

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
&
ENVIRONMENT MANAGEMENT PLAN

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

For Obtaining
Environmental Clearance under EIA Notification – 2006
Schedule Sl. No. 1 (a) (i): Mining Project




TVL. SUGANYA BLUE METALS ROUGH STONE & GRAVEL QUARRY
CLUSTER EXTENT – 7.70.55 Ha

NAME OF PROPOSED PROJECT PROPONENT

Tvl. Suganya Blue Metals,

Thiru. R. Malaiyarasan (Authorized Signatory)

No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post,
Kallikudi Taluk, Madurai District- 625 022

PROJECT LOCATION	PROPOSED PRODUCTION
<p>S.F. Nos. 108/2D, 109/1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L and 1M Ulagani Village, Kallikudi Taluk, Madurai District. Extent: 3.48.0 ha</p>	<p style="text-align: center;">Reserves: 3,84,905m³ of Rough stone & 48,946m³ of Gravel</p> <p>Peak Production = 83,010 m³ of Rough Stone 17,422 m³ of Gravel</p> <p>Proposed Depth = 42 m BGL Mining Plan Period: 5 years</p>
ToR obtained vide File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024	
<p style="text-align: center;">Environmental Consultant GEO EXPLORATION AND MINING SOLUTIONS  Old No. 260-B, New No. 17, Advaitha Ashram Road, Alagapuram, Salem – 636 004, Tamil Nadu, India Accredited for sector 1 Cat ‘A’, sector 31 & 38 Cat ‘B’ Certificate No : NABET/EIA/2225/RA 0276  Phone: 0427-2431989, Email: infogeoexploration@gmail.com Web: www.gemssalem.com </p>	<p style="text-align: center;">Laboratory EHS 360 LABS PRIVATE LIMITED, NABL Accredited Laboratory 10/2 Ground floor, 50th street, 7th Avenue, Ashok Nagar, Chennai – 600 083.</p>
<u>Baseline Monitoring Period</u> Dec 2022 to Feb 2023	

For the easy representation the proposed, existing and expired quarries are designated as below –

PROPOSED QUARRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Status
P1	Tvl. Suganya Blue Metals, (Thiru. R. Malaiyarasan (Authorized Signatory) No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District- 625 022	108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M Ulagani Village, Kallikudi Taluk,	3.48.0	ToR obtained vide File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024
P2	Tmt.M. Meenatchi, W/o. Mahalingam, Ulagani, Thirumangalam Taluk, Madurai District – 625 022	16/2B, 16/3 & 16/4 etc., of Achankulam Village, Kallikudi Taluk, Madurai District	1.42.0	EC Granted vide EC24B0108TN5843396N Dated; 10.05.2024
Total Extent			4.90.0	
EXISTING QUARRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
E1	L.Selvi	112/10A (0.19.5), 112/10B (0. 12.0), 112/10C (0.19.5), 112/10D1 (0.75.3), 112/10D3 (0.52.75), 112/10E (0.12.0), 112/11 (0.71.0), 112/8A (0.07.0)	2.80.55	ROC.NO.1705/2017 dt 08.06.2023 14.06.2023 to 13.06.2028
Total Extent			2.80.55	
ABANDONED/EXPIRED QURRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
A-1	Thiru. M.Pandi	3/1,2,3,4,5	2.11.0 Ha	ROC.NO.156/2010/mines dt 13.07.2010 19.08.2010 to 18.08.2015
A-2	ThiruP.R.kalyana Sundaram	2/3A etc.,	2.91.0 Ha	ROC.NO.1135/2009/mines dt 30.07.2010 03.09.2010 to 02.09.2015
A-3	Thiru R.Ravi	1/1A etc	3.82.0	ROC.NO.15/2014/mines dt 11.05.2015 27.05.2015 to 26.05.2020
Total Extent			8.84.0	
TOTAL CLUSTER EXTENT			7.70.55	

Note:-

- **Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016**

As per above notification S.O.2269(E) dated : 01.07.2016 in para (b) in Appendix XI,- (ii)(5): The lease not operative for three years or more and leases which have got environmental clearance as on 15th January, 2016 shall not be counted for calculating the area of cluster, but shall be included in the Environment Management Plan and the Regional Environmental Management Plan”

TERMS OF REFERENCE (ToR) COMPLIANCE

Tvl Suganya Blue Metals

“ToR obtained vide File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024”

SEAC STANDARD CONDITIONS		
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	It is a fresh lease area, at present the area is virgin. There is no pit.
	i. original pit dimension of the existing quarry	It is a fresh lease area, at present the area is virgin. There is no pit.
	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 carried out, if any	Non Illigal
	vi. Non-Compliance / violation in the quarry during the past working	Non violence
	vii. Quantity of material mine out outside the mine lease area (or) in the adjacent quarry/field	-
	viii. condition of safety / benches	Addressed in the Mining Plan by providing adequate safety and making bench formations.
	ix. Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	Ultimate pit = Pit: 204m(L) x 121m(W) x 42m(D) (BGL)
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 letter detailing habitations around the proposed mining is obtained from VAO Ulagani Village, dated 04.04.2024 enclosed as Annexure	
3. 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 1km of the proposed quarry.	The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 4	
4. The proponent shall carry out Bio diversity study through reputed institution and the same shall be included in EIA Report.	The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No.3	
5. 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.	Request to consider the secondary source data detailing the nearest reserve forest from Tamil Nadu Geographical Information System (TNGIS). The Nearest Reserve Forest Kodimangalam B Block R.F – 17.71Km – North	
6. 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, NIRI/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	It is a fresh lease area, at present the area is virgin. There is no pit.	

and possible mitigation measures during the time of appraisal for obtaining the EC.	
7.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.	Proposed depth is 42m Bgl.
8. 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 PP affirms that post execution of Quarry Lease Deed the application for Notice of Opening of the Mine along with Notice of Appointment of Competent Person shall be submitted to Director General Mines Safety, Chennai as per MMR, 1961. And ensure the quarry is operated under the Competent Person Employed.
9.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.	The details of design for carrying out controlled blasting operation involving line drilling and muffle blasting to minimize blast-induced ground vibrations and controlled fly rock travel beyond 30 m from the blast site is detailed in Chapter 4.
10.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.	The PP has submitted self-declaration affidavit that there are no other quarries applied or existing in his name elsewhere in the state.
11.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,	It is a fresh lease area, at present the area is virgin. There is no pit.
12.What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	
13. Quantity of minerals mined out.	
c) Highest production achieved in any one year	
d) Detail of approved depth of mining.	
e) Actual depth of the mining achieved earlier.	
f) Name of the person already mined in that leases area.	
g) If EC and CTO already obtained, the copy of the same shall be submitted.	
h) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	mining plan depth is 42m bgl
14.All corner coordinates of the mine lease area, superimposed on a high-resolution Imagery/Toposheet, 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 area).	Satellite imagery of the project area along with boundary coordinates is given in the Chapter No 2,
15.The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	The Drone Video of the project site is taken covering the Greenbelt and Fencing around the Project and enclosed as soft copy as CD.
16.The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety	As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 1750 Nos of trees were planted as a part

distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads. As well the pp has provided wire fencing as recommended all along the boundary of the lease applied area.
17. The Project proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology justifications, with the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	Details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology justifications are provided in Chapter 2. The anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same are provided in Chapter 4.
18. 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 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 Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of 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.
19. The Project Proponent shall conduct the 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) 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.	The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.
20. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quantity, air quality, soil quality & flora/fauna including Traffic/vehicular movement study.	Baseline Data were collected for Winter season Dec 2022 to Feb 2023 Details in Chapter No. 3.
21. 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.	Cumulative impact study has been carried out covering proposed and existing quarries in the cluster and results related to air pollution, water pollution, & health impacts have been given in chapter No. 7, Based on the results, environmental management plan has been prepared and given in Chapter No. 10.
22. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
23. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water	Land use and land cover of the study area is discussed in Chapter No. 3.

<p>bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass pre operational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p>	<p>Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 3, Table No 3.3</p>
<p>24.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.</p>	<p>Not applicable</p>
<p>25.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.</p>	<p>Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.</p>
<p>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>	<p>The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.</p>
<p>27.Impact on local transport infrastructure due to the Project should be indicated.</p>	<p>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. Details have been provided in Chapter No.2</p>
<p>28.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.</p>	<p>As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 1750Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads.</p>
<p>29.A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.</p>	<p>Noted & agreed. Mine closure plan is detailed in Chapter:4.</p>
<p>30.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.</p>	<p>Noted, it will submit final EIA/EMP report.</p>
<p>31.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 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.</p>	<p>As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 1750 Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads.</p>

32. Taller/one year old Saplings raised in appropriate size of bags; preferably eco-friendly 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.	Detailed in chapter-3 Ecology biodiversity studies.
33. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Disaster management Plan is detailed in Chapter-7
34. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.	A Risk Assessment and management Plan Chapter-7
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 are discussed in chapter- 10
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 anticipated due to this project. Details of CER and CSR are discussed under Chapter 8.
37. 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.	Details are listed in Chapter:3.
38. 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
39. 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.	Project benefit is given in the Chapter No.8.
40. 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.	Not Applicable. The applied area is a new proposal for Environmental Clearance.
41. 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.	Noted and agreed
42. 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 Reference besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted and agreed

Annexure 'B'

Cluster Management Committee

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.	Cluster Management Committee has been constituted initially with 3 quarries.
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 information will be shared to the cluster management committee during the monthly meeting.
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.
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.	All the information has been discussed in Chapter No.2.
5	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.	The risk management plan and disaster management plan will be followed as per the EIA report.
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.	Environmental policy is described in the EIA report Chapter No. 6 and the same will be followed.
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.	Proper action plan regarding the restoration will be followed by the committee.
8	The committee shall furnish the Emergency Management plan within the cluster.	The committee will submit the emergency management plan to the respective authority in the stipulated time period.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	The information on the health of the workers and the local people will be updated periodically.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	A proper action plan with reference to water, sanitation & safety will be devised and submitted by the committee to the respective authority.

11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	The fire safety and evacuation plan will be carried out by as per the respective quarry mines managers.
<u>Impact study of mining</u>		
12	<p>Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following</p> <p>a) Soil health & soil biological, physical land chemical features .</p> <p>b) Climate change leading to Droughts, Floods etc.</p> <p>c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.</p> <p>d) Possibilities of water contamination and impact on aquatic ecosystem health.</p> <p>e) Agriculture, Forestry & Traditional practices.</p> <p>f) Hydrothermal/Geothermal effect due to destruction in the Environment.</p> <p>g) Bio-geochemical processes and its foot prints including environmental stress.</p> <p>h) Sediment geochemistry in the surface streams.</p>	<p>Details of Soil health is given in Chapter No 3 and biodiversity is given in Chapter No 3.</p> <p>The project will not cause any significant changes in the climate</p> <p>Climatic changes and GHG are described in Chapter No 4.</p> <p>Details of water contamination and impact on aquatic ecosystem is given in Chapter No 4.</p> <p>Hydrothermal/ Geothermal effects due to destruction in the environment, Bio geochemical process and sediment geo chemistry given in the Chapter No 7.</p>
<u>Agriculture & Agro-Biodiversity</u>		
13	Impact on surrounding agricultural fields around the proposed mining Area.	As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present will be low. With proper mitigation measures, the project will be carried out to reduce the impact further to the level of negligence.
14	Impact on soil flora & vegetation around the project site.	The vegetation details have been provided in chapter III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
15	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	The vegetation details have been provided in chapter III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as

	boundary of the proposed mining area shall committed mentioned in EMP.	per IUCN. There is no endangered red list species found in the study area
16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	Details are discussed in Chapter No.3
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The project area is bounded by Existing quarries on the South side and North side barren land. Budgetary allocation given in the Chapter No. 10.
Forests		
19	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	There is no Reserve Forest within 1km radius from the project area. The mining operation will not cause any significant impact to the Reserve Forest and Wild life Sanctuaries
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna	There is no forest/wildlife within 10km radius, chapter 3 details of Ecology and Biodiversity, and 4 endemic vulnerable and endangered indigenous flora and fauna.
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Details are discussed in the Chapter No.3
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Anticipated Environment Impact and Mitigation measures are detailed in Chapter No.4
<u>Water Environment</u>		
23	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, onds 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	There are 11 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method

	groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	
24	Erosion Control measures.	Details discussed in the chapter No.4
25	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.	Details in Chapter 3
26	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	Details are given in the Chapter No 4.
28	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.	Details in Chapter 4 impact of bio diversity.
29	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical. chemical components and microbial components.	Details of impact on soil environment is detailed in Chapter No.4
30	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Kodimangalam B Block R.F – 17.71Km – North There is, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area. Ecological Environment is discussed under Chapter 3
<u>Energy</u>		
31	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	Detailed discussed in chapter 4

Climate Change		
32	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>A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃)</p> <p>Carbon dioxide (CO₂): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.</p> <p>Methane (CH₄): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills.</p> <p>Nitrous oxide (N₂O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater</p>
33	The Environmental impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Detailed discussed in chapter 3.
<u>Mine Closure Plan</u>		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
EMP		
35	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	Detailed discussed in chapter 10.
36	The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.	Detailed discussed in chapter 10.
<u>Risk Assessment</u>		

37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	A Risk Assessment and management Plan Chapter-7
<u>Disaster Management Plan</u>		
38	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.	Disaster management Plan details in Chapter-7
Others		
39	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.	Letter obtained from the VAO regarding surface features within 300m radius
40	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 part of the Environment Management Plan.	The issues raised during public hearing is addressed in chapter No.7
41	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.	Plastic waste management in the project area detailed in Chapter No.7.

S. No	Terms of Reference	Reply
1.1	An EIA-EMP Report shall be prepared for peak capacity (.MTPA) operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.	Peak Production = 83,010m ³ of Rough Stone Proposed Depth = 42m bgl Project area of 3.48.0Ha.

1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection can be for any	Peak capacity of 83,010 m ³ operation to cover the impacts and environment management plan in chapter- IV and Chapter-10 covered in project specific activities. Baseline Data were collected for Winter Season Dec 2022– Feb 2023 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. III
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided.	Noted, Google earth image showing lease area with Coordinates of pillars in chapter-
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.	Land use and land cover of the 10km Radius of study area is discussed in Chapter No. III. Geology map of the project area covering 10km radius Figure No. 2.5, Page No. 20. Geomorphology of the area is given in Chapter No 2 Figure No 2.6, Page No. 20 There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	Land use and land cover of the study area is discussed in Chapter No. III with Physical features such as waterbodies, odai, canal etc.,
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	DEM data using Drainage pattern around 10km radius showing streams and lakes etc., discussed in Chapter No. 3.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted.	Drainage pattern around 10km radius showing streams and lakes etc., is discussed in Chapter No. 3.

1.8	<p>(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.</p>	<p>Details in chapter-2 showing the land features. And also enclosed Approved mining plan in annexure</p>
1.9	<p>Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.</p>	<p>It is an opencast quarrying operation proposed to operate in Mechanized method. The Rough Stone quarry formation is a hard, compact and homogeneous body.</p> <p>The height and width of the bench will be maintained as 5m with 90⁰ bench angles.</p> <p>Quarrying activities will be carried out under the supervision of Competent</p>
1.10	<p>Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.</p>	<p>Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.</p>
1.11	<p>A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc.,</p>	<p>Not Applicable. The details of waste dump management are given in the Chapter No. 4</p>

1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights				Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.5.		
					Description	Present area (Ha)	Area at the end of lease period (Ha)
	Sno	ML. project Land use	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under quarrying	Nil	2.63.60
	1	Agriculture Land			Both Infrastructure	Nil	0.01.00
	2	Forest Land			Roads	Nil	0.02.00
	3	Grazing Land			Green Belt	Nil	0.34.62
	4	Settlements			Unutilized Area	3.48.0	0.46.78
	5	Others (Specify)					
	S.No	Details	Area (Ha)	Grand Total		3.48.0	3.48.0
	1	Buildings					
2	Infrastructure						
3	Roads						
4	Others (Specify)						
	Total						
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan				Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.		
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET				Baseline Data were collected for Winter season Dec 2022–Feb 2023 as per CPCB Notification and MoEF & CC Guidelines.Details in Chapter No. 3.		

1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air) / downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for	Details in chapter-3 showing the various sampling stations As per CPCB guidelines.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10km buffer zone i.e., dispersed in 10 km buffer area. In case of expansion, the	Air Quality Modelling and windrose pattern for prediction of incremental GLC's of pollutant was carried out using AERMOD view 13 Model. Details in Chapter No. 4.
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory	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 in Chapter-II.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and	Detailed in chapter-3 socio-economic study with occupational status & economic status of the study area. The study should also include the status of infrastructural facilities and amenities present in the study area CSR are discussed under Chapter 8.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by	Detailed Ecology and biodiversity study in chapter-3
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.	Detailed in chapter-4 population in the impact zone and measures for occupational health and safety and proposed occupational health in chapter-X

1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.	Noted and agreed
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.	The ground water table is at 73m below ground level. In these projects, ultimate depth is 42m Bgl It is inferred the quarrying activities in the Cumulative EIA project (Quarry) will not intersect the Ground water table.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.	Detailed in Chapter-IV Anticipated and mitigation measures of in the study area.
1.24	Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.	Total Water Requirement: 2.2 KLD Discussed under Chapter 2, Table No 2.15, The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Methodology And Instrument Used For Air Quality Analysis in chapter-3and Air Pollution control equipment (APCEs) in chapter-10 sub 10.2 Environmental policy.
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored.	Details in Machinery and equipment details in Chapter-2 Table No 2.10
1.27	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	Noted and agreed
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	A Risk Assessment and Disaster Preparedness and management Plan Chapter- 7
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	Detailed in Machinery and technology used Chapter-3 Table 3.17 – Methodology and Instrument Used for Air Quality Analysis Detailed study in chapter-4 Impact of choice of mining method and impact on air quality and blasting and noise and vibrations.

1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no much significant impact due to the proposed transportation from the project area. Details in Chapter 2. Infrastructure & other facilities will be provided to the Mine Workers after the
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.	Detailed in chapter-2 for mineral transportation route with approach roads etc., and impacting air quality detailed given chapter-4
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre-mining status should be provided. A Plan for the ecological restoration of the mined-out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and	Discussed under Chapter 2. Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be undertaken	Greenbelt Development Plan is discussed under Chapter 4,
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.	The total cost and the details are given in the Chapter No. 10
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc. and costs along with the schedule of the implementation of the	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.	CSR are discussed under Chapter 8. And specific budgetary provisions (capital and recurring) for specific activities over the life of the project in chapter-10
1.38	Corporate Environment Responsibility:	CER are discussed under Chapter 8.
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.	Detailed in chapter-10 The Environment Policy

1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.	
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.	The Environment Monitoring Cell discussed under Chapter 6
1.42	d) To have proper checks and balances, the company should have a well laid down 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.	The Environment Monitoring Cell discussed under Chapter 6
1.43	e) Environment Management Cell and its responsibilities to be clearly spell out in EIA/ EMP	The Environment Monitoring Cell discussed under Chapter 6
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be	The Environment Monitoring Cell discussed under Chapter 6
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.	No litigation is pending in any court against this project
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.	<u>Megamalai Wildlife Sanctuary – 27.5km – South West.</u> It will submit final EIA/EMP report.
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable	It will submit final EIA/EMP report
1.48	Details on the Forest Clearance should be given as per the format given: Total Mine lease area (ha): Total Forest Land (Ha) : Date of FC : Extent of Forest Land : Balance area for which FC is yet to be obtained: Status of application for diversion of forest Land:	Kodimangalam B Block R.F – 17.71Km – North Total Mine Lease area 3.48.0ha It will submit final EIA/EMP report
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report.	Enclosed Approved mining plan in Annexure volume-I
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated	The outcome of public hearing will be updated in the final EIA/AMP report.
1.51	PP shall carry out survey through drone highlighting the ground reality for at least 10 minutes.	Noted and agreed

1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s),	Noted and agreed
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)	As per detailed in front page of Draft EIA/EMP, NABET, NABL certification detailed given in the report.
1.54	The compliances of Tor must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the	As per Tor compliance each chapter wise page and table, figure no given in the EIA/EMP report.

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CHAPTER – 1: INTRODUCTION

1.0 Preamble

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

Rough Stone are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of **Tvl. Suganya Blue Metals** Rough Stone & Gravel Cluster Quarries consisting of two Proposed and one Existing Quarries with total extent of Cluster of 7.70.55 Ha in Ulagani Village, Kallikudi Taluk, Madurai District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

This EIA Report is prepared in compliance with ToR obtained for the below proposals in Table 1.1 and the Baseline Monitoring study has been carried out during the period of December 2022 – February 2023

TABLE 1.1: ToR OBTAINED PROJECT

CODE	Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
P1	Tvl. Suganya Blue Metals	3.48.0	File No.: 10880, TOR Identification No. T024B0108TN5218529N Dated; 25.06.2024

Source: ToR Letter's of the project proponent

1.1 Purpose of the report

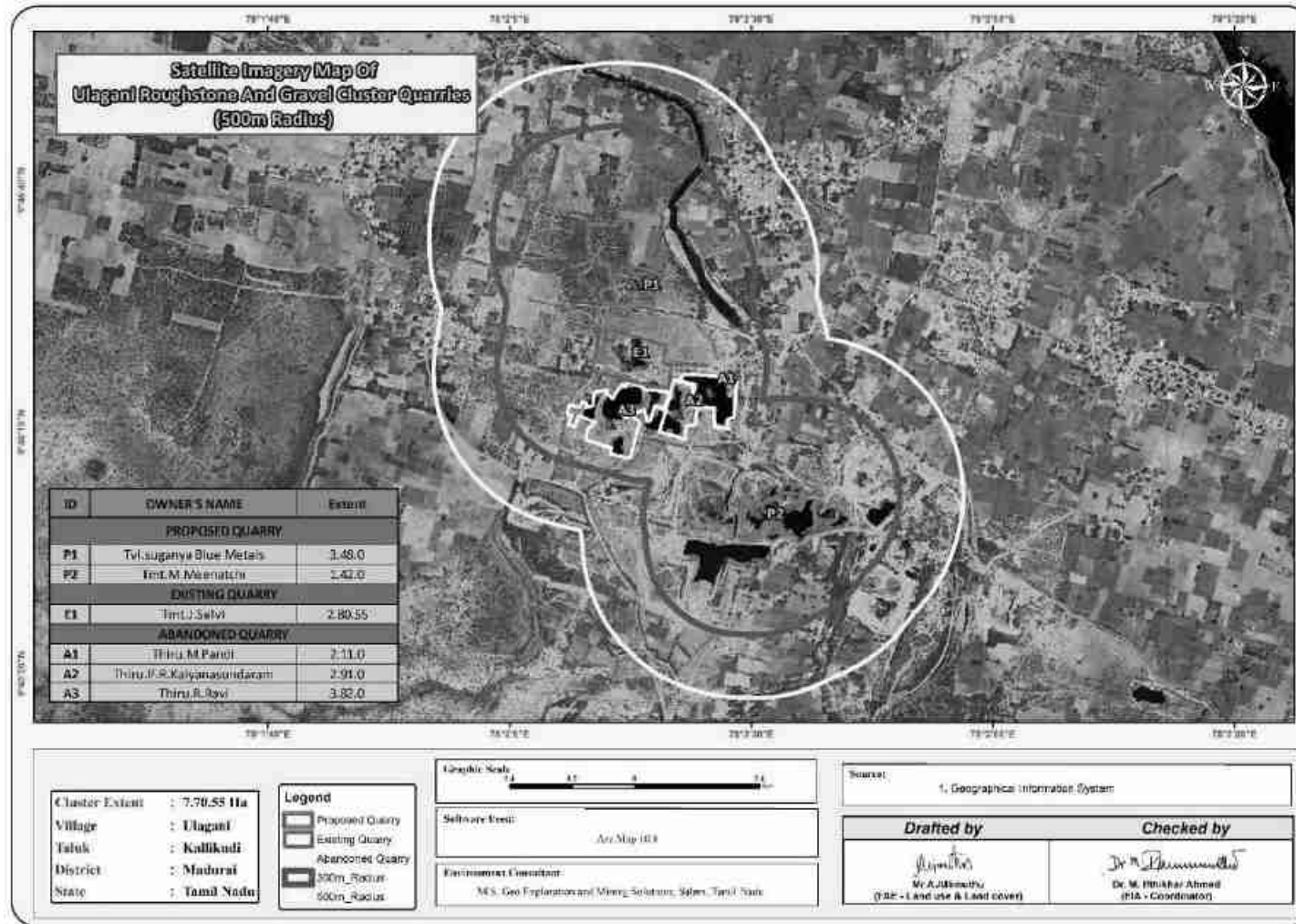
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 1886 (E) of 20th April 2022, Mining Projects are classified under two categories i.e. A (> 250 Ha) and B (\leq 250 Ha), and Schematic Presentation of Requirements on Environmental Clearance of Minor Minerals including cluster situation in Appendix – XI.

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed projects are categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

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

FIG.1.1 SATELLITE IMAGERY CLUSTER QUARRIES



+Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

Note: As per above notification S.O.2269(E) dated: 01.07.2016 in para (b) in Appendix XI, - (i)(6) A cluster shall be formed when the distance between the peripheries of one lease is less than 500 meters from the periphery of other lease in a homogeneous mineral area which shall be applicable to the mine lease or quarry licenses granted on and after 9th September, 2013

1.2 Identification of Project and Project Proponent

1.2.1 Identification of Project

The project areas in the cluster are Patta Land, no forest land is involved

TABLE 1.2: PROPOSED PROJECTS IN THE CLUSTER

PROPOSAL – P1	
Description	
Name of the Project	Tvl. Suganya Blue Metals Rough Stone & Gravel Quarry
S.F. No.	108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M
Extent	3.48.0 Ha
Village & Taluk	Ulagani Village, Kallikudi Taluk
District	Madurai District

Source: Approved Mining Plan

1.2.2 Identification of Project Proponent

TABLE 1.3: DETAILS OF PROJECT PROPONENT

PROPOSAL – P1	
Name of the Company	Tvl. Suganya Blue Metals Thiru. R. Malaiyarasan (Authorized Signatory)
Address	No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District - 625 022.
Mobile	98428 04566 & 80722 79017
Status	Partnership Firm

Source: Approved Mining Plan

1.3 Brief description of the project

1.3.1 Nature and size of the Project

The quarrying operation is proposed to be carried out by Opencast Mechanized Mining method with 5.0m bench height and 5.0m bench width by deploying Jack Hammer Drilling & Slurry Explosive during blasting. Hydraulic Excavator and tippers are used for Loading and transportation. Rock Breakers are deployed to avoid secondary blasting.

TABLE 1.4: SALIENT FEATURES OF THE PROPOSED PROJECTS IN CLUSTER

SALIENT FEATURES OF PROPOSAL “P1”	
Name of the Mine	Tvl. Suganya Blue Metals Rough Stone & Gravel Quarry
Land Type	The Suganya Blue Metals is a Partnership firm and the Partnership deed executed on 03.08.2009 and registered on 04.08.2009 with five partners. The Partnership firm Reconstituted on 01.04.2022 with four partnerships under the Indian Partnership act 1932. Thiru. R. Malaiyarasan is one of the partners an authorized person for signing all the documents on behalf of the firm.
Previous quarry operation details	It is fresh land
S.F. Nos, Village, Taluk & District	108/2D, 109, 1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L & 1M. Ulagani Village, Kallikudi Taluk, Madurai District.
Extent	3.48.0 Ha
Toposheet No	58 K/01
Latitude	09°46'28.0212"N to 09°46'36.8935"N
Longitude	78°02'13.0813"E to 78°02'20.5055"E

Highest elevation	128m AMSL	
Geological Reserves	Rough Stone	Gravel
	13,91,960 m ³	69,598m ³
Mineable Reserves	Rough Stone	Gravel
	3,84,905m ³	48,946m ³
Proposed Quantity of Reserves Level of production	3,84,905m ³	48,946m ³
Peak Production	83,010 m ³	17,422 m ³
Mining Plan Period / Lease Period	5 Years	
Proposed Depth	42m (2m Gravel + 40m Rough Stone) Bgl	
Ultimate Pit Dimension	204m (L) X 121m (W) X 42m (D) BGL	
Water Level in the surrounds area	The Water table is found at a depth of 73m in summer and at 68m in rainy seasons.	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is a Plain topography. The area has gentle sloping towards eastern side and altitude of the area is 128m (max) above from Mean Sea level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit.	
Machinery proposed	Jack Hammer	12
	Compressor	3
	Excavator with Bucket and Rock Breaker	1
	Trucks	3
Blasting	Usage of Slurry Explosive with MSD detonators	
Manpower Deployment	46 Nos	
Total Project Cost	Project Cost	Rs. 2,74,25,000/-
	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 2,78,05,000/-
CER Cost	Rs.5,00,000/-	
Nearest Habitation	310-NE	
Reserve Forest	Kodimangalam B Block R.F – 17.71Km – North	
Wild Life Sanctuary	Megamalai (Srivilliputhur) Wildlife Sanctuary – 27.5km – South West.	

1.3.2 Location of the project

The Lease applied area is located about 18km southwest side of Madurai town, 11km Northeast side of kallikudi town and 400m Southwest side of ulagani village.

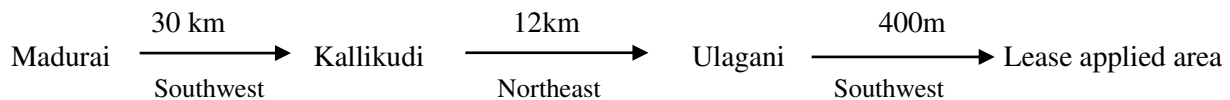


FIG1.1A KEY MAP SHOWING THE LOCATION OF THE PROJECT SITE

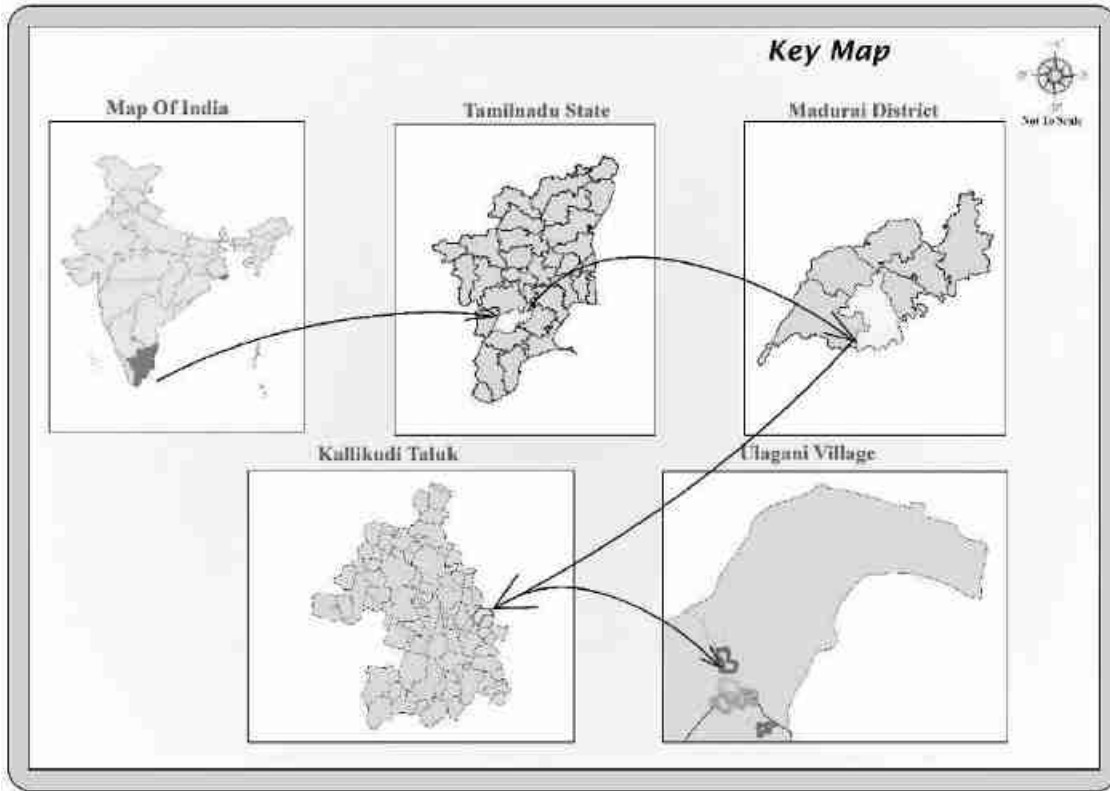


FIGURE 1.2: TOPOSHEET SHOWING LOCATION OF THE PROJECT SITE AROUND 10 KM RADIUS

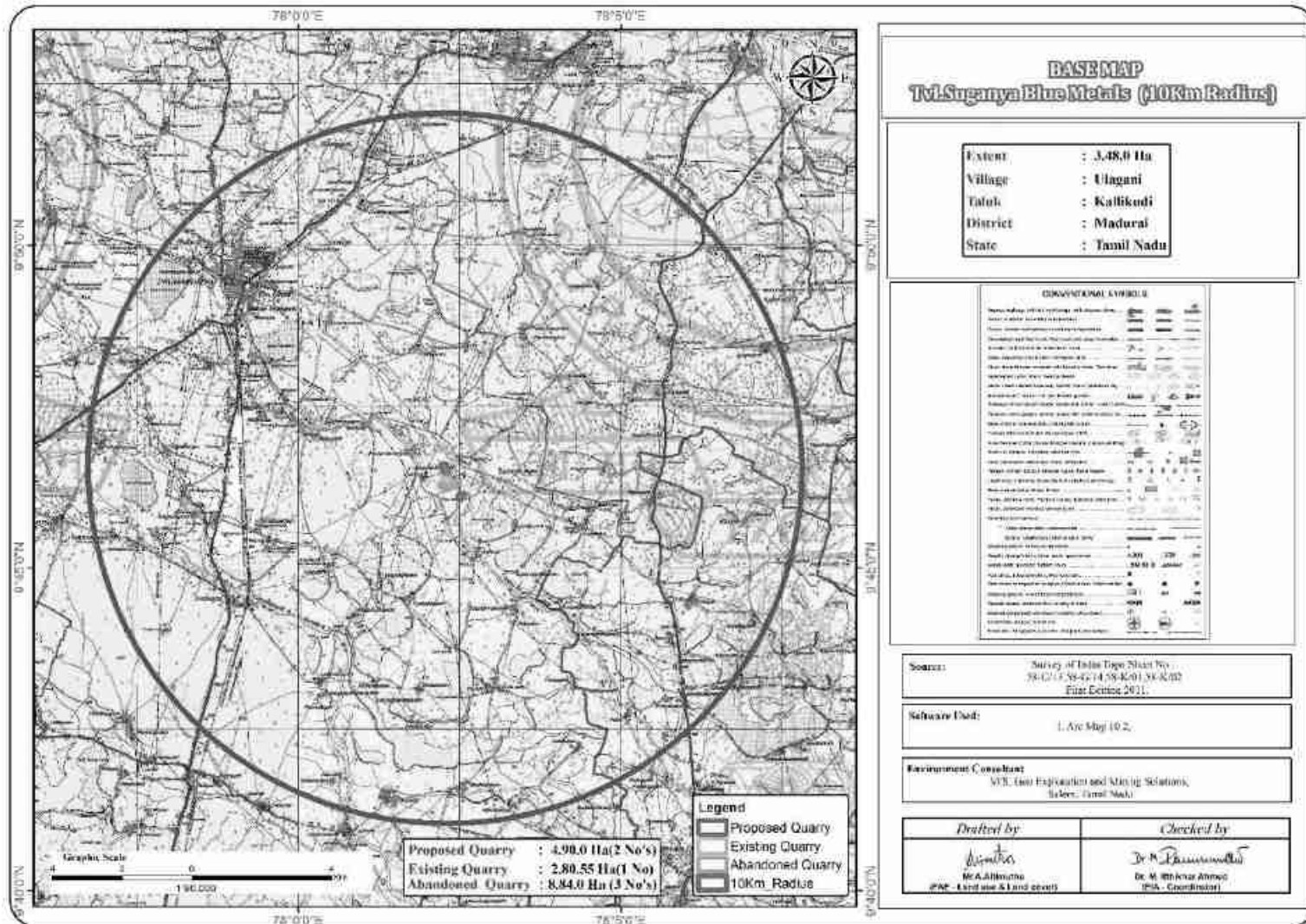
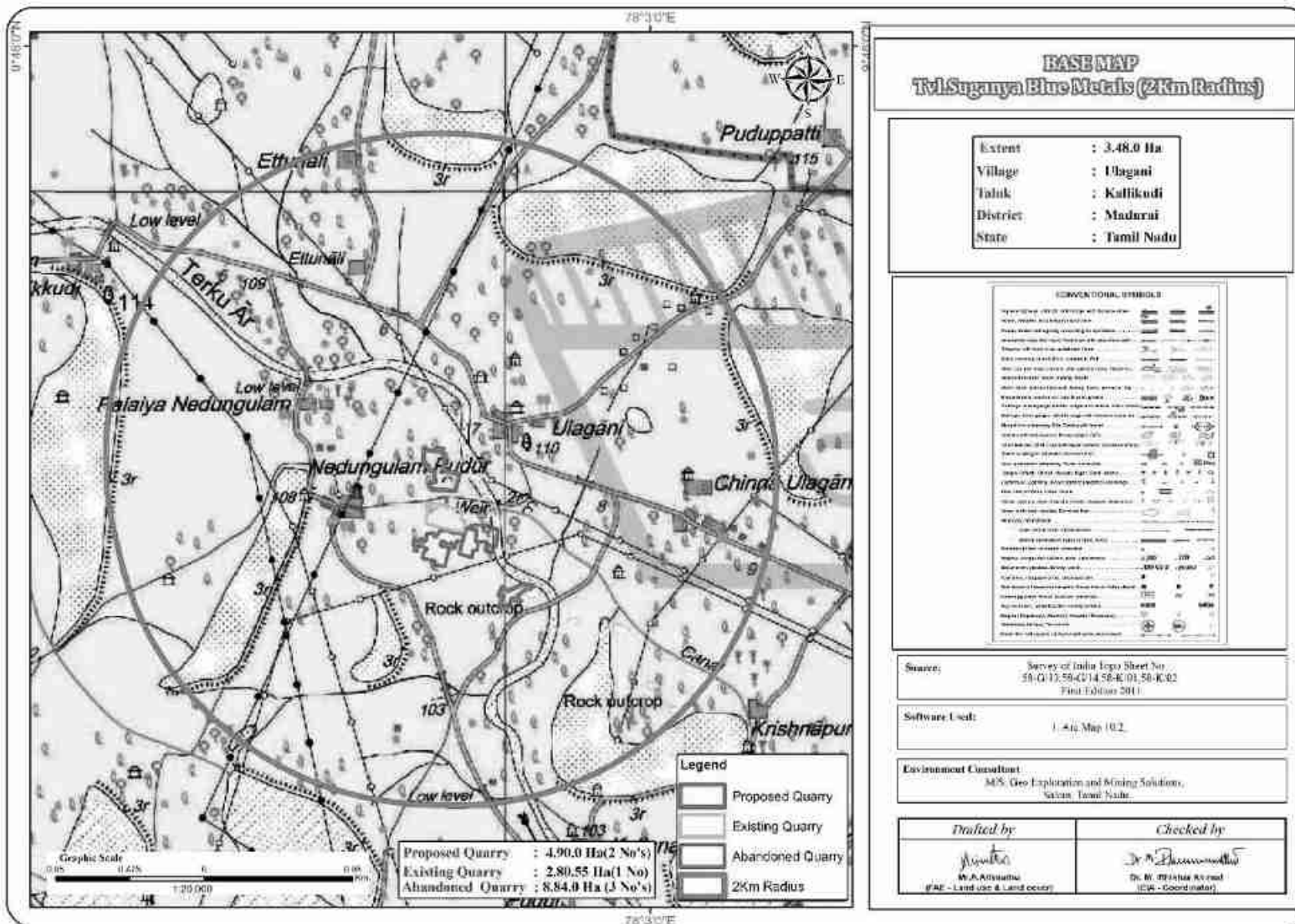


FIGURE 1.3: TOPOSHEET SHOWING LOCATION OF THE PROJECT SITE AROUND 2 KM RADIUS



1.4 Environmental Clearance

The Environmental Clearance process for the project will comprise of four stages. These stages in sequential order are given below: -

1. Screening
2. Scoping
3. Public consultation &
4. Appraisal

SCREENING –

- The proponent applied for Rough Stone Quarry Lease Dated: 11.10.2023.
- The Deputy Director, Department of Geology and Mining, Madurai District and passed a precise area Communication letter vide Rc. No. 1271/Kanimam/2023, Dated: 23.01.2024 for over an extent of 3.48.0 Hectares of patta lands in S.F.Nos. 108/2D, 109, 1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L & 1M. of Ulagani Village, Kallikudi Taluk, Madurai District.
- As per the precise area communication letter the Mining plan was prepared and got approval from the Assistant Director, Department of Geology and Mining, Madurai District vide: Roc. No. 1271/Mines/2023, Dated: 19.02.2024
- Proponent applied for ToR for Environmental Clearance vides online Proposal No. SIA/TN/MIN/471587 Dated:04.05.2024

SCOPING –

- The proposal was placed in 472th SEAC meeting held on 31.05.2024 and the committee recommended for issue of ToR.
- The proposal was considered in 731th SEIAA meeting held on 19.06.2024 and issued ToR vide File No.; 10880 TO24B0108TN5218529N Dated: 25.06.2024

Public Consultation –

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 is submitted along with this Draft EIA/ EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

Appraisal –

Appraisal is the detailed scrutiny by the State Expert Appraisal Committee (SEAC) of the application and other documents like the final EIA & EMP Report, outcome of the Public Consultations including Public Hearing Proceedings, submitted by the proponent to the regulatory authority concerned for grant of environmental clearance.

The report has been prepared using the following references:

- Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, 2010
- EIA Notification, 14th September, 2006
- ToR vide File No.; 10880 TO24B0108TN5218529N Dated: 25.06.2024

- Approved Mining of the Proposed Rough Stone quarry project.

1.5 Post Environment Clearance Monitoring

The Project Proponents in the Cluster will submit a half-yearly compliance report in respect of stipulated Environmental Clearance terms and conditions to MoEF & CC Regional Office & SEIAA after grant of EC on 1st June and 1st December of every year.

1.6 Generic Structure of EIA Document

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC.

A brief description of each Chapter is presented in Table No. 1.5.

TABLE 1.5 – STRUCTURE OF THE EIA REPORT

S. No	Chapters	Title	Particulars
1	Chapter 1	Introduction	Presents, an Introduction along with Scope and Objective of this EIA/EMP Studies
2	Chapter 2	Project Description	Presents the Technical Details of the Project
3	Chapter 3	Description of Environment	Presents the Baseline Status for various Environmental Parameters in the Study Area for One Season (3 Months)
4	Chapter 4	Anticipated Environmental Impacts and Mitigation Measures	Presents the Identification, Prediction and Evaluation of overall Environmental Impacts due to the Proposed Projects Activities. Also presents Proposed Mitigation Measures.
5	Chapter 5	Analysis of Alternatives (Technology & Site)	Presents Analysis of alternatives with respect to site
6	Chapter 6	Environment Monitoring Programme	Present details of post project environment monitoring
7	Chapter 7	Additional Studies	Presents Public Consultation, Risk Assessment and Disaster Management Plan
8	Chapter 8	Project Benefits	Presents project benefits as: Improvements in the Physical Infrastructure, Social Infrastructure Employment Potential –Skilled; Semi-Skilled and Unskilled etc.,
9	Chapter 9	Cost Benefit Analysis	Environmental Cost Benefit Analysis has not been recommended at Scoping Stage – thus no analysis carried out separately in this EIA/EMP Report.
10	Chapter 10	Environmental Management Plan	Description of the administrative aspects to ensure the Mitigation Measures are implemented and their effectiveness monitored, after approval of the project.

11	Chapter 11	Summary & Conclusion	Summary of the EIA Report
12	Chapter 12	Disclosure of Consultants Engaged	Disclosure of the Consultants

1.7 Scope of the Study

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the post monsoon season (**Dec 2022 – Feb 2023**) for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project.

TABLE 1.6 – ENVIRONMENT ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	24 hourly samples twice a week for three months at 8 locations
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station, Madurai
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 4 ground water and 2 surface water locations once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was collected from the Forest department.
5	Noise levels	Noise levels in dB(A)	At 8 locations data monitored once for 24 hours during EIA study.
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 locations during study period
7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk assessment done for the mining associated activities

Source: Field Monitoring Data

The data has been collected as per the requirement of the ToR issued by SEIAA – TN and Standard ToR Published by MoEF & CC.

1.7.1 Regulatory Compliance & Applicable Laws/Regulations

- Application for Quarrying Lease as per Tamil Nadu Minor Mineral Concession Rules, 1959
- Obtained Precise Area Communication Letter as per Tamil Nadu Minor Mineral Concession Rules, 1959 for Preparation of Mining Plan and obtaining Environmental Clearance
- The Mining Plan of Rough Stone quarry has been approved under Rule 41 & 42 as amended of Tamil Nadu Minor Mineral Concession Rules, 1959
- ToR vide File No.; 10880 TO24B0108TN5218529N Dated: 25.06.2024
- Approved Mining of Proposed Rough Stone quarry project

CHAPTER – 2: PROJECT DESCRIPTION

2.0 General

The Proposed Rough Stone Quarry requires Environmental Clearance. There are two proposed and one existing quarry forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 7.70.55 ha.

As the extent of cluster are more than 5 ha, the proposal falls under B1 Category as per the Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018, and requirement for EIA, EMP and Public Consultation for obtaining Environmental Clearance.

2.1 Description of the Project

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarries.

Method is mining is common for the proposed quarry in the cluster. Rough Stone are proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.2 Location of the Project

- The Proposed Project is located in Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State.
- The project falls in Toposheet No: 58 K/01. The Proposed area fall in the Latitude between 09°46'28.0212" N to 09°46'36.8935" N and Longitude between 78°02'13.0813"E to 78°02'20.5055" E The project under the cluster is classified as patta land (Non-Forest Land) & does not fall within 10 km radius of any Eco – sensitive zone, Wild life Sanctuary, National Park, Tiger Reserve, Elephant Corridor and Biosphere Reserves.
- The Lease applied area is located about 18km southwest side of Madurai town, 11km Northeast side of kallikudi town and 400m Southwest side of ulagani village.

TABLE 2.1: SITE CONNECTIVITY TO THE CLUSTER QUARRIES

Nearest Roadway	National Highway – Madurai – Tirunelveli (NH – 44) – 6 km – West State Highway – Tirumangalam – Vadipatti (SH – 73) 7.5km – North West
Nearest Village	Ulagani – 350m – North East
Nearest Town	Kallikudi – 10km – SW
Nearest Railway	Thirumangalam – 7.5km – NW
Nearest Airport	Madurai – 9.0km – NE
Seaport	Thoothukudi 113.0 Km - SE

Source: Google image, Survey of India Toposheet

The Proposed Project corners coordinates are given below.

TABLE 2.2 – BOUNDARY CO-ORDINATES OF PROPOSED PROJECT

BOUNDARY CO-ORDINATES		
S.N.	LATITUDE	LONGITUDE
1	09° 46' 28.6325"N	78° 02' 14.4285"E
2	09° 46' 29.7120"N	78° 02' 14.4395"E
3	09° 46' 29.8347"N	78° 02' 15.6168"E
4	09° 46' 30.9386"N	78° 02' 15.3373"E
5	09° 46' 32.3435"N	78° 02' 15.2790"E
6	09° 46' 32.2902"N	78° 02' 14.1948"E
7	09° 46' 33.1392"N	78° 02' 14.2659"E
8	09° 46' 33.3918"N	78° 02' 13.2956"E
9	09° 46' 34.0681"N	78° 02' 13.2874"E
10	09° 46' 34.0883"N	78° 02' 13.1049"E
11	09° 46' 35.4018"N	78° 02' 13.0813"E
12	09° 46' 35.4018"N	78° 02' 13.0813"E
13	09° 46' 36.5434"N	78° 02' 13.2308"E
14	09° 46' 36.4231"N	78° 02' 14.2200"E
15	09° 46' 36.2691"N	78° 02' 16.0800"E
16	09° 46' 36.8935"N	78° 02' 16.0754"E
17	09° 46' 36.8296"N	78° 02' 17.1227"E
18	09° 46' 35.6487"N	78° 02' 16.9900"E
19	09° 46' 35.5910"N	78° 02' 17.6957"E
20	09° 46' 32.1846"N	78° 02' 16.2957"E
21	09° 46' 31.9431"N	78° 02' 18.6294"E
22	09° 46' 31.5072"N	78° 02' 20.2451"E
23	09° 46' 31.2789"N	78° 02' 20.5055"E
24	09° 46' 29.2020"N	78° 02' 19.9601"E
25	09° 46' 28.0212"N	78° 02' 19.6952"E
26	09° 46' 28.1245"N	78° 02' 17.6083"E
27	09° 46' 28.2026"N	78° 02' 16.0302"E
28	09° 46' 28.3024"N	78° 02' 14.8000"E
29	09° 46' 28.5681"N	78° 02' 14.8231"E

Source: PFR Report.

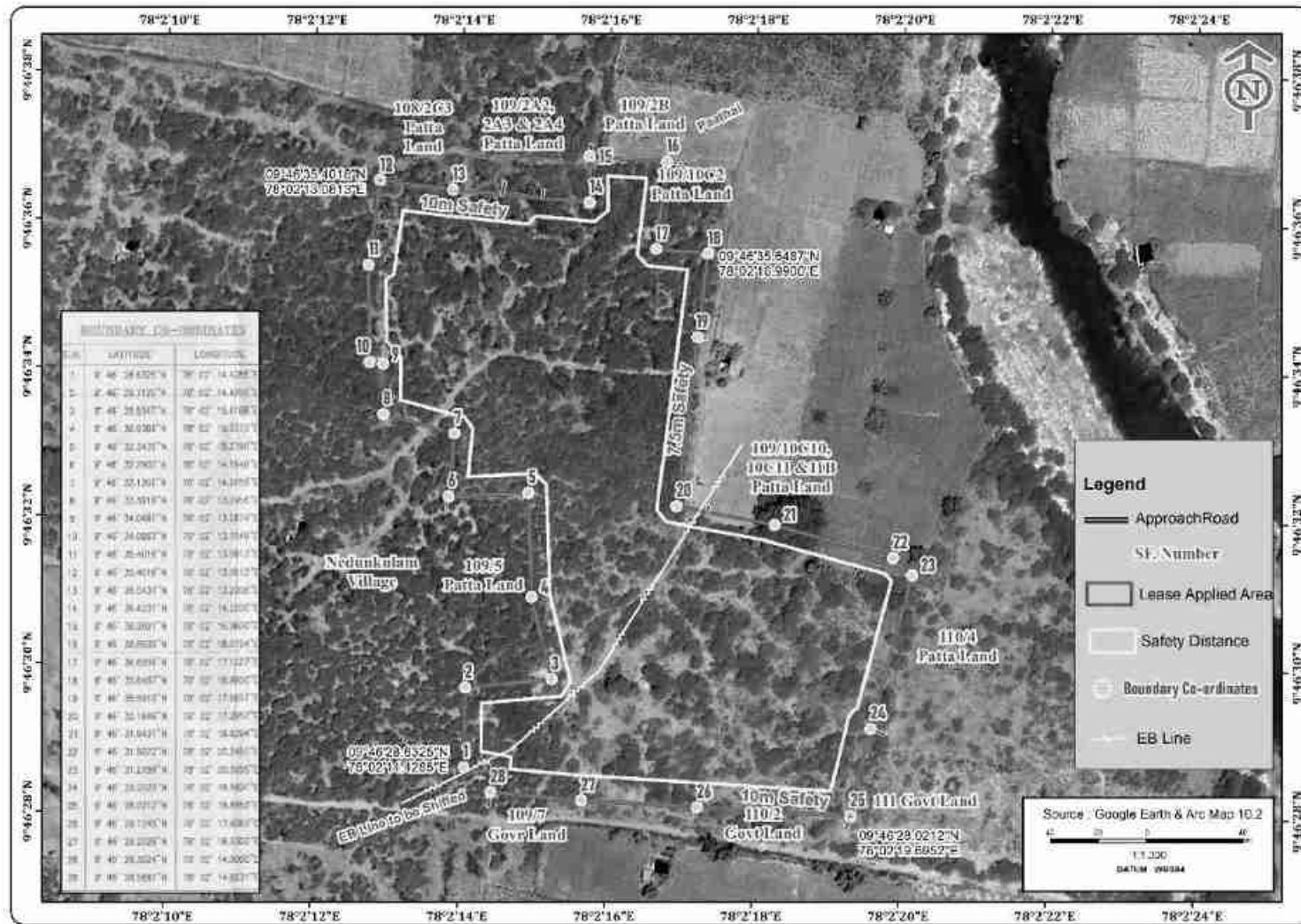
FIGURE 2.1: TOPOGRAPHICAL VIEW OF THE PROJECT SITE



FIGURE 2.1 a): FENCING & GREENBELT PHOTO OF THE PROJECT SITE

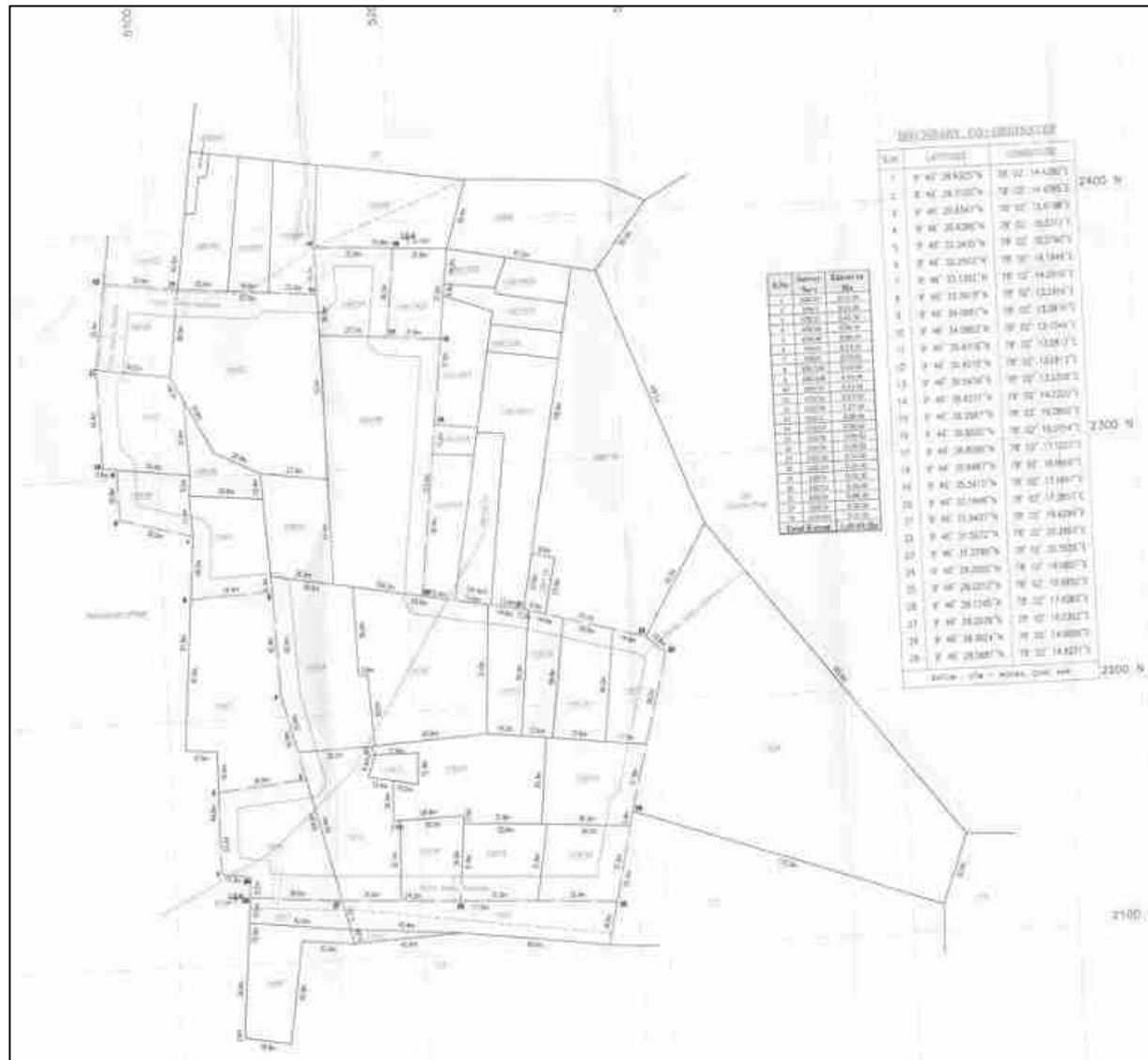


FIGURE 2.2: SHOWING GOOGLE IMAGE ROUGH STONE QUARRY PROJECT AREA



P1- Suganya Blue Metals

FIGURE 2.3: QUARRY LEASE PLAN



P1- Suganya Blue Metals

FIGURE 2.4: SUPERIMPOSED VILLAGE MAP

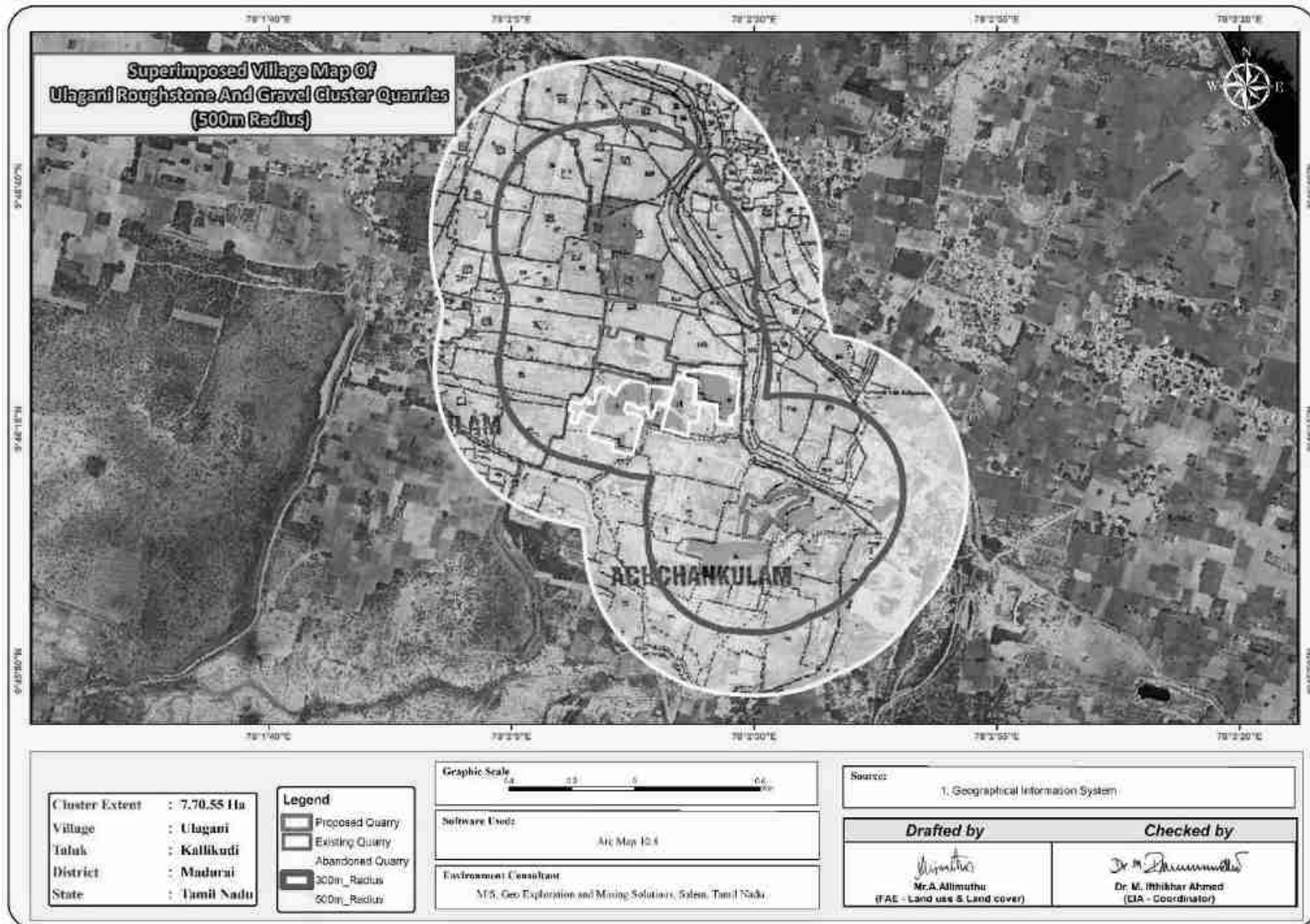


FIGURE 2.5: DIGITIZED MAP OF THE STUDY AREA (10 KM RADIUS FROM PROJECT SITE)

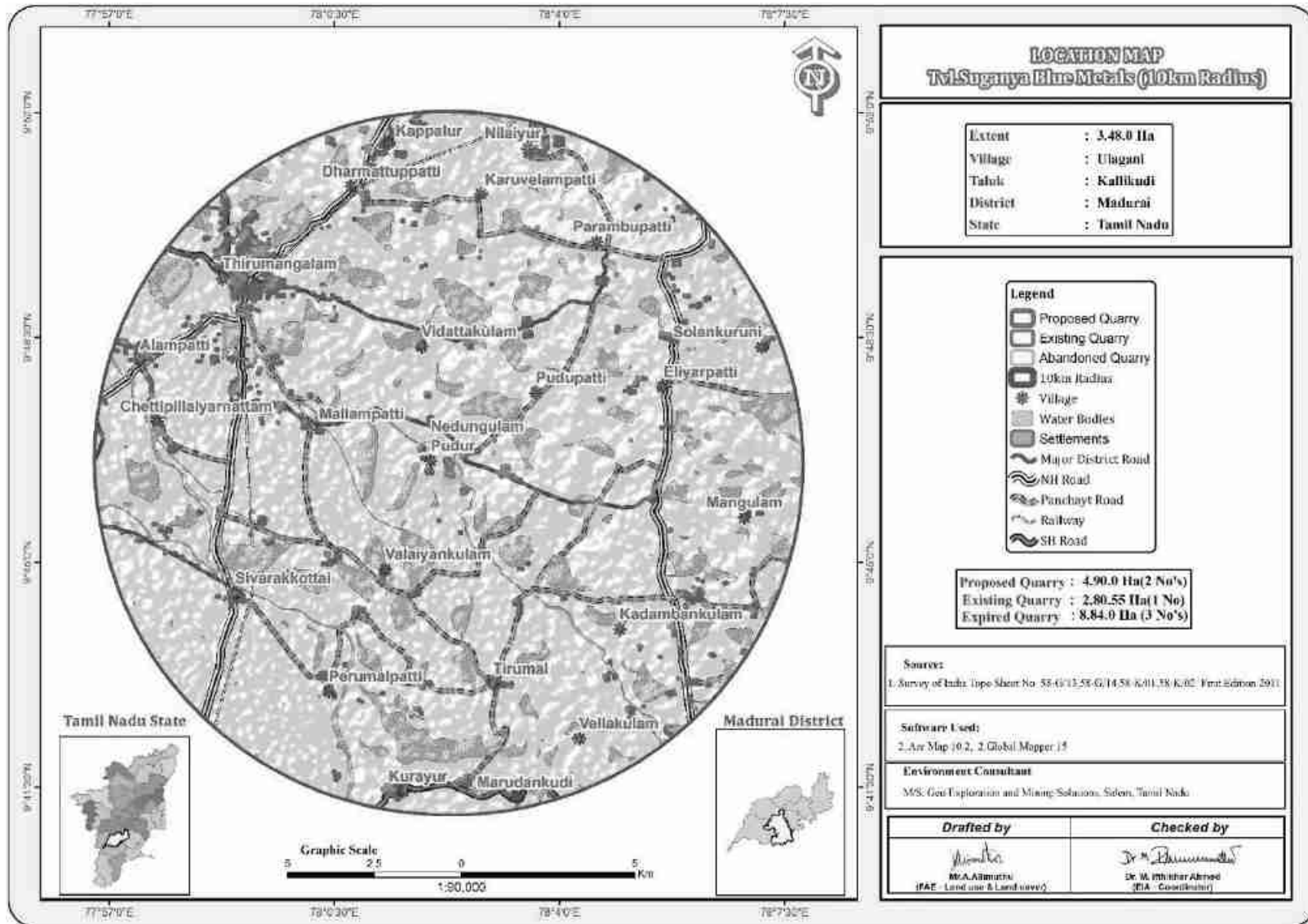


FIGURE 2.6: DIGITIZED MAP OF THE STUDY AREA (5 KM RADIUS FROM PROJECT SITE)

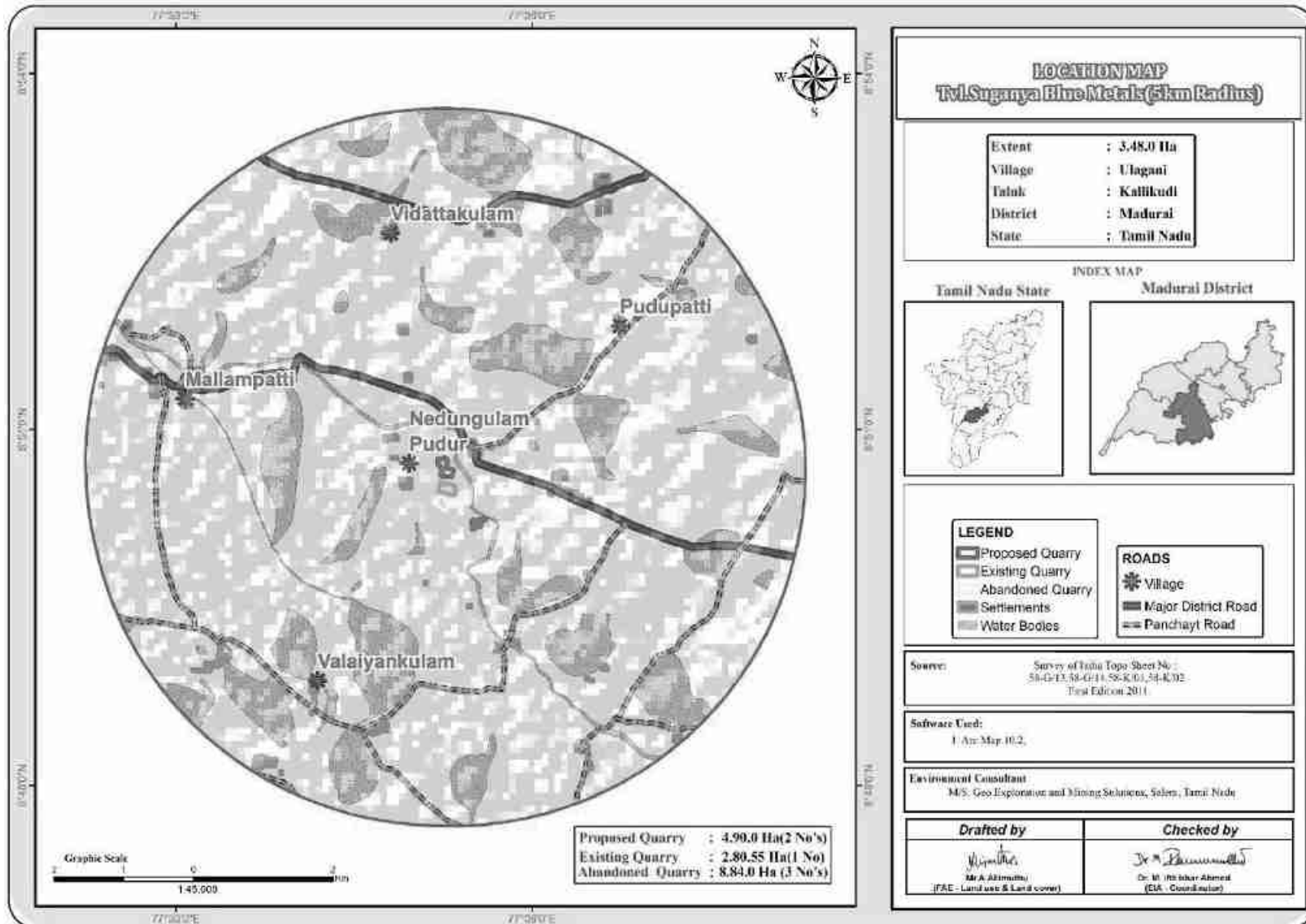
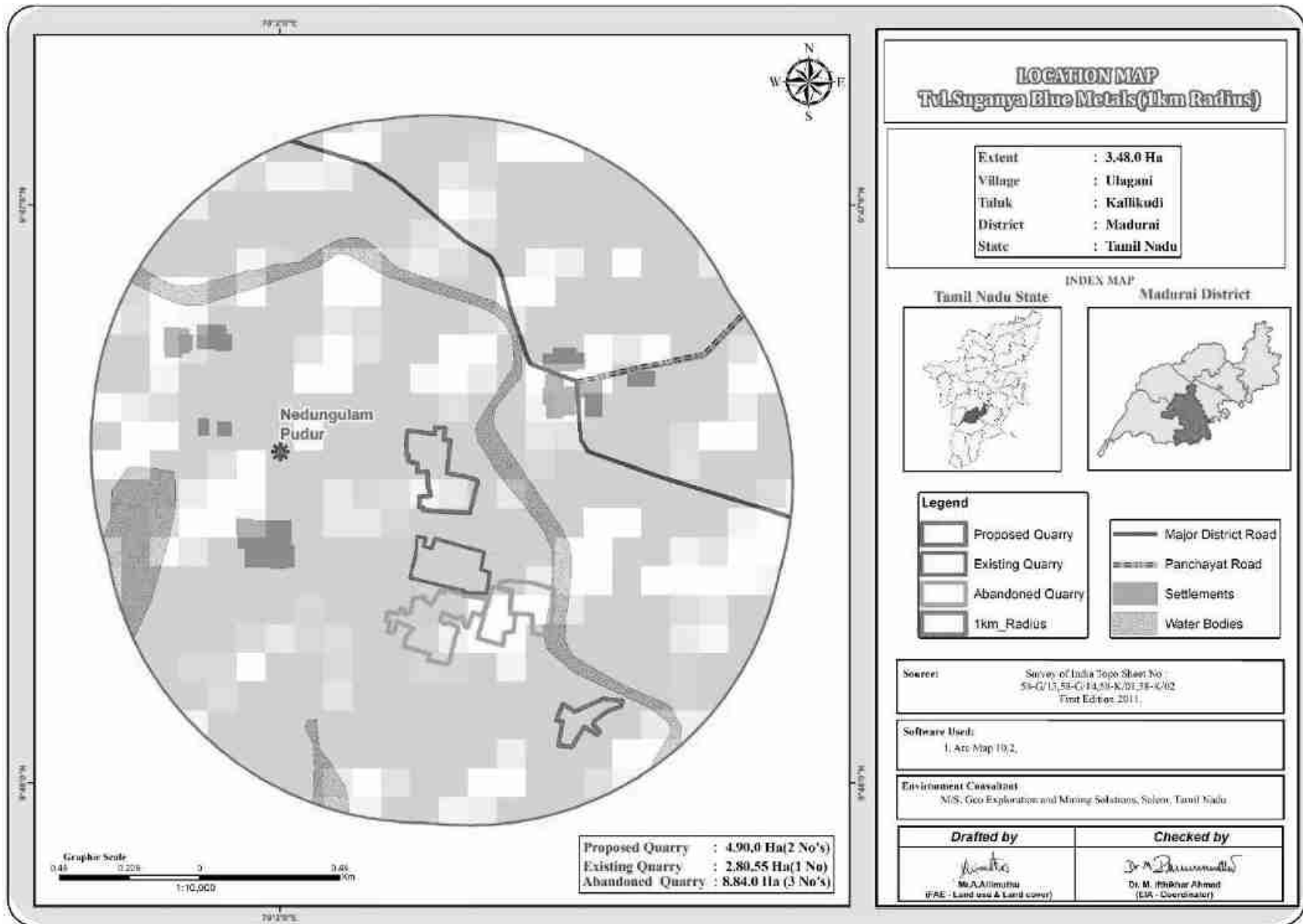


FIGURE 2.7: DIGITIZED MAP OF THE STUDY AREA (1 KM RADIUS FROM PROJECT SITE)



2.2.1 Project Area

- (i) The project under cluster are site specific, there is No beneficiation or processing proposed inside the project area.
- (ii) There is no forest land involved in the proposed project area and is devoid of major vegetation and trees.

TABLE 2.3 – LAND USE PATTERN OF THE PROPOSED PROJECT

LAND USE PATTERN OF PROJECT – P1		
Description	Present area in (ha)	Area at the end of life of quarry (Ha)
Area under Quarrying	Nil	2.63.60
Infrastructure	Nil	0.1.0
Roads	Nil	0.02.0
Green Belt	Nil	0.34.62
Un – utilized area	3.48.0	0.46.78
Grand Total	3.48.0	3.48.0

Source: Approved Mining Plan

2.2.2 Size or Magnitude of Operation

TABLE 2.4: OPERATIONAL DETAILS FOR PROPOSED PROJECT

PARTICULARS	DETAILS	
	Rough Stone (5Year Plan period)	Gravel (3Years Plan period)
Geological Resources	13,91,960m ³	69,598m ³
Mineable Reserves	3,84,905m ³	48,946m ³
Production for first five-year plan period	3,84,905m ³	48,946m ³
Production per day	256	54
No of Lorry loads (6m ³ per load)	21	5
Number of Working Days	300 Days	
Total Depth of Mining	42m (2m Gravel +40m Rough stone)	

Source: Approved mining plan

2.3 Geology

2.3.1 Regional Geology

Madurai district of Tamil Nadu forms a part of southern Granulitic terrain and is predominantly occupied by crystalline rocks of Archaean to late Proterozoic age. Regionally, the rocks can be grouped under five categories namely:

- ❖ Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet- sillimanite ± biotite ± cordierite ± spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite.
- ❖ Charnockite Group consisting of acid charnockite and pyroxene granulite.
- ❖ Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (mafic sultramafics).
- ❖ Migmatite group made up of banded hornblende biotite gneiss, grey granitic gneiss,
- ❖ Pink granitic gneiss and grey hornblende granite.

Table 2.5 Stratigraphy of Madurai District

Age	Group	Lithology
Holocene		Red lomy/Block cotton soil/clay \pm gypsum
Cenozoic		Kankar/calc-tufa
Neoproterozoic	Acid intrusives	Quartz veins Pegmatite Pink Granite
	Sivamalai syenite Complex	Nepheline-syenite
	Chalk Hills (Basic Intrusives)	Pyroxenite/Dunite
Archaean - Palaeoproterozoic	Peninsular Gneissic Complex (II) PGC (II)	Pink Granite Gneiss Hornblende Biotite gneiss
Archaean	Charnockite Group	Charnockite (Unclassified) Pyroxene Granulite Banded Magnetite Quartzite

2.3.2 Local Geology: -

Regional foliation trend of the rock types in Melur area swerves from NE-SW to ENEWSW direction dipping either east or westwards with dip amounts ranging between 50 and 80 depicting a broad antiformal fold with axial plane trending along ENE-WSW direction and plunging at low angles towards ENE direction. The garnetiferous quartz-feldspathic granulite viz. Kashmir White bands are located mainly in the limb portions of the major fold. The pink medium grained granite viz. Vanjinagaram Pink has been intruded mainly along the weak plane of the above major fold axis and in turn has influenced the adjoining grey granite/ grey migmatite rocks with pink permeations, giving rise to the formation of pink and grey augen gneiss viz. Tiger Skin. Due to the cross folding of the above major fold mainly along NNW-SSE direction, puckering effect (microfolds) besides development of minor step like fractures are seen in the Tiger Skin deposit. Minor folds trending along ENE-WSW direction are also noticed mainly in the Kashmir White bands. Some of the fractures and cleavages are seen filled by pegmatites and quartz veins, especially in Tiger Skin deposit. Apart from the above-mentioned structural features, no other major structural disturbance which may affect production of commercial granite could be deciphered in Melur area.

The study area follows the regional trend and mainly comprises of Hard Rock Formation as a homogeneous formation / Batholith formation of Charnockite. All the project areas are plain terrain, all the project areas are covered with Topsoil formation of 2m thickness; Massive Charnockite formation is found after 2 m Topsoil formation which is clearly inferred from the nearby existing quarry pit.

Source: District Survey Report for Minor Minerals Madurai District – May 2019

2.3.3 Hydrogeology

The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from 20-25 m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40 m bgl in remaining parts of the district. The depth of dug wells varies from 10 – 20 m with a yield of 45 – 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 – 3 lps. In general, there are about 2 – 3 fracture zones less than 50 m and about 2 – 3 fracture form beyond 100 m also. The variation in the yield of bore wells are very high in the district. Potential fractures with high discharge have been

established along Valandur-usilampatti Timmarasanayakanur, Thirali-Peraiyur tract and Palkalainagar- Nilayur tract in the district. The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May) and 1.86 to 5.74 m bgl during post monsoon period. (Source: CGWB).

Source: http://cgwb.gov.in/district_profile/tamilnadu/madurai.pdf

Aquifer Systems:

Granite, Charnockite, Pegmatite, Gneissic Rocks are largely found in Madurai area. Sedimentary rocks namely calcareous gritty (sand stone mixed clay), and quartz vein. The younger alluvium formations are seen predominantly in the northern part of the area and are considered as highly permeable. The northwest and middle east part of the area consist of fluvial– deltaic sediment deposits, which are laid on Granitoid gneiss and are considered as good zone for groundwater potential. However, the hard rock materials composed of crystalline charnockite, conglomerate, and quartzite vein present in the southern part of the area are not suitable for groundwater potential zones.

Hard Rock Formations

More than 90% of the district is underlain by hard rocks. The gneissic type of formation is found on the western portion in the Western Ghats and its offshoots, Cumbum valley, north of Thirumangalam, parts of Melur, etc., Infact, this is the major formation among the various types of hard rocks.

Charnockite

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less when compared to gneissic formations. The groundwater potential is low, when compared with the gneissic formations. Charnockite occurs as distinct pockets in parts of Periyakulam, Melur, Thirumangalam and Usilampattitaluks. Quartzites which are resistant to weathering are also seen as patches in Charnockite and gneissic varieties.

Valley fill sediments

Valley fill sediments composed of admixtures of calcareous mud, clay, silt and sand occur in several places in the western portion particularly in Uthamapalayam and Usilampattitaluks. Good deposits are found in Cumbum valley, Varshanad valley and near Palakombai. These are the products of quick transportation of weathering material from the adjacent mountain slopes around the valley.

Alluvial Formations

Alluvial deposits such as sand, silt, stiff clay, Topsoil, etc., which are transported sediments by the river are found on either side of Vaigai near Madurai and Vadipatti blocks. These formations are overlying the hard rock as a thin layer. In the river alluvium groundwater occurs under water table condition. The maximum thickness is 40 m and the average thickness of the aquifer is approximately 15 m. These formations are porous and permeable which have good water bearing zones.

Aquifer Parameters

The thickness of aquifer in this district is highly erratic and varies between 15 m to 40 m below ground level. The intergranular Porosity is essentially dependent on the intensity and degree of weathering and fracture development

in the bed rock. As discussed earlier deep weathering has developed in Gneissic formations and moderate weathering in charnockite formations. The range of aquifer parameters in hard rock and sedimentary formations are given below:

TABLE 2.6: RANGE OF AQUIFER PARAMETERS

Type of Aquifer	Water Table conditions
hard rock areas	
Permeability	0.98-2.45 m/day
Transmissivity (T) m ² /day	15-60 m ² /day
Well yield in LPM	45-135 lpm
Valley fill sediments	
Permeability	1.95-4.40 m/day
Transmissivity (T) m ² /day	75-150 m ² /day
Well yield in LPM	225-450 lpm
Alluvium formation	
Permeability	19.57-48.93 m/day
Transmissivity (T) m ² /day	210-1500 m ² /day
Well yield in LPM	315-1080 lpm

Source: <https://www.twadboard.tn.gov.in/content/madurai>

TABLE 2.7: GROUND WATER LEVEL VARIATIONS OF MADURAI DISTRICT

Jan 2017	May 2017	Jan 2018	May 2018	Jan 2019	May 2019	Jan 2020	May 2020	Jan 2021	May 2021	5 Years Pre-Monsoon Average	5Years Post Monsoon Average
9.7	14.1	7.1	10.0	7.2	11.0	7.6	10.3	4.7	5.4	9.3	6.5

Source: <https://www.twadboard.tn.gov.in/content/madurai>

FIGURE 2.11: REGIONAL GEOLOGY MAP

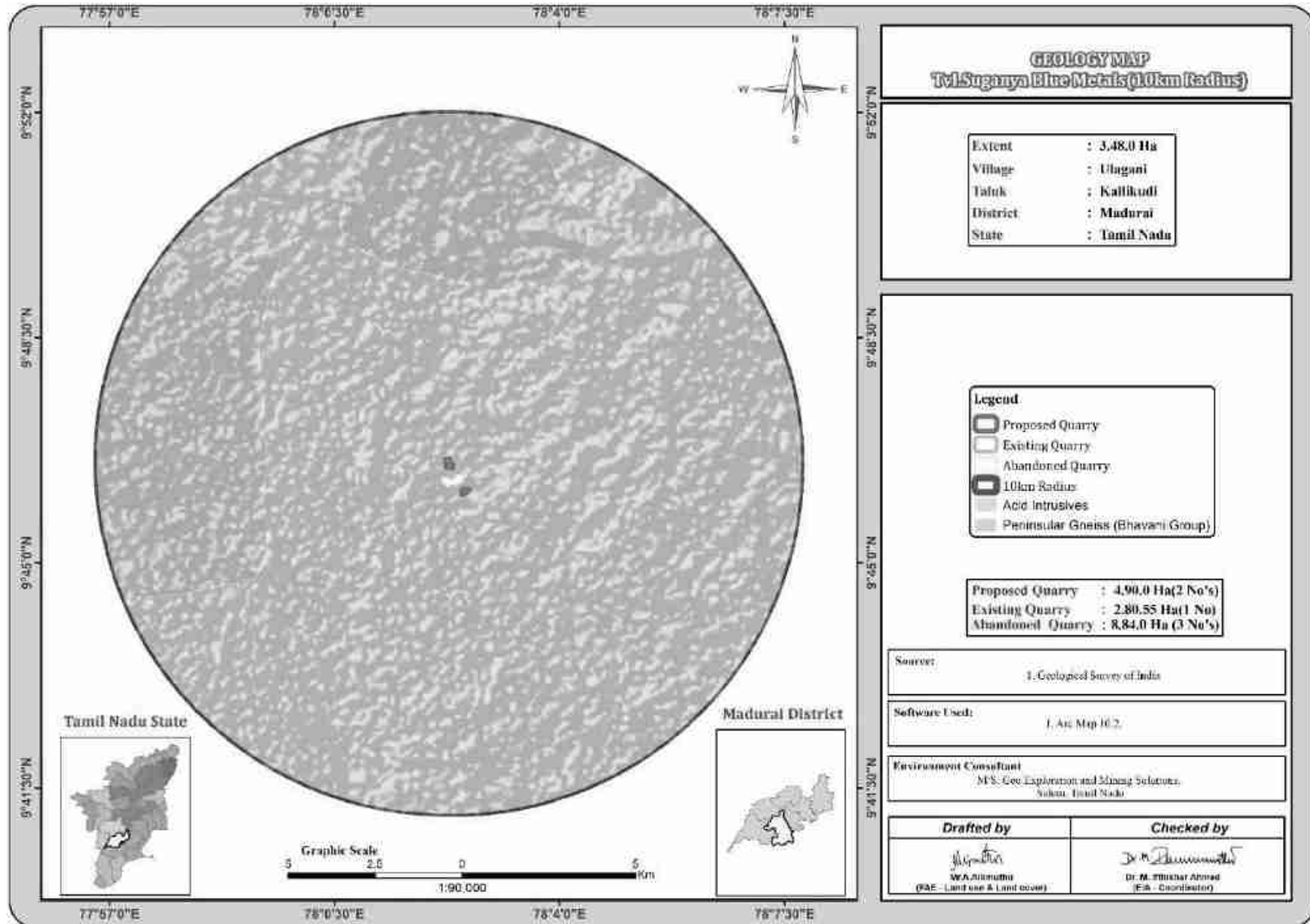


FIGURE 2.12: GEOMORPHOLOGY MAP

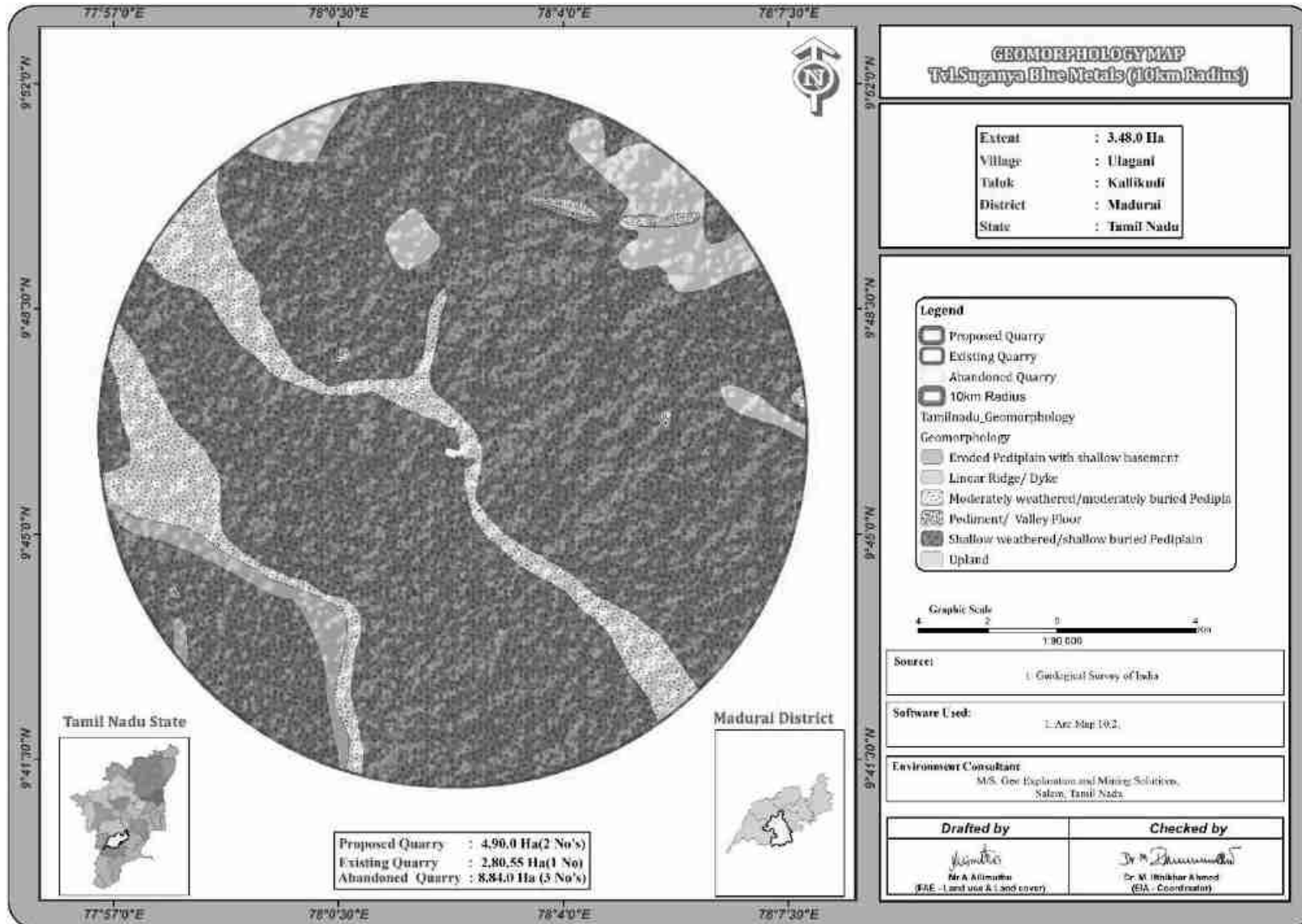
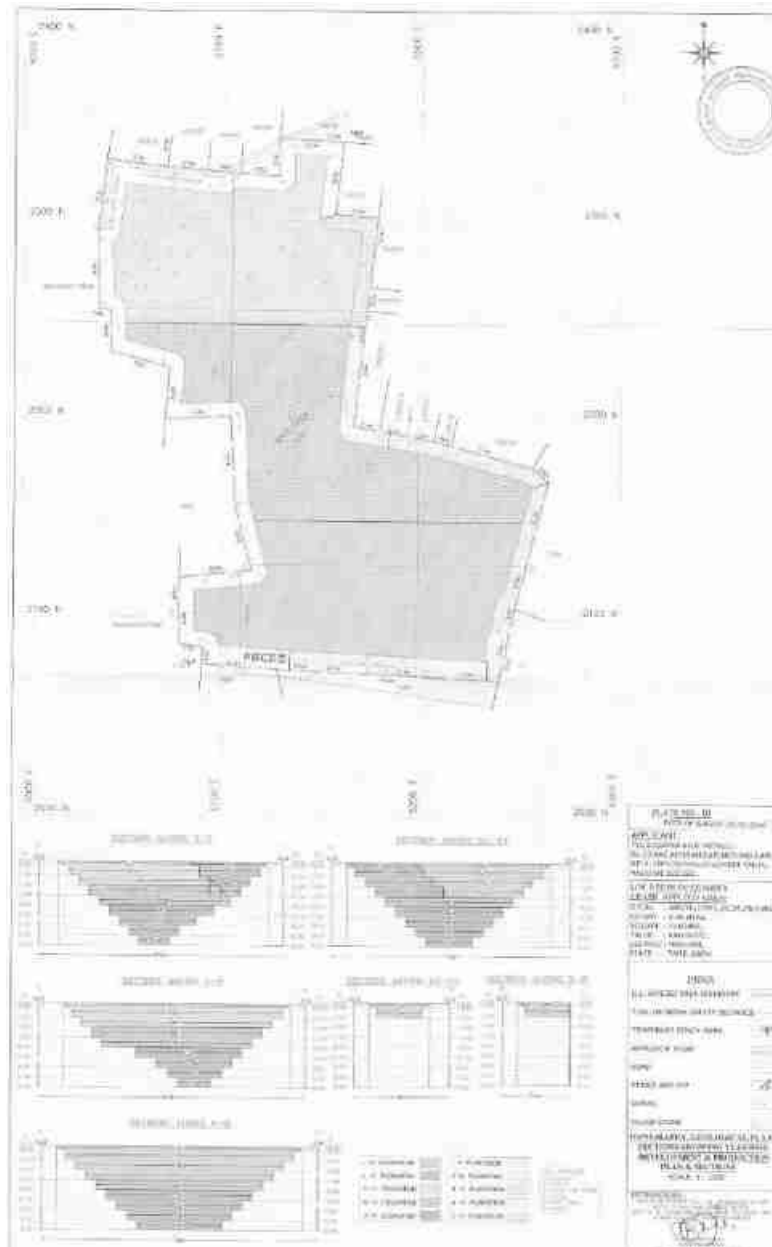


FIGURE 2.13: TOPOGRAPHY, GEOLOGICAL, YEARWISE DEVELOPMENT PRODUCTION PLAN AND SECTION



2.4 Resources and Reserves of the Cluster quarries

The Resources and Reserves of Rough Stone were calculated based on Cross-Section Method by plotting sections to cover the maximum project area.

Based on the availability of Geological Resources the Mineable Reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m (Safety Barrier all around the applied area) and safety distance as per precise area communication letter and deducting the locked up reserves during bench formation (Also called as Bench Loss) and the Mineable Reserves is calculated considering there is no waste / overburden / side burden (100% Recovery Anticipated).

TABLE 2.8: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT

Description	Rough Stone	Gravel
Geological Resource in m ³	13,91,960	69,598
Mineable Resource in m ³	3,84,905	48,946

Source: Approved Mining Plan

TABLE 2.9: YEAR-WISE PRODUCTION PLAN OF PROPOSED PROJECT

YEAR	ROUGH STONE (m ³)	GRAVEL (m ³)
I	81,720	17,422
II	83,010	16,516
III	68,810	15,008
IV	78,190	-
V	73,175	-
TOTAL	3,84,905	48,946

Source: Approved Mining Plan

Disposal of Waste

There is no waste anticipated in these Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%). Top layer of Topsoil formation will be removed and sold to needy customers directly.

Conceptual Mining Plan/ Final Mine Closure Plan

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

TABLE 2.10: ULTIMATE PIT DIMENSION OF PROPOSED PROJECT

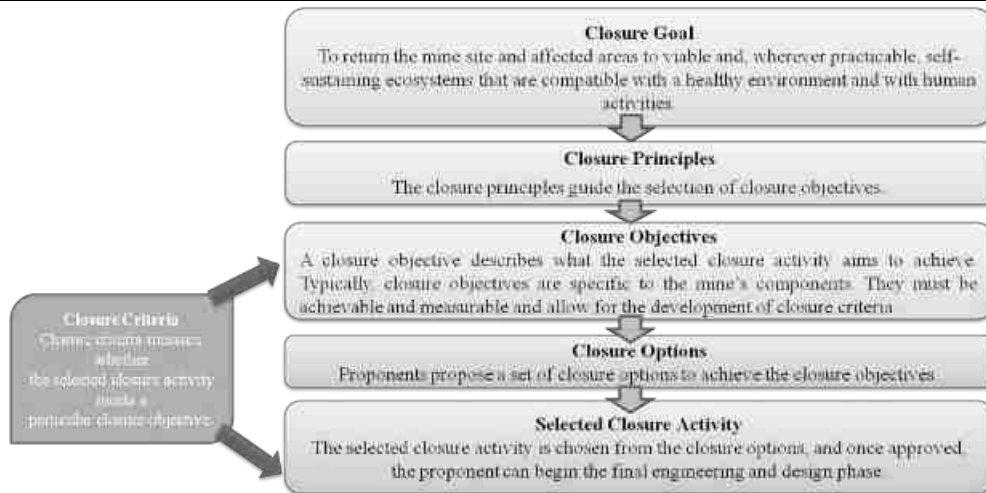
Section	Length (m)	Width(m)	Depth(m)
XY-AB	204	121	42m

Source: Approved Mining Plan

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

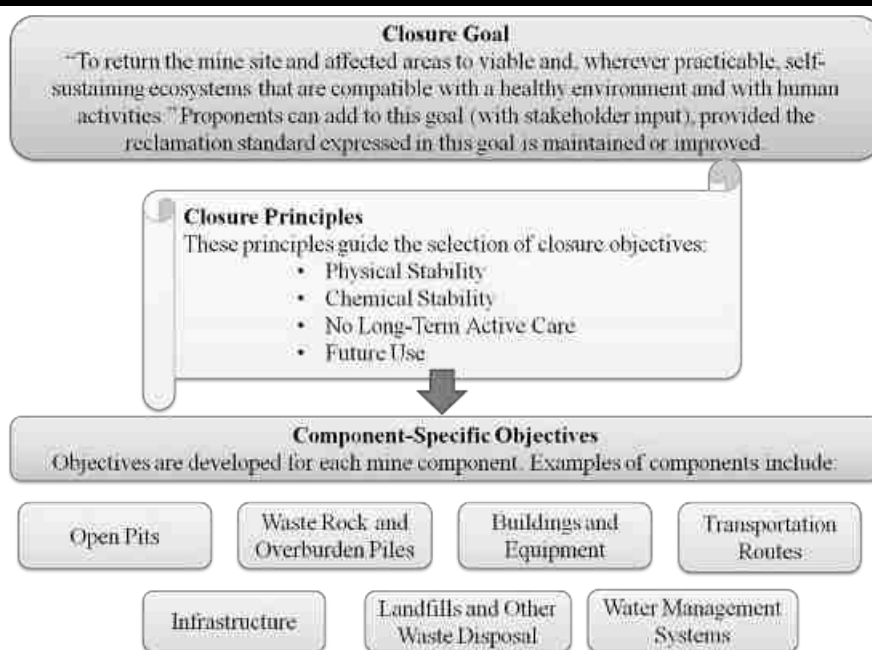
Closure Objectives –

- Access to be limited, for the safety of humans and wildlife.
- The open pit mine workings and pit boundary are physically and geo-technically stable.
- Water quality in flooded pits is safe for humans, aquatic life, and wildlife.
- Discharge of contaminated drainage has been minimized and controlled.
- Original or desired new surface drainage patterns have been established.
- For flooded pits, in-pit aquatic habitat has been established where practical and feasible.
- Emergency access and escape routes from flooded pits for humans and wildlife are in place.
- Dust levels are safe for people, vegetation, aquatic life, and wildlife.



Closure Planning & Options Considerations in Mine Design –

- The closure of mine is well planned at the initial stage of planning & design consideration by the internal and external stake holders
- Construction of 2m height bund all along the mine pit boundary and ensure its stability all time & construction of garland drain along the natural slope to avoid sliding and collection of soil to the pit & surface runoff during rainfall
- After complete exploitation of mineral, the lowest bench foot wall side will be maintained as plain surface without any sump pits to avoid any accidents
- All the sharp edges will be dressed to smoother face before the closure of mine and ensure no loose debris on hanging wall side
- There is a river on southern side of the project area. The river will not be hindered by any of mine closure activities
- The project proponent as a part of social responsibilities assures to supply the stored mine pit water to the nearby villages after effective treatment process as per the standards of TNPCB & TWAD
- Native species will be planted in 3 row patterns on the boundary barriers and 1st bench, a full-time sentry will be appointed at the gate to prevent inherent entry of public & cattle.
- The access road to the quarry will be cut-off immediately after the closure
- The layout design shall be prepared and get approved from Department of Geology and Mining.
- The proponent is instructed to construct as per the layout approved
- Physical and chemical stability of structures left in place at the site, the natural rehabilitation of a biologically diverse, stable environment, the ultimate land use is optimized and is compatible with the surrounding area and the requirements of the local community, and taking the needs of the local community into account and minimizing the socio-economic impact of closure
- There will be a positive change in the environmental and ecology due to the mine closure



Post-Closure Monitoring –

The purpose of post-closure monitoring with respect to open pit mine workings is to ensure the attainment of closure objectives.

- Monitor physical and geotechnical stability of remnant pit walls.
- Monitor the ground regime in pit walls to confirm achievement of design objectives.
- Monitor water level in pit to confirm closure objectives regarding fish, fish habitat, and wildlife safety are being achieved.
- Sample water quality and quantity at controlled pit discharge points.
- Identify and test unanticipated areas where water management is an issue.
- Inspect integrity of barriers such as berms & fences.
- Monitor wildlife interactions with barriers to determine effectiveness.
- Inspect aquatic habitat in flooded pits where applicable.
- Monitor dust levels.

TABLE 2.11: MINE CLOSURE BUDGET FOR THE PROPOSED PROJECT

ACTIVITY		YEAR					RATE	AMOUNT (INR)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	200	200	200	200	200	@100 Rs	Rs.2,00,000/-
	Cost	40000	40000	40000	40000	40000		
Plantation in the quarried out top benches, approach road and panchayat road	Nos.	300	-	200	200	100	Per sapling	Rs.1,60,000/-
	Cost	60000	-	40000	40000	20000		
Wire Fencing (In Mtrs) 1050		3,15,000	-	-	-	-	@300 Rs Per Meter	Rs.3,15,000/-
Garland drain (In Mtrs) 950		2,85,000	-	-	-	-	@300 Rs	Rs.2,85,000/-

						Per Meter	
TOTAL							Rs. 9,60,000/-

Source: Proposed by FAE's and EC

2.5 Method of Mining

The method of mining is common for all the proposed projects – The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The top layer of overburden (Topsoil) will be Excavate directly by Hydraulic Excavators and loaded into tippers directly and sold to needy customers. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.5.1 Drilling

Drilling will be carried out as per parameters given below: -

Spacing – 1.2m, Burden – 1.0, Depth of hole - 1.5m

2.5.2 Blasting

Blasting will be done as per details below: -

- Controlled blasting parameter: -
 - Spacing – 1.2m
 - Burden – 1.0 m
 - Depth of hole – 1.5m
 - Charge per hole – 0.5Kg
 - Powder factor – 6.0 tonnes/kg
 - Dia of hole – 30-32 mm

Details of blasting design and parameters are discussed in approved mining plan.

Volume of Rough Stone will be excavated from one hole	=	3 Tonnes
Total Volume from proposed quarry	=	3,84,905m³
	=	3,84,905/5
	=	76,981/300
	=	257* 2.6
	=	667 Tonnes per day

Therefore, Number of Holes per day	=	667/3
	=	222 Holes per day

Type of Explosives to be used –

Slurry explosives (An explosive material containing substantial portions of a liquid, oxidizers, and fuel, plus a thickener), NONEL / Electric Detonator & Detonating Fuse.

2.5.3 Extent of Mechanization**TABLE 2.12 PROPOSED MACHINERY DEPLOYMENT**

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	12	1.2m to 2.0m	Compressed air
2	Compressor	3	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Trucks	3	35Tonnes	Diesel Drive

Source: Approved Mining Plan.

2.6 General Features**2.6.1 Existing Infrastructures**

Infrastructures like Mine office, Temporary Rest shelters for workers, Latrine and Urinal Facilities are available in the Existing quarries and the same infrastructure as per the Mine Rule will be arranged after the grant of quarry lease in the proposed quarries.

2.6.2 Drainage Pattern

The general drainage pattern of the area is dendritic. There are no streams, canals or water bodies crossing within the project area, hence there is no requirement of stream or canals diversion in the near future.

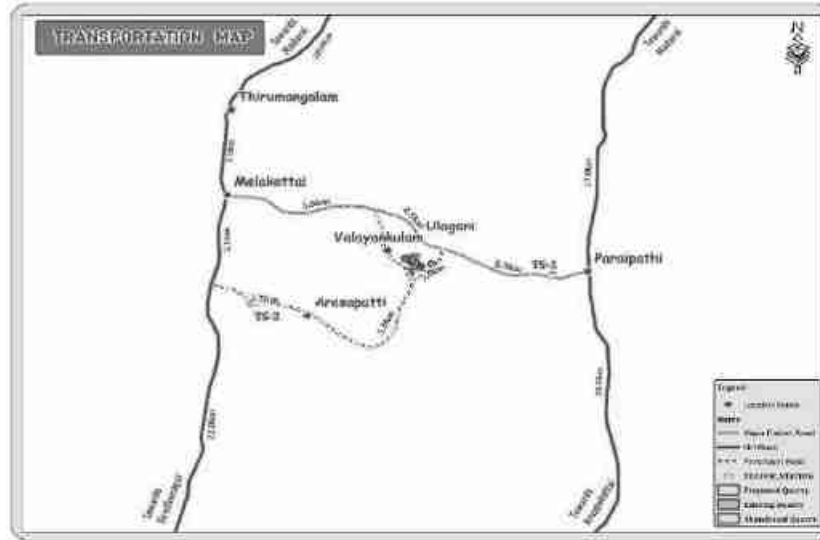
2.6.3 Traffic Density

Traffic density measurements were performed as per IRC 1960 Guidelines at three locations based on the transportation route. Traffic density measurement 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.

TABLE 2.13 – TRAFFIC SURVEY LOCATION'S

Station code	Station location	Distance and Direction	Type of Road
TS1	Paraipathi-Melakottai (District Road)	4.7Km & NE	District Road)
TS2	Arasapatti Panchayat Road	4.8km & SW	Panchayat Road

Source: On-site monitoring by GEMS FAE & TM

FIGURE 2.14: TRAFFIC SURVEY LOCATIONS & TRANSPORTATION ROUTE MAP

(Source: Survey of India Toposheet)

TABLE 2.14 – EXISTING TRAFFIC VOLUME

Station code	HMV (Hourly Average)		LMV hourly average		2/3 Hourly average		Total PCU per hour
	No	PCU	No	PCU	No	PCU	
TS1	100	300	65	65	120	60	425
TS2	55	165	45	45	100	50	260

Source: On-site monitoring by GEMS FAE & TM

- PCU conversion factor for HMV (Trucks and Bus) = 3, LMV (Car, Jeep and Auto) = 1 and 0.5 for Motor Vehicles (2/3 Wheelers)

TABLE 2.15 – ANTICIPATED TRAFFIC DUE TO THIS PROPOSED PROJECT

Transportation of Rough stone per day		
Capacity of trucks	Cumulative Trips	Volume in PCU
10/20 tonnes	21Trips	63

Source: Anticipated based on Approved Mining Plan Production

TABLE 2.16 – SUMMARY OF TRAFFIC VOLUME

Route	Existing traffic value in PCU	Incremental traffic from the quarry in PCU	Total traffic volume	Hourly Capacity in PCU as per IRC guidelines
Paraipathi-Melakottai (District Road)	425	63	488	1200
Arasapatti Panchayat Road	260	63	323	500

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

- As per the IRC 1960 this existing District Road can handle 1200 PCU in hour in hour & village road 500 PCU hence there will not be any conjunction due to this proposed transportation.

2.6.4 Mineral Beneficiation and Processing

There is no proposal for the mineral processing or ore beneficiation in this project

2.7 Project Requirement

2.7.1 Water Source & Requirement

Detail of Total water requirements in KLD as given below:

TABLE 2.17 – WATER REQUIREMENT FOR THE PROPOSED PROJECT

PROPOSAL – P1		
*Purpose	Quantity	Source
Dust Suppression	0.8 KLD	From Existing bore wells from nearby area
Green Belt development	0.9 KLD	From Existing bore wells from nearby area
Drinking and Domestic purpose	0.5 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Total	2.2 KLD	

Source: Prefeasibility Report

About 50% water will be required for the suspension of the dust, Water shall be obtained from accumulated rainwater/seepage water in quarry pits. Packaged Drinking Water is available from the nearby approved water vendors.

2.7.2 Power and Other Infrastructure Requirement

The project's does not require power supply for the quarry operation. The quarrying activity is proposed during day time only (General Shift 8 AM – 5 PM, Lunch Break 1 PM – 2 PM). Electricity for use in office and other internal infrastructure will be obtained from TNEB. For the quarrying operation like compressor for drilling Diesel will be utilized.

The temporary infrastructures such as Mine Office, First Aid Room, Rest Shelter etc., will be constructed within the project area before commencing the quarry operation. No workshops are proposed inside the project area hence there will not be any process effluent generation from the project area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. There is no toxic effluent expected to generate in the form of solid, liquid or gaseous form hence there is no requirement of waste treatment.

2.7.3 Fuel Requirement

High speed Diesel (HSD) will be used for mining machineries. Diesel will be brought from nearby Fuel Stations.

Average diesel consumption is around = Total of 210 Liters of HSD per day for proposed project

2.7.4 Employment Requirement:

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community.

TABLE 2.18: EMPLOYMENT POTENTIAL FOR PROPOSED PROJECT

Identification code	Employment in Nos
P1	46
Total	46

A total of 46 people will get employment due to the proposed quarry

2.7.5 Project Cost

TABLE 2.19 – PROJECT COST OF PROPOSED PROJECT

Identification code	Project Cost
P1	Rs. 2,78,05,000/-
Total	Rs. 2,78,05,000/-

Source: Approved Mining Plan & Prefeasibility Report of the project

2.8 Project Implementation Schedule

The commercial operation will commence after the grant of Environmental Clearance. CTO 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.

TABLE 2.20 – EXPECTED TIME SCHEDULE FOR THE PROPOSED QUARRIES

S. No	Particulars lease execution	Time schedule (in month)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to operate						Production start period

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

CHAPTER – 3: DESCRIPTION OF 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 Dec 2022, Jan & Feb 2023 with CPCB guidelines. Environmental data has been collected with reference to cluster quarries by EHS 360 LABS PRIVATE LIMITED (Approved by ISO/IEC 17025:2017), for the below attributes-

- Land
- Water
- Air
- Noise
- Biological
- Socio-economic status

Study Area

An area of 10 km radius (aerial distance) from the periphery of the cluster is considered for EIA study. The data collection has been used to understand the existing environment scenario around the cluster quarries against which the potential impacts of the project can be assessed. The study area has been divided into two zones viz **core zone** and **buffer zone** where core zone is considered as cluster and buffer zone taken as 10km radius from the periphery of the Cluster. Both Core zone and Buffer zone is taken as the study area.

Study Period

The baseline study was conducted during the pre-monsoon season i.e Dec 2022 - Feb 2023

Study Methodology

Baseline data was generated for various environmental parameters including Land, Soil, Water (surface and groundwater), Air, Noise, Ecology & Biodiversity and Socio-economic status to determine the quality of the prevailing environmental settings. A MoEF accredited Laboratory was used for generating the baseline data.

1. The project area (Core zone) was surveyed in detail with the help of Total Station survey instrument and the boundary pillars were picked up with the help of handheld GPS. The boundary coordinates were superimposed on the satellite imagery to understand the relief of the area, besides Land use pattern of the area was studied through the Bhuvan (ISRO).
2. Soil samples were collected and analysed for relevant physico-chemical characteristics, exchangeable cations, nutrients & micro nutrients etc., in order to assess the impact of mining activities and proposed greenbelt development
3. Ground water samples were collected during the study period from the open wells and bore wells, while surface water was collected from river and lake in the buffer zone. The samples were analysed for parameters necessary to determine water quality (based on IS: 10500:2012 criteria) and those which are relevant from the point of view of environmental impact of the proposed quarries.

4. A meteorological station was setup in pachapalayam village. Wind speed, Wind direction, Dry and wet bulb temperature, Relative humidity, Rainfall with cloud cover and general weather conditions were recorded throughout the study period.
 5. In order to assess the Ambient Air Quality (AAQ), samples of Ambient Air were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM₁₀ and SO₂, NO_x with gaseous attachments & Fine Dust Samplers (FDS) for PM_{2.5} and other parameters as per NAAQ norms and analysed for primary air pollutants to work out the existing status of air quality
 6. The noise level measurements were also made at various locations in different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone
 7. Baseline biological studies were carried out to assess the ecology of the study area to study the existing flora and fauna pattern of the area
 8. Socio-Economic survey was conducted at village and household level in the study area to understand the present socio-economic conditions and assess the extent of impact due to the proposed mining project
- The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of samples analysis, etc., are given below Table 3.1.

TABLE 3.1 – ENVIRONMENTAL MONITORING ATTRIBUTES AND FREQUENCY OF MONITORING

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Datas from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM ₁₀ PM _{2.5} SO ₂ NO _x Fugitive Dust	24 hourly twice a week (Dec 2022 – Feb 2023)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (1 core & 7 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics,	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

	Population Statistics and Existing Infrastructure in the study area			
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Source: On-site monitoring/sampling by EHS 360 labs in association with GEMS

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

3.1 LAND ENVIRONMENT

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

3.1.1 LAND USE/ LAND COVER

To study the land use pattern of the core as well as a buffer zone, land use/land cover details have been identified/ maps have been prepared in accordance with the **Standard ToR point no. 4 & 10 Stating:**

Point No. 4 All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ 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).

Point No. 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.

Current vintage data of Indian Remote Sensing Satellite ResourceSat1-LISSIII (False Color Composite) has been used for Land Use / Land Cover study. Satellite image has been procured from National Remote Sensing Centre, Hyderabad.

3.1.2 OBJECTIVE

The objectives of the LULC study are as follow:

- ☞ To develop the Land use & Land cover map using land coordinates of the plant area (Core Zone) and 10 km radius from the plant site (Buffer area).
- ☞ To Identify and mark the important Land use and Land cover features using the primary and secondary data collected.
- ☞ To evaluate the impacts on existing land use/cover features of the buffer area by the Existing Project activities.
- ☞ To identify the mitigative measures for the sustainable use of land and to protect the buffer zone from the adverse impacts.

Technical specification of Satellite imagery Data Used:

Current vintage data of Indian Remote Sensing Satellite RESOURCESAT1 (LISS-III) digital FCC (False Color Composite) has been used for preparation of Land use/ Land cover thematic map of study area. Satellite image has been procured from National Remote Sensing Centre, Hyderabad. Survey of India Toposheet as a reference map on 1:50,000 scale has been used for preparation of base layer data like road, rail network; village for geo-referencing of satellite image.

- ☞ Satellite Image - Resourcesat1-LISSIII, 23.5m Resolution
- ☞ Satellite Data Source - NRSC, Hyderabad
- ☞ Satellite Vintage - 14st July 2020, Swath 141km wide.
- ☞ SOI Toposheet No - 58 K/01
- ☞ Software Used - ArcGIS 10.8

The satellite image (FCC color 3,2,1) of the buffer zone is given in 3.1

The spatial resolution and the spectral bands in which the sensor collects the remotely sensed data are two important parameters for any land use survey. Resourcesat1-LISSIII, 23m Resolution of 23.5m and a 141 km wide swath of the earth in 23.5m resolution covering wide areas the data is collected in 4 visible bands namely band number and Resolution.

TABLE 3.2: Resourcesat1-LISSIII SENSOR characteristics

Band Number	Description	Wavelength	Resolution
Band 1	Green	0.52-0.59 μm	23.5 meters
Band 2	Red	0.62-0.68 μm	23.5meters
Band 3	NIR	0.77-0.86 μm	23.5meters
Band 4	SWIR	1.55-1.70 μm	70meters

Source: NRSC, Hyderabad

3.1.3 METHODOLOGY

The land use / land cover map is prepared by adopting the interpretation techniques of the Satellite image in combination with collateral data such as Survey of India topographical maps. Image classification is done by using visual interpretation techniques and digital classification using any of the image processing software. The various activities for preparation of LULC include preprocessing, rectification, image enhancements and classifying the satellite data for assessing the change in land use land cover due to proposed developmental activities.

- ☞ Preliminary/primary data collection of the study area
- ☞ Satellite data procurement from NRSC
- ☞ Secondary data collection from authorized bodies
- ☞ Survey of India Toposheet (SOI)
- ☞ Mine Layout
- ☞ Cadastral / Khasra map
- ☞ GPS Coordinates of Lease Boundary
- ☞ Processing of satellite data using ArcGIS 10.8 and preparing the Land Use & Land cover maps (e.g. Plant/Mine area, Existing Quarries, Settlements, Agriculture land, Non agriculture land, water bodies, etc.) by Digital Image Processing (DIP) technique.
- ☞ Geo-Referencing of the Survey of India Toposheet
- ☞ Geo-Referencing of satellite Imagery with the help of Geo-Referenced Toposheets
- ☞ Enhancement of the Satellite Imagery
- ☞ Base Map layer creation (Roads, Railway, Village Names, and other Secondary data, etc.)

- ☞ Data analysis and Classification using Digital interpretation techniques.
- ☞ Ground truth studies or field Verification.
- ☞ Error fixing / Reclassification
- ☞ Final Map Generation.

The land use/Land cover Map of the buffer zone is given in 3.4(b).

Land Use Pattern of the Buffer Zone (Study area)

Details of the same are given in Table - 3.3 and the map is shown in Figure - 3.2

TABLE: 3.3 LAND USE / LAND COVER DETAILS OF STUDY AREA

S.No	CLASSIFICATION	AREA_HA	AREA_ %
BUILTUP			
1	URBAN	594.67	1.74
2	RURAL	259.77	0.76
3	MINING	89.12	0.26
AGRICULTURAL LAND			
4	CROP LAND	19379.66	56.55
5	PLANTATION	382.46	1.12
6	FALLOW LAND	7007.72	20.45
BARREN LAND/WASTELANDS			
7	SCRUB LAND	1199.92	3.50
8	SALT AFFECTED LAND	65.06	0.19
9	BARREN ROCKY	620.12	1.81
WETLANDS/ WATER BODIES			
11	WATER BODIES/LAKE/RIVER	4670.61	13.63
TOTAL		34269.11	100.00

Source: Bhuvan, NRSC.

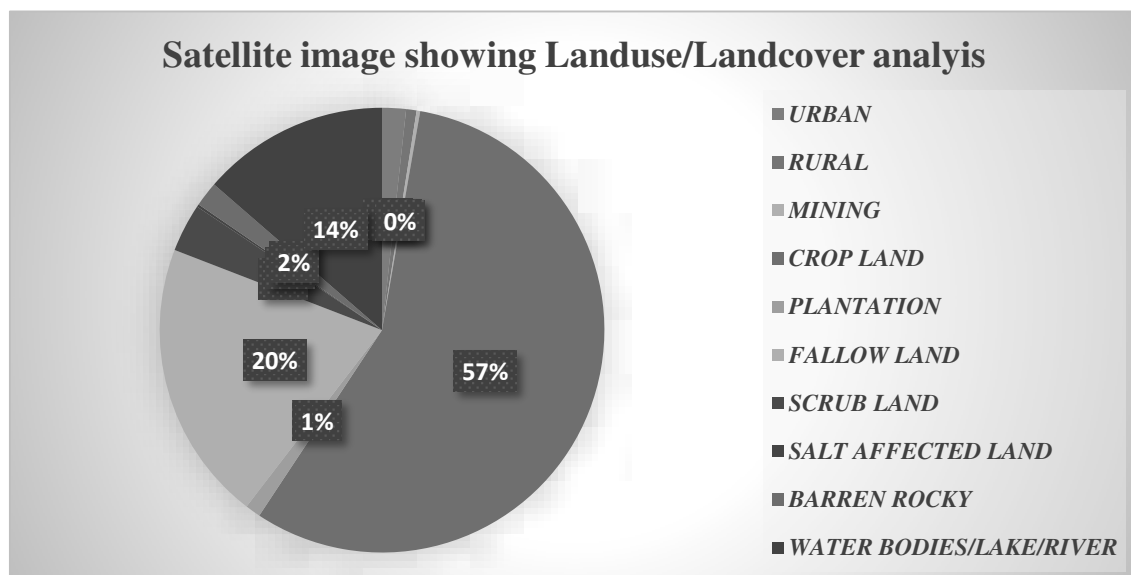
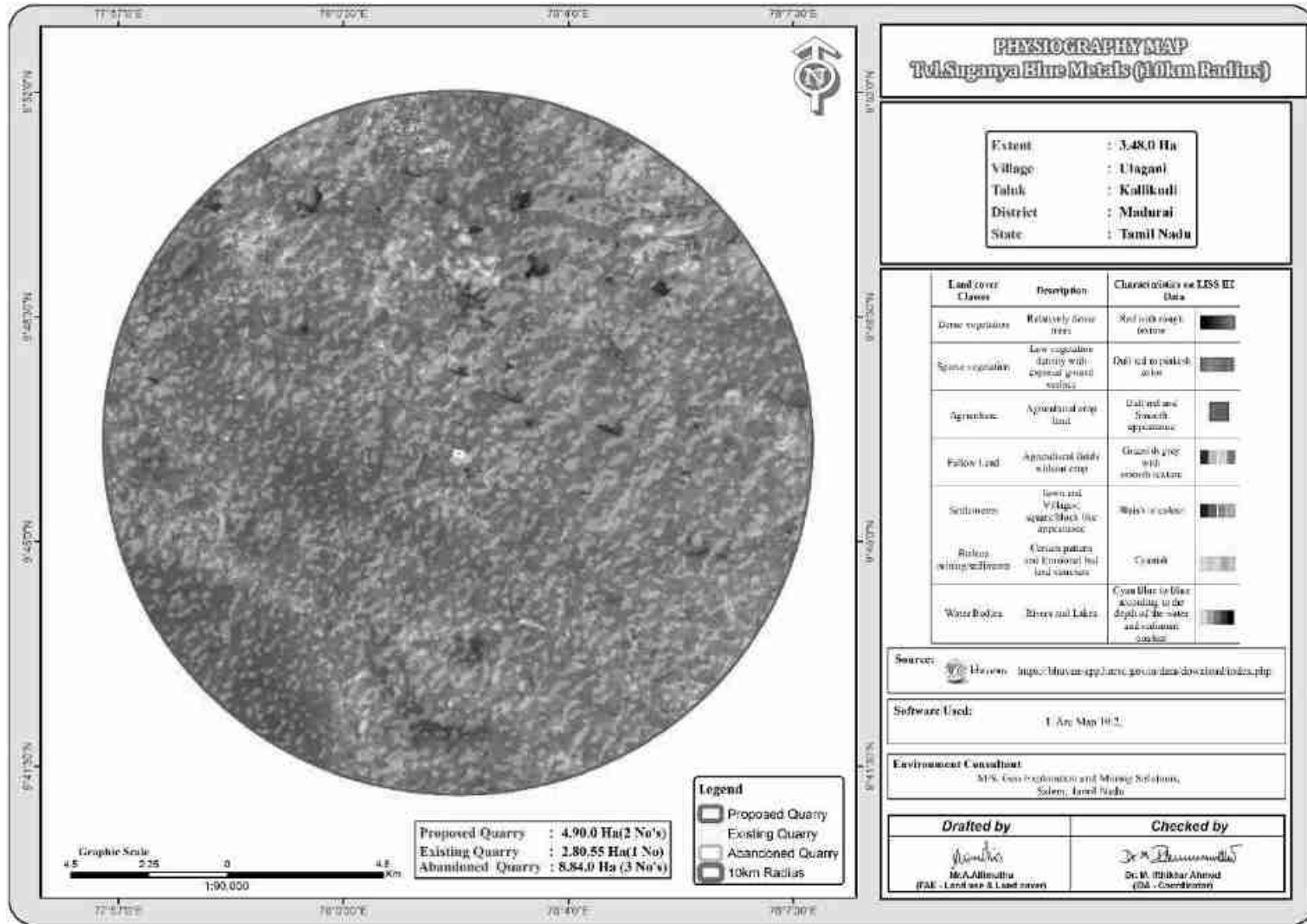


FIGURE 3.1: CHART SHOWING LANDUSE/LANDCOVER ANALYSIS USING LISS III Data

FIGURE 3.2: PHYSIOGRAPHY MAP 10KM RADIUS



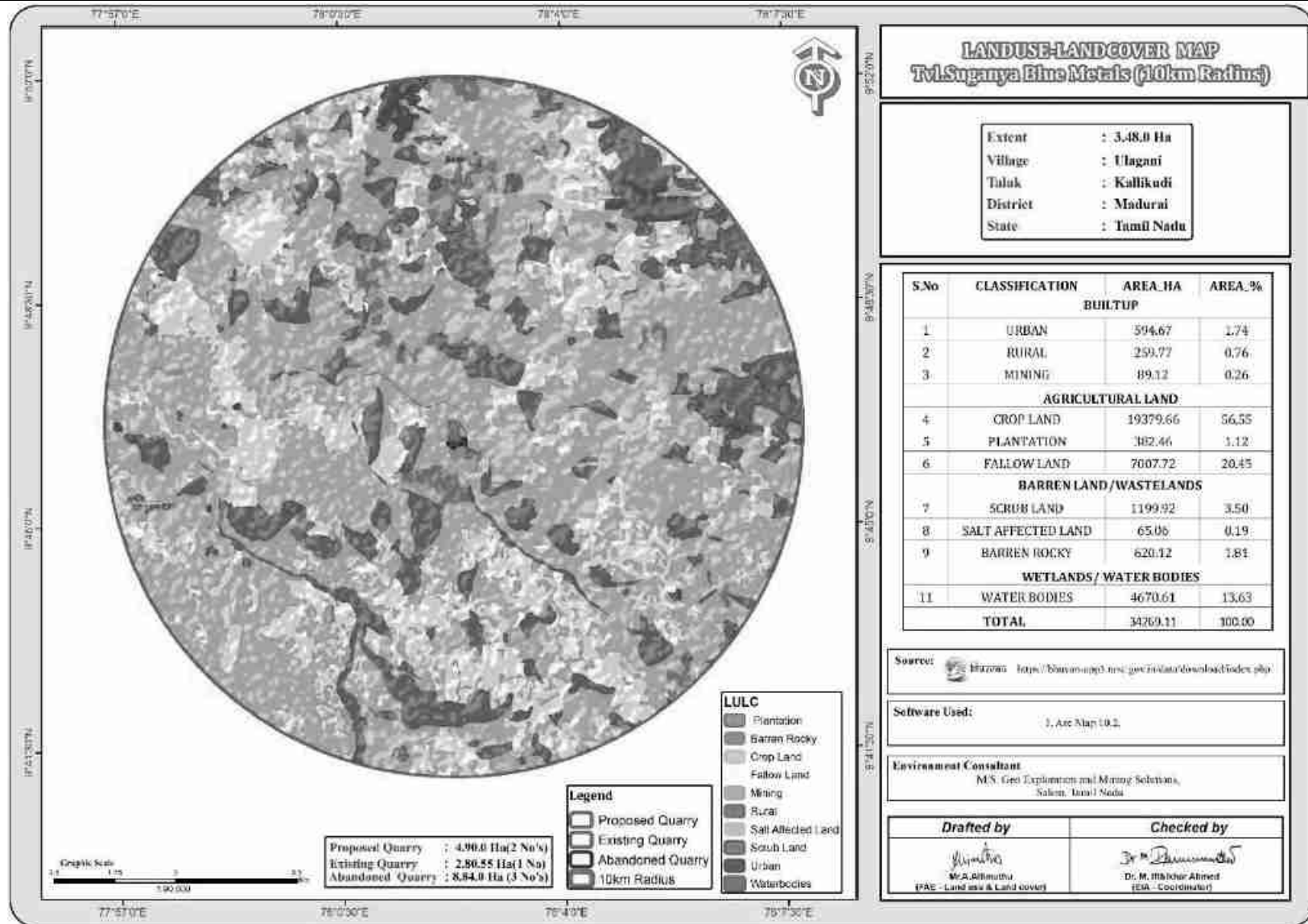


FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS

3.1.4 Interpretation

- ☞ The 10 km radius study area mainly comprises of crop land & Agriculture Plantation land accounting of 56.55% & 1.12% of the total study area. The study area also consists of fallow land of 20.45%.
- ☞ The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.).
- ☞ Water Bodies such as ponds/ lakes comprises of 14% of the total buffer area. The two seasonal rivers such as Gundra river at 5.2Km in SW direction, Terku Aaru stream 40m in NE and Canal at 270m in SE direction of the total study area.
- ☞ The Scrub land accounts of 3.50%. and Salt affected land is accounts of 0.19% As per the primary survey, it was observed the scrub land is mainly occupied by the stony waste and left-over domestic waste generated by the nearby areas.
- ☞ 0.26% of the total study area is occupied by the mine industries of captive mines. The area occupied by Mainly Roughstone and Topsoil of the total buffer area. As also observed within the primary survey, the 10 km buffer area is also occupied by the medium scaled granite and marble and small Brick kiln industries also located in the study area.
- ☞ 2.50% of the area is covered under the human Settlement. The nearest village within the 3 km radius from the project site boundary is observed to be villages Achangulam, Nedungulam, Chinna ulagani, Valayankulam etc.,

3.1.5 Cropping Pattern of the Buffer Zone

The productivity of Agriculture in the Southern and Northern part of the Tamil Nadu is comparatively like the Madurai district has more favorable conditions for the agriculture. As observed, within the study area agriculture is the dominant occupation. As observed during the primary survey conducted during the month of Nov. majority of the crops were Major horticulture crops cultivated in this district are fruits crops like mango, guava, jack, sapota and banana, vegetables like brinjal, bhendi, pumpkin and tapioca, spices like chillies, tamarind and turmeric and plantation crops like cashew and cocoa and flowers like tuberose and marigold and rose. The major source of irrigation within the study area was observed to be done by the stored ground water such as tube/ bore wells and tanks and not by the running surface water as the study area. Also observed, to conserve the ground water agricultural farmers are using sprinkling system technology to irrigate their agriculture fields.

3.1.6 Interpretation and Conclusion

- ☞ Ulagani Village Roughstone quarries has Existing Project which will be done within the existing mines.
- ☞ Out of the total project area i.e. 34269 ha, 1.12% (i.e., 382.46 ha) will be developed under greenbelt development/ plantation.
- ☞ As a Existing quarrie is coming in the area, percentage of human settlement will be increased in surrounding of project site and Infrastructure facilities also will be developed on the basis of requirement.
- ☞ The 10 km study area mostly covers of crop land 56.55%. As per current study 3.50% of the area is occupied by scrub land 1.81%, Barren rocky land, Salt affected land is 0.19% in 10 km radius from the study area land use into quarrie purpose land for this existing quarries.

☞ The project site falls under the Roughstone and Topsoil region. Therefore, the area is appropriate for developing Road development and building etc., it shows that the region has good prospects in the future. Due to proposed Roughstone and Topsoil in this region, economic condition of locals is expected to be improved directly & indirectly. Hence project will prove to be the best economic proposal for the coming times.

3.1.7 TOPOGRAPHY

The lease applied area exhibits flat terrain. The area has gentle sloping towards North eastern side from Madurai district. The altitude of the area is 100-230 m above Mean Sea level. The area is covered by 2m thickness of Topsoil/Gravle formation. Massive Charnockite which is clearly inferred from the existing and proposed quarry pits.

3.1.7.1 Drainage Pattern of the Area

Drainage pattern are created by stream erosion over time that reveals characteristics of the kind of rocks and geological structures in a landscape region drained by streams.

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land.

Dendritic patterns, which are by far the most common, develop in areas where the rock (or unconsolidated material) beneath the stream has no particular fabric or structure and can be eroded equally easily in all directions.

There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic.

3.1.7.2 Seismic Sensitivity

The proposed project site falls in the seismic Zone II, low damage risk zone as per BMTPC, Vulnerability Atlas of Seismic zone of India IS: 1893 – 2002. The project area falls in the hard rock terrain on the peninsular shield of south India which is highly stable.

(Source: https://moes.gov.in/writereaddata/files/LS_EN_20032020_385.pdf)

3.1.7.3 Environmental Features in the Study Area

There is no Wildlife Sanctuaries, National Park and Archaeological monuments within project area. Therefore, there will be no need to acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e.10 km radius, are given in the below Table 3.3.

TABLE 3.3 – DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE PROJECT AREA

Sl.No	Sensitive Ecological Features	Name	Arial Distance in km from Cluster
1	National Park / Wild life Sanctuaries	Megamalai Wildlife Sanctuary	27.5km – SW.
2	Reserve Forest	Kodimangalam B Block R.F	17.71Km – N
3	Nearest Habitation	Ulagani	310m-NE
4	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km Radius
5	Critically Polluted Areas	None	Nil within 10 km Radius

6	Mangroves	None	Nil within 10 km Radius
7	Mountains/Hills	None	Nil within 10 km Radius
8	Notified Archaeological Sites	None	Nil within 10 km Radius
9	Defence Installation	None	Nil within 10 km Radius

Source: Survey of India Toposheet, Village Cadastral Map & Google Earth/Maps

TABLE 3.4 – NEAREST WATER BODIES FROM PROPOSED QUARRIES

Sl.No	NAME	DISTANCE & DIRECTION
1	Gundaru	70m E
2	Terkku Aaru Stream	750m SE
3	Canal	770m SE
4	Odai	1.1km South
5	Tank	1.2Km_SE
6	Achankulam Kanmoi	830m_SW
7	Mallampatti Tank	800m_W
8	Tank Near Chinna Ulagani	2Km_E
9	Kilanesaneri	4.7km SW
10	Tank Near Nallur	8.6km NE
11	Mambatti Kanmoi	8.9km NW

Source: Village Cadastral Map and Field Survey, PFR Report

3.1.6 Soil Environment

Soil quality of the study area is one of the important components of the land environment. The composite soil samples were collected from the study area and analysed for different parameters. The locations of the monitoring sites are detailed in Table 3.5 and Figure 3.6.

TABLE 3.5 – SOIL SAMPLING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Core Zone	Project Area	9°46'4.21"N 78° 2'29.12"E
2	S-2	Valayankulam	1.2km NW	9°46'20.88"N 78° 1'56.21"E
3	S-3	Koodakovil	3.6km SE	9°45'59.59"N 78° 4'37.35"E
4	S-4	Arasapatti	3.8km SW	9°45'11.00"N 78° 0'32.56"E
5	S-5	Kombadi	4.2km NE	9°47'53.92"N 78° 3'55.36"E
6	S-6	T. Kokulam	3.5km SE	9°44'27.97"N 78° 3'18.03"E

Source: On-site monitoring/sampling by EHS 360 Labs in association with GEMS

The objective of the soil sampling is -

1. To determine the baseline soil characteristics of the study area;
2. To determine the impact of proposed activity on soil characteristics and;

To determine the impact on soil more importantly agriculture production point of view.

Methodology –

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the proposed quarry site representing various land use conditions. The samples were collected by auger boring into the soil up to 90-cm depth. Six (6) locations were selected for soil sampling on the basis of soil types,

vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were analysed for physical and chemical characteristics. The sealed samples were sent to laboratory for analysis. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology in respect are given in below Table 3.6.

TABLE 3.6 – METHODOLOGY OF SAMPLING COLLECTION

Particulars	Details
Frequency	One grab sample from each station-once during the study period
Methodology	Composite grab samples of the topsoil were collected from 3 depths, and mixed to provide a representative sample for analysis. They were stored in airtight Polythene bags and analysed at the laboratory.

Source: On-site monitoring/sampling by EHS 360 Lab.

Soil Testing Result –

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium. The standard classification of soil and physico-chemical characteristics of the soils are presented below in Table 3.6 & Test Results in Table 3.7.

FIGURE 3.4: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS

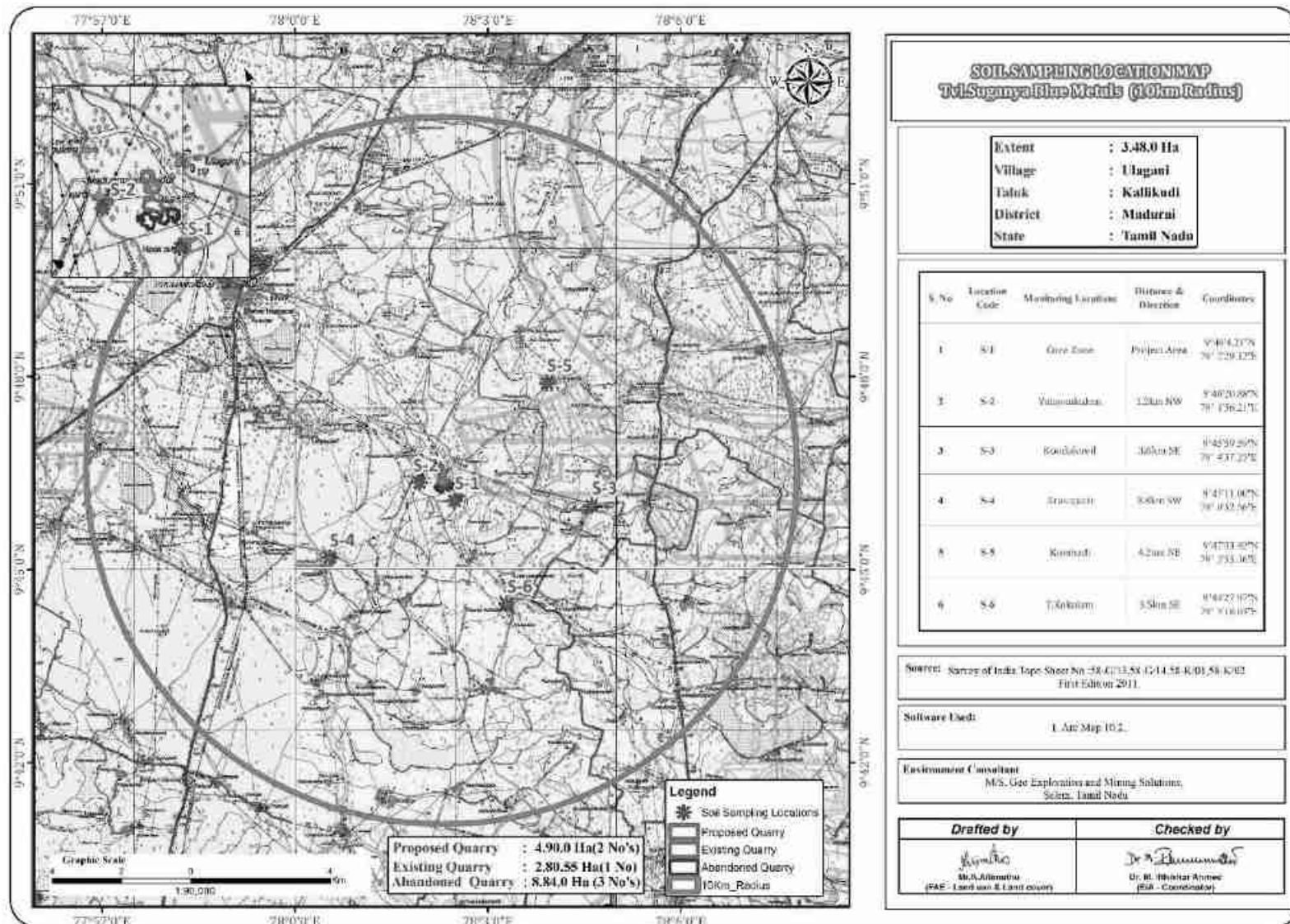


FIGURE 3.5: SOIL MAP

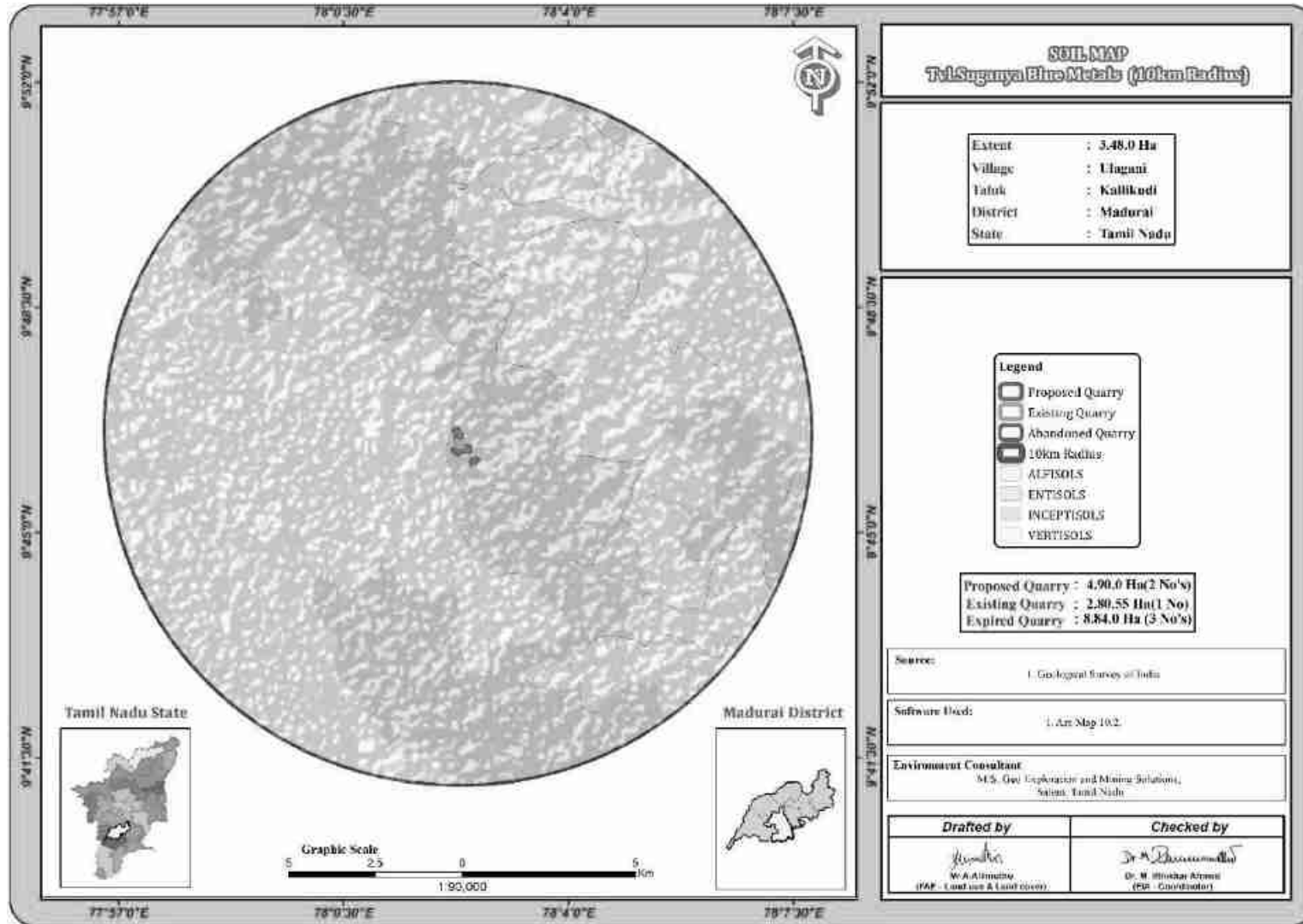


TABLE 3.7 – SOIL QUALITY MONITORING DATA

S. No	Test Parameters	Protocols	S1-core Zone	Soil – 2 Valayankulam	S3- Koodakovil	S4- Arasapatti	S5- Kombadi	S6- T.Kokulam
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.03	8.46	7.89	7.08	8.21	7.32
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	436 µmhos/cm	565 µmhos/cm	489 µmhos/cm	537µmhos/cm	347 µmhos/cm	547 µmhos/cm
03	Texture :							
	Clay	Gravimetric Method	33.4 %	33.4 %	31.5 %	33.2 %	35.7 %	35.1 %
	Sand		35.2 %	34.9 %	37.3 %	36.5 %	34.6 %	34.7 %
	Silt		31.4 %	31.7 %	30.8 %	30.3 %	29.7%	30.2 %
04	Water Holding Capacity	By Gravimetric Method	42.3 %	43.1%	40.4 %	43.8 %	45.6 %	45.9 %
05	Bulk Density	By Cylindrical Method	1.07 g/cm ³	1.23 g/cm ³	1.04g/cm ³	1.41 g/cm ³	1.24 g/cm ³	1.16 g/cm ³
06	Porosity	By Gravimetric Method	43.1 %	43.7 %	41.7 %	46.3 %	41.2 %	46.8 %
07	Calcium as Ca	USEPA3050B–1996&USEPA 6010 C - 2000	162 mg/kg	144 mg/kg	163.6 mg/kg	142 mg/kg	158 mg/kg	155.6 mg/kg
08	Magnesium as Mg		62.3 mg/kg	55.6 mg/kg	61.7 mg/kg	51.6 mg/kg	58.5 mg/kg	59.8 mg/kg
09	Manganese as Mn		30.2 mg/kg	24.3 mg/kg	28.6 mg/kg	23.7 mg/kg	24.3 mg/kg	27.9 mg/kg
10	Zinc as Zn		1.17 mg/kg	1.43 mg/kg	2.45 mg/kg	1.98 mg/kg	1.16 mg/kg	1.34mg/kg
11	Boron as B		1.08mg/kg	1.61 mg/kg	1.07 mg/kg	1.02 mg/kg	1.04kg	1.14 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	138 mg/kg	124 mg/kg	136.8 mg/kg	126 mg/kg	136 mg/kg	132 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff:2015)	0.023 %	0.020 %	0.024 %	0.016 %	0.019 %	0.017 %
14	Potassium as K	USEPA3050B–1996&USEPA 6010 C - 2000	36.1 mg/kg	39.8 mg/kg	29.7 mg/kg	32.3 mg/kg	33.7 mg/kg	30.7 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Reaff: 2019)	1.21mg/kg	2.02 mg/kg	1.63 mg/kg	1.24 mg/kg	1.41 mg/kg	2.09 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	292 mg/kg	323 mg/kg	342 mg/kg	302mg/kg	312 mg/kg	365 mg/kg
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)	BDL (DL : 1.0 mg/kg)
20	Lead as Pb		0.75 mg/kg	1.49 mg/kg	0.73 mg/kg	1.17 mg/kg	0.91 mg/kg	0.95 mg/kg
21	Iron as Fe		2.63 mg/kg	2.18 mg/kg	1.98 mg/kg	2.21 mg/kg	3.03 mg/kg	1.98 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.18 %	3.46 %	2.84 %	2.62 %	2.68 %	2.39 %
23	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.27 %	2.01 %	1.65 %	1.52 %	1.76 %	1.39 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	28.9 meq/100g of soil	27.8 meq/100g of soil	31.9 meq/100g of soil	21.9 meq/100g of soil	42.1 meq/100g of soil	48.7 meq/100g of soil

Source: Sampling Results EHS 360 Lab.

Interpretation & Conclusion**Physical Characteristics –**

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay to Sandy Soil and Bulk Density of Soils in the study area varied between 1.07– 1.41 g/cc. The Water Holding Capacity of the soil samples ranging from 40.4 – 45.9% and Porosity of the soil is found to be medium i.e ranging from 41.7 – 46.8%.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline in nature with pH range 7.08 to 8.46
- The available Nitrogen content range between 292 to 365mg/kg
- The available Phosphorus content range between 1.21 to 2.09mg/kg
- The available Potassium range between 29.7 to 39.8 mg/kg

Whereas, the micronutrient as zinc (Zn), iron (Fe) and copper (Cu) were found in the range of 1.16 to 2.45 mg/kg; 1.98 to 3.03 mg/kg and cobber is (BDL).

Wilting co efficient in significant level would mean that the soil would support the vegetation. The soil properties in the buffer zone reveal that the soil can sustain vegetation. If amended suitability the core area can also withstand plantation.

3.2 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 water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

3.2.1 Surface Water Resources:

Gavundan river lies at 8.0 Km south from the project cluster. The area is studded with few tanks and kanmai that serve as the source for agriculture and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells, trenches is in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

3.2.2 Ground Water Resources:

The terrain is underlain by hard rock formations, Fissured and fractured crystalline rocks constitute the important aquifer systems in the Madurai region. Ground water occurs under phreatic to semi-confined conditions in these formations and is being developed by means of dug wells and filter points. Proterozoic formation is the basement rocks which consist of quartzite, crystalline limestone, calc-granulite, hornblende – biotite gneiss, charnockite or pyroxene granulite, granite and pegmatite. Weathered, a fissured crack, shear zones and joints in the basement rock act as a good groundwater potential zone in the study area.

The study area falls in the Thirumangalam block which is categorized as over-exploited zone as per G.O (MS) No 113 dated 09.06.2016.

3.2.3 Methodology

Reconnaissance survey was undertaken to collect the sampling and locations were finalized based on;

1. Drainage pattern;
2. Location of residential areas representing different activities/likely impact areas; and
3. Likely areas, which can represent baseline conditions

One (1) surface water and five (5) ground water samples were collected in the study area and physico-chemical, heavy metals and bacteriological parameters were analysed. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the Examination of Water and Waste water' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.8 and shown as Figure 3.5.

TABLE 3.8 – WATER SAMPLING LOCATIONS

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	SW-1	Pit Water	Project Area	9°46'6.35"N 78° 2'30.91"E
2	SW-2	Virusangulam	4.5km NW	9°48'36.55"N 78° 2'39.96"E
3	WW-1	Near Project Area	160m SE	9°46'0.07"N 78° 2'34.76"E
4	WW-2	Koodakovil	3.6km SE	9°46'3.43"N 78° 4'37.21"E
5	BW-1	Near Project Area	400m West	9°46'8.90"N 78° 2'16.26"E
6	BW-2	Arasapatti	3.8km SW	9°45'8.25"N 78° 0'33.40"E

Source: On-site monitoring/sampling by EHS 360 lab.

Note: SW- Surface water, WW – Well Water, BW – Bore well

FIGURE 3.6: SITE PHOTOGRAPHS OF WATER SAMPLING LOCATIONS



TABLE 3.9 – SURFACE WATER ANALYSIS RESULTS

SNO	TEST	PROTOCOL	Surface Water (SW-1) - Pit Water	Surface Water (SW-2) - Virusangulam
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	7 Hazen	8.3 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	8.06	8.21
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	1284 µmhos/cm	1011µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	5.3 NTU	4.9 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	757 mg/l	596mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	274.4 mg/l	257 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	68.7 mg/l	67 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	25.8 mg/l	21.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	258.6 mg/l	234mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	169.4 mg/l	186.7 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	72.6 mg/l	68.2 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.5 mg/l	0.47 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23rd Edn. 2017:4500 F,D	0.511mg/l	0.29 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	14.3 mg/l	12.3 mg/l
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019)(Annex K)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	8.7 mg/l	11.2 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	32.2mg/l	36.1mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	5.9 mg/l	5.7 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	32.3 mg/l	30.4 mg/l
40	Total Coliform	APHA 23rd Edn. 2017:9221B	1378 MPN/100ml	1378 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23rd Edn. 2017:9221F	151 MPN/100ml	151 MPN/100ml

Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number

TABLE 3.10 – GROUND WATER ANALYSIS RESULTS

Sno	Test	Protocol	Ground Water (WW-1) – Near Project Area	Ground Water (WW-2) – Koodakovil	Ground Water (BW-1) – Near Project Area	Ground Water (BW-2) – Arasapatti
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5	5 Hazen	5 Hazen	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.47	7.83	7.67	7.92
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	967µmhos/cm	990 µmhos/cm	927 µmhos/cm	817 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	1.3 NTU	2.1 NTU	2.6 NTU	1.6 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	580 mg/l	594 mg/l	556 mg/l	490 mg/l
7	Total Hardness as CaCO3	IS 3025 Part 21:2009 (Reaff:2019)	208.1 mg/l	220.3 mg/l	199.9 mg/l	175.4 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	55.6 mg/l	52.0mg/l	47.4 mg/l	52.3 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	16.8 mg/l	17.8 mg/l	19.8 mg/l	10.9 mg/l
10	Total Alkalinity as CaCO3	IS 3025 Part 23:1986 (Reaff:2019)	191.6mg/l	199.6mg/l	165.3 mg/l	143.7mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	169 mg/l	158.4 mg/l	152.5mg/l	115 mg/l
12	Sulphate as SO4	IS 3025 Part 24:1986 (Reaff:2019)	46.8 mg/l	56.3mg/l	50.7 mg/l	56.9 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.38 mg/l	0.37 mg/l	0.38 mg/l	0.44mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23rd Edn. 2017:4500 F.D	0.26mg/l	0.17mg/l	0.17 mg/l	0.37 mg/l
16	Nitrate as NO3	IS 3025 Part 34:1988 (Reaff:2019)	9.7 mg/l	8.6 mg/l	6.9 mg/l	6.1 mg/l
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C6H5OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
33	Sulphide as H2S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
36	Total Coliform	APHA 23rd Edn. 2017:9221B	203 MPN/100ml	123 MPN/100ml	157 MPN/100ml	134 MPN/100ml
37	Escherichia coli	APHA 23rd Edn. 2017:9221F	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml

Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number

* IS: 10500:2012-Drinking Water Standards; # within the permissible limit as per the WHO Standard. The water can be used for drinking purpose in the absence of alternate sources. Note: SW- Surface water, GW – Ground water.

Source: Sampling Results by EHS 360 lab.

3.2.4 Interpretation & Conclusion

Surface Water

The pH of surface 8.06-8.21 while turbidity found within the standards. Total Dissolved Solids 596-757mg/l and Chloride 169.4 – 186.7 mg/l. Nitrates 12.3 – 14.3 mg/l, while sulphates 68.2 – 72.6mg/l.

Ground Water

The pH of the water samples collected ranged from 7.47 to 7.92 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. on Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 490 – 594 mg/l in all samples. The Total hardness varied between 175.4 – 220.3 mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.2.5 Hydrology and Hydrogeological studies

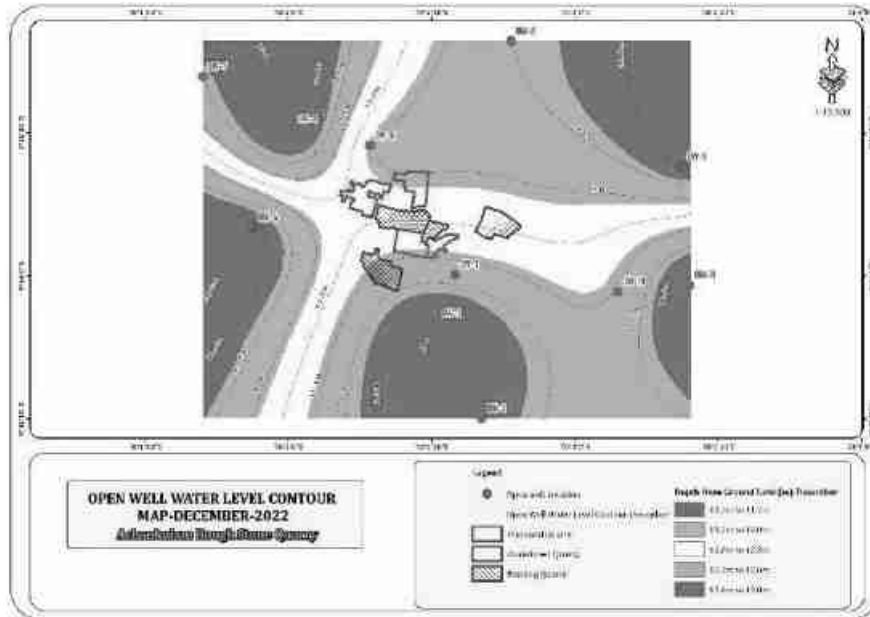
The district is underlain by hard rock formation Fissured and Fractured crystalline rocks constitute the important aquifer systems in the district. Geophysical prospecting was carried out in that area by SSRMP-80 Instrument by qualified Geo physicist with the help of IGIS software and it was inferred that the low resistance encountered at the depth between 68-73m. the quarrying operations is restricted upto 47m hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area. There is no necessity of stream, channel diversion due to this upcoming project.

During the rainy season there is a possibility of collection of seepage water from the subsurface levels this is due to the high intensity of fracture and weathered portion upto a depth of 10m thus the collected seepage water will be stored in the mine sump pits and will be used for dust suppression and greenbelt development and during the end of the life of the mine this collected water will be as a temporary reservoir in that area.

TABLE 3.11: POST MONSOON WATER LEVEL OF OPEN WELLS 1 KM RADIUS

S.NO	Name	LONGITUDE	LATITUDE	Dec-22	Jan-23	Feb-23
1	OW1	78° 02' 34.90"E	9° 46' 00.239"N	12.5	13.1	13.7
2	OW2	78° 02' 31.15"E	9° 45' 50.028"N	13	13.6	14.2
3	OW3	78° 02' 40.44"E	9° 45' 30.076"N	12.8	13.4	14
4	OW4	78° 01' 52.65"E	9° 46' 10.082"N	11.5	12.1	12.7
5	OW5	78° 02' 17.08"E	9° 46' 27.303"N	12	12.6	13.2
6	OW6	78° 02' 00.96"E	9° 46' 30.675"N	13	13.6	14.2
7	OW7	78° 01' 42.11"E	9° 46' 41.729"N	12.6	13.2	13.8
8	OW8	78° 02' 46.66"E	9° 46' 49.251"N	11.8	12.4	13
9	OW9	78° 03' 22.53"E	9° 46' 22.798"N	11.6	12.2	12.8
10	OW10	78° 03' 08.92"E	9° 45' 56.632"N	12.4	13	13.6
11	OW11	78° 03' 23.96"E	9° 45' 57.965"N	13	13.6	14.2

FIGURE 3.7: CONTOUR MAP OF OPEN WELL WATER LEVEL



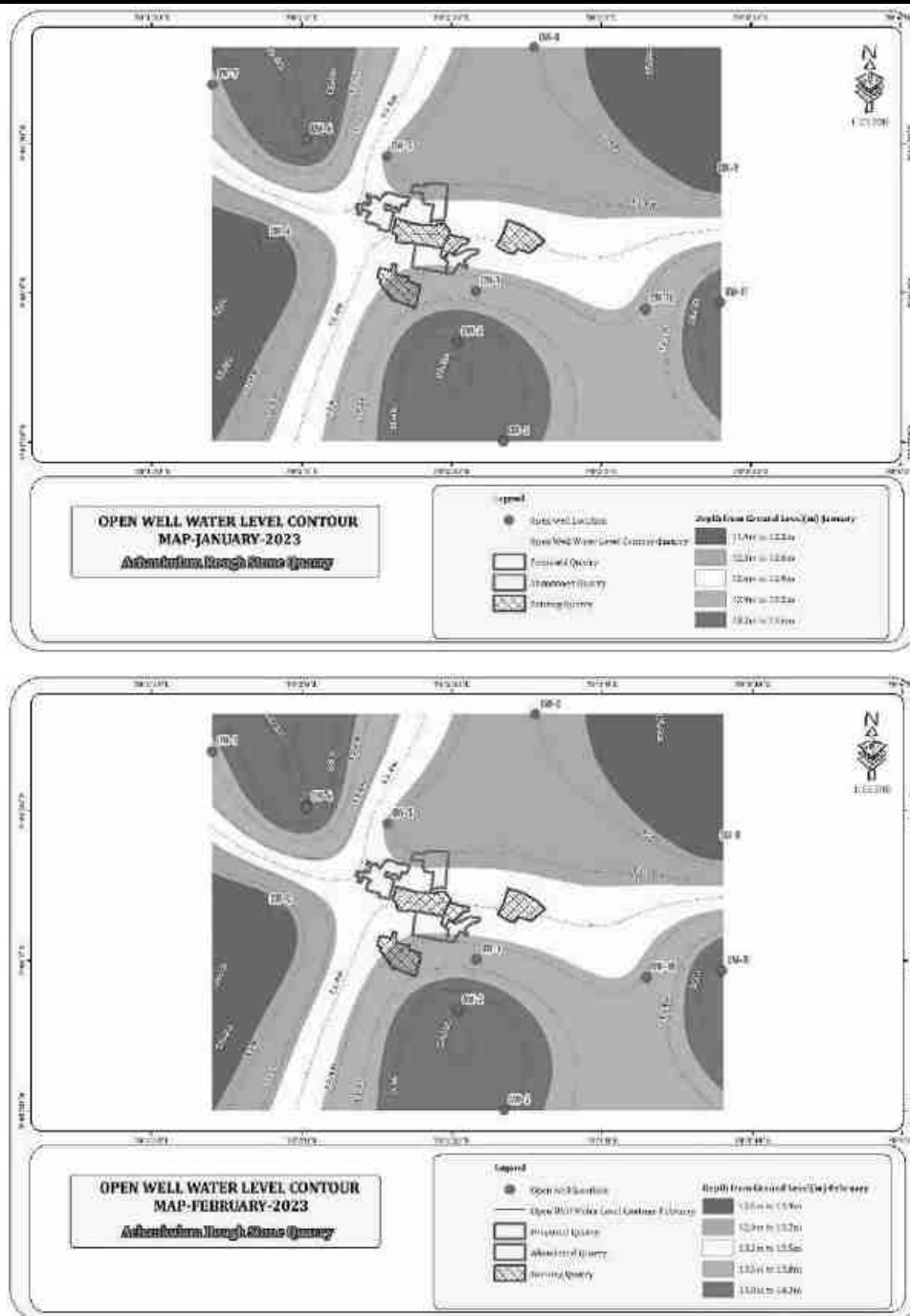
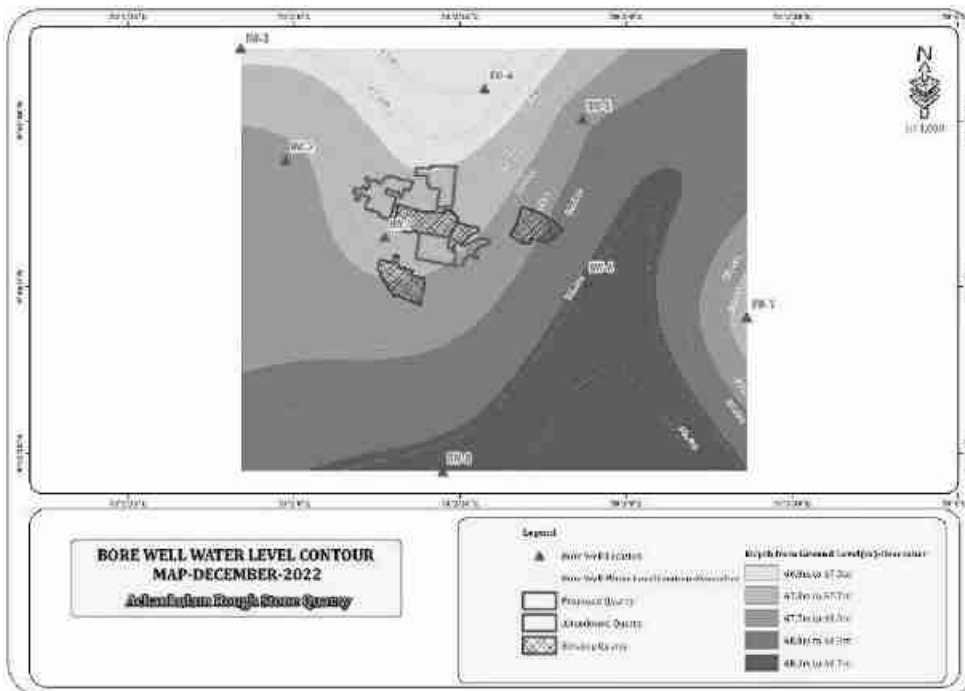
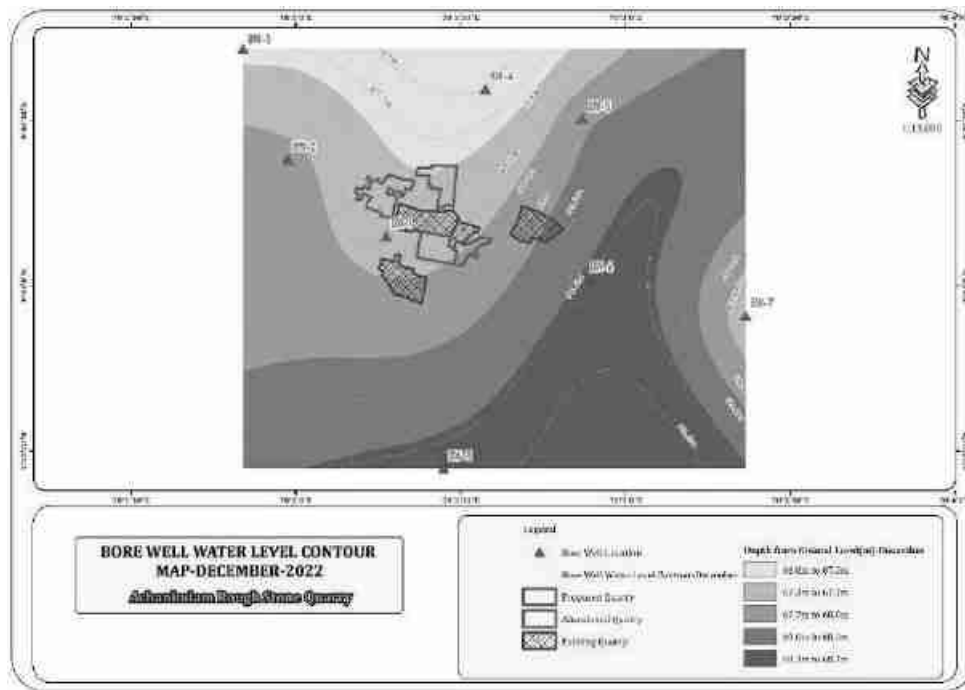


TABLE 3.12: POST MONSOON WATER LEVEL OF BOREWELLS 1 KM RADIUS

S.NO	Name	LONGITUDE	LATITUDE	Dec-22	Jan-23	Feb-23
1	BW1	78° 02' 16.46"E	9° 46' 09.022"N	67.5	68.1	68.7
2	BW2	78° 01' 58.53"E	9° 46' 22.946"N	67.8	68.4	69
3	BW3	78° 01' 50.42"E	9° 46' 43.038"N	67.2	67.8	68.4
4	BW4	78° 02' 34.52"E	9° 46' 35.780"N	67	67.6	68.2
5	BW5	78° 02' 52.17"E	9° 46' 30.307"N	68	68.6	69.2
6	BW6	78° 02' 52.66"E	9° 46' 01.206"N	68.4	69	69.6

7	BW7	78° 03' 21.89"E	9° 45' 54.565"N	67.4	68	68.6
8	BW8	78° 02' 26.93"E	9° 45' 26.772"N	68.5	69.1	69.7

FIGURE 3.8: CONTOUR MAP OF BORE WELL WATER LEVEL



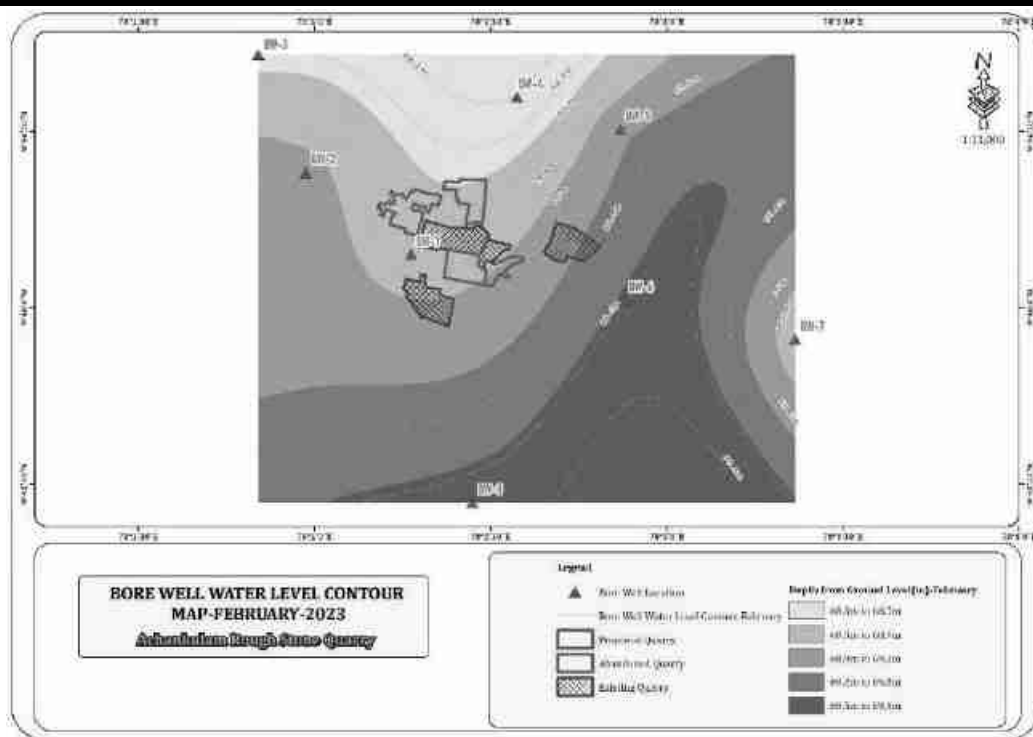


FIGURE 3.9: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

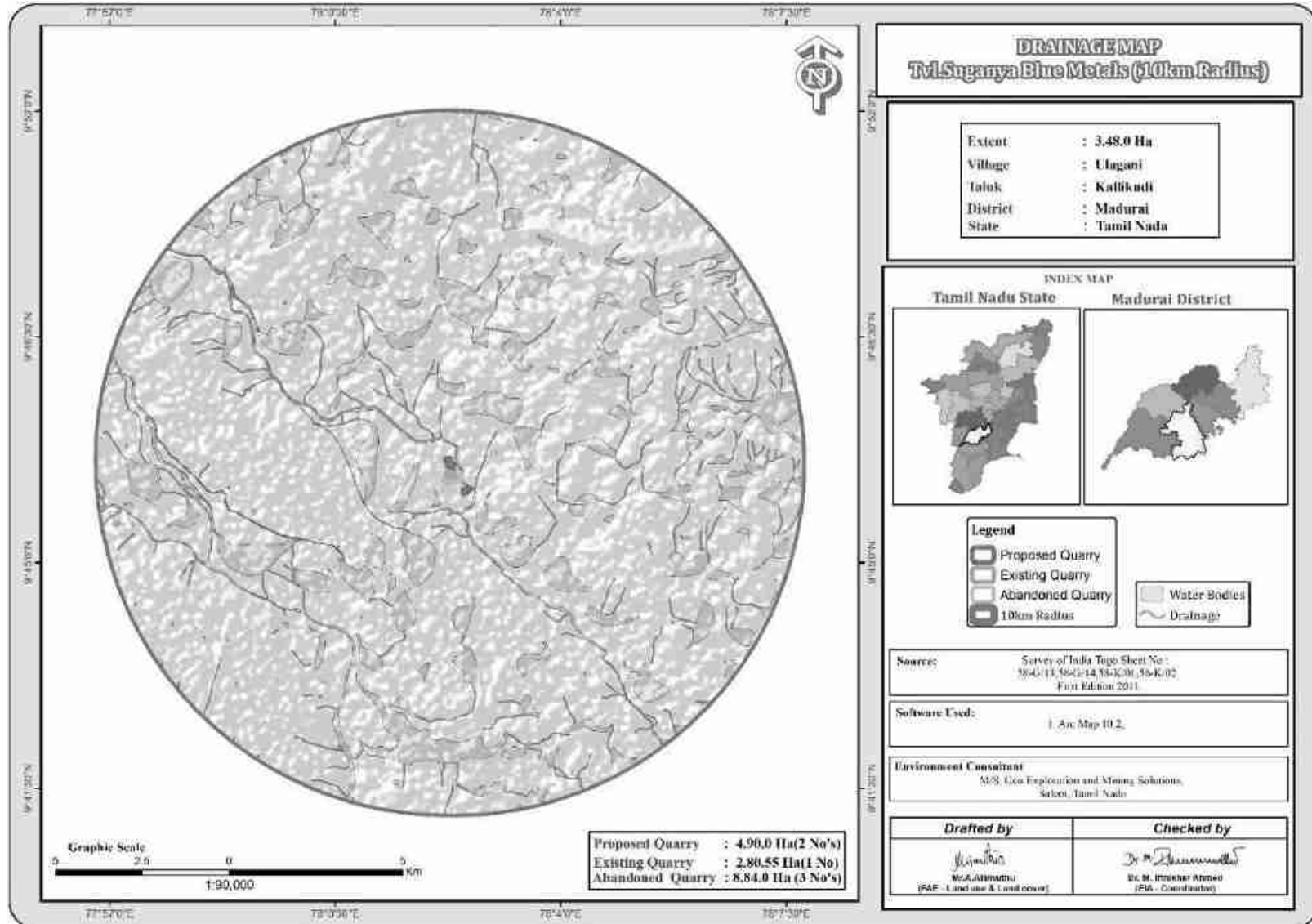
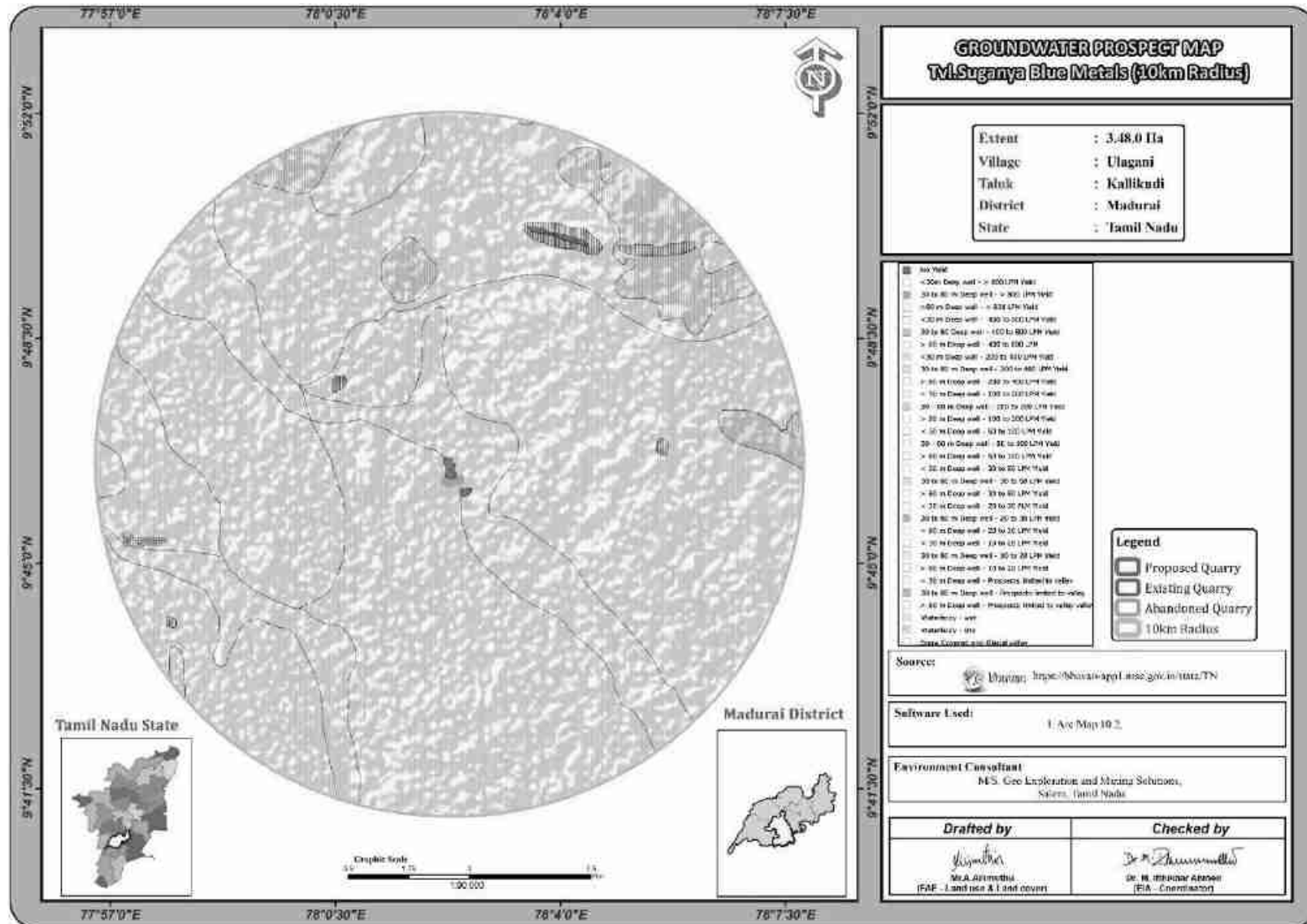


FIGURE 3.10: GROUND WATER LEVEL MAP



Source : Bhuvan

3.2.5.1 Methodology and Data Acquisition

Electric Resistivity Method is well established for delineating lateral as well vertical discontinuities in the resistive structure of the Earth's subsurface. The present study makes use of vertical electric sounding (VES) to delineate the Vertical Resistivity structure at depth. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral in homogeneities and is capable of providing higher depth of investigation. This is four electrodes collinear set up where in the outer electrodes send current into the ground and the inner electrodes measure the potential difference.

The present study utilizes maximum current electrode separation $AB/2$. The data from this survey are commonly arranged and contoured in the form of Pseudo-section that gives an approximate of the subsurface resistivity. This technique is used for the inversion of Schlumberger VES data to predict the layer parameter namely layer resistivity and Geo electric layer thickness. The main goal of the present study is to search the vertical in homogeneities that is consistent with the measured data.

For a Schlumberger among the Apparent resistivity can be calculated as follows

$$\rho_a = \frac{G\Delta V}{I}$$

ΔV = potential difference between receiving electrodes

G = Geometric Factor.

Rocks show wide variation in resistivity ranging from 10-8 more than 10+14 ohmmeter. On a broad classification, one can group the rocks falling in the range of 10-8 to 1 ohmmeter as good conductors. 1 to 106 ohmmeter as intermediate conductors and 106 to 1012 ohmmeter as more as poor conductor. The resistivity of rocks and subsurface lithology, which is mostly dependent on its porosity and the pore fluid resistivity is defined by Archie's Law,

$$\rho_r = F\rho_w = a \emptyset^m \rho_w$$

ρ_r = Resistivity of Rocks

ρ_w = Resistivity of water in pores of rock

F = Formation Factor

\emptyset = Fractional pore volume

A = Constants with values ranging from 0.5 to 2.5

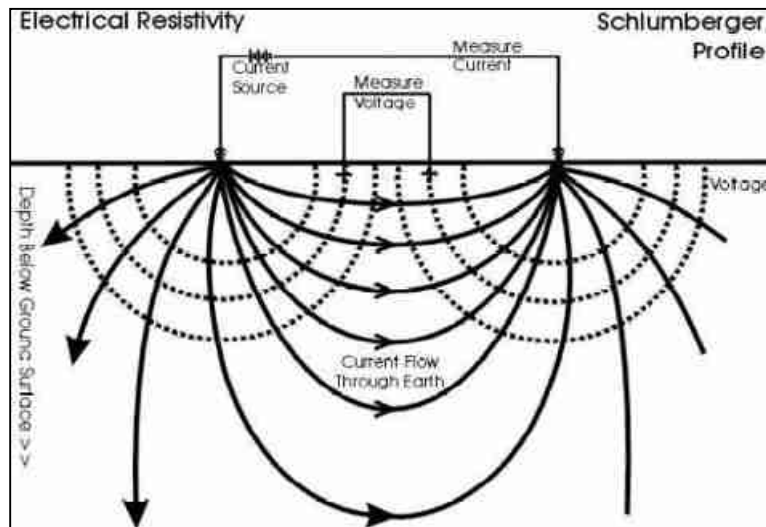
3.2.5.2 Survey Layout

The layout for a resistivity survey depends on the choice of the current and potential electrode arrangement, which is called electrode array. Here the present study is considered with Schlumberger array. In which the distance may be used for current electrode separation while potential electrode separation is kept on third to one fifth of the same. One interesting aspect in VES is the principle of reciprocity, which permits interchange of the potential and current electrode without any effect on the measured apparent resistivity.

The field equipment deployed for the study is in a deep resistivity meter with a model of SSR – MP – AT. This Signal stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation

features for Earth resistivity. In the presence of random earth Noises, the signal to noise ratio can be enhanced by \sqrt{N} where N is the number of stacked readings. This SSR meter in which running averages of measurements $[1, (1+2)/2, (1+2+3)/3 \dots (1+2+\dots+16)/16]$ up to the chosen stacks are displayed and the final average is stored automatically, in memory utilizing the principles of stacking to achieve the benefit of high signals to noise ratio. Based on these above significations the signal stacking resistivity meter was used for (VES) Vertical Electric Resistivity Sounding.

RESISTIVITY SURVEY PROFILE



Measurements of ground Resistivity is essentially done by sending a current through two electrodes called current electrodes (C₁& C₂) and measuring the resulting potential by two other electrodes called potential electrode (P₁& P₂). The amount of current required to be sent into the ground depends on the contact resistance at the current electrode, the ground resistivity and the depth of interest.

3.2.5.3 Data Presentation

It was inferred that the low resistance encountered at the depth between 68-73m. The maximum depth proposed project is 42 m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area.

3.2.5.4 Geophysical Data Interpretation

The geophysical data was obtained to study the lateral variations, vertical in homogeneities in the sub – surface with respect to the availability of groundwater. From the interpreted data, it has inferred that the area has moderate groundwater potential in the investigated area. This small quarrying operation will not have any significant impact on the natural water bodies.

3.3 Air Environment

The ambient air quality with respect to the study area of 10 km radius including the cluster quarries forms the baseline information. The prime objective of baseline air quality monitoring is to assess existing air quality of the area. This will also be useful in assessing the conformity to standards of the ambient air quality during the operations

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of Existing and proposed quarries within the radius of 500m.

The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. This section describes the identification of sampling locations, methodology adopted during the monitoring period and sampling frequency.

The baseline status of the ambient air quality has been assessed through scientifically designed ambient air quality network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions.
- Topography of the study area.
- Likely impact area.
-

3.3.1 Meteorology & Climate

Meteorology is the key to understand the air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A temporary meteorological station was installed at project site. The station was installed at a height of 4 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis.

Climate –

- The climate here is tropical. The summers are much rainier than the winters in Madurai. This location is classified as Aw by Köppen and Geiger. In Madurai, the average annual temperature is 28.2 °C | 82.7 °F. In a year, the rainfall is 849 mm | 33.4 inch.
- This region, situated near the equator line, is characterized by difficult-to-define summer seasons. The best time to visit is January, February, March, September, November, December.
- The driest month is January, with 16 mm | 0.6 inch of rain. The greatest amount of precipitation occurs in October, with an average of 180 mm | 7.1 inch.
- May is the warmest month of the year. The temperature in May averages 31.0 °C | 87.8 °F. The lowest average temperatures in the year occur in December, when it is around 24.6 °C | 76.4 °F.

<https://en.climate-data.org/asia/india/tamil-nadu/madurai-5892/>

Rainfall –

The average annual rainfall and the 5 years rainfall is as follows:

TABLE 3.13 – RAINFALL DATA

Actual Rainfall in mm					Normal Rainfall in mm
2017	2018	2019	2020	2021	
904.6	734.1	671.9	915.5	1095.2	985

Source: <https://www.twadboard.tn.gov.in/content/Madurai>

TABLE 3.14 – METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Dec-2022	Jan-2023	Feb-2023
1	Temperature (°C)	Max	24.84	25.08	26.74
		Min	22.27	21	23.83
		Avg	23.55	23.04	25.28
2	Relative Humidity (%)	Avg	85.56	81.09	69.37
3	Wind Speed (m/s)	Max	4.26	4.23	4.05
		Min	1.07	2.45	2.58
		Avg	2.66	3.34	3.31
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		NE,ENE	E,ESE	ESE,E

Source: On-site monitoring/sampling by EHS360 lab in association with GEMS

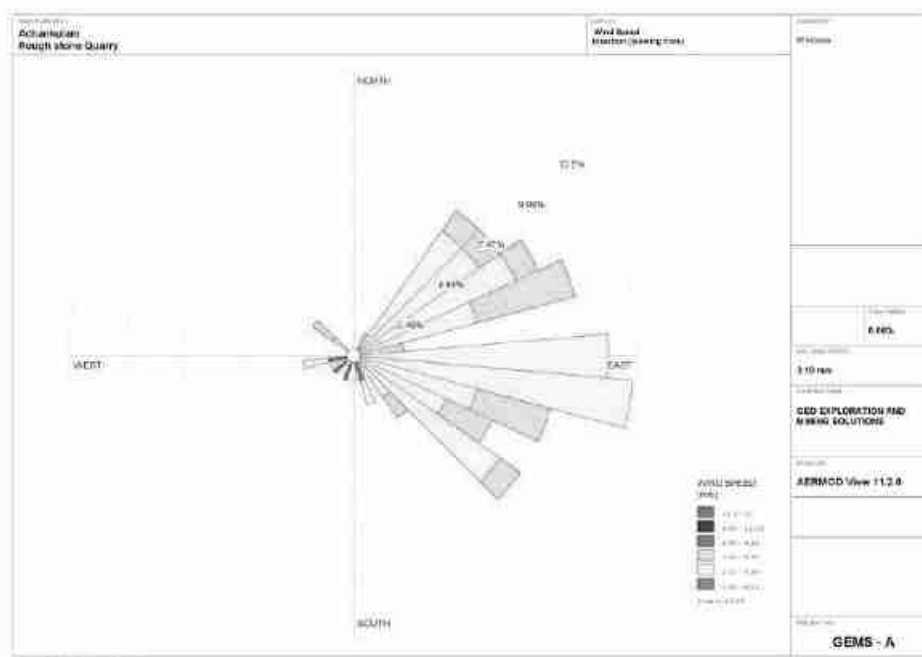
Correlation between Secondary and Primary Data

The meteorological data collected at the site is almost similar to that of secondary data collected from IMD Madurai. A comparison of site data generated during the three months with that of IMD, Madurai Agro reveals the following:

- The average maximum and minimum temperatures of IMD, Madurai agro showed a higher in respect of on-site data i.e. in Thirumangalam village.
- The relative humidity levels were lesser at site as compared to IMD, Madurai agro.
- The wind speed and direction at site shows similar trend that of IMD, Madurai agro.

Windrose diagram of the study site is depicted in Figure. 3.8. Predominant downwind direction of the area during study season is North East to South West.

FIGURE 3.11: WINDROSE DIAGRAM



Environmental In the abstract of collected data wind rose were drawn on presented in figure No.3.14 during the monitoring period in the study area

1. Predominant winds were from NE, NE, E, ENE, SE
2. Calm conditions prevail of about 0.00% of the monitoring period
3. Temperature readings ranging from 24.6⁰C to 31.0⁰C
4. Relative humidity ranging from 57% to 71%
5. The monitoring was carried out continuously for three months

3.3.2 Methodology and Objective

The prime objective of the ambient air quality study is to assess the existing air quality of study area and its conformity to NAAQS. The observed sources of air pollution in the study area are industrial, traffic and domestic activities. The baseline status of the ambient air quality has been established 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; etc

3.3.3 Sampling and Analytical Techniques

TABLE 3.15 – METHODOLOGY AND INSTRUMENT USED FOR AIR QUALITY ANALYSIS

Parameter	Method	Instrument
PM _{2.5}	Gravimetric Method	Fine Particulate Sampler

	Beta attenuation Method	Make – Thermo Environmental Instruments – TEI 121
PM ₁₀	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hochheiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by EHS360 lab & CPCB Notification

TABLE 3.16 – NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide ($\mu\text{g}/\text{m}^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	Particulate matter (size less than $10\mu\text{m}$) PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	Particulate matter (size less than $2.5\mu\text{m}$) PM _{2.5} ($\mu\text{g}/\text{m}^3$)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval,

** 24 hourly / 8 hourly or 1 hourly monitored value as applicable shall be complied with 98 % of the time in a year. However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

3.3.4 Frequency & Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at seven (8) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period Dec2022 – Feb 2023. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂) & Nitrogen Dioxide (NO₂).

3.3.5 Ambient Air Quality Monitoring Stations

Eight (8) monitoring stations were set up in the study area as depicted in Figure 3.6.1 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

TABLE 3.17 – AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Core Zone	Project Area	9°46'7.47"N 78° 2'33.72"E
2	AAQ-2	Valayankulam	1.2km NW	9°46'23.60"N 78° 1'55.98"E
3	AAQ-3	Koodakovil	3.6km SE	9°45'59.49"N 78° 4'36.73"E
4	AAQ-4	Vidathakulam	4.3km NW	9°48'25.43"N 78° 1'56.78"E
5	AAQ-5	Melakottai	6.3km NW	9°47'33.87"N 77°59'20.66"E
6	AAQ-6	Arasapatti	3.8km SW	9°45'8.27"N 78° 0'35.09"E
7	AAQ-7	Kombadi	4.2km NE	9°47'53.91"N 78° 3'55.63"E
8	AAQ-8	T.Kokulam	3.5km SE	9°44'25.36"N 78° 3'19.92"E

Source: On-site monitoring/sampling by EHS360 lab in association with GEMS

FIGURE 3.13 AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

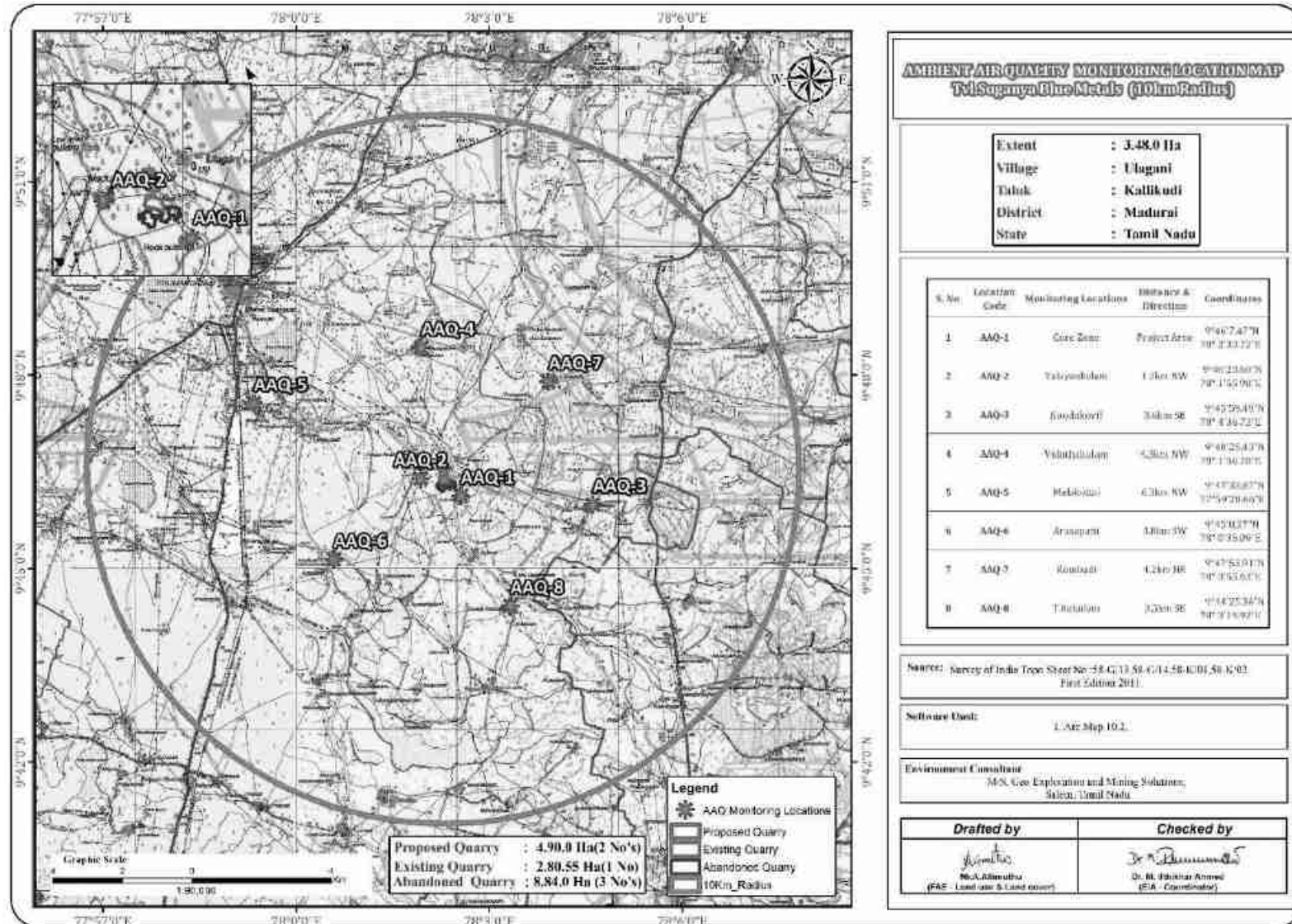


TABLE 3.18 – AAQ1- CORE ZONE

Period: Dec2022 – Feb 2023

Location: AAQ1- Core Zone

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	56.2	43.2	22.5	6.2	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	55.3	42.1	21.0	5.0	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	57.1	44.5	23.4	7.3	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	58.3	45.3	23.0	8.1	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	59.2	46.2	22.4	5.3	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	60.2	47.2	21.5	6.2	25.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	56.2	45.0	22.6	7.1	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	57.3	43.2	23.0	8.4	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	58.2	46.0	20.4	7.3	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	55.2	47.2	21.3	8.5	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	56.3	42.2	22.4	8.3	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	58.2	45.3	23.5	6.1	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	60.3	43.1	21.0	7.0	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	56.0	44.4	23.1	6.5	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	57.3	45.5	22.0	8.4	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	58.4	46.3	23.0	6.3	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	60.2	47.3	22.5	7.4	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	55.2	46.2	21.0	8.3	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	58.6	45.2	23.5	6.0	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	56.4	44.3	21.6	7.1	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	60.3	42.0	22.3	8.5	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	55.2	43.5	20.2	7.3	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	56.8	45.2	22.3	6.2	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	58.2	47.2	23.5	5.3	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	60.5	46.0	20.6	6.1	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	57.3	45.3	21.3	7.5	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note:BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.19 – AAQ2 – VALAYANKULAMPeriod: Dec2022 – Feb 2023
hourly

Location: AAQ2- Valayankulam

Time: 24-

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	62.5	36.2	22.3	6.1	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	63.1	35.3	21.0	7.3	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	64.0	41.7	23.0	5.5	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	65.5	41.5	22.4	6.8	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	63.2	37.0	21.3	6.6	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	64.2	40.3	23.5	7.2	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	65.2	41.1	20.2	8.2	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	63.1	39.0	22.5	6.4	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	62.4	36.3	23.5	8.1	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	65.5	40.9	20.6	7.5	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	63.2	39.2	21.4	6.0	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	64.2	36.3	22.3	7.0	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	65.2	40.6	23.5	8.0	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	63.0	38.2	23.5	6.5	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	62.4	39.2	21.6	7.7	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	64.2	37.3	22.4	7.3	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	65.0	40.3	23.4	6.6	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	61.2	36.0	20.2	7.9	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	62.3	39.0	21.5	5.5	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	64.5	38.2	22.3	6.1	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	65.5	40.1	23.4	7.4	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	63.1	37.0	21.3	7.9	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	64.2	35.3	22.5	5.5	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	65.5	36.2	23.6	6.4	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	62.2	37.2	22.5	7.4	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	64.3	38.0	23.6	7.6	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.20 – AAQ3 – KOODAKOVIL

Period: Dec 2022 – Feb 2023

AAQ3- Koodakovil

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	62.3	40.7	20.2	5.5	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	63.2	41.6	21.5	6.2	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	64.1	42.5	23.4	7.2	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	65.0	43.1	22.5	6.0	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	63.0	42.7	23.4	7.3	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	64.2	41.5	21.0	5.0	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	61.0	40.2	22.5	6.3	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	62.0	42.6	23.6	7.4	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	63.4	43.4	20.1	6.2	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	62.1	41.2	21.2	7.0	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	63.5	43.1	22.0	5.3	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	64.2	41.4	23.4	6.3	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	62.2	39.3	22.5	7.1	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	63.0	40.0	23.6	6.4	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	64.0	42.4	21.0	7.2	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	61.3	39.3	22.4	7.0	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	62.0	38.2	23.5	6.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	63.3	39.1	22.7	5.4	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	64.5	43.5	23.5	6.4	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	63.5	40.2	20.1	7.3	25.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	64.2	43.3	22.0	8.8	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	63.0	42.6	23.6	5.6	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	65.2	43.1	21.4	6.6	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	63.1	41.0	22.5	7.5	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	64.2	42.4	23.1	5.3	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	65.0	40.5	22.6	6.1	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.21– AAQ4 – VIDATHAKULAM

Period: Dec 2022 – Feb 2023

Location: AAQ4 - Vidathakulam

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	65.0	43.2	22.1	5.5	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	64.2	42.1	23.1	6.2	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	66.3	44.2	20.1	5.0	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	67.1	45.1	22.3	6.3	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	66.0	46.0	23.4	5.2	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	65.2	44.2	20.0	6.3	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	66.3	43.0	21.3	5.4	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	64.1	45.1	22.5	6.2	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	65.0	47.1	23.6	5.0	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	66.3	48.2	21.4	6.8	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	66.0	46.2	22.4	5.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	67.0	47.0	23.0	6.1	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	65.0	44.0	20.0	5.4	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	64.0	45.2	22.1	6.3	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	66.4	46.3	23.3	5.0	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	67.2	44.0	22.0	6.8	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	64.2	45.3	20.1	5.9	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	65.3	46.2	23.5	6.1	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	66.1	43.1	22.5	5.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	67.2	42.2	20.5	6.4	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	65.3	45.1	23.5	5.7	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	66.0	46.2	21.4	6.3	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	66.2	46.0	22.6	5.2	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	65.0	45.2	23.5	6.1	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	67.1	44.1	21.2	6.8	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	66.8	42.3	23.5	5.3	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.22 – AAQ5 – MELAKOTTAI

Period: Dec 2022 – Feb 2023

AAQ5- Melakottai

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	63.2	44.2	21.2	6.2	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	62.4	45.3	22.3	7.0	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	65.5	46.1	23.1	8.0	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	64.0	47.2	20.2	7.2	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	65.5	46.0	24.3	6.3	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	64.3	47.2	22.2	7.1	20.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	63.0	45.2	23.5	7.7	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	65.1	46.3	21.3	6.3	19.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	66.2	47.0	22.4	7.4	19.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	64.0	44.2	23.5	7.9	20.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	65.2	43.0	22.2	7.5	19.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	66.3	44.2	23.0	7.3	20.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	61.1	42.3	25.4	6.2	22.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	65.2	46.2	23.6	7.4	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	66.3	47.1	25.5	7.6	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	67.1	45.5	21.0	6.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	65.0	46.1	22.5	7.2	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	67.2	47.0	23.4	7.8	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	63.0	45.2	22.0	6.2	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	62.1	47.6	23.5	7.6	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	66.5	46.2	21.0	6.1	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	67.2	45.5	24.0	5.9	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	65.0	47.2	25.5	7.5	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	66.3	46.3	23.2	6.4	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	67.1	43.2	24.5	5.8	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	65.2	44.5	25.5	7.5	25.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.23 – AAQ 6 - ARASAPATTI

Period: Dec 2022 – Feb 2023

Location: AAQ6 – Arasapatti

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	62.3	44.5	20.2	6.0	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	63.1	45.3	23.2	7.2	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	64.5	46.1	22.4	6.3	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	65.2	45.0	20.2	7.2	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	63.0	44.2	21.3	6.0	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	65.5	46.3	23.4	7.2	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	63.2	46.0	22.5	6.4	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	62.2	44.2	21.0	7.3	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	61.0	45.3	23.2	6.5	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	62.5	46.1	22.1	7.1	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	63.4	44.8	23.5	6.8	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	65.0	45.2	21.0	7.2	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	64.1	46.3	22.3	6.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	63.0	44.1	23.4	7.4	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	65.2	46.0	22.4	6.2	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	60.2	44.0	23.5	7.1	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	61.2	45.2	20.3	6.3	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	62.3	46.8	22.4	7.3	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	64.5	45.2	23.5	6.8	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	65.5	44.2	20.3	7.0	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	63.2	46.3	21.5	6.2	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	64.2	44.0	23.5	7.3	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	65.5	46.2	22.1	6.4	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	62.2	45.5	23.1	7.2	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	63.1	46.3	20.1	6.2	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	65.5	45.2	22.3	7.3	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.24 – AAQ7 – Kombadi

Period: Dec 2022 – Feb 2023

Location: AAQ7– Kombadi

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	63.2	41.2	22.5	6.6	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	64.3	42.3	21.2	7.2	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	66.0	43.5	23.5	6.4	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	67.2	42.5	21.4	7.3	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	63.0	43.0	22.0	6.0	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	64.2	41.5	21.3	7.2	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	66.5	42.3	22.4	6.3	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	67.0	42.0	21.0	7.4	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	63.0	43.8	22.4	6.1	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	65.2	44.5	20.3	7.2	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	64.2	45.2	22.1	6.3	25.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	62.0	42.1	21.0	7.5	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	63.0	43.3	22.4	6.4	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	64.5	44.6	20.3	7.8	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	65.0	45.3	22.6	6.3	21.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	66.2	42.5	21.3	7.2	23.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	64.0	43.0	20.5	6.4	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	65.0	45.1	21.6	7.0	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	66.3	43.2	22.3	6.8	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	63.3	44.5	23.5	7.2	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	65.2	43.6	22.0	6.3	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	66.4	45.6	23.5	7.2	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	67.2	42.3	23.8	6.4	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	65.2	43.1	21.2	7.5	25.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	64.3	44.8	23.0	6.3	24.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	65.0	43.6	23.4	7.6	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.25 – AAQ8 – T.KOKULAM

Period: Dec 2022 – Feb 2023

Location: AAQ8– T.Kokulam

Sampling Time: 24-hourly

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	60	100	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period.hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.12.2022	7:00-7:00	65.0	42.3	20.2	5.5	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.12.2022	7:15-7:15	63.2	43.1	21.3	6.2	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.12.2022	7:00-7:00	64.2	44.5	23.4	7.3	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.12.2022	7:15-7:15	66.5	45.2	22.4	8.2	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19.12.2022	7:00-7:00	67.3	46.2	20.3	6.0	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.12.2022	7:15-7:15	68.2	44.0	21.5	7.2	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26.12.2022	7:00-7:00	65.2	42.3	22.3	8.8	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.12.2022	7:15-7:15	66.3	43.1	23.4	6.2	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.01.2023	7:00-7:00	64.0	44.5	23.0	7.4	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.01.2023	7:15-7:15	66.0	46.3	21.2	8.3	26.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.01.2023	7:00-7:00	67.3	44.2	22.5	5.5	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.01.2023	7:15-7:15	68.2	43.1	23.5	6.3	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16.01.2023	7:00-7:00	65.2	44.5	21.0	8.2	26.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.01.2023	7:15-7:15	66.3	46.0	23.8	7.0	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.01.2023	7:00-7:00	67.4	42.1	22.5	6.3	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.01.2023	7:15-7:15	68.2	43.5	21.6	7.1	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30.01.2023	7:00-7:00	65.3	45.2	23.5	8.2	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.01.2023	7:15-7:15	67.8	46.1	22.4	5.2	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.02.2023	7:00-7:00	68.0	42.1	21.6	6.3	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.02.2023	7:15-7:15	64.3	43.1	23.5	7.4	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.02.2023	7:00-7:00	66.9	44.5	21.8	8.2	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.02.2023	7:15-7:15	67.2	45.6	22.6	6.3	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.02.2023	7:00-7:00	68.3	46.0	23.8	5.0	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.02.2023	7:15-7:15	64.2	44.1	24.5	6.4	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.02.2023	7:00-7:00	65.5	45.2	23.6	8.2	26.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.02.2023	7:15-7:15	66.0	46.3	22.1	7.3	27.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ;DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

TABLE 3.26: SUMMARY OF AAQ

PM2.5	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Arithmetic Mean	22.1	22.3	22.3	22.1	23.1	22.1	22.0	22.4
Minimum	20.2	20.2	20.1	20.0	20.2	20.1	20.2	20.2
Maximum	23.5	23.6	23.6	23.6	25.5	23.5	23.8	24.5
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

PM10	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Arithmetic Mean	45.0	39.1	41.5	44.9	45.6	45.3	43.4	44.4
Minimum	42.0	35.3	38.2	42.1	42.3	44.0	41.2	42.1
Maximum	47.3	41.7	43.5	48.2	47.6	46.8	45.6	46.3
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Arithmetic Mean	7.0	6.9	6.5	5.8	7.0	6.8	6.8	6.9
Minimum	5.0	5.5	5.0	5.0	5.8	6.0	6.0	5.0
Maximum	8.5	8.2	8.8	6.8	8.0	7.4	7.8	8.8
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0

NO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Arithmetic Mean	24.3	24.3	24.4	24.2	22.7	24.2	23.8	24.7
Minimum	23.0	23.0	23.0	23.0	19.1	22.1	21.0	22.6
Maximum	25.6	25.6	25.8	25.5	25.8	25.3	25.8	27.3
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0

TABLE 3.27 – ABSTRACT OF AMBIENT AIR QUALITY DATA

1	Parameter	PM2.5	PM10	SO₂	NO₂
2	No. of Observations	260	260	260	260
3	10 th Percentile Value	39.3	20.4	5.5	23.0
4	20 th Percentile Value	41.6	21.2	6.1	23.1
5	30 th Percentile Value	42.5	21.5	6.3	23.5
6	40 th Percentile Value	43.2	22.2	6.3	24.0

7	50 th Percentile Value	44.2	22.4	6.6	24.1
8	60 th Percentile Value	44.8	22.5	7.1	24.5
9	70 th Percentile Value	45.2	23.2	7.3	25.0
10	80 th Percentile Value	46.0	23.5	7.4	25.2
11	90 th Percentile Value	46.3	23.6	7.9	25.5
12	95 th Percentile Value	47.1	23.8	8.2	25.6
13	98 th Percentile Value	47.3	25.5	8.5	26.4
14	Arithmetic Mean	44.3	22.7	7.0	24.5
15	Geometric Mean	44.3	22.7	7.0	24.5
16	Standard Deviation	2.5	1.4	0.9	1.1
17	Minimum	39.3	20.4	5.5	23.0
18	Maximum	47.3	25.5	8.5	26.4
19	NAAQ Norms*	100.0	60.0	80.0	80.0
	% Values exceeding Norms*	0.0	0.0	0.0	0.0

Legend: PM_{2.5}-Particulate Matter size less than 2.5 µm; PM₁₀-Respirable Particulate Matter size less than 10 µm; SO₂-Sulphur dioxide; NO₂-Nitrogen Dioxide; CO-Carbon monoxide; O₃-Ozone; NH₃-Ammonia; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C₆H₆-Benzene & BaP- Benzo (a) pyrene in particulate phase levels were monitored below their respective detectable limits.

* NAAQ Norms-National Ambient Air Quality Norms-Revised as per GSR 826(E) dated 16.11.2009 for Industrial, Residential, Rural and other Area.

FIGURE 3.14: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ 8

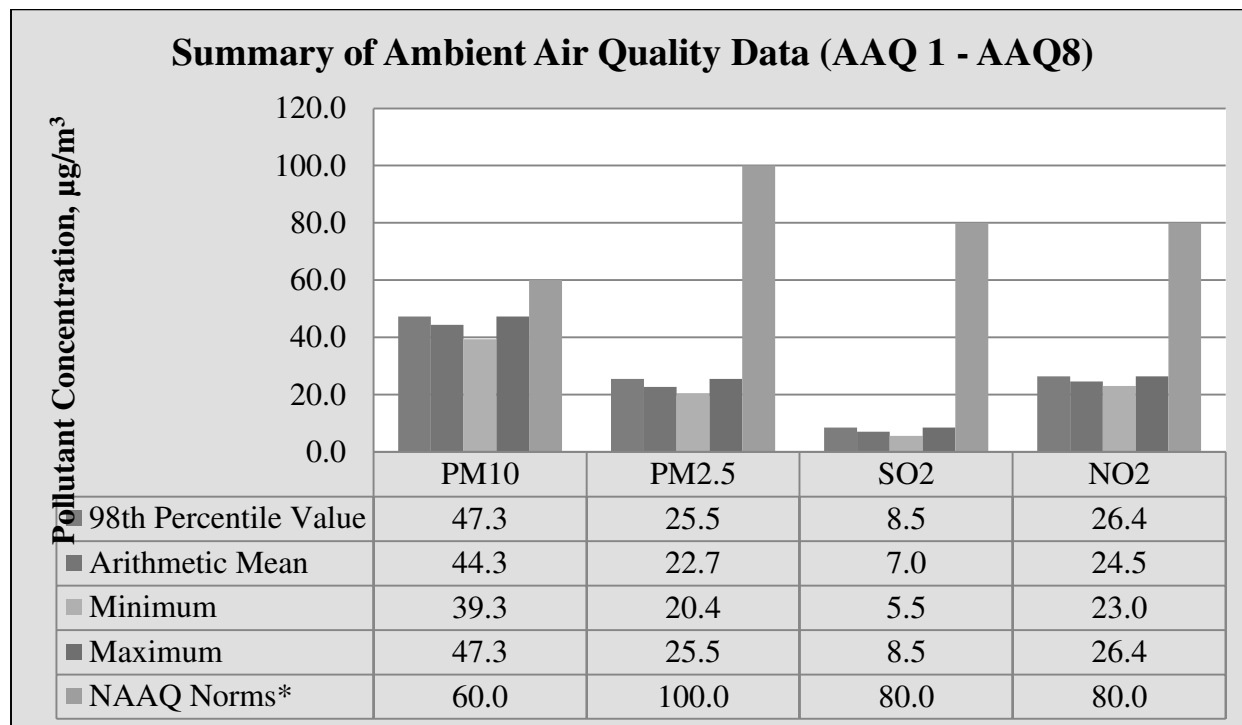


FIGURE 3.15: BAR DIAGRAM OF PARTICULATE MATTER (PM₁₀)

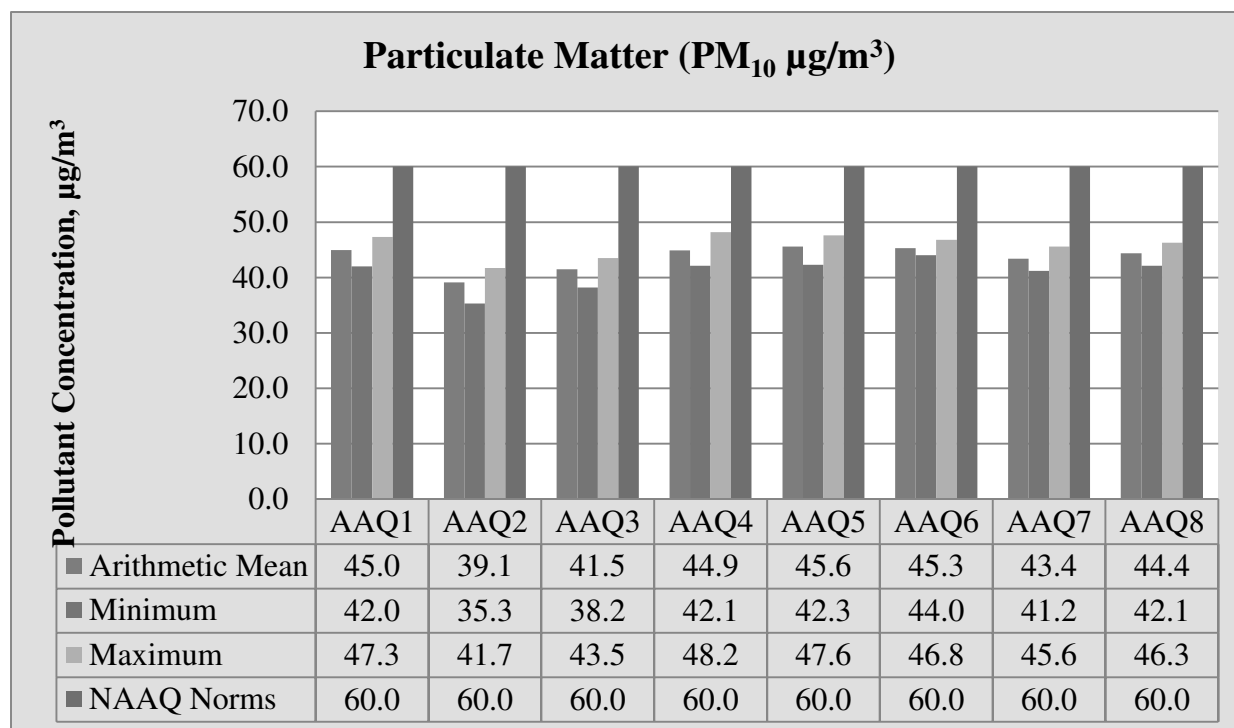


FIGURE 3.16: BAR DIAGRAM OF PARTICULATE MATTER (PM_{2.5})

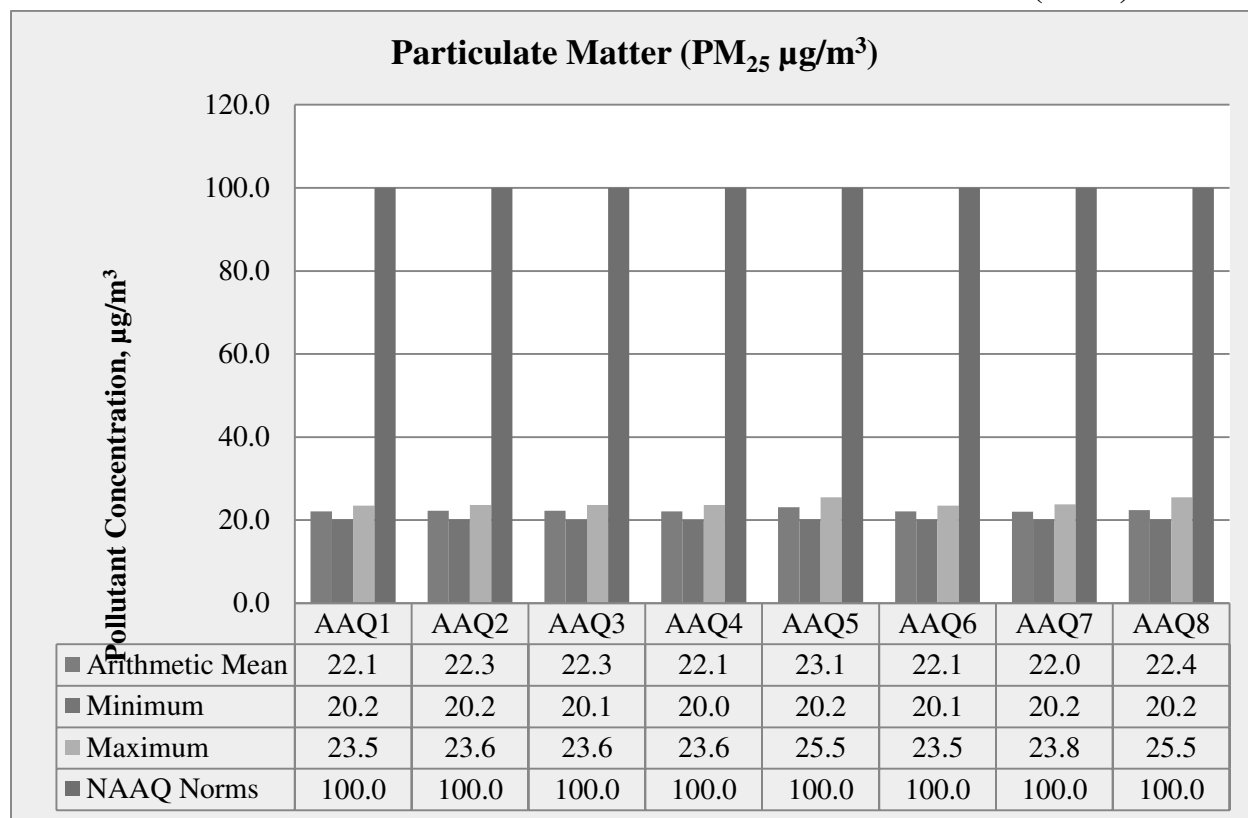


FIGURE 3.17: BAR DIAGRAM OF PARTICULATE MATTER (SO₂)

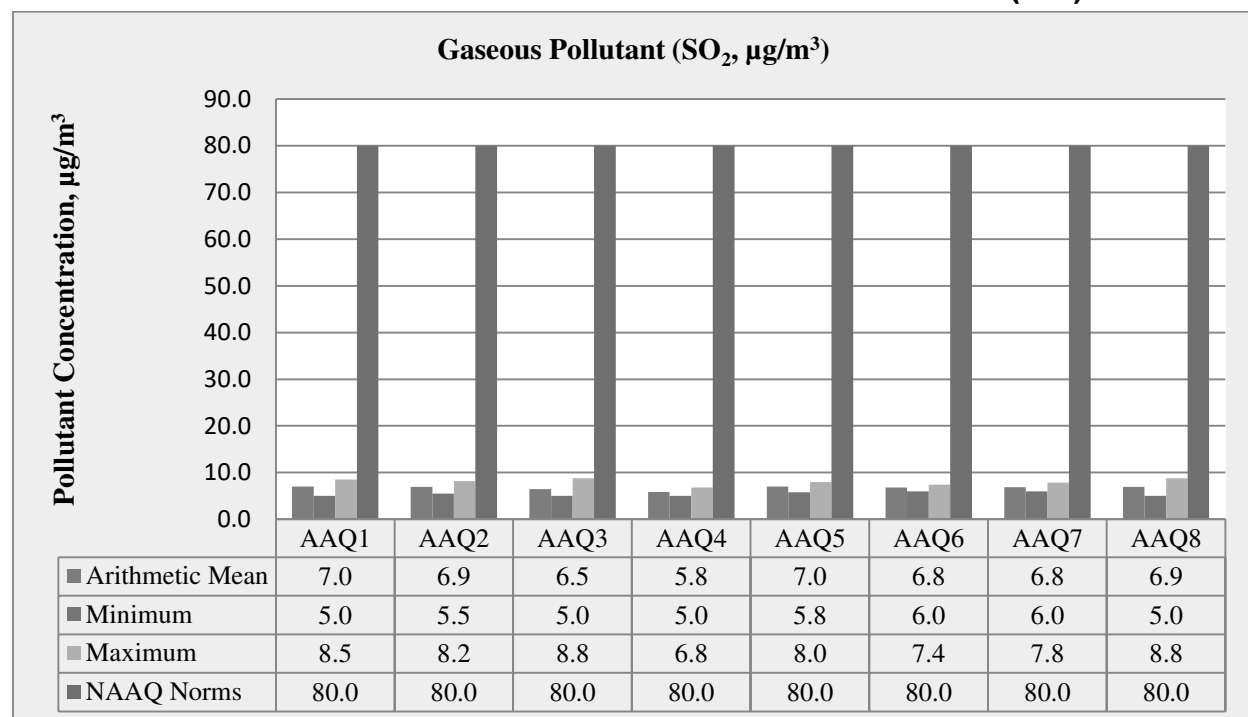
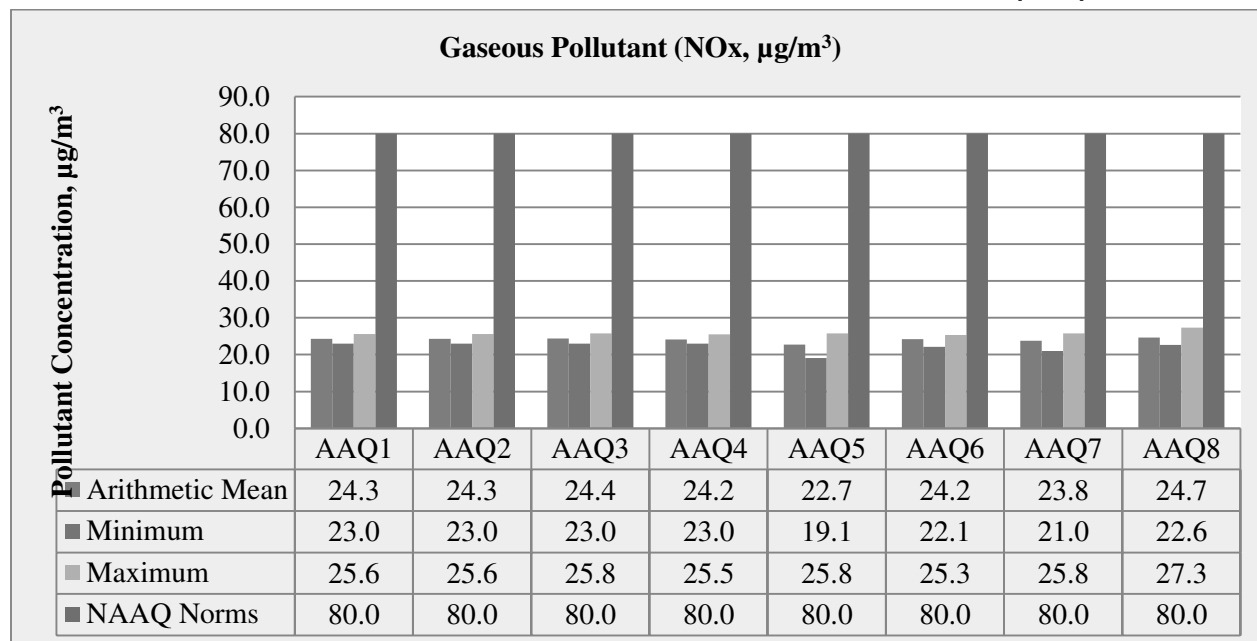


FIGURE 3.18 : BAR DIAGRAM OF PARTICULATE MATTER (NO₂)

3.3.6 Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 35.3 µg/m³ to 48.2 µg/m³, PM_{2.5} data ranges from 20 µg/m³ to 25.5 µg/m³, SO₂ ranges from 5.0 µg/m³ to 8.8 µg/m³ and NO₂ data ranges from 19.1 µg/m³ to 27.3 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.3.7 FUGITIVE DUST EMISSION

Fugitive dust was recorded at 8 AAQ monitoring stations for 30 days average during the study period.

TABLE 3.28– AVERAGE FUGITIVE DUST SAMPLE VALUES IN µg/m³

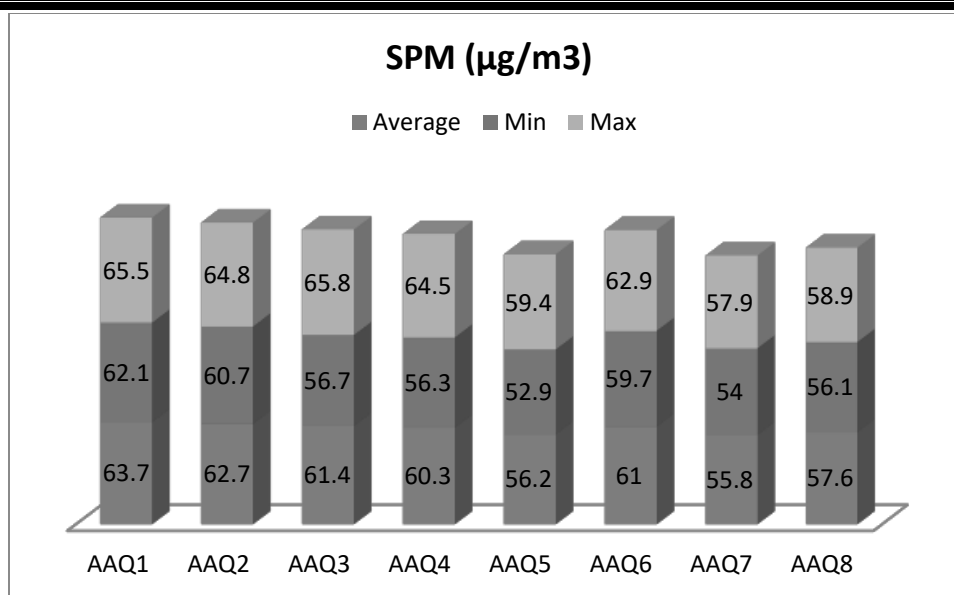
AAQ Locations	Avg SPM (µg/m ³)
AAQ 1	67.3
AAQ 2	68.2
AAQ 3	66.9
AAQ 4	63.6
AAQ 5	65.7
AAQ 6	66
AAQ 7	66.7
AAQ 8	66.7

Source: EHS360 lab.

TABLE 3.29– FUGITIVE DUST SAMPLE VALUES IN µg/m³

SPM (µg/m ³)	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Average	67.3	68.2	66.9	63.6	65.7	66.0	66.7	66.7
Min	65.7	65.3	60.1	62.1	62.3	63.1	63.6	65.3
Max	69.2	69.9	69.7	64.8	69.3	76.4	69.7	68.2

Source: Calculations from Lab Analysis Reports



Source: Bar Diagram of table 3.30

3.4 Noise Environment

The vehicular movement on road and mining activities is the major sources of noise in study area, the environmental assessment of noise from the mining activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses.

The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at eight (8) locations. The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that it best suited the purpose and objectives of the study.

TABLE 3.30 – DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Core Zone	Project Area	9°46'5.75"N 78° 2'31.83"E
2	N-2	Valayankulam	1.2km NW	9°46'22.36"N 78° 1'56.17"E
3	N-3	Koodakovil	3.6km SE	9°45'59.91"N 78° 4'36.93"E
4	N-4	Vidathakulam	4.3km NW	9°48'25.44"N 78° 1'56.64"E
5	N-5	Melakottai	6.3km NW	9°47'34.04"N 77°59'20.50"E
6	N-6	Arasapatti	3.8km SW	9°45'8.69"N 78° 0'34.84"E
7	N-7	Kombadi	4.2km NE	9°47'53.50"N 78° 3'55.45"E
8	N-8	T.Kokulam	3.5km SE	9°44'25.76"N 78° 3'19.03"E

Source: On-site monitoring/sampling by EHS360 lab with GEMS

FIGURE 3.19: SITE PHOTOGRAPHS OF NOISE MONITORING IN CLUSTER

3.4.2 Method of Monitoring

Digital Sound Level Meter was used for the study. All reading was taken on the 'A-Weighting' frequency network, at a height of 1.5 meters from ground level. The sound level meter does not give a steady and consistent reading and it is quite difficult to assess the actual sound level over the entire monitoring period. To mitigate this shortcoming, the Continuous Equivalent Sound level, indicated by Leq, is used. Equivalent sound level, 'Leq', can be obtained from variable sound pressure level, 'L', over a time period by using following equation.

$$Leq = 10 \text{ Log } L / T \sum (10L_n/10)$$

Where L = Sound pressure level at function of time dB (A)

T = Time interval of observation

3.4.3 Analysis of Ambient Noise Level in the Study Area

An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.6

Day time : 6:00 hours to 22.00 hours.

Night time : 22:00 hours to 6.00 hours

TABLE 3.31 – NOISE MONITORING RESULTS IN CORE AND BUFFER ZONE

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Core Zone	42.6	34.2	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
2	Valayankulam	41.9	35.4	
3	Koodakovil	39.2	35.7	Residential Day Time– 55 dB (A)
4	Vidathakulam	38.4	31.0	

5	Melakottai	37.1	35.3	Night Time- 45 dB (A)
6	Arasapatti	41.4	37.0	
7	Kombadi	36.1	34.2	
8	T.Kokulam	37.8	35.8	

Source: On-site monitoring/sampling by EHS 360 lab in association with GEMS

FIGURE 3.20: NOISE MONITORING STATIONS AROUND 10 KM RADIUS

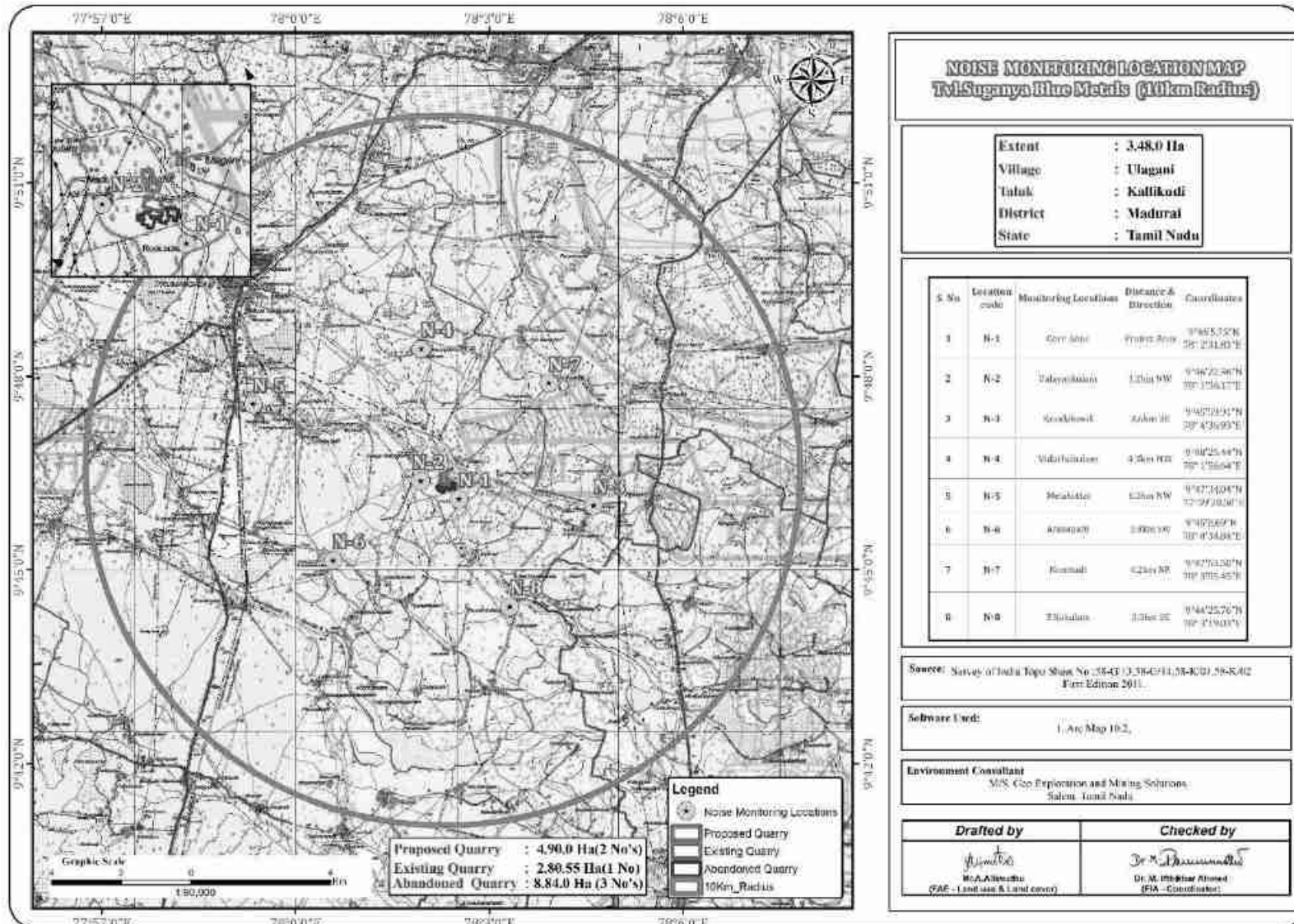
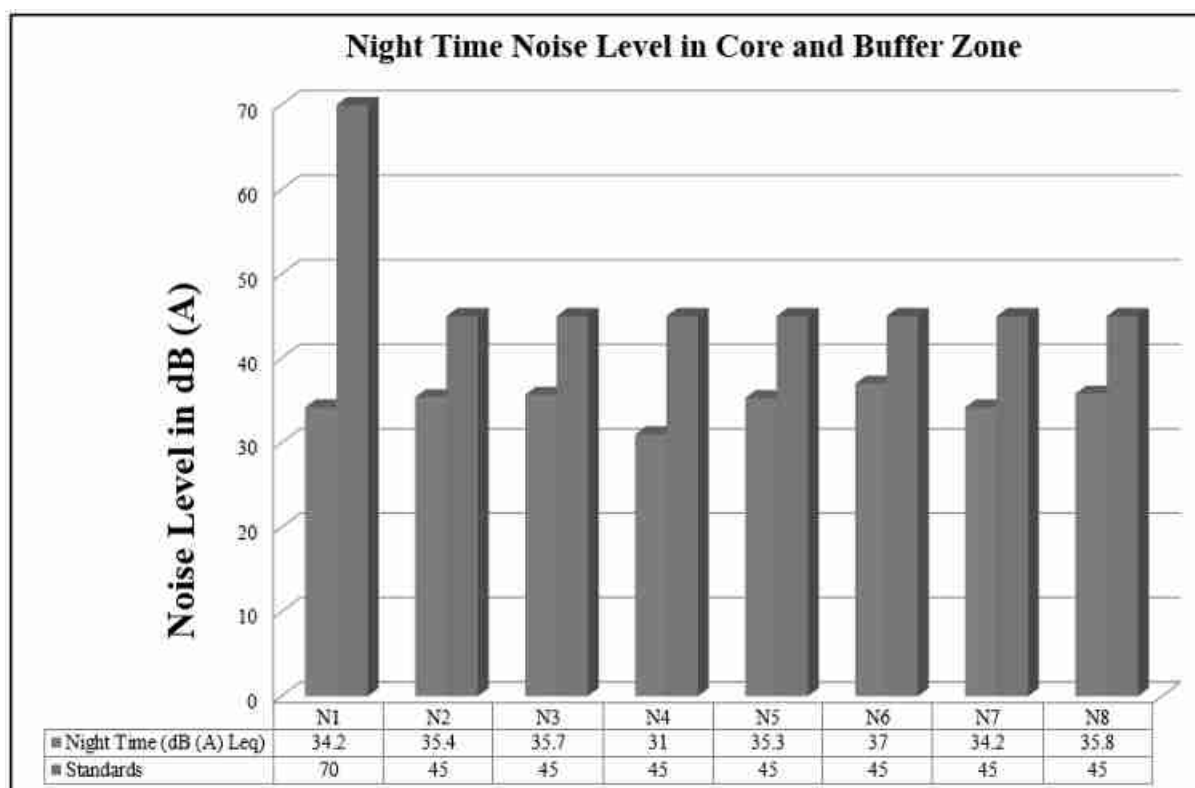
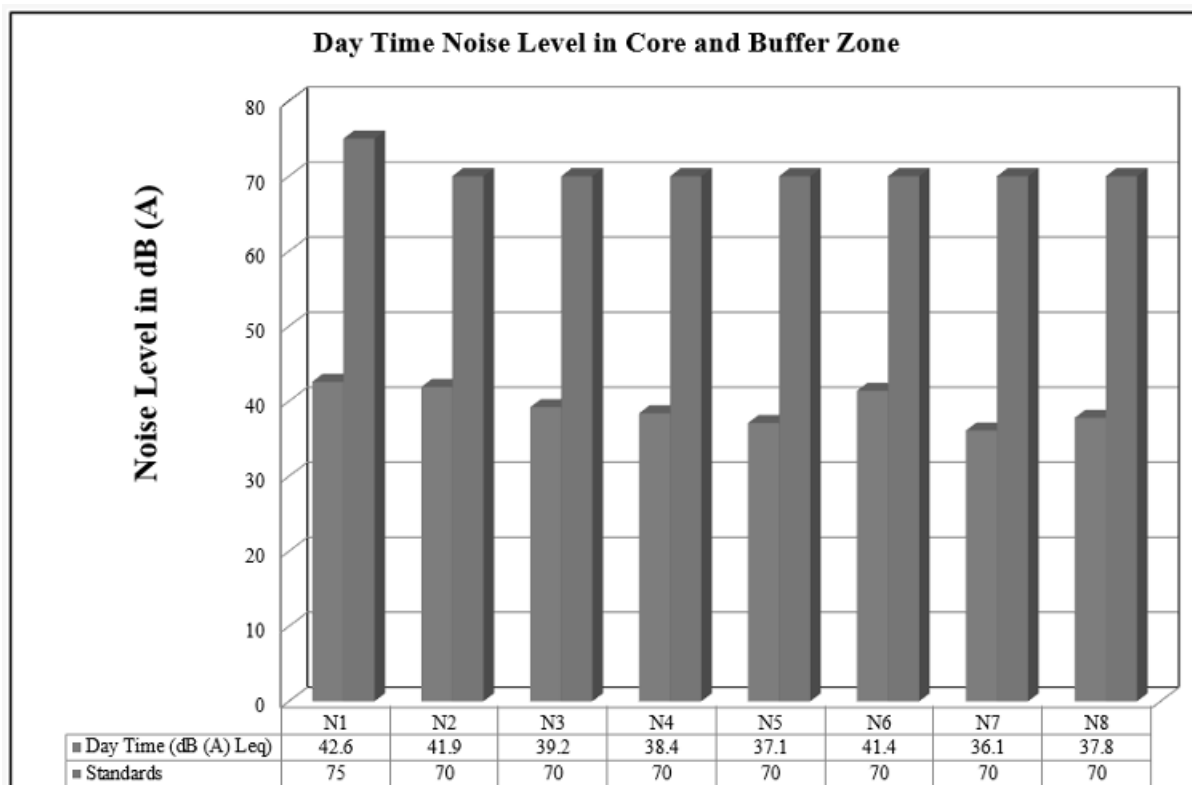


FIGURE 3.21: DAY & NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE



3.4.4 Interpretation & Conclusion:

Ambient noise levels were measured at 8 (eight) locations around the project area considering cluster quarries. Noise levels recorded in core zone during day time were from 42.6 dB (A) Leq and during night time were from 34.2 (A) Leq. Noise levels recorded in buffer zone during day time were from 37.1 – 41.9 dB (A) Leq and during night time were from 31– 37 dB (A) Leq.

3.5. Biological Environment

3.5.1. Study area Ecology

In this project, the total area of the Cluster within 10km radius from the periphery of this quarry is reported as **7.70.55 Ha**. In such a Cluster situation, a common Ecology and Biodiversity study for the entire cluster of quarries is enough to capture all the possible externalities. The common EIA/EMP data can be used for all quarries that fall under this cluster but the present work was carried out on the detailed study of the impacts of Ulagani Village Rough stone quarry on the ecology and biodiversity of the core lease area with the proper mitigation and sustainable management plan. The proposed mine lease area exhibits plain terrain. The following methods were applied during the baseline study of flora, fauna and diversity assessment.

3.5.2. Objectives of Biological Studies

- a) Identification and listing of flora and fauna which are important as per the Wildlife (Protection) Act 1972.
- b) Suggest Wildlife conservation (species specific/habitat specific) and management plan for the threatened (critically endangered & endangered species - schedule I) faunal species if any reported within the study area.
- c) To identify the impacts of mining on agricultural lands and how it affects.
- d) Proper collection of information about wildlife Sanctuaries/ national parks/ biosphere reserves of the project area.
- e) Devise management & conservation measures for biodiversity.

3.5.3. Methodology of Sampling

Identification of vegetation in relation to the natural flora and crops was conducted through reconnaissance field surveys and onsite observations in core and buffer zone. The plant species identification was done based on the reference materials and also by examining the morphological characteristics and reproductive materials i.e. flowers, fruits and seeds. Land use pattern in relation to agriculture crop varieties were identified through physical verification of land and interaction with local villagers.

The faunal elements (animal species) of core and buffer zone were identified by direct sightings or indirect evidences viz. pug marks, skeletal remains, scats and droppings etc. (Jayson and Easa 2004). Standard binocular was used for the observations. The authenticity of faunal elements occurrence was confirmed by interaction with the local people. Avifauna identification was done with pictorial descriptions of published literature. Information pertaining to existence of any migratory corridors and paths were obtained from local inhabitants. The status of each faunal element was determined and wildlife schedule category was ascertained as per the IUCN-Red Data Book and Indian wildlife (Protection) Act, 1972.

Plot method is used in the floral documentation in the core and buffer zone. For trees (10x10-m), shrubs (5x5-m) and herbs (1x1-m) plots were taken. Birds and butterflies were mainly focused during faunal assessment,

transect method was employed for birds and butterflies. Transect is a path along which one counts and records the occurrence of an individual for study. A straight-line walk covering desired distance, within a time span of one hour to 30 minutes was carried out in the proposed region. Bird species were recorded during the hours of peak activity. 0700 to 1100 Hrs and 1430 to 1730 Hrs (Bibby et al. 2000).

Direct observations and bird calls were used for bird documentation. Same transects were used for counting butterflies. Opportunistic observations were made for Amphibians, reptiles and ordinales. Presence of mammals was recorded by direct and indirect signs. All possible transects were taken for birds and butterflies. Birds and butterflies were classified into species level. Recorded bird species were identified to species level using standard books (Ali & Ripley 1987, Grimmett et al., 2016).

A). Sampling

A stratified simple random sampling procedure was employed to obtain a sample from study area. The study area was further stratified in different land use/ecosystems.

B) Sampling Size

Keeping in mind both random sampling technique and covering all land use patterns for the study following sampling locations were chosen depending up on the area of the proposed site.

C) Timing of Study

The study was carried out during morning and evening hours, to cover the different activity phases for important species such as time resting, feeding, hunting, and daily movements.

3.5.4 Observations from Sampling

The various observations relating to flora and fauna species are discussed in detail below, in separate sections.

3.5.5 Equipment/ References

- Canon Mark III Camera with 50-500mm lens– Snap shots taken
- Leica Binoculars (8x 20) to spot/identify species
- IUCN Red Data Book – <https://www.iucnredlist.org/species>

Ornithological/Entomological/Herpetological/Mammalian catalogues and pictorial descriptions from various authors and websites are followed for species identification.

3.5.6 Part I Field Sampling Techniques

3.5.6.1 Transect walk – Birds

Six nos of transect lines with varying length (100m-300m) and fixed width (2m) were laid which cuts through the core and buffer areas of proposed site. The transect surveys were conducted from 0700 to 1100Hrs and 1430 to 1730Hrs (Bibby et al. 2000). All avifauna found along these transects were recorded for analysing the data. Counts were conducted while there is no heavy rain, mist or strong wind.

3.5.6.2 Modified Pollard Walk – for Butterflies

The Modified Pollard Walk (Pollard 1977, 1993, Walpole 1999) using fixed width transect walk method were employed to investigate butterfly spatial distribution, diversity and abundance at the different survey sites.

3.5.6.3 Visual Encounter Survey (VES) - reptiles and amphibians

VES is a time-constrained sampling technique (Campbell and Christman, 1982; Corn and Bury, 1990). It needs a systematic search through an area or habitat for a prescribed time period (Campbell and Christman, 1982). The result of VES is measured against the time spent for search. VES technique is one of the simplest methods, and an appropriate technique for both inventory and monitoring Herpetofauna (Heyer et al. 1994).

3.5.6.4 Observational methods- Mammals

For the purpose of recording mammals, we used two different observational techniques: (1) direct observations, and (2) recording of occurrences like holes, markings, scats, hairs, and spines (Menon 2003). For identification confirmations, photographs with a scale reference were used, and locations were recorded using a portable GPS device. Indigenous knowledge particularly that of the locals, was occasionally employed to compile a preliminary list of species and/or aid in the recognition of indicators.

3.5.6.5 Multiple Stage Quadrat – Vegetation

A variety of habitat or vegetation structure variables were measured using the Multiple Stage Quadrat sampling protocol (Sykes and Horrill 1977). All of those areas were sampled, and the major corners were temporarily delineated with coloured ribbons. Each site was identified in the field using a compass and clinometer, and the plot's latitude, longitude, and elevation were recorded using a handheld Global Positioning System (Garmin 12XL).

3.5.6.6 Flora

The quadrat sampling technique was used for sampling vegetation. Sampling quadrats of the regular shape of dimensions 10 × 10 m, 5 × 5 m, and 1 × 1 m, were nested within each other and were defined as the units for sampling the area and measuring the diversity of trees, Shrubs and herbs respectively.

Table No: 3.32. Flora in the Core zone of lease area

SI.No	English Name	Vernacular Name	Scientific Name	Family Name
Trees				
1.	Neem or Indian lilac	Vembu maram	<i>Azadirachta indica</i>	Meliaceae
2.	Velvet mesquite	Mullu maram	<i>Prosopis juliflora</i>	Fabaceae
3.	Gum arabic tree	Karuvelam	<i>Vachellia nilotica</i>	Fabaceae
4.	Portia tree	Poovarasam	<i>Thespesia Populnea</i>	Malvaceae
5.	Indian mulberry	Nuna maram	<i>Morinda tinctoria</i>	Rubiaceae
Shrubs				
6.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae
7.	Indian mallow	Thuthi	<i>Abutilon indicum</i>	Meliaceae
Herbs				
8.	Indian nettle	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae
9.	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae
10.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
11.	Goatweed	Kallurukki	<i>Scoparia dulcis</i>	Plantaginaceae
12.	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae
13.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae
Climber/ Creepers				
14.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae
15.	Wild water lemon	Sirupunaikkali	<i>Passiflora foetida</i>	Passifloraceae
16.	Wild Bitter gourd	Pavakkai	<i>Momordica charantia</i>	Cucurbitaceae
Grasses				
17.	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae
18.	Nut grass	Korai	<i>Cyperus rotandus</i>	Poaceae
19.	Great brome	Thodappam	<i>Bromus diandrus</i>	Poaceae
20.	Sedges	Korai Pul	<i>Carex solandri</i>	Cyperaceae

3.5.7 Flora's Composition of the Core Zone

Taxonomically a total of 20 species have been recorded from the core mining lease area. Based on the habitat classification of the enumerated plants the majority of species were Herbs 6 followed by Trees 5, Grasses 4, Climber/Creepers 3, and Shrubs 2. A baseline study of cluster area showed low species richness because lease area is the plain topography dry area and it is the existing quarry. The result of the core zone of flora studies shows that Fabaceae and Poaceae, Lamiaceae are the main dominating species in the study area mentioned in Table No.3.32 No species were found in the threatened category.



a. Prosopis juliflora



b. Azadirachta indica



c. Morinda tinctoria



d. Cyperus rotandus



e. Abutilon indicum



f. Thespesia Populnea

Fig No: 3.22 Flora species observation in the Core zone area

Table No: 3.33 Flora in the Buffer zone of the Cluster study area.

SI.No	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type *(E,M,EM)
Trees					
1.	Neem or Indian lilac	Vembu	<i>Azadirachta indica</i>	Meliaceae	M
2.	Common fig	Athi Maram	<i>Ficus Carica</i>	Anacardiaceae	EM
3.	Frywood	Vaagai	<i>Albizia lebbek</i>	Mimosaceae	M
4.	Indian plum	Elanthai maram	<i>Ziziphus mauritiana</i>	Rhamnaceae	EM
5.	Mango	Manga	<i>Mangifera indica</i>	Anacardiaceae	E
6.	Oil cake tree	Wunja	<i>Albizia amara</i>	Fabaceae	M
7.	Chinaberry	Malai vembu	<i>Melia azedarach L</i>	Meliaceae	M
8.	Velvet mesquite	Mullu maram	<i>Prosopis juliflora</i>	Fabaceae	M
9.	Indian rosewood	Shisham	<i>Dalbergia sissoo</i>	Fabales	M
10.	Madras thorn	Kudukapuli	<i>Pithecellobium dulce</i>	Fabaceae	EM
11.	Portia tree	Poovarasam	<i>Thespesia Populnea</i>	Malvaceae	E
12.	Royal poinciana	Cemmayir Konra	<i>Delonix regia</i>	Fabaceae	M
13.	Lemon	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	EM
14.	Jamun Fruit Plant	Naval maram	<i>Syzygium cumini</i>	Myrtaceae	EM
15.	Gum arabic tree	Karuvelam	<i>Vachellia nilotica</i>	Fabaceae	E
16.	Kassod Tree	ManjalKonrai	<i>Cassia siamea</i>	Fabaceae	M
17.	Asian Palmyra palm	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	E
18.	Bamboo	Moongil	<i>Bambusoideae</i>	Poaceae	E
19.	Teak	Thekku	<i>Tectona grandis</i>	Verbenaceae	E
20.	Indian mulberry	Nuna maram	<i>Morinda tinctoria</i>	Rubiaceae	E
21.	Banyan	Alai	<i>Ficus benghalensis</i>	Moraceae	E
22.	Cashew	Munthiri	<i>Anacardium occidentale</i>	Anacardiaceae	EM
23.	Coconut	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	EM
24.	Horsetail She-oak	Savukku maram	<i>Casuarina equisetifolia</i>	Casuarinaceae	E
25.	Eucalyptus	Thailam maram	<i>Eucalyptus tereticornis</i>	Myrtaceae	M
26.	Creamy peacock flower	Perungondrai	<i>Delonix elata</i>	Fabaceae	M
27.	Pongamia pinnata	Pongam	<i>Millettia pinnata</i>	Fabaceae	M
28.	Indian bael	Vilvam	<i>Aegle marmelos</i>	Rutaceae	E
29.	Indian gooseberry	Nelli	<i>Phyllanthus emblica</i>	Phyllanthaceae	EM
30.	Guava	Koyya	<i>Psidium guajava</i>	Myrtaceae	EM

31.	Tamarind	Puliyamaram	<i>Tamarindus indica</i>	Legumes	EM
32.	Drumstick tree	Murunga maram	<i>Moringa oleifera</i>	Moringaceae	EM
33.	Sugar apple	Sitapalam	<i>Annona squamosal</i>	Annonaceae	EM
34.	Papaya	Pappali maram	<i>Carica papaya L</i>	Caricaceae	EM
35.	Banana tree	Vazhaimaram	<i>Musa acuminata</i>	Musaceae	EM
36.	Jack fruit	Palamaram	<i>Artocarpus heterophyllus</i>	Moraceae	E
Shrubs					
1.	Solanum pubescens	Malaisundai	<i>Solanum pubescens Willd</i>	Solanaceae	M
2.	Bellyache bush	Kaatamanaku	<i>Jatropagossypifolia</i>	Euphorbiaceae	M
3.	Stachytarpheta urticifolia	Rat tai	<i>Stachytarpheaurticifolia</i>	Verbenaceae	M
4.	Devil's trumpet	Umathai	<i>Datura metel</i>	Solanaceae	EM
5.	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae	M
6.	Indian mallow	Thuthi	<i>Abutilon indicum</i>	Meliaceae	M
7.	Bush Morning Glory	Neiveli Kattamani	<i>Ipomoea carnea</i>	Convolvulaceae	E
8.	Castor bean	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	M
9.	Shoe flower	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	EM
10.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	M
11.	Touch-me-not	Thottalchinungi	<i>Mimosa pudica</i>	Mimosaceae	M
12.	Indian mallow	Maanikham	<i>Abutilon indicum</i>	Meliaceae	M
13.	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae	EM
14.	Indian Oleander	Arali	<i>Nerium indicum</i>	Apocynaceae	M
15.	West Indian Lantana	Unni chedi	<i>Lantana camara</i>	Verbenaceae	E
Herbs					
1.	Purple pitcher plant	Kavali	<i>Tephrosia purpurea</i>	Fabaceae	M
2.	Chamber bitter	Malai Kizhanelli	<i>Phyllanthus urinaria L.</i>	Euphorbiaceae	M
3.	Carrot grass	Vishapoond	<i>Parthenium hysterophorus</i>	Asteraceae	NE
4.	Billygoat weed	Pumpillu	<i>Ageratum conyzoides</i>	Asteraceae	M
5.	Aloe barbadensis	Katrazhai	<i>Aloe vera</i>	Asphodelaceae	EM
6.	Indian Mercury	Kuppamani	<i>Acalypha indica</i>	Euphorbiaceae	EM
7.	Indian nettle	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	M
8.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae	E
9.	Cleome viscosa	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	M
10.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae	M
11.	Asthma-plant	Amman pacharisi	<i>Euphorbia hirta</i>	Euphorbiaceae	M
12.	Poor land flatsedg	Kunnakora	<i>Cyperus compressus</i>	Cyperaceae	NE

13.	Indian mint	Karpura valli	<i>Coleus amboinicus</i>	Lamiaceae	M
14.	Europeanblack nightshade	Manathakkali	<i>Solanumnigrum</i>	Solanaceae	M
15.	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	M
16.	Bright eyes	Nithiyakalyani	<i>Catharanthus roseus</i>	Apocynaceae	M
17.	Tridax daisy	Thatha poo	<i>Tridax procumbens</i>	Asteraceae	M
18.	Gale of the wind	Keelaneeli	<i>Phyllanthus niruri</i>	Phyllanthaceae	EM
Climber/ Creepers					
1.	Ivy gourd	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	M
2.	Bitter apple	Peikkumatti	<i>Citrullus colocynthis</i>	Cucurbitaceae	M
3.	Wild water lemon	Poonai puduku chedi	<i>Passiflora foetida</i>	Passifloraceae	M
4.	Bitter apple	Peikkumatti	<i>Citrullus colocynthis</i>	Cucurbitaceae	M
5.	Butterfly pea	Sangu poo	<i>Clitoria ternatea</i>	Fabaceae	M
6.	Rosary Pea	Gundumani	<i>Abrus precatorius</i>	Fabaceae	M
7.	White pumpkin	Poosanaikkaai	Cucurbitaceae	Cucurbitaceae	M
8.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	M
9.	Wild bitter	Pavarkai	<i>Momordica charantia</i>	Cucurbitaceae	M
Grass					
1.	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	E
2.	Windmill grass	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	NE
3.	Great brome	Thodappam	<i>Bromus diandrus</i>	Poaceae	E

**E- Economical, M- Medicinal, EM- Both Economical and Medicinal, NE- Not evaluated.*

3.5.8 Economically important Flora of the study area

Agricultural crops: The main agricultural crops are maize and paddy. The locals also cultivate a variety of vegetables and fruits, including brinjal, drumsticks, onion, and coriander, as well as fruits like banana, papaya, mangoes, and guava.

Medicinal species: Several more medicinal plants commonly found in wastelands are also present in the near area. *Azadirachta indica* (Neem), *Ocimum tenuiflorum* (Holy basil), etc., and others are common medicinal plants in the area.

Rare and endangered floral species: There are no rare or endangered or threatened (RET) species in the study area. During the vegetation survey, there are no species that are endangered or threatened under IUCN (International Union for Conservation of Nature and Natural resources) guidelines.

3.5.9 Flora Composition in the Buffer Zone

Similar habitats may be found in the buffer area as well, although there is a wider variety of plants there than in the core zone area. The buffer zone has some forests located away from the proposed project site and there are 81 species in the buffer zone study area in total, based on records. The floral (81) varieties among them Trees 36, herbs 18, shrubs 15, Climbers/Creepers 9, and Grasses 3 were identified. The result of the buffer zone of flora studies shows that Fabaceae and Cucurbitaceous, Euphorbiaceae is the main dominating species in the study area mentioned in Table No.3.2. There are no impacts due to this mining activity. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Apart from the proposed project area, there is agricultural land. Horticulture and agricultural land are untouched. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. A list of floral species has been prepared based on a primary survey (site observations) and discussion with local people. The total number of different plant life forms under trees, shrubs, herbs, and climbers is shown in Table 3.34 and their % distribution is shown in Figure 3.32

Table 3.34: Number of floral life forms in the Study Area

S. No	Plant Life Form	Number of Species
1	Trees	36
2	Shrubs	15
3	Herbs	18
4	Climber/ Creepers	9
6	Grass	3
Total No. of Species		81

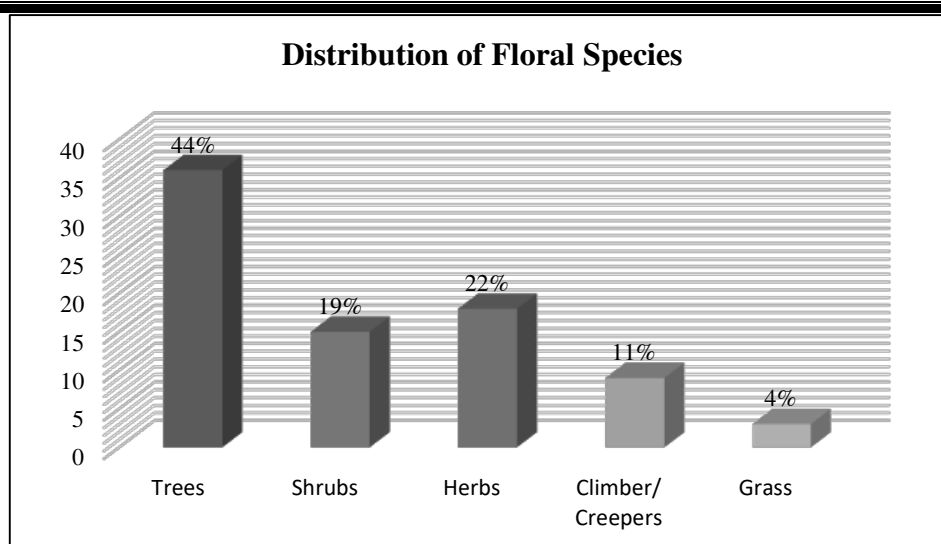


Fig No. 3.23 diagram showing % distribution of floral life forms

3.5.10. The vegetation in the RF / PF areas, ecologically sensitive areas

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves/(existing as well as proposed) within 10 km of the mine lease area. There are no protected forests within the project area. Hence submission of clearance from the National Board of Wildlife does not arise. No Wildlife Sanctuary in the study area. In addition, No Biosphere Reserves, Wildlife corridors, or, Tiger / Elephant reserves within 10 km of the project area. No protected (PF) forests either in the mine lease area or in the buffer zone. Thus, no forest land is involved in any manner.

There are no protected or ecologically sensitive areas such as National parks or Important Bird Areas (IBAs), or Wetlands or migratory routes of fauna or water bodies or human settlements within the proposed mine lease area. There are no Biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thus, the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive. It is away from the proposed project site.

3.5.11 Fauna

3.5.11.1. Fauna Composition in the Core Zone

A total of 24 varieties of species were observed in the Core zone of Ulagani Village, Rough stone quarry (Table No.3.35) among them numbers of Insects 8, Reptiles 3, Mammals 2, and Avian 11. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species according to the Indian Wildlife Act 1972. A total of 11 species of bird were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

Table No: 3.35 Fauna in the Core zone of lase area, rough stone quarry

SI. No	Scientific Name	Common Name	IUCN Red List data
Insects			
1.	Agriansp	Dragonfly	-
2.	Musca domestica	House fly	-
3.	Hieroglyphus sp	Grasshopper	LC
4.	Danaus genutia	Common Tiger	NL
5.	Danaus genutia	Striped Tiger	LC
6.	Danaus chrysippuschrysippus	Plain Tiger	LC
7.	Apisindica	Honey Bee	-
8.	Hamitermes silvestri	Termite	LC
Reptiles			
1.	Calotes versicolor	Garden lizard	LC
2.	Mabuya carinatus	Common skink	LC
3.	Ahaetulla nasuta	Green vine snake	NL
Mammals			
1.	Mus booduga	Indian Field Mouse	NL
2.	Herpestes javanicus	Asian Small Mongoose	LC
Aves			
1.	Acridotheres tristis	Common myna	LC
2.	Laniusexcubitor	Shikra	LC
3.	Corvussplendens	House crow	LC
4.	Eudynamys	Koel	LC
5.	Psittacula krameri	Rose-ringed parakeet	LC
6.	Coturnix coturnix	Common quail	LC
7.	Dicrurus macrocercus	Black drongo	LC
8.	Bubulcus ibis	Cattle egret	LC
9.	Columbidae	Rock pigeon	LC
10.	Saxicoloides fulicata	Indian Robin	LC
11.	Ardeo labacchus	Pond-Heron	LC

*NL- Not listed, LC- Least Concern

(Sources: Species observation in the field study)

3.5.11.2. Fauna Composition in the Buffer Zone

As the animals, especially vertebrates move from place to place in search of food, shelter, mate or other biological needs, separate lists for core and buffer areas are not feasible however, a separate list of fauna pertaining to core and buffer zone are listed separately. Though there are no reserved forest in the buffer zone. As such there are no

chances of occurrence of any rare or endangered or endemic or threatened (REET) species within the core or buffer area.

There are no Sanctuaries, National Parks, Tiger Reserve or Biosphere Reserve or Elephant Corridor or other protected areas within 10 km radius from core area. It is evident from the available records, reports, and circumstantial evidence that the entire study area including the core and buffer areas were free from any endangered animals. There were no resident birds other than common bird species such as, green bee eaters, Indian blue robin, Common Mynas, Black drangos, Crows, Woodpecker bird etc.

The list of bird species recorded during field survey and literature from the study area is given in Table 3.37 The list of reptilian species recorded during field survey and literature from the study area are given in Table 3.38 The list of insect species recorded during field survey and literature from the study area are given in Table 3.39 The list of and List of Butterflies identified from the project site and their conservation status is given in Table No.3.40 It is apparent from the list that none of the species either spotted or reported is included in Schedule I of the Wildlife Protection Act. Similarly, none of them comes under the REET category.

Taxonomically a total of 67 species were identified from the project site. Based on habitat classification the majority of species were Insects 5, followed by birds 25, Reptiles 8, Mammals 6, amphibians 3, and Butterflies 20. A total of 25 species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed. There are no impacts on nearby fauna species.

Dominant species are mostly birds and insects, and three were observed during the extensive field visit *Sphaerotherca breviceps*, *Euphlyctis hexadactylus*, *Bufomelanostictus*, there is no schedule I Species in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

Table 3.36 List of Fauna & Their Conservation Status, Mammals: (*directly sighted animals & Secondary data)

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Funambulus palmarum</i>	Indian palm squirrel	LC
2.	<i>Mus booduga</i>	Indian Field Mouse	LC
3.	<i>Herpestes javanicus</i>	Asian Small Mongoose	LC
4.	<i>Lepus nigricollis</i>	Indian hare	LC
5.	<i>Rattus norvegicus</i>	Brown rat	LC
6.	<i>Lepus nigricollis</i>	Rabbit	LC

Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Table No. 3.37 Listed birds

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Bubulcus ibis</i>	Cattle Egret	LC
2.	<i>Saxicoloidesfulicata</i>	Indian Robin	LC
3.	<i>Streptopeliachinensis</i>	Spotted Dove	LC
4.	<i>Accipiter badius</i>	Shikra	LC
5.	<i>Coraciasbenghalensis</i>	Indian Roller	LC
6.	<i>Dinopiumjavanense</i>	Common Golden-backed Woodpecker	LC
7.	<i>Anthusrufulus</i>	Paddyfield Pipit	LC

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Apis cerana</i>	Indian honey bee	-
2.	<i>Hamitermes silvestri</i>	Termite	LC
3.	<i>Hieroglyphus sp</i>	Grasshopper	LC
4.	<i>Camponotus Vicinus</i>	Ant	NL
5.	<i>Ceratogomphus pictus</i>	Dragonfly	-
8.	<i>Nectarinia minima</i>	Small Sunbird	LC
9.	<i>Acridotherestrictis</i>	Common Myna	LC
10.	<i>Vanellusindicus</i>	Red-wattled Lapwing	-
11.	<i>Dicrurusmacrocercus</i>	Black Drongo	LC
12.	<i>Lonchurapunctulata</i>	Spotted Munia	LC
13.	<i>Dendrocittavagabunda</i>	Indian Treepie	LC
14.	<i>Corvussplendens</i>	House Crow	LC
15.	<i>Eudynamys</i>	Koel	LC
16.	<i>Psittacula krameni</i>	Rose ringed parakeet	LC
17.	<i>Dicrurus macrocercus</i>	Black drongo	LC
18.	<i>Corvus splendens</i>	House crow	LC
19.	<i>Alcedo atthis</i>	Small blue kingfisher	LC
20.	<i>Columba livia</i>	Rock pigeon	LC
21.	<i>Cuculus canorus</i>	Common Cuckoo	LC
22.	<i>Pycnonotus cafer</i>	Red vented Bulbul	LC
23.	<i>Milvus migrans</i>	Black kite	LC
24.	<i>Meropsorientalis</i>	Small Bee-eater	LC
25.	<i>Halcyon smyrnensis</i>	White-breasted Kingfisher	LC

Not Evaluated (NE) Least Concern (LC) Near Threatened (NT) Endangered (E)

Table 3.38 List of Reptiles either spotted or reported from the study area

NT – Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Table 3.39 List of insects either spotted or reported from the study area

SI. No	Scientific Name	Common Name	IUCN Red List data
1.	<i>Calotes versicolor</i>	Oriental garden lizard	LC
2.	<i>Hemidactylus flaviviridis</i>	House lizards	NL
3.	<i>Naja naja</i>	Indian cobra	LC
4.	<i>Vipera russelli</i>	Russell's viper	NL
5.	<i>Ahaetulla nasuta</i>	Green vine snake	LC
6.	<i>Ptyas mucosa</i>	Rat snake	NL
7.	<i>Bungarus caeruleus</i>	Common krait	LC
8.	<i>Mabuya carinatus</i>	Common skink	LC

Table 3.40 List of Butterflies identified from the project site and their conservation status

SI. No	Scientific Name	Common Name	IUCN Conservation Status
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1.	Danaus genutia	Striped Tiger	LC
2.	Danaus chrysippuschrysippus	Plain Tiger	LC
3.	Acraea terpsicore	Tawny Coster	LC
4.	Papiliopolytespolytes	Common Mormon	LC
5.	Papiliopolytesromulus	Common Mormon	LC
6.	Papiliodemoleusdemoleus	Lime Butterfly	LC
7.	Hypolimnasmisippus	DanaidEggfly	LC
8.	Junoniahierta	Yellow Pansy	LC
9.	Junonialemonias	Lemon Pansy	LC
10.	Hypolimnasmisippus	DanaidEggfly	LC
11.	Phalantaphalanthia	Common Leopard	LC
12.	Zizulahlax	Tiny Grass Blue	LC
13.	Catochrysopsstrabo	Forget-Me-Not	LC
14.	Euchrysopsnejeus	Gram Blue	LC
15.	Lampidesboeticus	Pea Blue	LC
16.	Euploea core	Common Crow	LC
17.	Melanitisleda	Common Evening Brown	LC
18.	Jamidescelenoceleno	Common Cerulean	LC
19.	Evereslacturnus	Indian Cupid	LC
20.	Pachlioptaaristolochiae	Common Rose	LC

3.5.12 Aquatic Ecology

The study area has few seasonal small water bodies away from the proposed project site. But no major drainage system can be found within the study area. No Aquatic diversity is noticed in the core zone area. Aquatic weeds are found to be growing everywhere in 10 km radius area, in every water bog, pond, etc. *Typha angustata* can be found growing all along the drains of villages, small water-logged depressions, and agricultural fields lacking water but containing enough moisture to support its growth. And where water is present, *Eichhornia crassipes* has taken its roots and covers the entire water surface by its sprawl and invasion.

3.5.12.1. Objectives of Aquatic Studies

- Generating data through actual field collection in these locations over the study period.
- Consulted with locals to obtain knowledge about aquatic flora and animals.

3.5.12.2 Macrophytes

The macrophytes observed within the study area are tabulated in Table 3.10.

Table No.3.41 Description of Macrophytes

Sl. No	Scientific name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
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1	<i>Nymphaea nauchali</i>	Blue lotus	Alli	LC
	<i>Eichornia crassipe</i>	Water hyacinth	Agayatamarai	NA
2	<i>Cyperus exaltatus</i>	Tall Flat Sedge	Koraikizhangu	LC
3	<i>Aponogeton natans</i>	Floating laceplant	Kottikizhnagu	NA
4	<i>Colocassia esculenta</i>	Taro	Seppakizhangu	LC
5	<i>Carex cruciata</i>	Cross Grass	Koraipullu	NA
6	<i>Cynodon dactylon</i>	Scutch grass	Arugampul	LC
8	<i>Nymphaea nouchali</i>	Blue waterlily	Nellambal	LC

3.5.12.3. Aquatic Faunal Diversity

Amphibian species like the common Pond frog, and Skipper frog, Indian Pond Frog were sighted near the water bodies located in the study area.

Table No. 3.42 Amphibians Observed/Recorded from the Study Area

SI. No	Common Name	Zoological Name	WLPA, 1972	IUCN Red List data
1.	Indian Pond Frog	<i>Euphlyctis hexadactylus</i>	Schedule IV	LC
2.	Indian Toad	<i>Bufo melanostictus</i>	Schedule IV	LC
3.	Indian Skipper Frog	<i>Euphlyctis cyanophlyctis</i>	Schedule IV	LC

3.5.13 Other Aquatic Fauna

3.5.13.1. Fishes

The fish species were seen during the primary field investigation near the study's area. Table 3.43 lists fish species such as Rohu, Catla, Catfish, and others.

Table No. 3.43 Fish Species reported in the study area

S.No	Common name	Scientific name	Family
1.	Ponithia	<i>Puntius sophore</i>	Cyprinidae
	Rohu	<i>Labeo rohita</i>	Cyprinidae
2.	-	<i>Cyprinus carpio</i>	Cyprinidae
3.	Catla	<i>Catla Catla</i>	Cyprinidae
5.	Catfish	<i>Siluriformes</i>	-
6.	Snakehead murrel	<i>Channa striata</i>	-

3.5.13.2 Findings/Results

The assessment was carried out during the Winter season. The inspection day was quite all right with respectable weather. The details of the flora and fauna observed are given below.

Records of threatened species in the area

No threatened species were observed

Endangered Species as per Wildlife (Protection) Act

No Endangered fauna was recorded in the project area.

Endemic Species of the Project areas

No endemic species were observed in the project area.

Migratory species of the Project areas

No migratory fauna observed in project area.

Migratory corridors and Flight paths

No migratory corridors and Flight paths were observed in project area.

Breeding and spawning grounds

No breeding and spawning grounds were earmarked for the wildlife fauna in project area.

There are no critically endangered, endangered, vulnerable, and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves/(existing as well as proposed) within 10 km of the mine lease area. There are no protected forests within the project area. Hence submission of clearance from the National Board of Wildlife does not arise.

There are no endangered, endemic, and RET Species. There is no Schedule I species in study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] The proposed project is not going to have any direct or indirect adverse impact on the species mentioned above.

3.6 SOCIO ECONOMIC ENVIRONMENT

The major developmental activities in mining /Industrial sector are required for economic development as well as creation of employment opportunities (direct and indirect) and to meet the basic/modern needs of the society, which ultimately results in overall improvement of the quality of life through upliftment of social, economic, health, education and nutritional status in the project region, state as well as the country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for new developmental projects. Thus, the study of

socioeconomic component incorporating various facets related to prevailing social and cultural conditions and economic status of the rough stone quarry project region is an important part of 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.

Gram Panchayat name of the Achangulam village is Kallanai. CD Block name is Kallikudi and Teshil/Taluk or sub-district is Thirumangalam. Data Reference year is 2009 of Census 2011. Sub District HQ Name is Thirumangalam and Sub District HQ Distance is 15 Km from the village. District Head Quarter name is Madurai

3.6.1 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 study the socio-economic status of the people living in the study area rough stone quarry project region.
- f) To assess the impact on socio-economic environment due to rough stone quarry project region.
- g) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

3.6.2 Scope of Work

- To study the Socio-economic Environment of area from the secondary sources
- Data Collection and Analysis
- Identification of impacts due to the mining projects
- Mitigation Measures

3.6.3 Methodology

The methodology adopted for the socio-economic impact assessment is as follows:

- a) The details of the activities and population structure have been obtained from Census 2001 and 2011 and analysed.
- b) Based on the above data, impacts due to plant operation on the community have been assessed and recommendations for further improvement have been made.

3.6.4 Sources of Information and Data Base

To achieve the above objectives, the information has been collected from both primary and secondary sources. Both primary data and secondary data have been analysed by means of suitable statistical techniques for the purpose of verifying the above selected hypotheses concerned with the surrounding area.

3.6.5 Primary Survey

The primary data collection includes the collection of data through a structured interview schedule by direct observation method. The questionnaire survey includes both open and closed methods. The sample size is limited respondents, who were selected on the basis of simple random sampling from Kallanai (Achangulam) Village, Kallikudi Taluk, Madurai District, Tamil Nadu State. in the field survey has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and tertiary Zone (7 - 10 km).

The questionnaires were designed to suit the subjects considering their rural background enabling to furnish correct information and data as far as possible. Data were collected at village level and household level by questionnaires and focused group discussions.

The study area for the field survey has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and Outer Zone (7 - 10 km).

3.6.6 Collection of Data from Secondary Sources

Data from secondary sources were collected on following aspects:

- Demographic profile of the area
- Economic profile of the area

Table 3.6.1 Type of Information and Sources

Information	Source
Demography	District Census Handbook, Govt. of India
Economic profile of the area	Census of India, Tamil Nadu State

b) Data Presentation and Analysis

The data collected were presented in a suitable, concise form i.e., tabular or diagrammatic or graphic form for further analysis. These tabulated data were interpreted and analyzed with the help of various qualitative techniques and ideographic approaches.

3.7 Background Information of the Area

Tamil Nadu is the 11th largest states in India in terms of area. The state is the seventh most populous state in the country and its main language Tamil has origins that date back to 500 BC. Chennai is the capital of Tamil Nadu and lies on the eastern coast line of India. Tamil Nadu is famous for its wonderful temples and monuments that have been built 1000s of years ago and has places that have been marked as

heritage sites by the United Nations. In a 180-degree paradigm shift, this state with a rich historical importance is also one of the fastest developing centres for technology and trade.

The State can be divided broadly into two natural divisions (a) the Coastal plains of South India and (b) the hilly western area. Parallel to the coast and gradually rising from it is the broad strip of plain country. It can further be subdivided into Coromandel plains comprising the districts of Kancheepuram, Madurai, Cuddalore and Vellore. The alluvial plains of the Cauvery Delta extending over Thanjavur and part of Tiruchirappalli districts and dry southern plains in Madurai, Dindigul, Ramanathapuram, Sivaganga, Virudhunagar, Tirunelveli and Tuticorin districts. It extends a little beyond Western Ghats in Kanyakumari District. The Cauvery Delta presents some extremely distinctive physical and human features, its power being a main factor in the remarkable growth, the towns of Tamil Nādu have witnessed.

3.8 Geography of the Area

Tamil Nadu is one of the 28 states of India, located in the southernmost part of the country. It extends from 8°4'N to 13°35'N latitudes and from 76°18'E to 80°20'E longitudes. Its extremities are

- in eastern - Point Calimere
- in western - hills of Anaimalai
- in northern - Pulicat lake
- in southern - Cape Comorin

It covers an area of 1,30,058 sq.km and 11th largest state in India. It covers 4% of the area of our country. Tamil Nadu is bounded by the Bay of Bengal in the east, Kerala in the west, Andhra Pradesh in the north, Tamil Nadu in the northwest and Indian Ocean in the south. Gulf of Mannar and Palk Strait separate Tamil Nadu from the Island of Sri Lanka, which lies to the southeast of India.

Already we have learnt that the state of Tamil Nadu had only 13 districts at the time of its formation. After that, the state was reorganised several times for the administrative convenience. At present there are 37 districts in Tamil Nadu, including the newly created districts such as Kallakurichi, Tenkasi, Chengalpet, Ranipet and Tirupathur.

3.9 Population Growth Rate

In 1991, there were only 21 districts in the State of Tamil Nadu. In 2001, eight new districts were created by reorganising the territorial jurisdiction. The nine districts are – Madurai, Namakkal, Perambalur, Viluppuram, Thiruvarur, Nagapattinam, and Theni. The population and its growth trend are important economic factors in a developing economy.

Year	Tamil Nadu	India
1941	11.91	14.22

1951	14.66	13.31
1961	11.85	21.51
1971	22.30	24.80
1981	17.50	24.66
1991	15.39	23.86
2001	11.19	21.34
2011	15.61	5.96
2021	5.96	1.0

3.10 Madurai District

Madurai district ranked 9th in terms of the highest population among the districts. Madurai District is situated in the South of Tamil Nadu state. It is bounded on the North by the districts of Dindigul, Thiruchirapalli and on the East by Sivagangai and on the West by Theni and South by Virudhunagar.

Geographical location :

North Latitude : Between 9°30.00 and 10°30.00

East Latitude : Between 77°00.00 and 78°30.00

Madurai District consists of three Revenue Divisions viz., Madurai, Melur and Usilampatti Eleven Taluks viz., Madurai North, Madurai West, Thirupparankundram, Vadipatti, Melur, Madurai East, Madurai South, Usilampatti, Thirumangalam, Peraiyur and Kalligudi comprising of 665 Revenue Villages. The District has Thirteen blocks viz. Madurai East, Madurai West, Thirupparankundram, Melur, Kottampatti, Vadipatti, Alanganallur, Usilampatti, Chellampatti, T. Kallupatti, Sedapatti, Thirumangalam and Kallikudi comprising of 420 Village Panchayats. There are three Municipalities viz. Melur, Thirumangalam and Usilampatti Nine Town Panchayats viz. A. Vallalapatti, Alanganallur, Elumalai, Palamedu, Paravai, Peraiyur, Sholavandan, T. Kallupatti and Vadipatti and one Madurai Corporation.

Madurai is surrounded by several mountains. The Madurai city has 3 hills as its city boundary. Yanaimalai, Nagamalai, Pasumalai named after Elephant, Snake and Cow respectively. It is famous for Jasmine Flowers. Jasmine flowers are transported to other cities of India from Madurai.

Kallikudi CD block

Achangulam village is situated in Teshil Thirumangalam, District Madurai and in State of Tamil Nadu India. Gram Panchayat name of the Achangulam village is Kallanai. CD Block name is Kallikudi and Teshil/Taluk or sub-district is Thirumangalam. Data Reference year is 2009 of Census 2011. Sub District

HQ Name is Thirumangalam and Sub District HQ Distance is 15 Km from the village. District Head Quarter name is Madurai and its distance from the village is 22KM. Nearest Town of the Achangulam village is Thirumangalam and nearest town distance is 15 km.

3.11 Study Area

Detailed socio-economic survey was conducted in the study area (Core and buffer zone) within 10 km radius of the area at Achangulam (Kallanai) Village, Kallikudi Taluk, Madurai District, Tamil Nadu State. In order to determine the impact of the proposed project on nature and inhabitant. To get an overview of the villagers and their perspectives about this proposed activity, different demographic parameters and social aspects such population density, sex ratio, literacy rate, worker ratio etc. has been identified, analyzed, studied together. These impacts may be beneficial or disadvantageous. If disadvantageous anticipated suggestions measures are advocated in order to have collective development.

3.12 Demographic pattern of 10km study area characteristics a comparative analysis

Table 3.43 Shows the socio-economic profile of the study area as compared to district, state and national level socio-economic profile

Particular	India	Tamil Nadu	Madurai District	Study Area (10km Radius)
Area (in sq. km.)	3,287,263	130058	3710	315
Population Density/ sq. Km.	368	554	819	210
No. of Households	249454252	13357027	794887	17731
Population	1210569573	72147030	3038252	66212
Male	623121843	36137975	1526475	33228
Female	587447730	36009055	1511777	32984
Scheduled Tribes	104281034	794697	11096	52
Scheduled Castes	201378086	14438445	408976	13194
Literacy Rate	72.99%	80%	75%	74%
Sex Ratio (Females per 1000 Males)	943	996	990	993

Source: Census of India, 2011

Table no 3.12.1 show demographic pattern of India, Tamil Nadu, Madurai District & Study area (10km Radius). In India had total area of 3.2 sqkm, State of Tamil Nadu area was 130058 sqkm, District of Madurai area was 3710 sqkm and study area is about 315 sqkm. Population density is total population per sqkm. So,

India population density was 368 sqkm, state of Tamil Nadu density was 554 sqkm, District had density about 819 sqkm and study area density is about 210 sqkm. As per Census 2011, about 5.96percent of population in the state lives in areas. Madurai had comparing state wise 4.21 percent of population lives in the district. In study area has 2.18% around 10km radius. State, District and study area. In Tamil Nadu state SC categories people had about 19 %, district of Madurai about 13.46 % it has increasing to Study area about 20% increasing in the total population Similarly ST population is about 1.10%, 0.36% and 0.08 % of the total population in the study area. State level Literacy rate is 80%, district level is 75% but study area has increased about 80%. There is literacy rate is study area is an increase comparing district level decreased. Sex ratio female per thousand males about state level is 996, District level is 990 and study area is 993.

The study area has population density 210 persons per sq.km of total population about 66212 as per census 2011. There were about 50 percent male and 49.8% female population. Study area has literate rate is about 74%, District had about 75% of literate rate as per census 2011.

3.13 Population Projection of the Study Area

Madurai Population 2022 – 2023

The last census of Madurai was done in 2011 and next census of 2021 has been postponed or cancelled. But we can do projection of future Madurai 2023 Population on the basis likely Population Growth Rate.

Year	Projected Population (Estimation)
2001	2,578,201
2011	3,038,252
2021	3,490,000
2025	3,640,000
2031	3,740,000

Source: <https://www.census2011.co.in/census/district/45-madurai.html>

A population projection is an estimation of the number of people expected to be alive at a future date that is made based on assumptions of population structure, fertility, mortality and migration. It is an essential to assess the need for new jobs, schools, doctors and nurses, planning urban housing, foods, clothing and requirements of energy and resources. It is also needed for policy discourse i.e., helps to the policy-makers to understand the existing problems and finally supports to develop the suitable solutions.

A population projection gives a picture of what the future size and structure of the population by sex and age might look like. It is based on knowledge of the past trends, and, for the future, on assumptions made for three components: fertility, mortality and migration.

Table 3.44 Total Population of Study Area

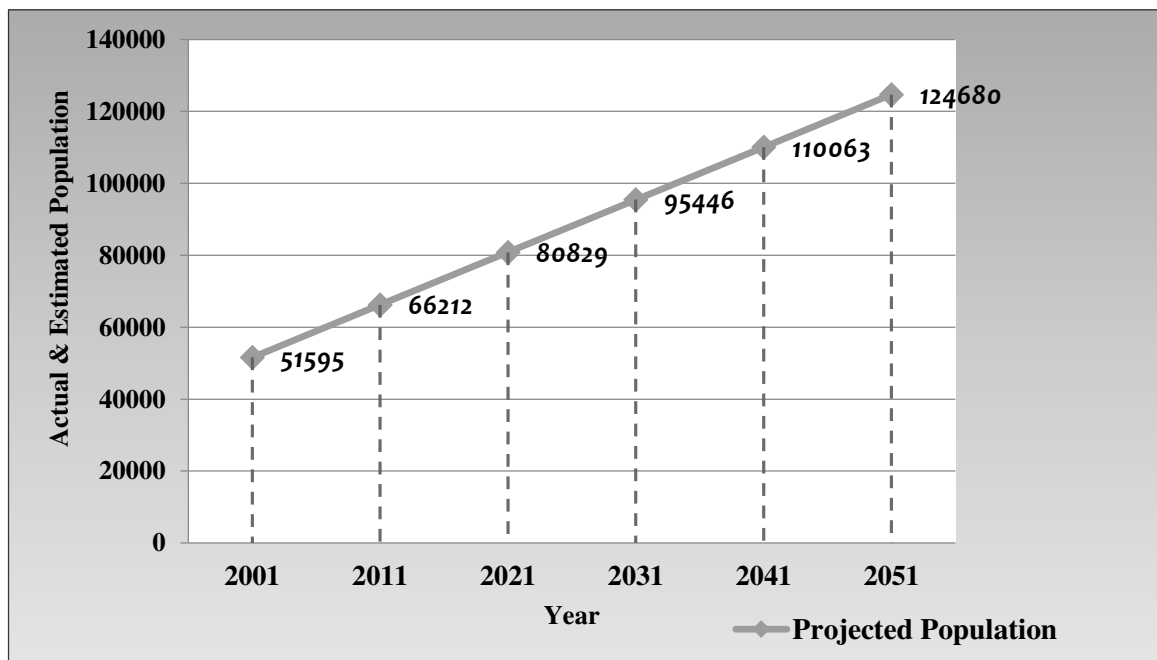
Sl No.	Population in 2001	Population in 2011
1	51595	66212

Source: <https://censusindia.gov.in/census.website/>

Table 3.45 Population Projection of Study Area

S. No	Year	Projected Population (Approximately)
1.	2021	80829
2.	2031	95446
3.	2041	110063
4.	2051	124680

Source: Calculated by SPSS 23v

**Fig 3.13.3 Graph Showing Population Projection**

Following formula has been used for the projection of population.

$$Y=a+bt$$

Where: Y= Dependent variable (Population)

a=Intercept

b=Slope

t=Interdependent variables (Time)

Above formula is applied to project population for the years (2021, 2031,2041,2051). Due to avoid the errors in manual calculation the statistical software SPSS (demo version 29) is used to calculate the intercept and the slope.

Due to the shortage of data on population the results show same value of growth for the years (2021,2031,2041,2051). If the researcher gets enough the data on population for earlier years the data projection will be accurate.

- Ref: Indian Economic survey, the SLR (Simple Linear Regression) techniques are used by statistical department, Government of India to project population.
- Source: <https://www.ibm.com/in-en/analytics/spss-statistics-software>

3.14 Population Growth of the Study Area

Table 3.46 Population Growth rate in Study area

Year	Actual Population	Growth Rate %
2001	51595	
2011	66212	12.83
2021	80829	12.21
2031	95446	11.81
2041	110063	11.53
2051	124680	11.33

Source: Compiled by Author-2022

above table no 3.14.1 is showing the growth rate of population since 2001, as per census in 2001 the population of study area was 51595 and 2011 it was 66212 if the population growth rate is 12.83%, it will approximately gradually an increase about 80829 in year 2021 and 124680 in the year of 2051. It has approximately population growth rate decline will be 11.33%.

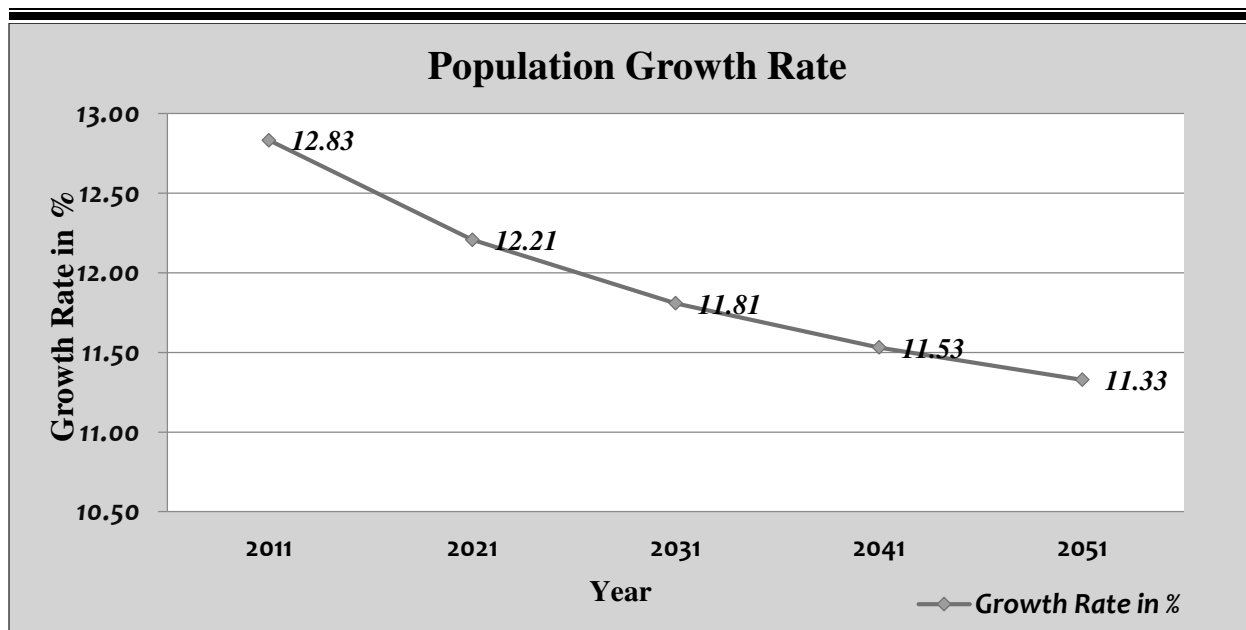


Fig.3.14.2 Graph Showing Population Growth Rate

Planning Analysis:

Calculating Growth Rates

The percent change from one period to another is calculated from the formula:

Where:

PR=Percent Rate

V_{Present} =Present or Future Value

V_{Past} = Past or Present Value

$$PR = \frac{(V_{Present} - V_{Past})}{V_{Past}} \times 100$$

The *annual* percentage growth rate is simply the percent growth divided by N, the number of years.

Source: <https://pages.uoregon.edu/rgp/PPPM613/class8a.htm>

3.15 Population Distribution and Composition of Study Area

The population as per 2011 Census records is 66212 (for 10 km radius buffer zone). Total no. of household is 2149, 4082 and 11500 respectively, in primary, secondary and tertiary zone. Sex ratio is 971, 978 and 1002 (females per 1000 males) observed in primary, secondary and tertiary zone respectively. SC population distribution is 770, 5332 and 7092 respectively in primary, secondary and tertiary zone. ST population distribution is very less 0,0 and 52 respectively in primary, secondary and tertiary. Average household size is 4. Zone wise Demographic profile of study area is given in the table 3.47below:

Source: <https://censusindia.gov.in/census.website/data/census-tables>

Table 3.47 Zone wise Demographic Profile of Study Area

Zone	No. of Villages	Total Household	Total Population	Male Population	%	Female Population	%
Primary Zone (0 - 3 Km)	6	2149	8090	4104	50.73	3986	49.27

Secondary Zone (3 - 7 Km)	6	4082	15629	7902	50.56	7727	49.44
Tertiary Zone (7 - 10 km)	19	11500	42493	21222	49.94	21271	50.06
Study Area (0-10 km)	31	17731	66212	33228	50.18	32984	49.82

Source: Census of India, 2011

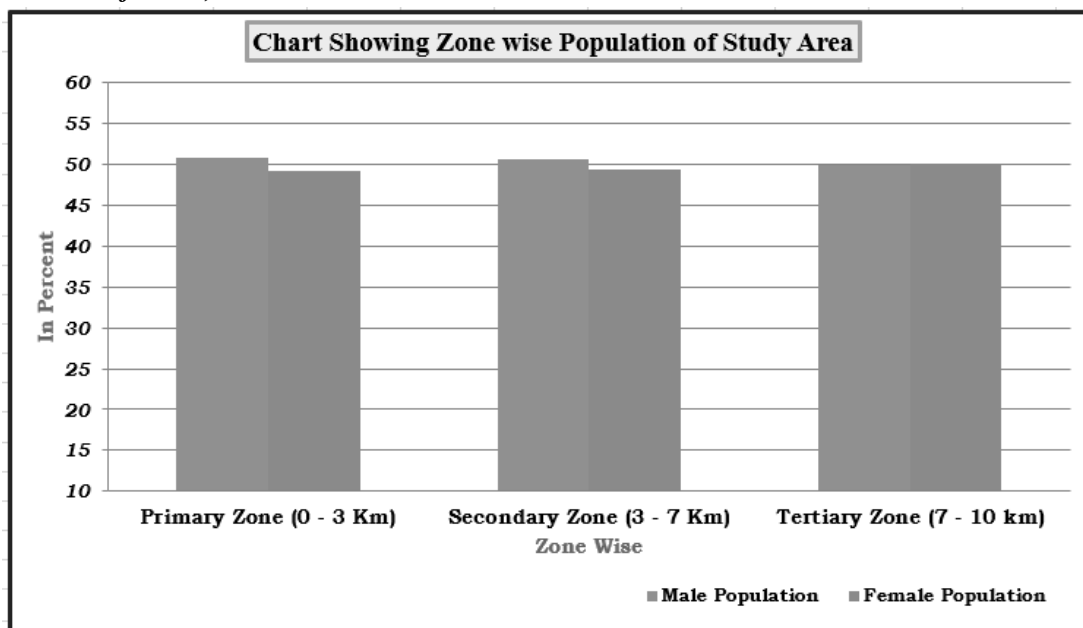


Figure 3.15.2 Population of study area

- ✓ Above table identifies the presence of villages and their subsequent population divided under three zones from plant boundary (i.e., Primary, secondary and tertiary zone).
- ✓ Primary zone has 6 villages where as much as 2149 households with 8090 population are located. Mostly lying on Built-up land for their livelihood and substance.
- ✓ Secondary and tertiary zone both comprise of 15629 and 42493 having a total population respectively.

Table 3.48 Village wise Demographic Profile of the Study Area (Core and Buffer Zone)

Sno	Name	TRU	No Household	Total Population	Male Population	Female Population	Person 0-6 yrs	Male 0-6 yrs	Female 0-6yrs	SC Persons	ST Person	Literate Person	Male Literate	Female Literate	Total Workers	Main Workers	Marginal workers	Non Workers
0-3km																		
1	Ulagani	Rural	386	1466	743	723	170	84	86	151	0	815	522	293	740	716	24	726
2	Maikkudi	Rural	345	1382	701	681	177	83	94	430	0	839	494	345	774	598	176	608
3	Valayankulam	Rural	274	1050	517	533	126	59	67	28	0	527	336	191	603	600	3	447
4	Nedungulam	Rural	266	897	445	452	83	42	41	88	0	558	337	221	518	494	24	379
5	Kallanai (Achangulam)	Rural	564	2112	1080	1032	331	179	152	62	0	1033	665	368	1242	1227	15	870
6	Melauppiligundu	Rural	314	1183	618	565	140	71	69	11	0	687	466	221	676	670	6	507
	Total		2149	8090	4104	3986	1027	518	509	770	0	4459	2820	1639	4553	4305	248	3537
3-7km																		
1	Melakottai	Rural	1376	5156	2564	2592	515	255	260	1943	0	3850	2120	1730	2545	1915	630	2611
2	Vadagarai	Rural	1262	4900	2513	2387	525	283	242	1691	0	3452	1934	1518	2005	1805	200	2895
3	Vidathakulam	Rural	520	1934	987	947	197	99	98	422	0	1295	758	537	1174	1151	23	760
4	Mallampatti	Rural	166	664	332	332	67	35	32	484	0	466	253	213	421	103	318	243
5	Giriyagoundanpatti	Rural	203	743	368	375	79	42	37	124	0	551	301	250	502	477	25	241
6	Koodakovil	Rural	555	2232	1138	1094	254	139	115	668	0	1541	877	664	1143	1052	91	1089
	Total		4082	15629	7902	7727	1637	853	784	5332	0	11155	6243	4912	7790	6503	1287	7839
7-10km																		
1	Kappalur	Rural	1026	3848	1913	1935	421	199	222	315	0	2681	1502	1179	1743	1678	65	2105
2	Maravankulam	Rural	802	2877	1436	1441	308	168	140	408	0	1950	1042	908	1261	1137	124	1616
3	Andipatti	Rural	256	969	488	481	83	46	37	224	0	684	377	307	546	209	337	423
4	Karisalpatti	Rural	445	1835	901	934	162	83	79	650	1	1423	772	651	852	834	18	983
5	Rayapalayam	Rural	239	880	445	435	65	32	33	0	0	689	378	311	470	319	151	410
6	Melanesaneri	Rural	79	310	168	142	44	21	23	0	0	184	117	67	193	187	6	117
7	Karisalkalampatti	Rural	326	1158	589	569	142	71	71	39	0	722	424	298	683	615	68	475
8	Keelanesaneri	Rural	130	498	251	247	54	34	20	96	0	307	175	132	252	249	3	246
9	Sivarakottai	Rural	905	3331	1646	1685	347	190	157	449	27	2386	1294	1092	1694	1170	524	1637
10	Kokkulam (Thirumal)	Rural	358	1466	751	715	188	99	89	95	0	871	549	322	791	723	68	675
11	Tirumal	Rural	764	2910	1458	1452	371	201	170	219	0	1735	1030	705	1669	1551	118	1241
12	Paraikulam	Rural	125	452	231	221	52	30	22	0	0	273	164	109	246	236	10	206
13	Saluppapillayarnatham	Rural	603	2129	1043	1086	220	112	108	690	0	1305	736	569	1390	1380	10	739
14	Vellakulam (K)	Rural	1431	4867	2380	2487	485	251	234	926	24	3594	1857	1737	2651	2328	323	2216
15	Villur	Rural	1555	5625	2790	2835	620	324	296	846	0	3493	2003	1490	3356	3211	145	2269
16	Chennampatti	Rural	360	1440	733	707	181	99	82	352	0	924	515	409	784	150	634	656
17	Kurayur	Rural	1415	5362	2731	2631	573	308	265	1295	0	3406	2031	1375	2886	2586	300	2476
18	Maruthangudi	Rural	329	1277	641	636	187	98	89	422	0	692	404	288	634	626	8	643
19	Vellakulam (S)	Rural	352	1259	627	632	150	85	65	66	0	777	446	331	814	521	293	445
	Total		11500	42493	21222	21271	4653	2451	2202	7092	52	28096	15816	12280	22915	19710	3205	19578
	G.total		17731	66212	33228	32984	7317	3822	3495	13194	52	43710	24879	18831	35258	30518	4740	30954

Source: Village Wise Demographic Profile of the Study Area, *Census of India, 2011*

3.16 Gender and Sex Ratio

Sex ratio is used to describe the number of females per 1000 of males. Sex ratio is a valuable source for finding the population of women in India and what is the ratio of women to that of men in India. In the Population Census of 2011, it was revealed that the population ratio in India 2011 is 940 females per 1000 of males. The study area has 993 females per 1000 males. Gender and sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region. Following table entails information about sex ratio of 31 villages lying in study area (buffer zone) as primary, secondary and tertiary zone.

Table 3.49 Sex ratio of the study area

S. No.	Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	971
2	Secondary zone (3-7 km)	978
3	Tertiary Zone (7-10 km)	1002

Source: Census of India, 2011

Figure 3.16.2 Sex Ratio within 10 Km study area

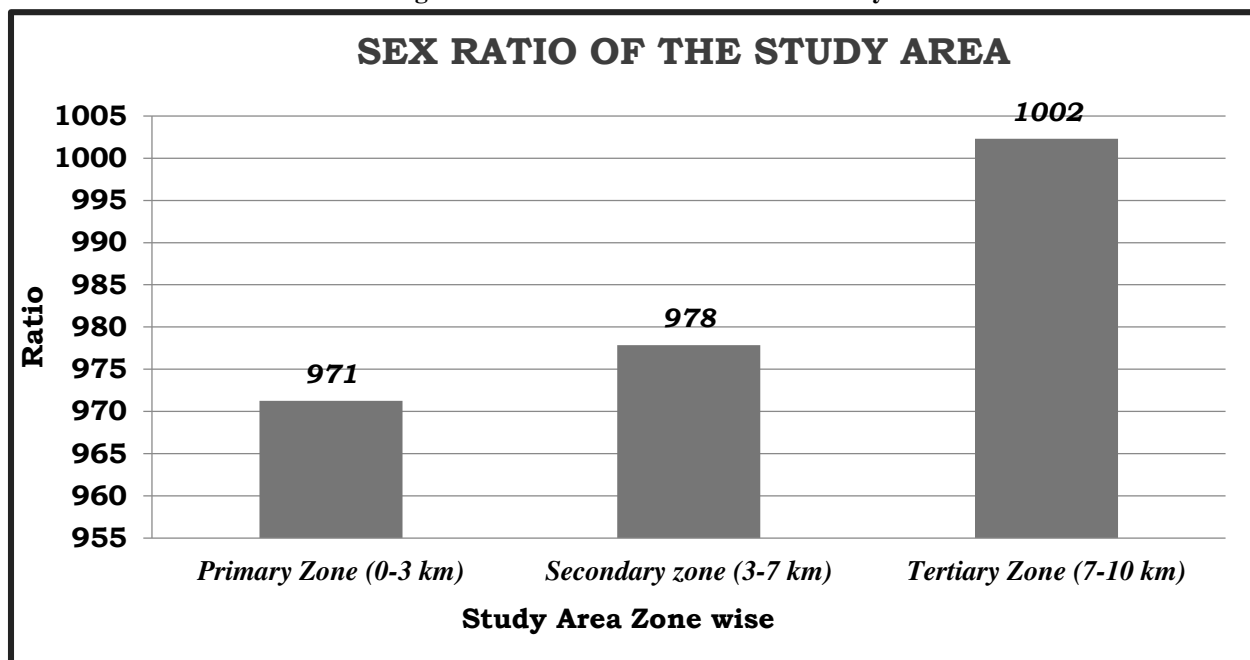
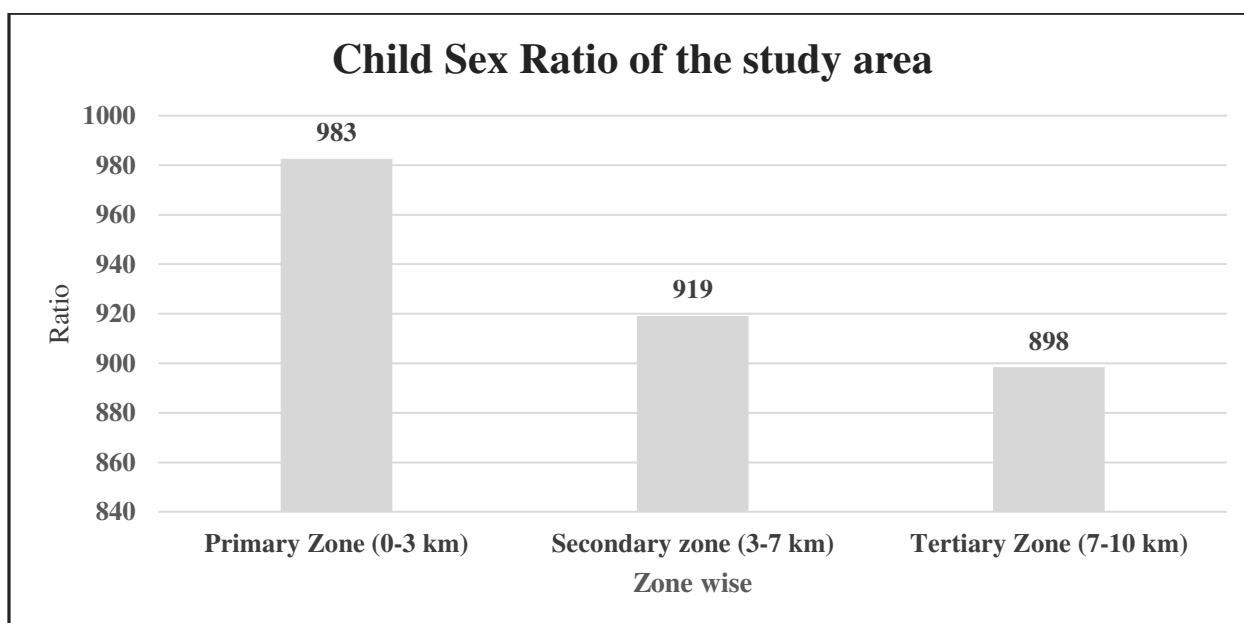


Table 3.50 Child Sex ratio of the study area

S. No.	Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	983
2	Secondary zone (3-7 km)	919
3	Tertiary Zone (7-10 km)	898

**Figure 3.16.2-b Child Sex Ratio within 10 Km study area**

3.17 Literacy Rate in Study Area

Literacy Rate is the percentage of people in a country with the ability to read and write. The analysis of the literacy levels is done in the study area. The 10 km radius of study area demonstrates a literacy rate of 74.22% as per census data 2011. The male literacy rate in the study area indicates 85% whereas the female literacy rate, which is an important indicator for social change, is observed to be 64% as per the census data 2011. This needs to focus on the study area and enhance further development focusing on education in the study area. (Table no 3.17.1).

Table 3.51 Literacy Rate of the Study Area

Zone	No. of Villages	Male Literacy Population	Male literacy Rate	Female Literacy Population	Female literacy Rate	Total Literacy	Total Literacy Rate
Primary Zone (0 - 3 Km)	6	2820	78.64	1639	47.14	4459	63.13
Secondary Zone (3 - 7 Km)	6	6243	88.57	4912	70.75	11155	79.72
Tertiary Zone (7 - 10 Km)	19	15816	84.26	12280	64.40	28096	74.25
Study Area (0-10km)	31	24879	84.61	18831	63.86	43710	74.22

Source: Census of India, 2011

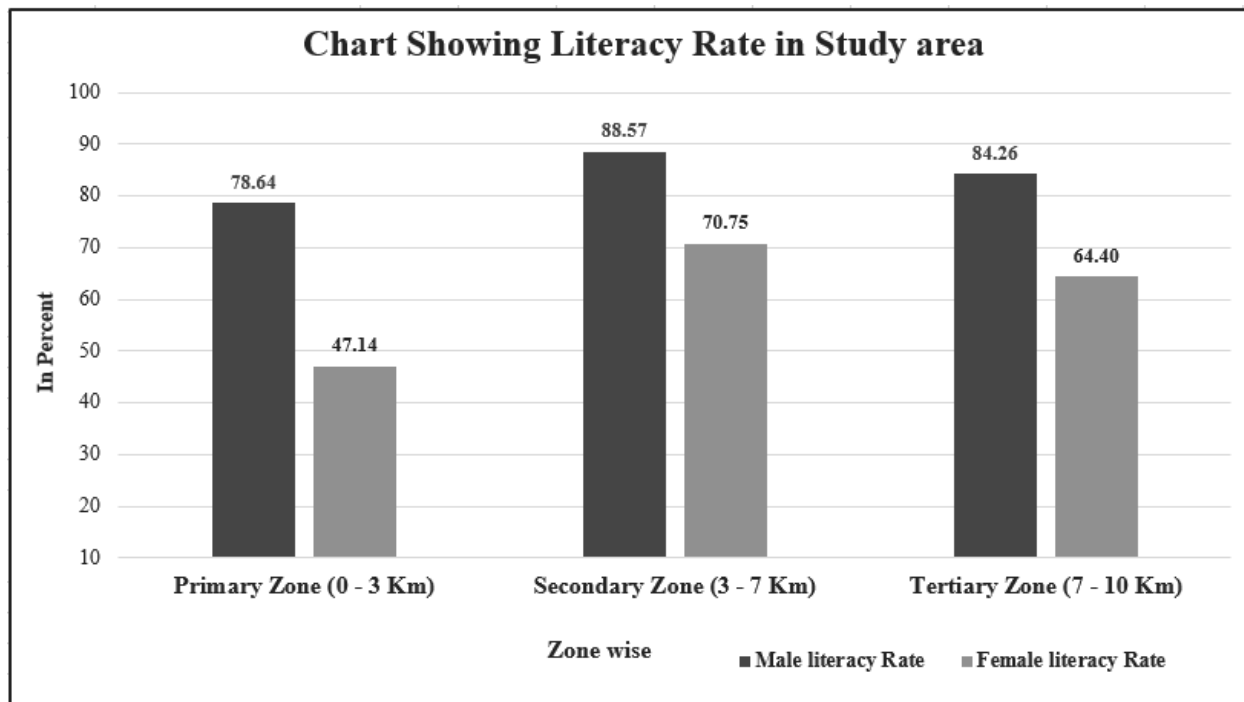


Figure 3.17.2 Gender wise Literacy Rate in the study area

3.18 Family Size

Size of family also describes about family functioning, resource consumption, total income generated and their expenditure pattern. Census 2011 data suggests that most of these households have a family size of up to 4 members, knowing the size of family also give fair understanding of relating how much resource consumption is being incurred, and annual income being generated and spent.

3.19 Vulnerable Group

While developing an action plan, it is very important to identify the population who fall under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Special provisions should be made for them. In the observed villages schedule caste (SC) population is 20% and Schedule Tribe population 0.08 %, Other Population is 80% in the total study area.

Table 3.52 vulnerable groups of the study area

Zone	No. of Villages	Vulnerable Groups					
		SC Population	%	ST Population	%	Other Population	%
Primary Zone (0 - 3 Km)	6	770	9.52	0	0.00	7320	90.48
Secondary Zone (3 - 7 Km)	6	5332	34.12	0	0.00	10297	65.88
Tertiary Zone (7 - 10 Km)	19	7092	16.69	52	0.12	35349	83.19

Total area (10km)	31	13194	19.93	52	0.08	52966	79.99
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Source: Census of India, 2011

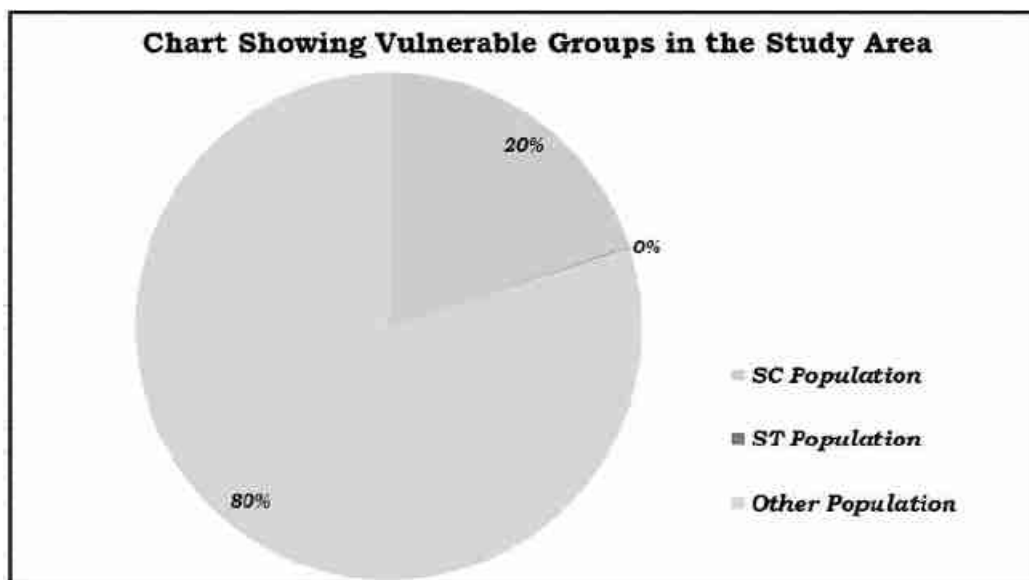


Figure 3.19.2 vulnerable groups

3.20 Economic Activities

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., Total workers, Main workers and non-workers. The main workers include cultivators, agricultural laborers, those engaged in household industry and other services. The non-workers include those engaged in unpaid household duties like, students, retired persons, dependents, beggars, vagrants etc. besides Institutional intimates or all other non-workers who do not fall under the above categories.

Table 3.53 shows the work force of the study area

Zone	No. of Villages	Total Workers	%	Main Workers	%	Marginal Workers	%	Non-Workers	%
Primary Zone (0 - 3 Km)	6	4553	56.28	4305	53.21	248	3.07	3537	43.72
Secondary Zone (3 - 7 Km)	6	7790	49.84	6503	41.61	1287	8.23	7839	50.16
Tertiary Zone (7 - 10 Km)	19	22915	53.93	19710	46.38	3205	7.54	19578	46.07
Study Area (10 Km)	31	35258	53.25	30518	46.09	4740	7.16	30954	46.75

Source: Census of India, 2011

The above table shows that out of the total working population, the percentage of main workers is 46% while 7% are marginal workers. Number of working populations is 53% and non-working population is 47% in the study area. As per the data obtained from the survey (as mentioned previously in occupational structure) most of these people are employed for major period of the year. Also, to mention the natural

environment also restricts the people in finding stable business is performed for only certain months. Thus, proposed project will act as possible exposure for them to get enrol and earn sustain livelihood.



Figure 3.20.2. Working population in the study area

3.21 Infrastructure Base

A better network of physical infrastructure facilities (built up and roads, irrigation, power and social infrastructure support, viz. health and Education, water and sanitation are essential for the development of the rural economy.

A review of infrastructural facilities available in the area has been done based on the information from baseline survey & census data of the study area. Infrastructural facilities available in the area are described in the subsequent sections.

- **Administrative offices** are located in Tamil Nadu, Madurai District (20km-NE) from site which by local transport.
- **Gounda River** southern side 5.7km-SW from mine lease boundary this river dry. There is no require people around the village and Veeraperumalpuram, Arasapatti and Thoombakulam 3.3km-Southern side from mine lease boundary, there is no require people in the study area.
- **Availability of** Panchayat Union primary school, Nedungulam Village (875m-NE), Panchayat Union primary school, Karisalkalampatti Village (6km-SW), Panchayat Union primary school, Thirumal Village (5.5km-SE), Government school, Pullor Village (8km-SE), Municipal Primary school, Thirumangalam Taluk, Government Primary School, Urappanur (7.0km-N), Annai Fathima college of arts and science college, Alampatti Village (2.0km-NW), many Pre-primary school, Elementary school, Engineering college, Medical and Training institute found in study area.
- **Health facilities** covered in the area PHC Valayakulam (8km-NE), Government PHC, Koodkovil (3km-SE), Government Hospital, Nilaiyurr (9km-N), Government Hospital, Thirumangalam Taluk (4.5km-NE) Buffer zone area like Government Hospital, Madurai, Government Hospital and Thirumangalam Taluks. Other private clinics and Pharmacy available in the study area.

Table 3.54 Educational Facilities in the Surveyed Area

Sno	Village Name	Govt Primary School (Numbers)	Private Primary School (Numbers)	Govt Middle School (Numbers)	Private Middle School (Numbers)	Govt Secondary School (Numbers)	Private Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Private Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Private Arts and Science Degree College (Numbers)
0-3km											
1	Ulagani	2	0	2	0	1	0	1	0	0	0
2	Maikkudi	0	0	0	1	0	0	0	0	0	0
3	Valayankulam	5	1	2	0	0	0	0	0	0	0
4	Nedungulam	0	0	0	0	0	0	0	0	0	0
5	Kallanai (Achangulam)	1	0	1	0	0	0	0	0	0	0
6	Melauppiligundu	1	0	0	0	0	0	0	0	0	0
	Total	9	1	5	1	1	0	1	0	0	0
3-7km											
1	Melakottai	7	1	2	1	1	1	1	0	0	0
2	Vadagarai	1	0	0	0	0	0	0	0	0	0
3	Vidathakulam	0	0	0	0	0	0	0	0	0	0
4	Mallampatti	1	0	1	0	0	0	0	0	0	0
5	Giriyagoundanpatti	1	0	0	0	0	0	0	0	0	0
6	Koodakovil	1	0	1	0	0	0	0	0	0	0
	Total	11	1	4	1	1	1	1	0	0	0
7-10km											
1	Kappalur	1	0	0	0	0	0	0	0	0	1
2	Maravankulam	1	0	0	0	0	0	0	0	0	0
3	Andipatti	1	0	1	0	0	0	0	0	0	0
4	Karisalpatti	2	0	0	0	0	0	0	0	0	0
5	Rayapalayam	2	0	1	0	1	0	1	0	0	0
6	Melanesaneri	0	0	0	0	0	0	0	0	0	0
7	Karisalkalampatti	1	0	0	0	0	0	0	0	0	0
8	Keelanesaneri	3	1	2	0	2	0	2	0	0	0
9	Sivarakottai	1	1	0	1	0	1	0	1	0	0
10	Kokkulam (Thirumal)	0	0	0	0	0	0	0	0	0	0
11	Tirumal	1	0	1	0	1	0	0	0	0	0
12	Paraikulam	2	0	0	0	0	0	0	0	0	0
13	Saluppapillayarnatham	4	0	3	0	0	0	0	0	0	0
14	Vellakulam (K)	3	0	1	0	1	0	0	0	0	0
15	Villur	1	0	0	0	0	0	0	0	0	0
16	Chennampatti	1	0	1	0	0	0	0	0	0	0
17	Kurayur	1	0	1	0	0	0	0	0	0	0
18	Maruthangudi	1	0	1	0	0	0	0	0	0	0
19	Vellakulam (S)	1	0	0	0	0	0	0	0	0	0
	Total	27	2	12	1	5	1	3	1	0	1
	Grant total	47	4	21	3	7	2	5	1	0	1

Source: DCHB Census 2011, Tamil Nadu

Table 3.55 Health/ Medical Facilities in the Surveyed Area

Sno	Village Name	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	Hospital Allopathic (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Family Welfare Centre (Numbers)	Non Government Medical facilities Others (Numbers)
0-3km										
1	Ulagani	0	0	1	0	0	0	0	0	0
2	Maikkudi	0	0	0	0	0	0	0	0	0
3	Valayankulam	0	0	1	0	0	0	1	0	1
4	Nedungulam	0	0	0	0	0	0	0	0	0
5	Kallanai (Achangulam)	0	0	0	0	0	0	0	0	0
6	Melauppiligundu	0	0	0	0	0	0	0	0	0
	Total	0	0	2	0	0	0	1	0	1
3-7km										
1	Melakottai	0	1	1	1	0	1	1	1	0
2	Vadagarai	0	0	0	0	0	0	0	0	0
3	Vidathakulam	0	0	0	0	0	0	0	0	0
4	Mallampatti	0	0	1	0	0	0	1	0	0
5	Giriyagoundanpatti	0	0	0	0	0	0	0	0	0
6	Koodakovil	0	0	0	0	0	0	0	0	0
	Total	0	1	2	1	0	1	2	1	0
7-10km										
1	Kappalur	0	0	0	0	0	0	0	0	0
2	Maravankulam	0	0	0	0	0	0	0	0	0
3	Andipatti	0	0	1	0	0	0	0	0	0
4	Karisalpatti	0	0	1	0	0	0	0	0	0
5	Rayapalayam	0	0	1	0	0	0	1	0	0
6	Melanesaneri	0	0	0	0	0	0	0	0	0
7	Karisalkalampatti	0	0	0	0	0	0	0	0	0
8	Keelanesaneri	0	0	1	0	0	0	0	0	1
9	Sivarakottai	0	0	0	0	0	0	0	0	0
10	Kokkulam (Thirumal)	0	0	0	0	0	0	0	0	0
11	Tirumal	0	0	1	0	0	0	0	0	0
12	Paraikulam	0	0	0	0	0	0	0	0	0
13	Saluppapillayarnatham	0	0	1	0	0	0	0	0	0
14	Vellakulam (K)	0	0	0	0	0	0	1	0	0
15	Villur	0	0	0	0	0	0	0	0	0
16	Chennampatti	0	0	0	0	0	0	0	0	0
17	Kurayur	0	0	0	0	0	0	0	0	0
18	Maruthangudi	0	0	0	0	0	0	0	0	0
19	Vellakulam (S)	0	0	0	0	0	0	0	0	0
	Total	0	0	6	0	0	0	7	0	7
	G.Total	0	1	10	1	0	1	10	1	8

Source: DCHB Census 2011, Tamil Nadu

Table 3.56 Water & Drainage Facilities in the Surveyed Area

Sno	Village Name	Tap Water-Treated (Status A(1)/NA(2))	Tap Water Untreated (Status A(1)/NA(2))	Covered Well (Status A(1)/NA(2))	Uncovered Well (Status A(1)/NA(2))	Hand Pump (Status A(1)/NA(2))	Tube Wells/Borehole (Status A(1)/NA(2))	Spring (Status A(1)/NA(2))	River/Canal (Status A(1)/NA(2))	Tank/Pond/Lake (Status A(1)/NA(2))	Others (Status A(1)/NA(2))	Closed Drainage (Status A(1)/NA(2))	Open Drainage (Status A(1)/NA(2))	No Drainage (Status A(1)/NA(2))
0-3km														
1	Ulagani	1	1	2	1	1	1	2	2	2	1	1	1	2
2	Maikkudi	1	2	2	2	2	1	2	2	2	2	1	1	2
3	Valayankulam	1	1	1	2	1	1	1	2	2	2	1	1	2
4	Nedungulam	1	2	1	2	2	2	2	2	2	2	2	1	2
5	Kallanai (Achangulam)	1	1	1	2	1	1	2	2	2	2	1	1	2
6	Melauppiligundu	1	1	1	2	1	2	2	2	2	2	2	1	2
3-7km														
1	Melakottai	1	1	2	2	1	1	2	2	2	1	1	1	2
2	Vadagarai	1	1	2	2	2	1	2	2	2	2	1	1	2
3	Vidathakulam	1	1	2	2	2	2	2	2	2	2	2	2	1
4	Mallampatti	1	2	2	2	1	1	2	2	2	2	1	1	2
5	Giriyagoundanpatti	2	1	1	1	2	1	2	2	2	2	1	1	2
6	Koodakovil	1	2	2	2	1	1	2	2	2	2	1	1	2
7-10km														
1	Kappalur	1	1	1	1	2	1	2	2	1	1	1	1	2
2	Maravankulam	1	1	1	2	1	1	2	2	2	2	1	1	2
3	Andipatti	1	1	2	2	2	1	2	2	2	2	1	1	2
4	Karisalpatti	1	1	2	1	2	1	1	2	2	2	1	1	2
5	Rayapalayam	1	1	2	1	1	2	1	1	1	2	1	1	2
6	Melanesaneri	1	1	2	1	2	1	2	2	2	2	1	1	2
7	Karisalkalampatti	1	1	1	2	2	1	2	2	2	2	1	1	2
8	Keelanesaneri	1	1	2	2	2	1	2	2	2	1	1	1	2
9	Sivarakottai	1	1	1	2	1	1	1	2	2	1	1	1	2
10	Kokkulam (Thirumal)	1	2	2	2	1	2	2	2	2	2	2	1	2
11	Tirumal	1	1	2	1	2	1	2	2	2	2	1	1	2
12	Paraikulam	1	1	1	1	2	2	2	2	2	2	1	1	2
13	Saluppapillayarnatham	1	1	1	1	1	2	2	2	2	1	1	1	2
14	Vellakulam (K)	1	2	1	2	2	2	2	2	2	2	1	1	2
15	Villur	1	1	2	2	2	2	2	2	2	2	1	1	2

16	Chennampatti	1	2	1	2	2	1	1	2	2	2	1	1	2
17	Kurayur	1	1	2	1	1	1	2	2	2	2	1	1	2
18	Maruthangudi	1	1	2	2	1	1	2	2	2	2	1	1	2
19	Vellakulam (S)	2	1	1	2	2	1	2	2	2	2	1	1	2

Source: DCHB Census 2011, Tamil Nadu

Index: A(1) means Available, NA(2) means Not Available in the village

3.57 Transport and Other Infrastructure Facilities in the Surveyed Area

Sn o	Village Name	Post Office (Status A(1)/NA(2))	Sub Post Office (Status A(1)/NA(2))	Post And Telegraph Office (Status A(1)/NA(2))	Private Courier Facility (Status A(1)/NA(2))	Public Bus Service (Status A(1)/NA(2))	Private Bus Service (Status A(1)/NA(2))	Railway Station (Status A(1)/NA(2))	Auto/Modified Autos (Status A(1)/NA(2))	Taxi (Status A(1)/NA(2))	Vans (Status A(1)/NA(2))	Cycle-pulled Rickshaws (machine driven) (Status A(1)/NA(2))	Carts Driven by Animals (Status A(1)/NA(2))	Sea/River/Ferry Service (Status A(1)/NA(2))	National Highway (Status A(1)/NA(2))	State Highway (Status A(1)/NA(2))	Major District Road (Status A(1)/NA(2))	Other District Road (Status A(1)/NA(2))
0-3km																		
1	Ulagani	2	1	2	2	1	1	2	1	2	2	2	2	2	1	2	1	1
2	Maikkudi	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
3	Valayankulam	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Nedungulam	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Kallanai (Achangulam)	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Melauppiligundu	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2
3-7km																		
1	Melakottai	2	1	2	2	2	2	2	1	2	1	2	2	2	2	2	1	1
2	Vadagarai	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
3	Vidathakulam	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2
4	Mallampatti	2	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2
5	Giriyagoundanpatti	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
6	Koodakovil	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
7-10km																		
1	Kappalur	2	1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2
2	Maravankulam	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2	2	1
3	Andipatti	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2
4	Karisalpatti	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1
5	Rayapalayam	2	1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2
6	Melanesaneri	2	1	2	2	1	2	2	1	1	1	2	2	2	1	2	1	1
7	Karisalkalpatti	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Keelanesaneri	2	1	2	2	2	2	2	1	1	1	2	2	2	1	1	1	1
9	Sivarakottai	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Kokkulam (Thirumal)	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
11	Tirumal	2	1	2	2	1	2	2	1	2	1	2	2	2	2	2	2	2
12	Paraikulam	2	1	2	2	1	1	2	2	2	1	2	2	2	2	2	1	2
13	Saluppapillayarnatham	2	1	2	2	1	1	2	1	1	1	2	2	2	2	2	2	1
14	Vellakulam (K)	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Villur	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
16	Chennampatti	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1
17	Kurayur	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	Maruthangudi	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	2	2
19	Vellakulam (S)	2	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1

Source: DCHB Census 2011, Tamil Nadu.

Index: A(1) means Available, NA(2) means Not Available in the village

3.22. Other Issues in the Study Area

1. Deforestation of Land (Cutting Trees or Plant etc.)
2. Agriculture Land decreases
3. Lack of awareness among vulnerable groups for their welfare
4. Medical/Clinic facilities and PHC need for the Core area
5. Environmental clean with solid wastage pin each village.
6. Functioning of Hospital facilities with Sub Health care centers.
7. Need proper drainage system with public toilet men and women separately.
8. Avoid Road damage during carriage by mine vehicles (tipper Lorry).
9. Use sprinkler water when loading mine materials, to avoid water pollution during dust emission.
10. Water bodies like Gounda river, Lake, pond avoid dust emission.

3.23 Interpretation

Based on the data, following inferences could be drawn:

- Total literacy rate in the study area is 74%.
- The study area had average educational facilities. The overall status depicts that the education is limited to primary and middle level.
- The schedule tribe community forms 0.03% and Scheduled Caste forms 17% of the total population of study area.
- The Other Population forms 80% of the total population of study area.
- The study area is well connected by NH/SH/Village Road.
- The study area not well health facilities of primary level.
- **Gounda River** - 5.7km-SW from mine lease boundary this river dry. from mine lease boundary this river dry
- Considering the above facts, the proposed project will boost the socio-economic development activities in the area and hence will leave positive impact.
- The study area has mobile connectivity.

3.24 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, additional schools for girls, furniture and equipment in schools, up-gradation of existing school infrastructure.
- **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 Covid-19, malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of PHCs and Anganwadi centers.
- **People with disability** – Establishment of centre for special education, sensitization of the community towards disabled and awareness on Government schemes.
- 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.

3.25 Conclusion

To evaluate the impacts of Existing rough stone quarry project on the surrounding area, it is vital to assess the baseline status of the environmental quality in the locality of the site. Hence it can be concluded that the present environment status of the study area will not be affected by the project as Tmt.M. Meenatchi Rough stone quarry will adopt adequate control measures to protect the surrounding environment and will contribute in development of the study areas.

Socio Economic/ demographic status of the study area reveals that area further require improvement in the Economy and Infrastructure Development of the area. Hence it can be concluded that the present baseline environment status of the study area will not be affected by the proposed project.

The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

CHAPTER – 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 General

The environmental impact can be categorized as either primary or secondary, primary impacts which are attributed directly by the project; secondary impacts are those which are indirectly induced. The open cast mining operations involve development of benches, Approach Road, Haul Road, Excavation and handling of material. If adequate control measures are not taken to prevent/mitigate the adverse environmental impacts/lead to damage of the eco-system.

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans for sustainable resource extraction. Based on the baseline environmental status at the existing mine site, the environmental factors that are likely to be affected (Impacts) are identified, quantified and assessed. The various anticipated impacts will be on

- Land environment
- Water Environment
- Air Environment
- Noise Environment
- Socio economic environment
- Solid waste
- Soil environment

4.1 Land Environment

4.1.2 Anticipated Impact from Proposed Project

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

4.1.2.1 Common Mitigation Measures for Proposed Project

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.,
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area

- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle

4.1.3 Soil Environment

4.1.4 Impact on Soil Environment

The top layer of the project site in the form of Gravel formation, the Gravel will be directly loaded into tippers for the filling and levelling of low-lying areas. There is no disposal of Topsoil. The excavated rough stone will be directly loaded into dumpers to the needy customers.

There will be no disposal of waste water from the quarry operation, No discharge of toxic effluent from the proposed projects. The dust emission at working face and haul roads will be controlled by water sprinkling and plantation.

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

4.1.5 Common Mitigation Measures for Proposed Project

- Run-off diversion – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry works areas. And will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season

4.1.6 Waste Dump Management

There are no wastages anticipated in this Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%).

The overburden in the form of Topsoil formation the Topsoil will be also sold to needy customers for the filling and levelling of low-lying areas.

4.2 Water Environment

4.2.1 Anticipated Impact on Surface and ground water

The impact due to quarrying on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity will not intersect ground water table as the maximum depth of the quarry in the cluster is 42m and water table is found at a depth of 68m to 73m BGL. The quarrying operation will be carried out well above the water table. There is no intersection of surface water bodies (Streams, Canal, Odai etc.,) in the project area. During rainy season rain water will be collected in the quarry pit and later used for greenbelt development and for the water sprinkling in the haul roads. There is no proposal for discharging of quarry pit water outside the project area.

TABLE 4.1: WATER REQUIREMENTS

PROPOSAL – P1		
*Purpose	Quantity	Source
Dust Suppression	0.8 KLD	From Existing bore wells from nearby area
Green Belt development	0.9 KLD	From Existing bore wells from nearby area
Drinking and Domestic purpose	0.5 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Total	2.2 KLD	

* Water for drinking purpose will be brought from approved water vendors

Source: Approved Mining Plan Pre-Feasibility Report

Total water requirement in the proposed quarry is about 2.2 KLD, the water for dust suppression and greenbelt development will be sourced from the mine pit water collected during rainy seasons, the water for domestic purpose and drinking will be sourced from the approved water vendors.

4.2.2 Common Mitigation measures:

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages.

- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water

4.3 Air Environment

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

4.3.1. Anticipated

Impact

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

4.3.1.1. Modelling of Incremental Concentration from Proposed Project

Wind erosion of the exposed areas and the air borne particulate matter generated by quarrying operation, and transportation are mainly PM₁₀ & PM_{2.5} and emissions of Sulphur dioxide (SO₂) & Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are the cause of air pollution in the project area.

Similarly, loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles causes of pollution. This leads to an impact on the ambient air environment around the project area.

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

The impact on Air Environment is due to the mining and allied activities during Land Development phase, Mining process and Transportation. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate Matter (PM₁₀) affecting Ambient Air of the area. Prediction of impacts

on air environment has been carried out taking into consideration cumulative production three proposed quarries. Air environment and net increase in emissions by Open pit source modelling in AERMOD Software.

4.3.1.2 Emission Estimation

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER =overall emission reduction efficiency, %

The proposed mining activity includes various activities like ground preparation, excavation, handling and transport of ore. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 4.2.

TABLE 4.2: ESTIMATED EMISSION RATE

	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.097713217	g/s
	Blasting	Point Source	0.002154671	g/s
	Mineral Loading	Point Source	0.044404154	g/s
	Haul Road	Line Source	0.002497746	g/s/m
	Overall Mine	Area Source	0.066434151	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001093433	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000083049	g/s

4.3.2 Frame work of Computation & Model details

The prediction included the impact of Excavation, Drilling, Blasting, loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and Cloud cover.

Impact was predicted over the distance of 10 km around the source to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM₁₀ was observed close to the source due to low to moderate wind speeds. Incremental value of PM₁₀ was superimposed on the base line data monitored at the proposed site to predict total GLC of PM₁₀ due to combined impacts

Air Pollution Dispersion Modelling

Baseline Air Quality –

Baseline air quality been has measured at 2 locations in the core zone and 6 locations within the buffer zone of the study area. The 24 - hourly average samples of particulate matters (PM₁₀ and PM_{2.5}), SO₂ and NO_x were measured following the National Ambient Air Quality Standards (NAAQS), 2009. Monitoring data of 8 sampling stations are given below –

Meteorological Data –

Meteorology is the key to understand the air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A temporary meteorological station was installed at project site and monitored continually for study period without break. The station was installed at a height of 4 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis. A weather data was collected from IMD, Madurai agro for the month of Dec 2022 – Feb 2023 to correlate with site data and found not much of change in the parameters.

FIGURE 4.1: AERMOD TERRAIN MAP

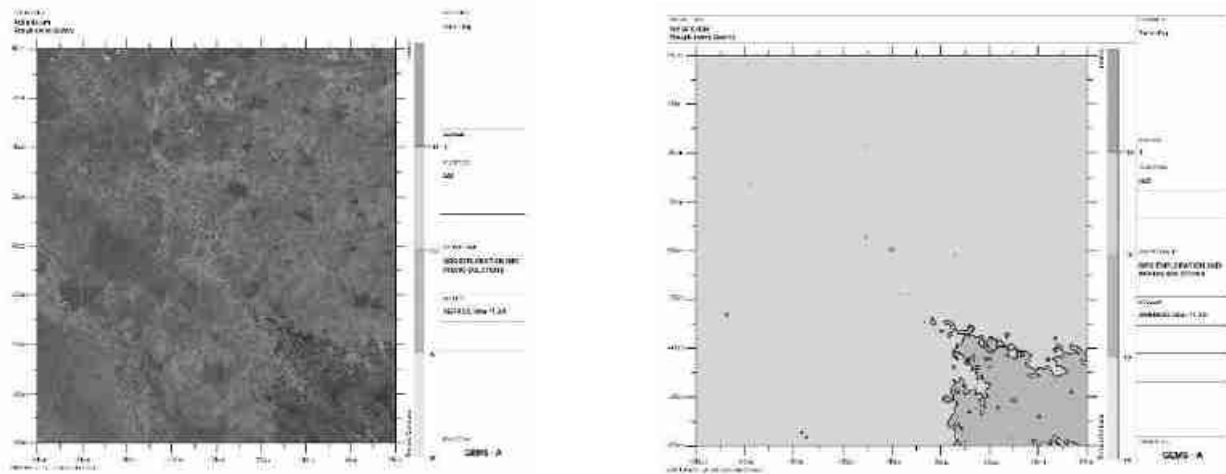


FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM₁₀

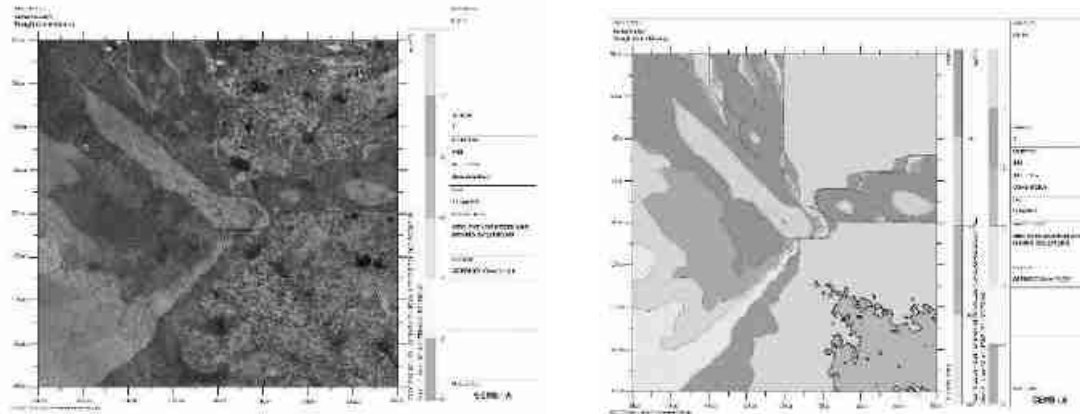


FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM₂₅

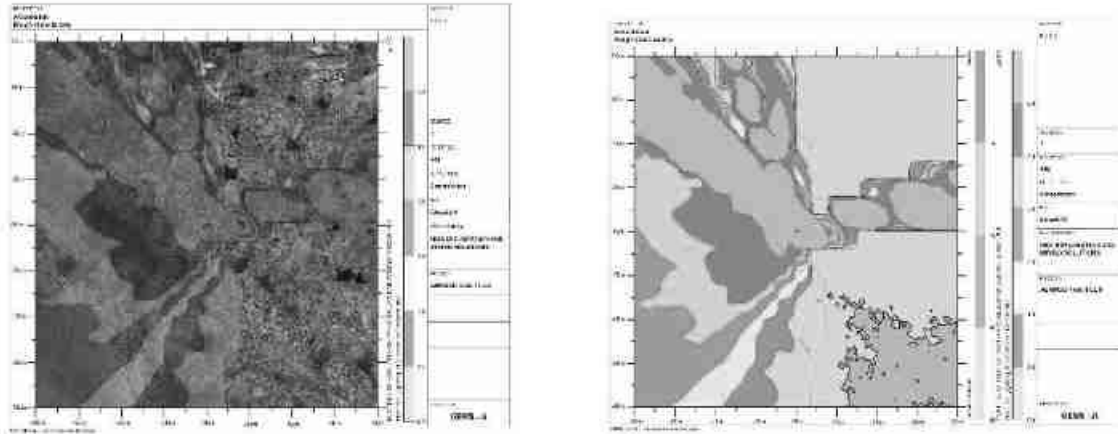


FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF SO₂

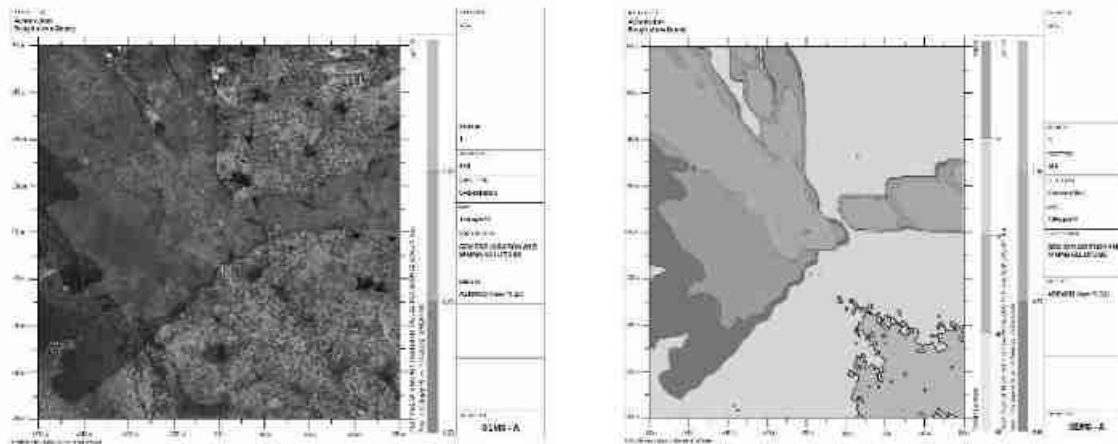


FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF NO_x

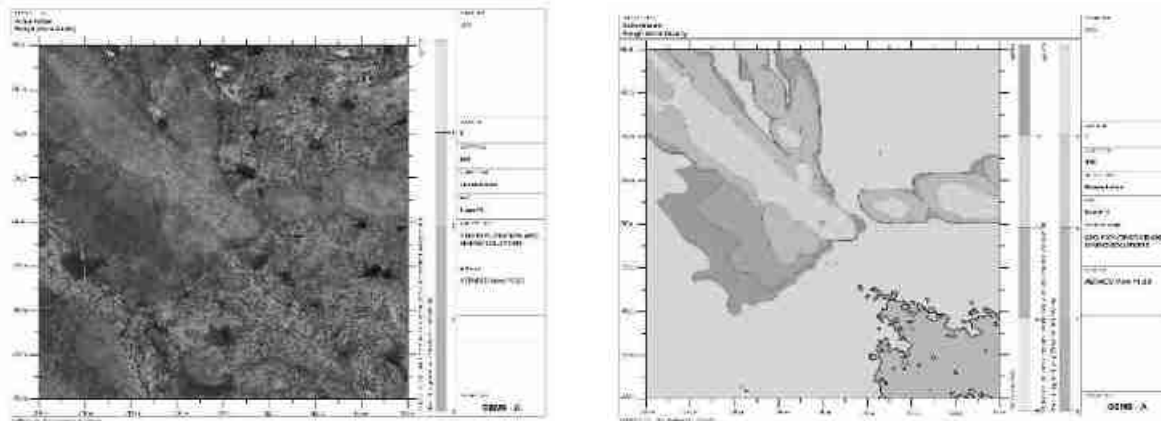
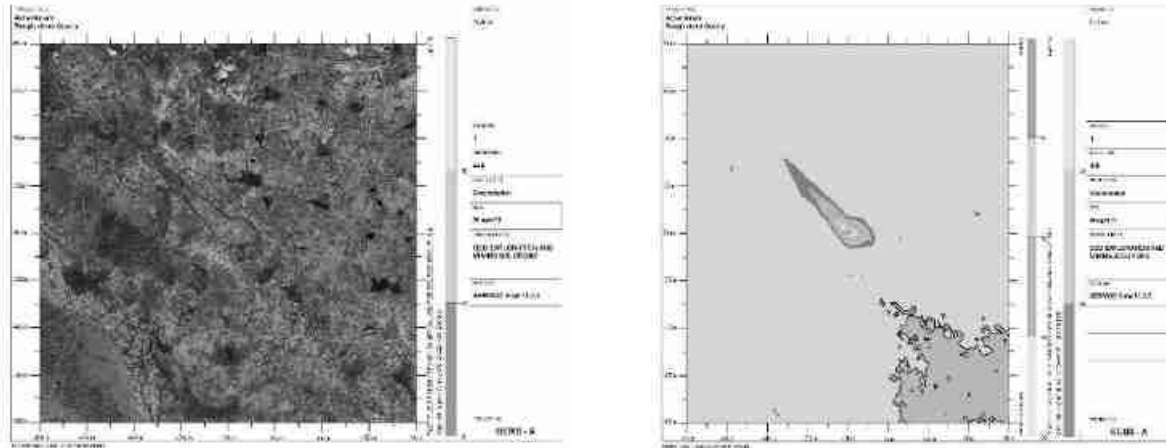


FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST**4.3.2.1 Model Results**

The post project Resultant Concentrations of PM₁₀, PM_{2.5}, SO₂& NO_x (GLC) is given in Table below:

TABLE 4.3: INCREMENTAL & RESULTANT GLC OF PM₁₀

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ due to mining (µg/m ³)	Total PM ₁₀ (µg/m ³) (5+6)
AAQ1	9°46'7.47"N 78° 2'33.72"E	91	33	45.0	11.83	56.8
AAQ2	9°46'23.60"N 78° 1'55.98"E	-1072	529	38.4	11.27	49.6
AAQ3	9°46'1.95"N 78° 3'55.60"E	2604	-141	41.5	1.05	42.5
AAQ4	9°48'25.43"N 78° 1'56.78"E	-1045	4308	44.9	10.00	54.9
AAQ5	9°47'33.87"N 77°59'20.66"E	-5840	2709	45.6	7.72	53.3
AAQ6	9°44'38.56"N 77°58'50.17"E	-6779	-2725	45.6	5.40	51.0
AAQ7	9°47'53.91"N 78° 3'55.63"E	2608	3329	43.4	0	43.4
AAQ8	9°45'7.52"N 78° 2'38.25"E	232	-1829	44.4	2.38	46.7

TABLE 4.4: INCREMENTAL & RESULTANT GLC OF PM_{2.5}

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM _{2.5} (µg/m ³)	Incremental value of PM _{2.5} due to mining (µg/m ³)	Total PM _{2.5} (µg/m ³) (5+6)
AAQ1	9°46'7.47"N 78° 2'33.72"E	91	33	22.1	5.67	27.8
AAQ2	9°46'23.60"N 78° 1'55.98"E	-1072	529	22.3	5.13	27.4
AAQ3	9°46'1.95"N 78° 3'55.60"E	2604	-141	22.3	0.80	23.1
AAQ4	9°48'25.43"N 78° 1'56.78"E	-1045	4308	22.1	4.91	27.0
AAQ5	9°47'33.87"N 77°59'20.66"E	-5840	2709	45.6	3.82	49.4
AAQ6	9°44'38.56"N 77°58'50.17"E	-6779	-2725	45.3	2.70	48.0
AAQ7	9°47'53.91"N 78° 3'55.63"E	2608	3329	22.0	0	22.0
AAQ8	9°45'7.52"N 78° 2'38.25"E	232	-1829	22.4	1.55	24.0

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF SO₂

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO ₂ (µg/m ³)	Incremental value of SO ₂ due to mining (µg/m ³)	Total SO ₂ (µg/m ³) (5+6)
AAQ1	9°46'7.47"N 78° 2'33.72"E	91	33	7.0	1.59	8.6
AAQ2	9°46'23.60"N 78° 1'55.98"E	-1072	529	6.9	1.55	8.5
AAQ3	9°46'1.95"N 78° 3'55.60"E	2604	-141	6.5	0	6.5
AAQ4	9°48'25.43"N 78° 1'56.78"E	-1045	4308	5.8	1.5	7.3
AAQ5	9°47'33.87"N 77°59'20.66"E	-5840	2709	7.0	1.19	8.2
AAQ6	9°44'38.56"N 77°58'50.17"E	-6779	-2725	6.8	0.41	7.2
AAQ7	9°47'53.91"N 78° 3'55.63"E	2608	3329	6.8	0	6.8
AAQ8	9°45'7.52"N 78° 2'38.25"E	232	-1829	6.9	0	6.9

TABLE 4.6: INCREMENTAL & RESULTANT GLC OF NO_x

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value of NO _x due to mining (µg/m ³)	Total NO _x (µg/m ³) (5+6)
AAQ1	9°46'7.47"N 78° 2'33.72"E	91	33	24.3	8.60	32.9
AAQ2	9°46'23.60"N 78° 1'55.98"E	-1072	529	24.3	8.00	32.3
AAQ3	9°46'1.95"N 78° 3'55.60"E	2604	-141	24.4	0	24.4
AAQ4	9°48'25.43"N 78° 1'56.78"E	-1045	4308	24.2	6.50	30.7
AAQ5	9°47'33.87"N 77°59'20.66"E	-5840	2709	22.6	1.73	24.3
AAQ6	9°44'38.56"N 77°58'50.17"E	-6779	-2725	24.2	0	24.2
AAQ7	9°47'53.91"N 78° 3'55.63"E	2608	3329	23.8	0	23.8
AAQ8	9°45'7.52"N 78° 2'38.25"E	232	-1829	24.7	0	24.7

TABLE 4.7: INCREMENTAL & RESULTANT GLC OF FUGITIVE DUST

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline Fugitive (µg/m ³)	Incremental value of Fugitive due to mining (µg/m ³)	Total Fugitive (µg/m ³) (5+6)
AAQ1	9°46'7.47"N 78° 2'33.72"E	91	33	66.23	80	146.23
AAQ2	9°46'23.60"N 78° 1'55.98"E	-1072	529	64.97	0	64.97
AAQ3	9°46'1.95"N 78° 3'55.60"E	2604	-141	68.17	0	68.17
AAQ4	9°48'25.43"N 78° 1'56.78"E	-1045	4308	64.26	0	64.26
AAQ5	9°47'33.87"N 77°59'20.66"E	-5840	2709	67.95	0	67.95
AAQ6	9°44'38.56"N 77°58'50.17"E	-6779	-2725	67.5	0	67.5
AAQ7	9°47'53.91"N 78° 3'55.63"E	2608	3329	67.32	0	67.32
AAQ8	9°45'7.52"N 78° 2'38.25"E	232	-1829	61.52	0	61.52

From the resultant of cumulative concentration i.e., Background + Incremental Concentration of pollutant in all the receptor locations without effective mitigation measures are still within the prescribed NAAQ limits of 100, 80 & 80 µg/m³ for PM₁₀, SO₂ & NO_x respectively. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be further being controlled.

4.3.4. Common Mitigation Measures for Proposed Project

Drilling – To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar.

Advantages of Wet Drilling: -

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e., at the time lunch hours, controlled charge per hole as well as charge per round of hole
- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & Transportation –

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt –

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

Occupational Health –

- Dust mask will be provided to the workers and their use will be strictly monitored

- Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- Ambient Air Quality Monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed

3.6 Noise Environment

Impact & Mitigation Measures

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. These activities will not cause any problem to the inhabitants of this area because there is no human settlement in close proximity to the project area. 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 working pit due to these major noise-generating sources. Noise modelling has been carried out to assess the impact on surrounding ambient noise levels. Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves, which are propagated outwards from the source through the air at a speed of 1,100 ft/sec, with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using model based on first principle.

$$L_{p2} = L_{p1} - 20 \log (r_2/r_1) - A_{e1,2}$$

Where:

L_{p1} & L_{p2} are sound levels at points located at distances r_1 & r_2 from the source.

$A_{e1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$L_{p_{total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

4.4.1 Anticipated Impact

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

- Source data
- Receptor data
- Attenuation factor

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

Sl.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
Total Noise Produced			95.8

*50 feet from source = 15.24 meters

Source: U.S. Department of Transportation (Federal Highway Administration) – Construction Noise Handbook

The total noise to be produced by mining activity is calculated to be 95.8 dB (A). Generally, most mining operations produce noise between 100-109 dB (A). We have considered equipment and operation noise levels (max) to be approx. 109 dB (A) for noise prediction modelling.

TABLE 4.9: PREDICTED NOISE INCREMENTAL VALUES

Location ID	N1	N2	N3	N4	N5	N6	N7	N8
Maximum Monitored Value (Day) dB(A)	42.6	41.9	39.2	38.4	37.1	41.4	36.1	37.8
Incremental Value dB(A)	46.12	38.52	28.97	27.43	24.11	28.50	27.64	29.22
Total Predicted Noise level dB(A)	47.72	43.54	39.59	38.73	37.31	41.62	36.68	38.36
NAAQ Standards	Industrial		Day Time- 75 dB (A)		Night Time- 70 dB (A)			
	Residential		Day Time- 55 dB (A)		Night Time- 45 dB (A)			

4.4.2 Common Mitigation Measures for Proposed Project

The following noise mitigation measures are proposed for control of Noise.

- Time intervals for each quarry during blasting.
- Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas.
- Limiting time exposure of workers to excessive noise.
- Proper and regular maintenance of vehicles, machinery and other equipment's.
- The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipment's.
- Speed of trucks entering or leaving the quarry will be limited to moderate speed to prevent undue noise from empty vehicles...
- Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes (occasionally).
- Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment.
- Provision of Quiet areas, where employees can get relief from workplace noise.
- The development of green belts around the periphery of the quarry site to attenuate noise.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

4.4.3 Ground Vibrations

Ground vibrations due to the proposed mining activities are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc., However, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest habitation from the project area is located 1km Southeast in Karacheri village. The ground vibrations due to the blasting in proposed mine are calculated using the empirical equation.

The empirical equation for assessment of peak particle velocity (PPV) is:

$$V = K [R/Q^{0.5}]^{-B}$$

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

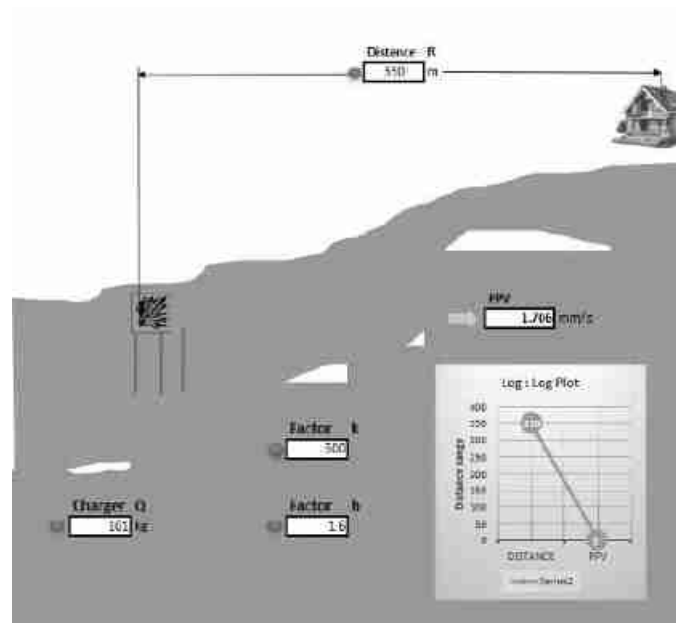
Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

TABLE 4.10: PREDICTED PPV VALUES DUE TO BLASTING

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	101(25*4)	310	2.071



From the above, the charge per blast of 101 Kg 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. It should be ensured that the explosives used for blasting at one blast should not exceed more than 25 Kg at any point of time. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.4.3.1 Common Mitigation Measures for Proposed Project

- The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators, which reduces the ground vibrations;
- Proper quantity of explosive, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting;
- Adequate safe distance from blasting will be maintained as per DGMS guidelines;
- Blasting shelter will be provided as per DGMS guidelines;

- Blasting operations will be carried out only during day time;
- The charge per delay will be minimized and preferably a greater number of delays will be used per blasts;
- During blasting, other activities in the immediate vicinity will be temporarily stopped;
- Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast;
- A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed.
- A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public.
- Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire.
- The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used.
- The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects.
- Appropriate blasting techniques shall be adopted such that the predicted peak particle velocity shall not exceed 8 Hz.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

4.5 Impact on Biological Environment

The developmental programs, policies, and projects operated or managed by government or private bodies can cause potentially significant changes in the physical, biological, and socio-economic environment. In some cases, the changes may be beneficial while in others it may be detrimental to the environment. Accordingly, environmental impact studies are required for systematic identification, qualification, and interpretation of the anticipated changes. The main environmental problems associated with mining activities are deforestation, land degradation (change in topography, soil erosion), visual intrusion, disturbance to the hydrological system, and water, air, and noise pollution which ultimately impact upon the floral and faunal status of the project area.

4.5.1. Impact on Flora

The proposed mine lease area is plain terrain and it is Patta land which is not fit for cultivation. It is mostly devoid of any considerable vegetation. The proposed existing mine lease area (core zone) not encompasses any designated forest land within it. The vegetation is very sparse and scanty. So, there will be no impact on flora from the mining operation. There will not be much contamination of soil or any other materials from the mining operation. No threatened plant species were reported in the core and buffer study area during the field survey.

4.5.1.1. Anticipated Impact on agricultural land associated with flora

1. There are no impacts on the nearby agricultural land due to this mining activity.
2. None of the plants will be cut during the operational phase of the mine.

3. There shall be negligible air emissions or effluents from the project site. During the loading of the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.
4. Most of the land in the buffer area is undulating terrain with croplands, grass patches, and small shrubs. Hence, there will be no effect on the flora of the region.

4.5.2 Mitigation Measures

4.5.2.1. Green Belt Development Plan

Greenbelt means the planting of special types of plants suitable to that particular agroclimatic zone and soil characteristics in a place that will make the area cooler, reduce air pollution, prevent soil erosion, and further improve the soil fertility status. A green belt around the periphery of the boundary and roadside will be created to avoid erosion of soil, prevention of landslides, and minimize air pollution and noise pollution in the project area. Green plants are capable of absorbing air pollutants and forming sinks for pollutants. Leaves with their vast area in a tree crown, absorb pollutants on their surface, effectively reducing their concentration and noise level in the ambient.

4.5.3.2. Proposed Green Belt

Extensive green belt development will be started during the construction phase, which will continue till the operation of the plant. About 300 trees will be planted per hectare all around the plant, approach roads, and township premises. Locally available types of trees which are resistant to pollutants will be planted. In addition to the above, all open spaces available within the premises will be developed as nurseries, parks, gardens, and other forms of greenery. 5 m wide greenbelt will be developed along the plant premises, as per land available.

4.5.3.3. Design of Green Belt

The present plan comprises the details of field investigations. Plant species for greenbelt development are selected as per CPCB guidelines. The green belt will be developed along the periphery of the Proposed Rough Stone quarry. The greenbelt development plan has been formulated considering the parameters such as climate, soil types, topography, etc.

a. Characteristic features of plants to be used for Absorption of pollutant gases

- Plant species should be perennial and evergreen with thick canopy cover.
- The crown of the tree (mass of foliage/leaves and branches growing outward from the trunk of the tree) should be either Oblong, Round, or Spreading for effective absorption of pollutant gases.
- Plant should have foliage of longer duration.

TABLE 4.11. LIST OF PLANT SPECIES PROPOSED FOR GREENBELT DEVELOPMENT

S. No	Scientific name	Tamil Name
1	<i>Aegle marmelos</i>	Vilva maram

2	<i>Albizia lebbek</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limonia acidissima</i>	Vila maram
6	<i>Syzygium cumini</i>	Naval maram
7	<i>Toona ciliata</i>	Santhana Vembu
8	<i>Ficus hispida</i>	Aththi maram
9	<i>Borassus flabellifer</i>	Panai-maram

(*Source: Term of Reference-ToR)

TABLE 4.12. SPECIES SUITABLE FOR ABATEMENT OF NOISE AND DUST POLLUTION

S. No	Botanical name	Common name
1	<i>Azadirachta indica</i>	Vembhu maram
2	<i>Ficus religiosa</i>	Arasan maram
3	<i>Ficus hispida</i>	Aththi maram
4	<i>Bombax ceiba</i>	Mul Elavu
5	<i>Syzygium cumini</i>	Naval maram
6	<i>Tamarindus indica</i>	Puliyamaram
7	<i>Mangifera indica</i>	Manga maram
8	<i>Harwickia binata</i>	Anjan maram

(*Source: Guidance for Developing Green belts Manual, CPCB 2000)

The above-suggested list covers species with thick canopy cover, perennial green nature, native origin, and a large leaf area index. The proposed species will help in forming an effective barrier between the mine site area and the surroundings. These species need to be planted along the periphery of the lease area to absorb fugitive emissions and noise levels which are generated during mining activities.

Some of the important aspects to be considered are:

- ✓ Planting of trees in each row will be in staggered orientation.
- ✓ In the front row, shrubs will be grown.
- ✓ Since the trunks of the tall trees are generally devoid of foliage, it will be useful to have shrubs in front of the trees so as to give coverage to this portion.

- ✓ The spacing between the trees will be maintained slightly less than the normal spaces, so that the trees may grow vertically and slightly increase the effective height of the green belt.

TABLE 4.13: GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Survial %	Area to be planted	Name of the species
I	It is proposed to plant 1750 Nos of trees in the 1 st year	80%	Safety barrier, Un utilized areas and nearby village roads	Neem, Pongamia pinnata, Ashoka, etc

TABLE 4.14: BUDGET FOR GREEBELT DEVELOPMENT PLAN

ACTIVITY		YEAR					RATE	AMOUNT (INR)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	200	200	200	200	200	@ 100 Rs	Rs.2,00,000/-
	Cost	40000	40000	40000	40000	40000		
Plantation cost in the quarried out top benches, approach road and panchayat road	Nos.	300	-	200	200	100	Per sapling	Rs.1,60,000/-
	Cost	60000	-	40000	40000	20000		
Wire Fencing (In Mtrs) 1050		3,15,000	-	-	-	-	@300 Rs Per Meter	Rs.3,15,000/-
Garland drain (In Mtrs) 950		2,85,000	-	-	-	-	@300 Rs Per Meter	Rs.1,53,000/-
TOTAL								Rs. 9,60,000/-

Source: approved Mining Plan

4.5.4. Anticipated Impact on Fauna

- Since the terrestrial fauna in the study area is distributed away from the mine site, the impacts of project are likely to be much low on terrestrial fauna of the region. The proposed mining lease area is devoid of any significant vegetation, it is not suitable for permanent habitat for any specific wildlife.
- Habitat degradation and disturbance to the faunal group due to ground vibration and increase in noise level will be minimized or resolved by modern technologies. So, from above facts it is revealed that there will be no impact on fauna. No threatened fauna species reported in the core and buffer study area.

4.5.4.1. Measures for protection and conservation of wildlife species

- Topsoil has a large number of seeds of native plant species in the mining area.
- Topsoil will be used for restoration and suitable surfaces for planted seedlings.
- Checks and controls the movement of vehicles in and out of the mine.
- Undertaking mitigative measures for a conducive environment to the flora and fauna in consultation with Forest Department.

- A dust suppression system will be installed within the mine and periphery of the mine.
- Plantation around the mine area will help in creating habitats for small faunal species and create a better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

4.5.5. Impact on Aquatic Biodiversity

Mining activities will not disturb the aquatic ecology as there is no effluent discharge proposed from the Rough Stone quarry. There is no natural perennial surface water body within the mine lease area, like wetlands, rivers streams, Odai, Vaari, Canal, Channel, lakes, ponds, tanks, and farmer sites. There are few small seasonal water bodies located in the study area. There is no water during the study period. Aquatic biodiversity is not observed in the study area. There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.

TABLE NO 4.15. ECOLOGICAL IMPACT ASSESSMENTS

SI.No	Attributes	Assessment
1	Activities of the project affect the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in the mining lease site. The fauna sighted mostly migrated from the buffer area.
2	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species sighted in core mining lease area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/coastline/estuary/sea	No national park or eco-sensitive zone around 10 km radius.
4	Proposed project restricts access to waterholes for wildlife	‘NO‘
5	Proposed mining project impact surface water quality that also provide water to wildlife	‘NO ‘scheduled or threatened wildlife animal sighted regularly core in core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management such as drains is constructed properly so there will be no siltation affect in nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	‘NO‘
8	The project release effluents into a water body that also supplies water to a wildlife	No water body near to core zone so chances of water become polluted is low.

9	Mining project effect the forest-based livelihood/ any specific forest product on which local livelihood depended	'NO'
10	Project likely to affect migration routes	'NO' 'migration route observed during monitoring period.
11	Project likely to affect flora of an area, which have medicinal value	'NO'
12	Forestland is to be diverted, has carbon high sequestration	'NO' 'There was no forest land diverted.
13	The project likely to affect wetlands, Fish breeding grounds, marine ecology	'NO'. Wetland was not present in near core Mining lease area. No breeding and nesting ground present in core mining area.

*(Format Source: EIA Guidance Manual-Mining and Minerals, 2010)

TABLE 4.16: ANTICIPATED IMPACT OF ECOLOGY AND BIODIVERSITY

Sl. No	Aspect Description	Likely Impacts on Ecology and Biodiversity (EB)	Impact Consequence - Probability Description / Justification	Significance	Mitigation Measures
Pre-Mining Phase					
1	Uprooting of vegetation of lease area	Site specific loss of common floral diversity (Direct impact)	Site possesses common floral (not trees) species. Clearance of these species will not result in loss of flora	Less severe	No immediate action required. However, Greenbelt /plantation will be developed in project site and in periphery of the project boundary, which will improve flora and fauna diversity of the project area.
		Site specific loss of associated faunal diversity (Partial impact)	Site supports only common species, which use wide variety of habitats of the buffer zone reserve forest area. So, there is no threat of faunal diversity.		
		-Loss of Habitat (Direct impact)	Site does not form Unique / critical		

			habitat structure for unique flora or fauna.		
Mining phase					
2	Excavation of mineral using machine and labours, Transportation activities will generate noise.	Site-specific disturbance to normal faunal movements at the site due to noise. (Partial impact)	Site does not form unique / critical habitat structure for unique flora or fauna.	Less severe	Mining activity should not be operated after 5PM. Excavation of dump and transportation work should stop before 7PM.
3	Vehicular Movement for transportation of materials will result in generation of dust (SPM) due to haul roads and emission of SO ₂ , NO ₂ , CO etc.	Impact on surrounding agriculture and associated fauna due to deposition of dust and Emission of CO. (Indirect impact)	Impact is less as the agricultural land far from core area.	Less severe	All vehicles will be certified for appropriate Emission levels. More plantation has been suggested Upgrade the vehicles with alternative fuel such biodiesel, methanol and biofuel around the mining area.

4.6 Socio Economic Impacts

4.1 Construction Phase

Anticipated Impacts:

- ♣ No. of people will get employment during the construction stage resulting in the ancillary development and growth. Nearby Local people will be given preference for employment on the basis of their skill and experience.
- ♣ Further due to proposed project, influx of working community will also generate an indirect employment through development of nearby market/ shops, trade centers, activities, transportation etc.
- ♣ Population influx during the construction phase can introduce various water and vector borne diseases which can lead to various unhygienic health problems in the area by disturbing the existing sanitation infrastructure.
- ♣ Rapid diverse population influx at the project site can create unusual behavioural activity such as worker-community conflicts, increase violence such as theft/stabbing and increased consumption of drugs/alcohol within the area.
- ♣ Impacts on the health of nearby villagers can be envisaged due to the transportation activities leading to short term exposure of fugitive dust, resulting in various acute diseases such as increased eye irritation, nausea, headache etc.

Mitigation measures:

- ♣ Deploying of mobile toilets or the construction of temporary toilets will be done near to the construction site with the adequate water supply.

- ♣ Awareness programme will be conducted before the monsoon season regarding the spread of water borne/ vector diseases.
- ♣ Mosquito repellents will be provided in the nearby villages and at construction site to avoid the spread of diseases.
- ♣ To overcome behavioural impact, proper site in charge with timely supervision will be done. In advance, facilities with equipped medical and safety services will be provided to take a control over the incident/violence if any caused.
- ♣ To overcome behavioural impact, supervision will be done by site in charge. In advance, emergency cell will be formed with fully equipped communication system, medical and safety services to take control over the incident/violence caused.

4.2 Operation Phase:

Anticipated Impacts:

- ♣ Long term exposure to the pollutants such as PM, SO₂ and NO₂ Cement dust have a potential to create health impacts such as risk of cardiovascular and respiratory disease, eye irritation, bronchitis, lung damage, increased heart ailments, etc.
- ♣ Other impacts, associated with the applied for Rough Stone quarry Project will create a positive impact as it will result in the overall development of the area in respect to the infrastructure development, educational growth, health facilities etc., as a part of the CSR activity.

Mitigation Measures:

- ♣ In order to mitigate the long-term health impacts, efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP will be installed at all major stacks to keep the emissions within the permissible limits. To reduce the gaseous emission, Pyro-process itself acts as a long SO₂ scrubber and De - NO_x system will be installed for fuel burning along with calciner for low NO_x formation. To reduce fugitive emission from vehicles and machineries will be regularly monitored and maintained.
- ♣ For emergency, proposed to develop an occupational health centre for its employees and nearby villagers.

4.3 Impact Evaluation:

TABLE 4.17. IMPACT EVALUATION IMPACT EVALUATION IS GIVEN IN TABLE BELOW

Impact Evaluation Element	Impact on socio economics due to the applied for Ulagani Rough Stone cluster quarry over an extent of 7.70.55 ha of Patta lands of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State.		
Potential Effect/ Concern	Proposed project will provide direct & indirect employment opportunities to the local residents, which will help to increase their earning and better living standard as well as further up-liftment of socio-economic status of the area.		
Characteristics of Impacts			
Nature	Positive		Negative
	✓		
Type	Direct	Indirect	Cumulative

			✓	
Extent	Project area	Local	Zonal	Regional
		✓		
Duration	Short time		Long term	
			✓	
Intensity	Low		Medium	High
			✓	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
			✓	
Significance of Impact				
Significance	Insignificant	Minor	Moderate	Major
			✓	

4.7 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
- Explosive storage and handling

4.7.1 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

4.7.2 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(C), 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.

4.7.3 Physical Hazards

The following measures are proposed for control of physical hazards

- Specific personnel training on work-site safety management will be taken up;
- Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide, especially after blasting activities;
- 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 Topsoil will be taken up

4.7.4 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.

4.8 Mine Waste Management

No waste is anticipated from any of the Existing quarries.

4.9 Mine Closure

Mine closure plan is the most important environmental requirement in mining projects. 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.

4.9.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.9.1.1 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.,

4.9.1.2 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 discharge 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.

4.9.1.3 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 e.g., planning for agriculture
 - Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor e.g., 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 – 5: ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 Introduction:

Consideration of alternatives to a project proposal is a requirement of EIA process. This quarry is site specific. The site has been selected based on geological investigation and exploration and from the existing quarry pits around the project site. Drilling, Blasting, Excavation, Loading & Transportation will be carried out in this quarrying operation.

- This area denotes the indicative of flow pattern of the rock mass in N40⁰E to S40⁰W with dipping SE60⁰.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility.
- Socio – economic background.

Enough infrastructure exists and lesser resources are required to be deployed. Since, any major construction for infrastructure is not required and hence does not affect the environment considerably.

5.1 Factors Behind the Selection of Project Site

Rough Stone Quarry Projects at Ulagani Village, Kallikudi Taluk a site specific. The Proposed existing mining lease area has following advantages: -

- The mineral deposit occurs in a non-forest area.
- There is no habitation within the project area; hence no R & R issues exist.
- There is no river, stream, nallah and water bodies in the applied mine lease area.
- Availability of skilled, semi-skilled and unskilled workers in this region.
- All the basic amenities such as medical, fire fighting, education, transportation, communication and infrastructural facilities are well connected and accessible.
- The mining operations will not intersect the ground water level. Hence, no impact on ground water environment.
- Study area falls in seismic zone – III, there is no major history of landslides, earthquake, subsidence etc., recorded in the past history.

5.2 Analysis of Alternative Site

The mineral deposits are site specific in nature; hence, question of seeking alternate site does not arise for this project.

5.3 Factors Behind Selection of Proposed Technology

Mechanized open cast mining operation with drilling and blasting method will be used to extract Rough Stone in the area. The quarry areas fall in the clusters has following advantages –

- As the mineral deposition is homogeneous and batholith formation, therefore opencast method of working out deposit is preferred over underground method.
- The material will be loaded after sprinkling with water with the help of excavators into dumpers / trippers and transported to the needy customers.
- Blasting and availability of drills along with controlled blasting technology gives desired fragmentation so that the mineral is handled safely and used without secondary blasting.

Semi skilled labours fit for quarrying operations are easily available around the nearby villages.

5.4 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 – 6: ENVIRONMENTAL MONITORING PROGRAMME

6.0 General

Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEF & Consent to Operate issued by the State Pollution Control Board. Monitoring reports will be submitted to regulator as per statutory requirements. The entire monitoring work will be carried out by MoEF & CC / NABL recognized laboratories.

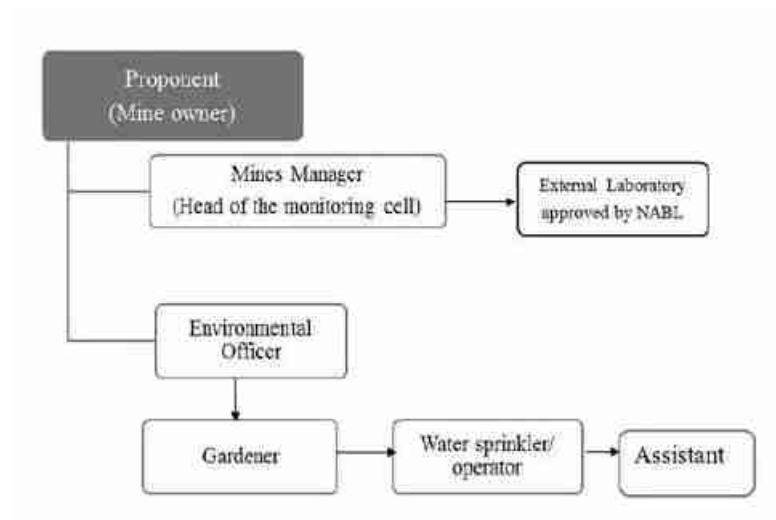
The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness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

6.1 Methodology of Monitoring Mechanism

Implementation of EMP and periodic monitoring will be carried out by the proponents and respective quarry owners in the cluster quarries. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed project; Mine Management Level environmental protection measures like dust suppression, treatment and recycling of waste water, control of noise due to blasting and Ground vibration, maintenance of machinery and vehicles, housekeeping in the mine premises, plantation, implementation of other hand, implementation of area level protection measures like plantation and green Environmental Management Plan and environmental clearance conditions will be monitored by the proponent. On the belt development, environmental quality monitoring etc.,

An environment monitoring cell (EMC) will be constituted at the quarry consisting of following members to monitor the implementation of EMP and other environmental protection measures.

FIGURE 6.1 HIERARCHY OF ENVIRONMENTAL MONITORING CELL



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. 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 monthly, half-yearly and yearly. The half-yearly reports will be submitted to Ministry of Environment and Forest, Regional Office and SEIAA 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).

6.2 Implementation Schedule of Mitigation Measures

The mitigation measures proposed in Chapter-4 will be implemented so as to reduce the impact on the environment due to the operations of the proposed existing project. Implementation schedule of mitigation measures is given in Table 6.1.

TABLE 6.1 IMPLEMENTATION SCHEDULE

Sl No.	Recommendations	Time Period	Schedule
1	Land Environment Control Measures	Before commissioning of the project	Immediately after the commencement of the project
2	Soil Quality Control Measures	Before commissioning of the project	Immediately after the commencement of the 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

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 monitoring are detailed in Table 6.2

TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC FOR P1

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 _{2.5} , PM ₁₀ , SO ₂ and NO _x .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (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 Environmental Policy of the Proponents

The project proponents in the Proposed existing quarries are committed to ensure that:

- Protect the environment by control and prevention of pollution and promote green environment.
- To operate the quarry with an objective of no injuries and accidents at the work place and provide a safe work place for our employees, contractors and others who perform their duties.
- Adequate health care will be taken to all the employees and create process to reduce the adverse effect of the operations on Health of the employees.
- Provide safety appliance and continuous training in safety to employees to ensure safe production and achieve the target of zero accidents.
- Develop safe working methods and practices, remove unsafe work conditions and consider all the aspects at the early stages of process development to provide safe working atmosphere.
- Communicate Safety, Health and Environmental Policy to all employees for better understanding and practice.

6.5 Budgetary Provision for Environmental Monitoring Programme

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.

Environmental Monitoring Programme for Proposed existing quarry for the mining plan period is Rs 3,80,000/- period of five years.

TABLE 6.3 ENVIRONMENT MONITORING BUDGET

Parameter	Sl. Nos	Capital Cost
Air Quality, Meteorology, Water Quality, Hydrology, Soil Quality	P1	Rs.3,80,000/-
Noise Quality, Vibration Study Greenbelt	Total	Rs. 3,80,000/-

Source: Approved Mining Plan

6.6 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 proponent with Environmental Monitoring cell and necessary corrective measures will be carried out. 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
- SEIAA, Chennai, Tamil Nadu

Besides the Mines Manager/Agent 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 – 7: ADDITIONAL STUDIES

7.0 General

The following Additional Studies were done as per items identified by project proponent and items identified by regulatory authority. Items identified by public and other stakeholders will be incorporated after Public Hearing.

- Public Consultation
- Risk Assessment
- Disaster Management Plan
- Cumulative Impact Study
- Plastic Waste Management

7.1. *Public Consultation:*

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 is submitted along with this Draft EIA / EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

7.2 *Risk Assessment*

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to time table are recorded along with pinpointed responsibilities.

The cluster quarry operation will be carried out under the direction of a Qualified Competent Mine manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

Factors of risks involved due to human induced activities in connection with mining & allied activities with detailed analysis of causes and control measures for the mine is given in below Table 7.1.

TABLE 7.1 RISK ASSESSMENT & CONTROL MEASURES

S. No	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries	Improper handling and unsafe working practice	<ul style="list-style-type: none"> ▪ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations; ▪ Entry of unauthorized persons will be prohibited; ▪ Fire fighting and first-aid provisions in the mine office complex and mining area; ▪ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be

			<p>made available to the employees and regular check for their use.</p> <ul style="list-style-type: none"> ▪ Working of quarry, as per approved plans and regularly updating the mine plans; ▪ Cleaning of mine faces shall be daily done in order to avoid any overhang or undercut; ▪ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager; ▪ Maintenance and testing of all mining equipment as per manufacturer 's guidelines.
2	Drilling& Blasting	<p>Due to improper and unsafe practices</p> <p>Due to high pressure of compressed air, hoses may burst</p> <p>Drill Rod may break</p>	<ul style="list-style-type: none"> ▪ Safe operating procedure established for drilling (SOP) will be strictly followed. ▪ Only trained operators will be deployed. ▪ 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. ▪ Drilling shall not be carried on simultaneously on the benches at places directly one above the other. ▪ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. ▪ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. ▪ Operator shall regularly use all the personal protective equipment.
3	Blasting	<p>Fly rock, ground vibration, Noise and dust.</p> <p>Improper charging, stemming & Blasting/fining of blast holes</p> <p>Vibration due to movement of vehicles</p>	<ul style="list-style-type: none"> ▪ 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. ▪ SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation ▪ Shots are fired during daytime only. ▪ All holes charged on any one day shall be fired on the same day. ▪ The danger zone is and will be distinctly demarcated (by means of red flags)
4	Transportation	<p>Potential hazards and unsafe workings contributing to accident and injuries</p>	<ul style="list-style-type: none"> ▪ Before commencing work, drivers personally check the dumper/truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning

		Overloading of material While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	<p>devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.</p> <ul style="list-style-type: none"> ▪ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. ▪ Concave mirrors should be kept at all corners ▪ All vehicles should be fitted with reverse horn with one spotter at every tipping point ▪ Loading according to the vehicle capacity ▪ Periodical maintenance of vehicles as per operator manual.
5	Natural calamities	Unexpected happenings	<ul style="list-style-type: none"> ▪ Escape Routes will be provided to prevent inundation of storm water ▪ Fire Extinguishers & Sand Buckets
6	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	<ul style="list-style-type: none"> ▪ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m height.

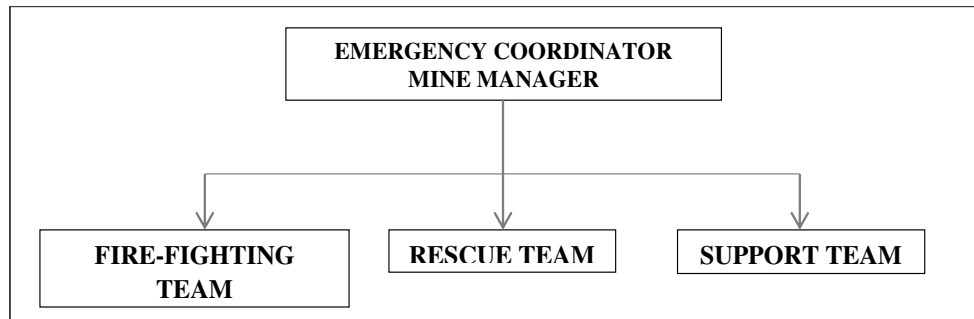
7.3 Disaster Management Plan

Natural disasters like Earthquake, Land slides has not been recorded in the past history as the terrain is categorized under seismic zone III. 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 and the coordination among key personnel and their team has been shown in Fig 7.1.

FIGURE 7.1: DISASTER MANAGEMENT TEAM LAYOUT

The emergency organization shall be headed by emergency coordinator who will be qualified competent mine manager. There would be three teams for taking care of emergency situations – Fire-Fighting Team, Rescue Team and Support Team. The proposed composition of the teams is given in Table 7.2.

TABLE 7.2: PROPOSED TEAMS TO DEAL WITH EMERGENCY SITUATION

DESIGNATION	QUALIFICATION
FIRE-FIGHTING TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
RESCUE TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
SUPPORT TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Assistant Team Leader	Environment Officer
Team Member	Mining Mate
Security Team Leader/ Emergency Security Controller	Mines Foreman

Once the mine becomes operational, the above table along with names of personnel will be prepared and made easily available to workers. A mobile communication network and wireless shall connect Mine Emergency Control Room (MECR) to control various departments of the mine, fire station and neighbouring industrial units/mines.

Roles and responsibilities of emergency team –

(a) Emergency coordinator (EC)

The emergency coordinator shall assume absolute control of site

(b) Incident controller (IC)

Incident controller shall be a person who shall go to the scene of emergency and supervise the action plan to overcome or contain the emergency. Shift supervisor or Environmental Officer shall assume the charge of IC.

(c) Communication and advisory team

The advisory and communication team shall consist of heads of Mining Departments i.e., Mines Manager

(d) Roll call coordinator

The Mine Foreman shall be Roll Call Coordinator. The roll call coordinator will conduct the roll call and will evacuate the mine personnel to assembly point. His prime function shall be to account for all personnel on duty.

(e) Search and rescue team

There shall be a group of people trained and equipped to carryout rescue operation of trapped personnel. The people trained in first aid and fire-fighting shall be included in search and rescue team

(f) Emergency security controller

Emergency Security Controller shall be senior most security person located at main gate office and directing the outside agencies e.g. fire brigade, police, doctor and media men etc.,

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

Proposed fire extinguishers at different locations –

The following type of fire extinguishers is proposed at strategic locations within the quarry.

Location	Type of Fire Extinguishers
Electrical Equipment's	CO ₂ type, foam type, dry chemical powder type
Fuel Storage Area	CO ₂ type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

Alarm system to be followed during disaster

On receiving the message of disaster from Site Controller, fire-fighting team, the mine control room attendant will sound siren wailing for 5 minutes. Incident controller will arrange to broadcast disaster message through public address system.

On receiving the message of "Emergency Over" from Incident Controller the emergency control room attendant will give "All Clear Signal", by sounding alarm straight for 2 minutes.

The features of alarm system will be explained to one and all to avoid panic or misunderstanding during disaster.

In order to prevent or take care of hazard / disasters if any the following control measures have been adopted.

- All safety precautions and provisions of Metalliferous Mines Regulations (MMR), 1961 is strictly followed during all mining operations
- Fire fighting and first-aid provisions in the mines office complex and mining area will be provided.
- Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees and the use of same is strictly adhered to through regular monitoring
- Training and refresher courses for all the employees working in the quarry in phase manner
- Cleaning of mine faces will be carried out regularly
- Provision of high-capacity standby pumps with generator sets with enough quantity of diesel for emergency pumping especially during monsoon.
- A blasting SIREN will be used at the time of blasting for audio signal.
- Checking of blasting area for any un-blasted hole or material.
- Warning notice boards indicating the time of blasting and NOT TO TRESPASS will be displayed at prominent places

7.4 CUMULATIVE IMPACT STUDY

There are two proposed and one existing quarries, two abandoned quarry falls in the cluster. The list of quarries is as below –

TABLE 7.3: LIST OF QUARRIES WITHIN 500 METER RADIUS FROM THIS PROPOSAL

PROPOSED QUARRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Status
P1	Tvl. Suganya Blue Metals, (Thiru. R. Malaiyarasan (Authorized Signatory) No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District- 625 022	108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M Ulagani Village, Kallikudi Taluk,	3.48.0	ToR obtained vide File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024
P2	Tmt.M. Meenatchi, W/o. Mahalingam, Ulagani, Thirumangalam Taluk, Madurai District – 625 022	16/2B, 16/3 & 16/4 etc., of Achankulam Village, Kallikudi Taluk, Madurai District	1.42.0	EC Granted vide EC24B0108TN5843396N Dated: 10.05.2024
Total Extent			4.90.0	
EXISTING QUARRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
E1	L.Selvi	112/10A (0.19.5), 112/10B (0. 12.0), 112/10C (0.19.5), 112/10D1 (0.75.3),	2.80.55	ROC.NO.1705/2017 dt 08.06.2023 14.06.2023 to 13.06.2028

		112/10D3 (0.52.75), 112/10E (0.12.0), 112/11 (0.71.0), 112/8A (0.07.0)		
Total Extent			2.80.55	
ABANDONED/EXPIRED QURRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
A-1	Thiru. M.Pandi	3/1,2,3,4,5	2.11.0 Ha	ROC.NO.156/2010/mines dt 13.07.2010 19.08.2010 to 18.08.2015
A-2	Thiru. P.R.Kalyana Sundaram	2/3A etc.,	2.91.0 Ha	ROC.NO.1135/2009/mines dt 30.07.2010 03.09.2010 to 02.09.2015
A-3	Thiru R. Ravi	1/1A etc	3.82.0	ROC.NO.15/2014/mines dt 11.05.2015 27.05.2015 to 26.05.2020
Total Extent			8.84.0	
TOTAL CLUSTER EXTENT			7.70.55	

Source :500m Cluster Letter by AD, G&M, Madurai.

- Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

TABLE 7.4: SALIENT FEATURES OF THE PROPOSED PROJECTS IN CLUSTER

SALIENT FEATURES OF PROPOSAL “P1”		
Name of the Mine	Tvl. Suganya Blue Metals Rough Stone & Gravel Quarry	
Land Type	It is a Patta land, registered in the name of the company Tvl. Suganya Blue Metals vide patta no.: 1438 & 1452	
S.F. Nos	108/2D, 109/1, 2C,3A, 3B, 4,6, 10A, 10B, 12, 110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L and 1M, Ulagani Village, Kallikudi Taluk, Madurai District.	
Extent	3.48.0 Ha	
Toposheet No	58 K/01	
Latitude	09°46'28.0212" N to 09°46'36.8935" N	
Longitude	78°02'13.0813" E to 78°02'20.5055" E	
Highest elevation	128m AMSL	
Geological Reserves	Rough Stone	Gravel
	13,91,960 m ³	69,598m ³
Mineable Reserves	Rough Stone	Gravel
	3,84,905m ³	48,946m ³
Production for five years	3,84,905m ³	48,946m ³
Mining Plan Period / Lease Period	5 Years	
Proposed Depth	42m (2m Topsoil + 40m Rough Stone) Bgl	
Ultimate Pit Dimension	204m(L) x 121m (W) x 42m(D)	
Water Level in the surrounds area	The Water table is found at a depth of 73m in summer and at 68m in rainy seasons.	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is a Plain topography. The area has gentle sloping towards eastern side and altitude of the area is 128m (max) above from Mean Sea level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit.	
Machinery proposed	Jack Hammer	12
	Compressor	3

	Excavator with Bucket and Rock Breaker	1
	Tippers	3
Blasting	Usage of Slurry Explosive with MSD detonators	
Manpower Deployment	46 Nos	
Total Project Cost	Rs.2,78,05,000/-	
CER Cost	Rs.5,00,000/-	
Nearest Habitation	310m-NE	
SALIENT FEATURES OF PROPOSAL "P2"		
Name of the Mine	Tmt.M. Meenatchi Rough Stone Quarry Project	
Land Type	It is a Patta land, registered in the name of the applicant Tmt.M. Meenatchi.	
Previous quarry operation details	The quarry lease was previously granted in favour of Thiru.P. Kannan over an extent of 0.85.5 Hectares of Patta land in S.F.No. 16/3 of Achankulam Village, Kallikudi Taluk, Madurai District vide Rc.No.687/2008/Mines, Dated: 03.07.2009 for the period of five years from 21.08.2009 to 20.08.2014 for quarrying of Rough Stone. Now the applicant has applied a quarry lease on 06.06.2016 for the period of five years over an extent of 1.42.0 Ha.	
S.F. Nos	16/2B, 16/3 & 16/4, Achankulam, Kallikudi Taluk, Madurai District.	
Extent	1.42.0 Ha	
Toposheet No	58 K/01	
Latitude	09° 46' 03.67"N to 09° 46' 08.60"N	
Longitude	78° 02' 28.65"E to 78° 02' 35.52"E	
Highest elevation	107m AMSL	
Geological Reserves	Rough Stone	Top Soil
	2,50,411m ³	8,110m ³
Mineable Reserves	Rough Stone	Top Soil
	33,148m ³	2,520m ³
Mining Plan Period / Lease Period	5 Years	
Proposed Depth	30m (2m Topsoil + 28m Rough Stone) Bgl	
Existing Pit Dimension	153m(L) x 73m (W) x 19m(D)	
Ultimate Pit Dimension	177m(L) x 73m (W) x 30m(D)	
Water Level in the surrounds area	The Water table is found at a depth of 70m in summer and at 65m in rainy seasons.	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is a Plain terrain. The area has gentle sloping towards Southeastern side and altitude of the area is 107m (max) above from Mean Sea level. The area is covered by 2m thickness of Topsoil and followed by Massive Charnockite which is clearly inferred from the existing quarry pit.	
Machinery proposed	Jack Hammer	1
	Compressor	1
	Excavator with Bucket and Rock Breaker	1
	Tippers	1
Blasting	Usage of Slurry Explosive with MSD detonators	
Manpower Deployment	12 Nos	
Total Project Cost	Rs.19,55,000/-	
CER Cost	Rs.5,00,000/-	
Nearest Habitation	Achankulam 830m-NE	
SALIENT FEATURES OF EXISTING "E1"		
Name of the Mine	Tmt.J. Selvi Rough Stone and Gravel Quarry Project	
S.F. Nos	112/10A, 112/10B, 112/10C, 112/10D, 112/10E, 112/11,112/8A & 112/9 etc., Ulagani Village, Madurai North Taluk Madurai District.	
Extent	2.85.0 Ha	
Toposheet No	58 K/01	

Latitude	09° 46' 19"N to 09° 46' 25"N	
Longitude	78° 02' 13"E to 78° 02' 21"E	
Proposed Quantity of Reserves Level of production	Rough Stone	Gravel
	3,89,860m ³	34,998m ³
Mining Plan Period / Lease Period	5 Years	
Proposed Depth	32m Bgl	
Water Level in the surrounds area	The Water table is found at a depth of 55m	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Blasting	Usage of Slurry Explosive with MSD detonators	
Manpower Deployment	23 Nos	
Total Project Cost	Project Cost	Rs. 70,85,000/-
	EMP Cost	Rs. 4,45,000/-
	Total	Rs. 75,30,000/-
CER Cost	Rs.1,41,000/-	
Nearest Habitation	400m-West	

Source: approved mining plan and E4 for Scheme of mining period

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the quarries (proposed and existing) within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting.

Impact on Air Environment –

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.5 & 7.6

TABLE 7.5 CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Proposed Production m ³	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day @ 12m ³ per load
P1	3,84,905	76,981	257	21 Trips /Day
P2	33,148	6,630	22	4 Trips /Day
Total	4,18,053	83,611	279	25 Trips /Day
E1	3,89,860	77,972	260	22 Trips /Day
Total	3,89,860	77,972	260	22 Trips /Day
Grant Total	8,07,913	1,61,582	539	47Trips /Day

TABLE 7.6: CUMULATIVE PRODUCTION OF GRAVEL IN CLUSTER

Quarry	Mineable Reserves in m ³	Per Year Production in m ³	Per Day in m ³	Number of Lorry Load @ 6m ³ per load
P1	48,946	9,789	33	3 Trips /day
P2	2,520	2,520	8	1Trips /day
TOTAL	51,466	12,309	41	4 Trips/ day
E1	34,998	11,666	39	4 Trips/ day
Total	34,998	11,666	39	4 Trips/ day
Grand total	86,464	23,975	80	8 Trips/ day

Source: Approved Mining plans of the project

Based on the above production quantities the emissions due to various activities in all the 2 proposed quarry and 1 existing quarries includes various activities like ground preparation, excavation, handling and transport of mineral. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 7.7.

TABLE 7.7: EMISSION ESTIMATION FROM CLUSTER

EMISSION ESTIMATION FOR QUARRY “P1”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.097713217	g/s
	Blasting	Point Source	0.002154671	g/s
	Mineral Loading	Point Source	0.044404154	g/s
	Haul Road	Line Source	0.002497746	g/s/m
	Overall Mine	Area Source	0.066434151	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001093433	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000083049	g/s
EMISSION ESTIMATION FOR QUARRY “P2”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.048846578	g/s
	Blasting	Point Source	0.000067264	g/s
	Mineral Loading	Point Source	0.035512172	g/s
	Haul Road	Line Source	0.002483828	g/s/m
	Overall Mine	Area Source	0.044045224	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000109338	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000003581	g/s
EMISSION ESTIMATION FOR QUARRY “E1”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.098898779	g/s
	Blasting	Point Source	0.002288596	g/s
	Mineral Loading	Point Source	0.045228834	g/s
	Haul Road	Line Source	0.002500895	g/s/m
	Overall Mine	Area Source	0.061944807	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.00125058	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000079880	g/s

Source: Emission Formula

TABLE 7.8: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM₁₀ in µg/m³	
Location	AAQ1 – CORE
Background (average)	45.0
Highest Incremental	11.83
Resultant	56.80
NAAQ Norms	100 µg/m ³
PM_{2.5} in µg/m³	
Background (average)	22.1
Highest Incremental	5.67
Resultant	27.80
NAAQ Norms	80 µg/m ³
SO₂ in µg/m³	
Location	AAQ1 – CORE
Background (average)	7.0
Highest Incremental	1.59
Resultant	8.6
NAAQ Norms	80 µg/m ³
NO_x in µg/m³	
Location	AAQ1 – CORE
Background (average)	24.3
Incremental	8.60
Resultant	32.9
NAAQ Norms	80 µg/m ³

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 quarries within the 500 m radius.

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using model based on first principle.

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) - Ae_{1,2}$$

Where:

Lp_1 & Lp_2 are sound levels at points located at distances r_1 & r_2 from the source.

$Ae_{1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$Lp_{total} = 10 \log \{10^{(Lp1/10)} + 10^{(Lp2/10)} + 10^{(Lp3/10)} + \dots\}$$

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

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

TABLE 7.9: PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
N1	42.6	46.1	47.7	Residential Day Time– 55 dB (A) Night Time- 45 dB (A)
N2	41.9	38.5	43.5	
N3	39.2	29.0	39.6	
N4	38.4	27.4	38.7	
N5	37.1	24.1	37.3	
N6	41.4	28.5	41.6	
N7	36.1	27.6	36.7	
N8	37.8	29.2	38.4	

Source: Lab Monitoring Data

The incremental noise level is found within the range of 24.1– 38.5 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. 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 (The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.).

Ground Vibrations

Ground vibrations due to mining activities in the all the 2proposed quarry and 1 existing quarries within cluster are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from the all the 2 proposed quarry and 1 existing quarries is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages

nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining areas and may cause injury to persons or damage to the structures. Nearest Habitations from 2 mines respectively are as in below Table 7.9

TABLE 7.10: NEAREST HABITATION FROM EACH MINE

Location ID	Distance in Meters
Habitation Near P1	310 NE
Habitation Near P2	810 -NW
Habitation Near E1	360-West

Source: Satellite Imagery and Field Data

The ground vibrations due to the blasting in all the mines are calculated using the empirical equation for assessment of peak particle velocity (PPV) is:

$$V = K [R/Q^{0.5}]^{-B}$$

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

TABLE 7.11: GROUND VIBRATIONS AT 3 MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	101	310 NE	2.071
P2	10	810NE	0.070
E1	112	360 West	1.771

Source: PPV Calculation

From the above table, the charge per blast is considered as maximum in each mine and the resultant PPV 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.

Socio Economic Environment –

The 4 mines shall provide employment and revenue will be created to government

TABLE 7.12: SOCIO ECONOMIC BENEFITS FROM 3 MINES

Location Code	Employment	Project Cost (Rs)	CER Cost
P1	46	Rs. 2,78,05,000/-	Rs.5,00,000/-

P2	12	Rs. 19,55,000/-	Rs.5,00,000/-
E1	23	Rs. 75,30,000/-	Rs.1,41,000/-
Total	81	Rs. 3,72,90,000 /-	Rs. 11,41,000/-

A total of 81 people will get employment due to 3 mines in cluster and already employed at existing mines are 23 Nos. 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 by all the mines.

As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is ≤ 100 crores, they shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC.

- 2 Proposed projects shall fund towards CER – **Rs. 10,00,000/-**

TABLE 7.13: GREENBELT DEVELOPMENT BENEFITS FROM 2 MINES & 1EXISTING MINES

PROPOSAL FOR P1 – Tvl. Suganya Blue Metals				
Year	No. of trees proposed to be planted	Survial %	Area to be planted	Name of the species
I	It is proposed to plant 1750 Nos of trees in the 1 st year	80%	Safety barrier, Unutilized areas and nearby village roads	Neem, Pongamia pinnata, Casuarina, etc
PROPOSAL FOR P2 – Tmt.M. Meenatchi				
I	It is proposed to plant 700 Nos of trees in the 1 st year	80%	Safety barrier, Unutilized areas and nearby village roads	Neem, Pongamia, pinnata, Casuarina, etc.,
EXISTING FOR E1 – Tmt. Selvi-J				
I	It is proposed to plant 1400 Nos of trees in the 1 st year	80%	Safety barrier, Unutilized area's and nearby village roads	Neem, Pongamia Pinnata, Casuarina, Thespesia populnea etc.,

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Neem, Pongamia Pinnata, Casuarina, etc in the Cluster at a rate of 3,850 Trees Planted over a period of 5 Years with Survival Rate of 80% .

7.5 PLASTIC WASTE MANAGEMENT PLAN

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.

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.

TABLE 7.14: ACTION PLAN TO MANAGE PLASTIC WASTE

Sl.No.	Activity	Responsibility
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

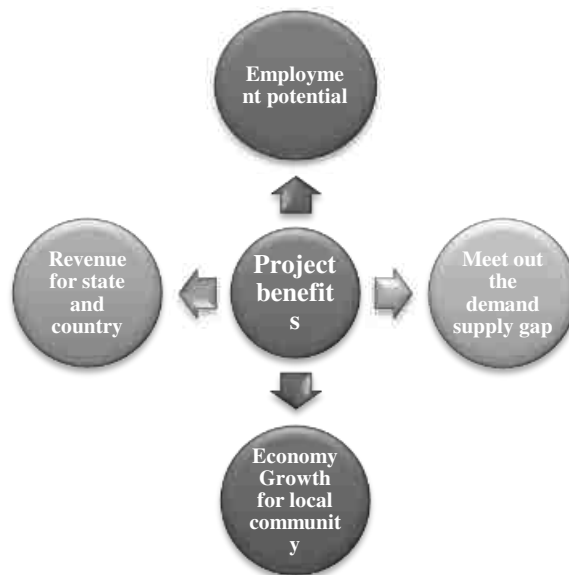
Source: Proposed by FAE's and EC

CHAPTER – 8: PROJECT BENEFITS

8.0 General

The Proposed Projects for Quarrying Rough Stone at Ulagani Village aims to produce cumulatively 3,84,905m³ of Rough Stone over a period of 5 years & 48,946m³ of Gravel over a period of 3Years. 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 46 persons for carrying out mining operations and give preference to the local people in providing employment. In addition, there will be opportunity for indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

8.2 Socio-Economic Welfare Measures Proposed

The impact of mining activity in the area will be more positive than negative 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 existing project site is located in Ulagani Village, Kallikudi Taluk, Madurai District of Tamil Nadu and the area have communications, roads and other facilities already well established. The following physical infrastructure facilities will further improve due to the cluster quarry projects.

- 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

The quarry projects in the region will have positive impact on the social economic condition of the area by way of providing employment to the local peoples; thereby increasing the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture.

- Social welfare program like medical camps, educational facilities to the poverty level students, providing water supply from the quarries during drought seasons will be taken from the project proponent's
- Supplementing Govt. efforts in health monitoring camps, social welfare and various Awareness programs among the rural population.

8.5 Other Tangible Benefits

The proposed quarry existing project 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 quarry site 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.,

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 10 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 will be taken up in the Ulagani village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.

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, all the mines being a green field project & Capital Investment is \leq 100 crores, they shall contribute of Capital Investment towards CER as per directions of EAC/SEAC and the total CER amount from the 1 proposed mines is Rs5,00,000/-.

TABLE 8.1 CER – ACTION PLAN

Code	CER
P1	Rs 5,00,000/-
Total	Rs 5,00,000/-

Source: Field survey conducted by FAE, consultation with project proponent

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER - 10: ENVIRONMENTAL MANAGEMENT PLAN – P1

10.1 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 of ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.2 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. Suganya Blue Metals** will –

- Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities
- 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 a program to train employees in general environmental issues and individual workplace environmental responsibilities
- Implement monitoring programmes 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

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of each Proposed existing 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 programme
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.3 Land Environment Management –

Land degradation is one of the major adverse impacts of opencast mining in the form of excavated voids and contamination of soil affects the viability of the soil resource.

Soil contamination then has a number of flow-on effects like, Inhibition of plant growth, and death of existing plants in contaminated areas and contamination of soil also has potential to impact on a surface water quality and groundwater resources.

TABLE 10.1: PROPOSED CONTROLS FOR LAND ENVIRONMENT

CONTROL	RESPONSIBILITY
Designing vehicle wash-down system so that all washed water is captured and passed through grease and oil separators.	Mines Manager
Re fueling will be carried out in a safe location, away from vehicle movement pathways	Mine Foreman & Mining Mate
Greenbelt development and its maintenance	Environment Officer
Garland drains with catch pits to be provided all around the project area to prevent run off affecting the surrounding lands.	Environment Officer
The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.	Mines Manager
Thick plantation using native flora species will be carried out on the top benches.	Mines Manager
There will be formation of a small surface water body in the mined-out area, which can be used for watering the greenbelt at the conceptual stages.	Environment Officer

Source: Proposed by FAE's & EIA Coordinator

10.4 Soil Management

Top Soil Management –

- There is topsoil about 2520 m³ for this Proposed and existing project site.

Overburden / Waste and Side Burden Management –

- The overburden in the form of Topsoil formation, the Topsoil will be directly loaded into tippers for the filling and levelling of low-lying areas, this will be done only after obtaining permission and paying necessary seigniorage fees to the Government.

TABLE 10.2: PROPOSED CONTROLS FOR SOIL MANAGEMENT

CONTROL	RESPONSIBILITY
Garland drains are to be paved around the quarry pit area to arrest possible wash off in the rainy seasons	Mines Manager
Surface run-off from the surface water via garland drains will be diverted to the mine pits	Mine Foreman & Mining Mate
Design haul roads and other access roads with drainage systems to minimize concentration of flow and erosion risk	Environment Officer
keeping records of mitigation of erosion events, to improve on management techniques	Environment Officer
A monitoring map with information including their GPS coordinates, erosion type, intensity, and the extent of the affected area, as well as existing control measures and assessment of their performance	Environment Officer
Empty sediment from sediment traps Maintain, repair or upgrade garland drain system	Environment Officer
Test soils for pH, EC, chloride, exchangeable cations, particle size and water holding capacity	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.5 Water Management

In the proposed existing quarry project, no process is involved for the effluent generation, only oil & grease from the machinery wash is anticipated and domestic sewage from mine office.

The quarrying operation is proposed upto a depth of 42m BGL, the water table in the area is 73m – 68m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3: PROPOSED CONTROLS FOR WATER ENVIRONMENT

CONTROL	RESPONSIBILITY
To maximize the reuse of pit water for water supply	Mines Foreman
Temporary and permanent garland drain will be constructed to contain the catchments of the mining area and to divert runoff from undisturbed areas through the mining areas	Mines Manager
Natural drains/nallahs/brooklets outside the project area should not be disturbed at any point of mining operations	Mines Manager
Ensure there is no process effluent generation or discharge from the project area into water bodies	Mines Foreman
Domestic sewage generated from the project area will be disposed in septic tank and soak pit system	Mines Foreman
Monthly or after rainfall, inspection for performance of water management structures and systems	Mines Manager
Conduct ground water and surface water monitoring for parameters specified by CPCB	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.6 Air Quality Management

The existing and proposed mining activities would result in the increase of particulate matter concentrations due to fugitive dust. Water sprinkling twice per day on the haul roads, approach roads in the vicinity would be undertaken and will be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements.

TABLE 10.4: PROPOSED CONTROLS FOR AIR ENVIRONMENT

CONTROL	RESPONSIBILITY
Generation of dust during excavation is minimized by daily (twice) water sprinkling on working face and daily (twice) water sprinkling on haul road	Mines Manager
Wet drilling procedure /drills with dust extractor system to control dust generation during drilling at source itself is implemented	Mines Manager
Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution	Mines Manager
Ambient Air Quality Monitoring carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted air pollution control measures	Mines Manager
Provision of Dust Mask to all workers	Mines Manager
Greenbelt development all along the periphery of the project area	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.7 Noise Management

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and other allied activities. No mining activities are planned during night time.

TABLE 10.5: PROPOSED CONTROLS FOR NOISE ENVIRONMENT

CONTROL	RESPONSIBILITY
Development of thick greenbelt all along the Buffer Zone (7.5 Meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman
Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring shall be carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.8 Ground Vibration and Fly Rock Control

TABLE 10.6: PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager

Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAE's & EIA Coordinator

10.9 Biological Environment Management

The proponent will take all necessary steps to avoid the impact on the ecology of the area by adopting suitable management measures in the planning and implementation stage. During mining, thick plantation will be carried out around the project periphery, on safety barrier zone, on top benches of quarried out area etc.,

Following control measures are proposed for its management and will be the responsibility of the Mines Manager.

- Greenbelt development all along the safety barrier of the project area
- It is also proposed to implement the greenbelt development programme and post plantation status will be regularly checked for every season.
- The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- Year wise greenbelt development will be recorded and monitored
 - Based on the area of plantation.
 - Period of plantation
 - Type of plantation
 - Spacing between the plants
 - Type of manuring and fertilizers and its periods
 - Lopping period, interval of watering
 - Survival rate
 - Density of plantation
- The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.9.1 Green Belt Development Plan

About 1750 nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7 PROPOSED GREENBELT ACTIVITIES FOR – P1

PROPOSAL FOR P1 – Tmt.M. Meenatchi, ,				
Year	No. of trees proposed to be planted	Survial %	Area to be planted	Name of the species

I	It is proposed to plant 1750 Nos of trees in the 1 st year	80%	Safety barrier, Unutilized areas and nearby village roads	Neem, Pongamia pinnata, Casuarina, etc
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Source: Conceptual Plan of Approved Mining plan & proposed by FAE's & EIA Coordinator

The objectives of the greenbelt development plan are –

- Provide a green belt around the periphery of the quarry area to combat the dispersal of dust in the adjoining areas,
- Protect the erosion of the soil, Conserve moisture for increasing ground water recharging,
- Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

A well-planned Green Belt with multi rows (three tiers) preferably with long canopy leaves shall be developed with dense plantations around the boundary and haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

10.9.2 Species Recommended for Plantation

Following points have been considered while recommending the species for plantation:

- Creating of bio-diversity.
- Fast growing, thick canopy cover, perennial and evergreen large leaf area,
- Efficient in absorbing pollutants without major effects on natural growth

TABLE 10.8: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT

S.No	Botanical Name	Local Name	Importance
1.	Azadirachta indica	Neem, Vembu	Neem oil & neem products
2.	Tamarindus indica	Tamarind	Edible & Medicinal and other Uses
3.	Polyalthia longifolia	Nettilinkam	Tall and evergreen tree
4.	Borassus Flabellifer	Palmyra Palm	Tall Wind breaker tree and its fruits are edible

Source: Proposed by FAE's & EIA Coordinator

10.10 Occupational Safety & Health Management

Occupational safety and health are very closely related to productivity and good employer-employee relationship. The main factors of occupational health impact in quarries are fugitive dust and noise. Safety of employees during quarrying operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and Rule 29 of Mines Rules 1955. To avoid any adverse effect on the health of workers due to dust, noise and vibration sufficient measures have been provided.

10.10.1 Medical Surveillance and Examinations –

- Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.
- Evaluating the effect of noise on workers
- Enabling corrective actions to be taken when necessary
- Providing health education

The health status of workers in the mine shall be regularly monitored under an occupational surveillance program. Under this program, all the employees are subjected to a detail medical examination at the time of employment. The medical examination covers the following tests under mines act 1952.

- General Physical Examination and Blood Pressure
- X-ray Chest and ECG
- Sputum test
- Detailed Routine Blood and Urine examination

The medical histories of all employees will be maintained in a standard format annually. Thereafter, the employees will be subject to medical examination annually. The below tests keep upgrading the database of medical history of the employees.

TABLE 10.10.1: MEDICAL EXAMINATION SCHEDULE

Sl.No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check – up					
B	Audiometric Test					
C	Eye Check – up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					

Medical Follow ups:- Work force will be divided into three targeted groups age wise as follows:-		
Age Group	PME as per Mines Rules 1955	Special Examination
Less than 25 years	Once in a Three Years	In case of emergencies
Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

10.10.2 Proposed Occupational Health and Safety Measures –

- The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- Lightweight and loose-fitting clothes having light colours will be preferred to wear.
- Noise exposure measurements will be taken to determine the need for noise control strategies.
- The personal protective equipment will be provided for mine workers.

- Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
- At noisy working activity, exposure time will be minimized.
- Dust generating sources will be identified and proper control measure will be adopted.
- Periodic medical examinations will be provided for all workers.
- Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
- The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipment's will be provided to them.
- A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS



10.10.3 Health and Safety Training Programme

The Proponents will provide special induction program along with machinery manufacturers for the operators and co-operators to run and maintain the machinery effectively and efficiently. The training program for the supervisors and office staffs will be arranged in the Group Vocational Training Centres in the State and engage Environmental Consultants to provide periodical training to all the employees to carry out the mining operation in and eco-friendly manner.

TABLE 10.10.2: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES –

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation Ground control hazards Occupational health hazards Electrical hazards First aid Explosives
Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul road maintenance,	Employees assigned to new work tasks	Before new Assignments	Variable	Task-specific health & safety procedures and SOP for various mining activity. Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	Required health and safety standards Transportation controls Communication systems Escape ways, emergency evacuations Fire warning Ground control hazards First aid Electrical hazards Accident prevention Explosives Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	Hazard recognition and avoidance Emergency evacuation procedures Health standards Safety rules Respiratory devices

Source: Proposed by FAE's & EIA Coordinator as per DGMS Norms

10.10.4 Budgetary Provision for Environmental Management –

Adequate budgetary provision has been made by the Company for execution of Environmental Management Plan. The Table 10.11 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.10.3: EMP BUDGET FOR PROPOSED PROJECT – P1

Activites	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	34800	34800
	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
	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 -12 Units	300000	30000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	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 - 3 Units	15000	750
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000
	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	69600
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be during operation of transportation vehicles, 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 implements 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 Tonnes of Blasted Material	0	1000753
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	5000	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
Mine Closure	1. Progressive Closure Activity - Surface Runoff managent	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	34800	5000
	2. Progressive Closure Activity 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	696000	10000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 1750 Trees - (1000 Inside Lease Area & 750 Outside Lease Area)	Site clearance, preparation of land, digging of pits / trenches, soil amendmets, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring)	200000	30000

		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	225000	22500
	4. Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 15% of the proposed closure cost will be spent during the final mine closure stage - Last Year	144000	0
	5. Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budget and not necessarily implemented in the Project Site	3464145	0
Implementation of EC, Mining Plan & DGMS Condition	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 mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
	Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 46 Employees	184000	46000
	Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	46000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	6960
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	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	174000	10000

	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd 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
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoeEF & CC OM	500000	0
TOTAL			3323600	2269363

In order to implement the environmental protection measures, an amount of Rs.33.23 lakhs as capital cost and recurring cost as Rs. 22.69 lakhs as recurring cost is proposed considering present market price considering present market scenario for the proposed project.

Year Wise Break Up	
1st Year	₹ 55,92,963
2nd Year	₹ 23,82,831
3rd Year	₹ 25,01,973
4th Year	₹ 26,27,071
5th Year	₹ 27,58,425
Total	159 lakhs

10.11 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 – 11: SUMMARY AND CONCLUSIONS

Tvl. Suganya Blue Metals Rough stone& Gravel quarry (Cluster Extent 7.70.55 ha) falls under “B1” category as per MoEF & CC Notification (S.O. 3977 (E)).

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B-1 and appraised by SEAC/ SEIAA as well as for cluster situation.

A detailed Draft EIA/ EMP Report is prepared for public and other stakeholders' suggestions and a Final EIA/ EMP Report will be prepared based on the outcome of Public Consultation.

Environmental monitoring and audit mechanism have been recommended before and after commencement of the project, where necessary, to verify the accuracy of the EIA predictions and the effectiveness of recommended mitigation measures.

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the months December 2022 to February 2023 for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suitable mitigation measures for likely adverse impacts due to the proposed and existing project is suggested individually for the respective proposed project under Chapter 10.

The project proponent ensures to obtain necessary clearances and quarrying will be carried out as per rules and regulations. The Mining Activity will be carried out in a phased manner as per the approved mining plan after obtaining EC, CTO from TNPCB, execution of lease deed and obtaining DGMS Permission and working will be carried out under the supervision of Competent Persons employed.

Overall, the EIA report has predicted that the project will comply with all environment standards and legislation after commencement of the project and operational stage mitigation measures are implemented.

Mining operations has positive impact on environment and socio economy such as landscape improvement, water as by-product, economy development and better public services, providing and supply of Rough Stone & Topsoil as per market demand.

Sustainable and modern mining leads us to see positive impact of mining operation and providing consistent employment for nearly 46 people directly in the cluster and indirectly around 100 people.

As discussed, it is safe to say that the proposed Existing quarries are not likely to cause any significant impact to the ecology of the area, as adequate preventive measures will be adopted to keep the various pollutants within the permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigate technique, as well as to serve as biological indicators for the pollutants released from the Tvl. Suganya Blue Metals Rough stone& Gravel quarry, Ulagani Village (Cluster Extent 7.70.55 ha).

CHAPTER 12: DISCLOSURE OF CONSULTANTS

The Project Proponent's –

1. **Tvl. Suganya Blue Metals** have engaged M/s Geo Exploration and Mining Solutions, an Accredited Organization under Quality Council of India – National Accreditation Board for Education & Training, New Delhi, for carrying out the EIA Study as per the ToR Issued.

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaita Ashram Road,

Alagapuram, Salem – 636 004

Tamil Nadu, India

Email: infogeoexploration@gmail.com

Web: **www.gemssalem.com**

Phone: 0427 2431989.

The Accredited Experts and associated members who were engaged for this EIA study as given below –

Sl.No.	Name of the expert	In house/ Empanelled	EIA Coordinator		FAE	
			Sector	Category	Sector	Category
1	Dr. M. Ifthikhar Ahmed	In-house	1	A	WP GEO SC	B A A
2	Dr. P. Thangaraju	In-house	-	-	HG GEO	A A
3	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	B A B
4	Mr. N. Senthilkumar	Empanelled	38 28	B B	AQ WP RH	B B A
5	Mrs. Jisha parameswaran	In-house	-	-	SW	B
6	Mr. Govindasamy	In-house	-	-	WP	B
7	Mrs. K. Anitha	In-house	-	-	SE	A
8	Mrs. Amirtham	In-house	-	-	EB	B
9	Mr. Alagappa Moses	Empanelled	-	-	EB	A
10	Mr. A. Allimuthu	In-house	-	-	LU	B
11	Mr. S. Pavel	Empanelled	-	-	RH	B
12	Mr. J. R. Vikram Krishna	Empanelled	-	-	SHW RH	A A

Abbreviations	
EC	EIA Coordinator
AEC	Associate EIA Coordinator
FAE	Functional Area Expert
FAA	Functional Area Associates
TM	Team Member
GEO	Geology
WP	Water pollution monitoring, prevention and control
AP	Air pollution monitoring, prevention and control
LU	Land Use
AQ	Meteorology, air quality modeling, and prediction
EB	Ecology and bio-diversity
NV	Noise and vibration
SE	Socio economics
HG	Hydrology, ground water and water conservation
SC	Soil conservation
RH	Risk assessment and hazard management
SHW	Solid and hazardous wastes
MSW	Municipal Solid Wastes
ISW	Industrial Solid Wastes
HW	Hazardous Wastes

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the EIA/EMP for Tvl. Suganya Blue Metals Rough Stone & Gravel Quarry Extent: 3.48.0 ha in Ulagani Village of Kallikudi Taluk, Madurai District, Tamil Nadu State. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

I, hereby certify that I was a part of the EIA team in the following capacity that developed the EIA/EMP Report.

Name: **Dr. M. Ifthikhar Ahmed**

Designation: **EIA Coordinator**

Date & Signature:




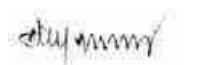















Period of Involvement: **January 2022 to till date**

Associated Team Member with EIA Coordinator:

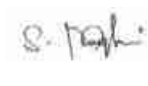

1. **Mr. S. Nagamani**
2. **Mr. Viswanathan**
3. **Mr. Santhoshkumar**
4. **Mr. S. Ilavarasan**

FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT

Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	<ul style="list-style-type: none"> ▪ Identification of different sources of air pollution due to the proposed mine activity ▪ Prediction of air pollution and propose mitigation measures / control measures 	Mr. A. Jagannathan	
2	WP	<ul style="list-style-type: none"> ▪ Suggesting water treatment systems, drainage facilities ▪ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures. 	Dr. M. Ifthikhar Ahmed	
			Mr. N. Senthilkumar	
3	HG	<ul style="list-style-type: none"> ▪ Interpretation of ground water table and predict impact and propose mitigation measures. ▪ Analysis and description of aquifer Characteristics 	Dr. P. Thangaraju	
4	GEO	<ul style="list-style-type: none"> ▪ Field Survey for assessing the regional and local geology of the area. ▪ Preparation of mineral and geological maps. ▪ Geology and Geo morphological analysis/description and Stratigraphy/Lithology. 	Dr. M. Ifthikhar Ahmed	
			Dr. P. Thangaraju	
5	SE	<ul style="list-style-type: none"> ▪ Revision in secondary data as per Census of India, 2011. ▪ Impact Assessment & Preventive Management Plan ▪ Corporate Environment Responsibility. 	Mrs. K. Anitha	

6	EB	<ul style="list-style-type: none"> Collection of Baseline data of Flora and Fauna. Identification of species labelled as Rare, Endangered and threatened as per IUCN list. Impact of the project on flora and fauna. Suggesting species for greenbelt development. 	Mrs. Amirtham	
			Mr. Alagappa Moses	
7	RH	<ul style="list-style-type: none"> Identification of hazards and hazardous substances Risks and consequences analysis Vulnerability assessment Preparation of Emergency Preparedness Plan Management plan for safety. 	Mr. N. Senthilkumar	
			Mr. S. Pavel	
			Mr. J. R. Vikram Krishna	
8	LU	<ul style="list-style-type: none"> Construction of Land use Map Impact of project on surrounding land use Suggesting post closure sustainable land use and mitigative measures. 	Mr. A. Allimuthu	
9	NV	<ul style="list-style-type: none"> Identify impacts due to noise and vibrations Suggesting appropriate mitigation measures for EMP. 	Mr. A. Jagannathan	
10	AQ	<ul style="list-style-type: none"> Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. Recommending mitigations measures for EMP 	Mr. N. Senthilkumar	
11	SC	<ul style="list-style-type: none"> Assessing the impact on soil environment and proposed mitigation measures for soil conservation 	Dr. M. Ifthikhar Ahmed	
12	SHW	<ul style="list-style-type: none"> Identify source of generation of non-hazardous solid waste and hazardous waste. Suggesting measures for minimization of generation of waste and how it can be reused or recycled. 	Mr. A. Jagannathan	
			Mr. J. R. Vikram Krishna	

LIST OF TEAM MEMBERS ENGAGED IN THIS PROJECT

Sl.No.	Name	Functional Area	Involvement	Signature
1	Mr. S. Nagamani	AP; GEO; AQ	<ul style="list-style-type: none"> Site Visit with FAE Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures Provide inputs on Geological Aspects Analyse & provide inputs and assist FAE with meteorological data, emission estimation, AERMOD modelling and suggesting control measures 	
2	Mr. Viswanathan	AP; WP; LU	<ul style="list-style-type: none"> Site Visit with FAE Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures Assisting FAE on sources of water pollution, its impacts and suggest control measures Assisting FAE in preparation of land use maps 	

3	Mr. Santhoshkumar	GEO; SC	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs on Geological Aspects ▪ Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts 	<i>M. Santhoshkumar</i>
4	Mr. Umamahesvaran	GEO	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs on Geological Aspects ▪ Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan 	<i>S. Umamahesvaran</i>
5	Mr. A. Allimuthu	SE	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of data's ▪ Provide inputs by analysing primary and secondary data 	<i>A. Allimuthu</i>
6	Mr. S. Ilavarasan	LU; SC	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assisting FAE in preparation of land use maps ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts 	<i>S. Ilavarasan</i>
7	Mr. E. Vadivel	HG	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE & provide inputs on aquifer characteristics, ground water level/table ▪ Assist with methods of ground water recharge and conduct pump test, flow rate 	<i>E. Vadivel</i>
8	Mr. D. Dinesh	NV	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE and provide inputs on impacts due to proposed mine activity and suggest mitigation measures ▪ Assist FAE with prediction modelling 	<i>D. Dinesh</i>
9	Mr. Panneer Selvam	EB	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of baseline data ▪ Provide inputs and assist with labelling of Flora and Fauna 	<i>P. Panneer Selvam</i>
10	Mrs. Nathiya	EB	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of baseline data ▪ Provide inputs and assist with labelling of Flora and Fauna 	<i>T. Annapp</i>

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. M. Ifthikhar Ahmed, Managing Partner, Geo Exploration and Mining Solutions, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared the EIA/EMP for Tvl. Suganya Blue Metals Rough Stone & Gravel Quarry Extent: 3.48.0 ha in Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature& Date:



Name:

Dr. M. Ifthikhar Ahmed

Designation:

Managing Partner

Name of the EIA Consultant Organization:

M/s. Geo Exploration and Mining Solutions

NABET Certificate No & Issue Date:

NABET/EIA/2225/RA 0276 Dated: 20-2-2023

Validity:

Valid till 06.8.2025

ANNEXURE
TVL. SUGANYA BLUE METALS
ROUGH STONE & GRAVEL QUARRY

**S.F.Nos. 108/2D, 109/1, 2C, 3A, 3B, 4, 6, 10A, 10B, 12,
110/1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L and 1M**

Ulagani Village, Kallikudi Taluk, Madurai District

EXTENT = 3.48.0 ha

ToR obtained

File No: 10880 ToR Identification: TO24B0108TN5218529N Dated: 25.06.2024

Project Proponent

Tvl. Suganya Blue Metals,

Thiru. R. Malaiyarasan (Authorized Signatory)

No. 13/4A2, Achankulam,

Nedungulam,

Mela Uppiligundu Post,

Kallikudi Taluk,

Madurai District- 625 022.

LIST OF ANNEXURES

Annexures	DESCRIPTION	PAGE NOS
P1- TVL. SUGANYA BLUE METALS, (THIRU. R. MALAIYARASAN (AUTHORIZED SIGNATORY)	COPY OF TERMS OF REFERENCE	1A - 14A
	COPY OF 500M RADIUS QUARRIES DETAILS LETTER	15A - 17A
	COPY OF MINING PLAN APPROVED LETTER	18A - 21A
	COPY OF APPROVED MINING PLAN WITH PLATES	22A – 114A
	COPY OF HYDROGEOLOGICAL REPORT	115A - 131A
	COPY OF EXPLOSIVE LETTER	132A – 133A
	COPY 300m AND VAO ATTESTATION LETTER	134A – 135A
P2 – TMT.M. MEENATCHI	COPY OF ENVIRONMENTAL CLEARANCE	136A – 162A
	COPY OF BASE LINE MONITORING DATA	163A - 206A
	COPY OF CONSULTANT ACCREDITATION CERTIFICATE	207A



File No: 10880
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment
Authority(SEIAA), TAMIL NADU)



Dated 25/06/2024



To,

Malaiyarasan R
SUGANYA BLUE METALS
No.13/4A2, Achankulam, Nedungulam, Mela uppiligundu post, Kallikudi Tk, MADURAI, TAMIL
NADU, 625022
sbm.suganya@gmail.com

Subject: Grant of Terms of Reference with Public Hearing under the provision of the EIA Notification 2006-as amended regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Tvl. Suganya Blue Metals, Rough Stone and Gravel Quarry Project at over an Extent of 3.48.0Ha of Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State submitted to Ministry vide proposal number SIA/TN/MIN/471587/2024 dated 30/05/2024.

Ref:

1. Online Proposal No. SIA/TN/MIN/471587/2024, dated: 04.05.2024
2. Your application submitted for Terms of Reference dated: 15.05.2024

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO24B0108TN5218529N
(ii) File No.	10880
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals Tvl. Suganya Blue Metals, Rough Stone and Gravel Quarry Project at over an Extent of 3.48.0Ha of Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A,
(vii) Name of Project	

	109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State
(viii) Name of Company/Organization	SUGANYA BLUE METALS
(ix) Location of Project (District, State)	MADURAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia 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.
4. The above-mentioned proposal has been considered by (SEIAA) Appraisal Committee of SEIAA in the meeting held on 19/06/2024. 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.
5. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference 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).
6. 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 grant Terms of Reference for instant proposal of Thiru. Malaiyarasan R under the provisions of EIA Notification, 2006 and as amended thereof.
7. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
8. The Terms of Reference 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.
9. This issues with the approval of the Competent Authority.
10. 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.

Copy To

1. The Additional Chief Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
3. The Chairperson, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. The District Collector, Madurai District.
7. Stock File.

Specific Terms of Reference for (Mining Of Minerals)

1. Seiaa Standard Conditions:

S. No	Terms of Reference
1.1	<p>Cluster Management Committee</p> <ol style="list-style-type: none"> 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. 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., 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. 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. 5. 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. 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. 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. 8. The committee shall furnish the Emergency Management plan within the cluster. 9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public. 10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety. 11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents. <p>Impact study of mining</p> <ol style="list-style-type: none"> 12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following <ol style="list-style-type: none"> a) Soil health & soil biological, physical land chemical features . b) Climate change leading to Droughts, Floods etc. c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health. e) Agriculture, Forestry & Traditional practices. f) Hydrothermal/Geothermal effect due to destruction in the Environment. g) Bio-geochemical processes and its foot prints including environmental stress. h) Sediment geochemistry in the surface streams. <p>Agriculture & Agro-Biodiversity</p> <ol style="list-style-type: none"> 13. Impact on surrounding agricultural fields around the proposed mining Area. 14. Impact on soil flora & vegetation around the project site. 15. 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. 16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 17. Action should specifically suggest for sustainable management of the area and restoration of

S. No	Terms of Reference
	<p>ecosystem for flow of goods and services.</p> <p>18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.</p> <p>Forests</p> <p>19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.</p> <p>20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.</p> <p>21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.</p> <p>22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.</p> <p>Water Environment</p> <p>23. 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.</p> <p>24. Erosion Control measures.</p> <p>25. 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.</p> <p>26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.</p> <p>27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.</p> <p>28. 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>29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.</p> <p>30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.</p> <p>Energy</p> <p>31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.</p> <p>Climate Change</p> <p>32. 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>33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.</p> <p>Mine Closure Plan</p> <p>34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.</p> <p>EMP</p> <p>35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.</p> <p>36. 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>Risk Assessment</p> <p>37. To furnish risk assessment and management plan including anticipated vulnerabilities during</p>

S. No	Terms of Reference
	<p>operational and post operational phases of Mining. Disaster Management Plan 38. 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.</p> <p>Others 39. 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. 40. 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 part of the Environment Management Plan. 41. 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</p>

2. Seac Conditions - Site Specific

S. No	Terms of Reference
2.1	<p>1. 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. Besides, the PP shall furnish a comprehensive report on the impacts of quarrying operations on the residents in the village located at a distance of 160m and mitigation measures for the same.</p> <p>2. 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.</p>

3. Seac Standard Conditions

S. No	Terms of Reference
3.1	<p>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.</p> <p>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.</p>

S. No	Terms of Reference
	<p>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.</p> <p>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.</p> <p>5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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, III/ Class mines manager appointed by the proponent.</p> <p>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.</p> <p>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.</p> <p>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,</p> <p>13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?</p> <p>14. Quantity of minerals mined out.</p> <ul style="list-style-type: none"> ● 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. <p>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).</p> <p>16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,</p> <p>17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery</p>

S. No	Terms of Reference
	<p>including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.</p> <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> <p>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.</p> <p>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.</p> <p>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.</p> <p>28. Impact on local transport infrastructure due to the Project should be indicated.</p> <p>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.</p> <p>30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.</p> <p>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.</p> <p>32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon</p>

S. No	Terms of Reference
	<p>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.</p> <p>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</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p> <p>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.</p>

4. Seiaa Specific Conditions:

S. No	Terms of Reference
4.1	<p>After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 3,84,905 m³ of Rough Stone & 48,946 m³ of Gravel up to ultimate depth of 42m below ground level and the annual peak production should not exceed 83,010 m³ of Rough Stone & 17,422 m³ of Gravel 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 and with the Specific and Standard Conditions.</p> <p>The PP shall carry out Hydrogeological study, Blast impact study, Slope stability study, Impact on</p>

S. No	Terms of Reference
	climate change in temperature raise through a reputed institution and furnish the report along with final EIA/EMP report.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	An EIA-EMP Report shall be prepared for peak capacity (.....MTPA)operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of mineral production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
1.3	Propoer KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of lengthe, quantity and quality of water to be diverted
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green

S. No	Terms of Reference																																																
	field and expansion projects.																																																
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.																																																
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.																																																
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.																																																
1.12	<p>Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights</p> <table border="1" data-bbox="319 1052 1484 1344"> <thead> <tr> <th>S.N</th> <th>ML/Project Land use</th> <th>Area under Surface Rights(ha)</th> <th>Area Under Mining Rights(ha)</th> <th>Area under Both (ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Agricultural land</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Forest Land</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Grazing Land</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Settlements</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Others (specify)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="319 1388 1484 1635"> <thead> <tr> <th>S.N.</th> <th>Details</th> <th>Area (ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Buildings</td> <td></td> </tr> <tr> <td>2</td> <td>Infrastructure</td> <td></td> </tr> <tr> <td>3</td> <td>Roads</td> <td></td> </tr> <tr> <td>4</td> <td>Others (specify)</td> <td></td> </tr> <tr> <td></td> <td>Total</td> <td></td> </tr> </tbody> </table>	S.N	ML/Project Land use	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under Both (ha)	1	Agricultural land				2	Forest Land				3	Grazing Land				4	Settlements				5	Others (specify)				S.N.	Details	Area (ha)	1	Buildings		2	Infrastructure		3	Roads		4	Others (specify)			Total	
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4	Others (specify)																																																
	Total																																																
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.																																																

S. No	Terms of Reference
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SO _x , NO _x and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within

S. No	Terms of Reference
	dark/grey zone.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored
1.27	PP to evaluate the green house emission gases from the mine operation and corresponding carbon absorption plan.
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be

S. No	Terms of Reference																																	
	undertaken particularly around the transport route.																																	
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.																																	
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with the schedule of the implementation of the R&R Plan should be given.																																	
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.																																	
1.38	Corporate Environment Responsibility:																																	
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.																																	
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.																																	
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.																																	
1.42	d) To have proper checks and balances, the company should have a well laid down 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.																																	
1.43	e) Environment Management Cell and its responsibilities to be clearly spelled out in EIA/ EMP report																																	
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.																																	
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.																																	
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.																																	
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.																																	
1.48	<p>Details on the Forest Clearance should be given as per the format given:</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;">Total ML Total</td> <td style="width: 15%;"></td> <td style="width: 15%;">Date</td> <td style="width: 15%;">Extent</td> <td style="width: 15%;">of</td> <td style="width: 15%;">Balance area for which</td> <td style="width: 15%;">Status</td> <td style="width: 15%;">of</td> <td style="width: 15%;">appl</td> <td style="width: 15%;">For</td> </tr> <tr> <td></td> <td>Project Area Forest</td> <td></td> <td>of FC</td> <td>of Forest Land</td> <td></td> <td>FC is yet to be</td> <td>diversion</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>(ha)</td> <td>land (ha)</td> <td>obtained</td> <td></td> <td></td> <td>land</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Total ML Total		Date	Extent	of	Balance area for which	Status	of	appl	For		Project Area Forest		of FC	of Forest Land		FC is yet to be	diversion					(ha)	land (ha)	obtained			land				
	Total ML Total		Date	Extent	of	Balance area for which	Status	of	appl	For																								
	Project Area Forest		of FC	of Forest Land		FC is yet to be	diversion																											
	(ha)	land (ha)	obtained			land																												

S. No	Terms of Reference
	If more than one provide details of each FC
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes
1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.

Signature Not Verified

Digitally Signed by : A R Rahul Nadh IAS
Member Secretary, SEIAA

Date: 26/06/2024

From

Thiru.G.Gurusamy, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Madurai.

To

Tvl.Suganya Blue Metals,
No.13/4A2, Achankulam,
Nedungulam,
Mela Uppiligundu Post,
Kallikudi Taluk,
Madurai District.

Roc. No.1271/Mines/2023, dated. 27.02.2024

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone and Gravel - Madurai District - Kallikudi Taluk - Ulagani Village - Patta lands - S.F. Nos. 108/2D (0.11.00), 109/1 (0.14.00), 109/10A (0.10.50), 109/10B (0.43.00), 109/12 (0.11.50), 109/2C (0.41.50), 109/3A (0.06.50), 109/3B (0.06.00), 109/4 (0.13.50), 109/6 (0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E (0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.5), 110/1J (0.18.00), 110/1K (0.08.50), 110/1L (0.10.50) and 110/1M (0.11.50) - Over an extent of 3.48.0 Hects - Application preferred by Tvl.Suganya Blue Metals - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - 500m details requested - Furnished - Reg.

- Ref: 1. Quarry lease application preferred by Tvl.Suganya Blue Metals, dated.Nil, Received in this office on 11.10.2023.
2. Precise area communication letter Roc No.1271/Mines/2023, dated.23.01.2024.
3. Letter dated.15.02.2024. Received from Tvl.Suganya Blue Metals along with draft mining plan on 15.02.2024.
4. This office letter even, dated.19.02.2024.
5. Letter-dated Nil. Received from Tvl.Suganya Blue Metals on 15.02.2024.

Tvl.Suganya Blue Metals has preferred an application for the grant of lease to quarry Rough stone and Gravel over an extent of 3.48.0 hectares of patta lands in SF.Nos. 108/2D (0.11.00), 109/1 (0.14.00), 109/10A (0.10.50), 109/10B (0.43.00), 109/12 (0.11.50), 109/2C (0.41.50), 109/3A (0.06.50), 109/3B (0.06.00), 109/4 (0.13.50), 109/6 (0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E (0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.5), 110/1J (0.18.00), 110/1K (0.08.50), 110/1L (0.10.50) and 110/1M (0.11.50) of Ulagani Village, Kallikudi Taluk under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

Based on reports and recommendations of the Revenue Divisional Officer, Thirumangalam and Deputy Director (Mines), precise area was communicated to the applicant vide reference 2nd cited with a direction to submit mining plan as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly Tvl.Suganya Blue Metals has submitted the draft Mining Plan and the same has been approved on 19.02.2024. In this connection the applicant has requested to furnish the details of quarry lease / mining lease situated within 500 mts radius from the subject quarry for obtaining Environment Clearance from the State level Environment Impact Assessment Authority.

In this connection it is stated that, the following existing, abandoned / expired and proposed quarries are located within 500m radius distance from the proposed area.

a. Existing quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecsta)	Collector's Proceedings No & date	Lease period
1.	J.Selvi	Ulagani	112/10A (0.19.5), 112/10B (0.12.0), 112/10C (0.19.5), 112/10D (0.75.3), 112/10D3 (0.52.75), 112/10E (0.12.0), 112/11 (0.71.0), 112/8A (0.07.0)	2.80.55	Roc.No. 1705/2017 Dt 08.06.2023	14.06.2023 13.06.2028

b. Expired Quarries


Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecsta)	Collector's Proceedings No & date	Lease period
-Nil-						

c. Abandoned Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecsta)	Collector's Proceedings No & date	Lease period
1.	M.Pandi	Achankulam	3/1, 2, 3, 4, 5	2.11.0	Roc.No.156/2010/Mines dated 13.07.2010	19.08.2010 18.08.2015
2.	P.R.Kalyana Sundaram	Achankulam	2/3A etc	2.91.0	Roc.No.1135/2009/Mines dated 30.07.2010	03.09.2010 02.09.2015
3.	R.Ravi	Achankulam	1/1A etc	3.82.0	Roc.No.15/2014/Mines, dated 11.05.2015	27.05.2015 26.05.2020

d. Proposed Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecsta)
1.	Tvl.Suganya Blue Metals	Ulagani	108/2D, 109/1, 109/10A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M	3.48.0
2.	Tmt. M. Meenatchi, W/o. M.R. Mahalingam, Ulagani Village, Kallikud Taluk	Achankulam	16/2B, 16/3 & 16/4	1.42.0


 27/2/2024
 Deputy Director,
 Dept. of Geology and Mining,
 Madurai


 27/2/2024

From

Thiru.G.Gurusamy, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Madurai.

To

Tvl.Suganya Blue Metals,
No.13/4A2, Achankulam,
Nedungulam,
Mela Uppiligundu Post,
Kallikudi Taluk,
Madurai District.

Roc. No.1271/Mines/2023, dated. 19.02.2024

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone and Gravel - Madurai District - Kallikudi Taluk - Ulagani Village - Patta lands - S.F. Nos. 108/2D (0.11.00), 109/1 (0.14.00), 109/10A (0.10.50), 109/10B (0.43.00), 109/12 (0.11.50), 109/2C (0.41.50), 109/3A (0.06.50), 109/3B (0.06.00), 109/4 (0.13.50), 109/6 (0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E (0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.5), 110/1J (0.18.00), 110/1K (0.08.50), 110/1L (0.10.50) and 110/1M (0.11.50) - Over an extent of 3.48.0 Hects - Application preferred by Tvl.Suganya Blue Metals - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - Reg.

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109/10A (0.10.50), 109/10B (0.43.00), 109/12 (0.11.50), 109/2C (0.41.50), 109/3A (0.06.50), 109/3B (0.06.00), 109/4 (0.13.50), 109/6 (0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E (0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.5), 110/1J (0.18.00), 110/1K (0.08.50), 110/1L (0.10.50) and 110/1M (0.11.50) of Ulagani Village, Kallikudi Taluk under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

Based on reports and recommendations of the Revenue Divisional Officer, Thirumangalam and Deputy Director (Mines), precise area was communicated to the applicant vide reference 2nd cited with a direction to submit mining plan as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly, Tvl.Suganya Blue Metals has submitted the draft Mining Plan and the same has been examined in detail and found correct. The mining plan submitted by Tvl.Suganya Blue Metals in respect of the subject area is approved subject to the following conditions:

- (i). That 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). This 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, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under the Tamil Nadu Minor Mineral Concession Rules, 1959.

- (iii). That the mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (iv). Second five years production (i.e. 6th year to 10th year) mentioned in the Year wise production table in page no.14 of the mining plan should be verified specifically at the time of approval of the Scheme of Mining.
- (v). Quarrying shall be done as per the approved Mining Plan and that 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.
- (vi). If anything is found to be concealed as required by the Mines Act in the contents of the Mining Plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- (vii). Waste material should be dumped within the lease granted area as earmarked in the Mining Plan.
- (viii). Quarrying operations and production shall be carried out as per the approved Mining Plan and the applicant shall be liable to pay the cost of mineral if there is any deviation in the quantum indicated in the approved year wise quantum of production and any such cases as on date are to be dealt with as per Court direction.

- (ix). If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules 1959 and other rules and act in force will attract.
- (x). The applicant shall strictly adhere to the statutory and safety requirements.

Encl: Approved Mining Plan.

SM
19/12/2014
Deputy Director,
Dept. of Geology and Mining,
Madurai.

Copy To:

by
19/12/14
The Commissioner,
Department of Geology and Mining,
Guindy, Chennai - 600 032.

MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR ULAGANI ROUGH STONE AND GRAVEL QUARRY

(PREPARED UNDER RULES 41 & 42 AS PER THE AMENDED UNDER TAMIL NADU MINOR MINERAL
CONCESSION RULES, 1959)

Patta Land/ Lease period = Five years

IN

LOCATION OF THE QUARRY LEASE APPLIED AREA

EXTENT : 3.48.0Ha
S.F.Nos. : 108/2D, 109/1,2C,3A,3B,4,6,10A,10B,12,
110/1A to 1M,
VILLAGE : ULAGANI
TALUK : KALLIKUDI
DISTRICT : MADURAI
STATE : TAMIL NADU

FOR

APPLICANT

TVL. SUGANYA BLUE METALS,

No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post,
Kallikudi Taluk,
Madurai District,
Tamil Nadu State- 625 022.

PREPARED BY

B. VENGADAGIRI, M.Sc.,
Qualified Person

No.105, 5th Cross, Alagapuram,
Salem District - 636 010,
Mobile No.: +91 86953 32233.
E-Mail: vengatb@gmail.com



ABBREVIATIONS

- EIA - Environmental Impact Assessment
- SEAC - State Expert Appraisal Committee
- SEIAA - State Level Environment Impact Assessment Authority
- MoEF&CC - Ministry of Environment, Forest and Climate changes
- MSL - Mean Sea Level
- CPCB - Central Pollution Control Board
- TNPCB - Tamil Nadu Pollution Control Board
- S.F.No. - Survey Field Number
- DMS - Director of Mines Safety
- DGMS - Director General of Mines Safety
- MMR - Metalliferous Mines Regulations
- MCR - Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules
- TNMMCR - Tamil Nadu Minor Mineral Concession Rules
- EMP - Environment Management Plan
- NONEL - Non Electric
- PPV - Peak Particle Velocity
- CRZ - Coastal Regulatory Zone
- HACA - Hill Area Conservation Authority
- QP - Qualified Person

Tvl. Suganya Blue Metals,
No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post, Kallikudi Taluk,
Madurai District,
Tamil Nadu State- 625 022.



CONSENT LETTER FROM THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Ulagani Rough Stone and Gravel Quarry lease applied area over an extent of 3.48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared by

B. VENGADAGIRI, M.Sc.,
Qualified Person

We have entrusted the works to prepare the Mining Plan based upon the production requirements to me as per the Mines Acts, Rules, Regulations and Amendments as on date. We request to the Deputy Director, Department of Geology and Mining, Madurai District, Tamil Nadu State to make further correspondence regarding the modification of the Mining Plan with the said Qualified Person at his following address.

B. VENGADAGIRI, M.Sc.,
No.105, 5th Cross, Alagapuram,
Salem District - 636 010,
Mobile No.: +91 86953 32233.

We hereby undertake that all the responsibilities of contents in the Mining Plan and if any corrections made in the Mining Plan by the Qualified Person may be deemed to have been made with our knowledge and consent and shall be acceptable to me and binding on me in all respects. If there is any substantial change during operation we will carry out a Modified Mining plan and seek its approval from concerned Authorities.

Signature of the Applicant
Tvl. Suganya Blue Metals


(R. Malaiyarsin)
Authorized person

Place: Madurai
Date: 29.01.2024

Tvl. Suganya Blue Metals,
No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post, Kallikudi Taluk,
Madurai District,
Tamil Nadu State- 625 022.



DECLARATION OF THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Ulagani Rough Stone and Gravel Quarry lease applied area over an extent of 3.48.0 Hectares Patta lands in S.F.Nos: 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared in full consultation with me.

We have understood its contents and agree to implement the same in accordance with Laws, Rules and Act applicable to quarry from time to time as per Tamil Nadu Minor Mineral Concession Rules, 1959.

Signature of the Applicant
Tvl. Suganya Blue Metals


(R. Malayarsan)
Authorized person

Place: Madurai

Date: 09.02.2024

CERTIFICATE

Certified that I am, **B. VENGADAGIRI, M.Sc.**, residing at No.105, 5th Cross, Alagapuram, Salem District – 636 010, Tamil Nadu, holding a Post Graduate Degree in Geology (M.Sc., Applied Geology) from Annamalai University, Chidambaram and I worked in the field of Geology in a role of Geologist.

Rule 15(I)(a) and (b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 stipulates the eligibility for preparing Mining plans as "(I)(a) a degree in mining engineering or a post-graduate degree in geology granted by a university established" and (I)(b) "Professional experience of five years of working in a supervisory capacity in the field of mining after obtaining the degree". Since my qualification and experience are satisfied the Rule (I)(a) and (I)(b) of 15 of the said Rules, I am eligible to prepare Mining Plans for both Major and Minor Minerals.

Accordingly, I prepared this Mining Plan and Progressive Quarry Closure Plan in Respect of Ulagani Rough Stone and Gravel Quarry over an extent of 3.48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District for Tvl. **Suganya Blue Metals**, having an office at No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District, Tamil Nadu State- 625 022. Since the Mining Plan is prepared as per the provisions contained in Rule 15(I)(a) and (I)(b) of Minerals (Other than Atomic and Hydro-Carbons Energy Minerals) Concession Rules, 2016.

Signature of the Qualified Person


B. VENGADAGIRI, M.Sc.,

Place: Salem

Date: 09.02.2024

B. VENGADAGIRI, M.Sc.,
No.105, 5th Cross, Alagapuram,
Salem District – 636 010,
Mobile No.: +91 86953 32233



CERTIFICATE FROM THE QUALIFIED PERSON

This is to certify that the Provisions of Prepared under Rules 41 & 42 as Amended in Tamil Nadu Minor Mineral Concession Rules, 1959. The preparation of Mining Plan and Progressive Quarry Closure Plan for Ulagani Rough Stone and Gravel Quarry lease applied area over an extent of 3,48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared for

Tvl. Suganya Blue Metals,
No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post, Kallikudi Taluk,
Madurai District,
Tamil Nadu State- 625 022.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the applicant will approach the concerned authorities of the Deputy Director, Department of Geology and Mining, Madurai District, Tamil Nadu State for such permissions/ exemptions/ relaxations and approvals.

It is also certified that information furnished in the above Mining Plan are true and correct to the best of my knowledge.

Signature of the Qualified Person


B. VENGADAGIRI, M.Sc.,

Place: Salem

Date: 09.02.2024

B. VENGADAGIRI, M.Sc.,
No.105, 5th Cross, Alagapuram,
Salem District - 636 010,
Mobile No.: +91 86953 32233



CERTIFICATE FROM THE QUALIFIED PERSON

Certified that the Provisions of Mines Act, Rules and Regulations or Orders made there under have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan for Ulagani Rough Stone and Gravel Quarry lease applied area over an extent of 3.48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared for

Tvl. Suganya Blue Metals,
No. 13/4A2, Achankulam, Nedungalam,
Mela Uppiligundu Post, Kallikudi Taluk,
Madurai District,
Tamil Nadu State- 625 022.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of Director of Mines Safety (DMS), No.5, II Street, Block-AA, Anna Nagar, Chennai-40, Tamil Nadu State for such permissions / exemptions / relaxations and approvals.

It is also certified that information furnished in the Mining Plan are true and correct to the best of my knowledge.

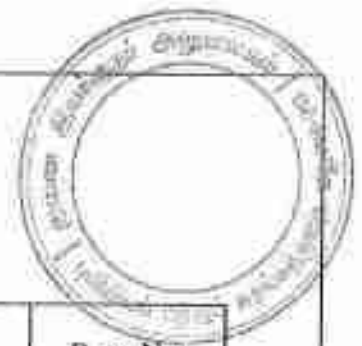
Signature of the Qualified Person

B. VENGADAGIRI, M.Sc.,

Place: Salem

Date: 09.02.2024

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MINING PLAN ALONG WITH PROGRESSIVE QUARRY CLOSURE PLAN FOR ULAGANI ROUGH STONE AND GRAVEL.

(PREPARED UNDER RULES 41 & 42 AS PER THE AMENDMENT OF TAMIL NADU MINOR MINERAL
CONCESSION RULES, 1959)

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The Company **Tvl. Suganya Blue Metals**, having an office at No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District, Tamil Nadu – 625 022 has entrusted and given consent to preparation of Mining plan and Progressive Mine Closure Plan as per the provisions of Mines Act, Rules, Regulations and as amended till date.

In the reference 1st read below, the Company has applied quarry lease for quarrying of Rough stone and Gravel over an extent of 3.48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State for a period of ten years under Rules 19 (1) and 20 of Tamil Nadu Minor Mineral Concession Rules, 1959. The followings are the statutory requirements (Reference) with respect to Rough stone and Gravel quarry (Refer Annexure No. I).

1. Tvl. Suganya Blue Metals, No. 13/4A2, Achankulam Village, Kallikudi, Madurai Company's application Dated: Nil (Application received on 11.10.2023).
2. Deputy Director, Department of Geology and Mining, Madurai letter Rc.No.1271/Mines/2023, dated: 12.10.2023
3. Revenue Division Officer, Thirumangalam letter Rc. No. 5073/2023/A4 dated: 24.11.2023.
4. Deputy Director, Department of Geology and Mining, Madurai, inspection report dated: .12.2023.
5. Amendment Rules 41 and 42 of Tamil Nadu Minor Mineral Concession Rules, 1959.
6. Government Order No. 169 Industries (M.M.C.1) Department, Dated: 04.08.2020.
7. Precise Area Communication issued by Deputy Director, Department of Geology and Mining, Madurai, letter R.C.No. 1271/Mines/2023, dated 26.12.2023.
8. Tvl. Suganya Blue Metals, Company's application Dated: 04.01.2024.

The application was examined, Scrutinized, Inspected and processed by the Deputy Director, Department of Geology and Mining, Madurai and issued a Precise Area Communication letter vide letter R.C. No. 1271/Mines/2023, dated 26.12.2023 for preparation of Mining plan as per the Rule 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959. The mining plan was prepared but availability of reserves does not meet out the company's requirement of the production schedule due to the entire reserves are split up for ten years to the life of the mine.

Since, in reference 8th read above the company has request to grant the lease period for five years based on their requirement of production schedule and availability of Reserves. Based on the request of the applicant and considering the factors the Deputy Director, Department of Geology and Mining, Madurai passed a Precise Area Communication letter with revised lease period for five years vide letter **R.C. No. 1271/Mines/2023, dated: 23.01.2024** for preparation of Mining plan as per the Rule-41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 within 90 days and getting approval from the Department of Geology and Mining, Madurai to obtain Environmental Clearance from the State Level Environment Impact Assessment Authority (SEIAA), Tamil Nadu, with the following conditions to provide (Refer Annexure No. I):

General Conditions:

- i. A safety distance of 7.5 meters should be provided to the adjacent patta lands from the lease applied area.
- ii. The applicant should submit the approved Mining Plan and Environmental clearance for the area applied for quarry lease for quarrying of Rough stone and Gravel over an extent of 3,48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District.

Specific conditions as prescribed in the precise area communication letter:

- i. A safety distance of 50 meters should be provided to the Gundar River in S.F.No. 106 passing on the Eastern side of S.F.No. 110/1F of the lease applied area.
- ii. A safety distance of 10 meters should be provided to the Government Poramboke bund situated on adjacent to the lease applied area.
- iii. A safety distance of 10 meters should be provided to the Cart Track demarcated in the F.M.B. Sketches of the lease applied area in S.F.Nos. 108/2D and 109/2C.
- iv. The applicant should be provide a safety distance of 50m to the Low Tension Power line passing from Southwest to Northeast side in S.F.Nos. 109/6, 110/1B, 110/1C and 110/1J of the applied area otherwise the Power lines should be removed from the area applied for quarry lease before commencement of quarry operation.

This Mining Plan along with Progressive Mine closure Plan is prepared in full consultation with **Tvl. Suganya Blue Metals**, having an office at No. 13/4A2, Achankulam, Nedungulam, Mela Uppiligundu Post, Kallikudi Taluk, Madurai District, Tamil Nadu State- 625 022 for Rough stone and Gravel quarry over an extent of 3,48.0 Hectares Patta lands in S.F.Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu State under Rules 19 and 20 of Tamil Nadu Minor Mineral Concession Rules, 1959 with obtained full consent as per the application and Production schedule in preparation of Mining plan as per the provisions of Mines Act, Rules, Regulations as on date.

The Mining plan has been prepared after carrying the field survey, collection of Primary & secondary data, environmental setting, geological features and tentatively estimated the Resources & Reserves, depth of mining as identified in the field with best our knowledge and experience. This mining plan is prepared by considering the Rule 41 & 42 as Amended in Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the EIA Notification 2006 and its subsequent Amendments.

In order to ensure compliance of the order of the Honourable Supreme Court Dated: 27.02.2012 in I.A.No.12-13 of 2011 in Special Leave Petition(SLP) (C) No. 19628-19629/2009, it has been now decided that all mining projects of minor minerals including their renewal is require prior environmental clearance. As per amendment in EIA Notification 2006 vide S.O. 1886(E), Dated:20.04.2022 "All mining lease area in respect of minor mineral mining leases and \leq 250 ha mining lease area in respect of major mineral mining lease other than coal" would be treated as category B and will be considered by the state notified by Ministry of Environment, Forest and Climate Change as prescribed procedure under EIA notification 2006.

The field survey carried out by the Qualified Person and Team as on 31.01.2024.

Short Notes of Mining plan:

- a. Village Panchayat - Ulagani
- b. Panchayat Union - Kallikudi
- c. Total extent of the lease applied area is 3.48.0Ha.
- d. Topography of the area - The area is exhibits plain topography.
- e. The Estimated Geological Resources are 13,91,960m³ of Rough stone and 69,598m³ of Gravel in the entire area.
- f. Tentative total Mineable Reserves are 3,84,905m³ of Rough stone and 48,946m³ of Gravel in the entire area.
- g. The proposed quantity of reserves/ (level of production) to be mined are 3,84,905m³ of Rough stone for five years and 48,946m³ of Gravel for first three years in the entire area.
- h. Proposed Depth of mining = 42m below ground level.
- i. Lease Period = Five years.
- j. Mining Plan Period = Five years.
- k. It is a fresh lease applied area, at present the area is virgin. Hence no existing pit.

- l. Method of mining / level of mechanization.
Opencast mechanized method, the quarry operation involves shallow jack hammer drilling, slurry blasting with NONEL initiation.
- m. Type of machineries proposed in the quarrying operation is given below.
Excavators attached with bucket and rock breaker.
Hand Jack hammer, Compressor (Diesel drive) (4 Jack Hammer capacity).
- n. No trees will be uprooted due to this quarry operation.
- o. The approach road from the main road to quarry is already existence; the same will be maintained in good condition for the haulage of quarry materials and machineries.
- p. There is No Export of this Rough stone and Gravel.
- q. Topo sketch covering 10km and 1km radius around the proposed area with markings of habitations, water bodies including streams, rivers, roads, major structure like bridges, wells, archaeological importance and places of worships is marked and enclosed as Plate Nos. IA & IB.
- r. The lease applied area is about 3.48.0Ha bounded by twenty nine corners; the corners are designated as 1-29 clockwise from the Southwest corner and the Co – ordinates for all the corners are clearly marked in the Quarry Lease Plan and Surface Plan enclosed as Plate No. II.
- s. The plans of proposed quarrying area showing the dimensions of the pit, their proposed depth and maximum area of proposed quarrying are enclosed as Plate Nos. III and IV.
- t. General conditions will not applicable for the proposed area. The area applied for lease is 10Km away from the,
i) Interstate Boundary,
ii) Protected area under wild life protection ACT, 1972,
iii) Critically polluted areas as identified by CPCB,
iv) Notified Eco sensitive areas.
- u. There is no waste anticipated during this quarry operation, hence waste dump is not proposed in the lease applied area.
- v. Around 46 employees are proposed to deploying the quarrying operation.
- w. Total Cost of the project is about Rs.2,83,61,000/-.

**2.0 GENERAL INFORMATION**

2.1 a) Name of the Applicant : Tvl. Suganya Blue Metals,

b) Address of the Applicant (With Phone No and Aadhaar No.)

Address : No. 13/4A2, Achankulam, Nedungulam

Mela Uppiligundu Post,

Kallikudi Taluk,

Madurai District,

State with Pin Code : Tamil Nadu – 625 022.

Mobile No : 91 98428 04566 and 80722 79017

Aadhaar No : 2229 9590 3428 (Refer Annexure No. VIII)

E-mail : suganya1sb@gmail.com

c) Status of the Applicant (Individual / Company / Firm):

Tvl. Suganya Blue Metals is a Partnership firm and the partnership deed executed on 03.08.2009 and Registered on 04.08.2009 with five partners. The Partnership firm Reconstituted on 01.04.2022 with four partners under the Indian Partnership act, 1932 (Refer Annexure No. VII). Thiru. R. Malaiyarasan is an Authorized person for signing the documents on behalf of the firm (Refer Annexure No. VII and VIII).

2.2 a) Mineral which the Applicant intends to mine:

The Applicant intends to quarry Rough stone and Gravel only.

b) Precise area communication letter details received from the Competent Authority of the Government:

The precise area communication letter was received from the Deputy Director, Department of Geology and Mining, Madurai District vide R.C. No. 1271/Mines/2023, dated: 23.01.2024 (Refer Annexure No. I) and was given to us for the preparation of mining plan to meet out the applicant's production schedule.

c) Period of permission / lease to be granted:

Five years as mentioned in Precise area communication letter.

d) Name and address of the Qualified Person who preparing the Mining Plan:

Name : **B. VENGADAGIRI, M.Sc.,**

Qualified Person (Under Rule 15(D)(a) and (D)(b) of MCR, 2016)

Address : No.105, 5th Cross,

Alagapuram,

Salem District – 636 010.

Mobile : +91 86953 32233

Email : vengatb6@gmail.com

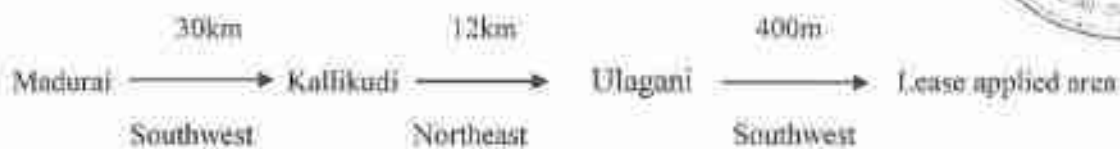
(Please Refer Annexure Nos. IX and IX-A).



3.0 LOCATION

a) Details of the area with location map:

The lease applied area is located about 18m Southwest side of Madurai town, 11km Northeast side of Kallikudi town and 400m Southwest side of Ulagani Village.



Location Map of the Lease Applied area

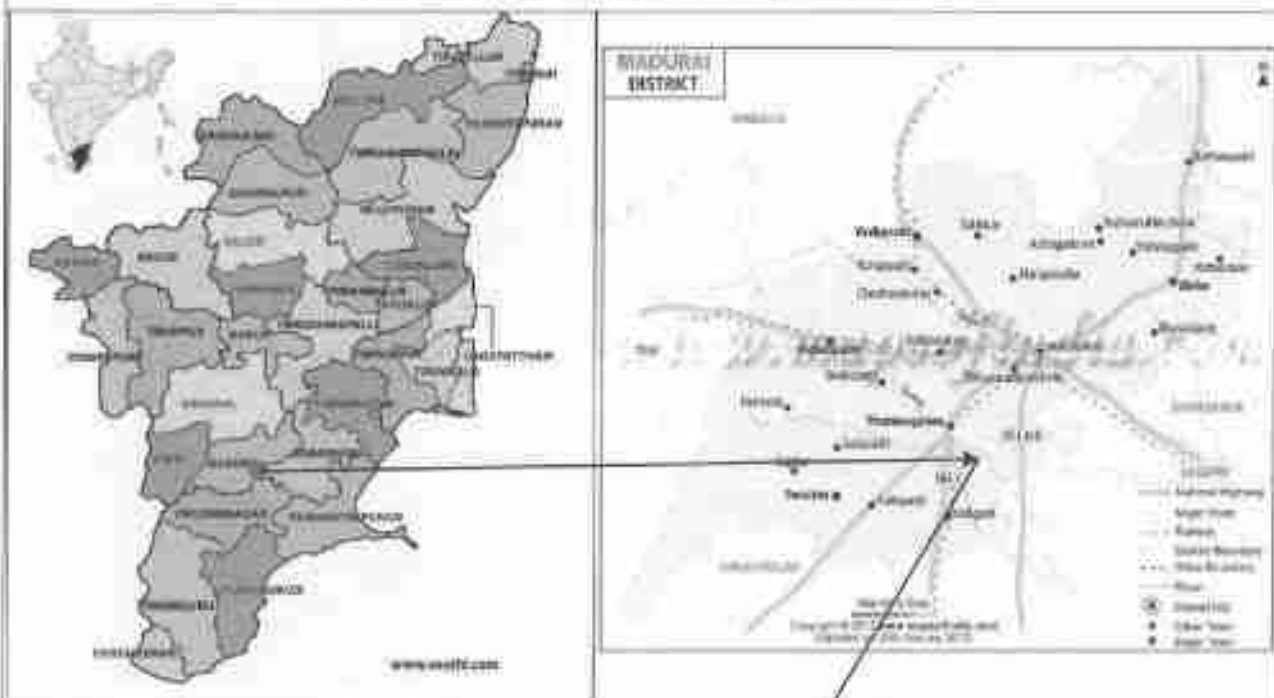


Table - I

District	Taluk	Village	S.F. No.	Area (Ha.)	Patta No.
Madurai	Kallikudi	Ulagani	108/2D	0.11.0	1438
			109/1	0.14.0	
			109/2C	0.41.5	
			109/3A	0.06.5	
			109/3B	0.06.0	
			109/4	0.13.5	
			109/6	0.19.5	
			109/10A	0.10.5	
			109/10B	0.43.0	
			109/12	0.11.5	
			110/1A	0.23.5	
			110/1D	0.06.5	
			110/1H	0.22.5	
			110/1I	0.02.5	
			110/1B	0.27.5	1452
			110/1C	0.08.0	
			110/1E	0.09.5	
			110/1F	0.09.0	
			110/1G	0.13.5	
			110/1J	0.18.0	
			110/1K	0.08.5	
			110/1L	0.10.5	
			110/1M	0.11.5	
Total Extent				3.48.0	

Source: As per the FMB and 'A' register record furnished by the applicant.

b) Classification of the area (Ryotwari/ Poramboke / others):

It is Patta lands, classified as Punsei (Barren land) (Refer Annexure Nos. IV & VI).

c) Ownership / Occupancy of the applied area (surface right):

It is Patta lands, registered in the name of Company (Tvl. Suganya Blue Metals) vide patta Nos. 1438 and 1452 (Refer Annexure Nos. IV & VI).

d) Toposheet No. with latitude and longitude:

The lease applied area falls in the Toposheet No: 58 K/01 Latitude between: 09°46'28.0212"N to 09°46'36.8935"N and Longitude between: 78°02'13.0813"E to 78°02'20.5055"E on WGS datum-1984. Please refer the Plate Nos. I to II as per the GSI Toposheet.

e) Existence of public road / Railway line, if any nearby and approximate distance:

The approach (cart track) road is situated on the Southern side, which is connects to the Nedungulam – Thoombakulam Village Road is located at 600m on the Southwest side of the lease applied area.

Road access is available from the quarry to state highways and National Highway, no towns are enrooted hence the traffic density is not much more due to the transportation of Rough stone and Gravel.

The approach road from the quarry is already existence and the same will be utilized for haulage and maintained during the entire lease period.

The Nearest Railway line is Madurai - Virudhunagar which is located about 5.5km on the Western side of the area as per the GSI Toposheet and Google Map.



PART - A

4.0 GEOLOGY AND MINERAL RESERVES

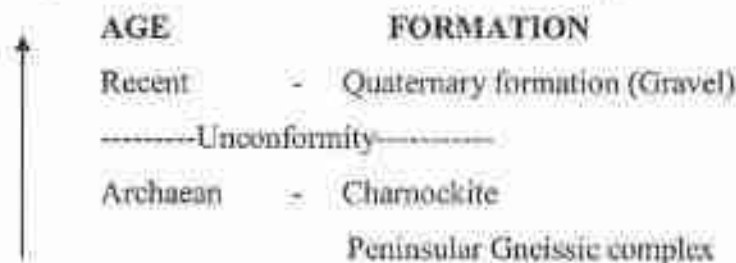
4.1 Brief description of the Topography and general Geology of the area (with plans):

The lease applied area exhibits plain topography. The area has gentle sloping towards Eastern side and altitude of the area is 128m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby existing quarry pit situated on the Southern side.

The Water level in the surrounding area is 68m - 73m below from general ground profile which is observed from the nearby bore wells. Average annual rainfall is about 985mm.

Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale of the Charnockite body is N40°E - S40°W with dipping towards SE60°.

The general geological sequences of the rocks in this area are given below:



4.2 Details of exploration already carried out if any:

State Geology and Mining Dept, Govt. of Tamil Nadu, has carried out the regional prospecting and exploration in these areas during 1992 to 1993.

Geological Survey of India has carried out detailed mapping in Madurai District. Besides, the Qualified Person and his team members made a detailed geological study of the proposed area. The Rough stone formation is clearly inferred from the nearby existing quarry pit situated on the Southern side.

4.3 Estimation of Reserves:

a) Geological Resources with geological sections on a scale of 1:1000 / 1:2000

As far as Rough stone (Charnockite) is concerned, the only practical method is the systematic geological mapping and delineation of Rough stone within the field and careful evaluation of body luster, physical properties, engineering properties, commercial aspects etc.,

Totally six sections have been drawn, three section drawn vertically as (X-Y, XI-YI and X2-Y2) Length wise and other three cross sections are drawn horizontally as (A-B, C-D and E-F) Width wise to cover the maximum area considered for lease upto 42m depth.

The Topographical, Geological plan and sections demarcated the commercial marketable Rough stone (Charnockite) deposit has been prepared in the scale of 1:1000 (please refer the Geological plan and sections Plate No. III). As the sale of Rough stone are in terms of cubic metres (Volume) only and not in terms of tonnage. No Exploration has been carried out.

Estimation of Geological Resources (Plate No. III):

The Geological Resources of Rough Stone and Gravel are calculated upto a depth of 42m [2m Gravel + 40m Rough stone] below ground level. The total **Geological Resources** are calculated by cross section (**Block area**) method. The total geological resources are given table below:

TABLE - 2

Section	Bench	Length (m)	Width (m)	Depth (m)	Rough stone @ 100% (m ³)	Gravel (m ³)
XY-AB	i	122	134	2	-	32696
	ii	122	134	5	81740	-
	iii	122	134	5	81740	-
	iv	122	134	5	81740	-
	v	122	134	5	81740	-
	vi	122	134	5	81740	-
	vii	122	134	5	81740	-
	viii	122	134	5	81740	-
	ix	122	134	5	81740	-
Total					653920	32696
XIY1-CD	i	121	139	2	-	33638
	ii	121	139	5	84095	-
	iii	121	139	5	84095	-
	iv	121	139	5	84095	-
	v	121	139	5	84095	-
	vi	121	139	5	84095	-
	vii	121	139	5	84095	-
	viii	121	139	5	84095	-
	ix	121	139	5	84095	-
Total					672760	33638
X2Y2-EF	i	48	34	2	-	3264
	ii	48	34	5	8160	-
	iii	48	34	5	8160	-
	iv	48	34	5	8160	-
	v	48	34	5	8160	-
	vi	48	34	5	8160	-
	vii	48	34	5	8160	-
	viii	48	34	5	8160	-
	ix	48	34	5	8160	-
Total					65280	3264
Grand Total					1391960	69598

The Geological Resources of Gravel : 69,598m³

The Geological Resources of Rough Stone : 13,91,960m³

Geological Resources has been computed based on the physical investigation and filed survey data.

Estimation of Mineable Reserves:

The mineable reserves are calculated after leaving the safety distance and Bench loss.

TABLE - 3

Section	Bench	Length (m)	Width (m)	Depth (m)	Rough stone @ 100% (m ³)	Gravel (m ³)
XY-AB	i	104	112	2	-	23296
	ii	96	106	5	50880	-
	iii	86	96	5	41280	-
	iv	76	86	5	32680	-
	v	66	76	5	25080	-
	vi	52	53	5	13780	-
	vii	39	38	5	7410	-
	viii	25	27	5	3375	-
	ix	15	16	5	1200	-
Total					175685	23296
XIY1-CD	i	100	121	2	-	24200
	ii	94	115	5	54050	-
	iii	84	104	5	43680	-
	iv	74	94	5	34780	-
	v	64	84	5	26880	-
	vi	54	73	5	19710	-
	vii	44	63	5	13860	-
	viii	34	53	5	9010	-
	ix	23	42	5	4830	-
Total					206800	24200
X2Y2-EF	i	29	25	2	-	1450
	ii	22	22	5	2420	-
Total					2420	1450
Grand Total					384905	48946

Total Mineable Reserves of Gravel : 48,946m³

Total Mineable Recoverable Reserves of Rough stone @ 100% : 3,84,905m³

The mineable reserves have been computed as 3,84,905 m³ of Rough stone at the rate of 100% recovery and 48,946m³ of Gravel for a period of five years upto a depth of 42m below ground level (Refer Plate No. III).

Estimation of Mineral Resources Locked up under Safety zone and Bench Loss:

TABLE - 4

MINERAL RESOURCES LOCKED UP UNDER SAFETY ZONE			
Area (m ²)	Depth (m)	Rough Stone (m ³)	Gravel (m ³)
8,380	2	-	16760
8,380	40	335200	-

Total Gravel Locked up under safety zone : 16,760m³

Total Rough stone Locked up under safety zone : 3,35,200m³

TABLE - 4A

MINERAL RESOURCES LOCKED UP UNDER BENCH LOSS					
Section	Bench	Area (m ²)	Depth (m)	Rough stone (m ³)	Gravel (m ³)
XY-AB	i	945	2	-	1890
	ii	2110	5	10550	-
	iii	3960	5	19800	-
	iv	5710	5	28550	-
	v	7760	5	38800	-
	vi	9010	5	45050	-
	vii	10040	5	50200	-
	viii	10890	5	54450	-
	ix	11510	5	57550	-
	Total				304950	1890
XIY1-CD	i	840	2	-	1680
	ii	2220	5	11100	-
	iii	4620	5	23100	-
	iv	6470	5	32350	-
	v	8470	5	42350	-
	vi	9850	5	49250	-
	vii	11000	5	55000	-
	viii	11980	5	59900	-
	ix	12740	5	63700	-
	Total				336750	1680
X2Y2-EF	i	142	2	-	283
	ii	371	5	1855	-
	iii	806	5	4030	-
	iv	806	5	4030	-
	v	806	5	4030	-
	vi	806	5	4030	-
	vii	806	5	4030	-
	viii	806	5	4030	-
	ix	806	5	4030	-
	Total				30065	283
Grand Total				671765	3853

Total Gravel Locked up under Bench Loss : 3,853m³

Total Rough stone Locked up under Bench Loss : 6,71,765m³

Summary of Reserves and Resources;

TABLE - 4B

Description	Rough stone (m ³)	Gravel (m ³)
Geological Resources	13,91,960	69,598
Mineable Reserves	3,84,905	48,946
Mineral Resources locked up under safety zone	3,35,200	16,760
Mineral Resources locked up under Bench loss	6,71,765	3,854

Note: The small variation is bound to occur as Reserves and Resources are only estimated.



5.0 MINING

5.1. Method of mining (opencast / underground):

Open cast Mechanized Mining is being carried out with 5.0 meter vertical bench with a bench width is not less than the bench height.

However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) is available with Director General of Mines Safety. If the applicant/lessee intends to modify the dimensions of benches, relaxation and permission are available with Director General of Mines Safety under 106 (2) (b) of Metalliferous Mines Regulations, 1961. In such a scenario if there is any drastic change in the Resources and Reserves a modified plan will be submitted to the concerned authority for necessary relaxation, clearance and permission. The relaxation will be applied and obtained after the execution of lease deed / commencement of quarry operation.

5.2. Mode of working (mechanized/ manual):

The Rough Stone is proposed to quarry at 5m bench height & width with conventional Opencast Mechanized Method.

The quarry operation involves shallow jack hammer drilling, slurry explosives in blasting, excavation, Loading and transportation of Rough stone to the needy crusher.

The production of Rough stone in this quarry involves the following method which is typical for Rough Stone quarrying in contrast to other major mineral mining.

Splitting of rock mass of considerable volume from the parent rock mass by shallow jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers.

Occasionally hydraulic excavators are attached with rock breakers for fragmentation to avoid secondary blasting. The primary boulders thus splitted are removed from the pits by excavators and further made to smaller sizes by rock breakers attached in excavators. It is a conventional opencast mechanized method of mining.



5.3. Proposed Bench Height and Width:

The bench height is proposed 5.0 meter vertical bench the width of the bench is not less than the Height. After obtaining relaxation as per 106 2(b) of Metalliferous Mines Regulations, 1961 from the DMS, the realignment of benches will be carried out.

5.4. Indicate the overburden / mineral production expected pit wise as detailed below (composite plan and section showing pit layout, dumps, disposal of waste if any etc.):

The overburden in the form of Gravel, the Gravel will be directly loaded into Trucks for the filling and levelling of low-lying areas, this will be done only after obtaining permission and paying necessary seigniorage fee to the Government. The excavated rough stone will be directly loaded into Trucks to the needy customers. The Composite year wise Development and production plan and sections indicating the pit lay out and green belt development are shown in Plate No. III.

Year wise Development and Production

TABLE - 5

YEARWISE PRODUCTION							
Year	Section	Bench	Length (m)	Width (m)	Depth (m)	Rough stone @ 100% (m ³)	Gravel (m ³)
I	X2Y2-EF	i	29	25	2	-	1450
		ii	22	22	5	2420	-
	X1Y1-CD	i	66	121	2	-	15972
		ii	60	115	5	34500	-
		iii	50	104	5	26000	-
		iv	40	94	5	18800	-
	Total						81720	17422
II	X1Y1-CD	i	34	121	2	-	8228
		ii	34	115	5	19550	-
		iii	34	104	5	17680	-
		iv	34	94	5	15980	-
	XY-AB	i	37	112	2	-	8288

		ii	30	106	5	15900	-
		iii	20	96	5	9600	-
		iv	10	86	5	4300	-
		Total				83010	16316
III	XY-AB	i	67	112	2	-	15008
		ii	66	106	5	34980	-
		iii	66	96	5	31680	-
		iv	5	86	5	2150	-
	Total				68810	15008	
IV	XY-AB	iv	61	86	5	26230	-
		v	66	76	5	25080	-
	XIYI-CD	v	64	84	5	26880	-
	Total				78190	-	
	XY-AB	vi	52	53	5	13780	-
		vii	39	38	5	7410	-
		viii	25	27	5	3375	-
		ix	15	16	5	1200	-
V	XIYI-CD	vi	54	73	5	19710	-
		vii	44	63	5	13860	-
		viii	34	53	5	9010	-
		ix	23	42	5	4830	-
	Total				73175	-	
Grand Total						384905	48946

The Recoverable reserves have been computed as 3,84,905m³ of Rough stone at 100% recovery for five years and 48,946m³ of Gravel for first three years upto a depth of 42m below from existing ground profile (R.L.128m to R.L.86m) (Refer Plate No. III).

The peak production capacity in the quarry is 83,010m³ of Rough stone on 2nd year and the proposed production schedule is arrived as per applicant's requirement.

The applicant ensures the total quantity proposed in the benches will not exceed during the quarrying operation. Besides the rough stone locked up in benches will be exploited after obtaining necessary permission from the office of Director of Mine Safety, Chennai region by submitting relevant documents, appropriate safety plans and its Mitigation measures.

One lorry load	=	12m ³ (approx.)
Total No of Working days	=	300 Days per year
Total quantity to be removed during the five years plan period-	=	3,84,905m ³
Peak production capacity during the 2 nd year	=	83,010m ³
Hence total Lorry loads per day	=	83,010m ³ /12m ³
	=	6,918 Lorry loads
	=	6,918/300 days
Rough Stone (Maximum)	=	23 Lorry loads per day
Total Gravel to be removed during the first three years	=	48,946m ³
Peak production capacity during the 1 st year	=	17,422m ³
Hence total Lorry loads per day	=	17,422m ³ /12m ³
	=	1,452 Lorry loads
	=	1,452/300 days
Gravel (Maximum)	=	5 Lorry loads per day
Working hours = 9.00 am to 6.00 pm (with 1.00-2.00 P.M. lunch break)		

5.5. Machineries to be used:

For Mining:

The following machineries are utilized on rental basis for the development and production work at this quarry.

TABLE - 6

I. DRILLING MACHINE:

S. No.	Type	Nos	Dia Hole mm	Size Capacity	Motive power
1	Jack Hammer	12	32	1.2m to 2.0m	Compressed air
2	Compressor	3	-	400 psi	Diesel Drive

II. EXCAVATION & LOADING EQUIPMENT:

S. No.	Type	Nos	Capacity	Motive Power
1	Excavator with Bucket and Rock Breaker	1	300	Diesel Drive

III. HAULAGE WITHIN THE MINE & TRANSPORT EQUIPMENT:

S. No.	Type	Nos	Capacity	Motive Power
1	Trucks	3	35 tonnes	Diesel Drive

5.6. Disposal of Overburden/Waste:

There is no Waste anticipated during this plan period hence, disposal of waste does not arise. The overburden in the form of Gravel, the Gravel will be directly loaded into Trucks for the filling and levelling of low-lying areas. The excavated rough stone (100%) will be directly loaded into Trucks to the needy customers.

5.7. Use of the Mineral:

The excavated rough stone (100%) will be directly loaded into Trucks as raw form to the needy nearby crushing unit to making Road metals and construction materials.

5.8. Brief note on conceptual mining plan for the entire lease period base on the geological, mining and environmental considerations:

Conceptual mining plan is prepared with an object of long-term systematic development of benches, layouts, selection of permanent structures, depth of quarrying and ultimate pit dimensions, selection of sites for construction of infrastructure, etc.,

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

As the applicant has applied quarry lease for five years, the ultimate pit limit (dimension) at the end of this mining plan period is given below:

TABLE - 7

Section	Length (m) (Max.)	Width (m) (Avg.)	Depth (m) (Max.)
XY-AB	204	121	42m below ground level (R.L. 128m - R.L. 86m)

All the base line information studies like Air quality monitoring, Noise and vibration monitoring, Water analysis studies will be carried out every year as per the MoEF & CC Norms. Please refer Plate Nos. III & IV. As per the NGT orders the applicant is directed to plant 500 trees per hectares along the quarry site and in the haul road either at the regular or the phased manner by planting native species.

There is no waste anticipated during the entire life of quarry hence, backfilling is not proposed in this Rough stone quarry. After completion of quarry operation the quarried out pit will be allowed to collect the seepage and rainwater and the water storage will be kept as temporary reservoir for charging the nearby wells and the water will be utilized for Green belt development purpose. The quarry area will be fenced with barbed wire fencing also safety bund constructed around the quarry to prevent inadvertent entry of public and cattle (Refer Plate No. IV and V).

6.0 BLASTING**6.1 Blasting pattern:**

The quarrying operation is proposed to be carried out by Mechanized Opencast Method in conjunction with conventional method of mining using shallow Jack hammer drilling and mild blasting with NONEL initiation of shattering effect for loosening the Rough stone. Nonel initiation provides a reasonably good solution to the fly rock problem. The main objectives of Nonel Blasting are to reduce the ground vibration, noise, flyrocks generated due to blasting operations. The overall cost of blasting in NONEL is very less compared to electrical blasting and hence it optimizes the cost of blasting.

Anticipated theoretical calculation of PPV

The empirical equation for assessment of peak particle velocity (PPV) is:

$$V = K [R/Q^{0.5}]^{-B}$$

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

PREDICTED PPV VALUES DUE TO BLASTING

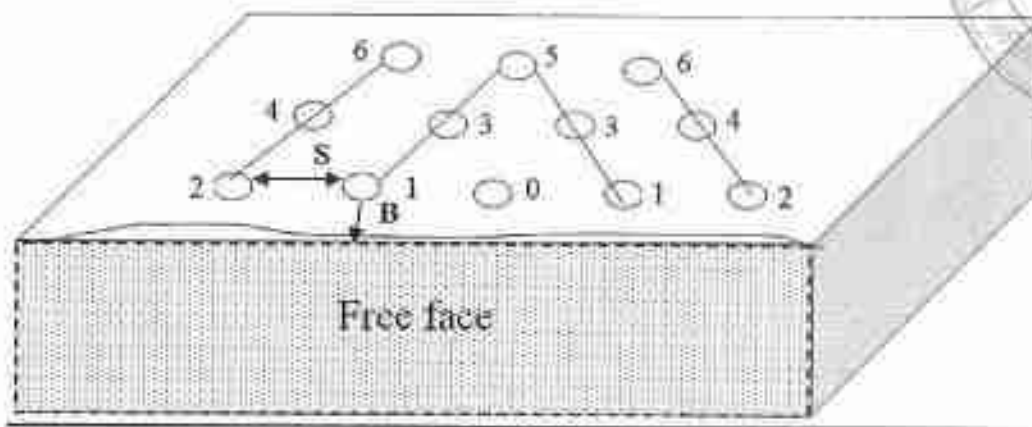
Table – 8

Maximum Charge per day (kg)	Number of Round Blast per day	Number of holes blasted per round	Number of holes blasted per day	Nearest Infrastructure (m)	PPV (mm/s)
144	2	144	288	302	1.647

If the blasting would be carried out by 288 holes in a single round the PPV is 2.868 to the nearest structure. From the above table, the charge per blast of 144kg 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. Anyhow, the applicant ensures that carry out the **blasting twice a day** under the supervision of competent qualified statutory personnel employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

Drilling and blasting parameters are as follows:

Depth of Each hole	:	1.6m
Spacing between holes	:	1.2m
Burden for hole	:	1.0m
Diameter of hole	:	32mm
Pattern of hole	:	Zigzag – Multi-rows
Inclination of holes	:	80° from horizontal
Use of delay detonators	:	25millisecond delays
Detonating fuse	:	Non-Electric Detonators

BLASTING PATTERN DRAWING**Staggered "V" Pattern of Blasting Design**

Spacing	=	1.2m
Burden	=	1.0m
Depth of the hole	=	1.6m
No of holes proposed per day (Peak Production)	=	288 Holes

6.2 Type of explosives to be used:

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 secondary blasting is proposed. NONEL blasting and muffle blasting may be adopted after permission from DGMS.

6.3 Measures proposed to minimize ground vibration due to blasting:

The quarry is situated more than 300m away from the nearby villages, Controlled blasting measures of NONEL initiation is being adopt for minimizing ground vibration and fly rock.

Shallow depths jackhammer drilling & blasting is proposed to be carried out with minimum use of explosive mainly to give heaving effect in rough stone for easy excavation and to control fly rock.

NONEL Delay detonators:

Delay blasting (millisecond delays) permits to divide the shot in 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 (As per Peak production capacity):

Peak production (2 nd Year)	= $83,010\text{m}^3 \times 2.6(\text{Bulk Density}) = 2,15,826 \text{ tons}$
No of Holes	= 288 Holes
Yield	= 720 Tons
Powder factor	= 5 Tons/Kg of explosives
Total explosive required	= 144 Kg-Slurry explosives
Charge/ hole	= 0.5 Kg
Blasting at day time only	= 1.00 – 1.30 P.M. (whenever required)

6.4 Storage and safety measures to be taken while blasting:

The applicant will engage authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory foreman/Permit Mines Manager. The explosives agencies should be having the valid Blaster certificate. He will blast holes in the quarry site. After the completion of Blasting the explosives Agencies will take it out back the remaining quantity of Explosives. The Competent Qualified Statutory personnel appointed by the applicant will maintain the records of Explosives as per the Indian Explosives Act.

7.0 MINE DRAINAGE**7.1 Depth of water table (based on nearby wells and water bodies):**

The area is a plain topography; since the lease applied area consists the most common type of dendritic drainage pattern. The water table in the area is about 68m – 73m which is observed from the existing private boreholes. The lease area is fully covered by Massive Charnockite formation. The quarry operation confined to well above the water table hence, the Ground Water problem will not arise. If water seepage may occur due to the fracture, the same will be used for Greenbelt. Anyhow, Garland drain will be constructed all along the boundary to prevent surface run-off water entering into the quarry.

TABLE – 9

Type	Distance & Direction	Location
Bore Well	320m Northeast side	09°46'40.03"N 78°02'27.16"E

7.2 Arrangements and places where the mine water is finally proposed to be discharged:

The quarry operations are confined to well above the water table during the entire lease period. If water is encountered at quarry due to rain water and seepage, the same will be pumped out by SHP water pump and discharge to the Green belt development areas. Besides, the water will also be used for dust suppression on haul roads during Haulage of machineries.

8.0 OTHER PERMANENT STRUCTURES (also shown in the map)**TABLE - 10**

S.No.	Description	Particulars	Aerial Distance & Direction																	
1	Nearest National Highway	(NH-44) Madurai - Tirumelveli	6km - West																	
2	State Highways	(SH-73) Tirumangalam - Vadipatti	7.5km - NW																	
3	Railway station	Tirumangalam Railway station	7.4 km - NW																	
4	Airport	Madurai	9 km - NE																	
5	Nearest Habitation	302m - NE																		
6	Town	Tirumangalam	7.5 km - NW																	
7	Nearest Government School	Maikkudi - Panchayat Union Middle School	2.4km - NW																	
8	Government Hospital	Tirumangalam	7.5km - NW																	
9	Reserved Forest	No Reserve Forest within 60m Radius. Nearest Reserve Forest is Nagamalai R.F. - 17.7km North																		
10	Defense Installation/Historical Monuments/ Archaeological	Nil within 500m radius.																		
11	Nearby Water Bodies	Gundar - 47m - NE																		
12	Interstate Boundary	Around 74.5 km - West (Kerala State Boundary)																		
13	Critically Polluted areas identified by the CPCB	Around 173 km - NW (Coimbatore - SIDCO)																		
14	Protected areas Notified under wildlife (Protection) Act, 1972	Around 27.5 km - West (Megamalai Wild Life Sanctuary)																		
15	Applicability of CRZ, Notification 2011 as amended.	Not Applicable																		
16	Applicability of Hill Area Conservation Authority (HACA) Clearance.	Not Applicable																		
17	Housing area, EB line (HT & LT Line)	There is an EB-LT line passing in S.F.Nos. 109/6, 110/1B, 110/1C and 110/1J, the applicant intends to remove the power line from the area. There is no EB-HT line or Housing area situated within 50m radius.																		
18	Boundaries of the permitted area.	The boundaries of the permitted areas are as follows (Refer Plate No. II): North - S.F.Nos. 108/2C3, 109/2A2, 2A3, 2A4 and 109/2B East - S.F.Nos. 109/10C2, 10C7, 10C8, 10C9, 10C10, 10C11, 11A, 11B, 110/4 and 111. South - S.F.Nos. 109/7 and 110/2 West - S.F.Nos. 109/5 and Nedungulam Village.																		
19	Adjacent Patta lands / Govt. Land	<table border="1"> <thead> <tr> <th>Direction</th> <th>Classification</th> <th>Safety Distance</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>Patta land</td> <td>7.5m and 10m to the Track</td> </tr> <tr> <td>East</td> <td>Patta land</td> <td>7.5m and 50m to the Gundar</td> </tr> <tr> <td rowspan="2">South</td> <td>Patta land</td> <td>7.5m</td> </tr> <tr> <td>Govt. land</td> <td>10m</td> </tr> <tr> <td>West</td> <td>Govt. land</td> <td>10m to the Track</td> </tr> </tbody> </table>	Direction	Classification	Safety Distance	North	Patta land	7.5m and 10m to the Track	East	Patta land	7.5m and 50m to the Gundar	South	Patta land	7.5m	Govt. land	10m	West	Govt. land	10m to the Track	(Refer Plate No. II):
Direction	Classification	Safety Distance																		
North	Patta land	7.5m and 10m to the Track																		
East	Patta land	7.5m and 50m to the Gundar																		
South	Patta land	7.5m																		
	Govt. land	10m																		
West	Govt. land	10m to the Track																		



STRUCTURE WITHIN 100 -200m

Number of Structures - 1 No.

TABLE - 11

Number of Structure	Type of Structure	Usage Purpose	Commercial / industry/ residential/ farm house/ Govt. building	Occupants of Building/ Structure	Remarks
1	Crusher plant	To crushing the Rough stone	Non residential	Nil	No resident

STRUCTURE WITHIN 200 -300m

Number of Structures - 2 Nos.

Number of Structure	Type of Structure	Usage Purpose	Commercial / industry / residential / farm house / Govt. building	Occupants of Building/ Structure	Remarks
2	Labour shed and office	Crusher plant's Labour rest shed and office	Non residential	Nil	No resident

9.0 EMPLOYMENT POTENTIAL & WELFARE MEASURES

9.1 Employment potential (skilled, semi-skilled, un skilled):

TABLE - 12

Designation	Present Employment position	Employees Requirement	Total
a) Supervisory category			
Geologist	-	1	1
b) Skilled labour			
Mine Foreman	-	1	1
Blaster/Mate	-	1	1
Excavator - Operator	-	1	1
Truck Driver	-	3	3
Water sprinkler Driver	-	1	1
Jack-Hammer Drillers	-	28	28
c) Unskilled			
Security	-	2	2
Labour & Helper	-	4	4
Co-operator and Cleaner	-	4	4
Total	-	46	46

The proposed output per man shift:

TABLE - 13

Maximum Production expected per annum	83,010m ³
No. of days likely to be worked	300 days
Average production per day	277m ³
OMS = Average Production per day / Average employment per day	$277m^3 / 46 = 6m^3$

The above manpower is adequate to meet out the production schedule and the machinery strength envisaged in the mining plan and to comply with the statutory provisions of the Mines Safety Regulations. It is been ensured that the labour will not be employed less than 18 years. No child labour will engaged or entertained for any kind of quarrying operations. All the labours engaged for quarrying operations will be insured during the quarry lease period.



9.2 Welfare Measures:

a) Drinking Water:

Packaged drinking water is available from the nearby water vendors in Tirumangalam which is located about 7.5km on the Northwest side of the lease applied area.

b) Sanitary Facilities:

Hygienic modern Sanitary Facilities will be constructed in the safety area as semi-permanent structure and it will be maintained periodically.

c) First aid facility:

First aid kits are kept in Mines office room, in case of such eventuality is the victim will be given first aid immediately at the site by the competent and statutory foreman/permit manager/mate will be in charge of first aid and injured person will be taken to the hospital by the applicant's vehicle. Hospital is available in Tirumangalam located at a distance of 7.5km on the Northwest side.

d) Labour Health:

Periodically medical check-up related to occupational health safety will be conducted to all the workers in applicant own cost.

e) Precautionary safety measures to the labourers:



- Helmets,
- Reflector Jackets
- Dust mask
- Mine Goggles,
- Ear plugs,
- Ear muffs
- Safety Shoes

All personnel protective equipment as per the DGMS standard will be provided as per the specification approved by Director of mines safety. Periodically medical check-up will be conducted for all workers for any mine health related problems. Proper training and vocational education will be given by qualified and experienced safety officer to all the employees about the safety and systematic Rough stone quarrying operations. The drillers and workers will be sent for vocational training periodically, to carry out the quarrying operations scientifically and to safe guard the men and machinery and to create awareness about conventional opencast quarrying operations.

PART - B**10.0 ENVIRONMENT MANAGEMENT PLAN**

The EMP is prepared based on the Mines act, Rules & amendment from by state & central government. If the SE/IAA/SEAC instructed the modification and alter the EMP the outcome of their recon would be final and the applicant is instructed to followed the EIA / EMP for its compliance as per the CPCB / TNPCB Norms.

Environment	Anticipated impact	Mitigation measure
Land Environment	<p>i. Topography of the area will change due to mining activity. Around 2.63.6 Ha. area will be proposed to quarry operation.</p>	<p>i. No waste will be anticipated during entire life of quarry. Hence, backfilling is not proposed in this quarry operation. Anyhow, barbed wire fencing and safety bund will be constructed around the quarry to prevent inadvertent entry of public and cattle.</p> <p>ii. The excavated benches shall be developed for plantation with grasses, herbs and shrubs of local species to improve aesthetic of the area and to prevent any soil erosion and landslide.</p> <p>iii. Mining benches will not exceed beyond the approved height and width.</p> <p>iv. Leftover foreign material like polythene bag, jute bag and useless articles will not be allowed to litter and no ill managed dumping will be used for filling the excavated pits.</p>
	<p>ii. Soil quality and it's fertility of adjacent lands will affected due to fugitive dust and Vehicular emissions during drilling, blasting, loading, unloading and haulage of men and machineries.</p>	<p>This is discussed in following Air Environment due to avoid repetition.</p>



<p>Water Environment</p>	<p>Surface Mining can have direct impact on physico-chemical characteristics of the local drainage and groundwater resources. The detrimental effects, if any, to water resources resulting from surface mining are caused by following:</p> <ul style="list-style-type: none"> i. Alteration of natural drainage pattern resulting from modification of topography. ii. Abnormal increase in the turbidity of the nearby stream and Gundar River. iii. Damage to riparian vegetation and River habitat. iv. The activities can also disrupt the ecological diversity in many ways. v. Contamination of groundwater if mining intersects with the water table. 	<ul style="list-style-type: none"> i. Construction of Garland drain with check dam and settling tank will be constructed around the quarry to collect the surface run off rain water and which will be discharge in to the natural drainage system and water bodies in the Gundar River passing on the Eastern side in manure as prescribed by TNPCB standards. ii. Further mining will be completely stopped during the monsoon for free flow of surface run off and allowing natural recharge of groundwater. iii. No wastewater shall be generated from the quarry activity. Proper drainage will be Maintained to eliminate inundation of working pits during rains from run-off water. iv. The mine pit water collected due to rain will be utilized for water spraying on the haul Roads and watering for plantations. v. Septic tanks and soak pits will be provided for the disposal of domestic' washroom effluents. vi. The deposit will be worked from the top surface up to a depth of 42m below ground level and shall not in any case intersect and contaminate the ground water as the depth of the water table in the area is 68m – 73m.
<p>Air Environment</p>	<p>In surface mining operations, the source of air pollution may cause deterioration of air quality due to the fugitive dust emissions from drilling/blasting, scooping, loading-unloading operation of extracted mineral and its transportation. Drilling/blasting and loading of quarry material would be associated with the fugitive dust emission in the active area whereas fugitive emission during transportation would affect the areas/villages situated adjacent to the road side.</p>	<ul style="list-style-type: none"> i. Green belt will be developed in the safety zone with thick long leaves plant to arrest the fugitive dust and vehicular emissions on the surrounding environments. ii. Wet drilling with dust extractor unit will be carried out to minimize the dust generation. iii. Controlled blasting with Proper blasting pattern will be followed for effective rock fragmentation and generation of minimal fine dust to the atmosphere. iv. Quarry material will be handled under wet condition during loading and unloading to minimize the dust generation of proportion, besides loaded materials are covered by Tarpaulin until to reach the destination during transportation.



	Another source of air pollution would be emission from the drilling machinery and excavators/Trucks vehicles to be used for loading.	<p>v. Regular water sprinkling to the haul road to arrest the dust generation.</p> <p>vi. Provision of dust filters/ mask to workers working at dust prone and affected areas.</p> <p>vii. Vehicular emission as a result of combustion of diesel generates small particulate matter (PM₁₀ & PM_{2.5}), Nitrogen oxides and Sulphur dioxide (NO₂ & SO₂). High quality diesel will be used in the motor vehicles to control these pollutants.</p> <p>viii. PUC (Pollution under control) certified vehicles will be used for transportation.</p> <p>ix. CPCB Prescribed emission standards for the vehicles would be followed.</p> <p>x. All vehicles and their exhausts would be well maintained and regularly tested for pollutant concentrations.</p>
<p>Noise and Vibration</p>	<p>In the present mining activity for building material, noise will be generated from drilling machinery, blasting and vehicular movement. Noise level in the working environment is compared with the standards prescribed by Central Pollution Control Board as adopted and enforced by the Govt. of India through Noise Pollution (Regulation and Control) Rules, 2000.</p>	<p>i. Selection of new low - noise equipments for the quarry operation.</p> <p>ii. The noise levels shall be maintained within the permissible levels by involving all the noise regulating measures in vehicles and drilling/blasting operations.</p> <p>iii. To ensure minimum vibrations and noise due to blasting. Non-electric delay detonators in continuous sequence is proposed.</p> <p>iv. Personnel Protective Equipment (PPE) like earmuffs and earplugs shall be provided to the employees whose in critical operation like drilling, blasting and excavation as occupational safety measures.</p> <p>v. Proper maintenance done with regular interval by the Oiling and greasing for the machineries and vehicles to control the Source of noise during operation and transportation.</p> <p>vi. Regular and proper maintenance of machinery and transportation vehicles shall be ensured.</p> <p>vii. Transporting vehicles are enforcing the speed limits of 20km/hour within quarry area and not exceed 40km per hour from quarry to destination to reduce Noise and vibration level.</p> <p>viii. There would be restrictions on mining activity and vehicular movement during night hours.</p>



<p>Biological Environment</p>	<p>The area having main floras are Neem, Palm, Cocos nucifera, Palm, Senna auriculata, Calotropis, Casuarina, Teak, Acacia nilotica, Thorny bushes and shrubs. No plants of botanical interest or animals of zoological interest recorded within 500m radius. The anticipated impacts on biological environment as follows:</p> <ol style="list-style-type: none"> i. Diversity of living insects in the overburden material. ii. Natural habitats of the existing faunas and its breeding will change due to the noise and vibration during operation. iii. Mining may drive away the nearby residents from their habitat. iv. Access roads crossing the riparian areas will have impact on the species disturbing the ecosystem. v. Diminution of the quality and quantity of habitat essential for aquatic and riparian species. vi. Deposition of dust on the plant and crop leaves is affecting the photosynthesis, Pollination, ratio of growth and reduction in the yield of agriculture. vii. Excessive and unscientific surface mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology. 	<ol style="list-style-type: none"> i. The natural habitats of the existing flora and fauna will not be disturbed. ii. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many species. iii. Fruit bearing trees will be planted to survive of the existing native faunas. iv. No clearance of vegetation will be done during the entire mining operations. v. Water sprinkling on haul roads would be reduces the dust emission, thus avoiding damage to the crops and plants. vi. No night hour mining will be carried out which may catch the attention of wildlife.
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<p>Socio Economic Environment</p>	<p>Any activity during mining will have adverse impact on Environment, careful mitigation measures are proposed to balance the impact on the existing environment and the applicant is always instruct to carry out safe, sustainable, eco-friendly mining operations at all times. The following positive impact on the society due to this mining activity.</p> <ol style="list-style-type: none"> i. It is proposed to provide employment to about 46 persons for carrying out mining operations and give preference to the local people in providing employment. In addition, there will be opportunity for indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project. ii. 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. iii. Improvement of Physical structure like 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. iv. The continuation of opportunity for the employments, the nearby villages, living peoples and their life style would be improved. v. The applicant is advised to invest the CER cost (@ 2% from the total Project Cost) to develop the local Panchayat. <p style="text-align: center;">Does not arise.</p>
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10.1 Environmental impact assessment statement describing impact of mining on the next five years:

In the mining plan proposed for a production of Rough stone does not involve deep hole drilling and blasting. Such limited mining activity is not likely to cause any impact adversely on the environment. As far as pollution of air, water and noise concerned, the environmental impact studies will be conducted as per EIA notification issued by MoEF& CC. It is B Category mine. The compliance monitoring will be carried out for every six months as prescribed by the MOEF&CC and with state concerned authorities.

10.2 Proposal for waste management:

There is no waste anticipated in this Rough stone and Gravel quarrying operation. The entire quarried out materials will be utilized (100%). The maintenance of machineries & fuelling will be carried out as per the TNPCB Norms and the waste will be disposed in the Norms.

10.3 Proposal for reclamation of land affected during mining activities and at the end of mining (refilling / fencing etc.):

In the mining plan only to a maximum depth of 42m below ground level has been envisaged as workable depth for safe & economic quarrying operation during entire life of quarry. There is no waste generated hence, backfilling is not possible. After completion of quarry operation the quarried out pit will be allowed to collect the seepage and rainwater and the water storage will be kept as temporary reservoir for charging the nearby wells and the water will be utilized for Green belt development purpose. The quarry area will be fenced with Barbed wire fencing also safety bund constructed around the quarry to prevent inadvertent entry of public and cattle.

10.4 Programme of Greenbelt development (indicate extend, number, name of species to be afforested):

The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development. Around 3,462m² area will be utilized for green belt development by planting 1000 numbers along the safety zone during entire lease period also around 300 tree saplings in the approach road at first year of the plan period and 500 tree saplings from third year onwards in quarried out top benches with 2m height tree saplings with an anticipated survival rate of 80% with maintain atleast 1500 plants during the entire life of the quarry.

As per the SEIAA Recommendation the plantation will be carried out based on the output Environmental Clearance and the recommended species will be carried out for green belt development. Appropriate species of trees will be planted in a phased manner as described below.

TABLE - 14

Year	No. of trees proposed to be planted	Area to be covered (m ²)	Name of the species	Survival %	No. of trees expected to be grown
I	200	694	Neem, Pongamia	80%	160
II	200	692	Pinnata, Cordia	80%	160
III	200	692	dichotoma, Mango,	80%	160
IV	200	692	Thespesia populnea,	80%	160
V	200	692	Mantharai, etc.,	80%	160

10.5 Proposed financial estimate / budget for (EMP) environment management:

Budget Provision for the Mining Plan period:

TABLE - 15

S. No	Monitory and Analysis Description	Rate per location	No. of location	Total Charges/ six months	Total Charges/ year
1	Ambient air quality monitoring	6500	4	26000	52000
2	Noise level monitoring	250	4	1000	2000
3	Ground vibration monitoring	1000	2	2000	4000
4	Water sampling and analysis	9000	1	9000	18000
Total EMP Cost/ year					76,000

The EMP cost would be around Rs. 3,80,000/- for the period of five years.

A. Operational Cost / Project Cost / Investment:		Approximate Cost (Rs.)
i) Land cost	The Land value as per the Government Guideline land cost is about, 3.48.0Ha x Rs. 12,35,500/Ha. = Rs.42,99,540/- Round of Rs.43,00,000/- (Source: https://tnreginet.gov.in/portal/)	43,00,000
ii) Machinery cost	The following machineries are proposed to meet out the productions. i. Excavator (1 No.) ii. Rock breaker (1 No.) iii. Truck (3 Nos.) iv. Compressor (3 Nos.) v. Hand jack hammer and loose tools (12 Nos)	50,00,000 1,00,000 75,00,000 15,00,000 6,00,000
	Total	1,47,00,000
iii) Blasting Cost	Explosives, Detonator, etc., (Rs. 6 per ton) (10,00,753 Tons x Rs: 6)	60,05,000
iv) Refilling/ Fencing	Fencing will be constructed around the quarry pit to prevent the inadvertent entry of public and cattle cost would be around (Total Peripheral length 1050m x Rs. 300/meter)	3,15,000
v) Labourers shed	Labour shed will be constructed as semi-permanent structure. The cost is around	5,00,000
vi) Sanitary facility	Adequate latrine and urinal accommodation has provided at conveniently accessible places the cost would be around	1,00,000
vii) Others items	First aid room & accessories	50,000
viii) Drinking water facility for the labourers	Packaged drinking water will be provided for all the Labours. Drinking water will be readily available at conveniently accessible points during the whole of the working shift the cost would be around.	1,00,000
ix) Sanitary arrangement	The latrine and urinal will keep clean and sanitary condition. The maintenance cost would be around.	60,000
x) Safety kit	All the Safety kit such as Helmet, Earmuffs, Goggles, Reflector Jackets, Safety shoes etc., will be provided to the workers by the applicant own cost which would be around.	50,000

xi) Water sprinkling	Water will be sprinkled in the haul roads by water sprinkler. The cost would be around,	6,00,000
xii) Garland drain	Construction of Garland drain with check dam to prevent surface run-off rain water entering to the quarry pit, the construction cost is around (Total Peripheral length 950m x Rs. 300/meter).	2,85,000
xiii) Greenbelt etc.	Greenbelt development and maintenance will be carried out in the boundary barriers the cost would be around (1000 saplings x Rs. 200/sapling).	2,00,000
	Greenbelt development and maintenance will be carried out in the quarried out top benches (500 saplings x Rs. 200/sapling).	1,00,000
	Greenbelt development and maintenance will be carried out in the Panchayat road (300 saplings x Rs. 200/sapling).	60,000
Total Cost		2,74,25,000

B. EMP Cost: (Per year)

Air Quality monitoring	Rs. 52,000/-
Water Quality Sampling	Rs. 18,000/-
Noise Monitoring	Rs. 2,000/-
Ground vibration test	Rs. 4,000/-
Total Cost	Rs. 76,000/-

Total EMP Cost for the five years period is **Rs.3,80,000/-**

Description	Amount (Rs.)
A. Operational Cost	Rs.2,74,25,000/-
B. EMP Cost	Rs.3,80,000/-
Total Project Cost (A+B)	Rs.2,78,05,000/-
C. The applicant indents to involve corporate environment responsibilities (CER) activity like Water Purifier, Plantation, Books to Library, sanitary facility, Painting for class rooms and as per requirement to the Maikkudi Panchayat Union Middle School at 2.0% from the total project cost. The Cost would be around Rs. 5,56,000/-.	
If the concerned authority is directed to modify the CER cost and mode of utilization of the cost, the same will be implement by the applicant.	Rs.5,56,000/-
Total Cost	Rs.2,83,61,000/-

The Total cost would be around two crore eighty three lakh and sixty one thousand only.

11.0 PROGRESSIVE QUARRY CLOSURE PLAN**11.1 Introduction:**

The entire area is proposed for a short period of five years only hence, the progressive quarry closure plan may not be applicable to this quarry. Anyhow, during temporary discontinuance of quarry the following measures will be taken.

- Barbed wire fencing will be constructed around the quarry.
- Benches will be smoothening.
- Quarry will be closed & sentries will be posted round the clock.
- Green belt development will be maintained.
- Machineries will be removed from pit and engaged in another site.

11.2 Present and Post Land use pattern:**LAND USE TABLE – 16**

Description	Present area (Ha)	Area at the end of lease period (Ha)
Area Under Quarry	Nil	2.63.60
Site Services	Nil	0.01.00
Roads	Nil	0.02.00
Green Belt	Nil	0.34.62
Unutilized Area	3.48.0	0.46.78
Grand Total	3.48.0	3.48.00

11.3 Statutory obligations:

The applicant ensures to comply all the conditions stipulated in the precise area communication letter before grant of quarry lease and during the course of quarry operations as per the DGMS, Department of Geology and Mines, Labour Enforcement officer, controller of Explosives etc., circulars, Norms, Rules, Regulations and Act.

11.4 Progressive quarry closure plan preparation:

Name and address of the Qualified Person who prepared the progressive closure plan and name, address and register number of the executing agency who is involved in the Preparation of progressive quarry closure plan.

Name : **B. VENKADAGIRI, M.Sc.,**
 Qualified Person (Under Rule 15(I)(a) and (I)(b) of MCR, 2016)

Address : No.105, 5th Cross,
 Alagapuram,
 Salem District – 636 010,

Mobile : +91 86953 32233

Email : vengatb6@gmail.com

The applicant will himself implement the closure plan; no outside agency will be involved.

**(i) Safety & Security:**

Safety measures will be implemented to prevent access in the excavation area an unauthorized persons as per Mine Act 1952, MMR 1961.

- Safety measures will be implemented as per Mine Act 1952, MMR 1961, and Mines Rules 1955.
- Provisions of MMR 1961 shall be strictly followed and all roads shall be wider than the height of the bench or equal to the height of the bench and have a gradient of not more than 1 in 16.
- The bench height will be 5.0m.
- Width of working bench will be kept about 5.0 m for ease of operations and provide sufficient room for the movement of equipments.
- Protective equipment like dust masks, ear-plugs/ muffs and other equipments shall be provided for use by the work persons.
- Notices giving warning to prevent inadvertent entry of persons shall be displayed at all conspicuous places and in particular near mine entries.
- Danger signs shall be displayed near the excavations and proper signal by siren alarm will be given to the public before blasting to prevent accident.
- Security guards will be posted.
- In the event of temporary closer, approaches will be fenced off and notice displayed.
- Installation of CCTV cameras in the quarry and entrance of the quarry.
- Monitoring of Quarrying operation by external agency as directed by authorities.

(ii) Disaster Management and Risk Assessment:

This should deal with action plan for high risk accidents like landslides, subsidence, flood, fire, seismic activities, tailing dam failures etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of applicant to meet such eventualities and the assistance to be required from the local authorities should be described.

- The mechanized mining activities in the area may involve any high risk accident due to side falls/collapse, flying stones due to blasting etc.
- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, TNMMCR 1959 and other laws applicable to mine will be strictly complied with.
- During heavy rainfall the mining activities will be suspended.
- All persons in supervisory capacity will be provided with proper communication facilities.
- Competent persons will be provided FIRST AID kits which they will always carry.
- The Greenbelt Development will be formed in around the quarried out top benches and panchayat road of the lease applied area.

Environmental Monitoring Cell:

A dedicated team nominated by the mine manager or Agent will monitor and maintain the environmental compliances of the quarry as per the approved Environment Management Plan and report the Compliance to the Mine Manager half yearly.

Disaster Management Cell:

The Competent Qualified Statutory managers appointed by the applicant as per the Director of Mines Safety will be responsible for Disaster Management. It care any eventualities his mobile number will be displayed and he will take all the precautions and safety measures as per Mines and Minerals (Development and Regulations) Act, 1957.

**(iii) Disposal of mining machinery**

All the Machineries will be purchased fresh; the same has been maintained in good condition during entire life of quarry. After completion of quarry operation all machineries will be utilized at another quarry area or sold out to the second hand. Hence, disposal or decommissioning of mining machinery does not arise.

(iv) Care and Maintenance during Temporary Discontinuance:

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstance following measures shall be taken for care, maintenance and monitoring of conditions.

- Notice of temporary discontinuance of work in mine shall be given to the DGMS as per the MMR 1961.
- All the mining machinery shall be shifted to a safe place.
- Entrance to the mine or part of the mine, to be discontinued shall be fenced off. Fencing shall be as per the circular 11/1959 from DGMS.
- Security Guards shall be posted for the safety and to prevent any unauthorized entry to the area.
- Carry out regular maintenance of the facilities/area detailed below in such a way as would have been done as if the mines were operation:
 - Quarry roads and approach roads,
 - Fencing on approach roads,
 - Checking and maintenance of machines and equipment,
 - Drinking water arrangements,
 - Quarry office, first aid stations etc.
- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out as per CPCB and IBM Guideline.
- Care and upkeep of plantation shall be carried out on regular basis.
- Status of the working and status monitoring for re-opening of the mines shall be discussed daily.

In case of discontinuance due to any natural calamities/abnormal conditions, mining operation will be restarted as early as possible after completing rescue work, restoring safety and security, repairs of roads etc.

(v) Economic Repercussion of Closure of Quarry and manpower Retrenchments:

The quarry lease is granted for a period of five years only. As per the production Programme envisaged, there will be no effect on the man power as the majority of persons belong to nearby villages and will have an option either to be available for employment for the next contract/ lease or do the agriculture in their fields.

(vi) Abandonment Cost:

As at present mining is not going to be closed so abandonment cost could not be assessed. However, based on the progressive quarry closure activities during the plan period, cost is assessed as given below at present scenario:

TABLE - 17

ACTIVITY		YEAR					RATE	COST (Rs.)
		I	II	III	IV	V		
Plantation under safety zone	No. of sapling	200	200	200	200	200	Rs.100 Per sapling	2,00,000
	Cost	40000	40000	40000	40000	40000		
Plantation in quarried out top benches and approach road	No. of sapling	300	-	200	200	100	Rs.100 Per sapling	1,60,000
	Cost	60000	-	40000	40000	20000		
Wire Fencing for 1050 Mtrs length		315000	-	-	-	-	Rs. 300 Per Meter	3,15,000
Garland Drain with settling tanks for 950 Mtrs length		285000	-	-	-	-	Rs. 300 Per Meter	2,85,000
Total								9,60,000



12.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

This Mining plan for Rough stone (Charnockite) and Gravel is under Rules 41 & 42 as per the Amended under Tamil Nadu Minor Mineral Concession Rules, 1959. The provisions of the Mines Act, Rules and Regulations and orders made there under shall be complied within the quarrying operation, so that the safety of the mine, machinery and person will be well protected. Permission, relaxation or exemption wherever required for the safe and scientific quarrying of the deposit will be obtained from the Department of Mines Safety. Any violation pointed out by the inspecting authorities shall be rectified and modified after scrutiny comments as per the guidelines of the Concerned Department and Authorities.

This Mining Plan and mine design is prepared based on the requirement instructed by the applicant to me. If there is any change in the production schedule, change of technology, change in product mix during the course of operations, the applicant is advice to prepare a modified mining plan and get approval by the concerned authority for subsequent clearance and approval. The same will be monitored by the inspecting authority of Department of Geology and mining and other Concerned Departments under Rule 25 and sub rule (5)(d) in Rule 36 of Tamil Nadu Minor Mineral Concession Rules, 1959.

I hereby ensure that the information provided is correct to best of my knowledge and experience, some of the information contained in this report has been provided by external sources and by the applicant and is presented as the form as submitted by the applicant. The information is not intended to serve as legal advice related to the individual situation. I do not owe and specifically disclaim any liability resulting from the use during the course of quarrying operations after the grant of lease. The document may be scrutinized by the competent authority before approval.

Prepared by

B. VENKADAGIRI, M.Sc.,
Qualified Person

Place: Salem

Date: 09.02.2024

This Mining Plan is approved subject to the conditions stipulations indicated in the Mining Plan Approval
 Rec. No. 1271/mines/2023
 Date: 19/02/2024

This Mining Plan is approved based on the approval of the postholder specified under rule 41(a) (i) (ii) (iii) & 42 of rule 36 of Tamil Nadu Minor Mineral Concession Rules, 1959 and subject to the conditions stipulations indicated under rule 41(a) (i) (ii) (iii) of rule 36 of Tamil Nadu Minor Mineral Concession Rules, 1959.
 19/02/2024
 Deputy Director,
 Geology and Mining,
 Madurai.

TOPOGRAPHICAL VIEW OF ULAGANI ROGH STONE AND
GRAVEL QUARRY LEASE APPLIED AREA





புவியியல் மற்றும் கரங்கர்த்தவறு
ந.க.எண். 1271/கனிமம்/2023,

தூண இயக்குநர் அலுவலகம்,
மாவட்ட ஆட்சியர் அலுவலக வளாகம்,
மதுரை.

நாள்: 26.12.2023

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - சாதாரண கற்கள் மற்றும் கிராமம் - மதுரை மாவட்டம் - கள்ளிக் குடி வட்டம் - உலகாணி கிராமம் - புல எண்கள். 108/2D, 109/1, 109/1A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L மற்றும் 110/1M ஆகியவற்றில் கைத்த விலத்தினம் 348.0 ஹெக்டேர் - 70 (பத்து) ஏக்கர்களுக்கு சாதாரணகற்கள் மற்றும் கிராமம் குவாரி உரிமம் வழங்கல் - உரைத் தட்டி (Precise Area) தேர்வு செய்யப்பட்டது - காய்கத்திட்டம் மற்றும் மாநில அளவிலான கற்றுக்குழல் தாக்க மதிப்பீடு ஆய்வையத்தின் இலக்கணம் பெற்று சமர்ப்பிக்க கோருவது - தொடர்பாக

- பார்க்கவும்:**
1. தி/ம.க.க.ய.பு.பு. வெட்டல், எண்.73/4A2 அச்சத்துகல் கிராமம், கள்ளிக் குடி, மதுரை என்ற நிறுவனத்தின் பது தாள், இலக்கம் (இவ்வலுவலகத்தில் பெறப்பட்ட நாள்.11.10.2023).
 2. இவ்வலுவலக கடிதம் எண் ந.க.எண்.1271/கனிமம்/2023, நாள்: 12.10.2023.
 3. திருமங்கலம் வருவாய் கோட்டாட்சியின் ந.க.எண். 5073/2023/அ4, நாள்.24.11.2023
 4. தூண இயக்குநர், புவியியல் மற்றும் கரங்கர்த்தவறு, புலத்தானிக்கை அறிக்கை, நாள். .12.2023
 5. 1959-ம் வருடத்திய அறிவுரை சிறுகனிம சட்டம் விதிகள் 41 மற்றும் 42.
 6. அரசாங்க எண்.169 தெழில் (எம்.எம்.சி.1) தூண, நாள் 04.08.2020.

மதுரை மாவட்டம், கள்ளிக் குடி வட்டம், உலகாணி கிராமம், புல எண்கள். 108/2D (0.11.00), 109/1 (0.14.00), 109/10A (0.10.50), 109/10B (0.43.00), 109/12 (0.11.50), 109/2C (0.41.50), 109/3A (0.06.50), 109/3B (0.06.00), 109/4 (0.13.50), 109/6 (0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E



(0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.50), 110/1J (0.18.00), 110/1K (0.08.50), 110/1L (0.10.50) மற்றும் 110/1M (0.11.50) ஆகியவற்றில் மொத்த விஸ்தீரணம் 3.48.0 ஹெக்டேர் பரப்பில் 10 (பத்து) வருடங்களுக்கு சாதாரணகர்கள் மற்றும் கிராமல் குவாரி குத்தகாக உரிமம் வழங்கக் கோரி பார்வை 1-இல் காணும் விண்ணப்பத்தினை சமர்ப்பித்துள்ளனர்.

திருமங்கலம், வகுவாய் கோட்டாட்சியர் மற்றும் முனிசிபல் மற்றும் கரங்கத்தூறை, தண்ண இயக்குநர் ஆகியோரின் ஆய்வு அறிக்கையில், மதுரை மாவட்டம், கள்ளிக் குடி வட்டம், உலகாணி கிராமம், மட்டா புல ண்கள். 108/2D, 109/1, 109/10A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/5, 110/1A, 110/1D, 110/1H மற்றும் 110/1I ஆனது மட்டா ண்கள்.1436-ன்படிபும், புல ண்கள். 110/1B, 110/1C, 110/1E, 110/1F, 110/1G, 110/1J, 110/1K, 110/1L மற்றும் 110/1M ஆனது மட்டா ண்கள்.1452-இன்படிபும் ககன்பா புலா மெட்டல் நிறுவனம் என்ற பெயரில் மட்டா கிராமக்கணக்கில் தாக்கலாகியுள்ளது என அறிக்கையில் தெரிவித்துள்ளனர்.

மேலும் விண்ணப்பிக்கப்பட்ட புலங்களை சுற்றியும் 300 மீட்டர் சுற்றளவில் குடியிருப்புகள், தொல்லியல்துறையின் மூலம் பாதுகாக்கப்பட்ட பகுதிகளாக அறிவிக்கப்பட்ட இடங்கள் மற்றும் வரலாற்று சின்னங்கள் எதும் இல்லை. மேலும் விண்ணப்பப் புல ண்கள்.110/1F-ன் கிழக்குபகுதியிலிருந்து 52 மீட்டர் தொலைவில் புல ண்கள்.106-ல் குண்டாறு அமைந்துள்ளது. விண்ணப்பப் புல ண்கள்.109/6, 110/1J, 110/1K, 110/1C, 110/1M-க்கு தெற்கே அரசப் புறம்போக்கு கரை அமைந்துள்ளது என கிராமக் கணக்கில் தெரிவிக்கப்பட்டுள்ளது. ஆனால் பாதையாக காணப்படுகிறது. மேலும் புல ண்கள்.108/2D மற்றும் 109/2C ஆகியவற்றில் பாதை செல்வதாக புல வரைபடத்தில் குறிப்பிடப்பட்டுள்ளது. ஆனால் புலத்தில் பாதை ஏதும் காணப்படவில்லை. மேலும் புல ண்கள். 109/6, 110/1J, 110/1B, 110/1C ஆகியவற்றின் தென்மேற்கில் இருந்து வடகிழக்கு நோக்கி தாழ்வழுத்த மின்கம்பி செல்கிறது. மேலும் 60 மீட்டர் சுற்றளவில் காப்பு காடுகள் மற்றும் 50 மீட்டர் சுற்றளவில் தேசிய / மாநில நெடுஞ்சாலைகள், கட்டிடங்கள் ஏதும் இல்லை. மேலும், 10 கி.மீ சுற்றளவில் வளத்துவறையால் பாதுகாக்கப்பட்ட பகுதியாக



அறிவிக்கப்பட்ட சரணாலயங்கள், தேசிய பூயங்காக்கள் சுற்றுச்சூழல் உணர்திறன் மிக்க பகுதிகள் (ECO-SENSITIVE ZONE) ஏதும் இல்லை என அறிக்கை செய்து, பின்வரும் நிபந்தனைகளுக்கு உட்பட்டு குவாரி உரிமை வழங்க பரிந்துரை செய்துள்ளனர்.

நிபந்தனைகள்

- i. விண்ணப்பப் புல எண்.110/1F-ன் கிழக்குப் பகுதியில் புல எண்.106-ல் உள்ள குண்டாறு பகுதிக்கு 50மீ பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
- ii. விண்ணப்பப் புலத்தில் அருகில் அமைந்துள்ள அசைப் புறம்போக்கு களங்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
- iii. விண்ணப்பப் புல எண். 108/2D மற்றும் 109/2C ஆகியவற்றில் புல வரைபடத்தில் குறிப்பிடப்பட்டுள்ள மாதைக்கு 10மீ பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
- iv. விண்ணப்பப் புலங்களைக் சுற்றியுள்ள மட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.
- v. விண்ணப்பப் புல எண்கள்.109/6, 110/1J, 110/1B, 110/1C ஆகியவற்றில் தென்மேற்கில் இருந்து வடகிழக்கு நோக்கி செல்லும் தாழ்வழுத்த மின்வழிக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும் அங்கு மின்கம்பிகளை அனுபதி ஆளை பெற்று குவாரியிப்பணி மேற்கொள்ளப்படுவதற்கு முன்பு அகற்றப்பட வேண்டும்.
- vi. மதுரை மாவட்டம், கள்ளிக் குடி வட்டம், உலகாணி கிராமம், புல எண்கள். 108/2D, 109/1, 109/10A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L மற்றும் 110/1M ஆகியவற்றில் பொத்த விஸ்தீரணம் 3.48.0 ஹெக்டேர் அடியானவர்கள் பூமியிலிருந்து உடைகல் மற்றும் கிராமல் வெட்டி எடுக்க குவாரி குத்தகை உரிமை வழங்குவது தொடர்பாக, ஏற்பளிக்கப்பட்ட அங்கத்திட்டம் மற்றும் சுற்றுச்சூழல் ஒப்பந்த ஆகியன பெற்றளிக்கப்பட வேண்டும்.

எனவே, துறை அலுவலர்களின் பரிந்துரையினை ஏற்றும் நிபந்தனைகளுக்கு உட்பட்டு, மதுரை மாவட்டம், கள்ளிக் குடி வட்டம், உலகாணி கிராமம், புல எண்கள். 108/2D (0.11.00), 109/1 (0.14.00), 109/10A (0.10.50), 109/10B (0.43.00), 109/12 (0.11.50), 109/2C (0.41.50), 109/3A (0.06.50), 109/3B (0.06.00), 109/4 (0.13.50), 109/6 (0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E (0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.5), 110/1J (0.18.00), 110/1K

(0.08.50), 110/1L (0.10.50) மற்றும் 110/1M (0.11.50) ஆகியவற்றில் மொத்த விஸ்தரிப்பை 3.48.0 ஹெக்டேர் பரப்பில் உடைகல் மற்றும் கிராவல் குவாரிப்பணி செய்ய தி/எ.ககன்யா புளூ மெட்டல்ஸ் நிறுவனத்தினருக்கு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி. 19(1) மற்றும் 20-இன்கீழ் பத்து (10) ஆண்டுகளுக்கு உடைகல் மற்றும் கிராவல் குவாரி உரிமை வழங்க தகுதி வாய்ந்த நிலப்பரப்பாக (Precise area) கருதப்படுகிறது.

தமிழ்நாடு சிறுகனிம சலுகை விதிகள்-1959 விதி எண்:41-இன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு கரங்கத் திட்டத்தினை (Mining Plan) 90 தினங்களுக்குள் சமர்ப்பிக்குமாறும், விதி எண்:42-இன்படி மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (State Level Environmental Impact Assessment Authority) இசைவினைப் பெற்று சமர்ப்பிக்குமாறும் விண்ணப்பதாரர் தி/எ.ககன்யா புளூ மெட்டல்ஸ் நிறுவனத்தினரைக் கேட்டுக் கொள்ளப்படுகிறது.

26/12/2017
 குணை இயக்குநர்,
 புலியியல் மற்றும் கரங்கத்துறை,
 மதுரை.

பெறுதல்:

தி/எ.ககன்யா புளூ மெட்டல்ஸ்,
 எண்.13/4A2, அச்சங்குளம் கிராமம்,
 கள்ளிக்குடி,
 மதுரை

நகல்:

உறுப்பினர் செயலர்,
 மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம் (SEIAA),
 சென்னை.



அனுப்புநர்,

ககன்யா புளு மெட்டல்ஸ்.

13/4A2, அச்சங்குளம் கிராமம்,

நெடுங்குளம் தல்லணை மெயின் ரோடு,

மேலவப்பினிகுண்டு, கள்ளிக்குடி வட்டம்,

மதுரை மாவட்டம்

பெறுநர்,

துணை இயக்குனர்,

புலியியல் மற்றும் சுரங்கத்துறை

மதுரை

ஐயா,

வணக்கம், நாங்கள் மதுரை மாவட்டம், கள்ளிக்குடி வட்டம், உலகாணி கிராமம், புல எண் 108/2D, 109/1, 109/10A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L மற்றும் 110/1, மொத்தம் - 3.48.0 ஹெக்டர் பரப்பில் 10 வருடங்கள் சாதாரண கற்கள் மற்றும் கிராவல் குவாரி செய்ய அனுமதி வேண்டி விண்ணப்பத்தினை சமர்ப்பித்து இதற்கான ந.க.எண் 1271/கனிமம்/2023 நாள் 26.12.2023 நாளிட்ட சூழிப்பாணை தங்களிடம் பெற்று 10 வருடங்களுக்கு சுரங்க திட்டம் தயார்செய்து பார்க்கையில் 10 வருடங்களுக்கான கன அளவு குறைவாக இருப்பதால் இதற்கான சுரங்க திட்ட அளவை மாற்றி ஐந்து வருடங்களுக்கான திட்ட அறிக்கையை தங்களிடம் சமர்ப்பிக்கின்றோம். இதற்கான சூழிப்பாணையை 5 (ஐந்து) வருடங்களுக்கு மாற்றி தகுமாறு தாழ்மையுடன் கேட்டுக்கொள்கிறோம்.

நன்றி.

இப்படிக்கு



புவியியல் மற்றும் கரங்கத்துறை

ந.க.எண்.1271/கனிமம்/2023,

துணை இயக்குநர் அலுவலகம்,
மாவட்ட ஆட்சியர் அலுவலக வளாகம்,
மதுரை.

நாள்: 23.01.2024

குறிப்பாணை

பொருள்: கனிமங்களுக்கும் குவாரிகளுக்கும் - சிறுகனிமம் - சாதாரண கற்கள் மற்றும் கிராவல் - மதுரை மாவட்டம் - கள்ளிக் குடி வட்டம் - உலகாணி கிராமம் - புல எண்கள்: 108/2D, 109/1, 109/1A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L மற்றும் 110/1M ஆகியவற்றில் மொத்த விஸ்தரிணம் 3.480 ஹெக்டேர் - 5 (ஐந்து) வகுடங்களுக்கு சாதாரணகற்கள் மற்றும் கிராவல் குவாரி உரிமம் வழங்கல் - உகந்த பரப்பு (Precise Area) தேர்வு செய்யப்பட்டது - கரங்கத்திட்டம் மற்றும் மாநில அளவிடான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்க கோருவது - தொடர்பாக.

- பார்வை:**
1. தி/ள்.க.கன்யா புளு டெட்டல்ஸ், எண்.13/4A2, அச்சங்குளம் கிராமம், கள்ளிக் குடி, மதுரை என்ற நிறுவனத்தின் மறு நாள், இலலை, (இவ்வலுவலகத்தில் பெறப்பட்ட நாள்.11.10.2023).
 2. இவ்வலுவலக கடிதம் எண் ந.க.எண்.1271/கனிமம்/2023, நாள்: 12.10.2023.
 3. திருமங்கலம் வருவாய் கோட்டாட்சியரின் ந.க.எண். 5073/2023/அ4, நாள்.24.11.2023
 4. துணை இயக்குநர், புவியியல் மற்றும் கரங்கத்துறை, புவத்தணிகளை அறிக்கை, நாள். .12.2023
 5. 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 41 மற்றும் 42.
 6. அரசாணை எண்.169 தொழில் (எம்.எம்.சி.1) துறை, நாள்: 04.08.2020.
 7. இவ்வலுவலக குறிப்பாணை எண் ந.க.எண். 1271/கனிமம்/ 2023, நாள்: 26.12.2023.
 8. தி/ள்.க.கன்யா புளு டெட்டல்ஸ், நிறுவனத்தினரது விண்ணப்பம் நாள்.04.01.2024



மேலும் புல எண்கள், 109/6, 110/11, 110/1B, 110/1C ஆகியவற்றின் தென்மேற்கில் இருந்து வடகிழக்கு நோக்கி தாழ்வழுத்த பின்கம்பி செல்கிறது. மேலும் 50 மீட்டர் சுற்றளவில் காப்பு காடுகள் மற்றும் 50 மீட்டர் சுற்றளவில் தேசிய / மாநில நெடுஞ்சாலைகள், கட்டிடங்கள் ஏதும் இல்லை. மேலும், 10 கி.மீ சுற்றளவில் வணத்துறையால் பாதுகாக்கப்பட்ட பகுதியாக அறிவிக்கப்பட்ட சரணாலயங்கள், தேசிய பூங்காக்கள் சுற்றுச்சூழல் உணர்திறன் மிக்க பகுதிகள் (ECO-SENSITIVE ZONE) ஏதும் இல்லை என அறிக்கை செய்து, பின்வரும் நிபந்தனைகளுக்கு உட்பட்டு குவாரி உரிமை வழங்க பரிந்துரை செய்துள்ளனர்.

நிபந்தனைகள்

- i. விண்ணப்பப் புல எண், 110/11-ன் கிழக்குபகுதியில் புல எண், 106-ன் உள்ள குண்டாறு பகுதிக்கு 50மீ பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
- ii. விண்ணப்பப் புலத்தின் அருகில் அமைந்துள்ள அரசு புறம்போக்கு கரைக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
- iii. விண்ணப்பப் புல எண், 108/2D மற்றும் 109/2C ஆகியவற்றில் புல வரைபடத்தில் குறிப்பிடப்பட்டுள்ள பாதுகாப்பு 10மீ பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
- iv. விண்ணப்பப் புலங்களைச் சுற்றியுள்ள மட்டை நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.
- v. விண்ணப்பப் புல எண்கள், 109/6, 110/11, 110/1B, 110/1C ஆகியவற்றின் தென்மேற்கில் இருந்து வடகிழக்கு நோக்கி செல்லும் தாழ்வழுத்த பின்கம்பிக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும். அல்லது பின்கம்பிகளை அணுமதி ஆணை பெற்று குவாரிப்பணி மேற்கொள்ளப்படுவதற்கு முன்பு அகற்றப்பட வேண்டும்.
- vi. மதுரை மாநகரம், கள்ளிக்குடி வட்டம், உலகாணி கிராமம், புல எண்கள், 108/2D, 109/1, 109/10A, 109/10B, 109/12, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L மற்றும் 110/1M ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 3,48.0 ஹெக்டேர் பாப்பளவள்ள பூமிவிலிருந்து உடைகல் மற்றும் கிராஃஸ் வெட்டி எடுக்க குவாரி குத்தகை உரிமை வழங்குவது தொடர்பாக, ஏற்பளிக்கப்பட்ட கரங்கத்திட்டம் மற்றும் சுற்றுச்சூழல் ஒப்புதல் ஆகியன பெற்றுளிக்கப்பட வேண்டும்.



(0.19.50), 110/1A (0.23.50), 110/1B (0.27.50), 110/1C (0.08.00), 110/1D (0.06.50), 110/1E (0.09.50), 110/1F (0.09.00), 110/1G (0.13.50), 110/1H (0.22.50), 110/1I (0.02.5), 110/1J (0.18.00), 110/1K (0.08.50), 110/1L (0.10.50) மற்றும் 110/1M (0.11.50) ஆகியவற்றில் மொத்த விஸ்தரிணம் 3.48.0 ஹெக்டேர் பரப்பில் உடைகல் மற்றும் கிராவல் குவாரிப்பணி செய்ய தி/ள்.ககன்யா புளூ மெட்டல்ஸ் நிறுவனத்தினருக்கு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி. 19(1) மற்றும் 20-இன்கீழ் ஐந்து (5) ஆண்டுகளுக்கு உடைகல் மற்றும் கிராவல் குவாரி உரிமம் வழங்க தகுதி வாய்ந்த நிலப்பரப்பாக (Precise area) அளவிடப்படுகிறது. தமிழ்நாடு சிறுகனிம சலுகை விதிகள்-1959 விதி எண்:41-இன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்கத் திட்டத்தினை (Mining Plan) 90 தினங்களுக்குள் சமர்ப்பிக்குமாறும், விதி எண்:42-இன்படி மாநில அளவிடான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (State Level Environmental Impact Assessment Authority) இசைவினைப் பெற்று சமர்ப்பிக்குமாறும் விண்ணப்பதாரர் தி/ள்.ககன்யா புளூ மெட்டல்ஸ் நிறுவனத்தினர் கேட்டுக்கொள்ளப்படுகிறார்.

Em
23/1/24

குணை இயக்குநர்,
புலிடீரியல் மற்றும் சுரங்கத்துறை,
மதுரை.

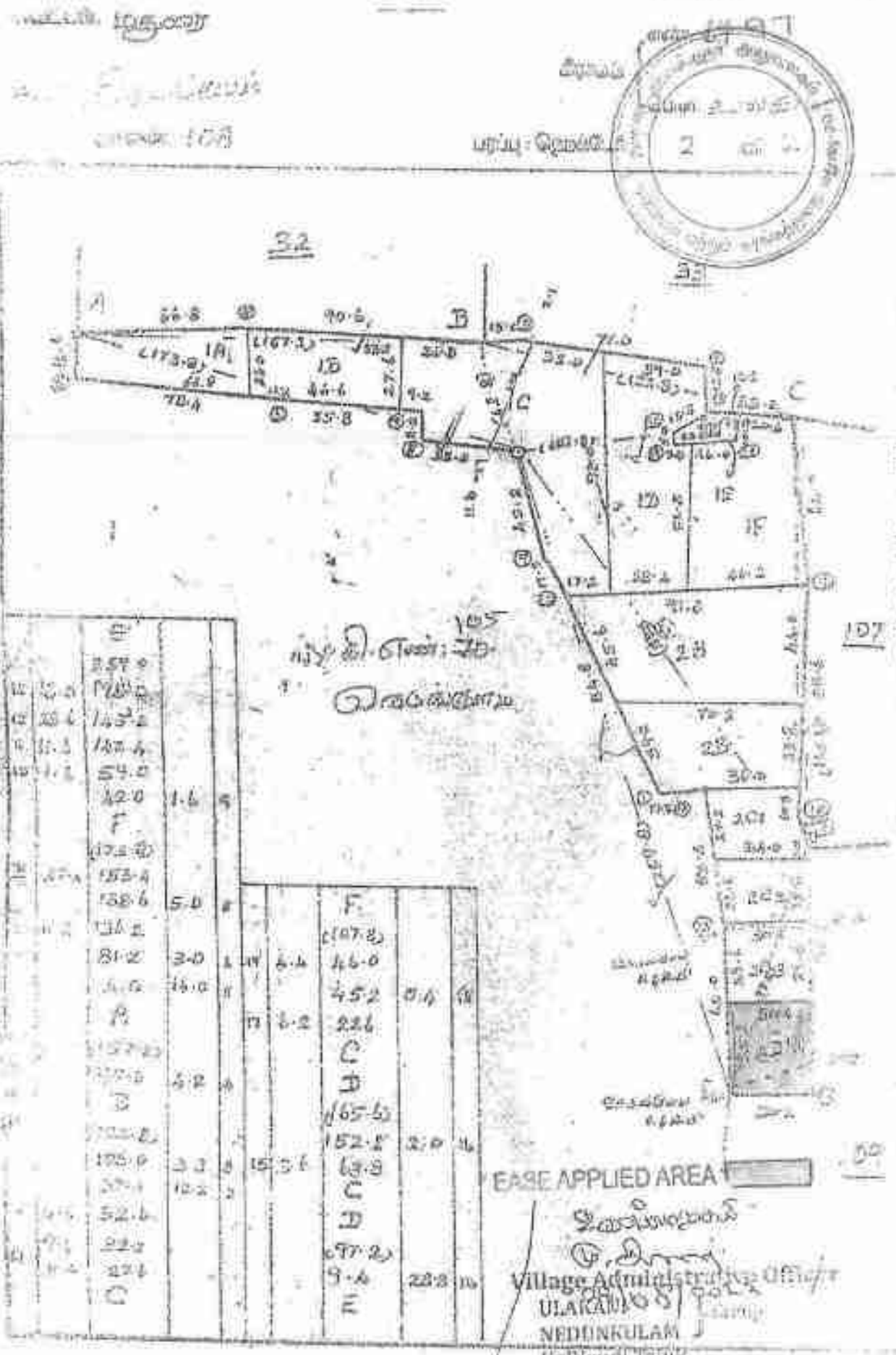
பெறுநர்:

தி/ள்.ககன்யா புளூ மெட்டல்ஸ்,
எண். 13/4A2, அச்சங்குளம் கிராமம்,
கள்ளிக்கூடி,
மதுரை

W
23/1/24

நகல்:

உறுப்பினர் செயலர்,
மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம் (SEIAA),
சென்னை.



10	10.2	257.0				
11	10.2	178.0				
12	10.2	143.2				
13	10.2	137.4				
14	10.2	54.0				
		12.0	1.6	9		
F						
15	10.2	102.0				
16	10.2	133.4				
17	10.2	138.6	5.0			
G						
18	10.2	134.2				
19	10.2	81.2	3.0	1	4	6.4
20	10.2	4.6	16.0			45.2
H						
21	10.2	107.2				22.6
I						
22	10.2	100.6				65.5
23	10.2	102.2				152.5
24	10.2	105.0	3.3	8	15	3.6
25	10.2	30.4	10.2			63.9
J						
26	10.2	52.4				97.2
27	10.2	22.2				9.4
28	10.2	23.4				22.8
K						
29	10.2	23.4				

EASE APPLIED AREA

Village Administration Office
ULAKKANDI
NEDUNKULAM
Kalligudi Taluk

16-5-81 Applied Area for Stone Quarry

பி.வி. இராஜசேகர்

பி. இராஜசேகர்

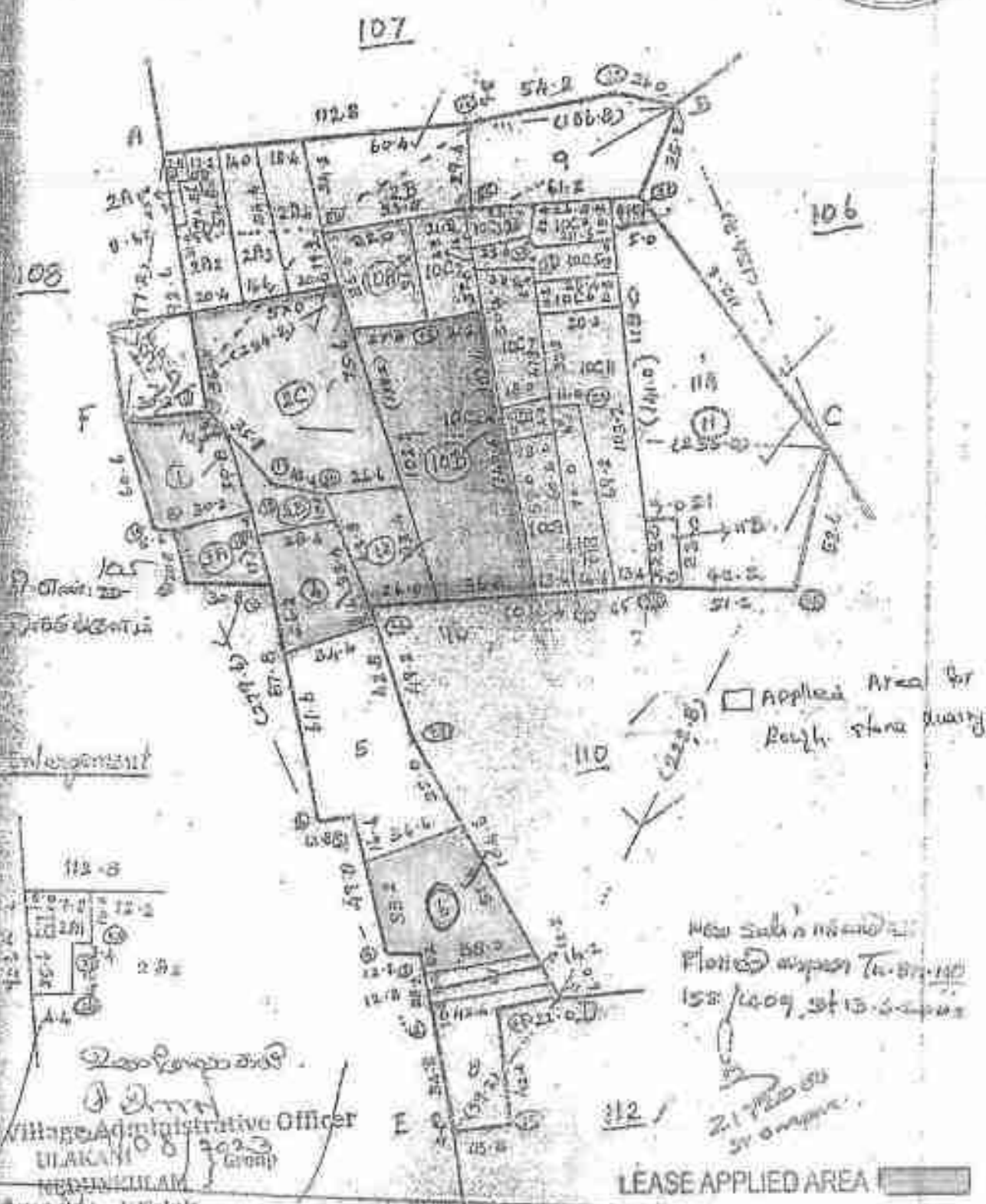
புலகம் 109

சான்றிதழ் எண் 23

பக்கம் 4

பக்கம் 2

புலகம் 107



108

106

புலகம் 105

110

113-8

112

சான்றிதழ் எண் 23
பி. இராஜசேகர்
Village Administrative Officer
ULAKAM
MEDAKKILAM
சுப்பிரமணியன்
Mudrakaram

New Sub's memo
Plotted as per T.O. No. 109
152/1009, dt 13.6.66

LEASE APPLIED AREA

சான்றிதழ் எண் 23

புலகம் 107

16.5.66

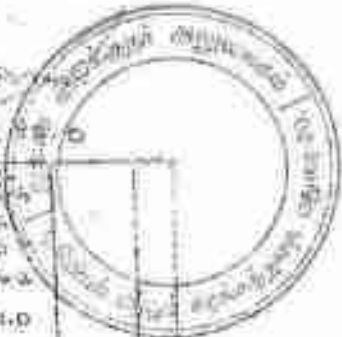
பி.பி.பி. கல்யாணசுந்தரி

பி.பி.பி. கல்யாணசுந்தரி

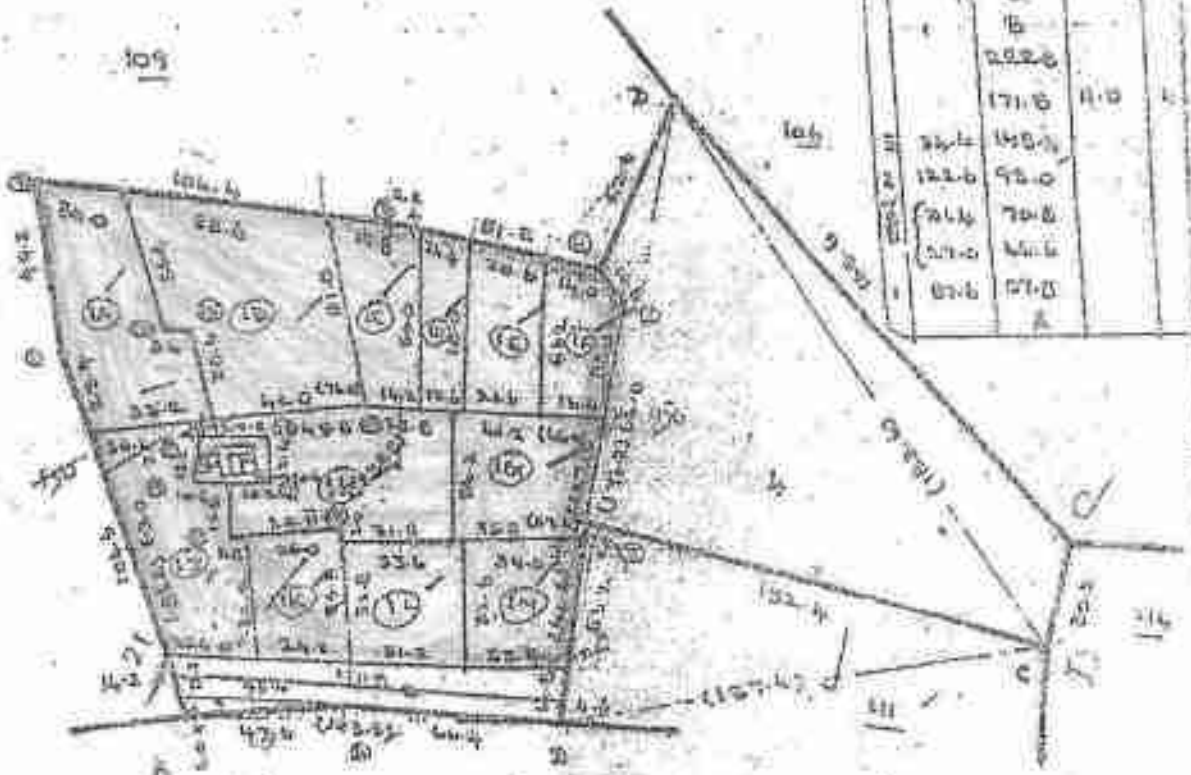
பி.பி.பி. கல்யாணசுந்தரி

பி.பி.பி. கல்யாணசுந்தரி

பி.பி.பி. கல்யாணசுந்தரி



	10	222.5		1	14.0	47.5		
15	10.0	100.0				4.0		
14	65.0	65.0				176.2		
13	64.0	64.0		7	4.0	121.0		
12	30.0	75.0				0		
		60.0	0.1	8		4		
11	21.0	24.0				103.0		
10	14.0	21.0				20.0	0.1	0
9	25.0	65.6				0		
		4				737.4		
						151.0	82.0	0
						0		
						252.0		
						171.0	11.0	0
						0		
						122.0	93.0	0
						20.0	70.0	0
						151.0	151.0	0
						0	0	0

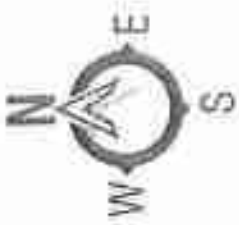


LEASE APPLIED AREA

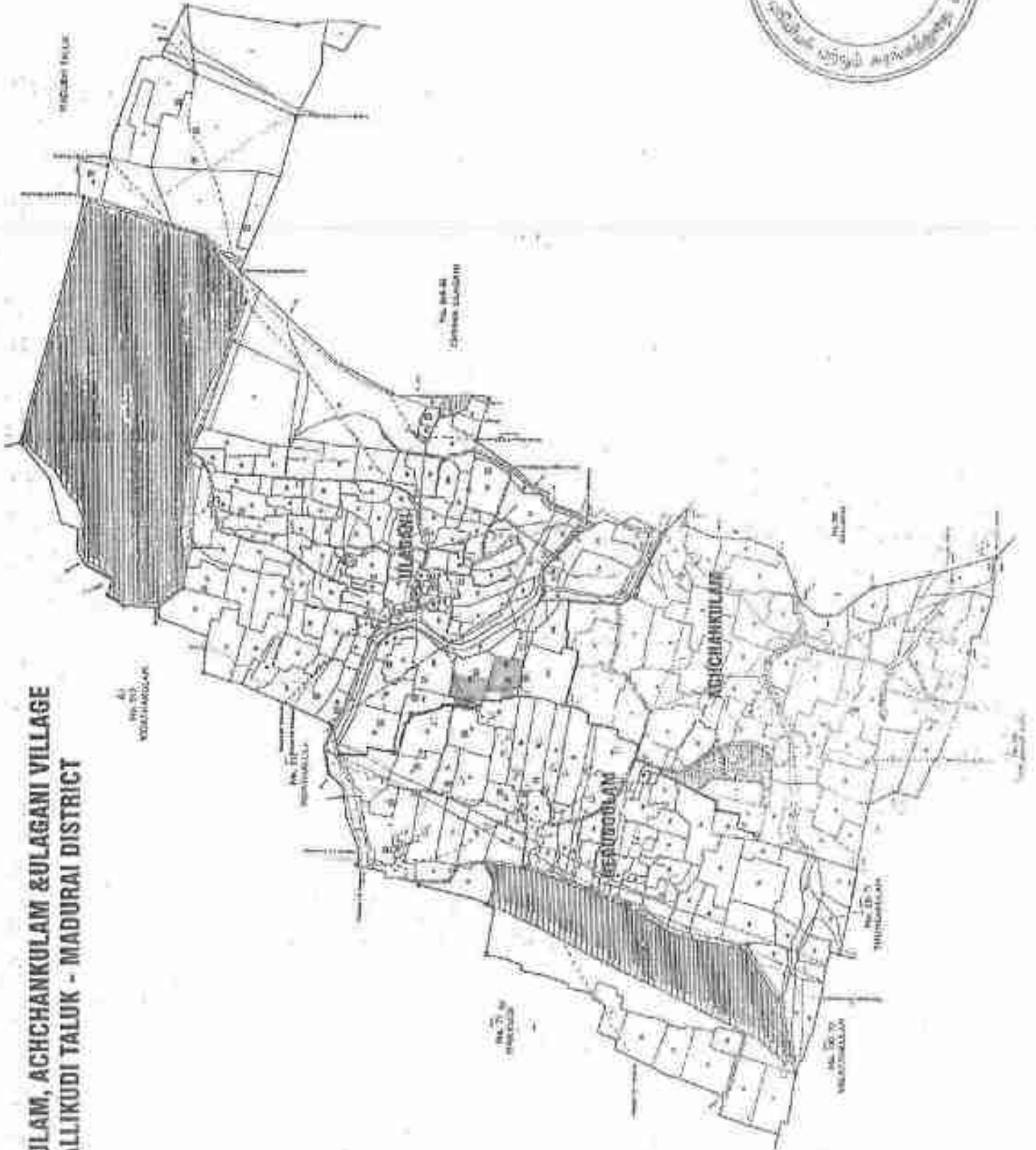
Applied Area
for Rough Stone
Quarry

(Handwritten Signature)
Village Administrative Officer
ULAKANI
NEDONICULAM
Kalliyadi Taluk

பி.பி.பி. கல்யாணசுந்தரி
பி.பி.பி. கல்யாணசுந்தரி
பி.பி.பி. கல்யாணசுந்தரி



**NEDUNGULAM, ACHCHANKULAM & ULAGANI VILLAGE
KALLIKUDI TALUK - MADURAI DISTRICT**



LEASE APPLIED AREA



ANNEXURE IV

தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : மதுரை

வட்டம் : கள்ளிகுத்துறை

வருவாய் இலாமம் : 97 உலகாணி

பட்டா எண் : 1438

உரிமையாளர்கள் பெயர்

1. கள்ளியா பழமெட்டல் நிறுவனம்

பலா எண்	உட்பிரிவு	பள்ளிசெய்		தள்ளிசெய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		மெற்கி - ஏ)	ரூ - பை	மெற்கி - ஏ)	ரூ - பை	மெற்கி - ஏ)	ரூ - பை	
107	1C2	0 - 8.00	0.22	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
107	1D	0 - 11.50	0.33	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
107	1E	0 - 12.00	0.34	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
108	2D	0 - 11.00	0.30	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
109	1	0 - 14.00	0.37	--	--	--	--	2023/0103/24/282975- -- -- 22-08-2023
109	10A	0 - 10.50	0.31	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
109	10B	0 - 43.00	1.26	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
109	10C2	0 - 8.50	0.23	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
109	12	0 - 11.50	0.31	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
109	2C	0 - 41.50	1.16	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
109	3A	0 - 6.50	0.20	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
109	3B	0 - 6.00	0.17	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
109	4	0 - 13.50	0.37	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
109	6	0 - 19.50	0.57	--	--	--	--	2023/0103/24/282518- -- -- 18-08-2023
110	1A	0 - 25.50	0.66	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
110	1D	0 - 6.50	0.18	--	--	--	--	2023/0103/24/255438- -- -- 15-03-2023
110	1H	0 - 22.50	0.62	--	--	--	--	2023/0103/24/244876- -- -- 23-01-2023
110	1I	0 - 2.50	0.07	--	--	--	--	2023/0103/24/290429- -- -- 10-10-2023
		2 - 32.00	7.67					



தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : பி. எண் 10(1) பிரிவு



மாவட்டம் : மதுரை

வட்டம் : கள்ளிகுடி

வருவாய் கிராமம் : 97 உலகாணி

பட்டா எண் : 1452

உரிமையாளர்கள் பெயர்

L - ... ககன்பா புது மெட்டல் நிதவசம்



புல எண்	உ.பிரிவு	புன்செய்		நுன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		மொக் - ஏர்	மூ - சை	மொக் - ஏர்	மூ - சை	மொக் - ஏர்	மூ - சை	
110	1B	0 - 27.50	0.70	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1C	0 - 8.00	0.22	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1E	0 - 9.50	0.27	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1F	0 - 9.00	0.25	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1G	0 - 13.50	0.37	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1J	0 - 18.00	0.49	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1K	0 - 8.50	0.24	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1L	0 - 10.50	0.29	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
110	1M	0 - 11.50	0.29	--	--	--	--	2023/0103/24/255447- -- -- 15-03-2023
		1 - 16.00	3.21					

குறிப்பு 2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பற்றியெட்டிணைப்பை பெறப்பட்டுள்ளது. இவற்றை நகல்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/007/01452/10762 என்ற குறிப்பு எண்ணை உள்ளிட்டு செய்து கருதி செய்துகொள்ளவும்.
- இந்த தகவல்கள் 04-01-2024 அன்று 04:55:13 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பெரி செய்வதற்கு 2D barcode படிப்பதன் மூலம் படித்து 3G/GPRS யூஸ் இணையதளத்தில் சரிபார்க்கவும்.

433 - 2/10/2019

பெரிய

சென்னை



சென்னை	பெரிய	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	IB	079	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	IC	080	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	IE	081	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	IF	082	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	IG	083	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	IH	084	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	II	085	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	II	086	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை
110	II	087	1452	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை	சென்னை

சென்னை
 சென்னை
 Village Administrative Officer
 ULAICANY
 NEDUNKULAM
 Kollonur

3 - 2023

laboratory

Unit: ...



No. of A.P. / Subsidy / Grant / Other Source	Sl. No.	Date	Sl. No. / Particulars	Amount / Particulars	Total	Remarks	Sl. No.	Date	Particulars
	108	20	0.1.10.00	030	1438	...			
	109	1	0.1.10.00	031	1438	-do-			
	109	10A	0.1.10.00	021	1438	-do-			
	109	10B	0.1.10.00	126	1438	-do-			
	109	12	0.1.10.00	031	1438	-do-			
	109	2C	0.1.10.00	1.16	1438	-do-			
	109	9A	0.6.10.00	0.20	1438	-do-			
	109	3B	0.6.10.00	0.17	1438	-do-			
	109	4	0.13.10.00	0.37	1438	-do-			
	109	6	0.19.10.00	0.57	1438	-do-			
	110	1A	0.23.10.00	0.66	1438	-do-			
	110	1B	0.6.10.00	0.18	1438	-do-			
	110	1H	0.22.10.00	0.62	1438	-do-			
	110	1G	0.2.10.00	0.07	1438	-do-			

P. Prasad
 Village Administrative Officer
 MEDURKOLAM
 Bangalore District
 2023

ഒ. നമ്പർ - 97 കണക്ക്.



	2	3	4	5	6	7	8	9	10	11	12
2D	(101-2D)	൮	4	...	7-2	4	2 77	0 11-0	0 30	30 ന്ന. ചുവപ്പു മത്സ്യം.	
								2 20-7	6 25		
1	(109-1)	൮	4	...	7-2	4	2 77	0 14-0	0 37	555 ന്ന. ചുവപ്പു മത്സ്യം.	വെട്ടി മത്സ്യം.
2A1	-2A1൮	൮	4	...	7-2	4	2 77	0 01-5	0 06	818 ന്ന. ചുവപ്പു മത്സ്യം (1), ന്ന. ചുവപ്പു മത്സ്യം (2), ന്ന. ചുവപ്പു മത്സ്യം (3).	വെട്ടി മത്സ്യം.
2A2	-2A1൮	൮	4	...	7-2	4	2 77	0 10-5	0 29	522 ന്ന. ചുവപ്പു മത്സ്യം.	
2A3	-2A1൮	൮	4	...	7-2	4	2 77	0 08-0	0 22	319 ന്ന. ചുവപ്പു മത്സ്യം.	
2A4	-2A1൮	൮	4	...	7-2	4	2 77	0 10-0	0 27	238 ന്ന. ചുവപ്പു മത്സ്യം.	
2B	-2B	൮	4	...	7-2	4	2 77	0 18-0	0 50	21 ന്ന. ചുവപ്പു മത്സ്യം.	
3C	(-3C)	൮	4	...	7-2	4	2 77	0 41-5	1 16	32 ന്ന. ചുവപ്പു മത്സ്യം.	
3A	(-3A1൮)	൮	4	...	7-2	4	2 77	0 16-5	0 20	241 ന്ന. ചുവപ്പു മത്സ്യം.	
3B	(-3B1൮)	൮	4	...	7-2	4	2 77	0 06-0	0 17	32 ന്ന. ചുവപ്പു മത്സ്യം.	
4	(-4)	൮	4	...	7-2	4	2 77	0 13-5	0 37	608 ന്ന. ചുവപ്പു മത്സ്യം.	
5	-5	൮	4	...	7-2	4	2 77	0 30-5	0 28	655 ന്ന. ചുവപ്പു മത്സ്യം.	
6	(-6)	൮	4	...	7-2	4	2 77	0 19-5	0 57	33 ന്ന. ചുവപ്പു മത്സ്യം.	
7	-7	൮	4	...	...	...	...	0 04-5	...	...	...
8	-8	൮	4	...	7-2	4	2 77	0 11-0	0 31	215 ന്ന. ചുവപ്പു മത്സ്യം.	
9	-9	൮	4	...	7-2	4	2 77	0 22-5	0 62	819 ന്ന. ചുവപ്പു മത്സ്യം (1), ന്ന. ചുവപ്പു മത്സ്യം (2), ന്ന. ചുവപ്പു മത്സ്യം (3).	



1	2	3	4	5	6	7	8	9	10	11	
							கு.எ.ப.	கு.எ.ப.	கு.எ.ப.		
109	10A	109-10A	ஈ	4	...	7-2	4	2 77	0 10-5	0 31	34 ம. அப்பாள் சாலை பாவுடி
	10B	10B, 10C17	ஈ	4	...	7-2	4	2 77	0 43-0	1 26	35 ம. அப்பாள் சாலை பாவுடி
	10C2	10C18	ஈ	4	...	7-2	4	2 77	0 08-5	0 23	35 ம. அப்பாள் சாலை பாவுடி
	10C3	10C19	ஈ	4	...	7-2	4	2 77	0 03-0	0 08	321 ம. அப்பாள் சாலை
	10C4	10C20	ஈ	4	...	7-3	4	2 77	0 04-5	0 12	319 ம. அப்பாள் சாலை (1), ம. அப்பாள் சாலை (2), ம. அப்பாள் சாலை (3)
	10C5	10C21	ஈ	4	...	7-2	4	2 77	0 05-5	0 15	242 ம. அப்பாள் சாலை
	10C6	10C22	ஈ	4	...	7-2	4	2 77	0 03-0	0 08	243 ம. அப்பாள் சாலை
	10C7	10C23	ஈ	4	...	7-2	4	2 77	0 14-0	0 32	36 ம. அப்பாள் சாலை
	10C8	10C24	ஈ	4	...	7-2	4	2 77	0 02-5	0 07	255 ம. அப்பாள் சாலை, ம. அப்பாள் சாலை, ம. அப்பாள் சாலை, * ம. அப்பாள் சாலை
	10C9	10C25	ஈ	4	...	7-2	4	2 77	0 10-0	0 25	242 ம. அப்பாள் சாலை
	10C10	10C26	ஈ	4	...	7-2	4	2 77	0 09-0	0 25	243 ம. அப்பாள் சாலை
	10C11	10C27	ஈ	4	...	7-2	4	2 77	0 20-5	0 37	21 ம. அப்பாள் சாலை பாவுடி
	11	11	ஈ	4	...	7-2	4	2 77	0 62-0	1 88	23 ம. அப்பாள் சாலை
	12	12	ஈ	4	...	7-2	4	2 77	0 11-5	0 31	608 ம. அப்பாள் சாலை
									4 27-0	11 38	
110	1A	110-1A	ஈ	4	...	7-2	4	2 77	0 23-5	0 14	322 ம. அப்பாள் சாலை
	1B	110-1B	ஈ	4	...	7-3	4	2 77	0 27-5	0 19	333 ம. அப்பாள் சாலை
	1C	110-1C	ஈ	4	...	7-2	4	2 77	0 08-0	0 22	296 ம. அப்பாள் சாலை

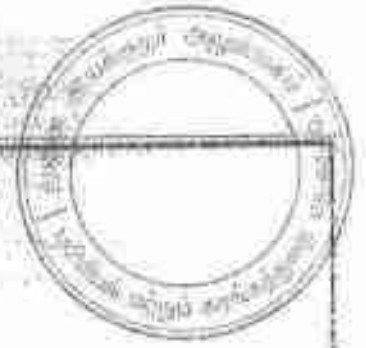
* ம. அப்பாள் சாலை, பாவுடி, பாவுடி.

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1	2	3	4	5	6	7	8	9	10	11	12
101	(1D) 110-10	൮	൩	...	7-2	4	2 77	0 06-5	0 18	322 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
	(1E) -1E	൮	൩	...	7-2	4	2 77	0 09-5	0 27	677 ഖ. ഗവൺമെന്റ്.	
	(1F) -1F	൮	൩	...	7-2	4	2 77	0 09-5	0 25	323 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
	(1G) -1G	൮	൩	...	7-2	4	2 77	0 13-5	0 37	24 റവ. ഖ. സ്കൂൾ സ്കൂൾ.	
	(1H) -1H	൮	൩	...	7-2	4	2 77	0 32-5	0 62	673 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
	(1I) -1I	൮	൩	...	7-2	4	2 77	0 02-5	0 67	487 ഗവൺമെന്റ് സ്കൂൾ സ്കൂൾ ഗവൺമെന്റ്.	എസ്. ജോർജ്ജ്.
	(1J) -1J	൮	൩	...	7-2	4	2 77	0 18-0	0 49	286 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
	(1K) -1K	൮	൩	...	7-2	4	2 77	0 08-5	0 24	323 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
	(1L) -1L	൮	൩	...	7-2	4	2 77	0 10-5	0 29	286 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
	(1M) -1M	൮	൩	...	7-2	4	2 77	0 11-5	0 29	323 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
2	-2	൮	൩	...	...	...	...	0 14-0	...	.....	ബസ്.
3	-3	൮	൩	...	7-2	4	2 77	0 01-0	0 06	407 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
4	-4	൮	൩	...	7-2	4	2 77	1 06-0	2 95	407 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
								2 92-0	7 75		
...	111	൩	൩	...	...	...	...	0 68-5	...	.....	ബസ്.
1	112-1	൮	൩	...	7-2	4	2 77	0 04-5	0 12	407 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
2	-2	൮	൩	...	7-2	4	2 77	0 05-5	0 19	407 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	
3	-3	൮	൩	...	7-2	4	2 77	0 33-5	1 44	407 ഖ. ഗവൺമെന്റ് സ്കൂൾ.	എസ്. ജോർജ്ജ്.
4A	-4A	൮	൩	...	7-2	4	2 77	0 03-5	0 06	624 റവ. ഗവ. സ്കൂൾ.	

* മറ്റൊരു വിവരങ്ങൾ നൽകേണ്ടി.



சுயிற்சாதி அடிக



(விதி 9(அ) ஐ-க் காண்க)

தொழில் கூட்டு நிறுவன அறிவிப்பு

மதுரை (தெற்கு) தொழில் நிறுவனப் பதிவாளர் 1932ம் ஆண்டு
 இந்திய கூட்டு வணிகச் சட்டம் 58(1) பிரிவில் குறிப்பிட்டிருக்கும்
 அதிகலை வர்ப் பெற்றதொண்டை இக்காலம் அறிவித்துக்
 கொள்கிறார். அந்த அதிகலை கோப்பில் சேர்க்கப்பட்டு
 தொழில் நிறுவனத்தின் பெயரை M/S SUGANYA BLUE
METALS

நிறுவனப் பதிவேட்டில் 2009ம் ஆண்டு 120 எண்ணாமை பதிவாகி
 உள்ளது.

2009 ஆம் ஆண்டு ஆகஸ்ட் திங்கள் 4 ந் தேதி

தொழில் கூட்டு நிறுவனப்பதிவாளர்
 மதுரை (தெற்கு).



V. CHINNAKARUPPAN
 ADVOCATE
 14/71, ASAFU STREET
 TALLAKOTTAI
 MADURAI - 625 107
 Cell: 94497-76014

11 OCT 2023

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भारतीय नगर न्यायिक

एक सौ रुपये

Rs 100

₹ 100

HUNDRED RS.



सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL



தமிழ்நாடு தரிலநாடு TAMILNADU

Suganya Blue Metals
Madurai

சுஜன் ப்லூ மீட்டல்ஸ் பிரைவட் லிமிடெட்
புதுச்சேரி நகராட்சி அலுவலகம்
புதுச்சேரி தலைநகர்
புதுச்சேரி - 625020

PARTNERSHIP DEED

M/s. SUGANYA BLUE METALS

This deed of Partnership entered into on this 01st day of April 2024 between

1. R.RAMAKRISHNAN, aged 68 years S/o Late Shri. Ramasamy Thever, residing at New No.1-1-11, Malayarasan cottage, Velmurugan Colony, Aruppukottai,
2. T.THILLAINATARAJAN, S/o. Thirunavukarasu, aged 53 years residing at No.510, 11th East Cross Street, Anna Road Madurai - 625020,
3. R. MALAIYARASAN, aged 38 years, S/o. R. Ramakrishnan, residing at A-702, Golden Lotus Apartment, Sambasaram, First Street, Moondrumavadi, K.Padur, Madurai.

And

[Handwritten signature]

[Handwritten signature]



[Handwritten signature]

For M/s. Suganya Blue Metals

[Handwritten signature]
Partner

11 OCT 2024

भारतीय गैर न्यायिक

रुपये

RS.



100

HUNDRED



भारत INDIA
INDIA NON JUDICIAL

தமிழ்நாடு தமிழ்நாடு TAMILNADU

Suganya Blue Metals
Madurai

சு. சி. சிவசுந்தரி, சி. சி. சிவசுந்தரி
சு. சி. சிவசுந்தரி, சி. சி. சிவசுந்தரி
சு. சி. சிவசுந்தரி, சி. சி. சிவசுந்தரி
(2)



4. Smt. T.SUBASHINI aged 41 years, W/o. T.Thilak Natarajan, residing at 510-11th East Cross Street Anna Nagar, Madurai - 625020.

Hereinafter called as partners No. 1, 2, 3 and wherever the context appears.

Whereas the Partners No. 1, 2, 3 and 4 along with Smt. R.Rajka had been carrying on the Manufacture and sale of blue metal Business under the name and style of "M/s. SUGANYA BLUE METALS" with effect from 03.08.2009 as per the deed of partnership of the same date.

Whereas the partner Smt. R.Rajka retired from the firm w.e.f 31.03.2022.

[Handwritten signature]

[Handwritten signature]



T. Subashini

For M/s. Suganya Blue Metals

[Handwritten signature]
Partner

भारतीय गैर न्यायिक

एक सौ रुपये

100



भारत INDIA
INDIA NON JUDICIAL

தமிழ்நாடு தமிழ்நாடு TAMILNADU

Suganya Blue metal's
Madurai

சு. சிவசுந்தரம், இ.இ.ப.
மாநில அரசு சட்ட அமைச்சர்
அலுவலகம், சென்னை
10.10.2022



(3)

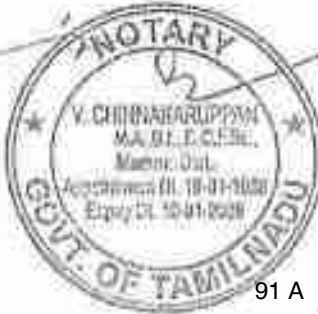
Whereas the remaining partners no-1, 2 and 3 have decided to continue the business w.e.f .01.09.2022 on the following terms and conditions

TERMS AND CONDITIONS:

1. The name and style of the firm shall be continued to be "M/s. SUGANYA BLUE METALS".
2. The business of the firm shall be located at No.S.No.1374 A, Aohanikulam, Nedunkulam, Kalandi Main Road, Melappilkkumbi Thirumangalam Taluk, Madurai District. The Partners shall be entitled to change the Business Place or opening Branches at mutual Consent.

[Handwritten signature]

[Handwritten signature]



For M/s. Suganya Blue Metals
[Handwritten signature]
Partner



3. The capital of the firm shall be fixed at Rs.24,00,000/- (Twenty Four Lakhs Only)

R.RAMAKRISHNAN	: Rs. 8,40,000/-
T.THILLAI NATARAJAN	: Rs. 5,00,000/-
R.MALAIYARASAN	: Rs. 6,00,000/-
T.SURASHINI	: Rs. 4,60,000/-
Total	: Rs. 24,00,000/-

4. The amounts standing in Share Capital Account and in Current Account shall carry interest @ 12% p.a.
5. The object of the firm is to take over all the Assets and Liabilities of the firm run with the Partners No: 1, 2, 3 and 4 along with R.Rakku as on 01.04.2022 and continue the business. The business of the firm shall be manufacture of Jally, M Sand, P Sand, and other construction related materials in various sizes and selling them to the public, Government Departments, Government Contractors, Private contractors and others. The partners may also carry on any other business on mutual consent.
6. The firm shall exploit the quarry license obtained either in the name of firm or any partners or any other person from the mining department. In case any issue / dispute arises from the mining department, or any issue that may arise at the quarry area, the quarry license owner alone is fully responsible for settling the issue and firm is not in any way answerable.
7. Partner No.1 Shri. R.RAMAKRISHNAN, shall be designated as Managing Partner, He shall be in charge of day to day administration of the firm. He is entitled for a monthly Salary of Rs: 25,000/-
8. All the other partners are working partners and they are entitled to a monthly salary of Rs.20,000/- each.

The Following are the duties of the other partners No.2 to 4

THILLAI NATARAJAN: In charge of marketing, to book orders for sale and collection of sale proceeds, account maintenance and other works.

(Signature)

(Signature)



(Signature)
Mrs. Suganya Blue Metals

(Signature)
Partner

11 OCT 2023



(3)

R.MALAIYARASAN : In charge of making raw material manufacture and supervision of finished goods. To obtain license from mines office and other Government office work sign orders for explosive contract agreement, to attend in pollution control office matters, to do all works relating to quarry and manufacturing units. He is wholly responsible for quarry and crusher units in all issues connected therewith. To appoint qualified and efficient persons for ensuring safety of the units. He will manage/settle all disputes relating to quarry and crusher units.

Besides, the above, Partners shall attend such duties or such other duties as may be decided by the partners from time to time.

9. The accounts of the firm shall be closed on every 31st March. The Profit or Loss after meeting all Administrative Expenses, Partners Salary, interest to Partners shall be divided or borne by the partners as below:

<u>Profit / Loss</u>	
R.RAMAKRISHNAN	35%
T.THILLAI NATARAJAN	25%
R.MALAIYARASAN	25%
T.SUBASHINI	15%
Total	100%

10. The Partners may open bank accounts, Current account or otherwise with any Banks and the Bank Accounts, shall be operated by the Managing Partner Shri. R.RAMAKRISHNAN Individually on behalf of the Firm.

11. For the funds required over and above the Capital of the partners, they may borrow from banks, other financial institutions and private parties on interest at the prevailing market rate. The loan documents shall be signed and deposited by all the partners jointly.

12. That any partner may retire from partnership after giving a notice to the other partners of not less than one month in writing and at the expiry of such notice period, he shall be deemed to have retired. On the death of any one of the partners or inability of one of the partners to continue the business, the remaining partners shall continue the business of the firm either by including legal heir of the partners/(s), if they do desire themselves or by admitting new partner/(s). This clause shall also be applicable in case of death/inability to the partner/(s) to continue in business for any other reason also. The retirement/ death of Partner shall not dissolve the firm but the firm shall continue in accordance with the terms and conditions referred supra.



[Handwritten signature]
For M/s. Suganya Blue Metals
[Handwritten signature]
Partner

11 OCT 2023



(6)

- 13. This is a Partnership "AT WILL".
- 14. The Partners may admit any new Partner into the Firm (with mutual consent).
- 15. If any dispute arises among the partners that shall be referred to an arbitration.
- 16. The Partners may change or alter or delete any of these foregoing clauses and add any new clauses on mutual consent, if the circumstances so warrant.
- 17. The Partners may maintain a Minutes Book in which the decisions taken at the Joint Meeting of the partners shall be recorded and Minutes Book shall form part and parcel on this deed.
- 18. For the Terms and Conditions which are not specifically stated in the foregoing clauses, the Terms and Conditions of the Indian Partnership Act will apply.

In Witness where of we the executors set out our hands and signatures in the presence of witnesses on this 01st Day April 2022.

1. 2.

3. 4.

WITNESSES:

1. K. Subramanian, Advocate
4/36, Lane 17, Chengam Chattram Colony,
Madurai - 625 002.

2. M. S. Madhavan, Advocate
10/10, Madhavan Lane, B/14A, Maligaivathi, Madurai - 625 002.

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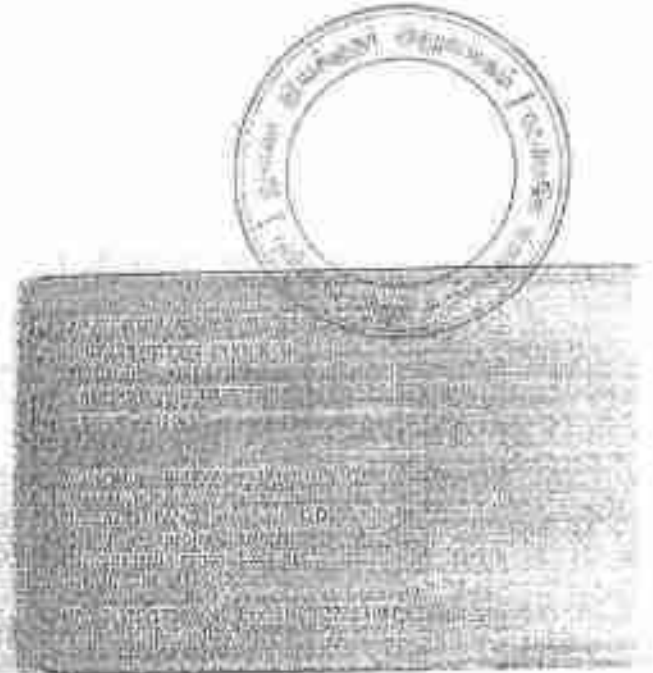
For M/s. Suganya Blue Metals

Partner

V. CHINNAKARUPPAN
B.Sc., M.A., B.L., D.C.F.S.C.
ADVOCATE
14/71, ASARI STREET
TALLAKULAM
MADURAI - 625 002
Tel: 94437-74000



11 NOV 2022



For M/s. Suganya Blue Metals

[Signature]
Partner

ATTACHED TRUE COPY
[Signature]
NOTARY PUBLIC



11 OCT 2023

V. CHINNAKARUPPAN
B.Sc., M.A., B.L., D.C.F. Sc.,
ADVOCATE
14/71, ASARI STREET
TALLAKULAM
MADRURAI - 625 002
Cell: 94437-74004



தமிழக அரசு
வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : மதுரை

வட்டம் : கள்ளிகுருகு

வருவாய் பிராமம் : 97 உலகாணி

பட்டா எண் : 1438

உரிமையாளர்கள் பெயர்

1. ... கல்வா புத்தமெட்டல் பிழாவளம்

புல எண்	உட்பிரிவு	புண்டெய்		நன்மை		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
107	1C2	0 - 8.00	0.22	--	--	--	--	2023/0103 /24/282518--- -- 18-08-2023
107	1D	0 - 11.50	0.33	--	--	--	--	2023/0103 /24/282518--- -- 18-08-2023
107	1E	0 - 12.00	0.34	--	--	--	--	2023/0103 /24/282518--- -- 18-08-2023
108	2D	0 - 11.00	0.30	--	--	--	--	2023/0103 /24/255438--- -- 15-03-2023
109	1	0 - 14.00	0.37	--	--	--	--	2023/0103 /24/282975--- -- 22-06-2023
109	10A	0 - 10.50	0.31	--	--	--	--	2023/0103 /24/282518--- -- 18-08-2023
109	10B	0 - 43.00	1.26	--	--	--	--	2023/0103 /24/282518--- -- 18-08-2023
109	10C2	0 - 8.50	0.23	--	--	--	--	2023/0103 /24/282518--- -- 18-08-2023
109	12	0 - 11.50	0.31	--	--	--	--	2023/0103 /24/255438--- -- 15-03-2023
109	2C	0 - 41.50	1.16	--	--	--	--	2023/0103 /24/255438--- -- 15-03-2023
109	3A	0 - 6.50	0.20	--	--	--	--	2023/0103 /24/255438--- -- 15-03-2023





109	3E	0 - 6.00	0.17	--	--	--	2023/0103 /24/255438-- -- 15-03-2023
109	4	0 - 13.50	0.37	--	--	--	2023/0103 /24/255438-- -- 15-03-2023
109	6	0 - 19.50	0.57	--	--	--	2023/0103 /24/282518-- -- 18-08-2023
110	3A	0 - 23.50	0.66	--	--	--	2023/0103 /24/255438-- -- 15-03-2023
110	1D	0 - 6.50	0.18	--	--	--	2023/0103 /24/255438-- -- 15-03-2023
110	1H	0 - 22.50	0.62	--	--	--	2023/0103 /24/244876-- -- 13-01-2023
110	II	0 - 2.50	0.07	--	--	--	2023/0103 /24/290429-- -- 10-10-2023
		2 - 72.00	7.67				

குறிப்பு 2 :



1. கோடுகள், தலைம் / சான்றிதழ் நகல் விவரங்கள் யின் படுவோட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/097/01438/10726 என்ற குறிப்பு எண்ணை உள்ளிட்டு சேய்து உறுதி செய்துகொள்ளவும்.
2. இக் தகவல்கள் 10-10-2023 அன்று 06:13:43 PM நேரத்தில் அச்சிடப்பட்டது.
3. எகப்பெரி கோடுகளில் 2D barcode படிப்பான் மூலம் படிந்து 3C/CPR3 வழி இணையதளத்தில் சரிபார்க்கவும்.



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11 OCT 2023

V. CHINNAKARUPPAN
 B.Sc., M.A., B.L., D.C.F.S.C.,
 ADVOCATE
 14/71, ASARI STREET
 TALLAKULAM
 MADURAI - 625 002
 Cell: 94437-74004



தமிழ்நாடு அரசு
வருவாய்த் துறை

நீல உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

வட்டம் : கள்ளிகுடி

பட்டா எண் : 1452



மாவட்டம் : மதுரை

வருவாய் பிராமம் : 97 உலகாணி

உரிமையாளர்கள் பெயர்

3. கசப்பா புது மெட்டல் நிலுவை

புல எண்.	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	ஹெக்டர் - ஏர்	ரூ - பை	
110	1B ✓	0 - 27.50	0.79	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1C ✓	0 - 8.00	0.22	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1D ✓	0 - 9.50	0.27	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1E ✓	0 - 9.00	0.25	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1G ✓	0 - 13.50	0.37	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1H ✓	0 - 18.00	0.49	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1K ✓	0 - 8.50	0.24	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1L ✓	0 - 10.50	0.29	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
110	1M ✓	0 - 11.50	0.29	--	--	--	--	2023/0103/24/2554 -- -- 15-03-2023
		1 - 16.00	3.21					

குறிப்பு 2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை உறுதிப்படுத்துவதற்காக <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/097/01452/10762 என்ற குறிப்பு எண்ணை உள்ளிடுவதற்கு உறுதி செய்துகொள்ளவும்.
- இந்த தகவல்கள் 29-08-2023 அன்று 02:21:08 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- எசுபிஊபி கேமராவின் 2D barcode டிராப்டை உறுதிப்படுத்து 3G/GPRS வலி இணையதளத்தில் சரிபார்க்கவும்.

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V. CHINNAKARASI
U.S.M.A. & L.S.P. ADVOCATE
14/71, AGARI STREET
TALLAKULAM
MADURAI - 625 016
Cell: 94437-7467

11 OCT 2023



தமிழ்நாடு தமிழ்நாடு TAMIL NADU N-
27.09.23 Suganya Blue Metals
Madurai

செ. சிவசுப்பிரமணியன், பி.பி.ச.
மாநிலச் சி.சு.அ.சி. 3332/2023
செயலகம்: கிழக்குமங்கலம்
பி.பி.ச. 605 005, கிழக்குமங்கலம்
தமிழ்நாடு அரசு
செயலகம்-605 005, கிழக்குமங்கலம்

12AC 2023/26

AFFIDAVIT UNDER RULE 22 (3) (I) (G)

AFFIDAVIT

We, Tvl. Suganya Blue Metals, No 13/4A2, Achangulam Village, Nedungulam, Kallanai Main road, Melapligund post, Kalikudi Taluk, Madurai District, do hereby solemnly affirm and sincerely state an affidavit showing the particulars of areas held under prospecting license or quarry lease or mining lease in each state which the applicant of any person jointly with us.



For M/s. Suganya Blue Metals

[Signature]
Partner

[Signature]
NOTARY



(2)

i) Already hold under prospecting / mining lease and quarry lease : Yes

1. மதுரை மாவட்ட ஆட்சியர் ந.க.எண்: 1680-2017-கனிமப் நான் 28.02.2019 for the periods of 5 years from 08.03.2019 to 07.03.2024
2. மதுரை மாவட்ட ஆட்சியர் ந.க.எண்: 400-2021-கனிமப் நான் 25.11.2022 for the periods of 10 years from 09.01.2023 to 08.01.2033

ii) Has already applied for but not granted : Nil

iii) Being applied for simultaneously : Nil

Solemnly affirmed and

Signed before me at Madurai

This 11 OCT 2023 day of 2023

DEPONENT


NOTARY

NOTARY PUBLIC
V. CHINNAKARUPPAN
SOFT OF TAMILNADU



For M/s. Suganya Blue Metals


Partner

11 OCT 2023
V. CHINNAKARUPPAN
B.Sc., M.A., B.L., D.C.F.Sc.,
ADVOCATE
14/71, ASARI STREET
TALLAKULAM
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V. CHINNAKARUPPAN
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ADVOCATE
14/71, ASARI STREET
TALLAKULAM
MADURAI - 625 002
Cell: 94437-74004

ANNEXURE



M/s. SUGANYA BLUE METALS

Admin Office : No : 24, H.O.G, 80 Feet Road,
Anna Nagar, Madurai - 625 021

GSTIN : 33ABPP9601R1Z1

Date _____

Letter of Authorization

Sub: Letter of Authorization for entering into Agreements with Mining quarry lease agreements

By this we authorize Mr.R.Malyarasan (Partner) the undersigned to execute agreements and to sign necessary documents as may required by mining and quarry lease purpose on behalf of the firm

Name of The Partner Duty Authorized	Signature
1.R.Malyarasan	For Suganya Blue Metals  Partner


For M/s.Suganya Blue Metals

For Suganya Blue Metals


Partner

1.R.Ramakrishnan

For Suganya Blue Metals


Partner

2. T.Thillai Narayan

For Suganya Blue Metals

3.R.Malyarasan


Partner

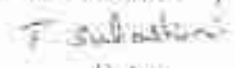
4.R.Rajku

For Suganya Blue Metals


Partner

5. T.Subashini

For Suganya Blue Metals


Partner



Government of India

மகேசுவரன் ரி
Maheshwaran R.
பிறப்பு நாள்/DOB: 03/06/1984
ஆர்/ GENDER: MALE

2229 9590 3428
VID - 9132 0896 3265 5435

எதிர்து ஆதாரம், எதிர்து அமைதி உரிமைகள்

Unique Identification Authority of India

மகேசுவரன் ரி, # 702, Golden Lotus
அப்டி, மகிண்டர் மையாடி, சம்பவல்லி 1-ஸ்ட்
ஸ்ட்ரீட், சம்பவல்லி, மதுரை,
தமிழ் நாடு - 625007

Address:
RAMAKRISHNAN R, # 702, GOLDEN LOTUS
APT, MCHINDRAN MAYADI, SAMBARKULAM 1 ST
STREET, Sambarkulam, Madurai,
Tamil Nadu - 625007

2229 9590 3428
VID - 9132 0896 3265 5435

தலைப்பு | தொடர்பு | www.uidai.gov.in

आयकर विभाग
 INCOME TAX DEPARTMENT
 MALAYALAM II
 RAMASAMY RAMAKRISHNAN
 03/06/1984
 Permanent Account Number
 ANFPM185C
 भारत सरकार
 GOVT OF INDIA







इस कार्ड के अतिरिक्त आप अपने प्रत्येक आयकर
 प्रेषण के लिए एक 'आयकर रिटर्न' भी भेजना पड़ेगा
 और इसे 31/03/2024 तक
 आयकर विभाग, दिल्ली में भेजना
 पड़ेगा - 110011
 यदि आपका आयकर प्रेषण
 ऑनलाइन है तो आपको
 अपना आयकर प्रेषण
 आयकर विभाग, दिल्ली में भेजना
 नहीं पड़ेगा।
 आयकर विभाग, दिल्ली
 प्लॉट नं. 512, बंगला हाउसिंग
 कॉम्प्लेक्स, टाउन डीप, बंगला हाउसिंग
 चौक, दिल्ली-110011
 फोन: 2333 2221, 2333 2222, 2333 2223
 ईमेल: income@incometax.gov.in

அண்ணாமலைப்
ANNAMALAI



பல்கலைக்கழகம்
UNIVERSITY



அறிவியற்புலம்
FACULTY OF SCIENCE

மே, 2011 இல்

பயன்பாட்டு நிலத்தியல்

பிரிவில்

நடைத்திய தேர்வுகளில்

வெங்கடகிரி பா

சுருதல்

மதிப்பீட்டாளர்கள் 10.00 க்கு சராசரியாக 6.03 பெற்று

இரண்டாம் வகுப்பில்

தேர்ச்சியடைந்து முறையாக அமைக்கப்பெற்ற தேர்வுக்குழுவினர் சான்றளித்தபடி,

அறிவியல் நிறைஞர்

பட்டம்

பெறவதற்கு

உரியவர்

ஆகின்றார்

என அண்ணாமலைப் பல்கலைக்கழக ஆளவை இதுன்பழி அறிவிக்கின்றது.

The Senate of the **ANNAMALAI UNIVERSITY** hereby makes known

that **VENGATAGIRI B**

has been admitted to the

Degree of **MASTER OF SCIENCE** in

APPLIED GEOLOGY,

he/she having secured **OGPA** of **6.03** out of **10.00** been certified

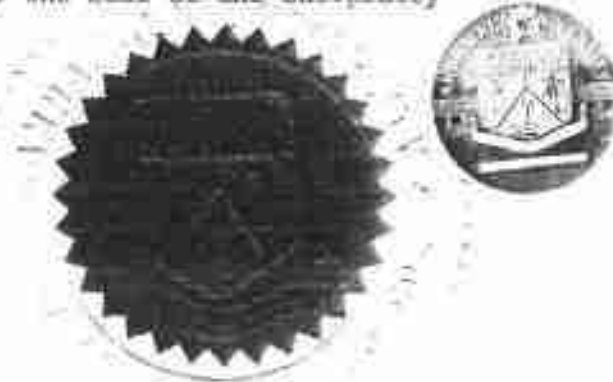
by duly appointed Examiners at the Examination held in

MAY, 2011 to be qualified to receive the same, and that

he/she was placed in **SECOND CLASS.**

பல்கலைக்கழக முத்திரை பெறுகின்றது

Given under the seal of the University



அண்ணாமலைபுலம்
Annamalai Nagar

நாள்

தளபதி தேர்வுகளைப்பார் (கல்விக்கார்த்த)

M. R. Kathinasabapathi

Dr. M. R. Kathinasabapathi
பதிவாளர்

M. R. Ramanathan

Dr. M. R. Ramanathan
தளபதி

GOVERNMENT OF INDIA

MINISTRY OF LABOUR AND EMPLOYMENT DIRECTORATE OF MINES SAFETY



Certificate of practical experience granted by the Manager to a Candidate for a Manager's / surveyor's / Mining Foreman / Mining Mate / Blastex Certificate of Competency Examination under the metalliferous Mine Regulations 1951

I M. S. PAVEL being the owner / Agent / Manager of K. PITCHAMPATTI MULTI COLOUR GRANITE Mine belonging to Ms. P. ANANDHAR LOKIA do hereby certify that

So B. VENGATAGET S/o Sri D. BALASUBRAMANIAN whose signature is appended worked in the above Mines from 10.07.62 to 10.07.62 and is still working. During the term of work he has obtained practical experience in detailed work. 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 a good character and a fit and proper person to be examined for a certificate of competency.

For K. Pitchampatti Multicolour Granite mine

Signature with Date M. S. Pavel
MANAGER (MINES)
OWNER/AGENT/ MANAGER MULTICOLOUR GRANITE MINE
K. PITCHAMPATTI
Post K. PITCHAMPATTI
KAPUR - TALUK B DIST
District KARUR
State TAMILNADU

B. Vengataget
Signature of the Candidate

State the name of the Mineral Works

MULTI-COLOUR GRANITE

Self attested
Self attested

Sl.No	Particulars of practical Experience	Place of Experience	Period of practical Experience		Years	Months	Days
			From	To			
1.	Training in drilling operation	Open cast	16.07.13 to 24.07.13		01	09	16
2.	Training in heavy blasting operations	Open cast	22.10.13 to 31.10.14		01	02	07
3.	Production on the job Quality control and Supervision of Engineer mining operations		01.01.15 to 21.12.15		00	09	21
GRAND TOTAL					03	03	14

IN WORDS:-

(A) AVERAGE MONTHLY OUTPUT (B) AVERAGE DAILY EMPLOYMENT DURING THE ABOVE AGE IS GIVEN BELOW:

Under ground working	Open cast working	Total
Average monthly output	Average monthly output = 2000	Monthly output = 2000
Average daily employment	Average daily employment = 25	Daily employment = 25

For K.Pitchampatti Multicolour Granite Mines


SIGNATURE OF THE CANDIDATE


SIGNATURE OF MANAGER
WITH DATE
MANAGER (MINES)
MULTICOLOUR GRANITE MINE
K. PITCHAMPATTI,
KARUR - TALUK & DIST

INSTRUCTIONS:-

State clearly the nature of duties.

State whether on surface in open cast working or below ground.

State specifically the persons spent by the applicant in the different mining operations on serving operation as the case may be. The employment has not been stated as the avocations attendance of the applicant at the mine. It must state how many weeks and how many days he was employed at the mine. Whether underground or above ground and in what capacity.

Delete if the mine is Metalliferous mine.

Delete if the mine coal mine.

Self attested


Self attested

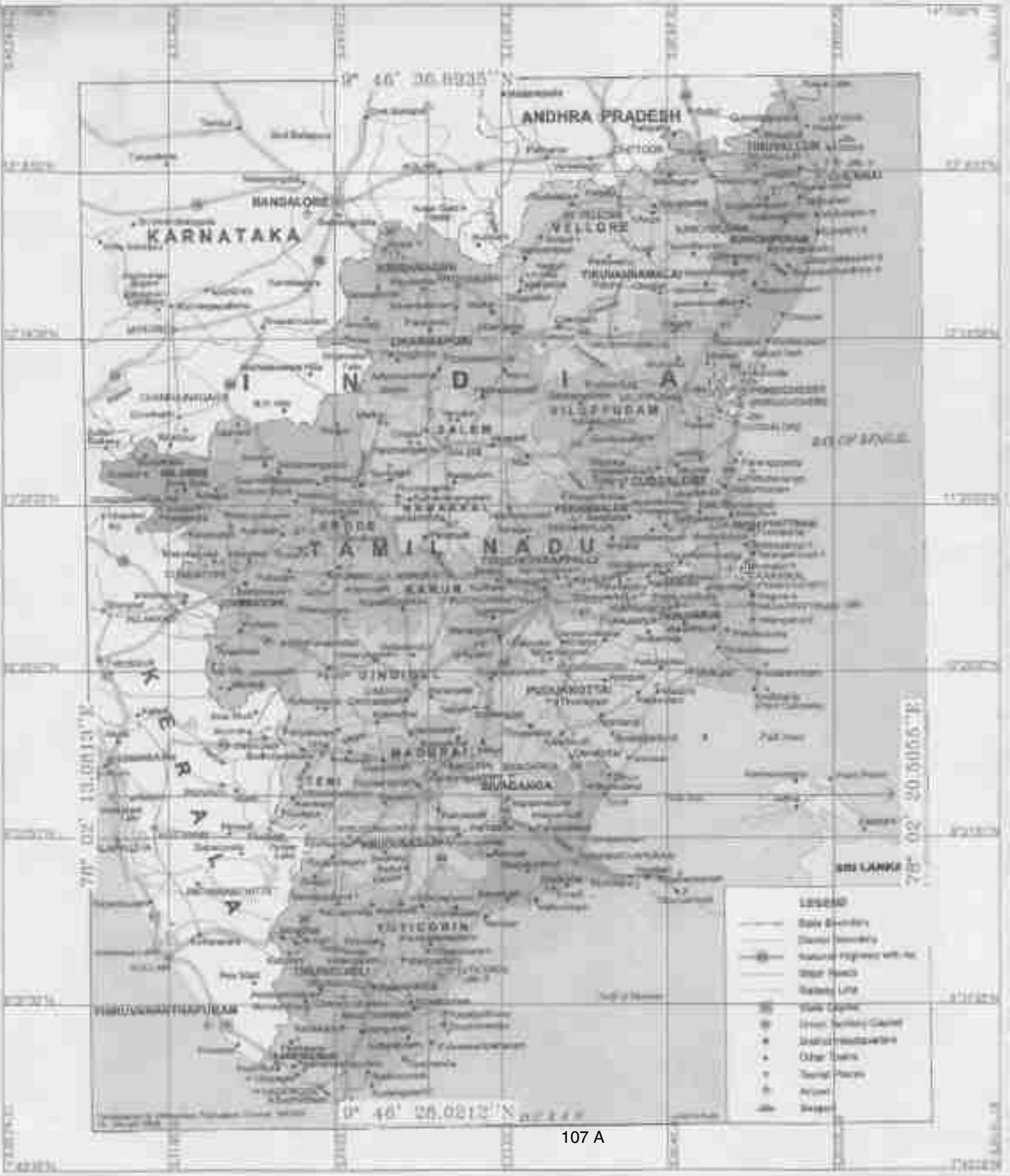



PLATE NO:1

DATE OF SURVEY : 31.03.2024

APPLICANT:


TVL SUGANYA BLUE METALS,
No. 13/462, ACHANKULAM, REDUNGULAM,
MELA UPPILEGUNDU, KALLIKUDI TALUK,
MADURAI-625 022.

LOCATION OF QUARRY

LEASE APPLIED AREA:

S.F No : 108/20, 109/1, 20, 3A, 3B, 4, etc.,
EXTENT : 3.48.00Ha,
VILLAGE : ULAGANI,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

C.I.A. AREA : 
TOPO SHEET NO. : 54 K01
LATITUDE : 12° 46' 28.8125\"/>

LOCATION PLAN

SCALE : 1:24,00,000

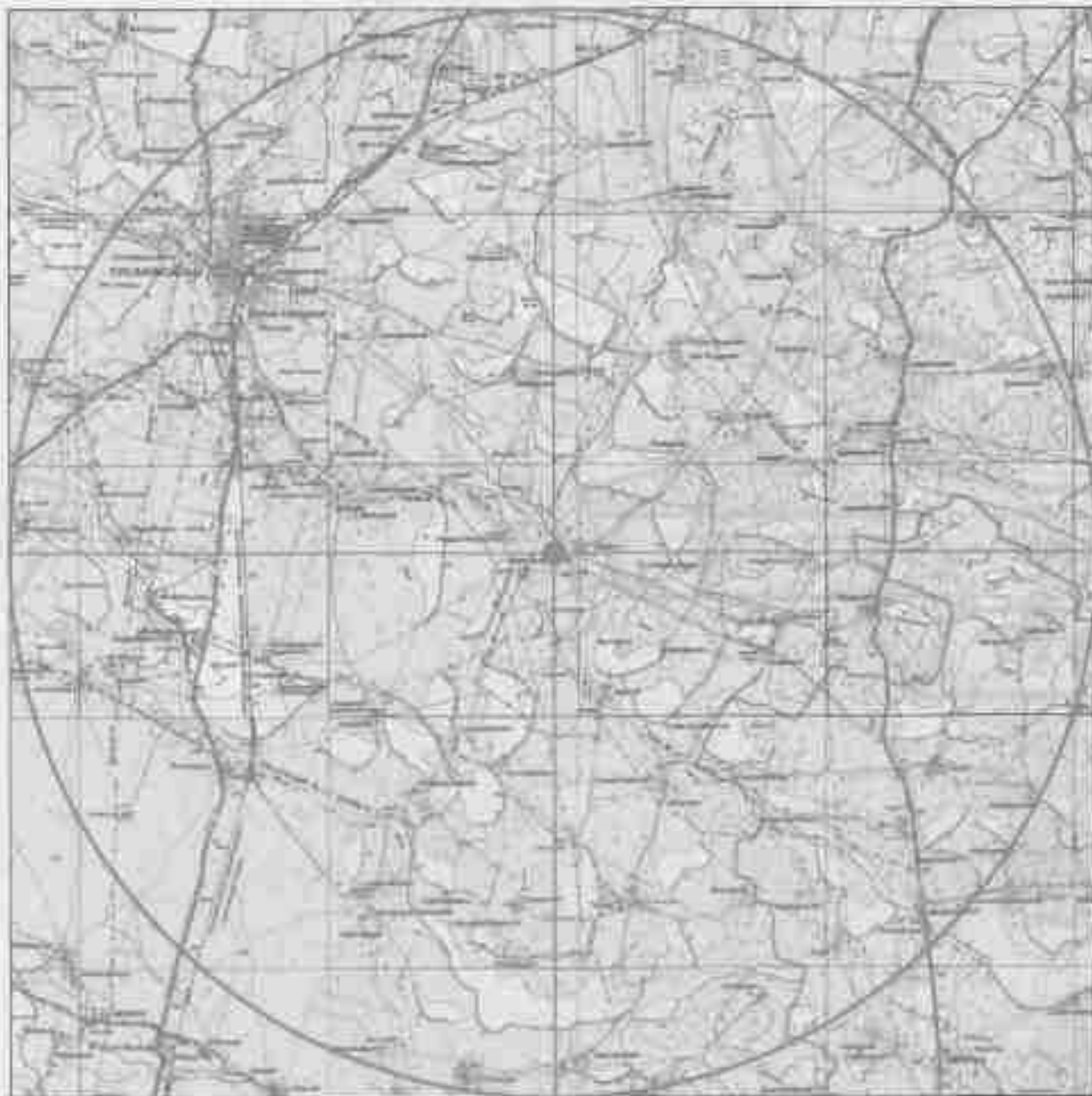
PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAN IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHORISED BY THE GOVERNMENT


Surveyor
Madurai



9° 52' 02.06"N



77° 50' 45.30"E

78° 02' 48.34"E

9° 41' 02.05"N

TOPO SHEET NO. : 58 K/01

LATITUDE : 9° 46' 26.0212"N to 9° 46' 36.8935"N

LONGITUDE : 78° 02' 13.0813"E to 78° 02' 20.5055"E

10KM RADIUS

Q.L. APPLI 108 AREA



PLATE NO: I-A

DATE OF SURVEY - 31.01.2024

APPLICANT:

TVL SUGANYA BLUE METALS,
No. 13/4A2, ACHANKULAM, NEDUNGULAM,
MELA UPPILGUNDU, KALLIKUDI TALUK,
MADURAI-625 072.



**LOCATION OF QUARRY
LEASE APPLIED AREA:**

S.F.No : 108/2D, 109/1, 2C, 3A, 3B, 4, etc.,
EXTENT : 3.46.00Ha,
VILLAGE : ULAGANI,
TALUK : KALLIKUDI,
DISTRICT: MADURAI,
STATE : TAMIL NADU.

INDEX

CONVENTIONAL SYMBOLS

Boundaries of the State	—	—	—
State Capital	—	—	—
State Boundaries	—	—	—
International Boundaries	—	—	—
Water Bodies	—	—	—
Waterfalls	—	—	—
Canals	—	—	—
Highways	—	—	—
Trunk Highways	—	—	—
Other Highways	—	—	—
Roads	—	—	—
Railways	—	—	—
Electric Lines	—	—	—
Telephone Lines	—	—	—
Post Offices	—	—	—
Police Stations	—	—	—
Government Buildings	—	—	—
Public Buildings	—	—	—
Temples	—	—	—
Religious Buildings	—	—	—
Other Buildings	—	—	—
Open Spaces	—	—	—
Plantations	—	—	—
Barren Lands	—	—	—
Marshes	—	—	—
Swamps	—	—	—
Other Wetlands	—	—	—
Other Symbols	—	—	—

**TOPO SKETCH OF QUARRY
LEASE APPLIED AREA FOR
10KM RADIUS**

SCALE - 1:100000

PREPARED BY:

THE SURVEYOR GENERAL, TAMIL NADU
AND DIRECTOR, SURVEY OF INDIA
MADRAS OFFICE

(Signature)
SURVEYOR GENERAL,
TAMIL NADU

Survey of India, Madras Office

LAND USE PATTERN

DESCRIPTION	AREA IN PERCENTAGE (%)
TREES/HABITATION	10
WATER/TANK/CANAL	10
AGRICULTURE LAND	80
CRUSHER/PLANT	20



PLATE NO:1-B

DATE OF SURVEY : 31.01.2024

TOPO SHEET NO. : 58 K/01

LATITUDE : 9° 46' 28.2212"N to 9° 46' 36.9455"N

LONGITUDE : 78° 02' 33.0813"E to 78° 02' 26.9055"E

1KM RADIUS

500M RADIUS

Q.L. APPLIED AREA



APPLICANT:

T.M. SUGANYA BLUE METALS,
No.13/442 ACHANKULAM, NEELINGULAM,
MELA UPPILIGUNDU, KALLIKUDI TALUK,
MADURAI-625 022.

LOCATION OF QUARRY

LEASE APPLIED AREA:

S.F.No : 109/2D, 109/1, 2C, 3A, 3B, 4, etc.,
EXTENT : 3.48.00Ha,
VILLAGE : ULAGANI,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

APPROACH ROAD	
WIND DIRECTION	
TREES	
VILLAGE ROAD	
AGRICULTURE LAND	
ROAD	
CRUSHER PLANT	
HABITATION	
QUARRY PIT	
CANAL	
TANK	
RIVER	

ENVIRONMENTAL & LANDUSE PLAN (For 1Km Radius)

SCALE 1:10,000

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLAN IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP AUTHENTICATED BY THE GOVERNMENT.



78° 01' 40.30"E

9° 47' 09.41"N

DECEMBER TO FEBRUARY

55.50"N

78° 02' 30.00"E

78° 02' 53.20"E

JULY TO SEPTEMBER



PLATE NO: I-C

DATE OF SURVEY : 31.01.2024

APPLICANT :
TVL SUGANYA BLUE METALS,
No.13/4A2,ACHANKULAM,NEDUNGULAM,
MELA UPPILIGUNDU,KALLIKUDI TALUK,
MADURAI-625 022.

**LOCATION OF QUARRY
LEASE APPLIED AREA:**
S.F.No : 108/2D,109/1,2C,
3A,3B,4,etc.,
EXTENT : 3.48.00Ha,
VILLAGE : ULAGANI,
TALUK : KALLIKUDI,
DISTRICT: MADURAI,
STATE : TAMIL NADU.

INDEX

Q.LAPPLIED BOUNDARY	
APPROACH ROAD	
MAJOR ROAD	
PANCHAYAT ROAD	
SH-ROAD	

ROUTE MAP

Not to Scale

PREPARED BY:
I AM TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED ON THE LEASE MAP
AUTHENTICATED BY STATE SURVEYOR

SUGANYA BLUE METALS,
OFFICE PERSON
Under Rule 100C of the MCR, 2011





Lot	Area	Volume
1	1000	1000
2	1000	1000
3	1000	1000
4	1000	1000
5	1000	1000
6	1000	1000
7	1000	1000
8	1000	1000
9	1000	1000
10	1000	1000
11	1000	1000
12	1000	1000
13	1000	1000
14	1000	1000
15	1000	1000
16	1000	1000
17	1000	1000
18	1000	1000
19	1000	1000
20	1000	1000
21	1000	1000
22	1000	1000
23	1000	1000
24	1000	1000
25	1000	1000
26	1000	1000
27	1000	1000
28	1000	1000
29	1000	1000
30	1000	1000
31	1000	1000
32	1000	1000
33	1000	1000
34	1000	1000
35	1000	1000
36	1000	1000
37	1000	1000
38	1000	1000
39	1000	1000
40	1000	1000
41	1000	1000
42	1000	1000
43	1000	1000
44	1000	1000
45	1000	1000
46	1000	1000
47	1000	1000
48	1000	1000
49	1000	1000
50	1000	1000

PROPERTY TO BE DIVIDED

LN	AREA	VOLUME
1	1000	1000
2	1000	1000
3	1000	1000
4	1000	1000
5	1000	1000
6	1000	1000
7	1000	1000
8	1000	1000
9	1000	1000
10	1000	1000
11	1000	1000
12	1000	1000
13	1000	1000
14	1000	1000
15	1000	1000
16	1000	1000
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41	1000	1000
42	1000	1000
43	1000	1000
44	1000	1000
45	1000	1000
46	1000	1000
47	1000	1000
48	1000	1000
49	1000	1000
50	1000	1000

PLATE NO. 1
SCALE SURVEY OF 2024

APPLICANT
THE SUGAR BLUE METALS
101 SUGAR BLUE METALS, BETHLEHEM, PA
101 SUGAR BLUE METALS, BETHLEHEM, PA
101 SUGAR BLUE METALS, BETHLEHEM, PA
101 SUGAR BLUE METALS, BETHLEHEM, PA

LOCATION OF QUARRY LEASE APPLIED AREA
T. 21 N. R. 34 E. S. 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50

DISTRICT - SUGAR BLUE
COUNTY - SUGAR BLUE
TOWNSHIP - SUGAR BLUE
DISTRICT - SUGAR BLUE
STATE - SUGAR BLUE

SITES

- ALL APPLIED AREA BOUNDARIES
- ALL EXISTING QUARRY BOUNDARIES
- QUARRY LEASE BOUNDARIES
- ROAD
- PROPERTY OF OTHERS

QUARRY LEASE & CONTACT

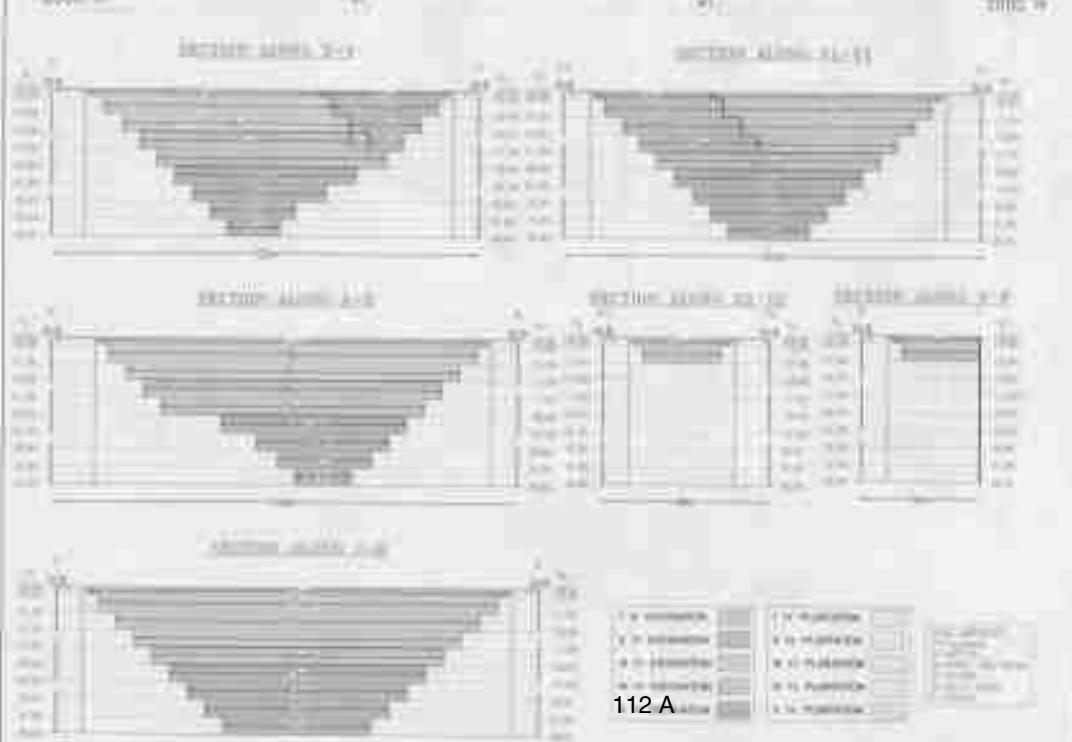
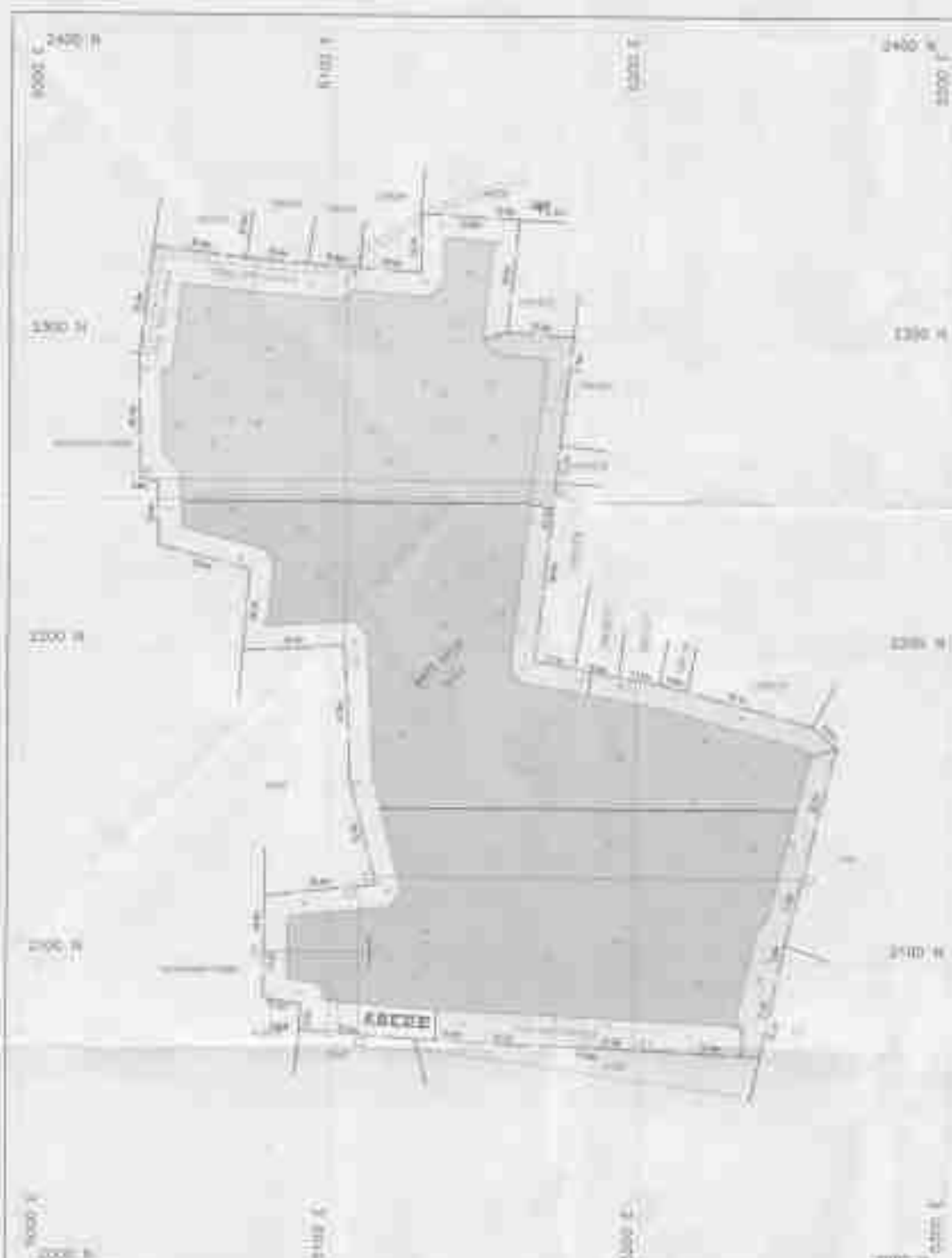
APPLICANT

SCALE 1" = 100'

DATE 10/10/2024

BY [Signature]

TITLE [Signature]



PLAT NO. 10
 2400 N 2400 W

NOTES:
 1. THE DESIGN IS BASED UPON THE DATA FURNISHED BY THE CLIENT AND THE DESIGNER HAS NOT MADE ANY VISUAL CHECK OF THE SITE.
 2. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 3. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 4. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 5. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 6. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 7. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 8. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 9. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.
 10. THE CLIENT IS TO VERIFY THE DATA AND THE DESIGNER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS.

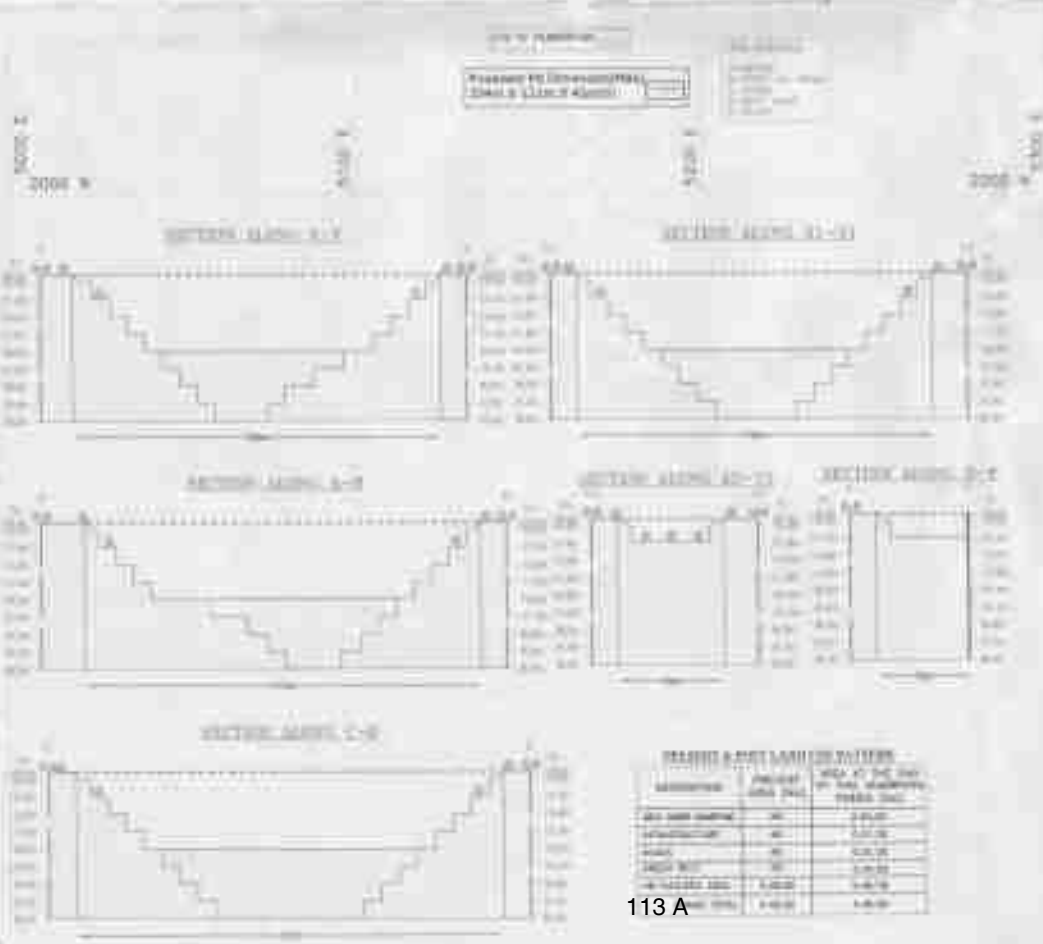
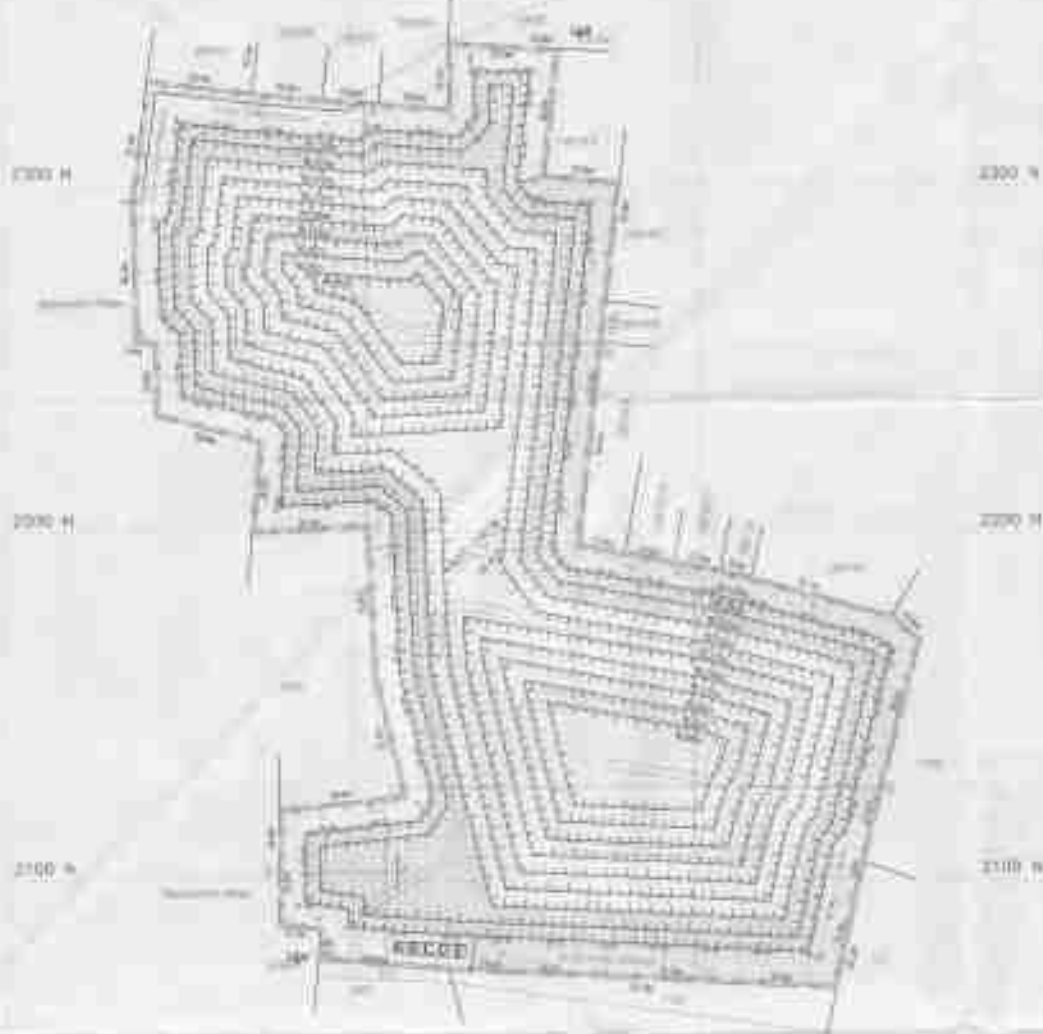
ITEMS:
 1. ALL DIMENSIONS ARE IN METERS.
 2. ALL DIMENSIONS ARE IN METERS.
 3. ALL DIMENSIONS ARE IN METERS.
 4. ALL DIMENSIONS ARE IN METERS.
 5. ALL DIMENSIONS ARE IN METERS.
 6. ALL DIMENSIONS ARE IN METERS.
 7. ALL DIMENSIONS ARE IN METERS.
 8. ALL DIMENSIONS ARE IN METERS.
 9. ALL DIMENSIONS ARE IN METERS.
 10. ALL DIMENSIONS ARE IN METERS.

TOPOGRAPHY, GEOLOGICAL PLAN & SECTION SHOWING DESIGN DEVELOPMENT & PRODUCTION PLAN & SECTIONS
 SCALE: 1:1000

PREPARED BY:
 [Signature]

DATE:
 [Date]

2400 N
2300 N
2200 N
2100 N

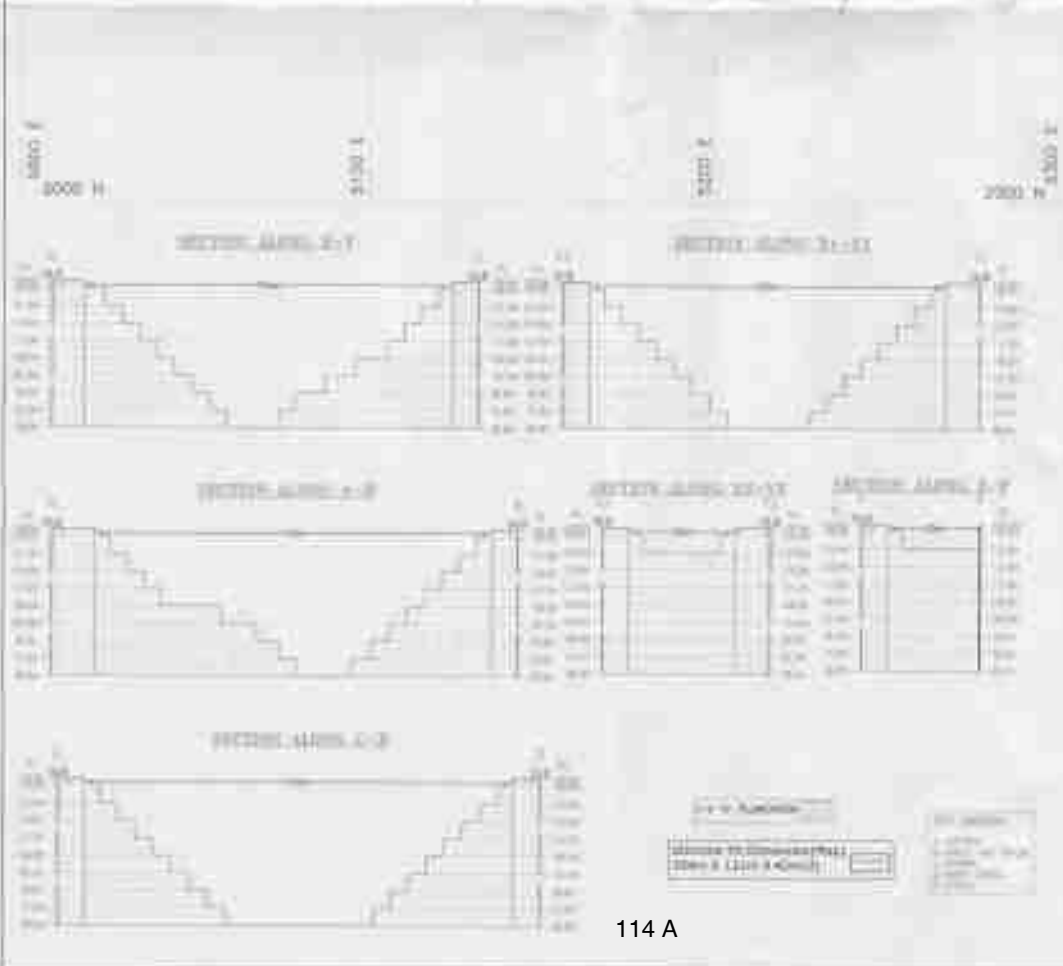
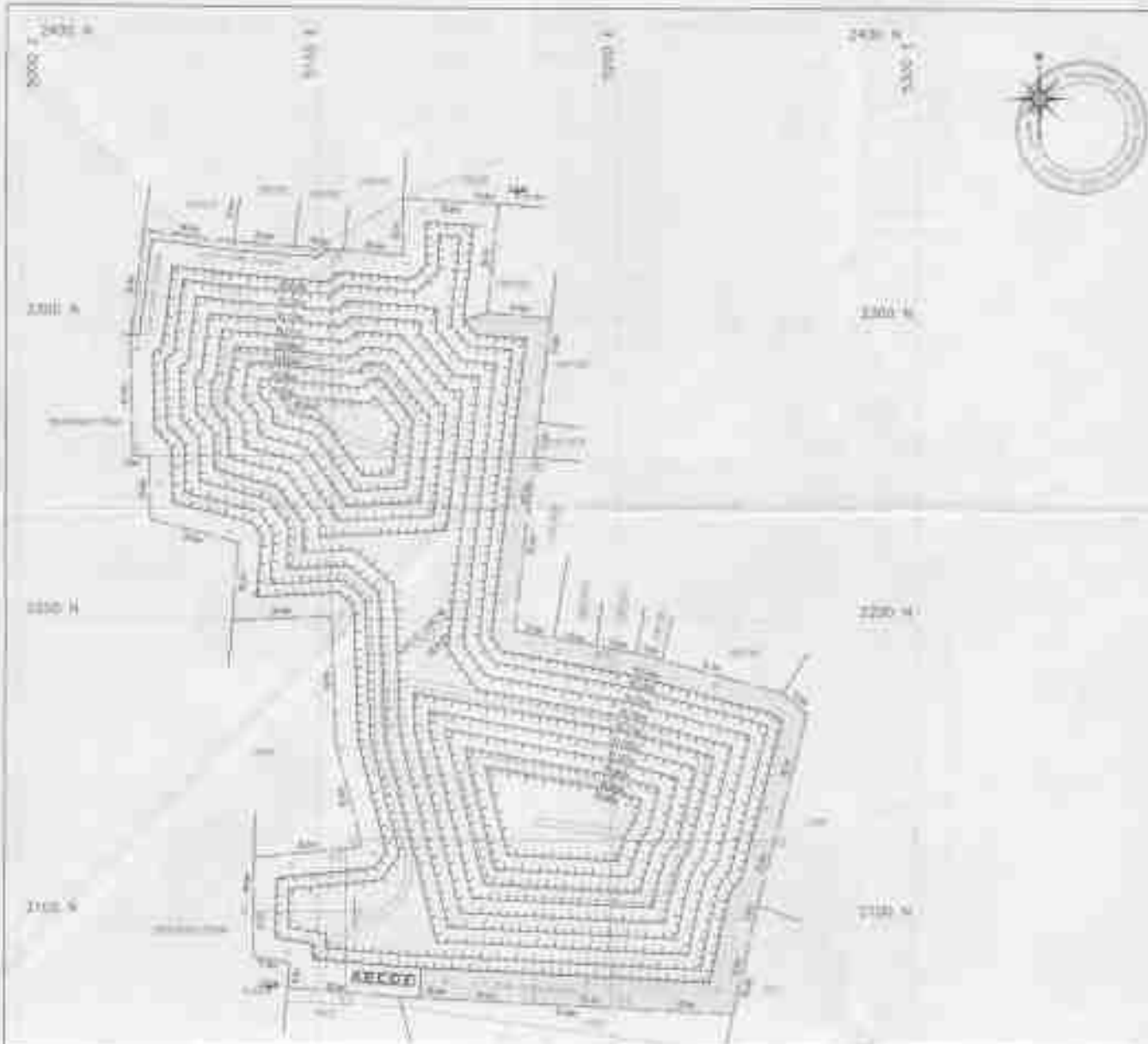


PLANNING IV
SECTION MAP (11-11-58)
REMARKS:
THE QUARRY IS LOCATED IN
THE LOCAL AUTHORITY'S RESERVATION
AREA. APPLICABLE REGULATIONS
MAY BE APPLIED TO THE QUARRY.
LOCATION OF QUARRY
LEASE: RYLANDS
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INDEX	
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1:2500	1:2500
1:1250	1:1250
1:625	1:625
1:312	1:312
1:156	1:156
1:78	1:78
1:39	1:39
1:20	1:20
1:10	1:10
1:5	1:5
1:2	1:2
1:1	1:1

GRAVEL & SAND QUANTITIES		
ITEM	UNIT	QTY
GRAVEL	m ³	1000
SAND	m ³	500
TOTAL	m ³	1500
GRAVEL	m ³	1000
SAND	m ³	500
TOTAL	m ³	1500

PREPARED BY QUARRY
CLOSED PLAN SECTION
SCALE 1:500



PLATNIK 1
 (Scale of Drawing: 1:5000)

APPLICANT:
 PT. SUDIRYA BUKITING
 No. 11042/KABUPATEN NEDIRWAAN
 PHLA UPTUNG/INDONESIA/PTK TELUK
 MESTER/001/000

LOKASI/DAIRAH KAWASAN
 UPTUNG, UPTUNG AREA
 UTM: 100000/1000000
 ZONASI: 1: 100000
 PELAKSANA: UDANG
 TINGKAT: 100000
 DOKUMEN: 100000
 DATE: 100000

- LEGEND**
- 1. 100000 AREA BOUNDARY
 - 2. 100000 SAFETY DISTANCE
 - 3. 100000 ROADWAY
 - 4. 100000 ROAD
 - 5. 100000 HIGHWAY
 - 6. 100000
 - 7. 100000
 - 8. 100000
 - 9. 100000
 - 10. 100000

CONCEPTUAL PLAN & SECTION
 ROAD 100000

DESIGNED BY:
 PT. SUDIRYA BUKITING
 No. 11042/KABUPATEN NEDIRWAAN
 PHLA UPTUNG/INDONESIA/PTK TELUK
 MESTER/001/000

HYDROGEOLOGICAL REPORT

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**HYDRO - GEOLOGICAL STUDIES AT TVL. SUGANYA BLUE METALS
ROUGH STONE & GRAVEL QUARRY IN ULAGANI VILLAGE,
KALLIKUDI TALUK, MADURAI DISTRICT, TAMIL NADU.**

1 INTRODUCTION

Proprietor of **Tvl. Suganya Blue Metals** in Rough stone and Gravel quarry Over an extent of 3.48.0 hectares of Patta land in S.F. Nos. 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M of Ulagani Village, Kallikudi Taluk, Madurai District, Tamil Nadu state on the hydrological regime of the area, The above area has been studied & investigated for finding out Ground water level and aquifer thickness and water quality in and around mine lease area. The electrical resistivity method, TEM study in Rough stone and gravel quarry and genesis rock with determine the shallow and deeper freshwater aquifer in the proposed mining area in Ulagani Village.

1.1. Scope of Study

The current study focuses on investigating both shallow and deeper aquifers using electrical resistivity Vertical Electrical Sounding (VES) method to measure the apparent resistivity in the study area. Specifically, the study aims to estimate the groundwater level in Ulagani village, Kallikudi Taluk, Madurai District, Tamil Nadu, including the proposed leasehold area and its surroundings. The study encompasses analysis of water level, sand type, rock type, and basement rock characteristics within the study area. Ultimately, the main objective is to ascertain the water table and flow dynamics

of the lease area and its vicinity. (Fig.1).

1.2. Profiles in the Study Area.

Name of the Lessee	: Tvl. Suganya Blue Metals
Survey No	: 108/2D, 109/1, 109/2C, 109/3A, 109/3B, 109/4, 109/6, 109/10A, 109/10B, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1E, 110/1F, 110/1G, 110/1H, 110/1I, 110/1J, 110/1K, 110/1L and 110/1M
Extent	: 3.48.0 hectares.
Village	: Ulagani village,
Taluka	: Kallikudi Taluk,
District	: Madurai
State	: Tamil Nadu

2. STUDY AREA DESCRIPTION



Figure.1. Shows proposed mine lease area

The lease applied area is located about 18m Southwest side of Madurai town, 11km Northeast side of Kallikudi town and 400m Southwest side of Ulagani Village.

30km

12km

400m

Madurai —————> Kallikudi —————> Ulagani —————> Lease applied area
 Southwest Northeast Southwest

2.1 Topography of the Lease Area and Its Surrounding Environments:

The lease applied area exhibits plain topography. The area has gentle sloping towards Eastern side and altitude of the area is 128m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby existing quarry pit situated on the Southern side.

The Water level in the surrounding area is 68m – 73m below from general ground profile which is observed from the nearby bore wells. Average annual rainfall is about 985mm.



Figure 2. Topography and Outcrop in the lease area

3. REGIONAL GEOLOGY OF MADURAI DISTRICT

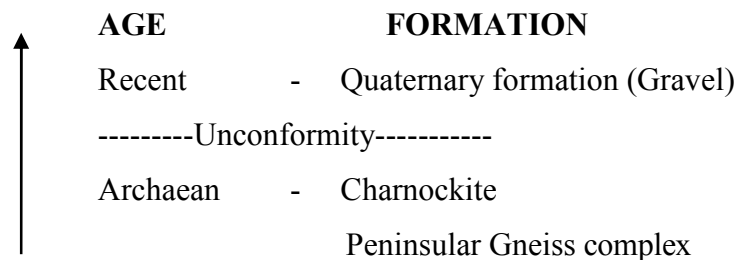
Madurai with a total area of 3860 sq.km. is one of the trifurcated districts of the erstwhile composite Madurai and is situated between North latitudes 9° 30' - 10° 16' and east longitudes 77° 15' - 78° 25'. It is bound by Theni district in the west, Dindigul district in the north, Karur and Sivaganga districts in the east and by Virudunagar district in the south. It comprises 10 taluks, viz., Madurai East, Madurai West, Thirupparankundram, Usilampatti, Tirumangalam, Madurai South, Madurai North, Vadipatti, Peraiyur and Melur taluks with Madurai City as the district headquarters. Madurai district is covered by granulite facies high grade metamorphic rocks and younger intrusives which fall under the following categories:

1. Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet-sillimanite ± biotite ± cordierite ± spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite.

2. Charnockite Group consisting of acid charnockite and pyroxene granulite.
3. Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (mafic ultra-mafic).
4. Migmatite group made up of banded hornblende biotite gneiss, grey granitic gneiss, pink granitic gneiss and grey hornblende granite.
5. The younger acid intrusive comprises granite and pegmatite. In the metasedimentary group, rocks of arenaceous, calcareous, and argillaceous composition have undergone metamorphism under the granulite facies. This group includes quartzite, calc gneiss/diopside granulite, marble, garnet-sillimanite gneiss (Khondalite), with occasional bands of garnetiferous quartzo-feldspathic gneiss (leptynite) and garnet cordierite gneiss. These rocks are found as individual bands, enclaves, or tectonic slices within the predominantly charnockite-migmatite region. Quartzite, a significant member of the metasedimentary group, occupies the crests of linear ridges with variable thickness ranging from less than a meter to 150 meters.

Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale of the Charnockite body is N40°E – S40°W with dipping towards SE 60°.

The general geological sequences of the rocks in this area are given below:



4. HYDROGEOLOGY

The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from 20-25 m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40 m bgl in remaining parts of the district. The depth of dug wells varies from 10 – 20 m with a yield of 45 – 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 – 3 lps. In



general there are about 2 – 3 fracture zones less than 50 m and about 2 – 3 fracture form beyond 100 m also. The variation in the yield of bore wells are very high in the district. Potential fractures with high discharge have been established along Valandur-usilampatti Timmarasanayakanur, ThiraliPeraiyur tract and Palkalainagar- Nilayur tract in the district. The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May) and 1.86 to 5.74 m bgl during post monsoon period. (Source: CGWB).

5. METHODOLOGY OF STUDY

1. Open well and bore well water level measurement, depth of water level diameter of open well, agriculture land survey.
2. Geophysical survey for deep aquifer in nearby site Rock and soil geology also collected for the aquifer characteristic study
3. Aquifer thickness and quality measurement study in nearby proposed mine site areas of the study area

5.1 Geophysical Investigation

5.1.1 Vertical Electrical resistivity sounding for aquifer study.

The electrical resistivity study is used to determine aquifer and occurred rock in the proposed site. The DDR 3 equipment was used for data collection (**Fig.3**)

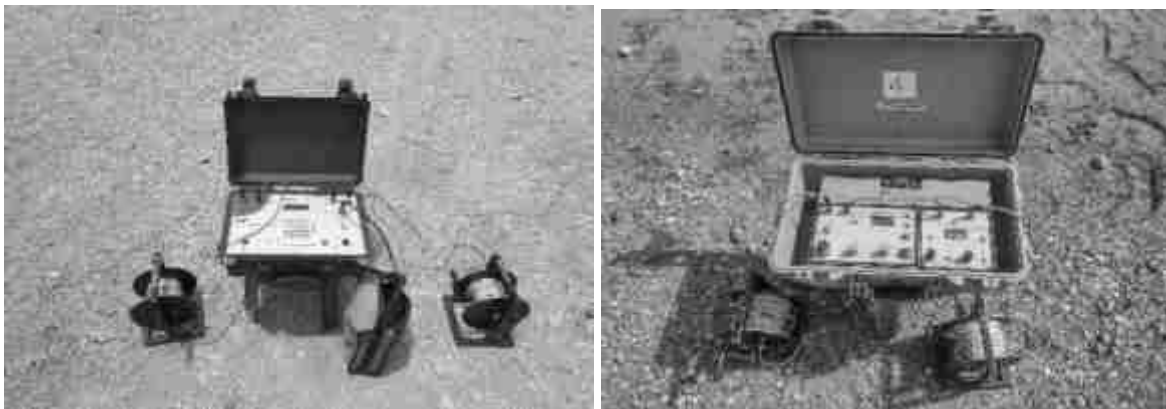


Figure 3. Electrical resistivity survey Instruments.

5.2.2 Basic Principles

The electrical properties of rocks in the upper part of the earth's crust are dependent upon the lithology, porosity, and the degree of pore space saturation and the salinity of the pore water.

Saturated rocks have lower resistivity than unsaturated and dry rocks. The higher the porosity of the saturated rock, or the higher the salinity of the saturating fluids, the lower is the resistivity. The presence of clays and conductive minerals also reduces the resistivity of the rock.

The resistivity of earth materials can be studied by measuring the electrical potential distribution produced at the earth's surface by an electric current that is passed through the earth. Current is moved through the subsurface from one current electrode to the other and the potential difference is recorded as the current passes. From this information, resistivity values of various layers are acquired and layer thickness can be identified.

The apparent resistivity values determined are plotted as a log function versus the log of the spacing between the electrodes. These plotted curves identify thickness of layers. If there are multiple layers (more than 2), the acquired data is compared to a master curve to determine layer thickness.

This method is least influenced by lateral in-homogeneities and capable of providing higher depth of investigation.

The resistance R of a certain material is directly proportional to its length L and cross-sectional area A, expressed as:

$$R = R_s * L/A \text{ (in Ohm)}$$

Where R_s is known as the specific resistivity (characteristic of the material and independent of its shape or size)

With Ohm's Law,

$$R = dV/I \text{ (Ohm)}$$

Where dV is the potential difference across the resistor and I is the electric current through the resistor. The specific resistivity may be determined by:

$$R_s = (A/L) * (dV/I) \text{ (in Ohm m)}$$



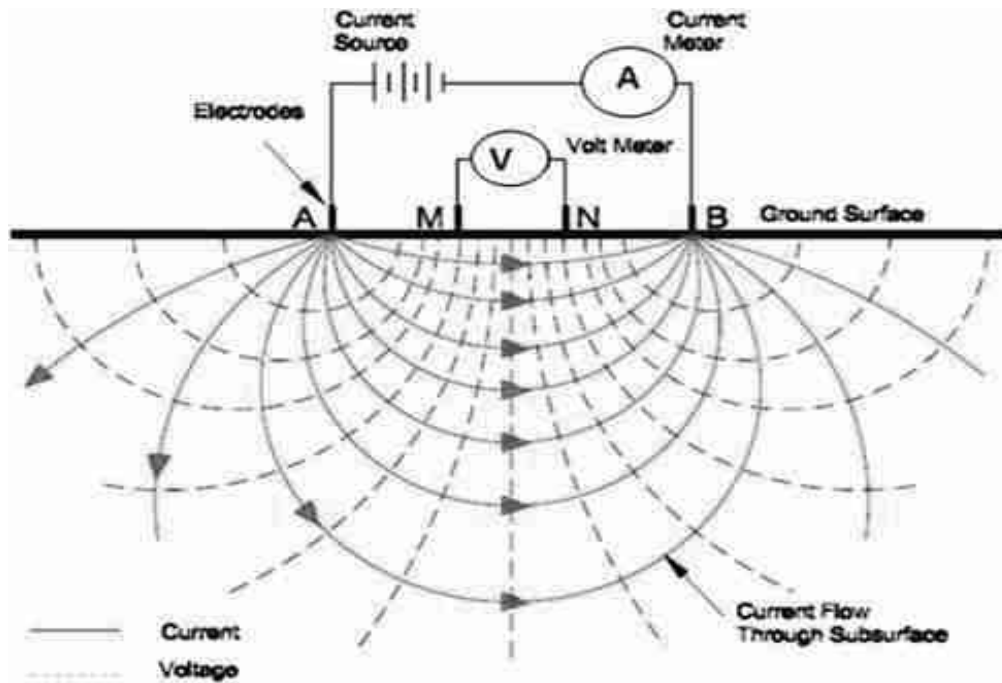


Figure 4. Schematic Diagram of Electrical resistivity principle



Figure 5. Geophysical survey location in the lease area

6. GEOPHYSICAL DATA INTERPRETATION & GRAPH

Table 1 Geophysical data of Station 1

<i>S. No</i>	<i>Ab/2</i>	<i>Mn /2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	21.3	100.37
2	4	1	23.6	4.55	107.21
3	6	1	55.0	2.43	133.60
4	8	1	99.0	1.68	166.25
5	10	1	155.5	1.24	192.83
6	10	5	23.6	5.83	137.37
7	15	5	62.8	2.98	187.24
8	20	5	117.8	1.98	233.26
9	30	5	274.9	1.13	310.63
10	40	5	494.8	0.72	356.26

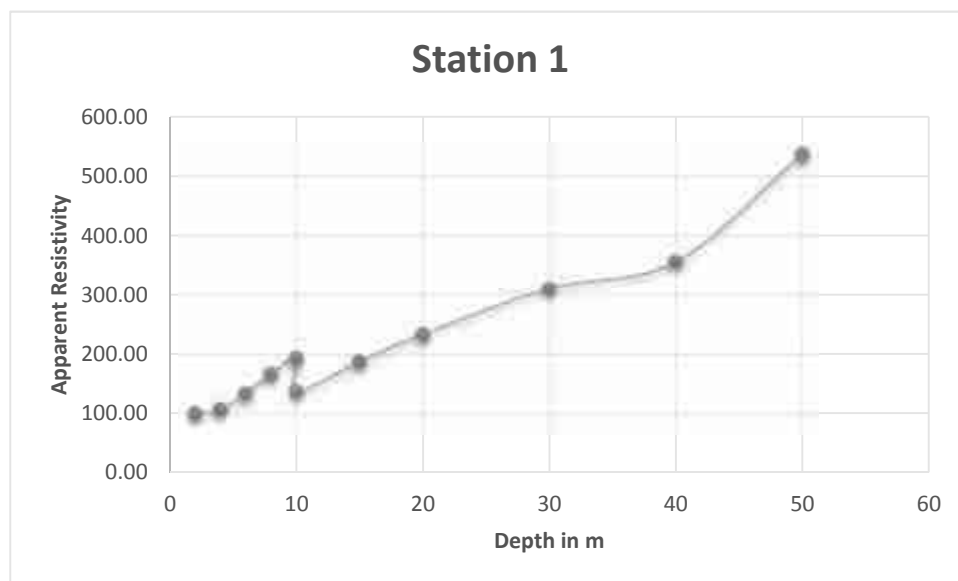


Figure 6 Graphical Representation of Geophysical data Station 1

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Table 2 Geophysical data of Station 2

<i>S. No</i>	<i>Ab/2</i>	<i>Mn /2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	31.6	148.91
2	4	1	23.6	11.84	278.97
3	6	1	55.0	6.57	361.21
4	8	1	99.0	4.15	410.69
5	10	1	155.5	2.68	416.76
6	10	5	23.6	12.02	283.22
7	15	5	62.8	6.16	387.05
8	20	5	117.8	3.6	424.12
9	30	5	274.9	1.96	538.78
10	40	5	494.8	1.18	583.87

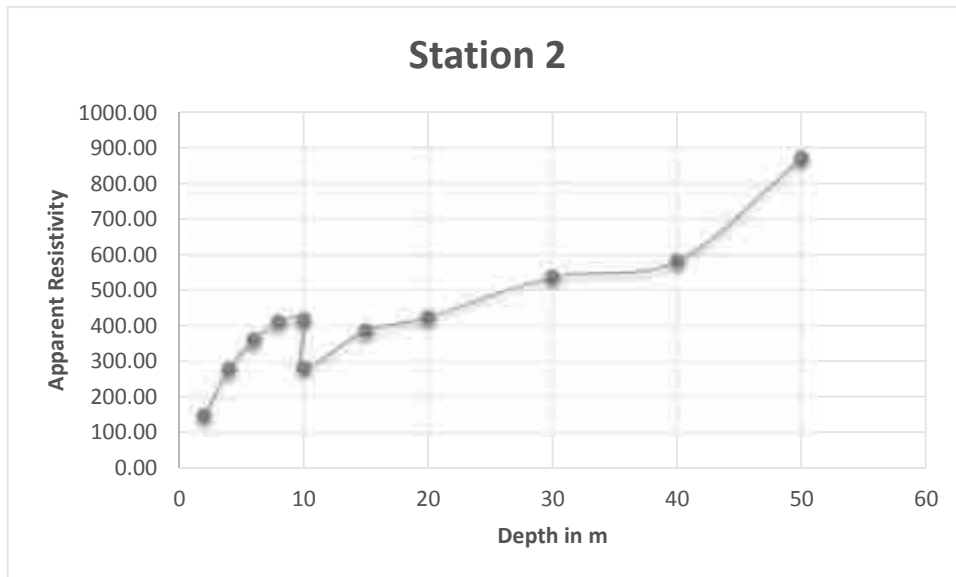


Figure 7 Graphical Representation of Geophysical data Station 2

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Table 3 Geophysical data of Station 3

<i>S. No</i>	<i>Ab/2</i>	<i>Mn/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	44.8	211.12
2	4	1	23.6	13.6	320.44
3	6	1	55.0	5.41	297.43
4	8	1	99.0	3.58	354.28
5	10	1	155.5	2.65	412.10
6	10	5	23.6	11.72	276.15
7	15	5	62.8	6.32	397.10
8	20	5	117.8	3.8	447.68
9	30	5	274.9	1.47	404.09
10	40	5	494.8	0.75	371.10
11	50	5	777.5	0.69	536.51

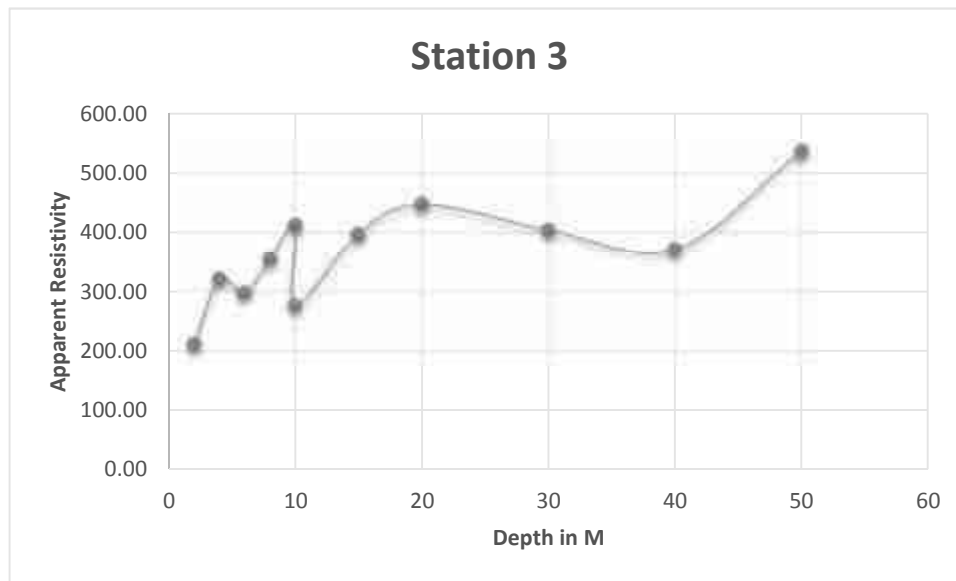


Figure 8 Graphical Representation of Geophysical data Station 3

Table 4 Geophysical data of Station 4

<i>S. No</i>	<i>Ab/2</i>	<i>Mn/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	27.4	129.12
2	4	1	23.6	6.48	152.68
3	6	1	55.0	3.82	210.02
4	8	1	99.0	2.52	249.38
5	10	1	155.5	1.75	272.14
6	10	5	23.6	5.52	130.06
7	15	5	62.8	3.04	191.01
8	20	5	117.8	2.27	267.43
9	30	5	274.9	1.56	428.83
10	40	5	494.8	0.85	420.58
11	50	5	777.5	0.74	575.38

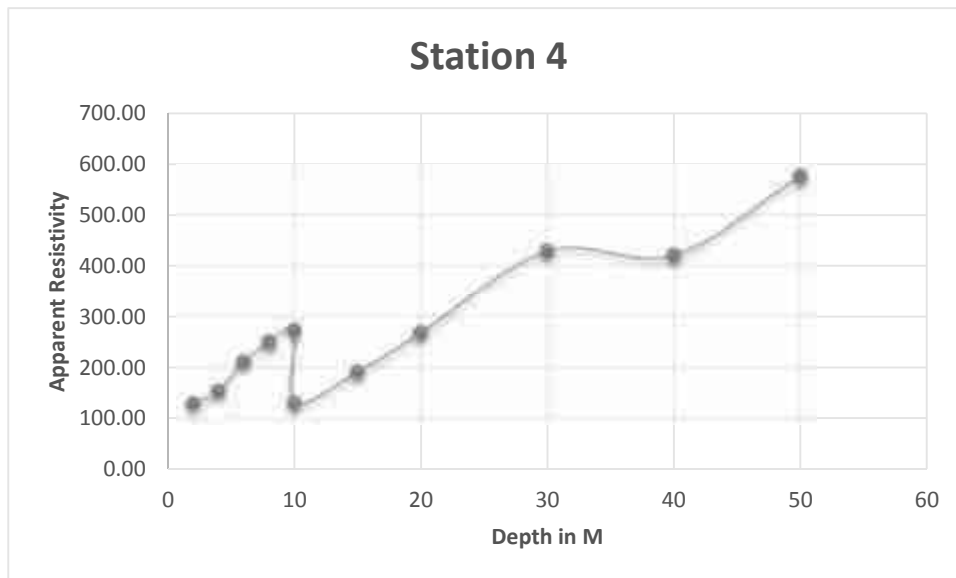


Figure 9 Graphical Representation of Geophysical data Station 4

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Table 5 Geophysical data of Station 5

<i>Sr. No.</i>	<i>AB/2</i>	<i>MN/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	45.8	215.83
2	4	1	23.6	8.39	197.69
3	6	1	55.0	3.54	194.62
4	8	1	99.0	2.6	257.30
5	10	1	155.5	1.9	295.47
6	10	5	23.6	8.68	204.52
7	15	5	62.8	4	251.33
8	20	5	117.8	2.45	288.63
9	30	5	274.9	1.44	395.84
10	40	5	494.8	0.56	277.09
11	50	5	777.5	0.47	365.45

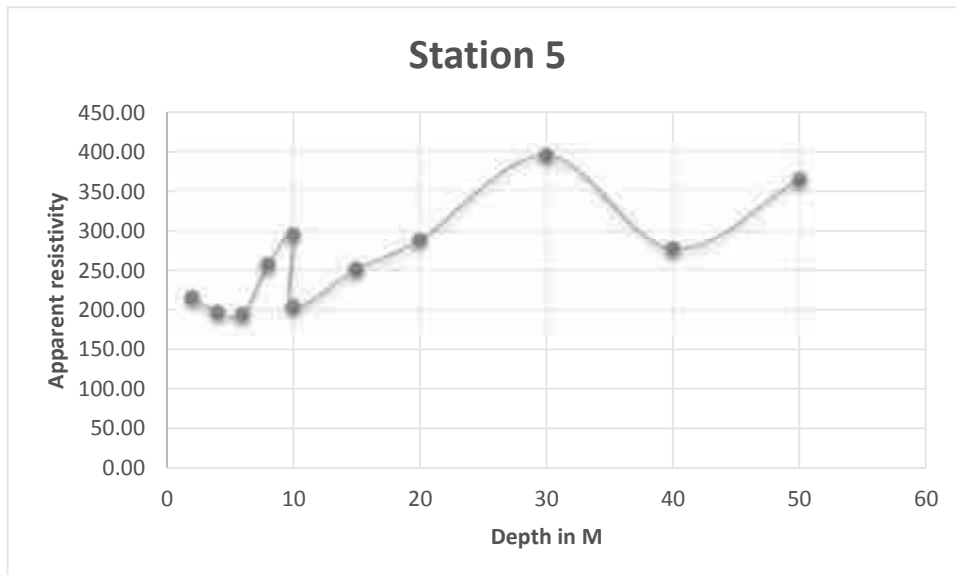


Figure 10 Graphical Representation of Geophysical data Station 5

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Table 6 Geophysical data of Station 6

<i>Sr. No.</i>	<i>AB/2</i>	<i>MN/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	29.6	139.49
2	4	1	23.6	5.49	129.36
3	6	1	55.0	2.42	133.05
4	8	1	99.0	1.48	146.46
5	10	1	155.5	1.06	164.84
6	10	5	23.6	4.04	95.19
7	15	5	62.8	1.96	123.15
8	20	5	117.8	1.27	149.62
9	30	5	274.9	0.8	219.91
10	40	5	494.8	0.56	277.09
11	50	5	777.5	0.48	373.22

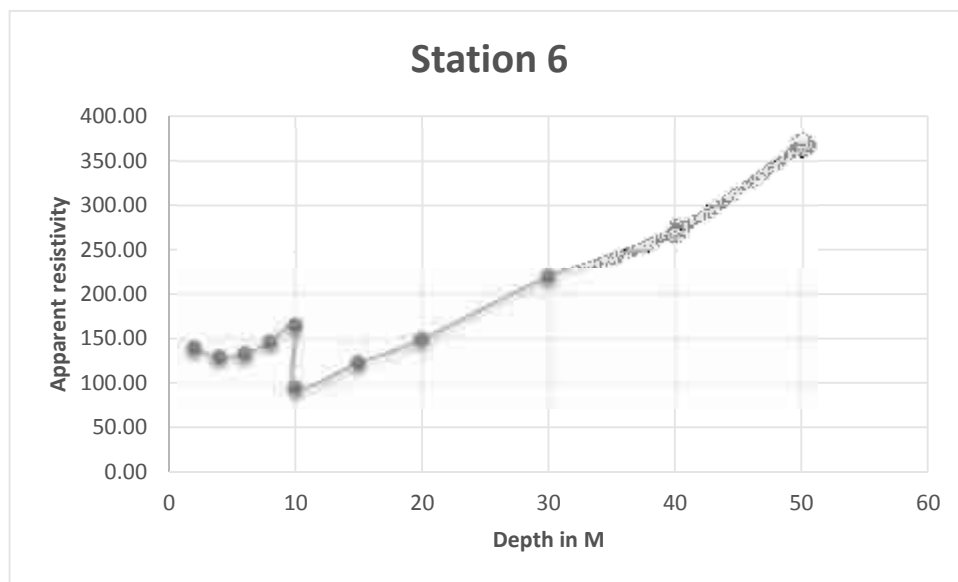


Figure 11 Graphical Representation of Geophysical data Station 6

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7. LITHOLOGY MODELLING USING GEOPHYSICAL DATA

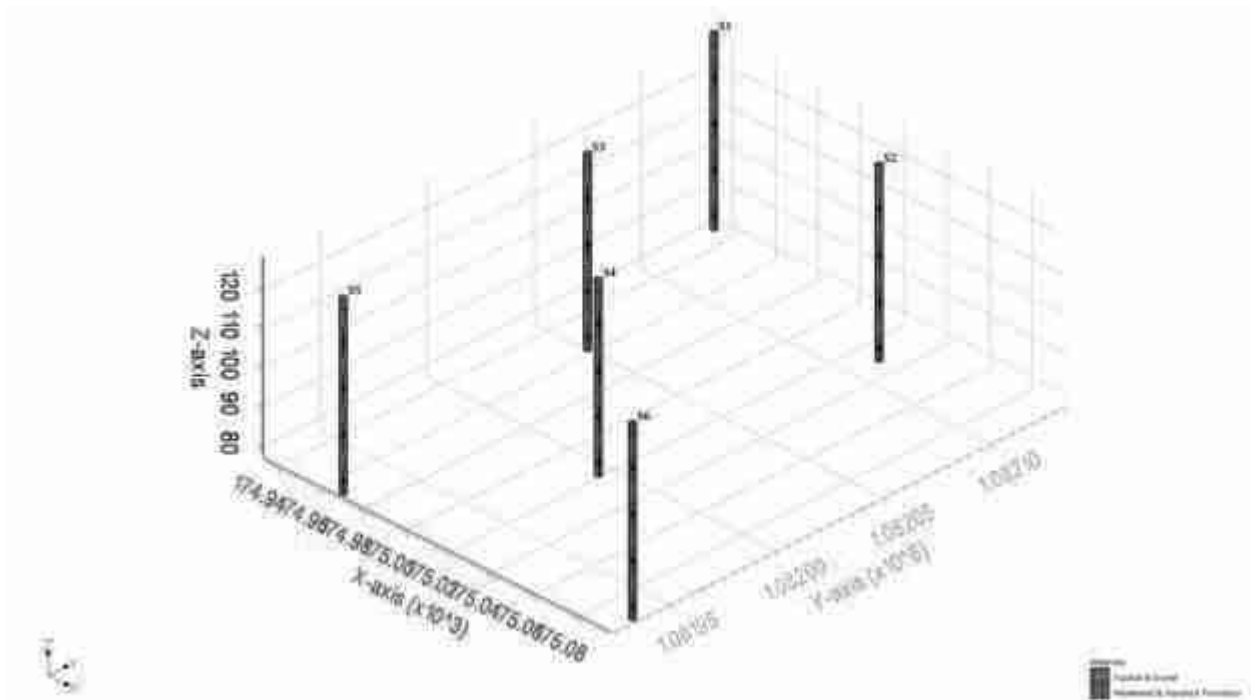


Figure 12 Borehole view of Subsurface Lithology

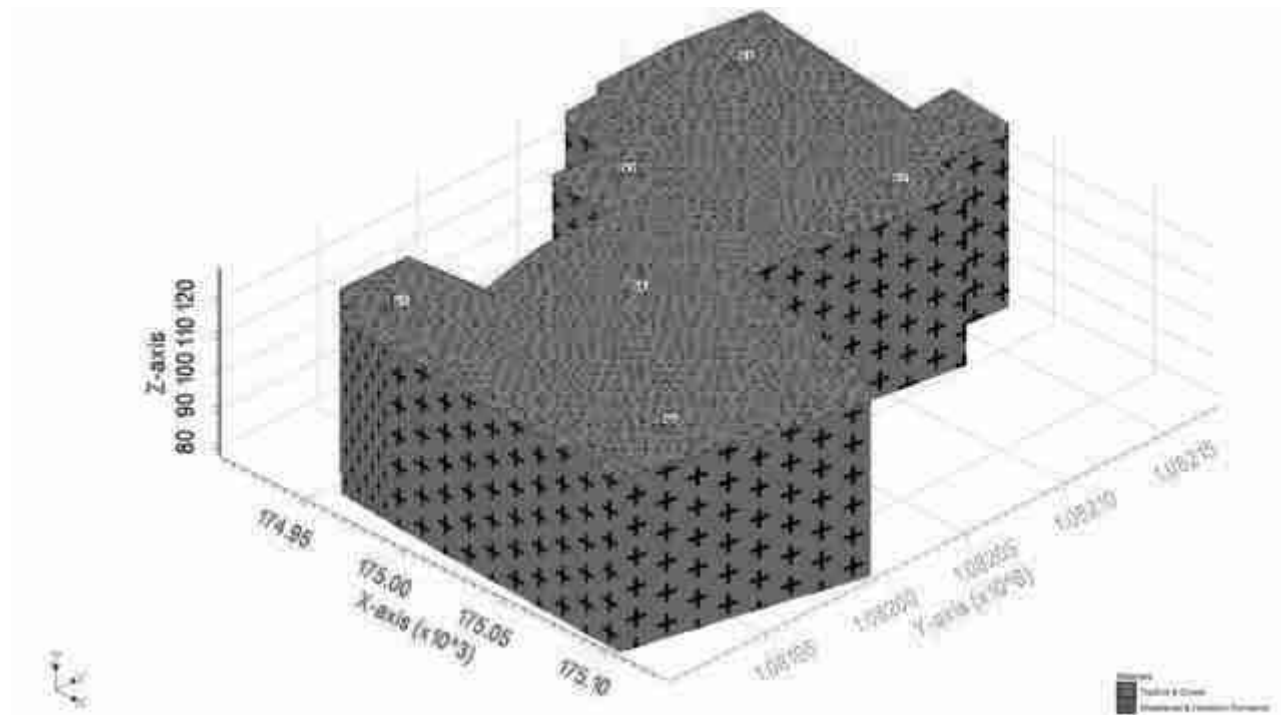
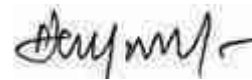


Figure 13 Solid view of Subsurface Lithology

8. CONCLUSION

- ❖ The lease applied area exhibits plain topography. The area has gentle sloping towards Eastern side and altitude of the area is 128m above from Mean Sea Level.
- ❖ The geological study of the given area covered by gravel and rough stone in the entire area. The discharge of the groundwater controlled by the massive Charnockite rock.
- ❖ The massive Charnockite formation act as a barrier and restrict the groundwater flow movement in the mine lease area.
- ❖ Based on the geophysical investigation, Vertical Electrical Sounding (VES) were conducted to determine the subsurface water table and rock types up to depth of 50 m.
- ❖ The subsurface formation up to this depth can be categorized as follows,
 - ❖ **0m to 2m (Average) - Top Soil / Gravel**
 - ❖ **3m to 50m (Average) – weathered & Charnockite Formation (Massive Formation)**
- ❖ In this mine lease area, groundwater occurs at shallow depth, depending on the intensity of weathering and its development is much less compared to gneissic formation. The mine area such no major intersections of water table are expected up to 50m.
- ❖ The aquifer are found within the weathered / fractured metamorphic terrain. Currently the aquifers are located at **55 to 60 meters** below ground level (BGL). However, considering the approved mining plan depth, which is **42 meters** below ground level. It will not impact the groundwater table.
- ❖ From the above study it can be concluded there will be no adverse effect on the hydrological regime, water drainage, environment, and livelihood. Agricultural activity in the region.



Dr. P. Thangaraju, M.Sc., Ph.D.,

Govt. Approved Hydro Geologist
M/s. Geo Exploration and Mining Solutions,
Regd. Office: No. 17, Advaita Ashram Road,
Alagapuram, Salem – 636 004, Tamil Nadu.

M/s SSPR Traders

Licence No. E/SC/TN/22/709(E95179)

No. 15-A2/1, INTUC Nagar,

Rajapalayam

Tamilnadu-626117

Date:- 02/04/24

To:-

Tvl. Suganya Blue Metals
No. 13/4A2, Achankulam, Nedunkulam,
Mela Uppiligundu Post, Kallikudi Taluk,
Madurai District-625022
Tamil Nadu

Sub:- Regarding blasting work using explosives in your proposed quarry.

Sir,

We are having explosive licence in Form 22 holding No: **E/SC/TN/22/709(E95179)** situated in Survey No. 100/2A D.Kadambakulam village, Kariapatti Taluk, Virudhunagar District. Our office function at address No. 15-A2/1, INTUC Nagar, Rajapalayam, Virudhunagar District.

We are enacting 2 explosives van for transporting detonators and class 2 explosives separately from our Magazine to our work site and well experienced and licenced blaster and shot firer for safe blasting work in the last 20 years without untoward incident.

We are willing to undertake work on contract basis at your S.F.Nos. 108/2D, 109/L, 109/2C, 109/4, 109/6, 109/3A, 109/38, 109/4, 109/6, 109/10A, 109/103, 109/12, 110/1A, 110/1B, 110/1C, 110/1D, 110/1B, 110/1P, 110/1G, 110/1H, 110/11, 110/15, 110/1K, 110/1L and 110/1M of 3.48.0 Hectare in Ulagani Village, Kallikudi Taluk, Madurai District.

Thanking You,

For SSPR Traders
For SSPR TRADERS


Partnership

(Occupier)

अनुमति प्रारूप रूप है - AFFIDAVIT FORM 1 & 2

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(घ) वी (घ) के तहत)
(Sec-3(gh) & (v) of Part 1 of Schedule IV of Explosives Rules, 2008)

(एक उपयोग के लिए एक समय पर वर्ग 1, 2, 3, 4, 5 या वर्ग 7 के विस्फोटक को निम्नी मण्डल में वर्ग 4 के विस्फोटक रखने के लिए अनुमति
License to possess (LTP) for magazines of class 1, 2, 3, 4, 5 or 7 to magazine

अनुमति सं. (आयुक्त सं. 1) : ESO/ TN-22708/ERS/179

प्राधिकारी: 3492 (आयुक्त सं. सं. 5903)

1. License is hereby granted to

M/s. SHRI Venkatesh (अभिधारी / Occupier) : A. Rajkumar), (S-22/ INTDC Nagar, Rajinibayam, Town Village - Rajinibayam, District - VEDHUNAGAR, Near Tamil Nadu, Pincode - 626117



को अनुमति अनुदात की जाती है।

2. अनुमतिधारी की प्रकृति (Status of licensee) - Partnership Firm

3. अनुमति निम्नलिखित प्रयोजनों के लिए विधायक है।

License is valid only for the following purpose:

4. अनुमति विस्फोटकों के निम्नलिखित किस्मों, मात्रा और प्रकार के लिए विधायक है।

License is valid for the following kinds and quantity of explosives - (Aff) (i)

क्र. सं. Sl. No.	नाम और विवरण Name and Description	वर्ग और प्रकार Class & Division	उप-प्रकार Sub-division	मात्रा किंवा एक संख्या में Quantity in any one class
1.	सुरक्षा - शरीर और एमिशन एक्सप्लोजिव Safety Fuse	3.8	0	1500 Kgs
2.	एम्बुशिंग फ्यूज Embedding Fuse	0.1	0	5000 Mtrs
3.	इलेक्ट्रिकल गैल्वेनी डेटोनेटर Electric and/or Galvanic Detonator	8.7	0	10000 Nos
4.		8.3	0	4400 Nos

purpose for use of Nitrate mixture - Shury and Emulsion Explosives, Safety Fuse, Embedding Fuse, Electric and/or Ordinary Detonators. - के उपयोग के लिए

(क) किस्मों एक कस्टोडियन मास में खरीदे जाने वाले विस्फोटक की मात्रा (अनुच्छेद 3(ख) और 3(घ) के अधीन अनुमति के लिए)
(b) Quantity of explosives to be purchased in a calendar month (applicable for license under clause 3(b) and (c))

As shown
in above.

5. निम्नलिखित शर्तों (शर्तों) से अनुमति धारक को मुहूर्त होती है।

The licensed premises shall conform to the following showing(s):

रेखांकित सं. (Drawing No.): ESO/ TN-22708/ERS/179
दिनांक (Date): 24/01/2024

6. अनुमति धारक निम्नलिखित पते पर स्थित है। The licensed premises are situated at following address:
Survey No. 1002A, ग्राम (Town Village) : S. Rajinibayam, Village

जिला (District)	VEDHUNAGAR	पुलिस थाना (Police Station) : Ariyur	प्लॉट नंबर (Plot No.)	विस्फोटक (Explosive)	626117
सुभाष (State)		स्टेट (State)	हॉल नंबर (Hall No.)	पिनकोड (Pincode)	
		ई. गेट (E-Gate)		फैक्ट्री (Factory)	

7. अनुमति धारक निम्नलिखित सुविधाएं प्रदान करता है।

The licensed premises consist of following facilities:

Our Explosives Storage shed, one lobby and a dammer storage shed.

8. अनुमति समग्र - कानून पर पदाधिकारी विस्फोटक अधिनियम, 2008 और उनसे संबंधित विस्फोटक नियम, 2008 के उपबंधों, शर्तों और अधिनियम शर्तों और निम्नलिखित उपायों के अधीन रहने हुए अनुदात की जाती है।

The license is granted subject to the provisions of Explosives Act, 2008 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, conditions and the following Assurances:

- उपरोक्त कन. 5 में क्या पर्यवेक्षित रेकॉर्डिंग, रजिस्ट्रेशन संबंधी और अन्य विवरण दर्जित करते हुए।
Drawings (showing site, installations) and other matters as stated in serial No. 5 above.
- अनुमति धारक/धारक द्वारा उक्त शर्तों से अनुमति की शर्तों और अधिनियम शर्तों।
Conditions and Additional Conditions of this license signed by the licensing authority.
- दूरी पर्यवेक्षित (24-7) Distance From DE 3.

9. यह अनुमति कार्यालय 31 मार्च 2022 तक विधायक रहेगी। This license shall remain valid till 31st day of March 2022.

यह अनुमति, अधिनियम या उसके अधीन विहित नियमों या अनुसूची V के भाग 4 के प्रारंभिक सेट-आप के अधीन तथा उपरोक्त हुए अनुमति की शर्तों का अतिक्रमण करने या यदि अनुदात प्रस्ताव नोकरा या उपरोक्त शर्तों के अधीन विवरण के अनुसार नहीं कर जाने पर निराकरण या प्रतिस्तरा भी मा सकती है, जहां यह लागू हो।

This license is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this license as set forth under the VII (wherever applicable), referred to in Part A of Schedule V or if the licensed premises are not found conforming to the drawings shown in the plans and Assurances attached hereto.

तारीख: The Day - 19/05/2017.

संयुक्त मुख्या विस्फोटक नियंत्रक / Joint Chief Controller of Explosives
South Circle, Chennai

Amendments:

- Amendment of Quantity of Explosives Monthly Purchase Limit (date: 05/03/2018)
- Change in Authorised Signatory/Occupier/Partner/Director (date: 24/01/2024)
- Amendment of Quantity of Explosives Monthly Purchase Limit (date: 24/01/2024)

अधिकारियों के प्रमाणन के लिए स्थान
Space for Authentication or Renewal

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of expiry	अनुदातन प्राधिकारी के हस्ताक्षर और नाम Signature of licensing authority and name
05/08/2022	31/03/2027	Ed: A. Chief Controller of Explosives, South Circle, Chennai

**कानूनी चेतावनी: विस्फोटकों को गलत ढंग से धरने या उनका दुरुपयोग विधि के अधीन गंभीर दंडित अपराध होगा।
Misuse of explosives or mishandling and misuse of explosives shall constitute serious criminal offence under the law.**

Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.

Digitally signed by Dr T L SHANMUGAM
Basic License No. - ESO/ TN-22708
Location-Chennai (ERS/179)
Date 24-01-2024 09:56 AM

1
 பதுங்கு லாவட்டம் சைல்கோட்டை வட்டம்
 சிங்கன்கொட்டை தீர்ப்பாயம் N:13/4A2
 மெய் உட்பிரிவுக்கீழ் சிங்கன்கொட்டை
 புகாரியின் அபிமான அபிமானம்
 சிங்கன்கொட்டை சிங்கன்கொட்டை சிங்கன்கொட்டை
 சிங்கன்கொட்டை

சைல்கோட்டை வட்டம் சிங்கன்கொட்டை
 உண்மையில் உண்மையில் தீர்ப்பாயம் N:13/4A2

404 திட்டம் 108/20, 109/1, 20, 3A, 3B, 4, 6,
 10A, 10B, 12, 110/1A to 110/1M கீழ்க்
 சிங்கன்கொட்டை தீர்ப்பாயம் 3.48. கீழ்க்கண்ட அபிமானம்
 சிங்கன்கொட்டை சிங்கன்கொட்டை சிங்கன்கொட்டை
 மெய்யான புது திட்டத்தில் சிங்கன்கொட்டை தீர்ப்பாயம்
 சிங்கன்கொட்டை சிங்கன்கொட்டை சிங்கன்கொட்டை
 புது திட்டத்தில் சிங்கன்கொட்டை 300 ரூபாய்
 சிங்கன்கொட்டை சிங்கன்கொட்டை சிங்கன்கொட்டை
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Village Administration Office
 U.K.K. N/04
 NEOUNKULAM
 Kalligudi Taluk
 Tadurai Dt

TOPOGRAPHICAL VIEW OF ULAGANI ROUGH STONE
AND GRAVEL QUARRY LEASE APPLIED AREA



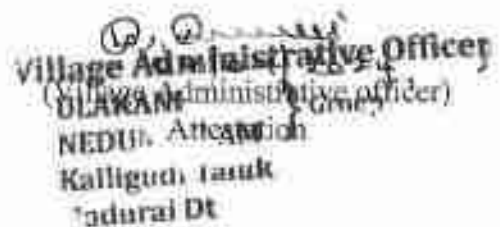
Name of the Applicant : Tvl. Suganya Blue Metals,
Address : No. 13/4A2, Achankulam, Nedungulam,
Mela Uppiligundu Post,
Kallikudi Taluk,
Madurai District,
Tamil Nadu State - 625 022.

Location:

S.F.Nos. : 108/2D, 109/1,2C,3A,3B,4,6,10A,10B,12, 110/1A to 110/1M
Extent : 3,48.0 Ha
Village : Ulagani
Taluk : Kallikudi
District : Madurai

Signature of the Applicant
Tvl. Suganya Blue Metals


(R. Malaiyarasan)
Partner


Village Administrative Officer
(Ulagani Administrative Officer)
NEDUNGI, Attention
Kallikudi Taluk
Madurai Dt



File No.: 9488
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA),
TAMIL NADU)



Dated 10/05/2024



To,

MEENATCHI
MEENATCHI
Ulagani, Thirumangalam Taluk, Madurai District , Tirumangalam, MADURAI, TAMIL NADU,
625022
lakshimimahalingam0304@gmail.com

Subject: Grant of prior Environmental Clearance (EC) to the proposed Mining Project under the provisions of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application submitted to SEIAA vide proposal number SIA/TN/MIN/459890/2024 dated 19/03/2024 lease over an extent of 1.42.0 Ha at S.F.No. 16/2B, 16/3 & 16/4 of Achankulam Village, Kallikudi Taluk, Madurai District, Tamil Nadu for grant of prior Environmental Clearance (EC) to the project under the provision of the EIA Notification 2006-and as amended thereof.

Ref:

1. Your application submitted for Terms of Reference dated:06.10.2022.
2. Tor Issued vide letter No. SEIAA-TN/F. No.9488/SEAC/ToR-1303/2023 Dated:07.12.2022
3. Public Hearing conducted on 04.10.2023.
4. Online Proposal No. SIA/TN/MIN/459890/2023, dt:25.01.2024 for EC.
5. Project proponent submitted EIA Report to SEIAA-TN on 05.02.2024.

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC24B0108TN5843396N
(ii) File No.	9488
(iii) Clearance Type	Fresh EC
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals M. Meenatshi Rough Stone and Gravel Quarry Extent – 1.42.0 Ha 16/2B, 16/3 & 16/4, Achankulam Village, Kallikudi Taluk, Madurai District.
(vii) Name of Project	

(ix) Location of Project (District, State)	MADURAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	No

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-2(Part A, B and C)/ EIA & EMP Reports were submitted to the SEIAA for an appraisal by the SEAc under the provision of EIA notification 2006 and its subsequent amendments.
4. The above-mentioned proposal has been considered by SEIAA in the meeting held on 29/04/2024. The minutes of the meeting and all the project documents are available on PARIVESH portal which can be accessed from the PARIVESH portal by scanning the QR Code above.
5. The SEAC, based on information submitted viz: Form 1 (Part A, B and C), EIA/EMP report etc., & clarifications provided by the project proponent and after detailed deliberations on all technical aspects and public hearing issues and compliance thereto furnished by the Project Proponent, recommended the proposal for grant of Environment Clearance under the provision of EIA Notification, 2006 and as amended thereof subject to stipulation of Specific and Standard EC conditions as detailed in the point below.
6. The SEIAA has examined the proposal in accordance with the provisions contained in the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and based on the recommendations of the SEAC hereby accords Environment Clearance for the instant proposal to M/s. MEENATCHI under the provisions of EIA Notification, 2006 and as amended thereof subject to compliance of the Specific and Standard EC conditions as given in Annexure (2)
7. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
8. The Environmental Clearance 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.
9. The PP is under obligation to implement commitments made in the Environment Management Plan, which forms part of this EC.

10. Salient Features of the Proposal:

Sl. No	Salient Features of the Proposal	
1.	Name of the Owner/Firm	: Tmt.M. Meenatchi, W/o Mahalingam, Ulagani, Thirumangalam Taluk, Madurai District- 625 022.
2.	Type of quarrying	: Rough Stone Quarry
3.	S.F Nos. of the quarry site	: 16/2B, 16/3 & 16/4
4.	Village in which situated	: Achankulam
5.	Taluk in which situated	: Kallikudi
6.	District in which situated	: Madurai
7.	Extent of quarry (in ha.)	: 1.42.0 Ha
8.	Latitude & Longitude of all corners of the quarry site	: 09°46'03.67"N to 09°46'08.60"N 78°02'28.65"E to 78°02'35.52"E
9.	Topo Sheet No.	: 58 -K/101
10.	Type of mining	: Opencast Mechanized Mining method involving drilling and blasting
11.	Period of Current Mine Plan	: 5 years
12.	Production (Quantity in m ³)	: As per the mining plan, the lease period is for 5 years. The mining plan is for the period of Five years & production

		should not exceed 33,148 m ³ of rough stone.
13.	Depth of Quarrying	30m BGL
14.	Depth of water table	: 65m-70m BGL
15.	Man Power requirement per day:	: 12 Nos.
16.	Water requirement: 1. i) Drinking Water & Domestic 2. Purpose 3. ii) Dust suppression 4. iii) Green belt	: 2.0 KLD 0.3 KLD 1.2 KLD 0.5 KLD
17.	Power requirement a. Domestic Purpose b. Industrial purpose	: TNEB 27,220 liters of HSD
18.	Precise area communication approved by the Joint Director / Assistant Director(i/c), Department of Geology and Mining	Rc.No.276//Kanimam/2016 Dated: 21.01.2022
19.	Mining Plan approved by Joint Director / Assistant Director(i/c), Department of: Geology and Mining	Rc.No. 276//Kanimam/2016 Dated: 14.07.2022
20.	Joint Director / Assistant Director(i/c), Department of Geology and Mining, 500m Cluster Letter	Rc.No. 276//Kanimam/2016 Dated: 18.08.2022
21.	VAO Certificate Regarding Structures within 300m Radius	Letter Dated:16.08.2022
22.	Tor Issued	Lr.No.SEIAA-TN/F.No.9488/SEAC/ TOR-1303/2022 Dated: 07.12.2022
23.	Public Hearing	04.10.2023
24.	EIA Report Submitted	05.02.2024
25.	Project Cost (excluding EMP cost)	: Rs.19,55,000/-
26.	EMP cost (in Rs. Lakh).	: Capital Cost – Rs. 25,51,400/- Recurring Cost/annum – Rs. 11,65,875/- Total EMP Cost for 5 years-Rs. 90 Lakhs
27.	CER cost (in Rs. Lakh).	: Rs. 5,00,000 /- as accepted by the PP
28.	Validity: This Environmental Clearance is accorded for the quantity of 33,148 m³ of rough stone up to the depth of 30m BGL and the annual peak production should not exceed 8,230m³ of rough stone. The Environmental Clearance issued is valid as per the approved mine plan period and as per MoEF&CC's notification S.O.1533(E) dated.14.09.2006 and S.O. 1807(E) dated 12.04.2022.	

11. General Instructions:

1. The project proponent shall prominently advertise it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days indicating that the project has been accorded environment clearance and the details of SEIAA website where it is displayed.
2. The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn must display the same for 30 days from the date of receipt.
3. The project proponent shall have a well laid down environmental policy duly approved by the Board of Directors (in case of Company) or competent authority, duly prescribing standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms / conditions.
4. Action plan for implementing EMP and environmental conditions along with responsibility matrix of the project

proponent (during construction phase) and authorized entity mandated with compliance of conditions (during operational phase) shall be prepared. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Six monthly progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six-Monthly Compliance Report.

5. Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
6. The Regional Office of this SEIA shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
7. Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

12. This issue with an approval of the Competent Authority.

Copy To

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Additional Chief Secretary to Government, Environment and Forests Department, Tamil Nadu.
3. The Additional Chief Secretary to Government, Natural Resources Department, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai – 34.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
6. The Chairperson, TNPC Board, 76, Mount Salai, Guindy, Chennai-32.
7. The District Collector, Madurai District.
8. The Commissioner of Geology and Mines, Guindy, Chennai-32.
9. Assistant Director, Department of Geology & Mining, Madurai District.
10. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
11. File Copy.

Annexure 1

Specific EC Conditions for (Mining Of Minerals)

1. Seiaa Specific Conditions:

S. No	EC Conditions
1.1	1. Keeping in view of MoEF&CC’s notification S.O.1533(E) dated.14.09.2006 and S.O. 1807(E) dated 12.04.2022, this Environmental Clearance is valid as per the approved mine plan period. 2. The EC granted is subject to review by District Collector, Mines Dept. and TNPCB on completion of every 5 years and also during the mine plan period, till the project life so as to review the EC conditions and to ensure that they have all been adhered to and implemented. 3. The project proponent shall submit a Certified Compliance Report obtained from IRO of MoEF&CC to the monitoring, regulatory and other concerned authorities including SEIAA, while seeking a renewal of the mining plan to cover the project life. 4. There should be regular monitoring of air quality, water quality, ground water level and noise quality and reports regarding the same should be submitted to TNPCB, SEIAA & IRO of MoEF&CC once in every 6 months. 5. The proponent shall strictly adhere to the mining plan and half yearly and annual returns shall be submitted to the Director of Geology and Mining Department with copy marked to TNPCB, SEIAA

S. No	EC Conditions
	<p>& IRO of MoEF&CC.</p> <p>6. Biodiversity in and around the project area should be monitored frequently and detailed biodiversity report should be submitted every year to SEIAA & IRO of MoEF&CC.</p> <p>7. The progressive and final mine closure plan including the green belt implementation and environmental norms should be strictly followed as per the EMP and as per the amount committed and approved in EC for EMP. Status of progressive mine closure and green belt implementation should be included in the half yearly compliance report submitted to TNPCB, SEIAA & IRO of MoEF&CC.</p> <p>8. As per the OM vide F. No. IA3-22/1/2022-IA-III [E- 172624] Dated: 14.06.2022, the Project Proponents are directed to submit the six-monthly compliance on the environmental conditions prescribed in the prior environmental clearance letter(s) through newly developed compliance module in the PARIVESH Portal from the respective login.</p> <p>9. The amount allocated for EMP should be kept in a separate account and both the capital and recurring expenditures should be done year wise for the works identified, approved and as committed. The work & expenditure made under EMP should be elaborated in the bi-annual compliance report submitted and also should be brought to the notice of concerned authorities during inspections.</p>

2. Seac Conditions - Site Specific

S. No	EC Conditions
2.1	<p>1) Tree plantation & fencing and installation of garland drainage with siltation tank around the mine lease area shall be completed before execution of the mine lease.</p> <p>2) The Tipper Lorries shall be covered completely after loading the rough stone as committed by the Proponent.</p> <p>3) The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds, before obtaining the CTO from the TNPCB.</p> <p>4) The PP shall register promptly through online in the Shram Suvidha Portal which is the official portal of Ministry of Labour & Employment, Govt of India to obtain Labour Identification Number (LIN) before obtaining the CTO from the TNPCB.</p> <p>6) Further, the PP shall send the 'Notice of Opening' indicating the appointment of First Class/Second Class Mine Manager for managing the quarrying operations and the proposed usage of HEMM shall be sent to the Director of Mines Safety, Chennai Region of the Mine under the provisions of MMR 1961 atleast 30 days before the commencement of the mining operation immediately after the execution of lease with district authority.</p> <p>7) The PP shall not employ any external agency for carrying out the blasting operation and he shall also install the temporary magazines approved by the concerned licensing authority before the execution of the lease, for storing the authorized explosives & detonators separately in accordance with the Explosive Rules, 2008.</p> <p>8) Considering the structures and water bodies are situated within a radial distance of 500 m, the PP shall carry out only one blast in a day involving 30 to 40 holes in a round at a time with keeping the total aggregate explosive charge/round is limited to 2 kg only in accordance with the provisions of MMR 1961.</p> <p>9) However, the PP shall carry out the scientific studies within a period of six months from the commencement of quarrying operations with prior permission from the DMS/Chennai Region, to design the controlled blast parameters for reducing the blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations carried out in the quarry, by involving anyone of these reputed Research and Academic Institution such as CSIR-Central Institute of Mining &</p>

S. No	EC Conditions
	<p>Fuel Research / Dhanbad, NIRM/Bangalore, IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation.</p> <p>10) The PP shall furnish an affidavit indicating the Standard Operating Procedures (SoP) for carrying out the 'Best Mining Practices' in the areas of drilling, blasting excavation, transportation, and green belt development, in securing the safety of the persons living within a radial distance of 500 m (danger zone) to the concerned AD (Mines) at the time of lease execution.</p> <p>11) The PP shall ensure that the transportation of minerals shall not be carried out through the village road passing near the school premises.</p> <p>12) The PP shall appoint a statutory Mine Manager possessing the I / II Class Mines Manager Certificate of Competency (R/UR) under MMR 1961 before executing the lease and a copy of such appointment shall be sent to the DMS/Chennai Region atleast 30 days before the commencement of the mining operations without fail.</p> <p>13) To ensure the safe environment in the mine, the PP shall carry out the extraction of common boundary pillar existing with adjacent lease after obtaining prior permission under the provisions of Reg. 111 of MMR 1961 during the life of the lease period.</p> <p>15) For the safety of the persons employed in the quarry, the PP shall carry out the scientific studies to assess the slope stability of the working benches and existing quarry wall within a period of one year from the date of lease execution, 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. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation.</p> <p>16) As a part of Ground Water Management, the PP shall carry out the scientific studies to assess the existing hydrogeological condition and impacts of the quarrying operation on the ground water level present in the core zone, within 2 years from the commencement of mining operations, by involving any one of the reputed Research and Academic Institution - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, University of Madras – Centre for Environmental Studies, and Anna University Chennai-Dept of Geology, CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation.</p>

3. Seac Standard Conditions

S. No	EC Conditions
3.1	<p>1) The PP shall inform send the 'Notice of Opening' of the quarry to the Director of Mines Safety, Chennai Region before obtaining the CTO from the TNPCB.</p> <p>2) The proponent shall appoint the statutory competent persons relevant to the proposed quarry size as per the provisions of Mines Act 1952 and Metalliferous Mines Regulations, 1961, as amended from time to time.</p> <p>3) Within a period one month from the execution of lease deed, the PP shall ensure that the persons deployed in the quarry including all the contractual employees/truck drivers shall undergo initial/periodical training in the DGMS approved GVTC situated in Trichy / Salem / Hosur.</p> <p>4) The PP shall construct a garland drain of size, gradient and length around the proposed quarry incorporating garland canal, silt traps, siltation pond and outflow channel connecting to a natural drain should be provided prior to the commencement of mining. Garland drain, silt-traps, siltation ponds and outflow channel should be de-silted periodically and geo-tagged photographs of the</p>

S. No	EC Conditions
	<p>process should be included in the HYCR.</p> <p>5) Monitoring of drainage water should be carried out at different seasons by an NABL accredited lab and clear water should only be discharged into the natural stream. Geo-tagged photographs of the drainage and sampling site should be submitted along with HYCR.</p> <p>6) The proponent shall install the 'S3 (or) G2' type of fencing all around the boundary of the proposed working quarry with gates for entry/exit before the commencement of the operation as recommended in the DGMS Circular, 11/1959 and shall furnish the photographs showing the same before obtaining the CTO from TNPCB.</p> <p>7) The Proponent shall submit a conceptual 'Slope Stability Action Plan' incorporating the benches & accessible haul road approved by the concerned AD (Mines) for the proposed quarry to the DEE/TNPCB at the time of obtaining the CTO.</p> <p>8) The PP shall ensure that the persons employed in the quarry whether permanent, temporary or contractual are undergoing the initial/periodical medical examination in the DGMS approved OHS Clinics/Hospitals as per the DGMS Circular No. 01 of 2011 before they are engaged in mining activities.</p> <p>9) The PP shall ensure that the persons employed in the quarry whether permanent, temporary or contractual are provided with adequate PPEs before engaged in mining operations.</p> <p>10) Proper barriers to reduce noise level and dust pollution should be established by providing greenbelt along the boundary of the quarrying site and suitable working methodology should be adopted by considering the wind direction.</p> <p>11) The Project Proponent shall ensure that the funds earmarked for environmental protection measures are kept in a separate bank account and should not be diverted for other purposes. Year-wise expenditure should be included in the HYCR.</p> <p>12) The Project Proponent shall send a copy of the EC to the concerned Panchayat/local body.</p> <p>13) Perennial maintenance of haulage road/village / Panchayat Road shall be done by the project proponent as required, in coordination with the concerned Govt. Authority.</p> <p>14) Perennial sprinkling arrangements shall be in place on the haulage road for fugitive dust suppression. Fugitive emission measurements should be carried out during the mining operation at regular intervals and submit the consolidated report to TNPCB once in six months.</p> <p>15) The Proponent shall ensure that the noise level is monitored during mining operation at the project site for all the machineries deployed and adequate noise level reduction measures are undertaken accordingly. The report on the periodic monitoring shall be included in the HYCR.</p> <p>16) 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. 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.</p> <p>17) Taller/one year old saplings raised in appropriate size of bags (preferably eco-friendly bags) should be planted in proper spacing 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.</p> <p>18) Noise and Vibration Related: (i) Appropriate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs/muffs, (ii) Noise levels should be monitored regularly (on weekly basis) near the major sources of noise generation within the core zone.</p> <p>19) The PP shall carry out maximum of only one round of controlled blast per day, restricted to the maximum of 30 to 40 number of holes per round with maintaining maximum charge per delay in such a manner that the blast-induced ground vibration level (Peak Particle Velocity) measured in the houses/structures located at a distance of 500 m shall not exceed 2.0 mm/s and no fly rock shall travel beyond 20 m from the site of blasting.</p> <p>20) The PP shall also ensure that the blasting operations are not carried out on a 'day after day'</p>

S. No	EC Conditions
	<p>basis and a minimum 24 hours break should be observed between blasting days to reduce the environmental impacts effectively.</p> <p>21) If 'Deep-hole large diameter drilling and blasting' is required, then the PP shall obtain special permission from DGMS.</p> <p>22) The PP shall ensure that the blasting operations shall be carried out during a prescribed time interval with a prior notice to the habitations situated around the proposed quarry after having posted the sentries/guards adequately to confirm the non-exposure of public within the danger zone of 500 m from the boundary of the quarry. The PP shall use the jack hammer drill machine fitted with the dust extractor for the drilling operations such that the fugitive dust is controlled effectively at the source.</p> <p>23) The PP shall ensure that the blasting operations are carried out by the blaster/Mine Mate/Mine Foreman employed by him in accordance with the provisions of MMR 1961 and it shall not be carried out by the persons other than the above statutory personnel.</p> <p>24) The proponent shall undertake in a phased manner restoration, reclamation and rehabilitation of lands affected by the quarrying operations and shall complete this work before the conclusion of such operations as per the Environmental Management Plan & the approved Mine Closure Plan.</p> <p>25) Ground water quality monitoring should be conducted once in every six months and the report should be submitted to TNPCB.</p> <p>26) The operation of the quarry should not affect the agricultural activities & water bodies near the project site and a 50 m safety distance from water body should be maintained without carrying any activity. The proponent shall take appropriate measures for "Silt Management" and prepare a SOP for periodical de-siltation indicating the possible silt content and size in case of any agricultural land exists around the quarry.</p> <p>27) The proponent shall provide sedimentation tank / settling tank with adequate capacity for runoff management.</p> <p>28) The proponent shall ensure that the transportation of the quarried granite stones shall not cause any hindrance to the Village people/Existing Village Road and shall take adequate safety precautionary measures while the vehicles are passing through the schools / hospital. The Project Proponent shall ensure that the road may not be damaged due to transportation of the quarried granite stones; and transport of granite stones will be as per IRC Guidelines with respect to complying with traffic congestion and density.</p> <p>29) To ensure safety measures along the boundary of the quarry site, security guards are to be posted during the entire period of the mining operation.</p> <p>30) The Project Proponent shall comply with the provisions of the Mines Act, 1952, MMR 1961 and Mines Rules 1955 for ensuring safety, health and welfare of the people working in the mines and the surrounding habitants.</p> <p>31) The project proponent shall ensure that the provisions of the MMDR Act, 1957 & the MCDR 2017 and Tamil Nadu Minor Mineral Concession Rules 1959 are complied by carrying out the quarrying operations in a skillful, scientific and systematic manner keeping in view proper safety of the labour, structure and the public and public works located in that vicinity of the quarrying area and in a manner to preserve the environment and ecology of the area.</p> <p>32) The quarrying activity shall be stopped if the entire quantity indicated in the Mining plan is quarried even before the expiry of the quarry lease period and the same shall be informed to the District AD/DD (Geology and Mining) District Environmental Engineer (TNPCB) and the Director of Mines Safety (DMS), Chennai Region by the proponent without fail.</p> <p>33) All the conditions imposed by the Assistant/Deputy Director, Geology & Mining, concerned District in the mining plan approval letter and the Precise area communication letter issued by concerned District Collector should be strictly followed.</p> <p>34) That the grant of this E.C. is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the project proponent.</p>

S. No	EC Conditions
	<p>35) As per the directions contained in the OM F.No.22-34/2018-IA.III dated 16th January 2020 issued by MoEF&CC, the Project Proponent shall, undertake re-grassing the mining area and any other area which may have been disturbed due to his mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The compliance of this direction shall be included in the Half Yearly Compliance Report which will be monitored by SEAC at regular intervals.</p> <p>36) The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.</p> <p>37) 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 adhere to the EMP as committed.</p>

4. Seiaa Standard Conditions:

S. No	EC Conditions
4.1	<p>a) EC Compliance:</p> <ol style="list-style-type: none"> The Environmental Clearance is accorded based on the assurance from the project proponent that there will be full and effective implementation of all the undertakings given in the Application Form, Pre-feasibility Report, mitigation measures as assured in the Environmental Impact Assessment/ Environment Management Plan and the mining features including Progressive Mine Closure Plan as submitted with the application. All the conditions as presented by the proponent in the PPT during SEAC appraisal should be addressed in Full. The proponent shall submit Compliance Reports on the status of compliance of the stipulated EC conditions including results of monitored data. It shall be sent to the respective Regional Office of Ministry of Environment, Forests and Climate Change, Govt. of India and also to the Office of State Environment Impact Assessment Authority (SEIAA). Concealing the factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986. <p>b) Applicable Regulatory Frameworks:</p> <ol style="list-style-type: none"> The project proponent shall strictly adhere to the provisions of Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006, Wildlife Protection Act, 1972, Forest Conservation Act, 1980, Biodiversity Conservation Act, 2016, the Biological Diversity Act, 2002, Biological diversity Rules, 2004 & TN Forest Act, 1882 and Rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter <p>c) Safe mining Practices:</p> <ol style="list-style-type: none"> The AD/DD, Dept. of Geology & Mining shall ensure operation of the proposed quarry after the submission of slope stability study conducted through the reputed research & Academic Institutions such as NIRM, IITs, NITS Anna University, and any CSIR Laboratories etc and ensure strict compliance and implementation of bench wise recommendations/action plans as recommended in the scientific slope stability study. A minimum buffer distance specified as per existing rules and statutory orders shall be maintained from the boundary of the quarry to the nearest dwelling unit or other structures, and from forest boundaries or any other ecologically sensitive and archeologically important areas or the specific distance specified by SEIAA in EC as per the recommendations of SEAC depending on

S. No	EC Conditions
	<p>specific local conditions.</p> <p>d) Water Environment – Protection and mitigation measures:</p> <p>8. The proponent shall ensure that the activity does not disturb the water bodies, neighboring open wells, bore wells and natural flow of surface and groundwater, nor cause any pollution, to water sources in the area nor effect the water quality and water quantity in the water sources.</p> <p>9. Water level in the nearest dug well in the downstream side of the quarry should be monitored regularly and included in the Compliance Report.</p> <p>10. Quality of water discharged from the quarry should be monitored regularly as per the norms of State Pollution Control Board and included in the Compliance Report.</p> <p>11. Rain Water Harvesting facility should be installed as per the prevailing provisions of TNMBR/TNCDBR, unless otherwise specified. Maximum possible solar energy generation and utilization shall be ensured as an essential part of the project.</p> <p>12. Regular monitoring of flow rates and water quality upstream and downstream of the springs and perennial nallahs flowing in and around the mine lease area shall be carried out and reported in the compliance reports to SEIAA. At any stage, if it is observed that ground water table is getting depleted due to the mining activity; necessary corrective measures shall be carried out.</p> <p>13. Garland drains and silt traps are to be provided in the slopes around the core area to channelize storm water. De-silting of Garland canal and silt traps have to be attended on a daily basis. A labour has to be specifically assigned for the purpose. The proponent shall ensure the quality of the discharging storm water as per the General Effluent Discharge Standards of CPCB.</p> <p>e) Air Environment – Protection and mitigation measures:</p> <p>14. The activity should not result in CO₂ release and temperature rise and add to micro climate alternations.</p> <p>15. The proponent shall ensure that Monitoring is carried out with reference to the quantum of particulate matter during excavation; blasting; material transport and also from cutting waste dumps and haul roads.</p> <p>f) Soil Environment – Protection and mitigation measures:</p> <p>16. The proponent shall ensure that the operations neither result in loss of soil biological properties and nutrients nor deplete the indigenous soil seed bank and disturb the mycorrhizal fungi, soil organism, soil community and result in eutrophication of soil and water. Further, the activities should not disturb the soil properties and seed and plant growth. Soil amendments as required to be carried out, to improve soil health.</p> <p>17. Bio remediation using microorganisms should be carried out to restore the soil environment to enable carbon sequestration.</p> <p>18. The proponent shall ensure that the mine restoration is done using mycorrhizal VAM, vermicomposting, Biofertilizers and the topsoil is protected and used in planting activities, site restoration and establishment of green belt in the area to ensure soil health and biodiversity conservation.</p> <p>19. The top soil shall be temporarily stored at earmarked place (s) and used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. At critical points, use of geotextile shall be undertaken for stabilization of the dump. Protective wall or gabions should be made around the dump to prevent erosion / flow of sediments during rains. The entire excavated area shall be backfilled.</p> <p>20. Activities should not result in invasion of site by exotic and alien plant and animal species and disturb the native biodiversity and soil micro flora and fauna.</p> <p>g) Noise Environment – Protection and mitigation measures:</p> <p>21. The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines. The activity of the proponent should not effect the biological clock of the villages resulting in stress, sleeping disorders affecting health.</p>

S. No	EC Conditions
	<p>h) Biodiversity - Protection and mitigation measures:</p> <p>22. The proponent should ensure that there is no disturbance to the agriculture plantations, social forestry plantations, waste lands, forests, sanctuary or national parks. There should be no impact on the land, water, soil and biological environment and other natural resources due to the mining activities.</p> <p>23. No trees in the area should be removed and all the trees numbered and protected. In case trees fall within the proposed quarry site the trees may be transplanted in the Greenbelt zone. The proponent shall ensure that the activities in no way result in disturbance to forest and trees in vicinity. The proponent shall ensure that the activity does not disturb the movement of grazing animals and free ranging wildlife. The proponent shall ensure that the activity does not disturb the biodiversity, the flora & fauna in the ecosystem. The proponent shall ensure that the activities do not disturb the resident and migratory birds. The proponent shall ensure that the activities do not disturb the vegetation and wildlife in the adjoining reserve forests and areas around. Also, the activities should not disturb the agro biodiversity, agro farms, green lands and grazing fields of all types. Actions to be taken to promote agroforestry, mixed plants to support biodiversity conservation in the mine restoration effort.</p> <p>24. The proponent shall ensure that all mitigation measures listed in the EIA/EMP are taken to protect the biodiversity and natural resources in the area.</p> <p>i) Climate Change:</p> <p>25. There should be least disturbance to landscape resulting in land use change, contamination and alteration of soil profiles leading to Climate Change.</p> <p>26. Operations should not result in GHG releases and extra power consumption leading to Climate Change.</p> <p>27. Mining through operational efficiency, better electrification, energy use, solar usage, use of renewable energy should try to decarbonize the operations.</p> <p>28. Mining should not result in water loss from evaporation, leaks and wastage and should support to improve the ground water.</p> <p>29. Mining activity should be flood proof with designs and the drainage, pumping techniques shall ensure climate-proofing and socio-economic wellbeing in the area and vicinity.</p> <p>j) Reserve Forests & Protected Areas:</p> <p>30. The activities should provide nature based support and solutions for forest protection and wildlife conservation.</p> <p>31. The project activities should neither result in forest fires, encroachments nor create forest fragmentation and disruption of forest corridors and alter the geodiversity and geological heritage of the area.</p> <p>32. There should be no disturbance to the freshwater flow from the forest impacting the water table and wetlands.</p> <p>33. The project proponent should support all activities of the forest department in creating awareness to local communities on forest conservation.</p> <p>34. The activities should not result in temperature rise due to increased fossil fuels usage disrupting the behavior of wildlife and flora.</p> <p>35. The activities should support and recognize the rights and roles of indigenous people and local communities and also support sustainable development.</p> <p>36. The project activities should support the use of renewables for carbon capture and carbon storage in the project site and forest surrounds.</p> <p>37. The project activities should not result in changes in forest structure, habitats and genetic diversity within forests.</p> <p>k) Green Belt Development:</p> <p>38. The proponent shall ensure that in the green belt development more indigenous trees species as suggested in Appendix of SEAC Minutes are planted and that the area is restored and rehabilitated with native trees .</p> <p>l) Workers and their protection:</p>

S. No	EC Conditions
	<p>39. The project proponent is responsible for implementing all the provisions of labour laws applicable from time to time to quarrying /Mining operations. The workers on the site should be provided with on-site accommodation or facilities at a suitable boarding place, protective equipment such as ear muffs, helmet, etc.</p> <p>40. The proponent has to provide insurance protection to the workers and the working hours and wages shall be implemented/enforced as per the Mines Act, 1952 in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.</p> <p>m) Transportation:</p> <p>41. No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a bypass road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.</p> <p>42. The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.</p> <p>n) Storage of wastes</p> <p>43. The project proponent shall store/dump the waste generated within the earmarked area of the project site for mine closure as per the approved mining plan.</p> <p>o) CER/EMP:</p> <p>44. The CER should be fully Implemented and fact reflected in the Half-yearly compliance report.</p> <p>45. The EMP shall also be implemented in consultation with local self-government institutions & Govt. departments as indicated in SEAC meeting.</p> <p>p) Directions for Reclamation of mine sites:</p> <p>46. The mining closure plan should strictly adhere to appropriate soil rehabilitation measures to ensure ecological stability of the area. Reclamation/Restoration of the mine site should ensure that the Geotechnical, physical, chemical properties are sustainable that the soil structure composition is buildup, during the process of restoration. The proponent shall ensure that the mine closure plan is followed as per the mining plan and the mine restoration should be done with native species, and site restored to near original status. The proponent shall ensure that the area is ecologically restored to conserve the ecosystems and ensure flow of goods and services.</p> <p>47. A crucial factor for success of reclamation site is to select sustainable species to enable develop a self-sustaining eco system. Species selected should easily establish, grow rapidly, and possess good crown and preferably be native species. Species to be planted in the boundary of project site should be un palatable for cattle's/ goats and should have proven capacity to add leaf-litter to soil and decompose. The species planted should be adaptable to the site conditions. Should be preferably pioneer species, deciduous in nature to allow maximum leaf-litter, have deep root system, fix atmospheric nitrogen and improve soil productivity. Species selected should have the ability to tolerate altered pit and toxicity of and site. They should be capable of meeting requirement of local people in regard to fuel fodder and should be able to attract bird, bees and butterflies. The species</p>

S. No	EC Conditions
	<p>should be planted in mixed association.</p> <p>48. Top soil with a mix of beneficial microbes (Bacteria/Fungi) to be used for reclamation of mine spoils. AM Fungi (Arbuscular mycorrhizal fungi), plant growth promoting Rhizo Bacteria and nitrogen fixing bacteria to be utilized. Soil and moisture conservation and water harvesting structures to be used where ever possible for early amelioration and restoration of site. Top soil is most important for successful rehabilitation of mined sites. Topsoil contains majority of seeds and plant propagation, soil microorganism, Organic matter and plant nutrients. Wherever possible the topsoil should be immediately used in the area of the for land form reconstruction, to pre mining conditions.</p> <p>49. Over burdens may be analyzed and tested for soil characteristics and used in the site for revegetation. Wherever possible seeds, rhizome, bulbs, etc., of pioneering species should be collected, preserved and used in restoring the site. Native grasses seeds may be used as colonizers and soil binders, to prevent erosion and allow diverse self- sustaining plant.</p> <p>50. Reclamation involves planned topographical reconstruction of site. Care to be taken to minimize erosion and runoff. Topsoil should have necessary physical, chemical, ecological, properties and therefore should be stored with precautions and utilized for reclamation process. Stocked topsoil should be stabilized using grasses to protect from wind. Seeds of various indigenous and local species may be broadcasted after topsoil and treated overburden are spread. Alkaline soils, acidic soils, Saline soils should be suitably treated/amended using green manure, mulches, farmyard manure to increase organic carbon. The efforts should be taken to landscape and use the land post mining. The EMP and mine closure plan should provide adequate budget for re-establishing the site to pre-mining conditions. Effective steps should be taken for utilization of over burden. Mine waste to be used for backfilling, reclamation, restoration, and rehabilitation of the terrain without affecting the drainage and water regimes. The rate of rehabilitation should be similar to rate of mining. Efforts should be taken to aesthetically improve the mine site. Action taken for restoration of the site should be specifically mentioned in the EC compliances.</p>

Standard EC Conditions for (Mining of minerals)

1. Statutory Compliance

S. No	EC Conditions
1.1	The Environmental clearance shall be subject to orders of Hon'ble Supreme Court of India, Hon'ble High Courts, NGT and any other Court of Law, from time to time, and as applicable to the project
1.2	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
1.3	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
1.4	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report (in case of the presence of schedule-I species in the study area).
1.5	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State pollution Control Board/ Committee.

S. No	EC Conditions
1.6	The project proponent shall obtain the necessary permission from the Central Ground Water Authority
1.7	Solid/hazardous waste generated in the mines needs to be addressed in accordance to the Solid Waste Management Rules, 2016/Hazardous & Other Waste Management Rules, 2016.
1.8	Permission of power supply to be taken from the concerned authority for meeting power demand of the project site.
1.9	The maximum production or peak production at any given time shall not exceed the limit as prescribed in the EC.
1.10	Validity of EC is as per life of the mine mentioned in EC letter or 30 years as per EIA Notification, 2006 and its amendments therein

2. Air Quality Monitoring And Mitigation Measure

S. No	EC Conditions
2.1	Adequate ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring of pollutants, namely particulates, SO ₂ and NO _x . Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive receptors in consultation with the State Pollution Control Board. Online ambient air quality monitoring station/stations may also be installed in addition to the regular air monitoring stations as per the requirement and/or in consultation with the SPCB
2.2	Transportation of mineral, to the extent if permitted by road, shall be carried out by covered trucks/conveyors. Effective control measures such as regular water sprinkling/rain gun/ Fog cannon /mist sprinkling etc., shall be carried out in critical areas prone to air pollution with higher level of particulate matter all through the mineral transport roads, loading/unloading and transfer points. Fugitive dust emissions from all sources shall be controlled regularly. It shall be ensured that the ambient air quality parameters conform to the norms prescribed by the Central/State Pollution Control Board.
2.3	Major approach roads shall be black topped and properly maintained.
2.4	PP to install solar lights along the road used for transportation of mineral to avoid the accidents at night and also seek its maintenance.
2.5	The transportation of mineral shall be carried out as per the provisions and route proposed in the approved mining plan. Transportation of the mineral through the existing road passing through any village shall be avoided. In case, it is proposed to construct a 'bypass' road, it should be so constructed that the impact of sound, dust and accidents could be appropriately mitigated.
2.6	Vehicular emissions shall be kept under control and regularly monitored. All the vehicles engaged in mining and allied activities shall operate only after obtaining 'PUC' certificate from the authorized pollution testing centres.
2.7	Adequate number of Fog canon (mist sprayer) shall be installed to reduce the impact of air pollution

S. No	EC Conditions
	at dust generating sources with time bound action plan.
2.8	Post environmental closure third party monitoring by reputed instituted in air quality, water, land & soil etc shall be carried out and analysed with EMP measures at regular interval. A suitable recommendation in this regard, shall be furnished to IRO, MoEF&CC for compliance. The data used for analysis shall be obtained from continuous AQMS, site specific water regime. Also third party shall analyses the implementation of river diversion, meeting to the requirement of project report.

3. Water Quality Monitoring And Mitigation Measures

S. No	EC Conditions
3.1	The monitoring data shall be uploaded on the company's website and displayed at the project site at a suitable location. The circular No.J-20012/1/2006-1A.11 (M) dated 27th May, 2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.
3.2	Regular monitoring of ground water level and quality shall be carried out in and around the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operations. The monitoring of ground water levels shall be carried out four times a year i.e. pre-monsoon, monsoon, post-monsoon and winter. The ground water quality shall be monitored once a year, and the data thus collected shall be sent regularly to MOEFCC/RO.
3.3	Monitoring of water quality upstream and downstream of river including ponds, lakes, tanks shall be carried out once in six months and record of monitoring data shall be maintained and submitted to the Ministry of Environment, Forest and Climate Change/Regional Office.
3.4	Ground water, excluding mine water, shall not be used for mining operations. Rainwater harvesting shall be implemented for conservation and augmentation of ground water resources.
3.5	The project proponent shall not alter major water channels around the site. Appropriate embankment shall be provided along the side of the river/nallah flowing near or adjacent to the mine. The embankment constructed along the river/nallah boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side, stabilized with plantation so as to withstand the peak water pressure preventing any chance of mine inundation.
3.6	Garland drains (of suitable size, gradient and length) around the critical areas i.e. mine shaft and low lying areas, shall be designed keeping at least 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine sites. The sump capacity shall also provide adequate retention period to allow proper settling of silt material of the surface runoff
3.7	The water pumped out from the mine, after siltation, shall be utilized for industrial purpose viz. watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly
3.8	Adequate groundwater recharge measures shall be taken up for augmentation of ground water. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry

S. No	EC Conditions
	due to dewatering of mine.
3.9	The surface drainage plan including surface water conservation plan for the area of influence affected by the said mining operations shall be prepared, considering the presence of any river/rivulet/pond/lake etc., with impact of mining activities on it, and implemented by the project proponent. The surface drainage plan and/or any diversion of natural water courses shall be as per the provisions of the approved Mining Plan/ EIA-EMP submitted to this Ministry/SEIAA-TN and the same should be done with due approval of the concerned State/GoI Authority. The construction of embankment to prevent any danger against inrush of surface water into the mine should be as per the approved mining plan and as per the permission of DGMS.

4. Noise And Vibration Monitoring And Prevention

S. No	EC Conditions
4.1	Adequate measures shall be taken for control of noise levels as per Noise Pollution Rules, 2016 in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with personal protective equipments (PPE) like ear plugs/muffs in conformity with the prescribed norms and guidelines in this regard. Adequate awareness programme for users to be conducted. Progress in usage of such accessories to be monitored.
4.2	The noise level survey shall be carried out as per the prescribed guidelines to assess noise exposure of the workmen at vulnerable points in the mine premises, and report in this regard shall be submitted to the Ministry/RO on six-monthly basis.

5. Mining Plan

S. No	EC Conditions
5.1	Mining shall be carried out under strict adherence to provisions of the Mines Act 1952 and subordinate legislations made there-under as applicable.
5.2	No change in mining method i.e. UG to OC, calendar programme and scope of work shall be made without obtaining prior approval of the Ministry of Environment, Forests and Climate Change (MoEFCC)/SEIAA-TN.
5.3	Mining shall be carried out as per the approved mining plan (including Mine Closure Plan) abiding by mining laws related to non-coal mining and the relevant circulars issued by Directorate General Mines Safety (DGMS).
5.4	Underground work place environmental conditions shall be rendered ergonomic and air breathable with adequate illumination in conformance with DGMS standards.
5.5	No mining shall be carried out in forest land without obtaining Forestry Clearance as per Forest (Conservation) Act, 1980 and also adhering to The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 read with provisions of Indian Forest Act, 1927.
5.6	Efforts should be made to reduce energy and fuel consumption by conservation, efficiency improvements and use of renewable energy.

6. Land Recalvation

S. No	EC Conditions
6.1	Digital Survey of entire lease hold area/core zone using Satellite Remote Sensing survey shall be carried out at least once in three years for monitoring land use pattern and report in 1:50,000 scale or as notified by Ministry of Environment, Forest and Climate Change(MOEFCC) from time to time shall be submitted to MOEFCC/Regional Office (RO).
6.2	Regular monitoring of subsidence movement on the surface over and around the working areas and its impact on natural drainage pattern, water bodies, vegetation, structure, roads and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence beyond the limit prescribed, appropriate effective mitigation measures shall be taken to avoid loss of life and materials. Cracks should be effectively plugged in with ballast and clay soil/suitable material.
6.3	Fly ash shall be used for external dump of overburden, backfilling or stowing of mine as per provisions contained in clause (i) and (ii) of subparagraph (8) of fly ash notification issued vide SO 2804 (E) dated 3rd November, 2009 as amended from time to time. Efforts shall be made to utilize gypsum generated from Flue Gas Desulfurization (FGD), if any, along with fly ash for external dump of overburden, backfilling of mines. Compliance report shall be submitted to Regional Office of MoEF&CC, CPCB and SPCB.
6.4	A separate team for subsidence monitoring and surface mitigation measures shall be constituted and continuous monitoring & implementation of mitigation measures be carried out.
6.5	Native tree species shall be selected and planted over areas affected by subsidence.
6.6	The project proponent shall make necessary alternative arrangements, if grazing land is involved in core zone, in consultation with the State government to provide alternate areas for livestock grazing, if any. In this context, the project proponent shall implement the directions of Hon'ble Supreme Court with regard to acquiring grazing land.

7. Public Hearing And Human Health Issues

S. No	EC Conditions
7.1	Adequate illumination shall be ensured in all mine locations (as per DGMS standards) and monitored.
7.2	The project proponent shall undertake occupational health survey for initial and periodical medical examination of the personnel engaged in the project and maintain records accordingly as per the provisions of the Mines Rules, 1955 and DGMS circulars. Besides regular periodic health check-up, 20% of the personnel identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, as amended time to time.
7.3	Personnel (including outsourced employees) working in core zone shall wear protective respiratory devices and shall also be provided with adequate training and information on safety and health aspects.

S. No	EC Conditions
7.4	Skill training as per safety norms specified by DGMS shall be provided to all workmen including the outsourcing employees to ensure high safety standards in mines.
7.5	Effective arrangement shall be made to provide and maintain at suitable points conveniently situated, a sufficient supply of drinking water for all the persons employed.
7.6	Implementation of the time bound action plan on the issues raised during the public hearing shall be ensured. The project proponent shall undertake all the tasks/measures as per the time bound action plan submitted with budgetary provisions during the public hearing. Land oustees shall be compensated as per the norms laid down in the R&R policy of the company/State Government/Central Government, as applicable.
7.7	The project proponent shall follow the mitigation measures provided in this Ministry's OM No.Z-11013/5712014-IA.II (M) dated 29th October, 2014, titled 'Impact of mining activities on habitations-issues related to the mining projects wherein habitations and villages are the part of mine lease areas or habitations and villages are surrounded by the mine lease area'.
7.8	PP to conduct need based assessment survey of the area to for in order to decide the activities to be carried under the CSR and to provide detail of the activity carried out with adequate budgetary provision and time bound action plan.
7.9	PP must ensure an emergency action plan during pandemic in order to provide assistance to the nearby villages located within the 10 km radius buffer zone (If required)
7.10	PP is asked to also identify the rural areas for installation of solar light with its maintenance within the study area of 10 km radius buffer zone with time bound action plan
7.11	PP to take measure for installation of Renewable Energy sources in nearby area falling within 10 km radius

8. Corporate Environment Responsibility

S. No	EC Conditions
8.1	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental/forest/wildlife norms/conditions and/or shareholders/stake holders.
8.2	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.
8.3	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be

S. No	EC Conditions
	reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
8.4	Self environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.
8.5	PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground. A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis. Any non- compliance or infringement should be reported to the concerned authority

9. Miscellaneous

S. No	EC Conditions
9.1	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.
9.2	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
9.3	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
9.4	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
9.5	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
9.6	The project authorities shall inform to the Regional Office of the MOEFCC regarding commencement of mining operations.
9.7	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
9.8	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the State Expert Appraisal Committee.
9.9	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC)/SEIAA-TN.

S. No	EC Conditions
9.10	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
9.11	The Ministry/SEIAA-TN may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
9.12	The Ministry/SEIAA-TN reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.
9.13	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
9.14	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.
9.15	The proponent shall abide by all the commitments and recommendations made in the EIA/EMP report and also that during presentation to the SEAC. All the commitments made on the issues raised during public hearing shall also be implemented in letter and spirit.
9.16	Compensation of the land acquired for the project shall be settled as per the R&R Policy. Adequate facility of drinking water, plantation and other social amenities should be provided to established R&R villages.
9.17	Persons of nearby villages shall be given training on livelihood and skill development to make them employable with its proper records.
9.18	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours

AFFIDAVIT FURNHSED BY THE PROPONENT

I, **Tmt. M. Meenatchi, W/o. Mahalingam, Ulagani, Thirumangalam Taluk, Madurai District, Tamil Nadu State – 625 022** solemnly declare and sincerely affirm that:

I have applied for getting Environment Clearance to SEIAA, Tamil Nadu State for quarrying of **Rough Stone Quarry over an extent of 1.42.0ha of Patta land in S.F.Nos. 16/2B, 16/3 & 16/4, Achankulam Village, Kallikudi Taluk, Madurai District, Tamil Nadu State.**

I swear to state and confirm that within 10km area of the quarry site, I have applied for environment clearance, none of the following is situated:

- a. Protected areas notified under the wild life (Protection) Act, 1972,
- b. Critically polluted areas as notified by the central pollution control board constituted under water (Prevention and Control of Pollution) Act, 1974,
- c. Eco-Sensitive areas as notified.
- d. Interstate Boundary

- 1. I will spend the amount of Rs. 5 Lakhs towards Corporate Environment Responsibility (Revised CER) for the following activities to the Panchayat Union Middle School, Ulagani Village, Kalligudi Union, Madurai District.

Sl. No.	Description	Cost breakup
1	Construction of Toilets and its maintenance	Rs.5,00,000/-
2	Providing Environmental related books to school library	
3	Carrying out plantation in the school ground around 100Nos	
4	Provision of drinking water facilities with R.O purifier	
5	Providing Table, Benches & Computers to the School	
TOTAL		Rs.5,00,000/-

- 2. The total area of following quarries located within 500m radius from the periphery of my quarry site details as shown below:

(i) Existing Quarries:

S. No.	Name of the Owner	Village	S.F.No.	Extent (in Hect).	Collector's Proceedings No. & Date	Lease Period
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1.	Annamuthu. M	Achankulam	16/1 & 16/2A	1.12.5	Roc.No.300/2017, Dated:19.09.2019	24.09.2019 to 23.09.2024
2.	Suganya Blue Metals	Achankulam	5/5, 5/9A etc.,	4.21.0	Roc.No.1108/2015, Dated:23.08.2017	12.09.2017 to 11.09.2022
3.	Suganya Blue Metals	Achankulam	12/2B1, 12/5, etc.,	2.71.0	Roc.No.1680/2017, Dated:28.02.2019	08.03.2019 to 07.09.2024
4.	I. Ahamed Abdul Razzak	Chinna ulagani	70/2 & 70/5 Etc.,	3.67.0	Roc.No.383/2014, Dated:08.05.2018	07.06.2018 to 06.06.2023

(ii) Abandoned / Expired Quarries:

S. No.	Name of the Owner	Village	S.F.No.	Extent (in Hect).	Collector's Proceedings No. & Date	Lease Period
1.	T. Thillai natarajan	Achankulam	14/9, 10 etc.,	2.64.5	RC.No.224/10, Dated:22.06.10	03.08.2010 to 02.08.2015
2.	M. Pandi	Achankulam	3/1, 2, etc.,	2.11.0	Roc.No.156/2010, Dated:13.07.2010	19.08.2010 to 18.08.2015

(iii) Present Proposed Quarries:

S. No.	Name of the Owner	Village	S.F.No.	Extent (in Hect).
1.	Tmt. M. Meenatchi	Achankulam	16/2B, 16/3 & 16/4	1.42.0
2.	Thiru. R. Ragavan	Achankulam	1/A2, 1/1B etc.,	3.70.70

4. There will not be hindrance or disturbance to the people living during quarrying activities and transportation of the mineral.
5. There is no approved habitation within 300m radius from the periphery of my quarry.
6. I swear that afforestation will be carried out during the course of quarrying operation and maintained.
7. The required insurance will be taken in the name of the laborers working in my quarry site.

8. The existing road from the main road to quarry is in good condition and the same is being maintained and utilized for Transportation of Rough stone.
9. I will not engage any child labor in my quarry site and I aware that engaging child labor is punishable under the law.
10. All types of safety / protective equipment will be provided to all the laborers working in my quarry.
11. No permanent structures, temples etc., are located within 500m radius from the periphery of my quarry.

REVISED EMP BUDGET

Mitigation Measure	Provision for Implementation	Capital	Recurring
Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	14200	14200
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
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 - 1 Units	25000	2500
No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
Stone carrying trucks will be covered by tarpaulin	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 – 1 Units	5000	250
Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000
Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	28400
Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000

Source of noise will be during operation of transportation vehicles, 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 implements 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 Tonnes of Blasted Material	0	86185
Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	5000	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

Scientific Study Report for the blast induced ground vibration	Scientific Study report has been conducted for the Proposed blasting parameters to the project area, quarry, Separate Blasting Study will be conducted after starting the quarry	400000	0
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 mentioning Environmental Conditions	10000	1000
Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 12 Employees	48000	12000
Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	12000
First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	2840
Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
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	71000	10000
Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1st Class / 2nd 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
Progressive Closure Activity - Surface Runoff management	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	14200	5000

Progressive Closure Activity 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	284000	10000
Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 750 Trees - (450 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)	90000	13500
	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	90000	9000
Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 20% of the proposed closure cost will be spent during the final mine closure stage - Last Year	#61050	0
Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budge and not necessarily implemented in the Project Site	#298332	0
As per MoEF & CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoeEF & CC OM	500000	0
TOTAL		2501400	1162874

EMP BUDGET SUMMARY BREAKUP YEAR WISE

Year Wise Break Up	
1 st Year	₹ 36,64,275/-
2 nd Year	₹ 12,21,019/-
3 rd Year	₹ 12,82,069/-
4 th Year	₹ 13,46,173/-
5 th Year	₹ 14,74,532/-
Total EMP for 5 years	90 Lakhs

I ensure to do all the social and Environment commitment as mentioned in the scheme of mining to the best of my knowledge.

DETAILS OF QUARRIES LOCATED WITHIN 500M RADIUS FROM THE PROPOSED QUARRY:

The Project Proponent has submitted a copy of the letter obtained from the Joint Director / Assistant Director(i/c), Department of Geology & Mining, Madurai District in his letter Rc.No. 276//Kanimam/2016 Dated: 18.08.2022. has stated that the details of other quarries within a radius 500m from the boundary of the proposed quarry site as follows:

a.Existing Quarries

S. No.	Name of the Owner	Village	S.F.No.	Extent (in Hect).	Collector's Proceedings No. & Date	Lease Period
1.	Annamuthu. M	Achankulam	16/1 & 16/2A	1.12.5	Roc.No.300/2017, Dated:19.09.2019	24.09.2019 to 23.09.2024
2.	Suganya Blue Metals	Achankulam	5/5, 5/9A etc.,	4.21.0	Roc.No.1108/2015, Dated:23.08.2017	12.09.2017 to 11.09.2022
3.	Suganya Blue Metals	Achankulam	12/2B1, 12/5, etc.,	2.71.0	Roc.No.1680/2017, Dated:28.02.2019	08.03.2019 to 07.09.2024
4.	I. Ahamed Abdul Razzak	Chinna ulagani	70/2 & 70/5 Etc.,	3.67.0	Roc.No.383/2014, Dated:08.05.2018	07.06.2018 to 06.06.2023

b.Abandoned / Expired Quarries:

S. No.	Name of the Owner	Village	S.F.No.	Extent (in Hect).	Collector's Proceedings No. & Date	Lease Period
1.	T. Thillai natarajan	Achankulam	14/9, 10 etc.,	2.64.5	RC.No.224/10, Dated:22.06.10	03.08.2010 to 02.08.2015
2.	M. Pandi	Achankulam	3/1, 2, etc.,	2.11.0	Roc.No.156/2010, Dated:13.07.2010	19.08.2010 to 18.08.2015

C.Present Proposed Quarries:

S. No.	Name of the Owner	Village	S.F.No.	Extent (in Hect).
1.	Tmt. M. Meenatchi	Achankulam	16/2B, 16/3 & 16/4	1.42.0
2.	Thiru. R. Ragavan	Achankulam	16/2, 16/3 & 16/4	3.90.70

Signature Not Verified

Digitally Signed by : A P Rahul Nadh IAS
Member Secretary, SEIAA

Date: 10/05/2024

TEST REPORT

Report No	EHS360/TR/2023-24/001	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/001
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ1 Core zone - 9°46'7.47"N 78°2'33.72"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	43.1	24.3	6.2	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	42.1	22.1	7.3	21.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	45.6	23.6	8.1	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	46.3	24.5	6.0	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	47.1	25.3	7.4	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	43.0	23.5	8.5	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	42.5	24.1	6.6	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	44.5	25.1	7.1	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	45.3	23.1	6.4	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	46.1	24.3	8.2	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	47.3	25.2	5.1	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	44.0	22.3	7.0	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	43.2	24.2	5.3	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	44.5	25.6	6.4	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	41.6	23.2	7.2	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	45.3	22.1	8.4	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	42.0	24.3	6.3	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	45.8	25.2	5.4	23.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	46.3	23.0	6.8	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	47.1	22.4	7.2	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	43.0	25.0	8.3	21.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	45.6	24.3	6.0	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	44.2	22.1	7.2	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	46.3	25.5	8.4	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	47.5	23.5	7.7	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	44.2	24.0	6.9	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/001	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/001
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ1 Core Zone - 10°58'53.92"N 77°55'59.77"E		

Date	Period. hrs	SPM (µg/m ³)	As (ng/m ³)	C6H6 (µg/m ³)	BaP (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)
05.12.2022	7:00-7:00	56.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	55.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	57.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	58.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	59.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	56.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	57.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	58.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	55.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	56.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	58.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	60.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	56.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	57.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	58.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	55.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	58.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	56.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	60.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	55.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	56.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	58.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	60.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	57.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/002	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/002
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 2 – Valayankulam - 9°46'23.60"N 78°1'55.98"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	36.2	22.3	6.1	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	35.3	21.0	7.3	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	41.7	23.0	5.5	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	41.5	22.4	6.8	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	37.0	21.3	6.6	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	40.3	23.5	7.2	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	41.1	20.2	8.2	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	39.0	22.5	6.4	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	36.3	23.5	8.1	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	40.9	20.6	7.5	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	39.2	21.4	6.0	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	36.3	22.3	7.0	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	40.6	23.5	8.0	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	38.2	23.5	6.5	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	39.2	21.6	7.7	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	37.3	22.4	7.3	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	40.3	23.4	6.6	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	36.0	20.2	7.9	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	39.0	21.5	5.5	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	38.2	22.3	6.1	23.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	40.1	23.4	7.4	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	37.0	21.3	7.9	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	35.3	22.5	5.5	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	36.2	23.6	6.4	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	37.2	22.5	7.4	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	38.0	23.6	7.6	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/002	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/002
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 2 – Valayankulam - 9°46'23.60"N 78°1'55.98"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
05.12.2022	7:00-7:00	62.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	61.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/003	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/003
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ3 – Koodakovil - 9°45'59.49"N 78° 4'36.73"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	40.7	20.2	5.5	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	41.6	21.5	6.2	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	42.5	23.4	7.2	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	43.1	22.5	6.0	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	42.7	23.4	7.3	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	41.5	21.0	5.0	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	40.2	22.5	6.3	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	42.6	23.6	7.4	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	43.4	20.1	6.2	24.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	41.2	21.2	7.0	23.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	43.1	22.0	5.3	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	41.4	23.4	6.3	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	39.3	22.5	7.1	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	40.0	23.6	6.4	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	42.4	21.0	7.2	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	39.3	22.4	7.0	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	38.2	23.5	6.3	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	39.1	22.7	5.4	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	43.5	23.5	6.4	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	40.2	20.1	7.3	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	43.3	22.0	8.8	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	42.6	23.6	5.6	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	43.1	21.4	6.6	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	41.0	22.5	7.5	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	42.4	23.1	5.3	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	40.5	22.6	6.1	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/003	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/003
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ3 – Koodakovil - 9°45'59.49"N 78° 4'36.73"E		

Date	Period. hrs	SPM (µg/m ³)	As (ng/m ³)	C6H6 (µg/m ³)	BaP (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)
05.12.2022	7:00-7:00	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	61.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	61.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

A-17
Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/004	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/004
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ4 – Vidathakulam - 9°48'25.43"N 78° 1'56.78"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	43.2	22.1	5.5	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	42.1	23.1	6.2	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	44.2	20.1	5.0	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	45.1	22.3	6.3	23.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	46.0	23.4	5.2	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	44.2	20.0	6.3	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	43.0	21.3	5.4	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	45.1	22.5	6.2	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	47.1	23.6	5.0	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	48.2	21.4	6.8	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	46.2	22.4	5.3	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	47.0	23.0	6.1	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	44.0	20.0	5.4	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	45.2	22.1	6.3	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	46.3	23.3	5.0	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	44.0	22.0	6.8	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	45.3	20.1	5.9	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	46.2	23.5	6.1	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	43.1	22.5	5.3	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	42.2	20.5	6.4	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	45.1	23.5	5.7	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	46.2	21.4	6.3	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	46.0	22.6	5.2	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	45.2	23.5	6.1	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	44.1	21.2	6.8	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	42.3	23.5	5.3	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/004	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/004
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ4 – Vidathakulam - 9°48'25.43"N 78° 1'56.78"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
05.12.2022	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	66.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	66.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	67.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	66.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	66.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	66.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	66.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	66.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/005	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/005
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ5 – Melakottai 9°47'33.87"N 77°59'20.66"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	44.2	21.2	6.2	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	45.3	22.3	7.0	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	46.1	23.1	8.0	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	47.2	20.2	7.2	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	46.0	24.3	6.3	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	47.2	22.2	7.1	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	45.2	23.5	7.7	21.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	46.3	21.3	6.3	19.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	47.0	22.4	7.4	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	44.2	23.5	7.9	20.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	43.0	22.2	7.5	19.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	44.2	23.0	7.3	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	42.3	25.4	6.2	22.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	46.2	23.6	7.4	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	47.1	25.5	7.6	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	45.5	21.0	6.3	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	46.1	22.5	7.2	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	47.0	23.4	7.8	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	45.2	22.0	6.2	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	47.6	23.5	7.6	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	46.2	21.0	6.1	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	45.5	24.0	5.9	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	47.2	25.5	7.5	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	46.3	23.2	6.4	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	43.2	24.5	5.8	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	44.5	25.5	7.5	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/005	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/005
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ5 – Melakottai 9°47'33.87"N 77°59'20.66"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
05.12.2022	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	66.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	61.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	66.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/006	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/006
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 6 - Arasapatti - 9°45'8.27"N 78°0'35.09"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	44.5	20.2	6.0	23.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	45.3	23.2	7.2	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	46.1	22.4	6.3	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	45.0	20.2	7.2	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	44.2	21.3	6.0	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	46.3	23.4	7.2	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	46.0	22.5	6.4	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	44.2	21.0	7.3	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	45.3	23.2	6.5	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	46.1	22.1	7.1	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	44.8	23.5	6.8	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	45.2	21.0	7.2	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	46.3	22.3	6.3	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	44.1	23.4	7.4	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	46.0	22.4	6.2	24.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	44.0	23.5	7.1	25.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	45.2	20.3	6.3	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	46.8	22.4	7.3	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	45.2	23.5	6.8	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	44.2	20.3	7.0	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	46.3	21.5	6.2	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	44.0	23.5	7.3	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	46.2	22.1	6.4	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	45.5	23.1	7.2	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	46.3	20.1	6.2	23.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	45.2	22.3	7.3	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/006	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/006
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 6 - Arasapatti - 9°45'8.27"N 78°0'35.09"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
05.12.2022	7:00-7:00	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	61.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	62.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	63.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	61.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/007	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/007
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ7 – Kombadi - 9°47'53.91"N 78° 3'55.63"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	41.2	22.5	6.6	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	42.3	21.2	7.2	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	43.5	23.5	6.4	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	42.5	21.4	7.3	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	43.0	22.0	6.0	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	41.5	21.3	7.2	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	42.3	22.4	6.3	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	42.0	21.0	7.4	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	43.8	22.4	6.1	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	44.5	20.3	7.2	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	45.2	22.1	6.3	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	42.1	21.0	7.5	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	43.3	22.4	6.4	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	44.6	20.3	7.8	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	45.3	22.6	6.3	21.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	42.5	21.3	7.2	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	43.0	20.5	6.4	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	45.1	21.6	7.0	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	43.2	22.3	6.8	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	44.5	23.5	7.2	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	43.6	22.0	6.3	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	45.6	23.5	7.2	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	42.3	23.8	6.4	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	43.1	21.2	7.5	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	44.8	23.0	6.3	24.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	43.6	23.4	7.6	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/007	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/007
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ7 – Kombadi - 9°47'53.91"N 78° 3'55.63"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
05.12.2022	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	66.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	66.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	67.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	66.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	63.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	66.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/008	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/008
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ8 – T.Kokulam - 9°44'25.36"N 78° 3'19.92"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
05.12.2022	7:00-7:00	42.3	20.2	5.5	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.12.2022	7:15-7:15	43.1	21.3	6.2	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.12.2022	7:00-7:00	44.5	23.4	7.3	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.12.2022	7:15-7:15	45.2	22.4	8.2	23.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.12.2022	7:00-7:00	46.2	20.3	6.0	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.12.2022	7:15-7:15	44.0	21.5	7.2	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.12.2022	7:00-7:00	42.3	22.3	8.8	23.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.12.2022	7:15-7:15	43.1	23.4	6.2	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.01.2023	7:00-7:00	44.5	23.0	7.4	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
03.01.2023	7:15-7:15	46.3	21.2	8.3	26.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.01.2023	7:00-7:00	44.2	22.5	5.5	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
10.01.2023	7:15-7:15	43.1	23.5	6.3	25.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.01.2023	7:00-7:00	44.5	21.0	8.2	26.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
17.01.2023	7:15-7:15	46.0	23.8	7.0	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.01.2023	7:00-7:00	42.1	22.5	6.3	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
24.01.2023	7:15-7:15	43.5	21.6	7.1	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.01.2023	7:00-7:00	45.2	23.5	8.2	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
31.01.2023	7:15-7:15	46.1	22.4	5.2	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.02.2023	7:00-7:00	42.1	21.6	6.3	24.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.02.2023	7:15-7:15	43.1	23.5	7.4	23.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.02.2023	7:00-7:00	44.5	21.8	8.2	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.02.2023	7:15-7:15	45.6	22.6	6.3	24.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.02.2023	7:00-7:00	46.0	23.8	5.0	25.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.02.2023	7:15-7:15	44.1	24.5	6.4	25.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.02.2023	7:00-7:00	45.2	23.6	8.2	26.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.02.2023	7:15-7:15	46.3	22.1	7.3	27.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<60	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/008	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/008
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 8 – T.Kokulam - 9°44'25.36"N 78° 3'19.92"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
05.12.2022	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.12.2022	7:15-7:15	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.12.2022	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.12.2022	7:15-7:15	66.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.12.2022	7:00-7:00	67.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.12.2022	7:15-7:15	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.12.2022	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.12.2022	7:15-7:15	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.01.2023	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
03.01.2023	7:15-7:15	66.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.01.2023	7:00-7:00	67.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
10.01.2023	7:15-7:15	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.01.2023	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
17.01.2023	7:15-7:15	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.01.2023	7:00-7:00	67.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
24.01.2023	7:15-7:15	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.01.2023	7:00-7:00	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
31.01.2023	7:15-7:15	67.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.02.2023	7:00-7:00	68.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.02.2023	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.02.2023	7:00-7:00	66.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.02.2023	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.02.2023	7:00-7:00	68.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.02.2023	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.02.2023	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.02.2023	7:15-7:15	66.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	6	5	1	1	20

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 009	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 009
Sample Description	Ambient Noise	Sample Collected Date	28.02.2023

Location	N1 – Core Zone - 9°46'5.75"N 78° 2'31.83"E			N2 – Valayankulam - 9°46'22.36"N 78°1'56.17"E		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	41.2	43.6	42.6	40.2	42.3	41.4
07:00-08:00	40.8	44.2	42.8	41.6	43.2	42.5
08:00-09:00	40.3	43.5	42.2	40.3	42.1	41.3
09:00-10:00	41.3	46.7	44.8	42.5	44.2	43.4
10:00-11:00	40.5	47.2	45.0	40.2	42.6	41.6
11:00-12:00	43.2	46.1	44.9	41.2	43.2	42.3
12:00-13:00	42.5	47.4	45.6	40.2	42.5	41.5
13:00-14:00	43.2	45.9	44.8	42.5	44.6	43.7
14:00-15:00	41.2	46.4	44.5	41.8	43.5	42.7
15:00-16:00	40.2	45.1	43.3	40.3	42.1	41.3
16:00-17:00	41.3	44.6	43.3	42.6	44.6	43.7
17:00-18:00	40.2	42.5	41.5	41.7	43.8	42.9
18:00-19:00	40.3	42.3	41.4	40.7	42.6	41.8
19:00-20:00	41.5	43.6	42.7	40.3	42.1	41.3
20:00-21:00	40.6	42.1	41.4	41.5	43.2	42.4
21:00-22:00	37.2	39.1	38.3	37.2	40.2	39.0
22:00-23:00	34.2	36.4	35.4	38.4	40.3	39.5
23:00-00:00	33.2	36.5	35.2	37.6	39.2	38.5
00:00-01:00	35.6	38.2	37.1	36.6	38.2	37.5
01:00-02:00	36.8	38.6	37.8	35.5	37.6	36.7
02:00-03:00	32.1	34.2	33.3	34.2	36.2	35.3
03:00-04:00	31.2	33.6	32.6	33.2	35.2	34.3
04:00-05:00	30.2	32.1	31.3	32.1	34.1	33.2
05:00-06:00	31.2	33.5	32.5	31	33.6	32.5
Result	Day Means		42.6	Day Means		41.9
	Night Means		34.2	Night Means		35.4

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****



Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/010	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/010
Sample Description	Ambient Noise	Sample Collected Date	28.02.2023

Location	N3 – Koodakovil 9°45'59.91"N 78° 4'36.93"E			N4 – Vidathakulam - 9°48'25.44"N 78°1'56.64"E		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	38.2	40.3	39.4	38.6	40.3	39.5
07:00-08:00	36.5	43.2	41.0	39.2	43.2	41.6
08:00-09:00	35.5	42.1	39.9	37.2	42.1	40.3
09:00-10:00	34.1	41.3	39.0	36.4	41.3	39.5
10:00-11:00	33.2	40.2	38.0	35.1	40.2	38.4
11:00-12:00	31.2	43.2	40.5	37.6	43.2	41.2
12:00-13:00	30.2	42.1	39.4	39.1	42.1	40.9
13:00-14:00	35.6	40.5	38.7	38.7	40.5	39.7
14:00-15:00	37.1	39.2	38.3	36.9	39.2	38.2
15:00-16:00	32.5	34.2	33.4	36.4	40.1	35.4
16:00-17:00	36.2	38.9	37.8	37.8	41.3	38.4
17:00-18:00	37.2	39.2	38.3	35.4	39.2	37.7
18:00-19:00	35.2	46.3	43.6	32.6	37.1	43.5
19:00-20:00	33.1	47.2	44.4	33.6	38.6	44.4
20:00-21:00	31.2	43.6	40.8	34.2	37.4	41.1
21:00-22:00	35.0	42.3	40.0	33.2	35.4	40.8
22:00-23:00	36.4	40.2	38.7	30.9	36.7	38.7
23:00-00:00	37.6	39.2	38.5	31.2	35.3	37.7
00:00-01:00	34.2	36.5	35.5	30.9	34.8	35.5
01:00-02:00	36.5	38.2	37.4	30.0	33.2	36.0
02:00-03:00	35.5	37.5	36.6	28.6	32.4	34.6
03:00-04:00	34.2	36.2	35.3	27.3	31.6	33.4
04:00-05:00	32.1	35.2	33.9	26.7	30.8	32.3
05:00-06:00	31.2	33.6	32.6	25.1	30.1	31.4
Result	Day Means		39.2	Day Means		38.4
	Night Means		35.7	Night Means		31.0

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 011	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 011
Sample Description	Ambient Noise	Sample Collected Date	28.02.2023

Location	N5 – Melakottai 9°47'34.04"N 77°59'20.50"E			N6 – Arasapatti 9°45'8.69"N 78° 0'34.84"E		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	36.2	38.6	37.6	37.5	40.2	39.1
07:00-08:00	35.5	37.2	36.4	38.9	42.3	40.9
08:00-09:00	34.2	36.2	35.3	39.7	43.6	42.1
09:00-10:00	36.5	38.1	37.4	40.1	44.1	42.5
10:00-11:00	38.8	40.2	39.6	41.6	43.5	42.7
11:00-12:00	39.2	42.3	41.0	42.3	45.1	43.9
12:00-13:00	37.6	38.6	38.1	43.4	44.2	43.8
13:00-14:00	35.5	36.2	35.9	41.7	45.2	43.8
14:00-15:00	36.4	38.2	37.4	40.1	44.4	42.8
15:00-16:00	32.5	34.2	33.4	39.6	43.2	41.8
16:00-17:00	31.2	33.1	32.3	38.5	42.6	41.0
17:00-18:00	36.3	38.6	37.6	37.4	41.8	40.1
18:00-19:00	35.2	37.6	36.6	36.9	40.6	39.1
19:00-20:00	38.2	39.2	38.7	35.8	41.3	39.4
20:00-21:00	36.5	39.2	38.1	34.7	42.7	40.3
21:00-22:00	37.2	38.2	37.7	39.8	41.5	40.7
22:00-23:00	36.4	39.1	38.0	38.6	40.6	39.7
23:00-00:00	38.2	39.4	38.8	37.6	42.1	40.4
00:00-01:00	36.9	39.2	38.2	36.4	41.8	39.9
01:00-02:00	35.4	37.1	36.3	35.6	39.2	37.8
02:00-03:00	33.2	35.6	34.6	34.6	37.5	36.3
03:00-04:00	31.2	33.2	32.3	33.5	36.1	35.0
04:00-05:00	30.2	32.5	31.5	32.1	35.8	34.3
05:00-06:00	34.2	36.5	35.5	32.9	36.7	35.2
Result	Day Means		37.1	Day Means		41.4
	Night Means		35.3	Night Means		37.0

**Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.**

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 012	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 012
Sample Description	Ambient Noise	Sample Collected Date	28.02.2023

Location	N7- - Kombadi 9°47'53.50"N 78° 3'55.45"E			N8 - T. Kokulam - 9°44'25.76"N 78° 3'19.03"E		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	35.6	37.2	36.5	40.2	42.3	41.4
07:00-08:00	36.4	38.2	37.4	42.3	44.2	43.4
08:00-09:00	38.6	40.2	39.5	41.2	43.5	42.5
09:00-10:00	37.2	39.2	38.3	43.2	45.2	44.3
10:00-11:00	39.2	42.1	40.9	38.9	40.2	39.6
11:00-12:00	35.6	36.2	35.9	37.4	36.2	36.8
12:00-13:00	36.6	38.2	37.5	35.5	37.2	36.4
13:00-14:00	34.5	36.2	35.4	36.2	38.6	37.6
14:00-15:00	38.8	40.2	39.6	38.2	40.2	39.3
15:00-16:00	37.2	38.6	38.0	37.2	39.2	38.3
16:00-17:00	32.1	34.2	33.3	35.6	38.6	37.4
17:00-18:00	33.2	36.2	35.0	32.1	35.6	34.2
18:00-19:00	31.4	33.5	32.6	31.2	33.2	32.3
19:00-20:00	30.2	32.6	31.6	35.4	37.2	36.4
20:00-21:00	33.6	35.6	34.7	34.2	36.2	35.3
21:00-22:00	32.1	34.6	33.5	32.2	34.2	33.3
22:00-23:00	31	35.2	33.6	31.2	35.6	33.9
23:00-00:00	33.2	36.5	35.2	32.2	36.6	34.9
00:00-01:00	32.1	34.2	33.3	33.2	37.2	35.6
01:00-02:00	34.6	36.2	35.5	31.4	35.1	33.6
02:00-03:00	32.1	35.2	33.9	33.2	39.2	37.2
03:00-04:00	33.2	35.6	34.6	35.5	37.1	36.4
04:00-05:00	34.2	36.4	35.4	34.2	36.6	35.6
05:00-06:00	30.2	32.1	31.3	36.6	38.2	37.5
Result	Day Means		36.1	Day Means		37.8
	Night Means		34.2	Night Means		35.8

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 013	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 013
Sample Description	Soil 1	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 1 – Core Zone		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.03
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	436 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	42.3 %
04	Bulk Density	By Cylindrical Method	1.07 g/cm3
05	Porosity	By Gravimetric Method	43.1 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	162 mg/kg
07	Magnesium as Mg		62.3 mg/kg
08	Chloride as Cl		138 mg/kg
09	Soluble Sulphate as SO4		0.023 %
10	Total Phosphorus as P		1.21mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	292 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.18 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.27 %

*****End of Report*****

Page 1 of 1

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Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 013	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 013
Sample Description	Soil 1	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 1 – Core Zone		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	33.4 %
	Sand		35.2 %
	Silt		31.4 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	30.2 mg/kg
16	Zinc as Zn		1.17 mg/kg
17	Boron as B		1.08mg/kg
18	Potassium as K		36.1 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		0.75 mg/kg
23	Iron as Fe		2.63 mg/kg
24	Cation Exchange Capacity	USEPA 9080 – 1986	28.9 meq/100g of soil

*****End of Report*****

Page 1 of 1

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Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 014	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 014
Sample Description	Soil 2	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 2 – Valayankulam		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.46
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	565 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	43.1%
04	Bulk Density	By Cylindrical Method	1.23 g/cm ³
05	Porosity	By Gravimetric Method	43.7 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	144 mg/kg
07	Magnesium as Mg		55.6 mg/kg
08	Chloride as Cl		124 mg/kg
09	Soluble Sulphate as SO ₄		0.020 %
10	Total Phosphorus as P		2.02 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	323 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	3.46 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.01 %

*****End of Report*****

Page 1 of 1

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Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 014	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 014
Sample Description	Soil 2	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 2 – Valayankulam		

S.No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	33.4 %
	Sand		34.9 %
	Silt		31.7 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	24.3 mg/kg
16	Zinc as Zn		1.43 mg/kg
17	Boron as B		1.61 mg/kg
18	Potassium as K		39.8 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.49 mg/kg
23	Iron as Fe		2.18 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986	27.8 meq/100g of soil

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name : Santhosh Kumar A.
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 015	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 015
Sample Description	Soil 3	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 3 Koodakovil		

S.No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.89
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	489 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	40.4 %
04	Bulk Density	By Cylindrical Method	1.04g/cm3
05	Porosity	By Gravimetric Method	41.7 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	163.6 mg/kg
07	Magnesium as Mg		61.7 mg/kg
08	Chloride as Cl		136.8 mg/kg
09	Soluble Sulphate as SO ₄		0.024 %
10	Total Phosphorus as P		1.63 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	342 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.84 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.65 %

*****End of Report*****

Page 1 of 1

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Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 015	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 015
Sample Description	Soil 3	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 3 Koodakovil		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	31.5 %
	Sand		37.3 %
	Silt		30.8 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	28.6 mg/kg
16	Zinc as Zn		2.45 mg/kg
17	Boron as B		1.07 mg/kg
18	Potassium as K		29.7 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		0.73 mg/kg
23	Iron as Fe		1.98 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986	31.9 meq/100g of soil

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name : Santhosh Kumar A.
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 016	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 016
Sample Description	Soil 4	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 4 Arasapatti		

S.No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.08
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	537 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	43.8 %
04	Bulk Density	By Cylindrical Method	1.41 g/cm ³
05	Porosity	By Gravimetric Method	46.3 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	142 mg/kg
07	Magnesium as Mg		51.6 mg/kg
08	Chloride as Cl		126 mg/kg
09	Soluble Sulphate as SO ₄		0.016 %
10	Total Phosphorus as P		1.24 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	302mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.62 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.52 %

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 016	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 016
Sample Description	Soil 4	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 4 Arasapatti		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	33.2 %
	Sand		36.5 %
	Silt		30.3 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	23.7 mg/kg
16	Zinc as Zn		1.98 mg/kg
17	Boron as B		1.02 mg/kg
18	Potassium as K		32.3 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.17 mg/kg
23	Iron as Fe		2.21 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986	21.9 meq/100g of soil

*****End of Report*****

Page 1 of 4

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 017	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 017
Sample Description	Soil 5	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 5 Kombadi		

S.No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.21
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	347 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	45.6 %
04	Bulk Density	By Cylindrical Method	1.24 g/cm ³
05	Porosity	By Gravimetric Method	41.2 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	158 mg/kg
07	Magnesium as Mg		58.5 mg/kg
08	Chloride as Cl		136 mg/kg
09	Soluble Sulphate as SO ₄		0.019 %
10	Total Phosphorus as P		1.41 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	312 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.68 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.76 %

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 017	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 017
Sample Description	Soil 5	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 5 Kombadi		

S.No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	35.7 %
	Sand		34.6 %
	Silt		29.7%
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	24.3 mg/kg
16	Zinc as Zn		1.16 mg/kg
17	Boron as B		1.04/kg
18	Potassium as K		33.7 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		0.91 mg/kg
23	Iron as Fe		3.03 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986


*****End of Report*****

Page 1 of 1

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Authorised Signatory


 Name : Santhosh Kumar A
 Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 018	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 018
Sample Description	Soil 6	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 6 T.Kokulam		

S.No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.32
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	547 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	45.9 %
04	Bulk Density	By Cylindrical Method	1.16 g/cm3
05	Porosity	By Gravimetric Method	46.8 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	155.6 mg/kg
07	Magnesium as Mg		59.8 mg/kg
08	Chloride as Cl		132 mg/kg
09	Soluble Sulphate as SO ₄		0.017 %
10	Total Phosphorus as P		2.09 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	365 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.39 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.39 %

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Name: Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/ 018	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 018
Sample Description	Soil 6	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 KG	Sample Received On	01.03.2023
Sample Condition	Good	Test Commenced On	01.03.2023
Sampling Location	Soil – 6 T.Kokulam		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	35.1 %
	Sand		34.7 %
	Silt		30.2 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	27.9 mg/kg
16	Zinc as Zn		1.34mg/kg
17	Boron as B		1.14 mg/kg
18	Potassium as K		30.7 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		0.95 mg/kg
23	Iron as Fe		1.98 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

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A-17

Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/019	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/019
Sample Description	Surface Water (SW-1)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Surface Water (SW-1) - Pit Water		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical		
1	Colour	IS 3025 Part 4:1983	7 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	8.06
4	Conductivity @ 25°C	IS 3025 Part 14:2013	1284 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	5.3 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	757 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	274.4 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	68.7 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	25.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	258.6 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	169.4 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	72.6 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.5 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.511mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	14.3 mg/l

*****End of Report*****



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Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/019	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/019
Sample Description	Surface Water (SW-1)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Surface Water (SW-1) - Pit Water		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL: 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL: 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL: 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL (DL: 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	8.7 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	32.2mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	5.9 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.01 mg/l)
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	32.3 mg/l
	Discipline: Biological	Group: Water	
40	Total Coliform	APHA 23 rd Edn. 2017:9221B	1378 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	151 MPN/100ml

*****End of Report*****



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Authorised Signatory

 Name: Santhosh Kumar A
 Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/020	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/020
Sample Description	Surface Water (SW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Surface Water (SW-2) Virusangulam		

S.No.	Parameters	Test Method	RESULTS
Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	10 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	8.21
4	Conductivity @ 25°C	IS 3025 Part 14:2013	1011µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	4.9 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	596mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	257 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	67 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	21.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	234mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	186.7 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	68.2 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.47 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.29 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	12.3 mg/l

*****End of Report*****

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/021	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/021
Sample Description	Surface Water (SW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Surface Water (SW-2)– Virusangulam		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C6H5OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	11.2 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	36.1mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	5.7 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.01 mg/l)
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	30.4 mg/l
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23rd Edn. 2017:9221B	1128 MPN/100ml
38	Escherichia coli	APHA 23rd Edn. 2017:9221F	132 MPN/100ml

*****End of Report*****



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Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/022	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Customer Name			
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/022
Sample Description	Ground Water (WW-1)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (WW-1) – Near Project Area		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.47
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	967µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	1.3 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	580 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	208.1 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	55.6 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	16.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	191.6mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	169 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	46.8 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.38 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.26mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	9.7 mg/l

*****End of Report*****

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/022	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/022
Sample Description	Ground Water (WW-1)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (WW-1) – Near Project Area		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	203 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

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 Name: Santhosh Kumar A
 Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/023	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Customer Name			
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/023
Sample Description	Ground Water (WW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (WW-2) - Koodakovil		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.83
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	990 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	2.1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	594 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	220.3 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	52.0mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	17.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	199.6mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	158.4 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	56.3mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.37 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.17mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	8.6 mg/l

*****End of Report*****

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/023	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/023
Sample Description	Ground Water (WW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (WW-2) - Koodakovil		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	123 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-1)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (BW-1) – Near Project Area		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.67
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	927 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	2.6 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	556 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	199.9 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	47.4 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	19.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	165.3 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	152.5mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	50.7 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.38 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.17 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	6.9 mg/l

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (BW-1) – Near Project Area		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	157 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

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Authorised Signatory

 Name: Santhosh Kumar A
 Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk,Madurai District. Extent: 1.42.0Ha		
Customer Name			
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (BW-2) – Arasapatti		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical	Group: Water	
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.92
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	817 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	1.6 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	490 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	175.4 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	52.3 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	10.9 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	143.7mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	115 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	56.9 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.44mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.37 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	6.1 mg/l

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2023-24/024	Report Date	06.03.2023
Site Location	M/s.Tmt.M.Meenatchi Rough Stone and Gravel Quarry S.F.Nos. 16/2B, 16/3 & 16/4,Achankulam Village, Kallikudi Taluk, Madurai District. Extent: 1.42.0Ha		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	28.02.2023
Qty. of Sample Received	2 Litres	Sample Received On	01.03.2023
Sample Condition	Fit for Analysis	Test Commenced On	01.03.2023
Sampling Location	Ground Water (BW-2) – Arasapatti		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents(as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	134 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

 Name: Santhosh Kumar A
 Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2.Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.



National Accreditation Board for Education and Training



Certificate of Accreditation

Geo Exploration & Mining Solutions, Salem

No. 17, Advaita Ashram Road, Fairlands, Salem – 636 004, Tamilnadu, India.

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 opencast only	1	1 (a) (i)	A
2	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	B
3	Building and construction projects	38	8(a)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated Jan 06, 2023 and 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/23/2684 dated Feb 20, 2023. The accreditation needs to be renewed before the expiry date by Geo Exploration & Mining Solutions, Salem following due process of assessment.

Sr. Director, NABET
Dated: Feb 20, 2023

Certificate No.
NABET/EIA/2225/RA 0276

Valid up to
August 06, 2025

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