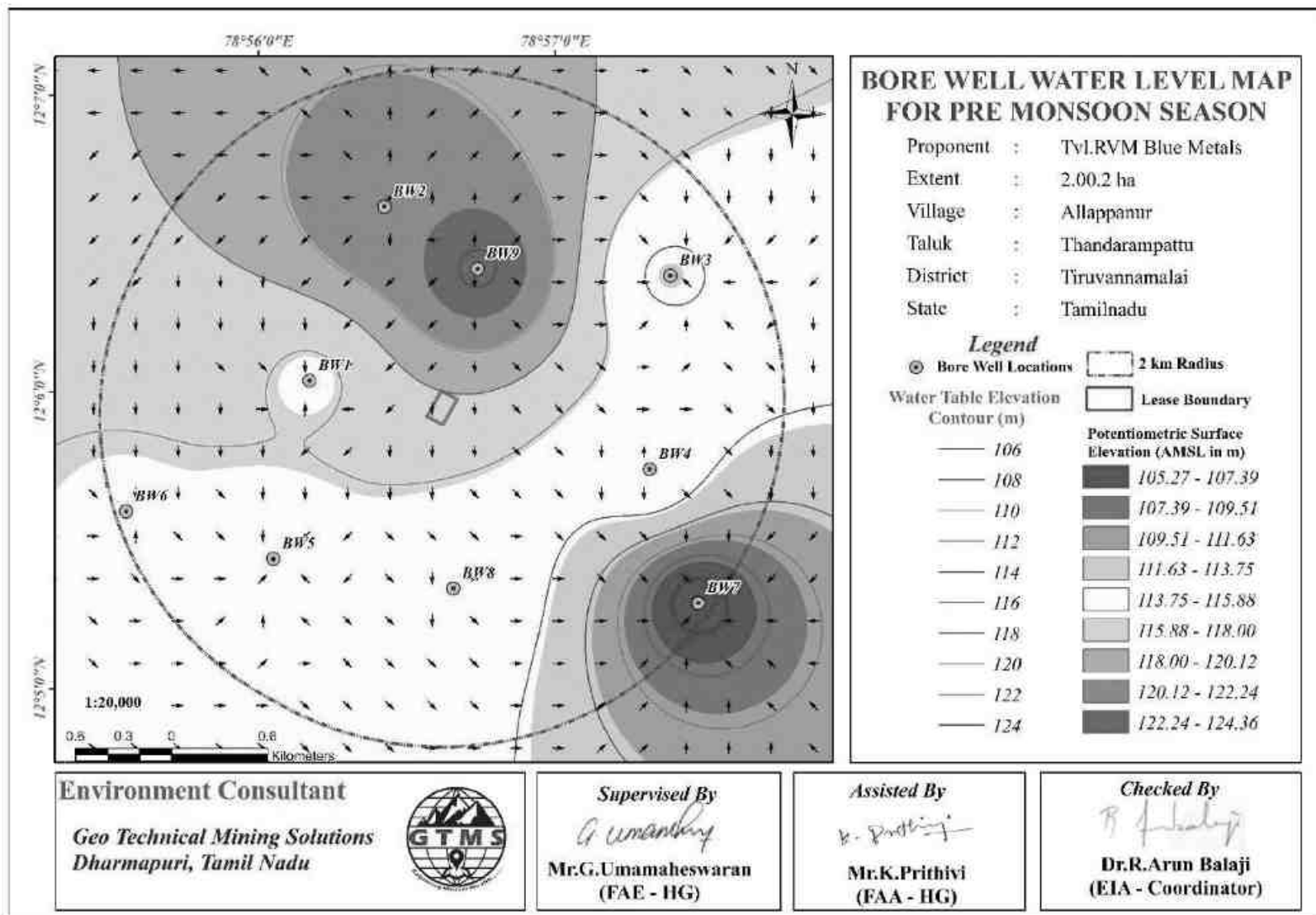


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

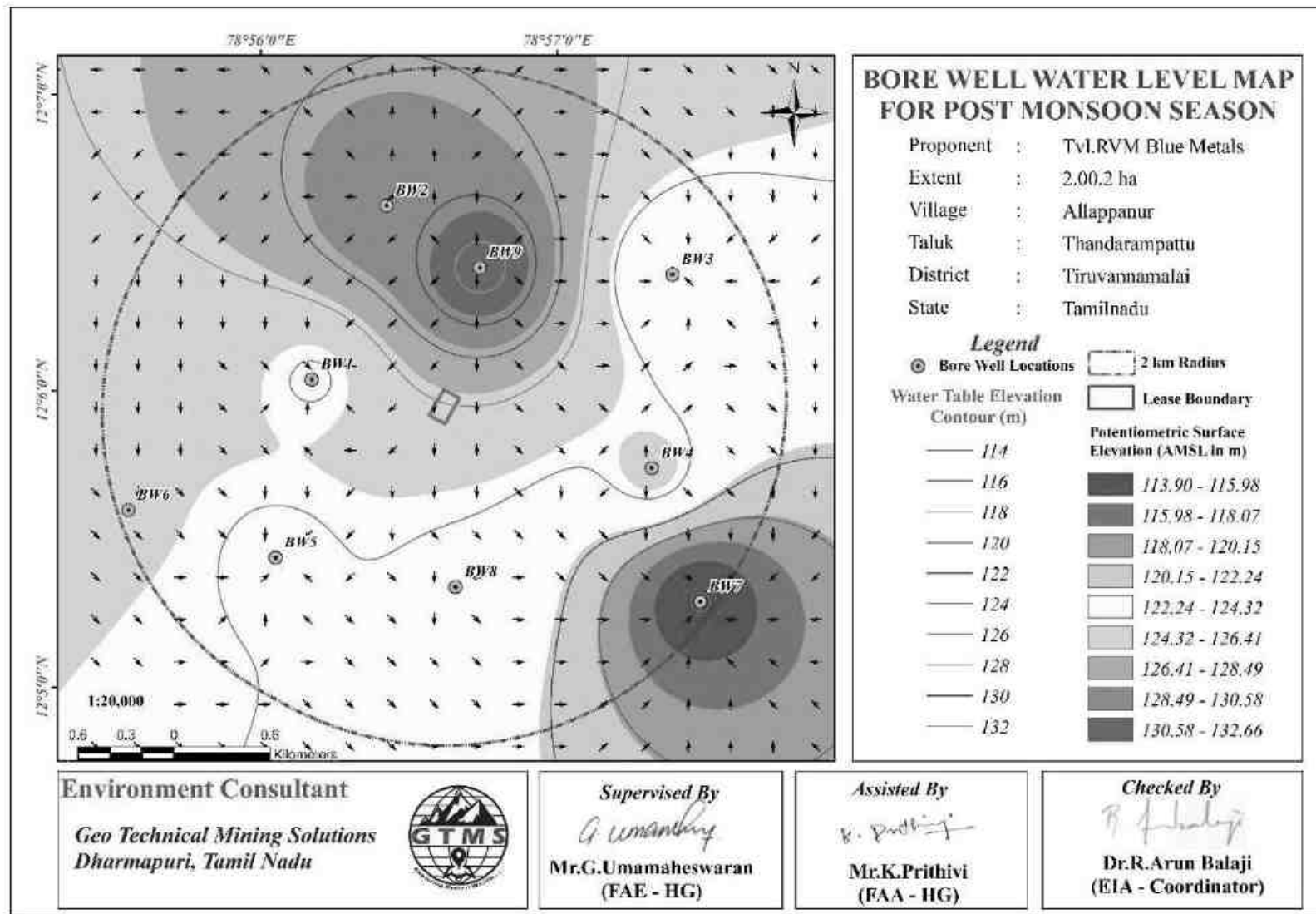
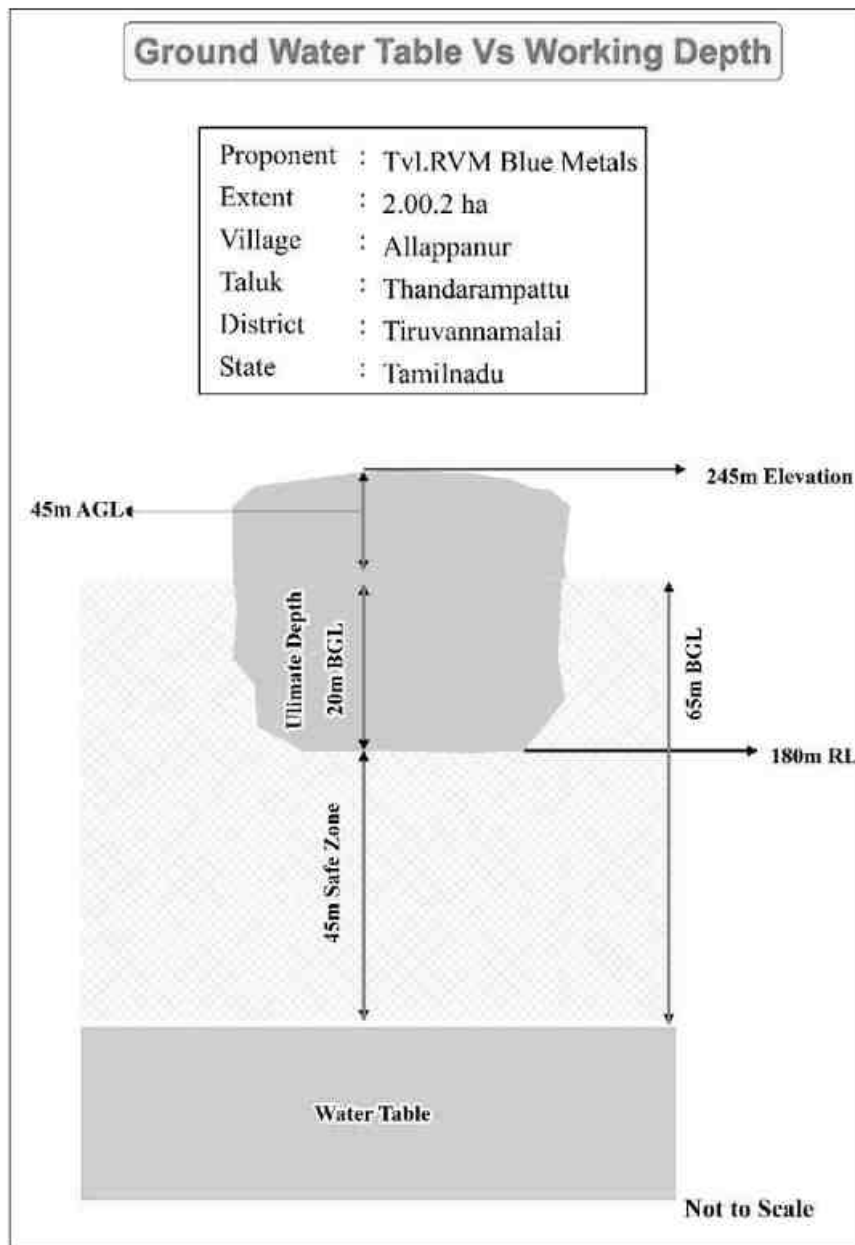


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season



**Figure 3.12 Schematic diagram illustrating Ground water table vs Ultimate mining depth**

### 3.3.3.1 Electrical Resistivity Investigation

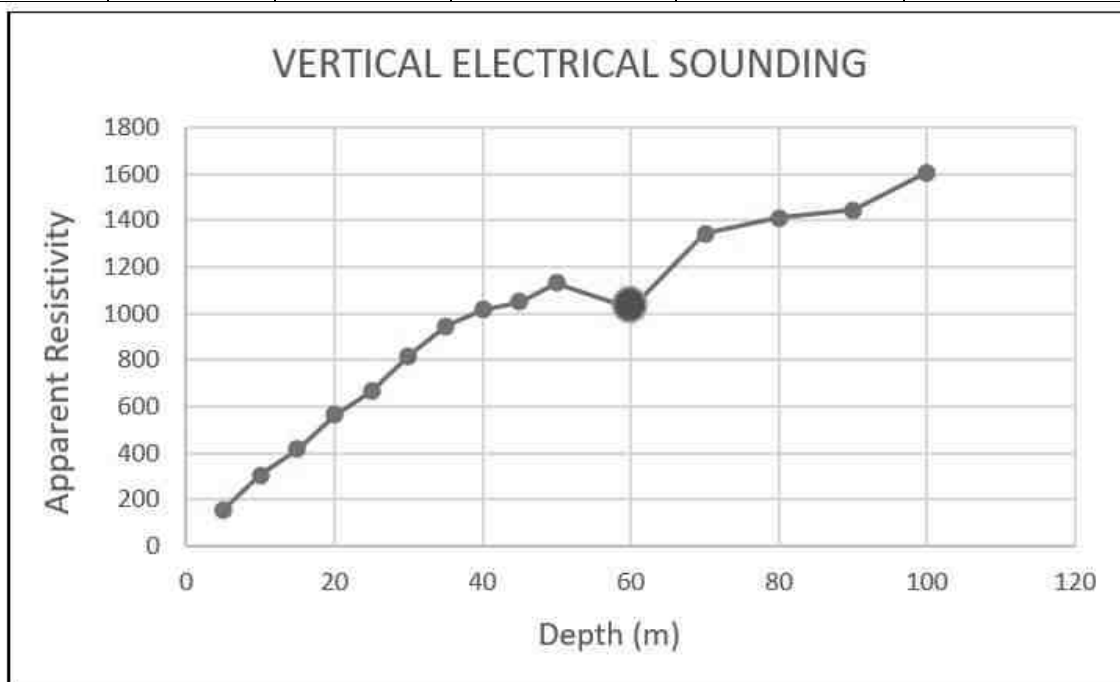
Electrical resistivity investigation is especially useful in the areas where there are no adequate exploratory well data about the aquifer conditions. The present study makes use of vertical electric sounding (VES) to delineate earth's subsurface layers. The electrical resistivity investigation uses four electrodes set up where current is sent through outer electrodes into the ground and the inner electrodes measure the potential difference.

## Result

The Geophysical VES data obtained from the project site have been shown in Table 3.11. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.13.

**Table 3.11 Vertical Electrical Sounding Data**

| Location Coordinates - 12° 5'56.93"N 78°56'36.97"E |          |          |                        |                        |                                    |
|----------------------------------------------------|----------|----------|------------------------|------------------------|------------------------------------|
| S. No.                                             | AB/2 (m) | MN/2 (m) | Geometrical Factor (G) | Resistance in $\Omega$ | Apparent Resistivity in $\Omega m$ |
| 1                                                  | 5        | 1        | 4.71                   | 33.248                 | 156.60                             |
| 2                                                  | 10       | 1        | 23.57                  | 12.915                 | 304.40                             |
| 3                                                  | 15       | 1        | 55.00                  | 7.542                  | 414.79                             |
| 4                                                  | 20       | 1        | 99.00                  | 5.678                  | 562.15                             |
| 5                                                  | 25       | 2        | 75.43                  | 8.803                  | 664.02                             |
| 6                                                  | 30       | 2        | 110.01                 | 7.422                  | 816.48                             |
| 7                                                  | 35       | 2        | 150.86                 | 6.266                  | 945.32                             |
| 8                                                  | 40       | 2        | 198.01                 | 5.129                  | 1015.68                            |
| 9                                                  | 45       | 2        | 251.44                 | 4.170                  | 1048.56                            |
| 10                                                 | 50       | 2        | 311.16                 | 3.638                  | 1132.15                            |
| 11                                                 | 60       | 5        | 188.58                 | 5.422                  | 1022.45                            |
| 12                                                 | 70       | 5        | 275.01                 | 4.891                  | 1345.18                            |
| 13                                                 | 80       | 5        | 377.16                 | 3.745                  | 1412.50                            |
| 14                                                 | 90       | 5        | 495.02                 | 2.922                  | 1446.32                            |
| 15                                                 | 100      | 5        | 628.60                 | 2.556                  | 1606.52                            |



**Figure 3.13 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60- 65m Below Ground Level in Proposed Project**

The rock formation of low resistivity values indicates occurrence of water at the depth of about 60-65m below ground level. The ultimate depth of proposed project is 65m (45 AGL+20M BGL) ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

### 3.4 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollutants and their existing levels in ambient air. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities.

#### 3.4.1 Meteorology

##### 3.4.1.1 Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.12.

**Table 3.12 Onsite Meteorological Data**

| S. No. | Parameters              |     | Dec,25 | Jan 26 | Feb 26 |
|--------|-------------------------|-----|--------|--------|--------|
| 1      | Temperature (°C)        | Min | 13.31  | 14.33  | 14.91  |
|        |                         | Max | 30.96  | 31.74  | 36.64  |
|        |                         | Avg | 21.94  | 22.43  | 24.46  |
| 2      | Relative Humidity (%)   | Min | 39.33  | 23.37  | 19.74  |
|        |                         | Max | 100.00 | 100.00 | 100.00 |
|        |                         | Avg | 81.17  | 75.05  | 65.34  |
| 3      | Wind Speed (m/s)        | Min | 0.18   | 0.25   | 0.32   |
|        |                         | Max | 5.43   | 5.84   | 5.29   |
|        |                         | Avg | 2.41   | 2.63   | 2.57   |
| 4      | Wind Direction (degree) | Min | 0.70   | 0.30   | 0.40   |
|        |                         | Max | 359.40 | 359.50 | 359.60 |
|        |                         | Avg | 157.96 | 125.42 | 111.37 |
| 5      | Surface Pressure(kPa)   | Min | 98.44  | 98.66  | 98.78  |
|        |                         | Max | 99.85  | 99.75  | 99.88  |
|        |                         | Avg | 99.05  | 99.31  | 99.35  |

Source: On-site monitoring/sampling by **Accuracy Analabs (OBC) Private Limited** in association with GTMS

### **Temperature:**

The temperature data for the study period (December 2025 to February 2026) shows a gradual increasing trend indicating the transition from winter to early summer conditions.

- Post-monsoon/Winter (Dec– Feb): Average temperature increased from 21.94°C (Dec) to 24.46°C (Feb).
- Maximum temperature rose significantly from 30.96°C (Dec) to 36.64°C (Feb), indicating early heat build-up.
- Minimum temperature also increased slightly from 13.31°C to 14.91°C, showing reduced nighttime cooling.

### **Relative Humidity:**

Humidity levels show a consistent decreasing trend during the study period.

- Average humidity reduced from 81.17% (Dec) to 65.34% (Feb).
- Minimum humidity dropped sharply from 39.33% to 19.74%, indicating drier daytime conditions.
- Maximum humidity remained at 100%, suggesting periodic saturation during early morning hours.

### **Rainfall & Winds:**

Average wind speed ranged between **2.41m/s and 2.63 m/s** during the study period. Maximum wind speed varied from **5.29m/s to 5.84 m/s**, indicating moderate wind conditions. The measured average wind velocity for the period is approximately **2.54m/s**. Wind direction shows a gradual seasonal shift: Average wind direction changed from **157.96° (Dec)** to **111.37° (Feb)**, indicating a shift in prevailing wind patterns during the transition period.

### **Surface Pressure (kPa):**

Atmospheric pressure remained relatively stable with a slight increasing trend.

- Average pressure increased from 99.05 kPa (Dec) to 99.35 kPa (Feb).
- Minimum and maximum values showed very little variation, indicating stable atmospheric conditions.

### **3.4.2 Ambient Air Quality Study**

The baseline ambient air quality is studied through a scientifically designed ambient air quality monitoring network considering the followings

- ❖ Meteorological condition on synoptic scale
- ❖ Topography of the study area
- ❖ Representatives of regional background air quality for obtaining baseline status

- ❖ Location of residential areas representing different activities
- ❖ Accessibility and power availability

**Table 3.13 Methodology and Instrument Used for AAQ Analysis**

| Parameter         | Method                                                   | Instrument                                      |
|-------------------|----------------------------------------------------------|-------------------------------------------------|
| PM <sub>2.5</sub> | Gravimetric method<br>Beta attenuation method            | Fine Particulate Sampler                        |
| PM <sub>10</sub>  | Gravimetric method<br>Beta attenuation method            | Respirable Dust Sampler                         |
| SO <sub>2</sub>   | IS-5182 Part II<br>(Improved West & Gaeke method)        | Respirable Dust Sampler with gaseous attachment |
| NO <sub>x</sub>   | IS-5182 Part II<br>(Jacob & Hoch heiser modified method) | Respirable Dust Sampler with gaseous attachment |

Source: Sampling Methodology based Accuracy Analabs (OBC) Private Limited & CPCB Notification

**Table 3.14 National Ambient Air Quality Standards**

| Pollutant                              | Time Weighted Average      | Concentration in ambient air                 |                                                         |
|----------------------------------------|----------------------------|----------------------------------------------|---------------------------------------------------------|
|                                        |                            | Industrial, Residential, Rural & other areas | Ecologically Sensitive area (Notified by Central Govt.) |
| SO <sub>2</sub> (µg/m <sup>3</sup> )   | Annual Avg.*<br>24 hours** | 50.0<br>80.0                                 | 20.0<br>80.0                                            |
| NO <sub>x</sub> (µg/m <sup>3</sup> )   | Annual Avg.<br>24 hours    | 40.0<br>80.0                                 | 30.0<br>80.0                                            |
| PM <sub>10</sub> (µg/m <sup>3</sup> )  | Annual Avg.<br>24 hours    | 60.0<br>100.0                                | 60.0<br>100.0                                           |
| PM <sub>2.5</sub> (µg/m <sup>3</sup> ) | Annual Avg.<br>24 hours    | 40.0<br>60.0                                 | 40.0<br>60.0                                            |

Source: NAAQS CPCB Notification No. B-29016/20/90/PCI-I Dated: 18<sup>th</sup> Nov 2009

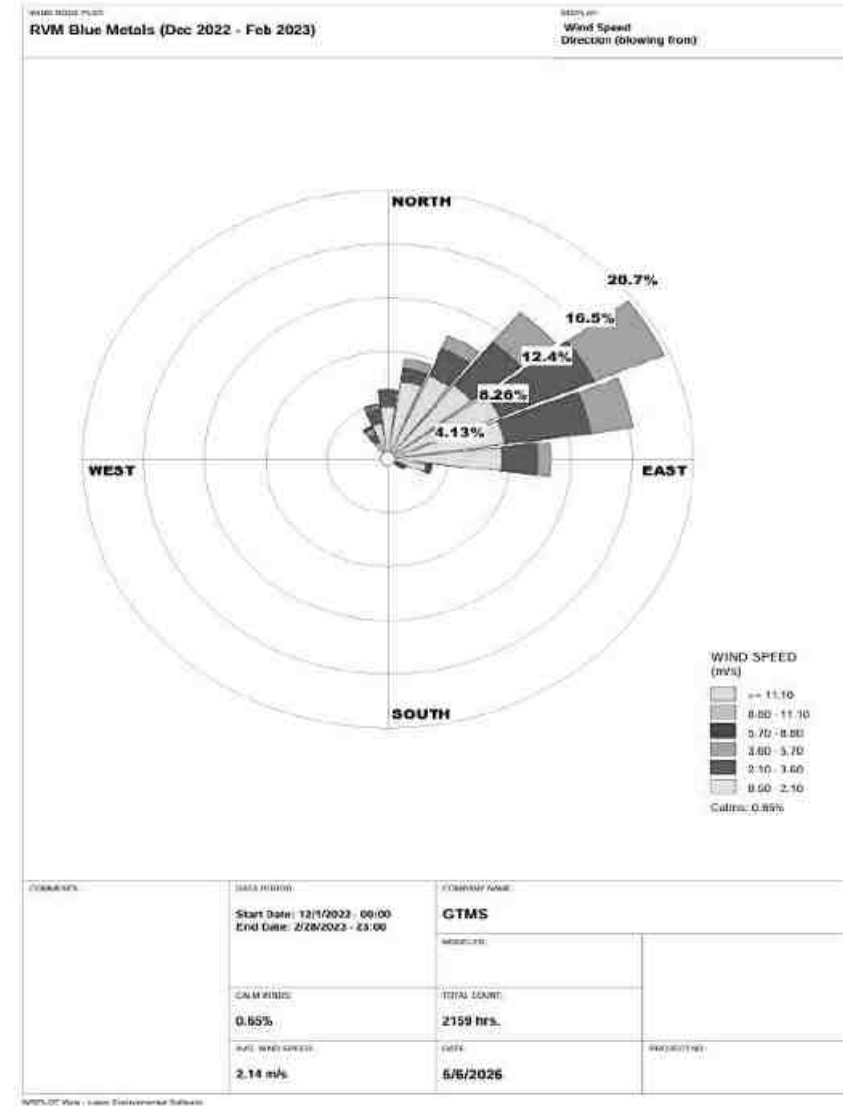
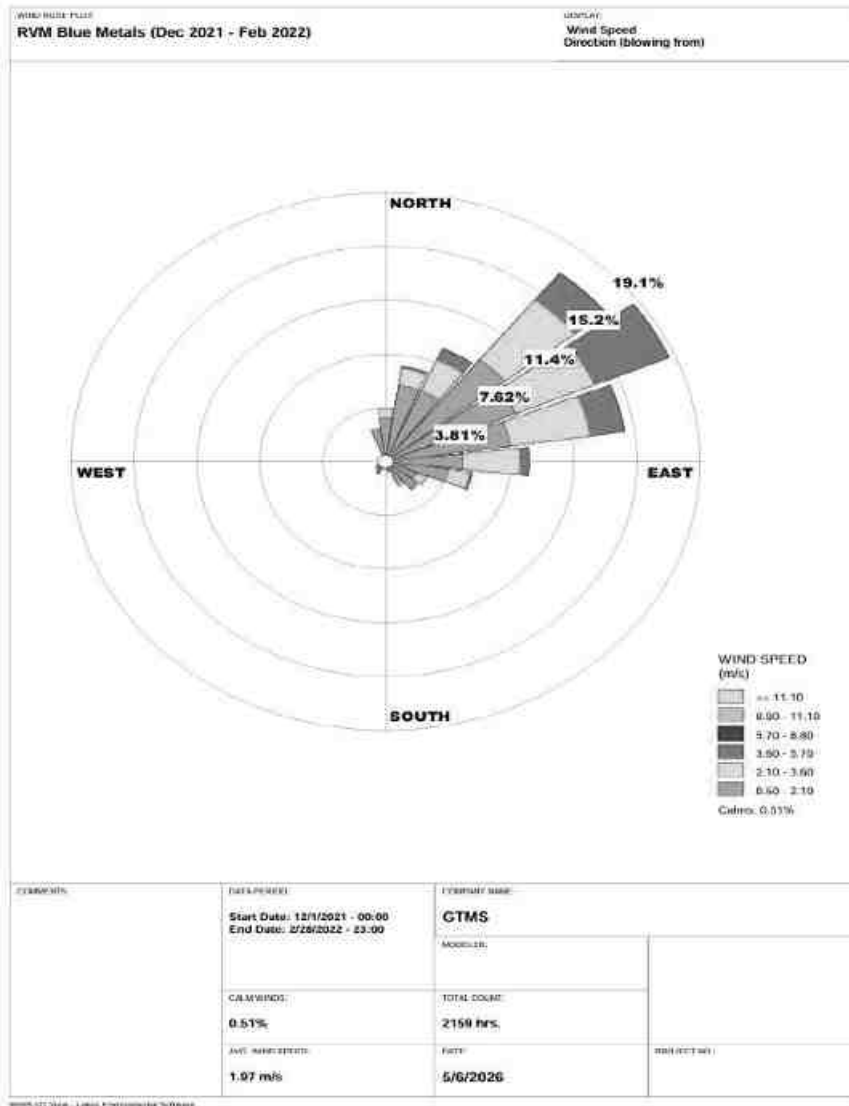


Figure 3.14 Windrose Diagram for December 2021- February 2022 and December 2022- February 2023

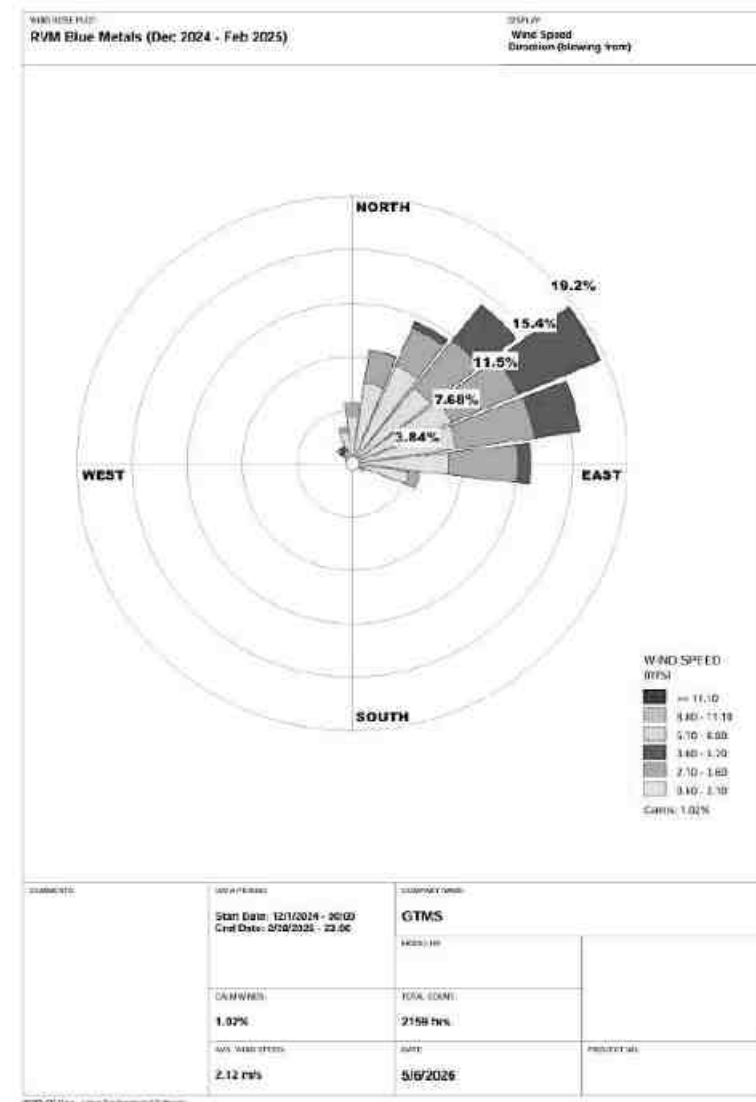
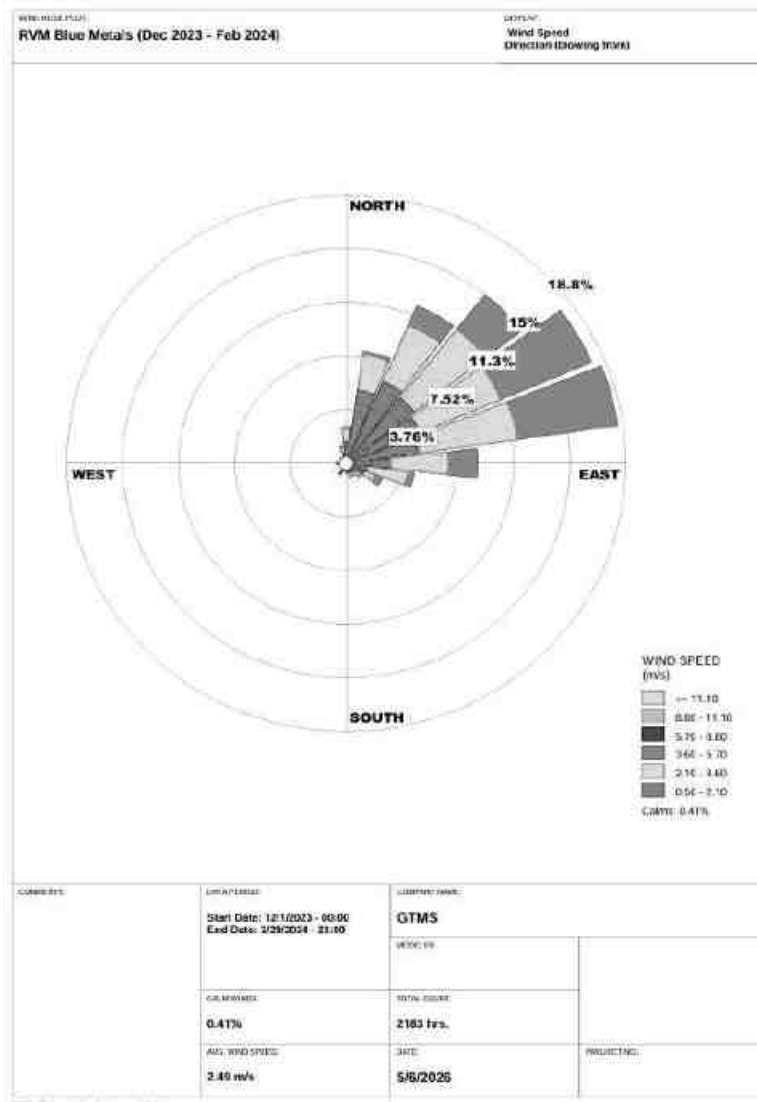


Figure 3.15 Windrose Diagram for December 2023- February 2024 and December 2024- February 2025

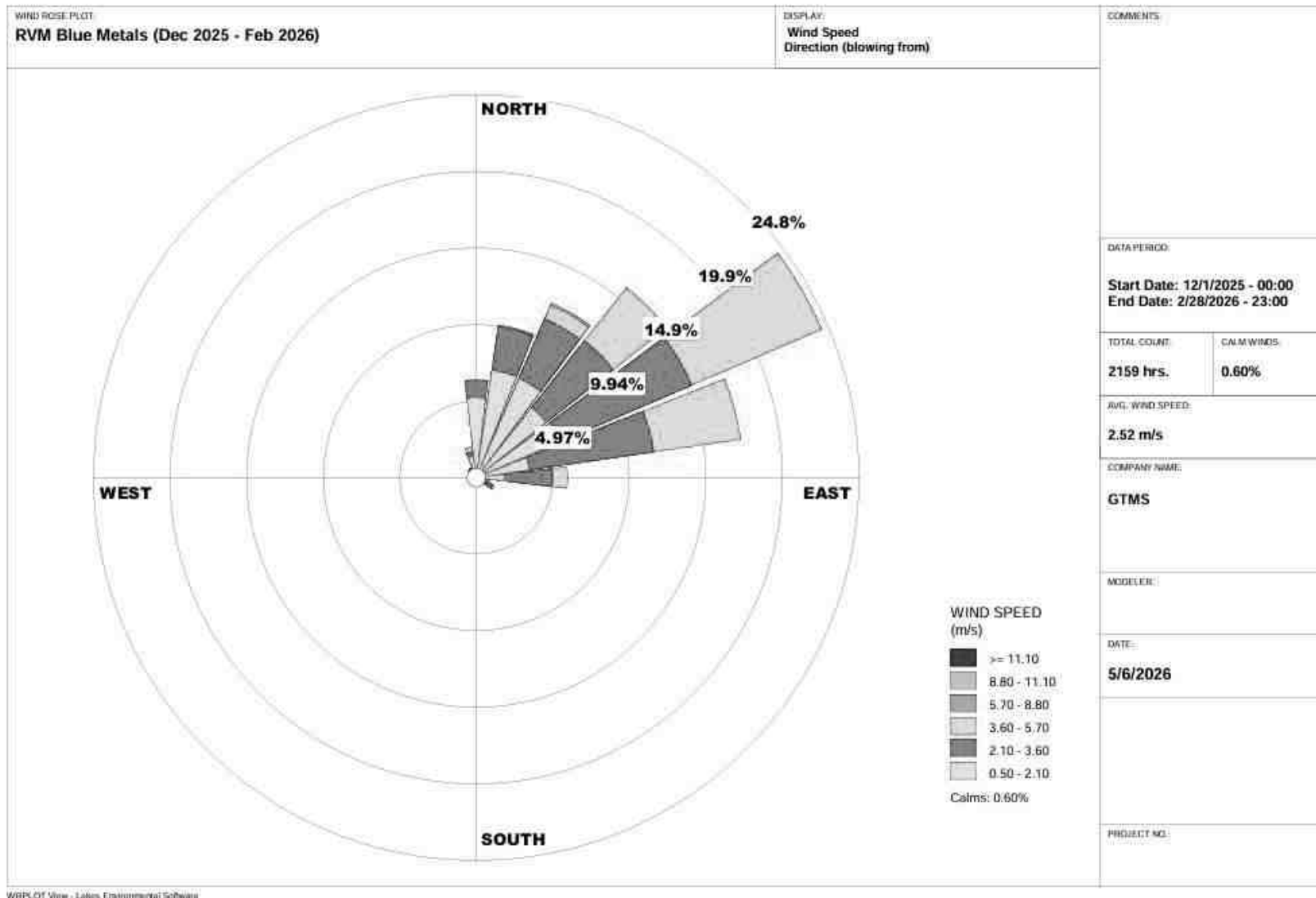


Figure 3.16 Onsite Wind Rose Diagram

## Methodology

- Monitoring was conducted twice a week at five locations using a 24-hour continuous schedule. This schedule is typically divided into three 8-hour shifts to ensure comprehensive daily data.
- Equipment was positioned at a height of  $3 \pm 0.5$  meters above ground level to minimize the influence of wind-blown ground dust.
- Stations were placed in open spaces at least 20 meters away from trees and vegetation to prevent these sinks from artificially lowering pollutant readings.

**Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations**

| Sampling ID | Location     | Distance (km) | Direction | Coordinates   |               |
|-------------|--------------|---------------|-----------|---------------|---------------|
|             |              |               |           | Latitude      | Longitude     |
| AAQ1        | Nearby Core  | 0.72          | N         | 12° 6'18.91"N | 78°56'51.97"E |
| AAQ2        | Kadambadi    | 1.58          | NE        | 12° 6'26.64"N | 78°57'23.74"E |
| AAQ3        | Allappanur   | 0.68          | W         | 12° 6'1.44"N  | 78°56'12.66"E |
| AAQ4        | Royandapuram | 1.18          | SW        | 12° 5'30.60"N | 78°56'3.88"E  |
| AAQ5        | Thondamanur  | 1.86          | SE        | 12° 5'18.89"N | 78°57'27.77"E |

Source: On-site monitoring/sampling Accuracy Analabs (OBC) Private Limited in association with GTMS

The study generated baseline data for four key parameters:

- Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>): Fine and coarse inhalable particles.
- Gaseous Pollutants: Sulphur Dioxide (SO<sub>2</sub>) and Nitrogen Dioxide (NO<sub>x</sub>)

Table 3.15 summarizes the average concentrations of the four pollutants ((PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub>) recorded across the five stations during the three-month period.

Figure 3.17 shows the map identifying the five specific sampling locations and Figures 3.18–3.22 give the graphical representations showing pollutant trends or comparisons for each monitoring station.

**Table 3.16 Summary of AAQ Result**  
**Particulate Matter (µg/m<sup>3</sup>)**

| Station ID | PM <sub>2.5</sub> (Mean) | PM <sub>2.5</sub> (98th %) | PM <sub>10</sub> (Mean) | PM <sub>10</sub> (98th %) |
|------------|--------------------------|----------------------------|-------------------------|---------------------------|
| AAQ1       | 15.92                    | 17.07                      | 42.58                   | 44.03                     |
| AAQ2       | 15.88                    | 17.31                      | 41.24                   | 45.33                     |
| AAQ3       | 17.24                    | 17.91                      | 44.73                   | 47.94                     |
| AAQ4       | 16.40                    | 18.00                      | 43.83                   | 48.39                     |
| AAQ5       | 17.93                    | 19.73                      | 46.20                   | 51.02                     |

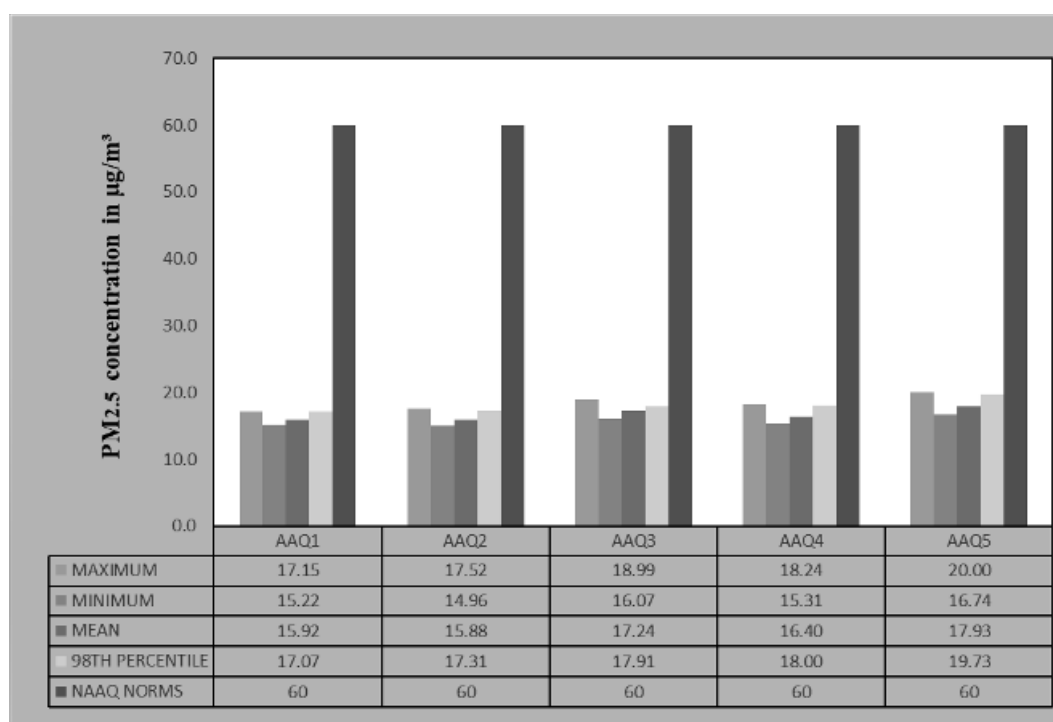
### Gaseous Pollutants ( $\mu\text{g}/\text{m}^3$ )

| Station ID | SO <sub>2</sub> (Mean) | SO <sub>2</sub> (98th %) | NO <sub>x</sub> (Mean) | NO <sub>x</sub> (98th %) |
|------------|------------------------|--------------------------|------------------------|--------------------------|
| AAQ1       | 4.97                   | 5.27                     | 10.15                  | 10.74                    |
| AAQ2       | 4.77                   | 5.22                     | 9.74                   | 10.64                    |
| AAQ3       | 5.16                   | 5.54                     | 9.78                   | 10.59                    |
| AAQ4       | 5.41                   | 5.65                     | 10.06                  | 10.76                    |
| AAQ5       | 5.55                   | 5.89                     | 11.12                  | 12.15                    |

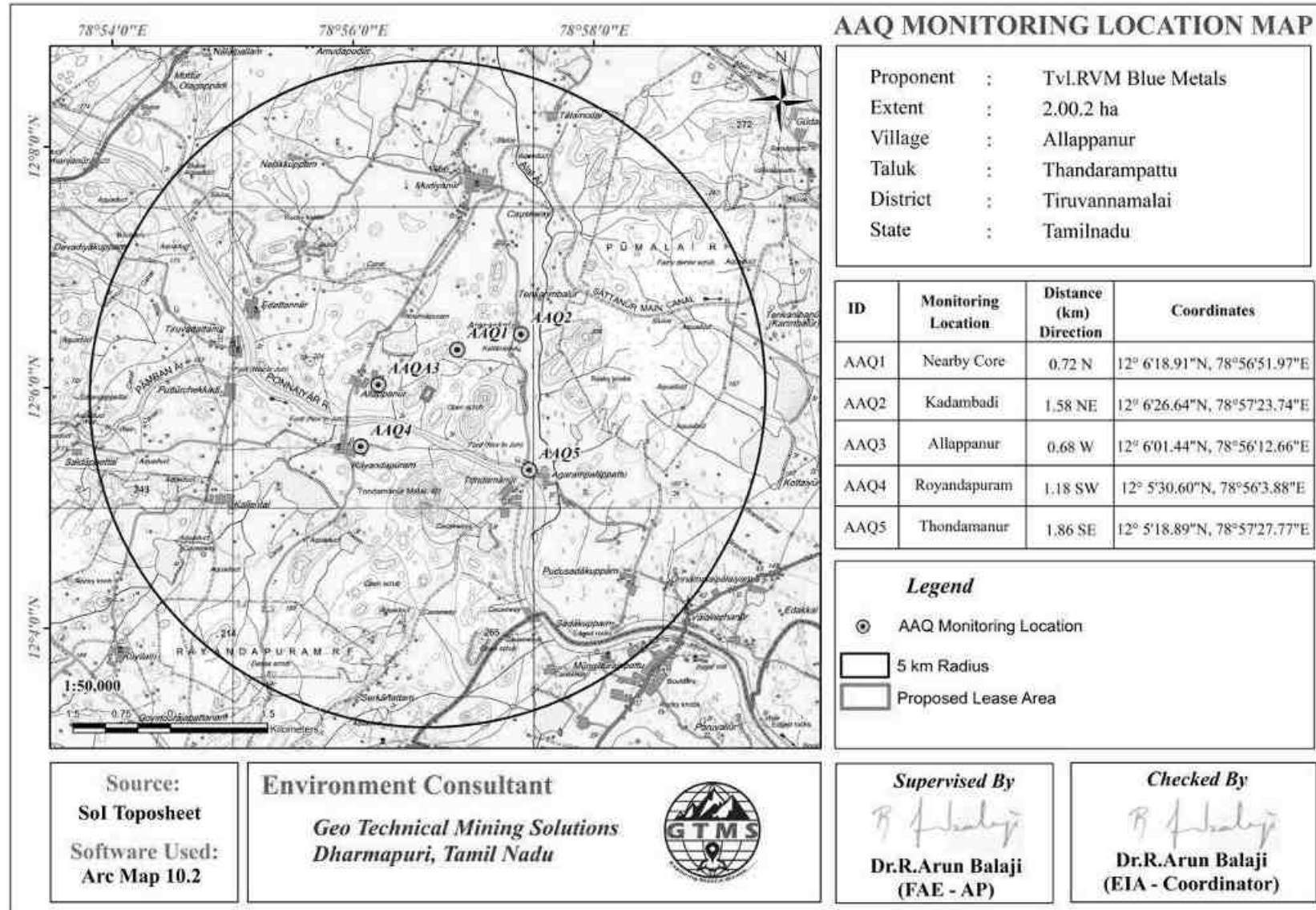
The station AAQ1 has the highest mean and 98th percentile for all four pollutants suggesting it may be located near a higher-intensity emission source like a major traffic intersection or industrial area. The **98<sup>th</sup> percentile** values represent the levels that 98% of the data falls below. Since these values (e.g., PM<sub>2.5</sub> max of 17.93  $\mu\text{g}/\text{m}^3$  at AAQ3) are close to the mean it suggests a stable environment without extreme daily pollution spikes.

### Pollutant correlation:

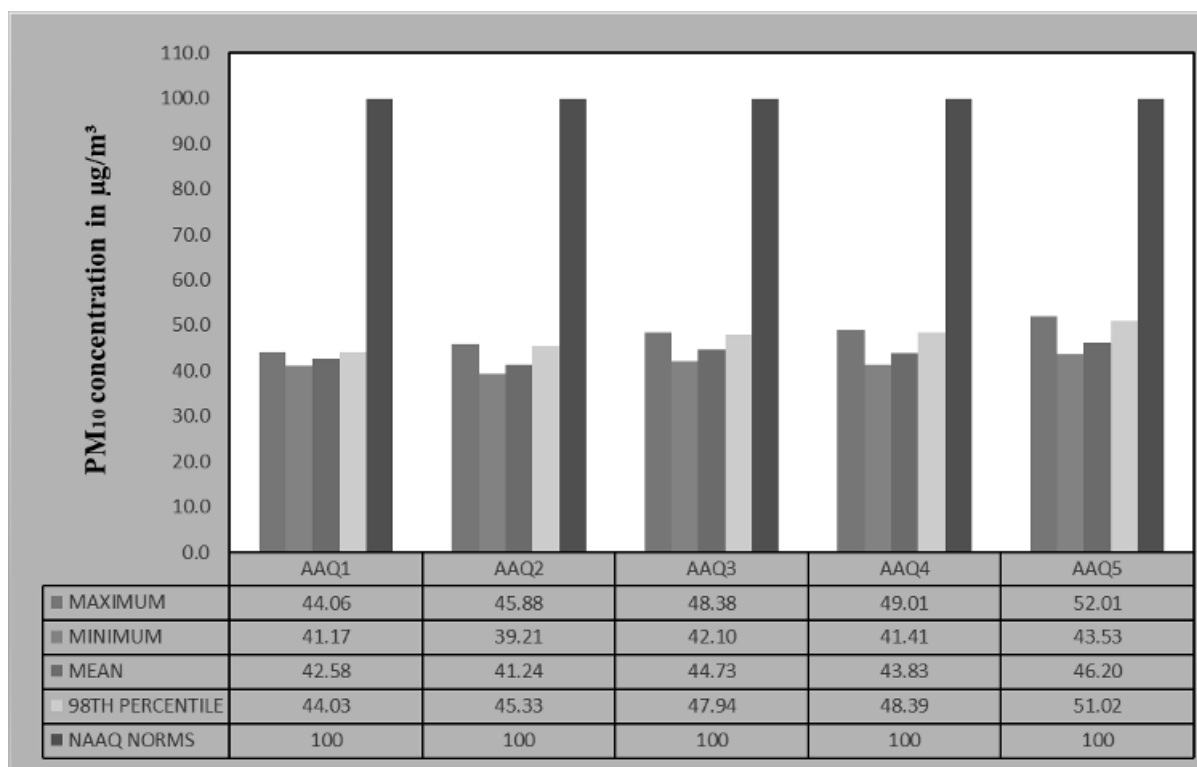
- The PM<sub>10</sub> levels (41.24– 46.20  $\mu\text{g}/\text{m}^3$ ) are roughly 2.5 times higher than PM<sub>2.5</sub> levels, which is typical in areas where coarse dust (construction, road dust) contributes more than fine combustion particles.
- SO<sub>2</sub> and NO<sub>x</sub> levels are closely linked likely originating from common vehicular or industrial sources.



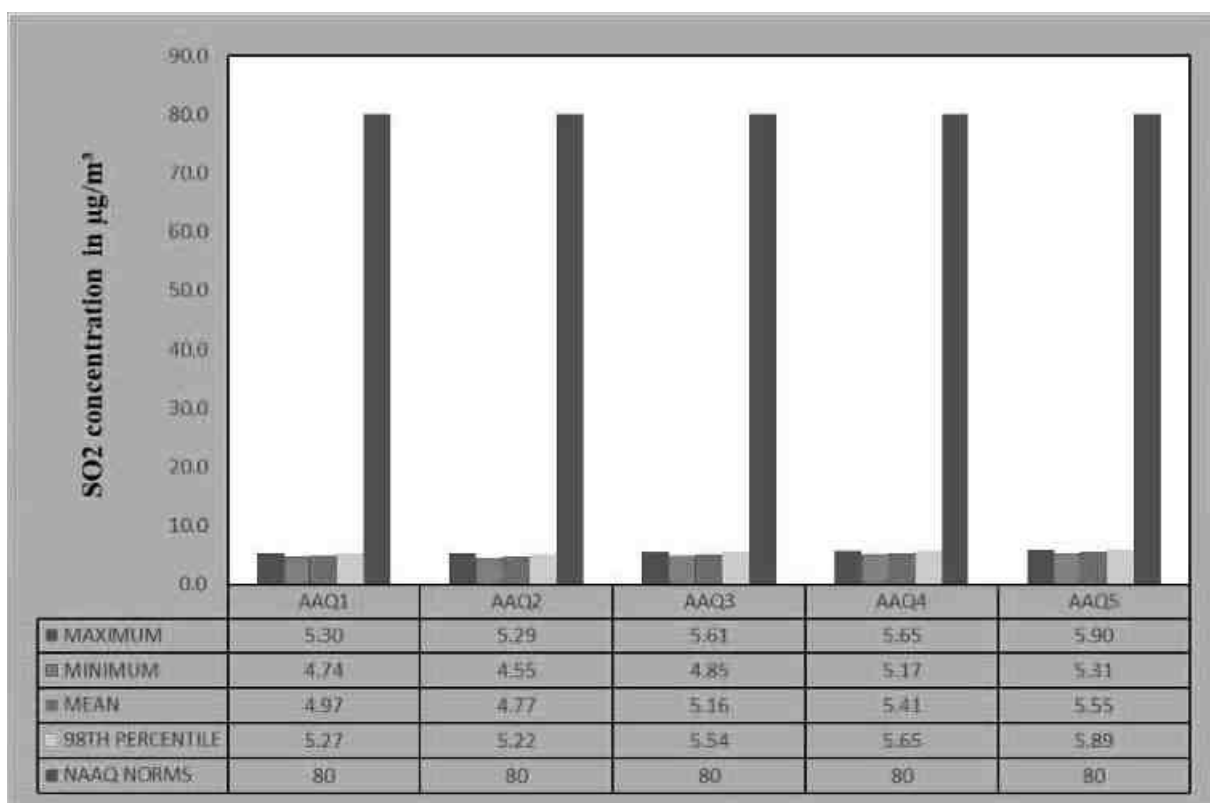
**Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM<sub>2.5</sub> Measured from 5 Air Quality Monitoring Stations within 5km Radius**



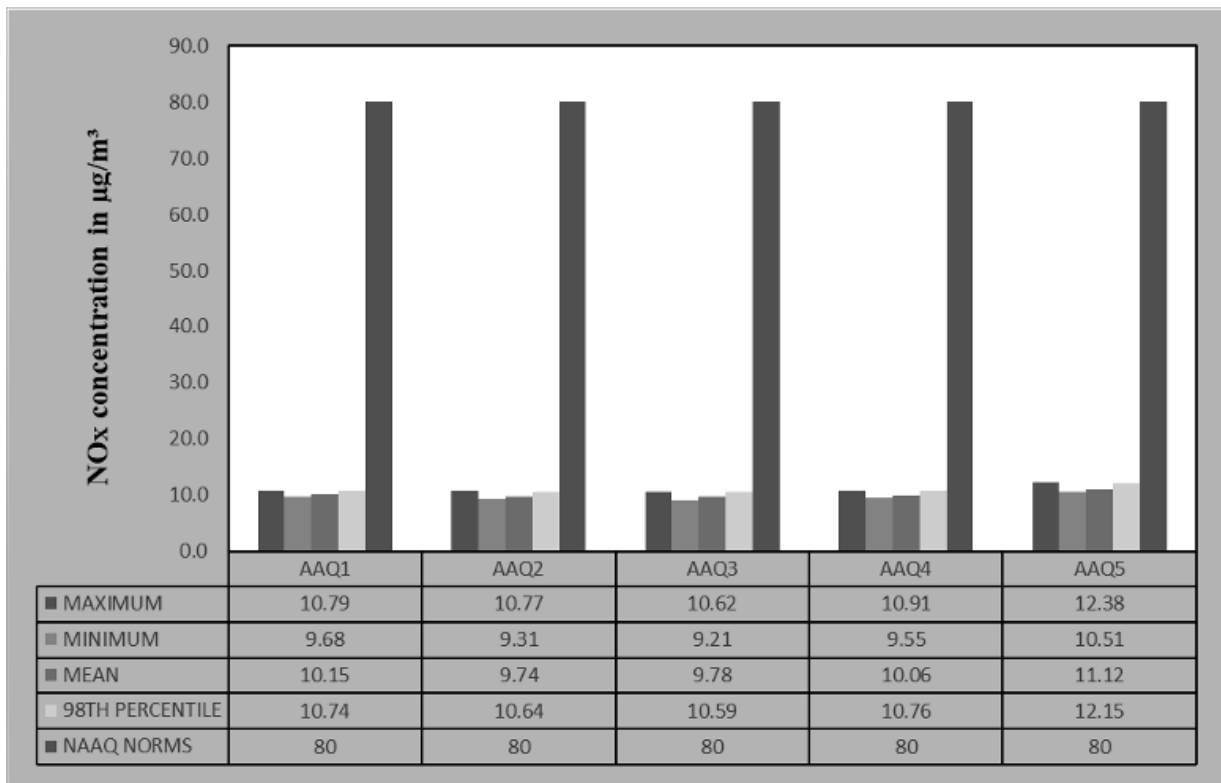
**Figure 3.18 Map Showing Ambient Air Quality Monitoring Station Locations Around 5km Radius from Proposed Project Site**



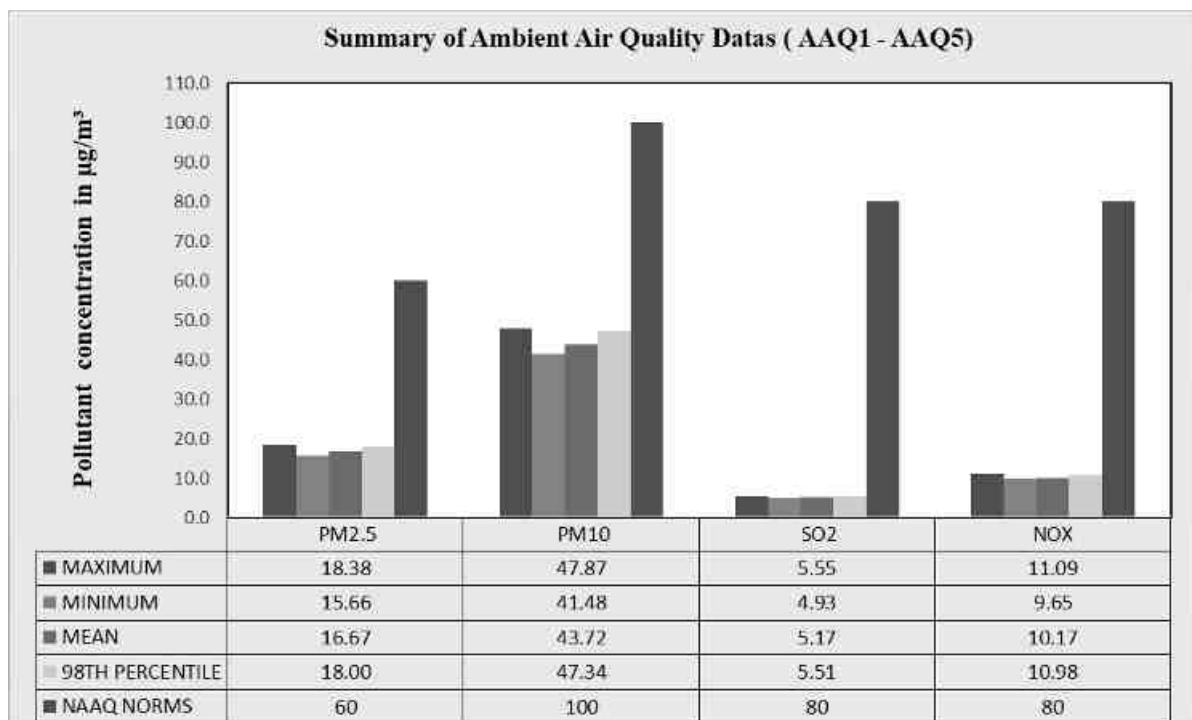
**Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM<sub>10</sub> Measured from 5 Air Quality Monitoring Stations within 5km Radius**



**Figure 3.20 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO<sub>2</sub> Measured from 5 Air Quality Monitoring Stations within 5km Radius**



**Figure 3.21 Bar Chart Showing Maximum, Minimum, and Average Concentrations of NO<sub>x</sub> Measured from 5 Air Quality Monitoring Stations within 5km Radius**



**Figure 3.22 Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5km Radius**

### 3.5 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at five (05) locations covering commercial, residential, rural areas within the radius of 5km. Details of noise monitoring locations are provided in Table 3.17 and spatial occurrence of the locations are shown in Figure 3.23.

**Table 3.17 Noise Monitoring Locations**

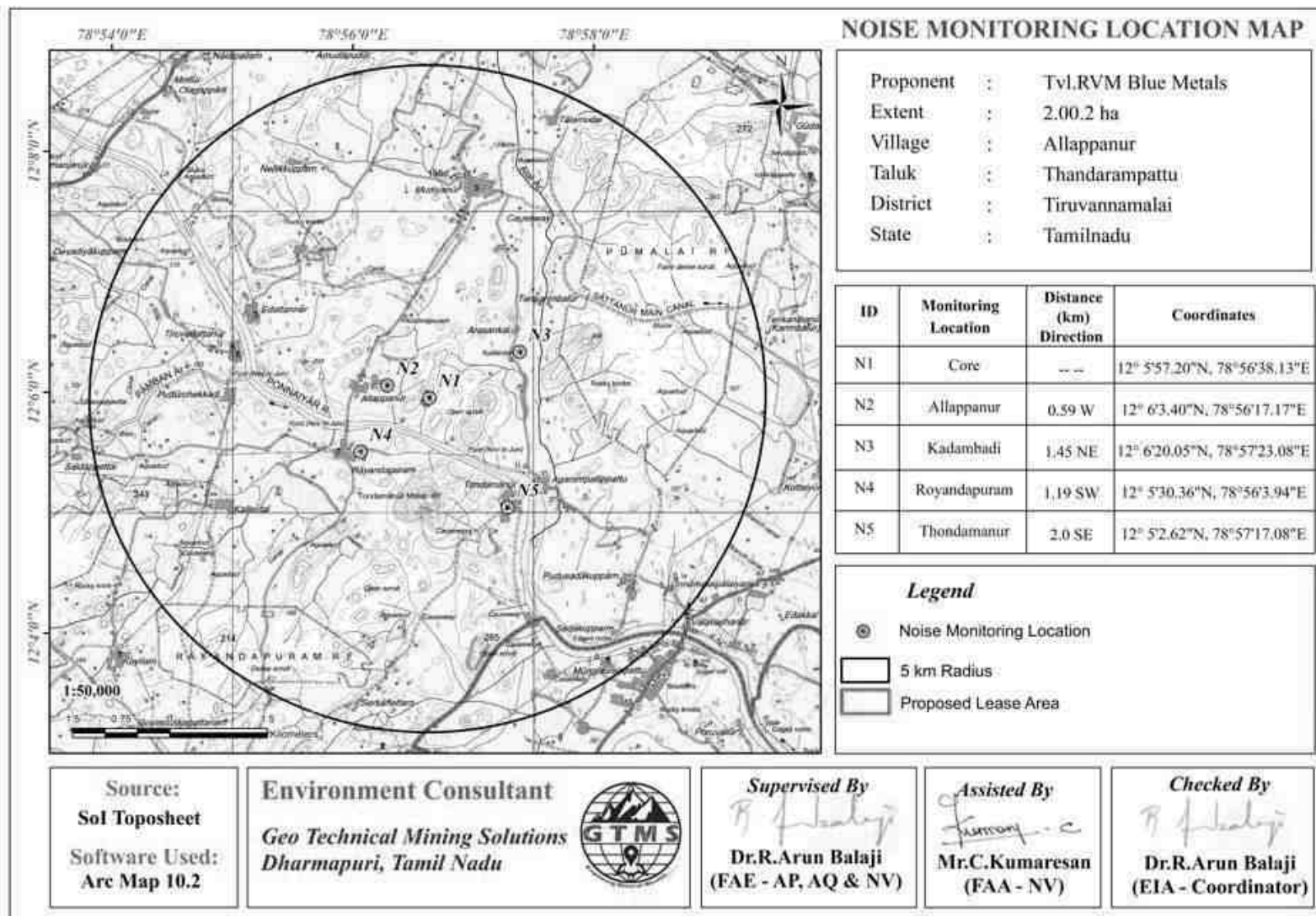
| Sampling ID | Location     | Distance (km) | Direction | Coordinates   |               |
|-------------|--------------|---------------|-----------|---------------|---------------|
|             |              |               |           | Latitude      | Longitude     |
| N1          | Core         | --            | --        | 12° 5'57.20"N | 78°56'38.13"E |
| N2          | Allppanur    | 0.59          | W         | 12° 6'3.40"N  | 78°56'17.17"E |
| N3          | Kadambadi    | 1.45          | NE        | 12° 6'20.05"N | 78°57'23.08"E |
| N4          | Royandapuram | 1.19          | SW        | 12° 5'30.36"N | 78°56'3.94"E  |
| N5          | Thodamanur   | 2.0           | SE        | 12° 5'2.62"N  | 78°57'17.08"E |

**Table 3.18 Ambient Noise Quality Result**

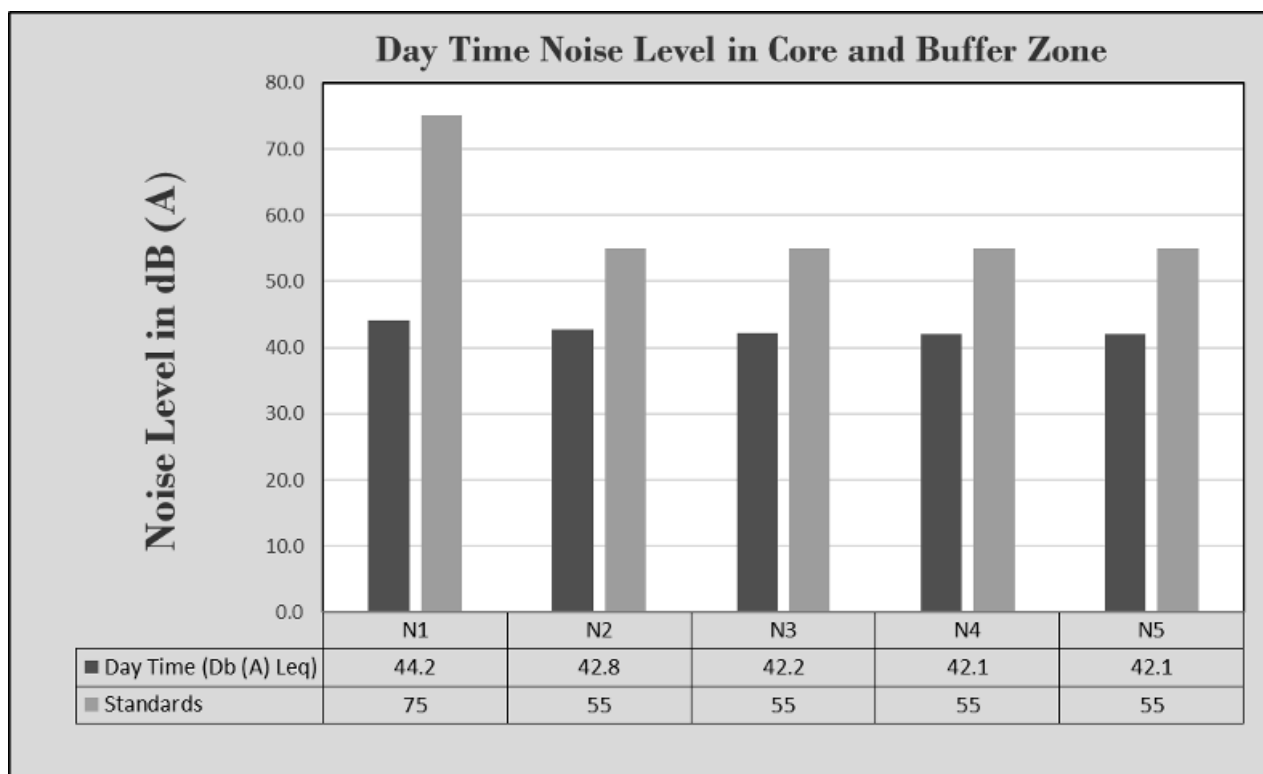
| Station ID | Location     | Environment al setting | Average day noise level (dB(A)) | Average night noise level (dB(A)) | Day time (6.00 AM – 10.00 PM) | Night time (10.00 PM – 6.00 AM) |
|------------|--------------|------------------------|---------------------------------|-----------------------------------|-------------------------------|---------------------------------|
|            |              |                        |                                 |                                   | Standard (Leq in dB (A))      |                                 |
| N1         | Core         | Industrial Area        | 44.2                            | 36.5                              | 75                            | 70                              |
| N2         | Allppanur    | Residential Area       | 42.8                            | 35.2                              | 55                            | 45                              |
| N3         | Kadambadi    |                        | 42.2                            | 33.5                              |                               |                                 |
| N4         | Royandapuram |                        | 42.1                            | 33.2                              |                               |                                 |
| N5         | Thodamanur   |                        | 42.1                            | 33.5                              |                               |                                 |

Source: On-site monitoring/sampling by Accuracy Analabs (OBC) Private Limited in association with GTMS.

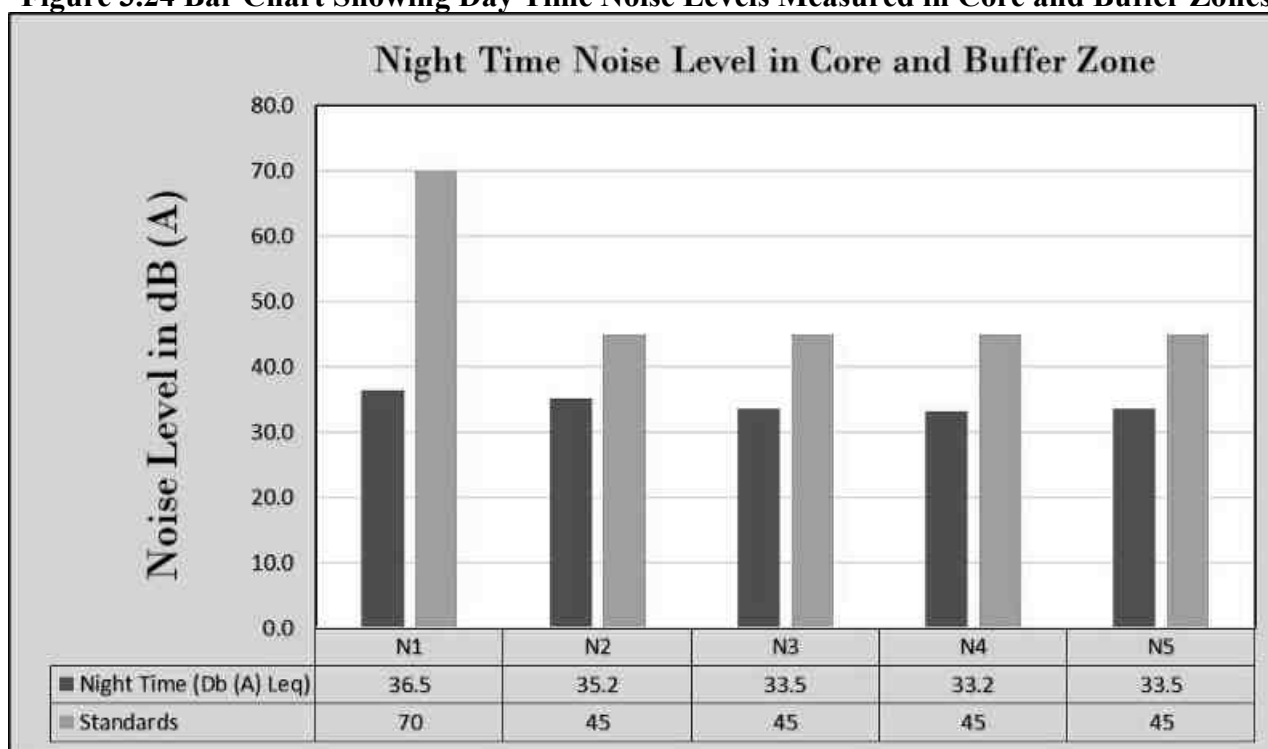
The Table 3.18 shows that noise level in core zone was 44.2dB (A) Leq during day time and 36.5dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 42.1 to 42.8dB (A) Leq and during night time from 33.2 to 35.2dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.24 and 3.25.



**Figure 3.23 Map Showing Noise Level Monitoring Station Locations around 5km Radius from Proposed Project Site**



**Figure 3.24 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones**



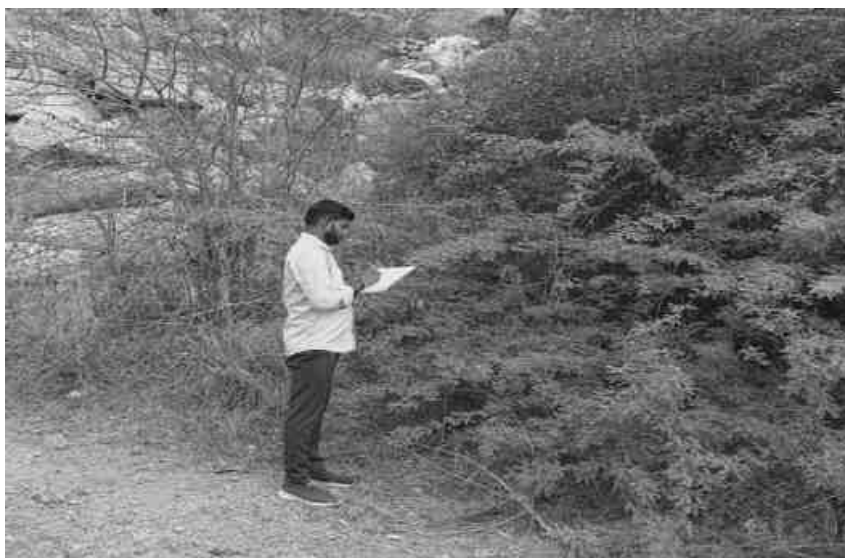
**Figure 3.25 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones**

### 3.6 BIOLOGICAL ENVIRONMENT

Collection of comprehensive baseline information on flora and fauna is a prerequisite for assessment of impacts of any extractive industries/ activities. Biological environment is an important component of the environment of any area. It covers flora & fauna in the region, details of forests and wildlife sanctuaries in the region, with list of endangered species. Over the years

ecological and along with it the loss of biological diversity has become a national and a global concern. Ecological assessment therefore is very critical for decision making and for the setting of a developmental project or an industry. An ecological study of the ecosystem is essential to understand the impact of industrialization and urbanization on existing flora and fauna of the area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if any.

The objective of this Section is to characterize and understand the present status of the ecosystems in the study area to assess the bio-diversity and to identify the critical areas. The present study was undertaken as a part of EIA report to understand the present status of ecosystem prevailing in the study area, to compare it with the past condition with the help of available data, to predict changes as a result of present activities and to suggest measures for maintaining the conditions.



**Figure 3.26 Quadrates Sampling Methods of Flora**

### **3.6.1 Flora**

#### **3.6.1.1 Objectives of the Study**

The ecological study of the area was conducted in order to understand the existing status of the flora and fauna to generate baseline information and evaluate the possible impacts on biological environment. The present study highlights the various issues pertaining to floristic diversity and faunal wealth in the surrounding area up to 10km radius from the proposed expansion project.

#### **3.6.1.2 Study Approach & Methodology**

The baseline study for existing ecological environment was carried out during study period. A participatory and consultative approach was followed. Field visits were under taken for survey of the aquatic and terrestrial vegetation and animals in the study area.

Nested quadrat sampling method was used for the study of community structure of the vegetation. The sampling consisted of randomly placed quadrats of 10m × 10m were laid down to assess trees, and sub quadrats of 5m × 5m were laid down for shrubs, 1m x 1m were laid down for herbs. The size and number of quadrats needed were determined using the species- area curve (Misra, 1968). The data on vegetation were quantitatively analysed for abundance, density, frequency as per Curtis & McIntosh (1950). The Important Value Index (IVI) for trees was determined as the sum of relative density, relative frequency and relative dominance (Curtis, 1959).

### **3.6.1.3 Survey Methodology**

The baseline study for existing biological environmental was carried out in Nov 2024. Study of flora and fauna carried out as per prescribed method addressed in SOP. Field visits were undertaken for survey of the vegetation and animals in the study area. The study area is divided into three parts as project site area along with 500m from all direction surrounding site is being considered as core area and rest of 5km study area is buffer part of the study area.

### **3.6.1.4 Important Value Index (IVI)**

The concept of ‘Important Value Index (IVI)’ has been developed for expressing the dominance and ecological success of any species, with a single value (Mishra, 1968, Sharma, 2005). This index utilizes three characteristics, they are (i) Relative frequency and (ii) Relative density. The three characteristics computed using frequency, density and abundance for all the species falling in all the quadrat by using the following formula. The relative frequency, relative density and relative abundance has been calculated to calculate the IVI value

$$IVI = \text{Relative frequency} + \text{Relative abundance} + \text{Relative density} [RF + RA + RD]$$

$$\text{Relative Value Index (RVI)} = \text{Relative Density} + \text{Relative Frequency} [RD + RF].$$

Relative Value Index used for Expressing dominance and Ecological success of Shrub and herb Species in a particular area.

### **Shannon- Wiener Index, Evenness and Richness**

Biodiversity index is a quantitative measure that reflects how many different types of species, there are in a dataset, and simultaneously takes into account how evenly the basic entities (such as individuals) are distributed among those types of species. The value of biodiversity index increases both when the number of types increases and when evenness increases. For a given number of type of species, the value of a biodiversity index is maximized when all type of species is equally abundant.

The **Shannon Diversity Index** (sometimes called the Shannon-Wiener Index) is a way to measure the diversity of species in a community.

The species diversity index (H) for floral and faunal diversity is calculated by the use of Shannon Wiener Index (Shannon Wiener, 1963) as:

$$H = - \sum (n_i/n) \times \ln (n_i/n)$$

- ✚ Where,  $n_i$  is individual density of a species and  $n$  is total density of all the species
- ✚ The Evenness Index (E) is calculated by using Shannon's Evenness formula (Magurran, 2004).
- ✚ The higher the value of H, the higher the diversity of species in a particular community

The lower the value of H, the lower the diversity. A value of  $H = 0$  indicates a community that only has one species

$$\text{Evenness Index (E)} = H / \ln(S)$$

Where, H is Shannon Wiener Diversity index; S is number of species

The Shannon evenness Index is a way to measure the evenness of species in a community. The term “evenness” simply refers to how similar the abundances of different species are in the community.

### 3.6.1.5 Floral diversity Analysis

Flora study was conducted using the above said methodology to inventory the existing terrestrial plants in both core and buffer zones. Details of plants have been described in the succeeding sections.

#### *Flora in core zone*

The core zone presents in tree, shrubs, herbs and grasses. Taxonomically total of 9 species belonging to 6 families have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were Herbs 4 followed by Trees 2 Shrubs 3. The result of core zone of flora studies shows that Fabaceae are the main dominating species in the study area it mentioned in Table 3.19. No species found as threatened category.

**Table 3.19 Flora in mine lease area**

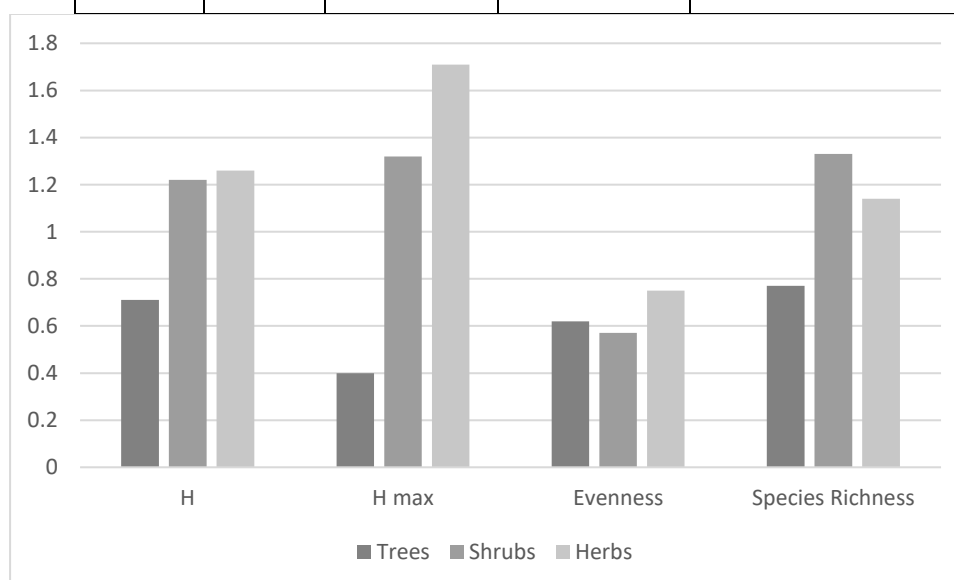
| S.no          | Local name           | Scientific name            | Family name | IUCN- Conservation Status |
|---------------|----------------------|----------------------------|-------------|---------------------------|
| <b>Trees</b>  |                      |                            |             |                           |
| 1.            | Arapu maram          | <i>Albizia amara</i>       | Fabaceae    | Not Listed                |
| 2.            | Karuvealan           | <i>Prosopis juliflora</i>  | Fabaceae    | Not Listed                |
| <b>Shrubs</b> |                      |                            |             |                           |
| 3.            | Unni chadi           | <i>Lantana camara</i>      | Verbenaceae | Not Listed                |
| 4.            | <u>Thazhuthaalai</u> | <i>Chromolaena odorata</i> | Asteraceae  | Not Listed                |
| 5.            | Thuthi               | <i>Abutilon indicum</i>    | Meliaceae   | Not Listed                |

| Herbs |                  |                                |                |            |
|-------|------------------|--------------------------------|----------------|------------|
| 6.    | Kattu kanchippul | <i>Apluda mutica</i>           | Poaceae        | Not Listed |
| 7.    | Kolunji chadi    | <i>Tephrosia purpurea</i>      | Fabaceae       | Not Listed |
| 8.    | Nayuruvi         | <i>Achyranthes aspera</i>      | Amaranthaceae  | Not Listed |
| 9.    | Nearunji mull    | <u><i>Tribulus zeyheri</i></u> | Zygophyllaceae | Not Listed |

NE- Not evaluated; LC- Least Concern, NT- Near Threatened, T- Threatened

**Table 3.20 Species Richness (Index) in mine lease area**

| Details       | H    | H max | Evenness | Species Richness |
|---------------|------|-------|----------|------------------|
| <b>Trees</b>  | 0.97 | 1.1   | 0.62     | 0.77             |
| <b>Shrubs</b> | 1.22 | 1.32  | 0.57     | 1.33             |
| <b>Herbs</b>  | 1.26 | 1.71  | 0.75     | 1.14             |



**Figure 3.27 Species Richness (Index) in Mine Lease area**

### ***Flora in 300m radius***

Taxonomically, a total of 22 species belonging to 16 families have been recorded from the 300m radius from the mining lease area. The species in the 300m radius include herbs (06), trees (04), shrubs (06), the 16 families, Fabaceae and Lamiaceae are the main dominating species in the study area, Species Richness (margalef Index) in the study area it mentioned in Table 3.21-3.22. Moreover, no species are found as threatened category. There is government land around 300 meters. *Prosopis juliflora* is the dominant tree followed by *Albizia amara* tree, *Azadirachta indica*, *Casapella thevetia* and *Lantana camara* plant.

**Table 3.21 Flora in 300m Radius**

| S. No                    | Local name       | Scientific name                  | Family Name    | IUCN Conservation Status |
|--------------------------|------------------|----------------------------------|----------------|--------------------------|
| <b>Trees</b>             |                  |                                  |                |                          |
| 1.                       | Arapu maram      | <i>Albizia amara</i>             | Fabaceae       | Not Listed               |
| 2.                       | Velikathan maram | <i>Prosopis juliflora</i>        | Fabaceae       | Not Listed               |
| 3.                       | Neem             | <i>Azadirachta indica</i>        | Meliaceae      | LC                       |
| 4.                       | Panai maram      | <i>Borassus flabellifer</i>      | Arecaceae      | Not Listed               |
| <b>Shrubs</b>            |                  |                                  |                |                          |
| 5.                       | Unichedi         | <i>Lantana camara</i>            | Verbenaceae    | Not Listed               |
| 6.                       | Sundaika         | <i>Solanum torvum</i>            | Solanaceae     | Not Listed               |
| 7.                       | Erukku           | <i>Calotropis gigantea</i>       | Apocynaceae    | Not Listed               |
| 8.                       | Aavaram          | <i>Senna auriculata</i>          | Fabaceae       | Not Listed               |
| 9.                       | Sappathikalli    | <i>Cereus pterogonus</i>         | Cactus         | Not Listed               |
| 10.                      | Thuthi           | <i>Abutilon indicum</i>          | Meliaceae      | Not Listed               |
| <b>Herbs/ Climber</b>    |                  |                                  |                |                          |
| 11.                      | Thumbai          | <i>Leucas aspera</i>             | Lamiaceae      | Not Listed               |
| 12.                      | Wild thulasi     | <i>Hyptis suaveolens (L.)</i>    | Lamiaceae      | Not Listed               |
| 13.                      | Amman Paccharisi | <i>Euphorbia hirta</i>           | Euphorbiaceae  | Not Listed               |
| 14.                      | Paca poondu      | <i>Pavonia gallaensis</i>        | Malvaceae      | Not Listed               |
| 15.                      | Perandai         | <i>Cissus quadrangularis</i>     | Vitaceae       | Not Listed               |
| 16.                      | Vishnukrandai    | <i>Evolvulus alsinoides</i>      | Convolvulaceae | Not Listed               |
| 17.                      | Nagathali        | <i>Opuntia dillenii</i>          | Cactaceae      | Not Listed               |
| 18.                      | Poolai poondu    | <i>Aerva lanata</i>              | Amaranthaceae  | Not Listed               |
| 19.                      | Nayuruvi         | <i>Achyranthes aspera</i>        | Amaranthaceae  | Not Listed               |
| <b>Creepers/ Grasses</b> |                  |                                  |                |                          |
| 20.                      | Siru puladi      | <i>Desmodium triflorum</i>       | Fabaceae       | Not Listed               |
| 21.                      | Vallikeerai      | <i>Ipomoea aquatica</i>          | Convolvulaceae | Not Listed               |
| 22.                      | Mudakkotan       | <i>Cardiospermum helicacabum</i> | Sapindaceae    | Not Listed               |

NE- Not evaluated; LC- Least Concern, NT- Near Threatened, T- Threatened

#### **Flora in 10km radius zone**

In the buffer zone, a total of 81 species belonging to 41 families were recorded. Among them are trees (32), shrubs (14), herbs (38), climbers (09), creepers (5), grasses (4), and cactus (1). Majority of the species belongs to the family of Fabaceae and Poaceae, as mentioned in Table 3.24. Species Richness (margalef Index) in the study area it mentioned in Table 3.25 Moreover, no species are found as threatened category.

**Table 3.22 Flora in 10km Radius**

| S. No        | Local name      | Scientific name       | Family Name    | IUCN Conservation Status |
|--------------|-----------------|-----------------------|----------------|--------------------------|
| <b>Trees</b> |                 |                       |                |                          |
| 1.           | Vembu           | Azadirachta indica    | Meliaceae      | Not Listed               |
| 2.           | Pongam oiltree  | Pongamia pinnata      | Fabaceae       | Not Listed               |
| 3.           | Karuvelam       | Acacia nilotica       | Mimosaceae     | LC                       |
| 4.           | Thennai maram   | Cocos nucifera        | Arecaceae      | Not Listed               |
| 5.           | Puliyamaram     | Tamarindus indica     | Legumes        | Not Listed               |
| 6.           | Athi            | Ficus recemosa        | Moraceae       | Not Listed               |
| 7.           | Vazhaimaram     | Musa                  | Musaceae       | Not Listed               |
| 8.           | Nettilinkam     | Polylathia longifolia | Annonaceae     | Not Listed               |
| 9.           | Amanakku        | Ricinus communis      | Euphorbiaceae  | Not Listed               |
| 10.          | Perumungil      | Bambusa bambos        | Poaceae        | Not Listed               |
| 11.          | Karungali       | Acacia sundra         | Legumes        | Not Listed               |
| 12.          | Sapota          | Manilkara zapota      | Sapotaceae     | Not Listed               |
| 13.          | Eucalyptus      | Eucalyptus globules   | Myrtaceae      | Not Listed               |
| 14.          | Navalmaram      | Sygygium cumini       | Myrtaceae      | Not Listed               |
| 15.          | Ezhumuchaipalam | Citrus lemon          | Rutaceae       | Not Listed               |
| 16.          | Alamaram        | Ficus benghalensis    | Moraceae       | Not Listed               |
| 17.          | Panai maram     | Borassus flabellifer  | Arecaceae      | Not Listed               |
| 18.          | Manga           | Mangifera indica      | Anacardiaceae  | Not Listed               |
| 19.          | Thekku          | Tectona grandis       | Verbenaceae    | Not Listed               |
| 20.          | Nelli           | Emblica officinalis   | Phyllanthaceae | Not Listed               |
| 21.          | Karuvelam maram | Vachellia nilotica    | Fabaceae       | Not Listed               |
| 22.          | Vadanarayani    | Delonix elata         | Fabaceae       | Not Listed               |
| 23.          | Marudaani       | Lawsonia inermis      | Lythraceae     | Not Listed               |
| 24.          | Pappali maram   | Carica papaya L       | Caricaceae     | Not Listed               |
| 25.          | Nochi           | Vitex negundo         | Verbenaceae    | Not Listed               |
| 26.          | Vilvam          | Aegle marmelos        | Rutaceae       | Not Listed               |
| 27.          | Nuna maram      | Morinda citrifolia    | Rubiaceae      | Not Listed               |

|                                              |                  |                               |                |            |
|----------------------------------------------|------------------|-------------------------------|----------------|------------|
| 28.                                          | Koyya            | Psidium guajava               | Myrtaceae      | Not Listed |
| 29.                                          | Seethapazham     | Annona reticulata             | Annonaceae     | Not Listed |
| 30.                                          | Vagai            | Albizia lebbeck               | Fabaceae       | Not Listed |
| 31.                                          | Teaku            | Tectona grandis               | Lamiaceae      | Not Listed |
| 32.                                          | Teanai Maram     | Cocos nucifera                | Arecaceae      | Not Listed |
| <b>Shrubs</b>                                |                  |                               |                |            |
| 33.                                          | Avarai           | Senna auriculata              | Fabaceae       | Not Listed |
| 34.                                          | Sundaika         | Solanum torvum                | Solanaceae     | Not Listed |
| 35.                                          | Arali            | Nerium indicum                | Apocynaceae    | Not Listed |
| 36.                                          | Idlipoo          | Xoracoc cinea                 | Rubiaceae      | Not Listed |
| 37.                                          | Neermulli        | Hydrophila auriculata         | Acanthaceae    | Not Listed |
| 38.                                          | Icham            | Phoenix pusilla               | Arecaceae      | Not Listed |
| 39.                                          | Chaturakalli     | Euphorbia antiquorum          | Euphorbiaceae  | Not Listed |
| 40.                                          | Kattamanakku     | Jatropha curcas               | Euphorbiaceae  | Not Listed |
| 41.                                          | Thuthi           | Abutilon indicum              | Meliaceae      | Not Listed |
| 42.                                          | Chemparuthi      | Hibiscu rosa-sinensis         | Malvaceae      | Not Listed |
| 43.                                          | Kundumani        | Abrus precatorius             | Fabaceae       | Not Listed |
| 44.                                          | Erukku           | Calotropis gigantea           | Apocynaceae    | Not Listed |
| 45.                                          | Bulangan         | Gmelina asiatica L.           | Lamiaceae      | Not Listed |
| 46.                                          | Mottled spurge   | Euphorbia lactea              | Euphorbiaceae  | Not Listed |
| <b>Herbs, Climber, Creeper &amp; Grasses</b> |                  |                               |                |            |
| 47.                                          | Thumbai          | <i>Leucas aspera</i>          | Lamiaceae      | Not Listed |
| 48.                                          | Wild thulasi     | <i>Hyptis suaveolens (L.)</i> | Lamiaceae      | Not Listed |
| 49.                                          | Amman Paccharisi | <i>Euphorbia hirta</i>        | Euphorbiaceae  | Not Listed |
| 50.                                          | Paca poondu      | <i>Pavonia gallaensis</i>     | Malvaceae      | Not Listed |
| 51.                                          | Perandai         | <i>Cissus quadrangularis</i>  | Vitaceae       | Not Listed |
| 52.                                          | Vishnukrandai    | <i>Evolvulus alsinoides</i>   | Convolvulaceae | Not Listed |
| 53.                                          | Nagathali        | <i>Opuntia dillenii</i>       | Cactaceae      | Not Listed |
| 54.                                          | Poolai poondu    | <i>Aerva lanata</i>           | Amaranthaceae  | Not Listed |
| 55.                                          | Nayuruvi         | <i>Achyranthes aspera</i>     | Amaranthaceae  | Not Listed |
| 56.                                          | Milagai          | Capsicum frutescens           | Solanaceae     | Not Listed |

|     |                  |                           |                |            |
|-----|------------------|---------------------------|----------------|------------|
| 57. | Kanamvazha       | Commelina benghalensis    | Commelinaceae  | Not Listed |
| 58. | Nai kadugu       | Celome viscosa            | Capparidaceae  | Not Listed |
| 59. | Thumbai          | Leucas aspera             | Lamiaceae      | Not Listed |
| 60. | Parttiniyam      | Parthenium hysterophorus  | Asteraceae     | Not Listed |
| 61. | Mukurattai       | Boerhavia diffusa         | Nyctaginaceae  | Not Listed |
| 62. | Thulasi          | Ocimum tenuiflorum        | Lamiaceae      | Not Listed |
| 63. | Manathakkali     | Solanumnigrum             | Solanaceae     | Not Listed |
| 64. | Kumipoondur      | Gomphrena celosioides     | Amaranthaceae  | Not Listed |
| 65. | Kattuthulasi     | Ocimum sanctum            | Lamiaceae      | Not Listed |
| 66. | Kovai            | Coccinia grandis          | Cucurbitaceae  | Not Listed |
| 67. | Perandai         | Cissus quadrangularis     | Vitaceae       | Not Listed |
| 68. | Mudakkotan       | Cardiospermum helicacabum | Sapindaceae    | Not Listed |
| 69. | Karkakartum      | Clitoria ternatea         | Fabaceae       | Not Listed |
| 70. | Nannari          | Hemidesmus indicus        | Asclepiadaceae | Not Listed |
| 71. | Kovakkai         | Trichosanthes dioica      | Cucurbitaceae  | Not Listed |
| 72. | Malli            | Jasminum augustifolium    | Oleaceae       | Not Listed |
| 73. | Musumusukkai     | Mukia maderaspatana       | Cucurbitaceae  | Not Listed |
| 74. | Mosukkattan      | Passiflora foetida        | Passifloraceae | Not Listed |
| 75. | Vallikeerai      | Ipomoea aquatica          | Convolvulaceae | Not Listed |
| 76. | Siru puladi      | Desmodium triflorum       | Fabaceae       | Not Listed |
| 77. | Sithrapaalavi    | Euphorbia prostrata       | Euphorbiaceae  | Not Listed |
| 78. | Korai            | Cyperus rotundus          | Poaceae        | Not Listed |
| 79. | mookuthi poondur | Wedelia trilobata         | Asteraceae     | Not Listed |
| 80. | Nellu            | Oryza sativa              | Poaceae        | Not Listed |
| 81. | Pullu            | Eragrostis ferruginea     | Poaceae        | Not Listed |
| 82. | Chevvarakupul    | Chloris barbata           | Amaranthaceae  | Not Listed |
| 83. | Arugampul        | Cynodon dactylon          | Poaceae        | Not Listed |
| 84. | Sapathikalli     | Opuntia dillenii          | Cactaceae      | Not Listed |

### 3.6.2 Fauna

The faunal survey was carried out for Mammals, Birds, Reptiles, Amphibians and Butterflies. There are no rare, endangered, threatened (RET) and endemic species present in core area.

**Table 3.23 Methodology applied during survey of fauna**

| S. No | Taxa       | Method of Sampling                       | References                      |
|-------|------------|------------------------------------------|---------------------------------|
| 1     | Insects    | Random walk, Opportunistic observations  | Pollard (1977); Kunte (2000)    |
| 2     | Reptiles   | Visual encounter survey (Direct Search)  | Daniel J.C (2002)               |
| 3     | Amphibians | Visual encounter survey (Direct Search)  |                                 |
| 4     | Mammals    | Tracks and Signs                         | Menon V (2014)                  |
| 5     | Avian      | Random walk, Opportunistic observations. | Grimmett R (2011); ALI S (1941) |

The fauna is studied for 10 km radius around the project site. Project site and 2 km around the project site is considered as core zone and from 2 km to 10 km radius, it is considered as buffer zone.

#### ***Fauna Composition in the Core Zone***

A total of 22 species belonging to 15 families were observed in the core zone (Table3.24). Among them are 9 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Avian. None of these species are threatened or endemic in the study area and surroundings. There are no Schedule I species and 8 species are under schedule IV according to Indian wild life Act, 1972. There are no critically endangered, endangered, vulnerable and endemic species in the core zone.

#### ***Fauna Composition in the Buffer Zone***

A total of 44 species belonging to 34 families were recorded from the buffer area. Among them were 20 species of Birds, 13 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Amphibians, as mentioned in Table.3.25. There are four species under Schedule II and twenty-six species under schedule IV according to Indian wild life Act 1972. And there are no critically endangered, vulnerable and endemic species in the buffer area. There is no schedule I Species in study area and there are no critically endangered, endangered, vulnerable and endemic species.

**Table 3.24 Fauna in the Core zone**

| S. No.  | Common name/EnglishName | FamilyName  | Scientific Name       | Schedule List Wildlife Protection Act, 1972 | IUCN Red List data |
|---------|-------------------------|-------------|-----------------------|---------------------------------------------|--------------------|
| INSECTS |                         |             |                       |                                             |                    |
| 1       | Common Tiger            | Nymphalidae | <i>Danaus genutia</i> | NL                                          | NL                 |

|          |                     |                |                               |             |    |
|----------|---------------------|----------------|-------------------------------|-------------|----|
| 2        | Red-veined darter   | Libellulidae   | <i>Sympetrum fonscolombii</i> | NL          | LC |
| 3        | Grasshopper         | Acrididae      | <i>Hieroglyphus sp</i>        | NL          | LC |
| 4        | Blue tiger          | Nymphalidae    | <i>Tirumala limniace</i>      | Schedule IV | LC |
| 5        | Stick insect        | Lonchodidae    | <i>carausius morosus</i>      | NL          | LC |
| 6        | Mottled emigrant    | Peridae        | <i>Catopsilia pyranthe</i>    | NL          | LC |
| 7        | Praying mantis      | Mantidae       | <i>Mantis religiosa</i>       | NL          | NL |
| 8        | Striped tiger       | Nymphalidae    | <i>Danaus plexippus</i>       | Schedule IV | LC |
| 9        | Acraea violae       | Nymphalidae    | <i>Acraea violae</i>          | NL          | LC |
| REPTILES |                     |                |                               |             |    |
| 10       | Garden lizard       | Agamidae       | <i>Calotes versicolor</i>     | NL          | LC |
| 11       | Common house gecko  | Gekkonidae     | <i>Hemidactylus frenatus</i>  | NL          | LC |
| 12       | Fan-Throated Lizard | Agamidae       | <i>Sitanaponticeriana</i>     | NL          | LC |
| MAMMALS  |                     |                |                               |             |    |
| 1        | Indian Field Mouse  | <i>Muridae</i> | <i>Mus booduga</i>            | Schedule IV | NL |
| AVES     |                     |                |                               |             |    |
| 1        | Green bee-eater     | Meropidae      | <i>Merops orientalis</i>      | NL          | LC |
| 2        | Koel                | Cuculidae      | <i>Eudynamys</i>              | Schedule IV | LC |
| 3        | Common myna         | Sturnidae      | <i>Acridotheres tristis</i>   | NL          | LC |
| 4        | Cattle egret        | Ardeidae       | <i>Bubulcus ibis</i>          | NL          | LC |
| 5        | House crow          | Corvidae       | <i>Corvus splendens</i>       | NL          | LC |
| 6        | Koel                | Cuculidae      | <i>Eudynamys scolopaceus</i>  | Schedule IV | LC |
| 7        | Crow Pheasant       | Cuculidae      | <i>Centropus sinensis</i>     | Schedule IV | LC |
| 8        | Indian pond heron   | Ardeidae       | <i>Ardeola grayii</i>         | Schedule IV | LC |
| 9        | Grey drongo         | Dicruridae     | <i>Dicrurus leucophaeus</i>   | Schedule IV | LC |

**Table 3.25 Fauna in the buffer zone**

| S. No.  | Common Name/English Name | Family Name | Scientific Name          | Schedule List Wildlife Protection Act 1972 | IUCN Red List Data |
|---------|--------------------------|-------------|--------------------------|--------------------------------------------|--------------------|
| INSECTS |                          |             |                          |                                            |                    |
| 1       | Tawny costar             | Nymphalidae | <i>Danaus chrysippus</i> | Schedule IV                                | LC                 |
| 2       | Milkweed butterfly       | Nymphalidae | <i>Danainae</i>          | NL                                         | LC                 |

|                 |                    |                |                               |                  |    |
|-----------------|--------------------|----------------|-------------------------------|------------------|----|
| 3               | Blue tiger         | Nymphalidae    | <i>Tirumala limniace</i>      | Schedule IV      | LC |
| 4               | Common Indian Crow | Nymphalidae    | <i>Euploea core</i>           | Schedule IV      | LC |
| 5               | Green marsh hawk   | Libellulidae   | <i>Orthetrum sabina</i>       | NL               | LC |
| 6               | Mottled emigrant   | Peridae        | <i>Catopsilia pyranthe</i>    | NL               | LC |
| 7               | Striped tiger      | Nymphalidae    | <i>Danaus plexippus</i>       | Schedule IV      | LC |
| 8               | Ant                | Formicidae     | <i>Camponotus Vicinus</i>     | NL               | NL |
| 9               | Red-veined darter  | Libellulidae   | <i>Sympetrum fonscolombii</i> | NL               | LC |
| 10              | Lesser grass blue  | Lycaenidae     | <i>Zizina otis indica</i>     | Schedule IV      | LC |
| 11              | Praying mantis     | Mantidae       | <i>mantis religiosa</i>       | NL               | NL |
| 12              | Grasshopper        | Acrididae      | <i>Hieroglyphus sp</i>        | NL               | LC |
| 13              | Common Tiger       | Nymphalidae    | <i>Danaus genutia</i>         | Schedule IV      | LC |
| <b>REPTILES</b> |                    |                |                               |                  |    |
| 1               | Chameleon          | Chamaeleonidae | <i>Chameleonzeylanicus</i>    | Sch II (Part II) | LC |
| 2               | Garden lizard      | Agamidae       | <i>Calotes versicolor</i>     | NL               | LC |
| 3               | Green Vine snake   | Colubridae     | <i>Ahaetulla nasuta</i>       | Schedule IV      | LC |
| 4               | Common house gecko | Gekkonidae     | <i>Hemidactylus frenatus</i>  | NL               | LC |
| 5               | Rat snake          | Colubridae     | <i>Ptyas mucosa</i>           | Sch II (Part II) | LC |
| <b>MAMMALS</b>  |                    |                |                               |                  |    |
| 1               | palmsquirrel       | Sciuridae      | <i>Funambulus palmarum</i>    | Schedule IV      | LC |
| 2               | Indian FieldMouse  | Muridae        | <i>Mus booduga</i>            | Schedule IV      | LC |
| 3               | Home mouse         | Muridae        | <i>Mus musculus tyleri</i>    | NL               | LC |
| <b>AVES</b>     |                    |                |                               |                  |    |
| 1               | House crow         | Corvidae       | <i>Corvus splendens</i>       | NL               | LC |
| 2               | Cattle egret       | Ardeidae       | <i>Bubulcus ibis</i>          | NL               | LC |
| 3               | Black drongo       | Dicruridae     | <i>Dicrurus macrocercus</i>   | Schedule IV      | LC |
| 4               | Red-vented Bulbul  | Pycnonotidae   | <i>Pycnonotus cafer</i>       | Schedule IV      | LC |
| 5               | Indian pond heron  | Ardeidae       | <i>Ardeola grayii</i>         | Schedule IV      | LC |
| 6               | green bee-eater    | Meropidae      | <i>Merops orientalis</i>      | NL               | LC |
| 7               | Small Sunbird      | Nectariniidae  | <i>Nectarinia asiatica</i>    | Schedule IV      | LC |
| 8               | Common myna        | Sturnidae      | <i>Acridotheres tristis</i>   | NL               | LC |
| 9               | Blue Rock Pigeon   | Columbidae     | <i>Columba livia</i>          | Schedule IV      | LC |
| 10              | Common Coot        | Rallidae       | <i>Fulica atra</i>            | Schedule IV      | LC |
| 11              | Small Sunbird      | Nectariniidae  | <i>Nectarinia asiatica</i>    | Schedule IV      | LC |

### 3.6.2 Aquatic Vegetation

The field survey for assessing the aquatic vegetation was also undertaken during the study period. The list of aquatic plants observed in the study area is given in table 3.26.

**Table 3.26 Aquatic Vegetation**

| S. No. | Scientific Name           | Common Name    | Vernacular Name (Tamil) | IUCN Red List of Threatened Species |
|--------|---------------------------|----------------|-------------------------|-------------------------------------|
| 1      | <i>Eichornia Crassipe</i> | Water Hyacinth | Agayatamarai            | NA                                  |

|   |                          |                     |               |    |
|---|--------------------------|---------------------|---------------|----|
| 2 | <i>Aponogeton natans</i> | Floating Lace Plant | Kottikizhangu | NA |
| 3 | <i>Nymphaea Nouchali</i> | Blue Water Lily     | Nellambal     | LC |
| 4 | <i>Carex Cruciata</i>    | Cross Grass         | Koraipullu    | NA |
| 5 | <i>Cynodon Dactylon</i>  | Scutch Grass        | Arugampullu   | LC |
| 6 | <i>Cyperus Exaltatus</i> | Tall Flat Sedge     | Koraikizhangu | LC |

\*Lc- Least Concern, Na-Not Yet Assessed

### **Food chain**

The food chain in aquatic ecosystems often begins with the algae or phytoplankton producers, and then the zooplankton that feed on them. This type of food chain is found in Noyal River by phytoplankton, zooplankton, fish and *Artiola gray*.

Ex: Phytoplankton → Zooplankton → small fish → large fish

### **Endangered and endemic species as per the IUCN Red List**

There are no rare, endangered and endemic species found in the study area

### **3.6.3 Agriculture & Horticulture in Tiruvannamalai district**

The pre-monsoon rainfall is almost uniform throughout the district. The coastal taluks get more rains rather than the interior regions. This district is mainly depending on the seasonal rains, the distress conditions prevail in the event of the failure of rains. Northeast and Southwest monsoon are the major donors with 54% and 36% contribution each to the total annual rainfall. Agriculture is the main occupation of the people with 20% of the population engaged in it. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals and Millets and Pulses are the other major crops. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals & Millets and Pulses are the other major crops cultivated.

#### **3.6.3.1 Major Agricultural Crops 1km radius**

Major horticulture crops cultivated in this district are vegetables crops like tomato, brinjal, chillies, onion and turmeric. Details of major field crops and horticulture in 1km radius is given in Table. 3.27.

**Table 3.27 Major Crops in 1km radius**

| S. No | Major crops   | Scientific name              | Families    |
|-------|---------------|------------------------------|-------------|
| 1     | Sorghum       | <i>Sorghum bicolor</i>       | Poaceae     |
| 2     | Gingelly      | <i>Sesamum indicum</i>       | Pedaliaceae |
| 3     | Groundnut     | <i>Arachis hypogaea</i>      | Legumes     |
| 4     | Sugarcane     | <i>Saccharum officinarum</i> | Poaceae     |
| 5     | Proso Millets | <i>Panicum miliaceum L</i>   | Poaceae     |
| 6     | Cotton        | <i>Gossypium herbaceum</i>   | Malvaceae   |

### 3.6.3.2 Major Horticulture Crops 1km radius

Horticulture includes cultivation of fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. It also includes plant conservation, landscape restoration, landscape and garden design.

### 3.6.3.3 Horticulture 1km radius

Major horticulture crops cultivated in Tiruvannamalai district are fruit crops like mango, banana, Sapota and guava, vegetables like tomato, brinjal, Veandai, chillies, onion and tapioca, spices like turmeric. Details of major field crops and horticulture cultivation in 1km radius is given in Table 3.28.

**Table 3.28 Major Field Crops & Horticulture cultivation in 1km radius.**

| S. No                            | Common Name  | Scientific Name               | Family         |
|----------------------------------|--------------|-------------------------------|----------------|
| <b>Major Horticultural Crops</b> |              |                               |                |
| 1                                | Guava        | <i>Psidium guajava</i>        | Myrtaceae      |
| 2                                | Sapota       | <i>Manilkara zapota</i>       | Sapotaceae     |
| 3                                | Lemon        | <i>Citrus × limon</i>         | Rutaceae       |
| 4                                | Papaya       | <i>Carica papaya</i>          | Caricaceae     |
| <b>Vegetables</b>                |              |                               |                |
| 5                                | Onion        | <i>Allium cepa</i>            | Amaryllidaceae |
| 6                                | Tapioca      | <i>Manihot esculenta</i>      | Spurges        |
| 7                                | Brinjal      | <i>Solanum melongena</i>      | Nightshade     |
| 8                                | Tomato       | <i>Solanum lycopersicum</i>   | Nightshade     |
| 9                                | Bottle Gourd | <i>Lagenaria siceraria</i>    | Cucurbits      |
| 10                               | Veandai kai  | <i>Abelmoschus esculentus</i> | Mallows        |
| 11                               | Moringa      | <i>Moringa oleifera</i>       | Moringaceae    |

### Results

Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any. The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

### 3.7 SOCIO-ECONOMIC ENVIRONMENT

The major developmental activities of the mining and industrial sector are crucial for economic development and the creation of direct and indirect employment opportunities. These activities also fulfil society's basic and modern needs of the society, ultimately improving the quality of life through advancements in social, economic, health, education, and nutritional status within the project region, state, and country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for developmental projects. Thus, the study of socio-economic environment component incorporating various sides related to prevailing social and cultural conditions and economic status of the rough stone mining quarries project region is an important part of the EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socio-economics and parameters of human interest due to the project.

#### 3.7.1 Objectives of the Study

*The objectives of the socio-economic impact assessment are as follows:*

- a) To study the socio-economic status of the people living in the study area of the project.
- b) To identify the basic needs of the nearby villages within the study area.
- c) To assess the impact on socio-economic environment due to the project.
- d) To provide the employment and improved living standards.
- e) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

#### 3.7.2 Methodology

The study employed cluster sampling to outline two zones around the proposed project site: Zone 1 (Core Zone, 0-1 km radius) and Zone 2 (Low Impact Zone, 1–5 km radius). The primary data collection was conducted through structured interviews, field observation, and focus group discussions with the local people of in Kundiyathandalam and Poonathangal Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The secondary data were collected from the Census report 2011 and official records, covering demographics and basic services including information on population, number of households, literacy rates, sex ratios, worker details and the availability of basic services. This study covers the positive and negative impacts of the project's establishment, and provides recommendations for analysing and mitigating adverse effects. The study areas are illustrated in Figure 3.28.

### 3.7.3 Demographic Profile of Tiruvannamalai District

Tiruvannamalai District is geographically bounded by Vellore and Ranipet districts to the north, Tirupathur district to the west, Kallakurichi district to the south, Chengalpattu district to the east, Villupuram district to the southeast, and Kanchipuram district to the northeast. Administratively, the district is divided into 12 taluks, which are further subdivided into 18 blocks, comprising a total of 860 villages. According to the 2011 Census, Tiruvannamalai District had a total population of 2,464,875, of which 1,235,889 were males and 1,228,986 were females respectively. In comparison, the 2001 Census recorded a population of 2,186,125, including 1,095,859 males and 1,090,266 females, indicating a significant population growth over the decade. This indicates a population growth of approximately 12.8 percent over the decade, reflecting steady demographic expansion in the district.

The average literacy rate of the district in 2011 was 84.41%, with male literacy at 90.80% and female literacy at 78.13%. In terms of the number of literates, there were 1,626,813 literate individuals, comprising 909,803 males and 717,010 females. However, gender disparities in education remain evident, as the male and female literacy rates stood at 81.18% and 62.05%, respectively. The sex ratio in Tiruvannamalai District was 994 females per 1000 males in 2011, showing a marginal decline from 995 in 2001, yet remaining considerably higher than the national average of 940. The child sex ratio was 930 girls per 1000 boys in 2011, reflecting a decrease from 948 in 2001, suggesting a continuing gender imbalance among the child population. The demographic characteristics of Tiruvannamalai District reflect moderate population growth, improving literacy levels, and a relatively balanced adult sex ratio, though the decline in the child sex ratio highlights the need for sustained gender-sensitive interventions and continued focus on educational equity and social awareness.

Source: <https://www.census2011.co.in/census/district/26-tiruvannamalai.html>

### 3.7.4 Profile of Study Area - Allappanur Village

Allappanur is a medium size village located in THANDRAMPET Taluka of Tiruvannamalai district, Tamil Nadu with total 314 families residing. The Allappanur village has population of 1395 of which 729 are males while 666 are females as per Population Census 2011. In Allappanur village population of children with age 0-6 is 177 which makes up 12.69 % of total population of village. Average Sex Ratio of Allappanur village is 914 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Allappanur as per census is 825, lower than Tamil Nadu average of 943. Allappanur village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Allappanur village was 66.34 % compared to 80.09 % of Tamil Nadu. In Allappanur Male literacy stands at 76.74 % while female literacy rate was 55.12

% .As per constitution of India and Panchyati Raaj Act, Allappanur village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Allappanur village.

**Table. 3.29 Demographic Status of Allappanur Villages**

| Particulars         | Allappanur |         |         |
|---------------------|------------|---------|---------|
|                     | Total      | Male    | Female  |
| Total No. of Houses | 314        | -       | -       |
| Population          | 1395       | 729     | 666     |
| Child (0-6)         | 177        | 97      | 80      |
| Schedule Caste      | 643        | 338     | 305     |
| Schedule Tribe      | 21         | 10      | 11      |
| Literacy            | 66.34 %    | 76.74 % | 55.12 % |
| Total Workers       | 926        | 492     | 434     |
| Main Worker         | 667        | -       | -       |
| Marginal Worker     | 259        | 76      | 183     |

Source: <https://www.census2011.co.in/data/village/632024-allappanur-tamil-nadu.html>

### 3.7.5 Workforce Participation in the study area

Workforce participation patterns in the study villages reveal notable differences in the nature and extent of employment. In Allappanur village, a total of 314 individuals from were engaged in economic activities. Of these, 667 were classified as main workers those employed or earning for more than six months during the reference period while a higher proportion (259) were involved in marginal work, indicating irregular or seasonal employment lasting less than six months. Among the main workers, 4 individuals were identified as cultivators (owners or co-owners of land), and 2 individuals were engaged as agricultural labourers, suggesting limited participation in agriculture-based occupations.

In contrast, Allappanur village exhibited a stronger engagement in stable employment. Out of 108 working individuals, a substantial 91.67% were categorized as main workers, with only 8.33% involved in marginal work. Among the main workers, 13 were cultivators (owners or co-owners) and 44 were agricultural labourers, reflecting a greater dependency on agriculture compared to Kundiyanthandalam village. The analysis indicates a higher proportion of stable and agriculture-based employment in Allappanur, whereas Allappanur demonstrates a predominance of marginal and possibly non-agricultural or seasonal employment. These differences may reflect variations in local resource availability, land ownership patterns, and access to non-farm employment opportunities.

#### ***Project Benefits:***

The local people have been provided with either direct employments or indirect employment such as business, contract works and development work like roads, etc. and other

welfare amenities such as medical facilities, conveyance, free education, drinking water supply etc. The number of villages and human settlements within a radius of 5 km from the project site along with population, their education level etc.

Table 3.30 presents detailed demographic, social, and economic indicators for villages in the study area. The study area comprises 43 villages, with total population of these villages varies considerably, ranging from small settlements such as Dharmacheri (34 residents) and Poonathangal (120 residents) to larger villages like Thenambakkam (4722 residents) and Orikkai (2310 residents). Children aged 0–6 generally account for approximately 8–12% of the total population, indicating a relatively young demographic profile in most villages.

Literacy levels show notable variation across the villages. Larger villages such as Thenambakkam, Magaral, and Elacheri exhibit high numbers of literates, whereas smaller villages such as Poonathangal, Girijapuram, and Dharmacheri report lower literacy levels, reflecting both population size and access to educational facilities. Male literacy consistently exceeds female literacy across the dataset, highlighting ongoing gender disparities in educational attainment.

Workforce participation also varies widely. In larger villages such as Thenambakkam (2789 male workers; 1269 female workers) and Magaral (758 male; 637 female), a significant proportion of the population is engaged in work activities, whereas smaller villages like Dharmacheri and Poonathangal have fewer workers. Across most villages, male workforce participation surpasses female participation, reflecting prevailing social norms and gender-based constraints on employment. The study findings revealed that considerable heterogeneity among the villages in terms of population size, literacy, workforce engagement, and social composition. However, gender disparities in education and employment underscore the need for targeted interventions to enhance female literacy and economic participation. Additionally, the concentration of SC populations in certain villages highlights the importance of caste-sensitive development policies to promote social and economic inclusivity.

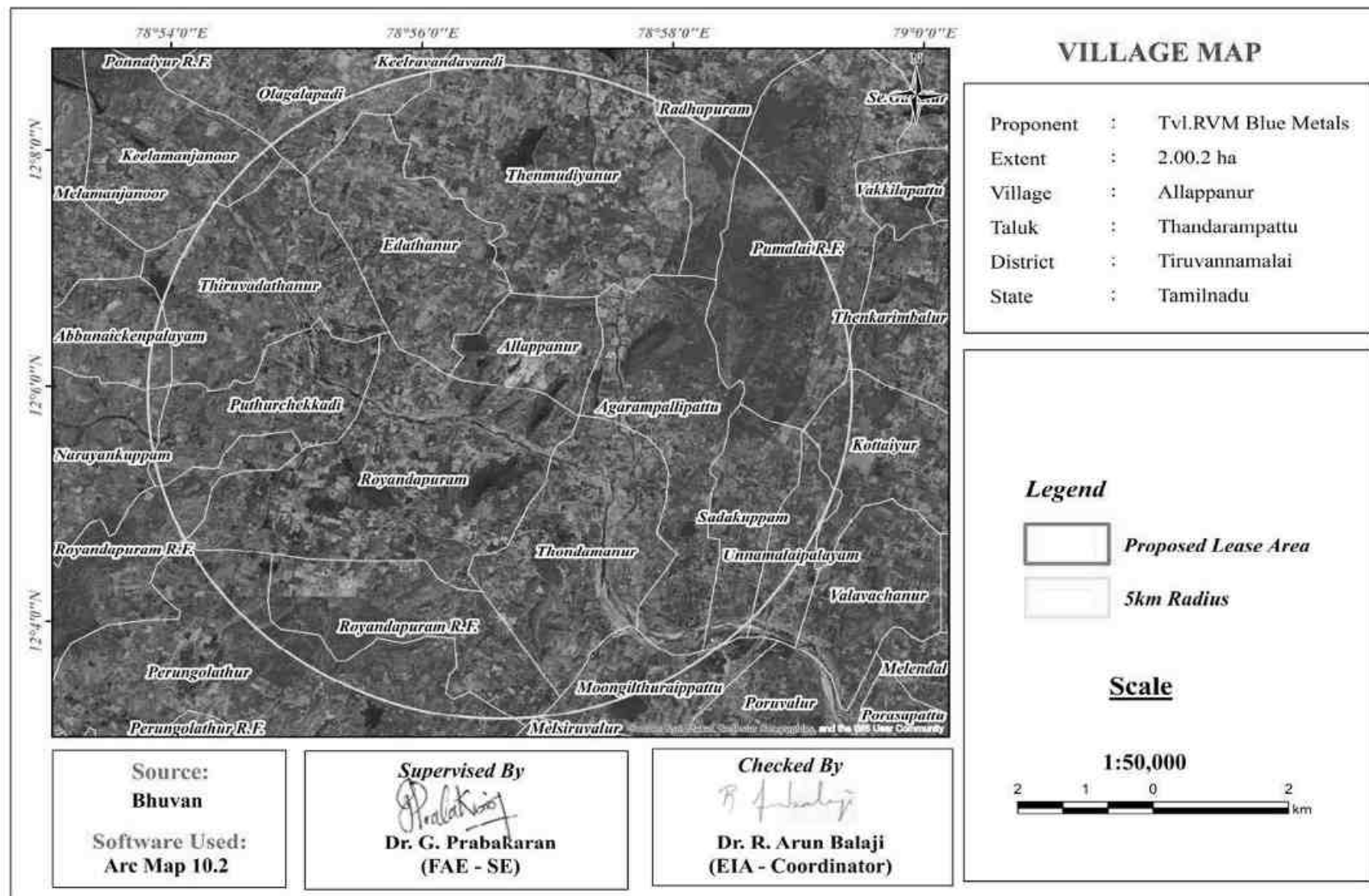
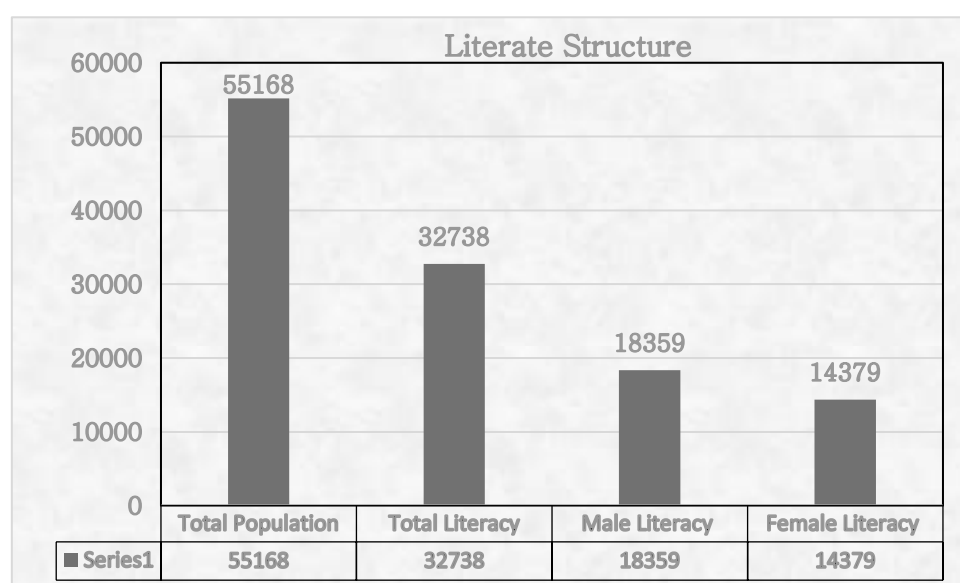
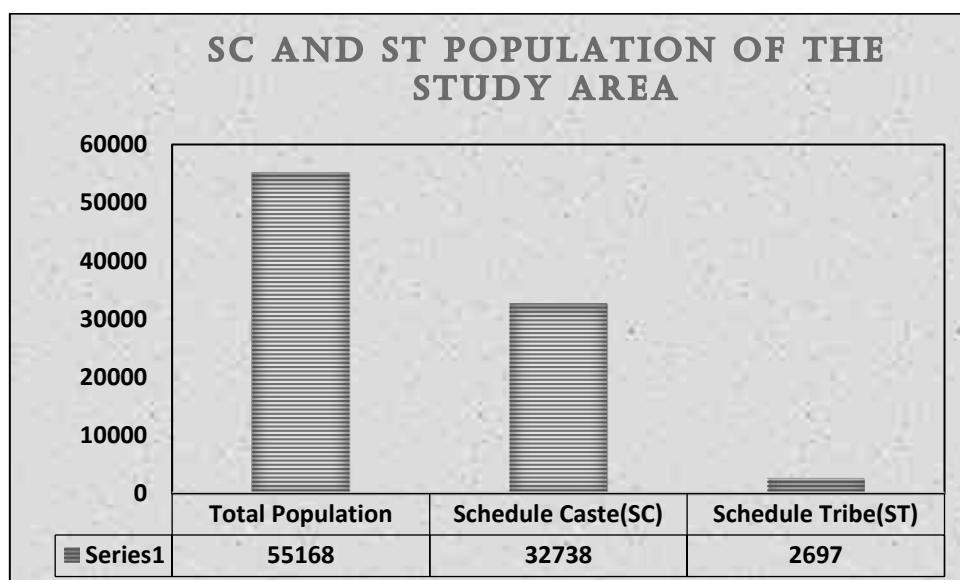
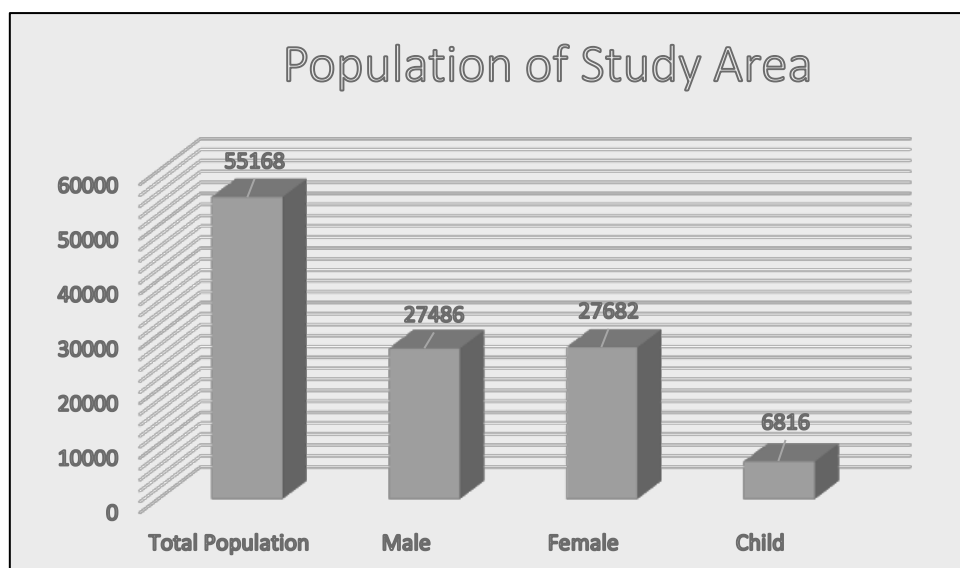


Figure 3.28 Details Village Boundaries within 5km Radius of the Project Lease Area

**Table 3.30 Demographic Structure and Literacy Rate of the villages (5 km radius)**

| Village Name       | No. of Houses | Total Population |              | Child (0-6) |             | Schedule Caste |             | Schedule Tribe |             | No of Literates |              | Total Workers |              |
|--------------------|---------------|------------------|--------------|-------------|-------------|----------------|-------------|----------------|-------------|-----------------|--------------|---------------|--------------|
|                    |               | Male             | Female       | Male        | Female      | Male           | Female      | Male           | Female      | Male            | Female       | Male          | Female       |
| Radhapuram         | 1154          | 2582             | 2647         | 357         | 320         | 504            | 509         | 41             | 45          | 1734            | 1390         | 1572          | 1394         |
| Olagalapadi        | 351           | 710              | 688          | 80          | 80          | 168            | 164         | 42             | 50          | 505             | 376          | 480           | 467          |
| Keelamanjanoor     | 413           | 832              | 869          | 103         | 93          | 218            | 226         | 2              | 2           | 522             | 404          | 491           | 512          |
| Narayankuppam      | 814           | 1833             | 1810         | 228         | 208         | 429            | 426         | 99             | 102         | 1101            | 832          | 1059          | 781          |
| Abbunaickenpalayam | 66            | 132              | 160          | 13          | 22          | 8              | 14          | 0              | 0           | 74              | 87           | 86            | 88           |
| Thiruvadathanur    | 541           | 1087             | 1219         | 175         | 179         | 242            | 265         | 52             | 54          | 641             | 579          | 563           | 382          |
| Edathanur          | 714           | 1398             | 1421         | 181         | 158         | 401            | 387         | 0              | 0           | 980             | 761          | 800           | 665          |
| Thenmudiyanur      | 1252          | 2786             | 2698         | 310         | 296         | 597            | 600         | 25             | 23          | 1954            | 1458         | 1726          | 1333         |
| Thenkarimbalur     | 654           | 1311             | 1362         | 182         | 158         | 601            | 641         | 10             | 17          | 777             | 575          | 794           | 623          |
| Agarampallipattu   | 510           | 1147             | 1160         | 170         | 170         | 420            | 382         | 0              | 0           | 825             | 631          | 654           | 453          |
| Allappanur         | 314           | 729              | 666          | 97          | 80          | 338            | 305         | 10             | 11          | 485             | 323          | 492           | 434          |
| Royandapuram       | 850           | 1958             | 1941         | 247         | 224         | 285            | 300         | 337            | 312         | 1264            | 985          | 1205          | 1022         |
| Puthurchekkadi     | 400           | 819              | 844          | 138         | 124         | 261            | 257         | 0              | 0           | 504             | 429          | 452           | 356          |
| Perungolathur      | 3075          | 6552             | 6567         | 746         | 752         | 966            | 1020        | 545            | 557         | 4559            | 3661         | 3951          | 3615         |
| Thondamanur        | 398           | 896              | 865          | 103         | 109         | 215            | 232         | 14             | 11          | 598             | 433          | 615           | 579          |
| Sadakuppam         | 344           | 760              | 830          | 125         | 115         | 1              | 1           | 0              | 0           | 505             | 396          | 429           | 430          |
| Unnamalaipalayam   | 256           | 614              | 627          | 77          | 73          | 149            | 176         | 0              | 0           | 443             | 332          | 329           | 265          |
| Kottaiyur          | 607           | 1307             | 1280         | 170         | 143         | 626            | 567         | 132            | 145         | 872             | 717          | 818           | 730          |
| Pumalai RF         | 0             | 0                | 0            | 0           | 0           | 0              | 0           | 0              | 0           | 0               | 0            | 0             | 0            |
| Royandapuram RF    | 11            | 33               | 28           | 7           | 3           | 0              | 0           | 32             | 27          | 16              | 10           | 14            | 19           |
| Royandapuram RF    | 0             | 0                | 0            | 0           | 0           | 0              | 0           | 0              | 0           | 0               | 0            | 0             | 0            |
| <b>Total</b>       | <b>12724</b>  | <b>27486</b>     | <b>27682</b> | <b>3509</b> | <b>3307</b> | <b>6429</b>    | <b>6472</b> | <b>1341</b>    | <b>1356</b> | <b>18359</b>    | <b>14379</b> | <b>16530</b>  | <b>14148</b> |

Source: <https://censusindia.gov.in/nada/index.php/catalog/45345>



**Figure 3.29: Demographic Details – Population, Social Groups, and Literacy Rate in the Study Villages**

**Table 3.31 Details of Workforce Participation of the Study Area**

| <b>Village<br/>Name</b> | <b>Total<br/>Worker</b> | <b>Total Male Workers</b> | <b>Total<br/>Female Workers</b> | <b>Main Workers</b> | <b>Main Cultivators</b> | <b>Main Agricultural<br/>Labourers</b> | <b>Other Workers</b> | <b>Non-Workers</b> |
|-------------------------|-------------------------|---------------------------|---------------------------------|---------------------|-------------------------|----------------------------------------|----------------------|--------------------|
| Radhapuram              | 2966                    | 1572                      | 1394                            | 2098                | 486                     | 1265                                   | 333                  | 2263               |
| Olagalapadi             | 947                     | 480                       | 467                             | 293                 | 134                     | 70                                     | 79                   | 451                |
| Keelamanjanoor          | 1003                    | 491                       | 512                             | 452                 | 195                     | 206                                    | 46                   | 698                |
| Narayankuppam           | 1840                    | 1059                      | 781                             | 664                 | 294                     | 87                                     | 279                  | 1803               |
| Abbunaickenpalayam      | 174                     | 86                        | 88                              | 98                  | 31                      | 16                                     | 47                   | 118                |
| Thiruvadathanur         | 945                     | 563                       | 382                             | 658                 | 227                     | 331                                    | 100                  | 1361               |
| Edathanur               | 1465                    | 800                       | 665                             | 1335                | 425                     | 645                                    | 253                  | 1354               |
| Thenmudiyanur           | 3059                    | 1726                      | 1333                            | 2038                | 876                     | 790                                    | 347                  | 2425               |
| Thenkarimbalur          | 1417                    | 794                       | 623                             | 794                 | 257                     | 289                                    | 227                  | 1256               |
| Agarampallipattu        | 1107                    | 654                       | 453                             | 537                 | 262                     | 125                                    | 139                  | 1200               |
| Allappanur              | 926                     | 492                       | 434                             | 667                 | 218                     | 251                                    | 184                  | 469                |
| Royandapuram            | 2227                    | 1205                      | 1022                            | 2184                | 714                     | 1321                                   | 136                  | 1672               |
| Puthurchekkadi          | 808                     | 452                       | 356                             | 625                 | 181                     | 323                                    | 116                  | 855                |
| Perungolathur           | 7566                    | 3951                      | 3615                            | 6177                | 1490                    | 3769                                   | 786                  | 5553               |
| Thondamanur             | 1194                    | 615                       | 579                             | 633                 | 402                     | 198                                    | 29                   | 567                |
| Sadakuppam              | 859                     | 429                       | 430                             | 212                 | 129                     | 29                                     | 50                   | 731                |
| Unnamalaipalayam        | 594                     | 329                       | 265                             | 445                 | 77                      | 296                                    | 70                   | 647                |
| Kottaiyur               | 1548                    | 818                       | 730                             | 1284                | 240                     | 888                                    | 141                  | 1039               |
| Pumalai RF              | 0                       | 0                         | 0                               | 0                   | 0                       | 0                                      | 0                    | 0                  |
| Royandapuram RF         | 33                      | 14                        | 19                              | 24                  | 21                      | 0                                      | 3                    | 28                 |
| Royandapuram RF         | 0                       | 0                         | 0                               | 0                   | 0                       | 0                                      | 0                    | 0                  |
| <b>Total</b>            | <b>30678</b>            | <b>16530</b>              | <b>14148</b>                    | <b>21218</b>        | <b>6659</b>             | <b>10899</b>                           | <b>3365</b>          | <b>24490</b>       |

### 3.7.6 Workforce Participation

The table 3.31 presents an in-depth breakdown of workforce characteristics across villages in the study area of district. The workforce participation across the villages in the study area exhibits significant variability in both size and composition. Total workers range from a minimal 21 in Thenmudiyanur to as high 3059 in Perungolathur, indicating substantial differences in population size and labor engagement among the villages. Male workers consistently outnumber female workers in nearly all villages, highlighting a pronounced gender disparity in workforce participation. Main workers constitute the majority of employed individuals, reflecting a workforce largely engaged in sustained economic activities rather than marginal or seasonal work.

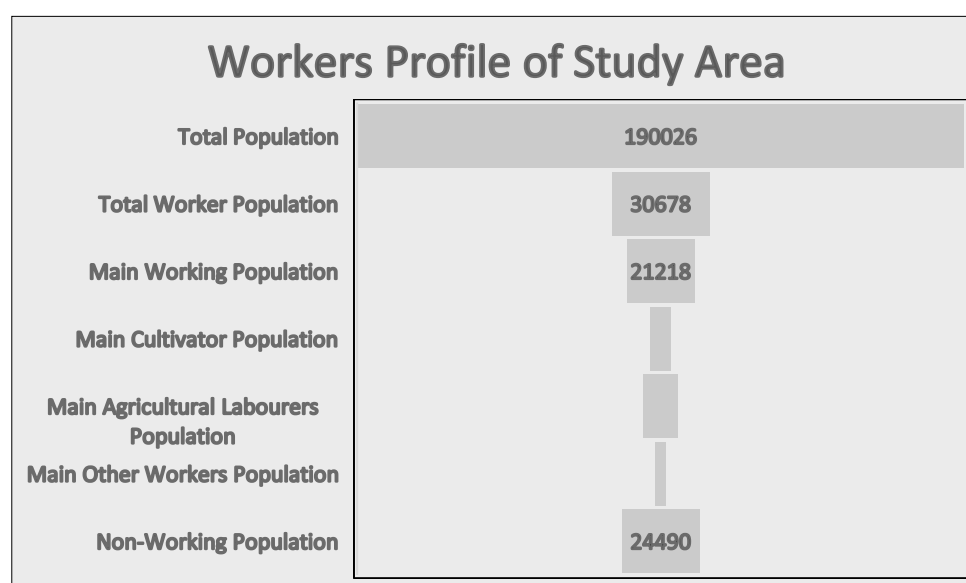
Agriculture remains the primary occupation, with many individuals employed as cultivators or agricultural labourers. Villages such as Edathanur, Thenmudiyanur, Royandapuram, and Perungolathur have a notable proportion of their workforce involved in cultivation and agricultural labour, underscoring the agrarian nature of the local economy. Non-agricultural employment, classified as ‘other workers,’ is relatively limited, suggesting low economic diversification and limited availability of alternative income sources.

The number of non-workers is substantial in most villages, particularly larger ones, indicating high dependency ratios and a significant portion of the population reliant on the working population for livelihood. Smaller villages, such as Allappanur, Abbunaickenpalayam, and Puthurchekkadi, exhibit low workforce numbers, which may reflect either limited local employment opportunities or demographic factors such as higher proportions of children and elderly residents.

Finally, the detailed information indicated a predominantly agrarian economy characterized by gender disparities in employment, a high reliance on agricultural work, and a substantial non-working population. These patterns highlight the need for targeted interventions to promote female workforce participation, diversify economic opportunities, and enhance sustainable livelihoods beyond agriculture.

The data reveals a predominantly agrarian workforce of 30,678 people, with males (16,530) outnumbering females (14,138). Most workers (21,218) are engaged in main employment, primarily in agriculture, with 10,899 cultivators and 7,406 agricultural laborers. Non-agricultural workers number 2,435, indicating some economic diversification. The non-working population is almost as large as the workforce (24,490), reflecting a high dependency

ratio. The notable gender gap points to socio-cultural barriers limiting female participation in the workforce.



**Figure 3.30 Details of Workforce participation in the Study Villages**

Additionally, the study finds that while certain villages are progressing with diverse employment and better gender inclusion, others remain heavily reliant on agriculture and have limited workforce engagement. Encouraging non-farm employment, particularly in rural and semi-urban areas, could bridge economic disparities. Skill development programs for women and youth, infrastructure enhancement, and local job creation through MSMEs or agro-processing units would help balance workforce participation and stimulate rural development across the district.

### ***CSR and DMR funds for Development***

As per SEAC recommendation the project proponent should spend minimum of 5 lakhs to the nearby school from the proposed project site as part of CER cost. Also, the village panchayat will get direct benefit from the government through District mineral Resource fund (DMF) for infrastructure development activities.

- ❖ Awareness and Opinion of the People About the Project, to assess public awareness and opinions regarding the proposed project, the following key observations were recorded:
- ❖ During the survey, it was observed that only residents of nearby villages were aware of the proposed project, while those in more distant villages were largely unaware.
- ❖ People in the region expressed expectations that the project would generate employment opportunities and lead to improvements in education, transportation, and sanitation facilities provided by the project authorities.

## ***Recommendation and Suggestions***

The village development plans are made in consultation with the community through Gram Sabha; these appear to address the needs of the community. However, it may be noted that at the implementation stage these plans often are fraught with problem of inadequate funds, lack of proper planning, corruption, vested interests and political agendas. Hence while ascertaining the scope for convergence with the government activities, care must be taken to ascertain realistic possibilities for implementation.

- Women empowerment: Home based income generation activities, vocational training programs and common education centre for increasing the literacy rate.
- Education: Free uniform, construction of common rooms and library, computer education and physical education, furniture and equipment in schools, up-gradation of existing school infrastructure through the CSR funds.
- Agriculture/livestock: Infrastructure such as agricultural practices, electricity connections, assistance with buying improved tools and equipment, capacity building, supply and/or knowledge of better variety of seeds, pasture land development and trainings on animal husbandry & facility of veterinary doctor.
- Health: Improvements in sanitary conditions of villages, assistance with construction of latrines, improvement in drainage system, health camps and awareness campaigns for diseases like common cold, malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of PHCs and Anganwadi centres.
- People with disability: Establishment of centre for special education, sensitization of the community towards disabled and awareness on Government schemes.
- Marginalized Communities and Vulnerable Groups: While Developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.
- Connectivity: Transport connectivity to easiness accessibility to the region.
- Greenbelt: Establish a greenbelt and plant saplings around quarry boundaries, village schools, and village roads.

While developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.

### 3.7.7 Conclusion

This study was carried out the baseline socio-economic conditions of the study area. It examined parameters including the population, number of households, literacy rate, sex ratio, workforce details, and the availability of essential amenities like transportation, drinking water, road connectivity, and educational facilities in the study area. The study revealed both positive and negative socio-economic implications associated with the proposed project and cluster quarries. While potential environmental and social impacts must be addressed, the project is expected to provide significant economic benefits in terms of local employment and improved livelihood opportunities in directly and indirectly.

Therefore, with the implementation of effective mitigation and management measures, the project can contribute positively to the socio-economic development of the area while minimizing adverse impacts.

### 3.8 TRAFFIC DENSITY

The traffic survey conducted based on the transportation route of material, the Rough Stone is proposed to be transported mainly through Village Road and SH -179B (Harur – Tiruvannamalai) as shown in Table 3.32- 3.35 and in Figure 3.31. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

**Table 3.32 Traffic Survey Locations**

| Station Code | Road Name                         | Distance and Direction |
|--------------|-----------------------------------|------------------------|
| TS1          | Village Road                      | 1.10km - NE            |
| TS2          | SH -179B (Harur – Tiruvannamalai) | 3.70km - NE            |

*Source: On-site monitoring by GTMS FAE & TM*

**Table 3.33 Existing Traffic Volume**

| Station code | HMV |     | LMV |     | 2/3 Wheelers |     | Total PCU |
|--------------|-----|-----|-----|-----|--------------|-----|-----------|
|              | No  | PCU | No  | PCU | No           | PCU |           |
| TS1          | 33  | 99  | 40  | 40  | 55           | 28  | 167       |
| TS2          | 65  | 195 | 72  | 72  | 80           | 40  | 307       |

Source: On-site monitoring by GTMS FAE & TM

\* PCU conversion factor: HMV (Trucks and Bus) = 3, LMV (Car, Jeep and Auto) = 1 and 2/3 Wheelers = 0.5

**Table 3.34 Rough Stone Transportation Requirement**

| Transportation of Rough Stone Per day |                      |               |
|---------------------------------------|----------------------|---------------|
| Capacity of trucks                    | No. of Trips per day | Volume in PCU |
| 15 tonnes                             | 19                   | 57            |

Source: Approved Mining Plan

**Table 3.35 Summary of Traffic Volume**

| Route | Existing traffic volume in PCU | Incremental traffic due to the project | Total traffic volume | Hourly Capacity in PCU as per IRC – 1960 guidelines |
|-------|--------------------------------|----------------------------------------|----------------------|-----------------------------------------------------|
| TS1   | 167                            | 57                                     | 224                  | 1200                                                |
| TS2   | 307                            | 57                                     | 364                  | 1200                                                |

Source: On-site monitoring analysis summary by GTMS FAE & TM

- Due to these projects the existing traffic volume will not exceed the traffic limit. As per the IRC 1960 this existing village road can handle 1,200 PCU in hour and Major district road can handle 1500 PCU in hour. Hence there will not be any conjunction due to this proposed transportation

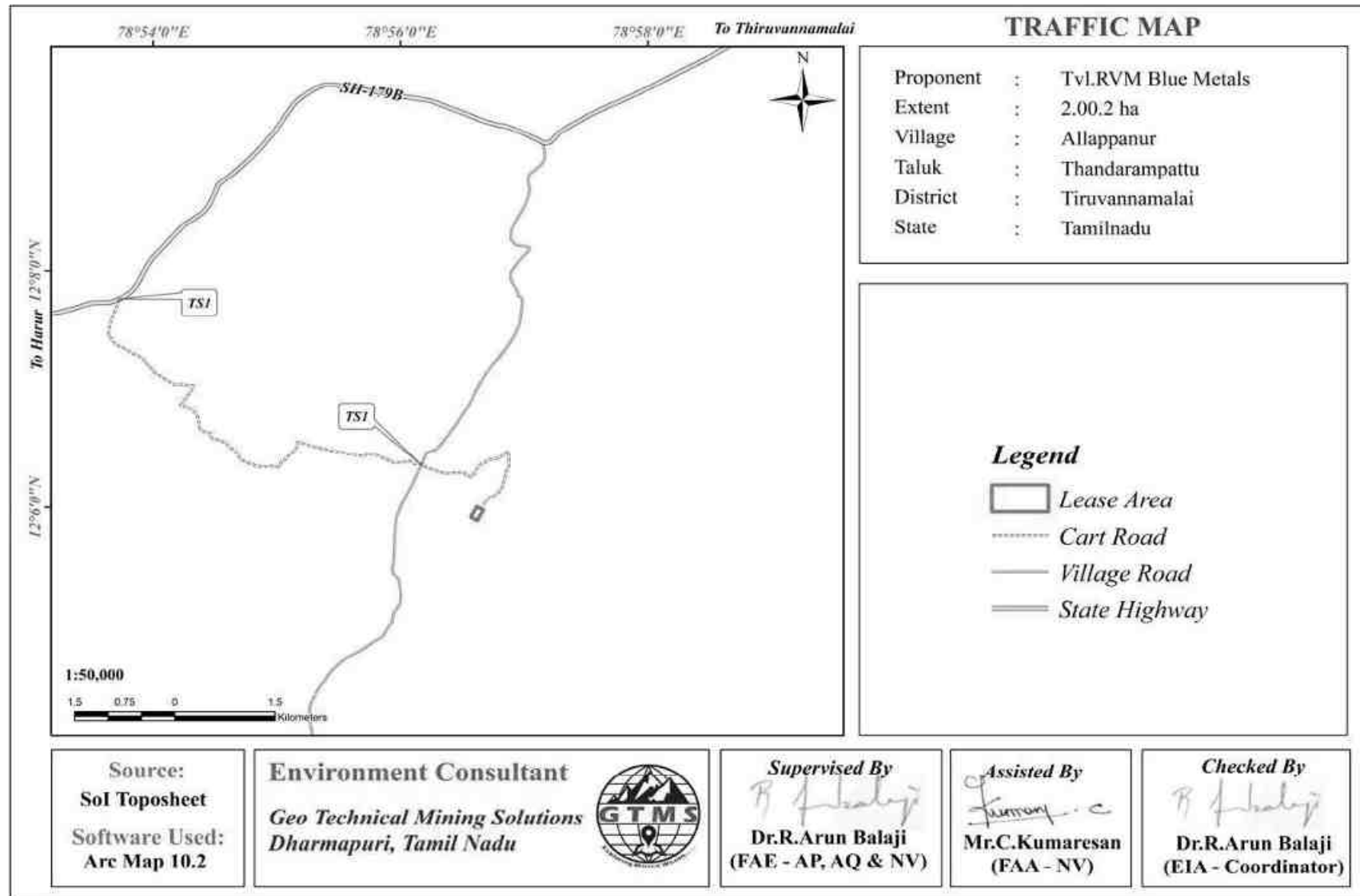


Figure 3.31 Traffic Density Map

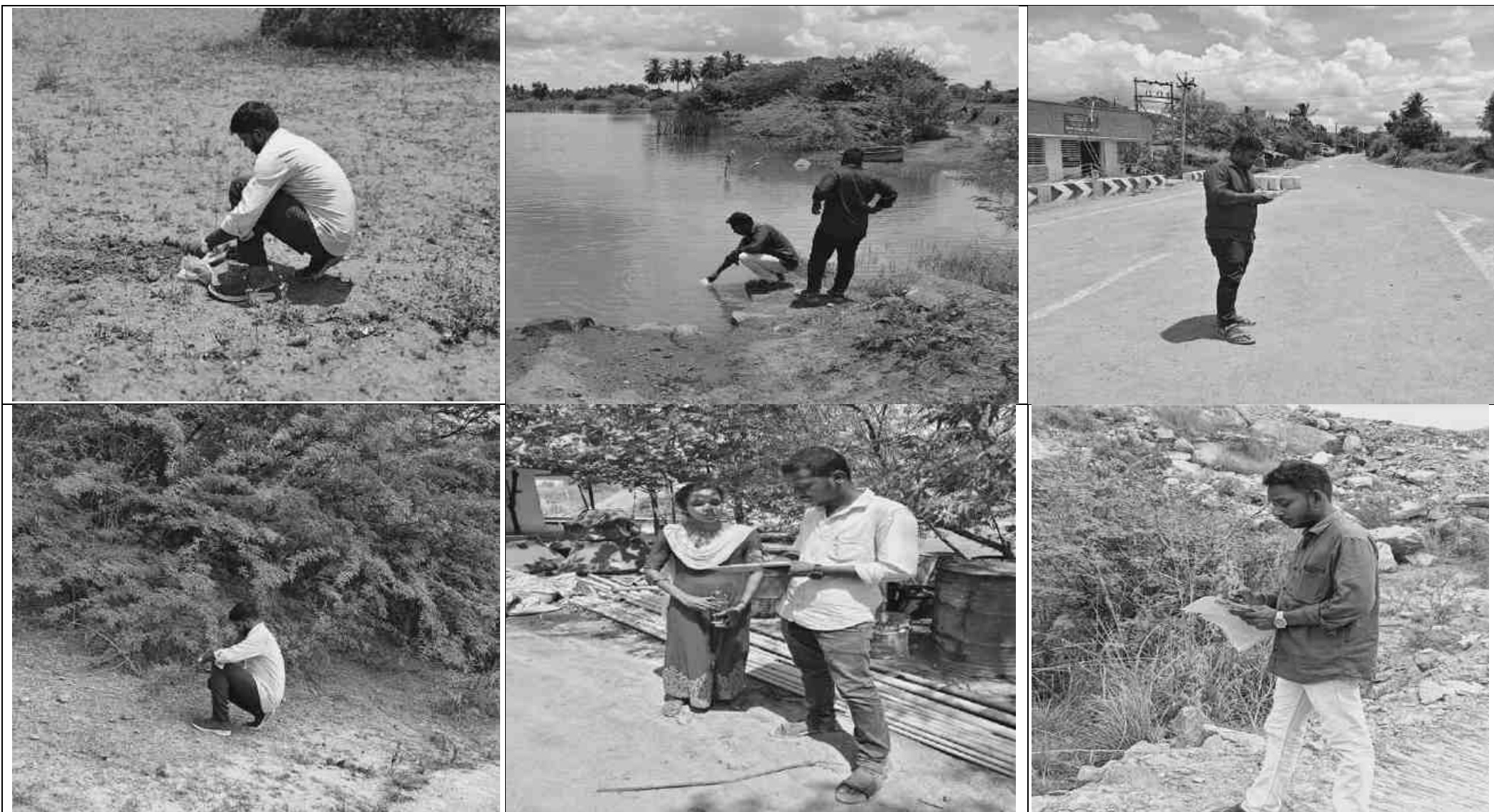
### 3.9 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries and National Park within 10km radius. Therefore, there will be no need of acquisition/ diversion of forest land. The details related to the environmentally sensitive areas around the proposed mine lease area i.e., 10km radius and the nearby water bodies are given in the Table 3.36.

**Table 3.36 Details of Environmental Sensitive Ecological Features in the Study Area**

| S. No. | Sensitive Ecological Features                      | Name                        | Areal Distance in km   |
|--------|----------------------------------------------------|-----------------------------|------------------------|
| 1      | National Park / Wild life Sanctuaries              | Oussudu Lake Bird Sanctuary | 88.27Km- E             |
| 2      | Reserve Forest                                     | Poomalai R.F                | 2.1km- E               |
|        |                                                    | Rayandapuram. A- R.F        | 3.82km- SW             |
|        |                                                    | Rayandapuram. B- R.F        | 3.76km- S              |
|        |                                                    | Ponnaiyar R.F               | 6.62km- NW             |
|        |                                                    | Radhapuram R.F              | 6.75km- NE             |
|        |                                                    | Pavunjipattu R.F            | 5.87km- S              |
|        |                                                    | Perungolathur R.F           | 7.52km- S              |
|        |                                                    | Kannamadaai R.F             | 9.78km- E              |
| 3      | Lakes/ Reservoirs/ Dams/ Streams/ Rivers           | Then pennai River           | 0.42km- S              |
|        |                                                    | Allappanur Lake             | 0.63km- N              |
|        |                                                    | Allappanur Tank             | 1.02km- E              |
|        |                                                    | Rayandapuram lake           | 2.07km- S              |
| 4      | Tiger Reserve/ Elephant Reserve/ Biosphere Reserve | None                        | Nil within 10km radius |
| 5      | Densely Polluted Areas                             | None                        | Nil within 10km radius |
| 6      | Mangroves                                          | None                        | Nil within 10km radius |
| 7      | Mountains/Hills                                    | None                        | Nil within 10km radius |
| 8      | Centrally Protected Archaeological Sites           | None                        | Nil within 10km radius |
| 9      | Industries/ Thermal Power Plants                   | None                        | Nil within 10km radius |
| 10     | Defence Installation                               | None                        | Nil within 10km radius |

Source: Survey of India Toposheet



**Figure 3.32 Field Study Photographs**

## CHAPTER IV

### ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 4.0 GENERAL

The identification of potential environmental impacts is indeed the crucial first step in the Environmental Impact Assessment (EIA) process utilizing various techniques such as checklists, matrices and network diagrams to understand a project's effects. The matrix method used in this study provides a structured way to identify and assess the impacts ensuring the project can be implemented in an eco-friendly manner. This chapter discusses the anticipated impacts on land, soil, water, air, noise, biological and socioeconomic environments.

The proposed stone mining project involves blasting, drilling and screening operations which contribute to environmental impacts is given in Table 4.1. The project is designed to minimize these impacts by implementing mitigation measures and ensuring a marginal environmental footprint with a detailed analysis to follow in subsequent tables.

**Table 4.1 Impact identification matrix.**

| Activities                                                                            | Environmental Attributes |      |       |     |       |         |                 |            | OHS |
|---------------------------------------------------------------------------------------|--------------------------|------|-------|-----|-------|---------|-----------------|------------|-----|
|                                                                                       | Land                     | Soil | Water | Air | Noise | Ecology | Socio Economics | Aesthetics |     |
| Site clearing & Site services                                                         | √                        | √    |       | √   |       | √       |                 |            |     |
| Development of Greenbelt                                                              |                          |      |       |     |       | √       |                 | √          |     |
| Operation Phase (Drilling, Blasting Loading and unloading, Transportation)            | √                        | √    |       | √   | √     | √       |                 |            | √   |
|                                                                                       | √                        | √    |       | √   | √     | √       |                 |            | √   |
|                                                                                       | √                        | √    |       | √   | √     | √       |                 |            | √   |
| Employment and the material usage                                                     |                          |      |       |     |       |         | √               |            |     |
| Mine closure (Removal of machineries, structures and Danger due to inadvertent entry) |                          |      |       | √   | √     |         | √               |            | √   |

√ Indicates Impact

## 4.1 LAND ENVIRONMENT

### Anticipated Impacts

- ❖ Converting barren land of 2.00.2hectares to rough stone mining creates a significant and usually irreversible change in land use and land cover involving the physical alteration of the land's surface, potential deforestation, loss of biodiversity, altered topography from pits and spoil dumps.
- ❖ Heavy vehicle movement causes significant problems to nearby agriculture and human habitation. These pollutants can degrade soil quality and introduce heavy metals into the environment.
- ❖ During transportation the tippers damage the bituminous roads. The primary damage is caused by the fourth power law (*The law posits that if you double an axle's load, the damage caused to the pavement increases by a factor of 2x4 or 16 times*) where pavement damage increases with the fourth power of the axle load. The immense weight of heavy payloads on an axle exerts a concentrated and repetitive stress on the road surface leading to permanent strain, premature failure and a cumulative damage.
- ❖ Rain drops hitting stone crushing waste can break apart the particles and flowing water detaches them from the surface transports and redeposits these particles especially from sloped surfaces. This a form of splash erosion followed by sheet erosion which can lead to environmental issues.

### Mitigation measures

- ❖ After mining there is a huge void of 1.46.0hectares upto a depth of 65m (45m AGL + 20m BGL) is useful for rain water storage structure has an advantage for local farmers. The artificial pond boundary shall be fences to avoid any mishaps.
- ❖ Union ministry of road transport and highways on July 16<sup>th</sup> 2018 increased the maximum cap of axle load limit by 20 to 25 percent cross various categories to keep the limit “at par with international standards”.

| Maximum Safe Axle Weight                                                                                   |                                                                                                                              |                          |
|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Sl. No.                                                                                                    | Axle Type                                                                                                                    | Maximum Safe Axle Weight |
| 1.                                                                                                         | <b>Single Axle</b>                                                                                                           |                          |
| 1.1                                                                                                        | Single Axle with single Tyre                                                                                                 | 3.0 tonnes               |
| 1.2                                                                                                        | Single Axle with two Tyres                                                                                                   | 7.5 tonnes               |
| 1.3                                                                                                        | Single Axle with four Tyres                                                                                                  | 11.5 tonnes*             |
| 2.                                                                                                         | <b>Tandem Axles (Two axles) (where the distance between two axles is less than 1.8 Mtr.)</b>                                 |                          |
| 2.1                                                                                                        | Tandem axle for rigid vehicles, trailers and semi-trailers                                                                   | 21 tonnes*               |
| 2.2                                                                                                        | Tandem axle for Puller tractors for hydraulic and pneumatic trailers                                                         | 28.5 tonnes              |
| 3.                                                                                                         | <b>Tri-axes (Three axles) (where the distance between outer axles is less than 3 Mtr.)</b>                                   |                          |
| 3.1                                                                                                        | Tri-axe for rigid vehicles, trailers and semi-trailers                                                                       | 27 tonnes*               |
| 4.                                                                                                         | Axle Row (two axles with four tyres each) in Modular Hydraulic trailers (9 tonnes load shall be permissible for single axle) | 18 tonnes                |
| * Note: If the vehicle is fitted with pneumatic suspension, 1 tonne extra load is permitted for each axle. |                                                                                                                              |                          |

MoRTH knows that previously built Indian roads are made keeping standard axle loads. The new national and state highways along with expressways can be built by using new norms but for the existing roads the life will be reduced on average by one year.

- ❖ 6-wheel tipper generally has a maximum legal speed limit which can be up to 60 km/h and speeds should be reduced for loaded conditions. The mine management should take care of the speed of vehicles i.e up to 40km/h in village roads constructed under Pradhan Mantri Gram Sadak Yojana and other district roads developed by Highways and Minor Ports Department, Government of Tamil Nadu as each time a truck passes the concentrated stress causes a small amount of permanent strain on the pavement. Over time these small strains accumulate and lead to significant fatigue and eventual failure.
- ❖ 6-wheel tippers of not more than 9tons payload capacity covered with tarpaulin to stop the spillage and dust should use.
- ❖ Protective measures such as establish plants like grasses, cover crops and trees to form a dense layer over the dump absorbing raindrop energy and holding particles in place.

## **4.2 SOIL ENVIRONMENT**

### **Anticipated Impacts**

- ❖ The fertility status of the soil near by the lease area may affect due to extra dust deposition on the soil. Dust deposition from a lease area can harm soil fertility by physically blocking soil pores, reducing aeration and water infiltration, and potentially altering the soil's chemical properties. This damage to the topsoil negatively impacts plant growth by interfering with photosynthesis and nutrient uptake ultimately decreasing crop production.
- ❖ Topsoil will be scraped from the area of 0.40.0hectares in the project site will store in safety area left for 10meters in the east side as shown in mining plan.

### **Mitigation measures**

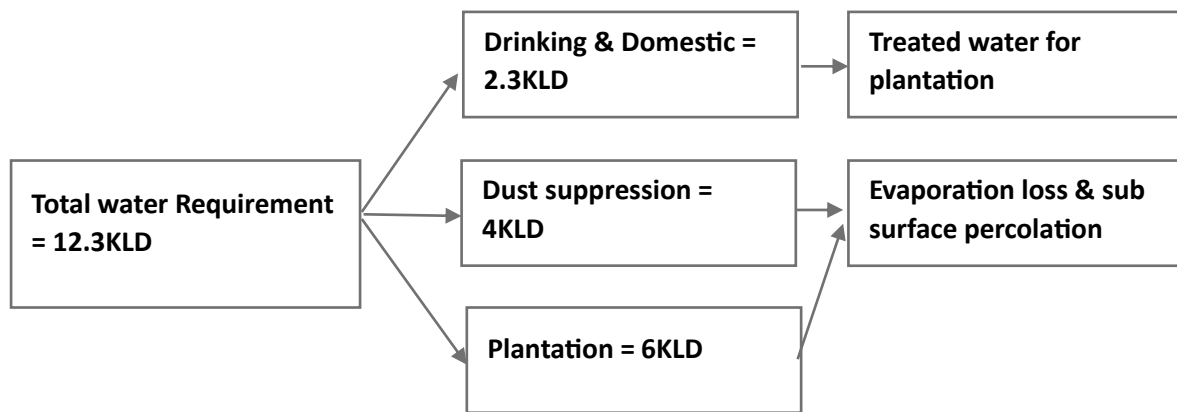
- ❖ When stock piling of top soil is done the mound should not be higher than 1.0m
- ❖ To minimize surface runoff and erosion the topography of a graded surface should be designed to create terraces or benches that follow land contours which intercept sheet flow. Additionally, a bulldozer's tracks can be used to create a fine-scale roughened surface perpendicular to the slope and stockpiles should be constructed with a rough surface to improve drainage, reduce erosion and encourage revegetation.
- ❖ Efforts will be made to minimize the storage time to prevent nutrient loss.

- ❖ To protect the quality of stockpiled topsoil immediate re-vegetation is crucial. Temporary seeding should be done within 30 days of stockpile formation to control erosion, prevent weed growth and maintain healthy soil microbes.
- ❖ If the stockpile will not be reused within 12 months it must be stabilized with permanent vegetation to ensure long-term erosion and weed control.
- ❖ The stored topsoil will be utilized for plantations in later phases during the progressive and final closure of the mine.

#### 4.3 WATER ENVIRONMENT

- ❖ 12.2KLD (12,200 liters per day) water requirement for drinking, domestic, dust suppression and plantation.

##### Water Balance Chart of the Mine



- ❖ The domestic effluents being generated during mine operation.
- ❖ Major impact of opencast mining on groundwater regime is quality deterioration. The proposed mining activities shall be carried out up to a depth of 65m (45m AGL + 20m BGL). The specific water table depth in the core and buffer zone is between 60m and 65 meters below ground level.
- ❖ The volume of rain water entering to the mine and accumulating in the quarry has been estimated on the basis of direct catchment area, maximum daily precipitation and the run-off coefficient.  $(Q = A \times H \times \bar{d}) \text{cubic meters/day}$ .

Where A- catchment area in m<sup>2</sup>

H- Max daily precipitation in mm

$\bar{d}$ - Run-off Co-efficient.

The run off co-efficient for mined out area is 0.60m<sup>3</sup>. The all-time record for maximum daily precipitation in Tiruvannamalai district was 468mm on September 30, 2018 as reported by [CEIC Data](#). More recent rainfall records are 110mm on October 17, 2025.

The maximum broken area is 2.00.2hectares in the sixth year and estimation for make of water done on the quarry parameters for sixth year onwards.

$$Q = 2.00.2\text{hecatres} \times 10000 \times 0.175 \times 0.60 \text{ m}^3.$$

$$Q = 2102\text{m}^3.$$

Total accumulated water in the pit is  $2102\text{m}^3$ .

Additionally, 20% of water from seepage is  $2522\text{m}^3$ .

Total water estimated for pumping requirement =  **$2522\text{m}^3$** .

If we take the all-time record then the total water estimated for pumping =  **$2522\text{m}^3$** .

To manage rain water runoff into quarry a 5 HP diesel operated pump will be placed at the site during the monsoon.

### **Mitigation Measures**

- ❖ The hard rock itself has very few interconnected pore spaces, limiting the amount of water it can store or transmit. Groundwater flow and storage occur primarily in secondary openings such as joints, cracks and fissures. The thickness of the weathered layer, where more significant porosity can develop, is typically limited to 1-3 meters, particularly in low-lying topographic areas. The groundwater in these shallow zones is under unconfined (or water table) conditions, meaning it is directly connected to the surface and not confined by impermeable layers.
- ❖ The storm water discharge coming out of quarries and dump through a network of garland drains is expected to contain solid particles. These solid particles shall be removed by settling in the settling pond before being used for dust suppression and plantation. Hence, there shall be no change in drainage system due to this mining project in buffer zone.
- ❖ Domestic sewage from site office will be discharged in MAK Anaerobic bacteria digestion bio-septic tank. The treated water will be utilized for watering and maintaining the green belt.
- ❖ Groundwater development efforts would need to focus on the weathered and fractured zones near the surface in the buffer zone.
- ❖ Periodic (every 6 month once) analysis of ground water level and quality from the open well OW4 and bore well BW1 as shown in Figure 3.8 & 3.10 to find the change due to quarrying.

- ❖ The average annual rainfall of the project area is 962.7mm and the runoff coefficient factors have been taken as per guidelines of Manual on Norms and Standards for Environmental Clearances by MoEF & CC, Govt. of India.

The total annual runoff can be calculated as:

$$\text{Runoff} = \text{Rainfall} \times \text{Catchment Area} \times \text{Runoff Coefficient}$$

$$\text{Annual Rainfall} = 962.7\text{mm}$$

$$\text{Total Project Area} = 20020\text{sq.m}$$

$$\text{Coefficient of Run off for Rooftop (Inclined)} = 0.90$$

$$\text{Coefficient of Run off for Rooftop (Flat)} = 0.80$$

$$\text{Coefficient of Run off for Road/Paved Area} = 0.70$$

$$\text{Coefficient of Run off for Open Area} = 0.25$$

Coefficient of Run off for Greenbelt Area = 0.15 Rain water can effectively be collected from Maximum size of void in 6th year of mining = 14600sq. m.

$$\text{Top soil dump area} = 4000\text{sq.m}$$

$$\text{Road \& Infrastructure} = 700\text{sq.m}$$

$$\text{Runoff from Void pit area} = 14600\text{sq.m} \times 0.805 \text{ m} \times 0.25 = 2938\text{m}^3$$

$$\text{Runoff from Top soil dump area} = 0.80\text{m} \times 4000\text{sq. m} \times 0.25 = 800\text{m}^3$$

$$\text{Runoff from Road \& Infrastructure} = 0.805\text{m} \times 700\text{sq. m} \times 0.70 = 394\text{m}^3$$

$$\text{Total Runoff from Project Area} = 4132\text{m}^3$$

The annual runoff generated in the project site is 4132m<sup>3</sup>. By considering the loss of 20% due to evaporation, spillage and wastage the effective runoff that can be harvested inside the project area is **3305.6m<sup>3</sup>**.

Daily water requirement (except drinking purpose) is 8m<sup>3</sup>. So, with 300 working days the water requirement will be = 8m<sup>3</sup> X 300 = **2400m<sup>3</sup>**

The surface runoff being generated from the project area will be channelized to rain water harvesting pond of 2m x 2m x 2m through network of drainage system 1m x 1m. The bottom of the ponds is naked and natural seepage from the bottom will recharge the ground water regime. Hence the storage pond will act as recharging structure. Even though rain water will be sufficient to fulfil the daily requirement of water but in the initial years of mining when the mining pit is smaller in size or in the year with deficit rainfall surface water will be collected with due permission.

#### 4.4 AIR ENVIRONMENT

##### Anticipated Impact

The main cause of air pollution in open-cast mining is the generation of airborne particulate matter (dust) from various mining activities including drilling, blasting, excavation, loading/unloading, vehicle movement on haul roads and the dumps. These activities release large quantities of fugitive dust which are then carried by the wind and can contribute to respiratory health problems for nearby communities and miners. The source of pollution is given in table below.

| Activities              | Air pollutants                                                                |
|-------------------------|-------------------------------------------------------------------------------|
| Drilling                | PM <sub>10</sub> , PM <sub>2.5</sub>                                          |
| Blasting                | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>x</sub> , NO <sub>x</sub>      |
| Loading & unloading     | PM <sub>10</sub> , PM <sub>2.5</sub>                                          |
| Haul road               | PM <sub>10</sub> , PM <sub>2.5</sub>                                          |
| Transportation          | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>x</sub> , NO <sub>x</sub> , CO |
| Waste/Top soil handling | PM <sub>10</sub> , PM <sub>2.5</sub>                                          |

The air dispersion modelling study was conducted using the AERMOD Cloud remote version for assessment of incremental Ground level concentration (GLC) for the proposed production. Area source model taken into consideration taking into consideration of the conceptual quarry area and dump area. Further line source model was taken into consideration for transportation of material through haul road. Model Setup is given in Table below

| Parameter                   | Details                                          |
|-----------------------------|--------------------------------------------------|
| Model Name                  | Aermod                                           |
| Model Type                  | Steady state Gaussian plume air dispersion model |
| Topography                  | Plain terrain                                    |
| Average Time                | 24 hours                                         |
| Source Type                 | Area source                                      |
| Boundary limit              | 5km X 5km                                        |
| Surface Meteorological Data | Site specific data processed by AERMET           |
| Receptor Height             | 0                                                |
| Anemometer height           | 10m                                              |

The air pollution modelling correctly focuses on particulate matter as the key pollutant for a mining project given that dust from mining operations and transportation is the primary source of air pollution in such industries rather than SO<sub>x</sub> or NO<sub>x</sub> which are typically associated with vehicular emissions. The incremental Ground Level Concentrations (GLCs) predicted are specifically for particulate matter reflecting the anticipated contribution of the proposed mining project to local air quality.

## Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae applied by Chaulya et al.,2001 from the same formula used in mining engineering to calculate specific energy (E). The equations used for SPM emission estimation was given in Table 4.2.

**Table 4.2 Empirical Formula for Emission Rate from Overall Mine**

|              | Pollutant | Source Type | Empirical Equation                             | Parameters                                                                                                                                                    |
|--------------|-----------|-------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overall Mine | SPM       | Area        | $E = [u0.4a0.2\{9.7 + 0.01p + b/(4 + 0.3b)\}]$ | u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s). |

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. It is important to note that PM<sub>10</sub> emission rate is derived from the SPM estimation in the background that PM<sub>10</sub> constitutes 52% of SPM emission. The PM<sub>2.5</sub> and PM<sub>10</sub> emission results were given in Table 4.3.

**Table 4.3 Estimated Emission Rate**

| Activity     | Pollutant         | Calculated Value (g/s) | Lease Area in m <sup>2</sup> | Calculated Value (g/s/m <sup>2</sup> ) |
|--------------|-------------------|------------------------|------------------------------|----------------------------------------|
| Overall Mine | PM <sub>2.5</sub> | 1.114334795            | 20020                        | 5.56611E-05                            |
| Overall Mine | PM <sub>10</sub>  | 0.557167397            |                              | 2.78305E-05                            |

In mining and mechanical excavation, the current PM<sub>2.5</sub>/PM<sub>10</sub> ratio of 1:1 (where both are 1.11 g/s) is highly unusual for standard industry models. Typically, PM<sub>2.5</sub> constitutes a much smaller fraction of the total PM<sub>10</sub> generated by mechanical rock breaking. Standard ratios for fugitive dust from mining, drilling and mechanical excavation typically range from 0.1 to 0.15. For mechanical excavation/drilling PM<sub>2.5</sub> is often estimated as only 10–15% of PM<sub>10</sub>. Many apply a correction factor (*e.g.*,  $PM_{2.5} = 0.15 \times PM_{10}$ ) for fugitive mining dust. Using the standard industry ratio of **0.15** ( $PM_{2.5} \approx 15\%$  of  $PM_{10}$ ) for mining activities the adjusted values for **PM<sub>2.5</sub>** are as follows:

### Technical justification for adjustment:

PM<sub>10</sub> in mining is primarily generated by mechanical processes (hauling, drilling and blasting) which produce coarse dust. A 1:1 ratio incorrectly implies that all dust is under 2.5 microns which is physically inconsistent with mineral extraction.

The U.S. EPA and modern global modelling guidelines recommend a ratio of 0.15 for unpaved roads and 0.10 for aggregate handling. The adjusted ratio of 0.15 aligns with these Environmental Protection Agency (EPA) AP-42 guidelines. Field studies using federal

reference method (FRM) samplers show that fine-fraction dust mass is typically only **10–15%** of total *PM*<sub>10</sub>.

### Modelling of Incremental Concentration

The post project resultant concentrations of *PM*<sub>10</sub>, *PM*<sub>2.5</sub> is given in Tables 4.4 - 4.5.

**Table 4.4 Incremental & Resultant GLC of *PM*<sub>2.5</sub>**

| Station ID | Distance to core area (km) | PM 2.5 concentrations(µg/m <sup>3</sup> ) |          |           |       | Comparison against air quality standard (60 µg/m <sup>3</sup> ) | Magnitude of change (%) | Limit |
|------------|----------------------------|-------------------------------------------|----------|-----------|-------|-----------------------------------------------------------------|-------------------------|-------|
|            |                            | Direction                                 | Baseline | Predicted | Total |                                                                 |                         |       |
| AAQ1       | 0.72                       | N                                         | 15.92    | 4         | 19.92 | Below standard                                                  | 25.1                    | 60    |
| AAQ2       | 1.58                       | NE                                        | 15.88    | 0         | 15.88 |                                                                 | 0.0                     | 60    |
| AAQ3       | 0.68                       | W                                         | 17.24    | 1         | 18.24 |                                                                 | 5.8                     | 60    |
| AAQ4       | 1.18                       | SW                                        | 16.40    | 5         | 21.4  |                                                                 | 30.5                    | 60    |
| AAQ5       | 1.86                       | SE                                        | 17.93    | 1         | 18.93 |                                                                 | 5.6                     | 60    |

**Table 4.5 Incremental & Resultant GLC of *PM*<sub>10</sub>**

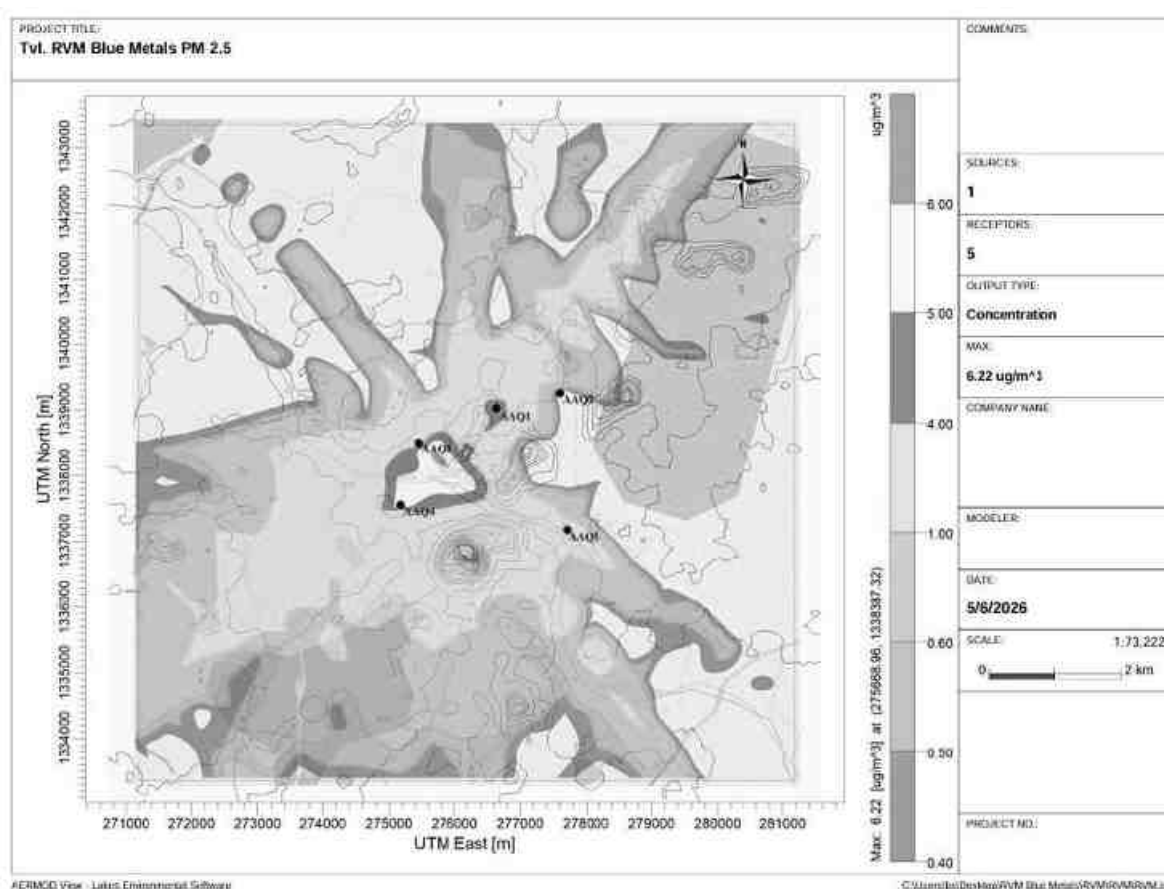
| Station ID | Distance to core area (km) | PM <sub>10</sub> concentrations(µg/m <sup>3</sup> ) |          |           |       | Comparison against air quality standard (100 µg/m <sup>3</sup> ) | Magnitude of change (%) | Limit |
|------------|----------------------------|-----------------------------------------------------|----------|-----------|-------|------------------------------------------------------------------|-------------------------|-------|
|            |                            | Direction                                           | Baseline | Predicted | Total |                                                                  |                         |       |
| AAQ1       | 0.72                       | N                                                   | 42.58    | 8         | 50.58 | Below standard                                                   | 18.8                    | 100   |
| AAQ2       | 1.58                       | NE                                                  | 41.24    | 0.5       | 41.74 |                                                                  | 1.2                     | 100   |
| AAQ3       | 0.68                       | W                                                   | 44.73    | 5         | 49.73 |                                                                  | 11.2                    | 100   |
| AAQ4       | 1.18                       | SW                                                  | 43.83    | 10        | 53.83 |                                                                  | 22.8                    | 100   |
| AAQ5       | 1.86                       | SE                                                  | 46.20    | 3         | 49.2  |                                                                  | 6.5                     | 100   |

The Air Quality index for the baseline and predicted values of *PM*<sub>2.5</sub> and *PM*<sub>10</sub> are given in table below.

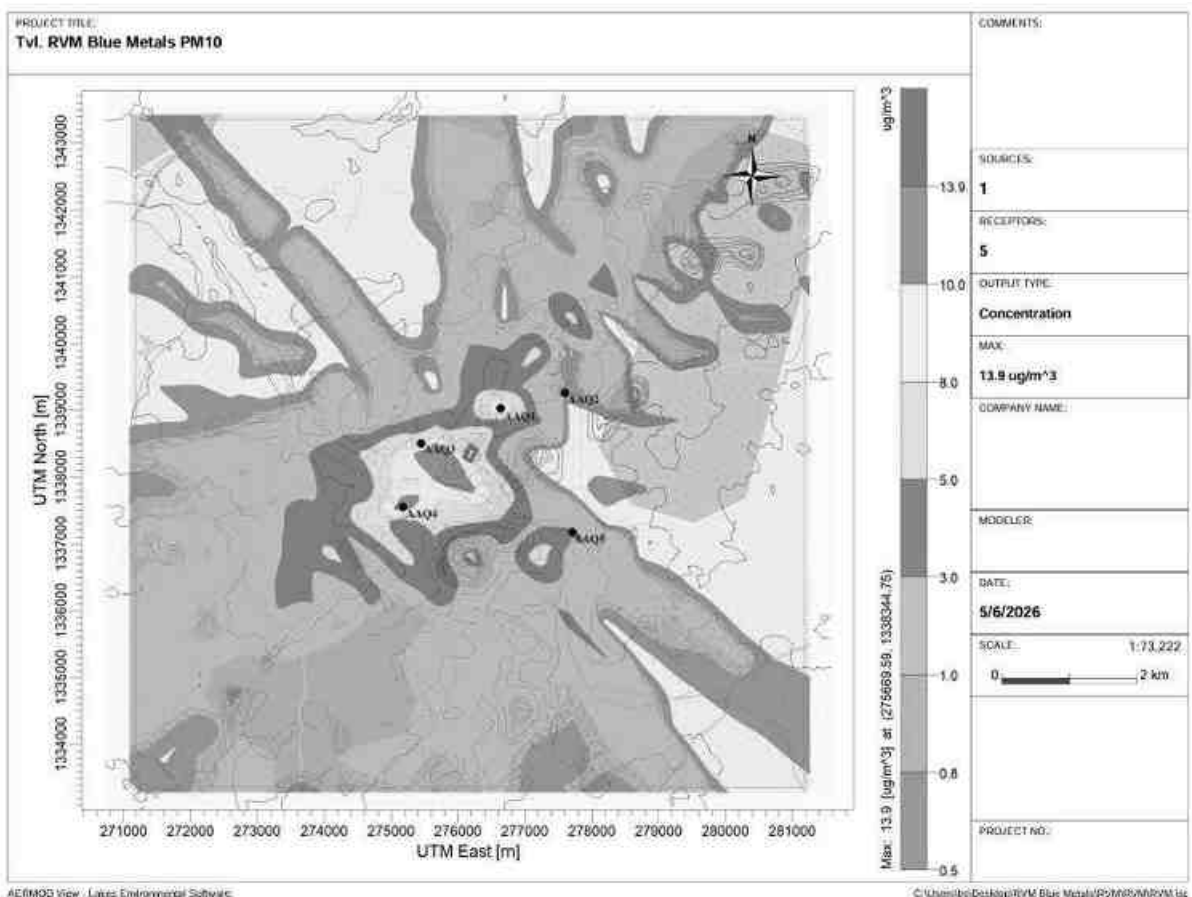
| Station ID | Distance to core area (km) | Direction | PM <sub>2.5</sub> (µg/m <sup>3</sup> ) |                                  | AQI for PM <sub>2.5</sub> | PM <sub>10</sub> (µg/m <sup>3</sup> ) |                                  | AQI for PM <sub>10</sub> |
|------------|----------------------------|-----------|----------------------------------------|----------------------------------|---------------------------|---------------------------------------|----------------------------------|--------------------------|
|            |                            |           | Baseline Conc.                         | Total (Baseline + Predicted GLC) |                           | Baseline Conc.                        | Total (Baseline + Predicted GLC) |                          |
| AAQ1       | 0.72                       | N         | 15.92                                  | 19.92                            | 3.6                       | 42.58                                 | 50.58                            | 54                       |
| AAQ2       | 1.58                       | NE        | 15.88                                  | 15.88                            | 2.8                       | 41.24                                 | 41.74                            | 44                       |
| AAQ3       | 0.68                       | W         | 17.24                                  | 18.24                            | 3.2                       | 44.73                                 | 49.73                            | 53                       |
| AAQ4       | 1.18                       | SW        | 16.40                                  | 21.40                            | 3.7                       | 43.83                                 | 53.83                            | 60                       |
| AAQ5       | 1.86                       | SE        | 17.93                                  | 18.93                            | 3.4                       | 46.20                                 | 49.2                             | 53                       |

<https://www.airnow.gov/aqi/aqi-calculator-concentration/>

In the present study American Meteorological Society and the United States Environmental Protection Agency Dispersion Model (AERMOD) air quality model was run for premonsoon season under maximum atmospheric temperature conditions. The AERMOD has been run for PM<sub>10</sub> and PM<sub>2.5</sub> distribution with 24-Hr maximum concentration and concentration contours were obtained as given in Figure 4.1 and 4.2. From these Isopleths plots it is observed that the highest pollutants concentrations predicted by AERMOD was near the major source in the core area and a maximum of 62.4µg/m<sup>3</sup> of PM<sub>10</sub> and 32.6µg/m<sup>3</sup> of PM<sub>2.5</sub> were found to be below the prescribed NAAQS near the source. The impact assessment matrix of PM<sub>2.5</sub> was tabled below



**Figure 4.1 Predicted Incremental Concentration of PM2.5**



**Figure 4.2 Predicted Incremental Concentration of PM10**

| Station | Impact Scale | Standard Compliance | Magnitude           |
|---------|--------------|---------------------|---------------------|
| AAQ1    | Low          | Below Standard      | Significant (18.8%) |
| AAQ2    | Low          | Below Standard      | Negligible (1.2%)   |
| AAQ3    | Low          | Below Standard      | Negligible (11.2%)  |
| AAQ4    | Low          | Below Standard      | Negligible (22.8%)  |
| AAQ5    | Low          | Below Standard      | Negligible (6.5%)   |

#### Leopold Matrix: Air Quality Impact

The Leopold Matrix is used to cross-reference project activities against environmental factors. Based on the  $PM_{2.5}$  data the project activities impact the environmental factor air quality. Scale: 1 (Lowest) to 10 (Highest). Magnitude is negative (-) for adverse impacts. Example for AAQ1 (Total  $32.6 \mu\text{g}/\text{m}^3$ ): If magnitude is -6 and importance is 6 the resulting -36 indicates a moderate negative impact that requires specific mitigation measures.

| Environmental Factor  | Project Activity: Construction | Project Activity: Operation |
|-----------------------|--------------------------------|-----------------------------|
| Physical: Air Quality | -4/5                           | -6/7                        |
| Biological: Health    | -3/4                           | -5/8                        |
| Social: Aesthetics    | -2/2                           | -3/4                        |

*Mitigation Measures: Air Quality Mitigation & Management Plan (2026).*

In accordance with 2026 **National Clean Air Programme (NCAP)** targets which aim for a 40% reduction in particulate matter by the end of 2026. These measures focus on reducing *PM*<sub>2.5</sub> at the source.

**Table 4.7 Proposed Mitigation Measures for Air pollution**

| Impacted Area      | Leopold Score (M/I) | Targeted Mitigation Measure                                                      | Implementation Frequency               |
|--------------------|---------------------|----------------------------------------------------------------------------------|----------------------------------------|
| AAQ1 (High Change) | -7 / 6              | Permanent Water sprinkler                                                        | Continuous during high-dust activities |
| Core Area (AAQ2)   | -5 / 8              | Install continuous wind-breaking walls (min. 3m height) to shield the core area. | Fixed throughout project phase         |
| Transport Routes   | -4 / 5              | Strictly enforce a 10 km/h limit for heavy vehicles to reduce dust resuspension. | All vehicle movements                  |
| Stockpiles         | -3 / 4              | Use tarpaulins or plastic sheets to cover all sand, cement and loose debris.     | Daily at close of work                 |
| Site Entry/Exit    | -2 / 3              | Tire wash unit to prevent track-out onto public roads.                           | Every vehicle exit                     |

#### Compliance Requirements

- **Real-Time Monitoring:** As of 2026 large construction sites are required to link low-cost air quality sensors directly to state pollution control board (SPCB) dashboards for live compliance tracking.
- **Emission Norms:** Ensure all on-site machinery and diesel generators (DG sets) meet the latest BS-VI or equivalent standards to minimize *PM*<sub>2.5</sub> and *NO<sub>x</sub>* emissions.
- **Emergency Response:** If *PM*<sub>2.5</sub> exceeds the 60  $\mu\text{g}/\text{m}^3$  limit trigger the Graded Response Action Plan (GRAP) which may require temporary suspension of excavation or demolition.

## 4.5 NOISE ENVIRONMENT

Key noise contributors in mining includes drilling, blasting, heavy machinery (HEMM) and the loading/transportation of materials.

#### Projected Noise Levels

- **Source Intensity:** Total noise from mining activities (blasting, excavators, tippers, etc.) is calculated at 95.8 dB(A) [None].
- **Mitigation Factors:** The model accounts for geometric attenuation (a 6dB decrease for every doubling of distance) and a 4.9 dB(A) reduction provided by the proposed Green Belt.

- **Resultant Impact:** At the nearest residential monitoring location **Allapanur** 680m away the predicted noise level is **42.8 dB(A)** which is well within the NAAQ residential daytime standard.

### Health & Environmental Risks

While the modelling predicts levels within legal limits for residents the following risks associated with mining noise remain a priority for worker safety and structural integrity.

- **Auditory Health:** Prolonged exposure to high-intensity noise from drilling and blasting can cause permanent hearing loss.
- **Physical Disturbance:** Beyond annoyance heavy machinery and blasting can lead to sleep disturbance for any nearby inhabitants and potential structural damage.

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.8.

**Table 4.8 Activity and Noise Level Produced by Machinery**

| S. No.       | Machinery / activity | Impact on environment? | Noise produced in dB(A) at 50 ft from source* |
|--------------|----------------------|------------------------|-----------------------------------------------|
| 1            | Blasting             | Yes                    | 94                                            |
| 2            | Jack hammer          | Yes                    | 88                                            |
| 3            | Compressor           | No                     | 81                                            |
| 4            | Excavator            | No                     | 85                                            |
| 5            | Tipper               | No                     | 84                                            |
| <b>Total</b> |                      |                        | <b>95.8</b>                                   |

The total noise to be produced by mining activity is calculated to be 95.8 dB (A).

Generally, most mining operations produce noise between 95.8 dB (A).

**Table 4.9 Permissible noise levels adopted by CPCB, 2000 and OSHA**

| Maximum Exposure Noise level Time per Working Day in hours | Noise level                                            |                                                      |
|------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|
|                                                            | CPCB, 2000 in dB (International Standard Organization) | OSHA code in dB (Occupational Safety and Health Act) |
| 8                                                          | 90                                                     | 90                                                   |
| 4                                                          | 93                                                     | 95                                                   |
| 2                                                          | 96                                                     | 100                                                  |
| 1                                                          | 99                                                     | 105                                                  |
| 0.5                                                        | 102                                                    | 110                                                  |
| 0.25                                                       | 105                                                    | 115                                                  |

A noise level of 90 dB causes disruption, leading to annoyance, cognitive errors, and temporary hearing loss, while 85 dB is considered an upper comfort level with potential for cognitive decrements in tasks requiring decision-making with hearing loss possible at 300-1200 Hz frequencies in that range. Prolonged exposure to sounds at or above 85 dB can damage hearing over time. The mitigation measures to minimize the noise pollution are given in Table below.

From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000. Therefore, no impact is anticipated on the noise environment due to the project.

#### 4.5.1 Ground Vibrations

Impact of blasting vibrations and fly rock on the nearby habitation it is critical to manage the **Peak Particle Velocity (PPV)** according to established safety standards. The Empirical formula ( $V=K[R/Q^{0.5}]^{-b}$ ) can determine the safe maximum charge per delay (Q) to ensure the PPV stays within the limits prescribed by the Directorate General of Mines Safety (DGMS).

Where,

V = peak particle velocity (mm/s)

K= site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

b = constant related to the rock and site (usually 1.6)

R = distance from charge (m)

For the structures the safety thresholds typically remain:

- **Kutchra Houses:** Should not exceed a PPV of **2.0–5.0 mm/s**.
- **RCC Framed Structures:** Can generally withstand **10.0–15.0 mm/s** depending on the dominant excitation frequency.

If the kutchra houses is at a distance of 300m the maximum allowable charge per delay is approximately 284.6kg to stay within the safe ground vibration limit of 5.0 mm/s. The quantity of explosive in kg derived from above formula by re-arrange the formula has

1. Divide by K:  $V/K=[R/Q]^{-b}$
2. Raise to power of -1/b:  $(V/K)^{-1/1.6} = R/\sqrt[1.6]{Q}$
3. Solve for  $\sqrt[1.6]{Q}$  :  $\sqrt[1.6]{Q} = R/(VK)^{-1/1.6}$
4. Square both sides:  $Q=[R/(V/K)^{-0.625}]^2$

Substitute the given values into the equation:

1. Calculate  $V/K$ :  $5/500=0.01$
2. Apply the exponent:  $0.01^{-0.625} \approx 17.783$
3. Calculate Q:  $Q = [300/17.783]^2 \approx 16.87^2 \approx \mathbf{284.6 \text{ kg}}$

Similarly, we calculate the max charge for RCC framed structure. The details are summarized and given in table below.

| Structure Type       | PPV Limit (V) | Safe Max Charge (Q) |
|----------------------|---------------|---------------------|
| Kutchra house        | 5.0 mm/s      | 284.6 kg            |
| RCC Framed Structure | 10.0 mm/s     | 674.9 kg            |

For any actual blasting work consult the qualified and licensed blasting experts and relevant regulatory bodies is essential.

#### 4.6 ECOLOGY AND BIODIVERSITY

The impact on Ecology and Biodiversity we prepared a matrix for to quantify both the scale of the physical change and the conservation value of the affected species or habitats. The assigned score for Magnitude (M) and an Importance (I) typically on a scale of 1–10.

##### Step A: Assign Magnitude (M)

- 1–2 (Minimal): Temporary disturbance no permanent loss of individuals.
- 5–6 (Moderate): Permanent loss of a small portion of common habitat no species loss.
- 9–10 (High): Total removal of a unique habitat or direct threat to a protected species population.

##### Step B: Assign Importance/Sensitivity (I)

- 1–3 (Low): Common species (e.g., invasive weeds, common rodents) or degraded wasteland.
- 4–7 (Medium): Native vegetation, locally important grazing land or non-threatened wildlife.
- 8–10 (High): REET species (Rare, Endangered, Endemic, Threatened), National Parks, or critical breeding grounds.

##### Step C: The Significance Formula

The final significance is often calculated using a risk-based approach

$$\text{Significance} = \text{Magnitude} \times \text{Importance}$$

##### Interpretation of Results (Total Score):

- 1–25: Negligible Impact. Standard mitigation (e.g., dust control) is sufficient.
- 26–50: Moderate Impact. Requires specific management plans (e.g., replanting programs).
- 51–100: Significant Impact. May require project redesign, habitat offsets or a dedicated Wildlife Conservation Plan.

| Aspect (Activity) | Ecological Impact                            | Magnitude | Importance | Significant score |
|-------------------|----------------------------------------------|-----------|------------|-------------------|
| Land Clearing     | Loss of topsoil and habitat destruction      | 9         | 10         | 90 (High)         |
| Drilling/Blasting | Air & Noise pollution and avian displacement | 5         | 6          | 30 (Low)          |
| Surface runoff    | Groundwater contamination                    | 9         | 8          | 72 (Med)          |
| Vehicle movement  | Air quality degradation                      | 9         | 7          | 63 (Med)          |

## 4.7 SOCIO ECONOMIC ENVIRONMENT

### Socio-Economic Aspect & Impact Matrix:

These scores are derived from social baseline surveys

| Aspect (Activity) | Socio-Economic Impact                      | Magnitude | Importance | Result (S) |
|-------------------|--------------------------------------------|-----------|------------|------------|
| Site Development  | Infrastructure/Road upgrades for community | +8        | 7          | +56 (Pos)  |
| Workforce Influx  | Stress on local health services            | 6         | 8          | 48 (Med)   |
| Land Acquisition  | Displacement of indigenous livelihoods     | 10        | 10         | 100 (High) |
| Operation         | Direct employment and GDP contribution     | +9        | 9          | +81 (Pos)  |

### 4.8 Mitigation measures of Opencast Mechanized Mining

#### Land Clearing (Score: 90 - High)

This is the most critical impact. Mitigation must focus on strict avoidance and substantial restoration. Clear land in small sections only when immediately rather than all at once to allow mobile fauna to escape naturally.

- Implement a 1:10 ratio replacement plan. For every hectare cleared plant 10 hectares of native local species in an adjacent or designated conservation zone or develop greenbelt with native species of 33% from the total project area as prescribed by MoEF&CC impact division.
- Strip and safely store the nutrient-rich topsoil. Reuse this exact topsoil during site restoration and landscaping to promote native seed bank recovery.

#### Waste Runoff (Score: 72 - Medium-High)

Construct garland drainage and siltation pond to treat all surface runoff before it leaves the site boundary. Store used oil, vehicle tyres and other old HEMM vehicle parts prevent for corrosion and leachate.

#### Transport in Haul Roads (Score: 56 - Medium)

- Regularly water haul roads during dry periods (e.g., three times daily) to suppress PM<sub>10</sub> and PM<sub>2.5</sub> dust particles.
- Enforce strict 20 km/h speed limits on all unpaved haul roads to minimize dust generation and reduce collision risk with wildlife.
- Ensure all vehicles and machinery adhere to strict maintenance schedules to minimize exhaust emissions (NO<sub>x</sub>, SO<sub>x</sub>).

### Drilling/Blasting (Score: 20 - Low)

While low impact best practices should still be implemented.

- Schedule blasting activities during times of low biological activity (e.g., mid-day) and outside sensitive breeding seasons.
- Alert local communities and workers in advance of blasting to minimize nuisance.

The impact and mitigation measures are summarized and given in table below

| Category                     | Anticipated Impact                                                                                                                      | Mitigation Measures                                                                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Air Quality</b>           | Dust (SPM/RSPM) from drilling, blasting, and haul roads. Gaseous emissions ( <i>SO<sub>x</sub></i> , <i>NO<sub>x</sub></i> ) from HEMM. | Use of <b>wet drilling</b> systems and water sprinklers on haul roads. Covering trucks with tarpaulins and developing multi-tier green belts.       |
| <b>Land Environment</b>      | Landscape scarring and total loss of topsoil. Change in topography and drainage.                                                        | Systematic <b>topsoil preservation</b> for future afforestation. Progressive backfilling of mined-out pits and restoration to original land use.    |
| <b>Water Resources</b>       | Lowering of water table due to mine dewatering. Siltation from waste dump runoff and Acid Mine Drainage (AMD).                          | Construction of <b>garland drains</b> and settling tanks to arrest silt. Rainwater harvesting in abandoned pits and treatment of discharge water.   |
| <b>Noise &amp; Vibration</b> | High noise (90–115 dB) from blasting and machinery. Ground vibrations affecting nearby structures.                                      | Use of <b>controlled blasting</b> techniques. Providing ear muffs to workers, regular machine maintenance, and acoustic barriers.                   |
| <b>Ecology/Biodiversity</b>  | Destruction of local flora and habitat fragmentation. Disturbance to wildlife migration routes.                                         | <b>Minimizing footprint</b> through planned excavation. Massive plantation of native species to create carbon sinks and restore habitats.           |
| <b>Socio-Economic</b>        | Health issues like respiratory diseases.                                                                                                | Implementing robust <b>Rehabilitation and Resettlement (R&amp;R)</b> policies. Providing local employment and regular health check-ups for workers. |

### 4.8 OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety hazards occur during the operational phase of mining and primarily include the following:

- ❖ Respiratory hazards
- ❖ Noise
- ❖ Physical hazards

#### 4.8.1 Respiratory Hazards

Long-term exposure to silica dust may cause silicosis the following measures are proposed:

- ❖ Cabins of excavators and tippers will be enclosed with AC and sound proof
- ❖ Use of personal dust masks will be made compulsory

#### **4.8.2 Noise**

Workers are likely to get exposed to excessive noise levels during mining activities. The following measures are proposed for implementation

- ❖ No employee will be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection
- ❖ The use of hearing protection will be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(A), or the average maximum sound level reaches 110 dB(A)
- ❖ Ear muffs provided will be capable of reducing sound levels at the ear to at least 85 dB(A)
- ❖ Periodic medical hearing checks will be performed on workers exposed to high noise levels.

#### **4.8.3 Physical Hazard**

The following measures are proposed for control of physical hazards

- ❖ Specific personnel training on work-site safety management will be taken up;
- ❖ Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level;
- ❖ Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up.

#### **Occupational Health Survey**

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests

- ❖ General physical tests
- ❖ Audiometric tests
- ❖ Full chest, X-ray, Lung function tests, Spirometric tests
- ❖ Periodic medical examination – yearly
- ❖ Lung function test – yearly, those who are exposed to dust
- ❖ Eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate

treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

To ensure these measures are effective through 2026 mines must implement:

- **Environmental Monitoring:** Six-monthly monitoring of air, water and noise parameters via accredited laboratories.
- **Occupational Health:** Mandatory Personal Protective Equipment (PPE) and periodic awareness programs for personal safety.
- **Corporate Social Responsibility (CSR):** Investing in local infrastructure, education and health camps to improve community well-being.

#### **4.9 MINE WASTE MANAGEMENT**

No waste is anticipated from any of the proposed quarries.

#### **4.10 MINE CLOSURE**

Mine closure plan is the most important environmental requirement in mining project. The mine closure plan should cover technical, environmental, social, legal and financial aspects dealing with progressive and post closure activities. The closure operation is a continuous series of activities starting from the decommissioning of the project. Therefore, progressive mine closure plan should be specifically dealt with in the mining plan and is to be reviewed along with mining plan. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have included most of the activities to be included in the closure plan. While formulating the closure objectives for the site, it is important to consider the existing or the pre-mining land use of the site; and how the operation will affect this activity.

The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved:

- ❖ To create a productive and sustainable after-use for the site, acceptable to mine owners, regulatory agencies, and the public
- ❖ To protect public health and safety of the surrounding habitation
- ❖ To minimize environmental damage
- ❖ To conserve valuable attributes and aesthetics
- ❖ To overcome adverse socio-economic impacts.

##### **4.10.1 Mine Closure Criteria**

The criteria involved in mine closure are discussed below:

##### **4.10.1.1 Physical Stability**

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard

to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The design periods and factors of safety proposed should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

#### **4.10.1.2 Chemical Stability**

The solid wastes on the mine site should be chemically stable. This means that the consequences of chemical changes or conditions leading to leaching of metals, salts or organic compounds should not endanger public health and safety nor result in the deterioration of environmental attributes. If the pollutant discharges likely to cause adverse impacts is predicted in advance, appropriate mitigation measures like settling of suspended solids or passive treatment to improve water quality as well as quantity, etc., could be planned. Monitoring should demonstrate that there is no adverse effect of pollutant concentrations exceeding the statutory limits for the water, soil and air qualities in the area around the closed mine.

#### **4.10.1.3 Biological Stability**

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc.,

A vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilizing the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful under three situations.

- ❖ Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- ❖ Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- ❖ Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor. For example, development of green barriers

The Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

## **CHAPTER V**

### **ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)**

#### **5.0 General**

Consideration of alternatives to a proposed project is a requirement of EIA process. During the scoping process, alternatives to a proposed project can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost- effective options.

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.

#### **5.1 ANALYSIS OF ALTERNATIVE SITE**

- ❖ No alternatives are suggested as the mine site is mineral specific.

#### **5.2 FACTORS BEHIND THE SELECTION OF PROJECT SITE**

Manual open cast mining method with secondary blasting will be applied to extract rough stone and gravel in the area. The proposed mining lease areas have following advantages:

- As the mineral deposition is homogeneous and batholith formation, opencast method of working is preferred over underground method.
- The material will be loaded with the help of excavators into tractors/ tippers and transported to the need by customers.
- Semi- Skilled labours fit for quarrying operations are easily available around the nearby villages.

#### **5.3 ANALYSIS OF ALTERNATIVE TECHNOLOGY**

Open cast mechanized method has been selected for this project. This technology is having least gestation period, economically viable, safest and less labour intensive. The method has inbuilt flexibility for increasing or decreasing the production as per market condition.

## **CHAPTER VI**

### **ENVIRONMENTAL MONITORING PROGRAMME**

#### **6.0 GENERAL**

The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections.

The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA- TN as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTE/CTO.

#### **6.1 METHODOLOGY OF MONITORING MECHANISM**

Implementation of EMP and periodic monitoring will be carried out by respective project proponents. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed project; Environmental protection measures like dust suppression, control of noise and blast vibrations, maintenance of machinery and vehicles, housekeeping in the mine premises, plantation, implementation of Environmental Management Plan and environmental clearance conditions will be monitored by the respective mine management. On the other hand, implementation of area level protection measures like green belt development, environmental quality monitoring etc., are taken up by a senior executive who reports to their Mine Management.

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in the proposed quarry. The responsibilities of this cell will be:

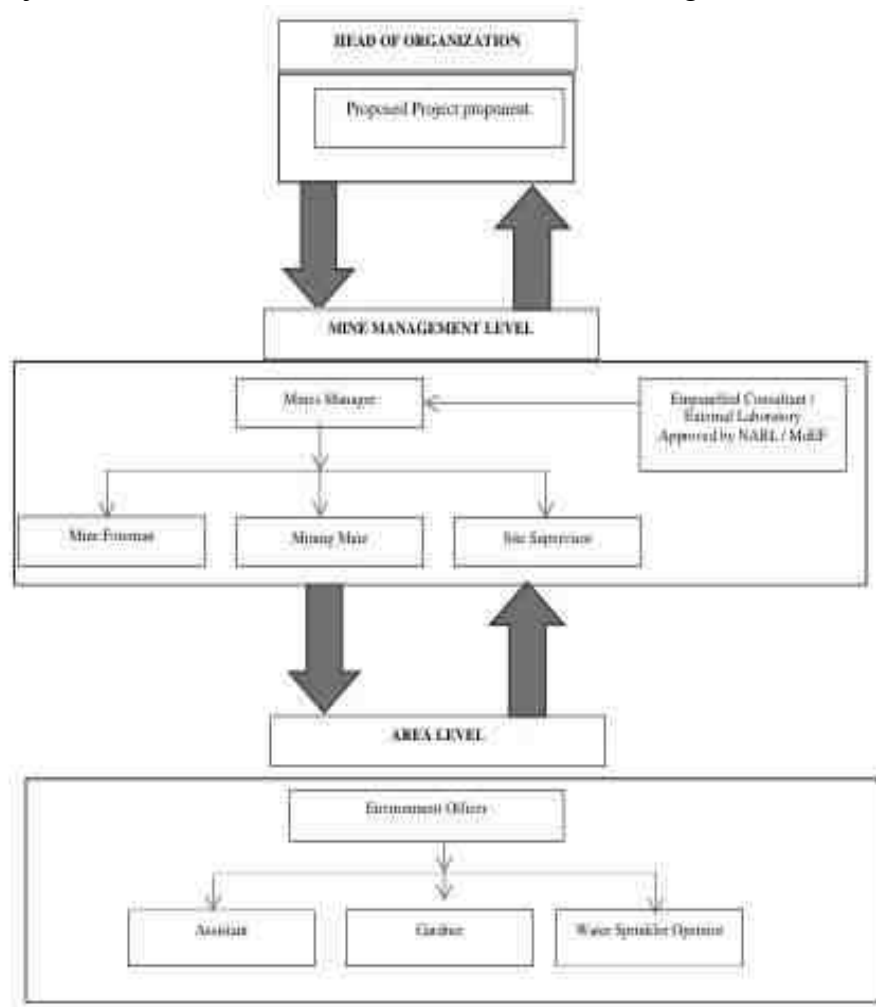
- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care

- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment
- ❖ Seeking expert's advice when needed.

The environmental monitoring cell will co- ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies as compliance status reports.

The sampling and analysis report of the monitored environmental attributes will be submitted to the Tamil Nadu Pollution Control Board (TNPCB) at a frequency of half-yearly and yearly by the proposed project proponent. The half-yearly reports are submitted to Ministry of Environment and Forest, Regional Office and SEIAA-TN as well.

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/ Ministry of Environment, Forest and Climate Change (MoEF & CC). The Environmental Monitoring Cell will be formed for the proposed project. The structure of the cell will be as shown in Figure 6.1.



**Figure 6.1 Proposed environmental monitoring chart**

## 6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The mitigation measures proposed in chapter IV will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in Table 6.1.

**Table 6.1 Implementation Schedule for Proposed Project**

| S. No. | Recommendations                   | Time Period                                                         | Schedule                                      |
|--------|-----------------------------------|---------------------------------------------------------------------|-----------------------------------------------|
| 1      | Land Environment Control Measures | Before commissioning of the project                                 | Immediately after the commencement of project |
| 2      | Soil Quality Control Measures     | Before commissioning of the project                                 | Immediately after the commencement of project |
| 3      | Water Pollution Control Measures  | Before commissioning of the project and along with mining operation | Immediately and as project progress           |
| 4      | Air Pollution Control Measures    | Before commissioning of the project and along with mining operation | Immediately and as project progress           |
| 5      | Noise Pollution Control measures  | Before commissioning of the project and along with mining operation | Immediately and as project progress           |
| 6      | Ecological Environment            | Phase wise implementation every year along with mine operations     | Immediately and as project progress           |

## 6.3 MONITORING SCHEDULE AND FREQUENCY

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges, emissions and wastes, for measurement against statutory standards. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The environmental monitoring will be conducted in the mine operations as follows:

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil quality and
- ❖ Greenbelt development

The details of proposed monitoring schedule have been provided in Table 6.2.

**Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry**

| S. No | Environment Attributes   | Location                                                                 | Monitoring     |                              | Parameters                                                                                  |
|-------|--------------------------|--------------------------------------------------------------------------|----------------|------------------------------|---------------------------------------------------------------------------------------------|
|       |                          |                                                                          | Duration       | Frequency                    |                                                                                             |
| 1     | Air Quality              | 2 Locations (1 Core & 1 Buffer)                                          | 24 hours       | Once in 6 months             | Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> . |
| 2     | Meteorology              | At mine site before start of Air Quality Monitoring & IMD Secondary Data | Hourly / Daily | Continuous online monitoring | Wind speed, Wind direction, Temperature, Relative humidity and Rainfall                     |
| 3     | Water Quality Monitoring | 2 Locations (1 SW & 1 GW)                                                | -              | Once in 6 months             | Parameters specified under IS:10500, 1993 & CPCB Norms                                      |
| 4     | Hydrology                | Water level in open wells in buffer zone around 1 km at specific wells   | -              | Once in 6 months             | Depth in m 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                                                                                 |

*Source: Guidance of manual for mining of minerals, February 2010*

#### **6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM**

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each proposal is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF.

The proposed capital cost for Environmental Monitoring Programme for **M/s. Ramana Stone Crusher**, Rough Stone Quarry is Rs. 2,95,000 for conducting Air Quality,

Meteorology, Water Quality, Hydrology, Soil Quality, Noise Quality Vibration Study, Greenbelt.

**Table 6.3 Environment Monitoring Budget**

| <b>S. No.</b> | <b>Parameter</b>       | <b>Capital Cost</b> | <b>Recurring Cost per annum</b> |
|---------------|------------------------|---------------------|---------------------------------|
| 1             | Air Quality            | -                   | Rs 60,000/-                     |
| 2             | Meteorology            | -                   | Rs 15,000/-                     |
| 3             | Water Quality          | -                   | Rs 20,000/-                     |
| 4             | Water Level Monitoring | -                   | Rs 10,000/-                     |
| 5             | Soil Quality           | -                   | Rs 20,000/-                     |
| 6             | Noise Quality          | -                   | Rs 10,000/-                     |
| 7             | Vibration Study        | -                   | Rs 1,50,000/-                   |
| 8             | Greenbelt              | -                   | Rs 10,000/-                     |
| <b>Total</b>  |                        | -                   | <b>Rs 2,95,000 /-</b>           |

*Source: Field Data*

## **6.5 REPORTING SCHEDULES OF MONITORED DATA**

The monitored data on air quality, water quality, noise levels and other environmental attributes will be periodically examined by the Cluster Mine Management Coordinator and Respective Head of Organization for taking necessary corrective measures. The monitoring data will be submitted to Tamil Nadu State Pollution Control Board in the Compliance to CTO Conditions & environmental audit statements every year to MoEF & CC and Half-Yearly Compliance Monitoring Reports to MoEF & CC Regional Office and SEIAA.

Periodical reports to be submitted to:

- ❖ MoEF & CC – Half yearly status report
- ❖ TNPCB - Half yearly status report
- ❖ Department of Geology and Mining: quarterly, half yearly annual reports

Besides the Mines Manager/Agent of respective project will submit the periodical reports to:

- ❖ Director of mines safety
- ❖ Labour enforcement officer
- ❖ Controller of explosives as per the norms stipulated by the department.

## CHAPTER VII

### ADDITIONAL STUDIES

#### 7.0 GENERAL

Additional studies deal with:

- ❖ Public Consultation for Proposed Project
- ❖ Risk Assessment
- ❖ Disaster Management Plan
- ❖ Cumulative Impact Study
- ❖ Plastic Waste Management

#### 7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district was made and the public opinions on the proposed project will be updated in the final EIA/EMP report.

#### 7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide circular No.13 of 2002, dated 31<sup>st</sup> December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project. Factors of risks involved due to human induced activities in connection with these proposed mining & allied activities with detailed analysis of causes and control measures for the mine is given in Table 7.1.

**Table 7.1 Risk Assessment & Control Measures for Proposed Project**

| S. No. | Risk factors                    | Causes of risk        | Control measures                                                                           |
|--------|---------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| 1      | Accidents due to explosives and | Improper handling and | ✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, |

|   |                           |                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|---------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | heavy mining machineries. | unsafe working practice                                                                                      | <p>1961 and Mines Rules, 1955 will be strictly followed during all mining operations.</p> <ul style="list-style-type: none"> <li>✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited.</li> <li>✓ Fire-fighting and first-aid provisions in the mine office complex and mining area.</li> <li>✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use.</li> <li>✓ Working of quarry, as per approved plans and regularly updating the mine plans.</li> <li>✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut.</li> <li>✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager.</li> <li>✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.</li> </ul> |
| 2 | Drilling                  | Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst; Drill Rod may break; | <ul style="list-style-type: none"> <li>✓ Safe operating procedure established for drilling (SOP) will be strictly followed.</li> <li>✓ Only trained operators will be deployed.</li> <li>✓ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places,</li> <li>✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other.</li> <li>✓ Periodical preventive maintenance and replacement of worn-out accessories in the</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|   |                |                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |                |                                                                                                                                                                          | <p>compressor and drill equipment as per operator manual.</p> <ul style="list-style-type: none"> <li>✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition.</li> <li>✓ Operator shall regularly use all the personal protective equipment.</li> </ul>                                                                                                                                                                                                                                                                          |
| 3 | Blasting       | <p>Fly rock, ground vibration, Noise and dust.</p> <p>Improper charging, stemming &amp; Blasting/ fining of blast holes</p> <p>Vibration due to movement of vehicles</p> | <ul style="list-style-type: none"> <li>✓ The maximum charge per delay and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blast can be conducted safely.</li> <li>✓ SOP for Charging, Stemming &amp; Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation</li> <li>✓ Shots are fired during daytime only.</li> <li>✓ All holes charged on any one day shall be fired on the same day.</li> <li>✓ The danger zone is and will be distinctly demarcated (by means of red flags)</li> </ul> |
| 4 | Transportation | <p>Potential hazards and unsafe workings contributing to accident and injuries</p> <p>Overloading of material</p> <p>While reversal &amp; overtaking of vehicle</p>      | <ul style="list-style-type: none"> <li>✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.</li> <li>✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle.</li> <li>✓ Concave mirrors should be kept at all corners</li> </ul>    |

|   |                                       |                                                        |                                                                                                                                                                                                         |
|---|---------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |                                       | Operator of truck leaving his cabin when it is loaded. | ✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point<br>✓ Loading according to the vehicle capacity<br>✓ Periodical maintenance of vehicles as per operator manual |
| 5 | Natural calamities                    | Unexpected happenings                                  | ✓ Escape Routes will be provided to prevent inundation of storm water<br>✓ Fire Extinguishers & Sand buckets                                                                                            |
| 6 | Failure of Mine Benches and Pit Slope | Slope geometry, Geological structure                   | ✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.                                                                                                                  |

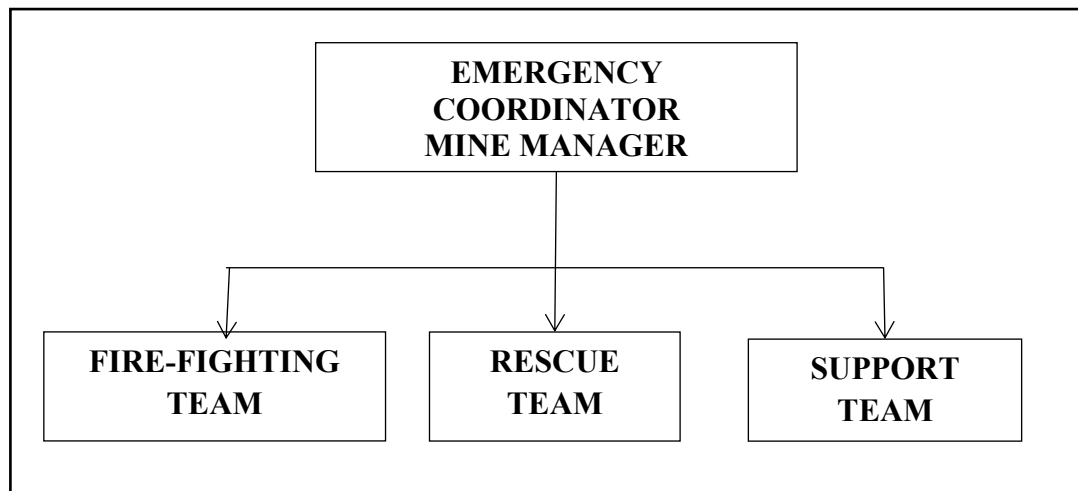
*Source: Analysed and proposed by FAE & EC*

### 7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone II. The area is far away from the sea. Hence, the disaster due to heavy floods and tsunamis are not anticipated. The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. 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.

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations. Structure of the team has been shown in Figure 7.1.



**Figure 7.1 Disaster management team layout for proposed project**

The emergency organization shall be headed by emergency coordinator who will be qualified competent mines manager. In his absence senior most people available at the mine shall be emergency coordinator till arrival of mines manager. There would be three teams for taking care of emergency situations – Fire-Fighting Team, Rescue Team and Support Team.

### **7.3.1 Emergency Control Procedure**

The onset of emergency, will in all probability, commence with a major fire or explosion or collapse of wall along excavation and shall be detected by various safety devices and also by members of operational staff on duty. If located by a staff member on duty, he (as per site emergency procedure of which he is adequately briefed) will go to nearest alarm call point, break glass and trigger off the alarms. He will also try his best to inform about location and nature of accident to the emergency control room. In accordance with work emergency procedure the following key activities will immediately take place to interpret and take control of emergency.

- ❖ On site fire crew led by a fireman will arrive at the site of incident with fire foam tenders and necessary equipment.
- ❖ Emergency security controller will commence his role from main gate office
- ❖ Incident controller shall rush to the site of emergency and with the help of rescue team and will start handling the emergency.
- ❖ Site main controller will arrive at MECR with members of his advisory and communication team and will assume absolute control of the site.
- ❖ He will receive information continuously from incident controller and give decisions and directions to:
  - ❖ Incident controller
  - ❖ Mine control rooms
  - ❖ Emergency security controller

## 7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the projects within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative study, there is only one proposed project known as P1 is taken into consideration. The details of P1 have been given in Table 7.2, and E1, E2 & E3, are given in the Table 7.2 to 7.5.

**Table 7.2 Salient Features of the cluster Project 'P1'**

|                                  |                                                                                                                                                                                                          |                              |                            |                           |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------|---------------------------|
| Name of the Quarry               | Tvl.RVM Blue Metals, Rough stone quarry                                                                                                                                                                  |                              |                            |                           |
| Type of Land                     | Govt Poramboke Land                                                                                                                                                                                      |                              |                            |                           |
| Extent                           | 2.00.2 Ha                                                                                                                                                                                                |                              |                            |                           |
| Toposheet No                     | 57-L/16                                                                                                                                                                                                  |                              |                            |                           |
| Location of Project Site         | 12°05'53.31"N to 12°06'0.23"N<br>78°56'34.10"E to 78°56'40.20"E                                                                                                                                          |                              |                            |                           |
| Highest Elevation                | 245m AMSL                                                                                                                                                                                                |                              |                            |                           |
| Proposed depth of Mining         | 65m (45m AGL + 20m BGL)                                                                                                                                                                                  |                              |                            |                           |
| Geological Resources             | Rough Stone in m <sup>3</sup>                                                                                                                                                                            |                              | Top Soil in m <sup>3</sup> |                           |
|                                  | m <sup>3</sup>                                                                                                                                                                                           | Tons (m <sup>3</sup> * 2.75) | m <sup>3</sup>             | Tons (m <sup>3</sup> * 2) |
|                                  | 835270                                                                                                                                                                                                   | 2296992                      | 4212                       | 8424                      |
| Mineable Reserves                | Rough Stone in m <sup>3</sup>                                                                                                                                                                            |                              | Gravel in m <sup>3</sup>   |                           |
|                                  | m <sup>3</sup>                                                                                                                                                                                           | Tons (m <sup>3</sup> * 2.75) | m <sup>3</sup>             | Tons (m <sup>3</sup> * 2) |
|                                  | 304295                                                                                                                                                                                                   | 836811                       | 3448                       | 6896                      |
| Proposed reserves for five years | Rough Stone in m <sup>3</sup>                                                                                                                                                                            |                              | Gravel in m <sup>3</sup>   |                           |
|                                  | m <sup>3</sup>                                                                                                                                                                                           | Tons (m <sup>3</sup> * 2.75) | m <sup>3</sup>             | Tons (m <sup>3</sup> * 2) |
|                                  | 304295                                                                                                                                                                                                   | 836811                       | 3448                       | 6896                      |
| Method of Mining                 | Open-Cast Mechanized mining                                                                                                                                                                              |                              |                            |                           |
| Topography                       | Flat Topography                                                                                                                                                                                          |                              |                            |                           |
| Machinery proposed               | Jack Hammer                                                                                                                                                                                              |                              | 2                          |                           |
|                                  | Compressor                                                                                                                                                                                               |                              | 1                          |                           |
|                                  | Tipper                                                                                                                                                                                                   |                              | 8                          |                           |
|                                  | Hydraulic Excavator                                                                                                                                                                                      |                              | 1                          |                           |
| Blasting Method                  | The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. |                              |                            |                           |
| Proposed Manpower Deployment     | 20 Nos                                                                                                                                                                                                   |                              |                            |                           |
| Project Cost                     | Rs.2,64,49,000/-                                                                                                                                                                                         |                              |                            |                           |
| CER Cost                         | Rs. 5,00,000/-                                                                                                                                                                                           |                              |                            |                           |
| Proposed Water Requirement       | 3.5 KLD                                                                                                                                                                                                  |                              |                            |                           |

**Table 7.3 Salient Features of the cluster Project 'E1'**

|                                  |                                                                                                                                                                                                          |   |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Name of the Quarry               | R.Amutha Rough Stone Quarry                                                                                                                                                                              |   |
| Type of Land                     | Govt Poramboke Land                                                                                                                                                                                      |   |
| Extent                           | 2.00.0 ha                                                                                                                                                                                                |   |
| Toposheet No                     | 57-L/16                                                                                                                                                                                                  |   |
| Location of Project Site         | 12°06'05.92"N to 12°06'11.59"N<br>78°56'39.56"E to 78°56'46.16"E                                                                                                                                         |   |
| Highest Elevation                | 246m AMSL                                                                                                                                                                                                |   |
| Proposed depth of Mining         | 46m BGL                                                                                                                                                                                                  |   |
| Geological Resources             | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |   |
|                                  | 306820 & 843755                                                                                                                                                                                          |   |
| Mineable Reserves                | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |   |
|                                  | 135470 & 372542                                                                                                                                                                                          |   |
| Proposed reserves for five years | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |   |
|                                  | 135470 & 372542                                                                                                                                                                                          |   |
| Method of Mining                 | Open-Cast Mechanized mining                                                                                                                                                                              |   |
| Topography                       | Flat Topography                                                                                                                                                                                          |   |
| Machinery proposed               | Jack Hammer                                                                                                                                                                                              | 2 |
|                                  | Compressor                                                                                                                                                                                               | 1 |
|                                  | Tipper                                                                                                                                                                                                   | 3 |
|                                  | Hydraulic Excavator                                                                                                                                                                                      | 1 |
| Blasting Method                  | The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. |   |
| Proposed Manpower Deployment     | 11 Nos                                                                                                                                                                                                   |   |
| Project Cost                     | Rs.86,60,000/-                                                                                                                                                                                           |   |
| CER Cost                         | Rs. 5,00,000/-                                                                                                                                                                                           |   |
| Proposed Water Requirement       | 1.495 KLD                                                                                                                                                                                                |   |

**Table 7.4 Salient Features of the cluster Project 'E2'**

|                          |                                                      |  |
|--------------------------|------------------------------------------------------|--|
| Name of the Quarry       | G.Dakshinamoorthy, Rough stone and gravel quarry     |  |
| Type of Land             | Govt Poramboke Land                                  |  |
| Extent                   | 2.00.0 ha                                            |  |
| Toposheet No             | 57-L/16                                              |  |
| Location of Project Site | 12°05'58"N to 12°06'06"N<br>78°56'39"E to 78°56'46"E |  |
| Highest Elevation        | 246m AMSL                                            |  |
| Proposed depth of Mining | 55m (45m AGL + 10m AGL)                              |  |
| Geological Resources     | Rough Stone in (m <sup>3</sup> & Ts)                 |  |
|                          | 649195 & 1785286                                     |  |
| Mineable Reserves        | Rough Stone in (m <sup>3</sup> & Ts)                 |  |
|                          | 288970 & 794668                                      |  |

|                                  |                                                                                                                                                                                                          |    |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Proposed reserves for five years | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |    |
|                                  | 288970 & 794668                                                                                                                                                                                          |    |
| Method of Mining                 | Open-Cast Mechanized mining                                                                                                                                                                              |    |
| Topography                       | Plain terrain                                                                                                                                                                                            |    |
| Machinery proposed               | Jack Hammer                                                                                                                                                                                              | 10 |
|                                  | Compressor                                                                                                                                                                                               | 3  |
|                                  | Tipper                                                                                                                                                                                                   | 6  |
|                                  | Hydraulic Excavator                                                                                                                                                                                      | 3  |
| Blasting Method                  | The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. |    |
| Proposed Manpower Deployment     | 22Nos                                                                                                                                                                                                    |    |
| Project Cost                     | Rs.1,14,70,000/-                                                                                                                                                                                         |    |
| CER Cost                         | Rs. 5,00,000/-                                                                                                                                                                                           |    |
| Proposed Water Requirement       | 3.5 KLD                                                                                                                                                                                                  |    |

**Table 7.5 Salient Features of the cluster Project 'E3'**

|                                  |                                                                                                                                                                                                          |   |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Name of the Quarry               | J.Gunasekaran, Rough stone & Gravel quarry                                                                                                                                                               |   |
| Type of Land                     | Govt Poramboke Land                                                                                                                                                                                      |   |
| Extent                           | 0.97.0 ha                                                                                                                                                                                                |   |
| Toposheet No                     | 57-L/16                                                                                                                                                                                                  |   |
| Location of Project Site         | 12°05'59.55"N to 12°06'03.55"N<br>78°56'52.96"E to 78°56'57.09"E                                                                                                                                         |   |
| Highest Elevation                | 255m AMSL                                                                                                                                                                                                |   |
| Proposed depth of Mining         | 28m BGL                                                                                                                                                                                                  |   |
| Geological Resources             | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |   |
|                                  | 308465 & 848278                                                                                                                                                                                          |   |
| Mineable Reserves                | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |   |
|                                  | 97770 & 268867                                                                                                                                                                                           |   |
| Proposed reserves for five years | Rough Stone in (m <sup>3</sup> & Ts)                                                                                                                                                                     |   |
|                                  | 97770 & 268867                                                                                                                                                                                           |   |
| Method of Mining                 | Open-Cast Mechanized mining                                                                                                                                                                              |   |
| Topography                       | Plain terrain                                                                                                                                                                                            |   |
| Machinery proposed               | Jack Hammer                                                                                                                                                                                              | 2 |
|                                  | Compressor                                                                                                                                                                                               | 1 |
|                                  | Tipper                                                                                                                                                                                                   | 1 |
|                                  | Hydraulic Excavator                                                                                                                                                                                      | 1 |
| Blasting Method                  | The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. |   |
| Proposed Manpower Deployment     | 22 Nos                                                                                                                                                                                                   |   |

|                            |                  |
|----------------------------|------------------|
| Project Cost               | Rs.1,07,60,000/- |
| CER Cost                   | Rs. 5,00,000/-   |
| Proposed Water Requirement | 3.0 KLD          |

#### 7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from cluster project have been given in Tables 7.6.

**Table 7.6 Cumulative Production Load of Rough Stone**

| Quarry       | 10 Years<br>in<br>(m <sup>3</sup> ) | 10 Years in<br>Ts<br>(m <sup>3</sup> X 2.75) | Per Year<br>in<br>(m <sup>3</sup> ) | Per Year<br>in Ts<br>(m <sup>3</sup> X 2.75) | Per<br>Day in<br>(m <sup>3</sup> ) | Per Day in<br>Ts<br>(m <sup>3</sup> X 2.75) | Number of<br>Lorry Load<br>Per Day |
|--------------|-------------------------------------|----------------------------------------------|-------------------------------------|----------------------------------------------|------------------------------------|---------------------------------------------|------------------------------------|
| P1           | 304295                              | 836811                                       | 30430                               | 83681                                        | 113                                | 310                                         | 19                                 |
| Quarry       | 5 Years<br>in<br>(m <sup>3</sup> )  | 5 Years in<br>Ts<br>(m <sup>3</sup> X 2.75)  | Per Year<br>in<br>(m <sup>3</sup> ) | Per Year<br>in Ts<br>(m <sup>3</sup> X 2.75) | Per<br>Day in<br>(m <sup>3</sup> ) | Per Day in<br>Ts<br>(m <sup>3</sup> X 2.75) | Number of<br>Lorry Load<br>Per Day |
| E1           | 135470                              | 372542                                       | 27094                               | 74508                                        | 100                                | 275                                         | 16                                 |
| E2           | 288970                              | 794668                                       | 57794                               | 158933                                       | 214                                | 588                                         | 36                                 |
| E3           | 97770                               | 268867                                       | 19554                               | 53773                                        | 72                                 | 199                                         | 12                                 |
| <b>Total</b> | <b>826505</b>                       | <b>2272888</b>                               | <b>134872</b>                       | <b>370895</b>                                | <b>499</b>                         | <b>1372</b>                                 | <b>83</b>                          |

The cumulative study shows that the overall production of rough stone from the proposed quarry is 499m<sup>3</sup> & 1372 Ts per day with a capacity of 83 trips of rough stone per day.

##### 7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the cluster projects on air environment of the cluster have been provided in Table 7.7 The cumulative values resulting from the project for each pollutant do not exceed the permissible limits set by CPCB.

**Table 7.7 Cumulative impact results from the cluster projects**

| Pollutants        | Baseline Data (µg/m <sup>3</sup> ) | Incremental Values (µg/m <sup>3</sup> ) | Cumulative<br>Value (µg/m <sup>3</sup> ) |
|-------------------|------------------------------------|-----------------------------------------|------------------------------------------|
|                   |                                    | P1                                      |                                          |
| PM <sub>2.5</sub> | 16.67                              | 6.0                                     | 22.67                                    |
| PM <sub>10</sub>  | 43.72                              | 13.9                                    | 57.62                                    |

### 7.4.2 Noise Environment

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. Cumulative Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities. Predictions have been carried out to compute the noise level at various distances around the different projects within the 500m radius.

**Table.7.8 Cumulative impact of noise from cluster projects**

| Location ID               | Distance (m) | Direction | Background Value (Day) dB(A) | Incremental Value dB(A) | Total Predicted dB(A) | Residential Area Standards dB(A) |
|---------------------------|--------------|-----------|------------------------------|-------------------------|-----------------------|----------------------------------|
| Habitation Near P1        | 590          | W         | 42.8                         | 28.5                    | 43.0                  | 55                               |
| Habitation Near E1        | 730          | W         |                              | 26.7                    | 42.9                  |                                  |
| Habitation Near E2        | 630          | W         |                              | 28.0                    | 42.9                  |                                  |
| Habitation Near E3        | 1090         | W         |                              | 23.2                    | 42.8                  |                                  |
| Cumulative Noise (dB (A)) |              |           |                              |                         | 48.9                  |                                  |

*Source: Lab Monitoring Data*

The cumulative analysis of noise due to cluster proposed projects shows that habitation will receive about 48.9dB (A) respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for day time.

### Ground Vibrations

Cumulative results of ground vibrations due to mining activities in the all the cluster projects have been shown in Table 7.9.

**Table 7.9 Cumulative effect of ground vibrations resulting from cluster projects**

| Location ID  | Maximum Charge in kgs | Nearest Habitation in m | PPV in mm/s  |
|--------------|-----------------------|-------------------------|--------------|
| P1           | 10.84                 | 590                     | 0.124        |
| E1           | 9.66                  | 730                     | 0.08         |
| E2           | 20.60                 | 630                     | 0.187        |
| E3           | 6.97                  | 1090                    | 0.033        |
| <b>Total</b> |                       |                         | <b>0.424</b> |

Results from the above tables 7.8 indicate that the cumulative PPV value of each habitation is well below the peak particle velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

### 7.4.3 Socio Economic Environment

Socio Economic benefits of the cluster project were calculated and the results have been shown in Table 7.10. The cluster project will contribute Rs. 20,00,000/-towards CER fund.

**Table 7.10 Socio Economic benefits from the cluster project**

| Location ID        | Project Cost             | CER Cost               |
|--------------------|--------------------------|------------------------|
| P1                 | Rs.2,64,49,000/-         | Rs. 5,00,000/-         |
| E1                 | Rs.86,60,000/-           | Rs. 5,00,000/-         |
| E2                 | Rs.1,14,70,000/-         | Rs. 5,00,000/-         |
| E3                 | Rs.1,07,60,000/-         | Rs. 5,00,000/-         |
| <b>Grand Total</b> | <b>Rs. 5,73,39,000/-</b> | <b>Rs. 20,00,000/-</b> |

**Table 7.11 Employment benefits from the cluster projects**

| Location ID        | Employment |
|--------------------|------------|
| P1                 | 20         |
| E1                 | 11         |
| E2                 | 22         |
| E3                 | 22         |
| <b>Grand Total</b> | <b>75</b>  |

A total of 75 people will get employment due to the cluster project in cluster

### 7.4.4 Ecological Environment

**Table 7.12 Greenbelt Development Benefits from cluster Projects**

| Code         | Number of Trees proposed | Area to be covered (m <sup>2</sup> ) | No. of Trees expected to be grown @ 80% survival rate | Species recommended                                                               |
|--------------|--------------------------|--------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------|
| P1           | 1001                     | 9009                                 | 801                                                   | <i>Azadirachta indica, Albizia lebbeck, Delonix regia, Tectona grandis, etc.,</i> |
| E1           | 1000                     | 9000                                 | 800                                                   |                                                                                   |
| E2           | 1000                     | 9000                                 | 800                                                   |                                                                                   |
| E3           | 485                      | 4365                                 | 388                                                   |                                                                                   |
| <b>Total</b> | <b>3486</b>              | <b>31374</b>                         | <b>2789</b>                                           |                                                                                   |

Cumulative studies show that the cluster Projects will plant about 3486 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Tectona grandis*, etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 2789 trees will survive in this green belt development program.

## 7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

All the Project Proponent shall comply with Tamil Nadu Government Order (Ms) No. 84 Environment and Forest (EC.2) Department Dated: 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986.

### 7.5.1 Objective

- ❖ To investigate the actual supply chain network of plastic waste.

- ❖ To identify and propose a sustainable plastic waste management by installing bins for collection of recyclables with all the plastic waste
- ❖ Preparation of a system design layout, and necessary modalities for implementation and monitoring.

A detailed action plan to manage plastic waste has been provided in Table 7.13.

**Table 7.13 Action Plan to Manage Plastic Waste**

| <b>S. No.</b> | <b>Activity</b>                                                                                                                                                                                                                                    | <b>Responsibility</b> |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1             | Framing of Layout Design by incorporating provision of the Rules, user fee to be charged from waste generators for plastic waste management, penalties/fines for littering, burning plastic waste or committing any other acts of public nuisance. | Mines Manager         |
| 2             | Enforcing waste generators to practice segregation of bio-degradable, recyclable and domestic hazardous waste.                                                                                                                                     | Mines Manager         |
| 3             | Collection of plastic waste.                                                                                                                                                                                                                       | Mines Foreman         |
| 4             | Setting up of Material Recovery Facilities.                                                                                                                                                                                                        | Mines Manager         |
| 5             | Segregation of Recyclable and Non-Recyclable plastic waste at Material Recovery Facilities.                                                                                                                                                        | Mines Foreman         |
| 6             | Channelization of Recyclable Plastic Waste to registered recyclers.                                                                                                                                                                                | Mines Foreman         |
| 7             | Channelization of Non-Recyclable Plastic Waste for use either in Cement kilns, in Road Construction.                                                                                                                                               | Mines Foreman         |
| 8             | Creating awareness among all the stakeholders about their responsibility.                                                                                                                                                                          | Mines Manager         |
| 9             | Surprise checking's of littering, open burning of plastic waste or committing any other acts of public nuisance.                                                                                                                                   | Mine Owner            |

*Source: Proposed by FAEs and EC*

## **CHAPTER VIII**

### **PROJECT BENEFITS**

#### **8.0 GENERAL**

The proposed project at Allappanur Village aims to produce **304295m<sup>3</sup> & 836811Ts** of rough stone over a period of 10 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

#### **8.1 EMPLOYMENT POTENTIAL**

It is proposed to provide employment to about 20 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

#### **8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED**

The impact of mining activity in the area will be more positive on the socio-economic environment in the immediate project impact area. The employment opportunities both direct and indirect will contribute to enhanced money incomes to job seekers with minimal skill sets especially among the local communities.

#### **8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE**

The proposed quarry project is located in allappanur Village, thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu. The area has already well-established communications roads and other facilities. The following physical infrastructure facilities will further improve due to proposed project.

- ❖ Road transport facilities
- ❖ Communications
- ❖ Medical, Educational and social benefits will be made available to the nearby civilian population in addition to the workmen employed in the mine.

## **8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE**

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

## **8.5 OTHER TANGIBLE BENEFITS**

The proposed mine is likely to have other tangible benefits as given below

- ❖ Indirect employment opportunities to local people in contractual works like construction of infrastructural facilities, transportation, sanitation for supply of goods and services to the mine and other community services
- ❖ Additional housing demand for rental accommodation will increase
- ❖ Cultural, recreation and aesthetic facilities will also improve
- ❖ Improvement in communication, transport, education, community development and medical facilities and overall change in employment and income opportunity
- ❖ The State Government will also benefit directly from the proposed mine, through increased revenue from royalties, cess, DMF, GST etc.,

## **8.6 CORPORATE SOCIAL RESPONSIBILITY**

Individual project proponents will take responsibility to develop awareness among all levels of their staff about CSR activities and the integration of social processes with business processes. Those involved with the undertaking of CSR activities will be provided with adequate training and re-orientation.

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 5 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas

- ❖ Health Services
- ❖ Social Development
- ❖ Infrastructure Development
- ❖ Education & Sports
- ❖ Self-Employment
- ❖ CSR Cost Estimation

- ❖ CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the allappanur Village. CSR budget is allocated.

## 8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is  $\leq 100$  crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 5,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

**Table 8.1 CER Action Plan**

| S. No. | Activity                                                                                                                                                                                                                                        | Budget (Rs.in Lakh) |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1      | The applicant Indents to involve in corporate environment responsibilities (CER) activities such as renovation of existing toilet, plantation within the school premises, donating environment related books to the nearby school library, etc. | Rs.5,00,000         |
|        | <b>Total</b>                                                                                                                                                                                                                                    | <b>Rs.5,00,000</b>  |

*Source: Field survey conducted by FAE in consultation with project proponent*

## 8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs. 3,33,63,860** to the state government through various ways, as provided in Table 8.2.

**Table 8.2 Project Benefits to the State Government**

| Particulars                                                                         | Budget for Rough Stone (Rs.) |
|-------------------------------------------------------------------------------------|------------------------------|
| CER                                                                                 | 5,00,000                     |
| Seigniorage @ Rs.90/m <sup>3</sup> of rough stone<br>Rs.56/m <sup>3</sup> of gravel | 27386550                     |
| District Mineral Foundation Tax @ 10% of Seigniorage                                | 2738655                      |
| Green Tax @ 10% of Seigniorage                                                      | 2738655                      |
| <b>Total</b>                                                                        | <b>3,33,63,860</b>           |

**CHAPTER IX**  
**ENVIRONMENTAL COST BENEFIT ANALYSIS**

Not Applicable, Since Environmental Cost Benefit Analysis not recommended at the  
Scoping stage.

## **CHAPTER X**

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **10.0 GENERAL**

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of environmental management plan will ensure to keep all the environmental parameters of the project in respect of ambient air quality, water quality, socio economic improvement standards. Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

#### **10.1 ENVIRONMENTAL POLICY**

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance. The Proponent Tvl. RVM Blue Metals will:

- ❖ Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities.
- ❖ Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- ❖ Allocate necessary resources to ensure the implementation of the environmental policy.
- ❖ Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- ❖ Implement monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- ❖ Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

##### **10.1.1 Description of the Administration and Technical Setup**

The environment monitoring cell discussed under Chapter VI will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level of each proposed quarry. 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 program.
- ❖ 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.

## 10.2 Budgetary Provision for Environmental Management

Adequate budgetary provision has been made by the company for execution of Environmental Management Plan. The Table 10.1 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

**Table 10.1 EMP Budget for Proposed Project**

| Attribute       | Mitigation measures                                                         | Provision for Implementation                                                                                                   | Capital Cost | Recurring Cost/annum |
|-----------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------|
|                 |                                                                             |                                                                                                                                | (Rs.)        | (Rs.)                |
| Air Environment | Compaction, gradation and drainage on both sides                            | Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare | 20020        | 20020                |
|                 | Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers | Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring     | 800000       | 50000                |

|  |                                                                                               |                                                                                                                 |       |       |
|--|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------|-------|
|  | Air quality will be regularly monitored as per norms within ML area & ambient area            | Yearly compliance as per CPCB norms                                                                             | 0     | 50000 |
|  | Muffle blasting – To control fly rocks during blasting                                        | Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts                     | 0     | 5000  |
|  | Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit  | Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance | 50000 | 5000  |
|  | No overloading of trucks/tippers/tractors                                                     | Manual Monitoring through Security guard                                                                        | 0     | 5000  |
|  | Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere | Monitoring if trucks will be covered by tarpaulin                                                               | 0     | 10000 |
|  | Enforcing speed limits of 20 km/hr within ML area                                             | Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed                                         | 40000 | 0     |
|  | Regular monitoring of exhaust fumes as per RTO norms                                          | Monitoring of Exhaust Fumes                                                                                     | 0     | 10000 |
|  | Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance       | Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare                                              | 0     | 40040 |

|                              |                                                                                                                            |                                          |               |               |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------|---------------|
|                              | Installing wheel wash system near exit gate of quarry                                                                      | Installation + Maintenance + Supervision | 50000         | 20000         |
| <b>Total Air Environment</b> |                                                                                                                            |                                          | <b>960020</b> | <b>215060</b> |
| <b>Noise Environment</b>     | Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals. | Provision made in Operating Cost         | 0             | 0             |
|                              | Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.                                         | Provision made in Operating Cost         | 0             | 0             |
|                              | Adequate silencers will be provided in all the diesel engines of vehicles.                                                 | Provision made in Operating Cost         | 0             | 0             |
|                              | It will be ensured that all transportation vehicles carry a fitness certificate.                                           | Provision made in Operating Cost         | 0             | 0             |
|                              | Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.     | Provision made in OHS part               | 0             | 0             |
|                              | Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.        | Provision made in Operating Cost         | 0             | 0             |

|                                |                                                                                                                  |                                                                                                                                         |              |               |
|--------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|
|                                | Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured. | Blowing Whistle by Mining Mate / Blaster / Competent Person                                                                             | 0            | 0             |
|                                | Provision for Portable blaster shed                                                                              | Installation of portable blasting shelter                                                                                               | 50000        | 2000          |
|                                | NONEL Blasting will be practiced to control Ground vibration and fly rocks                                       | Rs. 30/- per 6 tons of blasted material                                                                                                 | 0            | 852026        |
| <b>Total Noise Environment</b> |                                                                                                                  |                                                                                                                                         | <b>50000</b> | <b>854026</b> |
| <b>Water Environment</b>       | Water Management                                                                                                 | Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum (2.96.5 X 10000)                       | 20020        | 10010         |
| <b>Total Water Environment</b> |                                                                                                                  |                                                                                                                                         | <b>20020</b> | <b>10010</b>  |
| <b>Waste Management</b>        | Waste management (Spent Oil, Grease etc.,)                                                                       | Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal). | 25000        | 20000         |
|                                |                                                                                                                  | Installation of dust bins                                                                                                               | 5000         | 2000          |
|                                | Bio toilets will be made available outside mine lease on the land of owner itself                                | Provision made in Operating Cost                                                                                                        | 0            | 0             |
| <b>Total Waste Management</b>  |                                                                                                                  |                                                                                                                                         | <b>30000</b> | <b>22000</b>  |

|                                                     |                                                                                                                                                                                          |                                                                                                                   |              |             |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------|-------------|
| <b>Implementation of EC, Mining Plan &amp; DGMS</b> | Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN                                                                                       | Fixed display board at the quarry entrance as permanent structure                                                 | 10000        | 1000        |
| <b>Total Implementation of EC, Mining Plan</b>      |                                                                                                                                                                                          |                                                                                                                   | <b>10000</b> | <b>1000</b> |
| <b>Occupational Health and Safety</b>               | Workers will be provided with Personal Protective Equipment                                                                                                                              | Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) | 80000        | 20000       |
|                                                     | Health checkup for workers will be provisioned                                                                                                                                           | IME & PME Health checkup @ Rs. 1000/- per employee                                                                | 0            | 20000       |
|                                                     | First aid facility will be provided                                                                                                                                                      | Provision of 2 Kits per Hectare @ Rs. 2000/-                                                                      | 0            | 8008        |
|                                                     | Mine will have safety precaution signages, boards.                                                                                                                                       | Provision for signages and boards made                                                                            | 10000        | 2000        |
|                                                     | Barbed Wire Fencing to quarry area will be provisioned.                                                                                                                                  | Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum (2.28.0hectare)               | 400400       | 20020       |
|                                                     | No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management | Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost       | 100100       | 20020       |

|                                      |                                                                                                 |                                                                                                                                                                                                                                |        |        |
|--------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
|                                      | Installation of CCTV cameras in the mines and mine entrance                                     | Camera 44 Nos, DVR, Monitor with internet facility                                                                                                                                                                             | 30000  | 5000   |
|                                      | Implementation as per Mining Plan and ensure safe quarry working                                | Mines Manager (1 <sup>st</sup> Class / 2 <sup>nd</sup> Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate | 0      | 780000 |
| Total Occupational Health and Safety |                                                                                                 |                                                                                                                                                                                                                                | 620500 | 875048 |
| Development of Green Belt            | Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area) | Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"       | 80080  | 12012  |
|                                      |                                                                                                 | Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)                                                                                                   | 180180 | 18018  |
| Total Development of Green Belt      |                                                                                                 |                                                                                                                                                                                                                                | 260260 | 30030  |

|                     |                                                                                                                                                                                                                                   |                                                                                                            |                        |                        |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------|------------------------|
| <b>Mine Closure</b> | Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs) |                                                                                                            | 68068                  | 0                      |
|                     | G.O.(Ms)No.23,<br>Dated: 28.09.2021                                                                                                                                                                                               | Section IVA of<br>TNMMCR 1959 (@10%<br>of Seigniorage Fee)<br>(Seigniorage Fee for<br>rough stone = Rs.90) | 2738655                | 0                      |
| <b>TOTAL</b>        |                                                                                                                                                                                                                                   |                                                                                                            | <b>46.89<br/>lakhs</b> | <b>20.07<br/>lakhs</b> |

**Table 10.2 Estimation of Overall EMP Budget after Adjusting 5% Annual Inflation**

| <b>I<sup>st</sup><br/>Year</b>  | <b>II<sup>nd</sup><br/>Year</b>  | <b>III<sup>rd</sup><br/>Year</b>  | <b>IV<sup>th</sup><br/>Year</b> | <b>V<sup>th</sup><br/>Year</b> | <b>Total<br/>Recurring<br/>Cost (lakhs)</b> | <b>Total<br/>EMP<br/>Cost<br/>(lakhs)</b> |
|---------------------------------|----------------------------------|-----------------------------------|---------------------------------|--------------------------------|---------------------------------------------|-------------------------------------------|
| 20.07Lakhs                      | 21.07lakhs                       | 22.12lakhs                        | 23.23lakhs                      | 25.07lakhs                     | <b>257.04</b>                               | <b>303.93</b>                             |
| <b>VI<sup>th</sup><br/>Year</b> | <b>VII<sup>th</sup><br/>Year</b> | <b>VIII<sup>th</sup><br/>Year</b> | <b>IX<sup>th</sup><br/>Year</b> | <b>X<sup>th</sup><br/>Year</b> |                                             |                                           |
| 26.33lakhs                      | 27.64lakhs                       | 29.03lakhs                        | 30.48lakhs                      | 32.00lakhs                     |                                             |                                           |

In order to implement the environmental protection measures, an amount of **Rs.46.89lakhs** as capital cost and recurring cost as **Rs. 20.07lakhs** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 303.93lakhs** as shown in Table 10.2.

### **10.3 CONCLUSION**

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.

## **CHAPTER XI**

### **SUMMARY AND CONCLUSION**

#### **11.1 INTRODUCTION**

As the proposed rough stone and gravel mining project (B1) falls within the quarry cluster of 500 m radius with the total extent of 1ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F. Nos. 51 (P-4) over the extent of 2.00.2ha is situated in the cluster falling in Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District. The projects involved in the calculation of cluster extent are of one proposed quarry and three existing quarries.

#### **11.2 PROJECT DESCRIPTION**

The proposed project area is located between Latitudes 12°05'53.31"N to 12°06'0.23"N Longitudes from 78°56'34.10"E to 78°56'40.20"E in Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District. According to the approved mining plan, about 304295m<sup>3</sup> & 836811 Ts of rough stone will be mined up to the depth of 65m (45m AGL + 20m BGL) in the ten years. The quarrying operation is proposed to be carried out by open cast semi-mechanized mining method involving drilling and formation of benches of the prescribed dimensions.

#### **11.3 DESCRIPTION OF THE ENVIRONMENT**

Baseline data were collected to evaluate the existing environmental condition in the core and buffer areas during **December 2025 through February 2026 with CPCB** as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified **Accuracy Analabs (OBC) Private Limited** for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

##### **11.3.1 Land Environment**

The study area (5km radius, approximately **8159.38 ha**) around the proposed mine site was classified into seven **LULC Classes** using Sentinel- II imagery. The distribution is dominated by **crop land**, which accounts for over two-thirds of the area.

##### **Areal Coverage by LULC Class**

- Crop Land: The dominant feature, comprising the maximum area of 6301.85ha (77.23%).
- Fallow Land: FL The second largest class covering 1007.28 ha (12.35%).
- Built-up Area: Accounts for 382.51 ha (4.69%) of the landscape.
- Water Bodies: Including major flows and small tanks totalling 85.24 ha (1.04%).
- Mining Area: Covers 49.55 ha, representing the least percentage of the total area (0.61%).

- Sparse Vegetation: Covers 332.95 ha (4.08%).

#### LULC Statistics of the Study Area

| S. No.       | Classification   | 2025             |            |
|--------------|------------------|------------------|------------|
|              |                  | Area in Hectares | Area in %  |
| 1            | Water Bodies     | 85.24            | 1.04       |
| 2            | Plantation cover | 332.95           | 4.08       |
| 3            | Crop Lands       | 6301.85          | 77.23      |
| 4            | Built-up Area    | 382.51           | 4.69       |
| 5            | Mining area      | 49.55            | 0.61       |
| 6            | Fallow land      | 1007.28          | 12.35      |
| 7            | Water Bodies     | 85.24            | 1.04       |
| <b>Total</b> |                  | <b>8159.38</b>   | <b>100</b> |

Source: Sentinel II Satellite Imagery

### 11.3.2 Soil Environment

Physical Characteristics & Chemical Characteristics

#### 1. Soil pH and Electrical Conductivity (EC):

- **pH** ranged from 7.15 to 7.85 indicating that the soil is **neutral to slightly alkaline**, which is favourable for most crops.
- **EC** value ranged from 0.27 to 0.38dS/cm, suggesting low salt concentration and non-saline soil across the sampling area.

#### 2. Physical Properties

- **Moisture** values ranged from 8.65 to 9.39%, which are within the typical range for loamy soils and support good root penetration and aeration.

#### 3. Soil Fertility Status:

- **Organic matter** levels ranged from 2.32 to 4.23% by weight, classifying soils as low to moderately fertile in terms of organic matter.
- **Nitrogen (N)** content varied from 37.0 to 45.0mg/kg by mass indicating moderate nitrogen availability.
- **Potassium (K)** ranged from 59.0 to 75.0mg/kg by mass moderate fertility potential in terms of potassium.
- **Phosphorous (P)** ranged from 14.0 to 18.0mg/kg by mass moderate fertility potential in terms of Phosphorous.

#### 4. Base Elements and Cation Ratios:

- **Manganese (Mg)** ranged from 70.0 to 96.4mg/kg.
- **Zinc (Zn)** ranged from 0.7 to 1.5mg/kg.

The Total Organic Matter (TOM) and Total Organic Carbon (TOC) in soil samples indicates a critically depleted state that significantly limits agricultural productivity.

| S. No. | OM   | PH | EC | Total Score | Recommendation                                  |
|--------|------|----|----|-------------|-------------------------------------------------|
| S1     | 3.15 | 6  | 5  | 14.15       | The soil requires major and immediate treatment |
| S2     | 3.34 | 6  | 5  | 14.34       |                                                 |
| S3     | 4.23 | 6  | 5  | 15.23       |                                                 |
| S4     | 2.32 | 9  | 5  | 16.32       |                                                 |
| S5     | 3.21 | 6  | 5  | 14.21       |                                                 |

Organic Matter- (%- 0.1 to 2.0- 15), (2.5 to 3.5- 20), (3.5 to 5.0- 25), Bulk Density- (0.64 to 0.92- 6), (0.92 to 0.98- 3), (0.98> - 1) pH- (5.8 to 7.3- 9), (7.3 to 8.0- 6), (8.0> - 3), Electrical Conductivity-dS/m (<0.98- 5), (0.98 to 1.71- 3), (1.71> - 1)

OM (Organic Matter) BD (Bulk Density) pH (Potential of Hydrogen) EC (Electrical Conductivity) Source: PSS-2262\_Soil\_Quality\_Monitoring.pdf (okstate.edu) .

### **Agricultural Suitability Evaluation**

Due to the dominant sandy loam texture, low organic matter content, and favourable drainage characteristics, the soil is more suitable for horticultural crops than for conventional wet-paddy cultivation.

| Feature              | Paddy Suitability                             | Horticulture Suitability                          |
|----------------------|-----------------------------------------------|---------------------------------------------------|
| Texture (Sandy Loam) | Low (Poor water retention)                    | High (Good drainage and aeration)                 |
| pH (7.35 – 8.53)     | Moderate (Paddy prefers acidic 5.5–6.5)       | High (Suitable for citrus, pomegranate, guava)    |
| Organic Matter       | Critically Low (Requires heavy organic input) | Low (Manageable with regular compost application) |
| Nutrients (NPK)      | Deficient (Requires heavy fertilization)      | Deficient (Requires balanced nutrient management) |

### **Stress Relaxation Behaviour of Soil**

Based on the sandy loam texture, very low organic matter content (<0.36%), and moderate cation exchange capacity (19.3– 22.5meq/100g), the soil is expected to exhibit rapid initial stress relaxation followed by a relatively high residual stress.

Unlike organic-rich soils, which continue to relax over extended periods due to elastic organic matrices, the present soils show limited long-term stress dissipation capacity.

### Impact of Vehicular Movement on Soil Sample S1

The cumulative stress generated by repeated vehicle movement over soil sample S1 (Sandy Loam to Silt) significantly degrades soil quality by increasing the silt fraction and reducing particulate organic matter, which directly affects plant growth and soil functionality.

#### Increase in Silt and Particulate Matter

Vehicle- induced stress physically alters soil texture through particle crushing and aggregate fragmentation:

- High dynamic stress from vehicle tires, concentrated within the top 0–20cm soil layer, acts as a mechanical milling force.
- Larger sand grains (67% in S1) and coarse particles collide and fracture under repeated pressure.
- This process shifts the grain-size distribution toward finer silt-sized particles.

#### Impact on Plant Growth

The gradual transformation toward a denser and silt-rich soil structure creates unfavourable growth conditions:

- Increasing silt content fills remaining macropores, rapidly increasing bulk density (1.0–1.08g/cc).
- Higher soil strength restricts root elongation, leading to root impedance and shallow root systems.
- Fine pore dominance reduces aeration and drainage, causing oxygen deficiency (hypoxia) in the root zone.

#### Preventive Measures for Soil Protection

To minimize siltation and compaction effects:

- **Surface contact pressure should be maintained below 150kPa**
- Vehicle movement should be avoided when soil moisture is high (7–10%), as wet soil conditions act as a lubricant
- Moist soils accelerate particle breakdown and promote deep- seated compaction

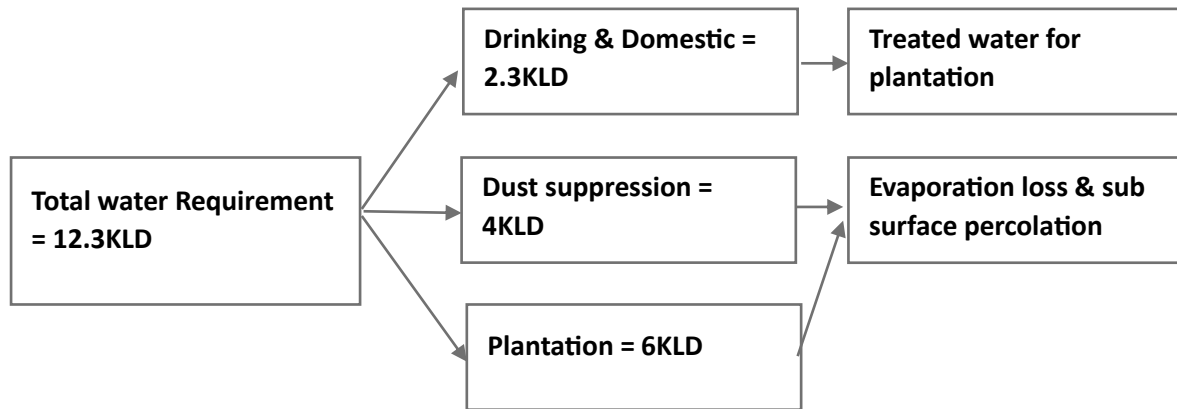
#### Summary of Vehicular Stress Effects on Soil Sample S1

| Soil Component | Change Due to Stress                        | Effect on Plant Growth            |
|----------------|---------------------------------------------|-----------------------------------|
| Silt Content   | Increases due to grain crushing             | Restricts root penetration        |
| Bulk Density   | Increases rapidly                           | Reduces air and water movement    |
| Organic Matter | Fragmentation and accelerated decomposition | Loss of nutrient-holding capacity |
| Pore Structure | Loss of macropores                          | Causes root hypoxia               |

### 11.3.3 Water Environment

- ❖ 12.2KLD (12,200 liters per day) water requirement for drinking, domestic, dust suppression and plantation.

#### Water Balance Chart of the Mine



- ❖ The domestic effluents being generated during mine operation.
- ❖ Major impact of opencast mining on groundwater regime is quality deterioration. The proposed mining activities shall be carried out up to a depth of 65m (45m AGL + 20m BGL). The specific water table depth in the core and buffer zone is between 60m and 65 meters below ground level.
- ❖ The volume of rain water entering to the mine and accumulating in the quarry has been estimated on the basis of direct catchment area, maximum daily precipitation and the run-off coefficient.  **$(Q = A \times H \times \bar{d})$  cubic meters/day.**

Where A- catchment area in m<sup>2</sup>

H- Max daily precipitation in mm

$\bar{d}$ - Run-off Co-efficient.

The run off co-efficient for mined out area is 0.60m<sup>3</sup>. The all-time record for maximum daily precipitation in Tiruvannamalai district was 468mm on September 30, 2018 as reported by [CEIC Data](#). More recent rainfall records are 110mm on October 17, 2025. The maximum broken area is 2.00.2hectares in the sixth year and estimation for make of water done on the quarry parameters for sixth year onwards.

$$Q = 2.00.2\text{hecatres} \times 10000 \times 0.175 \times 0.60 \text{ m}^3.$$

$$Q = 2102\text{m}^3.$$

Total accumulated water in the pit is 2102m<sup>3</sup>.

Additionally, 20% of water from seepage is 2522m<sup>3</sup>.

Total water estimated for pumping requirement = **2522m<sup>3</sup>**.

If we take the all-time record then the total water estimated for pumping = **2522m<sup>3</sup>**.

To manage rain water runoff into quarry a 5 HP diesel operated pump will be placed at the site during the monsoon.

#### 11.3.4 Air Environment

The study generated baseline data for four key parameters:

- Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>): Fine and coarse inhalable particles.
- Gaseous Pollutants: Sulphur Dioxide (SO<sub>2</sub>) and Nitrogen Dioxide (NO<sub>x</sub>)

Table 3.15 summarizes the average concentrations of the four pollutants ((PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub>) recorded across the five stations during the three-month period.

Figure 3.17 shows the map identifying the five specific sampling locations and Figures 3.18–3.22 give the graphical representations showing pollutant trends or comparisons for each monitoring station.

**Table 3.16 Summary of AAQ Result**

##### Particulate Matter (µg/m<sup>3</sup>)

| Station ID | PM <sub>2.5</sub> (Mean) | PM <sub>2.5</sub> (98th %) | PM <sub>10</sub> (Mean) | PM <sub>10</sub> (98th %) |
|------------|--------------------------|----------------------------|-------------------------|---------------------------|
| AAQ1       | 15.92                    | 17.07                      | 42.58                   | 44.03                     |
| AAQ2       | 15.88                    | 17.31                      | 41.24                   | 45.33                     |
| AAQ3       | 17.24                    | 17.91                      | 44.73                   | 47.94                     |
| AAQ4       | 16.40                    | 18.00                      | 43.83                   | 48.39                     |
| AAQ5       | 17.93                    | 19.73                      | 46.20                   | 51.02                     |

##### Gaseous Pollutants (µg/m<sup>3</sup>)

| Station ID | SO <sub>2</sub> (Mean) | SO <sub>2</sub> (98th %) | NO <sub>x</sub> (Mean) | NO <sub>x</sub> (98th %) |
|------------|------------------------|--------------------------|------------------------|--------------------------|
| AAQ1       | 4.97                   | 5.27                     | 10.15                  | 10.74                    |
| AAQ2       | 4.77                   | 5.22                     | 9.74                   | 10.64                    |
| AAQ3       | 5.16                   | 5.54                     | 9.78                   | 10.59                    |
| AAQ4       | 5.41                   | 5.65                     | 10.06                  | 10.76                    |
| AAQ5       | 5.55                   | 5.89                     | 11.12                  | 12.15                    |

The station AAQ1 has the highest mean and 98th percentile for all four pollutants suggesting it may be located near a higher-intensity emission source like a major traffic intersection or industrial area. The **98<sup>th</sup> percentile** values represent the levels that 98% of the data falls below. Since these values (e.g., PM<sub>2.5</sub> max of 17.93 µg/m<sup>3</sup> at AAQ3) are close to the mean it suggests a stable environment without extreme daily pollution spikes.

### **Pollutant correlation:**

- The PM<sub>10</sub> levels (41.24– 46.20 µg/m<sup>3</sup>) are roughly 2.5 times higher than PM<sub>2.5</sub> levels, which is typical in areas where coarse dust (construction, road dust) contributes more than fine combustion particles.
- SO<sub>2</sub> and NO<sub>x</sub> levels are closely linked likely originating from common vehicular or industrial sources.

### **11.3.5 Noise Environment**

That noise level in core zone was 44.2dB (A) Leq during day time and 36.5dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 42.1 to 42.8dB (A) Leq and during night time from 33.2 to 35.2dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

### **11.3.6 Biological Environment**

The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

#### ***Flora in core zone***

The core zone presents in tree, shrubs, herbs and grasses. Taxonomically total of 9 species belonging to 6 families have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were Herbs 4 followed by Trees 2 Shrubs 3.

#### ***Flora in 300 m radius zone***

Taxonomically, a total of 22 species belonging to 16 families have been recorded from the 300m radius from the mining lease area. The species in the 300m radius include herbs (06), trees (04), shrubs (06), the 16 families, Fabaceae and Lamiaceae are the main dominating species in the study area, Species Richness (margalef Index) in the study area it mentioned in Table 3.21- 3.22. Moreover, no species are found as threatened category. There is government land around 300 meters. *Prosopis juliflora* is the dominant tree followed by *Albizia amara* tree, *Azadirachta indica*, *Casapella thevetia* and *Lantana camara* plant.

#### ***Flora in 10 km radius buffer zone***

In the buffer zone, a total of 81 species belonging to 41 families were recorded. Among them are trees (32), shrubs (14), herbs (38), climbers (09), creepers (5), grasses (4), and cactus (1). Majority of the species belongs to the family of Fabaceae and Poaceae, as mentioned in

Table 3.24. Species Richness (margalef Index) in the study area it mentioned in Table 3.25  
Moreover, no species are found as threatened category.

#### ***Fauna in Core Zone***

A total of 22 species belonging to 15 families were observed in the core zone (Table 3.24). Among them are 9 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Avian. None of these species are threatened or endemic in the study area and surroundings. There are no Schedule I species and 8 species are under schedule IV according to Indian wild life Act, 1972. There are no critically endangered, endangered, vulnerable and endemic species in the core zone.

#### ***Fauna in Buffer Zone***

A total of 44 species belonging to 34 families were recorded from the buffer area. Among them were 20 species of Birds, 13 species of Insects, 3 species of Reptiles, 1 species of Mammals, and 9 species of Amphibians, as mentioned in Table.3.25. There are four species under Schedule II and twenty-six species under schedule IV according to Indian wild life Act 1972. And there are no critically endangered, vulnerable and endemic species in the buffer area. There is no schedule I Species in study area and there are no critically endangered, endangered, vulnerable and endemic species.

### **11.3.7 Socio Economic Environment**

The proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of people's standard of living.

### **11.4 ENVIRONMENT MANAGEMENT PLAN**

In order to implement the environmental protection measures, an amount of **Rs.46.89lakhs** as capital cost and recurring cost as **Rs. 20.07lakhs** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 303.93lakhs**.

### **11.5 OVERALL STUDY AREA CONCLUSION**

The Environmental Impact Assessment (EIA) for the proposed rough stone and gravel quarry project in Kundiyathandalam & Poonathangal Village, Tiruvannamalai District, Tamil Nadu, has comprehensively evaluated the baseline environmental conditions and projected impacts associated with quarry operations. The study concludes that the project is environmentally sustainable with appropriate mitigation and management practices in place.

The land use analysis using Sentinel II imagery reveals that agricultural land dominates the study area, with limited urbanization and industrial activity. While minor land use changes are expected due to quarrying, these are localized and reversible.

The soil environment is assessed to be healthy and agriculturally productive, with good moisture retention, neutral to slightly alkaline pH, and moderate nutrient levels.

Surface and groundwater quality are generally good. Surface water meets all drinking and irrigation standards with minimal treatment, and groundwater is safe for consumption after mild treatment for hardness and taste. No microbial contamination was detected, and key parameters fall within permissible limits.

Air quality and noise levels are within Central Pollution Control Board (CPCB) norms, and the Air Quality Index remains causing minimal impact to human health. Quarrying impacts on air and noise can be effectively controlled through dust suppression, green belt development, and controlled blasting techniques.

The biological environment in the core zone shows limited flora and fauna due to existing quarry activity, but the buffer zone hosts a healthy diversity of species with no presence of endangered or migratory species. Green belt development and post-mining reclamation plans are proposed to enhance biodiversity and carbon sequestration.

The socio-economic environment will benefit from direct and indirect employment, infrastructure development, and improved livelihoods. The project also contributes to the local economy through taxes, royalty payments, and community development initiatives under Corporate Environmental Responsibility (CER).

Potential environmental impacts such as dust, noise, and runoff are anticipated but can be managed with the proposed Environment Management Plan (EMP). Adequate provisions have been made for water management, air pollution control, soil conservation, occupational health, and post-mining restoration. Risk assessment and a disaster management plan have been integrated to ensure safety and emergency preparedness.

Overall, the study concludes that the proposed quarry project is technically feasible, environmentally sound, and socio-economically beneficial. With strict implementation of the mitigation measures and monitoring programs, the project can proceed without causing significant adverse impacts on the environment or local communities.

## CHAPTER XII

### DISCLOSURES OF CONSULTANT

The Project Proponent, **Tvl. RVM Blue Metals** has engaged **Geo Technical Mining Solutions**, a NABET accredited consultancy for carrying out the EIA study as per the ToR issued.

**Address of the consultancy:**

No: 1/213B Natesan Complex,  
Oddapatti, Dharmapuri – 636705,  
Tamil Nadu, India.  
Email: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com)  
Web: [www.gtmsind.com](http://www.gtmsind.com)  
Phone: 04342 232777.

The accredited experts and associated members who were engaged in this EIA study are given below:

| S.No.                                            | Name of the expert | In house/<br>Empanelled          | Sector  | Functional Area | Category |
|--------------------------------------------------|--------------------|----------------------------------|---------|-----------------|----------|
| <b>Approved Functional Area Experts &amp; EC</b> |                    |                                  |         |                 |          |
| 1.                                               | Dr. R. Arunbalaji  | EIA Coordinator<br>(EC) In-house | 1(a)(i) | AQ              | B        |
| 2.                                               | G. Umamaheswaran   | In-house, FAE                    | 1(a)(i) | GEO             | B        |
| 3.                                               | G. Prithiviraj     | In-house, FAE                    | 1(a)(i) | LU              | B        |
| 4.                                               | G. Umamaheswaran   | In-house, FAE                    | 1(a)(i) | HG              | B        |
| 5.                                               | Dr.R.Arunbalaji    | In-house, FAE                    | 1(a)(i) | AP              | B        |
| 6.                                               | R.Revathy          | In-house, FAE                    | 1(a)(i) | WP              | B        |
| 7.                                               | Dr.R.Arunbalaji    | In-house, FAE                    | 1(a)(i) | NV              | B        |
| 8.                                               | J.Rajarajeshwari   | In-house, FAE                    | 1(a)(i) | SC, EB          | B        |
| 9.                                               | Dr. G. Prabakaran  | In-house, FAE                    | 1(a)(i) | SE              | B        |
| 10.                                              | J.N. Manikandan    | Empanelled FAE                   | 1(a)(i) | RH, SHW         | B        |
| <b>Approved Functional Area Associates</b>       |                    |                                  |         |                 |          |
| 11.                                              | R.Srikrishna       | FAA                              | 1(a)(i) | LU              | B        |
| 12.                                              | K.Prithivi         | FAA                              | 1(a)(i) | HG              | B        |
| 13.                                              | R.Srikrishna       | FAA                              | 1(a)(i) | Geo             | B        |
| <b>Team Members</b>                              |                    |                                  |         |                 |          |
| 14.                                              | G. Umamaheswaran   | TM                               | 1(a)(i) | TM for EC       | -        |

|     |                |    |         |                      |   |
|-----|----------------|----|---------|----------------------|---|
| 15. | M.Muralidharan | TM | 1(a)(i) | TM for FAE<br>NV, HW | - |
| 16. | A.Jothibas     | TM | 1(a)(i) | AP & AQ              | - |

### **DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP**

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the EIA & EMP report.

Signature

:



Date

:

Name

: **Dr.R. Arun Balaji**

Designation

: EIA Coordinator

Name of the EIA Consultant Organization

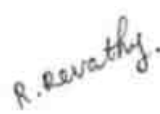
: Geo Technical Mining Solutions

Period of Involvement

: Till date

We, the FAEs, FAAs and TM hereby declare that information furnished in this EIA/EMP report for **Tvl. RVM Blue Metals**, rough stone quarry project with the extent of 2.00.2ha situated in the cluster with the extent of **6.97.2ha** in Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, and Tamil Nadu is true and correct to the best of our knowledge.

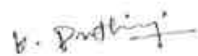
### **List of Functional Area Experts Engaged in this Project**

| <b>S. No.</b> | <b>Functional Area</b> | <b>Involvement</b>                                                                                                                                                                                                                   | <b>Name of the Experts</b> | <b>Signature</b>                                                                      |
|---------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------|
| 1             | AP                     | <ul style="list-style-type: none"> <li>○ Identification of different sources of air pollution due to the proposed mine activity</li> <li>○ Prediction of air pollution and propose mitigation measures / control measures</li> </ul> | Dr.R.Arunbalaji            |  |
| 2             | WP                     | <ul style="list-style-type: none"> <li>○ Suggesting water treatment systems, drainage facilities</li> <li>○ Evaluating probable impacts of effluent/waste water discharges into the receiving</li> </ul>                             | R.Revathy                  |  |

|   |     |                                                                                                                                                                                                                                                                                                                      |                   |                                                                                       |
|---|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|
|   |     | environment/water bodies and suggesting control measures.                                                                                                                                                                                                                                                            |                   |                                                                                       |
| 3 | HG  | <ul style="list-style-type: none"> <li>○ Interpretation of ground water table and predict impact and propose mitigation measures.</li> <li>○ Analysis and description of aquifer Characteristics</li> </ul>                                                                                                          | G. Umamaheswaran  |    |
| 4 | GEO | <ul style="list-style-type: none"> <li>○ Field Survey for assessing the regional and local geology of the area.</li> <li>○ Preparation of mineral and geological maps.</li> <li>○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.</li> </ul>                                          | G. Umamaheswaran  |    |
| 5 | SE  | <ul style="list-style-type: none"> <li>○ Revision in secondary data as per Census of India, 2011.</li> <li>○ Impact Assessment &amp; Preventive Management Plan</li> <li>○ Corporate Environment Responsibility.</li> </ul>                                                                                          | Dr. G. Prabakaran |  |
| 6 | EB  | <ul style="list-style-type: none"> <li>○ Collection of Baseline data of Flora and Fauna.</li> <li>○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list.</li> <li>○ Impact of the project on flora and fauna.</li> <li>○ Suggesting species for greenbelt development.</li> </ul> | J.Rajarajeshwari  |  |
| 7 | RH  | <ul style="list-style-type: none"> <li>○ Identification of hazards and hazardous substances</li> </ul>                                                                                                                                                                                                               | J.N. Manikandan   |  |

|    |     |                                                                                                                                                                                                                                                  |                   |                                                                                       |
|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|
|    |     | <ul style="list-style-type: none"> <li>○ Risks and consequences analysis</li> <li>○ Vulnerability assessment</li> <li>○ Preparation of Emergency Preparedness Plan</li> <li>○ Management plan for safety.</li> </ul>                             |                   |                                                                                       |
| 8  | LU  | <ul style="list-style-type: none"> <li>○ Construction of Land use Map</li> <li>○ Impact of project on surrounding land use</li> <li>○ Suggesting post closure sustainable land use and mitigative measures.</li> </ul>                           | G. Prithiviraj    |    |
| 9  | NV  | <ul style="list-style-type: none"> <li>○ Identify impacts due to noise and vibrations</li> <li>○ Suggesting appropriate mitigation measures for EMP.</li> </ul>                                                                                  | Dr.R. Arun Balaji |    |
| 10 | AQ  | <ul style="list-style-type: none"> <li>○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD.</li> <li>○ Recommending mitigations measures for EMP</li> </ul>                                      | Dr.R. Arun Balaji |  |
| 11 | SC  | <ul style="list-style-type: none"> <li>○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation</li> </ul>                                                                                              | J.Rajarajeshwari  |  |
| 12 | SHW | <ul style="list-style-type: none"> <li>○ Identify source of generation of non-hazardous solid waste and hazardous waste.</li> <li>○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.</li> </ul> | J.N. Manikandan   |  |

**List of Functional Area Associate Engaged in this Project**

| S.No. | Name         | Functional Area | Involvement                                                                                                                                                | Signature                                                                           |
|-------|--------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1     | R.Srikrishna | LU              | <ul style="list-style-type: none"> <li>○ Site visit with FAE</li> <li>○ Provide inputs &amp; Assisting FAE for LU</li> </ul>                               |  |
| 2     | R.Srikrishna | GEO             | <ul style="list-style-type: none"> <li>○ Field visits along with FAE</li> <li>○ Assistance to FAE in both primary and secondary data collection</li> </ul> |  |
| 3     | K.Prithivi   | HG              | <ul style="list-style-type: none"> <li>○ Site visit with FAE</li> <li>○ Provide inputs &amp; Assisting FAE for HG</li> </ul>                               |  |

**DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT**

**ORGANIZATION**

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for **Tvl.RVM Blue Metals**, rough stone quarry project with the extent of 2.00.2ha situated in the cluster with the extent of 6.97.2ha in Allappanur Village, Vembakkam Taluk, Tiruvannamalai District, and Tamil Nadu is true and correct to the best of our knowledge.

Signature : 

Date :

Name : **Dr. S. Karuppannan**

Designation : Managing Partner

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

NABET Certificate No & Issue Date : NABET/EIA/23-26/RA 0319

Validity : Till 31.12.2026



**File No: 13458**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Issued by the State Environment Impact Assessment Authority(SEIAA),**  
**TAMIL NADU)**

\*\*\*



Dated: 07/04/2026



To,

R Murugesan  
 RVM BLUE METALS  
 S.F.No. 264/1, Pudurchekkadi Village, Thandarampattu Taluk, Tiruvannamalai- 606708, TAMIL  
 NADU.  
 rvmbbluemetals7@gmail.com

**Subject:** Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding.

**Sir/Madam,**

**Sub:** SEIAA, Tamil Nadu – Proposed Rough Stone quarry over an extent of 2.00.2 Ha in S.F. No. 51 (Part - 4) of Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu by Tvl. RVM Blue Metals - under project category – “B1” of Item 1(a) “Mining of Minerals” of the Schedule to the EIA Notification, 2006– ToR issued along with Public Hearing- preparation of EIA report – Regarding.

**Ref:**

1. Online proposal No. SIA/TN/MIN/570399/2026 Dated 26/02/2026.
2. Minutes of the 693rd meeting of SEAC-1 held on 17.03.2026.
3. Minutes of the 988th meeting of SEIAA held on 02.04.2026

2. The particulars of the proposal are as below:

|                                              |                                                  |
|----------------------------------------------|--------------------------------------------------|
| (i) TOR Identification No.                   | TO26B0108TN5969959N                              |
| (ii) File No.                                | 13458                                            |
| (iii) Clearance Type                         | TOR                                              |
| (iv) Category                                | B1                                               |
| (v) Project/Activity Included Schedule No.   | 1(a) Mining of minerals, 1(a) Mining of minerals |
| (vi) Name of Project                         | ALLAPPANUR VILLAGE ROUGH STONE QUARRY            |
| (vii) Name of Company/Organization           | RVM BLUE METALS                                  |
| (viii) Location of Project (District, State) | TIRUVANNAMALAI, TAMIL NADU                       |
| (ix) Issuing Authority                       | SEIAA                                            |
| (x) Applicability of General Conditions      | no                                               |
| (xi) Applicability of Specific Conditions    | no                                               |

1. In view of the particulars given in the Para 1 above, the project proposal inter alia including Form-1 (Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.
2. The above-mentioned proposal has been considered by SEIAA in the meeting held on 02.04.2026. The minutes of the meeting and all the Application and documents submitted [viz. Form-1 Part A, Part B] are available on PARIVESH portal which can be accessed by scanning the QR Code above.
3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).
4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal of **Tvl. RVM Blue Metals** under the provisions of EIA Notification, 2006 and as amended thereof.
5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
6. The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/Regulations or Statutes, as applicable, to the project.
7. This issues with the approval of the Competent Authority.
8. The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

## Annexure 1

### Specific Terms of Reference s for (Mining Of Minerals)

#### 1. Seac Conditions - Site Specific

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1   | <p>1. A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic &amp; scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal:</p> <ul style="list-style-type: none"> <li>i. Copy of the agreement forming CMC.</li> <li>ii. The Organization chart of the Committee with defining the role of the members</li> <li>iii. The 'Standard Operating Procedures' (SoP) executing the planned activities.</li> </ul> <p>2. The PP shall install the CCTV camera for the continuous surveillance of mining activity &amp; furnish the photographic/video graphic evidence along with the EIA report.</p> |

#### 2. Seiaa Specific Conditions :

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1   | <p>After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant <b>Terms of Reference (ToR) along with Public Hearing for the total production quantity of 3,04,295m<sup>3</sup> of Rough Stone and the annual peak production shall not exceed 34,020m<sup>3</sup> of Rough Stone for the depth of 65m (45m AGL + 20m BGL).</b> as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation</p> |

| S. No | Terms of Reference                                                                                                                                   |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions & SEIAA Specific & Standard conditions. |

### 3. Seiaa Standard Conditions :

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1   | <p><b><u>Cluster Management Committee</u></b></p> <ol style="list-style-type: none"> <li>1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.</li> <li>2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,</li> <li>3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.</li> <li>4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.</li> <li>5. The committee shall deliberate on risk &amp; emergency management plan, fire safety &amp; evacuation plan and sustainable development goals pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.</li> <li>6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report.</li> <li>7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.</li> <li>8. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.</li> </ol> <p><b><u>Agriculture &amp; Agro-Biodiversity</u></b></p> <ol style="list-style-type: none"> <li>9. Impact on surrounding agricultural fields around the proposed mining Area.</li> <li>10. Impact on soil flora &amp; vegetation around the project site.</li> <li>11. Details of type of vegetation including no. of trees &amp; shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP.</li> <li>12. The Environmental Impact Assessment should study the agro-biodiversity, agro- forestry, horticultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.</li> <li>13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.</li> <li>14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.</li> </ol> <p><b><u>Forests</u></b></p> <ol style="list-style-type: none"> <li>15. The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife.</li> <li>16. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.</li> <li>17. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.</li> <li>18. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.</li> </ol> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p><b><u>Water Environment</u></b></p> <p>19. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping &amp; open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.</p> <p>20. Erosion Control measures.</p> <p>21. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, &amp; any ecological fragile areas.</p> <p>22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.</p> <p>23. The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment, by the activities.</p> <p>24. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.</p> <p>25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.</p> <p>26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.</p> <p>27. The EIA shall include the impact of mining activity on the following:</p> <ol style="list-style-type: none"> <li>Hydrothermal/Geothermal effect due to destruction in the Environment.</li> <li>Bio-geochemical processes and its foot prints including Environmental stress.</li> <li>Sediment geochemistry in the surface streams.</li> </ol> <p><b><u>Energy</u></b></p> <p>28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.</p> <p><b><u>Climate Change</u></b></p> <p>29. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.</p> <p>30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil &amp; below soil carbon stock, soil health and physical, chemical &amp; biological soil features.</p> <p>31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.</p> <p><b><u>Mine Closure Plan</u></b></p> <p>32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.</p> <p><b><u>EMP</u></b></p> <p>33. Detailed Environment Management Plan along with adaptation, mitigation &amp; remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.</p> <p>34. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.</p> <p><b><u>Risk Assessment</u></b></p> <p>35. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.</p> <p><b><u>Disaster Management Plan</u></b></p> <p>36. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards &amp; to cope with disaster/untoward accidents in &amp; around the</p> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>proposed mine lease area due to the proposed method of mining activity &amp; its related activities covering the entire mine lease period as per precise area communication order issued.</p> <p><b>Others</b></p> <p>37. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.</p> <p>38. As per the MoEF&amp; CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.</p> <p>39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the Environment. The ecological risks and impacts of plastic &amp; microplastics on aquatic Environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.</p> |

**Standard Terms of Reference for (Mining of minerals)**

**1.**

| S. No      | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.1</b> | Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994                                                                                                                                       |
| <b>1.2</b> | A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given                                                                                                                                                                                                                                                                                                                                                         |
| <b>1.3</b> | All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee                                                                                                                                                                                                            |
| <b>1.4</b> | All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)                                                                                                                                               |
| <b>1.5</b> | Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics                                                                                                                                                                                         |
| <b>1.6</b> | Details about the land proposed for mining activities should be givenwith information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority                                                                                                                                                                                                                |
| <b>1.7</b> | It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report                                                                                                                                                                                                                                                                                                                                                       |
| 1.8   | Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided                                                                                                                                                                                                                                                                                                                                                                               |
| 1.9   | The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1.10  | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given                                                                                                                                                                                          |
| 1.11  | Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1.12  | A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees |
| 1.13  | Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished                                                                                                                                                                                                                                                                                                                                                             |
| 1.14  | Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1.15  | The vegetation in the RF / PF areas in the study area, with necessary details, should be given                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1.16  | A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted                                                                                                                                                                                                                                                                                             |
| 1.17  | Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished                                                                                           |
| 1.18  | A detailed biological study of the study area [core zone and buffer zone (10 km radius of the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost                                                                                                                                                                                                                            |
| 1.19  | Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1.20  | Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1.21  | R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report                                                                            |
| 1.22  | One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given |
| 1.23  | Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map                                                                                                                                                                                                                                                                                            |
| 1.24  | The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1.25  | Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.26  | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1.27  | Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1.28  | Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished                                                                                                                                                       |
| 1.29  | Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1.30  | Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1.31  | A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution |
| 1.32  | Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines                                                                                                                                                                         |
| 1.33  | Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1.34  | Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1.35  | Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed                                                                                                                                                                                                                                                                                                                                                                |
| 1.36  | Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 1.37  | Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1.38  | Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1.39  | Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1.40  | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1.41  | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1.42  | A Disaster management Plan shall be prepared and included in the EIA/EMP Report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1.43  | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1.44  | Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area |

**SEAC Standard Condition:**

1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:
  - (i) Original pit dimension
  - (ii) Quantity achieved Vs EC Approved Quantity
  - (iii) Balance Quantity as per Mineable Reserve calculated.
  - (iv) Mined out Depth as on date Vs EC Permitted depth
  - (v) Details of illegal/illicit mining
  - (vi) Violation in the quarry during the past working.
  - (vii) Quantity of material mined out outside the mine lease area
  - (viii) Condition of Safety zone/benches
  - (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.
2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.
3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the water bodies like lake, water tanks, etc are located within 1 km of the proposed quarry.
5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel

Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.

8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.
9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.
11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
  - Highest production achieved in any one year
  - Detail of approved depth of mining.
  - Actual depth of the mining achieved earlier.
  - Name of the person already mined in that leases area.
  - If EC and CTO already obtained, the copy of the same shall be submitted.
  - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
14. Quantity of minerals mined out.

15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,
17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.

23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
28. Impact on local transport infrastructure due to the Project should be indicated.
29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.

33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detail ed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.

43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

#### **STANDARD TERMS OF REFERENCE**

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or

stakeholders at large, may also be detailed in the EIA Report.

- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures

required, should be worked out with cost implications and submitted.

- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the

mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM<sub>10</sub>, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the

aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
  - a) Executive Summary of the EIA/EMP Report
  - b) All documents to be properly referenced with index and continuous page numbering.
  - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
  - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
  - e) Where the documents provided are in a language other than English, an English translation should be provided.
  - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

- g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

**In addition to the above, the following shall be furnished:-**

**The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:**

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be submitted along with EIA report.

9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions

during the operations of the mines.

29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

**Besides the above, the below mentioned general points should also be followed:-**

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2<sup>nd</sup> December, 2009, 18<sup>th</sup> March 2010, 28<sup>th</sup> May 2010, 28<sup>th</sup> June 2010, 31<sup>st</sup> December 2010 & 30<sup>th</sup> September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
  - After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.

- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29<sup>th</sup> August, 2017.



From  
Dr.S.Vediappan, M.Sc., Ph.D.,  
Deputy Director,  
Geology and Mining,  
Tiruvannamalai - 4.

To  
Tvl.RVM Blue Metals,  
SF.No. 264/1, Pudur Chekkadi Village,  
Thandarampattu Taluk  
Tiruvannamalai 606 708

**R.c.No.728/Mines/2025 dated 20.02.2026.**

Sir,

**Sub:** Quarries and Minerals – Minor Mineral - Rough stone - Tiruvannamalai District – Thandarampattu Taluk - Allappanur Village - Govt. Poramboke Land in SF.No.51 (part-4) over an extent of 2.00.2 Hectare – e-Tender cum Auction conducted - Tvl.RVM Blue Metals offered the highest bid amount - declared as the successful bidder – Precise area communicated – draft Mining Plan Submitted- Mining Plan Approved accorded - regarding.

**Ref:** 1. Tiruvannamalai District Gazette (Extra-ordinary) No.09 dated: 04.11.2025.  
2. E-Auction date 10.12.2025.  
3. Precise Area Communication Notice Rc.No.728/Mines/2025, dated 13.02.2026.  
4. Mining Plan submitted by Tvl.RVM Blue Metals dated 20.02.2026.

\*\*\*\*\*

The District Collector, Tiruvannamalai has published Gazette Notification vide reference 1<sup>st</sup> cited for grant of Rough Stone Quarry leases by e-Tender Cum Auction in Government poramboke lands in Tiruvannamalai District. Accordingly, in the e-Auction conducted on 10.12.2025 for the grant of Rough Stone Quarry lease in Government Poramboke land in SF.No. 59 (part-4) over an extent of 2.00.2 hectares for a period of 10 years in Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, the firm Tvl.RVM Blue Metals had quoted the highest lease amount and remitted the lease amount within the stipulated period. Accordingly, precise area was communicated vide reference 3<sup>rd</sup> cited with direction to submit Approved Mining Plan and Environment Clearance.

2172

2. As directed, the applicant has submitted three copies of draft mining plan for approval vide letter dated 20.02.2026. The Mining Plan has been verified in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

| Depth in Mts.                 | Mineral     | Geological Resources |         | Mineable Reserves |         |
|-------------------------------|-------------|----------------------|---------|-------------------|---------|
|                               |             | in Cbm               | in Tons | in Cbm            | in Tons |
| 65m<br>(45m AGL +<br>20m BGL) | Rough Stone | 835270               | 2296992 | 304295            | 836811  |
|                               | Topsoil     | 4212                 | 8424    | 3448              | 6896    |

ii) Year wise production proposed for the **first five year period** are as follows:-

| Year  | Mineral     | Quantity |        |
|-------|-------------|----------|--------|
|       |             | CBM      | Tons   |
| I     | Rough Stone | 34020    | 93555  |
| II    |             | 30160    | 82940  |
| III   |             | 32585    | 89609  |
| IV    |             | 30700    | 84425  |
| V     |             | 27600    | 75900  |
| Total |             | 155065   | 426429 |

iii) Year wise production proposed for the **2<sup>nd</sup> five year period** are as follows:-

| Year  | Mineral     | Quantity |        |
|-------|-------------|----------|--------|
|       |             | CBM      | Tons   |
| VI    | Rough Stone | 32380    | 89045  |
| VII   |             | 28650    | 78787  |
| VIII  |             | 32000    | 88000  |
| IX    |             | 30650    | 84287  |
| X     |             | 25550    | 70263  |
| Total |             | 149230   | 410382 |

2177

4. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:

- i. The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.
  - ii. The approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules 1981, Environment Protection Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.
  - iii. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
  - iv. Scheme of Mining for the should be submitted 2nd five year 180 Days prior to expiry of 1st five year period as stipulated in rule 41 (a) of TNMMCR.
  - v. Quarrying shall be done in accordance with the approved Mining Plan.
  - vi. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
  - vii. Gravel if any is available in the proposed quarry area it shall be stored separately within leasehold area.
  - viii. All the conditions stipulated in the precise area communication dated 13.02.2025 should be duly complied with.
5. Further, other quarries situated within **500m radial distance** are as follows.

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**Abandoned Quarries**

| Sl. No. | Name of the Owner                             | Village & S.F. Nos.     | Extent in Hect. | Lease Period                | Remarks           |
|---------|-----------------------------------------------|-------------------------|-----------------|-----------------------------|-------------------|
| 1       | G.Ravi<br>1/1C, Mettu Street,<br>Tandrampet   | Allappanur<br>51(Part2) | 1.00.0          | 22/09/2008 to<br>21/09/2018 | Expired<br>Quarry |
| 2       | G.Ramesh<br>1/1C, Mettu Street,<br>Tandrampet | Allappanur<br>51(Part)  | 1.00.0          | 07/06/2010 to<br>06/06/2015 |                   |

**Existing quarries**

| Sl. No. | Name of the Owner               | Village & S.F. Nos.       | Extent in Hect. | Lease Period                | Remarks            |
|---------|---------------------------------|---------------------------|-----------------|-----------------------------|--------------------|
| 1       | R.Amutha<br>W/o.S.Ramachandran, | Allappanur<br>51 (Part)   | 2.00.0          | 11/06/2018 to<br>10/06/2028 | Existing<br>quarry |
| 2       | G.Dakshinamoorthy,              | Allappanur<br>51 (Part)   | 2.00.0          | 10/06/2021 to<br>09/06/2031 |                    |
| 3       | J.Gunasekaran,                  | Allappanur<br>51 (Part-3) | 0.97.0          | 12/03/2024 to<br>11/03/2029 |                    |

**Present Proposed Quarries**

| Sl. No | Name of the Owner    | Village & S.F. Nos.       | Extent in Hect. |
|--------|----------------------|---------------------------|-----------------|
| 1      | Tvl.RVM Blue Metals, | Allappanur<br>51 (Part-4) | 2.00.2          |

**Encl:** 2 Copies of Approved Mining Plan.

*[Signature]*  
Deputy Director,  
Geology and Mining,  
Tiruvannamalai.

**Copy submitted to:**

1. The Chairman, SEIAA,  
Tamil Nadu, 3<sup>rd</sup> Floor, Panagal Maaligai,  
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.

*[Signature]*  
28/2/26

5277

## Annexure- III

From  
Dr.S.Vediappan, M.Sc., Ph.D.,  
Deputy Director,  
Geology and Mining,  
Tiruvannamalai - 4.

To  
Tvl.RVM Blue Metals,  
SF.No. 264/1, Pudur Chekkadi Village,  
Thandarampattu Taluk  
Tiruvannamalai 606 708

**R.c.No.728/Mines/2025 dated 20.02.2026.**

Sir,

**Sub:** Quarries and Minerals – Minor Mineral - Rough stone - Tiruvannamalai District – Thandarampattu Taluk - Allappanur Village - Govt. Poramboke Land in SF.No.51 (part-4) over an extent of 2.00.2 Hectare – e-Tender cum Auction conducted - Tvl.RVM Blue Metals offered the highest bid amount - declared as the successful bidder – Precise area communicated – draft Mining Plan Submitted- Mining Plan Approved accorded - regarding.

**Ref:** 1. Tiruvannamalai District Gazette (Extra-ordinary) No.09 dated: 04.11.2025.  
2. E-Auction date 10.12.2025.  
3. Precise Area Communication Notice Rc.No.728/Mines/2025, dated 13.02.2026.  
4. Mining Plan submitted by Tvl.RVM Blue Metals dated 20.02.2026.

\*\*\*\*\*

The District Collector, Tiruvannamalai has published Gazette Notification vide reference 1<sup>st</sup> cited for grant of Rough Stone Quarry leases by e-Tender Cum Auction in Government poramboke lands in Tiruvannamalai District. Accordingly, in the e-Auction conducted on 10.12.2025 for the grant of Rough Stone Quarry lease in Government Poramboke land in SF.No. 59 (part-4) over an extent of 2.00.2 hectares for a period of 10 years in Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, the firm Tvl.RVM Blue Metals had quoted the highest lease amount and remitted the lease amount within the stipulated period. Accordingly, precise area was communicated vide reference 3<sup>rd</sup> cited with direction to submit Approved Mining Plan and Environment Clearance.

21-27

2. As directed, the applicant has submitted three copies of draft mining plan for approval vide letter dated 20.02.2026. The Mining Plan has been verified in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

| Depth in Mts.                 | Mineral     | Geological Resources |         | Mineable Reserves |         |
|-------------------------------|-------------|----------------------|---------|-------------------|---------|
|                               |             | in Cbm               | in Tons | in Cbm            | in Tons |
| 65m<br>(45m AGL +<br>20m BGL) | Rough Stone | 835270               | 2296992 | 304295            | 836811  |
|                               | Topsoil     | 4212                 | 8424    | 3448              | 6896    |

ii) Year wise production proposed for the **first five year period** are as follows:-

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|-------|-------------|----------|--------|
|       |             | CBM      | Tons   |
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| II    |             | 30160    | 82940  |
| III   |             | 32585    | 89609  |
| IV    |             | 30700    | 84425  |
| V     |             | 27600    | 75900  |
| Total |             | 155065   | 426429 |

iii) Year wise production proposed for the **2<sup>nd</sup> five year period** are as follows:-

| Year  | Mineral     | Quantity |        |
|-------|-------------|----------|--------|
|       |             | CBM      | Tons   |
| VI    | Rough Stone | 32380    | 89045  |
| VII   |             | 28650    | 78787  |
| VIII  |             | 32000    | 88000  |
| IX    |             | 30650    | 84287  |
| X     |             | 25550    | 70263  |
| Total |             | 149230   | 410382 |

4. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:

- i. The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.
  - ii. The approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules 1981, Environment Protection Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.
  - iii. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
  - iv. Scheme of Mining for the should be submitted 2nd five year 180 Days prior to expiry of 1st five year period as stipulated in rule 41 (a) of TNMMCR.
  - v. Quarrying shall be done in accordance with the approved Mining Plan.
  - vi. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
  - vii. Gravel if any is available in the proposed quarry area it shall be stored separately within leasehold area.
  - viii. All the conditions stipulated in the precise area communication dated 13.02.2025 should be duly complied with.
5. Further, other quarries situated within **500m radial distance** are as follows.

12-12

**Abandoned Quarries**

| Sl. No. | Name of the Owner                            | Village & S.F. Nos.     | Extent in Hect. | Lease Period                | Remarks           |
|---------|----------------------------------------------|-------------------------|-----------------|-----------------------------|-------------------|
| 1       | G.Ravi<br>1/1C, Mettu Street,<br>Tandrapet   | Allappanur<br>51(Part2) | 1.00.0          | 22/09/2008 to<br>21/09/2018 | Expired<br>Quarry |
| 2       | G.Ramesh<br>1/1C, Mettu Street,<br>Tandrapet | Allappanur<br>51(Part)  | 1.00.0          | 07/06/2010 to<br>06/06/2015 |                   |

**Existing quarries**

| Sl. No. | Name of the Owner               | Village & S.F. Nos.       | Extent in Hect. | Lease Period                | Remarks            |
|---------|---------------------------------|---------------------------|-----------------|-----------------------------|--------------------|
| 1       | R.Amutha<br>W/o.S.Ramachandran, | Allappanur<br>51 (Part)   | 2.00.0          | 11/06/2018 to<br>10/06/2028 | Existing<br>quarry |
| 2       | G.Dakshinamoorthy,              | Allappanur<br>51 (Part)   | 2.00.0          | 10/06/2021 to<br>09/06/2031 |                    |
| 3       | J.Gunasekaran,                  | Allappanur<br>51 (Part-3) | 0.97.0          | 12/03/2024 to<br>11/03/2029 |                    |

**Present Proposed Quarries**

| Sl. No | Name of the Owner    | Village & S.F. Nos.       | Extent in Hect. |
|--------|----------------------|---------------------------|-----------------|
| 1      | Tvl.RVM Blue Metals, | Allappanur<br>51 (Part-4) | 2.00.2          |

**Encl:** 2 Copies of Approved Mining Plan.

*[Signature]*  
Deputy Director,  
Geology and Mining,  
Tiruvannamalai.

**Copy submitted to:**

1. The Chairman, SEIAA,  
Tamil Nadu, 3<sup>rd</sup> Floor, Panagal Maaligai,  
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.

*[Signature]*  
20/12/26

*[Signature]*



# MINING PLAN

FOR

**ALLAPPANUR VILLAGE ROUGH STONE QUARRY LEASE WITH PROGRESSIVE  
QUARRY CLOSURE PLAN**

Government land /Open Cast Semi-Mechanized mining/Non- Forest/Non-Captive Use

Lease period 10 Years from the date of lease execution

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

## LOCATION OF THE LEASE AREA

STATE : TAMILNADU  
DISTRICT : TIRUVANNAMALAI  
TALUK : THANDARAMPATTU  
VILLAGE : ALLAPPANUR  
S.F. No : 51 (Part - 4)  
EXTENT : 2.00.2 Hectares

## ADDRESS OF THE APPLICANT

**Tvl. RVM Blue Metals,**

S.F.No. 264/1, Pudurchekkadi Village,

Thandarampattu Taluk,

Tiruvannamalai District – 606 708.

## PREPARED BY

**Dr. S. KARUPPANNAN. M.Sc., Ph.D.**

Qualified Person



**GEO TECHNICAL MINING SOLUTIONS**

(A NABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri -636705

Ph: +91 9443937841, 7010076633

E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com) .

Website: [www.gtmsind.com](http://www.gtmsind.com)



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### ANNEXURES

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### LIST OF PLATES

| Sl. No. | Description                                | Plate No. | Scale                                      |
|---------|--------------------------------------------|-----------|--------------------------------------------|
| 1       | Key Map                                    | I         | Not to scale                               |
| 2       | Location Plan                              | I-A       | Not to scale                               |
| 3       | Toposheet Map                              | I-B       | 1:1,00,000                                 |
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| 7       | Surface and Geological Plan                | III       | Plan 1:1000                                |
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| 11      | Mine Layout Plan and Land Use Pattern      | V         | Plan 1:1000                                |
| 12      | Year wise Development and Production Plan  | VI        | Plan 1:1000                                |
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**Tvl.RVM Blue Metals,**  
S.F.No.264/1, Pudurchekkadi Village,  
Thandarampattu Taluk,  
Tiruvannamalai District – 606 708.

**CONSENT LETTER FROM THE APPLICANT**

The Mining Plan in respect of rough stone quarry in government poramboke land at S.F.No: 51 (Part - 4) over an extent of 2.00.2 hectares of Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu State has been prepared by

**Dr. S. KARUPPANNAN. M.Sc., Ph.D. (Qualified Person)**

I request the **Deputy Director**, Department of Geology and Mining, Tiruvannamalai District to make all further correspondence regarding modifications or technical clarifications of the Mining Plan with the said Qualified Person at the following address,

**Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,**  
Qualified Person  
**GEO TECHNICAL MINING SOLUTIONS**  
(A NABET Accredited & ISO Certified Company)  
No: 1/213-B, Ground Floor, Natesan Complex,  
Oddapatti, Collectorate Post office, Dharmapuri-636705  
Ph: +91 9443937841, 7010076633,  
E-mail: info.gtmsdpi@gmail.com,  
Website: [www.gtmsind.com](http://www.gtmsind.com)

I hereby undertake that all modifications so made in the Mining Plan by the Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

*(Signature)*  
Signature of the applicant  
(Tvl. RVM Blue Metals)

**Place:** Tiruvannamalai, TN.

**Date:**



**Tvl.RVM Blue Metals,**  
S.F.No.264/1, Pudurchekkadi Village,  
Thandampattu Taluk,  
Tiruvannamalai District – 606 708.

### DECLARATION

The Mining Plan in respect of rough stone quarry in government poramboke land at S.F.No: 51 (Part - 4) over an extent of 2.00.2 hectares of Allappanur Village, Thandampattu Taluk, Tiruvannamalai District, Tamil Nadu State have been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

*R. V. M.*  
Signature of the applicant  
(Tvl. RVM Blue Metals)

**Place:** Tiruvannamalai, TN.

**Date:**



**Dr. S. KARUPPANNAN. M.Sc., Ph.D.**

Qualified Person

**GEO TECHNICAL MINING SOLUTIONS**

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Website: [www.gtmsind.com](http://www.gtmsind.com)

### CERTIFICATE

This is to certify that the provisions of 8(17)(a) Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone quarry lease in S.F.No: 51 (Part - 4) over an extent of 2.00.2 hectares of Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu State granted to **Tvl. RVM Blue Metals**, Tiruvannamalai District.

Wherever specific permission / exemptions / relaxations or approvals are required, the applicant will approach the concerned authorities of State and Central governments for granting such permissions etc.

Signature of the Qualified Person

**Dr.S.KARUPPANNAN,M.Sc,Ph.D.,**  
Qualified Person

**GEO TECHNICAL MINING SOLUTIONS**  
A NABET Accredited and ISO Certified Company  
1/213-B, Ground Floor, Natesan Complex,  
Collectorate Post Office, Oddapatti,  
Dharmapuri-636705, TamilNadu, India

**Place:** Dharmapuri, TN.

**Date:** 17/2/26



**Dr. S. KARUPPANNAN. M.Sc., Ph.D.**

Qualified Person

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E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),

Website: [www.gtmsind.com](http://www.gtmsind.com)

### CERTIFICATE

I certify that, preparation of Mining Plan for rough stone quarry lease S.F.No: 51 (Part - 4) over an extent of 2.00.2 hectares of Allappanur Village, Thandarampattu Taluk, Tiruvannamalai District, Tamil Nadu prepared to **Tvl. RVM Blue Metals** covers all the provisions of Mines Act, Rules and Regulations etc., made there under and whenever specific permission are required the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

**Place:** Dharmapuri, TN.

**Date:** 17/2/26

Signature of the Qualified Person

**Dr.S.KARUPPANNAN,M.Sc,Ph.D.,**

Qualified Person

**GEO TECHNICAL MINING SOLUTIONS**

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1/213-B, Ground Floor, Natesan Complex,

Collectorate Post Office, Oddapatti,

Dharmapuri-636705, TamilNadu, India



# MINING PLAN

## ALLAPANUR ROUGH STONE QUARRY LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

Govt Poramboke land / Open cast Semi-Mechanized mining/Non-forest/Non-Captive Use

**Lease period 10 Years from the date of lease execution**

**(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)**

### INTRODUCTORY NOTES:

The rough stone quarry lease tender for the Tiruvannamalai District published in Special Gazette Publication No. 09 dated 04.11.2025 on [www.tntenders.gov.in](http://www.tntenders.gov.in) has progressed through the bidding stage. Tvl. RVM Blue Metals, registered at S.F.No. 264/1, Pudurchekkadi village, Thandarampattu Taluk, Tiruvannamalai District – 606 708 submitted an application for the lease at Survey No. 52 (Part-4). This site covers an extent of 2.00.2 hectares in Allapanur Village, Thandarampattu Taluk. Following a thorough scrutiny of the application **Tvl. RVM Blue Metals** was permitted to participate in the online tender held on 10.12.2025 where they ultimately emerged as the highest bidder.

Subsequently, the Deputy Director of the Department of Geology and Mining, Tiruvannamalai, issued a Precise Area Communication Letter vide **Roc.No.728/Mines/2025, dated 13.02.2026** for a lease period of ten (10) years under Rule 8(17)(a) of the Tamil Nadu Minor Mineral Concession Rules (TNMMCR), 1959. As per the directive, the applicant must submit a draft mining plan within 90 days of issuance incorporating the following specific conditions:

- A safety distance of **7.5m** must be maintained for adjacent patta lands and **10m** for government lands.
- A safety distance of **50m** must be maintained for structures, railway lines, water bodies, national highways and electric lines.
- Quarrying operations must be conducted without causing any damage or nuisance to adjacent lands or the general public.
- The lease area must be **fenced** before the commencement of operations and maintained throughout the entire lease period.
- Drilling must be performed using **handheld jackhammers** and blasting must be conducted using a **minimal explosive charge** per hole.
- Quarrying must strictly adhere to the **approved mining plan** as it serves as the guiding document for scientific and systematic mining.

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### **Preparation and Submission of Mining Plan:**

The Mining Plan, which includes a Progressive Quarry Closure Plan, has been prepared in accordance with Rule 41 and submitted under Rule 42 of the Tamil Nadu Minor Mineral Concession Rules (TNMMCR), 1959. This plan adheres to the conditions specified in the Precise Area Communication Letter vide **Roc.No.728/Mines/2025, dated 13.02.2026.**

#### **1. Resource Estimation**

- **Geological Resources:** Geological resource of estimated as **839482m<sup>3</sup>** or **2305416MT** including the resources of safety zone, topsoil etc. Of which, rough stone resources of about **835270m<sup>3</sup>** or **2296992MT** and topsoil is **4212m<sup>3</sup>** or **8424MT**.
- **Mineable Reserves:** The total Mineable Reserves are estimated at **307743m<sup>3</sup>** or **843707MT**. Of which, rough stone is about **304295m<sup>3</sup>** or **836811MT** and topsoil is **3448m<sup>3</sup>** or **6896MT**. This value was derived by deducting the reserves located within the safety zones and those restricted by bench geometry from the total geological resources.
- **Depth of Mining:** The quarrying operations will reach a total vertical depth of 65m. This comprises 45m Above Ground Level (AGL) inclusive of the 1m topsoil and 20m Below Ground Level (BGL) as detailed in Plates No. III, IIIA, IV & IVA.

#### **2. Production Schedule**

The proposed production of Rough Stone for the ten-year lease period, including the specific first five-year phase and the corresponding extraction depths, is detailed in the table below and illustrated in **Plate No. VIA**.

This production volume specifically pertains to the **Rough Stone mineral** and excludes the topsoil layer located at the surface. The mining depth profile and bench geometry will be strictly maintained as per the cross-sections provided in the development plans.

| <b>Feature</b>                | <b>Geological Resources</b> | <b>Mineable Reserves</b> | <b>10-Year Total Production</b> | <b>Phase 1 (Years 1-5)</b> |
|-------------------------------|-----------------------------|--------------------------|---------------------------------|----------------------------|
| <b>Tonnage (MT)</b>           | 2296992 MT ✓                | 836811 MT ✓              | 836811 MT ✓                     | 426429 MT                  |
| <b>Volume (m<sup>3</sup>)</b> | 835270 m <sup>3</sup> ✓     | 304295 m <sup>3</sup> ✓  | 304295 m <sup>3</sup> ✓         | 155065m <sup>3</sup>       |
| <b>Max Depth</b>              | 65m ✓                       | 65m ✓                    | 65m ✓                           | 65m ✓                      |
| <b>AGL / BGL</b>              | 45m / 20m ✓                 | 45m / 20m ✓              | 45m / 20m ✓                     | 45m / 20m ✓                |
| <b>Elevation (R.L.)</b>       | 245m to 180m ✓              | 245m to 180m ✓           | 245m to 180m ✓                  | 245m to 180m ✓             |



**Environmental Sensitivity of the proposed lease area: -**

- i). **Interstate boundary:** There is no interstate boundary around the periphery of proposed lease area.
- ii). **Wildlife Sanctuaries any:** There are no wildlife sanctuaries within the radius of 10km from the project site under the wildlife (Protection) Act, 1972.
- iii). **Forest (conservation) Act, 1980:** No forest land granted for quarrying and there is no reserve forest around 60m radius.
- iv). **CRZ Notification, 2019:** There is no Sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 2019.

**Environmental measures to be adopted during the ongoing activity period,**

- a. Under **Rule 41** of the **TNMMCR, 1959** and Environment guidelines the management of topsoil is mandatory:
  - **Storage:** The topsoil must be stacked in a designated area usually the **10m safety zone** and protected with a retaining wall or garland drain to prevent wash-off during monsoons.
  - **Utilization:** Since you have **3448m<sup>3</sup>** of topsoil. This volume must be utilized for planting **native species** (like Neem or Pungam) to create a "biological barrier" around the quarry.
  - **Non-Commerciality:** Explicitly stating that the topsoil is "**not for sale**" is vital. If topsoil is sold without a specific permit it constitutes a violation of the **Tamil Nadu Prevention of Illegal Mining, Transportation and Storage of Minerals and Mineral Dealers Rules, 2011.**
- b. Usage of sharp drill bits while drilling which will help in reducing noise.
- c. Secondary blasting will be totally avoided and handheld jack rock breaker will be used for breaking boulders.
- d. Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.
- e. Green Belt/Plantation will be developed around the project area, approach road and village roads. The plantation minimizes propagation of noise.
- f. Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- g. Transportation of material will be carried out during day time and material will be covered with tarpaulin.



- h. The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- i. And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

### 1.0 GENERAL:

|        |                                                                                    |       |                                                                                                                                                                                                                                                           |
|--------|------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a.     | Name of the Applicant                                                              | :     | <b>Tvl.RVM Blue Metals,</b>                                                                                                                                                                                                                               |
|        | Applicant address                                                                  | :     | S.F.No.264/1, Pudurchekkadi village, Thandarampattu taluk,                                                                                                                                                                                                |
|        | District                                                                           | :     | Tiruvannamalai                                                                                                                                                                                                                                            |
|        | State                                                                              | :     | Tamilnadu                                                                                                                                                                                                                                                 |
|        | Pin code                                                                           | :     | 606 708                                                                                                                                                                                                                                                   |
|        | Phone                                                                              | :     | 9443347306                                                                                                                                                                                                                                                |
|        | Fax                                                                                | :     | Nil                                                                                                                                                                                                                                                       |
|        | Gram                                                                               | :     | Nil                                                                                                                                                                                                                                                       |
|        | Telex                                                                              | :     | Nil                                                                                                                                                                                                                                                       |
| E-mail | :                                                                                  | ..... |                                                                                                                                                                                                                                                           |
| b.     | Status of the Applicant                                                            |       |                                                                                                                                                                                                                                                           |
|        | Private individual                                                                 | :     | ---                                                                                                                                                                                                                                                       |
|        | Cooperative Association                                                            | :     | ---                                                                                                                                                                                                                                                       |
|        | Private company                                                                    | :     | Yes                                                                                                                                                                                                                                                       |
|        | Public company                                                                     | :     | ---                                                                                                                                                                                                                                                       |
|        | Public Sector Undertaking                                                          | :     | ---                                                                                                                                                                                                                                                       |
|        | Joint Sector Undertaking                                                           | :     | ---                                                                                                                                                                                                                                                       |
| c.     | Mineral(s) which are occurring in the area and which the applicant intends to mine | :     | Rough Stone                                                                                                                                                                                                                                               |
| d.     | Period for which the mining lease granted /renewed/ proposed to be applied         | :     | The precise area has been communicated to the applicant for quarrying Ten (10) years.                                                                                                                                                                     |
|        | Name of the QP preparing the Mining Plan                                           | :     | <b>Dr. S.KARUPPANNAN, M.Sc.,Ph.D.</b>                                                                                                                                                                                                                     |
|        | Address                                                                            | :     | <b>GEO TECHNICAL MINING SOLUTIONS</b><br>No: 1/213-B, Ground Floor,<br>Natesan Complex, Oddapatti,<br>Collectorate Post office,<br>Dharmapuri-636705<br>Ph: +91 9443937841, +917010076633,<br>E-mail: info.gtmsdpi@gmail.com,<br>Website: www.gtmsind.com |
|        | Phone                                                                              | :     | +91 9443937841, 7010076633                                                                                                                                                                                                                                |

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|    |                                                                    |   |                                                                                                                                                                        |
|----|--------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Fax                                                                | : | Nil                                                                                                                                                                    |
|    | e-mail                                                             | : | <a href="mailto:info.gtmsdpi@gmail.com">info.gtmsdpi@gmail.com</a>                                                                                                     |
| g. | Reference No. and date of consent letter from the state government | : | The precise area communication letter issued by the Deputy Director, Department Geology and Mining, Tiruvannamalai vide <b>Roc.No.728/Mines/2025 Dated 13.02.2026.</b> |

## 2.0 LOCATION AND ACCESSIBILITY:

|                                                                                                |                      |              |                      |                                                                                                                                                                                                              |                            |                                                    |
|------------------------------------------------------------------------------------------------|----------------------|--------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------|
| a.                                                                                             | Details of the Area: |              | :                    | Refer plate no: IA & IB                                                                                                                                                                                      |                            |                                                    |
|                                                                                                | District & State     |              | :                    | Tiruvannamalai, Tamil Nadu                                                                                                                                                                                   |                            |                                                    |
|                                                                                                | Taluk                |              | :                    | Thandarampattu                                                                                                                                                                                               |                            |                                                    |
|                                                                                                | Village              |              | :                    | Allappanur                                                                                                                                                                                                   |                            |                                                    |
| Khasra No./ Plot No./ Block Range/ Felling Series etc.:                                        |                      |              |                      |                                                                                                                                                                                                              |                            |                                                    |
|                                                                                                | Survey No            | Sub Division | Total Extent in Hect | Village and land ownership details                                                                                                                                                                           | Mine lease Applied S.F.No. | Mine lease Applied area out of total area in hect. |
|                                                                                                | 51                   | -            | 92.94.0              | Govt poramboke land                                                                                                                                                                                          | 51 (part 4)                | 2.00.2 ✓                                           |
| Lease area (hectares)                                                                          |                      |              | :                    | 2.00.2 Hectares ✓                                                                                                                                                                                            |                            |                                                    |
| Whether the area is recorded to be in forest (please specify whether protected, reserved, etc) |                      |              | :                    | The proposed lease area is recorded as Govt poramboke land. (Ref.Anne.No's:IV)                                                                                                                               |                            |                                                    |
| Ownership / Occupancy                                                                          |                      |              | :                    | Government of TamilNadu.                                                                                                                                                                                     |                            |                                                    |
| Existence of Public Road / Railway line if any nearby and approximate distance                 |                      |              | :                    | ✓ Exploited quarry materials will be transported through the approach road situated on the northern side.<br>✓ MDR is located in the west of the lease area and the approach road connects the MDR at 1.5km. |                            |                                                    |
| Toposheet No. with latitude and longitude                                                      |                      |              | :                    | Toposheet No. <b>57 L/16</b><br>Latitude: From 12°05'53.31"N to 12°06'0.23"N<br>Longitude: From 78°56'34.10"E to 78°56'40.20"E                                                                               |                            |                                                    |



Geo-Coordinates of the lease boundary:

| S.No | Latitude      | Longitude     |
|------|---------------|---------------|
| 1    | 12° 5'58.50"N | 78°56'40.20"E |
| 2    | 12° 5'53.31"N | 78°56'37.28"E |
| 3    | 12° 5'55.05"N | 78°56'34.10"E |
| 4    | 12° 6'0.23"N  | 78°56'37.01"E |
| 5    | 12° 5'59.29"N | 78°56'38.74"E |

Land use pattern (Forest, Agricultural, Grazing, Barren etc.)

: It is an government poramboke Land classified as Tharisu.

b. *Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.*

: Refer plate no-IA & IB

**i) INFRASTRUCTURE AND COMMUNICATION:**

| S.No | Description              | Place                       | Distance |
|------|--------------------------|-----------------------------|----------|
| a.   | Nearest police station   | Thanipadi                   | 6.9km    |
| b.   | Nearest fire station     | Pudupalayam, Thandarampattu | 6.8km    |
| c.   | Nearest medical facility | Thandarampattu              | 6.9km    |
| d.   | Nearest school           | PUPS-Allapanur              | 2.9km    |
| e.   | Nearest DSP office       | Tiruvannamalai              | 8.5km    |
| f.   | Nearest villages         | Thondamanur                 | 1.4km    |
|      |                          | Thenmudiyanoor              | 2.8km    |
|      |                          | Agarampallipattu            | 1.6km    |
|      |                          | Kodanallur                  | 2.5km    |



## PART – A

### 3.0 GEOLOGY AND MINERAL RESERVES:

*(a) Briefly describe the topography and general geology and local/mine geology of the mineral deposit including drainage pattern:*

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i)  | Topography                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | : This area is typically covered under the <b>G43V16</b> sheet index (the modern OSM equivalent for the older 57 L/16 numbering). The lease area allotted in the hillock of height 45m maximum. |
| (ii) | <p><b>GEOLOGY of ALLAPANUR, TIRUVANNAMALAI DISTRICT</b></p> <p><b>1. Regional Geology</b></p> <p>The project area is situated within the Southern Granulite Terrain of the Indian Peninsular Shield. This region is a classic example of an Archaean-aged (ca. 2600 Ma) crystalline basement. It has undergone multiple periods of high-grade metamorphism and deformation, resulting in a complex of hard-rock metamorphic terrains dominated by charnockites and gneisses.</p> <p><b>2. District Geology and Lithology</b></p> <p>The regional sequence includes</p> <ul style="list-style-type: none"> <li>• <b>Charnockite Group:</b> The most prevalent rock type, appearing as blue-grey, medium-to-coarse-grained hypersthene-bearing granulites.</li> <li>• <b>Migmatite Complex:</b> Includes Hornblende-Biotite and Epidote-Hornblende Gneiss.</li> <li>• <b>Intrusives:</b> Neoproterozoic Dolerite Dykes (Black Granite) and minor bands of Banded Magnetite Quartzite (BMQ).</li> <li>• <b>Surficial Deposits:</b> A thin veneer of Quaternary Alluvium and red loamy soil. The weathering profile (saprolite) typically varies from 18 to 32 metres.</li> </ul> <p><b>3. Topography of the lease area</b></p> <ul style="list-style-type: none"> <li>• <b>Terrain &amp; Landform:</b> While the surrounding regional terrain is relatively flat the specific lease area is situated on a prominent hillock. This hillock rises to a height of 70m above the local regional ground level.</li> <li>• <b>Elevation:</b> The highest point of this landform is 245m Above Mean Sea Level (AMSL) located on the northern side of the site.</li> </ul> |                                                                                                                                                                                                 |



|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|      | <p><b>Implications:</b> Given its location in Zone II the probability of high intensity seismic events is low. However, all mining operations and any civil structures within the lease area are designed to comply with the standard safety factors prescribed for this zone.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                 |
| (iv) | <p><b>Drainage Pattern:</b></p> <p>The drainage pattern for the proposed lease area in Allapanur is determined by its position on a 70m hillock within the broader Palar and Thenpennaiyar sub-catchments.</p> <p><b>Site-Specific Drainage (Radial/Divergent)</b></p> <ul style="list-style-type: none"> <li>• <b>Radial Flow:</b> The lease area is a distinct hillock rising 70m from the regional level the primary drainage pattern is <b>radial</b>. Surface runoff during monsoon periods flows outward from the highest point (245m AMSL) in all directions down the slopes of the hillock.</li> <li>• <b>Seasonal Channels:</b> Runoff is carried by small seasonal first-order streams or depressions that remain dry for most of the year but activate during the Northeast and Southwest monsoons.</li> </ul> <p><b>Hydrological Impact of Mining</b></p> <ul style="list-style-type: none"> <li>• <b>Bench Drainage:</b> During the proposed bench-type mining artificial drainage channels (garland drains) must be constructed around the periphery of each bench to collect and divert runoff into settling tanks.</li> <li>• <b>Sediment Control:</b> These settling tanks prevent silt-laden runoff from the hillock from entering local agricultural lands or natural water bodies.</li> <li>• <b>Perennial Status:</b> There are no perennial water courses within the quarry lease area all drainage is purely rain-fed and seasonal.</li> </ul> |                                                                                                 |
| (b)  | <p><i>The topographic plan of the lease area prepared on a scale of 1 :1000 or 1 : 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                 |
|      | a. Present status:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | : The QP examined the surface features during site visit. It is a fresh quarry lease.           |
|      | b. Surface Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | : Surface plan showing elevation contour and accessibility road was prepared at the scale of 1: |

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|     |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                         |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                                                                                                                                                                                                  | 1000, as shown in Plate No. III.                                                                                                                                        |
| (c) | Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:                                                                                                                                                                                                                                                    | : Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:500, as shown in Plate No. IIIA |
| (d) | <p><i>Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below:-</i></p> <p>No future programmed proposed in this area. Its massive homogeneous parent rock. Hence exploration proposal is not required to this mining project.</p> |                                                                                                                                                                         |

(e) *Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.*

The **Cross-Section Method** is used to calculate the volume by determining the area of vertical slices (the longitudinal and transverse sections) and multiplying them by the distance between or influenced by those sections. In this case, the calculation specifically covers the ten-year plan period down to a depth of below ground level.

This volume is derived from two specific cross-sections (Longitudinal **XY-AB** and Transverse **XY-CD**) and breaks down as follows:

The geological resource data provided for the ltimate depth as per. the lease area extent is **839482m<sup>3</sup>** or **2305416MT** up to a depth of **65m** consists of **45m AGL + 20m BGL**.

**Material Breakdown**

The resources are divided into primary Rough Stone and topsoil

| Material Type               | Volume (m <sup>3</sup> ) | Tonnage (MT) |
|-----------------------------|--------------------------|--------------|
| <b>Rough Stone</b>          | 835270                   | 2296992      |
| <b>Topsoil not for sale</b> | 4212                     | 8424         |

| GEOLOGICAL RESOURCES |       |               |              |              |                       |                               |                           |              |                   |               |
|----------------------|-------|---------------|--------------|--------------|-----------------------|-------------------------------|---------------------------|--------------|-------------------|---------------|
| Section              | Bench | Length in (m) | Width in (m) | Depth in (m) | ROM in m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Topsoil in m <sup>3</sup> | Bulk Density | Rough Stone in MT | Topsoil in MT |
| XY-AB                | Slope | 28            | 53           | 1            | 1484                  | .....                         | 1484                      | 2            | .....             | 2968          |
|                      | 1     | 27            | 37           | 5            | 4995                  | 4995                          | .....                     | 2.75         | 13736             | .....         |

*Handwritten signature or initials.*



|             |       |    |     |   |        |        |        |       |         |         |
|-------------|-------|----|-----|---|--------|--------|--------|-------|---------|---------|
|             | II    | 58 | 33  | 5 | 9570   | 9570   | .....  | 2.75  | 26317   |         |
|             | III   | 78 | 55  | 5 | 21450  | 21450  | .....  | 2.75  | 58988   |         |
|             | IV    | 82 | 80  | 5 | 32800  | 32800  | .....  | 2.75  | 90200   |         |
|             | V     | 82 | 88  | 5 | 36080  | 36080  | .....  | 2.75  | 99220   |         |
|             | VI    | 82 | 100 | 5 | 41000  | 41000  | .....  | 2.75  | 112750  |         |
|             | VII   | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | VIII  | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | IX    | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | X     | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | XI    | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | XII   | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | XIII  | 82 | 110 | 5 | 45100  | 45100  | .....  | 2.75  | 124025  |         |
|             | TOTAL |    |     |   |        | 463079 | 461595 | 1484  | .....   |         |
| XY-CD       | Slope | 62 | 44  | 1 | 2728   | .....  | 2728   | 2     | .....   | 5456    |
|             | IV    | 13 | 32  | 5 | 2080   | 2080   | .....  | 2.75  | 5720    | .....   |
|             | V     | 37 | 63  | 5 | 11655  | 11655  | .....  | 2.75  | 32051   | .....   |
|             | VI    | 52 | 83  | 5 | 21580  | 21580  | .....  | 2.75  | 59345   | .....   |
|             | VII   | 66 | 102 | 5 | 33660  | 33660  | .....  | 2.75  | 92565   | .....   |
|             | VIII  | 77 | 110 | 5 | 42350  | 42350  | .....  | 2.75  | 116462  | .....   |
|             | IX    | 85 | 110 | 5 | 46750  | 46750  | .....  | 2.75  | 128563  | .....   |
|             | X     | 98 | 110 | 5 | 53900  | 53900  | .....  | 2.75  | 148225  | .....   |
|             | XI    | 98 | 110 | 5 | 53900  | 53900  | .....  | 2.75  | 148225  | .....   |
|             | XII   | 98 | 110 | 5 | 53900  | 53900  | .....  | 2.75  | 148225  | .....   |
|             | XIII  | 98 | 110 | 5 | 53900  | 53900  | .....  | 2.75  | 148225  | .....   |
|             | TOTAL |    |     |   |        | 376403 | 373675 | 2728  | .....   | 1027606 |
| GRAND TOTAL |       |    |     |   | 839482 | 835270 | 4212   | ..... | 2296992 | 8424    |

(f) Indicate mineable reserves by slice plan / level plan method, as applicable, as per the proposed mining parameters: -

The total mineable reserve for roughstone is estimated to be **307743m<sup>3</sup>** or **843707MT** by deducting the reserve safety zone, block in benches from the total geological resources up to a depth of **65m** consists of **45m AGL + 20m BGL**. Of which, rough stone is about **304295m<sup>3</sup>** or **836811MT** and topsoil is **3448m<sup>3</sup>** or **6896MT**. The commercially viable rough stone has been prepared on 1:1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no's IVA).

| MINEABLE RESERVES |       |               |              |              |                       |                               |                           |              |                   |               |
|-------------------|-------|---------------|--------------|--------------|-----------------------|-------------------------------|---------------------------|--------------|-------------------|---------------|
| Section           | Bench | Length in (m) | Width in (m) | Depth in (m) | ROM in m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Topsoil in m <sup>3</sup> | Bulk Density | Rough Stone in MT | Topsoil in MT |
| XY-AB             | Slope | 28            | 43           | 1            | 1204                  | .....                         | 1204                      | 2            | .....             | 2408          |
|                   | I     | 17            | 37           | 5            | 3145                  | 3145                          | .....                     | 2.75         | 8649              | .....         |
|                   | II    | 48            | 33           | 5            | 7920                  | 7920                          | .....                     | 2.75         | 21780             | .....         |
|                   | III   | 63            | 55           | 5            | 17325                 | 17325                         | .....                     | 2.75         | 47643             | .....         |



|             |       |    |    |   |        |        |        |       |        |        |
|-------------|-------|----|----|---|--------|--------|--------|-------|--------|--------|
|             | IV    | 62 | 70 | 5 | 21700  | 21700  | .....  | 2.75  | 59675  | .....  |
|             | V     | 57 | 73 | 5 | 20805  | 20805  | .....  | 2.75  | 57213  | .....  |
|             | VI    | 52 | 80 | 5 | 20800  | 20800  | .....  | 2.75  | 57200  | .....  |
|             | VII   | 47 | 70 | 5 | 16450  | 16450  | .....  | 2.75  | 45238  | .....  |
|             | VIII  | 42 | 60 | 5 | 12600  | 12600  | .....  | 2.75  | 34650  | .....  |
|             | IX    | 37 | 50 | 5 | 9250   | 9250   | .....  | 2.75  | 25438  | .....  |
|             | X     | 32 | 40 | 5 | 6400   | 6400   | .....  | 2.75  | 17600  | .....  |
|             | XI    | 27 | 30 | 5 | 4050   | 4050   | .....  | 2.75  | 11138  | .....  |
|             | XII   | 22 | 20 | 5 | 2200   | 2200   | .....  | 2.75  | 6050   | .....  |
| TOTAL       |       |    |    |   | 143849 | 142645 | 1204   | ..... | 392274 | 2408   |
| XY-CD       | Slope | 51 | 44 | 1 | 2244   | .....  | 2244   | 2     | .....  | 4488   |
|             | IV    | 13 | 22 | 5 | 1430   | 1430   | .....  | 2.75  | 3932   | .....  |
|             | V     | 37 | 48 | 5 | 8880   | 8880   | .....  | 2.75  | 24420  | .....  |
|             | VI    | 52 | 63 | 5 | 16380  | 16380  | .....  | 2.75  | 45045  | .....  |
|             | VII   | 66 | 77 | 5 | 25410  | 25410  | .....  | 2.75  | 69877  | .....  |
|             | VIII  | 77 | 70 | 5 | 26950  | 26950  | .....  | 2.75  | 74113  | .....  |
|             | IX    | 85 | 60 | 5 | 25500  | 25500  | .....  | 2.75  | 70125  | .....  |
|             | X     | 88 | 50 | 5 | 22000  | 22000  | .....  | 2.75  | 60500  | .....  |
|             | XI    | 83 | 40 | 5 | 16600  | 16600  | .....  | 2.75  | 45650  | .....  |
|             | XII   | 78 | 30 | 5 | 11700  | 11700  | .....  | 2.75  | 32175  | .....  |
|             | XIII  | 68 | 20 | 5 | 6800   | 6800   | .....  | 2.75  | 18700  | .....  |
|             | TOTAL |    |    |   |        | 163894 | 161650 | 2244  | .....  | 444537 |
| GRAND TOTAL |       |    |    |   | 307743 | 304295 | 3448   | ..... | 836811 | 6896   |

#### 4.0 MINING:

- a) Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.

##### Proposed Method of Mining

Considering the lease area is situated on a hillock rising 70m above the local ground level, the mining operations will be carried out using the opencast mechanised mining method specifically adopting the "Top-Slicing" approach.

- **Bench Development:** Mining will commence from the highest elevation 245m AMSL on the northern side. The hillock will be systematically lowered by developing benches.
- **Bench Geometry:**
  - **Height:** Benches will be maintained at a height of 5 metres.
  - **Width:** The bench width will be kept no less than the height (or as per DGMS safety standards) to allow for safe movement of machinery.
  - **Slope:** The individual bench slopes will be maintained at 60° to 70° while the ultimate pit slope will be kept at 45° for long-term stability.
- **Drilling and Blasting:**
  - Since the Charnockite is extremely fresh and hard jackhammer or



wagon drilling (32mm to 115mm dia) will be employed.

- Controlled blasting using slurry explosives and NONEL (Non-Electric) detonators will be used to fragment the rock while minimizing ground vibration and fly-rock.

- **Loading and Haulage:**

- Excavators (Hydraulic Type) will be used to load the fragmented rough stone into tippers.
- The existing Surface Plan includes a gradient-controlled haul road winding around the 45m hillock to ensure safe transport of material to the local regional level.

- **Production Goal:** This benching method ensures maximum recovery of the high-integrity orthopyroxene charnockite while maintaining the safety of the working faces.

b) *Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.*

Total proposed production rough stone is about 304295m<sup>3</sup> or 836811MT up to a depth of 65m consists of 45m AGL + 20m BGL for ten years plan period. (Refer Plate No's. VI & VIA).

| Year         | Pit No.(s) | Topsoil/<br>Overburden<br>(m <sup>3</sup> ) | Saleable<br>rough stone<br>(m <sup>3</sup> ) | Saleable<br>rough stone<br>(MT) @<br>100% | Rough stone<br>rejects(MT) | Sub grade/<br>Weathered<br>rock (m <sup>3</sup> ) | Topsoil (MT) |
|--------------|------------|---------------------------------------------|----------------------------------------------|-------------------------------------------|----------------------------|---------------------------------------------------|--------------|
| --           | -          | 3448                                        | --                                           | --                                        | --                         | --                                                | 6896         |
| I            | I          | ...                                         | 34020                                        | 93555                                     | ...                        | ...                                               | ...          |
| II           | I          | ...                                         | 30160                                        | 82940                                     | ...                        | ...                                               | ...          |
| III          | I          | ...                                         | 32585                                        | 89609                                     | ...                        | ...                                               | ...          |
| IV           | I          | ...                                         | 30700                                        | 84425                                     | ...                        | ...                                               | ...          |
| V            | I          | ...                                         | 27600                                        | 75900                                     | ...                        | ...                                               | ...          |
| VI           | I          | ...                                         | 32380                                        | 89045                                     | ...                        | ...                                               | ...          |
| VII          | I          | ...                                         | 28650                                        | 78787                                     | ...                        | ...                                               | ...          |
| VIII         | I          | ...                                         | 32000                                        | 88000                                     | ...                        | ...                                               | ...          |
| IX           | I          | ...                                         | 30650                                        | 84287                                     | ...                        | ...                                               | ...          |
| X            | I          | ...                                         | 25550                                        | 70263                                     | ...                        | ...                                               | ...          |
| <b>Total</b> | <b>---</b> | <b>3448</b>                                 | <b>304295</b>                                | <b>836811</b>                             | <b>...</b>                 | <b>...</b>                                        | <b>6896</b>  |

c) *Composite plans and Year wise sections (In case of 'A' class mines):*

Not applicable. It is a "B" category quarry.



| YEARWISE PRODUCTION RESERVES (First Five Years)  |         |       |               |              |              |                       |                               |                           |              |                   |               |
|--------------------------------------------------|---------|-------|---------------|--------------|--------------|-----------------------|-------------------------------|---------------------------|--------------|-------------------|---------------|
| Year                                             | Section | Bench | Length in (m) | Width in (m) | Depth in (m) | ROM in m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Topsoil in m <sup>3</sup> | Bulk Density | Rough Stone in MT | Topsoil in MT |
| I-YEAR                                           | XY-AB   | Slope | 28            | 43           | 1            | 1204                  | .....                         | 1204                      | 2.00         | .....             | 2408          |
|                                                  |         | I     | 17            | 37           | 5            | 3145                  | 3145                          | .....                     | 2.75         | 8649              | .....         |
|                                                  |         | II    | 48            | 33           | 5            | 7920                  | 7920                          | .....                     | 2.75         | 21780             | .....         |
|                                                  |         | III   | 63            | 55           | 5            | 17325                 | 17325                         | .....                     | 2.75         | 47643             | .....         |
|                                                  |         | IV    | 12            | 70           | 5            | 4200                  | 4200                          | .....                     | 2.75         | 11550             | .....         |
|                                                  | XY-CD   | Slope | 51            | 44           | 1            | 2244                  | .....                         | 2244                      | 2.00         | .....             | 4488          |
|                                                  |         | IV    | 13            | 22           | 5            | 1430                  | 1430                          | .....                     | 2.75         | 3933              | .....         |
| TOTAL                                            |         |       |               |              |              | 37468                 | 34020                         | 3448                      | .....        | 93555             | 6896          |
| II-YEAR                                          | XY-AB   | IV    | 50            | 70           | 5            | 17500                 | 17500                         | .....                     | 2.75         | 48125             | .....         |
|                                                  | XY-CD   | V     | 37            | 48           | 5            | 8880                  | 8880                          | .....                     | 2.75         | 24420             | .....         |
|                                                  |         | VI    | 12            | 63           | 5            | 3780                  | 3780                          | .....                     | 2.75         | 10395             | .....         |
| TOTAL                                            |         |       |               |              |              | 30160                 | 30160                         | 0                         | .....        | 82940             | 0             |
| III-YEAR                                         | XY-CD   | VI    | 35            | 63           | 5            | 11025                 | 11025                         | .....                     | 2.75         | 30319             | .....         |
|                                                  |         | VII   | 56            | 77           | 5            | 21560                 | 21560                         | .....                     | 2.75         | 59290             | .....         |
| TOTAL                                            |         |       |               |              |              | 32585                 | 32585                         | 0                         | .....        | 89609             | 0             |
| IV-YEAR                                          | XY-CD   | VIII  | 62            | 70           | 5            | 21700                 | 21700                         | .....                     | 2.75         | 59675             | .....         |
|                                                  |         | IX    | 30            | 60           | 5            | 9000                  | 9000                          | .....                     | 2.75         | 24750             | .....         |
| TOTAL                                            |         |       |               |              |              | 30700                 | 30700                         | 0                         | .....        | 84425             | 0             |
| V-YEAR                                           | XY-CD   | IX    | 16            | 60           | 5            | 4800                  | 4800                          | .....                     | 2.75         | 13200             | .....         |
|                                                  |         | X     | 44            | 50           | 5            | 11000                 | 11000                         | .....                     | 2.75         | 30250             | .....         |
|                                                  |         | XI    | 34            | 40           | 5            | 6800                  | 6800                          | .....                     | 2.75         | 18700             | .....         |
|                                                  |         | XII   | 24            | 30           | 5            | 3600                  | 3600                          | .....                     | 2.75         | 9900              | .....         |
|                                                  |         | XIII  | 14            | 20           | 5            | 1400                  | 1400                          | .....                     | 2.75         | 3850              | .....         |
| TOTAL                                            |         |       |               |              |              | 27600                 | 27600                         | 0                         | .....        | 75900             | 0             |
| GRAND TOTAL (A)                                  |         |       |               |              |              | 158513                | 155065                        | 3448                      | .....        | 426429            | 6896          |
| YEARWISE PRODUCTION RESERVES (Second Five Years) |         |       |               |              |              |                       |                               |                           |              |                   |               |
| VI-YEAR                                          | XY-AB   | V     | 57            | 73           | 5            | 20805                 | 20805                         | .....                     | 2.75         | 57214             | .....         |
|                                                  |         | VI    | 25            | 80           | 5            | 10000                 | 10000                         | .....                     | 2.75         | 27500             | .....         |
|                                                  | XY-CD   | VI    | 5             | 63           | 5            | 1575                  | 1575                          | .....                     | 2.75         | 4331              | .....         |
| TOTAL                                            |         |       |               |              |              | 32380                 | 32380                         | 0                         | .....        | 89045             | 0             |
| VII-YEAR                                         | XY-AB   | VI    | 27            | 80           | 5            | 10800                 | 10800                         | .....                     | 2.75         | 29700             | .....         |
|                                                  |         | VII   | 40            | 70           | 5            | 14000                 | 14000                         | .....                     | 2.75         | 38500             | .....         |
|                                                  | XY-CD   | VII   | 10            | 77           | 5            | 3850                  | 3850                          | .....                     | 2.75         | 10587             | .....         |
| TOTAL                                            |         |       |               |              |              | 28650                 | 28650                         | 0                         | .....        | 78787             | 0             |
| VIII-YEAR                                        | XY-AB   | VII   | 7             | 70           | 5            | 2450                  | 2450                          | .....                     | 2.75         | 6738              | .....         |
|                                                  |         | VIII  | 42            | 60           | 5            | 12600                 | 12600                         | .....                     | 2.75         | 34650             | .....         |
|                                                  | XY-CD   | VIII  | 15            | 70           | 5            | 5250                  | 5250                          | .....                     | 2.75         | 14437             | .....         |
|                                                  |         | IX    | 39            | 60           | 5            | 11700                 | 11700                         | .....                     | 2.75         | 32175             | .....         |
| TOTAL                                            |         |       |               |              |              | 32000                 | 32000                         | 0                         | .....        | 88000             | 0             |



|                          |       |      |    |    |               |               |             |              |               |             |       |
|--------------------------|-------|------|----|----|---------------|---------------|-------------|--------------|---------------|-------------|-------|
| IX-YEAR                  | XY-AB | IX   | 37 | 50 | 5             | 9250          | 9250        | .....        | 2.75          | 25437       | ..... |
|                          |       | X    | 32 | 40 | 5             | 6400          | 6400        | .....        | 2.75          | 17600       | ..... |
|                          | XY-CD | X    | 44 | 50 | 5             | 11000         | 11000       | .....        | 2.75          | 30250       | ..... |
|                          |       | XI   | 20 | 40 | 5             | 4000          | 4000        | .....        | 2.75          | 11000       | ..... |
| <b>TOTAL</b>             |       |      |    |    | <b>30650</b>  | <b>30650</b>  | <b>0</b>    | <b>.....</b> | <b>84287</b>  | <b>0</b>    |       |
| X-YEAR                   | XY-AB | XI   | 27 | 30 | 5             | 4050          | 4050        | .....        | 2.75          | 11138       | ..... |
|                          |       | XII  | 22 | 20 | 5             | 2200          | 2200        | .....        | 2.75          | 6050        | ..... |
|                          | XY-CD | XI   | 29 | 40 | 5             | 5800          | 5800        | .....        | 2.75          | 15950       | ..... |
|                          |       | XII  | 54 | 30 | 5             | 8100          | 8100        | .....        | 2.75          | 22275       | ..... |
|                          |       | XIII | 54 | 20 | 5             | 5400          | 5400        | .....        | 2.75          | 14850       | ..... |
| <b>TOTAL</b>             |       |      |    |    | <b>25550</b>  | <b>25550</b>  | <b>0</b>    | <b>.....</b> | <b>70263</b>  | <b>0</b>    |       |
| <b>GRAND TOTAL (B)</b>   |       |      |    |    | <b>149230</b> | <b>149230</b> | <b>0</b>    | <b>.....</b> | <b>410382</b> | <b>0</b>    |       |
| <b>GRAND TOTAL (A+B)</b> |       |      |    |    | <b>307743</b> | <b>304295</b> | <b>3448</b> | <b>.....</b> | <b>836811</b> | <b>6896</b> |       |

| d)              | Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | : Composite plan not prepared in this proposed lease area |                 |              |              |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------|--------------|--------------|--|--|--|-------|--------|---------------------|---------------|--------------|--------------|-----|--|---------|----|----|---|---|--|--|----|----|---|
| e)              | <p><i>Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:</i></p> <p>At this rate of production, the expected life of quarry is calculated as given below:</p> <p><b><u>Rough stone:</u></b></p> <p>Mineable reserves of rough stone (10 Years) = 304295m<sup>3</sup> or 836811MT</p> <p>Annual Peak production = 34020m<sup>3</sup> or 93555MT</p>                                                                                                                                                                                                     |                                                           |                 |              |              |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
| f)              | <i>Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:</i>                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           |                 |              |              |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
| i)              | <i>Time frame of completion of mineral exploration program in leasehold area. Give broad description identified potential areas to be covered in the given time frame:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                           |                 |              |              |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
| ii)             | <p><i>Whether ultimate pit limit has been determined and demarcated on surface and geological plan :-</i></p> <p>The ultimate pit limit has been determined and demarcated in the conceptual plan</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="6">SECTION XY - AB</th> </tr> <tr> <th>Bench</th> <th>Period</th> <th>Overburden /Mineral</th> <th>Length in (m)</th> <th>Width in (m)</th> <th>Depth in (m)</th> </tr> <tr> <td>---</td> <td></td> <td>Topsoil</td> <td>28</td> <td>43</td> <td>1</td> </tr> <tr> <td>I</td> <td></td> <td></td> <td>17</td> <td>37</td> <td>5</td> </tr> </table> |                                                           | SECTION XY - AB |              |              |  |  |  | Bench | Period | Overburden /Mineral | Length in (m) | Width in (m) | Depth in (m) | --- |  | Topsoil | 28 | 43 | 1 | I |  |  | 17 | 37 | 5 |
| SECTION XY - AB |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                           |                 |              |              |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
| Bench           | Period                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Overburden /Mineral                                       | Length in (m)   | Width in (m) | Depth in (m) |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
| ---             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Topsoil                                                   | 28              | 43           | 1            |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |
| I               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                           | 17              | 37           | 5            |  |  |  |       |        |                     |               |              |              |     |  |         |    |    |   |   |  |  |    |    |   |



|                        |                                                                                                                                                                                                         |               |                            |                      |                                                                                                                                                                                                                                                  |                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
|                        | II                                                                                                                                                                                                      |               |                            | 48                   | 33                                                                                                                                                                                                                                               | 5                   |
|                        | III                                                                                                                                                                                                     |               |                            | 63                   | 55                                                                                                                                                                                                                                               | 5                   |
|                        | IV                                                                                                                                                                                                      |               |                            | 62                   | 70                                                                                                                                                                                                                                               | 5                   |
|                        | V                                                                                                                                                                                                       |               |                            | 57                   | 73                                                                                                                                                                                                                                               | 5                   |
|                        | VI                                                                                                                                                                                                      |               |                            | 52                   | 80                                                                                                                                                                                                                                               | 5                   |
|                        | VII                                                                                                                                                                                                     | 10 years      | Roughstone                 | 47                   | 70                                                                                                                                                                                                                                               | 5                   |
|                        | VIII                                                                                                                                                                                                    |               |                            | 42                   | 60                                                                                                                                                                                                                                               | 5                   |
|                        | IX                                                                                                                                                                                                      |               |                            | 37                   | 50                                                                                                                                                                                                                                               | 5                   |
|                        | X                                                                                                                                                                                                       |               |                            | 32                   | 40                                                                                                                                                                                                                                               | 5                   |
|                        | XI                                                                                                                                                                                                      |               |                            | 27                   | 30                                                                                                                                                                                                                                               | 5                   |
|                        | XII                                                                                                                                                                                                     |               |                            | 22                   | 20                                                                                                                                                                                                                                               | 5                   |
| <b>SECTION XY - CD</b> |                                                                                                                                                                                                         |               |                            |                      |                                                                                                                                                                                                                                                  |                     |
|                        | <b>Bench</b>                                                                                                                                                                                            | <b>Period</b> | <b>Overburden /Mineral</b> | <b>Length in (m)</b> | <b>Width in (m)</b>                                                                                                                                                                                                                              | <b>Depth in (m)</b> |
|                        | ---                                                                                                                                                                                                     |               | Topsoil                    | 51                   | 44                                                                                                                                                                                                                                               | 1                   |
|                        | IV                                                                                                                                                                                                      |               |                            | 13                   | 22                                                                                                                                                                                                                                               | 5                   |
|                        | V                                                                                                                                                                                                       |               |                            | 37                   | 48                                                                                                                                                                                                                                               | 5                   |
|                        | VI                                                                                                                                                                                                      |               |                            | 52                   | 63                                                                                                                                                                                                                                               | 5                   |
|                        | VII                                                                                                                                                                                                     |               |                            | 66                   | 77                                                                                                                                                                                                                                               | 5                   |
|                        | VIII                                                                                                                                                                                                    | 10 years      | Roughstone                 | 77                   | 70                                                                                                                                                                                                                                               | 5                   |
|                        | IX                                                                                                                                                                                                      |               |                            | 85                   | 60                                                                                                                                                                                                                                               | 5                   |
|                        | X                                                                                                                                                                                                       |               |                            | 88                   | 50                                                                                                                                                                                                                                               | 5                   |
|                        | XI                                                                                                                                                                                                      |               |                            | 83                   | 40                                                                                                                                                                                                                                               | 5                   |
|                        | XII                                                                                                                                                                                                     |               |                            | 78                   | 30                                                                                                                                                                                                                                               | 5                   |
|                        | XIII                                                                                                                                                                                                    |               |                            | 68                   | 20                                                                                                                                                                                                                                               | 5                   |
| iii)                   | Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: - |               |                            | :                    | The recovery of rough stone in this quarry is 100%. Hence no waste proposed in this mining plan.                                                                                                                                                 |                     |
| iv)                    | Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal.                                         |               |                            | :                    | Backfilling is generally not envisaged or applicable. This is primarily because rough stone is considered a consumable product where the entire mineral is excavated, leaving no significant waste or overburden (OB) to fill the resulting pit. |                     |
| v)                     | Whether post mining land use envisaged: -                                                                                                                                                               |               |                            | :                    | Post mining land use generally incorporate in the mine closure plan focus on making the site safe, stable and productive.                                                                                                                        |                     |



|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                 |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| g)  | Open cast mining                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                 |
| i)  | Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | : A fully mechanized opencast method in hard rock will be adopted, complying with Regulation 106 of the Metalliferous Mines Regulations, 1961 DGMS. Key features include heavy machinery (HEMM) for drilling, blasting, loading, and transporting, with bench heights limited to $\leq 6\text{m}$ , widths $\geq$ height and slopes $\leq 45^\circ$ for safety. |
| ii) | <p><i>Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice.</i></p> <p>As per <b>Indian Bureau of Mines (IBM)</b> and State Environmental Impact Assessment Authority (SEIAA) requirements the following are given in</p> <ol style="list-style-type: none"> <li><b>Layout of Mine Workings</b> correctly identifies the systematic development and access (ramps/roads).</li> <li><b>Layout of Faces</b> correctly details the benching system required under Rule 106 of the Metalliferous Mines Regulations (MMR) 1961.</li> <li><b>Plan References to 4(b) and 4(d)</b> is exactly how the sections are titled in standard Mining Plan templates. <ul style="list-style-type: none"> <li><b>4(b):</b> Typically refers to the Geological Plan/Sections showing the nature of the deposit.</li> <li><b>4(d):</b> Typically refers to the Production and Development Plan showing year-wise pit layouts and dump sites.</li> </ul> </li> </ol> |                                                                                                                                                                                                                                                                                                                                                                 |
|     | a. Details of Topsoil/Overburden                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Topsoil available on the surface of the lease area will be removed in the 1st year of the mine operation.                                                                                                                                                                                                                                                       |
|     | b. Rough Stone waste and side burden waste:-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The recovery of rough stone in this quarry is 100%. There is no rough stone waste or side burden will be removed.                                                                                                                                                                                                                                               |
| H   | Underground Mining                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Not applicable                                                                                                                                                                                                                                                                                                                                                  |
| i)  | <p><b>Extent of mechanization:</b></p> <p>Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                 |
|     | <p><b>(1) Drilling Machines:</b></p> <p>Drilling of shot holes will be carried out using tractor mounted compressor and</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                 |



jack hammer. Details of drilling equipment's are given below.

| Type        | Nos | Dia of hole (mm) | Size / Capacity | Make | Motive power | H.P. |
|-------------|-----|------------------|-----------------|------|--------------|------|
| Jack Hammer | 2   | 32 mm            | Hand held       | --   | Diesel       | --   |
| Compressor  | 1   | ---              | Air             | --   | Diesel       | --   |

**(2) Loading Equipment:**

| Type                | Nos | Size / Capacity       | Make | Motive power | H.P. |
|---------------------|-----|-----------------------|------|--------------|------|
| Hydraulic Excavator | 1   | 2.9-4.5m <sup>3</sup> | --   | Diesel       | --   |

**(3) Haulage and Transport Equipment**

(a) Haulage within the mining leasehold:

| Type   | Nos | Size / Capacity | Make | Motive power | H.P. |
|--------|-----|-----------------|------|--------------|------|
| Tipper | 8   | --              | --   | Diesel       | --   |

**Whether the dumpers are fitted with exhaust conditioner should be indicated:**

The dumpers not used in this quarry area, hence it's a small "B" category mine.

- b) Transport from mine head to the destination
- Road Transportation (Trucks)** common for short-to-medium distances often uses 10 MT to 27-tonne capacity dumpers.
- c) Describe briefly the transport system (please specify)
- The transport system for open-pit rough stone (granite/rock) mines primarily relies on a "truck-and-shovel" method utilizing hydraulic excavators for loading and heavy-duty dump trucks (tippers) for moving broken rock to crushers or stockpiles. This flexible diesel-powered system ensures rapid movement from the blasting face to the exit.
- i) Ore transported by: own trucks / hired trucks
- Own trucks.
- ii) Main destination to which ore is transported (giving to and from distance)
- Rough stone is primarily transported to nearby stone crushers to produce construction aggregates.

**a) Details of hauling / transport equipment:**

| Type | Nos | Size / Capacity | Make | Motive power | H.P. |
|------|-----|-----------------|------|--------------|------|
| --   | --  | --              | --   | --           | --   |

**4) (4). Miscellaneous:**

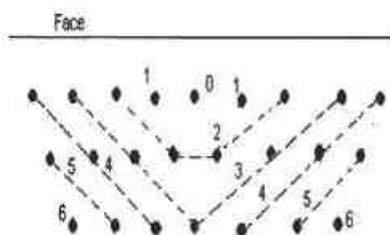
Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.



|                                                 | (A) Operations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The mining operation is open-cast, mechanized methods are adopted and on single shift basis only.                                                                     |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--|------------------------------|----|-----------------|-----|------------------|------|---------------|-----|------------------------|------|----------|-----|----------------------|-----|------------------------|-----|-----------------------------|-------|------------------------------|-----|------------------------|------|-------------------------------------|------|-------------------------------------------------|-----|---------------------------|----|---------------------------|---|-------------------|-----------|------------------------------|-------|------------------------------------|------|-----------------|------|--------------------|--------|-----------------------------|----|-------------------|-------|
|                                                 | (B) Machineries deployed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted. |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| 5.                                              | <p><b>BLASTING:</b></p> <p><i>a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.</i></p> <p>Blasting pattern:</p> <p>The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.</p> <p>Rough stone production for 10 years = <b>304295m<sup>3</sup> / 836811MT</b></p> <table><tr><th colspan="2">BLAST DESIGN</th></tr><tr><td>Blasthole Diameter (D) in mm</td><td>32</td></tr><tr><td>Burden (B) in m</td><td>1.2</td></tr><tr><td>Spacing (S) in m</td><td>1.38</td></tr><tr><td>Subdrill in m</td><td>0.5</td></tr><tr><td>Charge length (C) in m</td><td>0.70</td></tr><tr><td>Stemming</td><td>0.5</td></tr><tr><td>Hole Length (L) in m</td><td>1.2</td></tr><tr><td>Bench Height (BH) in m</td><td>2.5</td></tr><tr><td>Mass of explosive/hole in g</td><td>437.5</td></tr><tr><td>Stemming material size in mm</td><td>3.2</td></tr><tr><td>Burden stiffness ratio</td><td>2.08</td></tr><tr><td>Blast volume/hole in m<sup>3</sup></td><td>4.14</td></tr><tr><td>Production of rough stone/day in m<sup>3</sup></td><td>109</td></tr><tr><td>Number of blast holes/day</td><td>26</td></tr><tr><td>Number of blast round/day</td><td>1</td></tr><tr><td>Blasthole pattern</td><td>Staggered</td></tr><tr><td>Mass of explosive /day in kg</td><td>11.48</td></tr><tr><td>Powder factor in kg/m<sup>3</sup></td><td>0.11</td></tr><tr><td>Loading density</td><td>0.63</td></tr><tr><td>Type of explosives</td><td>Slurry</td></tr><tr><td>Diameter of packaging in mm</td><td>25</td></tr><tr><td>Initiation system</td><td>NONEL</td></tr></table> |                                                                                                                                                                       | BLAST DESIGN |  | Blasthole Diameter (D) in mm | 32 | Burden (B) in m | 1.2 | Spacing (S) in m | 1.38 | Subdrill in m | 0.5 | Charge length (C) in m | 0.70 | Stemming | 0.5 | Hole Length (L) in m | 1.2 | Bench Height (BH) in m | 2.5 | Mass of explosive/hole in g | 437.5 | Stemming material size in mm | 3.2 | Burden stiffness ratio | 2.08 | Blast volume/hole in m <sup>3</sup> | 4.14 | Production of rough stone/day in m <sup>3</sup> | 109 | Number of blast holes/day | 26 | Number of blast round/day | 1 | Blasthole pattern | Staggered | Mass of explosive /day in kg | 11.48 | Powder factor in kg/m <sup>3</sup> | 0.11 | Loading density | 0.63 | Type of explosives | Slurry | Diameter of packaging in mm | 25 | Initiation system | NONEL |
| BLAST DESIGN                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Blasthole Diameter (D) in mm                    | 32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Burden (B) in m                                 | 1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Spacing (S) in m                                | 1.38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Subdrill in m                                   | 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Charge length (C) in m                          | 0.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Stemming                                        | 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Hole Length (L) in m                            | 1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Bench Height (BH) in m                          | 2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Mass of explosive/hole in g                     | 437.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Stemming material size in mm                    | 3.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Burden stiffness ratio                          | 2.08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Blast volume/hole in m <sup>3</sup>             | 4.14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Production of rough stone/day in m <sup>3</sup> | 109                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Number of blast holes/day                       | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Number of blast round/day                       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Blasthole pattern                               | Staggered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Mass of explosive /day in kg                    | 11.48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Powder factor in kg/m <sup>3</sup>              | 0.11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Loading density                                 | 0.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Type of explosives                              | Slurry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Diameter of packaging in mm                     | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Initiation system                               | NONEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                       |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |                                                 |     |                           |    |                           |   |                   |           |                              |       |                                    |      |                 |      |                    |        |                             |    |                   |       |



Note: If >2kg of explosives per day use for blasting if proponent get the permission from the DGMS



Staggered method of mining

**b) Type of explosives used / to be used:**

Following explosives are recommended for efficient blasting with safe practice.

Small dia. 25mm slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of rough stone. No deep hole drilling or primary blasting is proposed.

**c) Measures proposed to minimize ground vibration due to blasting:**

The control blasting measures is being adopted for minimizing ground vibration and fly rock.

Shallow depth jack hammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give hearing effect in rough stone for easy excavation and to control fly rock.

**Delay defonators:**

Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals. The major advantages of delay blasting are:

- ❖ Reduction of ground vibration
- ❖ Reduction in air blast
- ❖ Reduction in over break
- ❖ Improved fragmentation
- ❖ Better control of fly rock

Blasting program for the production per day

|                           |   |                           |
|---------------------------|---|---------------------------|
| No of holes               | : | 26 holes                  |
| Yield                     | : | 109m <sup>3</sup>         |
| Total explosive required  | : | 11.48kg-Slurry explosives |
| Charge per hole           | : | 0.5kg                     |
| Blasting at day time only | : | 12.0p.m-1.0p.m            |



| c)                   | Powder factor in ore and overburden / waste / development heading / stope                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : | Powder factor is proposed as 0.11kg per hole of explosives                                                                                              |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|----------------------|---------------------------------------|-------------------|-----------------------------------|---------------|-------------------------------------|-------------------|----------------------------------------|------------------|------------------------------------------------|
| d)                   | Whether secondary blasting is needed, if so describe it briefly                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | : | There is no secondary blasting involved.                                                                                                                |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| e)                   | Storage of explosives (like capacity and type of explosive magazine)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | : | Storage licenses for explosives in Tamil Nadu are regulated under the Explosives Rules, 2008 by the Petroleum and Explosive Safety Organization (PESO). |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| 6.                   | <b>MINE DRAINAGE:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| a)                   | Likely depth of water table based on observations from nearby wells and water bodies                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | : | The ground water table is reported as of 65m in summer and 60m in rainy season from the below ground level observed in the adjacent bore well.          |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| b)                   | Workings expected to be _____ m. above / reach below water table by the year _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | : | Proposed mining depth is 65m (45m AGL + 20m BGL) will not affect the ground water table.                                                                |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| c)                   | Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged.                                                                                                                                                                                                                                                                                                                                                                                                |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
|                      | <table border="1"> <thead> <tr> <th>Feature</th> <th>Details</th> </tr> </thead> <tbody> <tr> <td>Anticipated Quantity</td> <td>Less than 300 Litres per minute (Lpm)</td> </tr> <tr> <td>Sources of Inflow</td> <td>Rainwater percolation and seepage</td> </tr> <tr> <td>Water Quality</td> <td>Potable (No hazardous contaminants)</td> </tr> <tr> <td>Pumping Equipment</td> <td>7.5 HP Diesel-powered Centrifugal Pump</td> </tr> <tr> <td>Operational Mode</td> <td>Periodical pumping (Standby capacity included)</td> </tr> </tbody> </table> |   |                                                                                                                                                         | Feature | Details | Anticipated Quantity | Less than 300 Litres per minute (Lpm) | Sources of Inflow | Rainwater percolation and seepage | Water Quality | Potable (No hazardous contaminants) | Pumping Equipment | 7.5 HP Diesel-powered Centrifugal Pump | Operational Mode | Periodical pumping (Standby capacity included) |
| Feature              | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| Anticipated Quantity | Less than 300 Litres per minute (Lpm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| Sources of Inflow    | Rainwater percolation and seepage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| Water Quality        | Potable (No hazardous contaminants)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| Pumping Equipment    | 7.5 HP Diesel-powered Centrifugal Pump                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |
| Operational Mode     | Periodical pumping (Standby capacity included)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |                                                                                                                                                         |         |         |                      |                                       |                   |                                   |               |                                     |                   |                                        |                  |                                                |

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|           |                                                                                                                                                                                        |                                                                                                                                                                                                                                                        |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>7.</b> | <b>STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:</b>                                                                                                                              |                                                                                                                                                                                                                                                        |
| a).       | Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the years:<br>No other wastes are removed during years.     |                                                                                                                                                                                                                                                        |
| b).       | Land chosen for disposal of waste with proposed justification                                                                                                                          | : There is no waste are proposed.                                                                                                                                                                                                                      |
| c).       | Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise. | : The recovery of rough stone in this quarry is 100%.                                                                                                                                                                                                  |
| <b>8.</b> | <b>USE OF MINERAL:</b>                                                                                                                                                                 |                                                                                                                                                                                                                                                        |
| a).       | Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)                                                                | : The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc                                                                |
| b).       | Indicate physical and chemical specifications stipulated by buyers                                                                                                                     | : Basically, the materials produced at this quarry are rough stone (charnockite) and gravel the same are used for building materials and road metal. So, there is no chemical specifications are specified. Only physical specifications are involved. |
| c).       | Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.                            | : Not blending process is involved, after blasting the rough stone and gravel will be directly loaded to the needy customer.                                                                                                                           |
| <b>9.</b> | <b>OTHERS</b>                                                                                                                                                                          |                                                                                                                                                                                                                                                        |
|           | Describe briefly the following<br>a) Site services                                                                                                                                     | : Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provided as                                                                                                         |

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per the Metalliferous Mines Regulations, 1961 as a welfare amenity for our quarry laborers.

**b) Employment potential:**

As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision.

The following man power is proposed for quarrying stone material during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of as per the MMR, 1961 norms.

|                |                |                   |                |
|----------------|----------------|-------------------|----------------|
| 1.             | Highly Skilled | Mines Manager     | 1No.           |
|                |                | Mine Engineer     | 1No.           |
|                |                | Mine Geologist    | 1No            |
|                |                | Blaster           | 1No            |
| 2.             | Unskilled      | Musdoor / Labours | 16 No's        |
| <b>Total =</b> |                |                   | <b>20 No's</b> |

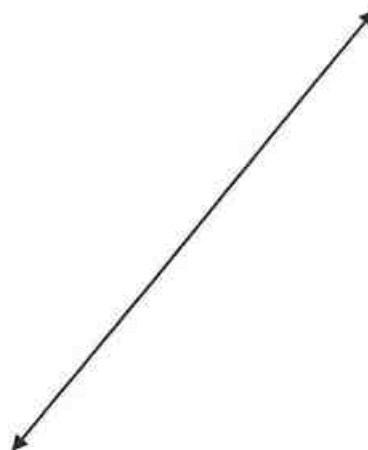
**10 MINERAL PROCESSING/BENEFICIATIONS:**

- (a) If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or, adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate. : Excavated rough stone minerals directly will be used by the applicant for required size  $\frac{1}{2}$ ,  $\frac{3}{4}$  and  $1\frac{1}{2}$  inches Jelly which are mainly used in road and building construction purpose.  
The recovery of rough stone in this quarry is 100%.
- (b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of : No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing

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|     |                                                                                                                                                    |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam). |   | control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.                                                                                                                                                                                                                                                                                                                            |
| (c) | A flow sheet or schematic diagram of the processing procedure should be attached.                                                                  | : | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| (d) | Specify quantity and type of chemicals to be used in the processing plant.                                                                         | : | Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| (e) | Specify quantity and type of chemicals to be stored on site / plant.                                                                               | : | Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| (f) | Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and of recycling.  | : | Drinking is 0.2KLD, utilized water is 0.8KLD, Dust suppression is 1.2KLD and Green Belt is 1.3KLD. Minimum quantity of water 3.5KLD per day. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. The sewage water to a tune of 0.9KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit. |





## **PART – B**

### **11.0 ENVIRONMENTAL MANAGEMENT PLAN:**

**a) Attach a note on the status of Baseline information with regard to the Following :**

| 11.1    | Fresh lease land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------|----|-------------------|-----|---|----------------|-----|---|-------|-----|---|------------|--------|---|------------|-----|---|--------------------------|-----|--|--------------------|---------------|--|
|         | <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Land Use</th><th>Present area (Hect.)</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Area under Mining</td><td>Nil</td></tr> <tr> <td>2</td><td>Infrastructure</td><td>Nil</td></tr> <tr> <td>3</td><td>Roads</td><td>Nil</td></tr> <tr> <td>4</td><td>Unutilized</td><td>2.02.0</td></tr> <tr> <td>5</td><td>Green belt</td><td>Nil</td></tr> <tr> <td>6</td><td>Settling Tank &amp; Drainage</td><td>Nil</td></tr> <tr> <td></td><td><b>Grand Total</b></td><td><b>2.02.0</b></td></tr> </tbody> </table> | Sl. No.                                                                                                                                                                                                                                                                                                                                                                                                                                                | Land Use | Present area (Hect.) | 1. | Area under Mining | Nil | 2 | Infrastructure | Nil | 3 | Roads | Nil | 4 | Unutilized | 2.02.0 | 5 | Green belt | Nil | 6 | Settling Tank & Drainage | Nil |  | <b>Grand Total</b> | <b>2.02.0</b> |  |
| Sl. No. | Land Use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Present area (Hect.)                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 1.      | Area under Mining                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 2       | Infrastructure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 3       | Roads                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 4       | Unutilized                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.02.0                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 5       | Green belt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 6       | Settling Tank & Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
|         | <b>Grand Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>2.02.0</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 11.2    | Water Regime                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | : Water table in this area is noticed at a depth of 65m in summer and 60m in rainy season from the below ground level and presently the quarrying of rough stone is ultimate up to a depth of 65m (45m AGL + 20m BGL). Hence, it will not affect the ground water depletion of this area. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 11.3    | Flora and Fauna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | : There is no major flora observed in this area and except bushes, shrubs, valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.                                                                                                                                                                                                                        |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |
| 11.4    | Quality of air, ambient noise level and water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | : Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.                        |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |  |



|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.5 | <p><b>Climatic conditions:</b></p> <p>This district has moderate climate. In Tiruvannamalai and Thandarampattu taluks, the climate is cool in winter and hot during summer. The district gets rainfall during both north-east monsoon and southwest monsoon. In summer, from march to June, the wind is hot and uncomfortable. In the monsoon season, from July to November, the wind is mild and from December to February, the wind is cold. The hottest month in this district was April (36.3°C) and coldest month in this district was January (21.2°C).</p> <p>The general climate is tropical. The district receives rainfall from Northeast and Southwest monsoons. The total rainfall during 2016-17 districts is 635.8mm.</p> |                                                                                                                                                                                                                                                                                                             |
| 11.6 | Human Settlement:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | : There is no human settlement within 300m radius from the boundary of the proposed area as per TNMMCR 1959.                                                                                                                                                                                                |
| 11.7 | Public buildings, places of worship and monuments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | : There is no public buildings within 50m radius as per TNMMCR 1959.<br>No worship places and monuments within 300m radius as per TNMMCR 1959.                                                                                                                                                              |
| 11.8 | Attach plans showing the locations of sampling stations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | : As per the EIA Notification 2006 quarries must conduct bi-annual (twice a year) environmental monitoring of air, water, noise, and vibration. Samples must be analyzed by a NABL accredited laboratory with reports submitted to the TNPCB and MoEF&CC to ensure compliance with environmental standards. |
| 11.9 | Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : Under <b>Section 19</b> of the Water Act 1974 the State Government has the power to restrict the application of the Act to specific areas. Tamilnadu government not specified the hillock under this act.                                                                                                 |

**b) Attach an Environmental Impact Assessment Statement describing the impact of Mining and beneficiation on environment on the following over the next five years (and upto conceptual plan period for 'A' category mines)**



i) **Land area indicating the area likely to be degraded due to quarrying pitting, dumping, roads, workshop, processing plant, township etc:**

Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:

| Sl. No. | Land Use                | Area in use during the quarrying period (Hect.) |
|---------|-------------------------|-------------------------------------------------|
| 1       | Area under Mining       | 1.46.0                                          |
| 2       | Infrastructure          | 0.02.0                                          |
| 3       | Roads                   | 0.05.0                                          |
| 4       | Green Belt & Earth Bund | 0.40.0                                          |
| 5       | Un-Utilized Area        | 0.07.2                                          |
|         | <b>Grand Total</b>      | <b>2.00.2</b>                                   |

|       |                                   |   |                                                                                                                                                                                                                                                                                                                                        |
|-------|-----------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ii).  | Air Quality                       | : | Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.                                                                                                                                                              |
| iii). | Water quality                     | : | A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.                                                                                                                                                                                                   |
| iv).  | Noise levels                      | : | Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.                                                                                    |
| v).   | Vibration levels due to blasting. | : | Ground vibration studies for the fresh lease area were not conducted initially. In compliance with DGMS guidelines studies will be conducted after obtaining necessary approvals. Until then controlled blasting techniques monitored by a competent person as per the Mines Act 1952 will be used to minimize vibration and fly rock. |
| vi).  | Water regime                      | : | Thenpennai river is located in the southern side away from the lease area at a distance of 430m.                                                                                                                                                                                                                                       |
| vii). | Socio-economics                   | : | Socio-economics are fundamentally tied to the <b>Thenpennai River</b> basin which serves as a primary source for both irrigation and local                                                                                                                                                                                             |

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|        |                           |                                                               |
|--------|---------------------------|---------------------------------------------------------------|
|        |                           | groundwater recharge.                                         |
| viii). | Historical monuments etc. | : There are no historical monuments found around 300m radius. |

c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

|     |                                              |                                                                                                                                                                                                       |
|-----|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| i). | Temporary storage and utilization of topsoil | : Topsoil is rarely "waste" in a quarry. It is a resource for two primary legal requirements: <ul style="list-style-type: none"> <li>• Greenbelt Development</li> <li>• Bench reclamation.</li> </ul> |
|-----|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

ii). Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.

| Year   | Reclamation Activity | Area (Ha) | Implementation Details                                                                  |
|--------|----------------------|-----------|-----------------------------------------------------------------------------------------|
| Year 1 | Safety & Fencing     | 2.00.2    | Construct a barbed wire or rubble masonry fence around the entire lease boundary.       |
| Year 2 | Green Belt Phase I   | 0.40.0    | Planting native species (Neem, Pungam) in the 7.5m safety zone.                         |
| Year 3 | Slope Stabilization  | 0.40      | Re-contouring inactive benches to a safe angle (typically 45°) to prevent landslides.   |
| Year 4 | Drainage & Sump      | 0.05.0    | Creating siltation ponds to collect runoff and prevent silt from entering nearby lands. |

iii). *Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares.*

**Green Belt Development:**

Greenbelt development in the safety zone left on all sides, two sides of the approach road, village road with appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described

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below

| Year   | Place                                 | Area in Sq.m | No.of Plants | Rate of survival | Rate                | Amount in Rs |
|--------|---------------------------------------|--------------|--------------|------------------|---------------------|--------------|
| First  | Lease Boundary                        | 4000         | 440          | 80%              | @100 Rs Per sapling | 44,000/-     |
| Second | Approach road and Nearby Village Road | --           | 400          | 80%              |                     | 40,000/-     |
| Third  | Schools                               | --           | 300          | 80%              |                     | 30,000/-     |
| Total  |                                       |              |              |                  |                     | 1,14,000/-   |

**Annual Maintenance Schedule (Years 1-5)**

| Year       | Primary Maintenance Activities                                                                    | Frequency / Intensity        | Key Objective           |
|------------|---------------------------------------------------------------------------------------------------|------------------------------|-------------------------|
| <b>1st</b> | Watering, Weeding (Monthly for first 2 months), Mulching (5-7 inch layer), Manuring and Fencing   | High (Daily to 3 times/week) | Establishment & Rooting |
| <b>2nd</b> | Gap Filling (Replacement of dead saplings), Soil Working, Weeding (once in 6 months) and Watering | Moderate (2-3 times/week)    | Growth & Survival       |
| <b>3rd</b> | Gap Filling (final round), Soil Working, Pruning and limited Irrigation                           | Low (Weekly/As needed)       | Self-Sustainability     |
| <b>4th</b> | Survival Monitoring, Protection of established trees, and Soil Nutrient Analysis                  | Periodic (Quarterly)         | Stability               |
| <b>5th</b> | Final Evaluation for Conceptual Plan, Thinning (if required) and Fire Line maintenance            | Annual                       | Long-term Integration   |

**Standard Specifications for Maintenance**

| Activity       | Specification / Requirement                                                       |
|----------------|-----------------------------------------------------------------------------------|
| Watering       | Minimum 5 litres per sapling, every 2-3 days during the first two years.          |
| Pit Enrichment | 1m <sup>3</sup> pit filled with sand, silt and farm yard manure in a 3:1:1 ratio. |
| Ring Bunds     | 1m diameter bunds around saplings to retain water and nutrients.                  |
| Gap Filling    | Mandatory replacement of dead plants annually to maintain 2,500 plants/Ha.        |
| Soil Working   | Weeding and soil raking every two months in the initial phase.                    |



|        |                                                                                                                                                               |   |                                                                                                                                                                                                             |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| iy).   | Stabilization and vegetation of dumps along with waste dump management Year wise for the five years (and upto conceptual plan period for 'A' category mines). | : | No waste or rejects shall be proposed.                                                                                                                                                                      |
| v).    | Measures to control erosion / sedimentation of water courses.                                                                                                 | : | Not applicable. There is no major dumps are stabilize in this quarry area.                                                                                                                                  |
| vi).   | Treatment and disposal of water from mine.                                                                                                                    | : | It will not be harmful and it does not require any treatment before discharging into the natural courses.                                                                                                   |
| vii).  | Measures for minimizing adverse effects on water regime.                                                                                                      | : | There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.                                                                |
| viii). | Protective measures for ground vibrations / air blast caused by blasting,                                                                                     | : | It is a small "B" category open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry. |
| ix).   | Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.                       | : | No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.                                                                                         |
| x).    | Socioeconomic benefits arising out of mining.                                                                                                                 | : | The nearest villages are will get employment benefits.                                                                                                                                                      |

**d). Monitoring schedules for different environmental components after the commencement of mining and other related activities. (for 'A' category mines only)**

Not applicable. It is B category quarry

#### **12.0 PROGRESSIVE QUARRY CLOSURE PLAN:**

|      |                                                                               |   |                                                                                                                                                                                         |
|------|-------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1 | Steps proposed for phased restoration, reclamation of already mined out area. | : | The Ultimate mining is proposed to an average depth of 65m (45m AGL + 20m BGL).                                                                                                         |
| 12.2 | Measures to be under taken on mine closure as per Act & Rules                 | : | As per MCDR 2017 every mine must have two types of closure plans. <ul style="list-style-type: none"> <li>• Progressive mine closure plan</li> <li>• Final mine closure plan.</li> </ul> |



|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   | Financial assurance is a security provided by the lessee to guarantee the implementation of the closure plan.<br><b>Minimum threshold:</b> 5lakh for “B” category mines or 3lakh per hectare. <i>(Average daily employment 25 persons or fewer classified as B category mines.)</i> |        |                  |          |                                                                                                              |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|----------|--------------------------------------------------------------------------------------------------------------|
| 12.3     | Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | : | The quarry lease is a fresh mining lease.                                                                                                                                                                                                                                           |        |                  |          |                                                                                                              |
| 12.4     | Mine closure activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | : | The proposed site is new for roughstone quarrying. This plan covers production for the first five years.                                                                                                                                                                            |        |                  |          |                                                                                                              |
| 12.5     | <b>Safety and security :</b><br>In accordance with the Metalliferous Mines Regulations (MMR), 1961 safety and security for small mechanized opencast mining operations under the jurisdiction of the Directorate General of Mines Safety (DGMS) must include the following measures. <ul style="list-style-type: none"><li>• Access control and fencing.</li><li>• Personal protective equipment (PPE) for workers.</li><li>• Heavy earth moving machinery (HEMM) approval from DGMS under Regulation 106 of MMR 1961.</li><li>• Health and Environment monitoring such as dust control and periodic medical examination (PME) every 3 years for workers.</li></ul> |   |                                                                                                                                                                                                                                                                                     |        |                  |          |                                                                                                              |
| 12.6     | <b>Disaster management and Risk Assessment:</b><br>In opencast roughstone mining risk assessment and disaster management focus on hazards like flyrock, slope failure, and HEMM (Heavy Earth Moving Machinery) accidents. These operations are strictly governed by the Director General of Mines Safety (DGMS) under the Mines Act, 1952 and Metalliferous Mines Regulations (MMR), 1961.<br><b>Preventive Mitigation Measures</b> <table><tr><th>Hazard</th><th>Control Strategy</th></tr><tr><td>Blasting</td><td>Use controlled blasting, maintain a 500m safety radius, sound sirens before firing, deploy trained blasters.</td></tr></table>                 |   |                                                                                                                                                                                                                                                                                     | Hazard | Control Strategy | Blasting | Use controlled blasting, maintain a 500m safety radius, sound sirens before firing, deploy trained blasters. |
| Hazard   | Control Strategy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |                                                                                                                                                                                                                                                                                     |        |                  |          |                                                                                                              |
| Blasting | Use controlled blasting, maintain a 500m safety radius, sound sirens before firing, deploy trained blasters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |                                                                                                                                                                                                                                                                                     |        |                  |          |                                                                                                              |

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|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                      |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|      | <b>Slope Failure</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Maintain bench height (max 6m) and width<br>keep pit slope at a safe angle (typically 45°-60°)<br>clear loose rocks from high walls. |
|      | <b>Machinery</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Install audio-visual reversing alarms<br>limit haul road gradients to 1 in 16<br>conduct weekly mechanical checks.                   |
|      | <b>Dust/Health</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Implement <b>wet drilling</b><br>use water tankers for dust suppression on roads<br>provide PPE (masks, helmets, ear muffs).         |
| 12.7 | <p>Care and maintenance during temporary discontinuance:</p> <ul style="list-style-type: none"> <li>• <b>Notice of Discontinuance:</b> A formal "Board of Discontinuance" will be prominently displayed at the main entrance of the workplace. This board will include contact information for the site manager and the expected duration of the shutdown.</li> <li>• <b>Restricted Entry:</b> All secondary access points will be secured to prevent unauthorized entry.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                      |
| 12.8 | <p><b><i>Economic repercussions of closure of quarry and man power entrenchments:</i></b></p> <p>For roughstone mines with a <b>10-year life period</b> the economic repercussions of closure and manpower retrenchment shift from temporary disruption to a permanent structural decline for the local community. Unlike shorter leases (e.g., 5 years) where workers might easily revert to agriculture a 10-year period typically solidifies the quarry as the primary economic pillar making its closure more impactful. Government of India under the <b>Industrial Disputes Act, 1947</b> (and the updated <b>Industrial Relations Code, 2020</b>) drivers and JCB operators who have completed at least one year of continuous service are entitled to:</p> <ul style="list-style-type: none"> <li>• <b>Retrenchment Compensation:</b> A mandatory payout equivalent to 15 days' average pay for every completed year of service.</li> <li>• <b>Notice Pay:</b> One month's written notice or wages in lieu of notice before termination.</li> <li>• <b>Re-skilling Fund:</b> Under the new labour codes effective late 2025 employers must contribute an additional 15 days wages into a dedicated fund to help retrenched workers learn new skills for other sectors.</li> </ul> |                                                                                                                                      |

14-11-22



### 12.9 Proposed Financial Estimate / Budget for (EMP) Environment Management:

|   |                                                      |                                       |
|---|------------------------------------------------------|---------------------------------------|
| A | <b>Fixed Asset Cost:</b>                             |                                       |
|   | 1. Land Cost (Tender Cost)                           | : Rs. 2,08,05,000/-                   |
|   | 2. Labour Shed                                       | Rs. 1,00,000/-                        |
|   | 3. Sanitary Facility                                 | : Rs. 1,00,000/-                      |
|   | 4. Fencing                                           | : Rs. 2,30,000/-                      |
|   | 5. Other expenses (Security guard, dust bin, etc)    | : Rs. 4,00,000/-                      |
|   | <b>Total</b>                                         | : <b>Rs. 2,16,35,000/-</b>            |
| B | <b>B. Machinery cost</b>                             | : <b>Rs. 25,00,000/- (Hire Basis)</b> |
| C | <b>Total Expenditure of EMP cost (for Ten years)</b> |                                       |
|   | 1. Drinking Water Facility                           | : Rs. 1,00,000/-                      |
|   | 2. Sanitary facility & Maintenance                   | : Rs. 2,00,000/-                      |
|   | 3. Permanent water sprinkler                         | : Rs. 1,50,000/-                      |
|   | 4. Afforestation and its maintenance                 | : Rs. 1,14,000                        |
|   | 5. Safety Kits                                       | : Rs. 1,00,000/-                      |
|   | 6. Provision of tyre washing facility                | : Rs. 1,50,000/-                      |
|   | 7. Blasting materials with blast mat cost            | : Rs. 10,00,000/-                     |
|   | 8. Environment monitoring                            | : Rs. 5,00,000/-                      |
|   | <b>Total</b>                                         | : <b>Rs. 23,14,000/-</b>              |
| D | <b>Total Project Cost (A+B+C)</b>                    | : <b>Rs. 2,64,49,000/-</b>            |

### 13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small "B" rough stone and gravel quarry.

### 14.0 CERTIFICATES:

All required certificates are enclosed.

### 15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

### 16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- I. Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- II. The applicant will endeavor every attempt to quarry the rough stone economically without any wastage and to improve the environment and ecology.

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### 17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the applicant @ 2.0% of average net profit of the company for the last three financial years to the nearby village on the Ministry has notified the amendments in section 135 of the Act as well in the CSR Rules on 22<sup>nd</sup> January 2021 as circular no. CSR-05/01/2021-CSR-MCA dated 25<sup>th</sup> August 2021.

Place: Dharmapuri, TN

Date: 17/2/26

Signature of the Qualified Person

**Dr.S.KARUPPANNAN,M.Sc,Ph.D.,**  
Qualified Person  
GEO TECHNICAL MINING SOLUTIONS  
A NAAT Accredited and ISO Certified Company  
1/214.B Ground Floor, Natesan Complex,  
C. P. S. Post Office, Oddapatti,  
Dharmapuri - 62705, TamilNadu, India

**This Mining Plan Is Approved**  
**Subject to the Conditions/Stipulation**  
**Indicated In The Mining Plan Approval**  
**Letter No. 728 /mines/2025 Dt: 20.2.2026**  
**Office Of The Deputy Director Of**  
**Geology And Mining, Tiruvannamalai.**

20.2.2026  
**Deputy Director,**  
**Geology and Mining,**  
**Tiruvannamalai.**

20/2/26

ந.க.எண்.728/கனிமம்/2025

துணை இயக்குநர் அலுவலகம், திருவண்ணாமலை  
புவியியல் மற்றும் சுரங்கத்துறை,  
திருவண்ணாமலை  
நாள். 13.02.2026



அறிவிக்கை

பொருள்: கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - கல்குவாரிகள் - மின்னணு பொது ஏலம் (E-Auction) - திருவண்ணாமலை மாவட்டம் - தண்டராம்பட்டு வட்டம் - அல்லப்பனூர் கிராமம் அரசு புறம்போக்கு புல எண். 51 (பகுதி-4)ல் 2.00.2 ஹெக்டேர் பரப்பில் - அதிகபட்ச ஏலத்தொகை கோரிய Tvl.RVM Blue Metals என்ற நிறுவனத்தின் பெயரில் ஏலம் ஊர்ஜிதம் செய்யப்பட்டது - முழு ஏலத்தொகையும் செலுத்தப்பட்டுள்ளது - சுரங்கத் திட்ட அறிக்கை மற்றும் தமிழ்நாடு சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மைச் சான்று பெற்று சமர்ப்பிக்க அறிவுறுத்தல் - தொடர்பாக.

- பார்வை: 1. திருவண்ணாமலை மாவட்ட அரசிதழ் சிறப்பு வெளியீடு எண்.9, நாள். 04.11.2025.  
2. மின்னணு ஏல நாள். 10.12.2025.  
3. இவ்வலுவலக கடிதம் இதே எண். நாள்.11.12.2025.  
4. Tvl.RVM Blue Metals என்ற நிறுவனத்தின் கடிதம் நாள்.12.12.2025.  
5. இவ்வலுவலக கடிதம் இதே எண். நாள். 12.12.2025.  
6. Tvl.RVM Blue Metals என்ற நிறுவனத்தின் கடிதம் நாள்.13.01.2025.

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திருவண்ணாமலை மாவட்ட அரசிதழ் சிறப்பு வெளியீடு எண். 09, நாள். 04.11.2025 மூலம் திருவண்ணாமலை மாவட்டத்திற்குட்பட்ட அரசு புறம்போக்கு நிலங்களில் சாதாரண கல்குவாரி அமைப்பதற்கு தகுதி வாய்ந்த இனங்களுக்கு மின்னணு ஒப்பந்தப்புள்ளி டெண்டர்/ஏலம் குறித்த அறிவிப்பு வெளியிடப்பட்டது.

மேற்படி அரசிதழில் வரிசை எண்.5ல் கண்ட திருவண்ணாமலை மாவட்டம், தண்டராம்பட்டு வட்டம், அல்லப்பனூர் கிராமம் அரசு புறம்போக்கு புல எண். 51 (பகுதி-4)ல் 2.00.2 ஹெக்டேர் பரப்பில் கற்குவாரி செய்ய, 10 ஆண்டுகளுக்கு குத்தகை உரிமம் வழங்க, இணையதளம் மூலம் விண்ணப்பங்கள் வரவேற்கப்பட்டு, 10.12.2025 அன்று நடைபெற்ற ஏலத்தில் ரூ.2,08,05,000/- (ரூபாய் இரண்டு கோடியே எட்டு இலட்சத்து ஐந்தாயிரம்



மட்டும்) ஏலம் கோரிய Tvl.RVM Blue Metals என்ற நிறுவனத்தினர் உயர்ந்தபட்ச ஏலதாரராக தேர்ந்தெடுக்கப்பட்டுள்ளது.

3. இது தொடர்பாக, ஏலதாரர் ஏலத்தொகையை அரசுக்கணக்கில் செலுத்துமாறு அறிவுறுத்தப்பட்டு, முழு ஏலத்தொகையும் ஏலதாரரால் கீழ்க்கண்டவாறு அரசுக்கணக்கில் செலுத்தப்பட்டுள்ளது.

| சலான் நாள்                             | சலான் எண்.     | வங்கி          | இனம்                | ஏலத்தொகை<br>(ரூபாயில்) |
|----------------------------------------|----------------|----------------|---------------------|------------------------|
| விண்ணப்பிக்கும் போது செலுத்தப்பட்ட EMD |                |                |                     | 10,00,000              |
| 16.12.2025                             | 20251216034150 | Indian<br>Bank | ஏலத்தொகையில்<br>10% | 20,80,500              |
| 30/12/2025                             | 20251230029372 |                | ஏலத்தொகையில்<br>90% | 30,00,000              |
| 06.01.2026                             | 20260106011034 |                |                     | 95,00,000              |
| 07.01.2026                             | 20260107010755 |                |                     | 52,24,500              |
| மொத்தம்                                |                |                |                     | 2,08,05,000            |

4. பார்வை 5ல் காணும் கடிதத்தில் ஏலதாரர், ஏலத்தொகையில் 20% தொகைக்கு /மதிப்பிற்கு குறைவில்லாமல் அசையா சொத்து (Solvency Certificate of Immovable Properties) மதிப்பு சான்றிதழ் மற்றும் ஏலத்தொகையில் 2% வருமானவரி (TCS) கணக்கிட்டு ரூ. 4,16,100/- (ரூபாய் நான்கு இலட்சத்து பதினாறாயிரத்து நூறு மட்டும்)ஐ செலுத்தப்பட்டதற்கான சலான் ஆகியவற்றை சமர்ப்பித்துள்ளார்.

5. எனவே, ஏலதாரர் Tvl.RVM Blue Metals என்ற நிறுவனத்தினருக்கு இத்துடன் இணைக்கப்பட்டுள்ள புலப்படத்தில் வண்ணம் தீட்டப்பட்ட பகுதியினை கற்குவாரி செய்ய உகந்த புலம் (Precise Area) என தீர்மானித்து அறிவிப்பு செய்யப்படுகிறது.

6. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959, விதிகள் 41 மற்றும் 42ன்படி கல் மற்றும் இதர சிறு கனிமங்களுக்கு குவாரி குத்தகை உரிமம் வழங்கும் முன்பு ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்று பெறப்பட வேண்டும் என வரையறுக்கப்பட்டுள்ளது.

7. எனவே, ஏலதாரர் Tvl.RVM Blue Metals என்ற நிறுவனத்தினர் ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்றினை பெற்று சமர்ப்பிக்கும் பட்சத்தில் திருவண்ணாமலை மாவட்டம், தண்டராம்பட்டு வட்டம், அல்லப்பனூர் கிராமம் அரசு புறம்போக்கு புல எண். 51 (பகுதி-4)ல் 2.00.2 ஹெக்டேர் பரப்பில் கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு கற்குவாரி செய்ய 1959ம் ஆண்டு

## 238

GOVERNMENT OF TAMILNADU  
2025



# TIRUVANNAMALAI DISTRICT GAZETTE

EXTRAORDINARY PUBLISHED BY AUTHORITY



TIRUVANNAMALAI, TUESDAY, NOVEMBER 4, 2025.

No. 9]

Ippasi 18, Visuvaavasu, Thiruvalluvar Aandu 2056.

## NOTIFICATION BY DISTRICT COLLECTOR

(Rc.No.655/Mines/2025 Dated.03-11-2025)

E-mail: (minestntvm10@gmail.com)

\*\*\*\*\*

### Notice Inviting Tender (NIT)

### "Inviting Application for Grant of Rough stone Quarry Leases in Government Lands"

In exercise of the power conferred by Section 15 of Mines and Mineral (Development & Regulation) Act, 1957 and in accordance with the Rule 8 of the Tamil Nadu Minor Mineral Concession Rules, 1959 read with G.O. Ms. No.21, Natural Resources (MMC.1), 31st July 2024 as amended from time to time notified there under, the District Administration of Tiruvannamalai District, Tamil Nadu has identified 7 (Seven) areas in Tiruvannamalai District for grant of leases to quarry Rough stone through electronic tender /auction (e-tender / auction).

E-tender with forward bidding is invited through the e-tendering portal by District Collector, Tiruvannamalai District for the grant of quarry lease in Government Lands for quarrying "Rough Stone" available in Tiruvannamalai District as indicated in the Annexure-I.

Tiru Dist. Gazt. Extry. 9.

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The tender process is online at e-portal URL, address <https://tntenders.gov.in>. bidders may download and go through the tender document available in the site to know the details of e-auction process. Intending bidders are advised to visit the mentioned site regularly till closing date of E-auction for any corrigendum / addendum / amendment.

Prospective bidders are advised to get themselves registered at Tamil Nadu tender portal, obtain 'login ID' & 'password' and go through the instructions available in the Home page after log in to the Tamil Nadu Tender Portal <https://tntenders.gov.in>. They should also obtain Digital Signature Certificate (DSC) in parallel which is essentially required for submission of their application.

**Application Fee – Rs.5,000 (Non – Refundable) for each quarry**

Bid submission start date : 11-11-2025 from 11.00 hrs

Bid Submission end date : 25-11-2025 up to 16.00 hrs

Financial bid opening and live e-auction date : Will be intimated later on through Tamil Nadu e-Tender portal

**ANNEXURE-I**

List of Areas identified in Government Lands in Tiruvannamalai District of Tamil Nadu for Grant of Rough Stone Quarry Leases through e-Auction

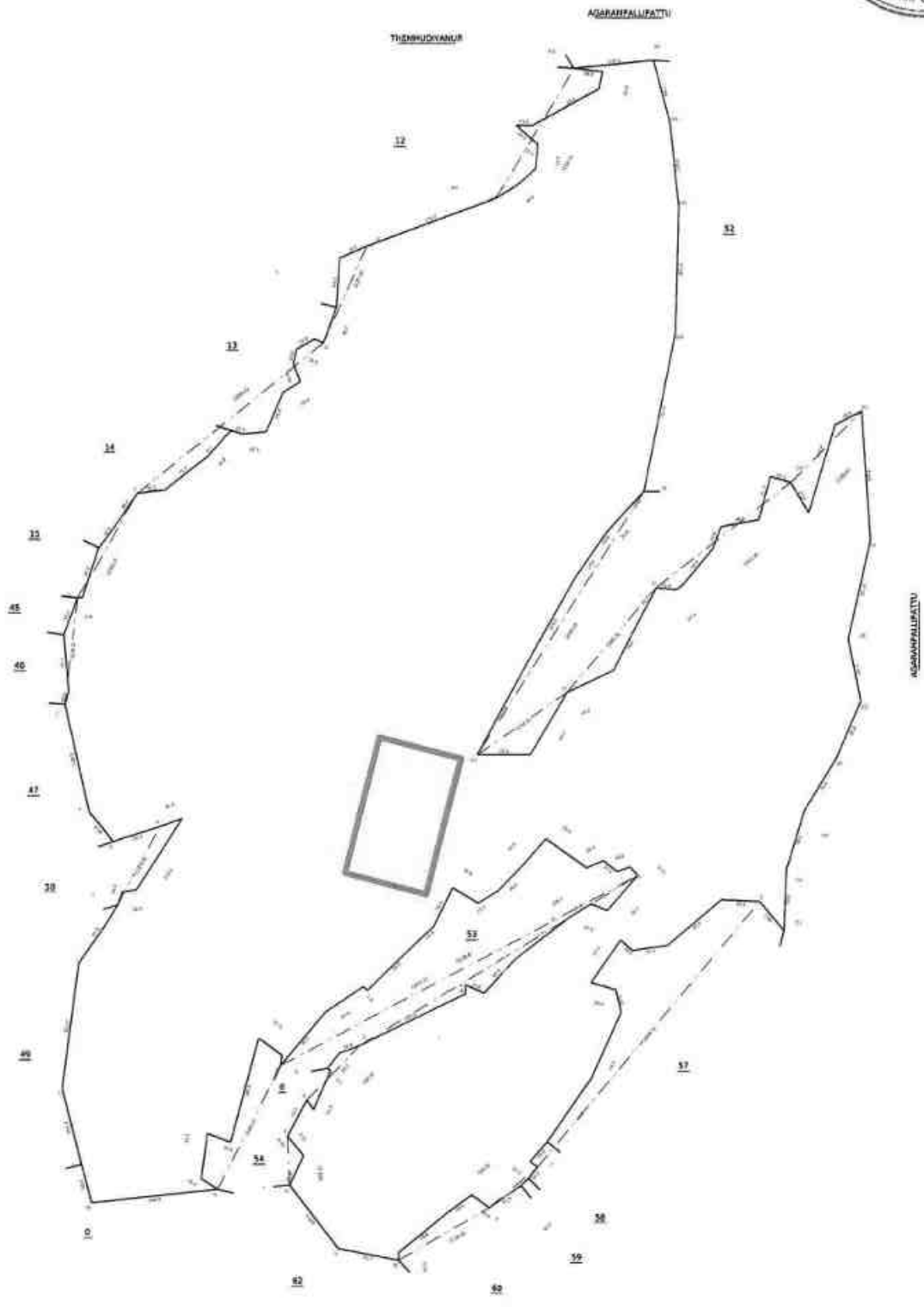
| Sl.No.                    | Village      | S.F.No.        | Extent (in Ha.) | Land Classification | Lease Period (in Years) |
|---------------------------|--------------|----------------|-----------------|---------------------|-------------------------|
| <b>THANDAMPATTU TALUK</b> |              |                |                 |                     |                         |
| 1                         | Varagur      | 3 (Part-5)     | 2.00.0          | UAW (Kadu)          | 10 Years                |
| 2                         | Peryampattu  | 45/2 (Part-2)  | 2.00.0          | UAW (Malai)         | 10 Years                |
| 3                         | Thondamanur  | 59 (Part-C)    | 1.50.0          | UAW (Malai)         | 10 Years                |
| 4                         | Thondamanur  | 59 (Part-D)    | 1.50.0          | UAW (Malai)         | 10 Years                |
| 5                         | Allappanur   | 51 (Part-4)    | 2.00.2          | UAW (Malai)         | 10 Years                |
| 6                         | Sathanur     | 258/5 (Part-A) | 1.00.0          | UAW (Kallanguthu)   | 5 Years                 |
| 7                         | Se-Andapattu | 54/39 (Part-2) | 2.25.0          | (Govt Punjai)       | 5 Years                 |
| <b>Total</b>              |              |                | <b>12.25.2</b>  |                     |                         |

Tiruvannamalai,  
3rd November 2025.

**K. THARPAGARAJ,**  
District Collector,  
Tiruvannamalai.

Printed by the Commissioner Stationery and Printing at the Government Branch Press, Vriddhachalam and Published by the Collector of the District.

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LEASE AREA

2/14/26, 11:22 AM

வட்டாட்சியர் அலுவலக இணைய சேவை - அ-பதிவேடு விவரங்களை பார்வை  
அ-பதிவேடு விவரங்கள் - ஊரகம்



மாவட்டம் : திருவண்ணாமலை

வட்டம் : தண்டராம்பட்டு

கிராமம் : அல்லப்பனூர்

|                              |       |                                |            |
|------------------------------|-------|--------------------------------|------------|
| 1. புல எண்                   | 51    | 9. மண் வயனமும்<br>ரகமும்       | 0 - 0      |
| 2. உட்பிரிவு எண்             | -     | 10. மண் தரம்                   | 0          |
| 3. பழைய புல<br>உட்பிரிவு எண் | 51    | 11. தீர்வை (ரூ -<br>ஹெ)        | 0.0        |
| 4. பகுதி                     | -     | 12. பரப்பு<br>(ஹெக்டேர் - ஏர்) | 92 - 94.00 |
| 5. அரசு /<br>ரயத்துவாரி      | அரசு  | 13. மொத்த தீர்வை<br>(ரூ - பை)  | 0.0        |
| 6. நிலத்தின் வகை             | தரிசு | 14. பட்டா எண்                  | 0          |
| 7. பாசன ஆதாரம்               | 0     | 15. குறிப்பு                   | -          |
| 8. இரு போகமா                 | 0     | 16. பெயர்                      |            |

17. புறம்போக்கு வகை

|           |                                                                                                                                                                                                                                                                                 |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| குறிப்பு: |                                                                                                                                                                                                                                                                                 |
|           | <p>1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <a href="https://eservices.tn.gov.in">https://eservices.tn.gov.in</a> என்ற இணைய தளத்தில் 06/07/012/51/-/110270 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.</p> |

Back | Home



Government of India  
Form GST REG-06  
(See Rule 10(1))



Registration Certificate

Registration Number : 33ABGFR1150D1ZR

|                                                                                                                    |                                        |                                                                                                                      |                                                                                       |    |                |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----|----------------|
| 1.                                                                                                                 | Legal Name                             | RVM BLUE METALS                                                                                                      |                                                                                       |    |                |
| 2.                                                                                                                 | Trade Name, if any                     | RVM BLUE METALS                                                                                                      |                                                                                       |    |                |
| 3.                                                                                                                 | Additional trade names, if any         | null                                                                                                                 |                                                                                       |    |                |
| 4.                                                                                                                 | Constitution of Business               | Partnership                                                                                                          |                                                                                       |    |                |
| 5.                                                                                                                 | Address of Principal Place of Business | 264/1, pudur chekkadi, Thanipadi, Tiruvannamalai, Tamil Nadu, 606708                                                 |                                                                                       |    |                |
| 6.                                                                                                                 | Date of Liability                      |                                                                                                                      |                                                                                       |    |                |
| 7.                                                                                                                 | Period of Validity                     | From                                                                                                                 | 07/01/2023                                                                            | To | Not Applicable |
| 8.                                                                                                                 | Type of Registration                   | Regular                                                                                                              |  |    |                |
| 9.                                                                                                                 | Particulars of Approving Authority     | Signature Not Verified<br>Digitally signed by: DC GOODS AND SERVICES TAX NETWORK 07<br>Date: 2023.01.07 19:45:35 IST |                                                                                       |    |                |
| Signature                                                                                                          |                                        |                                                                                                                      |                                                                                       |    |                |
| Name                                                                                                               |                                        | VENKATACHALAPATHY PRAKASH                                                                                            |                                                                                       |    |                |
| Designation                                                                                                        |                                        | Assistant Commissioner                                                                                               |                                                                                       |    |                |
| Jurisdictional Office                                                                                              |                                        | THIRUVANNAMALAI - II                                                                                                 |                                                                                       |    |                |
| 9. Date of issue of Certificate                                                                                    |                                        | 07/01/2023                                                                                                           |                                                                                       |    |                |
| Note: The registration certificate is required to be prominently displayed at all places of business in the State. |                                        |                                                                                                                      |                                                                                       |    |                |

This is a system generated digitally signed Registration Certificate Issued based on the approval of application granted on 07/01/2023 by the jurisdictional authority.



Annexure A



GSTIN 33ABGFR1150D1ZR

Legal Name RVM BLUE METALS

Trade Name, if any RVM BLUE METALS

Additional trade names, if any null

## Details of Additional Places of Business

Total Number of Additional Places of Business in the State 0



सत्यमेव जयते



GSTIN 33ABGFR1150D1ZR  
 Legal Name RVM BLUE METALS  
 Trade Name, if any RVM BLUE METALS  
 Additional trade names, if any null

#### Details of Managing / Authorized Partners

|   |                                                                                   |                    |                      |
|---|-----------------------------------------------------------------------------------|--------------------|----------------------|
| 1 |  | Name               | RAMALINGAM MURUGESAN |
|   |                                                                                   | Designation/Status | Managing Partner     |
|   |                                                                                   | Resident of State  | Tamil Nadu           |
| 2 |  | Name               | ANITHA               |
|   |                                                                                   | Designation/Status | Partner              |
|   |                                                                                   | Resident of State  | Tamil Nadu           |

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தமிழ்நாடு தமிழ்நாடு TAMILNADU

25 NOV 2022

CT 947436

நா.ருத்திரன்,

மு.தா.வி. உரிமம் எண்: 9/20  
2நீ திருவண்ணாமலை மாவட்டம், தமிழ்நாடு

**PARTNERSHIP DEED**  
**M/S RVM BLUE METALS**

This Deed of Partnership made on this 25<sup>th</sup> Day of November 2022 by and between:

1. R. Murugesan S/o. Thiru. Ramalingam, aged about 48 years, now residing at No. 344 Kataiya Gounder thanipadi Village & Post, Thandrapet Taluk, Tiruvannamalai District, hereinafter called the Party of the FIRST PART.

2. G. Anitha W/O R. Murugesan aged about 39 years, now residing at No. 344 Kataiya Gounder thanipadi Village & Post, Thandrapet Taluk, Tiruvannamalai District, hereinafter called the Party of the SECOND PART.

Whereas the Parties of the First Part and Second part decided to carry on partnership business under the name and style of " M/S RVM BLUE METALS" with effect from 25-11-2022 according to the terms and conditions of the partnership mutually agreed upon with office at Thanipadi.

1. R. Murugesan

2. G. Anitha



தமிழ்நாடு தமிழ்நாடு TAMILNADU<sup>2</sup>

NOW THIS DEED WITNESS THAT:

CT 947435

25 NOV 2022

நா.ருத்திரன்.

The Name of the Partnership Business shall be "M/S RVM BLUE METAL" and/or such other name/s as may be mutually decided by the parties hereto. மு.தா.வி.. உரிமம் எண்: 9/2008, இணை சார்பதிக வளாகம் திருவண்ணாமலை, தமிழ்நாடு

**2. Place of Business:**

The Place of Business shall be at No.344, Kataiya Gounder Street, thanipadi Village & Post, Thandrampet Taluk, Tiruvannamalai District. The parties hereto by mutual consent may carry on the business at such other places as may be mutually decided.

**3. Business:**

The Business of the Partnership shall be "Running of Blue metal crusher and M Sand" or such other business as may be mutually decided by the parties hereto.

**4. Capital:**

The Party of the First Part & Second part agrees to contribute Rs.1,00,000/- each towards their capital. Wherever additional funds are required for proper and sufficient conduct of the business it shall be contributed by the parties hereto or funds shall be raised by way of borrowings either from the parties hereto or from outsiders. In either case interest shall be paid on such borrowings at prevailing market rates and it shall be treated as expenditure of the partnership business.

12/11/22

25/11/22



தமிழ்நாடு தமிலநாடு TAMILNADU

CT 947434

25 NOV 2022

—3—

நா.ருத்திரன்,

மு.தா.வி.. உரிமம் எண்: 9/2003,  
2நீ இணை சார்பதிவுக வளாகம்  
திருவண்ணாமலை தமிழ்நாடு

**5. Interest:**

Interest shall be paid to partners at a simple rate of 12% interest or such other rate as may be prescribed by IT Act then and there, shall be calculated and credited to partner's capital/current accounts at the end of the year. If the Profits are not sufficient, interest shall be restricted to the amount of profit available. In case of Loss no interest shall be paid to the partners.

**6. Managing Partner:**

The Party of the First Part Shall be the Managing Partner of the firm. Party of the First Part Shall be allowed to represent on behalf of the firm. All the partners are working partners of the firm. All the partners will engage themselves in conducting the affairs of the firm.

The Party of the FIRST PART shall have the power to sign all correspondence on behalf of the firm connected with the Partnership business before Government Authorities like Pollution, Goods and Service tax Departments, Income Tax Department, Government Departments or Agencies etc on behalf of the firm.

**7. Remuneration to Working Partner:**

The Working Partners shall be paid remuneration for the services rendered by them. The remuneration payable to the each working partner will be as follows:

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| If the book profit is negative       | Rs.150000/-                           |
| On first Rs.300000/-of book profit   | Rs. 75000/- or 90% of the book profit |
| Whichever is more.                   |                                       |
| On the balance of the book profits - | 60% of the book profits               |

1. கருது

2. பதிவு

சு. 17



#### **8. Books of Accounts:**

Proper books of account shall be maintained in respect of all the transactions of the Partnership business. All books, Vouchers, Files and other documents relating to the partnership business shall be kept in the place of business of the firm. All partners or their authorized agent shall have power to inspect the books etc., at all business hours of the firm and shall have power to take copies, notes or extracts from them.

#### **9. Shares in Profit and Losses:**

Every year the books of accounts shall be closed to Profit and Loss Account on 31<sup>st</sup> March and the Net Profit/Loss shall be divided or borne by the partners as detailed below:

1. Party of the first Part - 30%
2. Party of the second part - 70%

#### **10. Bank Accounts:**

Bank Account/s shall be opened in the name of the firm and the same shall be operated by party of the first part. To operate, bank shall include power to operate any OCC, Loan Account, Current Account and any other account of the firm.

#### **11. Power to Borrow**

Partners shall borrow from time to time such sum or sums of money, at such interest for such period and on such terms and conditions of lending institutions with security by mortgaging movable or immovable property of the firm or without securities by any one or all of the partners as may be agreed to by the firm and lending institutions.

#### **12. Duties of Partners:**

The partners shall be true and adjust to each other in all transactions and dealings, and at all times during the continuance of the partnership, diligently and faithfully employ themselves in the conduct of the management of the said firm. The partners shall meet as and when necessary for the efficient and smooth running of the firm.

No one partner shall individually instruct or interfere in the working of the firm on the administrative or executive side of the business of the firm. Each partner shall discharge his individual debts, and the firm or its assets shall in no way be bound or made liable for any individual debts of the partners. The partners are at liberty to carry on any other business similar to or otherwise with that of this firm either individually or in association with others.

12-7-7

2 5 21/11/11



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### 13. Restrictions on Partners:

i) No partner shall in any event obstruct or stop the running of the business of the firm either directly or through any other person like the appointment of an administrator, receiver or liquidator any partner obstructs or interferes with the partnership business through any such third person or through any process of law or otherwise, he shall be liable to pay damages for all losses, financial or otherwise to all the other partners of the firm.

ii) No partner shall have the right or power to sell the immovable properties if any or the major assets of the firm without the consent of all the partners, from the firm his/her share of interest in the firm shall not be sold to any outsider without the written consent of all the existing partners.

In any such event the retiring partner shall first give an option in writing by registered post acknowledgment due, to all the existing partners to purchase his share or interest, only if none of the existing partners are unwilling to purchase by his share, the share or interest shall be sold to an outsider. The refusal to buy the retiring partner's share by the other partners shall be in writing.

### 14. Expulsion of partners:

If any partner refuses, to attend to the business or the partners meetings, consecutively for 3 meetings, sign any paper required for the business or for the improvement of the business, or refuses to sign the papers for obtaining loans or renewal of loans, obtaining or renewal of licenses or applying for Income Tax registration or continuance thereof or any other papers required to be signed by various departments such as Sales Tax, Corporation Tax, Police Department(s) etc., such partner or partners refusing to sign will be deemed as a non-co-operating partner and can be expelled from the partnership by the resolution of the partners. Even, if the conduct of the particular partner is not satisfactory in the opinion of the partners, such partner can be expelled from the partnership by a resolution of the partners.

### 15. Duration of Partnership:

This partnership shall be one terminable AT WILL.

### 16. Retirement:

If any partner desires to retire from the firm, he shall give at least three months notice in writing to all the partners, of his intention to do so. At the end of 3 months from the date of notice or retirement, the accounts of the firm shall be closed and the net amount payable to the retiring partner after taking into account the profit or loss up to the date of retirement shall be determined.

The accounts shall be closed after providing for all usual outgoings, bad and doubtful debts, dead stock, counterfeit currency etc, The accounts of the retiring partner shall be settled by transfer of all loans, advances or other debts of the firm which were made as per the recommendation of the retiring partner and any further amounts after such transfer shall be settled in accordance with this deed.

12-7-72

2. 12-7-72

12-7-72



### 17. Death of Partners:

Death, insolvency, expulsion, retirement or admission, of any partner or partners shall not have the effect of dissolving the firm. In the event of death of any of the partners, the shares of the deceased partner shall be determined as per the books of account maintained by the firm taking into account the profit or loss accrued as on the date of the death, and the withdrawals, if any, made by the deceased partner or his heirs.

Such amounts as determined, shall be payable to the legal heirs of the deceased within a period of 3 month from the date of the death and thereafter, they shall not have any right or access to the assets or profits of the firm, but are only entitled to the recovery of such amount standing to the credit of the deceased.

### 18. Nomination of Legal Heirs:

Each partner shall nominate one person from his legal heirs as the first choice of preference to be taken as a partner in case of his death if the continuing partners agrees to the same. Likewise he can also nominate a person of second choice from his legal heirs in case the first nominee is not satisfactory to the continuing partners. However, the mere fact of nomination would not entitle the legal heir a right to become a partner unless the continuing partners are willing to take him as a partner. This will not be questioned in any court of law.

### 19. Settlement of Accounts:

Where any sum becomes payable to a partner on account of his retirement or expulsion or to the legal heirs of the deceased partner, the remaining or continuing partners as the case may be are at liberty to determine the bad debts, dead stock and write off the sums as an expenditure in the books as on the date of retirement, Expulsion or Death of the partner.

If however, the retiring or expelled partner, or legal heirs of the deceased partner, does not agree to the quantum of bad debts, dead stock shall be assigned to the retiring or expelled partner or legal heir of the deceased partner towards payment of any sum due from the firm. Similarly, at the time of retirement, expulsion or death of a partner, a list of doubtful debts, and slow moving stock shall be ascertained and the firm shall retain the portion of such debts or stock belonging to the retired, expelled or deceased partner to the extent of his share as per the profit sharing ratio and this sum shall moving stock are realized.

In case the firm does not have liquid funds to pay the retiring partner, his account shall be settled by transferring the debtors and stock held by the firm at the value agreed upon by the majority of the partners and the balance if any shall be paid to him.

### 20. Goodwill:

The Partners hereby agree that in view of the nature of business, there is no goodwill attached to the firm and no such sum shall be due or payable on this account to any partner or heirs or legal representatives on death, retirement, and expulsion of any partner or on change in the constitution of the firm.

12-11-17

2 17 21/11/17

12-11-17



7

**21. Arbitration:**

Any dispute or difference which may arise among the parties or their representative with regard to the construction, meaning, effect of this deed or any part thereof, or respecting the accounts profits or losses of the business or the rights and liabilities of the partners under this deed or dissolution or winding up the business or any other matter relating to the firm shall be referred to arbitration.

**22. Amendment and others:**

Any of the terms and condition shall be altered, varied, deleted or added to by common consent of all parties hereto. In respect of matters not provided for in this deed the parties hereto shall abide by the provisions of the "INDIAN PARTNERSHIP ACT -1932".

**23. Execution:**

The contents of this document has been read over and translated into Tamil to all the partners, who have executed this deed after having understood the full meaning and implication of its contents.

IN WITNESS WHEREOF THE PARTNERS HERE TO HAVE SET THEIR RESPECTIVE HANDS ON THIS DAY, MONTH, AND YEAR ABOVE WRITTEN IN THE PRESENCE OF THE WITNESS ATTESTING HERE TO.

**WITNESS:**

1 G. Venkatesan

G. VENKATESAN S/o R. Gopala  
VETTAVALAM

1 R-7

2 S. Jaffer

S. Jaffer  
S/o T. M. SADDULLAH  
Samartharam  
NALLAVANDOLAM PUS.  
THELVANMANUR Dt.

2 U 210190

21-7



 **आधार**

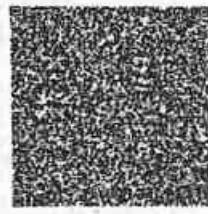
இந்திய அரசாங்கம்  
Government of India

இந்திய தனிப்பட்ட அடையாள ஆளவைய அமைப்பு  
Unique Identification Authority of India

பதிவேட்டு எண்/ Enrolment No.: 0657/09532/00061

To  
முருகேசன் ரா  
Murugesan R  
S/O: Ramalingam  
344  
KATAIYA GOUNDER STREET  
Thanipadi  
Tiruvannamalai Tamil Nadu - 606708  
9443347306

Signature valid



உங்கள் ஆதார் எண் / Your Aadhaar No. :  
**9749 0480 7022**  
VID : 9136 5475 1508 8401  
எனது ஆதார். எனது அடையாளம்

 **आधार**

இந்திய அரசாங்கம்  
Government of India

 முருகேசன் ரா  
Murugesan R  
பிறந்த நாள்/DOB: 29/05/1974  
ஆண்/ MALE

9749 0480 7022  
VID : 9136 5475 1508 8401  
எனது ஆதார். எனது அடையாளம்

 **AADHAAR**

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று குடியறினமக்கு அல்ல.
- பாதுகாப்பான QR குறியீடு/ ஆபவன் XML / ஆவ்வன் அங்கீகரிக்கப்பட்ட பயன்படுத்தி அடையாளத்தை சரிபார்க்கவும்.
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

**INFORMATION**

- Aadhaar is a proof of identity, not of citizenship.
- Verify identity using Secure QR Code/ Offline XML/ Online Authentication.
- This is electronically generated letter.

■ ஆதார் நாடு முழுவதும் செல்லுபடியாகும்.

■ பல்வேறு அரசு மற்றும் அரசு சாரா சேவைகளை எளிதில் பெற ஆதார் உதவுகிறது.

■ உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடிவை ஆதாரில் புதுப்பிக்கவும்.

■ மAdhaar செயலியைப் பயன்படுத்தி உங்கள் உமாறட போனில் ஆதாரை எடுத்துச் செல்லுங்கள்.

■ Aadhaar is valid throughout the country.

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 **Unique Identification Authority of India**

முகவரி:  
தலை / தாய் பெயர்: ராமலிங்கம், 344,  
உடைய கவுண்டர் தெரு, தாயிப்பாடி,  
திருவண்ணாமலை,  
தமிழ் நாடு - 606708

Address:  
S/O: Ramalingam, 344, KATAIYA GOUNDER  
STREET, Thanipadi, Tiruvannamalai,  
Tamil Nadu - 606708

9749 0480 7022  
VID : 9136 5475 1508 8401

1047 | help@uidai.gov.in | www.uidai.gov.in

Reg. No. 03BBB1007  
Col Code 013 / 106



பெரியார் பல்கலைக்கழக ஆட்சிக்குழு 2005 ஆம் ஆண்டு ஏப்ரல் மாதம்  
நடந்த பயன்பாட்டு புவியமைப்பியல் தேர்வில்  
S கருப்பண்ணன் என்பவர்  
தனிச்சிறப்புடன் முதல் வகுப்பில் தேர்ச்சி பெற்றார் என்று தக்க  
தேர்வாளர்கள் சான்றளித்தபடி அறிவியல் நிறைஞர்  
என்னும் பட்டத்தை அவருக்குப் பல்கலைக்கழக இலச்சினைபுடன் வழங்குகிறது.

*The Syndicate of the Periyar University hereby makes known*  
*that* **KARUPPANNAN S** *has been*  
*admitted to the* **DEGREE OF MASTER OF SCIENCE in**  
**APPLIED GEOLOGY**  
*he/she having been certified by duly appointed Examiners to be qualified*  
*to receive the same and was placed in the* **FIRST CLASS WITH DISTINCTION**  
*at the Examination held in* **APR-2005**



Given under the seal of this university

சுற்றி

Periyar University, Tiruvarur



## BALAJI MINES

Proprietor: E. SANTHARAMAN,  
PURITY LIME STONE SUPPLIERS,  
5/88, CHINNAGOLLAPATTI, KANNANKURICHI P. O.,  
SALEM-636 008, Tamil Nadu.



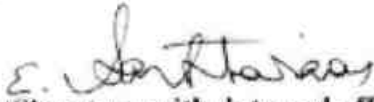
Mines : Devar Malai Village, Kulithalai Tk., KARUR Dt. (Via) Kerur to Palayam.

Date | 5-10-2010

### EXPERIENCE CERTIFICATE

I E.SANTHARAMAN being the Managing Director of BALAJI MINES do hereby certify that Thiru. S.KARUPPANNAN, son of T.SUNDARAM (Whose signature is appended) worked as a Geologist in Balaji Mine, Devar malai village, kulithalai Taluk, Karur Distriet, from 01.06.2005 to 10.10.2010. During his term of work aforesaid, he has obtained practical experience as detailed overleaf. The duties connected with his work have involved his continuous attendance at the mine, and have been efficiently performed by him.

I believe him to be of good character and a fit and proper person to be examined for Certificate of Competency.

  
(Signature with date and official Seal)

TIN No: 33852702141  
CST No: 704829 / 7-4-99  
**BALAJI MINES**  
5/88, Chinnagollapatty,  
Kannankurichi (P.O), SALEM-8.

  
(Signature of Candidate)

217



K.P. RAMAN  
Cell 94876 33359

K.P. LAKSHMANA  
Cell 94432 84075  
04348-244321

**SRI RAMAJAYAM**  
**GRANITES**

731, Krishnagiri Main Road, Opp. E.B. Office, MATHUR - 635 203.  
email: sriramajayamgranites@gmail.com



Date: 11.10.2011

### EXPERIENCE CERTIFICATE

This is to certify that **Mr. Karuppannan Sundaram** has been worked as a "Senior Geologist" in our company from 11<sup>th</sup> October 2010 to 11<sup>th</sup> October 2011. During this period, he has been involved in the Quality Control for Granite block extraction from quarry. Involvement of his work is highly appreciated and have been efficiently worked in our company. The duties connected with his work have been continuous attendance at the quarry.

I wish him all the best in all his future endeavors.

For SRI RAMAJEYAM GRANITES

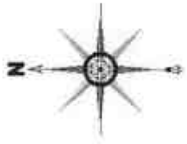
K.P. Lakshmana  
Proprietor

11/10/2011

Attested/  
18/10/2011

**DEPUTY DIRECTOR**  
**DEPARTMENT OF GEOLOGY AND MINING**  
**DHARMAPURI**

RTI



# PLATE No-I

## APPLICANT:

**TIVLRVM BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

## LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

## INDEX

|                 |  |
|-----------------|--|
| MINE LEASE AREA |  |
| APPROACH ROAD   |  |
| CACT ROAD       |  |
| VILLAGE ROAD    |  |
| HABITATION      |  |

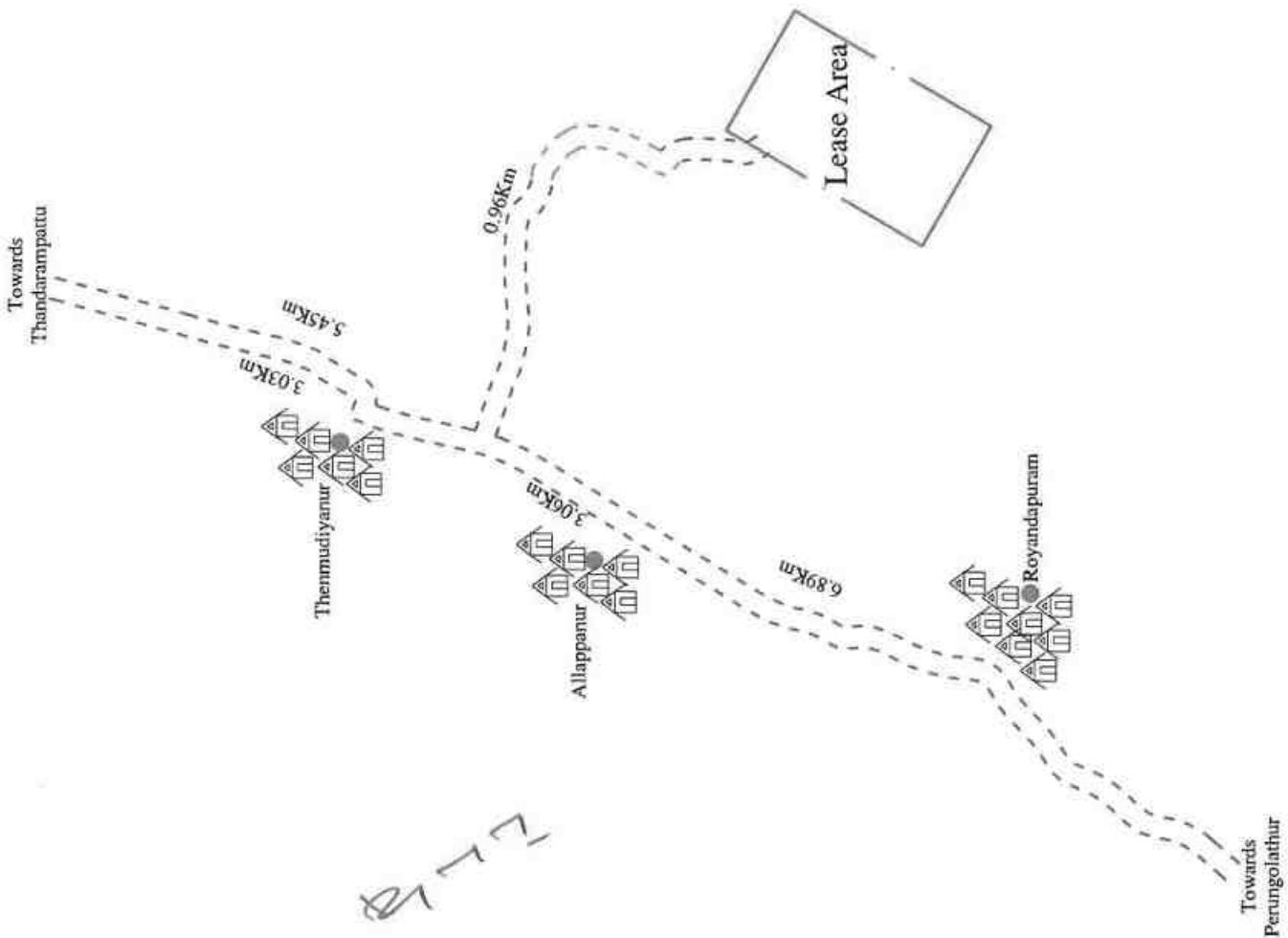
## KEY MAP

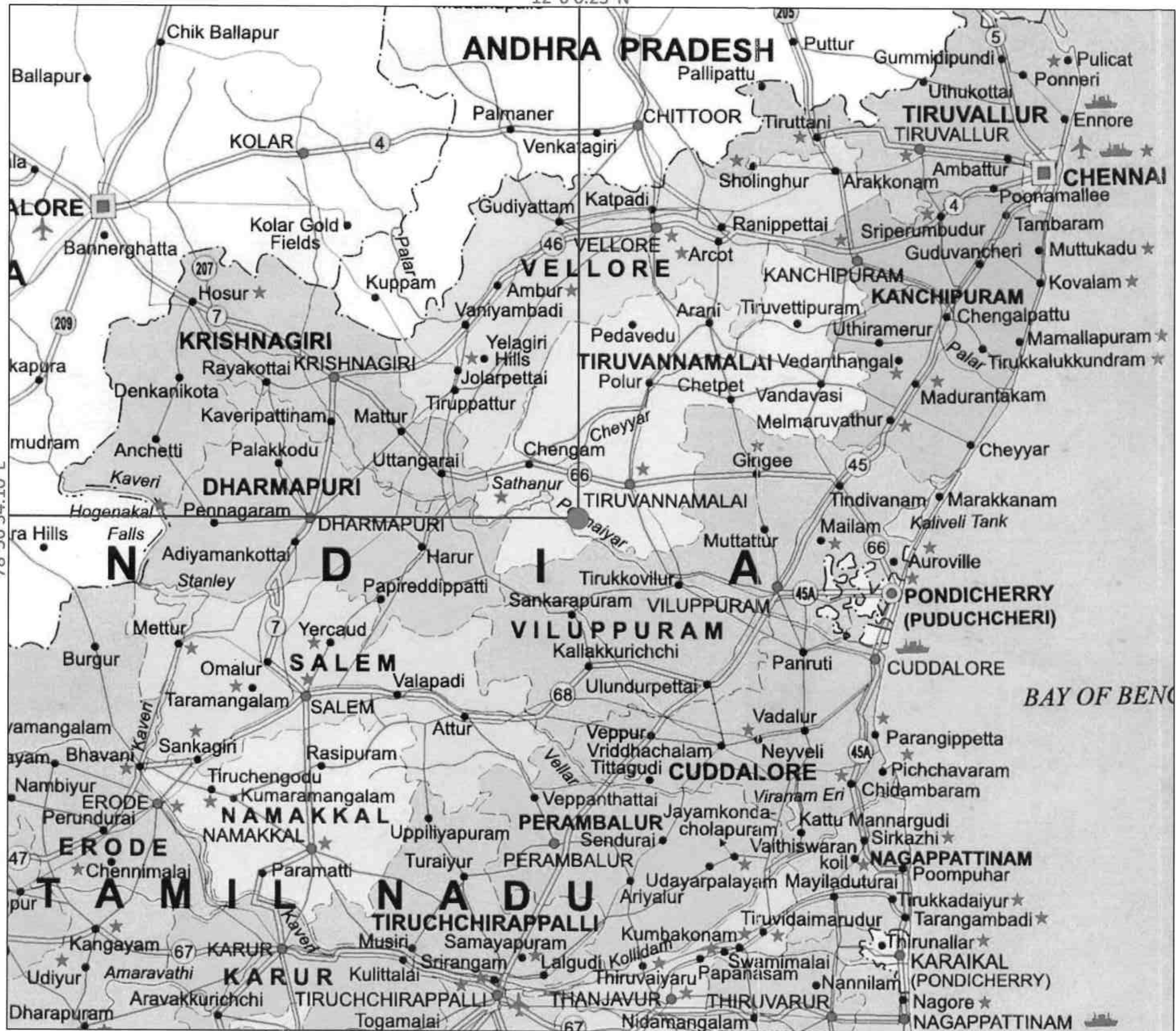
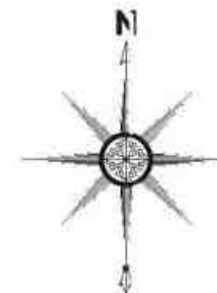
Not to Scale

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS  
BEEN CHECKED BY ME AND IS CORRECT  
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,PH.D  
QUALIFIED PERSON





# PLATE No-IA

## APPLICANT:

Tvl.RVM BLUE METALS,  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

## LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

## INDEX

MINE LEASE AREA : ●

LATITUDE : 12° 5'53.31"N to 12°6'0.23"N

LONGITUDE : 78°56'34.10"E to 78°56'40.20"E

## LOCATION PLAN

NOT TO SCALE

Prepared By:

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TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
QUALIFIED PERSON



|                                                                  |  |                      |
|------------------------------------------------------------------|--|----------------------|
| Express Highway: with toll, with bridge; with distance alone     |  |                      |
| Roads, installed: according to importance                        |  |                      |
| Roads, double carriages; according to importance                 |  |                      |
| Unimproved road, Cart-track, Path-track with pass, Foot-path     |  |                      |
| Streams: with track in bed; unimproved, Canal                    |  |                      |
| Dams: masonry or rock-filled, earthwork, Wall                    |  |                      |
| Fitter: dry with water channel, with island & rocks, Tide river  |  |                      |
| Submerged rocks: Shoal, Swamp, Reefs                             |  |                      |
| Wells: lined, unlined, Tube-well, Spring, Tanks: permanent; dry  |  |                      |
| Embankments: road or rail track, Broken ground                   |  |                      |
| Railways: broad gauge; double, single with station, meter gauge  |  |                      |
| Railways, other gauges: double, single with distance alone, An   |  |                      |
| Mineral line or tramway, Kān, Cuying with tunnel                 |  |                      |
| Contours with notations, Rocky slopes, Cliffs                    |  |                      |
| Sand features: (Y)el, (D)une-hill(permanent), (Y)ellow(s)hilling |  |                      |
| Towns or Villages: inhabited, deserted, Fort                     |  |                      |
| Huts: permanent, temporary, Tower, Antiquities                   |  |                      |
| Temples, Chhatris, Church, Mosque, Ghat, Tomb, Graves            |  |                      |
| Lighthouse, Light-hs, Buoys: lighted, unlighted, Anchorage       |  |                      |
| Mine: Vein or lode, Galls, Scabur                                |  |                      |
| Palms: palmgrove, other, Plantain, Cofee, Bamboo, Other trees    |  |                      |
| Artes: cultivated, wooded, Surveyed tree                         |  |                      |
| Boundary, International                                          |  |                      |
| states: demarcated, un-demarcated                                |  |                      |
| district: subdivided; taluk or thak; forest                      |  |                      |
| Boundary pillars: surveyed, unlocated                            |  |                      |
| Height, triangulation station; point; approximate                |  | A 200      , 200     |
| Bench-mark: geodetic; levelling; zero                            |  | BM 63.3      BM 63.3 |
| Post office, Telegraph office, Overhead tank                     |  |                      |
| Rest house or inspection bungalow, Court house, Police station   |  |                      |
| Camping ground, Forest: reserved, protected                      |  |                      |
| Spaced names: administrative, locality or kind                   |  | KURRI      RA        |
| Hospital, Dispensary, Veterinary, Hospital / Dispensary          |  |                      |
| Aerodrome, Helipad, Tourist site                                 |  |                      |
| Power line: with poles, unarmoured, with poles and ground        |  |                      |

**Dr.S.KARUPPANNAN,M.Sc.,Ph.D.**  
**QUALIFIED PERSON**

12°6'0.23"N

78°56'34.10"E

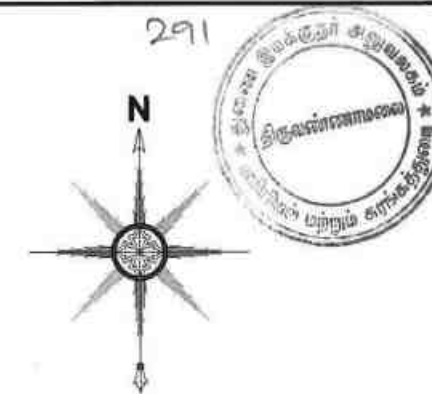


PLATE No-IC

**APPLICANT:**  
**Tvl.RVM BLUE METALS,**  
 S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
 THANDARAMPATTU TALUK,  
 TIRUVANNAMALAI DISTRICT - 606 708.

**LEASE AREA:**  
 S.F.No : 51(Part 4),  
 EXTENT : 2.00.20HECTS,  
 VILLAGE : ALLAPPANUR,  
 TALUK : THANDARAMPATTU,  
 DISTRICT : TIRUVANNAMALAI.

# INDEX

|                 |  |
|-----------------|--|
| MINE LEASE AREA |  |
| APPROACH ROAD   |  |
| CART ROAD       |  |
| VILLAGE ROAD    |  |
| 100m RADIUS     |  |
| 200m RADIUS     |  |
| 300m RADIUS     |  |
| 400m RADIUS     |  |
| 500m RADIUS     |  |
| EXISTING PIT    |  |
| RIVER           |  |

LATITUDE : 12° 5'53.31"N to 12°6'0.23"N

LONGITUDE : 78°56'34.10"E to 78°56'40.20"E

SATELLITE IMAGERY MAP

SCALE- 1:5000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS  
 BEEN CHECKED BY ME AND IS CORRECT  
 TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
 QUALIFIED PERSON

OCTOBER TO DECEMBER

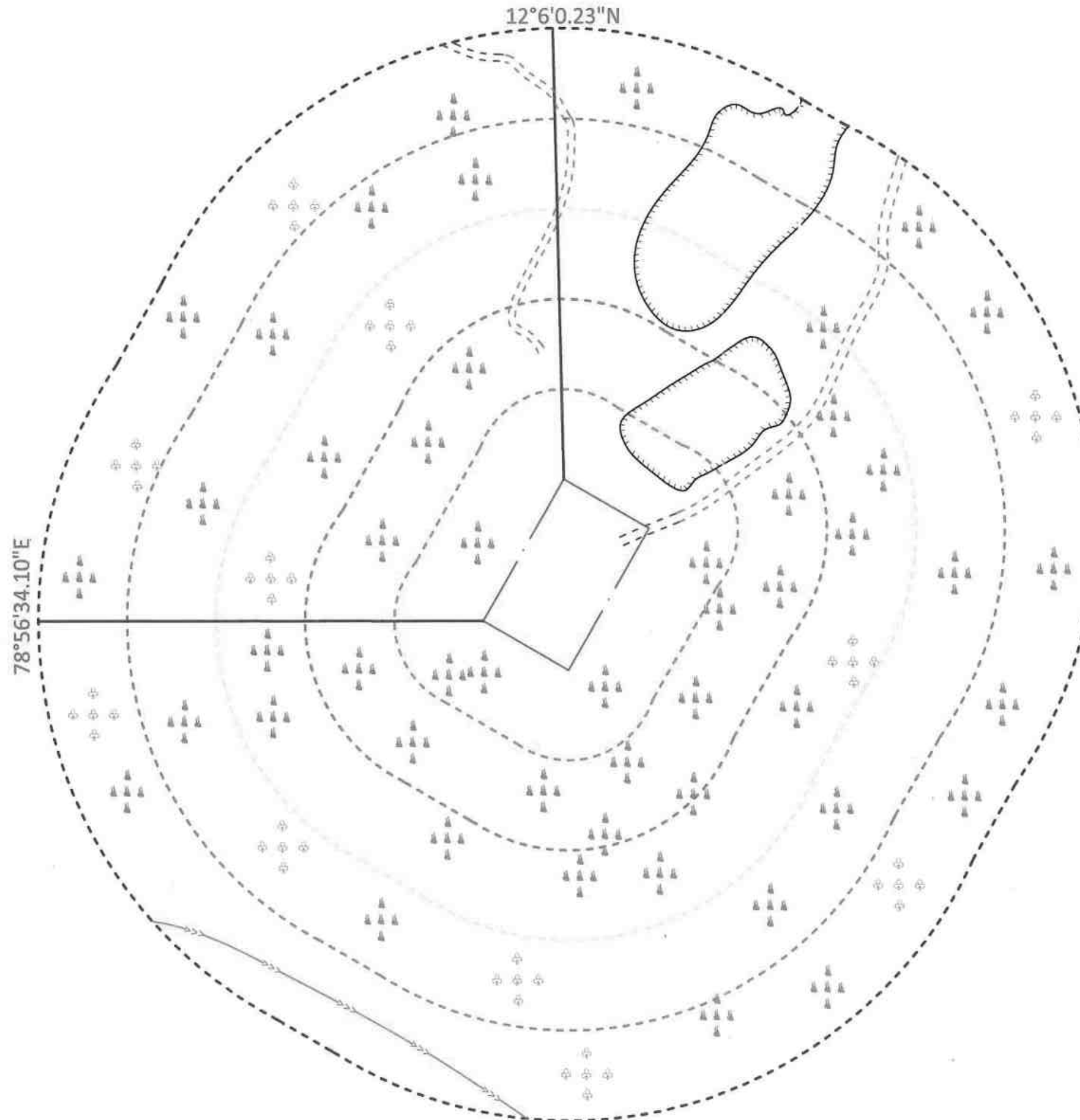
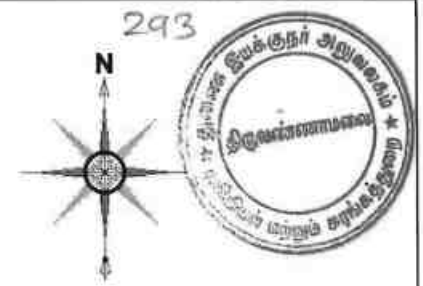


PLATE No-ID

APPLICANT:

**TvLRVM BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

# INDEX

|                 |  |
|-----------------|--|
| MINE LEASE AREA |  |
| APPROACH ROAD   |  |
| CART ROAD       |  |
| VILLAGE ROAD    |  |
| 100m RADIUS     |  |
| 200m RADIUS     |  |
| 300m RADIUS     |  |
| 400m RADIUS     |  |
| 500m RADIUS     |  |
| EXISTING PIT    |  |
| SHRUBS & TREES  |  |
| WIND DIRECTION  |  |
| RIVER           |  |

LATITUDE : 12° 5'53.31"N to 12°6'0.23"N

LONGITUDE : 78°56'34.10"E to 78°56'40.20"E

## ENVIRONMENTAL PLAN

SCALE- 1:5000

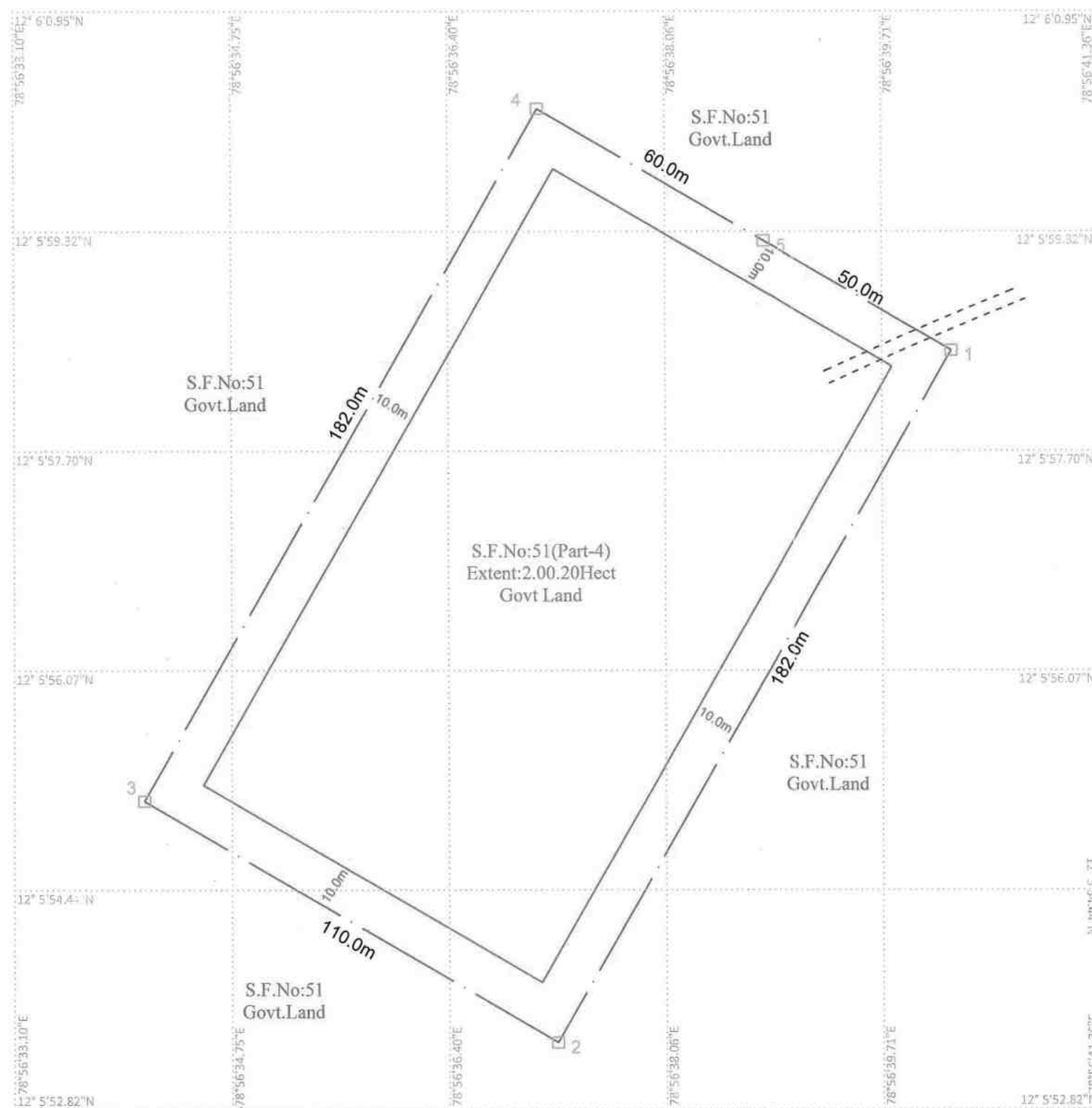
Prepared By:

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TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
QUALIFIED PERSON

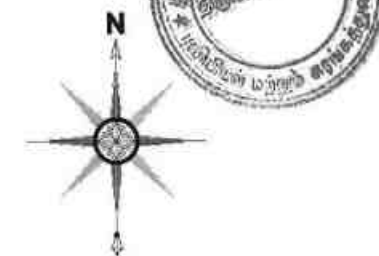
JULY TO SEPTEMBER

P177



2177

295



## PLATE No-II

### APPLICANT:

**Tvl.RVM BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

### LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

### INDEX

|                        |  |
|------------------------|--|
| MINE LEASE BOUNDARY    |  |
| SAFETY BOUNDARY        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |

| S.No | Latitude      | Longitude     |
|------|---------------|---------------|
| 1    | 12° 5'58.50"N | 78°56'40.20"E |
| 2    | 12° 5'53.31"N | 78°56'37.28"E |
| 3    | 12° 5'55.05"N | 78°56'34.10"E |
| 4    | 12° 6'0.23"N  | 78°56'37.01"E |
| 5    | 12° 5'59.29"N | 78°56'38.74"E |

### MINE LEASE PLAN

PLAN SCALE 1 : 1000

Prepared By:

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TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
QUALIFIED PERSON



### PLATE No-III

#### APPLICANT:

**Tvl.RVM BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

#### LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

#### INDEX

|                        |  |
|------------------------|--|
| MINE LEASE BOUNDARY    |  |
| SAFETY BOUNDARY        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |
| OUTCROP                |  |
| TOP SOIL               |  |
| SHRUBS                 |  |
| CONTOUR LINES          |  |
| TEMPORARY BENCH MARK   |  |

#### SURFACE & GEOLOGICAL PLAN

PLAN- SCALE 1: 1000

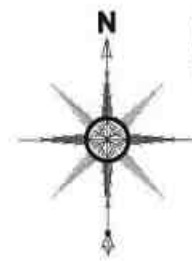
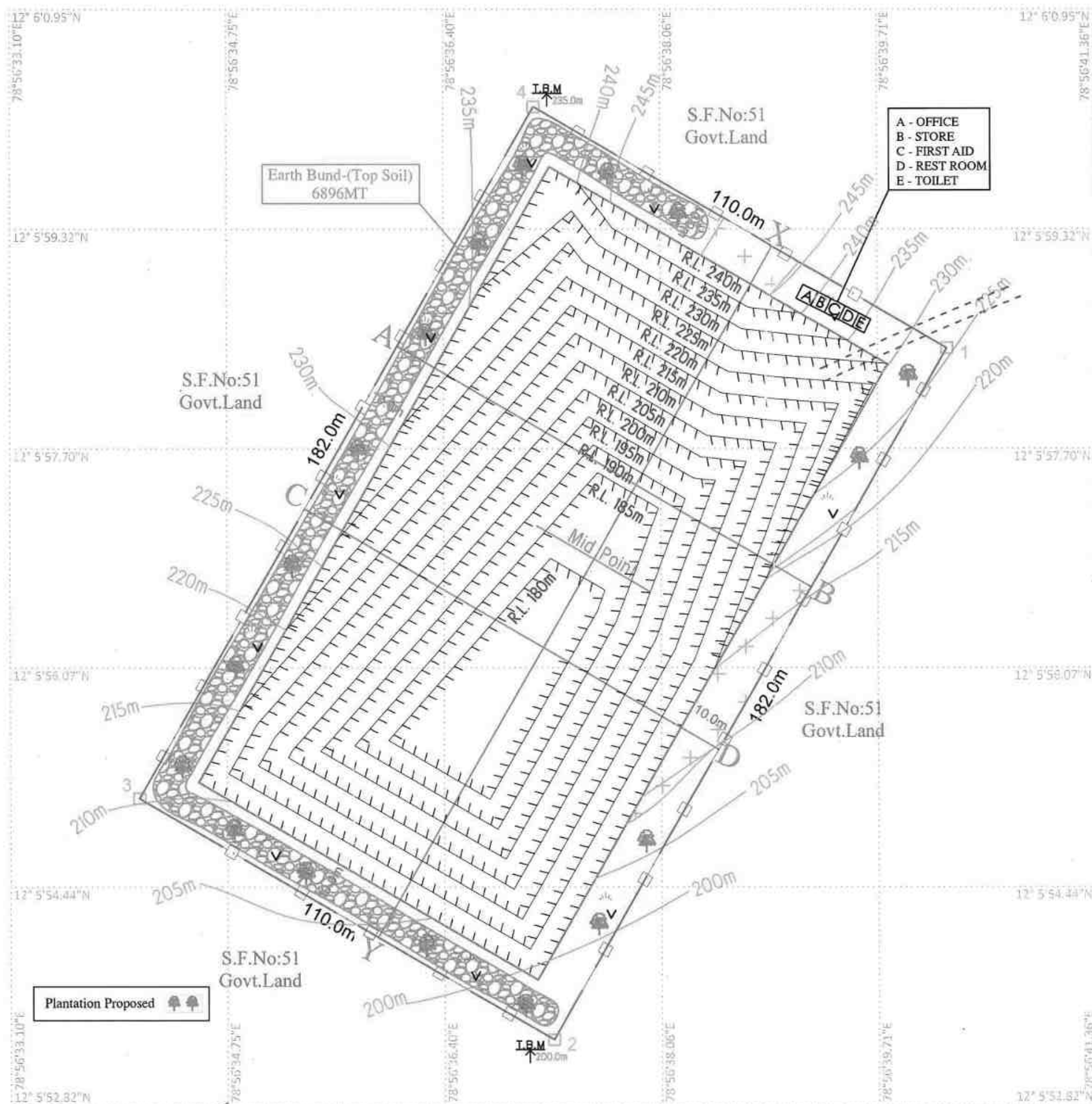
Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS  
BEEN CHECKED BY ME AND IS CORRECT  
TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
QUALIFIED PERSON







# PLATE No-IV

**APPLICANT:**  
**Tvl.RVM BLUE METALS,**  
 S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
 THANDARAMPATTU TALUK,  
 TIRUVANNAMALAI DISTRICT - 606 708.

**LEASE AREA:**  
 S.F.No : 51(Part 4),  
 EXTENT : 2.00.20HECTS,  
 VILLAGE : ALLAPPANUR,  
 TALUK : THANDARAMPATTU,  
 DISTRICT : TIRUVANNAMALAI.

## INDEX

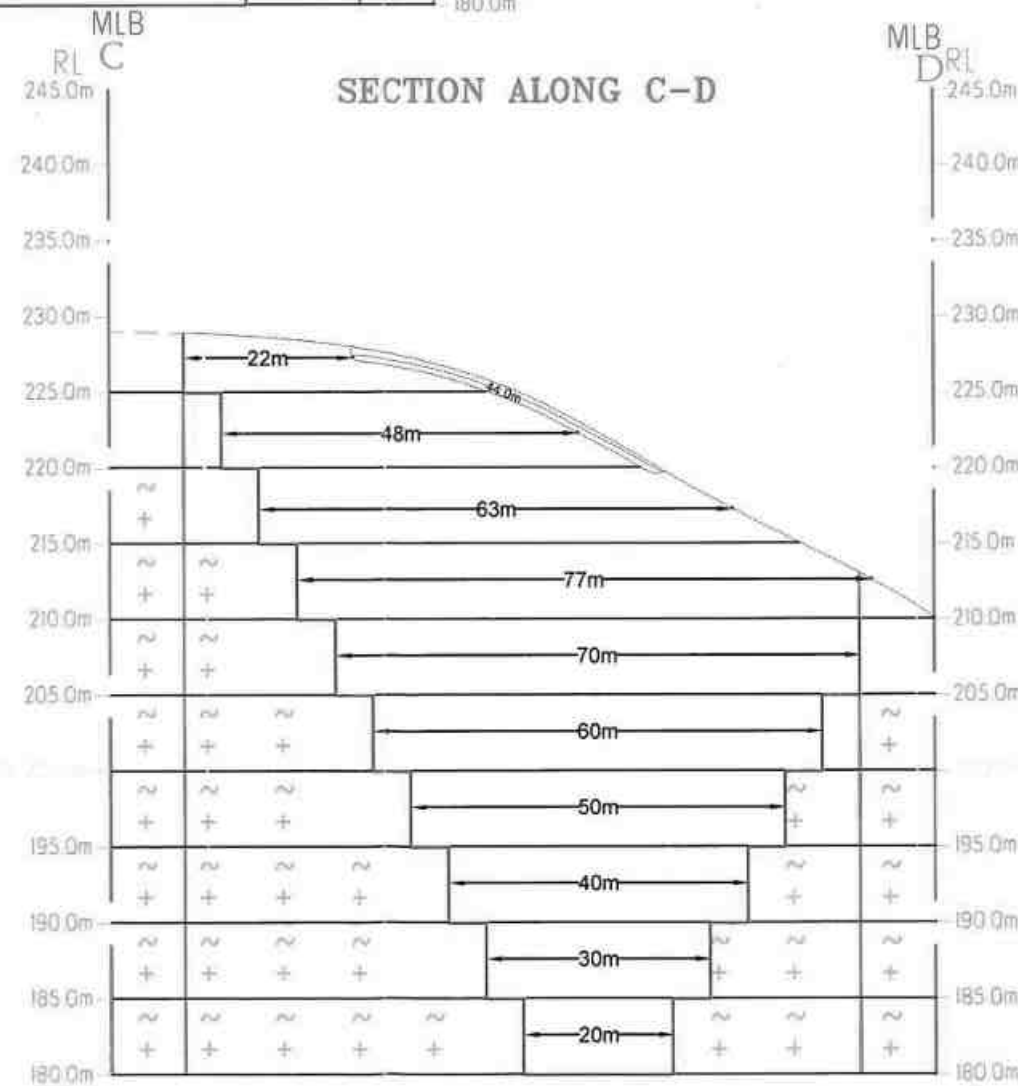
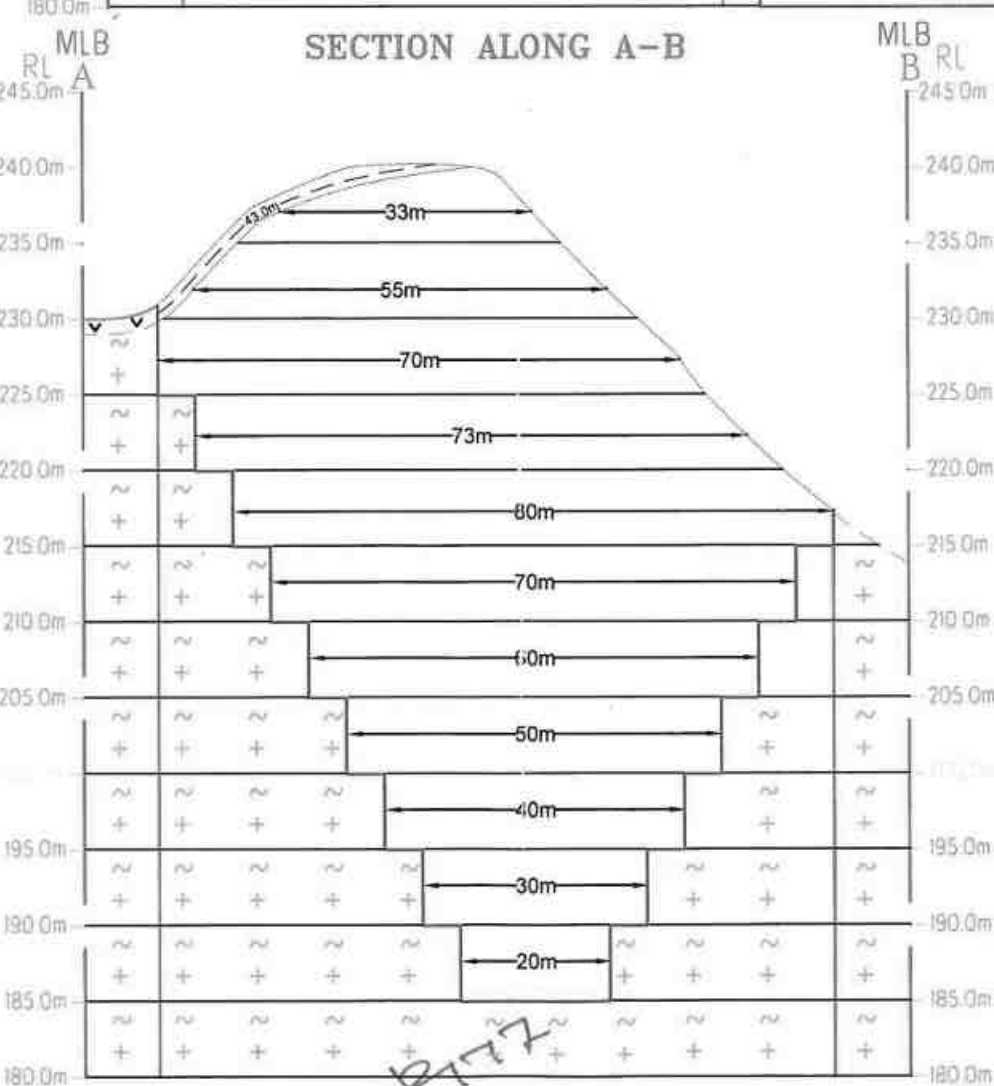
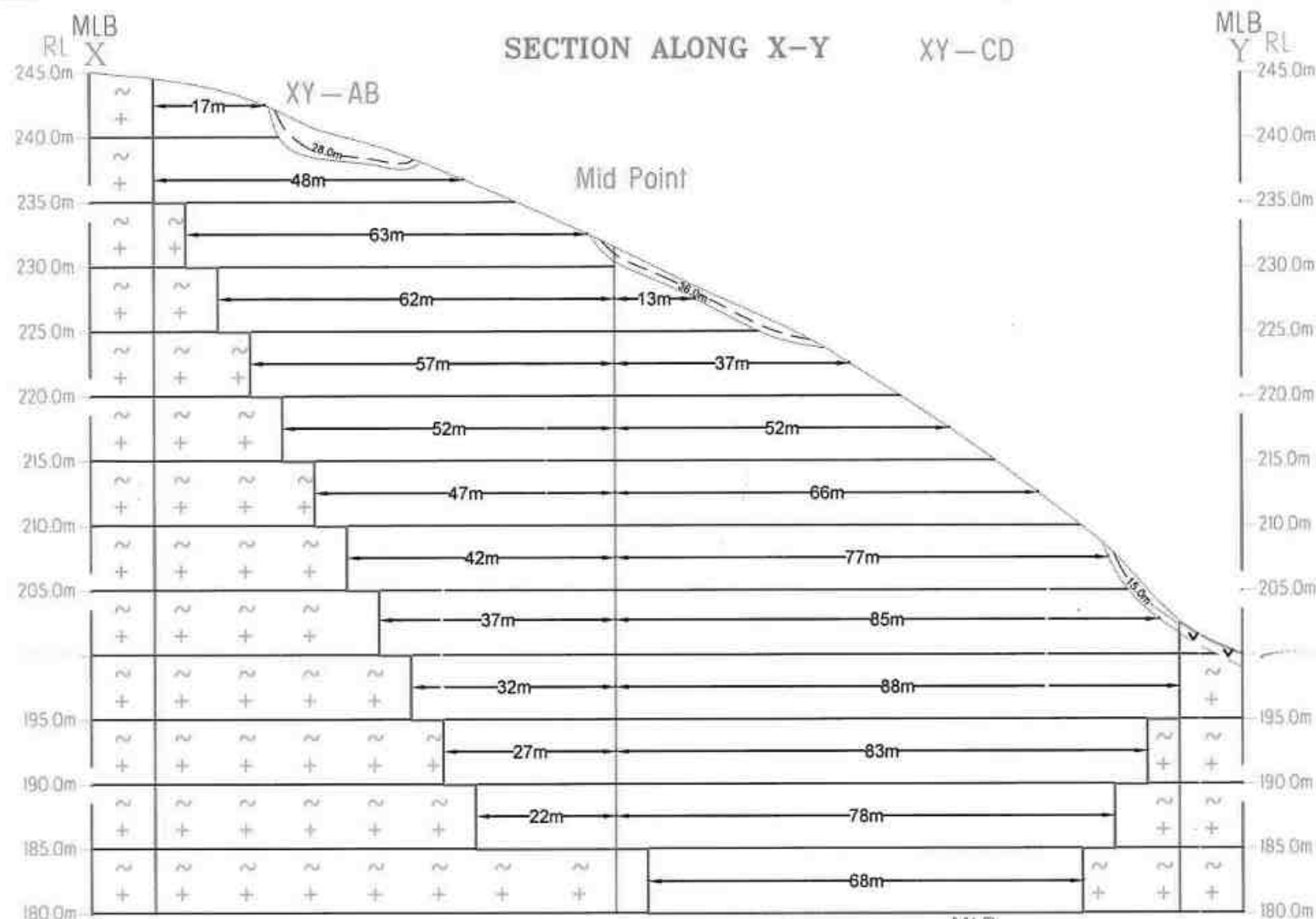
|                        |  |
|------------------------|--|
| MINE LEASE BOUNDARY    |  |
| SAFETY BOUNDARY        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |
| OUTCROP                |  |
| TOP SOIL               |  |
| SHRUBS                 |  |
| CONTOUR LINES          |  |
| TEMPORARY BENCH MARK   |  |
| ULTIMATE BENCH         |  |
| PROPOSED EARTH BUND    |  |
| FENCING                |  |

## CONCEPTUAL PLAN

SCALE 1: 1000

Prepared By:  
 I DO HEREBY CERTIFY THAT THE PLATE HAS  
 BEEN CHECKED BY ME AND IS CORRECT  
 TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
 QUALIFIED PERSON



| MINEABLE RESERVES |       |               |              |              |                       |                               |                           |              |                   |               |
|-------------------|-------|---------------|--------------|--------------|-----------------------|-------------------------------|---------------------------|--------------|-------------------|---------------|
| Section           | Bench | Length in (m) | Width in (m) | Depth in (m) | ROM in m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Topsoil in m <sup>3</sup> | Bulk Density | Rough Stone in MT | Topsoil in MT |
| XY-AB             | Slope | 28            | 43           | 1            | 1204                  | .....                         | 1204                      | 2            | .....             | 2408          |
|                   | I     | 17            | 37           | 5            | 3145                  | 3145                          | .....                     | 2.75         | 8649              | .....         |
|                   | II    | 48            | 33           | 5            | 7920                  | 7920                          | .....                     | 2.75         | 21780             | .....         |
|                   | III   | 63            | 55           | 5            | 17325                 | 17325                         | .....                     | 2.75         | 47643             | .....         |
|                   | IV    | 62            | 70           | 5            | 21700                 | 21700                         | .....                     | 2.75         | 59675             | .....         |
|                   | V     | 57            | 73           | 5            | 20805                 | 20805                         | .....                     | 2.75         | 57213             | .....         |
|                   | VI    | 52            | 80           | 5            | 20800                 | 20800                         | .....                     | 2.75         | 57200             | .....         |
|                   | VII   | 47            | 70           | 5            | 16450                 | 16450                         | .....                     | 2.75         | 45238             | .....         |
|                   | VIII  | 42            | 60           | 5            | 12600                 | 12600                         | .....                     | 2.75         | 34650             | .....         |
|                   | IX    | 37            | 50           | 5            | 9250                  | 9250                          | .....                     | 2.75         | 25438             | .....         |
|                   | X     | 32            | 40           | 5            | 6400                  | 6400                          | .....                     | 2.75         | 17600             | .....         |
|                   | XI    | 27            | 30           | 5            | 4050                  | 4050                          | .....                     | 2.75         | 11138             | .....         |
|                   | XII   | 22            | 20           | 5            | 2200                  | 2200                          | .....                     | 2.75         | 6050              | .....         |
| TOTAL             |       |               |              |              | 143849                | 142645                        | 1204                      | .....        | 392274            | 2408          |
| XY-CD             | Slope | 51            | 44           | 1            | 2244                  | .....                         | 2244                      | 2            | .....             | 4488          |
|                   | IV    | 13            | 22           | 5            | 1430                  | 1430                          | .....                     | 2.75         | 3932              | .....         |
|                   | V     | 37            | 48           | 5            | 8880                  | 8880                          | .....                     | 2.75         | 24420             | .....         |
|                   | VI    | 52            | 63           | 5            | 16380                 | 16380                         | .....                     | 2.75         | 45045             | .....         |
|                   | VII   | 66            | 77           | 5            | 25410                 | 25410                         | .....                     | 2.75         | 69877             | .....         |
|                   | VIII  | 77            | 70           | 5            | 26950                 | 26950                         | .....                     | 2.75         | 74113             | .....         |
|                   | IX    | 85            | 60           | 5            | 25500                 | 25500                         | .....                     | 2.75         | 70125             | .....         |
|                   | X     | 88            | 50           | 5            | 22000                 | 22000                         | .....                     | 2.75         | 60500             | .....         |
|                   | XI    | 83            | 40           | 5            | 16600                 | 16600                         | .....                     | 2.75         | 45650             | .....         |
|                   | XII   | 78            | 30           | 5            | 11700                 | 11700                         | .....                     | 2.75         | 32175             | .....         |
|                   | XIII  | 68            | 20           | 5            | 6800                  | 6800                          | .....                     | 2.75         | 18700             | .....         |
| TOTAL             |       |               |              |              | 163894                | 161650                        | 2244                      | .....        | 444537            | 4488          |
| GRAND TOTAL       |       |               |              |              | 307743                | 304295                        | 3448                      | .....        | 816811            | 6896          |

### PLATE No-IVA

#### APPLICANT:

**Tvl.RVM BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

#### LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

#### INDEX

|                     |       |
|---------------------|-------|
| MINE LEASE BOUNDARY | ---   |
| SAFETY BOUNDARY     | ---   |
| TOP SOIL            | V V V |
| ROUGH STONE         | ..... |
| ULTIMATE BENCH      | ---   |

#### CONCEPTUAL SECTION

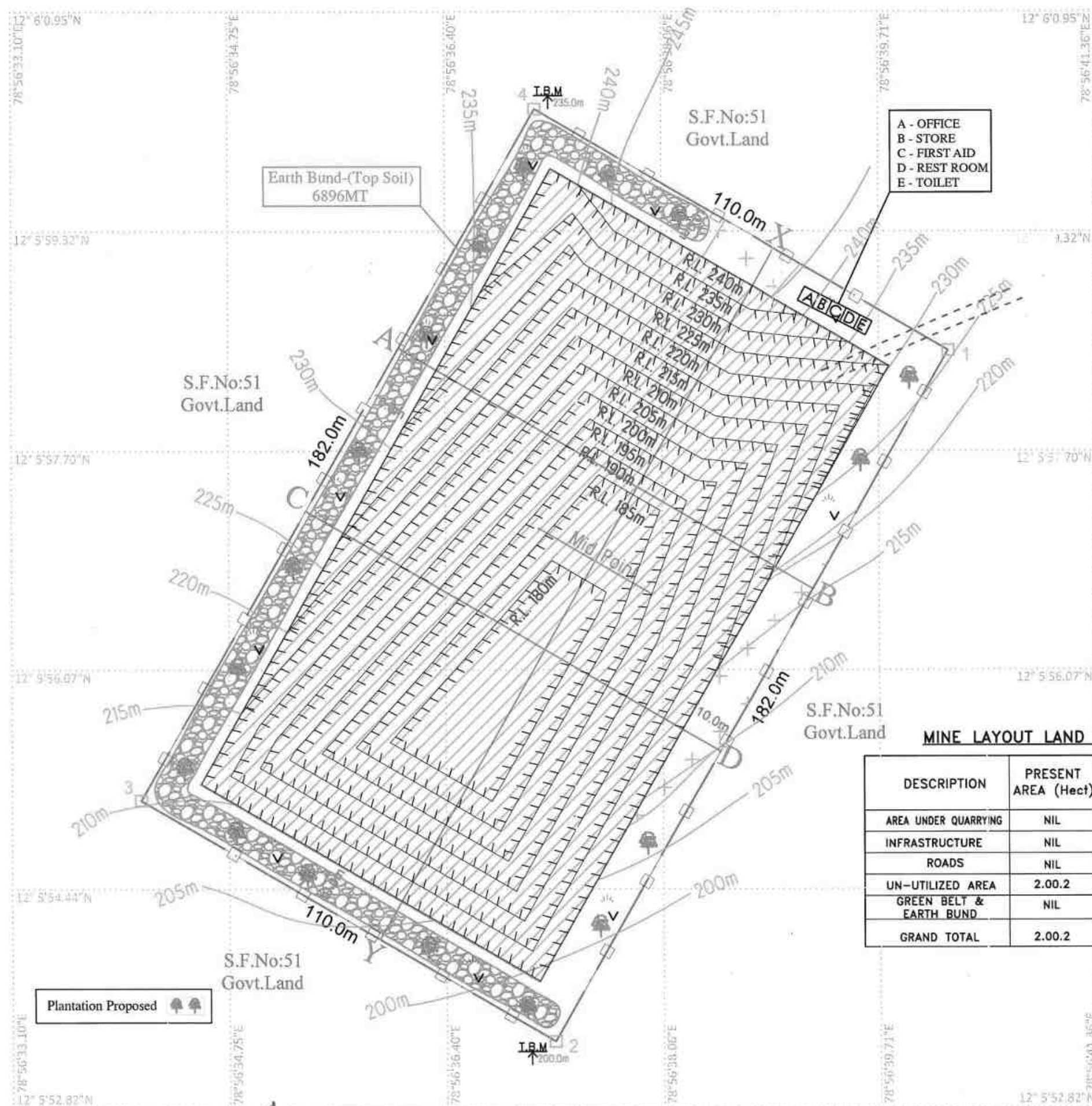
SCALE - HOR 1 : 1000  
& VER 1 : 500

#### Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS  
BEEN CHECKED BY ME AND IS CORRECT  
TO THE BEST OF MY KNOWLEDGE

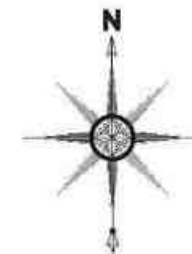
*[Signature]*

**Dr.S.KARUPPANNAN,M.Sc.,Ph.D.**  
QUALIFIED PERSON



**MINE LAYOUT LAND USE PATTERN**

| DESCRIPTION             | PRESENT AREA (Hect) | AREA IN USE DURING THE QUARRYING PERIOD (Hect) | COLOR CODE |
|-------------------------|---------------------|------------------------------------------------|------------|
| AREA UNDER QUARRYING    | NIL                 | 1.46.0                                         |            |
| INFRASTRUCTURE          | NIL                 | 0.02.0                                         |            |
| ROADS                   | NIL                 | 0.05.0                                         |            |
| UN-UTILIZED AREA        | 2.00.2              | 0.07.2                                         |            |
| GREEN BELT & EARTH BUND | NIL                 | 0.40.0                                         |            |
| GRAND TOTAL             | 2.00.2              | 2.00.2                                         |            |



**PLATE No-V**

**APPLICANT:**

**T.V.R.V.M BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

**LEASE AREA:**

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

**INDEX**

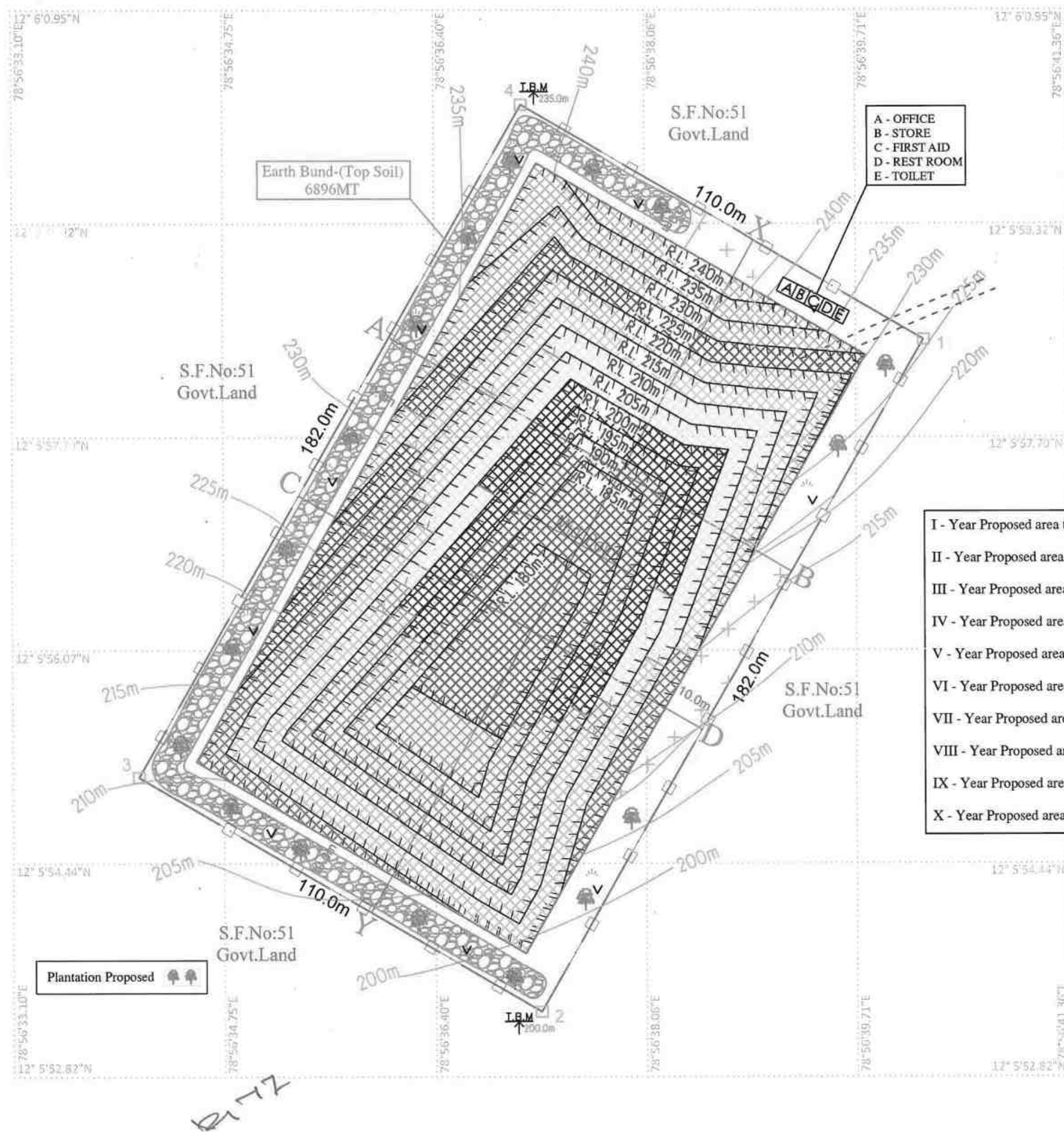
|                        |  |
|------------------------|--|
| MINE LEASE BOUNDARY    |  |
| SAFETY BOUNDARY        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |
| OUTCROP                |  |
| TOP SOIL               |  |
| SHRUBS                 |  |
| CONTOUR LINES          |  |
| TEMPORARY BENCH MARK   |  |
| PROPOSED BENCH         |  |
| PROPOSED EARTH BUND    |  |
| FENCING                |  |

**MINE LAYOUT PLAN &  
LAND USE PATTERN**  
SCALE 1: 1000

**Prepared By:**

I DO HEREBY CERTIFY THAT THE PLATE HAS  
BEEN CHECKED BY ME AND IS CORRECT  
TO THE BEST OF MY KNOWLEDGE

**Dr.S.KARUPPANNAN,M.Sc.,Ph.D.**  
QUALIFIED PERSON



## PLATE No-VI

### APPLICANT:

**TvLRVM BLUE METALS,**  
S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
THANDARAMPATTU TALUK,  
TIRUVANNAMALAI DISTRICT - 606 708.

### LEASE AREA:

S.F.No : 51(Part 4),  
EXTENT : 2.00.20HECTS,  
VILLAGE : ALLAPPANUR,  
TALUK : THANDARAMPATTU,  
DISTRICT : TIRUVANNAMALAI.

### INDEX

|                        |  |
|------------------------|--|
| MINE LEASE BOUNDARY    |  |
| SAFETY BOUNDARY        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |
| OUTCROP                |  |
| TOP, SOIL              |  |
| SHRUBS                 |  |
| CONTOUR LINES          |  |
| TEMPORARY BENCH MARK   |  |
| PROPOSED BENCH         |  |
| PROPOSED EARTH BUND    |  |
| FENCING                |  |

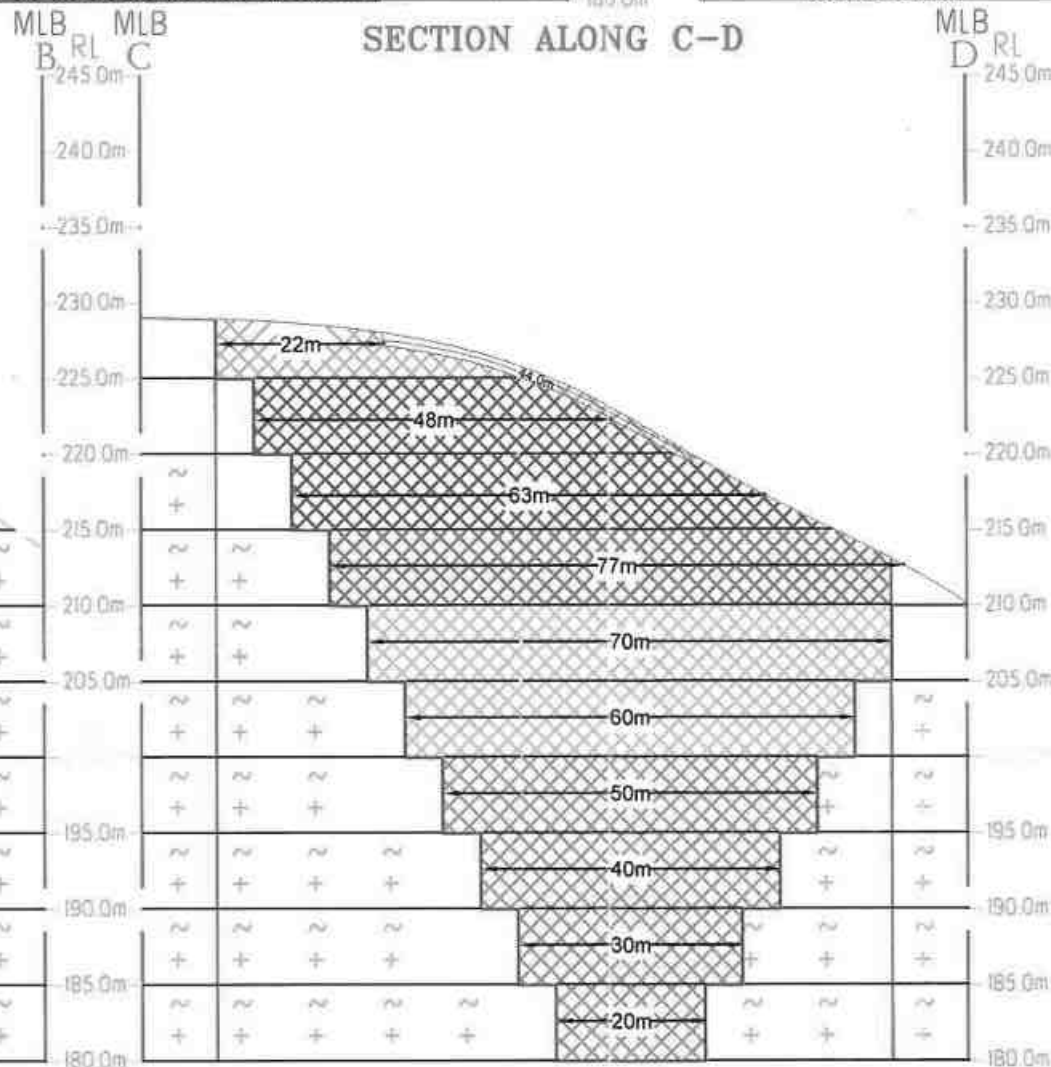
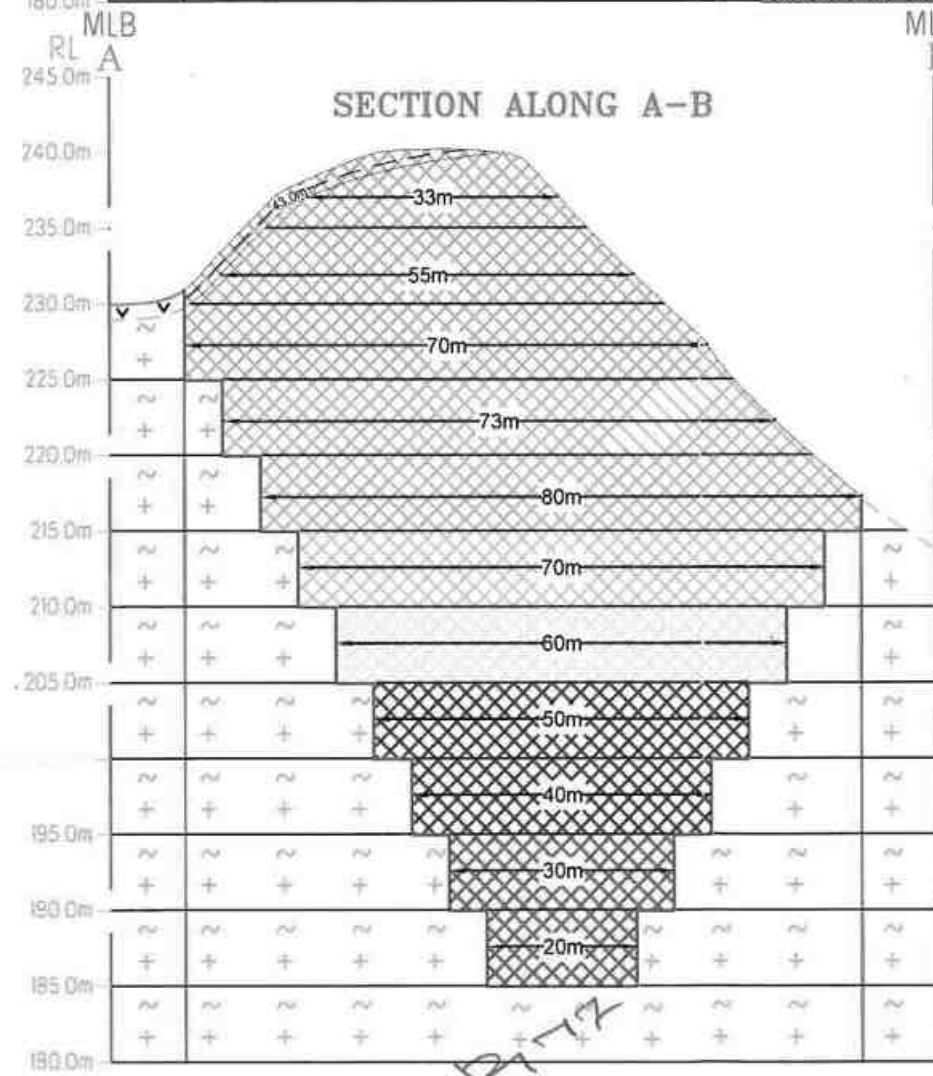
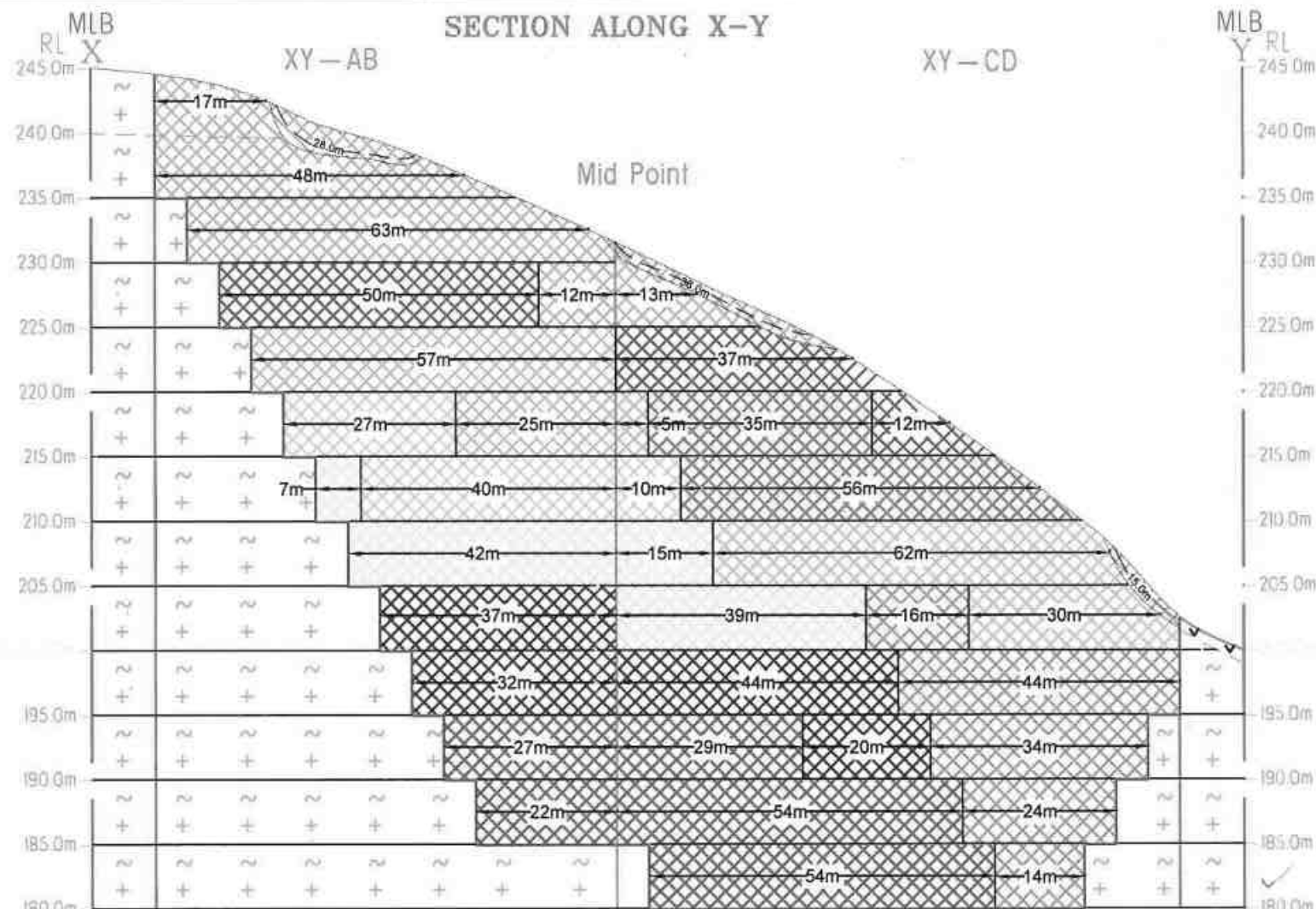
### YEARWISE DEVELOPMENT & PRODUCTION PLAN

SCALE 1: 1000

### Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS  
BEEN CHECKED BY ME AND IS CORRECT  
TO THE BEST OF MY KNOWLEDGE

**Dr.S.KARUPPANNAN,M.Sc.,Ph.D.**  
QUALIFIED PERSON



| YEARWISE PRODUCTION RESERVES (First Five Years)  |         |       |                  |                 |                 |                          |                                     |                              |                 |                         |                  |
|--------------------------------------------------|---------|-------|------------------|-----------------|-----------------|--------------------------|-------------------------------------|------------------------------|-----------------|-------------------------|------------------|
| Year                                             | Section | Bench | Length<br>in (m) | Width<br>in (m) | Depth<br>in (m) | ROM in<br>m <sup>3</sup> | Rough<br>Stone in<br>m <sup>3</sup> | Topsoil<br>in m <sup>3</sup> | Bulk<br>Density | Rough<br>Ston: in<br>MT | Topsoil<br>in MT |
| I-YEAR                                           | XY-AB   | Slope | 28               | 43              | 1               | 1204                     | 1204                                | 204                          | 2.00            | 2408                    |                  |
|                                                  |         | I     | 17               | 37              | 5               | 3145                     | 3145                                |                              | 2.75            | 8649                    |                  |
|                                                  |         | II    | 48               | 33              | 5               | 7920                     | 7920                                |                              | 2.75            | 21780                   |                  |
|                                                  |         | III   | 63               | 55              | 5               | 17325                    | 17325                               |                              | 2.75            | 47643                   |                  |
|                                                  | XY-CD   | IV    | 12               | 70              | 5               | 4200                     | 4200                                |                              | 2.75            | 11550                   |                  |
|                                                  |         | Slope | 51               | 44              | 1               | 2244                     | 2244                                | 2244                         | 2.00            | 4488                    |                  |
| TOTAL                                            |         |       |                  |                 |                 | 37468                    | 34020                               | 3448                         |                 | 93555                   | 6896             |
| II-YEAR                                          | XY-AB   | IV    | 50               | 70              | 5               | 17500                    | 17500                               |                              | 2.75            | 48125                   |                  |
|                                                  | XY-CD   | V     | 37               | 48              | 5               | 8880                     | 8880                                |                              | 2.75            | 24420                   |                  |
|                                                  |         | VI    | 12               | 63              | 5               | 3780                     | 3780                                |                              | 2.75            | 10395                   |                  |
| TOTAL                                            |         |       |                  |                 |                 | 30160                    | 30160                               | 0                            |                 | 82940                   | 0                |
| III-YEAR                                         | XY-CD   | VI    | 35               | 63              | 5               | 11025                    | 11025                               |                              | 2.75            | 30319                   |                  |
|                                                  |         | VII   | 56               | 77              | 5               | 21560                    | 21560                               |                              | 2.75            | 59290                   |                  |
|                                                  | TOTAL   |       |                  |                 |                 |                          | 32585                               | 32585                        | 0               |                         | 89609            |
| IV-YEAR                                          | XY-CD   | VIII  | 62               | 70              | 5               | 21700                    | 21700                               |                              | 2.75            | 59675                   |                  |
|                                                  |         | IX    | 30               | 60              | 5               | 9000                     | 9000                                |                              | 2.75            | 24750                   |                  |
| TOTAL                                            |         |       |                  |                 |                 | 30700                    | 30700                               | 0                            |                 | 84425                   | 0                |
| V-YEAR                                           | XY-CD   | IX    | 16               | 60              | 5               | 4800                     | 4800                                |                              | 2.75            | 13200                   |                  |
|                                                  |         | X     | 44               | 50              | 5               | 11000                    | 11000                               |                              | 2.75            | 30250                   |                  |
|                                                  |         | XI    | 34               | 40              | 5               | 6800                     | 6800                                |                              | 2.75            | 18700                   |                  |
|                                                  |         | XII   | 24               | 30              | 5               | 3600                     | 3600                                |                              | 2.75            | 9900                    |                  |
|                                                  |         | XIII  | 14               | 20              | 5               | 1400                     | 1400                                |                              | 2.75            | 3850                    |                  |
| TOTAL                                            |         |       |                  |                 |                 | 27600                    | 27600                               | 0                            |                 | 75900                   | 0                |
| GRAND TOTAL (A)                                  |         |       |                  |                 |                 | 158513                   | 155065                              | 3448                         |                 | 426429                  | 6896             |
| YEARWISE PRODUCTION RESERVES (Second Five Years) |         |       |                  |                 |                 |                          |                                     |                              |                 |                         |                  |
| VI-YEAR                                          | XY-AB   | V     | 57               | 73              | 5               | 20805                    | 20805                               |                              | 2.75            | 57214                   |                  |
|                                                  |         | VI    | 25               | 80              | 5               | 10000                    | 10000                               |                              | 2.75            | 27500                   |                  |
|                                                  | XY-CD   | VI    | 5                | 63              | 5               | 1575                     | 1575                                |                              | 2.75            | 4331                    |                  |
| TOTAL                                            |         |       |                  |                 |                 | 32380                    | 32380                               | 0                            |                 | 89045                   | 0                |
| VII-YEAR                                         | XY-AB   | VI    | 27               | 80              | 5               | 10800                    | 10800                               |                              | 2.75            | 29700                   |                  |
|                                                  |         | VII   | 40               | 70              | 5               | 14000                    | 14000                               |                              | 2.75            | 38500                   |                  |
|                                                  | XY-CD   | VII   | 10               | 77              | 5               | 3850                     | 3850                                |                              | 2.75            | 10537                   |                  |
| TOTAL                                            |         |       |                  |                 |                 | 28650                    | 28650                               | 0                            |                 | 78787                   | 0                |
| VIII-YEAR                                        | XY-AB   | VII   | 7                | 70              | 5               | 2450                     | 2450                                |                              | 2.75            | 6738                    |                  |
|                                                  |         | VIII  | 42               | 60              | 5               | 12600                    | 12600                               |                              | 2.75            | 34650                   |                  |
|                                                  | XY-CD   | VIII  | 15               | 70              | 5               | 5250                     | 5250                                |                              | 2.75            | 14437                   |                  |
|                                                  |         | IX    | 39               | 60              | 5               | 11700                    | 11700                               |                              | 2.75            | 32175                   |                  |
| TOTAL                                            |         |       |                  |                 |                 | 32000                    | 32000                               | 0                            |                 | 88000                   | 0                |
| IX-YEAR                                          | XY-AB   | IX    | 37               | 80              | 5               | 9250                     | 9250                                |                              | 2.75            | 25437                   |                  |
|                                                  |         | X     | 32               | 40              | 5               | 6400                     | 6400                                |                              | 2.75            | 17600                   |                  |
|                                                  | XY-CD   | X     | 44               | 50              | 5               | 11000                    | 11000                               |                              | 2.75            | 30250                   |                  |
|                                                  |         | XI    | 20               | 40              | 5               | 4000                     | 4000                                |                              | 2.75            | 11000                   |                  |
| TOTAL                                            |         |       |                  |                 |                 | 30650                    | 30650                               | 0                            |                 | 84287                   | 0                |
| X-YEAR                                           | XY-AB   | XI    | 27               | 30              | 5               | 4050                     | 4050                                |                              | 2.75            | 11138                   |                  |
|                                                  |         | XII   | 22               | 20              | 5               | 2200                     | 2200                                |                              | 2.75            | 6050                    |                  |
|                                                  | XY-CD   | XI    | 29               | 40              | 5               | 5800                     | 5800                                |                              | 2.75            | 15950                   |                  |
|                                                  |         | XII   | 54               | 30              | 5               | 8100                     | 8100                                |                              | 2.75            | 22275                   |                  |
|                                                  |         | XIII  | 54               | 20              | 5               | 5400                     | 5400                                |                              | 2.75            | 14850                   |                  |
| TOTAL                                            |         |       |                  |                 |                 | 25550                    | 25550                               | 0                            |                 | 70243                   | 0                |
| GRAND TOTAL (B)                                  |         |       |                  |                 |                 | 149230                   | 149230                              | 0                            |                 | 41082                   | 0                |
| GRAND TOTAL (A+B)                                |         |       |                  |                 |                 | 307743                   | 304295                              | 3448                         |                 | 836111                  | 6896             |

- I - Year Proposed area to be Quarried**
- II - Year Proposed area to be Quarried**
- III - Year Proposed area to be Quarried**
- IV - Year Proposed area to be Quarried**
- V - Year Proposed area to be Quarried**
- VI - Year Proposed area to be Quarried**
- VII - Year Proposed area to be Quarried**
- VIII - Year Proposed area to be Quarried**
- IX - Year Proposed area to be Quarried**
- X - Year Proposed area to be Quarried**

**PLATE No-VIA**

**APPLICANT:**  
**TvLRVM BLUE METALS,**  
 S.F.No.264/1, PUDURCHEKKADI VILLAGE,  
 THANDARAMPATTU TALUK,  
 TIRUVANNAMALAI DISTRICT - 606 708.

**LEASE AREA:**  
 S.F.No : 51(Part 4),  
 EXTENT : 2.00.20HECTS,  
 VILLAGE : ALLAPPANUR,  
 TALUK : THANDARAMPATTU,  
 DISTRICT : TIRUVANNAMALAI

**GL-GROUND LEVEL**

- INDEX**
- MINE LEASE BOUNDARY**
- SAFETY BOUNDARY**
- TOP SOIL**
- ROUGH STONE**
- PROPOSED BENCH**

**YEARWISE DEVELOPMENT & PRODUCTION SECTION**  
 SCALE - HOR 1 : 1000  
 & VER 1: 500

**Prepared By:**  
 I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE  
**Dr.S.KARUPPANNAN,M.Sc.,Ph.D.**  
**QUALIFIED PERSON**

## Annexure- IV

திருவண்ணாமலை மாவட்டம், தண்டராம்பட்டு வட்டம் அல்லப்பனூர் கிராம சர்வே எண் : 51 ல் மொத்த பரப்பு 2.00.2 ஹெக்ட நிலத்தில் முருகேசன் த.பெ. ராமலிங்கம் என்பவர் குவாரி அமைப்பதற்கு விண்ணப்பித்துள்ளார் இந்த புதிய குவாரி அமையும் இடத்திலிருந்து 300 மீட்டர் சுற்றளிவல் குடியிருப்புகள், கோவில், பள்ளிக்கூடம், பேருந்து நிலையம், புகை வண்டி நிலையம், சந்தை, பிரதான சாலைகள் மற்றும் பொதுமக்கள் கூடும் ஏனைய பகுதிகள் ஏதும் இல்லை என தெரிவித்துக்கொள்கிறேன்.

  
Village Administration Office  
Rayandapuram Group  
Thandarampet Taluk  
Tiruvannamalai District



## National Accreditation Board for Education and Training

### Certificate of Accreditation

#### Geo Technical Mining Solutions, Dharmapuri

5/1485-3, Salem Main Road, Elakkiyampatty, Dharmapuri, Tamil Nadu

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors.

| S. No | Sector Description                                             | Sector (as per) |           | Cat. |
|-------|----------------------------------------------------------------|-----------------|-----------|------|
|       |                                                                | NABET           | MoEFCC    |      |
| 1.    | Mining of minerals - including opencast and underground mining | 1               | 1 (a) (i) | A    |

**Note:** Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated January 24, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3142 dated Feb 19, 2024. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.

Issue Date  
Feb 19, 2024

Valid up to  
Dec 31, 2026



Mr. Ajay Kumar Jha  
Sr. Director, NABET

Certificate No.  
NABET/EIA/23-26/RA 0319

Prof (Dr) Varinder S Kanwar  
(CEO NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.