

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

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

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

CLUSTER EXTENT = 6.80.0 hectares

At

Mangalam Village, Cheyyar Taluk,

Tiruvannamalai District, Tamil Nadu State

TOR File No. 12919 and ToR Identification No. TO25B0108TN5903858N Dated: 27.11.2025

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and address	Extent & S.F.No.	Production in m ³ & Tons
M/s.MSH Blue Metal Director Mr.Jeevith Kumar, No. 11/1, 3rd East Street, Poonga Nagar, Sothupakkam Village, Cheyyur Taluk, Chengalpattu District – 603 319	1.98.0 ha & S.F. Nos. 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7	Rough stone 340500m ³ & 936375Ts Gravel 30600m ³ & 61200Ts

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

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

Valid till: 31.12.2026



ENVIRONMENTAL LAB

EKDANT ENVIRO SERVICES(P) Ltd

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North main road, Anna Nagar West Extn,

Chennai – 600101.

Baseline Study Period – Oct through Dec 2025

TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.12919

ToR Identification No. TO25B0108TN5903858N, dated. 27/11/2025

M/s. MSH Blue Metal Rough Stone & Gravel Mining Lease

Specific Terms of Reference s for (Mining of Minerals)

1. Seac Conditions - Site Specific

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

2. Seac Standard Conditions

S. No	Terms of Reference		Remarks
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:	
	(i)	Original pit dimension	As it is a fresh quarry, these conditions are not applicable.
	(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 6m height and ultimate depth of not exceeding 50m.	
	2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.		The VAO certificate is attached as Annexure, -V
	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.		The map showing the details of structures within the radius of 500m is shown in the Figure 4.3 under Chapter IV in the EIA report page 112.

4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Detailed hydrological study report will be submitted in the final EIA report.
5	The Proponent shall carry out Bio-diversity study through reputed Institution and the same shall be included in EIA Report.	The Bio-diversity study report from the reputed institution will be submitted in the final EIA report.
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	The DFO letter will be submitted in the final EIA report.
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / 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	This is a fresh quarry lease.

	during the time of appraisal for obtaining the EC.	
8	However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual ‘Slope Stability Plan’ for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.	This is a fresh lease area; the Slope Stability report will be submitted once the mining depth reaches 30m BGL.
9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	The affidavit for blasting operation will be enclosed in the final EIA report.
10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	A conceptual design of blasting has been given in Section 2.5.1 under Chapter II in the EIA report page 15.
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.	This is the only quarry in name of the lessee.
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	Not applicable, it is a fresh quarry lease.

	13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	As it is a fresh quarry lease, these conditions are not applicable.
	14	Quantity of minerals mined out.	
		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.	
	15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, is shown in Figure 2.2 of Chapter II, page-9.
	16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.	The drone video will be submitted during final presentation.
	17	The proponent shall furnish photographs of adequate fencing, green belt along the	Photographs of adequate fencing, green belt and safety distances of

		periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	nearby quarries/lands will be included in final EIA Presentation.
	18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.	The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. The details reserve estimation has been shown in Table 2.5 under Chapter II in the EIA report page 12.
	19	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	The chart including the role of statutory officials is prepared and given in section 2.7 -, page no-22.
	20	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open 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	The hydro-geological study is discussed in the Section 3.2.2 under Chapter III in the EIA report page 43-52.

		seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	
	21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data was collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed in Chapter III of EIA report, page 23-94.
	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.	Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 130-137.
	23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams

		after treating the water in settling tanks. The detailed rain water harvesting report will be included in final EIA report.
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.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1 under Chapter III in the EIA report page 24-34. The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 95. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.9 under Chapter II in the EIA report page 18.
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.	Not applicable, this rough stone and gravel is of 100% recovery. So, no waste rejects or dumps have been proposed in or outside

			the lease area. No requirement of R&R.
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.		Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area.
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.		As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.
28	Impact on local transport infrastructure due to the Project should be indicated.		Details regarding impact of the project on traffic and transport infrastructure are given in Section 3.7 under Chapter III in the EIA report page 93-94.
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.		A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.8 under Chapter III in the EIA report page 95-96.

30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	A progressive mine closure plan has been attached with the approved mining plan report as Annexure - IV The budget details for the progressive mine closure plan are shown in Table 2.13 under Chapter II in the EIA report page 21.
31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	The EIA coordinator and the FAE for ecology and biodiversity visited the study area and educated the local students about the importance of protecting the biological environment.
32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	A detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV in the EIA report page 113-114.
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	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-

	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.	friendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist. The green belt development plan including planting procedure is discussed in page- 113-114
34	A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	The disaster management plan for the project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 126-130.
35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Risk assessment plan for the project has been prepared and provided in Section 7.2 under Chapter VII in the EIA report page 126-130.
36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV in the EIA report 116-118.
37	Public health implications of the Project and related activities for the population in the	No public health implications are anticipated due to this project.

	impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII in the EIA report page 140-141.
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1 under Chapter VIII in the EIA report page 139.
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The benefits of the project in all these aspects are discussed in the Chapter VIII in the EIA report page 139-141.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	It is fresh lease area and the condition is not applicable.

	42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	A detailed environment management plan has been prepared following the suggestion made by SEAC, is added as Chapter X in the EIA report page 143-149. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted in final EIA report.
	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.	This EIA report has been prepared keeping in mind that, fact concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.

3. Seiaa Specific Conditions

S.No	Terms of Reference	Remarks
3.1	After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 340500 m³ of Rough Stone & 30600 m³ of Gravel up to the depth of 52m (2mAGL + 50mBGL) as	The proponent thanking the authorities for granting the ToR with Public Hearing for quantity of 340500 m ³ of Rough Stone & 30600 m ³ of Gravel up to the depth of 52m (2mAGL + 50mBGL) as per the approved mining plan.

	per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions & the SEIAA Standard conditions.	Will undergo a combined EIA study and prepare the EMP as per the recommendations.

4. Seiaa Standard Conditions:

S.No	Terms of Reference		Remarks
	Cluster Management Committee		
4.1	1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	A cluster management committee including all cluster proponents will be constituted by the proponent.
	2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.	The members of the cluster management committee will coordinate among themselves in effective implementation of EMP.
	3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease and updated every year.
	4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the	The plan has prepared and information regarding haul roads as route map and network has

		individual quarry in the form of route map and network.	been discussed in under Chapter II in the EIA report page 5-22.
	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 committee will frame the risk management plan including the evacuation plan in a holistic manner. However, quarrying will be stopped during the intense rain conditions.
	6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail in the EIA report.	It will be advised by the proponent to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.
	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.	The proper action plan regarding the restoration will be framed and followed by the committee.
	8	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	The health status of workers and the local people will be monitored and updated periodically.
	Agriculture & Agro-Biodiversity		
	9	Impact on surrounding agricultural fields around the proposed mining Area.	There shall be negligible air emissions or effluents from the project site. During loading the

			truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly, as shown in Section 4.6 under Chapter IV in the EIA report page 113-115.
	10	Impact on soil, flora & vegetation around the project site.	The details on flora have been provided in Section 3.5 under Chapter III in the EIA report page 65-79. There is no schedule I species of animals observed within study area. There is no endangered red list species found in the study area.
	11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III in the EIA report page 65-79. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV in the EIA report page 113-115.
	12	The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horticultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological details have been provided in Section 3.5 under Chapter III in the EIA report page 65-79 and measures have been provided in Section 4.6 under Chapter IV in the EIA report page 113-115.

	13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 97-119.
	14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV in the EIA report page 98.
	Forests		
	15	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	The project proponent will do barbed wire fencing work around the lease area to prevent wildlife from entering the site. A full-time watchman has been appointed in advance to restrict the movements of the local people nearby the quarry site.
	16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV in the EIA report page 113-115.
	17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The impacts of the project on standing trees and the existing trees have been discussed in Section 4.6 under Chapter IV in the EIA report page 113-115.

	18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	There are no such areas nearby project site. Protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.36 under Chapter III in the EIA report page 95.
	Water Environment		
	19	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	The detailed hydro-geological study is carried out and results are discussed in chapter-III of EIA report page- 43-52
	20	Erosion Control measures.	Garland drainage structures will be constructed around the lease area to control the erosion and afforestation will be done in order to restore the stability of the terrain, discussed in Section 4.3 under Chapter IV in the EIA report page 102.

21	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	The impacts have been discussed and provided in Chapter IV of EIA report page 97-119.
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	An analysis for food chain in aquatic ecosystem is discussed in Section 3.5 under Chapter 3 in the EIA report page 65-79.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment are discussed in Chapter IV in the EIA report page 97-119.
24	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV in the EIA report page 113-115.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV in the EIA report page 99.
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV in the EIA report page 100-102.
27	The EIA shall include the impact of mining activity on the following:	

		a. Hydrothermal / Geothermal effect due to destruction in the Environment	The average geothermal gradient of earth is 25 ⁰ C/km. As the proposed depth of mining is 50m below the local ground level, the temperature will increase by 1.25 ⁰ C at the depth of mining. So, there will be no effect on environment.
		b. Bio-geochemical processes and its foot prints including environmental stress.	No Bio-geochemical processes are anticipated as the quarrying is of hard rock type. At the end of life of mine, the proposed quarry shall be left as an artificial reservoir structure to collect rain water and will enrich the ecosystem.
		c. Sediment geochemistry in the surface streams	There will be no effect on sediment geochemistry and are discussed in the Table 3.4 under Chapter III in the EIA report page 37.
	Energy		
	28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	The measures taken to control noise, air, water, and dust are furnished in Chapter IV of the EIA report page 97-119.
	Climate Change		
	29	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon	The carbon emission and the measures to mitigate carbon emission have been discussed in

		sinks and temperature reduction including control of other emission and climate mitigation activities.	Section 4.6 under Chapter IV in the EIA report page 113-115.
	30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.	These aspects have been discussed in Chapter IV of the EIA report page 97-119.
	31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	There will be no such emission impact to local livelihood from this quarry project. All the vehicles used for transportation of the quarry materials will be maintained regularly to keep the GHGs emission within statutory limits.
	Mine Closure Plan		
	32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	This is a fresh lease; a progressive mine closure plan has been attached with the approved mining plan report in Annexure - IV The budget details for the progressive mine closure plan are shown in Table 2.13 under Chapter II in the EIA report page 21.
	EMP		

	33	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.	A detailed Environment Management plan has been given as Chapter X in the EIA report page 143-149.
	34	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	Environment Management plan with budget has been furnished in Tables 10.1 & 10.2 under Chapter X in the EIA report page 143-149.
	Risk Assessment		
	35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and management plan for this project has been prepared and provided in Section 7.2 under Chapter VII in the EIA report page 126-129.
	Disaster Management Plan		
	36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan for this project has been prepared and provided in Section 7.3 under Chapter VII in the EIA report page 129-130.
Others			

	37	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The VAO certificate is included as Annexure- V
	38	As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	The concerns raised during the public consultation will be submitted in final EIA report.
	39	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The plastic waste management has been discussed in Section 7.5 of Chapter VII in the EIA report page 137-138.

Standard Terms of Reference for (Mining of minerals)

1.

S.No	Terms of Reference	Remarks
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994	Not applicable, this a fresh quarry lease.

	came into force, w.r.t. the highest production achieved prior to 1994.	
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed as Annexure.
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All the documents are in the name of the lessee.
1.4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, is shown in Figure 2.2 of Chapter II, page-9.
1.5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, is shown in Chapter III of EIA report, pages-23-96
1.6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land	The lease area was inspected by the officers of Department of Mining and Geology along with revenue officials and

	use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	found that the land is fit for quarrying under the policy of State Government.
1.7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	The proponent has framed Environmental Policy and the same has been furnished in Section 10.1 under Chapter X, pp.143-144.
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	It is an opencast quarrying operation proposed to operate in Manual method. The Rough Stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 45 ⁰ bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines

		Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
1.9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and biodiversity studies. All data contained in the EIA report is for life of the mine / Lease period.
1.10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area delineating the features has been discussed in Section 3.1 under Chapter III, pp.24-29. The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III, p.95. Land use plan of the project area showing pre- operational, operational and post-operational phases are discussed in Table 2.9 under Chapter II, p.18.
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Not Applicable, the rough stone excavation is of 100% recovery, no dump or overburden will remain in or around the lease area.
1.12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project	Not applicable, as No forest land involved. The details have been given in Table 3.36 under Chapter III, p.95.

	Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the State Expert Appraisal Committees.	
1.13	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not applicable, as the proposed project area does not involve any forest land.
1.14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP).
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is found within the study area. The details of reserve forest within 10km have been tabulated in Table 3.36 under Chapter III, p.95. Flora and Fauna vegetation details are discussed in section 3.5.1 and 3.5.2 under chapter III, p.65-79.

1.16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	There is no any wildlife/protected area from the periphery of the project area. Information regarding wildlife /protected area within 10km has been given in Table 3.36 under Chapter III, p.95. Impact on Fauna and mitigation measures are given in section 3.5.1 and 3.5.2 under chapter III, p.65-79.
1.17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	The details of National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from the periphery of the project area furnished in Table 3.36 of Chapter III, p.95.
1.18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.5 of Chapter III, pp.65-79.

	area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not included in 'Critically Polluted' Area and does not come under 'Aravalli Range'.
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable The project doesn't attract the C.R.Z. Notification, 2018.
1.21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view.	Not Applicable. There are no approved habitations of SCs/STs or any other weaker sections in the lease area. R&R Plan might not require

	In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	
1.22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least	Baseline data were collected for the period of October 2025 - December 2025 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been discussed in Sections 3.1-3.8 of Chapter III, pp. 23-96.

	one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	
1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been discussed in Section 4.4 under the Chapter IV, pp.103-108.
1.24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II, p.20.
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily

		requirement basis. Drinking water will be sourced from the approved water vendors.
1.26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure will serve as water reservoir for nearby villages during droughts.
1.27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV, pp. 100-102.
1.28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from State Ground Water Authority for working below ground water and for pumping of ground	Not Applicable. The ground water table is found at the depth of 65-60 m below ground level. The ultimate depth of quarry is 52m (2m AGL and 50m BGL). Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2 under Chapter III, pp.39-52.

	water should also be obtained and copy furnished	
1.29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
1.30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The highest elevation of the project area is 120m. Ultimate depth of the mine is 52m (2m AGL and 50m BGL). Depth to the water level in the area is 65-60m BGL.
1.31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with	Greenbelt development plan has given in Section 4.6 under Chapter IV, pp.113-115.

	emphasis on local and native species and the species which are tolerant to pollution.	
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details are provided in Section 3.7 under Chapter III, p.93-94.
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities which are to be provided for mine workers has been discussed in Section 2.6. of Chapter II, page.21.
1.34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Progressive mine closure plan has been prepared for this project and is given in Table 2.13 under Section 2.5.9 under Chapter II, p.21.
1.35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be	Occupational health impacts of the project and preventive measures have been explained in Section 4.8 of Chapter IV, pp.116-117.

	incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
1.36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. The workers will be provided with face masks, helmets, rain coats, first aid kits etc. Regular health check-up will be conducted and medications will be provided, if needed.
1.37	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1 under Chapter VIII, p.139.
1.38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project	A detailed Environment Management Plan has been prepared and provided in Tables 10.1 & 10.2 of Chapter X, page-143-149.
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also	The minutes of public hearing along with proponent responses will be included in final EIA report.

	incorporated in the final EIA/EMP Report of the Project	
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No litigation is pending in any court against this project.
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	Project Cost is Rs.63,73,000/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs. 51,77,860 as capital cost and recurring cost as Rs. 21,06,920 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be Rs. 3,21,36,372, as shown in Tables 10.1 & 10.2 under Chapter X, pp.143-149.
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report	The disaster management plan for this project has been prepared and provided in Section 7.3 of Chapter VII, page129-130.
1.43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project in all aspects is given as Chapter VIII in EIA report page-139-141.
1.44	Besides the above, the below mentioned general points are also to be followed	
a)	All documents to be properly referenced with index and continuous page numbering	All the documents are properly referenced with index and continuous page numbering.

b)	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated	List of tables and source of the data collected have been mentioned.
c)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	All Original reports of Baseline samples analysis/testing will be included in final EIA report.
d)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided are in English language only.
e)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be included in final EIA report.
f)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009 have been followed while preparing this EIA report.
g)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public	No changes are made in the basic scope and the project parameters.

	Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	
h)	As per the circular no. J 11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	It is a new lease area; this condition is not applicable.
i)	The EIA report should also include; (i) Surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) Geological maps and sections, (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All the plans including surface & geological plans, and progressive closure plan have been included as Annexures.

STANDARD TERMS OF REFERENCE

1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in	Not applicable, it is fresh quarry lease.

	production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexure – IV.
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All the documents are in the name of the lessee.
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, is shown in Figure 2.2 of Chapter II in the EIA report page 9.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, are shown in Chapter III in the EIA report page 27-96.

6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The lease area was inspected by the officers of Department of Geology and Mining along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report	The Environmental Policy is discussed in the Section 10.1 of Chapter X in the EIA report page 143.
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided	It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 45° bench angles. Quarrying activities will be carried out

		under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.	The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and bio-diversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area delineating features has been discussed in figure 3.1 under Chapter III in the EIA report page 27-33. The details of surrounding sensitive ecological features have been provided in Table 3.36 under Chapter III in the EIA report page 95. Land use plan of the project area showing pre- operational, operational and post-operational phases are tabulated in Table 2.9 under Chapter II in the EIA report page 18.
11.	Details of the land for any over burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	It is not applicable, rough stone is of 100% recovery and no dumps have been proposed outside the lease area. The entire quarried rough stone will be transported to the needy customers. No raise of R&R

12.	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	It is not applicable, as no forest land involved within the proposed project area. The details of RF nearby the lease area is given in Table 3.36 under Chapter III in the EIA report page 95.
13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	It is not applicable, as the proposed project area does not involve any forest land.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	There is no any reserve forest in the study area.

		The details of reserve forest nearby are listed in the Table 3.36 under Chapter III in the EIA report page 95.
16.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.36 under Chapter III in the EIA report page 95.
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/ Elephant Reserves within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.36 under Chapter III in the EIA report page 95.
18.	A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.5 under Chapter III in the EIA report page 65-79.

	primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not listed in 'Critically Polluted' Area and does not come under 'Aravalli Range'.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable. The project doesn't attract the C.R.Z. Notification, 2018.
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be	Not Applicable.

	furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspect should be discussed in the Report	There are no approved habitations of SCs/STs and other weaker sections in the lease area. Therefore, R&R Plan / Compensation Plan might not require.
22	One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant	Baseline data were collected for the period of October - December 2025 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included and discussed in Sections 3.1-3.8 of Chapter III in the EIA report page 27-96.

	downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	
23.	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the Chapter IV in the EIA report page 103-108.
24.	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II in the EIA report page 20.
25.	Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater /seepage water in mine pits and purchased from local water vendors through water

		tankers on daily requirement basis. Drinking water will be sourced from the approved local water vendors.
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for nearby villages during droughts.
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 of Chapter IV in the EIA report page 100-104.
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground	The ground water table is found at the depth of 60-65m below ground level. The ultimate depth of quarry is 52m (2 AGL and 50m BGL). Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.3 under Chapter III in the EIA report page 51-52.

	water should also be obtained and copy furnished.	
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
30.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	The highest elevation of the project area is 120m. The ultimate depth of quarry is 52m (2m AGL and 50m BGL). Depth to the water level in the area is 60-65m below the ground level.
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up. From on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and	Greenbelt development plan has been prepared and given in Section 4.6 under Chapter IV in the EIA report page 113-115.

	native species and the species which are tolerant to pollution.	
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to analyses the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Section 3.7 under Chapter III in the EIA report page 93-94.
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities which are to be provided for mine workers after the grant of quarry lease has been discussed in Section 2.6.under Chapter II in the EIA report page 22.
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Progressive mine closure plan has been prepared for this project and is given in Section 2.6.5 under Chapter II in the EIA report page 22.
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	Occupational health impacts of the project and preventive measures have been explained in Section 4.8 under Chapter IV in the EIA report page 116-119.

	examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. The workers will be provided with face masks, helmets, rain coats, first aid kits etc. Regular health check-up will be conducted and medications will be provided, if needed.
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly and many indirectly as discussed in Section 8.1 under Chapter VIII 139.
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	A detailed Environment Management Plan has been prepared and provided in Table 10.1 & 10.2 under Chapter X in the EIA report page 143-149.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan	The minutes of public hearing and commitment of PP will be included in final EIA report.

	with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 63,73,000/- CER Cost is Rs. 5,00,000/- In order to implement the environmental protection measures, an amount of Rs. 51,77,860 as capital cost and recurring cost as Rs. 21,06,920 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 10 years will be Rs. 3,21,36,372 and shown in Tables 10.1 & 10.2 of Chapter X, pp.143-149.
42.	A disaster management plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 129-131.
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project in all aspects have been given as Chapter VIII in the EIA report page 139-141.

44	Besides the above, the below mentioned general points are also to be followed:	
a)	Executive Summary of the EIA/EMP Report.	Executive summary has been enclosed as a separate booklet.
b)	All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
c)	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	All Original reports of Baseline sample analysis/testing will be submitted in the final EIA report.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	All the documents provided here are in English language only.
f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be submitted in the final EIA report.
g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4 th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009 have been followed while preparing this EIA report.

h)	Changes, if any made in the basic scope and project parameters (as submitted in Form- I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	No changes are made in the basic scope and the project parameters.
i)	As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	As it is a new lease area, this condition is not applicable.
j)	The EIA report should also include; (i) Surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) Geological maps and sections and, (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All the plans including surface & geological plans, and progressive closure plan have been included as Annexures – IV.

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CHAPTER I

INTRODUCTION

1.0 PREAMBLE

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments the projects are categorized into A, B1 & B2 to determine the level of scrutiny and process. The mining projects whose extent is ≥ 5 ha or the cluster of quarries (if homogeneous mineral) within 500m radius extent is greater than 5ha falls under category B1. These projects require preparation and submission of an EIA report after public consultation to SEIAA to obtain environmental clearance as per the Office Memorandum F.No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

1.1 PURPOSE OF THE REPORT

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

1.2 ENVIRONMENTAL CLEARANCE

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

Screening

The project had applied in PARIVESH 2.0 proposal no. SIA/TN/MIN/555705/2025, Dated:27.10.2025 to obtain terms of reference.

Scoping

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

Public Consultation

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

Appraisal

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

1.3 TERMS OF REFERENCE (ToR)

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

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

Proposed Quarries					
Code	Name of the Owner	S.F. No	Village	Extent (ha)	Status
P1	M/s.MSH Blue Metal	102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7	Mangalam	1.98.0	Proposed Area
P2	G.Balaji	6/7,6/12A,6/12B,9/3B, 9/4B, 9/5A & etc	Mariyanallur	3.54.50	Proposed Area
Existing Quarries					
E1	M/s.MSH Blue Metal	35/3,35/4,36/2,36/3, 37/1,37/2 & 37/3	Mariyanallur	1.27.5	06.12.2021 to 05.12.2026
Total Cluster Extent				6.80.0	---

Source: DD Letter: Rc.No.484/Kanimam/2025, Dated:14.10.2025

The file was appraised in 641th SEAC meeting on 11.11.2025 and issued terms of reference (ToR) identification no **TO25B0108TN5903858N** on **27.11.2025** by SEIAA, TN.

1.4 POST ENVIRONMENT CLEARANCE MONITORING

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

1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

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

1.6 IDENTIFICATION OF THE PROJECT PROPONENT

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

1.2 Details of Project Proponent

Name of the Project Proponent	M/s.MSH Blue Metal
Address	Director Mr.Jeevith Kumar, No. 11/1, 3rd East Street, Poonga Nagar, Sothupakkam Village, Cheyyur Taluk, Chengalpattu District – 603 319.
Status	Proponent

1.7 BRIEF DESCRIPTION OF THE PROJECT

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

The overall extent of the project site is 1.98.0ha and it is located in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu.

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

1.8 SCOPE OF THE STUDY

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

1.9 Legislation Applicable to Mining of Mineral Sector

A few important legislations are given below:

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

CHAPTER II

PROJECT DESCRIPTION

2.0 DECSRIPTION OF THE PROJECT

The proponent MSH Blue Metal is involved in the mining and its auxiliary activities. The proponent had applied for quarry lease on 22.09.2025 to extract rough stone and gravel. The precise area communication letter was issued by Deputy Director of Geology and Mining, Tiruvannamalai vide (Roc.No.484/Kanimam/2025, Dated 19.09.2025). The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Tiruvannamalai (Rc.No.484/Kanimam/2025 Dated 14.10.2025). The project area and the proposed excavation details were given in Table 2.1.

Table 2.1 Proposed project area and excavation details

Name of the Quarry	MSH Blue Metal	
Type of Land	Patta Land	
Extent	1.98.0ha	
S.F. No	102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7	
Toposheet No	57 P/10	
Highest Elevation	120m AMSL	
Latitude	12°42'51.09"N to 12°42'56.90"N	
Longitude	79°35'3.00"E to 79°35'7.47"E	
Proposed depth as per ToR	52m (2m AGL + 50m BGL)	
Ultimate depth for ten years	52m (2m AGL + 50m BGL)	
Geological Resources	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	990000 & 2722500	39600 & 79200
Mineable Reserves	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	340500 & 936375	30600 & 61200
Proposed production for 10 years	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	340500 & 936375	30600 & 61200
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
	Jack hammer	2

Machinery requirements	Excavator	1
	Compressor	1
	Tipper	8
Proposed Manpower Deployment	20	
Project Cost	Rs.63,73,000/-	
Proposed Water Requirement	3.5 KLD	

2.1 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Mangalam village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu as shown in Figure 2.1.

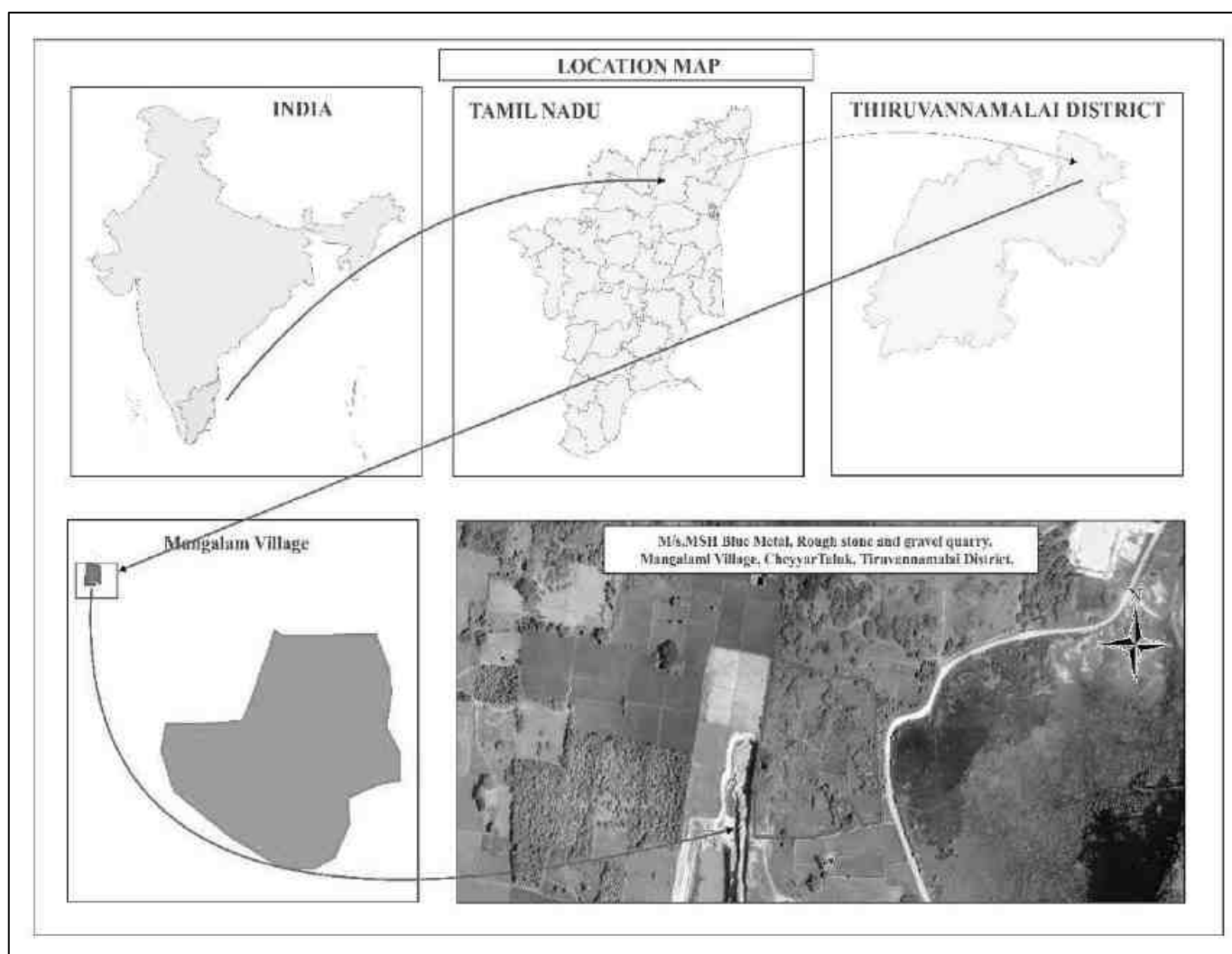


Figure 2.1 Key Map Showing Location of Project Site

To reach the site access the SH – (Cheyyar-Kancheepuram road). The travel distance is around 1.60km from North side. Accessibility details to the proposed project site have been given in Table 2.2.

Table 2.2 Site Connectivity to the Project Area

Type of Features	Name/Location	Distance (km)	Direction
Bituminous road	Village road	1.05	W
Nearest Roadways	SH – 770 (Cheyyar – Kancheepuram)	1.5	SE
Nearest Town	Kancheepuram	19.50	NE
Nearest Airport	Chennai	88.0	NE
Nearest Villages	Vadapundipattu	0.9	N
	Mangalam	0.6	E
	Tumbai	1.5	S
	Mariyanallur	0.8	NW

2.2 LEASEHOLD AREA

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

Table 2.3 Lease hold area details

Survey No	Sub Division	Total Extent in Hect	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F.No.	Mine lease Applied area out of total area in hect.
102	1	0.30.5	427	M/s.MSH Blue Metal	102/1	0.30.5
102	2	0.14.0			102/2	0.14.0
102	3	0.14.0			102/3	0.14.0
102	4	0.06.0			102/4	0.06.0
102	5	0.05.0			102/5	0.05.0
102	6A	0.11.0			102/6A	0.11.0
102	6B	0.10.0			102/6B	0.10.0
102	7A	0.13.0			102/7A	0.13.0
102	7B	0.02.0			102/7B	0.02.0
102	7C	0.09.0			102/7C	0.09.0
103	3A	0.04.5			103/3A	0.04.5
103	3B	0.04.0			103/3B	0.04.0
103	4	0.09.5			103/4	0.09.5
103	5A	0.10.0			103/5A	0.10.0
103	5B	0.06.0			103/5B	0.06.0
103	5C	0.11.0			103/5C	0.11.0
103	5D	0.04.5			103/5D	0.04.5
103	6A	0.13.5			103/6A	0.13.5
103	6B	0.13.5			103/6B	0.13.5
103	7	0.07.0			103/7	0.07.0
Total Extent		1.98.0	Applied lease area extent			1.98.0

The proposed project is site specific. There is no mineral beneficiation or processing proposed inside the project area. There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

The overall extent of the project area is 1.98.0Ha as per the precise area communication letter vide Roc.No.484/Mines/2025, dated 19.09.2025 issued by Dept of Geology and Mining, Tiruvannamalai District lies near the Mangalam village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu. The breakup of the existing land use for mining and ancillary feature is given in Table 2.3a.

Table 2.3a Present Land use pattern of the project area

Sl. No.	Land Use	Present area (Hect.)
1.	Area under Mining	Nil
2	Infrastructure	Nil
3	Roads	Nil
4	Unutilized	1.98.0
5	Green Belt	Nil
6	Settling Tank & Drainage	Nil
	Grand Total	1.98.0

2.2.1 Geo Coordinates

The proposed lease area is elevated topography. The maximum elevation (120m) was observed center side of the site. The boundary corner and the intermediate stone geographic coordinates is given in Table 2.4 and shown in Figure 2.2.

The quarries within the cluster of 500m radius as per the letter Rc.No.484/kanimam/2025 dated: 14.10.2025 is enclosed as Annexure II is shown in Figure 2.3.

Table 2.4 Geographic coordinates of the Project area

Pillar No	Latitude	Longitude	pillar No	Latitude	Longitude
1	12°42'56.09"N	79°35'7.17"E	9	12°42'51.52"N	79°35'6.23"E
2	12°42'55.91"N	79°35'7.24"E	10	12°42'51.32"N	79°35'6.28"E
3	12°42'55.65"N	79°35'7.29"E	11	12°42'51.10"N	79°35'5.19"E
4	12°42'51.56"N	79°35'7.47"E	12	12°42'51.09"N	79°35'3.00"E
5	12°42'51.45"N	79°35'6.91"E	13	12°42'52.68"N	79°35'3.03"E
6	12°42'52.18"N	79°35'6.45"E	14	12°42'56.90"N	79°35'3.63"E
7	12°42'52.17"N	79°35'5.78"E	15	12°42'56.36"N	79°35'5.80"E
8	12°42'51.66"N	79°35'6.06"E	16	12°42'56.20"N	79°35'6.95"E

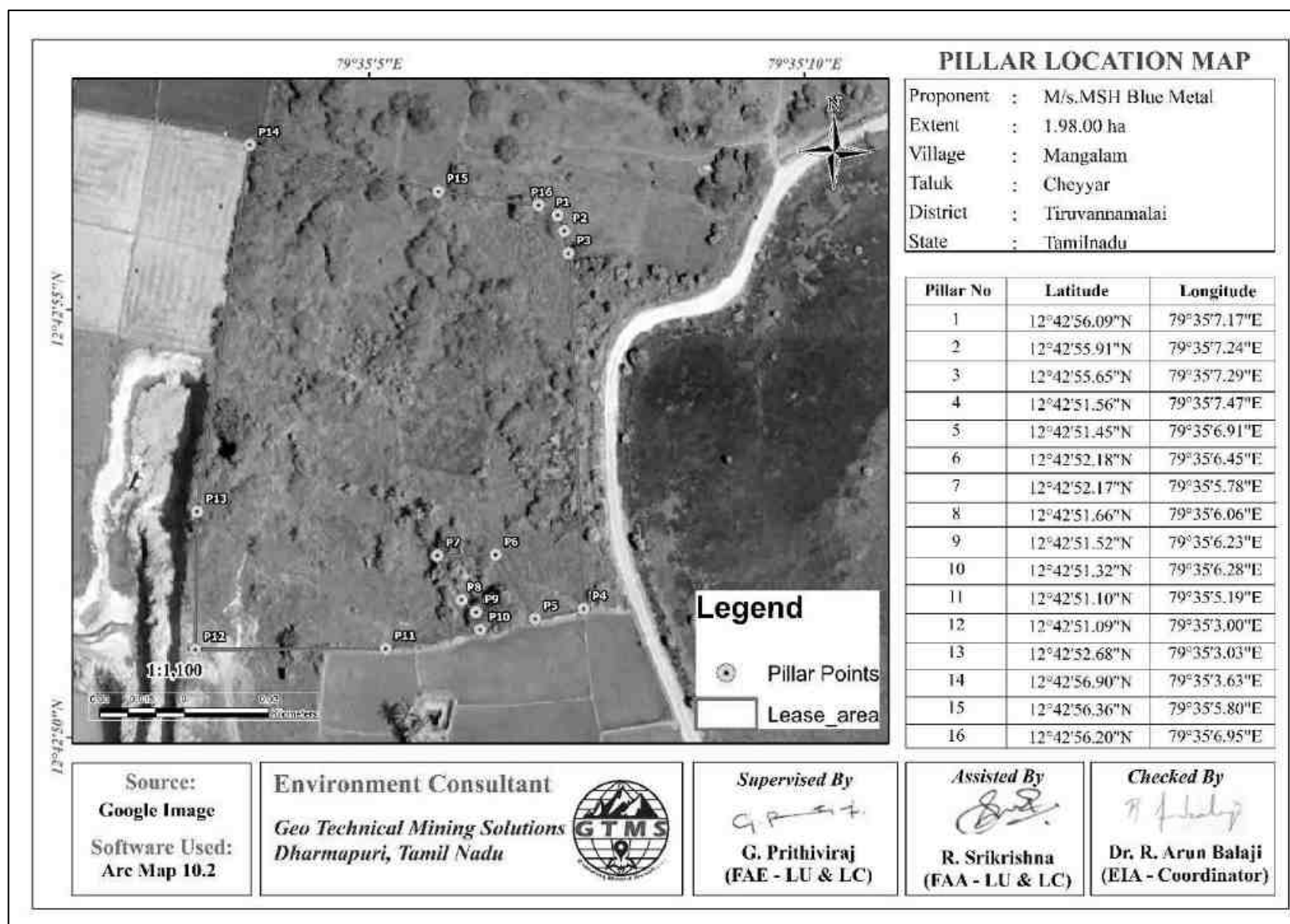


Figure 2.2 Google Earth Image Showing Pillar Coordinates of Lease Area

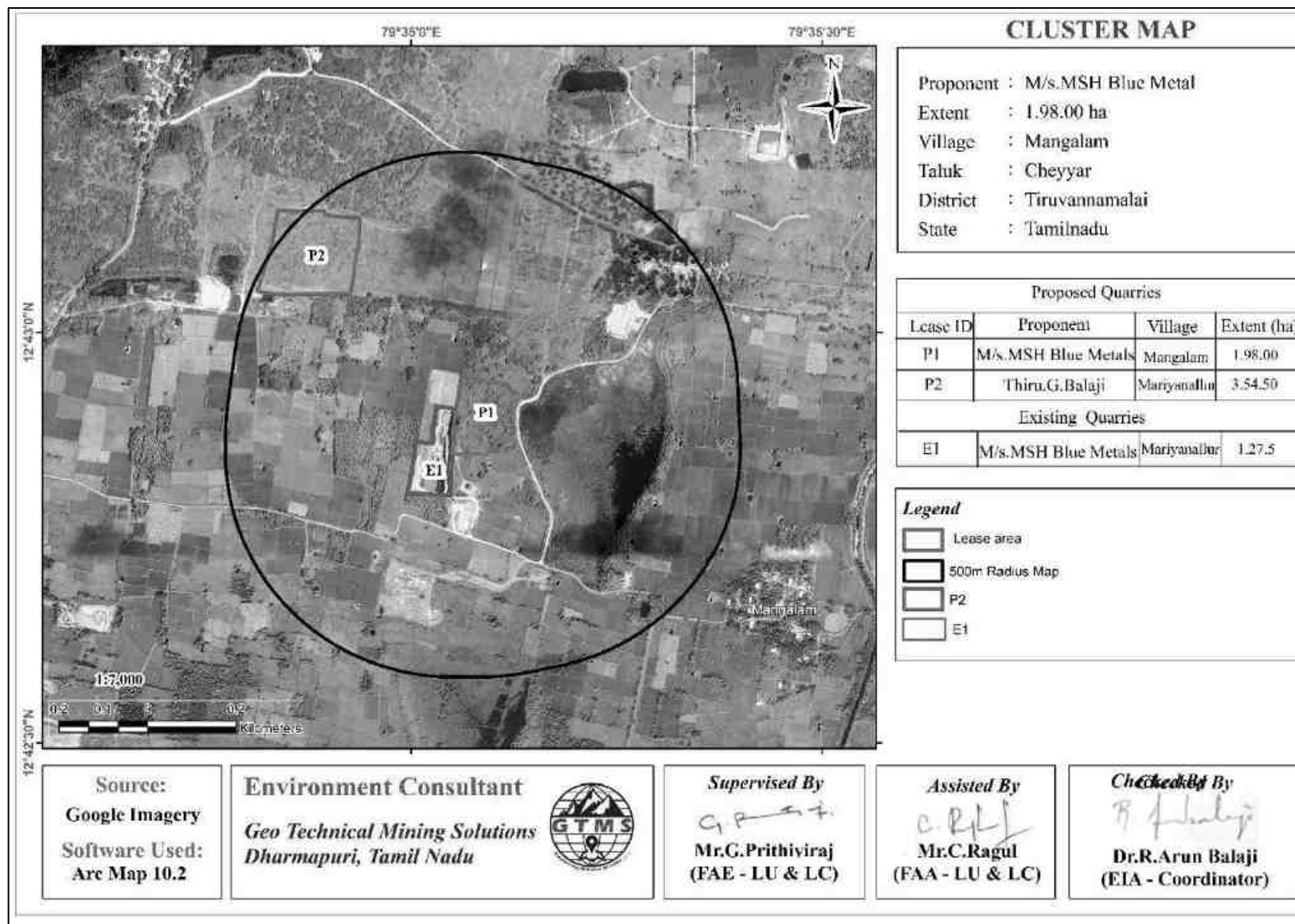


Figure 2.3 Google Earth Image of the cluster

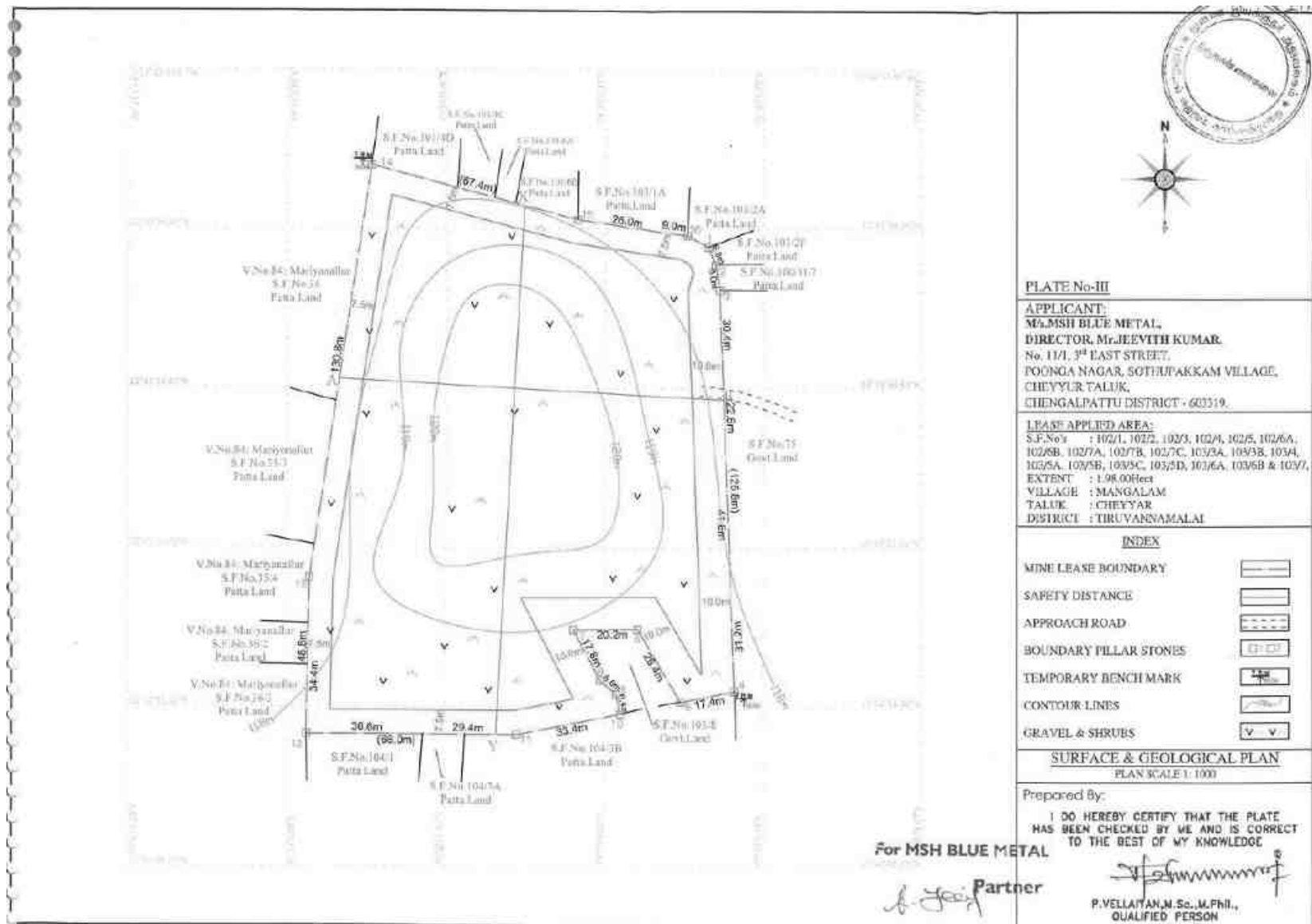


Figure 2.4 Surface & Geological Plan

2.3 GEOLOGY

The compositional characteristics of co-existing orthopyroxene, garnet and biotite have established several petrographic varieties within the Charnockites–Enderbites such as the granulites and gneisses. The mineral composition shows an unvarying presence of pleochroic rhombic pyroxene. Plagioclase feldspars, alkali feldspars and quartz are the salic minerals present in this series of rocks. Order of superposition of the proposed lease.

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

The gravel available at a depth of 0.5m followed by gravel exists up to a depth of 5m and the rough stone occurs at a depth of 5m below ground level.

2.4 QUANTITY OF RESERVES

The resources and reserves of rough stone and gravel were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety margins, as shown in Figure 2.5 and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 52m (2m AGL + 50m BGL) considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The results of geological resources and reserves is given in Table 2.5 and the approved year wise development plan is enclosed as Figure 2.5 & 2.5a.

Table 2.5 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m ³ & Tons	Gravel in m ³ & Tons
Geological Resource in (m ³ & Ts)	990000 & 2722500	39600 & 79200
Mineable Reserves in (m ³ & Ts)	340500 & 936375	30600 & 61200
Proposed production for 10 years (m ³ & Ts)	340500 & 936375	30600 & 61200

Source: Approved Mining Plan & ToR

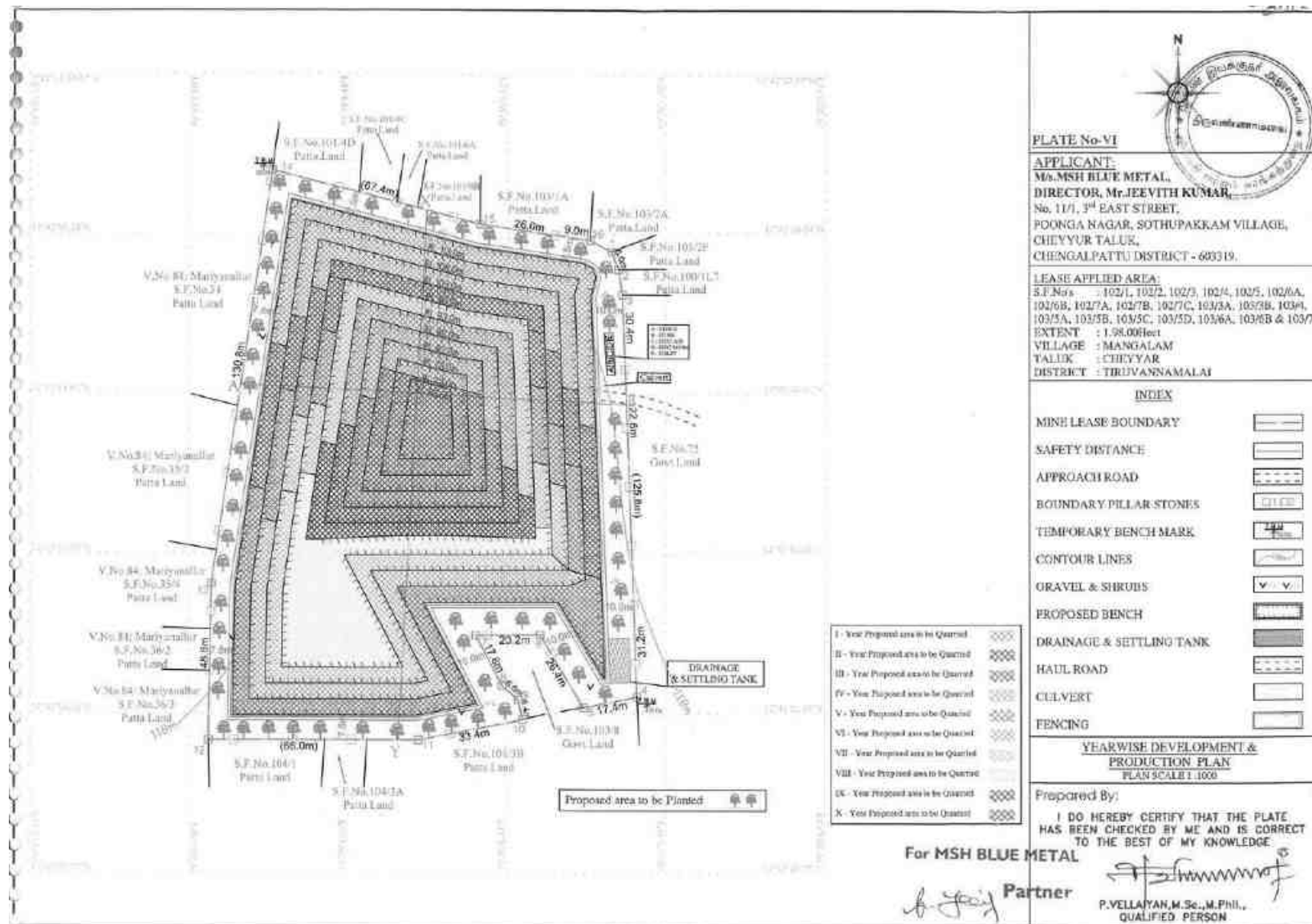


Figure 2.5 Year wise Development & Production Plan

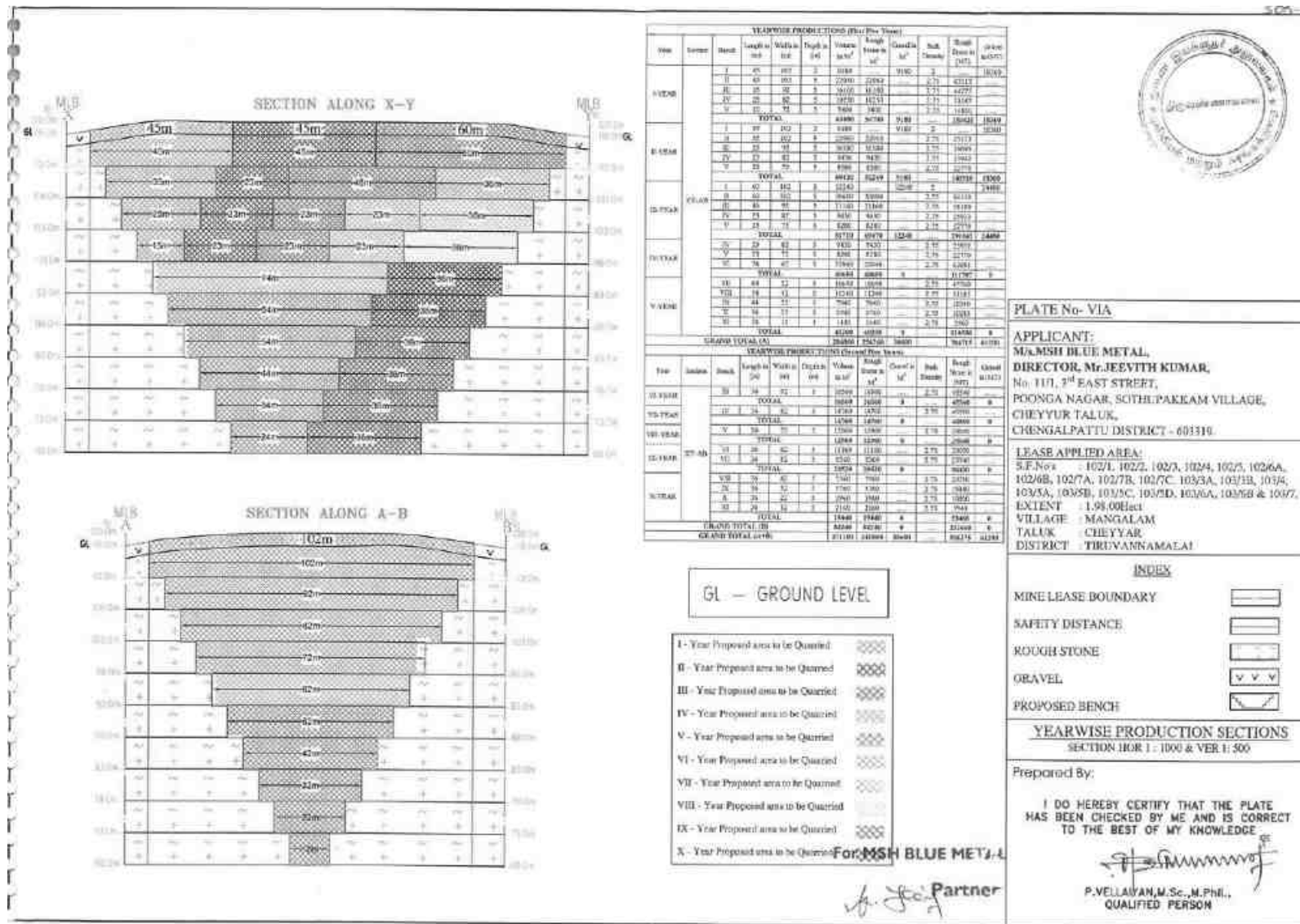


Figure 2.5a Year wise Development & Production Section

2.5 MINING METHOD

The Quarrying operation is proposed to be carried out by open cast mechanized mining method with the bench height and width of 5 m each. The open cast mechanized method involving drilling and blasting is proposed to extract rough stone. The extracted rough stone will be loaded to the trucks to the nearby stone crushing units. Due permission from D.G.M.S, will be taken as per Rule 106 of MMR 1961 is proposed. Mining operation is proposed in one shift i.e. 8 AM to 4 PM. The average number of working days in a year would be 270 days/yr excluding Sunday & holidays. The production will be slow down trend during monsoon period. In this project, NONEL blasting will be adopted to extract rough stone.

2.5.1 Conceptual Blasting Design

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

Rules of Thumb for Blast Design

Based on practical experience and technical information, a set of rules for blasting have been provided as below (Chapter8 (nps.gov)). These rules will be applied to blast rocks in the proposed project.

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

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

Rule 2: Generally, select the densest explosive possible.

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

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

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

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

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

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

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

Rule 6: Stemming should be equal to the burden.

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

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

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

Table 2.6 Conceptual Blasting Design

Blasthole Diameter (D) in mm	32
Burden (B) in m	1.5
Spacing (S) in m	1.30
Subdrill in m	0.45
Charge length (C) in m	0.64
Stemming	1.5
Hole Length (L) in m	2.6
Bench Height (BH) in m	2.1
Stemming material size in mm	3.2
Burden stiffness ratio	1.43
Blast volume/hole in m ³	4.16
Number of blastholes/day	30
Blasthole pattern	Staggered
Mass of explosive /day in kg	12.13
Powder factor in kg/m ³	0.10
Type of explosives	Slurry
Initiation system	NONEL

Statutory Provision & Precaution during Blasting: -

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

2.5.2 Magnitude of Operation

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

Table 2.7 Operational Details for Proposed Project

	Rough Stone (m³) & Ts / 10 years	Gravel (m³) & Ts / 3 years
Proposed production	340500 & 936375	30600 & 61200
Number of Working Days	270	270
Production /Day (m ³) & Ts	126 & 347	38 & 76
No. of Lorry Loads	21	6

2.5.3 Extent of Mechanization

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

Table 2.8 Machinery Details

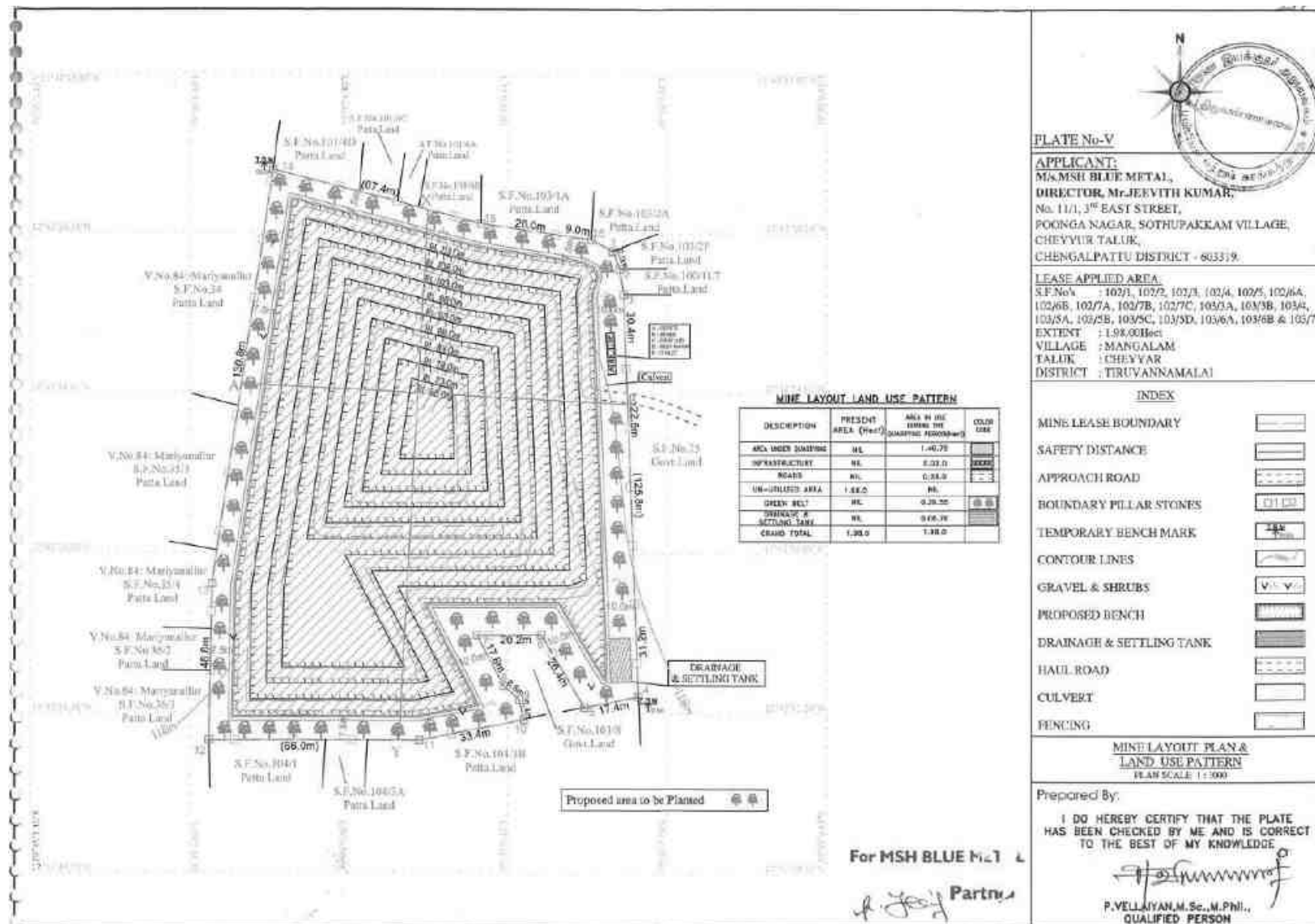
S. No.	Type	No. of Unit	Size/Capacity	Dia of Hole (mm)	Motive Power
1	Jack Hammers	2	Hand Held	32mm	Diesel
2	Compressor	1	AIR	---	Diesel
3	Excavator	1	2.9 - 4.5 m ³	---	Diesel
Haulage & Transport Equipment					
4	Tipper	8	---	---	Diesel

2.5.4 Post mining land use

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

Table 2.9 Land Use at the end of mine Life

Description	Present area (Hect.)	Area at the end of life of quarry (ha)
Area under quarry	Nil	1.46.75
Infrastructure	Nil	0.02.0
Roads	Nil	0.03.0
Green Belt	Nil	0.39.55
Un utilized Area	1.98.0	Nil
Drainage & Settling Tank	Nil	0.06.7
Total	1.98.0	1.98.0



2.5.5 Conceptual Mining Plan

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

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m)	Depth (m)
I	150	102	52

Source: Approved Mining Plan & ToR

2.5.6 Infrastructures

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

Other Infrastructure Requirement

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

2.5.7 Water Requirement

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

Table 2.11 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	1.2 KLD	Existing bore wells nearby the lease area
Green Belt development	1.3 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.0 KLD	Existing bore wells and approved water vendors
Total	3.5 KLD	

Source: Prefeasibility Report

2.5.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12 Around **15,41,100 litres of HSD** will be used for rough stone extraction during 10 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.12 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	Rough Stone (340500 m³)	Gravel (30600m³)	Total Diesel (litre)
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m ³ /hr)	20	60	---
Time Required (hours)	17,025	510	---
Total Diesel Consumption for 10 years (litre)	2,72,400	5,100	2,77,500
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	30	---	---
Total Diesel Consumption for 10 years (litre)	32,400	---	32,400
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m ³	6	6	---
Number of Trips / days	21	6	---
Number of Trips / 10 years	56,700	4,860	---
Total Diesel Consumption for 10 years (litre)	11,34,000	97,200	12,31,200
Total Diesel Consumption by Excavator, Compressor and Tipper			15,41,100

2.5.9 Capital Requirement

The project proponent will invest Rs. **63,73,000** to the project. The breakup summary of the investment has been given in Table 2.13.

Table 2.13 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset	13,00,000
2	Machinery	25,00,000
3	EMP	25,73,000
	Total Project Cost	63,73,000

Source: *Approved Mining Plan*

2.6 MANPOWER REQUIREMENT

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

Table 2.14 Employment Potential for the Proposed Project

S. No.	Category	Role	Nos
1	Highly Skilled	Mines Manager	1
		Mine Engineer	1
		Mine Geologist	1
		Blaster	1
2	Unskilled	Musdoor/ Labours	16
Total			20

Source: Prefeasibility Report

2.7 PROJECT IMPLEMENTATION SCHEDULE

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

Table 2.15 Expected Time Schedule

S. No.	Particulars	Time Schedule (in Months)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to Establish						Project Establishment Period
3	Consent to operate						Production starting period.
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

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

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

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

Study Area

The study area has been divided into two zones: core zone and buffer zone. Core zone is considered as lease area and buffer zone as 5 km radius from the periphery of the cluster, except for ecological study, which considers 10 km as buffer zone. Both core and buffer zones are taken as the study area. The data was collected from the study area to understand the existing environment conditions of the above-mentioned environmental components. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1.

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 10 km radius of the study area	Once during the study period	Study Area	Satellite Imagery & Primary Survey
*Soil	Physico- Chemical characteristics	Once during the study period	6 (1 in core & 5 in 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	7 (3 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	24 hours, twice a week	5 (1 core & 4 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	5 (1 core & 5 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 Quadrant & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-economic characteristics, Population statistics and existing infrastructure in the study area	Site visit & Census Handbook, 2011	Study area	Primary Survey, census handbook & need based assessments.

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

3.1 LAND ENVIRONMENT

3.1.1 Geology and Geomorphology

Cheyar Taluk forms a part of Thiruvannamalai District covering an area of 634 sq.km and lies in the northern part of Tamilnadu. The geology of study area located in Cheyyar

Taluk is characterized by a hard rock terrain primarily composed of Archean metamorphic rocks with a significant presence of younger sedimentary deposits. The geology map of the study area is prepared from the district resource map developed by Geological Survey of India (GSI 2005). The digital map after geo-referencing process clipped with referenced to the study area boundary. Rock formations in the study area are

Archean Suite (Oldest) (Primary Formations: Charnockite, Epidote-hornblende gneiss, Hornblende-biotite gneiss) **Associated Rocks:** Pyroxene granulite, Migmatite and Magnetite quartzite.

- **Intrusive Features:** Dolerite dykes (Cross-cutting the Archean country rocks)
- **Sedimentary Deposits (Youngest):** Recent to Sub-recent Sediments (Sand, Silt and Gravel)

The geology of the study area is shown in **Figure 3.1**. The study area is dominated by **Charnockite** a metamorphic rock that serves as the primary geological structure and the remaining are argillaceous sandstone.

The difference between charnockite and argillaceous sandstone are there

- I. **origin** (metamorphic/igneous vs. sedimentary),
- II. **composition** (feldspar/pyroxene vs quartz/clay),
- III. **texture** (coarse/crystalline vs. gritty/fine)
- IV. **formation process** (deep crustal transformation vs. surface deposition) and
- V. **porosity** (Sandstone is often porous (good for water) while argillaceous layers are often impermeable.

Geomorphology:

The geomorphology of study area is characterized by a hard rock terrain primarily dominated by a **pediment-pediplain complex** which covers a significant portion of the area. The landscape is mostly flat with a general slope from west to east.

The key geomorphological features of the region include:

- **Landforms:** The predominant features are pediments, shallow pediments and buried pediments.
- **Drainage:** The area is drained by the seasonal cheyyar river which is a major tributary of the Palar River. The drainage pattern is generally dendritic.
- **Soil Type:** The region is characterized by deep red soil, thin red soil, clayey soil and gravelly soil with red soil being the most predominant.

The geomorphology of the study area is given in **Figure 3.2**.

3.1.2 Land Use/ Land Cover

The study area (5 km radius approximately **8135.27 ha**) around the proposed mine site was classified into seven LULC classes using Sentinel II imagery. The rapid population growth drives significant land-use/land-cover (LULC) changes primarily increasing built-up areas at the expense of agricultural land and water bodies leading to habitat loss, increased land surface temperature (LST) and strain on resources though improved agricultural tech has somewhat reduced pressure on cultivated land. The overall trend shows conversion from natural/agricultural uses to urban infrastructure.

Aerial Coverage by LULC Class

- Crop Land: The dominant feature, comprising the maximum area of 5291.90ha (65.05%).
- Built-up Area: The second largest class covering 798.35 ha (9.81%).
- Fallow Land: FL Accounts for 644.22 ha (7.92 %) of the landscape.
- Water Bodies: Including major flows and small tanks totalling 1309.70 ha (16.10%).
- Mining Area: Covers 53.96 ha, representing the least percentage of the total area (0.66%).
- Sparse Vegetation: Covers 15.96 ha (0.20%).
- Barren Land: The smallest naturally occurring class, with 21.19 ha (0.26%).

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	2025	
		Area in Hectares	Area in %
1	Water Bodies	1309.70	16.10
2	Vegetation cover	15.96	0.20
3	Crop Lands	5291.90	65.05
4	Mining area	53.96	0.66
5	Built-up Area	798.35	9.81
6	Barren Land	21.19	0.26
7	Fallow land	644.22	7.92
Total		8135.27	100

Source: Sentinel II Satellite Imagery

The LULC changes within a 5 km radius study area between 2017 and 2025 is given in Table 3.2a.

Table 3.2a Comparison of LULC 2017 – 2025

S. No.	Classification	LU in 2017		LU in 2025	
		in Ha	in %	in Ha	in %
1	Water Bodies	1100.61	13.53	1309.70	16.10
2	Vegetation	6.96	0.09	15.96	0.20
3	Crop Land	5924.9	73.44	5291.90	65.05

4	Mining Area	29.58	0.36	53.96	0.66
5	Built-up Area	562.93	6.92	798.35	9.81
6	Bare Land	6.56	0.08	21.19	0.26
7	Fallow Land	503.75	5.58	644.22	7.92
Total		8135.27	100	8135.27	100

The study area (8,135.27 Ha) underwent significant transitions between 2017 and 2025. The primary trend is a shift from agricultural dominance toward urbanization and industrial activities accompanied by an unexpected increase in water bodies.

Land Use Change Summary (2017–2025)

Classification	Net Change (Ha)	% Change in Total Area	Interpretation
Crop Land	-633.00	-8.39%	Significant loss; likely converted to built-up and fallow lands.
Built-up Area	+235.42	+2.89%	Rapid urban expansion due to population growth and infrastructure.
Water Bodies	+209.09	+2.57%	Expansion potentially from new reservoirs or mine-induced ponding.
Fallow Land	+140.47	+2.34%	Increase suggests land degradation or pending conversion to built-up.
Mining Area	+24.38	+0.30%	Growth in industrial footprint, nearly doubling its 2017 size.
Vegetation	+9.00	+0.11%	Small gain, possibly due to plantation or reclamation efforts.
Bare Land	+14.63	+0.18%	Likely due to construction site clearing or land degradation.

From the above table it is observed that the increase in bare and fallow land combined with urban growth typically leads to higher Land Surface Temperatures (LST) and reduced groundwater recharge (ecosystem stress).

A deeper analysis of 2017–2025 LULC data were done to know the annual rates of change and a hypothesized transition matrix are as follows

1. Annual Rate of Change (ARC)

The **ARC** represents the average annual percentage increase or decreases for each category over the 8-year period. It is calculated using the formula:

$$ARC = [(Area_{final} - Area_{initial}) / Area_{initial}] / years \times 100.$$

Classification	Total Net Chang(Ha)	Annual Rate of Change (%)
Built-up Area	+235.42	+5.23% (Highest growth rate)
Water Bodies	+209.09	+2.37%
Mining Area	+24.38	+10.30% (Small base, fast growth)
Crop Land	-633.00	-1.34% (Steadiest decline)
Bare Land	+14.63	+27.88% (Driven by rapid clearing)

2. Hypothesized Transition Matrix

A transition matrix identifies which land types likely converted into others. Based on common regional trends and your specific data the built-up area expansion likely came from these sources:

- **Crop Land → Built-up Area:** This is typically the dominant transition, accounting for ~60-70% of urban expansion as farmers sell land near growing infrastructure.
- **Crop Land → Fallow Land:** Much of the 140.47 Ha increase in fallow land likely represents "transitional" crop land that has been left uncultivated in preparation for sale or due to decreasing water availability.
- **Mining Area → Water Bodies:** The 209 Ha increase in water might be linked to the growth in **Mining Area**. Open-pit mines often accumulate water (ponding), creating new "water bodies" on the map.
- **Vegetation → Bare Land:** The slight increase in bare land (+14.63 Ha) often precedes urban construction or results from clearing existing vegetation

Key Interpretations for 2026 onwards

- **Sustainability Risk:** If the -1.34% annual loss of crop land continues the area will lose another ~500 Ha by 2033 significantly impacting local food security.
- **Industrialization Push:** The doubling of mining area (from 0.36% to 0.66%) and the surge in built-up area suggest this region is shifting from a primary (agricultural) economy to a secondary/tertiary (industrial/urban) economy

3.1.3 Topography

The Toposheet 57 P/10 is a specific Survey of India (SoI) topographical map at a 1:50,000 scale, where 1 cm on the map = 500 meters on the ground. Based on the geographical grid this sheet primarily covers parts of Northern Tamil Nadu specifically within the Tiruvannamalai and Kanchipuram districts. The slope is towards eastern side and falls in Toposheet no. 57 P/10 and the topo-map is given in Figure 3.5.

The 2017–2025 land use and land cover data aligns perfectly with the physical characteristics of this specific toposheet:

- The high percentage of agriculture (73%) reflects the rural-agrarian nature of the Palar-Cheyyar sub-basin.
- This grid is known for its traditional Tank Irrigation Systems (Eris). The 13–16% water body coverage in your data corresponds to these large seasonal tanks, which are prominent blue features on the toposheet.
- The expansion noted (from 6.9% to 9.8%) likely reflects the growth of towns and the encroachment of residential layouts into formerly agricultural fringes identified on the map.
- The area is mostly an undulating plain with gentle slopes. Contours are widely spaced indicating a flat terrain ideal for agricultural expansion and the built-up area growth (+40%) recorded.
- Typical elevations range from 80m to 120m above mean sea level. The soil erosion risk is generally low.

3.1.4 Drainage Pattern

The study area's drainage pattern is influenced by two major seasonal rivers. The drainage pattern is concordant and is characterized by a **sub-dendritic system** with first-order streams. **Toposheet 57 P/10** (Vandavasi/Cheyyar region) reveals a landscape primarily defined by its drainage network and subtle elevation changes which directly influence the LULC shifts observed.

The drainage density of this toposheet is typically moderate (1.4 - 1.8 km/km²), influenced by the Cheyyar River and its tributaries.

- **Drainage Pattern:** Predominantly **dendritic** (tree-like) which is common in the weathered hard-crystalline rock terrain of Tiruvannamalai.
- **LULC Correlation:** High drainage density in the southern part of the sheet supports the extensive Crop Land (73%) through "Eri" (tank) irrigation. However, the conversion of some streams into dry channels often explains the increase in Fallow Land and Bare Land (+2.34%) in LULC data.

3.1.5 Seismic Sensitivity

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

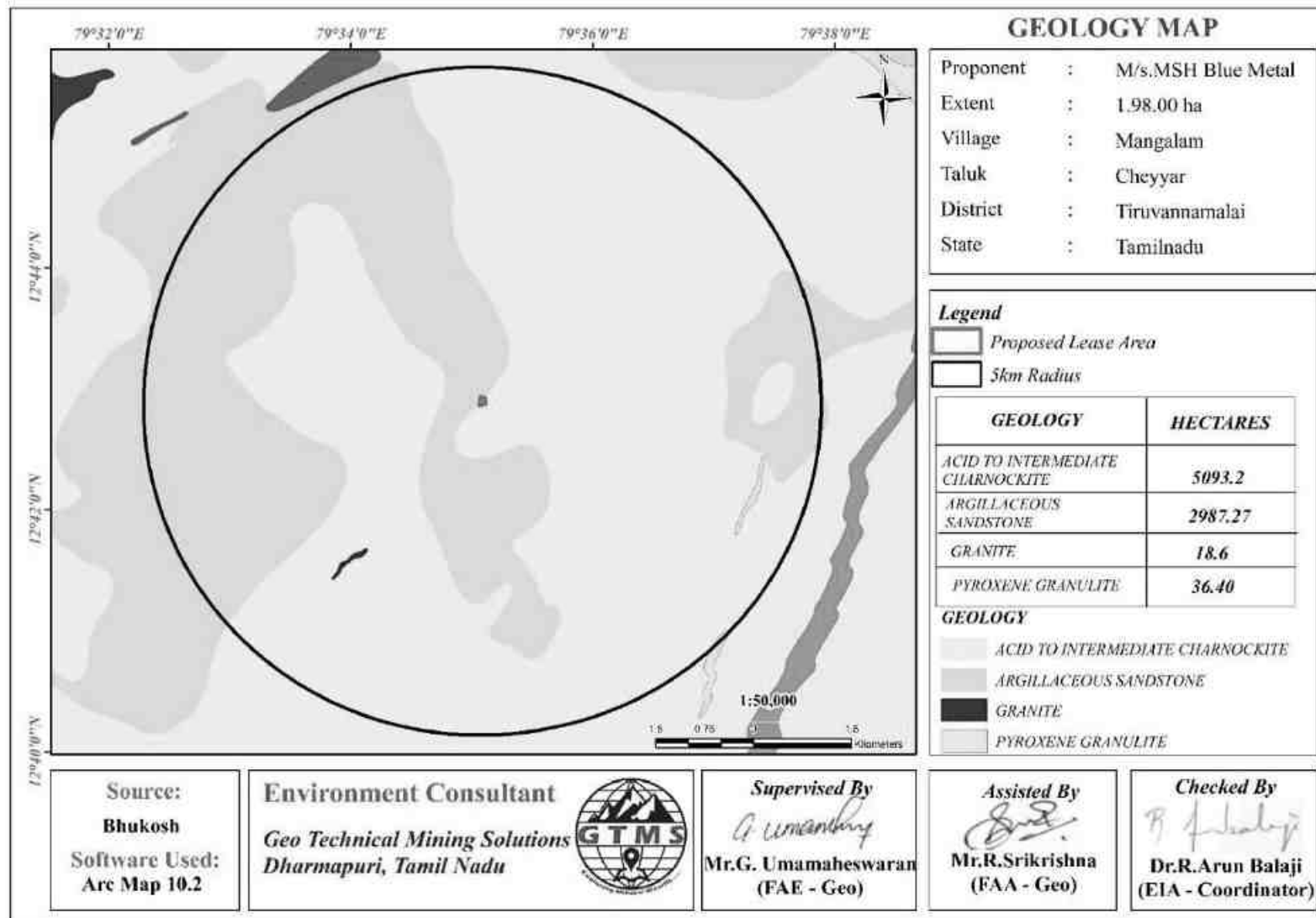


Figure 3.1 Geology Map with 5km Radius around Proposed Project Site

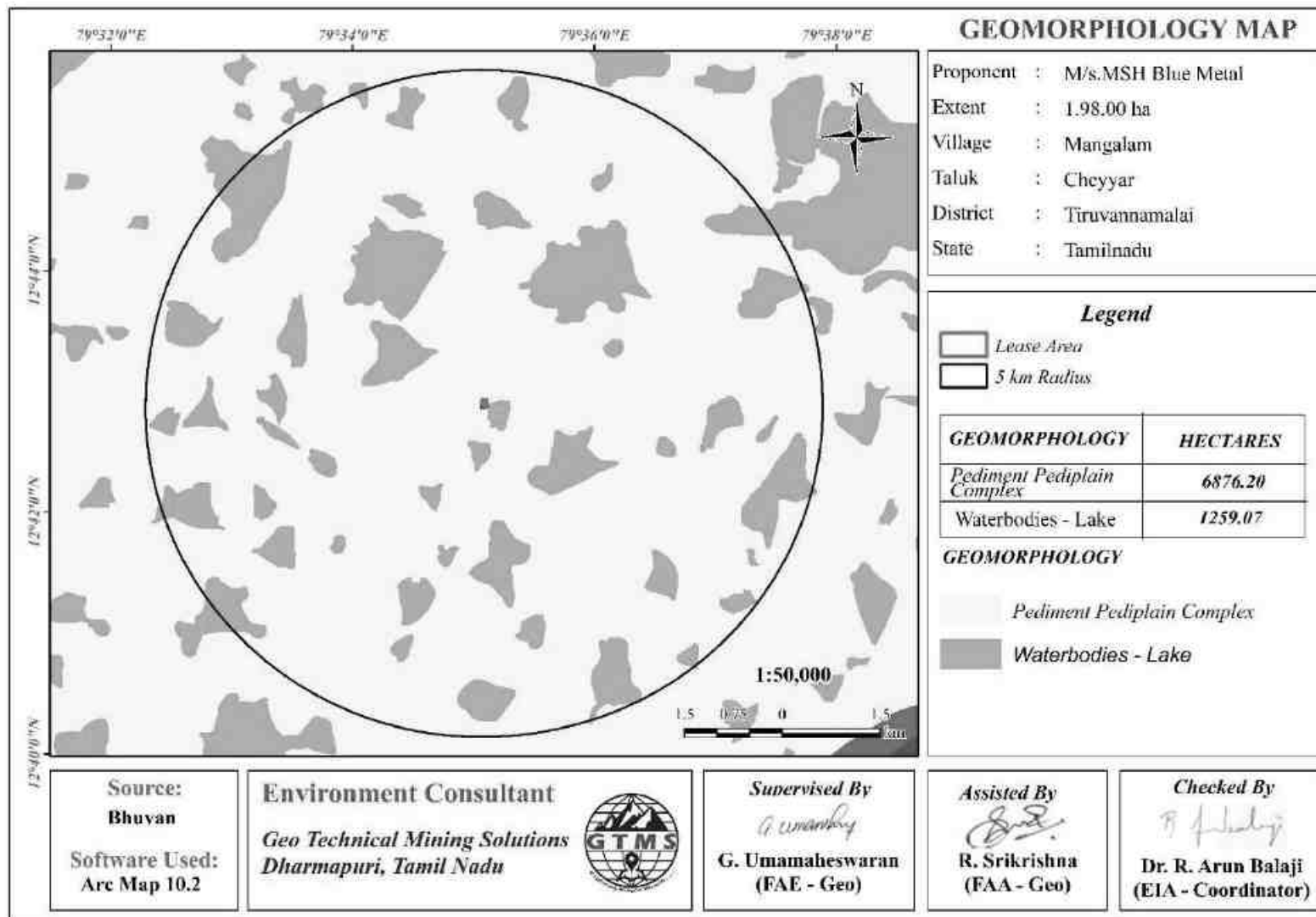


Figure 3.2 Geomorphology Map with 5km Radius around Proposed Project Site

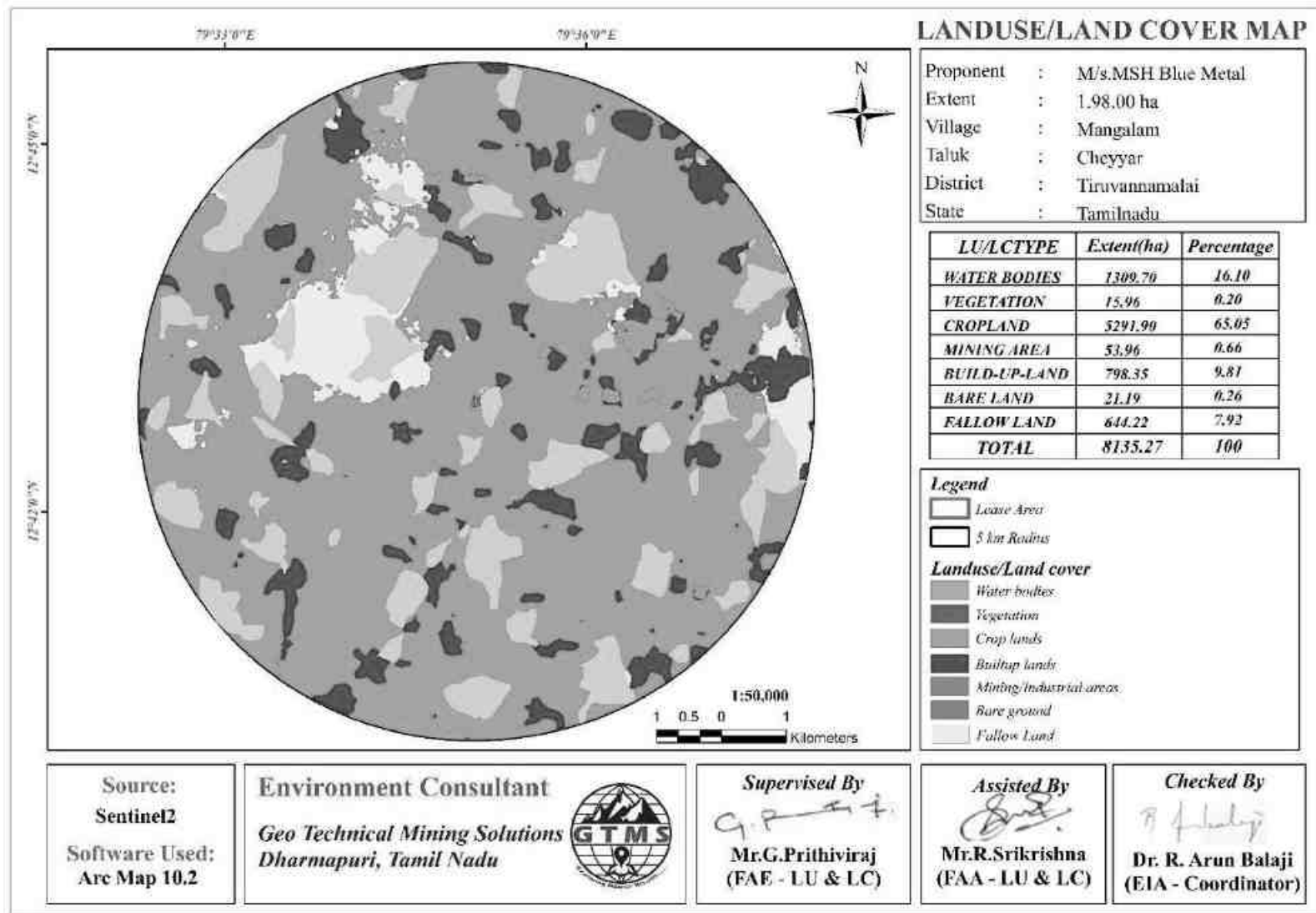


Figure 3.3 LULC Map with 5km Radius around Proposed Project Site (2025)

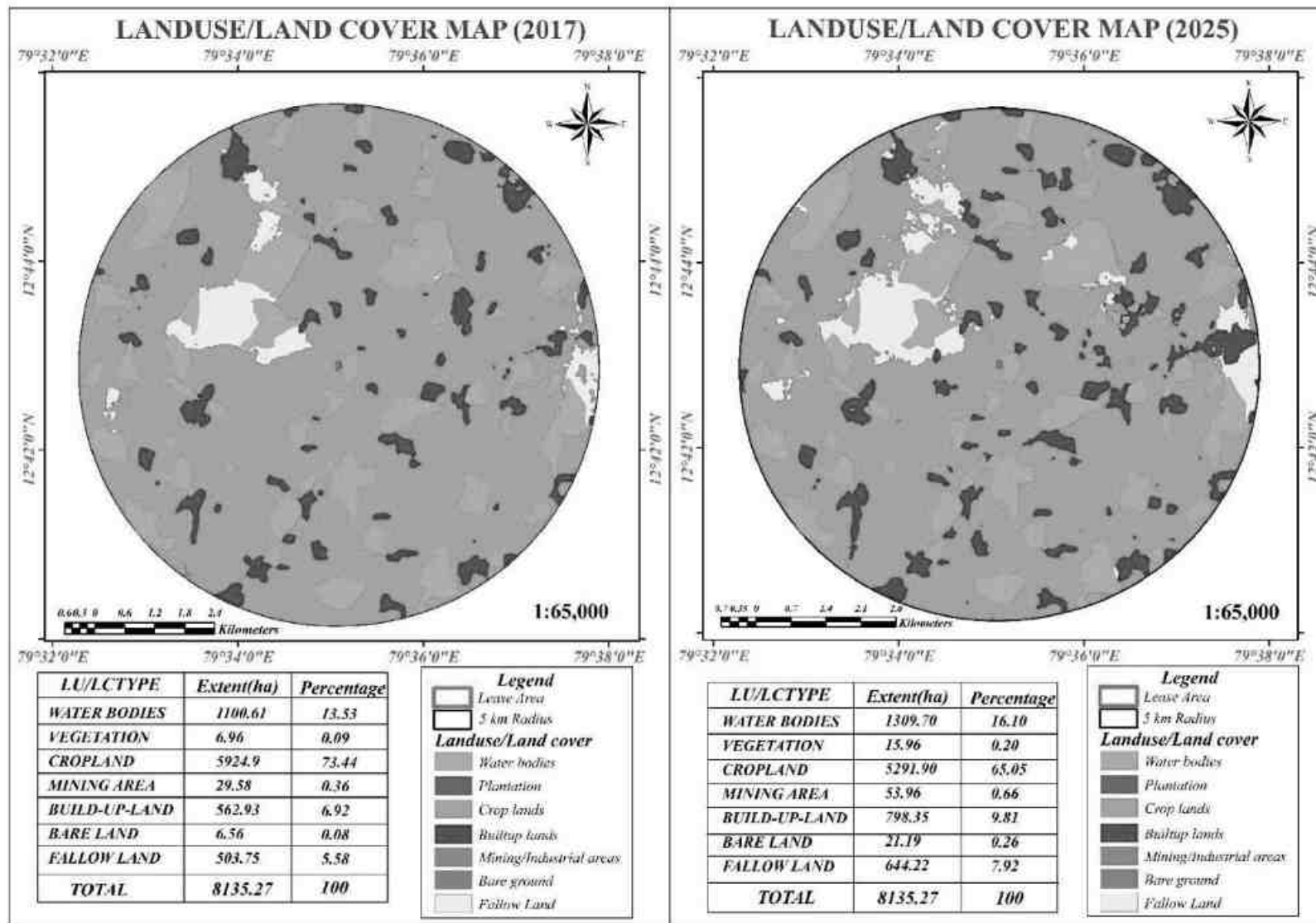


Figure 3.3a Comparison Map of LULC with 5km Radius around Proposed Project Site (2017 & 2025)

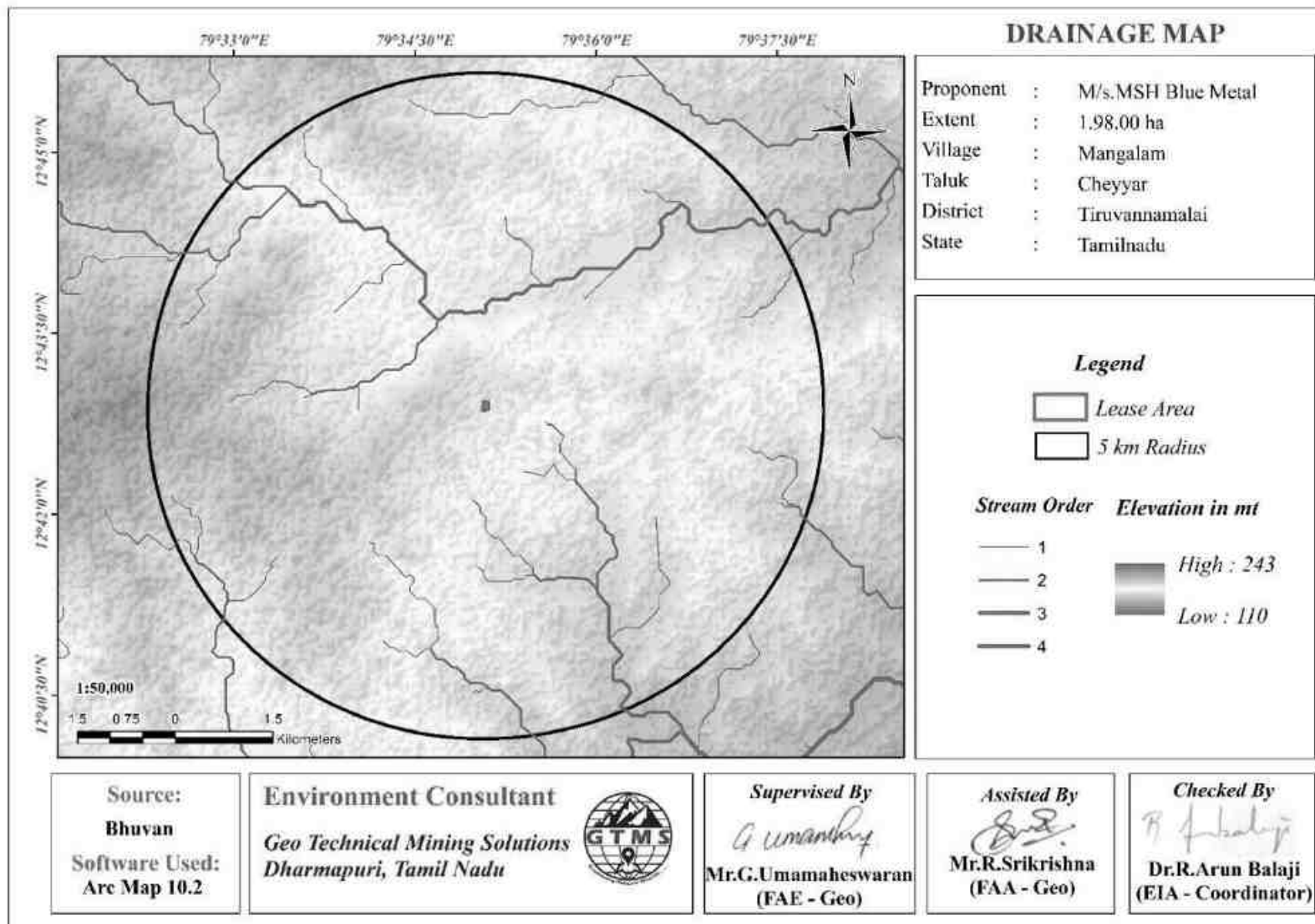


Figure 3.4 Drainage Map with 5km Radius around Proposed Project Site

3.1.6 Soil

Composite soil samples were collected from 6 locations of the study area to determine the baseline soil characteristics of the soil. The locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.5. The samples thus collected were analysed for physical and chemical characteristics. The physical and chemical characteristic results of soil samples are provided in Table 3.4.

Table 3.3 Soil Sampling Locations

Location Id	Monitoring Locations	Distance in m	Direction	Coordinates	
				Latitude	Longitude
S1	Mangalam	0.52	SE	12°42'36.16"N	79°35'14.48"E
S2	Mangalam	0.31	SW	12°42'49.29"N	79°34'52.80"E
S3	Palli	1.12	E	12°42'57.02"N	79°35'44.40"E
S4	Vadapoondipattu	1.09	NE	12°43'27.79"N	79°35'23.31"E
S5	Nedumparai	1.31	SW	12°42'43.94"N	79°34'20.34"E
S6	Thumbai	1.14	S	12°42'14.00"N	79°35'3.30"E

Source: On-site monitoring/sampling Ekdant Enviro Services (P) Ltd, in association with GTMS.

The analysis of the mineral and metal content of the soil samples from the soil analysis report issued by NABL accredited lab was interpreted within typical agricultural standards for the study area are as follows.

Mineral/Metal	Range (mg/kg)	Typical Status	Key Observation
Calcium (Ca)	409 - 497	Optimal/High	Excellent base saturation, good supply.
Magnesium (Mg)	107 - 248	Optimal	Balanced with Calcium, sufficient levels.
Sodium (Na)	25.0 - 56.0	Low	Very low salinity hazard.
Potassium (K)	2.08 - 4.66	Very Low	Critically Deficient nutrient for plant growth.
Phosphorous (P)	22.94 - 46.19	Optimal/High	Sufficient likely no immediate P fertilizer needed.
Iron (Fe)	0.86 - 2.17	Low	Deficiency expected due to high soil pH.
Copper (Cu)	38.0 - 67.0	High/Excessive	High levels might be a concern if source isn't natural.
Zinc (Zn)	17.0 - 36.0	Adequate/High	Sufficient levels for most crops.
Nickel (Ni)	4.0 - 21.0	Normal	Within standard background levels.
Lead (Pb)	7.0 - 30.0	Very Low	Non-contaminated, safe levels.
Chromium (Cr)	BLQ	Not Detectable	Non-contaminated.

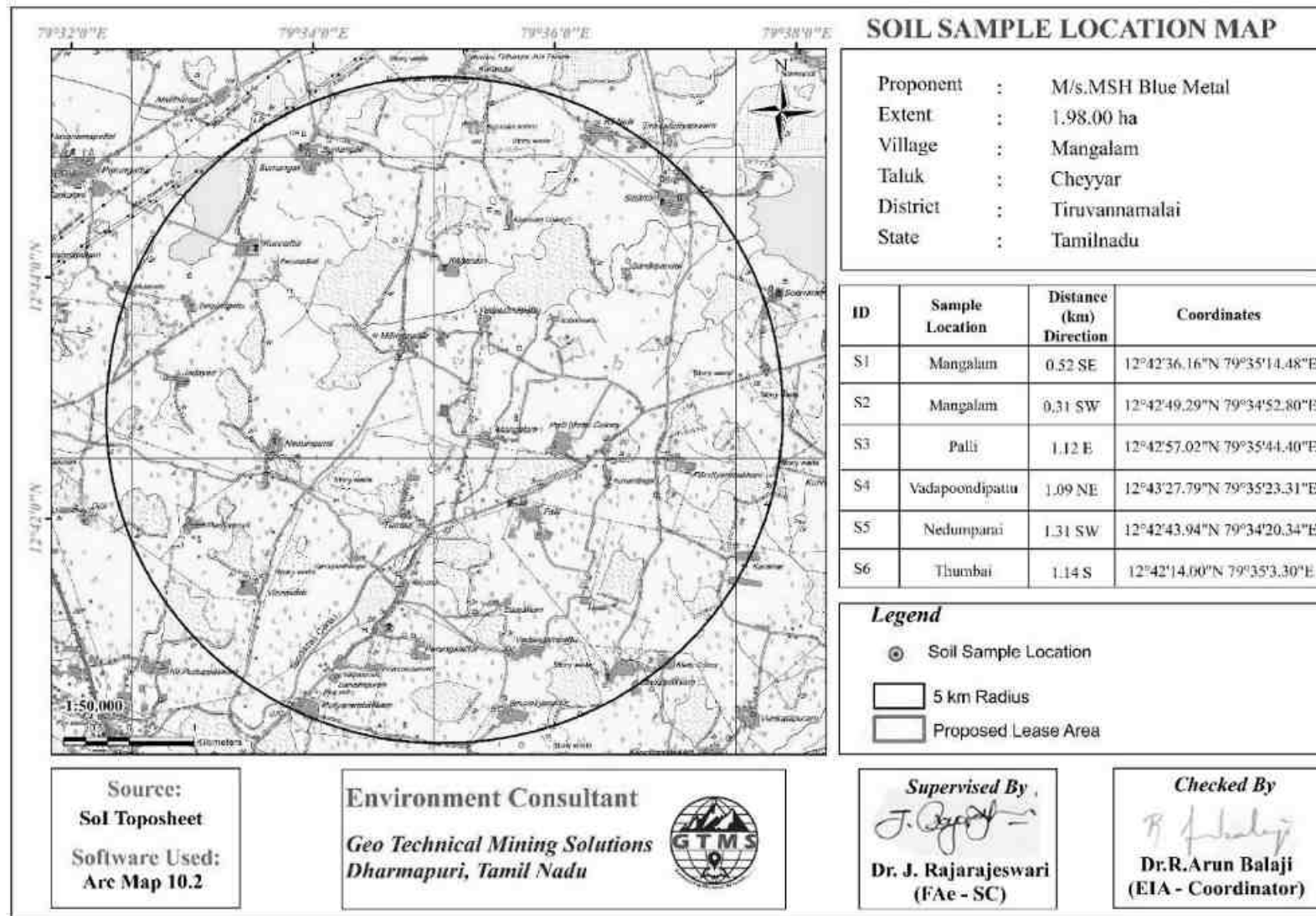


Figure 3.5 Map Showing Soil Sampling Locations within 5km Radius around Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S. No	Parameters	Unit	Results					
			S1	S2	S3	S4	S5	S6
PHYSICAL PARAMETERS								
1	pH	-	8.40	8.62	8.72	8.42	8.07	8.54
2	EC	μS/cm	117.20	148.23	132.40	165.20	137.40	127.40
3	Moisture	g/100g	7.73	15.70	12.80	16.50	6.58	13.40
4	Density	g/cc	1.43	1.36	1.62	1.40	1.56	1.28
5	Color	Qualitative	Brownish	Brownish	Brownish	Brownish	Brownish	Brownish
6	Consistency	Qualitative	Sticky	Sticky	Sticky	Sticky	Sticky	Sticky
7	Soil Texture	g/100g	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
8	Sand	%	85.0	81.66	88.50	86.04	82.10	86.07
9	Silt	%	4.80	5.42	2.90	4.70	2.80	10.85
10	Clay	%	10.20	12.90	8.60	9.26	15.02	3.06
CHEMICAL PARAMETERS								
8	Alkalinity	g/100g	0.039	0.030	0.040	0.050	0.059	0.070
9	Sodium Absorption Ratio	-	0.81	1.23	0.66	2.54	0.25	1.35
10	Chloride	mg/100g	0.009	0.013	0.004	0.018	0.009	0.013
11	Sulphates			0.008	0.033	0.053	0.071	.041
12	Total Nitrogen	kg/ha	0.023	0.033	0.022	0.036	0.032	0.037
13	Organic matter	%	2.40	1.38	3.84	1.40	1.56	1.28
14	Structure	-	Structureless	Structureless	Structureless	Structureless	Structureless	Structureless
15	Cation Exchange Ratio	μ/100g	34.40	12.48	19.02	9.20	15.62	17.39
16	Calcium	mg/kg	425	437	481	409	473	497
17	Water Holding Capacity	%	52.0	49.0	53.0	51.0	48.0	50.0
18	Magnesium	mg/kg	233	224	151	248	214	107
19	Sodium	mg/kg	38.0	56.0	30.0	25.0	42.0	49.0
20	Potassium	mg/kg	3.16	4.66	2.50	2.08	3.50	4.08
21	Iron	mg/kg	0.86	1.20	1.62	1.39	1.89	2.17
22	Copper	mg/kg	62.0	49.0	67.0	38.0	56.0	40.0
23	Nickel	mg/kg	4.0	9.0	15.0	21.0	11.0	17.0
24	Chromium	mg/kg	BLQ (LOQ=0.01)	BLQ (LOQ=0.01)	BLQ (LOQ=0.01)	BLQ (LOQ=0.01)	BLQ (LOQ=0.01)	BLQ (LOQ=0.01)
25	Lead	mg/kg	7.0	12.0	18.0	23.0	30.0	15.0
26	Zinc	mg/kg	22.0	27.0	32.0	17.0	36.0	25.0
27	Phosphorous	mg/kg	27.10	35.20	39.80	46.19	31.70	22.94

Source: On-site monitoring/ Sampling Results by Ekdant Enviro Services (P) Ltd in association with GTMS.

Interpretation of the soil analysis report

1. Essential Macronutrients (Ca, Mg, P, K)

- Calcium and Magnesium levels are robust and well-balanced. These minerals contribute positively to a stable soil structure and ensure good supply for most crops.
- Phosphorous is in the high/optimal range (around 46 mg/kg is excellent) suggesting the soil can support good root development without immediate P amendments.
- Potassium is the most significant deficiency observed. The extremely low values (2.08-4.66 mg/kg) indicate that plant health, disease resistance and fruit/flower development will be severely limited without immediate fertilization.

2. Micronutrients & pH Interaction

The high alkaline pH (8.1-8.7 from previous data) directly impacts the availability of certain micronutrients:

- Iron levels are low which is typical for alkaline soils as the iron becomes chemically "locked up" and unavailable to plants. This could lead to chlorosis.
- Copper and Zinc levels are surprisingly high or adequate despite the high pH which is a positive indicator for these specific nutrients.

3. Heavy Metals and Safety

The heavy metal analysis confirms the soil is safe and uncontaminated.

- Levels of Lead are very low compared to regulatory limits.
- Chromium is undetectable across all samples.
- Nickel is within background environmental levels.

Organic Matter Levels

- S3 (3.84%): **Excellent.** For a sandy loam 3.84% is considered very high and ideal. Sandy soils naturally struggle to hold organic matter so reaching nearly 4% indicates excellent soil health likely due to consistent organic amendments or natural vegetation.
- S6 (1.28%): **Low but Typical.** While 1.28% is on the lower side it is very common for cultivated mineral soils which typically range from 1% to 6%. It is not bad but it has less buffer for nutrients and water than S3.

Sample	OM %	Rating for Sandy Loam	Recommendation
S3	3.84%	Very Good / Optimal	Maintain with light mulching or cover crops.
S1, S2, S4, S5	~1.3% - 2.4%	Fair / Moderate	Good for standard growth, but could benefit from more compost.
S6	1.28%	Low	Priority for adding manure, compost, or green manure.

Water Retention: S3 (3.84%) will act like a sponge holding significantly more water during dry spells than S6. Just a 1% increase in OM can drastically improve how long a crop survives without rain.

Nutrient "Gas Tank": Organic matter is the primary source of Nitrogen and Phosphorus. The analysis showed critically low Nitrogen the higher OM in S3 provides a natural "slow-release" fertilizer that S6 lacks.

pH Stability: The soil is currently alkaline (pH 8.1–8.7). Higher organic matter helps buffer the pH preventing it from swinging even higher and locking out more nutrients.

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 baseline quality of surface and ground water.

Table 3.5 Water Sampling Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
SW1	Mangalam	0.15	E	12°42'52.87"N	79°35'12.30"E
SW2	Mariynallur	1.17	NW	12°43'16.54"N	79°34'30.50"E
SW3	Thumbai	1.35	S	12°42'8.30"N	79°35'14.94"E
OW1	Mariynallur	0.08	N	12°42'59.40"N	79°35'3.15"E
OW2	Mangalam	0.29	SW	12°42'43.55"N	79°34'57.20"E
OW3	Mariynallur	0.72	W	12°42'56.18"N	79°34'39.23"E
OW4	Mangalam	0.86	E	12°42'49.32"N	79°35'35.93"E

Source: On-site monitoring/sampling Ekdant Enviro Services (P) Ltd, in association with GTMS.

3.2.1 Ground and Surface Water Quality Resources and Result

Ground Water Quality

The observations based on the laboratory analysis of water samples, as presented in Table 3.6 are discussed below. The results were compared with the IS 10500:2012 drinking water standards. The analysis indicates that most of the physical parameters are within the acceptable and permissible limits, with a few marginal variations. Overall, the water quality is generally suitable for potable use; however, certain parameters such as TDS, hardness and alkalinity may influence taste and cause scaling in household appliances.

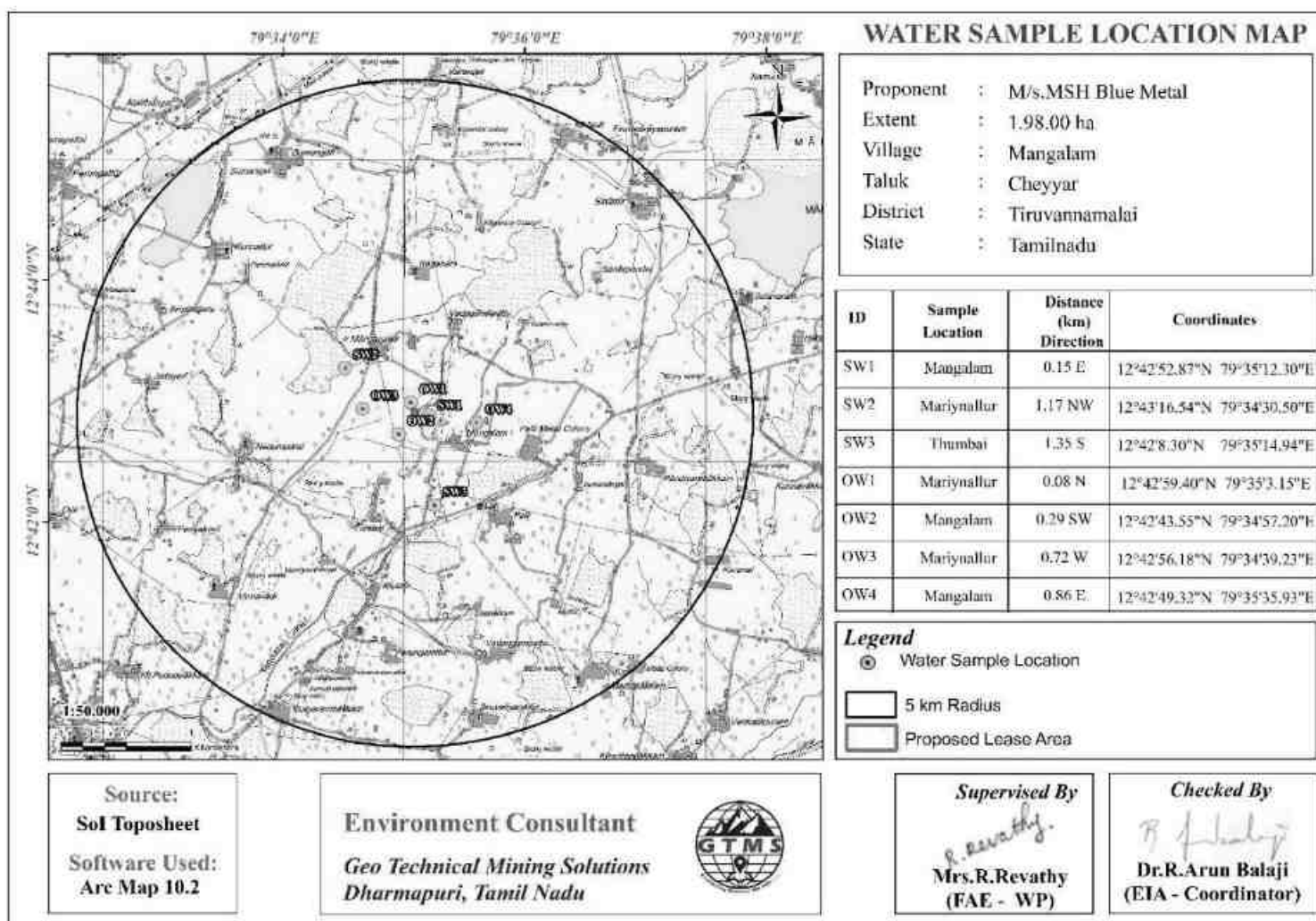


Figure 3.6 Map Showing Water Sampling Locations within 5km Radius around Proposed Project Site

Table 3.6 Ground and Surface Water Quality Resources and Result									
S. No.	Parameters	Units	SW1	SW2	SW3	OW1	OW2	OW3	OW4
Physical Properties									
1	Appearance	-	Slightly Turbid Clear	Slightly Turbid Clear	Slightly Turbid Clear	Slightly Turbid Clear	Slightly Turbid Clear	Slightly Turbid Clear	Slightly Turbid Clear
2	pH value @ 25°C	-	7.32	7.17	7.60	7.82	7.37	7.40	7.62
3	Color	CU	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4	Odour	Quality	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Turbidity	NTU	0.60	0.80	0.50	0.90	0.70	0.40	1.20
6	EC at 25°C	µS/cm	549	657	593	983	1040	1125	1206
Chemical Properties									
7	TSS	mg/l	2.0	3.0	2.0	3.0	2.0	2.0	4.0
8	TDS	mg/l	324	388	344	580	624	664	712
9	Total Hardness (CaCO ₃)	mg/l	166	148	138	196	212	220	240
10	Calcium Hardness (CaCO ₃)	mg/l	82.0	76.0	64.0	132	136	142	128
11	Magnesium Hardness (CaCO ₃)	mg/l	84.0	72.0	74.0	64.0	76.0	78.0	112
12	Calcium as Ca	mg/l	33.0	30.0	26.0	53.0	54.0	57.0	51.0
13	Magnesium as Mg	mg/l	20.0	18.0	18.0	16.0	18.0	19.0	27.0
14	Phenolphthalein Alkalinity as CaCO ₃	mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil
15	Total Alkalinity as CaCO ₃	mg/l	70.0	94.0	90.0	186	196	210	184
16	Chlorides as Cl	mg/l	88.0	92.0	62.0	128	224	188	238
17	Sulfates as SO ₄	mg/l	32.0	42.0	30.0	72.0	110	96.0	116
18	Total Iron as Fe	mg/l	0.16	0.20	0.13	0.24	0.18	0.14	0.28
19	Silica (Reactive) as SiO ₂	mg/l	15.0	12.0	10.0	14.0	12.0	15.0	16.0
20	Carbonate Hardness as CaCO ₃	mg/l	70.0	94.0	90.0	186	196	210	184.0
21	Carbonate Hardness as CaCO ₃	mg/l	96.0	54.0	48.0	10.0	16.0	10.0	56.0
22	Free Residual Chlorine	mg/l	BLQ (LOQ=0.1)	BLQ (LOQ=0.1)	BLQ (LOQ=0.1)	BLQ (LOQ=0.1)	BLQ (LOQ=0.1)	BLQ (LOQ=0.1)	BLQ (LOQ=0.1)

Source: On-site monitoring/ Sampling Results by Ekdant Enviro Services (P) Ltd in association with GTMS

This data shows a progression across seven samples generally moving from Good/Moderate quality (Samples 1-3) to Higher Mineral/Saline content (Samples 4-7). Overall, the water is chemically safe for most uses but borders on Hard to Very Hard.

- **pH (7.17 – 7.82):** Perfectly balanced. It is slightly alkaline which is ideal as it is non-corrosive to your pipes.
- **Iron (0.13 – 0.28 mg/l):** All samples are below the 0.3 mg/l threshold. You shouldn't see orange staining or a metallic taste.
- **Appearance & Odor:** Agreeable and Clear are positive. While slightly turbid is noted the NTU levels (0.4 – 1.2) are mostly within the acceptable range for general use.

Salinity & Conductivity (The salty trend)

There is a clear spike in minerals starting at Sample 4:

- **TDS (Total Dissolved Solids):** Samples 1-3 are excellent (~350 mg/l). Samples 4-7 (up to 712 mg/l) exceed the excellent drinking water threshold (500 mg/l). While safe the water may taste slightly flat or mineral-heavy.
- **Chlorides:** Samples 5 and 7 (224–238 mg/l) are approaching the EPA Secondary Standard of **250 mg/l**. High chlorides can increase the risk of corrosion in metal pipes and impart a salty taste.

Residual Chlorine

- **Result:** BLQ (Below Limit of Quantitation).
- **Interpretation:** There is no detectable chlorine in this water. This means there is no ongoing disinfection. If this is well water or stored water it is vulnerable to bacterial growth. To be clear we should perform a **Microbiological Test** (Total Coliform/E. coli) to ensure it is safe to drink.
- **For Drinking:** The water is chemically acceptable though Samples 4-7 may taste a bit heavy. Ensure a bacteria test is performed since chlorine is absent.
- **For Appliances:** Consider a water softener if using Samples 4-7 to prevent limescale damage.
- **For Irrigation:** These levels are generally safe though the Electrical Conductivity (EC) in Sample 7 (1206 µS/cm) is getting high for salt-sensitive plants.

Hardness

Groundwater (Samples 1-3) and surface water (Samples 4-7) both fall into the Hard and very hard categories respectively, though they follow an unusual trend.

Source Type	Hardness (mg/l)	Range	Classification as per <u>IS 10500:2012</u>	Typical Domestic Impact
Groundwater	138 – 166		Hard	Minor soap scum, manageable scale in kettles.
Surface Water	196 – 240		Very Hard	Significant scaling in pipes/heaters, high soap consumption.

The surface water being harder (up to 240 mg/l) suggests that in dry seasons evaporation can concentrate minerals in surface water leading to higher hardness compared to deeper protected groundwater.

3.2.2 Hydrogeological Studies

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

Rainfall

Rainfall data for the study area were collected for the period of 2004-2024([POWER | Data Access Viewer \(nasa.gov\)](#)). Long term monthly average rainfall was estimated from the data of 2004-2024 and compared with the monthly rainfall for the year 2024, shown in Figure 3.7. The Figure 3.7 shows that rainfall is generally high in the months of September through November in every year. Particularly, rainfall in July through August and October, December of 2022 is higher than the previous years.

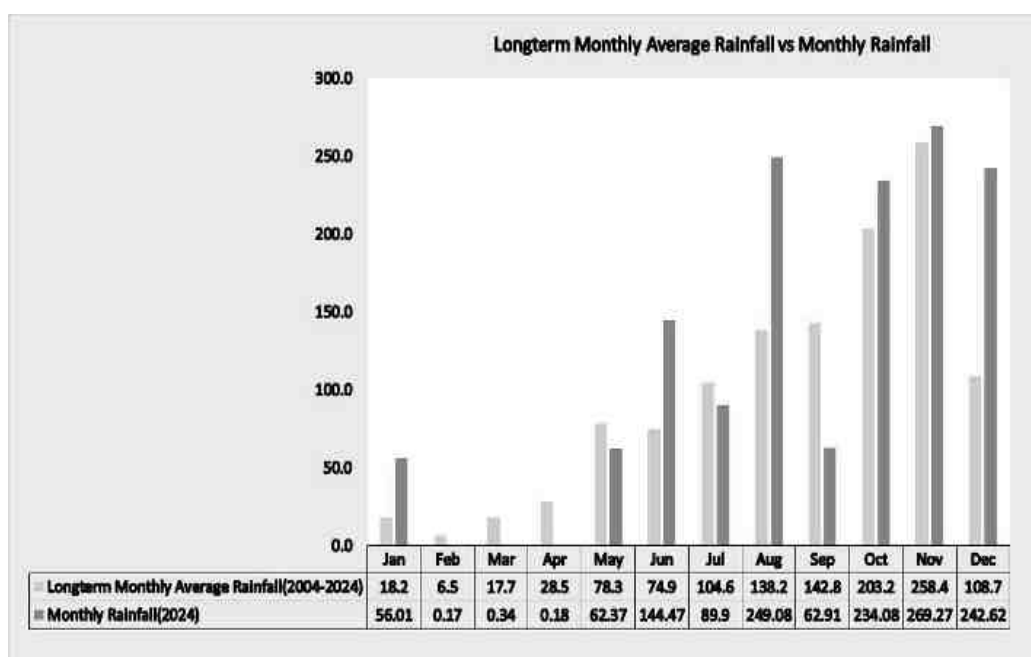


Figure 3.7 Long-Term Monthly Average Rainfall Vs Monthly Rainfall

3.2.3.1 Groundwater Levels and Flow Direction

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

The open well water level data thus collected onsite are provided in Tables 3.7 and 3.8. According to the data, average depths to the static water table in open wells range from 10.97 to 13.90m BGL in pre monsoon and 10.08 to 13.05m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depths to static potentiometric surface in bore wells for the period of October through December (Post-Monsoon Season) vary from 52.1 to 55.6m and from 61.2-64.8m for the period of March through May, (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines. From the maps of open well groundwater flow direction shown in Figures 3.8-3.9, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 6,7 located in Northeast direction the open well number 3 located in southeast direction of the proposed project site. The groundwater flow maps in Figures 3.10-3.11 show that most of the bore well groundwater for the post- and pre-monsoon seasons flow towards the bore well number 7. It is located in Northeast direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

Water Balance management in site & artificial rainwater

A sustainable eco-friendly water management strategy will be adopted in this project. Since the water requirement during the mining period is estimated about 3.5KLD for drinking, domestic and sanitary needs, creation and maintenance of green belt and for sprinkling purposes. The drinking water must be pure and safe, so it will be outsourced from nearby vendors/RO water plant will be installed in the site. The artificial rainwater harvesting

structures are planned in and around the site. In flow direction northeast site. The excavated pits nearby the site will be connected by the garland drain system and water will be stored and this water will be utilised for the green belt maintenance and dust suppression sprinkling purpose. The rooftop harvesting structure is also planned from the labour sheds and other structures will be connected to the nearby excavated pits and utilised. These implementations will reduce the dependency of water from the nearby borewells and open wells. According to the soil resistivity data of the region, few locations are porous and permeable in nature. It will help in infiltration of rainwater and recharge the aquifer naturally during monsoon. This sustainable strategy will be helpful in maintaining the water balance within 2km radius of project site.

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

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Mar-2025	Apr-2025	May- 2025	Average		
OW01	12.9	13.4	14.7	13.67	12°42'59.37"N	79°35'3.31"E
OW02	10.9	11.3	11.7	11.30	12°42'49.46"N	79°34'31.63"E
OW03	13.5	13.9	14.3	13.90	12°42'40.67"N	79°35'21.55"E
OW04	11.8	12.3	13.2	12.43	12°42'22.14"N	79°34'26.13"E
OW05	10.5	10.9	11.5	10.97	12°41'58.63"N	79°35'35.18"E
OW06	12.4	12.7	13.2	12.77	12°43'27.92"N	79°35'26.30"E
OW07	11.4	11.6	11.9	11.63	12°43'39.03"N	79°34'53.83"E
OW08	11.7	12.5	13.2	12.47	12°42'53.93"N	79°35'46.71"E

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2025	Nov- 2025	Dec-2025	Average		
OW01	13.6	13.2	12.5	13.1	12°42'59.37"N	79°35'3.31"E
OW02	11.7	11.4	10.8	11.3	12°42'49.46"N	79°34'31.63"E
OW03	14.2	13.7	12.6	13.5	12°42'40.67"N	79°35'21.55"E
OW04	12.6	12.1	11.6	12.1	12°42'22.14"N	79°34'26.13"E
OW05	11.3	10.9	10.1	10.8	12°41'58.63"N	79°35'35.18"E
OW06	13.1	12.8	11.7	12.5	12°43'27.92"N	79°35'26.30"E
OW07	11.5	11.2	10.5	11.1	12°43'39.03"N	79°34'53.83"E
OW08	12.6	12.4	11.9	12.3	12°42'53.93"N	79°35'46.71"E

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2025	Apr-2025	May- 2025	Average		
BW01	60.9	63.3	65.8	63.3	12°43'14.99"N	79°34'40.66"E
BW02	60.4	63.7	64.1	62.7	12°42'37.80"N	79°35'29.19"E
BW03	62.8	63.2	63.9	63.3	12°43'4.73"N	79°35'21.96"E
BW04	61.2	65.8	67.4	64.8	12°42'3.22"N	79°35'26.01"E
BW05	61.2	64.8	65.3	63.8	12°41'58.41"N	79°34'45.08"E
BW06	60.6	65.8	66.3	64.2	12°42'42.74"N	79°34'25.68"E
BW07	58.9	63.9	65.4	62.7	12°43'41.96"N	79°35'21.71"E
BW08	59.3	62.5	63.1	61.6	12°43'9.38"N	79°35'58.13"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2025	Nov-2025	Dec-2025	Average		
BW01	51.5	54.2	59.7	55.1	12°43'14.99"N	79°34'40.66"E
BW02	51.9	53.5	59.7	55.0	12°42'37.80"N	79°35'29.19"E
BW03	51.8	53.4	58.8	54.7	12°43'4.73"N	79°35'21.96"E
BW04	52.2	56.8	57.1	55.4	12°42'3.22"N	79°35'26.01"E
BW05	52.9	54.2	58.7	55.3	12°41'58.41"N	79°34'45.08"E
BW06	51.7	55.2	59.8	55.6	12°42'42.74"N	79°34'25.68"E
BW07	51.2	53.9	57.2	54.1	12°43'41.96"N	79°35'21.71"E
BW08	50.9	52.1	56.4	53.1	12°43'9.38"N	79°35'58.13"E

Source: Onsite monitoring data

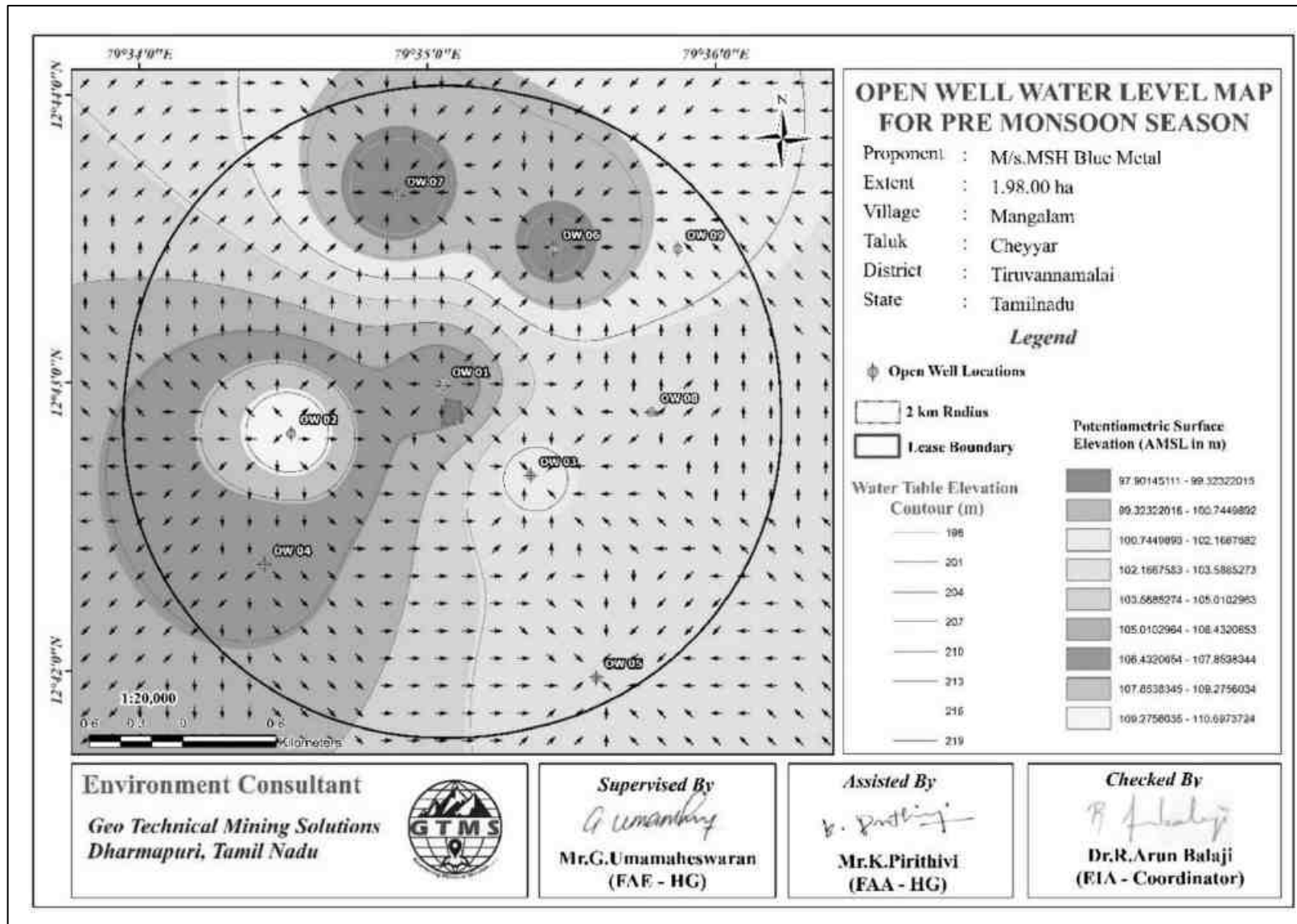


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

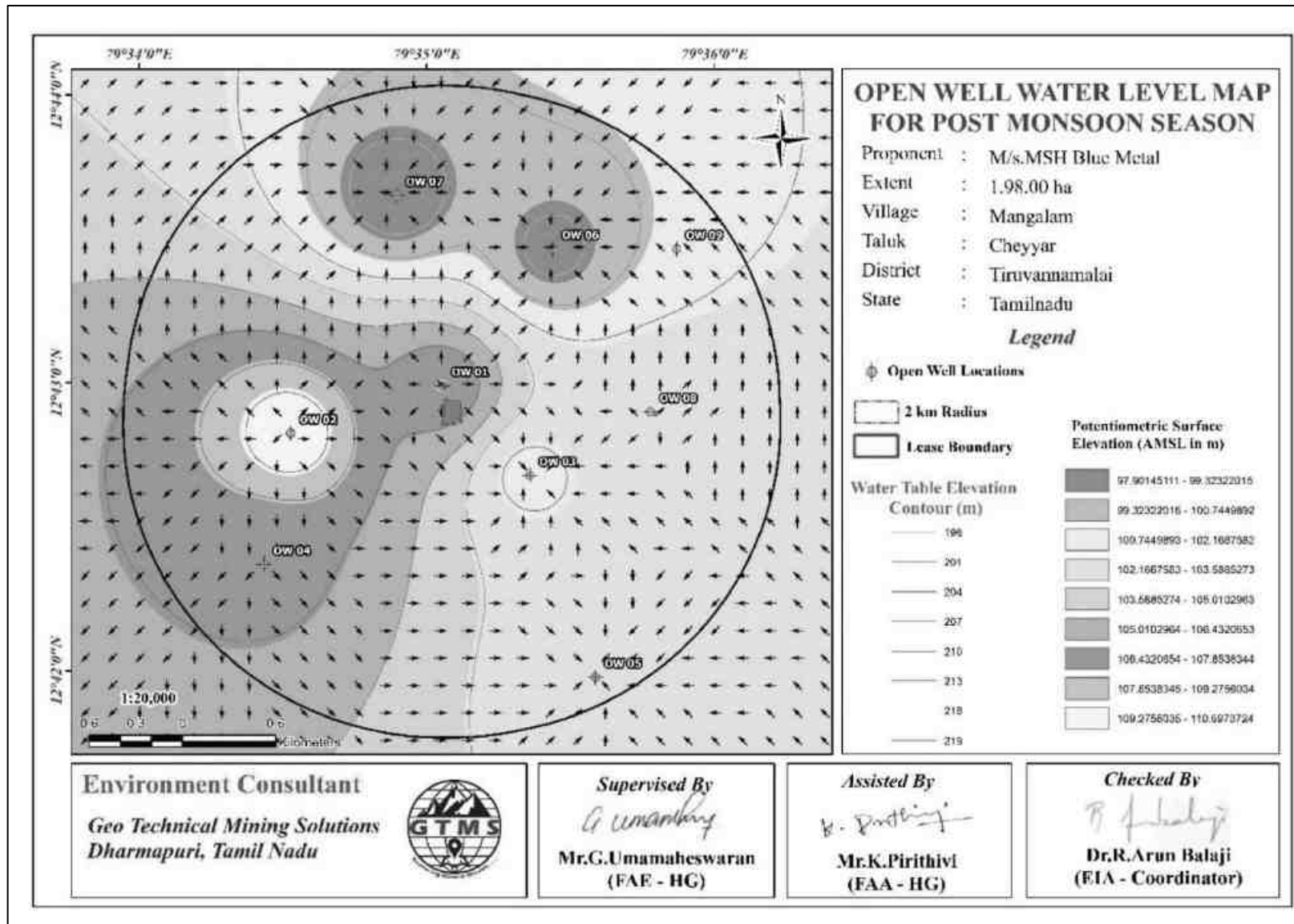


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

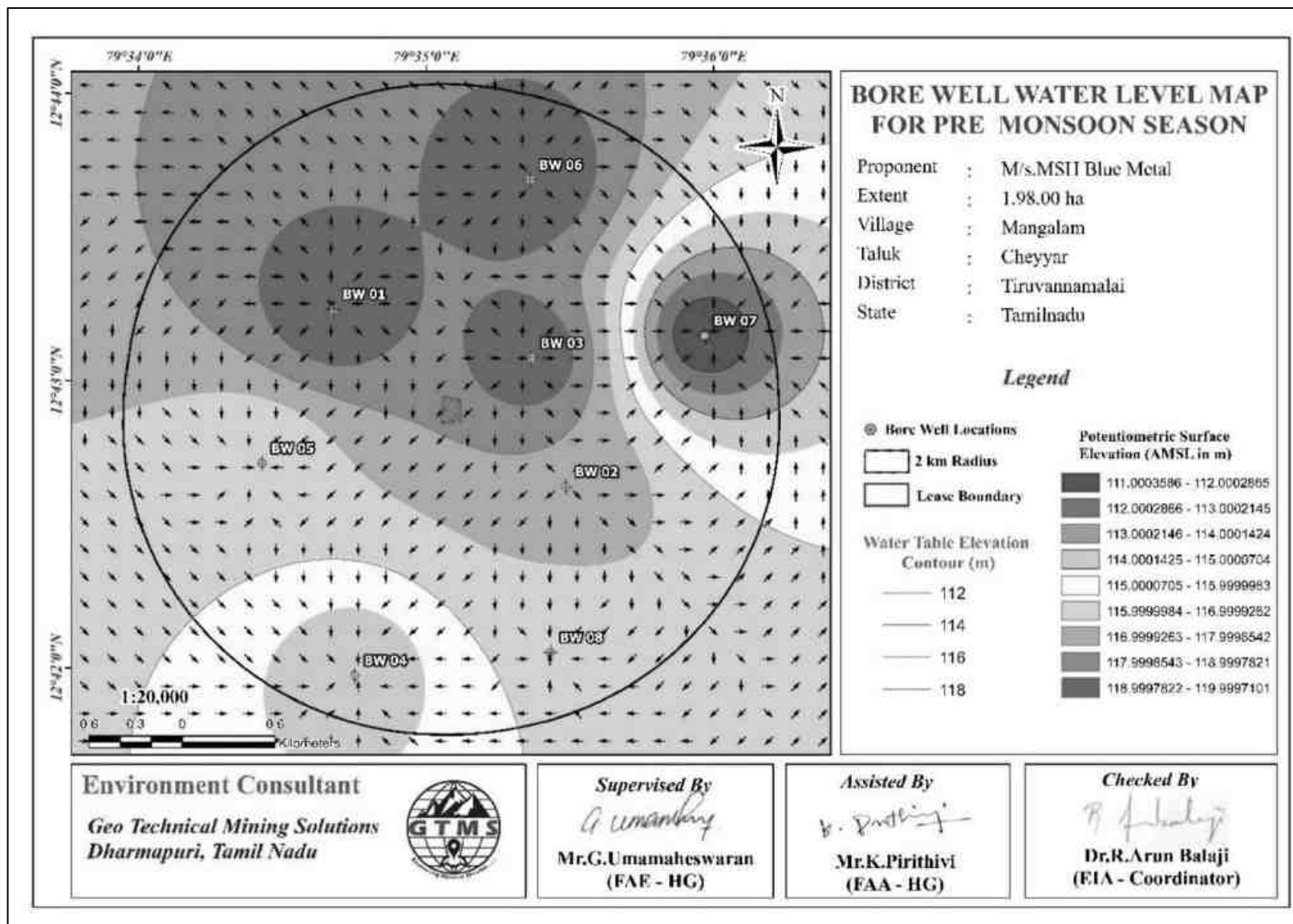


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

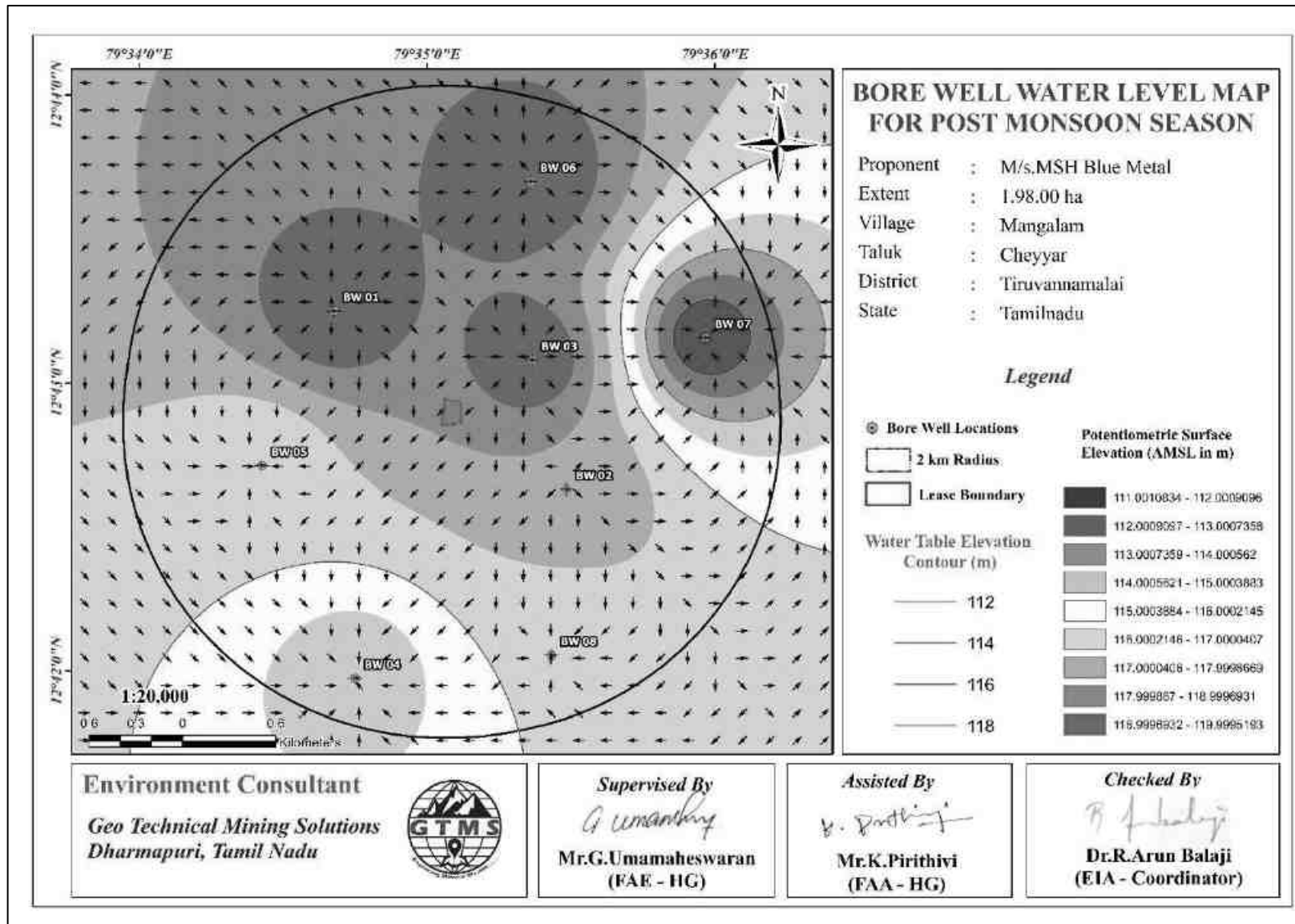


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

3.2.3.2 Electrical Resistivity Investigation

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

Result

The Geophysical VES data obtained from the project site have been shown in Table 3.11. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.12.

Table 3.11 Vertical Electrical Sounding Data

Location Coordinates - 12°42'54.93"N 79°35'4.55"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in Ω	Apparent Resistivity in Ωm
1	5	1	4.71	33.248	156.60
2	10	1	23.57	12.915	304.40
3	15	1	55.00	7.542	414.79
4	20	1	99.00	5.678	562.15
5	25	2	75.43	8.803	664.02
6	30	2	110.01	7.422	816.48
7	35	2	150.86	6.266	945.32
8	40	2	198.01	5.129	1015.68
9	45	2	251.44	4.170	1048.56
10	50	2	311.16	3.638	1132.15
11	60	5	188.58	5.422	1022.45
12	70	5	275.01	4.891	1345.18
13	80	5	377.16	3.745	1412.50
14	90	5	495.02	2.922	1446.32
15	100	5	628.60	2.556	1606.52

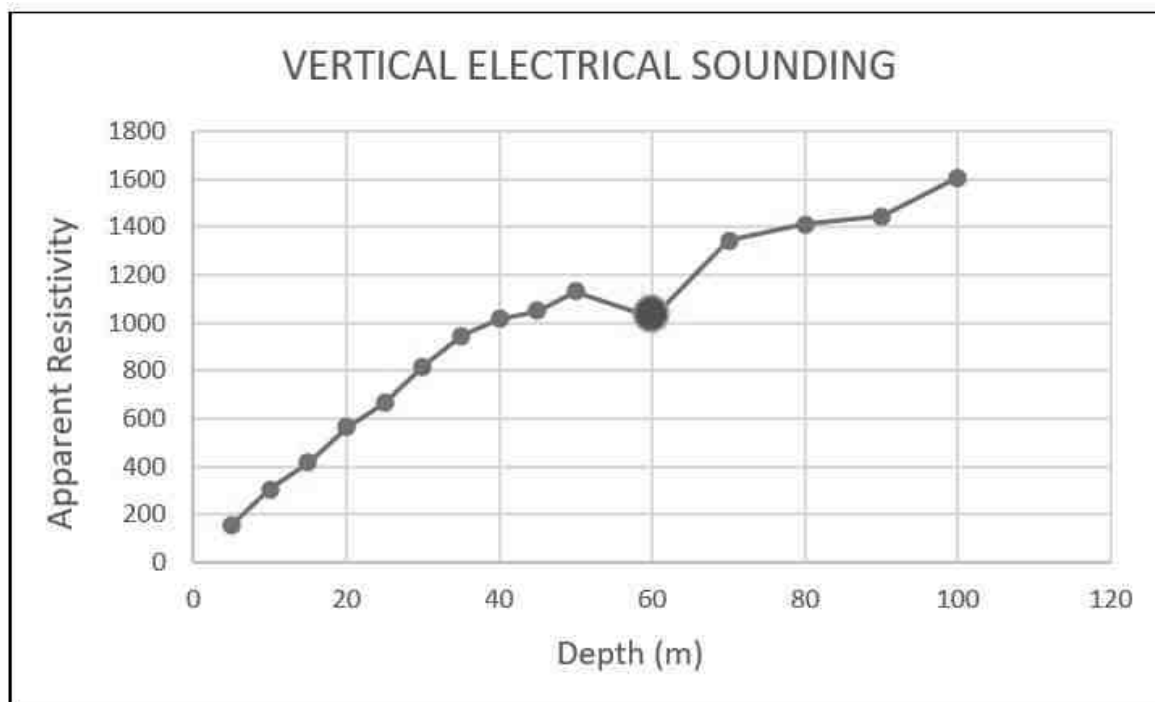


Figure 3.12 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60-65m Below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 60m below ground level. The ultimate depth of proposed project is 52m (2m below ground level + 50m below ground water). Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

3.3 AIR ENVIRONMENT

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

3.3.1 Meteorology

3.3.1.1 Climatic Variables

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

Table 3.12 Onsite Meteorological Data

S. No.	Parameters		OCT,2025	NOV,2025	DEC,2025
1	Temperature (°C)	Min	24.01	22.86	20.55
		Max	32.44	31.30	29.48
		Avg	27.59	26.49	25.19
2	Relative Humidity (%)	Min	56.55	58.80	54.92
		Max	94.29	94.13	96.30
		Avg	82.56	81.68	81.64
3	Wind Speed (m/s)	Min	0.11	0.25	1.34
		Max	5.97	8.91	6.34
		Avg	2.40	3.85	3.92
4	Wind Direction (degree)	Min	1.40	0.40	0.10
		Max	358.30	359.50	359.60
		Avg	159.25	87.58	70.49
5	Surface Pressure(kPa)	Min	99.92	100.04	100.29
		Max	100.97	101.21	101.37
		Avg	100.49	100.79	100.91

Source: On-site monitoring/sampling by Ekdant Enviro Services (P) Ltd in association with GTMS

3.3.1.2 Wind Pattern

Wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction. Two types of wind rose were generated: historical seasonal wind rose for the period of October to December of the years from 2021 to 2024 and the seasonal wind rose for the study period of October through December 2025. The wind rose diagrams thus produced are shown in Figures 3.13-3.13a. Figure 3.14 reveals that:

- ❖ The measured average wind velocity during the study period is 2.02m/s.
- ❖ Predominant wind was dominant in the directions ranging from Northeast to Southwest.

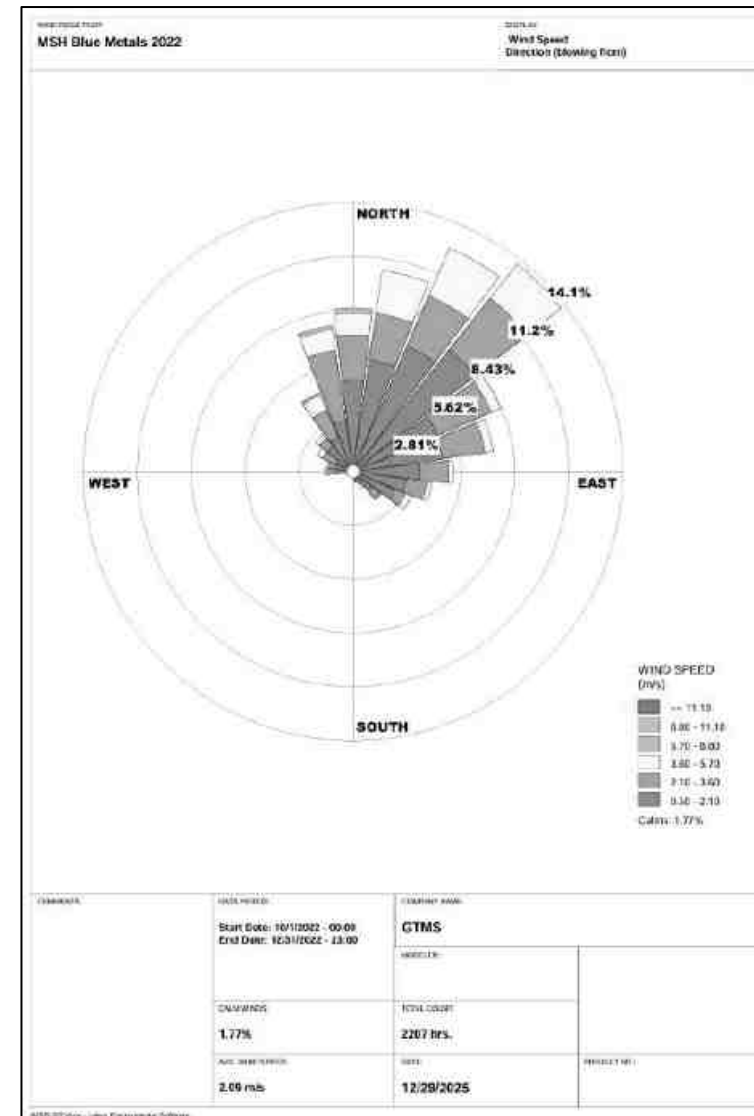
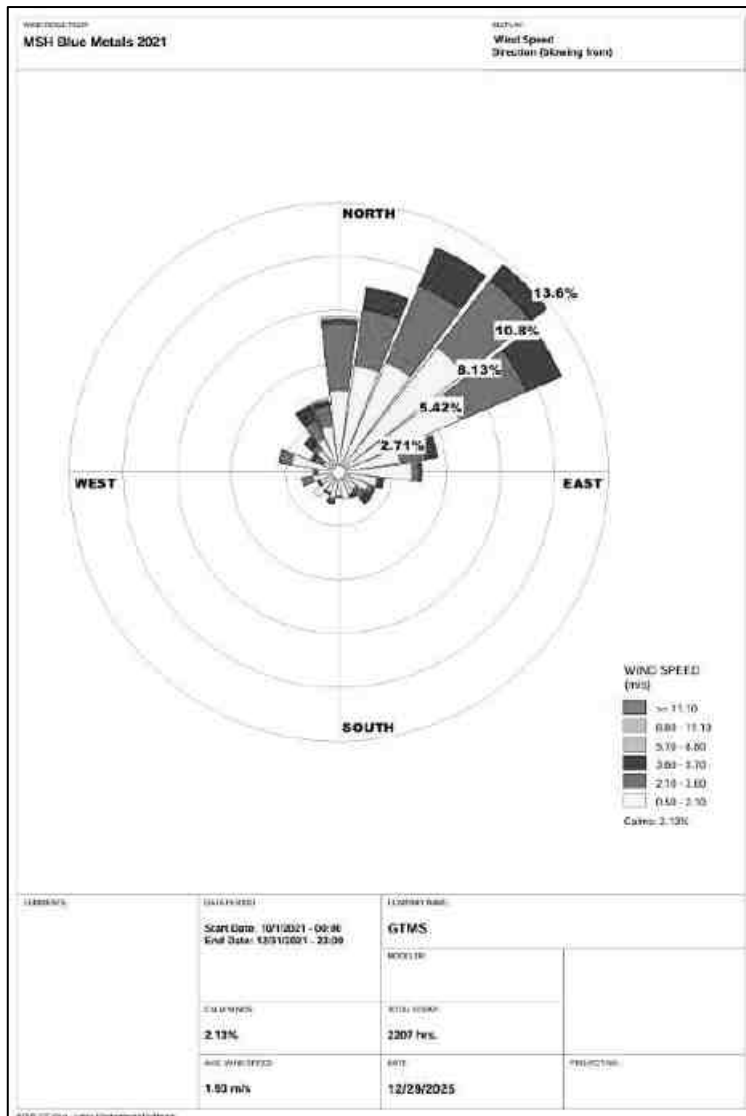


Figure 3.13 Windrose Diagram for 2021 and 2022 (October to December)

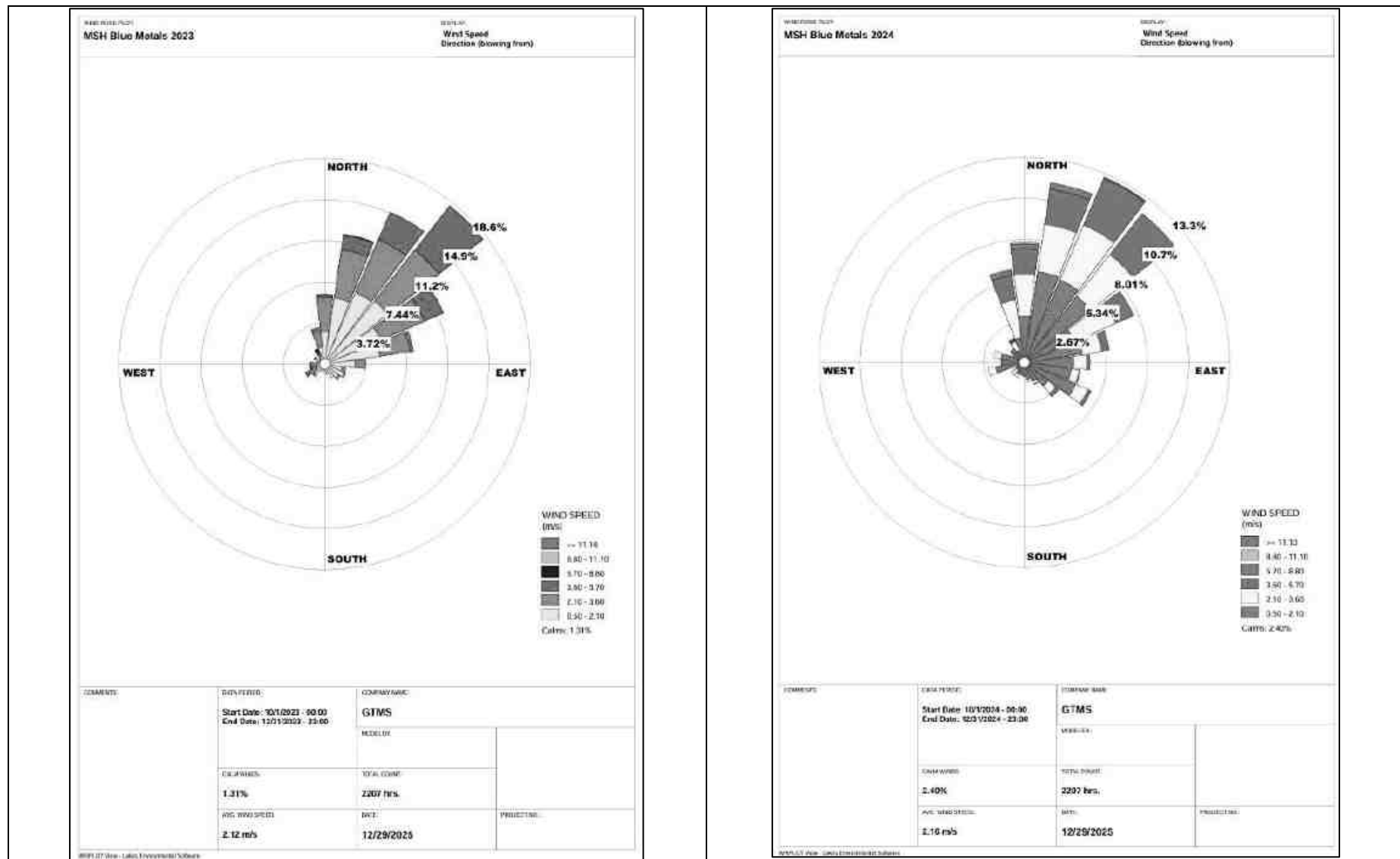


Figure 3.13a Windrose Diagram for 2023 and 2024 (October to December)

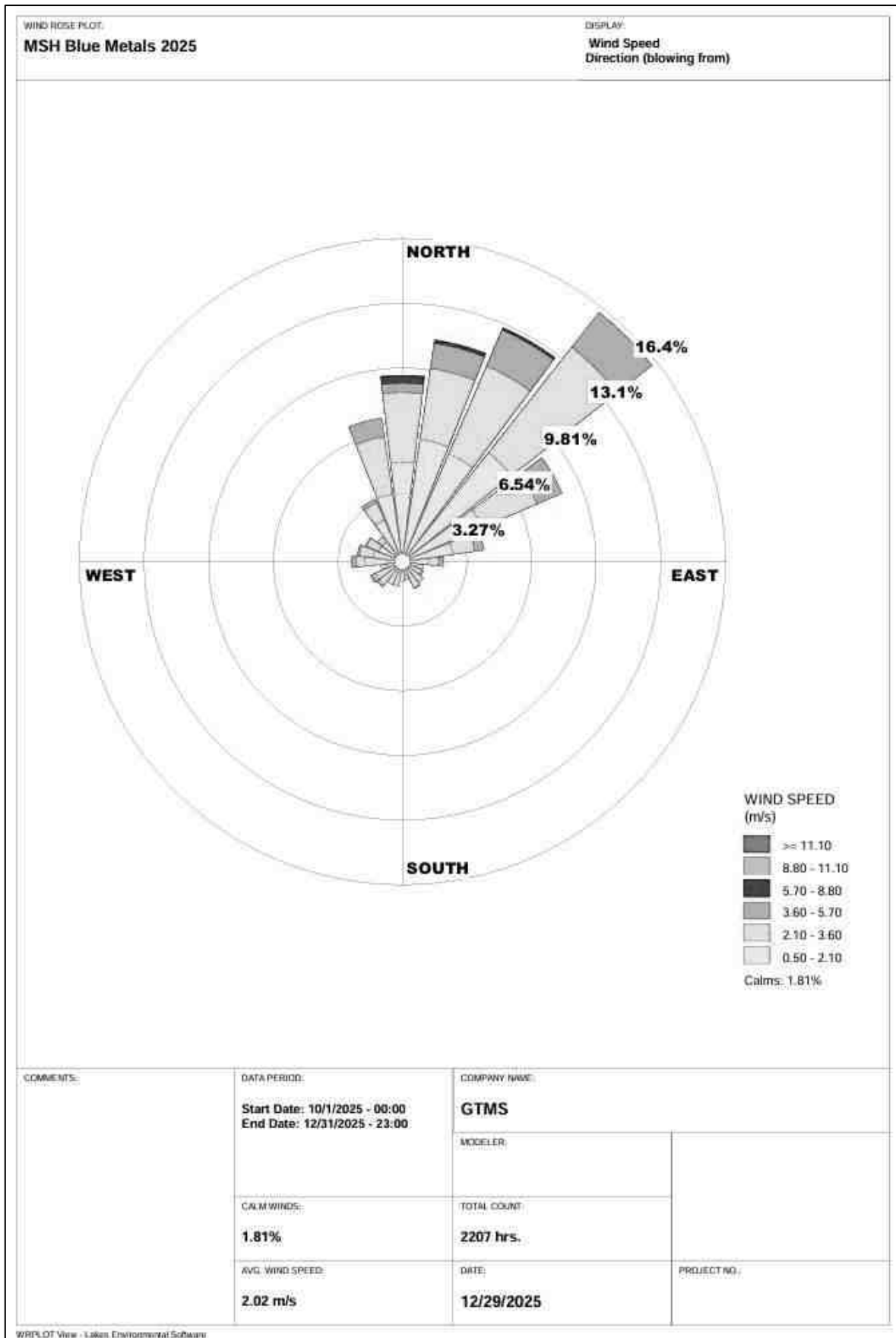


Figure 3.14 Onsite Wind Rose Diagram

3.3.2 Ambient Air Quality Study

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

- ❖ Meteorological condition on synoptic scale
- ❖ Topography of the study area
- ❖ Representatives of regional background air quality for obtaining baseline status
- ❖ Location of residential areas representing different activities
- ❖ Accessibility and power availability

Table 3.13 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
PM _{2.5}	Gravimetric method Beta attenuation method	Fine Particulate Sampler
PM ₁₀	Gravimetric method Beta attenuation method	Respirable Dust Sampler
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment

Source: Sampling Methodology based Ekdant Enviro Services (P) Ltd & CPCB Notification

Table 3.14 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO ₂ (µg/m ³)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO _x (µg/m ³)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM ₁₀ (µg/m ³)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	PM _{2.5} (µg/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

Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at 5 locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period October to December, 2025 as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least $3 \pm 0.5\text{m}$ above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for $\text{PM}_{2.5}$, PM_{10} , sulphur dioxide (SO_2) and nitrogen dioxide (NO_x). The sampling locations are shown in Figure 3.15 and average concentrations of air pollutants are summarized in Tables 3.15 and are shown in Figures 3.16-3.20.

Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
AAQ1	Core	--	--	12°42'55.05"N	79°35'5.33"E
AAQ2	Mangalam	0.65	SE	12°42'38.85"N	79°35'24.45"E
AAQ3	Mariyanallur	0.86	NW	12°43'21.02"N	79°34'52.06"E
AAQ4	Vadapoondipatti	1.26	NE	12°43'33.30"N	79°35'24.91"E
AAQ5	Nedumparai	2.55	SW	12°42'33.96"N	79°33'40.48"E

Source: On-site monitoring/sampling Ekdant Enviro Services (P) Ltd in association with GTMS

Results

As per the monitoring data, $\text{PM}_{2.5}$ ranges from $19.6\mu\text{g}/\text{m}^3$ to $22.8\mu\text{g}/\text{m}^3$; PM_{10} from $40.1\mu\text{g}/\text{m}^3$ to $44.0\mu\text{g}/\text{m}^3$; SO_2 from $6.1\mu\text{g}/\text{m}^3$ to $8.0\mu\text{g}/\text{m}^3$; NO_x from $7.1\mu\text{g}/\text{m}^3$ to $13.3\mu\text{g}/\text{m}^3$. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index

The AQI shows that the air quality of the study area falls within good category 42 causing minimal impact to human health.

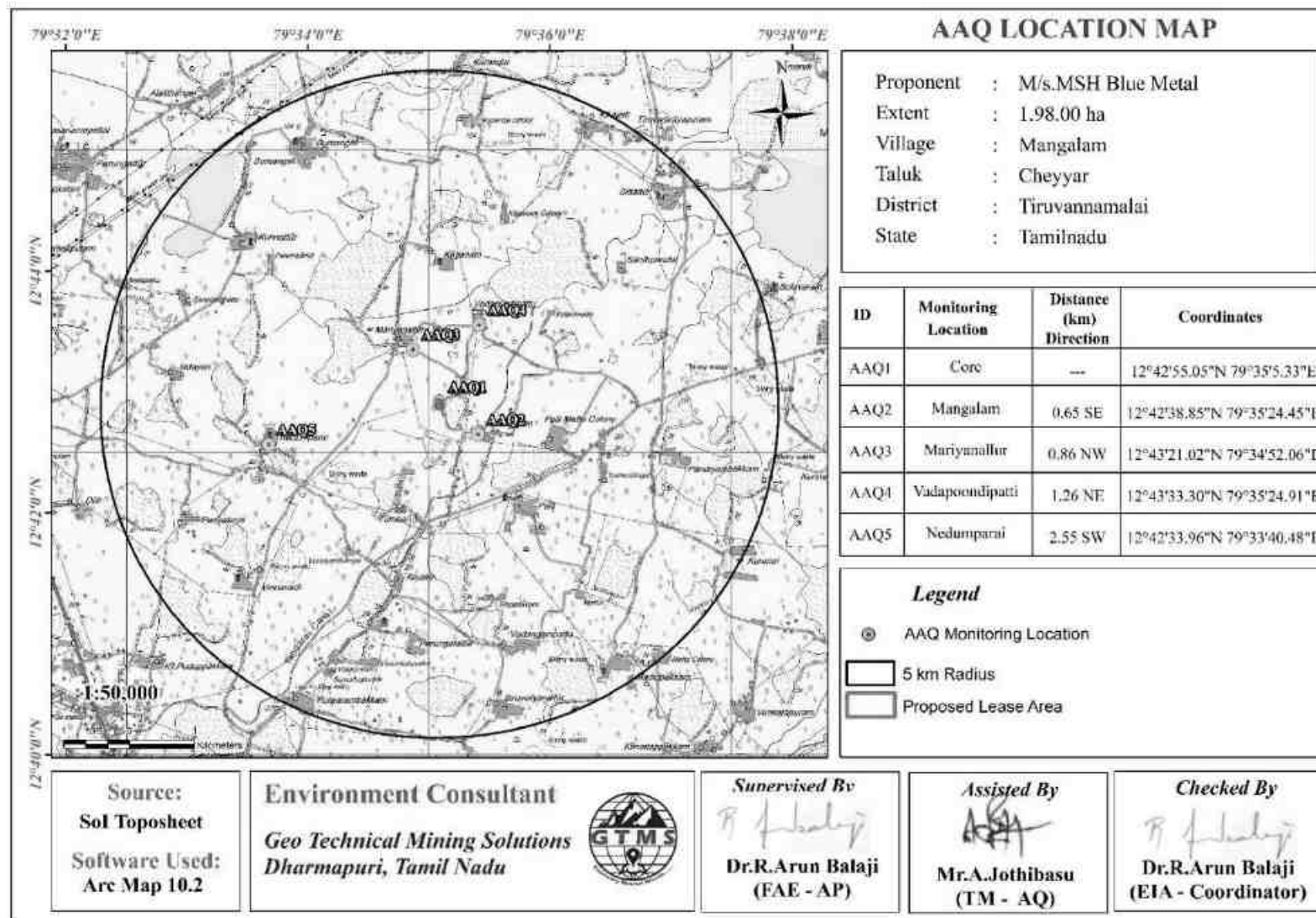


Figure 3.15 Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

Table 3.16 Summary of AAQ Result

PM _{2.5}					PM ₁₀			
Station ID	Max	Min	Mean	98 th Percentile	Max	Min	Mean	98 th Percentile
AAQ1	25.6	22.5	24.0	25.55	47.9	43.1	45.2	47.9
AAQ2	21.9	18.2	20.0	21.55	41.7	38.2	40.0	41.6
AAQ3	21.6	18.1	19.3	20.08	42.8	38.7	41.0	42.8
AAQ4	22.9	19.8	21.0	22.6	43.9	40.2	42.0	43.4
AAQ5	21.9	19.5	20.7	21.856	43.9	40.1	41.5	43.8
SO ₂					NO _x			
AAQ1	9.9	7.5	8.6	9.8	14.7	8.5	11.8	21.4
AAQ2	9.7	7.3	8.4	9.65	13.5	6.6	10.1	19.4
AAQ3	6.8	5.1	5.7	6.1	11	5.9	8.2	20.7
AAQ4	7.9	5.7	7.0	7.9	14	7.6	11	18.6
AAQ5	5.9	5.1	5.5	5.9	13.1	6.8	10	18.5

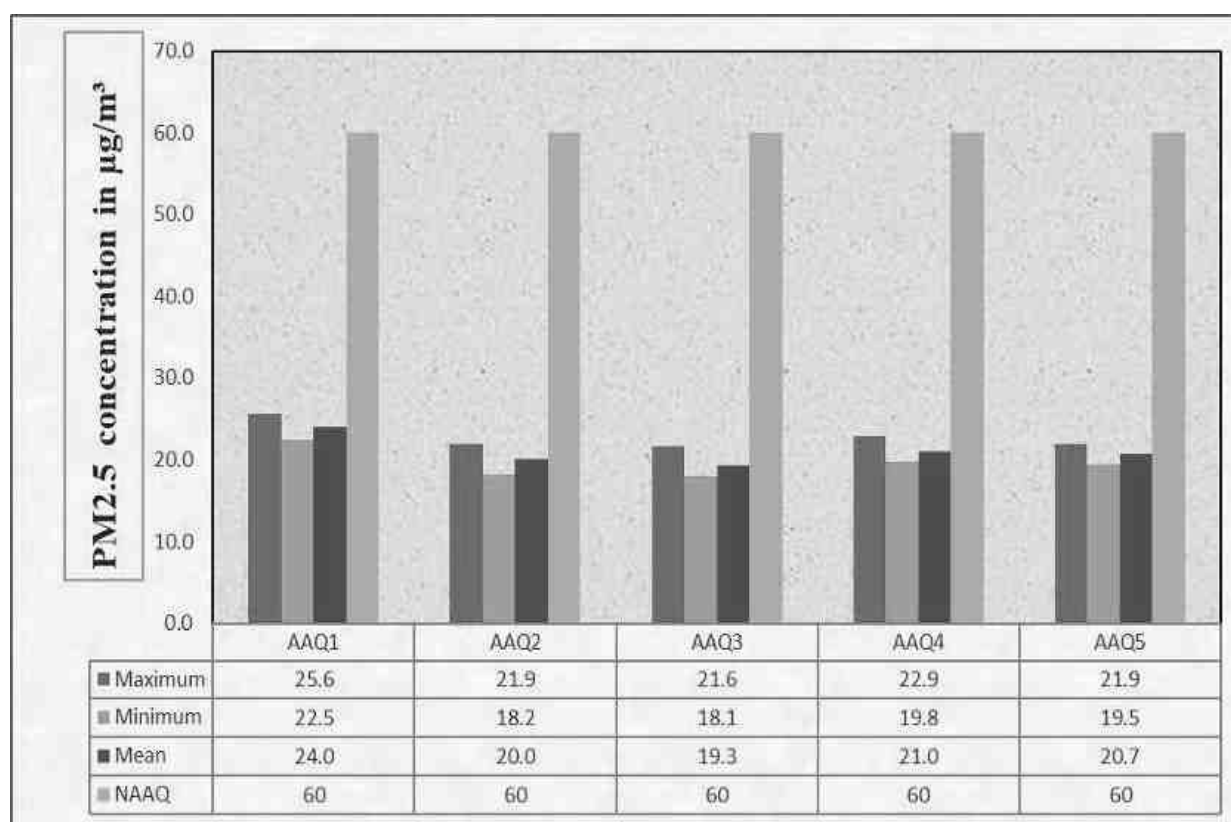


Figure 3.16 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM_{2.5} Measured from 5 Air Quality Monitoring Stations within 5km Radius

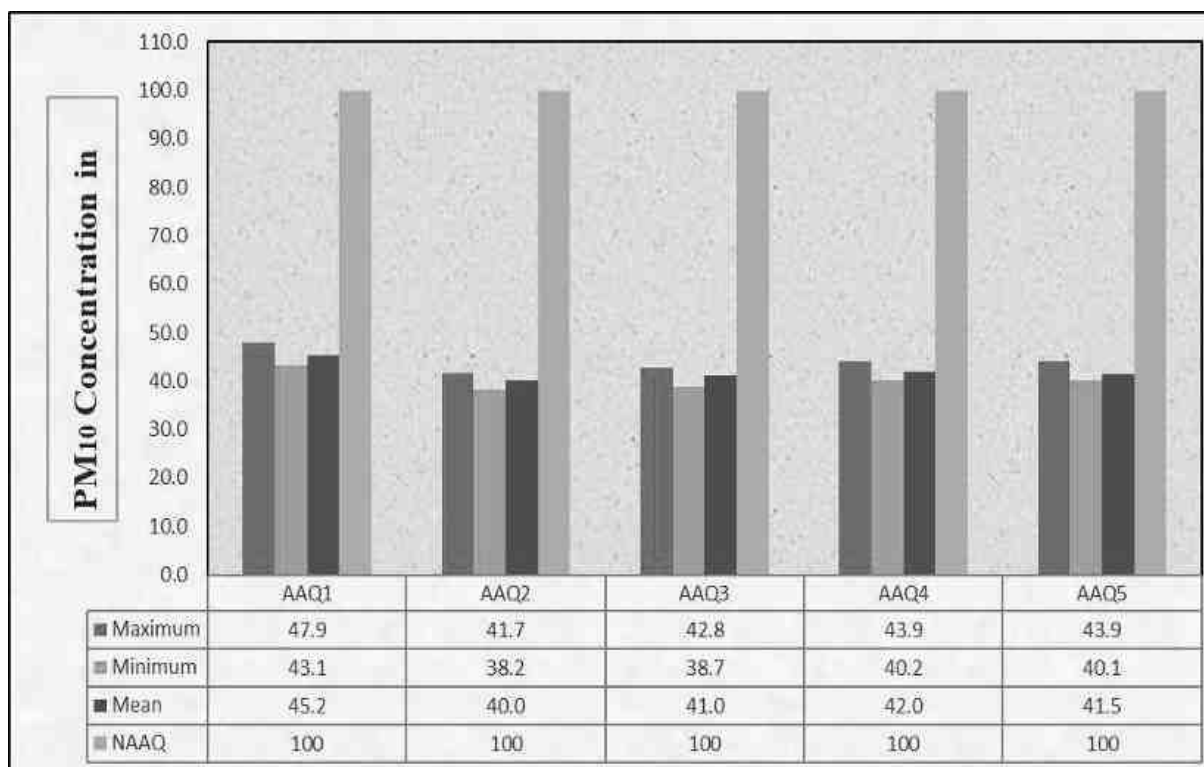


Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM₁₀ Measured from 5 Air Quality Monitoring Stations within 5km Radius

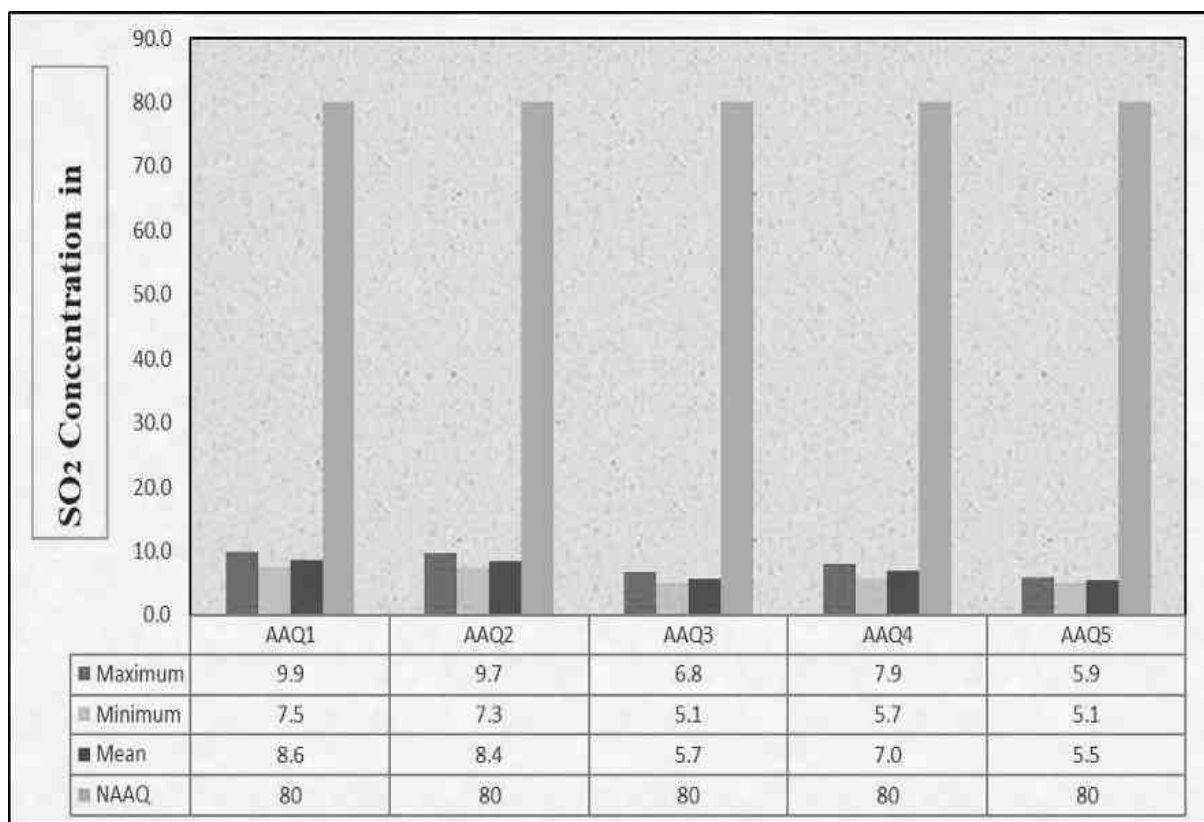


Figure 3.18 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO₂ Measured from 5 Air Quality Monitoring Stations within 5km Radius

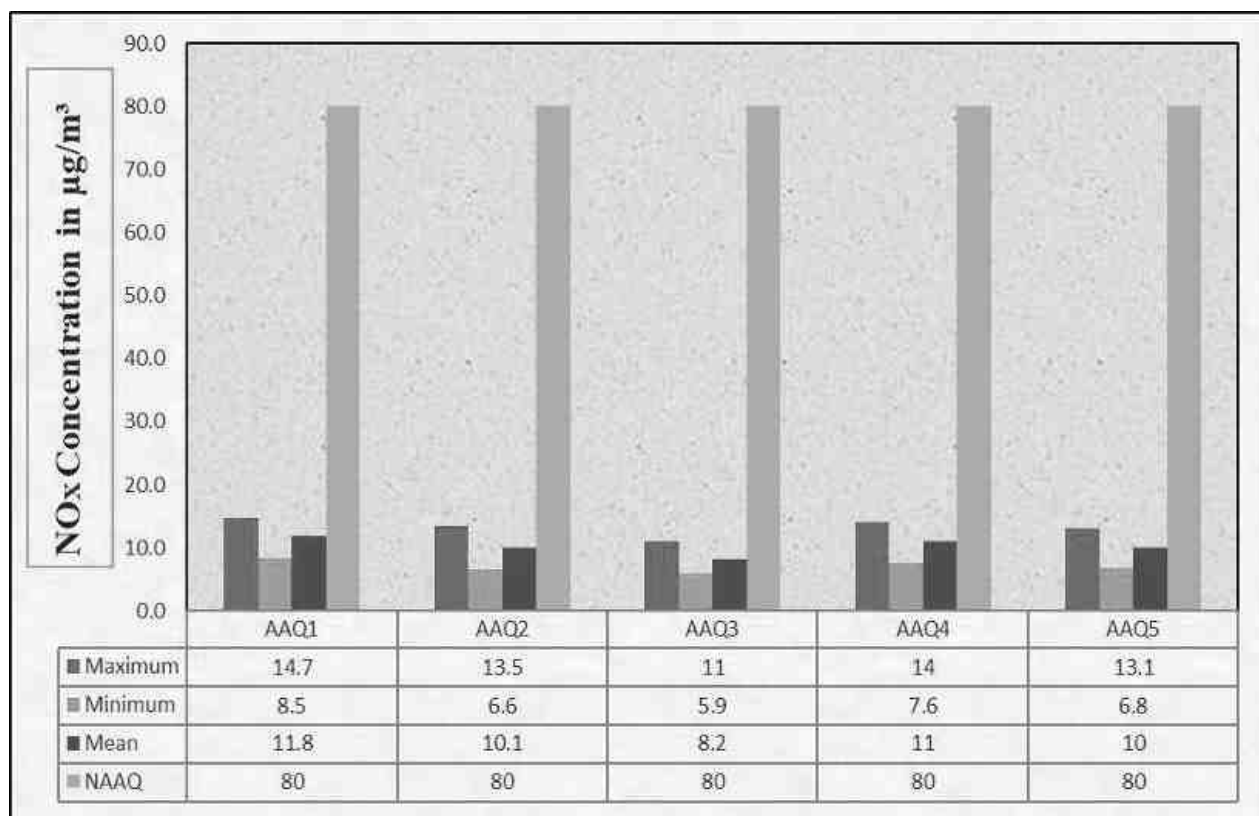


Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of NO_x Measured from 5 Air Quality Monitoring Stations within 5km Radius

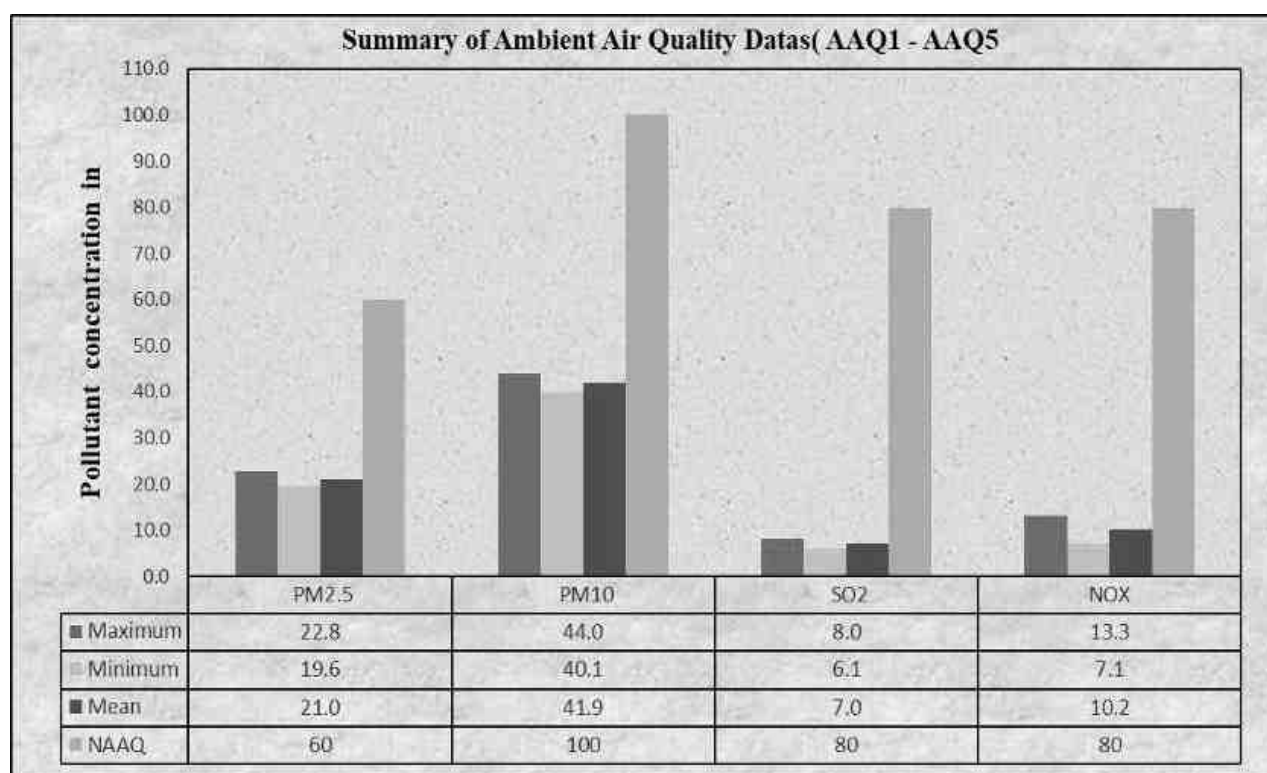


Figure 3.20 Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5km Radius

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at five (05) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.17 and spatial occurrence of the locations are shown in Figure 3.21.

Table 3.17 Noise Monitoring Locations

Sampling ID	Location	Distance (km)	Direction	Coordinates	
				Latitude	Longitude
N1	Core	--	--	12°42'52.48"N	79°35'6.30"E
N2	Mangalam	0.60	SE	12°42'39.79"N	79°35'23.45"E
N3	Mariyanallur	0.76	NW	12°43'18.93"N	79°34'52.37"E
N4	Vadapoondipatti	1.26	NE	12°43'33.36"N	79°35'24.05"E
N5	Nedumparai	2.62	SW	12°42'21.40"N	79°33'41.38"E

Table 3.18 Ambient Noise Quality Result

Station ID	Location	Environmental setting	Average day noise level (dB(A))	Average night noise level (dB(A))	Day time (6.00 AM – 10.00 PM)	Night time (10.00 PM – 6.00 AM)
					Standard (Leq in dB (A))	
N1	Core	Industrial Area	62.4	54.1	75	70
N2	Mangalam	Residential Area	51.0	40.5	55	45
N3	Mariyanallur		48.4	39.0		
N4	Vadapoondipatti		49.1	38.2		
N5	Nedumparai		50.5	40.8		

Source: On-site monitoring/sampling by Ekdant Enviro Services (P) Ltd in association with GTMS

The Table 3.18 shows that noise level in core zone was 62.4dB(A) Leq during day time and 54.1dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 51.0to 48.4dB (A) Leq and during night time from 38.2 to 40.8dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.22 and 3.23.

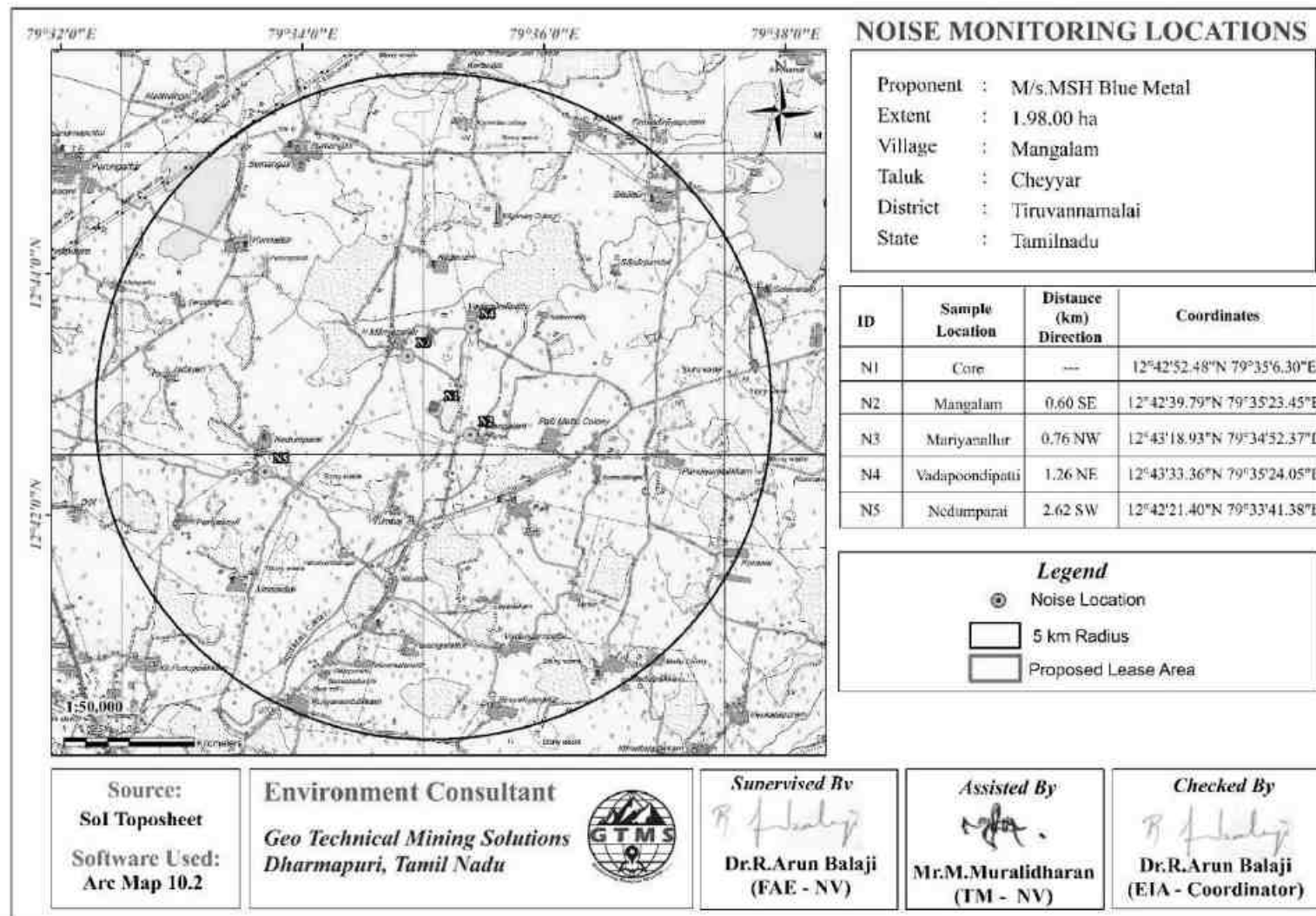


Figure 3.21 Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

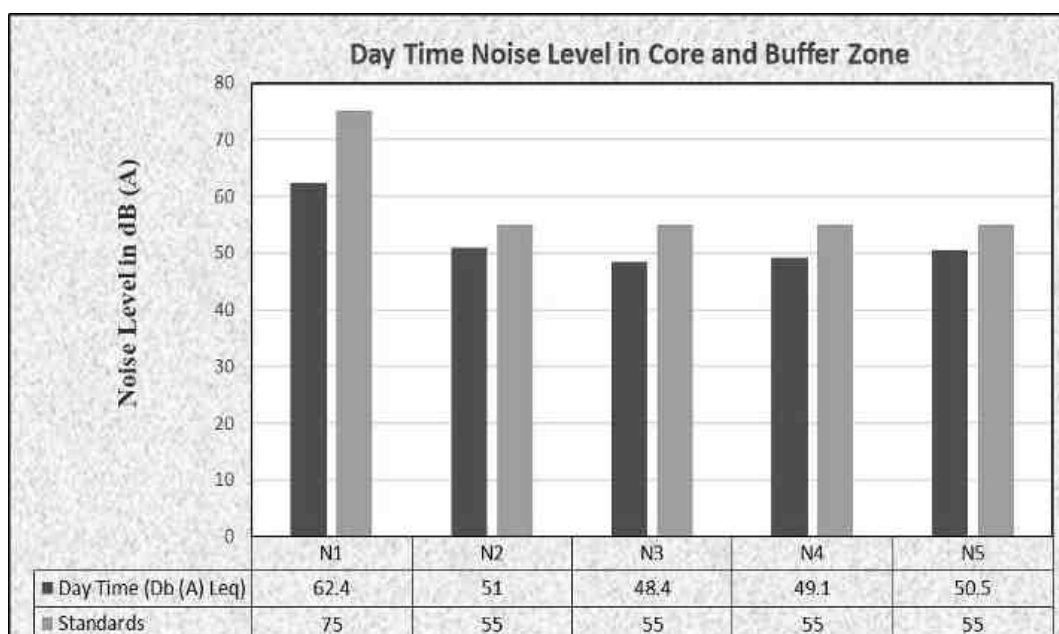


Figure 3.22 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

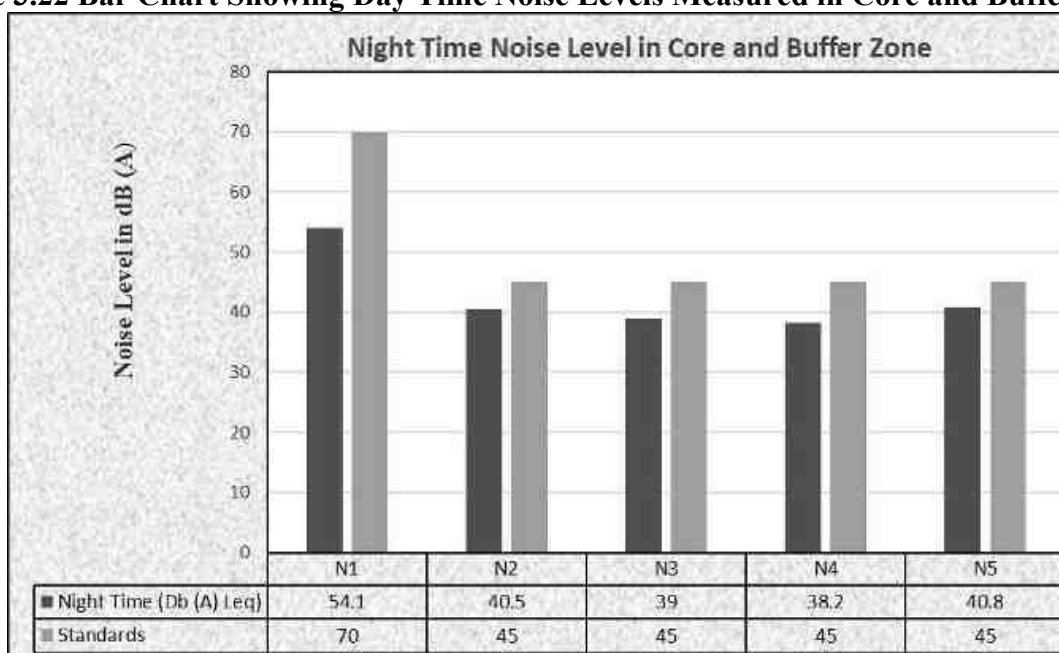


Figure 3.23 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

3.5 BIOLOGICAL ENVIRONMENT

Collection of comprehensive baseline information on flora and fauna is a prerequisite for assessment of impacts of any extractive industries/ activities. Biological environment is an important component of the environment of any area. It covers flora & fauna in the region, details of forests and wildlife sanctuaries in the region, with list of endangered species. Over the years ecological and along with it the loss of biological diversity has become a national and a global concern. Ecological assessment therefore is very critical for decision making and for the setting of a developmental project or an industry. An ecological study of the ecosystem is essential to understand the impact of industrialization and urbanization on existing flora and

fauna of the area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if any.

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



Figure 3.24 Quadrates Sampling Methods of Flora

3.5.1 Flora

3.5.1.1 Objectives of the Study

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

3.5.1.2 Study Approach & Methodology

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

Nested quadrat sampling method was used for the study of community structure of the vegetation. The sampling consisted of randomly placed quadrats of 10m × 10m were laid down to assess trees, and sub quadrats of 5 m × 5 m were laid down for shrubs, 1m x 1m were laid

done for herbs. The size and number of quadrats needed were determined using the species-area curve (Misra, 1968). The data on vegetation were quantitatively analysed for abundance, density, frequency as per Curtis & McIntosh (1950). The Important Value Index (IVI) for trees was determined as the sum of relative density, relative frequency and relative dominance (Curtis, 1959).

3.5.1.3 Survey Methodology

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

3.5.1.4 Important Value Index (IVI)

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

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

Relative Value Index (RVI) = Relative Density + Relative Frequency [RD + RF].

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

Shannon- Wiener Index, Evenness and Richness

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

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

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

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

Where, n_i is individual density of a species and n is total density of all the species

✚ The Evenness Index (E) is calculated by using Shannon's Evenness formula (Magurran, 2004).

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

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

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

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

3.5.1.5 Floral diversity Analysis

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

Flora in core zone

There are no trees inside of the mining lease area, but there are 60 *Borassus flabellifer* trees, *Morinda citrifolia* 5 and *Azadirachta indica* 4 within a 7.5-meter safety zone.

Flora in 300m radius

Taxonomically, a total of 33 species belonging to 19 families have been recorded from the 300m radius from the mining lease area. The species in the 300m radius include herbs (18), trees (08), shrubs (05), the 19 families, Fabaceae and Lamiaceae are the main dominating species in the study area. Species Richness (margalef Index) in the study area it mentioned in Table 3.19-3.21. Moreover, no species are found as threatened category. There is government land around 300 meters. *Vachelia leucophylla* is the dominant tree followed by *Phoenix sylvestris* tree, *Carissa carandas*, *Casapella thevetia* and *Lantana camara* tree.

Flora in 10km radius zone

In the buffer zone, a total of 81 species belonging to 41 families were recorded. Among them are trees (32), shrubs (14), herbs (38), climbers (09), creepers (5), grasses (4), and cactus (1). Majority of the species belongs to the family of Fabaceae and Poaceae, as mentioned in Table 3.28. Species Richness (margalef Index) in the study area it mentioned in Table 3.22. Moreover, no species are found as threatened category.

Table 3.19 Flora in 300m Radius

S.No.	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Velikathan maram	<i>Prosopis juliflora</i>	Fabaceae	6	5	10	0.6	50.0	1.2	12.8	12.8	25.6	Not Listed
2	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	5	4	10	0.5	40.0	1.3	10.6	10.3	20.9	Not Listed
3	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	7	6	10	0.7	60.0	1.2	14.9	15.4	30.3	Not Listed
4	Vembu	<i>Azadirachta indica</i>	Meliaceae	6	5	10	0.6	50.0	1.2	12.8	12.8	25.6	Not Listed
5	Vagai	<i>Albizia lebbek</i>	Fabaceae	5	4	10	0.5	40.0	1.3	10.6	10.3	20.9	Not Listed
6	Eshamaram	<i>Phoenix Reclinata</i>	Arecaceae	7	6	10	0.7	60.0	1.2	14.9	15.4	30.3	Not Listed
7	Teaku	<i>Tectona grandis</i>	Lamiaceae	6	5	10	0.6	50.0	1.2	12.8	12.8	25.6	Not Listed
8	Veallai vealan	<i>Vachellia leucophloea</i>	Fabaceae	5	4	10	0.5	40.0	1.3	10.6	10.3	20.9	Lest Concern
Shrubs													
9	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	9	8	15	0.6	53.3	1.1	22.0	22.2	44.2	Not Listed
10	Kela chadi	<i>Carissa carandas</i>	Apocynaceae	8	7	15	0.5	46.7	1.1	19.5	19.4	39.0	Not Listed
11	Arali	<i>Casapella thevetia</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	17.1	16.7	33.7	Not Listed
12	Sappathikalli	<i>Cereus pterogonus</i>	Cactaceae	9	8	15	0.6	53.3	1.1	22.0	22.2	44.2	Not Listed
13	Unichedi	<i>Lantana camara</i>	Verbenaceae	8	7	15	0.5	46.7	1.1	19.5	19.4	39.0	Not Listed

<i>Herbs, Climbers & Grass</i>													
14	Thumbai	<i>Leucas aspera</i>	Lamiaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
15	Katang kathrikai	<i>Solanum virginianum</i>	Solanaceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
16	Arugampul	<i>Cynodon dactylon</i>	Poaceae	10	9	20	0.5	45.0	1.1	6.8	7.0	13.8	Not Listed
17	Poolai poondu	<i>Aerva lanata</i>	Amaranthaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
18	Korai	<i>Cyperus rotundus</i>	Cyperaceae	6	5	20	0.3	25.0	1.2	4.1	3.9	8.0	Not Listed
19	Nearunji	<i>Tribulus terrestris</i>	Zygophyllales	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
20	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
21	Vilaiti tulsi	<i>hyptis suaveolens</i>	Lamiaceae	11	10	20	0.6	50.0	1.1	7.5	7.8	15.2	Not Listed
22	Pink Blumea	<i>Blumea axillaris</i>	Asteraceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
23	Rail poondu	<i>Croton bonplandianus</i>	Euphorbiaceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
24	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
25	Veattukaya poondu	<i>Tridax Procumbens</i>	Asteraceae	9	8	20	0.5	40.0	1.1	6.1	6.2	12.3	Not Listed
26	Kundumani	<i>Abrus precatorius</i>	Fabaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
27	Mosukkattan	<i>Passiflora foetida</i>	Passifloraceae	7	6	20	0.4	30.0	1.2	4.8	4.7	9.4	Not Listed
28	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	10	9	20	0.5	45.0	1.1	6.8	7.0	13.8	Not Listed
29	Kandakathari	<i>Solanum xanthocarpum</i>	Solanaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed
30	Arugam Pill	<i>Cynodon dactylon</i>	Poaceae	9	8	20	0.5	40.0	1.1	6.1	6.2	12.3	Not Listed
31	Paspalum	<i>Paspalum quadrifarium</i>	Poaceae	8	7	20	0.4	35.0	1.1	5.4	5.4	10.9	Not Listed

LC- Least Concern - [Species categorized as Least Concern (LC) is a taxon when it has been evaluated against the Red List criteria and does not qualify for Endangered Near Threatened.], DD – Data Deficient [Species categorized as DD is a taxon when there is no inadequate information to make a direct, VU- Vulnerable indirect assessment of its risk of extinction based on its distribution and/or population status].

<https://www.iucnredlist.org/> <https://bsi.gov.in/uploads/documents/research-program/Threatened-plants-of%20India.pdf>

Table 3.20 Calculation of Species Diversity in 300m Radius

S. No	Common name	Scientific name	No. of Species	Pi	ln (Pi)	Pi x ln (Pi)
Tree						
1	Velikathan maram	<i>Prosopis juliflora</i>	6	0.13	-2.06	-0.26
2	Panai maram	<i>Borassus flabellifer</i>	5	0.11	-2.24	-0.24
3	Nuna maram	<i>Morinda citrifolia</i>	7	0.15	-1.90	-0.28
4	Vembu	<i>Azadirachta indica</i>	6	0.13	-2.06	-0.26
5	Vagai	<i>Albizia lebbek</i>	5	0.11	-2.24	-0.24
6	Eshamaram	<i>Phoenix reclinata</i>	7	0.15	-1.90	-0.28
7	Teaku	<i>Tectona grandis</i>	6	0.13	-2.06	-0.26
8	Veallai vealan	<i>Vachellia leucophloea</i>	5	0.11	-2.24	-0.24
H (Shannon Diversity Index) =2.07						
Shrubs						
9	Erukku	<i>Calotropis gigantea</i>	9	0.22	-1.52	-0.33
10	Kela chadi	<i>Carissa carandas</i>	8	0.20	-1.63	-0.32
11	Arali	<i>Casapella thevetia</i>	7	0.17	-1.77	-0.30
12	Sappathikalli	<i>Cereus pterogonus</i>	9	0.22	-1.52	-0.33
13	Unichedi	<i>Lantana camara</i>	8	0.20	-1.63	-0.32
H (Shannon Diversity Index) =1.61						
Herbs						
14	Thumbai	<i>Leucas aspera</i>	8	0.05	-2.91	-0.16
15	Katang kathrikai	<i>Solanum virginianum</i>	7	0.05	-3.04	-0.14
16	Arugampul	<i>Cynodon dactylon</i>	10	0.07	-2.69	-0.18
17	Poolai poondu	<i>Aerva lanata</i>	8	0.05	-2.91	-0.16
18	Korai	<i>Cyperus rotundus</i>	6	0.04	-3.20	-0.13
19	Nerunji	<i>Tribulus terrestris</i>	8	0.05	-2.91	-0.16
20	Nayuruv	<i>Achyranthes aspera</i>	7	0.05	-3.04	-0.14
21	Vilaiti tulsi	<i>Hyptis suaveolens</i>	11	0.07	-2.59	-0.19
22	Pink Blumea	<i>Blumea axillaris</i>	8	0.05	-2.91	-0.16
23	Rail Pindu	<i>Croton bonplandianus</i>	7	0.05	-3.04	-0.14
24	Communist pacha	<i>Chromolaena odorata</i>	8	0.05	-2.91	-0.16
25	veattukayapundu	<i>Tridax Procumbens</i>	9	0.06	-2.79	-0.17
26	Kundumani	<i>Abrus precatorius</i>	8	0.05	-2.91	-0.16
27	Mosukkattan	<i>Passiflora foetida</i>	7	0.05	-3.04	-0.14

28	Perandai	<i>Cissus quadrangularis</i>	10	0.07	-2.69	-0.18
29	Kandakathari	<i>Solanum xanthocarpum</i>	8	0.05	-2.91	-0.16
30	Arugam Pill	<i>Cynodon dactylon</i>	9	0.06	-2.79	-0.17
31	paspalum	<i>Paspalum quadrifarium</i>	8	0.05	-2.91	-0.16
H (Shannon Diversity Index) =2.88						

Table 3.21 Species Richness (Index) in 300m Radius

Details	H	H max	Evenness	Species Richness
Tree	2.07	2.08	1.00	1.82
Herbs	1.61	1.61	1.00	1.08
Shrubs	2.88	2.89	1.00	3.41

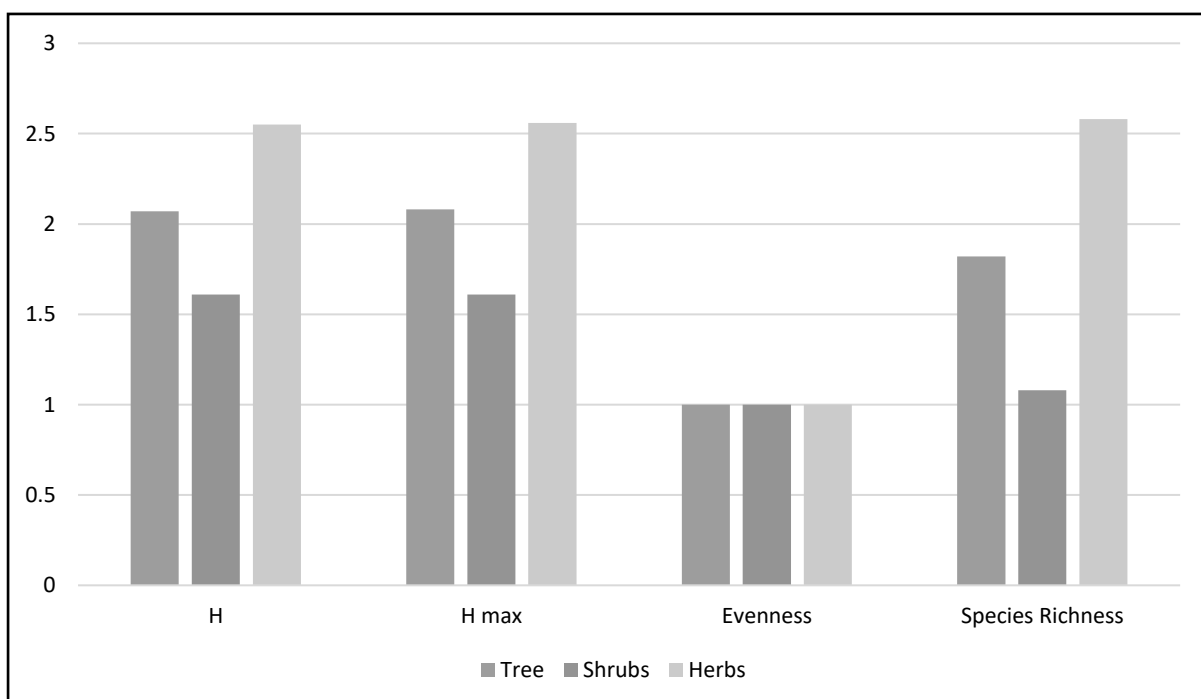


Figure 3.25 Floral Diversity Species Richness (Index) 300m Radius

From the above, it can be interpreted that herb community has higher diversity. While the tree community shows less diversity. It is also observed that most of the quadrates have controlled generation of plant species with older strands. Higher herb species diversity can be interpreted as a greater number of successful species and a more stable ecosystem where more ecological niches are available, environmental change is less likely to be damaging to the ecosystem as a whole. Species richness is high for herb community when compared with tree and shrubs.

Table 3.22 Flora in 10km radius

S.No	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Vembu	<i>Azadirachta indica</i>	Meliaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
2	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
3	Karuvelam	<i>Acacia nilotica</i>	Mimosaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
4	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
5	Puliyamaram	<i>Tamarindus indica</i>	Legumes	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
6	Athi	<i>Ficus recemosa</i>	Moraceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
7	Vazhaimaram	<i>Musa</i>	Musaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
8	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
9	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
10	Perumungil	<i>Bambusa bambos</i>	Poaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
11	Karungali	<i>Acacia sundra</i>	Legumes	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
12	Sapota	<i>Manilkara zapota</i>	Sapotaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
13	Eucalyptus	<i>Eucalyptus globules</i>	Myrtaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
14	Navalmaram	<i>Sygygium cumini</i>	Myrtaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
15	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	8	7	10	0.8	70.0	1.1	4.7	5.0	9.7	Not Listed
16	Alamaram	<i>Ficus benghalensis</i>	Moraceae	3	2	10	0.3	20.0	1.5	1.8	1.4	3.2	Not Listed
17	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
18	Manga	<i>Mangifera indica</i>	Anacardiaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
19	Thekku	<i>Tectona grandis</i>	Verbenaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
20	Nelli	<i>Embllica officinalis</i>	Phyllanthaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
21	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
22	Vadanarayani	<i>Delonix elata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
23	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed

24	Pappali maram	<i>Carica papaya L</i>	Caricaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
25	Nochi	<i>Vitex negundo</i>	Verbenaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
26	Vilvam	<i>Aegle marmelos</i>	Rutaceae	4	3	10	0.4	30.0	1.3	2.3	2.2	4.5	Not Listed
27	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
28	Koyya	<i>Psidium guajava</i>	Myrtaceae	7	6	10	0.7	60.0	1.2	4.1	4.3	8.4	Not Listed
29	Seethapazham	<i>Annona reticulata</i>	Annonaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
30	Vagai	<i>Albizia lebbbeck</i>	Fabaceae	5	4	10	0.5	40.0	1.3	2.9	2.9	5.8	Not Listed
31	Teaku	<i>Tectona grandis</i>	Lamiaceae	6	5	10	0.6	50.0	1.2	3.5	3.6	7.1	Not Listed
32	Teanai Maram	<i>Cocos nucifera</i>	Arecaceae	3	2	10	0.3	20.0	1.5	1.8	1.4	3.2	Not Listed
Shrubs													
33	Avarai	<i>Senna auriculata</i>	Fabaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
34	Sundaika	<i>Solanum torvum</i>	Solanaceae	9	8	15	0.6	53.3	1.1	8.6	8.8	17.4	Not Listed
35	Arali	<i>Nerium indicum</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
36	Idlipoo	<i>Xorococ cineia</i>	Rubiaceae	6	5	15	0.4	33.3	1.2	5.7	5.5	11.2	Not Listed
37	Neermulli	<i>Hydrophila auriculata</i>	Acanthaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
38	Icham	<i>Phoenix pusilla</i>	Arecaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
39	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.7	5.5	11.2	Not Listed
40	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
41	Thuthi	<i>Abutilon indicum</i>	Meliaceae	9	8	15	0.6	53.3	1.1	8.6	8.8	17.4	Not Listed
42	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
43	Kundumani	<i>Abrus precatorius</i>	Fabaceae	6	5	15	0.4	33.3	1.2	5.7	5.5	11.2	Not Listed
44	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	8	7	15	0.5	46.7	1.1	7.6	7.7	15.3	Not Listed
45	Bulangan	<i>Gmelina asiatica L.</i>	Lamiaceae	9	8	15	0.6	53.3	1.1	8.6	8.8	17.4	Not Listed
46	mottled spurge	<i>Euphorbia lactea</i>	Euphorbiaceae	7	6	15	0.5	40.0	1.2	6.7	6.6	13.3	Not Listed
Herbs, Climber, Creeper & Grasses													
47	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
48	Vetukaayapoondur	<i>Tridax procumbens</i>	Asteraceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
49	Koraikkilangu	<i>Cyperus articulatus</i>	Cyperaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
50	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
51	Manjal	<i>Curcuma longa</i>	Zingiberaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
52	Chempu	<i>Colocasia indica</i>	Araceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
53	Karisilanganni	<i>Eclipta prostrata</i>	Asteraceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
54	Korai	<i>Cyperus rotundus</i>	Cyperaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
55	Kunnakora	<i>Cyperus compressus</i>	Cyperaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed

56	Milagai	<i>Capsicum frutescens</i>	Solanaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
57	Kanamvazha	<i>Commelina benghalensis</i>	Commelinaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
58	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
59	Thumbai	<i>Leucas aspera</i>	Lamiaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
60	Parttiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
61	Mukurattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
62	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	11	10	20	0.6	50.0	1.1	3.9	4.0	7.9	Not Listed
63	Manathakkali	<i>Solanumnigrum</i>	Solanaceae	7	8	20	0.4	40.0	0.9	2.5	3.2	5.7	Not Listed
64	Kumipoondu	<i>Gomphrena celosioides</i>	Amaranthaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
65	Kattuthulasi	<i>Ocimum sanctum</i>	Lamiaceae	10	9	20	0.5	45.0	1.1	3.5	3.6	7.1	Not Listed
66	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
67	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
68	Mudakkotan	<i>Cardiospermum helicacabum</i>	Sapindaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
69	Karkakartum	<i>Clitoria ternatea</i>	Fabaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
70	Nannari	<i>Hemidesmus indicus</i>	Asclepiadaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
71	Kovakkai	<i>Trichosanthes dioica</i>	Cucurbitaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
72	Malli	<i>Jasminum augustifolium</i>	Oleaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
73	Musumusukkai	<i>Mukia maderaspatana</i>	Cucurbitaceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
74	Mosukkattan	<i>Passiflora foetida</i>	Passifloraceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
75	Vallikeerai	<i>Ipomoea aquatica</i>	Convolvulaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
76	Siru puladi	<i>Desmodium triflorum</i>	Fabaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
77	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
78	Korai	<i>Cyperus rotandus</i>	Poaceae	6	5	20	0.3	25.0	1.2	2.1	2.0	4.1	Not Listed
79	mookuthi poondu	<i>Wedelia trilobata</i>	Asteraceae	7	6	20	0.4	30.0	1.2	2.5	2.4	4.9	Not Listed
80	Nellu	<i>Oryza sativa</i>	Poaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed
81	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	12	11	20	0.6	55.0	1.1	4.2	4.4	8.6	Not Listed
82	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	8	7	20	0.4	35.0	1.1	2.8	2.8	5.6	Not Listed
83	Arugampul	<i>Cynodon dactylon</i>	Poaceae	13	12	20	0.7	60.0	1.1	4.6	4.8	9.4	Not Listed
84	Sapathikalli	<i>Opuntia dillenii</i>	Cactaceae	9	8	20	0.5	40.0	1.1	3.2	3.2	6.4	Not Listed

3.5.2 Fauna

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

Table 3.23 Methodology applied during survey of fauna

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

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

Fauna Composition in the Core Zone

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

Fauna Composition in the Buffer Zone

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

Table 3.24 Fauna in the Core zone

S. No.	Common name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act, 1972	IUCN Red List data
INSECTS					
1	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	NL	NL
2	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC

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

Table 3.25 Fauna in the buffer zone

S. No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
INSECTS					
1	Tawny costar	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
3	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
4	Common Indian Crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
5	Green marsh hawk	Libellulidae	<i>Orthetrum sabina</i>	NL	LC
6	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
7	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
8	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
9	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
10	Lesser grass blue	Lycaenidae	<i>Zizina otis indica</i>	Schedule IV	LC
11	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
12	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
13	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
REPTILES					
1	Chameleon	Chamaeleonidae	<i>Chameleonzeylanicus</i>	Sch II (Part II)	LC
2	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
3	Green Vine snake	Colubridae	<i>Ahaetulla nasuta</i>	Schedule IV	LC

4	Common housegecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
5	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
MAMMALS					
1	palmsquirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
2	Indian FieldMouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
3	Home mouse	Muridae	<i>Mus musculus tytleri</i>	NL	LC
AVES					
1	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
2	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
3	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
4	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotus cafer</i>	Schedule IV	LC
5	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
6	green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
7	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC
8	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
9	Blue Rock Pigeon	Columbidae	<i>Columba livia</i>	Schedule IV	LC
10	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC
11	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC

3.5.3 Aquatic Vegetation

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

Table 3.26 Aquatic Vegetation

S. No.	Scientific Name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1	<i>Eichornia Crassipe</i>	Water Hyacinth	Agayatamarai	NA
2	<i>Aponogeton natans</i>	Floating Lace Plant	Kottikizhangu	NA
3	<i>Nymphaea Nouchali</i>	Blue Water Lily	Nellambal	LC
4	<i>Carex Cruciata</i>	Cross Grass	Koraipullu	NA
5	<i>Cynodon Dactylon</i>	Scutch Grass	Arugampullu	LC
6	<i>Cyperus Exaltatus</i>	Tall Flat Sedge	Koraikizhangu	LC

*Lc- Least Concern, Na-Not Yet Assessed

Food chain

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

Ex: Phytoplankton → Zooplankton → small fish → large fish

Endangered and endemic species as per the IUCN Red List

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

3.5.4 Agriculture & Horticulture in Kanchipuram district

The pre-monsoon rainfall is almost uniform throughout the district. The coastal taluks get more rains rather than the interior regions. This district is mainly depending on the seasonal rains, the distress conditions prevail in the event of the failure of rains. Northeast and Southwest monsoon are the major donors with 54% and 36% contribution each to the total annual rainfall.

Agriculture is the main occupation of the people with 20% of the population engaged in it. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals and Millets and Pulses are the other major crops. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals & Millets and Pulses are the other major crops cultivated.

3.5.4.1 Major Agricultural Crops 1km radius

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

Table 3.27 Major Crops in 1km radius

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

3.5.4.2 Major Horticulture Crops 1km radius

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

3.5.4.2 Horticulture 1km radius

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

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

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

Results

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

3.6 SOCIO-ECONOMIC ENVIRONMENT

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

3.6.1 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 analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

3.6.2 Methodology

The study employed cluster sampling to outline two zones around the proposed project site: Zone 1 (Core Zone, 0-1 km radius) and Zone 2 (Low Impact Zone, 1–5 km radius). The primary data collection was conducted through structured interviews, field observation, and focus group discussions with the local people of in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu. The secondary data were collected from the Census report

2011 and official records, covering demographics and basic services including information on population, number of households, literacy rates, sex ratios, worker details and the availability of basic services. This study covers the positive and negative impacts of the project's establishment, and provides recommendations for analysing and mitigating adverse effects. The study areas are illustrated in Figure 3.26.

3.6.3 Demographic Profile of Tiruvannamalai District

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

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

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

3.6.4 Profile of Study Area - Mangalam Village

Mangalam is a medium size village located in Vandavasi Taluka of Tiruvannamalai district, Tamil Nadu with total 116 families residing. The Mangalam village has population of 480 of which 223 are males while 257 are females as per Population Census 2011. In Mangalam village population of children with age 0-6 is 44 which makes up 9.17 % of total population of village. Average Sex Ratio of Mangalam village is 1152 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Mangalam as per census is 1316, higher than Tamil Nadu

average of 943. Mangalam village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Mangalam village was 64.91 % compared to 80.09 % of Tamil Nadu. In Mangalam Male literacy stands at 73.53 % while female literacy rate was 57.33 %. As per constitution of India and Panchyati Raaj Act, Mangalam village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Mangalam village. In Mangalam village, most of the villagers are from Schedule Caste (SC). Schedule Caste (SC) constitutes 61.25 % of total population in Mangalam village. The village Mangalam currently doesn't have any Schedule Tribe (ST) population. In Mangalam village out of total population, 195 were engaged in work activities. 72.82 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 27.18 % were involved in Marginal activity providing livelihood for less than 6 months. Of 195 workers engaged in Main Work, 40 were cultivators (owner or co-owner) while 5 were Agricultural labourer, as presented in Table 3.29.

Table. 3.29 Demographic Status of Mangalam Village

Particulars	Mangalam		
	Total	Male	Female
Total No. of Houses	116	-	-
Population	480	223	257
Child (0-6)	44	19	25
Schedule Caste	294	138	156
Schedule Tribe	0	0	0
Literacy	64.91 %	73.53 %	57.33 %
Total Workers	195	130	65
Main Worker	142	-	-
Marginal Worker	53	3	50

Source: <https://www.census2011.co.in/data/village/632070-Mangalam-tamil-nadu.html>

3.6.5 Workforce Participation in the study area

Workforce participation patterns in the study villages reveal notable differences in the nature and extent of employment. In Kundiyanthandalam village, a total of 254 individuals from were engaged in economic activities. Of these, 38.19% were classified as main workers those employed or earning for more than six months during the reference period while a higher proportion (61.81%) were involved in marginal work, indicating irregular or seasonal employment lasting less than six months. Among the main workers, 4 individuals were identified as cultivators (owners or co-owners of land), and 2 individuals were engaged as agricultural labourers, suggesting limited participation in agriculture-based occupations.

In contrast, Mangalam village exhibited a stronger engagement in stable employment. Out of 108 working individuals, a substantial 91.67% were categorized as main workers, with only 8.33% involved in marginal work. Among the main workers, 13 were cultivators (owners

or co-owners) and 44 were agricultural labourers, reflecting a greater dependency on agriculture compared to Kundiyanthandalam village. The analysis indicates a higher proportion of stable and agriculture-based employment in Poonathangal, whereas Kundiyanthandalam demonstrates a predominance of marginal and possibly non-agricultural or seasonal employment. These differences may reflect variations in local resource availability, land ownership patterns, and access to non-farm employment opportunities.

Project Benefits:

The local people have been provided with either direct employments or indirect employment such as business, contract works and development work like roads, etc. and other welfare amenities such as medical facilities, conveyance, free education, drinking water supply etc. The number of villages and human settlements within a radius of 5 km from the project site along with population, their education level etc.

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

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

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

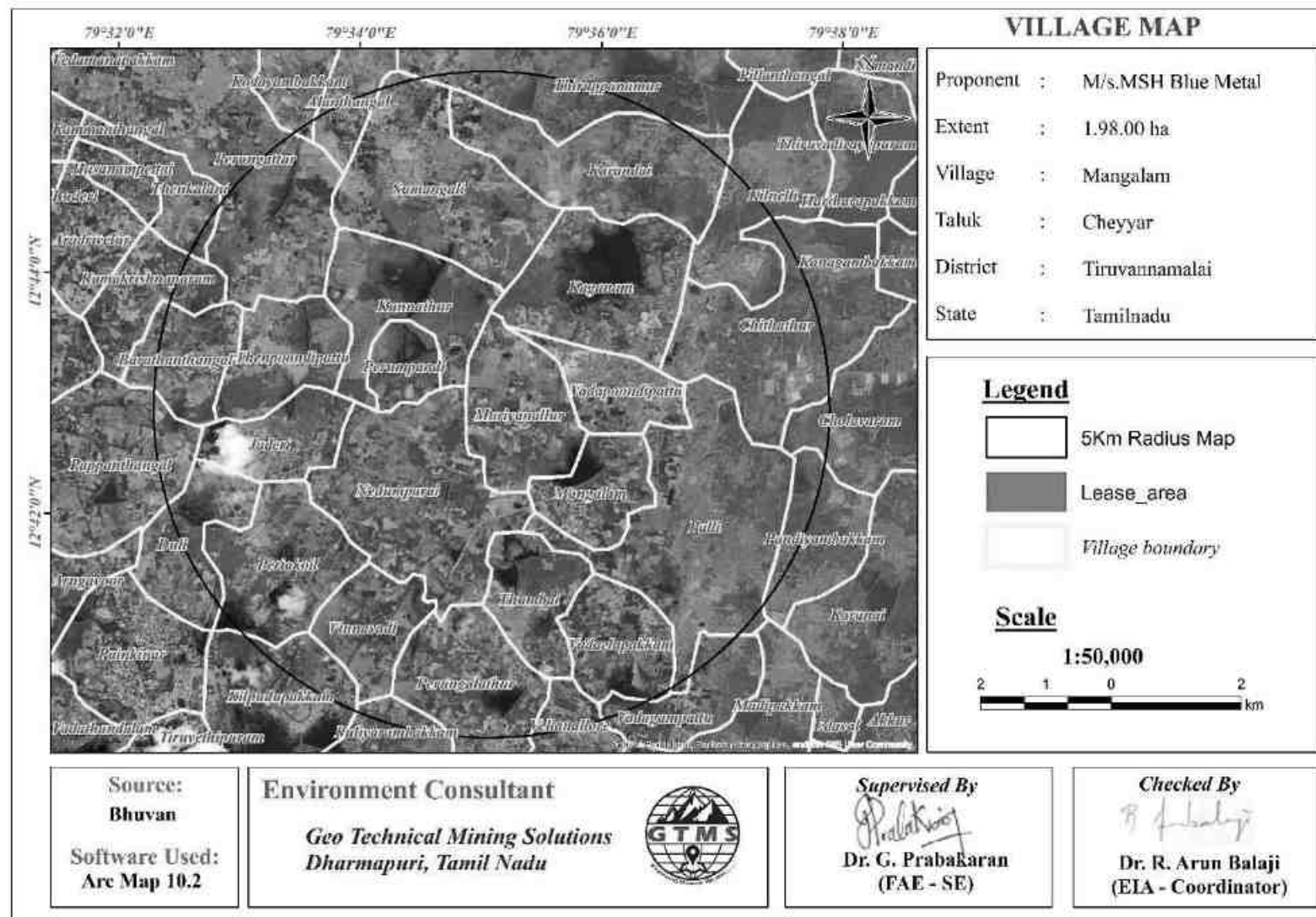


Figure 3.26 Details Village Boundaries within 5 km Radius of the Project Lease Area

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

Village Name	No. of Houses	Total Population		Child (0-6)		Schedule Caste		Schedule Tribe		No of Literates		Total Workers	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Kunnathur	731	1437	1475	141	141	369	410	0	0	1175	1016	842	595
Palli	688	1348	1374	135	139	590	575	18	21	1034	797	870	764
Mangalam	80	157	157	16	15	41	46	5	3	133	110	103	47
Vadapoondipattu	240	472	497	45	43	305	300	0	0	371	326	332	267
Mariyanallur	131	245	261	24	30	0	0	31	35	179	142	173	170
Perumpandi	12	30	27	4	3	0	0	19	15	14	11	19	10
Nedumpirai	349	706	712	52	52	114	113	13	14	581	482	486	471
Jaderi	137	270	260	25	18	1	1	0	0	220	123	175	168
Thenpoondipattu	123	261	264	22	38	161	147	0	0	192	123	167	155
Barathanthangal	131	263	252	27	31	0	0	38	31	204	147	166	136
Pappanthangal	492	991	957	110	105	193	194	24	22	763	577	622	354
Duli	291	579	575	71	73	112	108	14	10	448	333	363	303
Periyakoil	132	297	285	37	22	38	38	0	0	210	144	185	172
Vinnavadi	303	601	634	71	57	18	20	0	0	453	383	469	477
Perungalathur	447	909	868	102	80	236	218	12	13	736	612	624	501
Thumbai	166	321	312	24	10	120	115	0	0	240	151	214	174
Vadaelapakkam	34	73	71	11	11	0	0	0	0	53	36	43	31
Veliyanallur	357	791	747	88	69	211	196	2	1	536	359	509	440
Puliyarampakkam	373	850	823	80	83	522	508	0	0	680	509	507	317
Kilpudupakkam (CT)	1698	3466	3446	348	324	432	445	4	5	3003	2610	1854	663

Pandiyampakkam	248	484	453	48	50	181	175	4	3	374	290	299	189
Thiruppanamoor	574	1104	1129	119	116	510	500	8	14	797	660	688	559
Kizhnelli	402	783	797	67	83	129	136	0	0	502	350	542	437
Karanthai	221	451	430	53	55	300	296	5	7	384	306	298	281
Sumangali	432	804	824	100	84	162	162	10	14	559	364	477	376
Alanthangal	134	271	270	27	38	0	0	8	8	123	86	158	131
Kodaiyampakkam	204	404	439	36	44	0	0	3	5	324	235	264	253
Perungattur	895	1839	1896	202	202	470	471	4	9	1488	1267	1061	875
Thenkazhani	599	1199	1295	110	133	0	3	0	0	965	777	750	627
Kaganam	203	422	384	37	36	237	222	16	16	294	174	240	136
Chithathur	657	1284	1370	142	141	276	311	30	33	889	751	791	500
Chozhavaram	340	670	646	88	75	312	298	1	1	513	428	440	323
Vadakkupattu	210	441	444	34	46	90	89	2	2	341	245	300	284

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

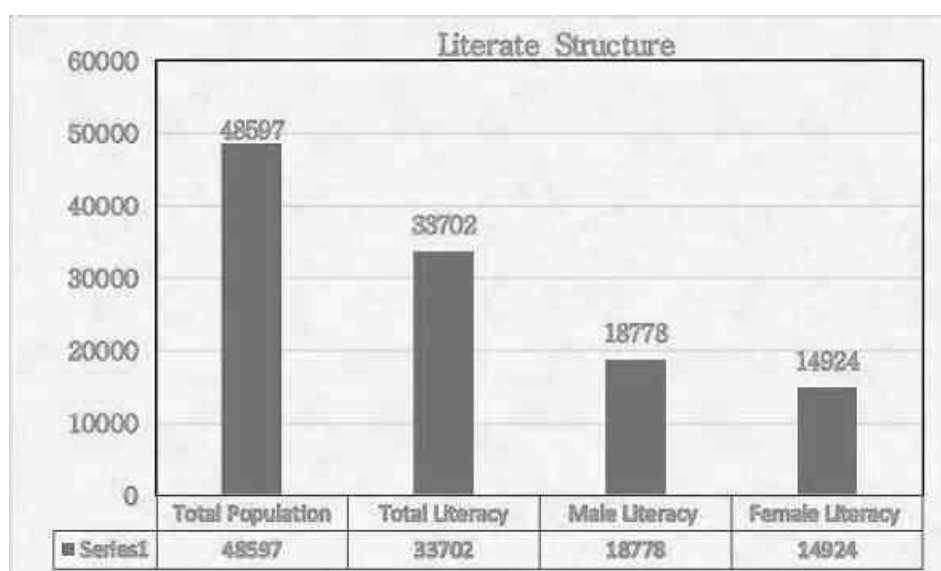
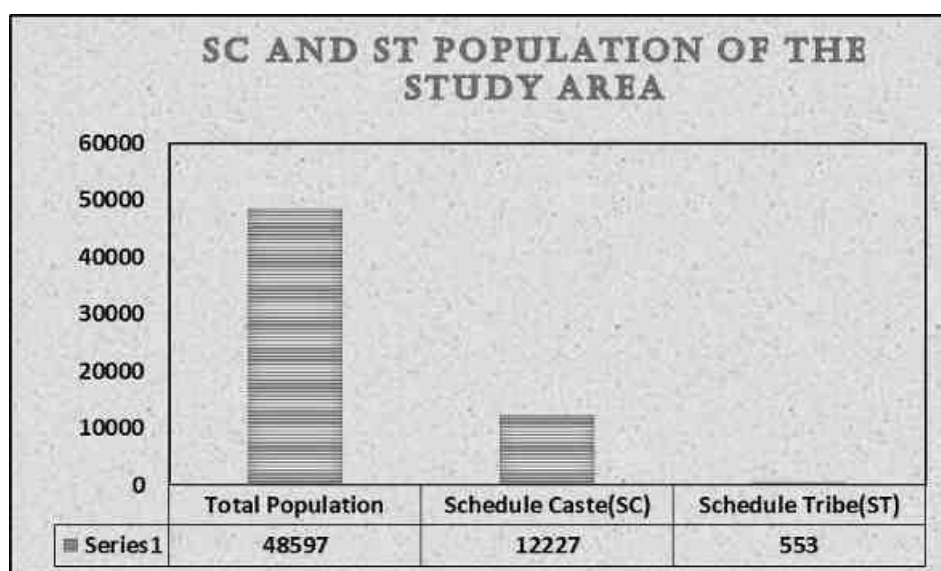
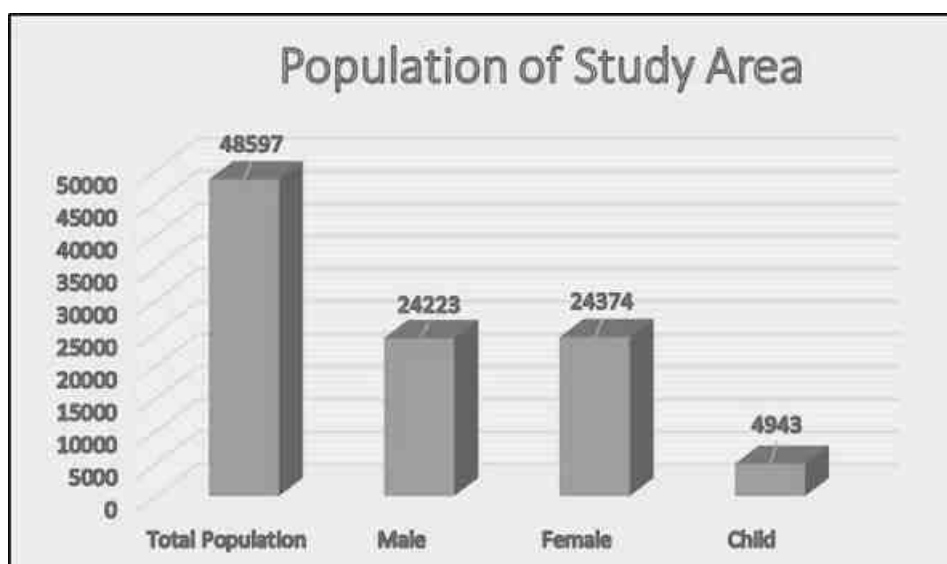


Figure 3.27: Demographic Details – Population, Social Groups, and Literacy Rate in the Study Villages

Table 3.31 Details of Workforce Participation of the Study Area

Village Name	Total Worker	Total Male Workers	Total Female Workers	Main Workers	Main Cultivators	Main Agricultural Labourers	Other Workers	Non-Workers
Kunnathur	1437	842	595	531	61	63	393	1475
Palli	1634	870	764	987	243	248	477	1088
Mangalam	150	103	47	136	103	11	22	164
Vadapoondipattu	599	332	267	410	198	121	40	370
Mariyanallur	343	173	170	316	30	117	151	163
Perumpandi	29	19	10	4	2	0	2	28
Nedumpirai	957	486	471	109	5	6	95	461
Jaderi	343	175	168	246	22	76	76	187
Thenpoondipattu	322	167	155	314	108	85	119	203
Barathanthangal	302	166	136	295	134	48	110	213
Pappanthangal	976	622	354	881	359	146	369	972
Duli	666	363	303	310	42	51	209	488
Periyakoil	357	185	172	342	219	35	88	225
Vinnavadi	946	469	477	942	637	165	123	289
Perungalathur	1125	624	501	185	69	53	60	652
Thumbai	388	214	174	352	73	144	130	245

Vadaelapakkam	74	43	31	74	1	53	20	70
Velianallur	949	509	440	900	458	306	125	589
Puliyampakkam	824	507	317	415	67	90	251	849
Kilpudupakkam (CT)	2517	1854	663	2277	116	202	1917	4395
Pandiyampakkam	488	299	189	466	181	197	78	449
Thiruppanamoor	1247	688	559	959	284	275	380	986
Kizhnelli	979	542	437	860	291	249	277	601
Karantnai	579	298	281	187	63	88	34	302
Sumangali	853	477	376	814	127	383	283	775
Alanthangal	289	158	131	262	129	79	43	252
Kodaiyampakkam	517	264	253	406	86	232	87	326
Perungattur	1936	1061	875	1776	82	917	675	1799
Thenkzhani	1377	750	627	894	143	115	442	1117
Kaganam	376	240	136	255	25	120	103	430
Chithathur	1291	791	500	888	68	323	373	1363
Chozhavaram	763	440	323	721	193	231	247	553
Vadakkupattu	584	300	284	584	337	222	18	301

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

3.6.6 Workforce Participation

The table 3.31 presents an in-depth breakdown of workforce characteristics across villages in the study area of district. The workforce participation across the villages in the study area exhibits significant variability in both size and composition. Total workers range from a minimal 16 in Dharmacheri to as high as 4,058 in Thenambakkam, indicating substantial differences in population size and labor engagement among the villages. Male workers consistently outnumber female workers in nearly all villages, highlighting a pronounced gender disparity in workforce participation. Main workers constitute the majority of employed individuals, reflecting a workforce largely engaged in sustained economic activities rather than marginal or seasonal work.

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

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

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

The data reveals a predominantly agrarian workforce of 31,751 people, with males (19,185) outnumbering females (12,566). Most workers (25,320) are engaged in main employment, primarily in agriculture, with 5,006 cultivators and 7,406 agricultural laborers. Non-agricultural workers number 7,598, indicating some economic diversification. The non-working population is almost as large as the workforce (31,369), reflecting a high dependency

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

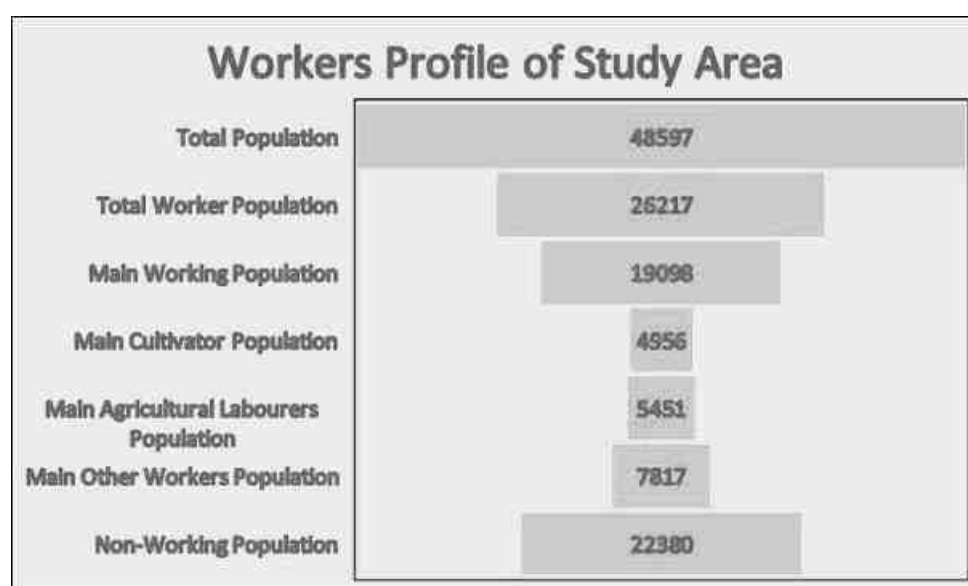


Figure 3.28 Details of Workforce participation in the Study Villages

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

CSR and DMR funds for Development

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

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

Recommendation and Suggestions

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

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

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

3.6.7 Conclusion

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

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

3.7 TRAFFIC DENSITY

The traffic survey conducted based on the transportation route of material, the Rough Stone and gravel is proposed to be transported mainly through Village Road and SH – 770 (Cheyyar – Kancheepuram) as shown in Table 3.32- 3.35 and in Figure 3.29. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Table 3.32 Traffic Survey Locations

Station Code	Road Name	Distance and Direction
TS1	Village Road	1.05km - West
TS2	SH – 770 (Cheyyar – Kancheepuram)	1.5km - SE

Source: On-site monitoring by GTMS FAE & TM

Table 3.33 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	71	213	95	95	105	53	361
TS2	185	555	147	147	172	86	788

Source: On-site monitoring by GTMS FAE & TM

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

Table 3.34 Rough Stone Transportation Requirement

Transportation of Rough Stone Per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	27	81

Source: Approved Mining Plan

Table 3.35 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
TS1	361	81	442	1200
TS2	788	81	869	1200

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

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

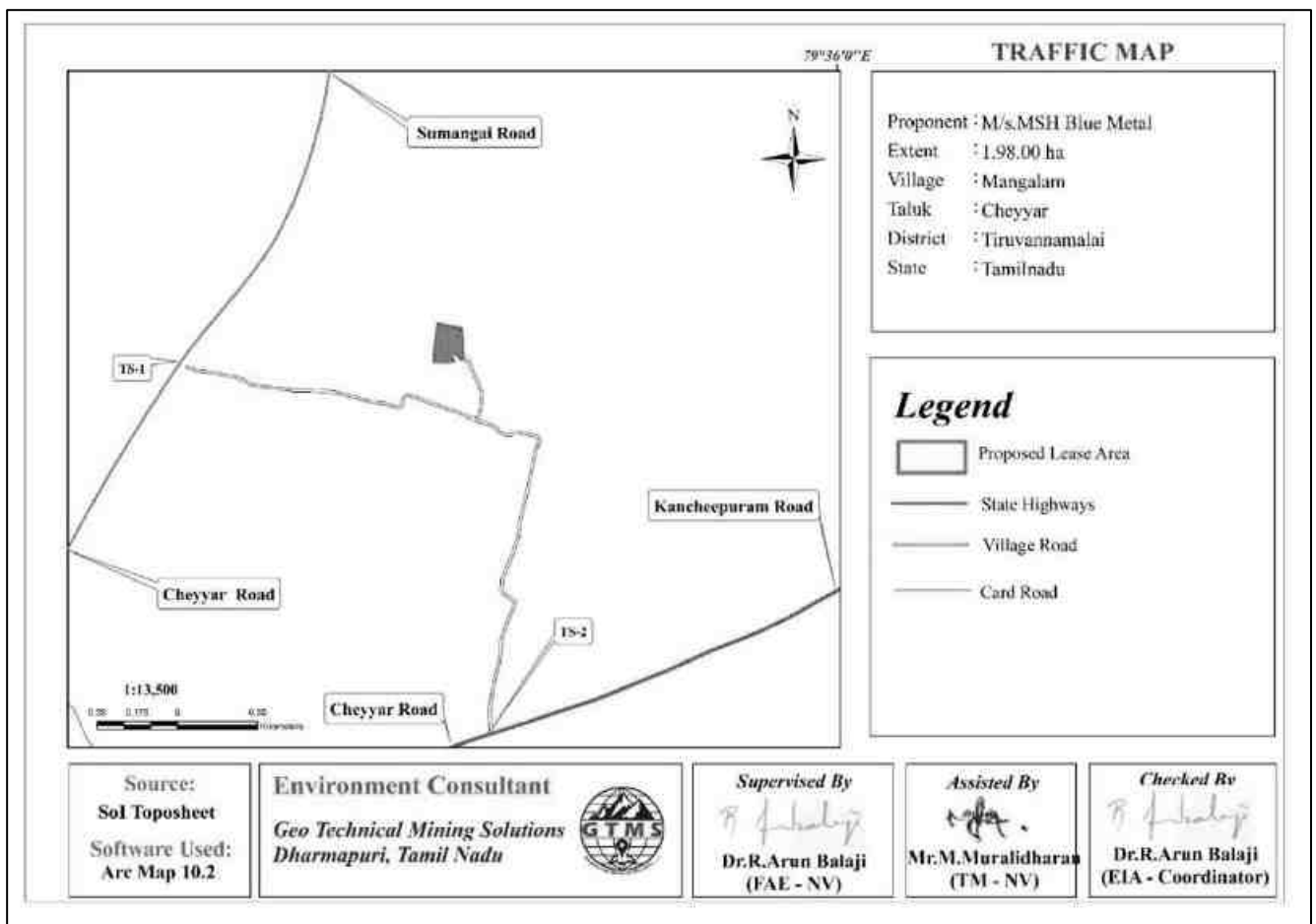


Figure 3.29 Traffic Density Map

3.8 SITE SPECIFIC FEATURES

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

Table 3.36 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius
2	Reserve Forest	Thandappan Thangal R.F	9.63km NW
		Pullavakkam R.F	10.02Km NW
		Marudham R.F	21.65km SE
		Vengunam R.F	18.45km S
		Nambedu R.F	18.71km SW
		Ponnur R.F	24.34km South
3	Lakes/ Reservoirs/ Dams/Streams/Rivers	Cheyyar River	6.35km SE
		Palar River	11.58km NE
		Mangalam Lake	1.18km SE
		Mamandur Lake	5.24km NE
		Mariyanallur Lake	1.07km NW
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Densely 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	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet



Figure 3.30 Field Study Photographs

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

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

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

Table 4.1 Impact identification matrix.

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

√ Indicates Impact

4.1 LAND ENVIRONMENT

Anticipated Impacts

- ❖ Converting barren land of 1.46.75 hectares to rough stone and gravel mining creates a significant and usually irreversible change in land use and land cover involving the physical alteration of the land's surface, potential deforestation, loss of biodiversity, altered topography from pits and spoil dumps.
- ❖ Heavy vehicle movement causes significant problems to nearby agriculture and human habitation. These pollutants can degrade soil quality and introduce heavy metals into the environment.
- ❖ During transportation the tippers damage the bituminous roads. The primary damage is caused by the fourth power law (*The law posits that if you double an axle's load, the damage caused to the pavement increases by a factor of 2x4 or 16 times*) where pavement damage increases with the fourth power of the axle load. The immense weight of heavy payloads on an axle exerts a concentrated and repetitive stress on the road surface leading to permanent strain, premature failure and a cumulative damage.
- ❖ Rain drops hitting stone crushing waste can break apart the particles and flowing water detaches them from the surface transports and redeposits these particles especially from sloped surfaces. This a form of splash erosion followed by sheet erosion which can lead to environmental issues.

Mitigation measures

- ❖ After mining there is a huge void of 1.98.0 hectares upto a depth of 52m is useful for rain water storage structure has an advantage for local farmers. The artificial pond boundary shall be fences to avoid any mishaps.
- ❖ Union ministry of road transport and highways on July 16th 2018 increased the maximum cap of axle load limit by 20 to 25 percent cross various categories to keep the limit “at par with international standards”.

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

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

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

4.2 SOIL ENVIRONMENT

Anticipated Impacts

- ❖ The fertility status of the soil near by the lease area may affect due to extra dust deposition on the soil. Dust deposition from a lease area can harm soil fertility by physically blocking soil pores, reducing aeration and water infiltration, and potentially altering the soil's chemical properties. This damage to the topsoil negatively impacts plant growth by interfering with photosynthesis and nutrient uptake ultimately decreasing crop production.
- ❖ Topsoil will be scraped from the area of 1.98.0 hectares in the project site will store in safety area left for 7.5m and 10m in the western side as shown in mining plan.

Mitigation measures

- ❖ When stock piling of top soil is done the mound should not be higher than 1.2m and 3.0m.
- ❖ To minimize surface runoff and erosion the topography of a graded surface should be designed to create terraces or benches that follow land contours which intercept sheet flow. Additionally, a bulldozer's tracks can be used to create a fine-scale roughened surface perpendicular to the slope and stockpiles should be constructed with a rough surface to improve drainage, reduce erosion and encourage revegetation.
- ❖ Efforts will be made to minimize the storage time to prevent nutrient loss.

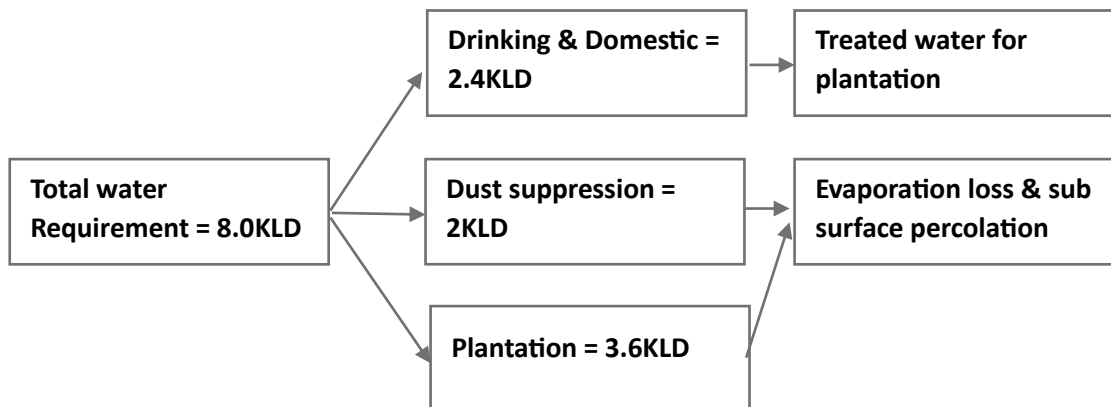
- ❖ To protect the quality of stockpiled topsoil immediate re-vegetation is crucial. Temporary seeding should be done within 30 days of stockpile formation to control erosion, prevent weed growth and maintain healthy soil microbes.
- ❖ If the stockpile will not be reused within 12 months it must be stabilized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

4.3 WATER ENVIRONMENT

Anticipated Impacts

- ❖ 8KLD (8,000 liters per day) water requirement for drinking, domestic, dust suppression and plantation.

Water Balance Chart of the Mine



- ❖ The domestic effluents being generated during mine operation.
- ❖ Major impact of opencast mining on groundwater regime is quality deterioration. The proposed mining activities shall be carried out upto a depth of 52m from average ground level. The specific water table depth in the core and buffer zone is between 10.8m and 13.5 meters below ground level.
- ❖ The volume of rain water entering to the mine and accumulating in the quarry has been estimated on the basis of direct catchment area, maximum daily precipitation and the run-off coefficient. $(Q = A \times H \times \bar{d})$ **cubic meters/day**.

Where A- catchment area in m²

H- Max daily precipitation in mm

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

The run off co-efficient for mined out area is 1.46.75. The all-time record for maximum daily precipitation in Tiruvannamalai district was 468mm on September 30, 2018 as

reported by CEIC Data. More recent rainfall records are 110mm on October 17, 2025. The maximum broken area is 1.46.75hectares in the sixth year and estimation for make of water done on the quarry parameters for sixth year onwards.

$$Q = 1.98.0\text{hecatres} \times 10000 \times 0.175 \times 0.60 \text{ m}^3.$$

$$Q = 2079\text{m}^3.$$

Total accumulated water in the pit is 2079m^3 .

Additionally, 20% of water from seepage is 415.8m^3 .

Total water estimated for pumping requirement = **2494.8m^3** .

If we take the all-time record then the total water estimated for pumping = **2494.8m^3** .

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

Mitigation Measures

- ❖ The hard rock itself has very few interconnected pore spaces, limiting the amount of water it can store or transmit. Groundwater flow and storage occur primarily in secondary openings such as joints, cracks and fissures. The thickness of the weathered layer, where more significant porosity can develop, is typically limited to 1-3 meters, particularly in low-lying topographic areas. The groundwater in these shallow zones is under unconfined (or water table) conditions, meaning it is directly connected to the surface and not confined by impermeable layers.
- ❖ The storm water discharge coming out of quarries and dump through a network of garland drains is expected to contain solid particles. These solid particles shall be removed by settling in the settling pond before being used for dust suppression and plantation. Hence, there shall be no change in drainage system due to this mining project in buffer zone.
- ❖ Domestic sewage from site office will be discharged in MAK Anaerobic bacteria digestion bio-septic tank. The treated water will be utilized for watering and maintaining the green belt.
- ❖ Groundwater development efforts would need to focus on the weathered and fractured zones near the surface in the buffer zone.
- ❖ Periodic (every 6 month once) analysis of ground water level and quality from the open well DW8 and bore well BW3 as shown in Figure 3.8 & 3.10 to find the change due to quarrying.

- ❖ The average annual rainfall of the project area is 1411mm and the runoff coefficient factors have been taken as per guidelines of Manual on Norms and Standards for Environmental Clearances by MoEF & CC, Govt. of India.

The total annual runoff can be calculated as:

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

Annual Rainfall = 1411mm

Total Project Area = 19800sq.m

Coefficient of Run off for Rooftop (Inclined) = 0.90

Coefficient of Run off for Rooftop (Flat) = 0.80

Coefficient of Run off for Road/Paved Area = 0.70

Coefficient of Run off for Open Area = 0.25

Coefficient of Run off for Greenbelt Area = 0.15 Rain water can effectively be collected from Maximum size of void in 6th year of mining = 14675sq. m.

Top soil dump area = 3955sq.m

Road & Infrastructure = 500sq.m

Runoff from Void pit area = 14675sq.m x 0.805 m x 0.25 = 2953m³

Runoff from Top soil dump area = 0.80m x 3955sq. m x 0.25 = 791m³

Runoff from Road & Infrastructure = 0.805m x 500sq. m x 0.70 = 281.75m³

Total Runoff from Project Area = 4025.75m³

The annual runoff generated in the project site is 4025.75m³. By considering the loss of 20% due to evaporation, spillage and wastage the effective runoff that can be harvested inside the project area is **3220.6m³**.

Daily water requirement (except drinking purpose) is 8m³. So, with 300 working days the water requirement will be = 8m³ X 300 = **2400m³**

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

4.4 AIR ENVIRONMENT

Anticipated Impact

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

Activities	Air pollutants
Drilling	PM ₁₀ , PM _{2.5}
Blasting	PM ₁₀ , PM _{2.5} , SO _x , NO _x
Loading & unloading	PM ₁₀ , PM _{2.5}
Haul road	PM ₁₀ , PM _{2.5}
Transportation	PM ₁₀ , PM _{2.5} , SO _x , NO _x , CO
Waste/Top soil handling	PM ₁₀ , PM _{2.5}

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

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

The air pollution modelling correctly focuses on particulate matter as the key pollutant for a mining project given that dust from mining operations and transportation is the primary source of air pollution in such industries rather than SO_x or NO_x which are typically associated with vehicular emissions. The incremental Ground Level Concentrations (GLCs) predicted are specifically for particulate matter reflecting the anticipated contribution of the proposed mining project to local air quality.

Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formula developed by Chaulya et al.,2001 and Jyothi Prabha, Gurdeep Singh and I.N.Sinha, 2003 “Emission Factor Equations for Haul roads: The Indian Perspective”, Indian Journal of Air Pollution Control Vol. VI No. I March pp 37- 43. The equations used for fugitive emission estimation have been given in Table 4.2.

Table 4.2 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	$E = [u^{0.4} a^{0.2} \{9.7 + 0.01p + b/(4+0.3b)\}]$	u = Wind speed(m/s). p = Mineral production (Mt/yr). b = Overburden handling (Mm ³ /yr). a = Lease area(km ²). E = Emission rate(g/s).
Transportation through roads	Fugitive dust	line	$E = [\{(100-m)/m\}^{0.8} \{s/(100-s)\}^{0.1} u^{0.3} \{2663 + 0.1(v+fc)\} 10^{-6}]$	E = Emission Rate (g/sec/m) m = Moisture Content of the road = 10% , s = Silt Content of the Road = 10% u = Wind Speed v = Average Vehicle Speed f = frequency of Vehicle movement in number per hour c = Capacity of the dumper in tons = 12 ton

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. It is important to note that PM₁₀ emission rate is derived from the SPM estimation in the background that PM₁₀ constitutes 52% of SPM emission. The PM_{2.5}, PM₁₀ emission results have been given in Table 4.3.

Table 4.3 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m ²	Calculated Value (g/s/m ²)
Overall Mine	PM _{2.5}	0.508237526	19800	2.56686E-05
Overall Mine	PM ₁₀	1.016475053	19800	5.13371E-05

4.4.1 Modelling of Incremental Concentration

The post project resultant concentrations of PM₁₀, PM_{2.5} is given in Tables 4.4 - 4.5.

Table 4.4 Incremental & Resultant GLC of PM_{2.5}

Station ID	Distance to core area (km)	PM _{2.5} concentrations($\mu\text{g}/\text{m}^3$)				Comparison against air quality standard (60 $\mu\text{g}/\text{m}^3$)	Magnitude of change (%)	Limit
		Direction	Baseline	Predicted	Total			
AAQ1	--	--	24.0	8.60	32.6	Below standard	35.83	60
AAQ2	0.65	SE	20.0	1	21		5.00	60
AAQ3	0.86	NW	19.3	0.5	19.8		2.59	60
AAQ4	1.26	NE	21.0	0.5	21.5		2.38	60
AAQ5	2.55	SW	20.7	1	21.7		4.83	60

Table 4.5 Incremental & Resultant GLC of PM₁₀

Station ID	Distance to core area	PM ₁₀ concentrations($\mu\text{g}/\text{m}^3$)				Comparison against air quality standard (100 $\mu\text{g}/\text{m}^3$)	Magnitude of change (%)	Limit
		Direction	Baseline	Predicted	Total			
AAQ1	--	--	45.2	17.2	62.4	Below standard	38.05	100
AAQ2	0.65	SE	40.0	3	43		7.50	100
AAQ3	0.86	NW	41.0	0.8	41.8		1.95	100
AAQ4	1.26	NE	42.0	1	43		2.38	100
AAQ5	2.55	SW	41.5	3	44.5		7.23	100

The Air Quality index for the baseline and predicted values of PM_{2.5} and PM₁₀ are given in table below.

Station ID	Distance to core area (km)	Direction	PM _{2.5} ($\mu\text{g}/\text{m}^3$)		AQI for PM _{2.5}	PM ₁₀ ($\mu\text{g}/\text{m}^3$)		AQI for PM ₁₀
			Baseline Conc.	Total (Baseline + Predicted GLC)		Baseline Conc.	Total (Baseline + Predicted GLC)	
AAQ1	--	--	24.0	32.6	95	45.2	62.4	54
AAQ2	0.65	SE	20.0	21	73	40.0	43	40
AAQ3	0.86	NW	19.3	19.8	71	41.0	41.8	38
AAQ4	1.26	NE	21.0	21.5	74	42.0	43	40
AAQ5	2.55	SW	20.7	21.7	74	41.5	44.5	41

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

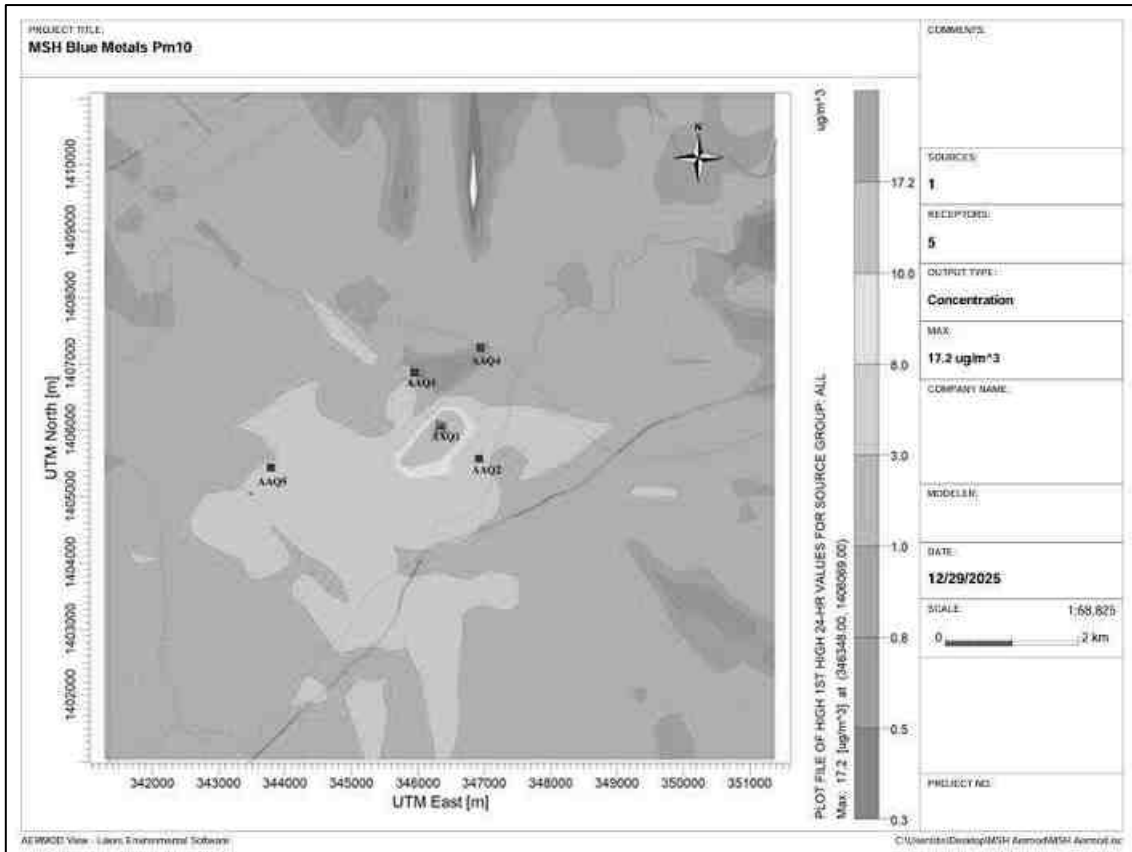


Figure 4.1 Predicted Incremental Concentration of PM10

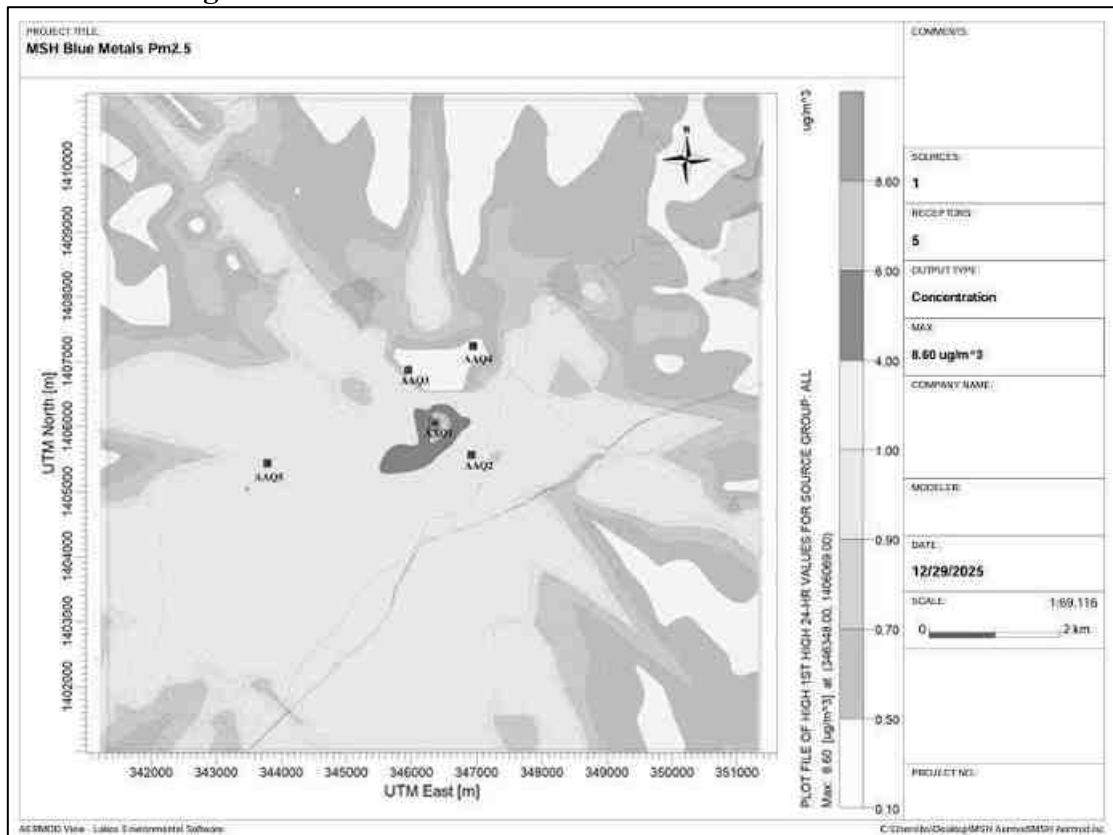


Figure 4.2 Predicted Incremental Concentration of PM2.5

In the present study American Meteorological Society and the United States Environmental Protection Agency Dispersion Model (AERMOD) air quality model was run for premonsoon season under maximum atmospheric temperature conditions. The AERMOD has been run for PM₁₀ and PM_{2.5} distribution with 24-Hr maximum concentration and concentration contours were obtained as given in Figure 4.1 and 4.2. From these Isopleths plots it is observed that the highest pollutants concentrations predicted by AERMOD was near the major source in the core area and a maximum of 62.4µg/m³ of PM₁₀ and 32.6µg/m³ of PM_{2.5} were found to be below the prescribed NAAQS near the source. The impact assessment matrix of PM_{2.5} was tabled below

Station	Impact Scale	Standard Compliance	Magnitude
AAQ1	High	Below Standard	Significant (35.8%)
AAQ2	Low	Below Standard	Negligible (5.0%)
AAQ3	Low	Below Standard	Negligible (2.6%)
AAQ4	Low	Below Standard	Negligible (2.4%)
AAQ5	Low	Below Standard	Negligible (4.8%)

Leopold Matrix: Air Quality Impact

The Leopold Matrix is used to cross-reference project activities against environmental factors. Based on the PM_{2.5} data the project activities impact the environmental factor air quality. Scale: 1 (Lowest) to 10 (Highest). Magnitude is negative (-) for adverse impacts. Example for AAQ1 (Total 32.6µg/m³): If magnitude is -6 and importance is 6 the resulting -36 indicates a moderate negative impact that requires specific mitigation measures.

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

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

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

Table 4.6 Proposed Mitigation Measures for Air pollution

Impacted Area	Leopold Score (M/I)	Targeted Mitigation Measure	Implementation Frequency
AAQ1 (High Change)	-7 / 6	Permanent Water sprinkler	Continuous during high-dust activities
Core Area (AAQ2)	-5 / 8	Install continuous wind-breaking walls (min. 3m height) to shield the core area.	Fixed throughout project phase

Transport Routes	-4 / 5	Strictly enforce a 10 km/h limit for heavy vehicles to reduce dust resuspension.	All vehicle movements
Stockpiles	-3 / 4	Use tarpaulins or plastic sheets to cover all sand, cement and loose debris.	Daily at close of work
Site Entry/Exit	-2 / 3	Tire wash unit to prevent track-out onto public roads.	Every vehicle exit

Compliance Requirements

- **Real-Time Monitoring:** As of 2026 large construction sites are required to link low-cost air quality sensors directly to state pollution control board (SPCB) dashboards for live compliance tracking.
- **Emission Norms:** Ensure all on-site machinery and diesel generators (DG sets) meet the latest BS-VI or equivalent standards to minimize $PM_{2.5}$ and NO_x emissions.
- **Emergency Response:** If $PM_{2.5}$ exceeds the $60 \mu g/m^3$ limit trigger the Graded Response Action Plan (GRAP) which may require temporary suspension of excavation or demolition.

4.5 NOISE ENVIRONMENT

According to DGMS Technical Circular No. 18 of 1975 and No.5 of 1990 on “Protection of Workers against noise” it is brought to the knowledge of all concerned that Noise is emerging as an important and challenging health hazard for mine workers. Source data has been computed taking into account of all the machinery and activities used in the open cast mining process had listed in Table 4.7.

Table 4.7 Activity and Noise Produced by Machinery in open cast mines

S. No.	Machinery / activity	Distance of measurement	Noise level dB(A)	
			Idling	Fully accelerated
1.	Jack hammer	1	80	97
2.	Compressor	1	-	96
3.	Bulldozer	2	84	100
4.	Tipper	2	75	92
5.	Drill	1	85	90

The permissible noise exposure levels in Indian mines are based on OSHA standards adapted and enforced by the Indian government through the Factories Act and CPCB norms are given in Table 4.8 below.

Table 4.8 Permissible noise levels adopted by CPCB, 2000 and OSHA

Maximum Exposure Noise level Time per Working Day in hours	Noise level	
	CPCB, 2000 in dB (International Standard Organization)	OSHA code in dB (Occupational Safety and Health Act)
8	90	90

4	93	95
2	96	100
1	99	105
0.5	102	110
0.25	105	115

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

Impact	Mitigation Measures
Noise impact due to mining activities. Noise impact due to vehicular movement. Auditory impact (hearing impairment resulting from excessive noise exposure)	❖ Diesel powered machineries which are major source of noise in open cast environment will be properly maintained as per maintenance schedule to prevent undesirable noise. ❖ Attention shall be paid towards rigorous maintenance of silencers of diesel engines. ❖ Static diesel engines shall be housed as far as possible (not made of sheet metals or surrounded by baffles). If possible, they will be placed on vibration isolators. ❖ Drill machine operators, blasters and dumper drivers will be issued earplugs and earmuffs. Duty hours of operators of noisy machinery will be regulated to keep their noise exposure levels within limits. ❖ Provision of sound proof cabins for the workers deployed on machines producing higher level of sound like dumpers, shovels etc. ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise ❖ Silencers / mufflers will be installed in all machineries

	❖ Greenbelt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness ❖ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

4.5.1 Ground Vibrations due to blasting

The major source of ground vibration from the quarry is blasting. The ground vibrations due to the blasting in the quarry are calculated using the empirical equation for assessment of peak particle velocity (PPV) is given below

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

where,

V = peak particle velocity (mm/s), K = site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

Table 4.9 Predicted PPV values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	12.13	580	0.139	19	0.03	124

Table 4.10 Predicted PPV values due to Blasting at 100-500m radius

Location ID	Maximum Charge in kgs	Radial Distance in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kPa)	Sound Level (dB)
P1	12.13	100	2.323	19	0.26	142
		200	0.766		0.11	135
		300	0.401		0.07	131
		400	0.253		0.05	128
		500	0.177		0.04	126

The PPV results shows that the ground vibration is well below the permissible limits set by DGMS in the circular 7, 1997.

Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, 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
- ❖ 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.
- ❖ 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
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.
- ❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- ❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system.

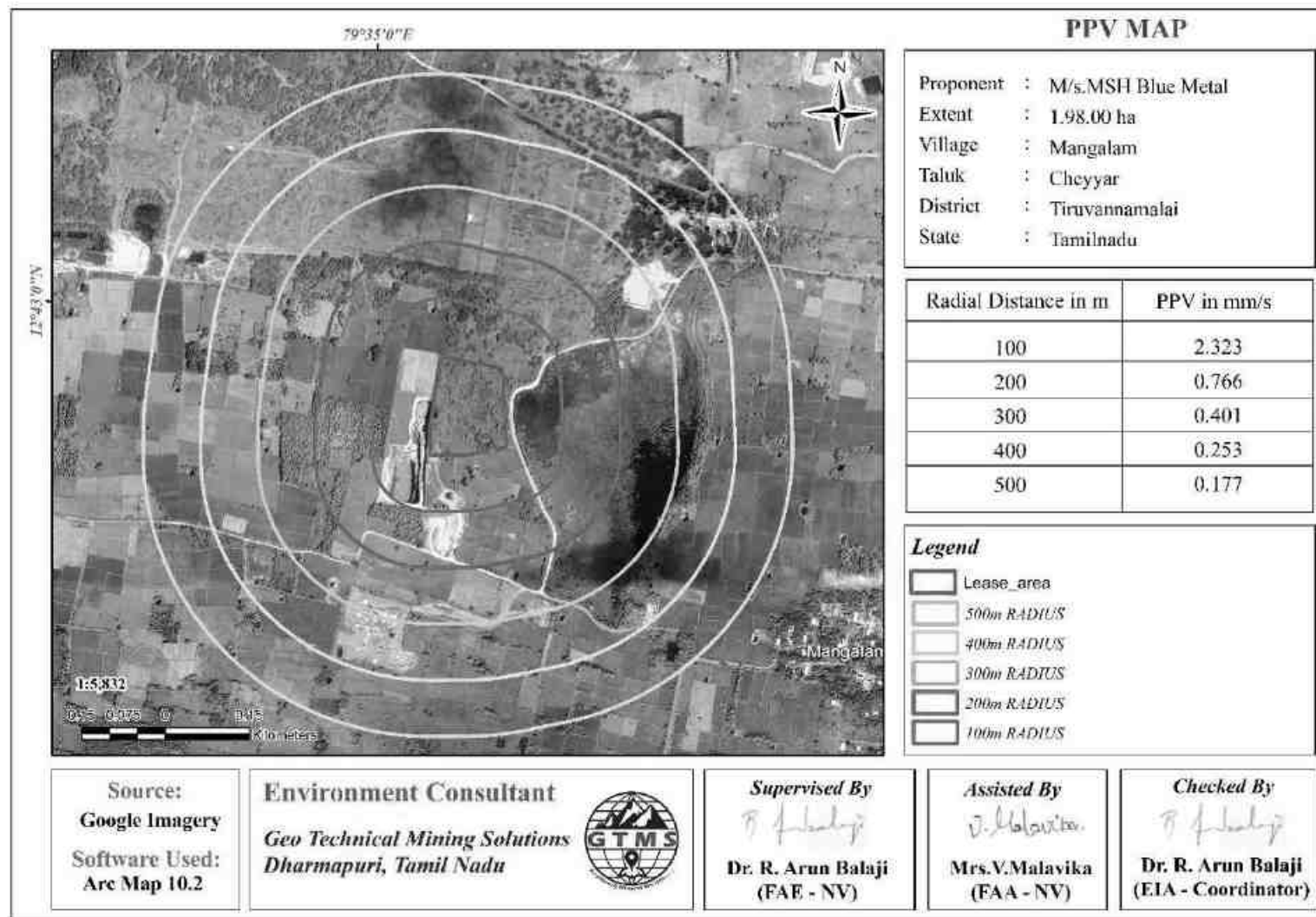


Figure 4.3 100-500m PPV Map

4.6 ECOLOGY AND BIODIVERSITY

4.6.1 Impact on Ecology and Biodiversity

- ❖ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ❖ The Number of plants in the mining lease area is given in Chapter III Table 3.21 which vegetation in the lease area may be affected during mining.
- ❖ Carbon released from quarrying machineries and tippers during quarrying would be 718kg per day, 194005kg per year and 970026kg over ten years, as provided in Table 4.11.

Table 4.11 Carbon Released During Ten Years of Rough Stone and Gravel Production

	Per day	Per year	Per ten years
Fuel consumption of excavator	34	9065	45326
Fuel consumption of tipper	718	194005	970026
Total fuel consumption in Liters	752	203070	1015352
CO ₂ emission in kg	2014	544228	2721143

4.6.2 Mitigation Measures on Flora

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ None of the plants in the lease area will be cut during operational phase of the mine. we recommend uprooting and planting of the 10 trees along the 7.5 m safety zone to prevent environmental pollution during quarrying. As the survival rate due to uprooting was only 30%, 100 seedlings will be procured at the rate of 10 seedlings per tree and planted in 7.5 m safety zone.
- ❖ Existing roads will be used and new roads will not be constructed to reduce impact on flora.
- ❖ Green belt of adequate width will develop around the project site. Dust catching species like *Alstonia scholaris*, *Bombax ceiba*, *Terminalia arjuna*, *Cassia fistula*, *Bombax ceiba*, *Azadirachta indica*, *Nyctanthes arbor-tristis*, *Psidium guajava*, *Tectona grandis* etc will be planted in green belt.
- ❖ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 19911kg of carbon per year. Therefore, we recommend 500 planting large number of

trees around the quarry and near school campuses, government wasteland, roadsides etc.

- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.13) about 990 trees (Table 4.14) will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 2602462kg of the total carbon as provided in Table 4.12.

Table 4.12 CO₂ Sequestration

CO ₂ sequestration in kg	88	23736	118681
Remaining CO ₂ not sequestered in kg	1926	520492	2602462
Trees required for environmental compensation	21671		
Area required for environmental compensation in hectares	43		

Table 4.13 Recommended Species for Greenbelt Development Plan

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	<i>Azadirachta indica</i>	Meliaceae	Neem,Vembu	Tree	Well distinct thick at both the layer Well distinct in Palisade & Spongy parenchyma. Spongy parenchyma is present at lower epidermis Many vascular bundles arranged almost parallel series.
2	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree	
3	<i>Polyalthia longifolia</i>	Annonaceae	Nettilingam	Tree	
4	<i>Albizia lebbbeck</i>	Fabaceae	Vagai	Tree	
5	<i>Delonix regia</i>	Fabaceae	Cemmayir-konrai	Tree	
6	<i>Bauhinia racemose</i>	Fabaceae	Aathi	Tree	
7	<i>Cassia fistula</i>	Fabaceae	Sarakondrai	Tree	
8	<i>Aegle marmelos</i>	Fabaceae	Vilvam	Tree	
9	<i>Pongamia pinnata</i>	Fabaceae	Pungam	Tree	
10	<i>Thespesia populnea</i>	Malvaceae	Puvarasu	Tree	

Table 4.14 Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered (m ²)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	396	317	3564
	Number of plants outside the mine lease area		
	594	475	5346
Total	990	792	8910

4.6.3. *Anticipated Impact on Fauna*

- ❖ Direct impact is anticipated on fauna of core zone
- ❖ Insignificant impact is anticipated on fauna in the buffer area due to air emissions, noise, vibration, transportation, waste water discharges, and changes in land use
- ❖ Berigai R.F. located on 280m north west of the mine lease area. There is a possibility that birds will be affected by mining activities and migrate.

4.6.4. *Mitigation Measures on Fauna*

- ❖ Fencing will be constructed around the proposed mine lease area to restrict the entry of stray animals
- ❖ The workers shall be trained not to harm any wildlife near the project site
- ❖ The quarry operation using in NONAL blasting Method Technic so controlled in sound and vibration.

4.6.4 *Impact on agriculture and horticulture crops in 1km Radius*

- ❖ Problems to agricultural and horticulture land due to dust caused by movement of heavy vehicles.
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season.
- ❖ The fugitive dust released from the mining operations may cause effect on the agricultural and horticulture land who are directly exposed to the fugitive dust.
- ❖ Dust from the quarries is likely to affect reproductive systems in nearby agricultural and horticulture lands.
- ❖ Dust from quarries can affect plant growth and reduce vegetable yields.

4.6.5 *Mitigation Measures on agriculture and horticulture crops.*

- ❖ The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases.
- ❖ A green belt will be created in 7.5m & 10m safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin

4.7 SOCIO ECONOMIC ENVIRONMENT

Anticipated Impact from Proposed and Existing Projects

- ❖ Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- ❖ Approach roads can be damaged by the movement of tippers
- ❖ Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region.

Common Mitigation Measures for Proposed Project

- ❖ Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- ❖ Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- ❖ Air pollution control measure will be taken to minimize the environmental impact within the core zone.
- ❖ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- ❖ Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc., from this project directly and indirectly.
- ❖ From above details, the quarry operations will have highly beneficial positive impact in the area

4.8 OCCUPATIONAL HEALTH AND SAFETY

Social and occupational health mitigation is a critical requirement for projects showing a significant magnitude of change such as your 35.8% increase at AAQ1. Under updated Tamil Nadu Occupational Safety and Health Rules and NCAP 2026 targets the following measures are recommended.

Social & Worker Health Mitigation Plan

Category	Mitigation Measure	Purpose
Respiratory Safety	Mandatory N95/FFP2 Masks: Required for all workers during drilling and blasting, loading.	Prevent deep lung penetration of <i>PM2.5</i> .

Health Surveillance	Quarterly Health Camps: Conduct lung function tests (Spirometry) for workers in High Change zones (AAQ1).	Early detection of respiratory illness.
Real-time Monitoring	Wearable AQ Sensors: Deploy wearable sensors for site supervisors in dust-heavy zones to track individual exposure.	Immediate alerts for unhealthy exposure limits.
Workplace Design	Rotation & Scheduling: Limit individual work duration in high-pollution zones and shift dust-heavy work to cooler hours.	Reduce cumulative pollutant load on workers.
Community Engagement	Live AQ Dashboards: Install a public display board at the site entry showing current $PM_{2.5}$ vs. the $60\mu g/m^3$ standard.	Build transparency with local residents near AAQ2

4.8.1 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 85dB(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 85dB(A) the peak sound levels reach 140dB(C) or the average maximum sound level reaches 110dB(A)
- ❖ Ear muffs provided will be capable of reducing sound levels at the ear to at least 85dB(A)
- ❖ Periodic medical hearing checks will be performed on workers exposed to high noise levels.

4.8.2 Physical Hazards

The following measures are proposed for control of physical hazards

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

4.8.3 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, spirometry tests, periodic medical examination – yearly, lung function test – yearly, those who are exposed to dust, and 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.

4.9 Mine Waste Management

No waste is anticipated from any of the proposed quarries.

4.10 Mine Closure

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

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

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

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

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.,

Chemical Stability

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

Biological Stability

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc., A vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilizing the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful under three situations.

- ❖ Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- ❖ Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- ❖ Where it is desirable to get a quick growth response from the native flora during those times.

when moisture is not a limiting factor. For example, development of green barriers the Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

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

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

- ❖ The proposed project is site specific and has the 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, firefighting, 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.
- ❖ As the proposed project area falls in seismic zone II, there is no major history of landslides, earthquake, subsidence etc., recorded in the past history.

5.2 ANALYSIS OF ALTERNATIVE SITE

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

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

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

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

5.4 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 VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections. The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA-TN as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTE/CTO.

6.1 METHODOLOGY OF MONITORING MECHANISM

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

- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care
- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment

- ❖ Seeking expert's advice when needed.

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

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

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

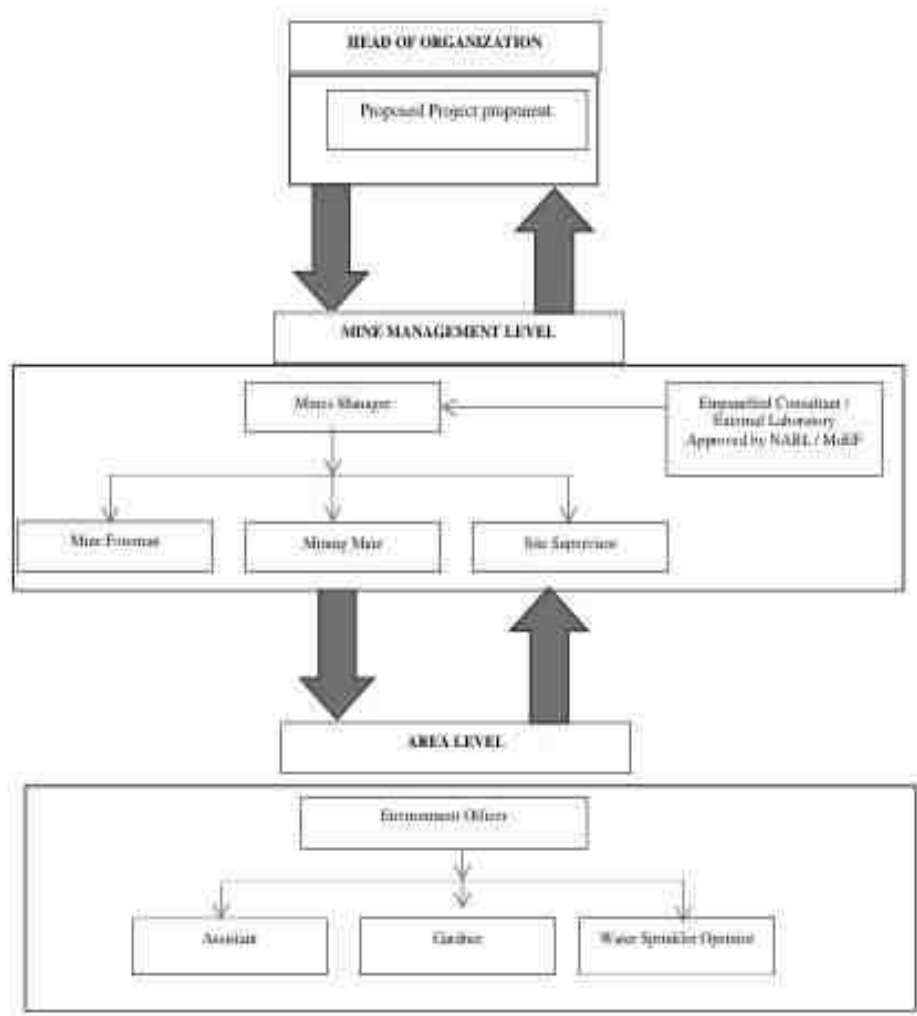


Figure 6.1 Proposed environmental monitoring chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

Table 6.1 Implementation Schedule for Proposed Project

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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

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

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil quality and
- ❖ Greenbelt development
- ❖ The details of proposed monitoring schedule have been provided in Table 6.2.

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

S. No	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM _{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 m BGL
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Peak particle velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and chemical characteristics
8	Greenbelt	Within the project area	Daily	Monthly	Maintenance

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

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each proposal is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF. The proposed recurring cost for Environmental Monitoring Programme is **Rs 2,95,000** /- per annum for the proposed project site.

Table 6.3 Environment Monitoring Budget

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

Source: Field Data

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

CHAPTER VII

ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

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

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

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

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

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

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

Table 7.1 Risk Assessment & Control Measures for Proposed Project

S. No.	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	✓ 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. ✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre 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 made available to the employees and regular check for their use. ✓ Working of quarry, as per approved plans and regularly updating the mine plans. ✓ Cleaning of mine faces on daily basis 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	Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst;	✓ 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,

		Drill Rod may break;	✓ 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	Fly rock, ground vibration, Noise and dust. Improper charging, stemming & Blasting/ fining of blast holes Vibration due to movement of vehicles	✓ 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	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material	✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.

		While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	✓ 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	✓ 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	✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

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

- ❖ Rescue and medical treatment of casualties;
- ❖ Safeguard other people;
- ❖ Minimize damage to property and the environment;
- ❖ Initially contain and ultimately bring the incident under control;
- ❖ Secure the safe rehabilitation of affected area; and
- ❖ Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.
- ❖ In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations. Structure of the team has been shown in Figure 7.1.

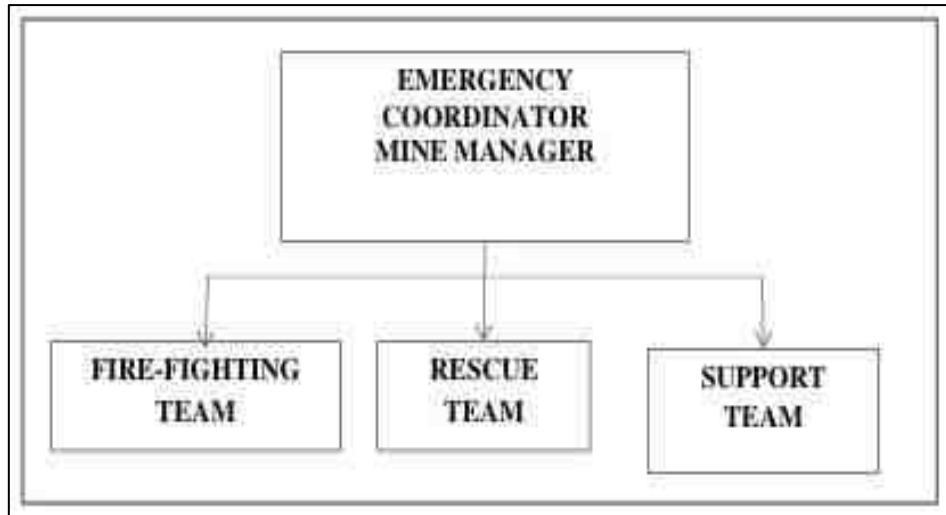


Figure 7.1 Disaster management team layout for proposed project

7.3.1 Emergency Control Procedure

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

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

7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the projects within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative

study, the proposed project, known as P1, P2 & E1 are taken into consideration. The details of P1, P2 & E1 have been given in Table 7.2, 7.3 & 7.4.

Table 7.2 Salient Features of the Cluster P1

Name of the Quarry	MSH Blue Metal	
Type of Land	Patta Land	
Extent	1.98.0ha	
S.F. No	102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7.	
Toposheet No	57 P/10	
Highest Elevation	120m AMSL	
Latitude	12°42'51.09"N to 12°42'56.90"N	
Longitude	79°35'3.00"E to 79°35'7.47"E	
Proposed depth as per ToR	52m (2m AGL + 50m BGL)	
Ultimate depth for ten years	52m (2m AGL + 50m BGL)	
Geological Resources	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	990000 & 2722500	39600 & 79200
Mineable Reserves	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	340500 & 936375	30600 & 61200
Proposed production for 10 years	Rough stone in m ³ & Tons	Gravel in m ³ & Tons
	340500 & 936375	30600 & 1704715
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery requirements	Jack hammer	2
	Excavator	1
	Compressor	1
	Tipper	8
Proposed Manpower Deployment	20	
Project Cost	Rs.63,73,000/-	
Proposed Water Requirement	3.5 KLD	

Table 7.3 Salient Features of the Cluster P2

Name of the Quarry	G.Balaji	
Type of Land	Patta Land	
Extent	3.54.50 ha	
S.F. No	6/7,6/12A,6/12B,9/3B,9/4B,9/5A,9/5B,9/6A2,9/6B,9/7B,9/8,9/9A,9/9B,C,D,E,F,G,H & 9/9I.	
Toposheet No	57 P/10	
Highest Elevation	120m AMSL	
Latitude	12°43'02.74"N to 12°43'08.89"N	
Longitude	79°34'48.76"E to 79°34'56.23"E	
Ultimate depth for five years	77m BGL	
Geological Resources	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	2473800 & 6802950	247380 & 494760
Mineable Reserves	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	667590 & 1835873	192217 & 384434
Proposed production for 5 years	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	667590 & 1835873	192217 & 384434
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery proposed	Jack hammer	8
	Excavator	1
	Compressor	2
	Tipper	5
Proposed Manpower Deployment	34	
Project Cost	Rs.1,12,67,000/-	
Proposed Water Requirement	3.5 KLD	

Table 7.4 Salient Features of the Cluster E1

Name of the Quarry	M/s.M.S.H Blue Metal	
Type of Land	Patta Land	
Extent	1.27.5ha	
S.F. No	35/3,35/4,36/2,36/3,37/1,37/2 & 37/3	
Toposheet No	57 P/10	
Highest Elevation	120m AMSL	
Latitude	12°42'54.60"N to 12°42'47.90"N	
Longitude	79°35'03.00"E to 79°34'00.25"E	
Ultimate depth for five years	30m BGL	
Geological Resources	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	291510 & 801652	18380 & 36760
Mineable Reserves	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	99995 & 274986	12482 & 24964
Proposed production for 5 years	Rough stone (m ³) & Tons	Gravel (m ³) & Tons
	99995 & 274986	12482 & 24964
Method of Mining	Open cast mechanized mining method	
Topography	Flat Terrain	
Machinery proposed	Jack hammer	4
	Excavator	1
	Compressor	1
	Tipper	5
Proposed Manpower Deployment	15	
Project Cost	Rs.41,30,000/-	
Proposed Water Requirement	3.5 KLD	

7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from the proposed project have been given in Tables 7.5 and 7.6.

Table 7.5 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	10 Years in (m³ & Ts)	Per Year in (m³ & Ts)	Per Day in (m³ & Ts)	Number of Lorry Load Per Day
P1	340500 & 936375	34050 & 93638	126 & 349	21
P2	667590 & 1835873	133518 & 367174	494 & 1359	82
E1	99995 & 274986	9999 & 27498	37 & 101	6
Grand Total	1108085 & 3047233	177567 & 488309	657 & 1806	109

Table 7.6 Cumulative Production Load of Gravel

Proposed Production Details				
Quarry	3 Years in (m³ & Ts)	Per Year in (m³ & Ts)	Per Day in (m³ & Ts)	Number of Lorry Load Per Day
P1	30600 & 1704715	10200 & 20400	37 & 74	6
P2	192217 & 384434	64072 & 128144	237 & 474	40
E1	12482 & 24964	4160 & 8320	15 & 30	2
Grand Total	235299 & 470598	78432 & 156864	289 & 578	48

The cumulative study shows that the overall production of rough stone from the quarry is 657 m³ or 1806 Ts per day with a capacity of 109 trips of rough stone per day and gravel from the quarry is 289m³ or 578 Ts per day with a capacity of 48 trips of gravel per day.

7.4.1.1 Cumulative Impact of Air Pollutants

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

Table 7.7 Cumulative Impact Results from the proposed project

Pollutants	Baseline Data (µg/m³)	Incremental Values (µg/m³)		Cumulative Value (µg/m³)
		P1	P2	
PM _{2.5}	21.0	8.60	11.6	41.2
PM ₁₀	41.9	17.2	18.6	77.7

7.4.2 Noise Environment

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. Cumulative Noise modelling has been carried out considering blasting and

compressor operation (drilling) and transportation activities. Predictions have been carried out to compute the noise level at various distances around the different quarries within the 500 m radius.

Table.7.8 Cumulative Impact of Noise for one Cluster Projects

Table 7.7: Cumulative Impact of Noise for One Cluster Projects						
Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	600	SE	51.0	28.4	51	55
Habitation Near P2	1100	SE		23.1	40	
Habitation Near E1	680	E		27.3	51	
Cumulative Noise (dB (A))					51.6	

Source: Lab Monitoring Data

The cumulative analysis of noise due to cluster project shows that habitation will receive about 51.6dB(A) respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for day time.

Ground Vibrations

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

Table 7.9 Cumulative Effect of Ground Vibrations Resulting from cluster Project

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	12.13	580	0.139
P2	47.58	1100	0.150
E1	7.13	680	0.071
Total			0.360

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

7.4.3 Socio Economic Environment

Socio Economic benefits of the proposed project were calculated and the results have been shown in Table 7.10 the project together will contribute Rs. 15,00,000/-towards CER fund.

Table 7.10 Socio Economic Benefits from the Cluster Project

Location ID	Project Cost	CER Cost
P1	Rs. 63,73,000/-	Rs.5,00,000
P2	Rs. 1,12,67,000/-	Rs.5,00,000
E1	Rs. 41,30,000/-	Rs.5,00,000
Grand Total	Rs. 2,17,70,000/-	Rs.15,00,000

Table 7.11 Employment Benefits for Cluster Project

Location ID	Employment
P1	20
P2	34
E1	15
Grand Total	69

A total of 69 people will get employment from the cluster project.

7.4.4 Ecological Environment

"Gap Plantation" procedure:

Developing a three-tier green belt of native plant species around industrial peripheries is a vital environmental guideline for mitigating pollution and enhancing ecosystem services. Dig pits of substantial dimensions (1m x 1m x 1m for large trees, half for smaller ones) fill them with a mixture of earth, sand, silt and manure and then water the saplings generously. Care for the first three years involves nutrient supplementation, plant protection, managing water stress and ensuring exposure to normal atmospheric conditions.

The chosen species should be fast-growing, deep-rooted, wind-firm possess a dense and potentially permeable canopy, tolerate air pollution (SO₂, NO₂) and ideally be indigenous.

Additional preferred characteristics include long-lasting foliage, large, sturdy leaves, abundant stomata, rough bark and a general ability to withstand local environmental stresses such as drought or inundation while also contributing positively to the environment through soil improvement, aesthetic appeal and attracting wildlife.

Activities for Maintenance:

- Regular pruning
- Watering
- Weed removal
- Manuring
- The growing plants are cared at least for the first 3 years under favourable condition of climate and irrigation.
- For healthy and vigorous growth adequate nutrient will be supplied
- To avoid water stress condition regular watering will be done.

Table 7.12 Greenbelt Development

Code	Number of Trees proposed	Area to be covered (m ²)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	990	8910	792	<i>Azadirachta indica</i> , <i>Albizia lebbeck</i> , <i>Delonix regia</i> , <i>Tectona grandis</i> , etc.,
P2	1773	15953	1418	
E1	638	5737	510	
Total	3401	30600	2720	

Cumulative studies show that the proposed project proponent will plant about 3401 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Tectona grandis*, etc inside and outside the lease area. It is expected that 80% of trees, i.e., 2720 trees will survive in this green belt development program.

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

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

7.5.1 Objective

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

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

Table 7.13 Action Plan to Manage Plastic Waste

S. 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 FAEs and EC

CHAPTER VIII

PROJECT BENEFITS

8.0 GENERAL

The proposed project at Mangalam Village, aims to produce 340500m³ or 936375 Ts of rough stone and 30600m³ or 61200 Ts of gravel over a period of 10 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

8.1 EMPLOYMENT POTENTIAL

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

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

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

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

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

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the

labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.5 OTHER TANGIBLE BENEFITS

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

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

8.6 CORPORATE SOCIAL RESPONSIBILITY

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

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

- ❖ Health Services Social Development
- ❖ Infrastructure Development
- ❖ Education & Sports
- ❖ Self-Employment
- ❖ CSR Cost Estimation
- ❖ CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Maruthadu Village. CSR budget is allocated.

8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

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

Table 8.1 CER Action Plan

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

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

8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs.3,93,30,320** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget for Rough Stone (Rs.)	Budget for Gravel (Rs.)
CER	5,00,000	
Seigniorage @ Rs.90/m ³ of rough stone / Rs.56/m ³ of gravel	3,06,45,000	17,13,600
District Mineral Foundation Tax @ 10% of Seigniorage	30,64,500	1,71,360
Green Tax @ 10% of Seigniorage	30,64,500	1,71,360
Total	3,72,74,000	20,56,320

CHAPTER IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

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

10.1 ENVIRONMENTAL POLICY

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance. The Proponent M/s.MSH Blue Metal will:

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

10.1.1 Description of the Administration and Technical Setup

The environment monitoring cell discussed under chapter VI will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level of each proposed quarry. The said team will be responsible for:

- ❖ Monitoring of the water/ waste water quality, air quality and solid waste generated.
- ❖ Analysis of the water and air samples collected through external laboratory.

- ❖ Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- ❖ Co-ordination of the environment related activities within the project as well as with outside agencies.
- ❖ Collection of health statistics of the workers and population of the surrounding villages.
- ❖ Green belt development.
- ❖ Monitoring the progress of implementation of the environmental monitoring program.
- ❖ Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.2 Budgetary Provision for Environmental Management

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

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost	Recurring Cost/annum
			(Rs.)	(Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	19800	19800
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring	800000	50000
	Air quality will be regularly monitored as per norms within ML area & ambient area	Yearly compliance as per CPCB norms	0	50000

	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2,500 per unit recurring cost for maintenance	50000	5000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5,000/- per tipper/dumper deployed	40000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	10000
	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare	0	39600
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			959800	214400
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0

	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for Portable blaster shed	Installation of portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	953400
Total Noise Environment			50000	955400
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	19800	9900
Total Water Environment			19800	9900
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring	25000	20000

		cost for collection /disposal).		
		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
Total Waste Management			30000	22000
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	10000	1000
Total Implementation of EC, Mining Plan			10000	1000
Occupational Health and Safety	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4,000/- per employee with recurring based on wear and tear (say, @ Rs. 1,000/- per employee)	80000	20000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1,000/- per employee	0	20000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2,000/-	0	7920
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum	396000	19800
	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	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	99000	19800

	be deployed for traffic management			
	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
Total Occupational Health and Safety			615000	874520
Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)	Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	79200	11880
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	178200	17820
Total Development of Green Belt			257400	29700
Mine Closure	Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs)		0	67320

	G.O.(Ms)No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Rough stone = Rs.90)	3235860	0
TOTAL			5177860	2106920

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

Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year	VIth Year	VIIth Year
2106920	2212266	2322879	2439023	2628294	2759708	2897694 i

VIIIth Year	IXth Year	Xth Year	Total Recurring Cost	Total EMP Cost
3042578	3194707	3354443	26958512	32136372

In order to implement the environmental protection measures, an amount of **Rs. 51,77,860** as capital cost and recurring cost as **Rs. 21,06,920** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 10 years will be **Rs. 3,21,36,372** as shown in Table 10.2.

10.3 CONCLUSION

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

CHAPTER XI

SUMMARY AND CONCLUSION

11.1 INTRODUCTION

The proposed rough stone mining project (P1) falls within the cluster of 500 m radius with the total extent of 6.80.0ha and it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No. 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 over the extent of 1.98.0 ha is situated in the cluster falling in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District and Tamil Nadu. The quarries involved in the calculation of cluster extent are one proposed and one existing quarry.

11.2 PROJECT DESCRIPTION

- The proposed project area is located between Latitudes from 12°42'51.09"N to 12°42'56.90"N and Longitudes from 79°35'3.00"E to 79°35'7.47"E in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District and Tamil Nadu.
- The mining plan approved for quarrying 340500m³ & 936375 Ts of rough stone and 30600m³ & 61200 Ts of gravel to the ultimate depth of 52m (2m AGL + 50m BGL) for ten years.
- The quarrying operation is opencast semi mechanized involving drilling, blasting and formation of benches of the prescribed dimensions.

11.3 DESCRIPTION OF THE ENVIRONMENT

Baseline data were collected for 5km radius from the proposed area during Oct 2025 to Dec 2025 as per CPCB guidelines. The data were collected by both the FAE's and NABL accredited and MoEF notified **Ekdant Enviro Services Pvt Ltd** for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic and socio-economy.

11.3.1 Land Environment

Land use pattern of the area of 5km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 1.

Table.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Water Bodies	1309.70	16.10
2	Vegetation cover	15.96	0.20
3	Crop Lands	5291.90	65.05
4	Mining area	53.96	0.66
5	Built-up Area	798.35	9.81
6	Barren Land	21.19	0.26
7	Fallow Land	644.22	7.92
Total		8135.27	100

Source: Sentinel II Satellite Imagery

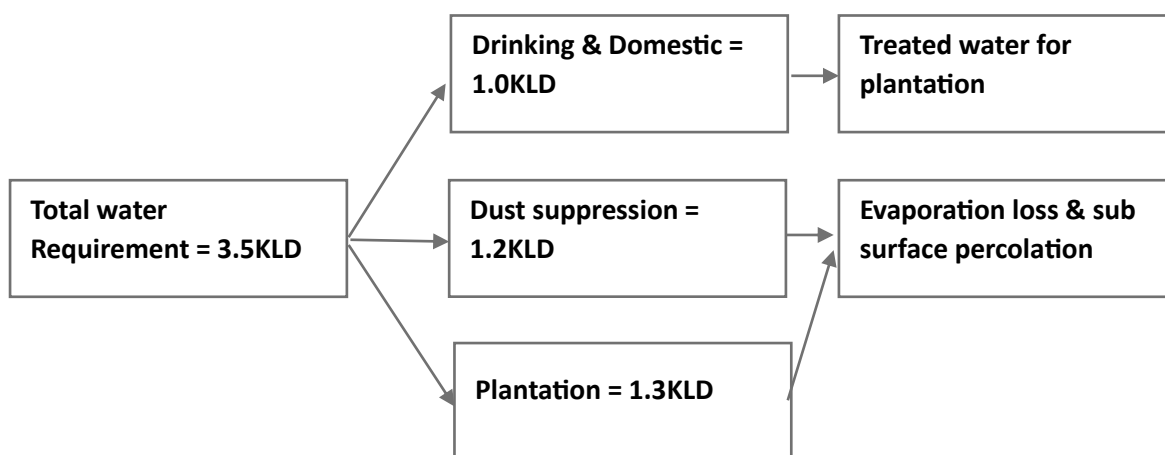
11.3.2 Soil Environment

The soil physical characteristics examined were bulk density, porosity, water holding capacity, pH, electrical conductivity (EC) and texture. In the study area soil pH ranged from 8.07 to 8.72 indicating a slightly alkaline environment. Soil EC measured from 117.20 to 165.20 dS/m reflecting the soluble salt content. Low bulk density is associated with good soil physical conditions while high bulk density signals poor conditions for crops.

11.3.3 Water Environment

Mangalam lake is the prominent surface water resources present in the study area. This lake was ephemeral in nature which convey water only after rainfall events. The surface water sample known as SW1 were collected from the Mangalam lake (0.15km E) to assess the baseline water quality as shown in Table 3.6 and Figure 3.6.

Inference: The surface water quality is compared with the CPCB Water Quality Criteria against A, B, C, D & E class of water. From the test result it is found that both the water does not fit Class A (Drinking Water Source without conventional treatment but after disinfection). But they can be used for outdoor bathing as it meets the requirements shown for class B water. 3.5KLD (3,500 liters per day) water requirement for drinking, domestic, dust suppression and plantation.



11.3.4 Air Environment

As per the monitoring data, PM_{2.5} ranges from 19.6µg/m³ to 22.8µg/m³; PM₁₀ from 40.1µg/m³ to 44.0µg/m³; SO₂ from 6.1µg/m³ to 8.0µg/m³; NO_x from 7.1µg/m³ to 13.3g/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Air quality Index (AQI)

The AQI shows that the air quality of the study area falls within good category 42 causing minimal impact to human health.

11.3.5 Noise Environment

Noise level in core zone was 62.4dB(A) Leq during day time and 54.1dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 51.0 to 48.4dB (A) Leq and during night time from 38.2 to 40.8dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.3.6 Biological Environment

The lease area as well as buffer zone area reveals no endangered and endemic species of flora and fauna in the area.

11.3.7 Socio Economic Environment

The proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of people's standard of living.

11.4 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs. 51,77,860** as capital cost and recurring cost as **Rs. 21,06,920** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 10 years will be **Rs. 3,21,36,372** /-.

11.5 CONCLUSION:

The environmental impact assessment (EIA) study for a proposed mining operation exposed the potential negative impacts such as

- **Dust emission impact:**

The project is expected to have a negligible impact on overall dust emissions, with levels remaining less than 0.5% of the existing levels.

- **Blasting restriction:**

Blasting with slurry mixtures should be minimized to avoid causing shockwaves and damage to nearby properties and populations.

- **Erosion control measures:**

Terracing, planting vegetation and soil stabilization techniques should be implemented to manage erosion.

- **Dust suppression equipment:**

Dust suppression machines should be readily available on site to minimize dust generation during material handling.

- **Green belt development**

Creating a vegetative barrier that absorbs gaseous and particulate pollutants reduces noise levels and mitigates soil erosion. By planting native tree species with their vast leaf surfaces, green belts effectively reduce pollutant concentrations in the ambient air and improve the aesthetic environment making them crucial for controlling the impacts of activities like proposed mining operations.

- **Comprehensive environmental management:**

All recommended environmental management practices should be implemented throughout the project lifecycle.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, **M/s.MSH Blue Metal** has engaged **Geo Technical Mining Solutions**, a NABET accredited consultancy for carrying out the EIA study as per the ToR issued.

Address of the consultancy:

No: 1/213B Natesan Complex,
Oddapatti, Dharmapuri – 636705,
Tamil Nadu, India.
Email:info.gtmsdpi@gmail.com
Web: www.gtmsind.com
Phone: 04342 232777.

The accredited experts and associated members who were engaged in this EIA study are given below:

S.No.	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
Approved Functional Area Experts & EC					
1.	Dr. R. Arunbalaji	EIA Coordinator (EC) In-house	1(a)(i)	AQ	B
2.	G. Umamaheswaran	In-house, FAE	1(a)(i)	GEO	B
3.	G. Prithiviraj	In-house, FAE	1(a)(i)	LU	B
4.	G. Umamaheswaran	In-house, FAE	1(a)(i)	HG	B
5.	Dr.R.Arunbalaji	In-house, FAE	1(a)(i)	AP	B
6.	R.Revathy	In-house, FAE	1(a)(i)	WP	B
7.	Dr.R.Arunbalaji	In-house, FAE	1(a)(i)	NV	B
8.	J.Rajarajeshwari	In-house, FAE	1(a)(i)	SC, EB	B
9.	Dr. G. Prabakaran	In-house, FAE	1(a)(i)	SE	B
10.	J.N. Manikandan	Empanelled FAE	1(a)(i)	RH, SHW	B
Approved Functional Area Associates					
11.	R.Srikrishna	FAA	1(a)(i)	LU	B
12.	K.Prithivi	FAA	1(a)(i)	HG	B
13.	R.Srikrishna	FAA	1(a)(i)	Geo	B
Team Members					
14.	G. Umamaheswaran	TM	1(a)(i)	TM for EC	-

15.	M.Muralidharan	TM	1(a)(i)	TM for FAE NV, HW	-
16.	A.Jothibas	TM	1(a)(i)	AP & AQ	-

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

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

Signature : 

Date :

Name : **Dr.R. Arun Balaji**

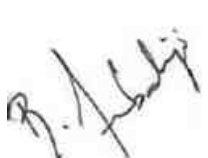
Designation : EIA Coordinator

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

We, the FAEs, FAAs and TM hereby declare that information furnished in this EIA/EMP report for **M/s. MSH Blue Metal**, rough stone and gravel quarry project with the extent of 1.98.0ha situated in the cluster with the extent of 6.80.0ha in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, and Tamil Nadu is true and correct to the best of our knowledge.

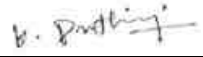
List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity ○ Prediction of air pollution and propose mitigation measures / control measures	Dr.R.Arunbalaji	
2	WP	○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving	R.Revathy	

		environment/water bodies and suggesting control measures.		
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	G. Umamaheswaran	
4	GEO	○ 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.	G. Umamaheswaran	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility.	Dr. G. Prabakaran	
6	EB	○ 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.	J.Rajarajeshwari	
7	RH	○ Identification of hazards and hazardous substances	J.N. Manikandan	

		○ Risks and consequences analysis ○ Vulnerability assessment ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety.		
8	LU	○ Construction of Land use Map ○ Impact of project on surrounding land use ○ Suggesting post closure sustainable land use and mitigative measures.	G. Prithiviraj	
9	NV	○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP.	Dr.R. Arun Balaji	
10	AQ	○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ Recommending mitigations measures for EMP	Dr.R. Arun Balaji	
11	SC	○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation	J.Rajarajeshwari	
12	SHW	○ 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.	J.N. Manikandan	

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	R.Srikrishna	LU	○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU	
2	R.Srikrishna	GEO	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
3	K.Prithivi	HG	○ Site visit with FAE ○ Provide inputs & Assisting FAE for HG	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for **M/s. MSH Blue Metal**, rough stone and gravel quarry project with the extent of 1.98.0ha situated in the cluster with the extent of 6.80.0ha in Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, and Tamil Nadu is true and correct to the best of our knowledge.

Signature

:



Date

:

Name

: **Dr. S. Karuppannan**

Designation

: Managing Partner

Name of the EIA Consultant Organization

: Geo Technical Mining Solutions

NABET Certificate No & Issue Date

: NABET/EIA/23-26/RA 0319

Validity

: Till 31.12.2026



File No: 12919
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA),
TAMIL NADU)



Dated: 27/11/2025



To,

Mr. Jeevith Kumar, Director
M/s. MSH BLUE METAL
No.11/1, 3rd East Street, Poonga Nagar, Sothupakkam Village, Cheyyur Taluk, Chengalpattu District -
603 319. TAMIL NADU.
mshbluemetals25@gmail.com

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

Sir/Madam,

Sub: SEIAA, Tamil Nadu – Proposed Rough Stone quarry over an extent of 1.98.0Ha of in S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu by M/s.MSH Blue Metal, Director Mr.Jeevith Kumar - under project category – “B1” and Schedule S.No. 1(a) – **ToR issued along with Public Hearing-** preparation of EIA report – Regarding.

Ref: 1. Online proposal No. SIA/TN/MIN/555705/2025, Dated: 27/10/2025.

2. Your application submitted for Terms of Reference dated: 27.10.2025

3. Minutes of the 641st SEAC -I Meeting held on 11.11.2025.

4. Minutes of the 922nd Authority meeting held on 25.11.2025

2. The particulars of the proposal are as below:

(i) TOR Identification No.	TO25B0108TN5903858N
(ii) File No.	12919
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals, 1(a) Mining of minerals
(vii) Name of Project	Mangalam Village Rough Stone and Gravel Mining Lease
(viii) Name of Company/Organization	MSH BLUE METAL
(ix) Location of Project (District, State)	TIRUVANNAMALAI, TAMIL NADU
(x) Issuing Authority	SEIAA

(xi) Applicability of General Conditions	no
(xii) Applicability of Specific Conditions	no

1. 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.

2. The above-mentioned proposal has been considered by SEIAA in the meeting held on 25.11.2025. The minutes of the meeting and all the Application and documents submitted [viz. Form-1 Part A, Part B] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).

4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal of **M/s.MSH Blue Metal, Director Mr.Jeevith Kumar** under the provisions of EIA Notification, 2006 and as amended thereof.

5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

6. The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/Regulations or Statutes, as applicable, to the project.

7. This issues with the approval of the Competent Authority.

8. The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

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 Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
5. The Chairperson, TNPC Board, 76, Mount Salai, Guindy, Chennai-32
6. The District Collector, Tiruvannamalai District
7. The Commissioner of Geology and Mines, Guindy, Chennai-32
8. The Assistant Director, Department of Geology & Mining, Tiruvannamalai District
9. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Integrated Regional office of MoEF&CC, Sastri Bhawan, Nungambakkam, Chennai
11. File Copy

Annexure 1

Specific Terms of Reference s for (Mining Of Minerals)

1. Seac Conditions - Site Specific

S. No	Terms of Reference
1.1	1. A Cluster Management Committee (CMC) shall be constituted including all the mines in the

S. No	Terms of Reference
	cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of required statutory personnel, appropriate environmental management, system of maintaining the haul roads and village/panchayat roads, authorized blasting operation, Monitoring system of the environmental & other statutory compliances & its reporting status, etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: (i) Copy of the agreement forming CMC. (ii) The Organisation chart of the Committee with defining the role of the members (iii) The 'Standard Operating Procedures' (SoP) executing the planned activities. 2. The PP shall ensure the installation of CCTV at the proposed quarry site and ensure its inclusion during the EIA presentation.

2. Seac Standard Conditions

S. No	Terms of Reference
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: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m. 2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site. 3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc. 4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry. 5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report. 6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site. 7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.

S. No	Terms of Reference
	8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level. 9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent. 10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site. 11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences. 12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines, 13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? 14. Quantity of minerals mined out. 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. 15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). 16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc., 17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan. 18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same. 19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment. 20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. 21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study. 22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health,

S. No	Terms of Reference
	biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind. 23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted. 24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. 25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided. 26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered. 27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided. 28. Impact on local transport infrastructure due to the Project should be indicated. 29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity. 30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific. 31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible. 32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner. 33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner 34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period. 35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period. 36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. 37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations. 38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining

S. No	Terms of Reference
	activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation. 39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. 40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc. 41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB. 42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine. 43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

3. Seiaa Specific Conditions :

S. No	Terms of Reference
3.1	After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 3,40,500 m³ of rough stone and the 30,600 m³ of Gravel up to the depth of 52m (2mAGL + 50mBGL). as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions & the SEIAA Standard conditions. 1. A revised map of the area to be mined shall be furnished along with the revised mine plan, ensuring that a safety distance of 30 m (totaling 50 m) is maintained from the existing Panchayat tank.

4. Seiaa Standard Conditions:

S. No	Terms of Reference
4.1	<u>Cluster Management Committee</u> 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 & emergency management plan, fire safety & evacuation plan and sustainable development goals pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. 6. The Cluster Management Committee shall form Environmental Policy to practice sustainable

S. No	Terms of Reference
	mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report. 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 deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity. <u>Agriculture & Agro-Biodiversity</u> 9. Impact on surrounding agricultural fields around the proposed mining Area. 10. Impact on soil flora & vegetation around the project site. 11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP. 12. The Environmental Impact Assessment should study the agro-biodiversity, agro- forestry, horticultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. <u>Forests</u> 15. The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife. 16. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 17. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 18. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. <u>Water Environment</u> 19. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. 20. Erosion Control measures. 21. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 23. The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment, by the activities. 24. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. 25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. 27. The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment.

S. No	Terms of Reference
	b) Bio-geochemical processes and its foot prints including Environmental stress. c) Sediment geochemistry in the surface streams. <u>Energy</u> 28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished. <u>Climate Change</u> 29. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. 30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features. 31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood. <u>Mine Closure Plan</u> 32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued. <u>EMP</u> 33. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs. 34. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan. <u>Risk Assessment</u> 35. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining. <u>Disaster Management Plan</u> 36. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. <u>Others</u> 37. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc. 38. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan. 39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the Environment. The ecological risks and impacts of plastic & microplastics on aquatic Environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had

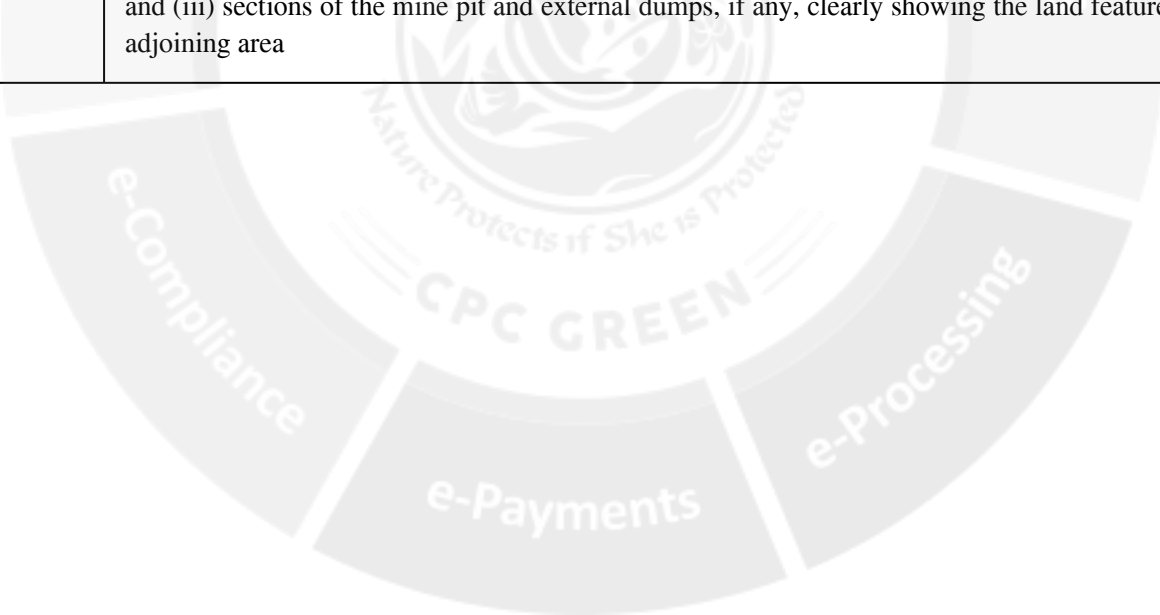
S. No	Terms of Reference
	been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)
1.5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics
1.6	Details about the land proposed for mining activities should be givenwith information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority
1.7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided
1.9	The study rea will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period
1.10	Land use of the study rea delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given
1.12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary

S. No	Terms of Reference
	claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the State Expert Appraisal Committees
1.13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished
1.14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given
1.16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted
1.17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished
1.18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)
1.21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a

S. No	Terms of Reference
	need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report
1.22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given
1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map
1.24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided
1.26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided
1.27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided
1.28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished
1.29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out
1.30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same
1.31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form

S. No	Terms of Reference
	(indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report
1.34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report
1.35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed
1.36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations
1.37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation
1.38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report

S. No	Terms of Reference
1.43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc
1.44	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area



STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly

authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on

ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and

modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio-economic significance and influence to the local community

- proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed: -
- a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - e) Where the documents provided are in a language other than English, an English translation should be provided.
 - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
 - g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.

- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

In addition to the above, the following shall be furnished:-

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:

1. Project name and location (Village, District, State, Industrial Estate (if applicable).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.

10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.

31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

Besides the above, the below mentioned general points should also be followed:-

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
 - After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above-mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
 - The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.

- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.



From
Dr.S.Vediappan, M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Tiruvannamalai - 4.

To
M/s.MSH Blue Metal,
Director Mr.Jeevith Kumar,
No.11/1, 3rd East Street,
Poonga Nagar, Sothupakkam Village,
Cheyyar Taluk,
Tiruvannamalai 603 319.

Rc.No.484/Kanimam/2025, dated 14.10.2025.

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone and Gravel - Tiruvannamalai District - Cheyyar Taluk - Mangalam Village Patta land SF.Nos. 102/1 (0.30.5), 102/2 (0.14.0) & etc., over an extent of 1.98.0 hecets., - Application preferred by M/s.MSH Blue Metal, Director Mr.Jeevith Kumar - Precise area communicated - Submission of three copies of draft Mining Plan for approval - Approval accorded - regarding.

Ref: 1. M/s.MSH Blue Metal, Director Mr.Jeevith Kumar Online Application No. 25TVM0403613 dated 26.06.2025.
2. Precise Area Communication Notice Rc.No.484/Kanimam/2025, dated 19.09.2025.
3. Mining Plan submitted by M/s.MSH Blue Metal, Director Mr.Jeevith Kumar dated 22.09.2025.

M/s.MSH Blue Metal, Director Mr.Jeevith Kumar has preferred an application for the grant of Rough Stone and Gravel quarry lease over an extent of 1.98.0 hecets., of Patta land in SF.Nos. 102/1 (0.30.5), 102/2 (0.14.0), 102/3 (0.14.0), 102/4 (0.06.0), 102/5 (0.05.0), 102/6A (0.11.0), 102/6B (0.10.0), 102/7A (0.13.0), 102/7B (0.02.0), 102/7C (0.09.0), 103/3A (0.04.5), 103/3B (0.04.0), 103/4 (0.09.5), 103/5A (0.10.0), 103/5B (0.06.0), 103/5C (0.11.00), 103/5D (0.04.50), 103/6A (0.13.50), 103/6B (0.13.50) & 103/7 (0.07.0) of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District for a period of 10 (Ten years) vide in the reference 1st cited and the precise

area has been communicated to the applicant vide in the reference 2nd cited with a direction to submit the approved mining plan and Environmental Clearance.

2. As directed, the applicant has submitted three copies of mining plan for approval vide in the reference 3rd cited. The Mining Plan has been verified in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

Depth in Mts.	Geological Resources			Mineable Reserves		
	Mineral	in Cbm	in Tons	Mineral	in Cbm	in Tons
52m (2m Gravel AGL + 50m Rough Stone)	Rough Stone	990000	2722500	Rough Stone	340500	936375
	Gravel	39600	79200	Gravel	30600	61200

ii) Year wise production proposed for the **first five year period** are as follows:-

Year	Rough Stone Quantity		Gravel Quantity	
	CBM	Tons	CBM	Tons
I	54700	150425	9180	18360
II	51240	140910	9180	18360
III	69470	191043	12240	24480
IV	40650	111787	-	-
V	40200	110550	-	-
Total	256260	704715	30600	61200

iii) Year wise production proposed for the **2nd five year period** are as follows:-

Year	Mineral	Quantity	
		CBM	Tons
I	Rough Stone	16560	45540
II		14760	40590
III		12960	35640
IV		20520	56430
V		19440	53460
Total		84240	231660

3. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:-

- i. The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.
- ii. This approval of the mining plan does not in any way convey the approval of the Government in terms or 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, 1986, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.
- iii. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- iv. Scheme of Mining shall be submitted for the 2nd five year 180 Days prior to expiry of 1st five year period as stipulated in rule 41 (a) of TNMMCR.
- v. Quarrying shall be done in accordance with the approved Mining Plan.
- vi. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- vii. All the conditions stipulated in the precise area communication dated 19.09.2025 should be duly complied with.

4. Further, other quarries situated within 500m radial distance are as follows.

1) Existing Quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
MSH Blue Metal, Office at No.12/14, Ramthilak Nagar, West Tambaram, Chennai	Mariyanallur 35/3, 35/4, 36/2, 36/3, 37/1, 37/2 & 37/3	1.27.5	06/12/2021 to 05/12/2026	Existing Quarry

ii) Abandoned quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
NIL				

iii) Present Proposed Quarries

Sl. No	Name of the Owner	Village & S.F. Nos.	Extent in Hects.
1	M/s.MSH Blue Metal	Mangalam 102/1 (0.30.5), 102/2 (0.14.0) & etc.,	1.98.0
2	Thiru.G.Balaji, S/o. Gunasekar,	Mariyanallur 6/7, 6/12A, 6/12B, 9/3B, 9/4B, 9/5A, & etc.,	3.54.50

Encl: 2 Copies of Approved Mining Plan.

[Signature]
14.10.25
Deputy Director,
Geology and Mining,
Tiruvannamalai.

Copy submitted to:

1. The Chairman, SEIAA,
Tamil Nadu, 3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.

[Signature]
14/10/25

From
Dr.S.Vediappan, M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Tiruvannamalai - 4.

To
M/s.MSH Blue Metal,
Director Mr.Jeevith Kumar,
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Sub: Mines and Minerals - Minor Mineral - Rough stone and Gravel - Tiruvannamalai District - Cheyyar Taluk - Mangalam Village Patta land SF.Nos. 102/1 (0.30.5), 102/2 (0.14.0) & etc., over an extent of 1.98.0 hecsts., - Application preferred by M/s.MSH Blue Metal, Director Mr.Jeevith Kumar - Precise area communicated - Submission of three copies of draft Mining Plan for approval - Approval accorded - regarding.

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FOR MSH BLUE METAL

B. Jeyaraj

Partner

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IV	40650	111787	-	-
V	40200	110550	-	-
Total	256260	704715	30600	61200

iii) Year wise production proposed for the **2nd five year period** are as follows:-

Year	Mineral	Quantity	
		CBM	Tons
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Total		84240	231660

For MSH BLUE METAL

B. Jey Partner

3. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:-

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B. Jeey
Partner

ii) Abandoned quarries

Name of the Owner	Village & S.F. Nos.	Extent in Hects.	Lease Period	Remarks
NIL				

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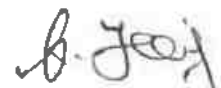
Encl: 2 Copies of Approved Mining Plan.


Deputy Director,
Geology and Mining,
Tiruvannamalai.

Copy submitted to:

1. The Chairman, SEIAA,
Tamil Nadu, 3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.

For MSH BLUE METAL

 **Partner**

MINING PLAN

FOR

**MANGALAM VILLAGE ROUGH STONE AND GRAVEL MINING LEASE WITH
PROGRESSIVE QUARRY CLOSURE PLAN**

Patta land /Open Cast-Semi-Mechanized mining/Non- Forest/Non-Captive Use

Lease period 10 Years from the date of lease execution

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

LOCATION OF THE LEASE AREA

STATE : TAMILNADU
DISTRICT : TIRUVANNAMALAI
TALUK : CHEYYAR
VILLAGE : MANGALAM
S.F. No's : 102/1, 102/2, 102/3, 102/4, 102/5,
102/6A, 102/6B, 102/7A, 102/7B,
102/7C, 103/3A, 103/3B, 103/4,
103/5A, 103/5B, 103/5C, 103/5D,
103/6A, 103/6B & 103/7
EXTENT : 1.98.0 Hectares

ADDRESS OF THE APPLICANT

M/s.MSH Blue Metal,

Director **Mr.Jeevith Kumar,**

No. 11/1, 3rd East Street,

Poonga Nagar,

Sothupakkam Village,

Cheyyur Taluk,

Chengalpattu District – 603 319

PREPARED BY

P.VELLAIYAN, M.Sc., M.Phil.,

Qualified Person

D.No.6-106-B, Athirampatti Village,

Amaragundhi Panchayat & Post,

Omalur Taluk,

Salem District-636 503.

Mob: +91 7010076626, 9751256465

For MSH BLUE METAL

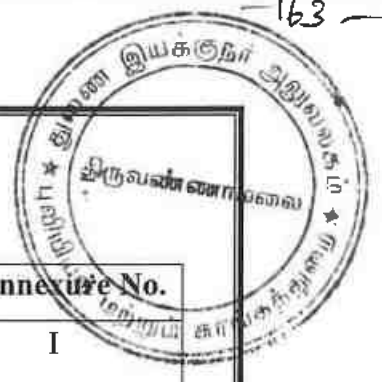
[Signature] Partner

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For MSH BLUE META

B. Jay Partner



ANNEXURES

Sl. No.	Description	Annexure No.
1.	Copy of precise area communication letter	I
2.	Copy of FMB (Field Measurement book)	II
3.	Copy of "A" register	III
4.	Copy of Chitta & Adangal	IV
5.	Copy of GST Certificate	V
6.	Photocopy of the applied lease area	VI
7.	Copy of ID Proof of the authorized signatory	VII
8.	Copy of Qualified Person Certificate	VIII

For MSH BLUE METAL

[Signature] Partner

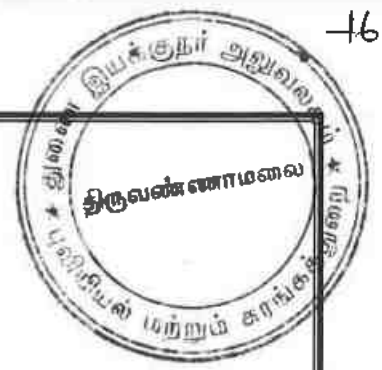
LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Toposheet Map	I-B	1:1,00,000
4	Satellite Imagery Map	I-C	1: 5,000
5	Environmental Plan	I-D	1: 5,000
6	Mine Lease Plan	II	1:1000
7	Surface and Geological Plan	III	Plan 1:1000
8	Geological Sections	IIIA	Sections Hor 1:1000 Ver 1:500
9	Conceptual Plan	IV	Plan 1:1000
10	Conceptual Sections	IVA	Sections Hor 1:1000 Ver 1:500
11	Mine Layout Plan and Land Use Pattern	V	Plan 1:1000
12	Year wise Development and Production Plan	VI	Plan 1:1000
13	Year wise Development, Production Sections	VIA	Sections Hor 1:1000 Ver 1:500

For MSH BLUE METAL

K. Jey Partner

167-
M/s.MSH Blue Metal,
Director Mr.Jeevith Kumar
No. 11/1, 3rd East Street,
Poonga Nagar,
Sothupakkam Village,
Cheyyur Taluk,
Chengalpattu District – 603 319.



CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry lease in patta land at S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 over an extent of 1.98.0hectares of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State has been prepared by

P.VELLAIYAN, M.Sc., M.Phil., (Qualified Person)

I request “The Deputy Director”, Department of Geology and Mining, Tiruvannamalai District to make further correspondence regarding modifications of the Mining Plan with the said Qualified Person on this following address,

P.VELLAIYAN, M.Sc., M.Phil.,

Qualified Person

D.No.6-106-B, Athirampatti Village,

Amaragundhi Panchayat & Post,

Omalur Taluk,

Salem District-636 503.

Mob: +91 7010076626, 9751256465

I hereby undertake that all modifications so made in the Mining Plan by the Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

Place: Chengalpattu, TN.

Date: 19/09/2025

For MSH BLUE METAL

(Signature)

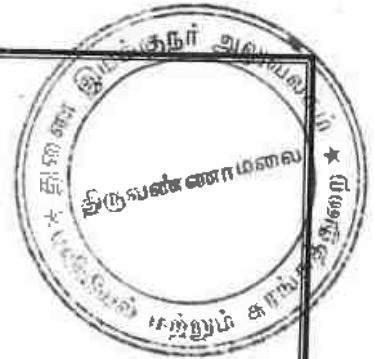
Signature of the applicant

(M/s.MSH Blue Metal)

For MSH BLUE METAL

(Signature) Partner

M/s.MSH Blue Metal,
Director Mr.Jeevith Kumar
No. 11/1, 3rd East Street,
Poonga Nagar,
Sothupakkam Village,
Cheyyur Taluk,
Chengalpattu District – 603 319.



DECLARATION

The Mining Plan in respect of rough stone and gravel quarry lease in Patta land at S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7, over an extent of 1.98.0hectares of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State have been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

For MSH BLUE METAL

B. Jeevith

Partner

Place: Chengalpattu, TN.

Date: 19/09/2025

Signature of the applicant

(M/s.MSH Blue Metal)

For MSH BLUE METAL

B. Jeevith

Partner

-171-
P.VELLAIYAN, M.Sc., M.Phil.,

Qualified Person

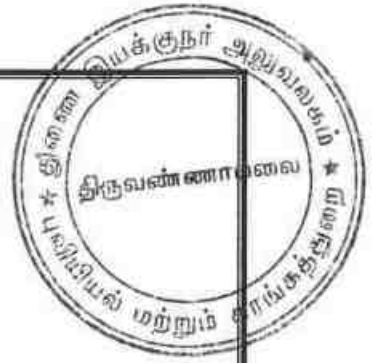
D.No.6-106-B, Athirampatti Village,

Amaragundhi Panchayat & Post,

Omalur Taluk,

Salem District-636 503.

Mob: +91 7010076626, 9751256465



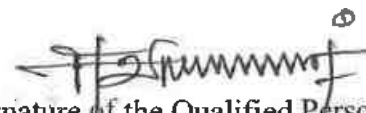
CERTIFICATE

This is to certify that, the provisions of 19(1) Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone and gravel quarry lease in S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7, over an extent of 1.98.0 hectares of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State granted to M/s.MSH Blue Metal, Chengalpattu District.

Wherever specific permission / exemptions / relaxations or approvals are required, the applicant will approach the concerned authorities of State and Central governments for granting such permissions etc.

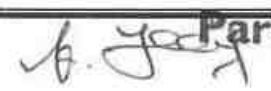
Place: Salem, TN

Date: 20/9/25


Signature of the Qualified Person

P. VELLAIYAN, M.Sc., M.Phil.,
Qualified Person
D.No. 6-106-B, Athirampatti (Vill),
Amaragundhi Panchayat & Post,
Omalur Taluk, Salem District - 636503.

For MSH BLUE METAL


Partner

Mob: +91 7010076626, 9751256465

I certify that, in preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7, over an extent of 1.98.0 hectares of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State prepared to **M/s.MSH Blue Metal**, Chengalpattu District, covers all the provisions of Mines Act, Rules, and Regulations etc., made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Date: 20/9/25

P. VELLAIYAN, M.Sc, M.Phil.,
Qualified Person
D.No. 6-106-B, Athirampatti (Vill),
Amaragundhi Panchayat & Post,
Omair Taluk, Salem District - 636503

A. Joff Partner

MINING PLAN

FOR MANGALAM VILLAGE ROUGH STONE AND GRAVEL MINING LEASE WITH
PROGRESSIVE QUARRY CLOSURE PLAN

Patta land / Open cast-Semi-Mechanized mining/Non-forest/Non-Captive Use

Lease period 10 Years from the date of lease execution

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

INTRODUCTORY NOTES:

- a) **Introduction:** The Mining plan with progressive quarry closure plan is prepared for M/s.MSH Blue Metal, Director Mr.Jeevith Kumar office at No. 11/1, 3rd East Street, Poonga Nagar, Sothupakkam Village, Cheyyur Taluk, Chengalpattu District - 603319, Tamilnadu State and filed with application for new proposals has submitted to the Department of Geology and Mining, Tiruvannamalai dated 26.06.2025 had requested to grant the quarry lease for rough stone and gravel in S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 over an extent of 1.98.0 hectares of Mangalam Village, Cheyyar Taluk, Tiruvannamalai District, Tamil Nadu State.
- b) **The Precise area communication letter:** The Deputy Director, Department of Geology and mining, Tiruvannamalai has directed to the applicant M/s.MSH Blue Metal, through his precise area communication letter vide Roc.No.484/Mines/2025 Dated 19.09.2025, for quarrying lease rough stone and gravel at Tamil Nadu State, Tiruvannamalai District, Cheyyar Taluk, Mangalam Village in S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 over an extent of 1.98.0 hectares has recommended as following conditions for a period of Ten (10) years under Rule 19 Tamil Nadu Minor Mineral concession rules, 1959.
 - a) The minerals to be quarried shall be transported on payment of seniority amount from time to time as per Schedule II of the Tamil Nadu Minor Mineral Concession Rules, 1959.
 - b) A safety distance of 7.5m should be provided for adjacent patta lands and 10m for government lands.

For MSH BLUE METAL

A. Jeevith Partner



- c) A safety distance of 10m shall be maintained for the water catchment situated in S.F.No:75 (lake) to the east and S.F.No.103/8 to the south as per the instructions of the Block Development Officer, Cheyyar.
- d) A certificate of mineral availability shall be obtained and submitted before granting the lease.
- e) Quarrying shall be carried out by experienced explosive users using low-energy explosives without any disturbance to the adjoining Pattadhars / without any encroachment on the adjoining Patta and Government lands.
- f) The mining plan shall be submitted within the time limit as per the rules.
- g) The quarry license shall be granted only if the Environmental Impact Assessment Commission has obtained and submitted a no-objection certificate for the area to be granted the quarry license.
- c) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 and submitted under rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for mining lease as per conditions mentioned in the precise area communication letter Roc.No.484/Mines/2025 Dated 19.09.2025.
- d) **Geological resources and Mineable reserves:** Geological resource of estimated as 1029600m^3 / 2801700MT including the resources of safety zone, gravel etc. Of which, rough stone resources of about 990000m^3 / 2722500MT and gravel is 39600m^3 / 79200MT. The total mineable reserve is estimated to be 371100m^3 / 997575MT by deducting the reserve safety zone, block in benches from the total Geological resources. of which, rough stone is about 340500m^3 / 936375MT and gravel is 30600m^3 / 61200MT up to a depth of 52m (2m above ground level + 50m below ground level) (Refer Plate No. IIIA & IVA) (R.L. 126m-68m).
- e) **Proposed Production Schedule:** Total proposed production of rough stone is 340500m^3 / 936375MT and gravel is 30600m^3 / 61200MT up to a depth of 52m (2m above ground level + 50m below ground level). (Refer Plate No.VIA).
- Proposed production for first five years of rough rough stone is 256260m^3 or 704715MT and gravel is 30600m^3 or 61200MT up to a depth of 52m (2m above ground level + 50m below ground level).
- f) **Environmental Sensitivity of the proposed lease area: -**
- i). **Interstate boundary:** There is no interstate boundary around 10Km radius periphery of proposed lease area.

For MSH BLUE METAL

A. Jey Partner



ii). **Wildlife Sanctuaries any:** There are no notified wildlife sanctuaries within the radius of 10km from the project site under the wildlife (Protection) Act, 1972.

iii). **Forest (conservation) Act, 1980:** No forest land granted for quarrying and there is no reserve forest around 60m radius.

iv). **CRZ Notification, 2019:** There is no Sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 2019.

h) Environmental measures to be adopted during the ongoing activity period,

- Usage of sharp drill bits while drilling which will help in reducing noise.
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.
- 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.
- And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

a.	Name of the Applicant	:	M/s.MSH Blue Metal
	Applicant address	:	Director Mr.Jeevith Kumar, No. 11/1, 3rd East Street, Poonga Nagar; Sothupakkam Village, Cheyyur Taluk,
	District	:	Chengalpattu
	State	:	Tamilnadu
	Pin code	:	603319
	Phone	:	
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	mshbluemetals@gmail.com

For MSH BLUE METAL

[Signature] Partner



b.	Status of the Applicant	
	Private individual	: ---
	Cooperative Association	: ---
	Private company	: Private company
	Public Company	: ---
	Public Sector Undertaking	: ---
	Joint Sector Undertaking	: ---
	Other (pl. specify)	: ---
c.	Mineral(s) Which are occurring in the area and which the applicant intends to mine	: Rough Stone and Gravel Quarry Lease
d.	Period for which the mining lease granted /renewed/ proposed to be applied	: The precise area has been communicated to the applicant for quarrying period of Ten (10) years.
e.	Name of the QP preparing the Mining Plan	: P.VELLAIYAN, M.Sc., M.Phil., Qualified Person
	Address	: D.No.6-106-B, Athirampatti Village, Amaragundhi Panchayat & Post, Omalur Taluk, Salem District-636 503.
	Phone	: +91 7010076626, 9751256465
	Fax	: Nil
	e-mail	: pvellaiyangp@gmail.com
f.	Reference No. and date of consent letter from the state government	: The precise area communication letter issued by the Deputy Director, Department Geology and Mining, Tiruvannamalai vide Roc.No.484/Mines/2025 Dated 19.09.2025.

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	: Refer plate no: IA & IB
	District & State	: Tiruvannamalai, Tamil Nadu
	Taluk	: Cheyyar
	Village	: Mangalam

For MSH BLUE METAL

[Signature] Partner.

Khasra No./ Plot No./ Block Range/ Felling Series etc.:						
Survey No	Sub Division	Total Extent in Hect	Patta No.	Village and Name of the Land Owner	Mine lease Applied S.F.No.	Mine lease Applied area out of total area in hect.
102	1	0.30.5	427	M/s.MSH Blue Metal	102/1	0.30.5
102	2	0.14.0			102/2	0.14.0
102	3	0.14.0			102/3	0.14.0
102	4	0.06.0			102/4	0.06.0
102	5	0.05.0			102/5	0.05.0
102	6A	0.11.0			102/6A	0.11.0
102	6B	0.10.0			102/6B	0.10.0
102	7A	0.13.0			102/7A	0.13.0
102	7B	0.02.0			102/7B	0.02.0
102	7C	0.09.0			102/7C	0.09.0
103	3A	0.04.5			103/3A	0.04.5
103	3B	0.04.0			103/3B	0.04.0
103	4	0.09.5			103/4	0.09.5
103	5A	0.10.0			103/5A	0.10.0
103	5B	0.06.0			103/5B	0.06.0
103	5C	0.11.0			103/5C	0.11.0
103	5D	0.04.5			103/5D	0.04.5
103	6A	0.13.5			103/6A	0.13.5
103	6B	0.13.5			103/6B	0.13.5
103	7	0.07.0			103/7	0.07.0
Total Extent		1.98.0			Applied lease area extent		1.98.0
Lease area (hectares)			: 1.98.0 Hectares			
Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)			: The proposed lease area is recorded as patta land. (Ref.Anne.No's:IV)			
Ownership / Occupancy			: This is a patta land S.F.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 is registered on the name of M/s.MSH Blue Metal as patta no.427.			
Existence of Public Road / Railway line if any nearby and approximate distance			: ✓ Exploited quarry materials will be transported through the approach road is situated on the east side of the lease area. ✓ There is no NH or SH road situated around 5km radius from the lease area.			

For MSH BLUE METAL

A. Jeyaraj Partner



	✓ There is an village road is situated on the western side about 0.8km which connecting Cheyur-Sumangali Road. ✓ There is no railway line is situated around 5km radius from the lease area.																																																			
Toposheet No. with latitude and longitude	Toposheet No. 57 P/10 Latitude: From 12°42'51.09"N to 12°42'56.90"N Longitude: From 79°35'3.00"E to 79°35'7.47"E																																																			
Geo-Coordinates of the lease boundary:																																																				
<table border="1"> <thead> <tr> <th>S.No</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr><td>1</td><td>12°42'56.09"N</td><td>79°35'7.17"E</td></tr> <tr><td>2</td><td>12°42'55.91"N</td><td>79°35'7.24"E</td></tr> <tr><td>3</td><td>12°42'55.65"N</td><td>79°35'7.29"E</td></tr> <tr><td>4</td><td>12°42'51.56"N</td><td>79°35'7.47"E</td></tr> <tr><td>5</td><td>12°42'51.45"N</td><td>79°35'6.91"E</td></tr> <tr><td>6</td><td>12°42'52.18"N</td><td>79°35'6.45"E</td></tr> <tr><td>7</td><td>12°42'52.17"N</td><td>79°35'5.78"E</td></tr> <tr><td>8</td><td>12°42'51.66"N</td><td>79°35'6.06"E</td></tr> <tr><td>9</td><td>12°42'51.52"N</td><td>79°35'6.23"E</td></tr> <tr><td>10</td><td>12°42'51.32"N</td><td>79°35'6.28"E</td></tr> <tr><td>11</td><td>12°42'51.10"N</td><td>79°35'5.19"E</td></tr> <tr><td>12</td><td>12°42'51.09"N</td><td>79°35'3.00"E</td></tr> <tr><td>13</td><td>12°42'52.68"N</td><td>79°35'3.03"E</td></tr> <tr><td>14</td><td>12°42'56.90"N</td><td>79°35'3.63"E</td></tr> <tr><td>15</td><td>12°42'56.36"N</td><td>79°35'5.80"E</td></tr> <tr><td>16</td><td>12°42'56.20"N</td><td>79°35'6.95"E</td></tr> </tbody> </table>		S.No	Latitude	Longitude	1	12°42'56.09"N	79°35'7.17"E	2	12°42'55.91"N	79°35'7.24"E	3	12°42'55.65"N	79°35'7.29"E	4	12°42'51.56"N	79°35'7.47"E	5	12°42'51.45"N	79°35'6.91"E	6	12°42'52.18"N	79°35'6.45"E	7	12°42'52.17"N	79°35'5.78"E	8	12°42'51.66"N	79°35'6.06"E	9	12°42'51.52"N	79°35'6.23"E	10	12°42'51.32"N	79°35'6.28"E	11	12°42'51.10"N	79°35'5.19"E	12	12°42'51.09"N	79°35'3.00"E	13	12°42'52.68"N	79°35'3.03"E	14	12°42'56.90"N	79°35'3.63"E	15	12°42'56.36"N	79°35'5.80"E	16	12°42'56.20"N	79°35'6.95"E
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Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	It is an barren Land.																																																			
b. <i>Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if</i>	Refer plate no-IA & IB																																																			

For MSH BLUE METAL

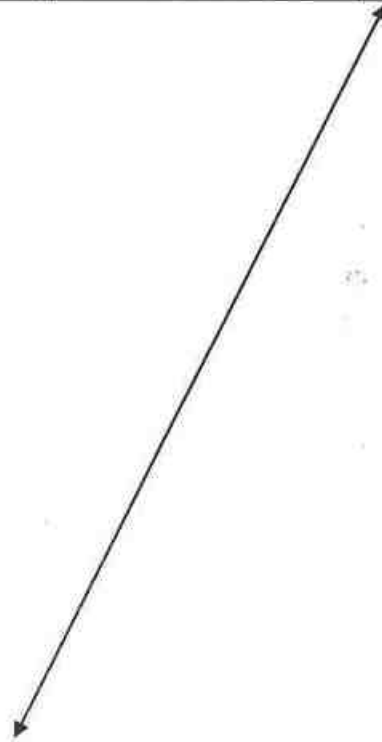
Partner

none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.



i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Kaganam	2.0Km	North
b.	Nearest police station	Cheyyar	7.0km	Southwest
c.	Nearest fire station	Cheyyar	7.0km	Southwest
d.	Nearest medical facility	Nedumparai	2.9km	Southwest
e.	Nearest school	Nedumparai	2.6km	West
f.	Nearest railway station	Kancheepuram	19.50km	Northeast
g.	Nearest port facility	Chennai	88.0km	Northeast
h.	Nearest airport	Chennai	72.2km	Northeast
i.	Nearest DSP office	Cheyyar	7.6km	Southwest
j.	Nearest villages	Vadapundipattu	0.9km	North
		Mangalam	0.6km	East
		Tumbai	1.5km	South
		Mariyanallur	0.8km	Northwest



For MSH BLUE METAL

A. Jeyaraj Partner

PART - A

3.0 GEOLOGY AND MINERAL RESERVES:

(a) Briefly describe the topography and general geology and local/mine geology of the mineral deposit including drainage pattern:

(i)	Topography	:	The proposed lease area is elevated topography. The maximum elevation (120m) was observed center side of the site. The slope is towards eastern side and falls in Toposheet no. 57 P/10

(ii) **General Geology of the District:**

The Entire district is underlain by the rocks belonging to hard crystalline rock masses of Archaean age. The Archaean rocks in this area are represented by rocks of eastern Ghat complex comprising charnockites, Migmatite complex of composite gneiss. The district is covered by metamorphic crystalline rocks of charnockite, composite gneiss of Archaean age. These rocks are highly metamorphosed and have been subjected to sever folding, crushing and faulting. Charnockites group is occupied by North and Southern part of the basin. The other rock type is encountered by composite granitic gneiss of Epidote hornblende biotite gneiss and hornblende biotite gneiss are occupy in the middle portion of the basin. Charnockite group occupies the high ground as well as plain and it is poorly weathered and jointed. They are generally black grey to dark grey in colour medium to coarse grained texture, and generally massive and un-foliated. A gneissic rock occurs as linear bands in the middle portion of the area and is highly migmatized. Mostly, micaceous with bands of granites, pegmatites, quartz veins the rock is well foliated. The Hornblende biotite gneiss forms the country rock of the area and epidote hornblende gneiss (Proterozoic age) occurs as small isolated outcrops. The crystalline formations are charnockite, granitic gneiss of Archean age have been intrude by dolerite dykes and pegmatite veins. These rocks are highly metamorphosed and have been subjected to very severe folding, crushing and faulting. The crystalline rocks are subjected to tectonic activities under various orogenic cycles resulting in the development of secondary structures such as joints, fissures and cleavages. The intensity of weathering varies from place to place. Highly weathered zones and granitic rock occurs in masses are around some of the villages like Ariyanallur, Mukkunam, Kaarunkuli Tondur, vedal,) Melokkur, Pennagar,

For MSH BLUE METAL

Chinngram(57p/7). The general geological requence of formations is given in the

Table

Age	Stage	Lithology
Recent	Migmatite	Biotite Gneiss, Hornblende gneiss
Archean	Charnockite Group	Magnetite

(iii) Local / Mine Geology of The Mineral Deposit:

Topography of the proposed lease area:

The applied lease area exhibits an elevated topography and the maximum elevation 128m was observed north side of the site. The rocks exhibits layered, medium to coarse grained hornblende biotite, orthopyroxene charnockite gneiss.

The Gravel is obtained the average of 0-2.0m and a rough stone starts from 2.0m to 52m (R.L.120-68m) from the surface level. The Surface plan showing elevation, contour, accessibility road and Geological map was prepared the proposed lease area.

Mode of origin:

The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures.

Physiography of the rocks:

General characteristics of the rocks of this series has recorded that the rocks are in general bluish gray or darkish in colour and extremely fresh in appearance with an even grained granular structure.

Chemical composition of rocks:

Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic ortho pyroxene granite of the series. The alkali feldspar may be intermediate between microcline and orthoclase, the fine micro perthitic texture being common.

Order of superposition of the proposed lease area,

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

For MSH BLUE METAL

Partner

(iv)	Drainage Pattern	:	There is no major river found within 30m radius. The drainage in the area is sub-dendritic in nature.
(b)	<i>The topographic plan of the lease area prepared on a scale of 1:1000 or 1:2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:</i>		
	a. Present status:	:	The QP examined the surface features during survey. It is a fresh quarry lease.
	b. Surface Plan	:	Surface plan showing elevation contour and accessibility road was prepared at the scale of 1:1000, as shown in Plate No. III.
(c)	Geological sections should be prepared at suitable intervals on a scale of 1:1000 / 1:2000:	:	Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1:1000 and at the vertical scale of 1:500, as shown in Plate No. IIIA
(d)	<i>Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below:-</i> No future programmed proposed in this area. Its massive homogeneous parent rock. Hence exploration proposal is not required to this mining project.		
(e) Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold. The geological resources were computed by cross section method with respect to the boundaries of the lease area. In this method, the lease area was divided into one longitudinal and transverse section to calculate the volume of material up to the depth of 52m (2m above ground level + 50m below ground level) for ten years plan period. (Refer Plate No. IIIA). The one longitudinal and transverse cross section were assigned XY-AB, as respectively. Using the cross-sectional method, total reserve is estimated to be 1029600m³ / 2801700MT including the resources of safety zone, and gravel, etc. Of which, rough stone resources of about 990000m³ / 2722500MT and gravel is 39600m³ / 79200MT.			
For MSH BLUE METAL <i>[Signature]</i> Partner			

GEOLOGICAL RESOURCES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	165	120	2	39600	.....	39600	2	.....	79200
	II	165	120	5	99000	99000	.....	2.75	272250	.....
	III	165	120	5	99000	99000	.....	2.75	272250	.....
	IV	165	120	5	99000	99000	.....	2.75	272250	.....
	V	165	120	5	99000	99000	.....	2.75	272250	.....
	VI	165	120	5	99000	99000	.....	2.75	272250	.....
	VII	165	120	5	99000	99000	.....	2.75	272250	.....
	VIII	165	120	5	99000	99000	.....	2.75	272250	.....
	IX	165	120	5	99000	99000	.....	2.75	272250	.....
	X	165	120	5	99000	99000	.....	2.75	272250	.....
	XI	165	120	5	99000	99000	.....	2.75	272250	.....
TOTAL					1029600	990000	39600	.....	2722500	79200

(f) Indicate mineable reserves by slice plan / level plan method, as applicable, as per the proposed mining parameters: -

The total mineable reserve is estimated to be 371100m³ / 997575MT by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 52m (2m above ground level + 50m below ground level). Of which, rough stone is about 340500m³ / 936375MT and gravel is 30600m³ / 61200MT. The commercially viable rough stone has been prepared on 1:1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no's IVA)

MINEABLE RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	150	102	2	30600	.....	30600	2	.....	61200
	II	150	102	5	76500	76500	.....	2.75	210375	.....
	III	140	92	5	64400	64400	.....	2.75	177100	.....
	IV	130	82	5	53300	53300	.....	2.75	146575	.....
	V	120	72	5	43200	43200	.....	2.75	118800	.....
	VI	110	62	5	34100	34100	.....	2.75	93775	.....
	VII	100	52	5	26000	26000	.....	2.75	71500	.....
	VIII	90	42	5	18900	18900	.....	2.75	51975	.....
	IX	80	32	5	12800	12800	.....	2.75	35200	.....
	X	70	22	5	7700	7700	.....	2.75	21175	.....
	XI	60	12	5	3600	3600	.....	2.75	9900	.....
TOTAL					371100	340500	30600	.....	936375	61200

For MSH BLUE METAL

4.0 MINING:

- a) Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.
(Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)
- The mining operation is open-cast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961, in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.

- b) *Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.*

Total proposed production of rough stone is **340500m³ / 936375MT** and gravel is **30600m³ / 61200MT** up to a depth of 52m (2m above ground level + 50m below ground level) for ten years lease period. (Refer Plate No.VIA).

- Proposed production for first five years of rough rough stone is **256260m³ or 704715MT** and gravel is **30600m³ or 61200MT** up to a depth of 52m (2m above ground level + 50m below ground level).

Year	Pit No.(s)	Topsoil/ Overburden (m ³)	ROM (m ³)	Saleable rough stone (m ³) @ 100%	Rough stone (MT)	Saleable Gravel (m ³)	Saleable Gravel (MT)	Rough stone to waste
I	I	...	63880	54700	150425	9180	18360	...
II	I	...	60420	51240	140910	9180	18360	...
III	I	...	81710	69470	191043	12240	24480	...
IV	I	...	40650	40650	111787	...	...	...
V	I	...	40200	40200	110550	...	...	...
Total	—	...	286860	256260	704715	30600	61200	...
VI	I	...	16560	16560	45540	...	...	...
VII	I	...	14760	14760	40590	...	...	...
VIII	I	...	12960	12960	35640	...	...	...
IX	I	...	20520	20520	56430	...	...	...
X	I	...	19440	19440	53460	...	...	...
Total	---	...	84240	84240	231660	...	...	...
Grand Total	—	...	371100	340500	936375	30600	61200	...

- c) *Composite plans and Year wise sections (In case of 'A' class mines):*
- Not applicable. It is a "B" class quarry lease

For MSH BLUE METAL

[Signature] Partner



YEARWISE PRODUCTIONS (First Five Years)												
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)	
I-YEAR	XY-AB	I	45	102	2	9180	.....	9180	2	.....	18360	
		II	45	102	5	22950	22950	.....	2.75	63113	.....	
		III	35	92	5	16100	16100	.....	2.75	44275	.....	
		IV	25	82	5	10250	10250	.....	2.75	28187	.....	
		V	15	72	5	5400	5400	.....	2.75	14850	.....	
		TOTAL				63880	54700	9180	.....	150425	18360	
II-YEAR		I	45	102	2	9180	.....	9180	2	.....	18360	
		II	45	102	5	22950	22950	.....	2.75	63113	.....	
		III	23	92	5	10580	10580	.....	2.75	29095	.....	
		IV	23	82	5	9430	9430	.....	2.75	25932	.....	
		V	23	72	5	8280	8280	.....	2.75	22770	.....	
		TOTAL				60420	51240	9180	.....	140910	18360	
III-YEAR		I	60	102	2	12240	.....	12240	2	.....	24480	
		II	60	102	5	30600	30600	.....	2.75	84150	.....	
		III	46	92	5	21160	21160	.....	2.75	58190	.....	
		IV	23	82	5	9430	9430	.....	2.75	25933	.....	
		V	23	72	5	8280	8280	.....	2.75	22770	.....	
		TOTAL				81710	69470	12240	.....	191043	24480	
IV-YEAR		IV	23	82	5	9430	9430	.....	2.75	25932	.....	
		V	23	72	5	8280	8280	.....	2.75	22770	.....	
		VI	74	62	5	22940	22940	.....	2.75	63085	.....	
		TOTAL				40650	40650	0	.....	111787	0	
V-YEAR		VII	64	52	5	16640	16640	.....	2.75	45760	.....	
		VIII	54	42	5	11340	11340	.....	2.75	31185	.....	
		IX	44	32	5	7040	7040	.....	2.75	19360	.....	
		X	34	22	5	3740	3740	.....	2.75	10285	.....	
		XI	24	12	5	1440	1440	.....	2.75	3960	.....	
		TOTAL				40200	40200	0	.....	110550	0	
GRAND TOTAL (A)						286860	256260	30600	.....	704715	61200	
YEARWISE PRODUCTIONS (Second Five Years)												
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)	
VI-YEAR	XY-AB	III	36	92	5	16560	16560	.....	2.75	45540	.....	
		TOTAL				16560	16560	0	.....	45540	0	
VII-YEAR		IV	36	82	5	14760	14760	.....	2.75	40590	.....	
		TOTAL				14760	14760	0	.....	40590	0	
VIII-YEAR		V	36	72	5	12960	12960	.....	2.75	35640	.....	
		TOTAL				12960	12960	0	.....	35640	0	
IX-YEAR		VI	36	62	5	11160	11160	.....	2.75	30690	.....	
		VII	36	52	5	9360	9360	.....	2.75	25740	.....	
		TOTAL				20520	20520	0	.....	56430	0	
X-YEAR		VIII	36	42	5	7560	7560	.....	2.75	20790	.....	
		IX	36	32	5	5760	5760	.....	2.75	15840	.....	
		X	36	22	5	3960	3960	.....	2.75	10890	.....	
		XI	36	12	5	2160	2160	.....	2.75	5940	.....	
		TOTAL				19440	19440	0	.....	53460	0	
GRAND TOTAL (B)						84240	84240	0	.....	231660	0	
GRAND TOTAL (A+B)						371100	340500	30600	.....	936375	61200	

For MSH BLUE METAL

K. Jeay Partner



d) Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc. : Composite plan not prepared in this proposed lease area

e) **Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:**

At this rate of production, the expected life of quarry is calculated as given below:

Rough stone:

Mineable reserves of rough stone (10 Years) = 340500m³ / 936375MT

Annual Peak production = 69470m³ / 191043MT

Gravel:

Mineable reserves of gravel = 30600m³ / 704715MT

f) **Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:**

i) Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame: : Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about up to a depth of 52m (2m above ground level + 50m below ground level) from the petrogenetic character of the charnockite rock as well as from the actual mining practice in the area and with the current trend of rough stone production the quarry may sustain for 10 years.

ii) Whether ultimate pit limit has been determined and demarcated on surface and geological plan :-
The ultimate pit limit has been determined and demarcated in the conceptual plan

SECTION XY-AB					
Bench	Period	Overburden/ Mineral	L (m)	W (m)	D (m)
I	Ten years Plan period	Gravel	150	102	2
II		Rough stone	150	102	5
III			140	72	5
IV			130	82	5
V			120	72	5
VI			110	62	5
VII			100	52	5

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		VIII			90	42	
		IX			80	32	
		X			70	22	
		XI			60	12	
Total Depth					52		
iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: -	:	The recovery of rough stone and gravel in this quarry is 100%. There is no waste rock will be proposed in this lease area.				
iv)	Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal: -	:	As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.				
v)	Whether post mining land use envisaged: -	:	At the end of mining activities over the quarry pit may be utilized for storage of rain water and may be converted in to dumping yards for solid waste by adopting suitable technologies.				
g)	Open cast mining						
i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	:	It is a fresh quarry lease. The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.				
ii)	Describe briefly the layout of mine workings, the layout of	:	The rough stone is proposed to quarry at 5m bench height & width conventional opencast semi mechanized quarrying operation using				

For MSH BLUE METAL

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	faces and sites for disposal of overburden/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice	shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste and are removal using Hydraulic excavator and loaded directly to the tippers and transported to the needy customer. Bench height = 5mts. Bench width = 5mts.					
	a. Details of Topsoil/ Overburden	No separate of topsoil will be removed.					
	b. Rough Stone waste and side burden waste:-	The recovery of rough stone in this quarry is 100%. There is no rough stone waste or side burden will be removed.					
H	Underground Mining	Not applicable					
i)	Extent of mechanization: Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.						
	(1) Drilling Machines: Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Details of drilling equipment's are given below.						
	Type	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.
	Jack Hammer	2	32 mm	Hand held	--	Diesel	--
	Compressor	1	---	Air	--	Diesel	--
	(2) Loading Equipment:						
	Type	Nos	Size / Capacity	Make	Motive power	H.P.	
	Hydraulic Excavator	1	2.9-4.5m ³	--	Diesel	--	
	(3) Haulage and Transport Equipment (a) Haulage within the mining leasehold:						
	Type	Nos	Size / Capacity	Make	Motive power	H.P.	
	Tipper	8	--	--	Diesel	--	
	Whether the dumpers are fitted with exhaust conditioner should be indicated: The dumpers not used in this quarry area, hence it's a small "B" category mine.						
b)	Transport from mine head to the destination	Tipper will be used for transport rough stone from the mine head to needy customer.					
c)	Describe briefly the transport system (please specify)	Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps					

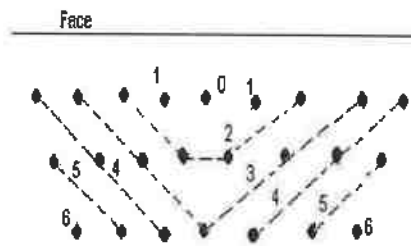
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		and deliver to the customer's area																				
	i) Ore transported by: own trucks / hired trucks	Hired trucks for initially production purposes																				
	ii) Main destination to which ore is transported (giving to and from distance)	The excavated stone materials will be supplied to the consumers like road laying, earth filling, building construction, etc																				
a)	Details of hauling / transport equipment:																					
	<table border="1"> <thead> <tr> <th>Type</th><th>Nos</th><th>Size / Capacity</th><th>Make</th><th>Motive power</th><th>H.P.</th></tr> </thead> <tbody> <tr> <td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr> </tbody> </table>	Type	Nos	Size / Capacity	Make	Motive power	H.P.	--	--	--	--	--	--									
Type	Nos	Size / Capacity	Make	Motive power	H.P.																	
--	--	--	--	--	--																	
4)	(4). Miscellaneous: Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.																					
	(A) Operations	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.																				
	(B) Machineries deployed	Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted.																				
5.	BLASTING: a) <i>Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.</i> Blasting pattern: The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. Rough stone production for 10 years = 340500m³ / 936375MT																					
	<table border="1"> <thead> <tr> <th colspan="2">BLAST DESIGN</th></tr> </thead> <tbody> <tr> <td>Blasthole Diameter (D) in mm</td><td>32</td></tr> <tr> <td>Burden (B) in m</td><td>1.2</td></tr> <tr> <td>Spacing (S) in m</td><td>1.38</td></tr> <tr> <td>Subdrill in m</td><td>0.5</td></tr> <tr> <td>Charge length (C) in m</td><td>0.70</td></tr> <tr> <td>Stemming</td><td>0.5</td></tr> <tr> <td>Hole Length (L) in m</td><td>1.2</td></tr> <tr> <td>Bench Height (BH) in m</td><td>2.5</td></tr> <tr> <td>Mass of explosive/hole in g</td><td>437.5</td></tr> </tbody> </table>		BLAST DESIGN		Blasthole Diameter (D) in mm	32	Burden (B) in m	1.2	Spacing (S) in m	1.38	Subdrill in m	0.5	Charge length (C) in m	0.70	Stemming	0.5	Hole Length (L) in m	1.2	Bench Height (BH) in m	2.5	Mass of explosive/hole in g	437.5
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Mass of explosive/hole in g	437.5																					

For MSH BLUE METAL

Stemming material size in mm	
Burden stiffness ratio	
Blast volume/hole in m ³	
Production of rough stone/day in m ³	
Number of blast holes/day	
Number of blast round/day	
Blasthole pattern	Staggered
Mass of explosive /day in kg	12.85
Powder factor in kg/m ³	0.11
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL

Note: If >2kg of explosives per day use for blasting if proponent get the permission from the DGMS



Staggered method of mining

b) Type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

Small dia. 25mm slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of rough stone. No deep hole drilling or primary blasting is proposed.

c) Measures proposed to minimize ground vibration due to blasting:

The control blasting measures is being adopted for minimizing ground vibration and fly rock.

Shallow depths jack hammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give hearing effect in rough stone for easy excavation and to control fly rock.

Delay detonators:

Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals. The major advantages of delay blasting are:

- ❖ Reduction of ground vibration
- ❖ Reduction in air blast
- ❖ Reduction in over break

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- ❖ Improved fragmentation
- ❖ Better control of fly rock

Blasting program for the production per day

No of holes	: 29 holes
Yield	: 122m ³
Total explosive required	: 12.85kg-Slurry explosives
Charge per hole	: 0.5kg
Blasting at day time only	: 12.0p.m-1.0p.m

c)	Powder factor in ore and overburden / waste / development heading / stope	: Powder factor is proposed as 0.11kg per hole of explosives
d)	Whether secondary blasting is needed, if so describe it briefly	: There is no secondary blasting involved.
e)	Storage of explosives (like capacity and type of explosive magazine)	: 1. The applicant is advised to engage an authorized explosive agency to carry out blasting. 2. First Aid Box will be keeping ready at all the time. 3. Necessary precautionary announcement will be carried out before the blasting operation.

6. **MINE DRAINAGE:**

a)	Likely depth of water table based on observations from nearby wells and water bodies	: The ground water table is reported as of 65m in summer and 60m in rainy season from the general ground level observed in the adjacent bore well.
b)	Workings expected to be _____ m. above / reach below water table by the year _____	: Proposed mining depth is 52m (2m above ground level + 50m below ground level). Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.
c)	Quantity and quality of water likely to be encountered, the pumping arrangements and	: The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water

For MSH BLUE METAL

	places where the mine water is finally proposed to be discharged		from the seepage shall be less than 300 L pm and it shall be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and it is not contaminated with any hazardous things.
7.	STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:		
a).	Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the years: No other wastes are removed during years.		
b).	Land chosen for disposal of waste with proposed justification	:	There is no waste are proposed.
c).	Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise.	:	The recovery of rough stone in this quarry is 100%. If rough stone may be unsold will be keep within the lease boundary.
8.	USE OF MINERAL:		
a).	Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc
b).	Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone (charnockite) and gravel the same are used for building materials and road metal. So, there is no chemical specifications are specified. Only physical specifications are involved.
c).	Give details in case blending of different grades of ores is being	:	Not blending process is involved, after

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	practiced or is to be practiced at the mine to meet specifications stipulated by buyers.		blasting the rough stone and gravel will be directly loaded to the needy customer.																								
9.	OTHERS																										
	Describe briefly the following a) Site services	:	Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provided as per the Metalliferous Mines Regulations, 1961 as a welfare amenity for our quarry laborers.																								
	b) Employment potential: As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision. The following man power is proposed for quarrying stone material during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of as per the MMR, 1961 norms. <table border="1"> <tr> <td>1.</td><td>Highly Skilled</td><td>Mines Manager</td><td>1No.</td></tr> <tr> <td></td><td></td><td>Mine Engineer</td><td>1No.</td></tr> <tr> <td></td><td></td><td>Mine Geologist</td><td>1No</td></tr> <tr> <td></td><td></td><td>Blaster</td><td>1No</td></tr> <tr> <td>2.</td><td>Unskilled</td><td>Musdoor / Labours</td><td>16 No's</td></tr> <tr> <td colspan="3">Total =</td><td>20 No's</td></tr> </table>			1.	Highly Skilled	Mines Manager	1No.			Mine Engineer	1No.			Mine Geologist	1No			Blaster	1No	2.	Unskilled	Musdoor / Labours	16 No's	Total =			20 No's
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Total =			20 No's																								
10	MINERAL PROCESSING/BENEFICIATIONS:																										
(a)	If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.	:	Excavated rough stone minerals directly will be used by the applicaant for required size ½, ¾ and 1½ inches Jelly which are mainly used in road and building construction purpose. The recovery of rough stone in this quarry is 100%.																								

For MSH BLUE METAL

(b)	Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	: No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.
(c)	A flow sheet or schematic diagram of the processing procedure should be attached.	: Not applicable.
(d)	Specify quantity and type of chemicals to be used in the processing plant.	: Not applicable
(e)	Specify quantity and type of chemicals to be stored on site / plant.	: Not applicable
(f)	Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and of recycling.	: Drinking is 0.2KLD, utilized water is 0.8KLD, Dust suppression is 1.2KLD and Green Belt is 1.3KLD. Minimum quantity of water 3.5KLD per day. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. The sewage water to a tune of 0.9KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit.

For MSH BLUE METAL

PART – B

11.0 ENVIRONMENTAL MANAGEMENT PLAN:

a) Attach a note on the status of Baseline information with regard to the Following :

11.1	Fresh lease land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.	<table border="1"> <thead> <tr> <th>Sl. No.</th><th>Land Use</th><th>Present area (Hect.)</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Area under Mining</td><td>Nil</td></tr> <tr> <td>2</td><td>Infrastructure</td><td>Nil</td></tr> <tr> <td>3</td><td>Roads</td><td>Nil</td></tr> <tr> <td>4</td><td>Unutilized</td><td>1.98.0</td></tr> <tr> <td>5</td><td>Green belt</td><td>Nil</td></tr> <tr> <td>6</td><td>Settling Tank & Drainage</td><td>Nil</td></tr> <tr> <td colspan="2">Grand Total</td><td>1.98.0</td></tr> </tbody> </table>	Sl. No.	Land Use	Present area (Hect.)	1.	Area under Mining	Nil	2	Infrastructure	Nil	3	Roads	Nil	4	Unutilized	1.98.0	5	Green belt	Nil	6	Settling Tank & Drainage	Nil	Grand Total		1.98.0
Sl. No.	Land Use	Present area (Hect.)																								
1.	Area under Mining	Nil																								
2	Infrastructure	Nil																								
3	Roads	Nil																								
4	Unutilized	1.98.0																								
5	Green belt	Nil																								
6	Settling Tank & Drainage	Nil																								
Grand Total		1.98.0																								
11.2	Water Regime	: Water table in this area is noticed at a depth of 65m in summer and 60m in rainy season from the general ground level and presently the quarrying of rough stone is ultimate up to a depth of 52m (2m above ground level + 50m below ground level). Hence, it will not affect the ground water depletion of this area. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development.																								
11.3	Flora and Fauna	: There is no major flora observed in this area and except bushes, shrubs, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.																								
11.4	Quality of air, ambient noise level and water	: Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.																								

For MSH BLUE METAL

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இயக்குநர் அலுவலகம்
தமிழ்நாடு
சென்னை

11.5 Climatic conditions:

This district has moderate climate. In Tiruvannamalai and Thandrapattu taluks, the climate is cool in winter and hot during summer. The district gets rainfall during both north-east monsoon and southwest monsoon. In summer from march to June, the wind is hot and uncomfortable. In the monsoon season, from July to November, the wind is mild and from December to February, the wind is cold. The hottest month in this district was April (36.3°C) and coldest month in this district was January (21.2°C). The general climate is tropical. The district receives rainfall from Northeast and Southwest monsoons. The total rainfall during 2016-17 districts is 635.8mm.

11.6 Human Settlement:

The nearest villages are found in the buffer zone with population as per 2011 census.

S.No	Village	Direction	Distance in Kms	Population
1	Vadapundipattu	North	0.9km	969
2	Mangalam	East	0.6km	314
3	Tumbai	South	1.5km	633
4	Mariyanallur	Northwest	0.8km	506

11.7 Public buildings, places of worship and monuments : No infrastructure like residential building, are found within radius of 300m. The places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.

11.8 Attach plans showing the locations of sampling stations : The proposed Ambient air quality, Water quality Ambient noise level and vibration are periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.

11.9 Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974 : The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974

For MSH BLUE META

b) Attach an Environmental Impact Assessment Statement describing the impact of Mining and beneficiation on environment on the following over the next five years (and upto conceptual plan period for 'A' category mines)

i) Land area indicating the area likely to be degraded due to quarrying pitting, dumping, roads, workshop, processing plant, township etc:

Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:

Sl. No.	Land Use	Area in use during the quarrying period (Hect.)
1	Area under Mining	1.46.75
2	Infrastructure	0.02.0
3	Roads	0.03.0
4	Green Belt	0.39.55
5	Un-Utilized Area	Nil
6	Drainage & Settling Tank	0.06.7
	Grand Total	1.98.0

ii).	Air Quality	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.
iii).	Water quality	A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.
iv).	Noise levels	Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)	No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity shall be recorded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
vi).	Water regime	No major river or any odai track are found around 50m radius.

For MSH BLUE METAL

vii).	Socio-economics	1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.	There are no historical monuments, etc found around 300m radius.

c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

i).	temporary storage and utilization of topsoil	: No separate of topsoil will be removed.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.	: The ultimate mining is proposed depth of 52m (2m above ground level + 50m below ground level) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
iii).	Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares. Green Belt Development: Safety barrier, nearby school area and Nearest Panchayat approach Roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below	

For MSH BLUE METAL

Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	3955	450	80%	@100 Rs Per sapling	45,000/-
Second	Approach road and Nearby Village Road	--	300	80%		30,000/-
Third	Schools	--	300	80%		30,000/-
Total						1,05,000/-

iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the five years (and upto conceptual plan period for 'A' category mines).	:	No waste or rejects shall be proposed.
v).	Measures to control erosion / sedimentation of water courses.	:	Not applicable. There is no major dumps are stabilize in this quarry area.
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses.
vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.
viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	It is a small "B" category open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

d). *Monitoring schedules for different environmental components after the commencement of mining and other related activities. (for 'A' category mines only)*
Not applicable. It is B category quarry

For MSH BLUE META

12.0 PROGRESSIVE QUARRY CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The Ultimate mining is proposed to an average depth of 52m (2m above ground level + 50m below ground level). The mined-out area will be fenced on top of working bench with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 450 trees will be proposed in the quarry area. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	The quarry lease is a fresh mining lease, no mitigation measures observed.
12.4	Mine closure activity	:	The ultimate mining plan is proposed to depth of 52m (2m above ground level + 50m below ground level) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS

For MSH BLUE METAL

		being a mechanized operation.
12.6	Disaster management and Risk Assessment	: Open cast mining method is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.
12.7	Care and maintenance during temporary discontinuance	: A board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.
12.8	Economic repercussions of closure of quarry and manpower entrenchments	: During the ten years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 20 labors will be improved.

12.9 Proposed Financial Estimate / Budget for (EMP) Environment Management:

A	Fixed Asset Cost:	
	1. Land Cost (G-Value)	: Rs. 4,50,000/-
	2. Labour Shed	: Rs. 1,00,000/-
	3. Sanitary Facility	: Rs. 1,00,000/-
	4. Fencing	: Rs. 2,50,000/-
	5. Other expenses (Security guard, dust bin, etc)	: Rs. 4,00,000/-
	Total	: Rs. 13,00,000/-

For MSH BLUE METAL

B	B. Machinery cost	: Rs. 25,00,000/- (Hire Basis)
C	Total Expenditure of EMP cost (for Ten years)	
	1. Drinking Water Facility	: Rs. 1,00,000/-
	2. Sanitary facility & Maintenance	: Rs. 2,00,000/-
	3. Permanent water sprinkler	: Rs. 1,50,000/-
	4. Afforestation and its maintenance	: Rs. 1,05,000
	5. Safety Kits	: Rs. 1,00,000/-
	6. Provision of tyre washing facility	: Rs. 1,50,000/-
	7. Blasting materials with blast mat cost	: Rs. 10,00,000/-
	8. Drainage & Settling Tank (0.06.70Hect or 670 Sq.m x 400)	Rs. 2,68,000/-
	9. Environment monitoring	: Rs. 5,00,000/-
	Total	: Rs. 25,73,000/-
D	Total Project Cost (A+B+C)	: Rs. 63,73,000/-

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small "B" rough stone and gravel quarry.

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- The applicant will endeavor every attempt to quarry the rough stone economically without any wastage and to improve the environment and ecology.
- The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued by Deputy Director, Department of Geology and Mining, Tiruvannamalai vide letter **Roc.No.484/Mines/2025 Dated 19.09.2025.**
- Total proposed production of rough stone is **340500m³ / 936375MT** and gravel is **30600m³ / 61200MT** up to a depth of 52m (2m above ground level + 50m below ground level) for ten years lease period. (Refer Plate No.VIA).

For MSH BLUE METAL

Partner

17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the applicant @ 2.0% of average net profit of the company for the last three financial years to the nearby village. The Ministry has notified the amendments in section 135 of the Act as well in the CSR Rules on 22nd January 2021 as circular no. CSR-05/01/2021-CSR-MCA dated 25th August 2021.

Place: Salem, TN

Date: 20/9/25

Signature of the Qualified Person

P. VELLAIYAN, M.Sc, M.Phil.,
Qualified Person

D.No. 6-106-B, Athirampatti (Vill),
Amaragundhi Panchayat & Post,
Omalar Taluk, Salem District - 636503.

**This Mining Plan Is Approved
Subject to the Conditions/Stipulation
Indicated In The Mining Plan Approval
Letter No. 484/mines/2025 Dt: 14.10.2025
Office Of The Deputy Director Of
Geology And Mining, Tiruvannamalai.**

**Deputy Director,
Geology and Mining,
Tiruvannamalai.**

For MSH BLUE METAL

Partner

நக.எண்.484/கனிமம்/2025

துணை இயக்குநர் அலுவலகம்
புவியியல் மற்றும் சுரங்கத்துறை,
திருவண்ணாமலை.
நாள். 19.09.2025

குறிப்பாணை

பொருள்: கனிமங்களும் சுரங்கங்களும் - சிறுகனிமம் -
சாதாரண கற்கள் - திருவண்ணாமலை மாவட்டம்
செய்யார் வட்டம் - மங்கலம் கிராம புல எண்கள்.102/1,
102/2 மற்றும் பலவற்றின் மொத்தப்பரப்பு 2.05.0
ஹெக்டேர் பரப்பில் - சாதாரண கற்கள் மற்றும்
கிராவல் மண் வெட்டியெடுக்க குவாரி குத்தகை
உரிமம் வழங்கக்கோரி தி/எ.MSH Blue Metal என்ற
நிறுவனத்தினர் 10 ஆண்டுகளுக்கு அனுமதிக்கோரி
1959ம் ஆண்டு தமிழ்நாடு சிறுகனிம சலுகை விதிகள்
விதி எண்.19-ன் கீழ் இணையதள வழியே
விண்ணப்பம் செய்தது - அறிக்கைகள் வரப்பெற்றது -
புலத்தணிக்கை செய்யப்பட்டது - தகுதியான
நிலப்பரப்பாக கருதி 1.98.0 ஹெக்டேர் பரப்பிற்கு
ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் சுற்றுச்சூழல்
தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்று
பெற்று சமர்ப்பிக்க கோருதல் தொடர்பாக.

- பார்வை: 1. தி/எ.MSH Blue Metal என்ற நிறுவனத்தின்
இணையதள விண்ணப்பம் எண்.25TVM0403613
நாள். 26.06.2025.
2. இவ்வலுவலக கடிதம் இதே எண் நாள். 07.07.2025.
3. வட்டாட்சியர், செய்யார் அவர்களின்
நக.ஆ1/3419/2025, நாள்.18.07.2025.
4. வருவாய் கோட்ட அலுவலர் (மு.க.பொ.) செய்யார்
அவர்களின் நக.அ5/3993/2025, நாள்.
21.07.2025.
5. உதவி புவியியலாளர், புவியியல் மற்றும்
சுரங்கத்துறை அவர்களின் புலத்தணிக்கை நாள்.
23.07.2025.
6. வட்டார வளர்ச்சி அலுவலர் (கி.உ.), செய்யார்
அவர்களின் கடிதம் நக.உ.அ4/675/2025,
நாள்.16.03.2025.
7. தி/எ.MSH Blue Metal என்ற நிறுவனத்தின் கடிதம்
நாள்.18.09.2025.
8. மற்றும் உரிய ஆவணங்கள்



பார்வையில் காணும் அடிதட்களின் மீது கனிவாக
வேண்டப்படுகிறது.

2) திருவண்ணாமலை மாவட்டம், செம்பார் வட்டம், மங்கலம் கிராம
புல எண்கள். 102/1 (0.30.5), 102/2 (0.14.0), 102/3 (0.14.0), 102/4 (0.06.0), 102/5
(0.05.0), 102/6A (0.11.0), 102/6B (0.10.0), 102/7A (0.13.0), 102/7B (0.02.0), 102/7C
(0.09.0), 103/3A (0.04.5), 103/3B (0.04.0), 103/4 (0.09.5), 103/5A (0.10.0), 103/5B
(0.06.0), 103/5C (0.11.00), 103/5D (0.04.50), 103/6A (0.13.50), 103/6B (0.13.50),
103/7 (0.07.0), & 104/3A (0.07.0) ஆகியவற்றின் மொத்தப்பரப்பு 2.05.0
ஹெக்டேர் பரப்பில் சாதாரண கற்கள் / கிராவல் மண் குவாரி செய்ப 10
ஆண்டுகளுக்கு குத்தகை உரிமம் வழங்கக்கோரி தி/சு.MSH Blue Metal
என்ற நிறுவனத்தினர் உரிம ஆவணங்களுடன் 26.06.2025 அன்று
இணைப்பதாம் வழியே விண்ணப்பம் அளித்துள்ளனர்.

3. மேற்கண்ட விண்ணப்பம் தொடர்பாக வட்டாட்சியர் செம்பார்,
வருவாய் கோட்ட அலுவலர் (முகவ.பெ), செம்பார், உதனி புனிதியலாள்
(கனிமம்) திருவண்ணாமலை ஆகியோர் புலத்தணிக்கை மேற்கொண்டு
அளித்த அறிக்கையின் அடிப்படையில் திருவண்ணாமலை மாவட்டம்,
செம்பார் வட்டம், மங்கலம் கிராம புல எண்கள். 102/1 (0.30.5), 102/2 (0.14.0),
102/3 (0.14.0), 102/4 (0.06.0), 102/5 (0.05.0), 102/6A (0.11.0), 102/6B (0.10.0),
102/7A (0.13.0), 102/7B (0.02.0), 102/7C (0.09.0), 103/3A (0.04.5), 103/3B (0.04.0),
103/4 (0.09.5), 103/5A (0.10.0), 103/5B (0.06.0), 103/5C (0.11.00), 103/5D (0.04.50),
103/6A (0.13.50), 103/6B (0.13.50), 103/7 (0.07.0), & 104/3A (0.07.0)
ஆகியவற்றின் மொத்தப்பரப்பு 2.05.0 ஹெக்டேரில் மட்டும் தி/சு.MSH Blue
Metal என்ற நிறுவனத்தினருக்கு கிராவல் மண் மற்றும் சாதாரண
கற்குவாரி உரிமம் வழங்க ஏற்கனவே குவாரி பணி செய்யாத புலமாக
இருப்பதால் மனுதாரரின் கோரிக்கையின்படி 10 ஆண்டு காலத்திற்கு
அனுமதி வழங்கலாம் என பரிந்துரை செப்துள்ளனர்.

5. வட்டாட்சி வளர்ச்சி அலுவலர் (கி.உ), செம்பார் அவர்கள்
16.09.2025 தா.நி.ப. அடிதடத்தில், மேற்படி குவாரி உரிமம் வழங்க கோரியுள்ள
இத்திற்கு கிழக்கே புல எண்.75 மற்றும் தெற்கில் 103/8ல் நீர்நீடிப்பு
பகுதிக்கு 10மீ. பதுகாப்பு இடைவெளி விட்டு குவாரிப்பணி மேற்கொள்ள
அனுமதி வழங்கலாம் என தெரிவித்துள்ளார்.

6. பார்வை 7ல் காணும் அடிதடத்தில் தி/சு.MSH Blue Metal என்ற
நிறுவனத்தினர் மேற்படி விண்ணப்ப புல எண்களில், புல எண்.104/3A
ஆனது குவாரிப்பணி செய்ப உகந்த புலமாக இயலாததால் அதனை விடுத்து
For MSH BLUE METAL

நீதமுள்ள புலங்களுக்கு குவாரிக் குத்தகை கேட்டுக்கொண்டுள்ளார்.



7. இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, சென்னை அவர்களின் 10.08.2020 நாளிட்ட கடிதத்துடன் இணைத்து வரப்பெற்ற அரளானை எண்.169 தொழில் துறை (எம்.எம்.சி-1) நாள் 04.08.2020-ன்படி பட்டா புலங்களில் கிராவல், சாதாரண வகை கற்கள் ஆகிய சிறுகனிம உரிமம் வழங்கும் நேர்வுகளில் நடவடிக்கை எடுக்க விதி 19 மற்றும் 33-ல் மாவட்ட ஆட்சியருக்கு வழங்கப்பட்ட அதிகாரம் தற்போது சம்மந்தப்பட்ட உதவி/துணை இயக்குநர் அவர்களுக்கு மாற்றி வழங்க உத்திரவிடப்பட்டுள்ளது.

8. எனவே, வட்டாட்சியர் செய்யார், வருவாய் கோட்ட அலுவலர் (மு.கூ.பொ), செய்யார், உதவி புவியியலாளர் (கனிமம்) திருவண்ணாமலை மற்றும் வட்டார வளர்ச்சி அலுவலர் (கி.உஉ.), செய்யார் ஆகியோரின் பரிந்துரை, நிபந்தனைகள் மற்றும் மனுதாரரின் 18.09.2025 நாளிட்ட கடிதத்தில் கேட்டுக்கொண்டதன் அடிப்படையில் புல எண்.104/3A (0.07.0)ஐ நீக்கி நீதமுள்ள புலங்களான, திருவண்ணாமலை மாவட்டம், செய்யார் வட்டம், மங்கலம் கிராம புல எண்கள். 102/1 (0.30.5), 102/2 (0.14.0), 102/3 (0.14.0), 102/4 (0.06.0), 102/5 (0.05.0), 102/6A (0.11.0), 102/6B (0.10.0), 102/7A (0.13.0), 102/7B (0.02.0), 102/7C (0.09.0), 103/3A (0.04.5), 103/3B (0.04.0), 103/4 (0.09.5), 103/5A (0.10.0), 103/5B (0.06.0), 103/5C (0.11.00), 103/5D (0.04.50), 103/6A (0.13.50), 103/6B (0.13.50) & 103/7 (0.07.0) ஆகியவற்றின் மொத்தப்பரப்பு 1.98.0 ஹெக்டேரில் 1959-ம் வருட தமிழ்நாடு சிறுகனிம விதிகள், விதி எண்.19-ன்படி கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு 10 (பத்து) வருட காலத்திற்கு தி/எம். MSH Blue Metal என்ற நிறுவனத்தினருக்கு கிராவல் / சாதாரண கற்கள் குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதப்படுகிறது.

நிபந்தனைகள்

- 1959-ம் வருடத்திய தமிழ்நாடு சிறு கனிம சலுகை விதிகள், அட்டவணை II-ல் கண்டுள்ளபடி குவாரி செய்யப்படும் கனிமங்களுக்கு சீனியரேஜ் தொகை அவ்வப்போது செலுத்தி கனிமம் கொண்டு செல்லப்பட வேண்டும்.
- அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5மீ. மற்றும் அரசு நிலங்களுக்கு 10 மீ. பாதுகாப்பு இடைவெளியும் விட வேண்டும்.
- கிழக்கே புல எண். 75ல் (ஏரி) மற்றும் தெற்கே புல எண். 104/3A & 104/3B இல் அமைந்துள்ள நீர்ப்பிடிப்புக்கு வட்டார வளர்ச்சி அலுவலர், செய்யாறு

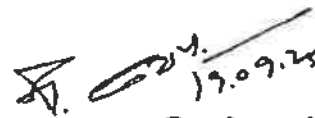
MSH BLUE METAL
Partner
Scanned with OKEN Scanner



அவர்கள் தெரிவித்துள்ளவாறு 10 மீ. பாதுகாப்பு இடைவெளி விட வேண்டும்.

- d. குத்தகை உரிமம் வழங்குவதற்கு முன்னர் கனிம நிலுவையிலுள்ள சான்று பெற்று சமர்ப்பிக்க வேண்டும்.
- e. அனுபவம் வாய்ந்த வெடிபொருள் பயன்படுத்துவோர் மூலம் குறைந்த அளவு சக்தி கொண்ட வெடிபொருட்களை பயன்படுத்தி அருகிலுள்ள பட்டாதாரர்களுக்கு எவ்வித இடையூறுமின்றி / அருகிலுள்ள பட்டா மற்றும் அரசு புலங்களில் எவ்வித ஆக்கிரமிப்பும் இன்றி குவாரிப் பணி மேற்கொள்ள வேண்டும்.
- f. விதிகளின்படி ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினை உரிய காலத்திற்குள் சமர்ப்பிக்க வேண்டும்.
- g. குவாரி உரிமம் வழங்க உள்ள பகுதிக்கு சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையின்மை சான்று பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும்.

9. மேலும், தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959, விதி 41-ன்படி குவாரிப் பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு மனுதாரரைக் கேட்டுக் கொள்ளப்படுகிறது. மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின் தொடர்ச்சியாக 1959-ம் வருடத்திய தமிழ்நாடு சிறு கனிம சலுகை விதிகள், விதி எண்.42-ன்படி சுற்றுச் சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் தடையின்மை சான்று பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.


19.09.24

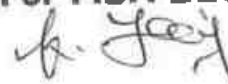
துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
திருவண்ணாமலை.

பெறுநர்
தி/ள்.MSH Blue Metal,
இயக்குநர் திரு.ஜீவித்குமார்,
எண்.11/1, 3வது கிழக்கு தெரு,
பூங்கா நகர், சோத்துப்பாக்கம் கிராமம்,
செய்யூர் வட்டம், செங்கல்பட்டு மாவட்டம்.

நகல்

1. தலைவர், மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம், சென்னை
2. இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, சென்னை-32.

For MSH BLUE METAL


Partner

Scanned with OKEN Scanner

District : Tiruvannamalai

Taluk : Cheyyar

Village : Mangalam [85]



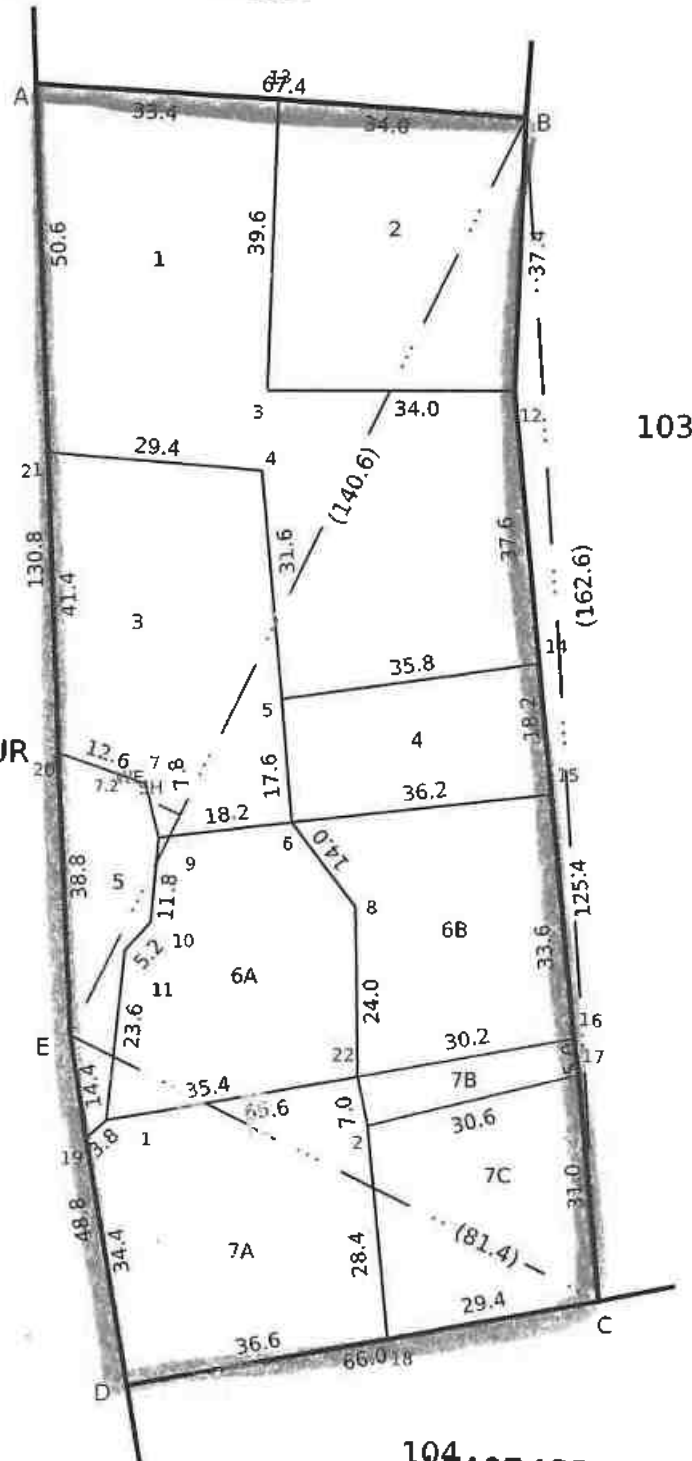
Survey No : 102

Area : Hect 01 Ares 14.50

Scale : 1 : 1000



V.NO.84
MARIYANALLUR



Data Digitized by **POPMISH BLUE METAL**
G Sumathi

Date of Issue: 25-07-2025 12:14:24

Survey and Settlement Department, Government of Tamil Nadu

District : Tiruvannamalai

Taluk : Cheyyar

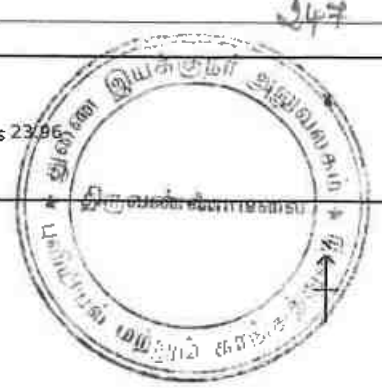
Village : Mangalam [85]



Survey No : 103

Area : Hect 01 Ares 23.86

Scale : 1 : 500



101

100

102

75

104

LEASE APPLIED AREA

For MSH BLUE METAL

Data Digitally Signed By
VENKATESANDURAI

Partner

Date of Issue: 25-07-2025 12:17:24

Survey and Settlement Department, Government of Tamil Nadu

234

270 KCS

Village : MANGALAM

District :Tiruvannamalai

Tbluk:CHEYAR

[illegible]

9/19/25, 8:01 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : திருவண்ணாமலை

வட்டம் : செய்யார்

வருவாய் கிராமம் : மங்கலம்

பட்டா எண் : 427

உரிமையாளர்கள் பெயர்

1. எம் எஸ் எச் புனா மெட்டல்



For MSH BLUE METAL

Partner

9/19/25, 8:01 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
102	1	0 - 30.50	1.50	--	--	--	--	2025/0103/06/514234- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
102	2	0 - 14.00	0.68	--	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
102	3	0 - 14.00	0.70	--	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
102	4	0 - 6.00	0.30	--	--	--	--	2025/0103/06/502170- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 20/07/2025 04:34:53:PM
102	5	0 - 5.00	0.24	--	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
102	6A	0 - 11.00	0.54	--	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
102	6B	0 - 10.00	0.50	--	--	--	--	2025/0103/06/502170- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 20/07/2025 04:34:53:PM

For MSH BLUE METAL

9/19/25, 8:01 PM

வட்டாட்சியத் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



102	7A	0 - 13.00	0.64	--	--	--	2024/0103/06/444999- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Devarajan R Zonal Deputy Tahsildar 06/11/2024 04:50:44:PM
102	7B	0 - 2.00	0.10	--	--	--	2025/0103/06/502170- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Suresh N Zonal Deputy Tahsildar 20/07/2025 04:34:53:PM
102	7C	0 - 9.00	0.44	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
103	3A	0 - 4.50	0.22	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
103	3B	0 - 4.00	0.20	--	--	--	2025/0103/06/502170- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Suresh N Zonal Deputy Tahsildar 20/07/2025 04:34:53:PM
103	4	0 - 9.50	0.46	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
103	5A	0 - 10.00	0.50	--	--	--	2025/0103/06/502170- -- --LAKE TANK SUBMERGIBLE--- Digitally signed: Suresh N Zonal Deputy Tahsildar 20/07/2025 04:34:53:PM

For MSH BLUE METAL

B. Jeyaraj Partner

103	5B	0 - 6.00	0.30	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
103	5C	0 - 11.00	0.54	--	--	--	2025/0103/06/502170- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 20/07/2025 04:34:53:PM
103	5D	0 - 4.50	0.22	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
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103	7	0 - 7.00	0.34	--	--	--	2025/0103/06/514234- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Suresh N Zonal Deputy Tahsildar 27/08/2025 03:22:35:PM
104	1	0 - 39.50	1.94	--	--	--	2024/0103/06/444999- -- --LAKE TANK SUBMERGIBLE--- Digitally signed:Devarajan R Zonal Deputy Tahsildar 06/11/2024 01:50:44:PM

For MSH BLUE METAL

 Partner

9/19/25, 8:01 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்

104	3A	0 - 7.00	0.35	--	--	--	--
		2 - 44.50	12.05				

2025/0103/06/514234-
 ★ திருவண்ணாமலை ★
 Digitally signed: Suresh
 N
 Zonal Deputy Inspector
 27/08/2025
 03:22:35 PM

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் **P/06/04/085/00427/60513** என்ற குறிப்பு எண்ணை உள்ளிடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 19-09-2025 அன்று 08:00:47 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

For MSH BLUE METAL

Partner



Government of India

Form GST REG-06

[See Rule 10(1)]

Registration Certificate

Registration Number :33ABQFM4480P1ZI



1.	Legal Name	MSH BLUE METAL		
2.	Trade Name, if any	MSH BLUE METAL		
3.	Additional trade names, if any			
4.	Constitution of Business	Partnership		
5.	Address of Principal Place of Business	Building No./Flat No.: No.11/1 Road/Street: 3rd East Street Poonga Nagar Locality/Sub Locality: Sothupakkam City/Town/Village: Melmaruvathur District: Chengalpattu State: Tamil Nadu PIN Code: 603319		
6.	Date of Liability			
7.	Date of Validity	From	16/06/2021	To
8.	Type of Registration	Regular	Not Applicable	
9.	Particulars of Approving	Tamil Nadu: Goods and Services Tax Act, 2017		
Signature Signature Not Verified Digitally signed by DS GOODS AND SERVICES TAX NETWORK 07 Date: 2024.03.25 18:45:17 IST				
Name		AARTHY		
Designation		Assistant Commissioner		
Jurisdictional Office		TAMBARAM		
Date of issue of Certificate		25/03/2024		
Note: The registration certificate is required to be prominently displayed at all places of Business/Office(s) in the State.				

This is a system generated digitally signed Registration Certificate issued based on the approval of application granted on 25/03/2024 by the jurisdictional authority.

For MSH BLUE METAL

Partner



सत्यमेव जयते



Annexure A

Goods and Services Tax Identification Number: 33ABQFM4480P1ZI

Details of Additional Place of Business(s)

Legal Name MSH BLUE METAL

Trade Name, if any MSH BLUE METAL

Additional trade names, if any

Total Number of Additional Places of Business(s) in the State 0

Goods and Services Tax

For MSH BLUE METAL

Partner

267-



Goods and Services Tax Identification Number: 33ABQFM4480P1Z1

Legal Name MSH BLUE METAL

Trade Name, if any MSH BLUE METAL

Additional trade names, if any

Details of Managing / Authorized Partners



Name Jeevith Kumar

Designation/Status Partner

Resident of State Tamil Nadu

Name Jayaprabha Senthil Kumar

Designation/Status Partner

Resident of State Tamil Nadu

For MSH BLUE METAL

[Signature] Partner

PHOTOCOPY OF THE APPLIED LEASE AREA

Site photos in respect of Rough stone and gravel quarry lease in S.No's: 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7 Land - over an extent of 1.98.0hectares - Mangalamvillage - Cheyyar Taluk - Tiruvannamalai District, Tamil Nadu State in belongs to M/s.MSH Blue Metal.



MSH BLUE METAL
Partner



Aadhaar no. issued: 14/03/2013



ஜீவித் குமார்
Jeevith Kumar
பிறந்த நாள்/DOB: 01/06/1994
ஆண்/ MALE

5106 3916 8945

எனது ஆதார். எனது அடையாளம்

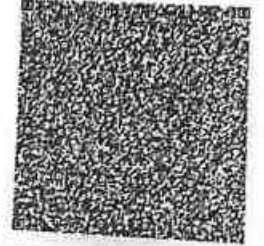
Scanned with ACE Scanner



தேசிய அடையாள அமைப்பு

Unique Identification Authority of India

முகவரி:
S/O: குப்புசாமி, எண் 11, பூங்கா நகர்,
சோதற்பாக்கம், மேல்மருவத்தூர்,
காஞ்சேபுரம்,
தமிழ் நாடு - 603319
Address:
S/O: Kuppasamy, NO 11, POONGA NAGAR,
Sothupakkam, PO: Melmaruvathur, DIST:
Kancheepuram,
Tamil Nadu - 603319



5106 3916 8945

VID : 9136 3613 9155 5258

☎ 1947

✉ help@uidai.gov.in

www.uidai.gov.in

Scanned with ACE Scanner

For MSH BLUE METAL

Partner



பெரியார் பல்கலைக்கழகம்
PERIYAR UNIVERSITY

அறிவியல் புலம்
FACULTY OF SCIENCE



பெரியார் பல்கலைக்கழகம்

ஜூலை 2017

ஆய்வுக் குறிப்பு நடத்திய

பயன்பாட்டுப் புவியமைப்பியல்

தேர்வில்

P வெள்ளையன்

முதல் வகுப்பில் உயர் தகமையுடன் O தரத்தில்

தேர்வு பெற்றுத் தகுதிபடைத்திருப்பதாக

உரிய தேர்வாளர்கள் சான்றிதழை ஏற்று

ஆய்வியல் நிறைஞர்

என்றும்

பட்டத்தினை அடைந்தது பல்கலைக்கழக இலாசியை

பெரியார் பல்கலைக்கழக ஆட்சிக்குழு

அறிவிக்கிறது.

The Syndicate of the **PERIYAR UNIVERSITY** hereby makes known that
VELLAIYAN P has been
admitted to the Degree of **MASTER OF PHILOSOPHY**
having been certified by duly appointed Examiners to be qualified to receive the same in
APPLIED GEOLOGY
and was placed in **FIRST CLASS EXEMPLARY WITH O GRADE**
at the Examination held in **JULY 2017** by Periyar University.



Given under the Seal of the University

Dated: 20-03-2018
Salem - 636011,
Tamil Nadu, India

Controller of Examinations

Registrar

Vice-Chancellor
FOR MSH BLUE METAL

Partner

Cell: 9885799345
E-mail -ellammangranites@gmail.com



M/s ELLAMMAN GRANITES

PLOT NO 1, ROOM NO 10, BANKERS COLONY, SRIKAKULAM ANDHRA PRADESH-532001

Ref. No.- EG/EC/2022/02

Date - 02.11.2022

EXPERIENCE CERTIFICATE

This is to certify that Mr.P.Vellaiyan Geologist worked in M/s Ellamman Granites as Mines Manager in Sy.No.71, Mukhalingapuram Village, Tekkali Mandal, Srikakulam District, Andhra Pradesh State from 20.07.2017 to 31.10.2022. During his working period he carried out Boundary demarcation survey using DGPS, Reserve Estimation, direct and co-ordinate the production activities, Ensure Mine Safety and Surface plan prepared. We found him a sincere, honest, hardworking, dedicated employee with a professional attitude and very good job knowledge. He is amiable in nature and character is well.

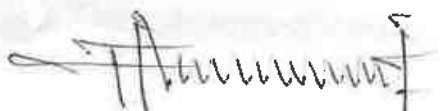
We wish him every success in life.

For ELLAMMAN GRANITES

R. Bala Sub

Proprietor

(Signature with date and official Seal)


(Signature of Employee)

For MSH BLUE METAL

 Partner



Cell: 9885799345

E mail : ellammangranites@gmail.com

M/s ELLAMMAN GRANITES

PLOT NO 1, ROOM NO 10, BANKERS COLONY, SRIKAKULAM ANDHRA PRADESH-532001

S.No	Nature of Practical Experience	Place of Work	Period of Experience		Total Working Experience		
			From	To	Year	Month	Days
1	Worked as Geologist and it Boundary demarcation survey using DGPS, Reserve Estimation, direct and co-ordinate the production activities, Ensure Mine Safety and Surface plan prepared.	Open Cast Mines and Office	20.07.2017	31.10.2022	5	3	11

For ELLAMMAN GRANITES

R. P. W. Dr

Proprietor

(Signature with date and official Seal)

(Signature of Employee)

For MSH BLUE METAL

Partner

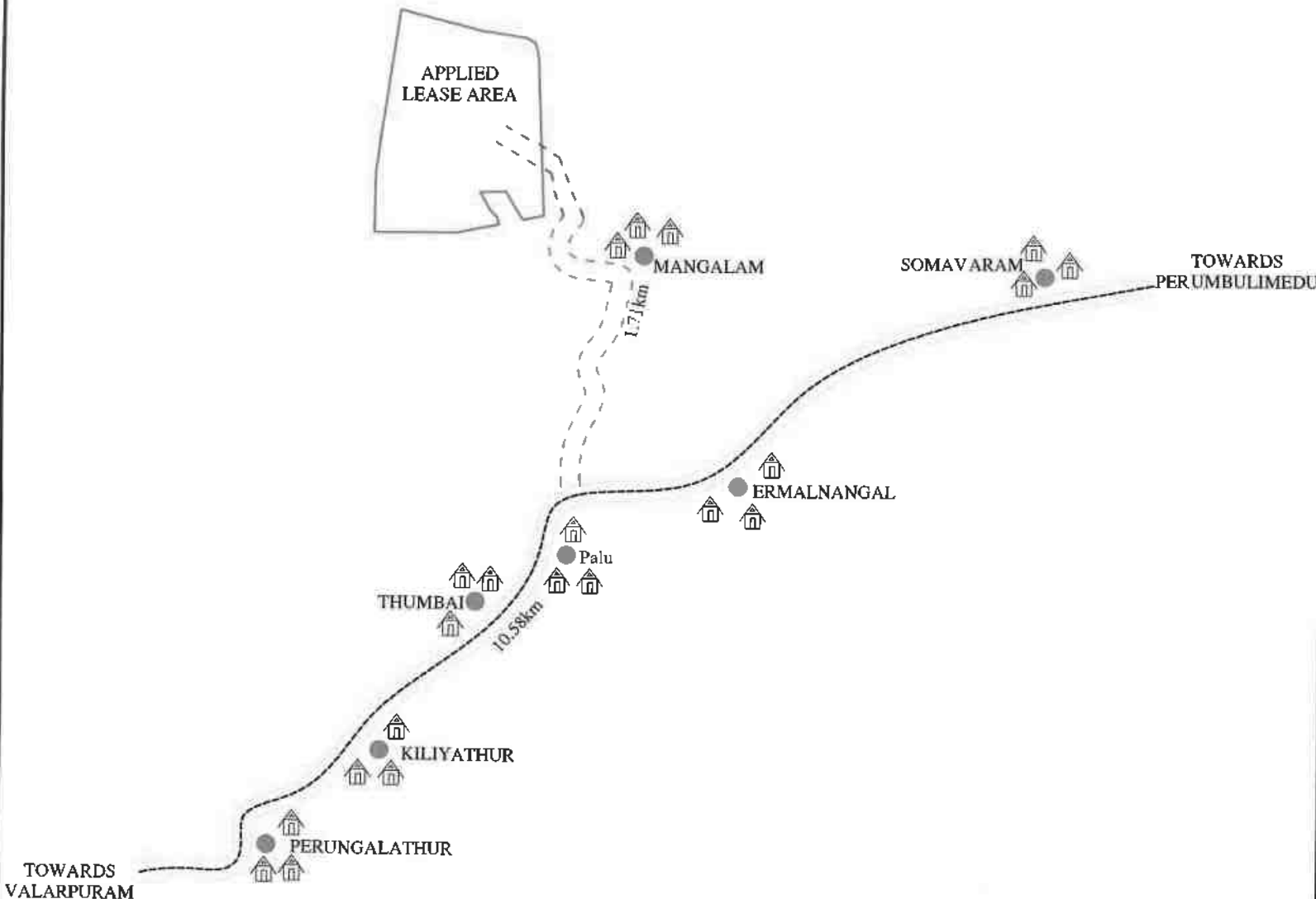


PLATE No-I

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603119.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5,
102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A,
103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D,
103/6A, 103/6B & 103/7,
EXTENT : 1.98.00Hect,
VILLAGE : MANGALAM,
TALUK : CHEYYUR,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA



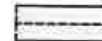
APPROACH ROAD



VILLAGE ROAD



SH-770 ROAD



HABITATION



KEY MAP

Not to Scale

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

P. Vellaiyan

P. VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON

For MSH BLUE METAL

Partner

12°42'56.90"N

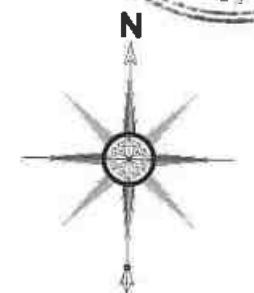
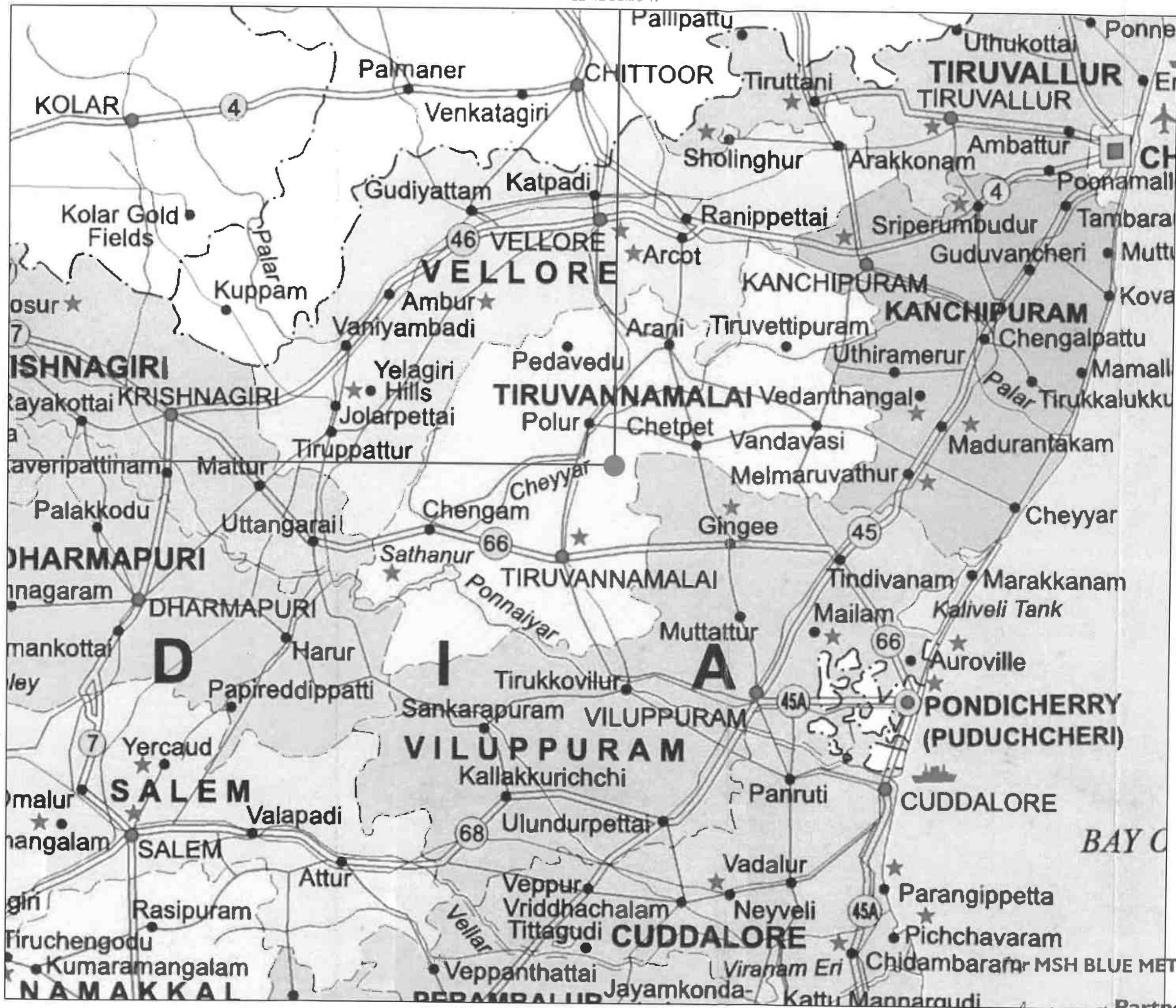


PLATE No-IA

APPLICANT:
M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:
S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5,
102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A,
103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D,
103/6A, 103/6B & 103/7,
EXTENT : 1.98.00Hect,
VILLAGE : MANGALAM,
TALUK : CHEYYAR,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA : ●
TOPO SHEET No : 57-P/10
LATITUDE : 12°42'51.09"N to 12°42'56.90"N
LONGITUDE : 79°35'3.00"E to 79°35'7.47"E

LOCATION PLAN
NOT TO SCALE

Prepared By:
I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

[Signature]

P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON

12°42'56.90"N

79°35'3.00"E

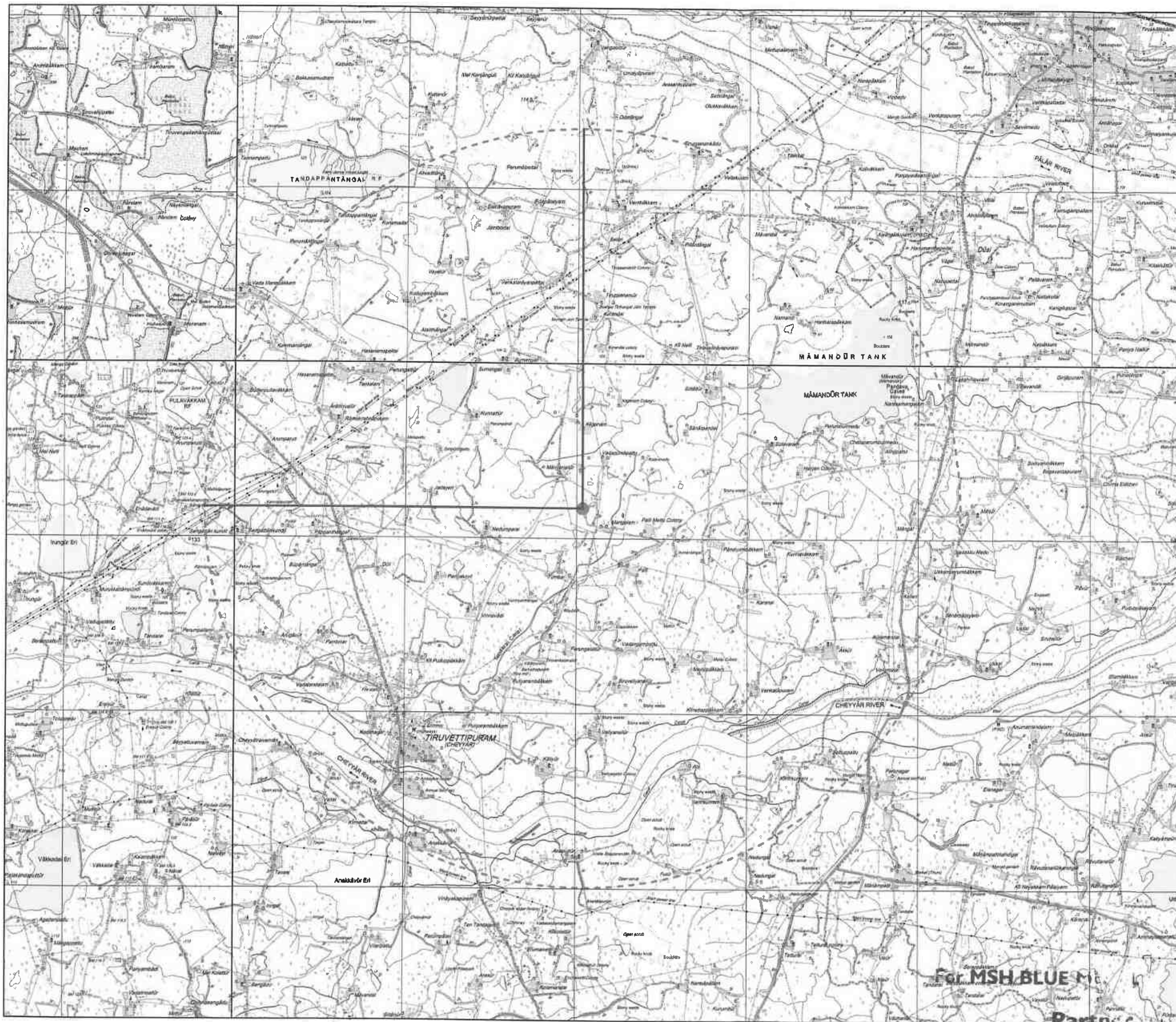


PLATE No-1B

APPLICANT:
M/s/MSH BLUE METAL,
DIRECTOR, Mr. JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:
S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5,
102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A,
103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D,
103/6A, 103/6B & 103/7,
EXTENT : 1.98.00 Hect,
VILLAGE : MANGALAM,
TALUK : CHEYYAR,
DISTRICT : TIRUVANNAMALAI.

TOPO SHEET No : 57-P/10

LATITUDE : 12°42'51.09"N to 12°42'56.90"N

LONGITUDE : 79°35'3.00"E to 79°35'7.47"E

MINE LEASE AREA

10KM RADIUS

CONVENTIONAL SYMBOLS

Express highway with toll with bridge with distance stone		20
Roads, metalled, according to importance		
Roads, double cartage way, according to importance		
Unmetalled road, Cart track, Pack-track with pass, Foot-path		
Drainage, with track in bed, underlined, Canal		
Canal, masonry or rock-lined, earthwork, Weir		
River, dry with water channel, with island & rocks, Tidal river		
Submerged rocks, Shoal, Swamp, Reeds		
Wells, hand, unlined, Tubewell, Spring, Tanks, perennial, dry		
Gravel pits, (road or rail) tank, Broken ground		
Railways, broad gauge, double, single with station, under cover		
Railways, other gauges, double, single with distance stone; do		
Mineral line or tramway, Min. Culling with wheel		
Contours with sea level, Rocky slopes, Cattle		
Band features (fence, 2 strand & 4 strand), (boundary, utility)		
Towers or Villages, inhabited, deserted, Fort		
Help, permanent, temporary, Tower, Antenna		
Temple, Church, Mosque, Igah, Tomb, Grave		
Lighthouse, Lightship, Buoy, lighted, unlighted, Anchorage		
Mine, Vm on tolls, Gase, Scrub		
Palms, papyrus, other, Plantain, Center, Bamboo, Other tree		
Acres, cultivated, wooded, Surveyed line		
Boundary, international		
State, demarcated, undemarcated		
district, subdivision, left or right, forest		
Boundary pillars, surveyed, unlocated		
Height, triangulated, station, point, approximate		200, 200
Bench-mark, geodetic, levelling, canal		BM 83-3, BM 83-4
Rail office, Telegraph office, Overhead tank		
Rail house or inspection bungalow, Circuit house, Police station		6, PF
Camping ground, Forest, reserved, protected		PF, PF
Speeded names, administrative, locality or street		NIKUN, A124
Hospital, Dispensary, Veterinary, Hospital / Dispensary		
Airodrome, Heliport, Tourist site		
Power line, with pylons surveyed, with poles unsurveyed		

TOPOSHEET MAP

SCALE - 1:1,00,000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

P. VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON

For MSH BLUE METAL
Partner

12°42'56.90"N

TOWARDS
VADAPPOONDIPATTU

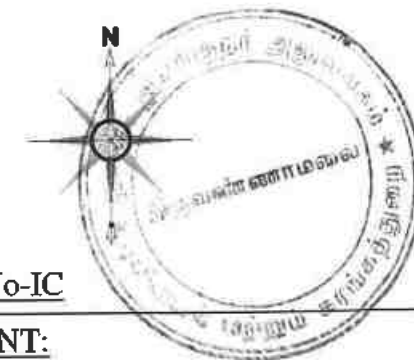


PLATE No-IC

APPLICANT:

**M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.**

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5,
102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A,
103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D,
103/6A, 103/6B & 103/7,
EXTENT : 1.98.00Hect,
VILLAGE : MANGALAM,
TALUK : CHEYYAR,
DISTRICT : TIRUVANNAMALAI.

INDEX

MINE LEASE AREA



APPROACH ROAD



CART ROAD



100m RADIUS



200m RADIUS



300m RADIUS



400m RADIUS



500m RADIUS



EXISTING QUARRY



TOPO SHEET No : 57-P/10

LATITUDE : 12°42'51.09"N to 12°42'56.90"N

LONGITUDE : 79°35'3.00"E to 79°35'7.47"E

SATELITE IMAGERY MAP

SCALE- 1:5000

Prepared By:

**I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE**

[Signature]

**P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON**

TOWARDS
MANGALAM

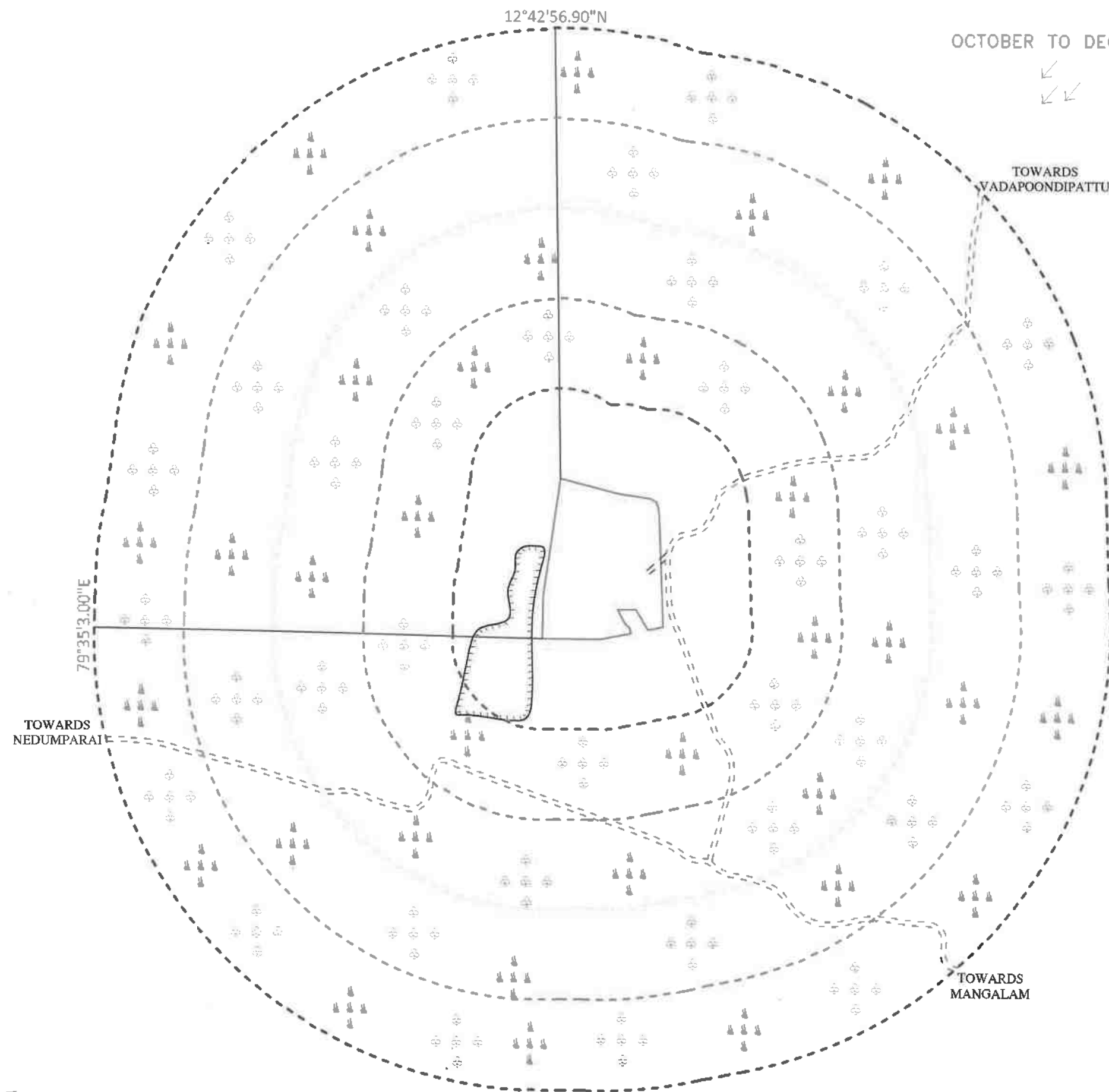
MSH BLUE METAL

Partner

[Signature]

TOWARDS
NEDUMPALAI 79°35'3.00"E





↑↑
JULY TO SEPTEMBER

OCTOBER TO DECEMBER
↓↓

TOWARDS
VADAPONDIPATTU

TOWARDS
MANGALAM

TOWARDS
NEDUMPARAI

For MSH BLUE METAL

B. Jayar Partner

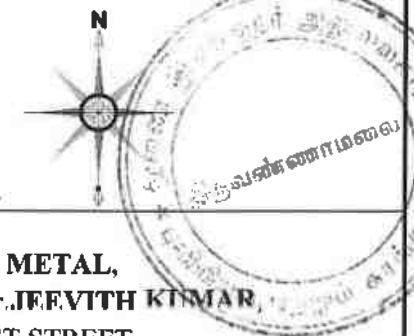


PLATE No-ID

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KIMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5,
102/6A, 102/6B, 102/7A, 102/7B, 102/7C, 103/3A,
103/3B, 103/4, 103/5A, 103/5B, 103/5C, 103/5D,
103/6A, 103/6B & 103/7,
EXTENT : 1.98.00Hect
VILLAGE : MANGALAM
TALUK : CHEYYAR
DISTRICT : TIRUVANNAMALAI

INDEX

MINE LEASE AREA



APPROACH ROAD



CART ROAD



100m RADIUS



200m RADIUS



300m RADIUS



400m RADIUS



500m RADIUS



EXISTING QUARRY



SHRUBS & TREES



WIND DIRECTION



HABITATION



TOPO SHEET No : 57-P/10

LATITUDE : 12°42'51.09"N to 12°42'56.90"N

LONGITUDE : 79°35'3.00"E to 79°35'7.47"E

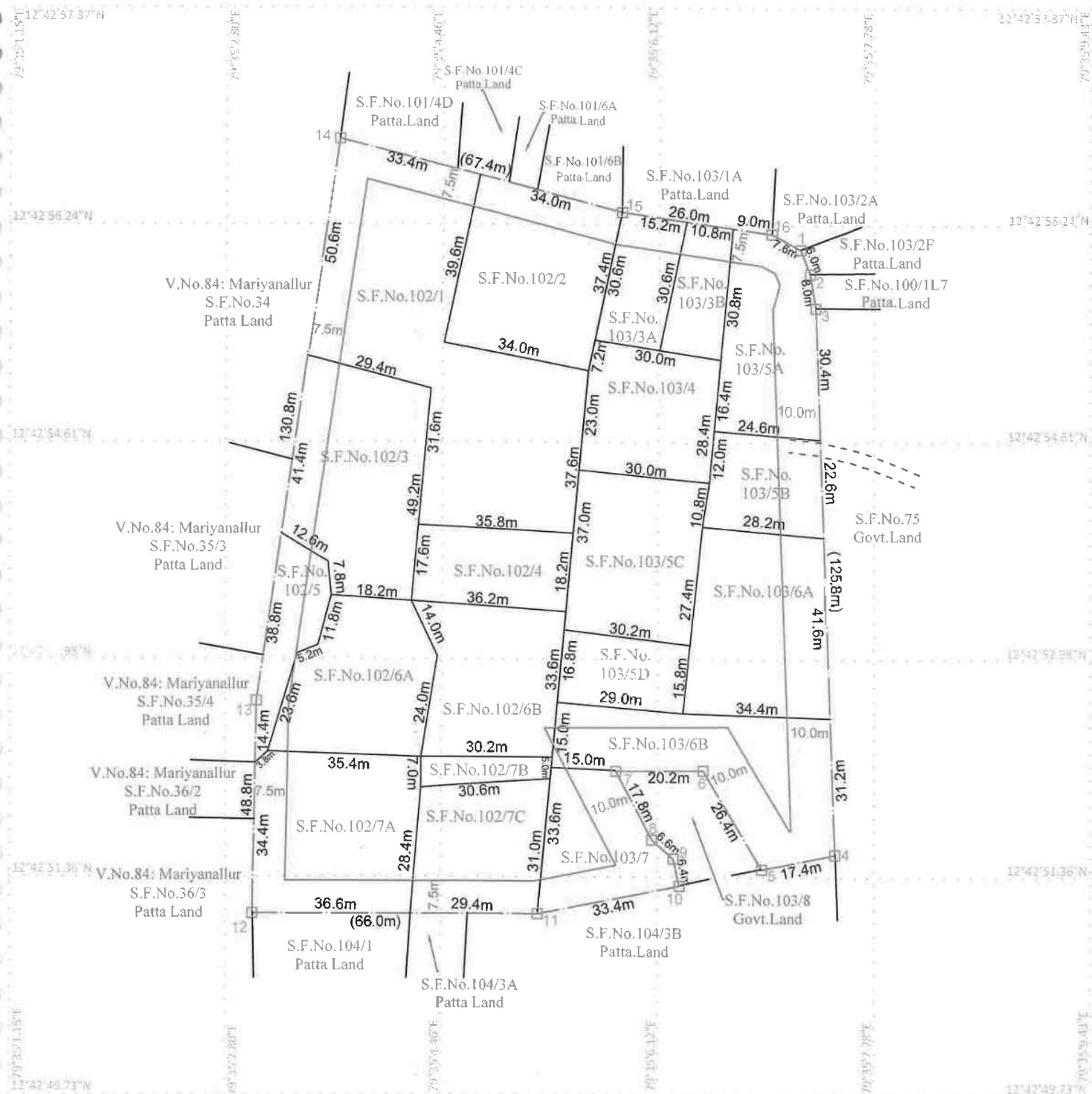
ENVIRONMENTAL PLAN

SCALE - 1:5000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

P. Vellaiyan
P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON



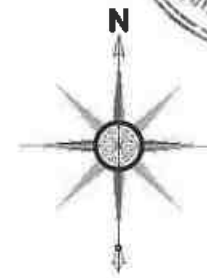
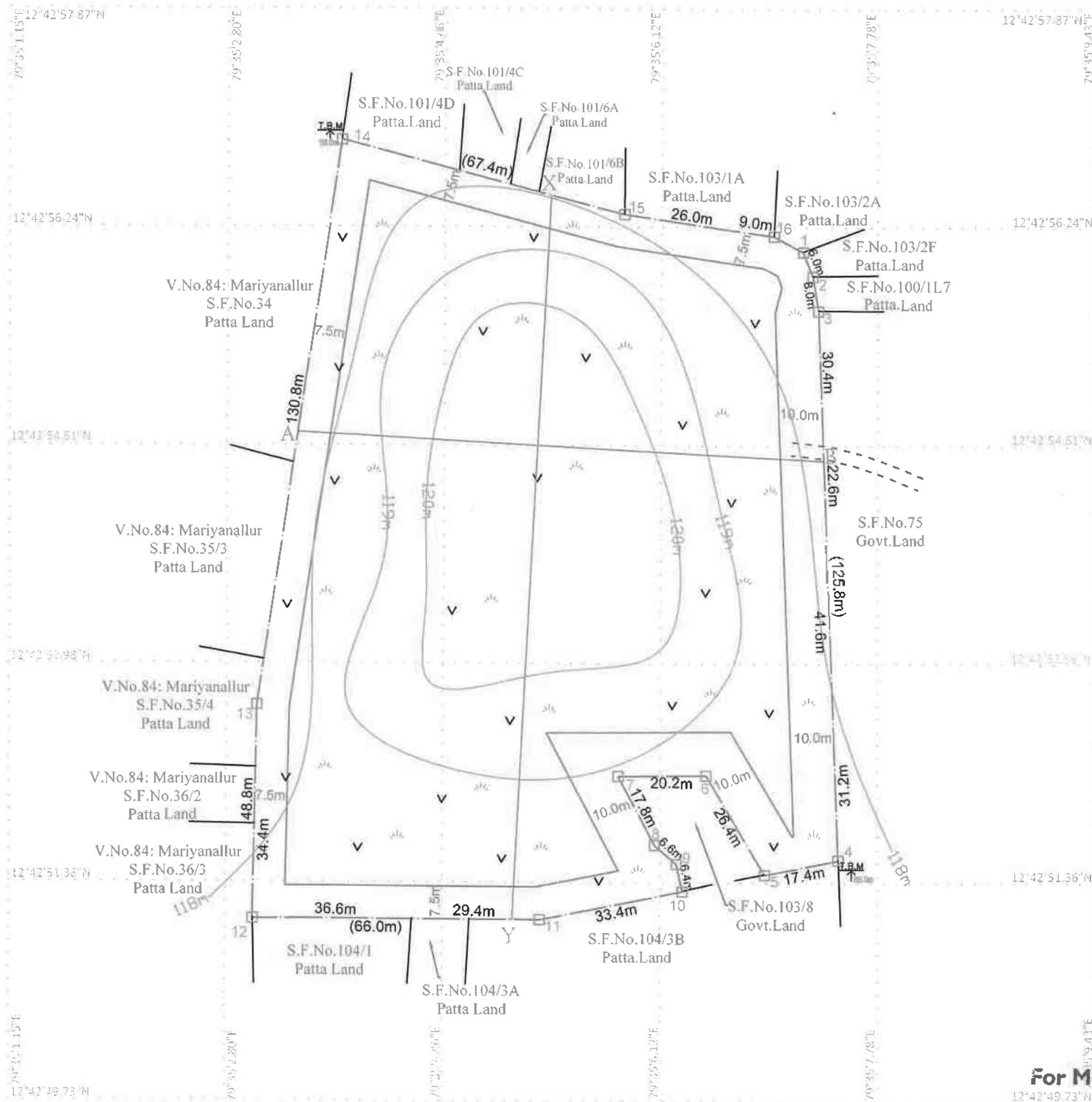


PLATE No-III

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
 No. 11/1, 3rd EAST STREET,
 POONGA NAGAR, SOTHUPAKKAM VILLAGE,
 CHEYYUR TALUK,
 CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A,
 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4,
 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7,
 EXTENT : 1.98.00Hect
 VILLAGE : MANGALAM
 TALUK : CHEYYAR
 DISTRICT : TIRUVANNAMALAI

INDEX

MINE LEASE BOUNDARY	
SAFETY DISTANCE	
APPROACH ROAD	
BOUNDARY PILLAR STONES	
TEMPORARY BENCH MARK	
CONTOUR LINES	
GRAVEL & SHRUBS	

SURFACE & GEOLOGICAL PLAN

PLAN SCALE 1: 1000

Prepared By:

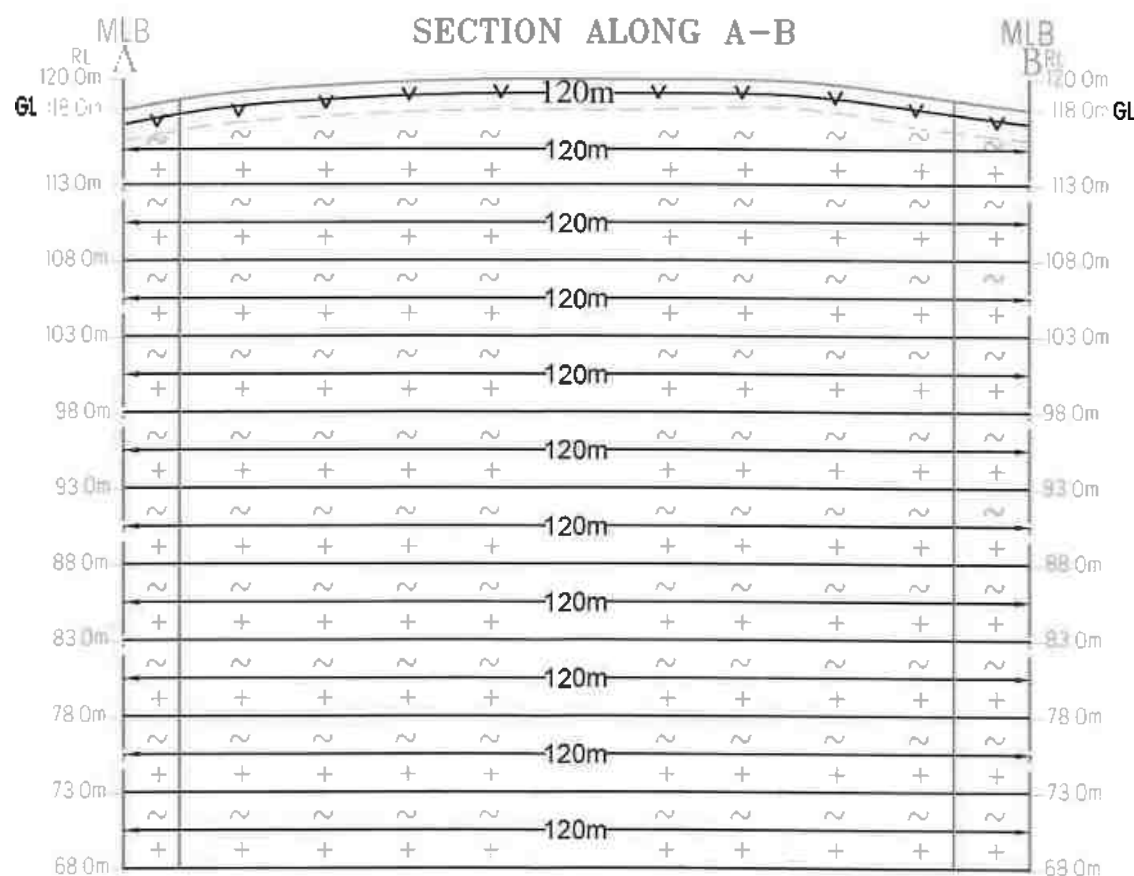
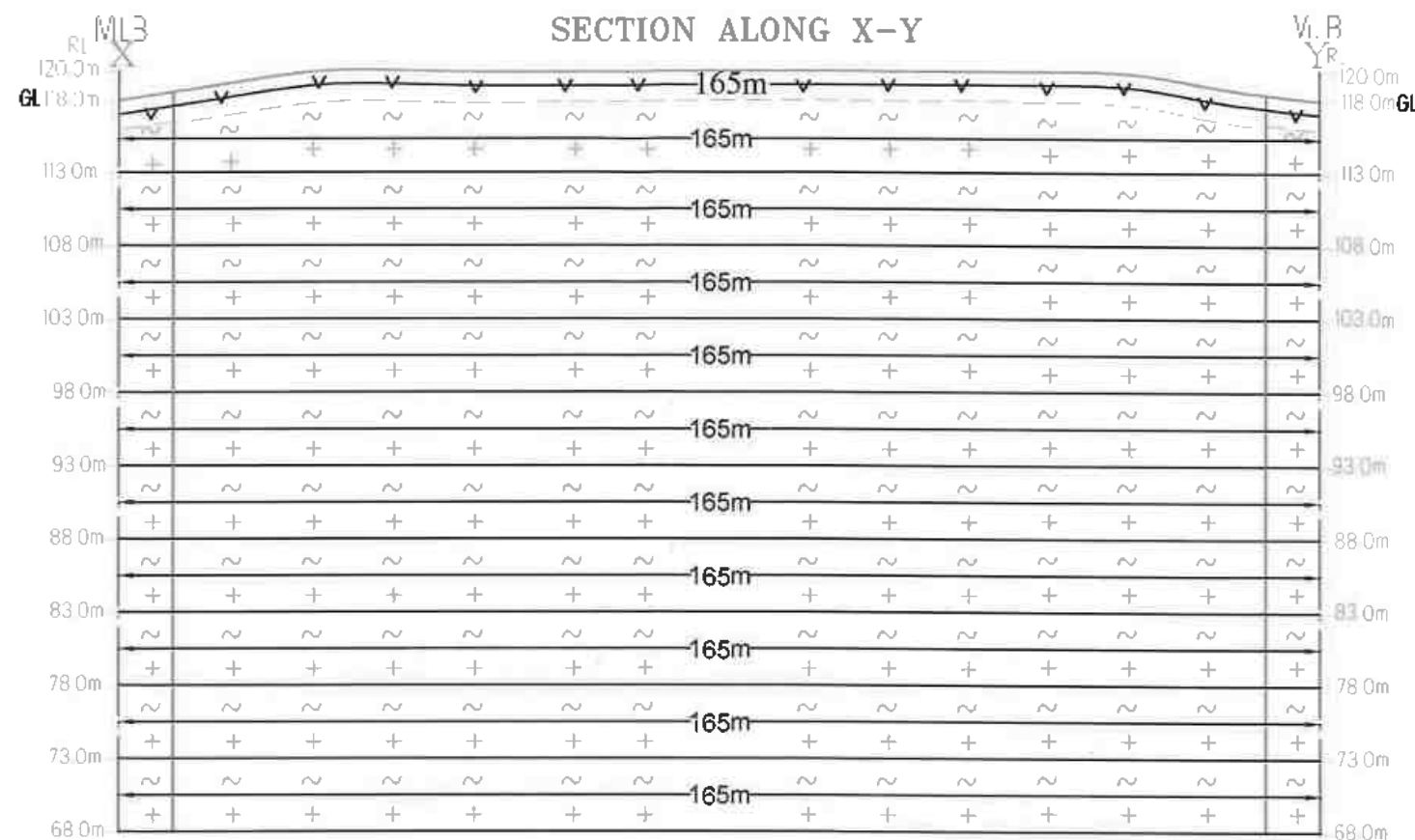
I DO HEREBY CERTIFY THAT THE PLATE
 HAS BEEN CHECKED BY ME AND IS CORRECT
 TO THE BEST OF MY KNOWLEDGE

For MSH BLUE METAL

12°42'49.73"N

A. Jeeva Partner

P.VELLAIYAN, M.Sc., M.Phil.,
 QUALIFIED PERSON



GEOLOGICAL RESOURCES									
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Gravel in (MT)
XY-AB	I	165	120	2	39600	.....	39600	2	79200
	II	165	120	5	99000	99000	.....	2.75	272250
	III	165	120	5	99000	99000	.....	2.75	272250
	IV	165	120	5	99000	99000	.....	2.75	272250
	V	165	120	5	99000	99000	.....	2.75	272250
	VI	165	120	5	99000	99000	.....	2.75	272250
	VII	165	120	5	99000	99000	.....	2.75	272250
	VIII	165	120	5	99000	99000	.....	2.75	272250
	IX	165	120	5	99000	99000	.....	2.75	272250
	X	165	120	5	99000	99000	.....	2.75	272250
	XI	165	120	5	99000	99000	.....	2.75	272250
TOTAL					1029600	990000	39600	.....	2722500

GL — GROUND LEVEL

PLATE No- IIIA

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A,
102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4,
103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7.
EXTENT : 1.98.00Hect
VILLAGE : MANGALAM
TALUK : CHEYYAR
DISTRICT : TIRUVANNAMALAI

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MINE LEASE BOUNDARY

SAFETY DISTANCE

ROUGH STONE

GRAVEL

GEOLOGICAL SECTIONS SECTION HOR 1 : 1000 & VER 1 : 500

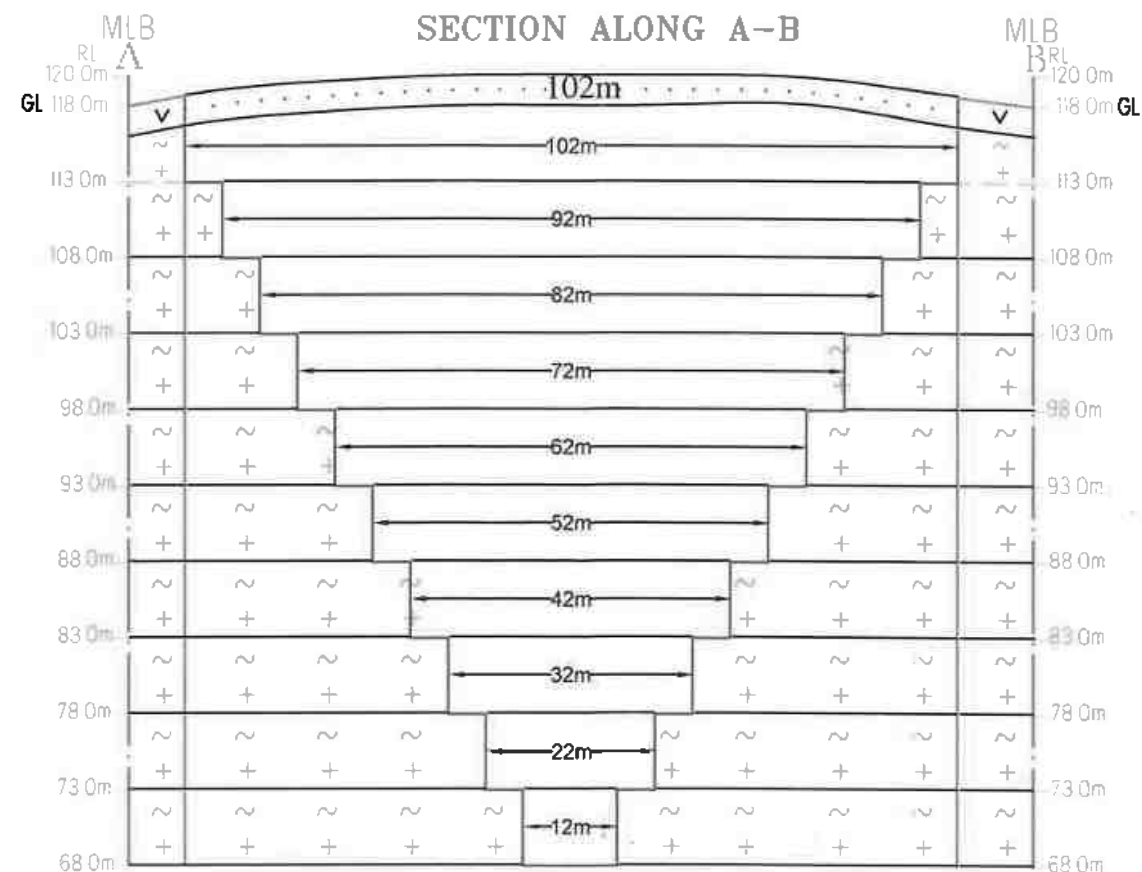
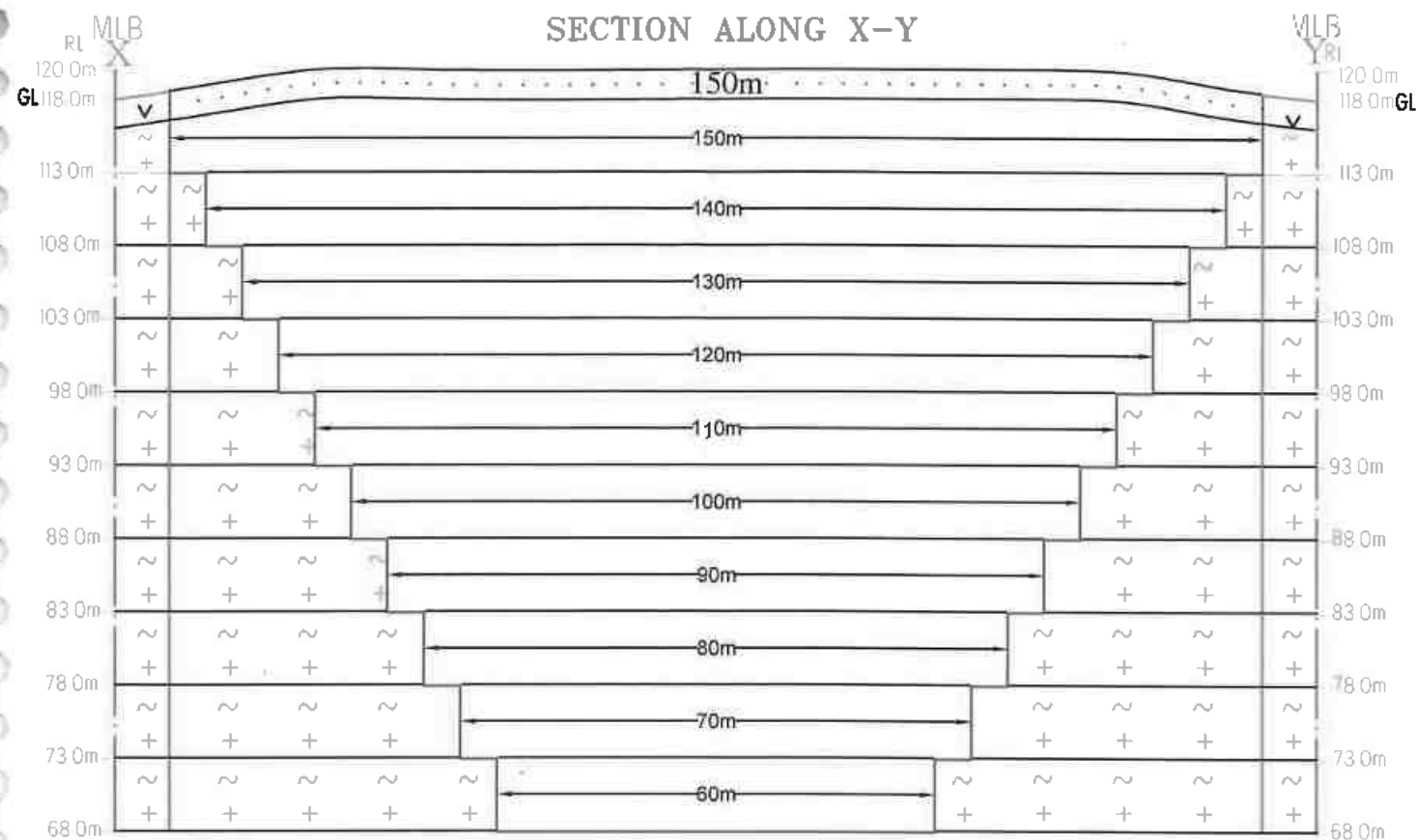
Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

For MSH BLUE METAL

Partner

P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON



MINEABLE RESERVES										
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)
XY-AB	I	150	102	2	30600	.....	30600	2	.....	61200
	II	150	102	5	76500	76500	.....	2.75	210375	.....
	III	140	92	5	64400	64400	.....	2.75	177100	.....
	IV	130	82	5	53300	53300	.....	2.75	146575	.....
	V	120	72	5	43200	43200	.....	2.75	118800	.....
	VI	110	62	5	34100	34100	.....	2.75	93775	.....
	VII	100	52	5	26000	26000	.....	2.75	71500	.....
	VIII	90	42	5	18900	18900	.....	2.75	51975	.....
	IX	80	32	5	12800	12800	.....	2.75	35200	.....
	X	70	22	5	7700	7700	.....	2.75	21175	.....
	XI	60	12	5	3600	3600	.....	2.75	9900	.....
TOTAL					371100	340500	30600	.....	936375	61200

GL — GROUND LEVEL

PLATE No- IVA

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A,
102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4,
103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7.
EXTENT : 1.98.00Hect
VILLAGE : MANGALAM
TALUK : CHEYYAR
DISTRICT : TIRUVANNAMALAI

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MINE LEASE BOUNDARY



SAFETY DISTANCE



ROUGH STONE



GRAVEL



ULTIMATE BENCH



CONCEPTUAL SECTIONS

SECTION HOR 1 : 1000 & VER 1 : 500

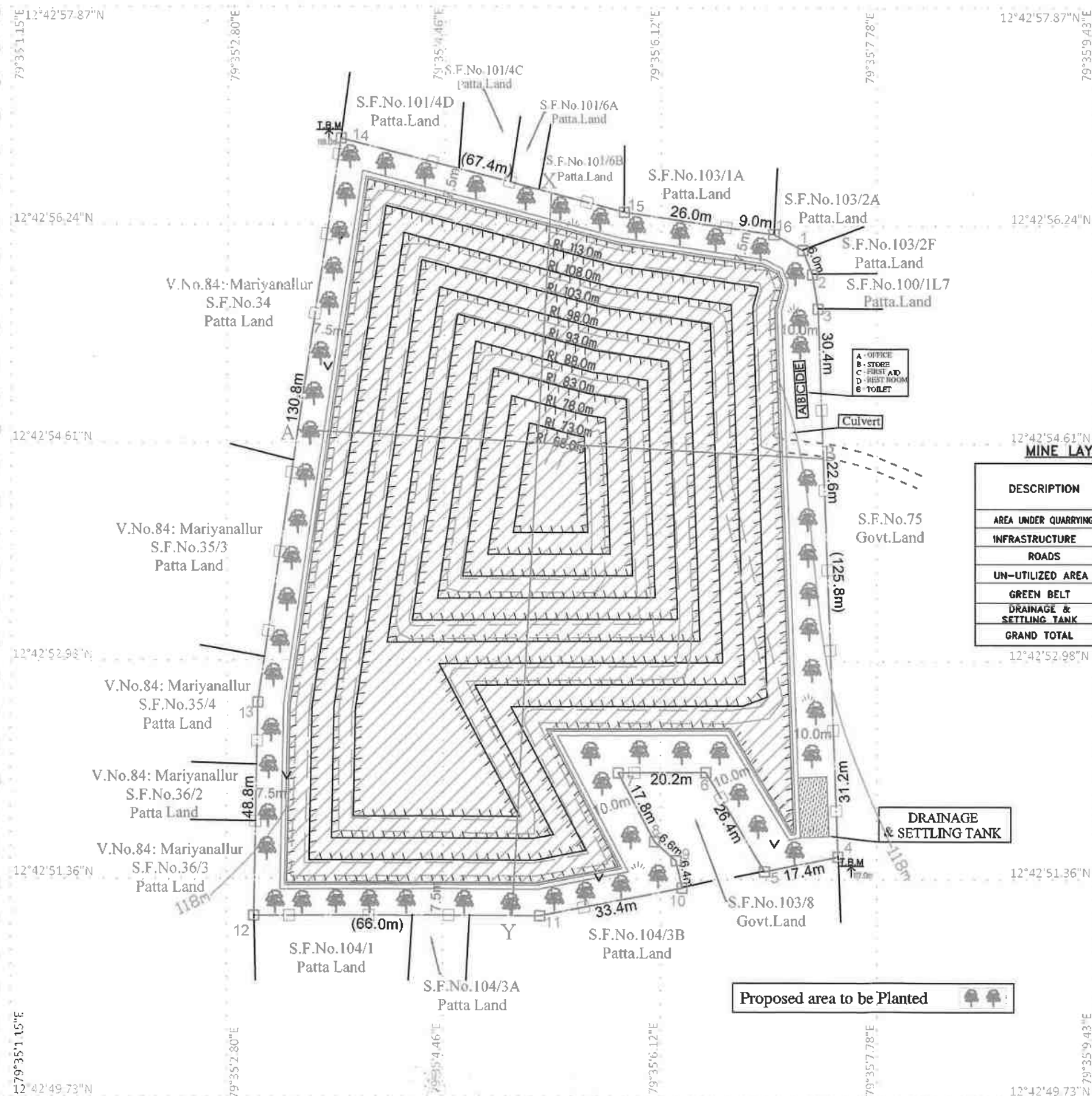
Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

For MSH BLUE METAL

A. Jey Partner

P. Vellaiyan
P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON



MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD (Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	1.46.75	
INFRASTRUCTURE	NIL	0.02.0	
ROADS	NIL	0.03.0	
UN-UTILIZED AREA	1.98.0	NIL	
GREEN BELT	NIL	0.39.55	
DRAINAGE & SETTLING TANK	NIL	0.06.70	
GRAND TOTAL	1.98.0	1.98.0	

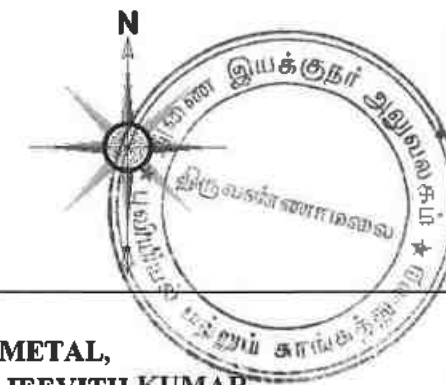


PLATE No-V

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
 No. 11/1, 3rd EAST STREET,
 POONGA NAGAR, SOTHUPAKKAM VILLAGE,
 CHEYYUR TALUK,
 CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A,
 102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4,
 103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7.
 EXTENT : 1.98.00Hect
 VILLAGE : MANGALAM
 TALUK : CHEYYAR
 DISTRICT : TIRUVANNAMALAI

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TEMPORARY BENCH MARK	
CONTOUR LINES	
GRAVEL & SHRUBS	
PROPOSED BENCH	
DRAINAGE & SETTLING TANK	
HAUL ROAD	
CULVERT	
FENCING	

MINE LAYOUT PLAN & LAND USE PATTERN PLAN SCALE 1 : 1000

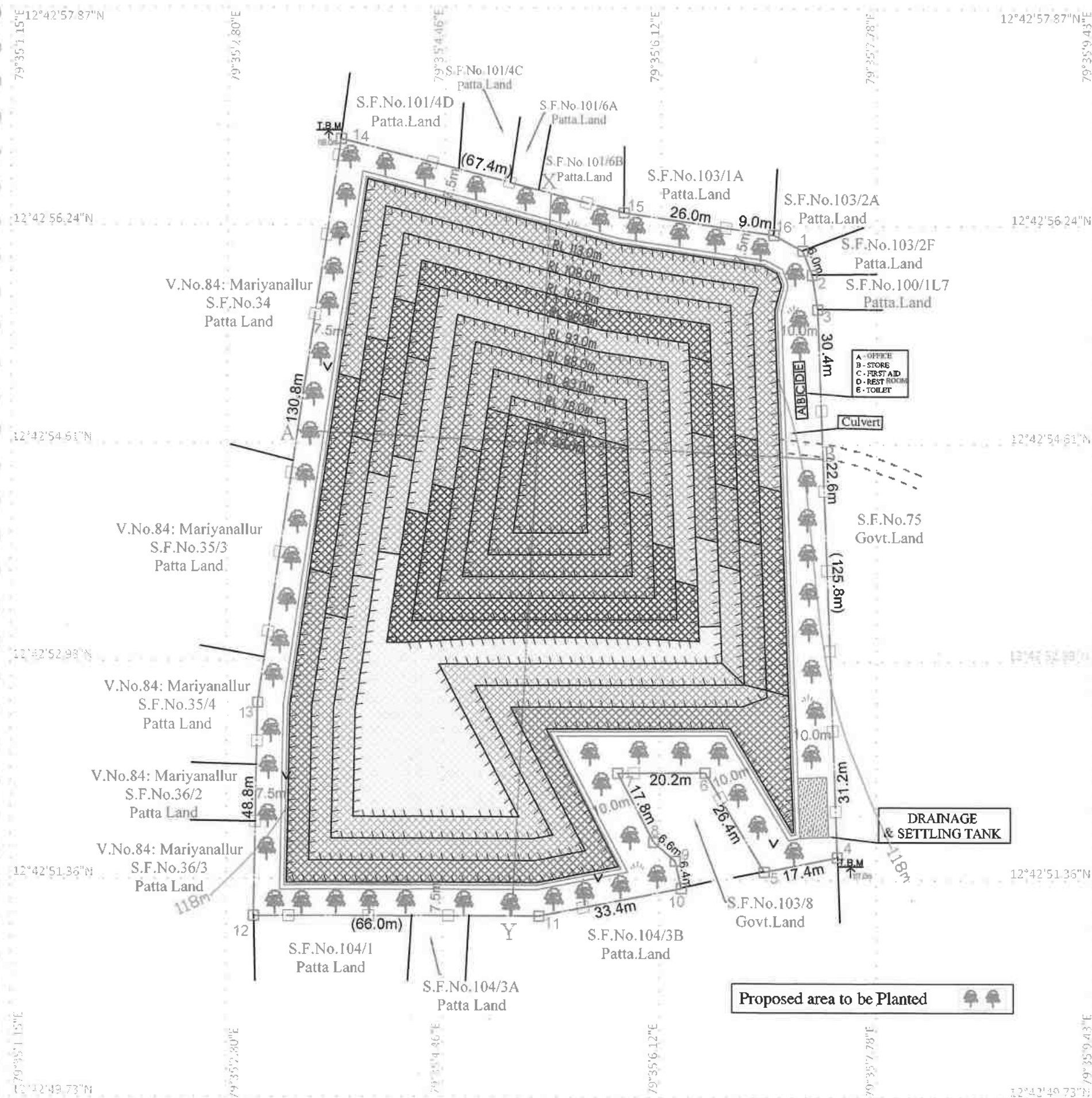
Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
 HAS BEEN CHECKED BY ME AND IS CORRECT
 TO THE BEST OF MY KNOWLEDGE

**P.VELLAIYAN, M.Sc., M.Phil.,
 QUALIFIED PERSON**

For MSH BLUE METAL

Partners



- I - Year Proposed area to be Quarried
- II - Year Proposed area to be Quarried
- III - Year Proposed area to be Quarried
- IV - Year Proposed area to be Quarried
- V - Year Proposed area to be Quarried
- VI - Year Proposed area to be Quarried
- VII - Year Proposed area to be Quarried
- VIII - Year Proposed area to be Quarried
- IX - Year Proposed area to be Quarried
- X - Year Proposed area to be Quarried

For MSH BLUE METAL

[Signature] Partner

P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON

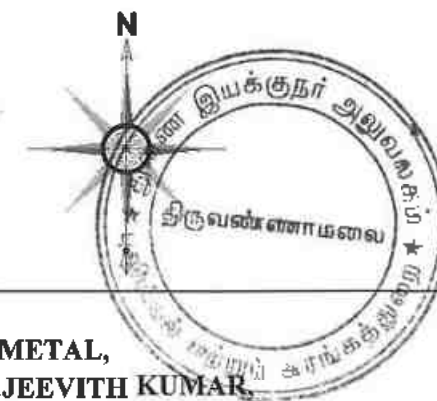


PLATE No-VI

APPLICANT:

M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:

S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A,
102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4,
103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7,
EXTENT : 1.98.00Hect
VILLAGE : MANGALAM
TALUK : CHEYYAR
DISTRICT : TIRUVANNAMALAI

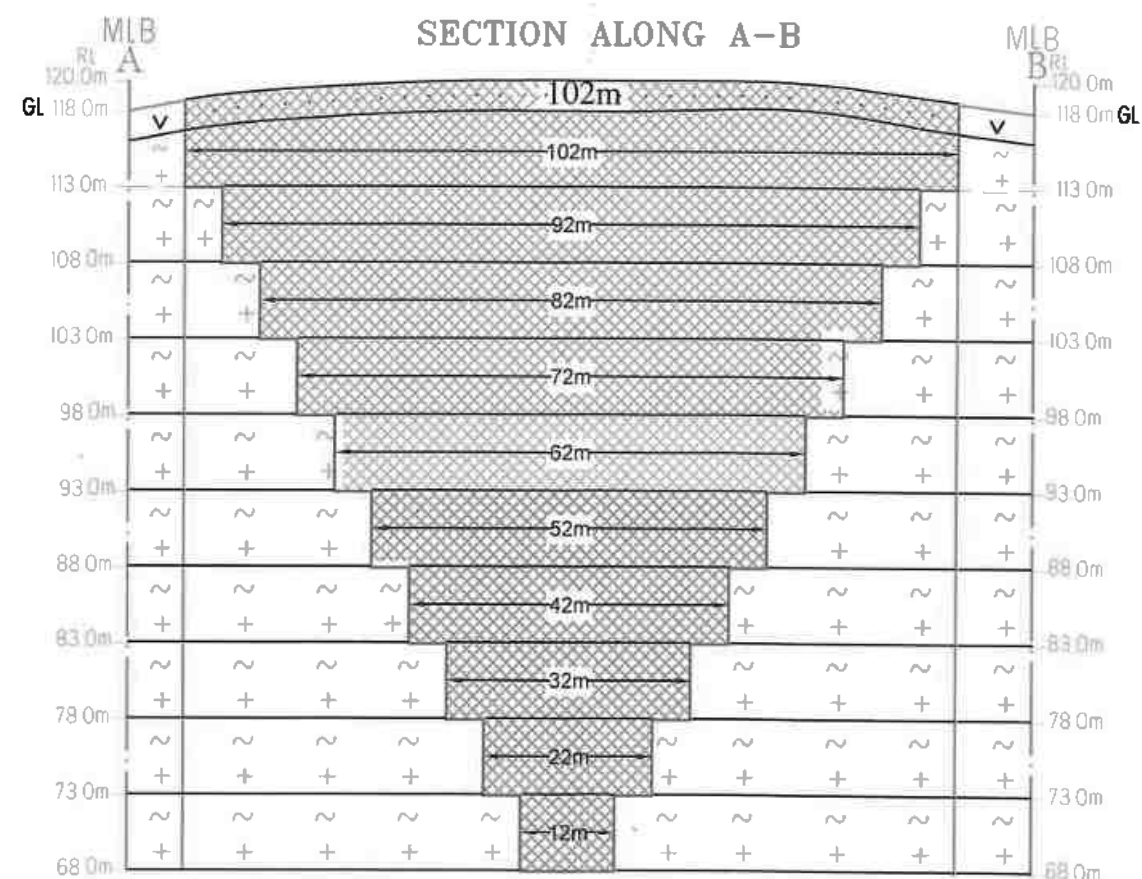
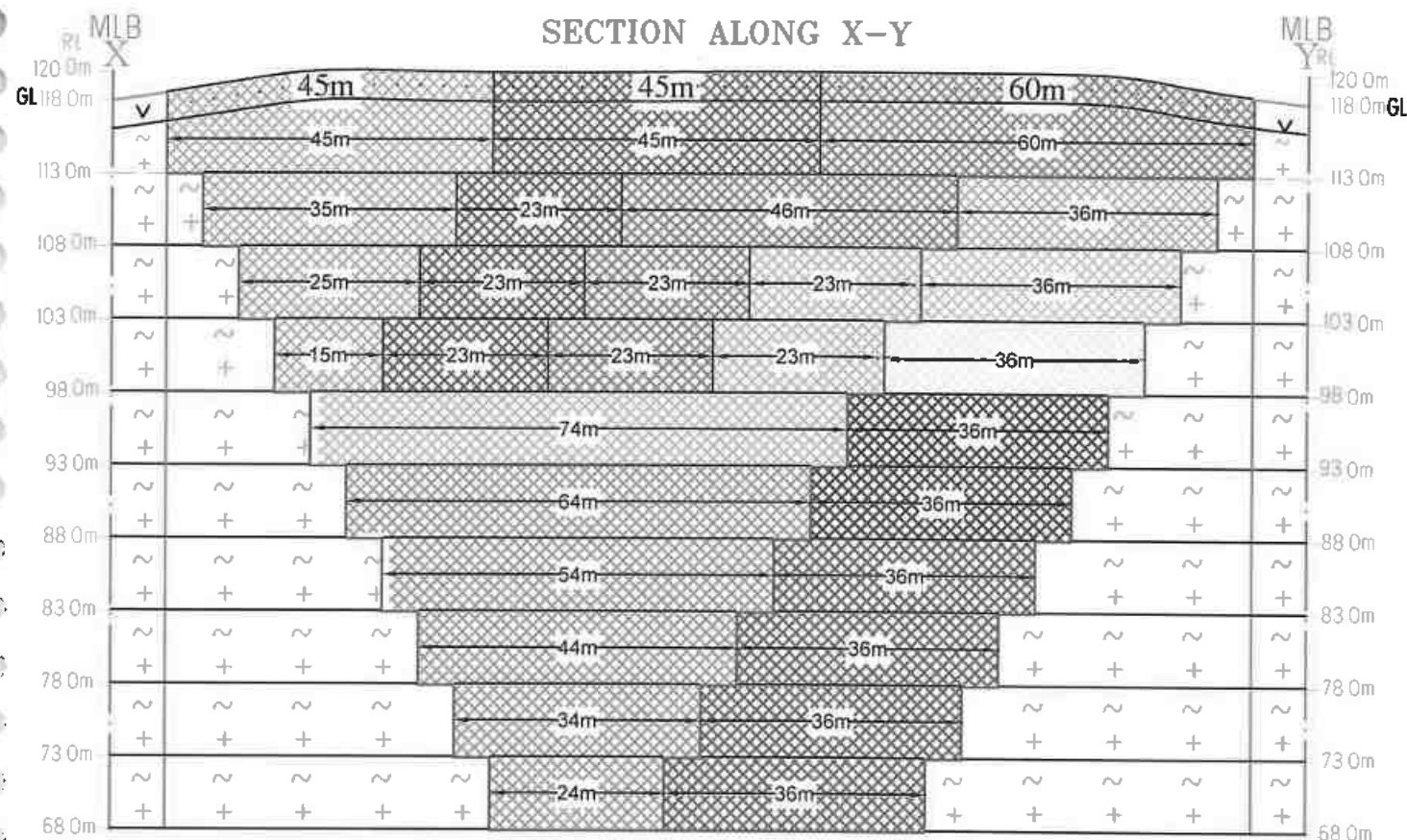
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GRAVEL & SHRUBS	
PROPOSED BENCH	
DRAINAGE & SETTLING TANK	
HAUL ROAD	
CULVERT	
FENCING	

YEARWISE DEVELOPMENT & PRODUCTION PLAN PLAN SCALE 1 : 1000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE



YEARWISE PRODUCTIONS (First Five Years)												
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)	
I-YEAR	XY-AB	I	45	102	2	9180	22950	9180	2	63113	18360	
		II	45	102	5	22950	22950	22950	2.75	63113	18360	
		III	35	92	5	16100	16100	16100	2.75	44275	12450	
		IV	25	82	5	10250	10250	10250	2.75	28187	7875	
		V	15	72	5	5400	5400	5400	2.75	14850	4125	
TOTAL					63880	54700	9180		150425	18360		
II-YEAR		I	45	102	2	9180	22950	9180	2	63113	18360	
		II	45	102	5	22950	22950	22950	2.75	63113	18360	
		III	23	92	5	10580	10580	10580	2.75	29095	8100	
		IV	23	82	5	9430	9430	9430	2.75	25932	7275	
		V	23	72	5	8280	8280	8280	2.75	22770	6375	
TOTAL					60420	51240	9180		140910	18360		
III-YEAR	XY-AB	I	60	102	2	12240	30600	12240	2	34150	24480	
		II	60	102	5	30600	30600	30600	2.75	84150	24480	
		III	46	92	5	21160	21160	21160	2.75	58190	16500	
		IV	23	82	5	9430	9430	9430	2.75	25932	7275	
		V	23	72	5	8280	8280	8280	2.75	22770	6375	
TOTAL					81710	69470	12240		191043	24480		
IV-YEAR		IV	23	82	5	9430	9430	9430	2.75	25932	7275	
		V	23	72	5	8280	8280	8280	2.75	22770	6375	
		VI	74	62	5	22940	22940	22940	2.75	63085	17725	
TOTAL					40650	40650	0		111787	0		
V-YEAR		XY-AB	VII	64	52	5	16640	16640	16640	2.75	45760	12800
	VIII		54	42	5	11340	11340	11340	2.75	31185	8625	
	IX		44	32	5	7040	7040	7040	2.75	19360	5375	
	X		34	22	5	3740	3740	3740	2.75	10285	2875	
	XI		24	12	5	1440	1440	1440	2.75	3960	1100	
TOTAL					40200	40200	0		110550	0		
GRAND TOTAL (A)						286860	256260	30600		704715	61200	
YEARWISE PRODUCTIONS (Second Five Years)												
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Volume In M ³	Rough Stone in M ³	Gravel in M ³	Bulk Density	Rough Stone in (MT)	Gravel in (MT)	
VI-YEAR	XY-AB	III	36	92	5	16560	16560	16560	2.75	45540	12450	
		TOTAL					16560	16560	0		45540	0
VII-YEAR		IV	36	82	5	14760	14760	14760	2.75	40590	11250	
		TOTAL					14760	14760	0		40590	0
VIII-YEAR		V	36	72	5	12960	12960	12960	2.75	35640	9900	
		TOTAL					12960	12960	0		35640	0
IX-YEAR		VI	36	62	5	11160	11160	11160	2.75	30690	8475	
		VII	36	52	5	9360	9360	9360	2.75	25740	7125	
		TOTAL					20520	20520	0		56430	0
X-YEAR		XY-AB	VIII	36	42	5	7560	7560	7560	2.75	20790	5825
			IX	36	32	5	5760	5760	5760	2.75	15840	4425
	X		36	22	5	3960	3960	3960	2.75	10890	3000	
	XI		36	12	5	2160	2160	2160	2.75	5940	1650	
	TOTAL					19440	19440	0		53460	0	
GRAND TOTAL (B)						84240	84240	0		231660	0	
GRAND TOTAL (A+B)						371100	340500	30600		936375	61200	

GL — GROUND LEVEL

- I - Year Proposed area to be Quarried
- II - Year Proposed area to be Quarried
- III - Year Proposed area to be Quarried
- IV - Year Proposed area to be Quarried
- V - Year Proposed area to be Quarried
- VI - Year Proposed area to be Quarried
- VII - Year Proposed area to be Quarried
- VIII - Year Proposed area to be Quarried
- IX - Year Proposed area to be Quarried
- X - Year Proposed area to be Quarried

For MSH BLUE METAL

Partner



PLATE No- VIA

APPLICANT:
M/s.MSH BLUE METAL,
DIRECTOR, Mr.JEEVITH KUMAR,
No. 11/1, 3rd EAST STREET,
POONGA NAGAR, SOTHUPAKKAM VILLAGE,
CHEYYUR TALUK,
CHENGALPATTU DISTRICT - 603319.

LEASE APPLIED AREA:
S.F.No's : 102/1, 102/2, 102/3, 102/4, 102/5, 102/6A,
102/6B, 102/7A, 102/7B, 102/7C, 103/3A, 103/3B, 103/4,
103/5A, 103/5B, 103/5C, 103/5D, 103/6A, 103/6B & 103/7,
EXTENT : 1.98.00Hect
VILLAGE : MANGALAM
TALUK : CHEYYAR
DISTRICT : TIRUVANNAMALAI

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- MINE LEASE BOUNDARY
- SAFETY DISTANCE
- ROUGH STONE
- GRAVEL
- PROPOSED BENCH

YEARWISE PRODUCTION SECTIONS
SECTION HOR 1 : 1000 & VER 1: 500

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE
HAS BEEN CHECKED BY ME AND IS CORRECT
TO THE BEST OF MY KNOWLEDGE

P.VELLAIYAN, M.Sc., M.Phil.,
QUALIFIED PERSON

අනන්‍ය

අතිරේක තොරතුරු සැපයීම, අනුමැතිය
 සැපයීම, ප්‍ර: 28. කිසිදුදා අනුමැතිය ලබා ගත්
 අතර අනුමැතිය අංක: 102/1 - (0.30.5), 102/2 - (0.14.0),
 102/3 - (0.14.0), 102/4 - (0.06.0), 102/5 - (0.05.0),
 102/6A - (0.11.0), 102/6B - (0.10.0), 102/7A - (0.13.0),
 102/7B - (0.02.0), 102/7C - (0.09.0), 103/3A - (0.04.5),
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 ලබා ගත් පසුව මෙයින් අනුමැතිය ලබා ගත් අතර
 MSH Blue metal, අනුමැතිය ලබා ගත් පසුව
 -හි ලැබුණු අනුමැතිය 300 ප්‍ර අනුමැතිය. අනුමැතිය
 ලබා ගත්, අනුමැතිය ලබා ගත් පසුව ලබා ගත්,
 ලබා ගත්, අනුමැතිය ලබා ගත්, අනුමැතිය
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For MSH BLUE METAL

Partner



National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Technical Mining Solutions, Dharmapuri

5/1485-3, Salem Main Road, Elakkiyampatty, Dharmapuri, Tamil Nadu

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors.

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals - including opencast and underground mining	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated January 24, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3142 dated Feb 19, 2024. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.

Issue Date
Feb 19, 2024

Valid up to
Dec 31, 2026



Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0319

Prof (Dr) Varinder S Kanwar
(CEO NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.