

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENT MANAGEMENT PLAN

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

KODANGIPALAYAM ROUGH STONE AND GRAVEL CLUSTER QUARRIES

At

Kodangipalayam Village, Palladam Taluk, Tiruppur District

For Obtaining

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

IN CLUSTER OVER AN EXTENT OF 19.38.11 Ha

NAME OF PROPOSED PROJECT PROPONENTS APPLYING IN CLUSTER

Code	Proponent Name	S.F No	Village & Taluk	Extent (Ha)
P1	Thiru.R.Gunasekar	103/3B2	Kodangipalayam Village, Palladam Taluk	1.69.5
P2	Thiru.P.Gowtham Rathinam	91/1A (P)		1.29.0
P3	Thiru.D.R.Karuppusamy	102/2B		1.00.11

File No.11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024 - P1

File No.11708 TOR Identification No TO25B0108TN5264313N Dated: 01.03.2025 - P2

File No.11106 TOR Identification No TO24B0108TN5808597N Dated: 06.03.2025 - P3

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS



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Accredited for sector 1 Category ‘A’, sector 31 Category ‘B’ & 38 Category ‘B’

Certificate No : NABET/EIA/2225/RA 0276 Dated: 20.02.2023

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ENVIRONMENTAL LAB

GLOBAL LAB AND CONSULTANCY SERVICES

Approved by ISO:9001:2015, NABL, FSSAI, Experts in QHSE

S.F No:92/3A2, Geetha Nagar, Alagapuram Pudur, Salem-636016.

Baseline Monitoring Season – October to December 2024

April -2025

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

*PROPOSED QUARRIES				
CODE	Name of the Proponent and Address	S.F. Nos & Village	Extent in Ha	Status
P1	Thiru.R. Gunasekar	103/3B2&Kodangipalayam Village	1.69.5Ha	Obtained ToR vide, File No.11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024.
P2	Thiru.P. Gowtham Rathinam	91/1A (P)&Kodangipalayam Village,	1.29.0 Ha	Obtained ToR vide, File No.11708 TOR Identification No TO25B0108TN5264313N Dated: 01.03.2025
P3	Thiru.D.R. Karuppusamy	102/2B&Kodangipalayam Village	1.00.11 Ha	Obtained ToR vide, File No.11106 TOR Identification No TO24B0108TN5808597N Dated: 06.03.2025 – P3
P4	Thiru.V. Kangesan	103/3A1A (P), 103/3A2,103/3B1&Kodangipalaya m Village	1.81.0 Ha	Applied for quarry lease
P5	Thiru.R. Subramaniyan	114/1B & Kodangipalayam	1.99.5 Ha	Applied for quarry lease
P6	Thiru.P. Vasanthamani	91/A& Kodangipalayam	1.72.0 Ha	Applied for quarry lease
	Total		9.51.11 Ha	
*EXISTING QUARRIES				
CODE	Name of the Proponent and Address	S.F.Nos , Village & Taluk	Extent in Ha	Lease Period
E-1	Thiru.D.R. Karuppusamy	102/1	1.32.5	28.02.2022 to 27.02.2027
E-2	Thiru.D.R. Karuppusamy	89/2a, 89/3	1.19.0	26.08.2022 to 27.08.2027
E-3	Thiru.V. Prakash	113/6	0.86.0	20.09.2019 to 19.09.2024
E-4	Tmt.M. Subbathal	114/2C, 114/2D etc	1.82.0	28.12.2022 to 27.12.2027
E-5	Thiru.M. Venkatesh	114/1A,115/1B,115/2	2.25.5	14.12.2023 to 13.12.2028
E-6	Thiru.K.M. Chinnasamy	89/4B(P)	2.42.0	28.12.2023 to 27.12.2028
	Total		9.87.0Ha	
ABANDONED/EXPIRED QURRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
Ex-1	Tmt.P. Vijayalakshmi	116/3B (P)	0.70.0	03.10.2018 to 02.10.2023
	Total		0.70.0Ha	
*TOTAL CLUSTER EXTENT			19.38.11 Ha	

Note:-

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

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

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. R. Gunasekar- P1

“ToR issued vide File No.11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024”

SPECIFIC CONDITIONS		
1	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & up to 1km 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, Temples etc., and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.	Noted and agreed The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III
2.SEAC STANDARD CONDITIONS		
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.	It is an Existing quarry Existing Pit Depth – 27m bgl Existing Pit Dimension is given below, Pit – I: 134m (L) X 114m (W) X 27m BGL (D)
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.	Noted and agreed. Letter obtained from the VAO regarding surface features within 300m radius
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.	Noted and agreed The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III
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.	Noted and agreed. The hydro-geological assessment was carried out to assess the potential effects on the groundwater table. It is expected that there will be no major impacts on the water bodies in the vicinity of the project site. Further information is given in Chapter 3.
5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3.
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.	Request to consider the secondary source data detailing the nearest reserve forest from Tamil Nadu Geographical Information System (TNGIS).

		The Nearest Reserve Forest Bolampatti I Reserve Forest 30.0km- SW
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.	Noted and agreed. It is an existing quarry. The slope stability report will be submitted together with the half-yearly compliance report once the depth reaches 30 meters.
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.	Noted and agreed. It is an existing quarry. The slope stability report will be submitted together with the half-yearly compliance report once the depth reaches 30 meters.
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.	Noted and agreed The Proponent given affidavit stating that the blasting operation will be carried out by the competent person as per the MMR 1961.
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.	Noted and agreed The details of design for carrying out controlled blasting operation involving line drilling and muffle blasting to minimize blast-induced ground vibrations and controlled fly rock travel beyond 30 m from the blast site is detailed in Chapter 4.
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	Noted and agreed. The project proponent possesses no additional quarries except this proposal.
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,	Noted and agreed
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	Earlier mining operation carried out from 16.04.2018 to 15.04.2023
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.	Existing depth – 27m bgl
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.	Noted and agreed The project site has been superimposed on the high resolution imagery.

	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).	The Satellite imagery of the project site is enclosed in Chapter II Geomorphology map of the area is enclosed in Chapter II. Lithology and Geology Map of the area is enclosed in Chapter II.
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	Noted and agreed The Drone Video of the project site is taken covering the Greenbelt and Fencing around the Project site.
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.	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 850 Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads. As well the pp has provided wire fencing as recommended all along the boundary of the lease applied area.
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.	Noted and agreed Details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology justifications are provided in Chapter 2. The anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same are provided in Chapter 4.
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.	Noted and agreed The Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act, 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
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 wells will intersect groundwater. Necessary data and documentation in this regard may be provided.	Noted and agreed The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.
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	Noted and agreed Baseline Data were collected for Post monsoon season October 2024 to Dec 2024. The Details of the Baseline Monitoring is given in the Chapter No. 3.
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	Noted and agreed Cumulative impact study has been carried out covering proposed and existing quarries in the cluster and results related to air pollution, water pollution, & health impacts have been given in chapter No. 7, Based on the results,

	plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	environmental management plan has been prepared and given in Chapter No. 10.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
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.	Noted and Agreed Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 3, Table No 3.3
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.
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 and does not come under 'Aravalli Range.
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.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
28	Impact on local transport infrastructure due to the Project should be indicated.	Noted and agreed Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Chapter No. 2.
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.	Noted and agreed
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific	Noted & agreed. Mine closure plan is detailed in Chapter No. 4.
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	Noted and agreed
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	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of

	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.	PP a count of 850 Nos of trees were planted as a part of greenbelt development program all along the periphery of the lease applied area and approach roads and village roads.
33	Taller/one-year-old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 850 Nos of trees were planted as a part of greenbelt development program all along the periphery of the lease applied area and approach roads and village roads.
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	Noted and agreed. Disaster management Plan is explicated in chapter 7.
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	Noted and agreed. Risk Assessment and management Plan is explicated in chapter 7.
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.	Noted and agreed Occupational Health impacts of the project elaborately discussed in chapter 10.
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.	Noted and agreed No Public Health Implications anticipated due to this project. The anticipated impact and effective mitigation measures are discussed in the Chapter No. 4
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.	Noted and agreed Socio-economic studies were conducted within a 5-kilometer radius of the quarry site. Details of report given in Chapter 3.
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 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.	Noted and agreed. The details of the Project benefits are given in the Chapter No. 8.
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.	Noted and agreed.
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.	Noted and agreed The EMP has been prepared for the entire life of the mine i.e., up to the lease period.

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.	Noted and agreed
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SEIAA STANDARD CONDITIONS		
Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted and agreed The Cluster management committee has been formed covering the existing and proposed quarries in the cluster
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.,	Noted and agreed The information will be shared to the cluster management committee during the monthly meeting.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Noted and agreed The list of members of the committee formed will be submitted to AD/Mines before resuming the mining operation.
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.	Noted and agreed It is an existing Granite quarry the blasting will be used occasionally for the removal of overburden only the blasting frequency and usage of haul roads are discussed.
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.	Noted and agreed The risk management plan and disaster management plan has been prepared and enclosed in this EIA report, Chapter No. 7.
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.	Noted and agreed Environmental policy of the cluster management committee is detailed in the EIA Report Chapter No. 6
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.	Noted and agreed The Restoration strategy is discussed in the progressive mine closure plan and enclosed in the Scheme of Mining plan.
8	The committee shall deliberate on the health of the workers/staff involved in the mining as well	Noted and agreed

	as the health of the public in the vicinity.	The information on the health of the workers and the local people will be updated periodically along with medical examination.
Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present is considerably low. The Mining operation will be carried out to reduce the impact further to the level of negligence.
10	Impact on soil flora & vegetation around the project site.	The vegetation details have been provided in chapter III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
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.	Noted and agreed There are no trees within the existing quarry site, and therefore, no proposal for tree felling or removal is anticipated during the quarrying operations.
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.	Noted and agreed The details of the soil analysis and the impacts are given in the Chapter No 3 & 4.
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted and agreed The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock	Noted and agreed The project area is situated centre part of the quarry lands. The proposed Rough Stone quarrying operation will employ the wet drilling method, which is expected to have negligible impacts on nearby agricultural lands.
Forests		
15	The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife	Noted and agreed. There is no Reserve Forest within 1km radius from the project area. The mining operation will not

		cause any significant impact to the Reserve Forest and Wild life Sanctuaries
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	There is no forest/wildlife within 10km radius, chapter 3 details of Ecology and Biodiversity, and 4 endemic vulnerable and endangered indigenous flora and fauna.
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection	Details are discussed in the Chapter No.3
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site	Anticipated Environment Impact and Mitigation measures are detailed in Chapter No.4
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	There are 9 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
20	Erosion Control measures	Details discussed in the chapter No.4
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.	Details in Chapter 3
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	Details are given in the Chapter No 4.
24	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies	Details in Chapter 4 impact of bio diversity.

	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	Details of impact on soil environment is detailed in Chapter No.4
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites	Bolampatti I R.F. 30.0km-SW There is, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area. Ecological Environment is discussed under Chapter 3
27	The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including environmental stress. c) Sediment geochemistry in the surface streams.	There are 9 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	Noted and agreed. Control measures of Noise, Air Water, Dust discussed in chapter 4
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 sinks and temperature reduction including control of other emission and climate mitigation activities	Noted and agreed. Details discussed in chapter 4.
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	Noted and agreed. Details are discussed in chapter 3.
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), and ozone (O ₃)

		Carbon dioxide (CO₂): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane (CH₄): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N₂O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
EMP		
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	Noted and agreed Detailed EMP discussed in chapter 10.
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.	Noted and agreed. Detailed EMP discussed in chapter 10.
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Noted and agreed. Risk Assessment and management Plan explicated in chapter 7.
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.	Noted and agreed. Disaster management Plan details given in Chapter-7

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.	Letter obtained from the VAO regarding surface features within 300m radius
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.	Noted and agreed. It will be updated in final EIA/EMP report.
39	The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecological risks and impacts of plastic & micro plastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported	Noted and agreed. Plastic waste management of the proposed project explicated in chapter 7.

Standard Terms of Reference for (Mining of minerals)		
S.No	Terms of Reference	Reply
1.1	An EIA-EMP Report shall be prepared for peak capacity (.....MTPA) operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.	Peak Production – 22920m ³ Depth – 37m bgl Mine Lease area – 1.69.5 Ha
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection can be for any season (three months) except monsoon.	Peak capacity of 22920m ³ operation to cover the impacts and environment management plan in chapter- IV and Chapter 10 covered in project specific activities. Baseline Data were collected for Post Monsoon Season Oct– Dec2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. III
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided.	Noted, Google earth image showing lease area with Coordinates of pillars in chapter-II.
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.	Land use and land cover of the 10km Radius of study area is discussed in Chapter No. III. Geology map of the project area covering 10km radius Figure No. 2.8. page No.22 Geomorphology of the area is given in Chapter No 2 Figure No 2.9, page no.23 There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.

1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	Land use and land cover of the study area is discussed in Chapter No. III with Physical features such as waterbodies, odai, canal etc.,
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	DEM data using Drainage pattern around 10km radius showing streams and lakes etc., discussed in Chapter No. 3.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted.	Drainage pattern around 10km radius showing streams and lakes etc., is discussed in Chapter No. 3.
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.	Details in chapter-2 showing the land features. And also enclosed Approved 3 rd Scheme of mining plan in annexure.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.	It is an opencast quarrying operation proposed to operate in Mechanized method. The height and width of the bench will be maintained as 5m with 90⁰ 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.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.	Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.

1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channeling of the water courses, etc., approach roads, major haul roads, etc should be indicated.	Not Applicable. The details of waste dump management are given in the Chapter No. 4																																																						
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights	Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.5.																																																						
	<table><tr><th>Sno</th><th>ML. project Land use</th><th>Area under Surface Rights(ha)</th><th>Area Under Mining Rights(ha)</th><th>Area under Both (ha)</th></tr><tr><td>1</td><td>Agriculture Land</td><td></td><td></td><td></td></tr><tr><td>2</td><td>Forest Land</td><td></td><td></td><td></td></tr><tr><td>3</td><td>Grazing Land</td><td></td><td></td><td></td></tr><tr><td>4</td><td>Settlements</td><td></td><td></td><td></td></tr><tr><td>5</td><td>Others (Specify)</td><td></td><td></td><td></td></tr></table>	Sno	ML. project Land use	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under Both (ha)	1	Agriculture Land				2	Forest Land				3	Grazing Land				4	Settlements				5	Others (Specify)				<table><tr><th>Description</th><th>Present area (Ha)</th><th>Area at the end of lease period (Ha)</th></tr><tr><td>Area Under Quarry</td><td>1.25.0</td><td>1.45.0</td></tr><tr><td>Dump</td><td>0.014.0</td><td>Nil</td></tr><tr><td>Site Services</td><td>Nil</td><td>0.02.0</td></tr><tr><td>Roads</td><td>0.01.0</td><td>0.02.0</td></tr><tr><td>Green Belt</td><td>Nil</td><td>0.12.5</td></tr><tr><td>Unutilized Area</td><td>0.29.5</td><td>0.08.0</td></tr><tr><td>Grand Total</td><td>1.69.5</td><td>1.69.5</td></tr></table>	Description	Present area (Ha)	Area at the end of lease period (Ha)	Area Under Quarry	1.25.0	1.45.0	Dump	0.014.0	Nil	Site Services	Nil	0.02.0	Roads	0.01.0	0.02.0	Green Belt	Nil	0.12.5	Unutilized Area	0.29.5	0.08.0	Grand Total	1.69.5	1.69.5
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1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
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1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.	Baseline Data were collected for Post Monsoon Season Oct– Dec 2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air) / downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the	Details in chapter-3 showing the various sampling stations As per CPCB guidelines.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10km buffer zone i.e., dispersed in 10 km buffer area. In case of expansion, the	Air Quality Modelling and wind rose pattern for prediction of incremental GLC's of pollutant was carried out using AERMOD view 13 Model. Details in Chapter No. 4.
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.	Traffic density survey was carried out to analyses the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter-II.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need-based survey for CSR activities to be followed.	Detailed in chapter-3 socio-economic study with occupational status & economic status of the study area. The study should also include the status of infrastructural facilities and amenities present in the study area CSR are discussed under Chapter 8.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.	Detailed Ecology and biodiversity study in chapter-3

1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.	Detailed in chapter-4 population in the impact zone and measures for occupational health and safety and proposed occupational health in chapter-X
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.	Noted and agreed
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.	The ground water table is at 58-62m below ground level. In this project, ultimate depth is 37m Bgl It is inferred the quarrying activities in the Cumulative EIA project (Quarry) will not intersect the Ground water table.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.	Detailed in Chapter-IV Anticipated and mitigation measures of in the study area.
1.24	Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.	Total Water Requirement: 1.5 KLD Discussed under Chapter 2, Table No 2.15, The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Methodology And Instrument Used for Air Quality Analysis in chapter-3and Air Pollution control equipment (APCEs) in chapter-10 sub 10.2 Environmental policy.
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored.	Details in Machinery and equipment details in Chapter-2 Table No 2.16
1.27	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	Noted and agreed
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	A Risk Assessment and Disaster Preparedness and management Plan Chapter- 7
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	Detailed in Machinery and technology used Chapter-3 Table 3.17 – Methodology and Instrument Used for Air Quality Analysis Detailed study in chapter-4 Impact of choice of mining method and impact on air quality and blasting and noise and vibrations.

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

1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.	
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.	The Environment Monitoring Cell discussed under Chapter 6
1.42	d) To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at	The Environment Monitoring Cell discussed under Chapter 6
1.43	e) Environment Management Cell and its responsibilities to be clearly spell out in EIA/ EMP report	The Environment Monitoring Cell discussed under Chapter 6
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.	The Environment Monitoring Cell discussed under Chapter 6
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.	No litigation is pending in any court against this project
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.	Nanjarayan Bird Sanctuary – 23km –NE It will Submit final EIA/EMP report
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable	Noted and agreed
1.48	Details on the Forest Clearance should be given as per the format given: Total Mine lease area (ha): Total Forest Land (Ha) : Date of FC : Extent of Forest Land : Balance area for which FC is yet to be obtained: Status of application for diversion of forest Land:	Boluvampatti I R.F. 30.0km- SW Total Mine Lease area 1.69.5ha Details on the Forest Clearance will Submit final EIA/EMP report.
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report.	Noted and agreed.
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same. should be provided.	The outcome of public hearing will be updated in the final EIA/AMP report.
1.51	PP shall carry out survey through drone highlighting the ground reality for at least 10 minutes.	Noted and agreed

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

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. P. Gowtham Rathinam – P2

“ToR issued vide File No.11708 TOR Identification No. TO25B0108TN5264313N Dated: 01.03.2025”

SEIAA-SPECIFIC CONDITIONS		
1	The impacts of coconut grove & its productivity shall be included in the EIA report.	Noted & agreed.
2	The EMP should cover the detailed restoration plan of the site.	Noted & agreed.
3	The concerns of the public regarding impacts of the mining activity on water bodies and agriculture shall be deliberated in detail during public hearing	Noted & agreed.
SEAC-SPECIFIC CONDITIONS		
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 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.	Noted and agreed PP has agreed to establish a Cluster Management Committee. Copy of the agreement concerning CMC will be Submitted during the appraisal meeting.
2	The Boundary pillars to be erected as per the mine rules and the evidence should be submitted along with the EIA report	Noted and agreed PP agreed to install boundary pillars in accordance with mining regulations to demarcate the leased area.
3	Since waterbodies are situated nearby, the PP shall carry out the hydrological study including the details of water flow pattern to determine the impacts of the mining operation in the waterbodies	Noted and agreed.
4	The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report	Noted and agreed.
5	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & up to 1km 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. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations	Noted and agreed The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III
6	The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted and agreed PP erected wire fencing around the quarry lease area and planted 645 trees to establish a green belt along the safety benches and village roads. Photographs are provided in Chapter 2. Additionally, PP has committed to construct a garland drainage tank in accordance with the stipulated conditions.

7	The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3.
8	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine	Noted and agreed PP prepared the EMP for entire life of mine.
9	The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures.	Noted and agreed
10	The PP shall prepare a conceptual working plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed.	Noted and agreed.
11	The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/video graphic evidence along with the EIA report	Noted and agreed. PP agreed to install CCTV cameras at the quarry concerned Photographs will be submitted during the appraisal meeting.
2.SEAC STANDARD CONDITIONS		
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.	It is an Existing quarry Existing Pit Depth – 1.5m bgl Existing Pit Dimension is given below, Pit – I: 28m (L) X 47m (W) X 1.5mBGL (D)
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.	Noted and agreed. Letter obtained from the VAO regarding surface features within 300m radius
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.	Noted and agreed The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III
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.	Noted and agreed. The hydro-geological assessment was carried out to assess the potential effects on the groundwater table. It is expected that there will be no major impacts on the water bodies in the vicinity of the project site. Further information is given in Chapter 3.
5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Noted and agreed

		The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3.
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.	Request to consider the secondary source data detailing the nearest reserve forest from Tamil Nadu Geographical Information System (TNGIS). The Nearest Reserve Forest Bolampatti I Reserve Forest 30.0km- SW
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.	Noted and agreed. It is an existing quarry. The slope stability report will be submitted together with the half-yearly compliance report once the depth reaches 30 meters.
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.	Noted and agreed. It is an existing quarry. The slope stability report will be submitted together with the half-yearly compliance report once the depth reaches 30 meters.
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.	Noted and agreed The Proponent given affidavit stating that the blasting operation will be carried out by the competent person as per the MMR 1961.
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.	Noted and agreed The details of design for carrying out controlled blasting operation involving line drilling and muffle blasting to minimize blast-induced ground vibrations and controlled fly rock travel beyond 30 m from the blast site is detailed in Chapter 4.
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	Noted and agreed. The project proponent possesses no additional quarries except this proposal.
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,	Noted and agreed
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	Earlier mining operation carried out from 10.11.2017 to 09.11.2022
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.	Existing depth – 1.5m bgl

	· 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).	Noted and agreed The project site has been superimposed on the high resolution imagery. The Satellite imagery of the project site is enclosed in Chapter II Geomorphology map of the area is enclosed in Chapter II. Lithology and Geology Map of the area is enclosed in Chapter II.
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	Noted and agreed The Drone Video of the project site is taken covering the Greenbelt and Fencing around the Project site.
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.	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 645 Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads. As well the pp has provided wire fencing as recommended all along the boundary of the lease applied area.
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.	Noted and agreed Details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology justifications are provided in Chapter 2. The anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same are provided in Chapter 4.
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.	Noted and agreed The Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act, 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
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.	Noted and agreed The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.
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	Noted and agreed Baseline Data were collected for Post monsoon season October 2024 to Dec 2024.

	quality & flora/fauna including traffic/vehicular movement study	The Details of the Baseline Monitoring is given in the Chapter No. 3.
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.	Noted and agreed Cumulative impact study has been carried out covering proposed and existing quarries in the cluster and results related to air pollution, water pollution, & health impacts have been given in chapter No. 7, Based on the results, environmental management plan has been prepared and given in Chapter No. 10.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
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.	Noted and Agreed Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 3, Table No 3.3
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.
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 and does not come under 'Aravalli Range.
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.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
28	Impact on local transport infrastructure due to the Project should be indicated.	Noted and agreed Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Chapter No. 2.
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.	Noted and agreed
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific	Noted & agreed. Mine closure plan is detailed in Chapter No. 4.

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	Noted and agreed
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.	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 645 Nos of trees were planted as a part of greenbelt development program all along the periphery of the lease applied area and approach roads and village roads.
33	Taller/one-year-old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 645 Nos of trees were planted as a part of greenbelt development program all along the periphery of the lease applied area and approach roads and village roads.
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	Noted and agreed. Disaster management Plan is explicated in chapter 7.
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	Noted and agreed. Risk Assessment and management Plan is explicated in chapter 7.
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.	Noted and agreed Occupational Health impacts of the project elaborately discussed in chapter 10.
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.	Noted and agreed No Public Health Implications anticipated due to this project. The anticipated impact and effective mitigation measures are discussed in the Chapter No. 4
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.	Noted and agreed Socio-economic studies were conducted within a 5-kilometer radius of the quarry site. Details of report given in Chapter 3.
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 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.	Noted and agreed. The details of the Project benefits are given in the Chapter No. 8.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the	Noted and agreed.

	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.	Noted and agreed The EMP has been prepared for the entire life of the mine i.e., up to the lease period.
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.	Noted and agreed

SEIAA STANDARD CONDITIONS		
Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted and agreed The Cluster management committee has been formed covering the existing and proposed quarries in the cluster
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.,	Noted and agreed The information will be shared to the cluster management committee during the monthly meeting.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Noted and agreed The list of members of the committee formed will be submitted to AD/Mines before resuming the mining operation.
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.	Noted and agreed It is an existing Granite quarry the blasting will be used occasionally for the removal of overburden only the blasting frequency and usage of haul roads are discussed.
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.	Noted and agreed The risk management plan and disaster management plan has been prepared and enclosed in this EIA report, Chapter No. 7.
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.	Noted and agreed Environmental policy of the cluster management committee is detailed in the EIA Report Chapter No. 6

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.	Noted and agreed The Restoration strategy is discussed in the progressive mine closure plan and enclosed in the Scheme of Mining plan.
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.	Noted and agreed The information on the health of the workers and the local people will be updated periodically along with medical examination.
Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present is considerably low. The Mining operation will be carried out to reduce the impact further to the level of negligence.
10	Impact on soil flora & vegetation around the project site.	The vegetation details have been provided in chapter III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
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.	Noted and agreed There are no trees within the existing quarry site, and therefore, no proposal for tree felling or removal is anticipated during the quarrying operations.
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.	Noted and agreed The details of the soil analysis and the impacts are given in the Chapter No 3 & 4.
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted and agreed The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock	Noted and agreed The project area is situated centre part of the quarry lands. The proposed Rough Stone quarrying operation will employ the wet drilling method, which is expected to have negligible impacts on nearby agricultural lands.

Forests		
15	The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife	Noted and agreed. There is no Reserve Forest within 1km radius from the project area. The mining operation will not cause any significant impact to the Reserve Forest and Wild life Sanctuaries
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	There is no forest/wildlife within 10km radius, chapter 3 details of Ecology and Biodiversity, and 4 endemic vulnerable and endangered indigenous flora and fauna.
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection	Details are discussed in the Chapter No.3
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site	Anticipated Environment Impact and Mitigation measures are detailed in Chapter No.4
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	There are 9 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
20	Erosion Control measures	Details discussed in the chapter No.4
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.	Details in Chapter 3
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.

23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	Details are given in the Chapter No 4.
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.	Details in Chapter 4 impact of bio diversity.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components	Details of impact on soil environment is detailed in Chapter No.4
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites	Bolampatti I R.F. 30.0km-SW There is, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area. Ecological Environment is discussed under Chapter 3
27	The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including environmental stress. c) Sediment geochemistry in the surface streams.	There are 9 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	Noted and agreed. Control measures of Noise, Air Water, Dust discussed in chapter 4
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 sinks and temperature reduction including control of other emission and climate mitigation activities	Noted and agreed. Details discussed in chapter 4.
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	Noted and agreed. Details are discussed in chapter 3.

31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃) Carbon dioxide (CO₂): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane (CH₄): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N₂O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
EMP		
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	Noted and agreed Detailed EMP discussed in chapter 10.
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.	Noted and agreed. Detailed EMP discussed in chapter 10.
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Noted and agreed. Risk Assessment and management Plan explicated in chapter 7.
Disaster Management Plan		
36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to	Noted and agreed.

	avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	Disaster management Plan details given in Chapter-7
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.	Letter obtained from the VAO regarding surface features within 300m radius
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.	Noted and agreed. It will be updated in final EIA/EMP report.
39	The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecological risks and impacts of plastic & micro plastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported	Noted and agreed. Plastic waste management of the proposed project explicated in chapter 7.

Standard Terms of Reference for (Mining of minerals)		
S.No	Terms of Reference	Reply
1.1	An EIA-EMP Report shall be prepared for peak capacity (.....MTPA) operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.	Peak Production – 27700m ³ Depth – 37m bgl Mine Lease area – 1.29.0 Ha
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection can be for any season (three months) except monsoon.	Peak capacity of 27700m ³ operation to cover the impacts and environment management plan in chapter- IV and Chapter 10 covered in project specific activities. Baseline Data were collected for Post Monsoon Season Oct– Dec2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. III
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided.	Noted, Google earth image showing lease area with Coordinates of pillars in chapter-II.

1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.	Land use and land cover of the 10km Radius of study area is discussed in Chapter No. III. Geology map of the project area covering 10km radius Figure No. 2.8. page No.22 Geomorphology of the area is given in Chapter No 2 Figure No 2.9, page no.23 There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	Land use and land cover of the study area is discussed in Chapter No. III with Physical features such as waterbodies, odai, canal etc.,
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	DEM data using Drainage pattern around 10km radius showing streams and lakes etc., discussed in Chapter No. 3.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted.	Drainage pattern around 10km radius showing streams and lakes etc., is discussed in Chapter No. 3.
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.	Details in chapter-2 showing the land features. And also enclosed Approved 3rd Scheme of mining plan in annexure.

1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.				It is an opencast quarrying operation proposed to operate in Mechanized method. The height and width of the bench will be maintained as 5m with 90⁰ 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.		
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.				Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.		
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channeling of the water courses, etc., approach roads, major haul roads, etc should be indicated.				Not Applicable. The details of waste dump management are given in the Chapter No. 4		
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights				Land use and land cover of the study area is discussed in Chapter No. 3.		
					Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.5.		

1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.	Baseline Data were collected for Post Monsoon Season Oct– Dec 2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air) / downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the	Details in chapter-3 showing the various sampling stations As per CPCB guidelines.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10km buffer zone i.e., dispersed in 10 km buffer area. In case of expansion, the	Air Quality Modelling and wind rose pattern for prediction of incremental GLC's of pollutant was carried out using AERMOD view 13 Model. Details in Chapter No. 4.
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.	Traffic density survey was carried out to analyses the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter-II.

1.18	The socio-economic study to be conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need-based survey for CSR activities to be followed.	Detailed in chapter-3 socio-economic study with occupational status & economic status of the study area. The study should also include the status of infrastructural facilities and amenities present in the study area CSR are discussed under Chapter 8.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.	Detailed Ecology and biodiversity study in chapter-3
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.	Detailed in chapter-4 population in the impact zone and measures for occupational health and safety and proposed occupational health in chapter-X
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.	Noted and agreed
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.	The ground water table is at 68m below ground level. In this project, ultimate depth is 37m Bgl It is inferred the quarrying activities in the Cumulative EIA project (Quarry) will not intersect the Ground water table.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.	Detailed in Chapter-IV Anticipated and mitigation measures of in the study area.
1.24	Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.	Total Water Requirement: 1.6 KLD Discussed under Chapter 2, Table No 2.15, The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Methodology And Instrument Used for Air Quality Analysis in chapter-3 and Air Pollution control equipment (APCEs) in chapter-10 sub 10.2 Environmental policy.
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored.	Details in Machinery and equipment details in Chapter-2 Table No 2.16

1.27	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	Noted and agreed
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	A Risk Assessment and Disaster Preparedness and management Plan Chapter- 7
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	Detailed in Machinery and technology used Chapter-3 Table 3.17 – Methodology and Instrument Used for Air Quality Analysis Detailed study in chapter-4 Impact of choice of mining method and impact on air quality and blasting and noise and vibrations.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no much significant impact due to the proposed transportation from the project area. Details in Chapter 2. Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2.
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.	Detailed in chapter-2 for mineral transportation route with approach roads etc., and impacting air quality detailed given chapter-4
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined-out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.	Discussed under Chapter 2. Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route.	Greenbelt Development Plan is discussed under Chapter 4
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.	The total cost and the details are given in the Chapter No. 10
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc. and costs along with the schedule of the implementation of the R&R Plan should be given.	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.

1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.	CSR are discussed under Chapter 8. And specific budgetary provisions (capital and recurring) for specific activities over the life of the project in chapter-10
1.38	Corporate Environment Responsibility:	CER are discussed under Chapter 8.
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.	Detailed in chapter-10 The Environment Policy
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.	
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.	The Environment Monitoring Cell discussed under Chapter 6
1.42	d) To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at	The Environment Monitoring Cell discussed under Chapter 6
1.43	e) Environment Management Cell and its responsibilities to be clearly spell out in EIA/ EMP report	The Environment Monitoring Cell discussed under Chapter 6
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.	The Environment Monitoring Cell discussed under Chapter 6
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.	No litigation is pending in any court against this project
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.	Nanjarayan Bird Sanctuary – 23.7km –NE It will Submit final EIA/EMP report
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable	Noted and agreed
1.48	Details on the Forest Clearance should be given as per the format given: Total Mine lease area (ha): Total Forest Land (Ha) : Date of FC : Extent of Forest Land : Balance area for which FC is yet to be obtained: Status of application for diversion of forest Land:	Boluvampatti I R.F. 30.0km- SW Total Mine Lease area 1.29.0 ha Details on the Forest Clearance will Submit final EIA/EMP report.
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report.	Noted and agreed.

1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same. should be provided.	The outcome of public hearing will be updated in the final EIA/AMP report.
1.51	PP shall carry out survey through drone highlighting the ground reality for at least 10 minutes.	Noted and agreed
1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.	Noted and agreed.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)	Noted and agreed. As per detailed in front page of Draft EIA/EMP, NABET, NABL certification detailed given in the report.
1.54	The compliances of Tor must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapters section.	Noted and agreed. As per Tor compliance each chapter wise page and table, figure no given in the EIA/EMP report.

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. D.R. Karuppusamy- P3

“ToR issued vide File No.11106 TOR Identification No. TO24B0108TN5808597N Dated: 06.03.2025”

SPECIFIC CONDITIONS		
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 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.	Noted and agreed PP has agreed to establish a Cluster Management Committee. Copy of the agreement concerning CMC will be Submitted during the appraisal meeting.
2	The Boundary pillars to be erected as per the mine rules and the evidence should be submitted along with the EIA report	Noted and agreed PP agreed to install boundary pillars in accordance with mining regulations to demarcate the leased area.
3	Since waterbodies are situated nearby, the PP shall carry out the hydrological study including the details of water flow pattern to determine the impacts of the mining operation in the waterbodies.	Noted and agreed. The hydro-geological assessment was carried out to assess the potential effects on the groundwater table. It is expected that there will be no major impacts on the water bodies in the vicinity of the project site. Further information is given in Chapter 3.
4	The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report	Noted and agreed.
5	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 1km 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. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.	Noted and agreed The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III
6	The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted and agreed PP erected wire fencing around the quarry lease area and planted 500 trees to establish a green belt along the safety benches and village roads. Photographs are provided in Chapter 2. Additionally, PP has committed to construct a garland drainage tank in accordance with the stipulated conditions.
7	The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3.

8	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine	Noted and agreed PP prepared the EMP for entire life of mine.
9	The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures	Noted and agreed
10	The PP shall prepare a conceptual working plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed.	Noted and agreed.
11	The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/video graphic evidence along with the EIA report.	Noted and agreed. PP agreed to install CCTV cameras at the quarry concerned Photographs will be submitted during the appraisal meeting.
2.SEAC STANDARD CONDITIONS		
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.	Fresh Lease
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.	Noted and agreed. Letter obtained from the VAO regarding surface features within 300m radius
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.	Noted and agreed The structure study has been carried out within the radius of 300m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III
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.	Noted and agreed. The hydro-geological assessment was carried out to assess the potential effects on the groundwater table. It is expected that there will be no major impacts on the water bodies in the vicinity of the project site. Further information is given in Chapter 3.
5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3.
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger	Request to consider the secondary source data detailing the nearest reserve forest from Tamil

	reserve etc., up to a radius of 25 km from the proposed site.	Nadu Geographical Information System (TNGIS). The Nearest Reserve Forest Bolampatti I Reserve Forest 29.5km- SW
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.	Noted and agreed. It is a fresh quarry. The slope stability report will be submitted together with the half-yearly compliance report once the depth reaches 30 meters.
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.	Noted and agreed. It is a fresh quarry. The slope stability report will be submitted together with the half-yearly compliance report once the depth reaches 30 meters.
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.	Noted and agreed The Proponent given affidavit stating that the blasting operation will be carried out by the competent person as per the MMR 1961.
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.	Noted and agreed The details of design for carrying out controlled blasting operation involving line drilling and muffle blasting to minimize blast-induced ground vibrations and controlled fly rock travel beyond 30 m from the blast site is detailed in Chapter 4.
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	Noted and agreed. The project proponent possesses no additional quarries except this proposal.
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,	Noted and agreed
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	Fresh Lease
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.	Fresh Lease
15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet,	Noted and agreed

	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).	The project site has been superimposed on the high resolution imagery. The Satellite imagery of the project site is enclosed in Chapter II Geomorphology map of the area is enclosed in Chapter II. Lithology and Geology Map of the area is enclosed in Chapter II.
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	Noted and agreed The Drone Video of the project site is taken covering the Greenbelt and Fencing around the Project site.
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.	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 500 Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads. As well the pp has provided wire fencing as recommended all along the boundary of the lease applied area.
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.	Noted and agreed Details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology justifications are provided in Chapter 2. The anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same are provided in Chapter 4.
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.	Noted and agreed The Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act, 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
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.	Noted and agreed The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.
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	Noted and agreed Baseline Data were collected for Post monsoon season October 2024 to Dec 2024. The Details of the Baseline Monitoring is given in the Chapter No. 3.
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	Noted and agreed Cumulative impact study has been carried out covering proposed and existing quarries in the cluster and results related to air pollution, water pollution, & health impacts have been given in

	impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	chapter No. 7, Based on the results, environmental management plan has been prepared and given in Chapter No. 10.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
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.	Noted and Agreed Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 3, Table No 3.3
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.
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 and does not come under 'Aravalli Range.
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.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
28	Impact on local transport infrastructure due to the Project should be indicated.	Noted and agreed Traffic density survey was carried out to analyze the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Chapter No. 2.
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.	Noted and agreed
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific	Noted & agreed. Mine closure plan is detailed in Chapter No. 4.
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	Noted and agreed
32	The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to	Noted and agreed

	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.	As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 500 Nos of trees were planted as a part of greenbelt development program all along the periphery of the lease applied area and approach roads and village roads.
33	Taller/one-year-old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	Noted and agreed As per the recommendations during SEAC ToR Presentation of the proposal and commitment of PP a count of 500 Nos of trees were planted as a part of greenbelt development program all along the periphery of the lease applied area and approach roads and village roads.
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	Noted and agreed. Disaster management Plan is explicated in chapter 7.
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	Noted and agreed. Risk Assessment and management Plan is explicated in chapter 7.
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.	Noted and agreed Occupational Health impacts of the project elaborately discussed in chapter 10.
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.	Noted and agreed No Public Health Implications anticipated due to this project. The anticipated impact and effective mitigation measures are discussed in the Chapter No. 4
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.	Noted and agreed Socio-economic studies were conducted within a 5-kilometer radius of the quarry site. Details of report given in Chapter 3.
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 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.	Noted and agreed. The details of the Project benefits are given in the Chapter No. 8.
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.	Noted and agreed.
42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit	Noted and agreed

	stating to abide the EMP for the entire life of mine.	The EMP has been prepared for the entire life of the mine i.e., up to the lease period.
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.	Noted and agreed

SEIAA STANDARD CONDITIONS		
Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted and agreed The Cluster management committee has been formed covering the existing and proposed quarries in the cluster
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.,	Noted and agreed The information will be shared to the cluster management committee during the monthly meeting.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Noted and agreed The list of members of the committee formed will be submitted to AD/Mines before resuming the mining operation.
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.	Noted and agreed It is an existing Granite quarry the blasting will be used occasionally for the removal of overburden only the blasting frequency and usage of haul roads are discussed.
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.	Noted and agreed The risk management plan and disaster management plan has been prepared and enclosed in this EIA report, Chapter No. 7.
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.	Noted and agreed Environmental policy of the cluster management committee is detailed in the EIA Report Chapter No. 6
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.	Noted and agreed The Restoration strategy is discussed in the progressive mine closure plan and enclosed in the Scheme of Mining plan.

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.	Noted and agreed The information on the health of the workers and the local people will be updated periodically along with medical examination.
Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present is considerably low. The Mining operation will be carried out to reduce the impact further to the level of negligence.
10	Impact on soil flora & vegetation around the project site.	The vegetation details have been provided in chapter III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
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.	Noted and agreed There are no trees within the existing quarry site, and therefore, no proposal for tree felling or removal is anticipated during the quarrying operations.
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.	Noted and agreed The details of the soil analysis and the impacts are given in the Chapter No 3 & 4.
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted and agreed The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock	Noted and agreed The project area is situated centre part of the quarry lands. The proposed Rough Stone quarrying operation will employ the wet drilling method, which is expected to have negligible impacts on nearby agricultural lands.
Forests		
15	The project proponent shall detailed study on impact of mining on Reserve forests and free	Noted and agreed. There is no Reserve Forest within 1km radius from the project area. The mining operation will not

	ranging wildlife	cause any significant impact to the Reserve Forest and Wild life Sanctuaries
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	There is no forest/wildlife within 10km radius, chapter 3 details of Ecology and Biodiversity, and 4 endemic vulnerable and endangered indigenous flora and fauna.
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection	Details are discussed in the Chapter No.3
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site	Anticipated Environment Impact and Mitigation measures are detailed in Chapter No.4
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	There are 9 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
20	Erosion Control measures	Details discussed in the chapter No.4
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.	Details in Chapter 3
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	Details are given in the Chapter No 4.
24	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies	Details in Chapter 4 impact of bio diversity.

	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	Details of impact on soil environment is detailed in Chapter No.4
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites	Bolampatti I R.F. 29.5km-SW There is, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area. Ecological Environment is discussed under Chapter 3
27	The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including environmental stress. c) Sediment geochemistry in the surface streams.	There are 10 open wells and 7 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	Noted and agreed. Control measures of Noise, Air Water, Dust discussed in chapter 4
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 sinks and temperature reduction including control of other emission and climate mitigation activities	Noted and agreed. Details discussed in chapter 4.
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	Noted and agreed. Details are discussed in chapter 3.
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), and ozone (O ₃)

		Carbon dioxide (CO₂): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane (CH₄): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N₂O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
EMP		
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	Noted and agreed Detailed EMP discussed in chapter 10.
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.	Noted and agreed. Detailed EMP discussed in chapter 10.
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Noted and agreed. Risk Assessment and management Plan explicated in chapter 7.
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.	Noted and agreed. Disaster management Plan details given in Chapter-7

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.	Letter obtained from the VAO regarding surface features within 300m radius
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.	Noted and agreed. It will be updated in final EIA/EMP report.
39	The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecological risks and impacts of plastic & micro plastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported	Noted and agreed. Plastic waste management of the proposed project explicated in chapter 7.

Standard Terms of Reference for (Mining of minerals)		
S.No	Terms of Reference	Reply
1.1	An EIA-EMP Report shall be prepared for peak capacity (.....MTPA) operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.	Peak Production – 20075m ³ Depth – 32m bgl Mine Lease area – 1.00.11 Ha
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection can be for any season (three months) except monsoon.	Peak capacity of 20075m ³ operation to cover the impacts and environment management plan in chapter- IV and Chapter 10 covered in project specific activities. Baseline Data were collected for Post Monsoon Season Oct– Dec2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. III
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided.	Noted, Google earth image showing lease area with Coordinates of pillars in chapter-II.
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.	Land use and land cover of the 10km Radius of study area is discussed in Chapter No. III. Geology map of the project area covering 10km radius Figure No. 2.8. page No.22 Geomorphology of the area is given in Chapter No 2 Figure No 2.9, page no.23 There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.

1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	Land use and land cover of the study area is discussed in Chapter No. III with Physical features such as waterbodies, odai, canal etc.,
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	DEM data using Drainage pattern around 10km radius showing streams and lakes etc., discussed in Chapter No. 3.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted.	Drainage pattern around 10km radius showing streams and lakes etc., is discussed in Chapter No. 3.
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.	Details in chapter-2 showing the land features. And also enclosed Approved 3 rd Scheme of mining plan in annexure.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.	It is an opencast quarrying operation proposed to operate in Mechanized method. The height and width of the bench will be maintained as 5m with 90⁰ 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.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.	Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.

1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channeling of the water courses, etc., approach roads, major haul roads, etc should be indicated.	Not Applicable. The details of waste dump management are given in the Chapter No. 4																																																										
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights	Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.5.																																																										
	<table><tr><th>Sno</th><th>ML. project Land use</th><th>Area under Surface Rights(ha)</th><th>Area Under Mining Rights(ha)</th><th>Area under Both (ha)</th></tr><tr><td>1</td><td>Agriculture Land</td><td></td><td></td><td></td></tr><tr><td>2</td><td>Forest Land</td><td></td><td></td><td></td></tr><tr><td>3</td><td>Grazing Land</td><td></td><td></td><td></td></tr><tr><td>4</td><td>Settlements</td><td></td><td></td><td></td></tr><tr><td>5</td><td>Others (Specify)</td><td></td><td></td><td></td></tr></table>	Sno	ML. project Land use	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under Both (ha)	1	Agriculture Land				2	Forest Land				3	Grazing Land				4	Settlements				5	Others (Specify)				<table><tr><th>Description</th><th>Present area (Ha)</th><th>Area required during the first five year (Ha)</th><th>Area at the end of lease period (Ha)</th></tr><tr><td>Area Under Quarry</td><td>Nil</td><td>0.74.9</td><td>0.74.9</td></tr><tr><td>Site Services</td><td>Nil</td><td>0.01.0</td><td>0.01.0</td></tr><tr><td>Roads</td><td>Nil</td><td>0.02.0</td><td>0.02.0</td></tr><tr><td>Green Belt</td><td>Nil</td><td>0.20.5</td><td>0.20.5</td></tr><tr><td>Unutilized Area</td><td>1.00.11</td><td>0.01.71</td><td>0.01.71</td></tr><tr><td>Grand Total</td><td>1.00.11</td><td>1.00.11</td><td>1.00.11</td></tr></table>	Description	Present area (Ha)	Area required during the first five year (Ha)	Area at the end of lease period (Ha)	Area Under Quarry	Nil	0.74.9	0.74.9	Site Services	Nil	0.01.0	0.01.0	Roads	Nil	0.02.0	0.02.0	Green Belt	Nil	0.20.5	0.20.5	Unutilized Area	1.00.11	0.01.71	0.01.71	Grand Total	1.00.11	1.00.11	1.00.11
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1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
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1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.	Baseline Data were collected for Post Monsoon Season Oct– Dec 2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air) / downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the	Details in chapter-3 showing the various sampling stations As per CPCB guidelines.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10km buffer zone i.e., dispersed in 10 km buffer area. In case of expansion, the	Air Quality Modelling and wind rose pattern for prediction of incremental GLC's of pollutant was carried out using AERMOD view 13 Model. Details in Chapter No. 4.
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.	Traffic density survey was carried out to analyses the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter-II.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need-based survey for CSR activities to be followed.	Detailed in chapter-3 socio-economic study with occupational status & economic status of the study area. The study should also include the status of infrastructural facilities and amenities present in the study area CSR are discussed under Chapter 8.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.	Detailed Ecology and biodiversity study in chapter-3

1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.	Detailed in chapter-4 population in the impact zone and measures for occupational health and safety and proposed occupational health in chapter-X
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.	Noted and agreed
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.	The ground water table is at 58-62m below ground level. In this project, ultimate depth is 32m Bgl It is inferred the quarrying activities in the Cumulative EIA project (Quarry) will not intersect the Ground water table.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.	Detailed in Chapter-IV Anticipated and mitigation measures of in the study area.
1.24	Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.	Total Water Requirement: 2.0 KLD Discussed under Chapter 2, Table No 2.15, The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Methodology And Instrument Used for Air Quality Analysis in chapter-3and Air Pollution control equipment (APCEs) in chapter-10 sub 10.2 Environmental policy.
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored.	Details in Machinery and equipment details in Chapter-2 Table No 2.16
1.27	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	Noted and agreed
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	A Risk Assessment and Disaster Preparedness and management Plan Chapter- 7
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	Detailed in Machinery and technology used Chapter-3 Table 3.17 – Methodology and Instrument Used for Air Quality Analysis Detailed study in chapter-4 Impact of choice of mining method and impact on air quality and blasting and noise and vibrations.

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

1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.	
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.	The Environment Monitoring Cell discussed under Chapter 6
1.42	d) To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at	The Environment Monitoring Cell discussed under Chapter 6
1.43	e) Environment Management Cell and its responsibilities to be clearly spell out in EIA/ EMP report	The Environment Monitoring Cell discussed under Chapter 6
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.	The Environment Monitoring Cell discussed under Chapter 6
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.	No litigation is pending in any court against this project
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.	Nanjarayan Bird Sanctuary – 23.3km –NE It will Submit final EIA/EMP report
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable	Noted and agreed
1.48	Details on the Forest Clearance should be given as per the format given: Total Mine lease area (ha): Total Forest Land (Ha) : Date of FC : Extent of Forest Land : Balance area for which FC is yet to be obtained: Status of application for diversion of forest Land:	Boluvampatti I R.F. 29.5km- SW Total Mine Lease area 1.00.11ha Details on the Forest Clearance will Submit final EIA/EMP report.
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report.	Noted and agreed.
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same. should be provided.	The outcome of public hearing will be updated in the final EIA/AMP report.
1.51	PP shall carry out survey through drone highlighting the ground reality for at least 10 minutes.	Noted and agreed

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

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.	Not applicable. This is not a violation category project. This proposal falls under B1 Category
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 applied land for quarrying is a Patta Land. Document is enclosed along with Approved Mining Plan as Annexure Volume 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.	Noted & agreed.
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).	Map showing – Project area is with adjacent quarries details is enclosed in Figure No.1.1 Project area boundary coordinates superimposed on Toposheet – Figure No. 1.1A Toposheet of the project area covering 10km radius – Figure No. 1.2 Geology map of the project area covering 10km radius - Figure No. 2.11
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.	Map showing – Geology map of the project area covering 10km radius - Figure No. 2.11 Geomorphological features are incorporated in the Toposheet map covering 10km radius around the project area Figure No. 2.12
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 applied area was inspected by the officers of Department of Geology 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	The proponent has framed their Environmental Policy and the same is discussed in the Chapter No 10.1.

	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.	It is an opencast quarrying operation proposed to operate in Mechanized 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 90° 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.	Noted & agreed. The study area considered for this study is 10 km radius 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 and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.3
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. There is no waste anticipated during this quarry operation. The entire quarried out rough stone will be transported to the needy customers. No Dumps is proposed outside the lease area.
12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not Applicable. There is no Forest Land involved in the proposed project area. The proposed project area is a Patta land. Approved Mining Plan is enclosed as Annexure Volume 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. 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.
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest within the Study Area.
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.	Not Applicable. There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
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	Not Applicable. There are no National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.

	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.	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
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 declared 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 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.	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.
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	Baseline Data were collected for Post Monsoon Season (Oct to Dec 2024) as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3.

	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 GLC's of pollutant was carried out using AERMOD Model. Details in Chapter No. 4,
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.	Total Water Requirement for this project is given in the chapter No 2, Table No 2.13.
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Water for dust suppression, greenbelt development and domestic use will be obtained from accumulated rainwater/seepage water in mine pits. Drinking water will be sourced from the approved water vendors, No 2, Table No 2.13.
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.	The rain water collected in the pits after spell of rain will be used for greenbelt development and dust suppression.
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 Quality discussed in Chapter No. 4.
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.	The ground water table is at 58-62m below ground level. The ultimate depth of this projects is P1 Pit – I: 134m (L) X 114m (W) X 27m BGL (D) P2 Pit I-28m (L) X 47m (W) X 1.5 BGL (D) Maximum depth is proposed in this EIA project is 37m.
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.	Details in Chapter 3 Water Environment
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.	Progressive greenbelt development plan has been prepared and discussed along with Recommended Species details are given in the Chapter 4, Table No.4.9
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.	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no much significant impact due to the proposed transportation from the project area. Details in Chapter 2.

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.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2. .
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Discussed in chapter No 2.
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.	Details in Chapter 10.
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.	Details in Chapter 10.
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Details in Chapter 4,
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.	Environment Management Plan Chapter 10.
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.	The outcome of public hearing will be updated in the final EIA/AMP report
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.	No litigation is pending in any court against this 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.	The proposed capital cost for Environmental Monitoring Programme is Rs 3,80,000/- and the recurring cost is Rs 76,000/- per annum for each project. Details in Chapter 6 .
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.	Details in Chapter 10.
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Details in Chapter 7.
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.	Details in Chapter.8.
44	Besides the above, the below mentioned general points are also to be followed: -	
A	Executive Summary of the EIA/EMP Report	Encloses as separate volume
B	All documents to be properly referenced with index and continuous page numbering.	All the documents are 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 are given properly.

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	Baseline monitoring reports are enclosed with mining plan
E	Where the documents provided are in a language other than English, an English translation should be provided.	Not Applicable.
F	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Will be enclosed along with Final EIA /EMP 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: 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: 4th August, 2009 are 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	Noted & agreed.
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.	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.	Surface Plan – Figure No. 2.2. Geological Plan – Figure No 2.9. Working Plan – Figure No 2.9. Closure Plan – Figure No.2.10.

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CHAPTER – 1: INTRODUCTION

1.0 Preamble

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

Rough Stone and Gravel are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed quarries of Kodangipalayam Rough Stone and Gravel Cluster Quarries consisting of Six Proposed quarries and Six existing quarries total extent of Cluster of **19.38.11Ha** in Kodangipalayam Village, Palladam Taluk Tiruppur District, Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

This EIA Report is prepared in compliance with ToR obtained for the below proposals in Table 1.1 and the Baseline Monitoring study has been carried out during the period of **Oct to Dec 2024**

TABLE 1.1: ToR OBTAINED PROJECTS

Code.	Proponent Name	Extent (Ha)	Terms of Reference (ToR)
P1	Thiru.R.Gunasekar	1.69.5	File No.11124. TOR Identification No. TO24B0108TN5770490N Dated:21.09.2024
P2	Thiru.P.Gowtham Rathinam	1.29.0	File No.11708. TOR Identification No. TO25B0108TN5264313N Dated:01.03.2025
P3	Thiru.D.R.Karuppusamy	1.00.11	File No.11106. TOR Identification No. TO24B0108TN5808597N Dated:06.03.2025

Source: ToR Letter's of the respective project proponents

1.1 Purpose of the report

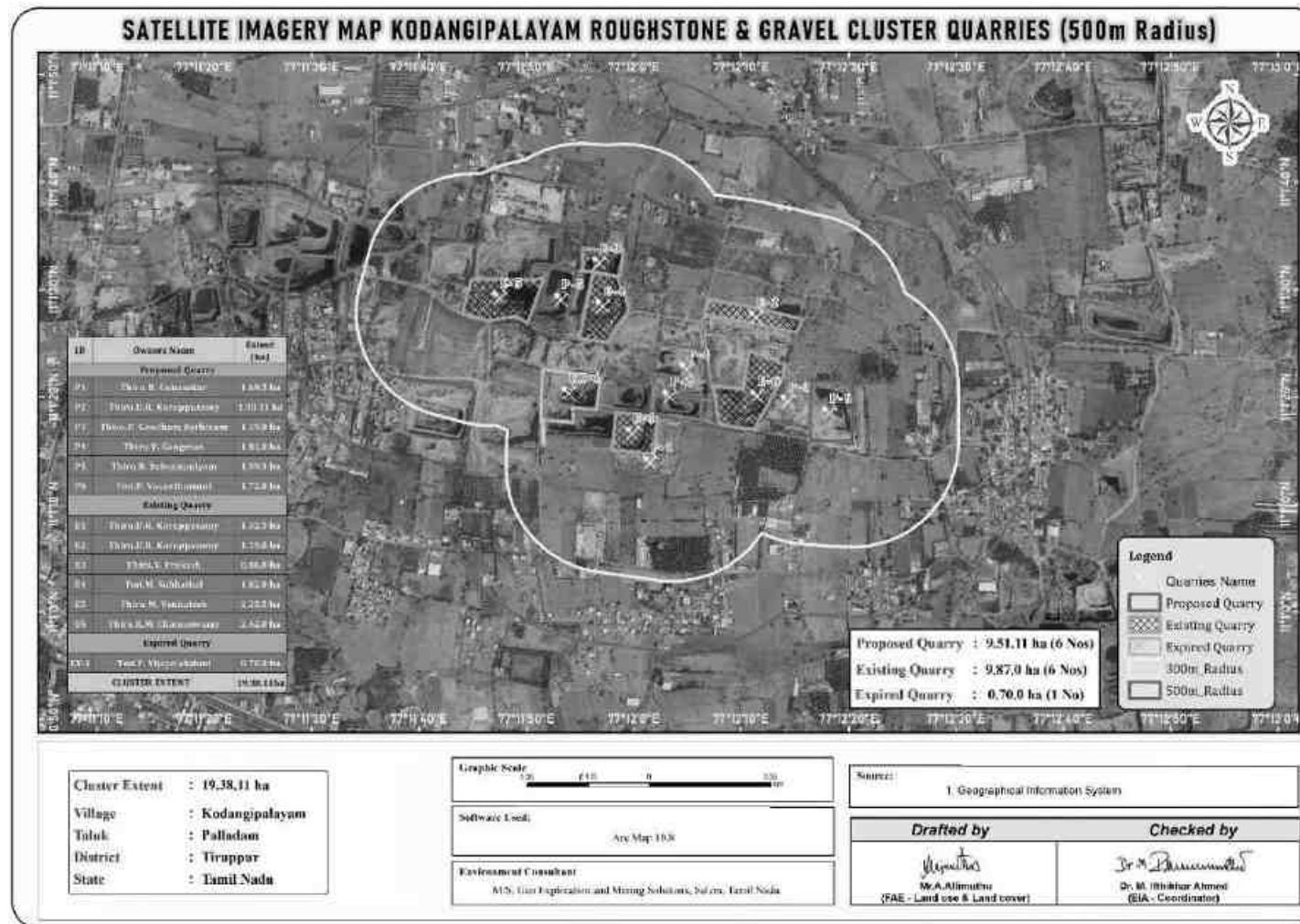
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 1889 of 20th April 2022, Mining Projects are classified under two categories i.e. A (> 250 Ha) and B ($\leq$ 250 Ha), and Schematic Presentation of Requirements on Environmental Clearance of Minor Minerals including cluster situation in Appendix – XI.

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

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

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

Figure 1.1. Satellite Imagery of Cluster quarries



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

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

1.2 Identification of Project and Project Proponent

1.2.1 Identification of Project

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

TABLE 1.2: PROPOSED PROJECTS IN THE CLUSTER

Description	P1	P2	P3
Name of the Project	Thiru.R.Gunasekar , Rough Stone & Gravel Quarry	Thiru.P.Gowtham Rathinam Rough stone & Gravel Quarry	Thiru.D.R. Karuppusamy Rough stone & Gravel Quarry
S.F. No.	103/3B2	91/1A(P)	102/2B
Extent	1.69.5 Ha	1.29.0 Ha	1.00.11
Village, Taluk	Kodangipalayam Village, Palladam Taluk,		
District	Tiruppur District		

Source: Approved Mining Plan

1.2.2 Identification of Project Proponent

TABLE 1.3: DETAILS OF PROJECT PROPONENT

PROPOSAL – P1	
Name of the Company	Thiru.R.Gunasekar
Address	S/o. M. Ramasamy, No. 3/176, Arul Jothy Nagar, Kodangipalayam Village, Karanampettai Post, Palladam Taluk, Tiruppur District – 641 662
Mobile	+91 98429 67273
Status	Proprietor (Individual)
PROPOSAL – P2	
Name of the Company	Thiru.P.Gowtham Rathinam
Address	S/o. Palanisamy, 1/17, Kangayampalayam Village, Sular Taluk, Coimbatore District – 641 401.
Mobile	+91 70107 82756
Status	Proprietor (Individual)
PROPOSAL – P3	
Name of the Company	Thiru.D.R.Karuppusamy
Address	S/o. Rangasamy, No. 1/403, Thatchenkadu, Devarayanpalayam, Palladam, Tiruppur District – 641 668
Mobile	+91 99443 67404
Status	Proprietor (Individual)

Source: Approved Mining Plan of the respective projects

1.3 Brief description of the project

1.3.1 Nature and size of the Project

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

TABLE 1.4: SALIENT FEATURES OF THE PROPOSED PROJECTS IN CLUSTER

SALIENT FEATURES OF PROPOSAL "P1"			
Name of the Mine	Thiru.R.Gunasekar Rough Stone & Gravel Quarry		
Land type & details	It is a Patta land classified as punjai (Barren land) It is a Patta land, registered in the name of applicant Thiru.R. Gunasekar vide patta no.1838		
Previous Land Ownership details	It is a fresh application. But the applied area has been considered quarrying operation earlier		
	S.No	Name of Lessee	Ditriect collector's Proceeding Number and date Lease Period
	1	Tmt.Ashwini Bala	Rc.No.2473/2005/X1 Dated: 17.12.2005 27.02.2006 to 26.02.2011
	2	Tmt.Ashwini Bala	Rc.No.128/Mines/2011 Dated: 07.03.2012 07.03.2012 To 06.03.2017 Premature Termination vide proceedings Rc.No.105/Mines/2016, dated: 04.11.2016
	3	Thiru.R.Gunasekar	Rc.no.737/Mines/2016, Dated: 16.04.2018 16.04.2018 to 15.04.2023
S.F. Nos	103/3B2		
Extent	1.69.5 Ha		
Maximum dimension of the existing quarry pit	Pit1: 134m (L) x 114m (W) x 27m(D)		
Geological Reserves	Rough Stone		Gravel
	413646m³		26484m³
Mineable Reserves	Rough Stone		Gravel
	94735m³		20252m³
Proposed Quantity of Reserves/Production for mining Period	94735m³		20252m³
Mining Plan Period / Lease Period	5 Years		
Ultimate Pit Dimension	167m (L) x 114m (W) x 37m (D) Max		
Proposed Depth of mining	37m		
Toposheet No	58 E/04		
Latitude	11°01'17.20"N to 11°01'22.10"N		
Longitude	77°12'01.36"E to 77°12'07.77"E		
Elevation	391m Amsl.		
Water table depth	The Ground water occurrence in this area is 58-62m depth below the ground level.		
Previous obtained Environmental Clearance	DEIAA-TPR/F.No.601/3(III)/2017 Dated:08.03.2018		
Machinery proposed	Jack Hammer		4
	Compressor		1

	Excavator with Bucket and Rock Breaker	1
	Tipper	3
Blasting	Usage of Slurry Explosive with MSD detonators	
Water Bodies	Odai	600m East
	Odai	1km SW
	Odai	3km East
	Samalapuram Lake	5.4km North
	Noyyal River	5.8km NW
	Sendevipalayam Check Dam	5.8km NW
Water requirement & source	Total water requirement for 1.5KLD from from existing, bore wells and drinking water will be sourced from Approved water vendors.	
Manpower Deployment	18 Nos	
Total Project Cost	Operational Cost	Rs. 1,29,43,000/-
	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 1,33,23,000/-
CER cost	Rs.5,00,000/-	
Nearest Habitation	460m-S	

Source: Approved Mining Plan of the respective proposals

SALIENT FEATURES OF PROPOSAL “P2”					
Name of the Mine	Thiru.P.Gowtham Rathinam Rough Stone & Gravel Quarry				
Land type & details	It is a Patta land. S.F. Nos 91/A(P) are jointly registered in the name of Tmt.P. Vasanthamani, Thiru.P. Mohan Rathinam and thiru.P. Gowtham Rathinam. vide patta no.1191. The applicant has obtained consent from the other pattadars				
Previous Land Ownership details	It is a fresh application. But the applied area has been considered quarrying operation earlier				
	S.No	Name of Lessee	S.F.No & Extent	Ditriect collector's Proceeding Number and date	Lease Period
	1	Thiru.R.Palanisamy	91/1(A) & 4.07.0	-	-
	2	Thiru.R.Palanisamy	91/1(A) & 4.07.0	Rc.No.2414/2005/X1 Dated: 19.12.2005	19.12.2005 to 18.12.2010
	3	Thiru.R.Palanisamy	91/1(A) & 4.07.0	Rc.no.20/Mines/2011, Dated: 02.09.2011	02.09.2011 to 01.09.2016
	4	Tmt.P.Vasanthamani	91/1(A) & 1.72.0	Rc.no.345/Mines/2016, Dated: 10.11.2017	10.11.2017 to 09.11.2022
S.F. Nos	91/1A (P)				
Extent	1.29.0 Ha				
Maximum dimension of the existing quarry pit	Pit I : 28m (L) x 47m (W) x 1.5m Bgl (D)				
Geological Reserves	Rough Stone		Gravel		

	449120m ³	30281m ³
Mineable Reserves	Rough Stone	Gravel
	1,35,250 m ³	23.205.5 m ³
Proposed Quantity of Reserves /Production for mining Period	1,35,250 m ³	23.205.5 m ³
Mining Plan Period / Lease Period	5 Years	
Ultimate Pit Dimension	103m (L) x 108m (W) x 37m Bgl (D) Max	
Proposed Depth of mining	37m below ground level	
Toposheet No	58 E/04	
Latitude	11°01'17.11"N to 11°01'21.30"N	
Longitude	77°12'11.91"E to 77°12'16.47"E	
Elevation	402m Amsl.	
Water table depth	The Ground water occurrence in this area is 68m depth below the ground level.	
Previous obtained Environmental Clearance	SEIAA-TN/F.No.5789/EC/1(a)/ No:3940/2016 Dated:14.07.2017	
Machinery proposed	Jack Hammer	4
	Compressor	1
	Excavator with Bucket and Rock Breaker	1
	Tipper	2
Blasting	Usage of Slurry Explosive with MSD detonators	
Water Bodies	Odai	350m East
	Odai	1.3km SW
	Odai	2.7km East
	Samalapuram Lake	5.5km North
	Noyyal River	6.0km NW
	Sendvipalayam Check Dam	6.2km NW
Water requirement & source	Total water requirement for 1.6KLD from from existing, bore wells and drinking water will be sourced from Approved water vendors.	
Manpower Deployment	19 Nos	
Total Project Cost	Operational Cost	Rs. 61,02,000/-
	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 64,82,000/-
CER cost	Rs.5,00,000/-	
Nearest Habitation	440m-SE	

Source: Approved Mining Plan of the respective proposals

SALIENT FEATURES OF PROPOSAL "P3"		
Name of the Mine	Thiru.D.R.Karuppusamy Rough Stone & Gravel Quarry	
Land type & details	It is a Patta land, Registered in the name of the applicant D.R.Karuppusamy S/o Rangasamy vide patta no.3143	
S.F. Nos	102/2B	
Extent	1.00.11 Ha	
Geological Reserves	Rough Stone	Gravel
	296280m ³	19752m ³
Mineable Reserves	Rough Stone	Gravel

	96110m ³	14196 m ³
Proposed Quantity of Reserves /Production for mining Period	96110m ³	14196 m ³
Mining Plan Period / Lease Period	5 Years	
Ultimate Pit Dimension	Pit1: 161m (L) x 48m (W) x 32m Bgl (D)	
Proposed Depth of mining	32m (2m Gravel + 30m Rough stone) below ground level	
Toposheet No	58 E/04	
Latitude	11°01'12.60"N to 11°01'14.87"N	
Longitude	77°11'57.79"E to 77°12'04.06"E	
Elevation	395m Amsl.	
Water table depth	The Ground water occurrence in this area is 58-62m depth below the ground level.	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Excavator with Bucket and Rock Breaker	1
	Tipper	2
Blasting	Usage of Slurry Explosive with MSD detonators	
Water Bodies	Odai	700m East
	Odai	920m SW
	Odai	3.1km East
	Samalapuram Lake	5.6km North
	Noyyal River	6km NW
	Sendeipalayam Check Dam	6km NW
Water requirement & source	Total water requirement for 2.0KLD from from existing, bore wells and drinking water will be sourced from Approved water vendors.	
Manpower Deployment	20 Nos	
Total Project Cost	Operational Cost	Rs.75,28,000/-
	EMP Cost	Rs.3,80,000/-
	Total Project cost	Rs.79,08,000/-
CER cost	Rs.5,00,000/-	
Nearest Habitation	330m-South	

Source: Approved Mining Plan of the respective proposals

1.3.2 Location of the project-P1

- The area is located in **S.F.Nos.103/3B2 of Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu State.**
- The entire quarry lease area falls in the Patta land, the lease applied area is exhibits flat terrain.
- The Altitude of the area is 391m (Maximum) above MSL.
- The area is mentioned in GSI Topo Sheet No. **58 - E/04**
- The Latitude between of **11°01'17.20"N to 11°01'22.10"N**
- The Longitude between of **77°12'01.36"E to 77°25'07.77"E** on WGS 1984datum

1.3.3 Location of the project-P2

- The area is located in **S.F.No. 91/1A(P) of Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu State.**
- The entire quarry lease area falls in the Patta land, the lease applied area is exhibits plain topography.
- The Altitude of the area is **402m** (Maximum) above MSL.
- The area is mentioned in GSI Topo Sheet No. **58 - E/04**
- The Latitude between of **11°01'17.11"N to 11°01'21.30"N**
- The Longitude between of **77°12'11.91"E to 77°12'16.47"E** on WGS 1984 datum.

1.3.4 Location of the project-P3

- The area is located in **S.F.No. 102/B of Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu State.**
- The entire quarry lease area almost plain topography.
- The Altitude of the area is **395m** (Maximum) above MSL.
- The area is mentioned in GSI Topo Sheet No. **58 - E/04**
- The Latitude between of **11°01'12.60"N to 11°01'14.87"N**
- The Longitude between of **77°11'57.79"E to 77°12'04.06"E** on WGS 1984 datum.

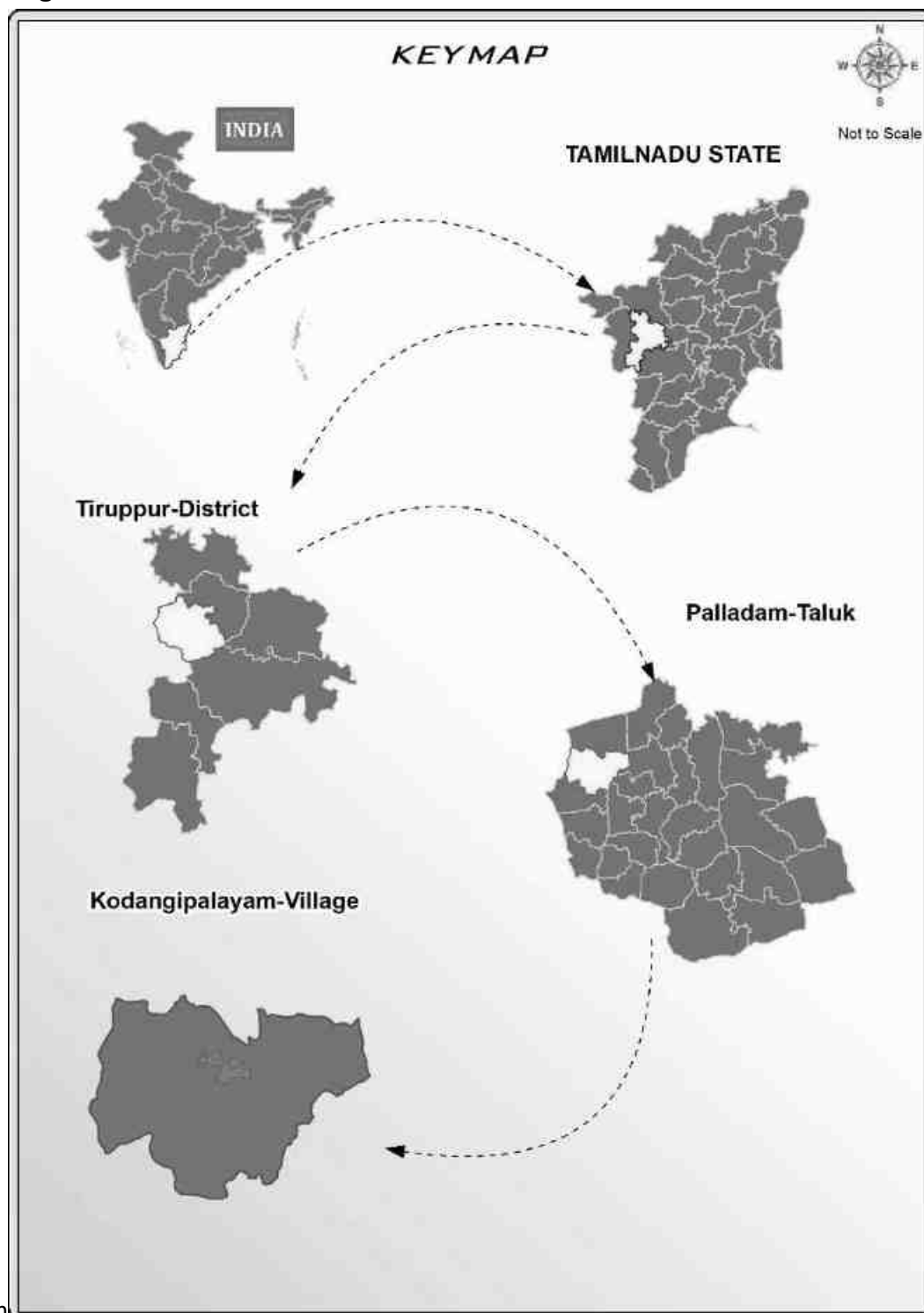
Figure 1.2 KEY MAP SHOWING THE LOCATION OF THE PROJECT SITE

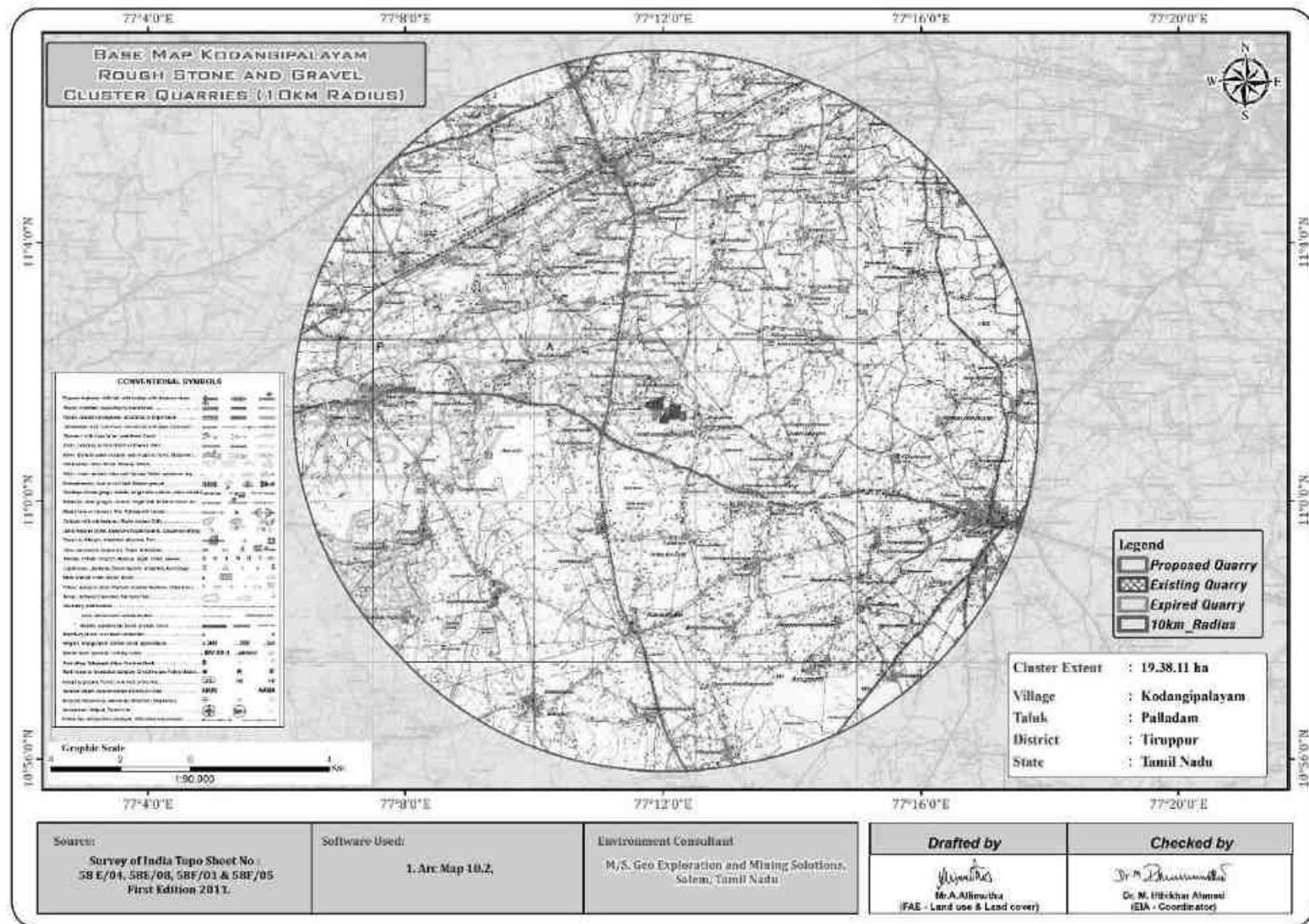
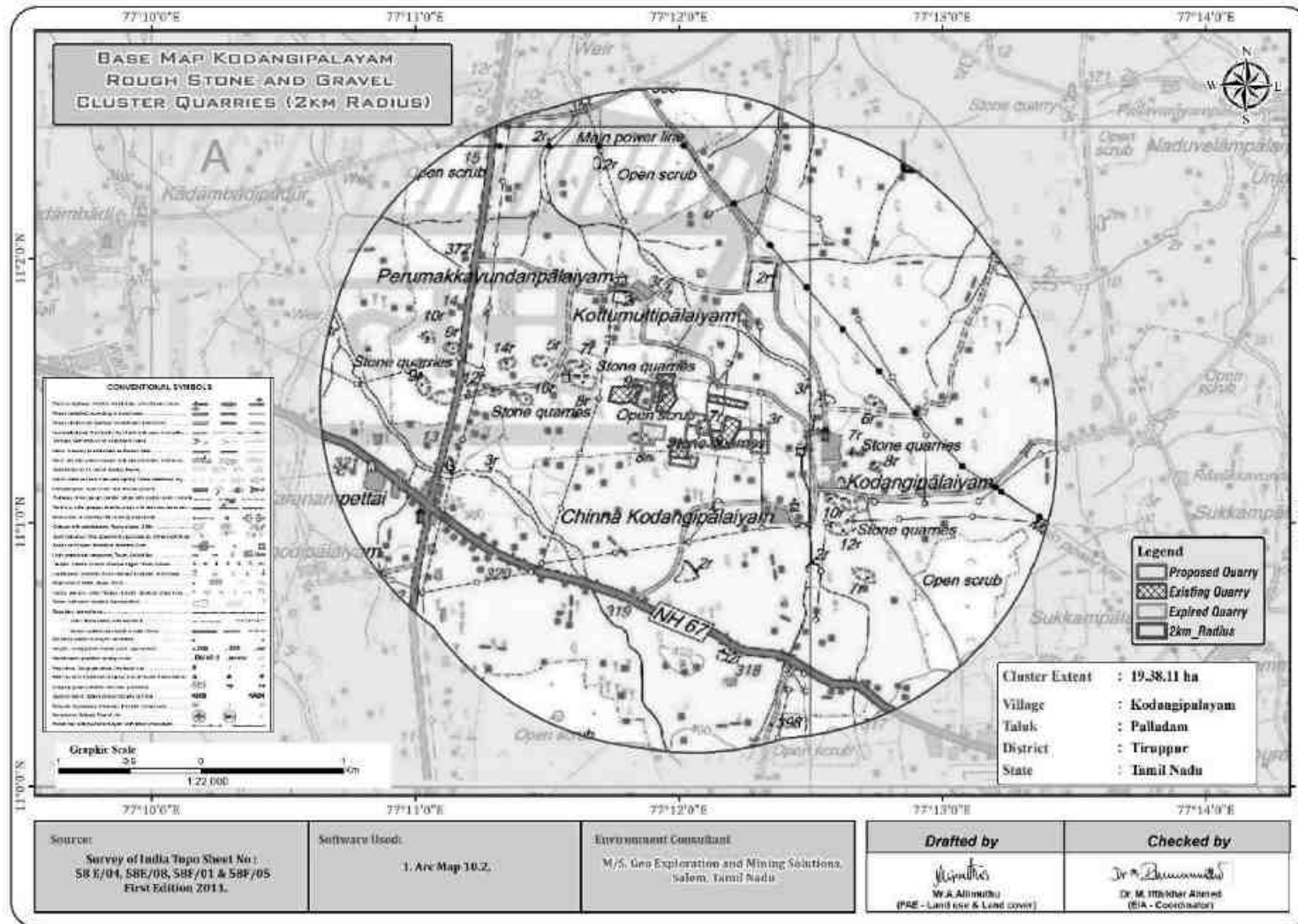
FIGURE 1.3: TOPOSHEET SHOWING LOCATION OF THE PROJECT SITE AROUND 10 KM RADIUS

FIGURE 1.4: TOPOSHEET SHOWING LOCATION OF THE PROJECT SITE AROUND 2 KM RADIUS

1.4 Environmental Clearance

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

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

SCREENING –

Project – P1

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 17.11.2016
- The precise area communication letter was received from the Assistant Director, Department of Geology and Mining, Tiruppur District vide Rc.No.737/Mines/2016, Dated: 16.04.2018
- The Mining plan was approved by the Assistant Director, Department of Geology and Mining, Tiruppur District vide Rc.No.737/Mines/2016 Dated: 12.06.2024.
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/485340/2023, Dated: 02.07.2024.

Project – P2

- The proponent applied for Rough Stone and Gravel Quarry Lease Date from 22.09.2022
- The precise area communication letter was received from the Deputy Director, Department of Geology and Mining, Tiruppur District and passed a Precise Area Communication letter vide Rc.No.660/Mines/2022, Dated:14.09.2023
- The Mining plan was approved by the Deputy Director, Department of Geology and Mining, Tiruppur District vide Rc.No.660/Mines/2022, Dated:13.12.2023
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/519258/2025, Dated:20.01.2025

Project – P3

- The proponent applied for Rough Stone and Gravel Quarry Lease Date from 21.07.2023
- The Precise area communication letter was received from the District collector Tiruppur Vide Rc.No.448/Mines/2023, Dated: 11.01.2024
- The Mining Plan was got approval by the Deputy Director, Department of Geology and Mining, Tiruppur vide Rc. No. 448/Mines/2023 Dated: 12.06.2024
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/488336/2024, Dated:18.07.2024

SCOPING –

Project – P1

- The proposal was placed in 492nd SEAC meeting held on 29.08.2024 and the committee recommended for issue of ToR.
- The proposal was considered in 753rd SEIAA meeting held on 10.09.2024 & 11.09.2024 and issued ToR vide File No. 11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024.

Project – P2

- The proposal was placed in 532th SEAC meeting held on 13.02.2025 and the committee recommended for issue of ToR.
- The proposal was considered in 798th SEIAA meeting held on 26.02.2024 and issued ToR vide File No. 11708 TOR Identification No. TO25B0108TN5264313N Dated: 01.03.2025

Project – P3

- The proposal was placed in 492nd SEAC meeting held on 29.08.2024 & 533rd SEAC meeting held on 13.02.2025 and the committee recommended for issue of ToR.
- The proposal was considered in 799th SEIAA meeting held on 03.03.2025 & 04.03.2025 and issued ToR vide Letter No File no.1106TOR Identification No. TO24B0108TN5808597N Dated: 06.03.2025

Public Consultation –

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with this Draft EIA/ EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

Appraisal –

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

The report has been prepared using the following references:

- Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, 2010
- EIA Notification, 14th September, 2006
 - *File No.11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024 -P1*
 - *File No.11708 TOR Identification No. TO25B0108TN5264313N Dated: 01.03.2025 –P2*
 - *File No.11106 TOR Identification No. TO24B0108TN5808597N Dated: 06.03.2025 –P3*

Approved Mining of P1 to P3 the Rough stone and Gravel quarry projects

1.5 Post Environment Clearance Monitoring

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

1.6 Generic Structure of EIA Document

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC. A brief description of each Chapter is presented in Table No. 1.5.

TABLE 1.5 – STRUCTURE OF THE EIA REPORT

S. No	Chapters	Title	Particulars
1	Chapter 1	Introduction	Presents, an Introduction along with Scope and Objective of this EIA/EMP Studies
2	Chapter 2	Project Description	Presents the Technical Details of the Project
3	Chapter 3	Description of Environment	Presents the Baseline Status for various Environmental Parameters in the Study Area for One Season (3 Months)
4	Chapter 4	Anticipated Environmental Impacts and Mitigation Measures	Presents the Identification, Prediction and Evaluation of overall Environmental Impacts due to the Proposed Projects Activities. Also presents Proposed Mitigation Measures.
5	Chapter 5	Analysis of Alternatives (Technology & Site)	Presents Analysis of alternatives with respect to site
6	Chapter 6	Environment Monitoring Programme	Present details of post project environment monitoring
7	Chapter 7	Additional Studies	Presents Public Consultation, Risk Assessment and Disaster Management Plan

8	Chapter 8	Project Benefits	Presents project benefits as: Improvements in the Physical Infrastructure, Social Infrastructure Employment Potential –Skilled; Semi-Skilled and Unskilled etc.,
9	Chapter 9	Cost Benefit Analysis	Environmental Cost Benefit Analysis has not been recommended at Scoping Stage – thus no analysis carried out separately in this EIA/EMP Report
10	Chapter 10	Environmental Management Plan	Description of the administrative aspects to ensure the Mitigation Measures are implemented and their effectiveness monitored, after approval of the project.
11	Chapter 11	Summary & Conclusion	Summary of the EIA Report
12	Chapter 12	Disclosure of Consultants Engaged	Disclosure of the Consultants

1.7 Scope of the Study

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the summer season Oct to Dec 2024 for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project.

TABLE 1.6 – ENVIRONMENT ATTRIBUTES

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

Source: Field Monitoring Data

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

1.7.1 Regulatory Compliance & Applicable Laws/Regulations

- Application for Quarrying Lease as per Tamil Nadu Minor Mineral Concession Rules, 1959
- Obtained Precise Area Communication Letter as per Tamil Nadu Minor Mineral Concession Rules, 1959 for Preparation of Mining Plan and obtaining Environmental Clearance
- The Mining Plan of Rough Stone and Gravel quarry has been approved under Rule 41 & 42 as amended of Tamil Nadu Minor Mineral Concession Rules, 1959
- Environment Protection Act, 1986
- ToR from SEIAA –
- ***File No.11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024 -P1***
- ***File No.11708 TOR Identification No. TO25B0108TN5264313N Dated: 01.03.2025 –P2***
- ***File No.11106 TOR Identification No. TO24B0108TN5808597N Dated: 06.03.2025 –P3***
- Approved Mining of P1 to P3 the Rough stone and Gravel cluster quarry projects

CHAPTER – 2: PROJECT DESCRIPTION

2.0 General

The Proposed Rough Stone and Gravel cluster Quarries requires Environmental Clearance. There are three proposed quarries forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 19.38.11Ha.

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

2.1 Description of the Project

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

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

2.2 Location of the Project

Location of the project-P1

- The area is located in **S.F.Nos.103/3B2 of Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu State.**
- The entire quarry lease area falls in the Patta land, the lease applied area is exhibits flat terrain.
- The Altitude of the area is 391m (Maximum) above MSL.
- The area is mentioned in GSI Topo Sheet No. **58 - E/04**
- The Latitude between of **11°01'17.20"N to 11°01'22.10"N**
- The Longitude between of **77°12'01.36"E to 77°25'07.77"E** on WGS 1984datum

Location of the project-P2

- The area is located in **S.F.No. 91/1A(P) of Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu State.**
- The entire quarry lease area falls in the Patta land, the lease applied area is exhibits plain topography.
- The Altitude of the area is **402m** (Maximum) above MSL.
- The area is mentioned in GSI Topo Sheet No. **58 - E/04**
- The Latitude between of **11°01'17.11"N to 11°01'21.30"N**
- The Longitude between of **77°12'11.91"E to 77°12'16.47"E** on WGS 1984 datum.

Location of the project-P3

- The area is located in **S.F.No. 102/B of Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu State.**
- The entire quarry lease area almost plain topography.
- The Altitude of the area is **395m** (Maximum) above MSL.
- The area is mentioned in GSI Topo Sheet No. **58 - E/04**
- The Latitude between of **11°01'12.60"N to 11°01'14.87"N**
- The Longitude between of **77°11'57.79"E to 77°12'04.06"E** on WGS 1984 datum.

- The projects under the cluster are classified as patta land (Non-Forest Land) & does not fall within 10 km radius of any Eco – sensitive zone, Wild life Sanctuary, National Park, Tiger Reserve, Elephant Corridor and Biosphere Reserves.

TABLE 2.1: SITE CONNECTIVITY TO THE CLUSTER QUARRIES

Nearest Roadway	NH 81-Coimbatore to Trichy-1.2km- South SH-165 - Annur- Kamanaichenpalayam
Nearest Village	Kodangipalayam- 770m- SE
Nearest Town	Palladam 9.5km- SE
Nearest Railway	Somanur Railway Station 7.2km- NW
Nearest Airport	Coimbatore Airport – 17Km - W
Seaport	Kochi- 155 Km-SW

Source: Survey of India Toposheet.

The cluster quarries corners co-ordinates are given below.

TABLE 2.2 – BOUNDARY CO-ORDINATES OF PROPOSED PROJECTS

P1		
S.No	Latitude	Longitude
1	11°01'18.23"N	77°12'01.36"E
2	11°01'18.43"N	77°12'01.39"E
3	11°01'21.09"N	77°12'01.70"E
4	11°01'22.10"N	77°12'01.84"E
5	11°01'21.84"N	77°12'04.36"E
6	11°01'20.32"N	77°12'04.20"E
7	11°01'19.91"N	77°12'07.30"E
8	11°01'17.20"N	77°12'07.77"E
9	11°01'17.80"N	77°12'04.70"E
10	11°01'18.07"N	77°12'03.26"E
Datum: UTM-WGS84 Zone 43 N		

Source: Mine Lease Plan of the respective proposals

P2		
S.No.	Latitude	Longitude
1	11°01'17.98"N	77°12'11.91"E
2	11°01'21.30"N	77°12'13.81"E
3	11°01'21.27"N	77°12'16.47"E
4	11°01'17.11"N	77°12'16.41"E
P3		
S.No.	Latitude	Longitude
1	11°01'14.81"N	77°11'58.01"E
2	11°01'14.57"N	77°12'01.93"E
3	11°01'14.87"N	77°12'01.89"E
4	11°01'14.72"N	77°12'04.06"E
5	11°01'14.42"N	77°12'04.06"E
6	11°01'12.60"N	77°12'03.41"E
7	11°01'13.27"N	77°11'57.79"E

FIGURE 2.1: TOPOGRAPHICAL VIEW OF THE PROJECT SITE**P1- Thiru.R. Gunasekar**



P2- Thiru.P. Gowtham Rathinam



P3- Thiru.D.R. Karuppusamy

FIGURE 2.2: FENCING AND GREENBELT OF THE PROJECT SITE-P1



P1- Thiru.R. Gunasekar

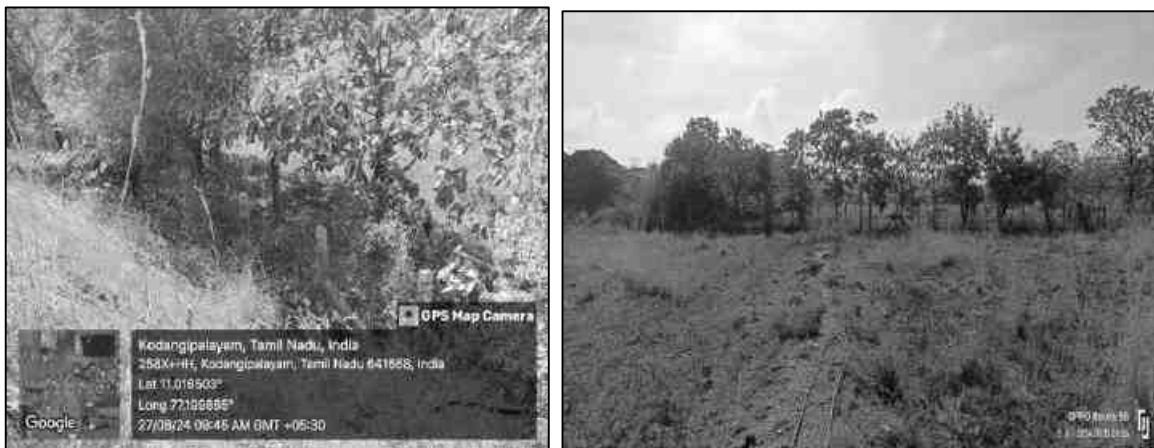
**P2- Thiru.P. Gowtham Rathinam****P3- Thiru.D.R. Karuppusamy**

FIGURE 2.5: SHOWING GOOGLE IMAGE ROUGH STONE AND GRAVEL QUARRY PROJECT AREAS P1-P3**SATELLITE IMAGERY OF P1**



SATELLITE IMAGERY OF P2



SATELLITE IMAGERY OF P3

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	11° 01' 18.23"N	77° 12' 01.30"E
2	11° 01' 18.43"N	77° 12' 01.38"E
3	11° 01' 21.06"N	77° 12' 01.70"E
4	11° 01' 22.10"N	77° 12' 01.84"E
5	11° 01' 21.54"N	77° 12' 04.36"E
6	11° 01' 20.32"N	77° 12' 04.20"E
7	11° 01' 18.61"N	77° 12' 07.30"E
8	11° 01' 17.28"N	77° 12' 07.77"E
9	11° 01' 17.80"N	77° 12' 04.70"E
10	11° 01' 18.01"N	77° 12' 03.26"E

DATUM : WTM-WGS84

PLATE NO-II
DATE OF SURVEY : 18.01.2024

APPLICANT:
THIRUJGUNASEKAR,
S/O RAMASAMY,
W/o ARULJOITHI NAGAR,
KARANAMPATTAL BULTR,
COIMBATORE DISTRICT

LOCATION OF QUARRY LEASE APPLIED AREA:
R.F.NO : 103/3B2,
EXTENT : 1.895 Ha.,
VILLAGE : KODANGIPALAYAM,
TALUK : PALLADAM,
DISTRICT : TIRUPUR,
STATE : TAMIL NADU.

INDEX

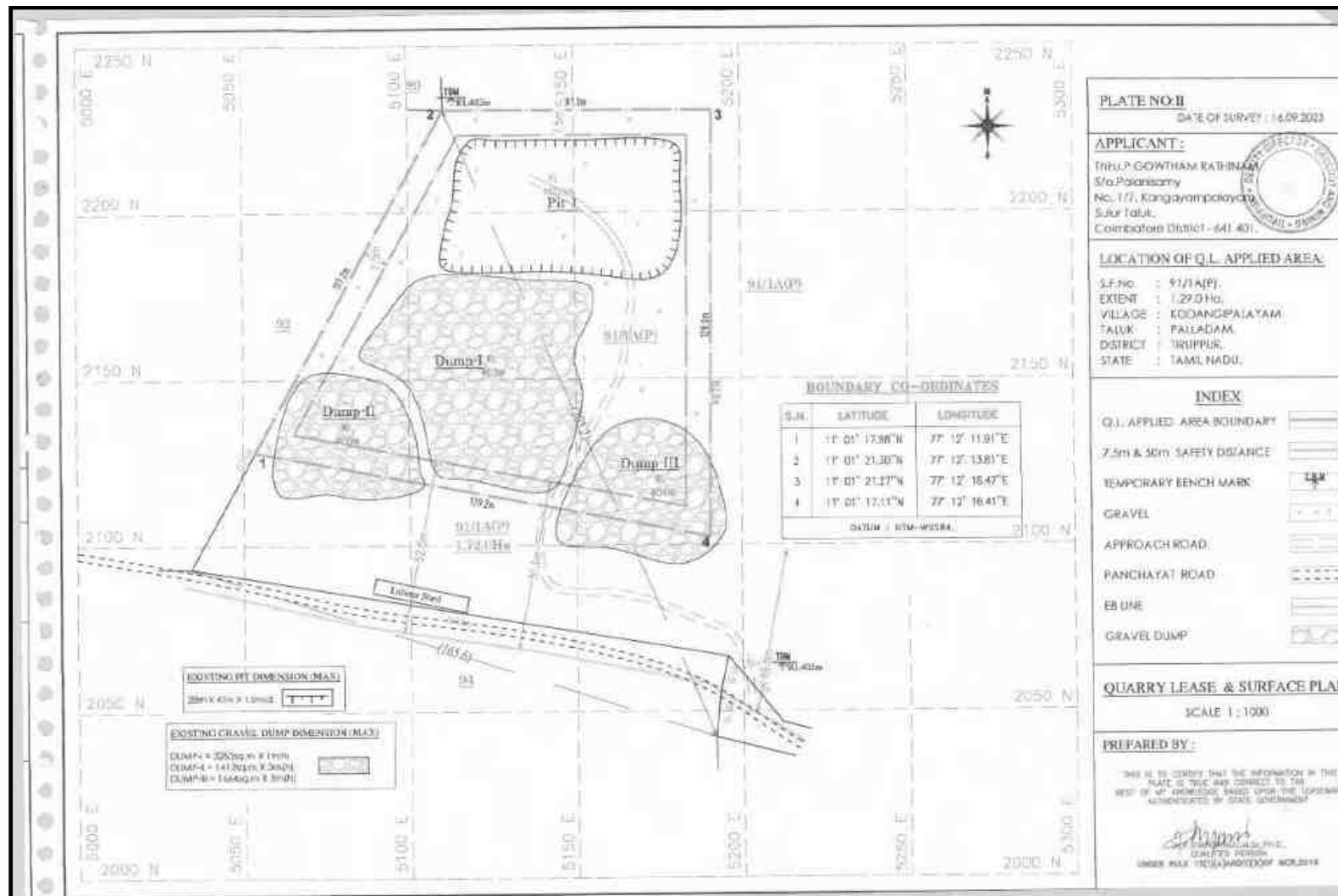
- Q.L. AREA BOUNDARY
- 1:20m & 10m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- APPROACH ROAD
- TREES
- QUARRY PIT
- QUARRY ROAD
- GRAVEL DUMP

QUARRY LEASE & SURFACE PLAN
SCALE 1:1000

PREPARED BY:
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE CERTAIN INFORMATION RECEIVED FROM THE GOVERNMENT.
[Signature]
SUBVENERY ENGINEER
UNDER RULE 19(2) GOVERNMENT ORDER 2019

Existing Pit Dimension
(34m(L) x 14m(W) x 27m(D))

23



P2- Thiru.P. Gowtham Rathinam

P3- Thiru.D.R. Karuppusamy

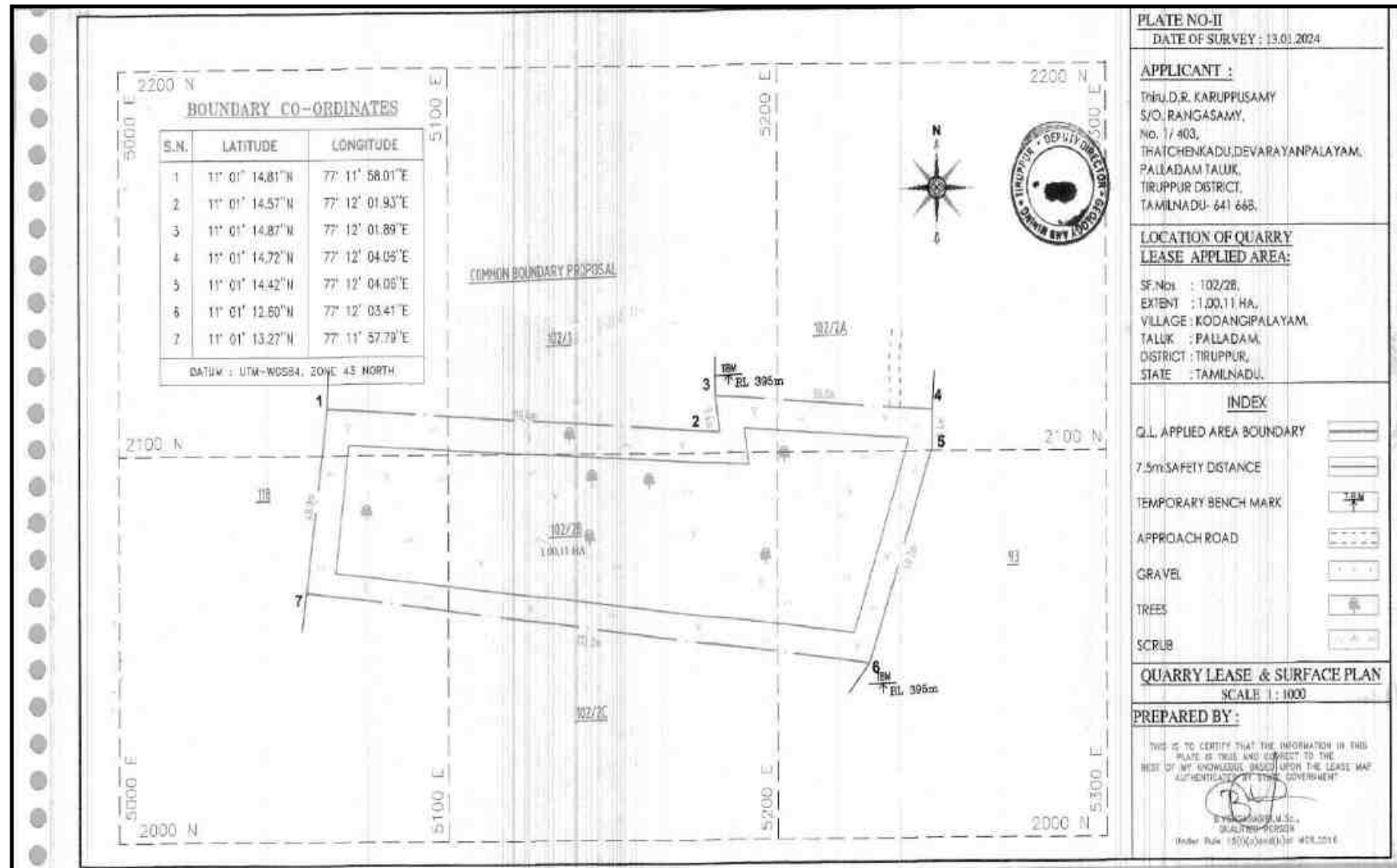


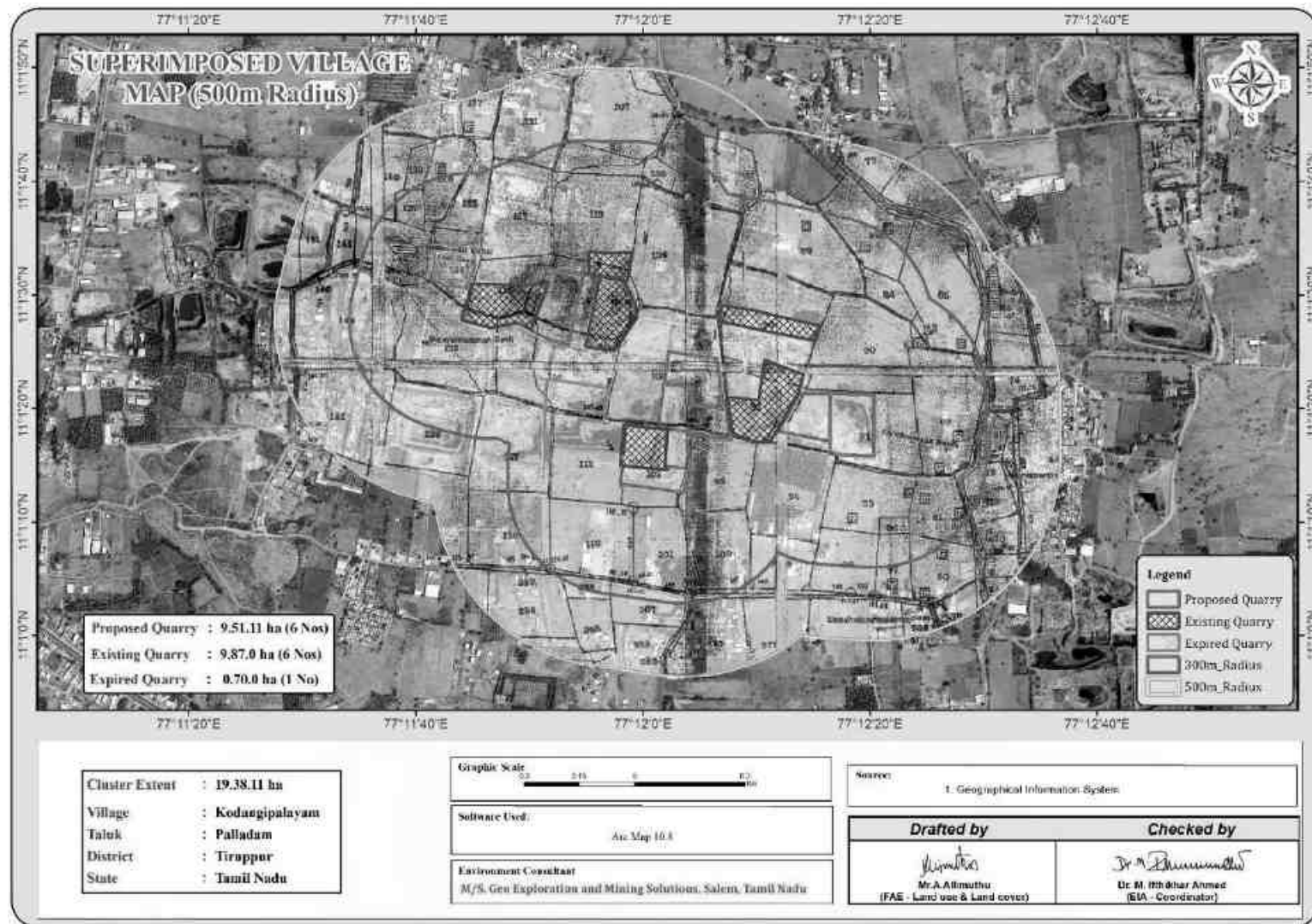
FIGURE 2.7: SUPERIMPOSED VILLAGE MAP

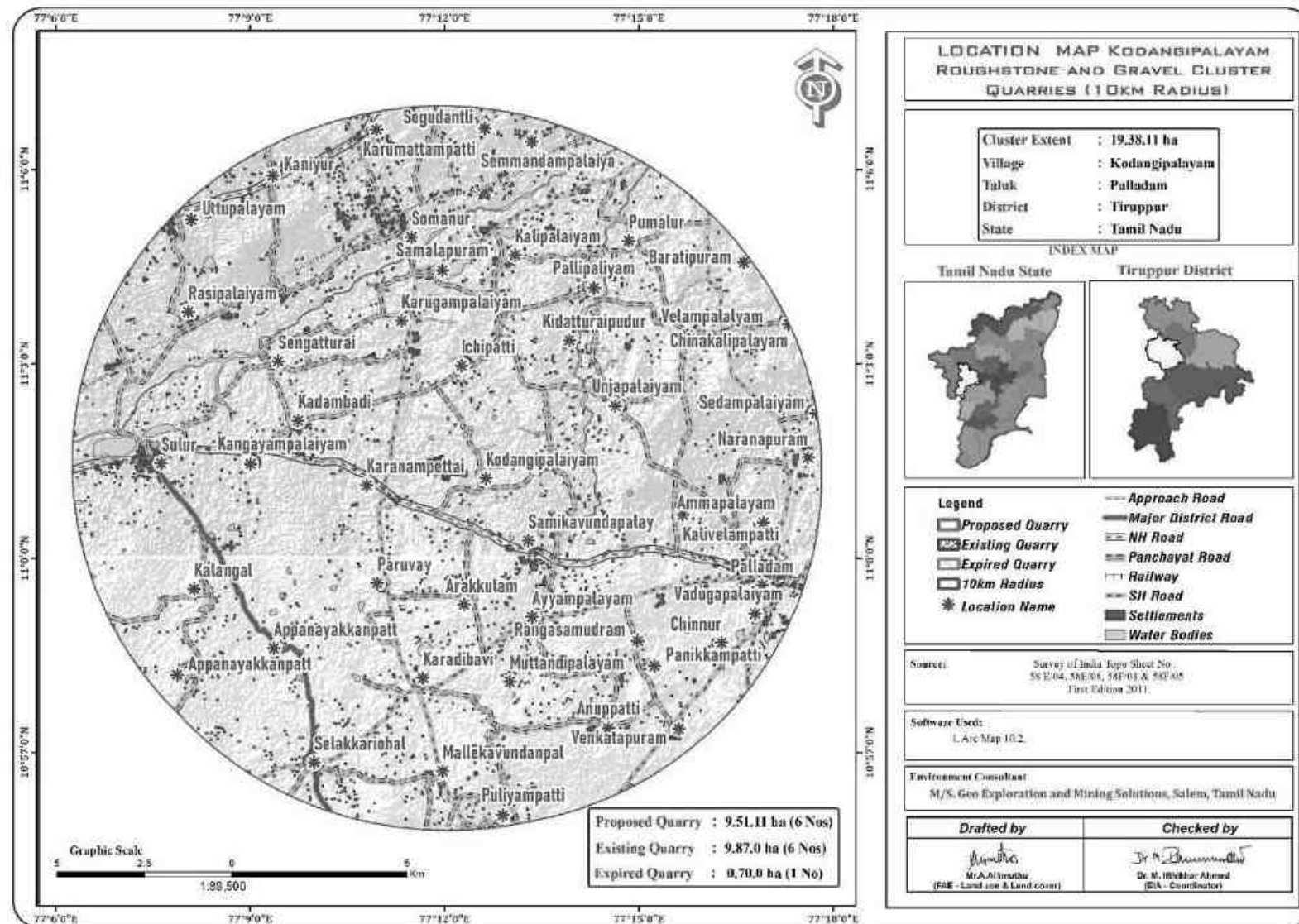
FIGURE 2.8: DIGITIZED MAP OF THE STUDY AREA (10 KM RADIUS FROM PROJECT SITE)

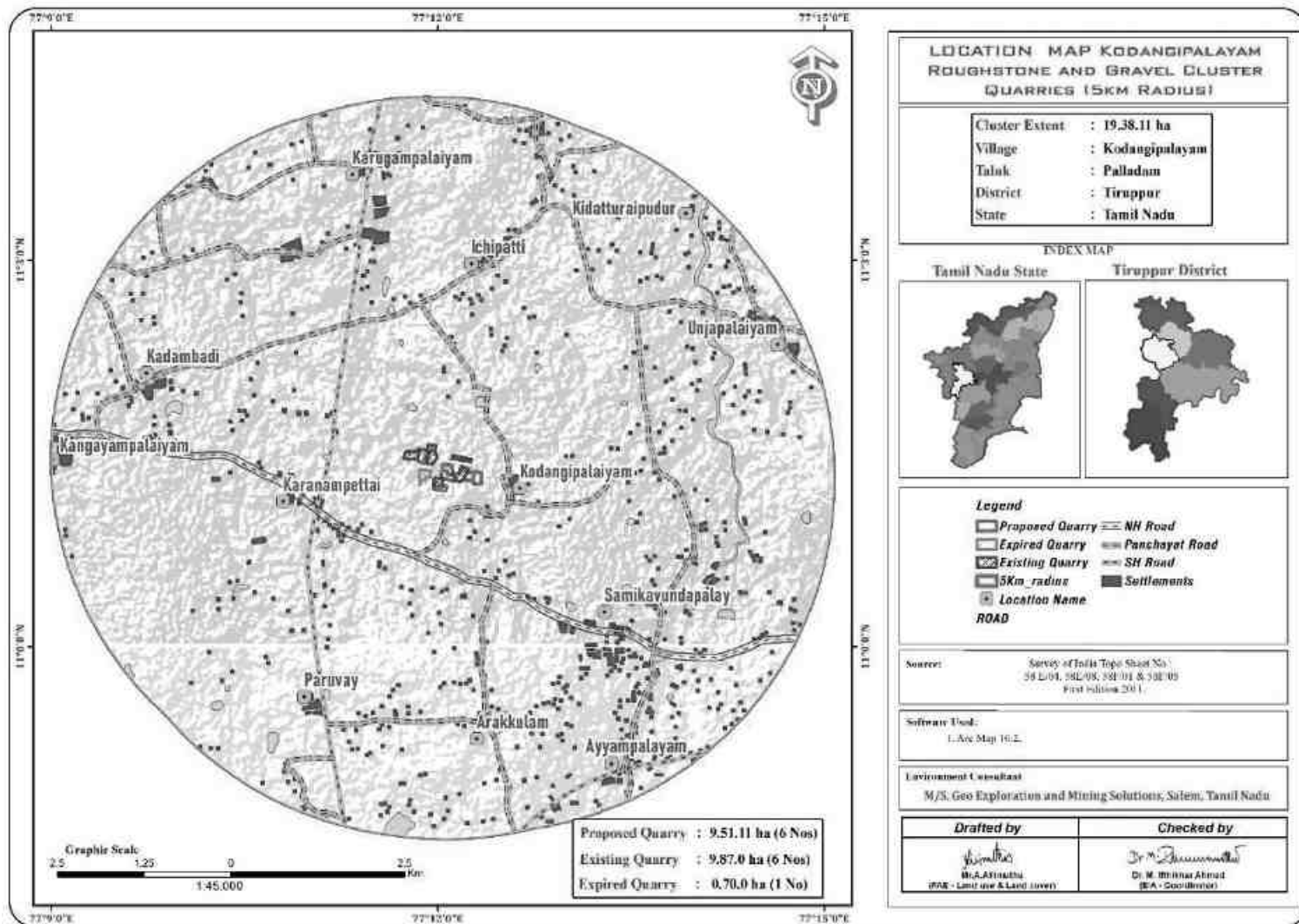
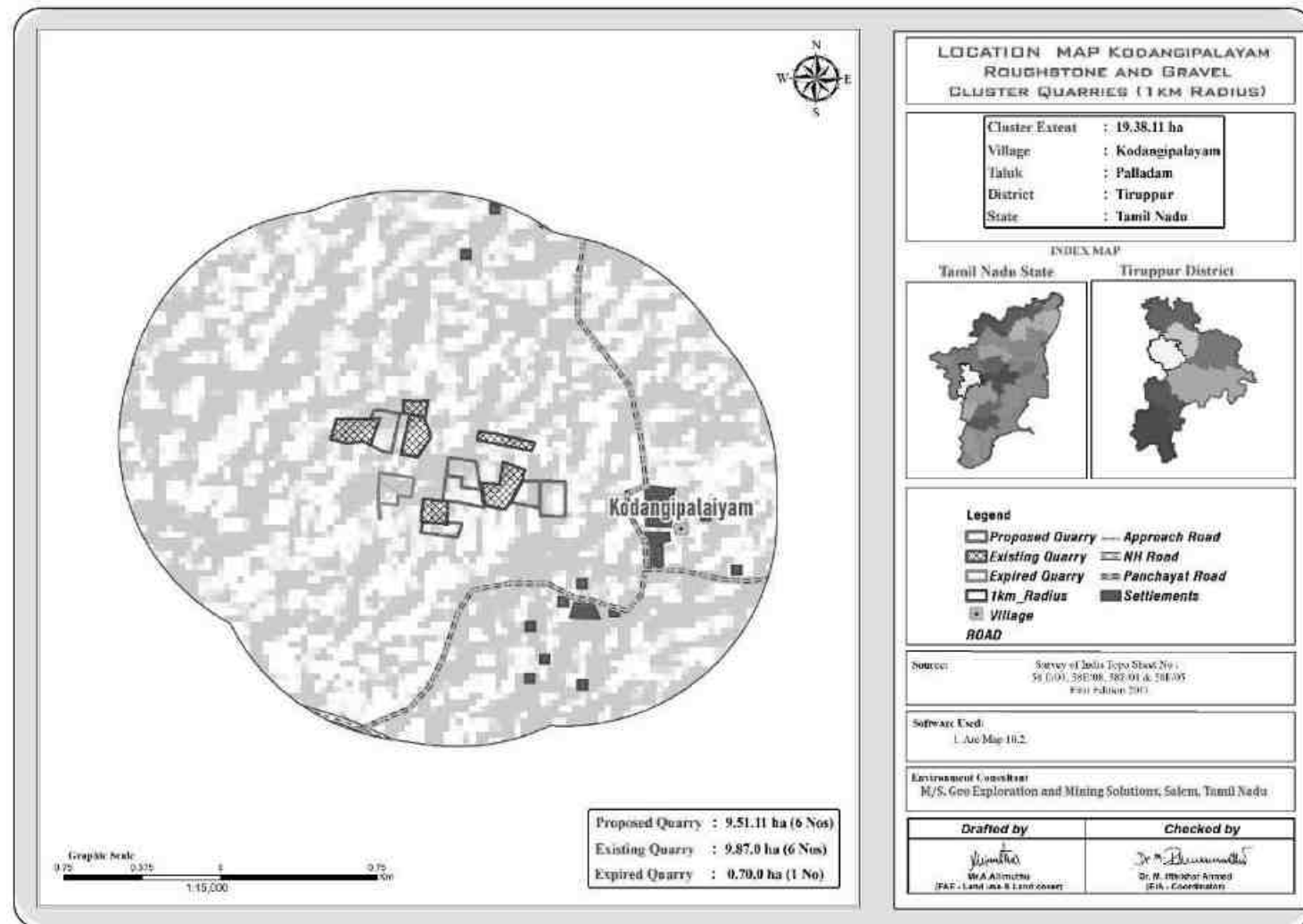
FIGURE 2.9: DIGITIZED MAP OF THE STUDY AREA (5 KM RADIUS FROM PROJECT SITE)

FIGURE 2.10: DIGITIZED MAP OF THE STUDY AREA (1 KM RADIUS FROM PROJECT SITE)

2.2.1 Project Area

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

TABLE 2.3 – LAND USE PATTERN OF THE PROPOSED PROJECTS P1-P3

LAND USE PATTERN OF PROJECT – P1			
Description	Present area in (ha)	Area at the end of life of quarry (Ha)	
Area under quarrying	1.25.0	1.45.0	
Dump	0.014.0	Nil	
Sire Services	Nil	0.02.0	
Roads	0.01.0	0.02.0	
Green Belt	Nil	0.12.5	
Un – utilized area	0.29.5	0.08.0	
Grand Total	1.69.5	1.69.5	
LAND USE PATTERN OF PROJECT – P2			
Description	Present area in (ha)	Area at the end of life of quarry (Ha)	
Area under quarrying	0.27.70	0.96.00	
Infrastructure	Nil	0.01.0	
Dump	0.54.65	Nil	
Roads	0.01.0	0.02.0	
Green Belt	Nil	0.30.0	
Unutilized area	0.45.65	Nil	
Grand Total	1.29.00	1.29.00	
LAND USE PATTERN OF PROJECT – P3			
Description	Present area in (ha)	Area required during the first five year (ha)	Area at the end of life of quarry (Ha)
Area Under Quarry	Nil	0.74.9	0.74.9
Site Services	Nil	0.01.0	0.01.0
Roads	Nil	0.02.0	0.02.0
Green Belt	Nil	0.20.5	0.20.5
Unutilized Area	1.00.1	0.01.7	0.01.7
Grand Total	1.00.1	1.00.1	1.00.1

Source: Approved Mining Plan

2.2.2 Size or Magnitude of Operation

TABLE 2.4: OPERATIONAL DETAILS FOR PROPOSED PROJECTS

OPERATIONAL DETAILS FOR PROJECT – P1		
PARTICULARS	DETAILS	
	Rough Stone (m³) (5Year Plan period)	Gravel (m³) (3 Years Plan period)
Geological Resources	413646 m³	26484 m³
Mineable Reserves	94735 m³	20252m³
Production for five-year plan period	94735 m³	20252m³
Mining Plan Period / Lease Applied Period	5Years	
Number of Working Days	300 Days	
Production per day	63	68
No of Lorry loads (12m³ per load)	5	6
Total Depth of Mining	37m Bgl.	
OPERATIONAL DETAILS FOR PROJECT – P2		
PARTICULARS	DETAILS	
	Rough Stone (m³) (5Year Plan period)	Gravel (m³)
Geological Resources	449120m³	30281 m³

Mineable Reserves	135250 m ³	23205.5-
Production for five years Plan	135250 m ³	23205.5-
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Da	
Production per day	90	26
No of Lorry loads (12m ³ per load)	5	2
Total Depth of mining	37m bgl	
OPERATIONAL DETAILS FOR PROJECT – P3		
PARTICULARS	DETAILS	
	Rough Stone (m ³) (5Year Plan period)	Gravel (m ³) (1 st Year)
Geological Resources	296280m ³	19752m ³
Mineable Reserves	96110m ³	14196 m ³
Production for five years Plan	96110m ³	14196 m ³
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Days	
Production per day	64	16
No of Lorry loads (12m ³ per load)	5	1
Total Depth of mining	32m bgl	

Source: Approved mining plan

* Gravel and weathered formation are proposed to excavate for first, second and third years only.

2.3 Geology

2.3.1 Regional Geology

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

- I. Charnockite Group represented by Charnockite, Pyroxene Granulite and Magnetite Quartzite,
- II. Peninsular Gneissic Complex (II) comprising hornblende-biotite gneiss,
- III. Basic intrusive include Pyroxinite/Dunite
- IV. Younger intrusive comprising, Nepheline-Syenite, Pink Granite, Pegmatite and Quartz veins and
- V. Quaternary sediments of Kankar and soil.

Stratigraphy of the area

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

Tiruppur District is predominantly occupied by hornblende Biotite gneisses of PGC (II) with enclaves of Magnetite Quartzite, Pyroxene Granulite and Charnockite. The area exposes several bands of Pyroxene Granulite which is medium grained, medium to dark grey in colour and stand out prominently in the gneissic country generally parallel to regional foliation. Charnockite is coarse grained, massive, many places it is foliated, grey colored and greasy and exposed as boulder outcrops and small knolls. It is well exposed in Central, Western and Southern parts of the Tiruppur District. The general strike of foliation varies from ENE-WSW, E-W with dipping towards NW and N respectively.

Hornblende-Biotite gneiss is well foliated, medium to coarse grained, pale grey and exposed as sheets and small knolls. Pink Granite gneiss occurs as thin bands and lensoidal bodies. It is a medium grained rock composed of alternating bands of mafic (mainly of biotite and hornblende) and felsic (Feldspar and Quartz) minerals. It is well recognized in Avinasi area.

Basic intrusives such as pyroxinite/dunite occurs as Outcrop and lensoidal bodies in the country rock and mostly concordant to the regional foliation. Many basic intrusive are reported in south and south-east of Tiruppur town. The trend of these bodies is east-west.

Nepheline syenite is a leucocratic, coarse-grained rock and composed mainly of Feldspar with Nepheline and shows pitted appearance due to removal of Nepleline. This alkaline rock is available in and around Sivanmalai area only. Acid intrusives comprising pink granite, pegmatite and quartz veins are traversed country rocks in micro (cm wide-meter long) to meso-scale (few meters wide and several meter long) extend. Granite is exposed around 9 km SW of Avanashi. Small scale pegmatite and quartz veins are noticed almost in all the rock types. Acid intrusives are overlain by sediments of Quaternary age, represented by Kankar and black cotton soil with Gypsum. Most of the area is covered by brown and red brown soil. Some part of the area covered with black cotton soil contains Gypsum as lumps. Black cotton soil covers south-western part of the district.

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

<https://cdn.s3waas.gov.in/s3d1f255a373a3cef72e03aa9d980c7eca/uploads/2019/05/2019052585.pdf>

2.3.2 Local Geology: -

The study area follows the regional trend and mainly comprises of Hard Rock Formation as a homogeneous formation / Batholith formation of Charnockite. The project area is plain terrain, covered with gravel formation of 1m thickness; Massive Charnockite formation is found after 1m gravel formation which is inferred from the resistivity survey method.

Peninsular gneiss forms the oldest rock formation, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale the Charnockite body N30°E – S30°E with dipping towards SE60° (Source Approved Mining plan).

2.3.3 Hydrogeology

Tiruppur District is underlain by crystalline metamorphic complex in the western parts of district and sedimentary tract in eastern side. An area of 4551 Sq.km is covered by crystalline rocks (63%) and 2671 Sq.km is covered by sediments (37%). The general geological sequence of formation is given below:

Quaternary - Laterites, Sands and Clays

Tertiary - Sandstone, Gravels and Clays

Cretaceous - Limestone, Calcareous Sandstone and Clay unconformity.

Archaean - Charnockites, Gneisses, Granites, Dolerites and Pegmatite

- The major part of the area is covered by metamorphic crystalline rocks of charnockite, granitic gneiss of Archaean age intruded by dolerite dykes and pegmatite veins. These rocks are highly metamorphosed and have been subjected to very severe folding, crushing and faulting.
- Ground Water occurs under the phreatic condition and wherever there are deep seated fractures, it occurs under semi-confined to confined conditions.
- Occurrence of Ground Water in hard rock depends upon the intensity and depth of weathering, fractures and fissures present in the rocks.
- Granites and gneisses yield moderately compared to the yield in Charnockites.
- Depth of well in hard rock generally ranges between 8 and 15m below ground level.

- Generally, yield in open wells ranges from 30 to 250m³ /day and in bore well between 260 and 430 m³ /day. The weathered thickness varies from 2.5 m to 42m in general there are 3 to 5 fracture zones within 100 m and 1 to 4 fracture zones between 100 and 200 m.

The Cretaceous formation is represented by Arenaceous Lime stone, Calcareous sand - stone and marl. The Tertiary formation is argillaceous comprising of Silty clay stones, argillaceous Lime stone.

The Quaternary deposits represented by the river deposits of Ponnaiyar and Varahanadhi spread over as patches in Tiruppur District. The alluvium consists of unconsolidated sands, gravelly sands, clays and clayey sands. The thickness of the sands ranges between 15 and 25 m in the alluvial formation which also form potential aquifers. In some areas, sand stone of tertiary formation are the potential groundwater reservoirs.

Aquifer Systems:

Occurrence and storage of groundwater depend upon three factors viz., Geology, Topography and rainfall in the form of precipitation. Apart from Geology, wide variation in topographic profile and intensity of rainfall constitutes the prime factors of groundwater recharge. Aquifers are part of the more complex hydro geological system and the behaviour of the entire system cannot be interpreted easily. In hard rock terrain the occurrence of Ground Water is limited to top weathered, fissured and fractured zone which extends to maximum 30 m on an average it is about 10-15 m in Tiruppur District.

In Sedimentary formations, the presence of primary inter granular porosity enhances the transmitting capacity of groundwater where the yield will be appreciable. The sedimentary area which occupies the eastern part of the district along the coastal tract is more favourable for groundwater recharge. Ground Water occurs both in semi confined and confined conditions. A brief description of occurrence of groundwater in each formation is furnished below.

Alluvial Formations

In the river alluvium groundwater occurs under water table condition. The maximum thickness is 37 m and the average thickness of the aquifer is approximately 12 m. These formations are porous and permeable which have good water bearing zones.

Tertiary Cuddalore sandstone

Tertiary formations are represented by Cuddalore Sandstone and characterised as fluvial to brackish marine deposits. Predominantly this formation is divided into Lower and Upper Cuddalore formations. In the Upper Cuddalore formations the groundwater occurs in semi confined conditions, whereas in the Lower Cuddalore the groundwater occurs in confined condition with good groundwater potential.

Cretaceous Formations

Groundwater occurring in the lens shape in the sandy clay lenses and fine sand is underlain by white and black clay beds which constitute phreatic aquifer depth which ranges 10m to 15m below ground level. Phreatic aquifer in Limestone is potential due to the presence of Oolitic Limestone.

Hard Rock Formations

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development are much less in other type of rocks when compared to gneissic formation. The groundwater potential is low, when compared with the gneissic formations.

Granitic Gneiss

Groundwater occurs under water table conditions in weathered, jointed and fractural formations. The pore space developed in the weathered mantle acts as shallow granular aquifers and forms the potential water bearing and yielding zones water table is shallow in canal and tank irrigation regions and it is somewhat deeper in other regions.

Charnockite

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development are much less when compared to gneissic formations. The groundwater potential is low, when compared with the gneissic formations.

Aquifer Parameters

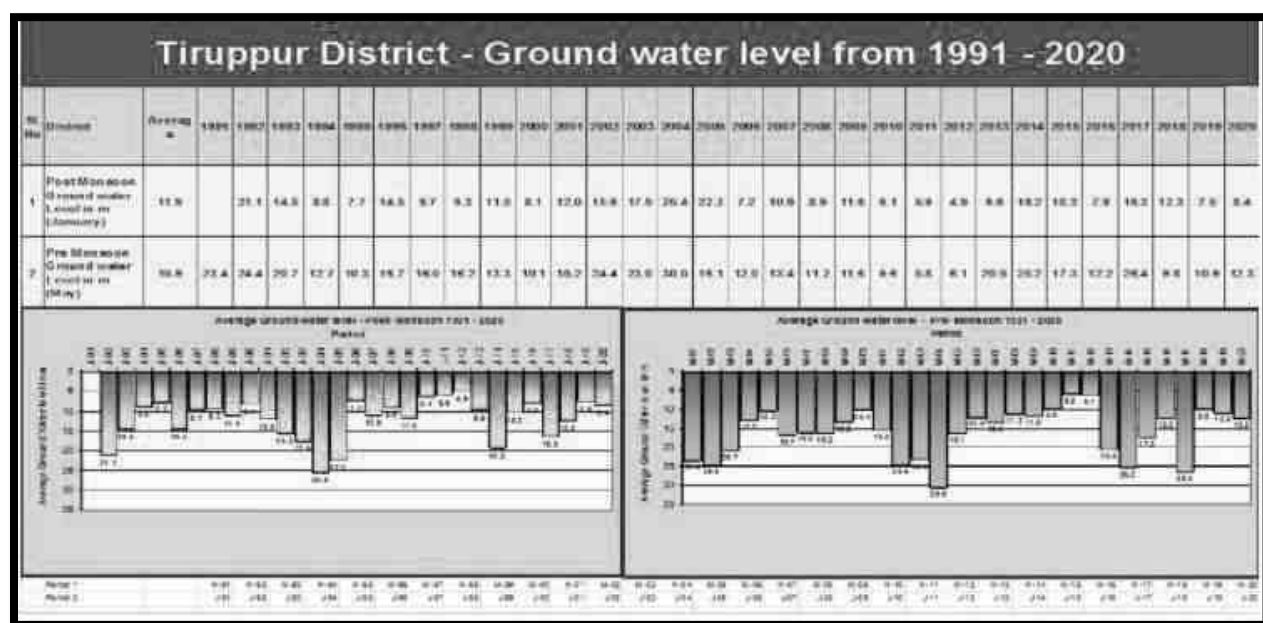
The thickness of aquifer in this district is highly erratic and varies between 15 m to 40 m below ground level. The inter granular Porosity is essentially dependent on the intensity and degree of weathering and fracture development in the bed rock. As discussed earlier deep weathering has developed in Gneissic formations and moderate weathering in charnockite formations. The range of aquifer parameters in hard rock and sedimentary formations are given below:

TABLE 2.5: RANGE OF AQUIFER PARAMETERS

Name	Sp. Capacity (lpm/d)	Specific Yield (%)	T (m ² /d)	K (m/day)	Yield of wells (lps)
Alluvium	2.08	7.2	98	19.7	2.5
Tertiary	78-173	1.4-3.5	46-134	16-33	2-3.3
Cretaceous	33-782	0.3-2.56	33-782	10-66	1.1-3.5
Crystalline	27-224	0.8-2.5	16-60	5-20	1-2

Source: <http://nwm.gov.in/sites/default/files/Notes%20on%20Trippur%20District.pdf>

The Ground Water levels from the 38 number of observation wells of TWAD have been analyzed for Post-Monsoon and Pre-Monsoon.

FIGURE 2.11: GROUND WATER LEVEL VARIATIONS OF TIRUPPUR DISTRICT**TABLE 2.6: GROUND WATER LEVEL VARIATIONS OF TIRUPPUR DISTRICT**

Jan 2017	May 2017	Jan 2018	May 2018	Jan 2019	May 2019	Jan 2020	May 2020	Jan 2021	May 2021	5 Years Pre-Monsoon Average	5 Years Post Monsoon Average
16.3	26.4	12.4	9.8	7.6	10.9	8.4	12.3	7.1	10.6	11.9	8.8

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

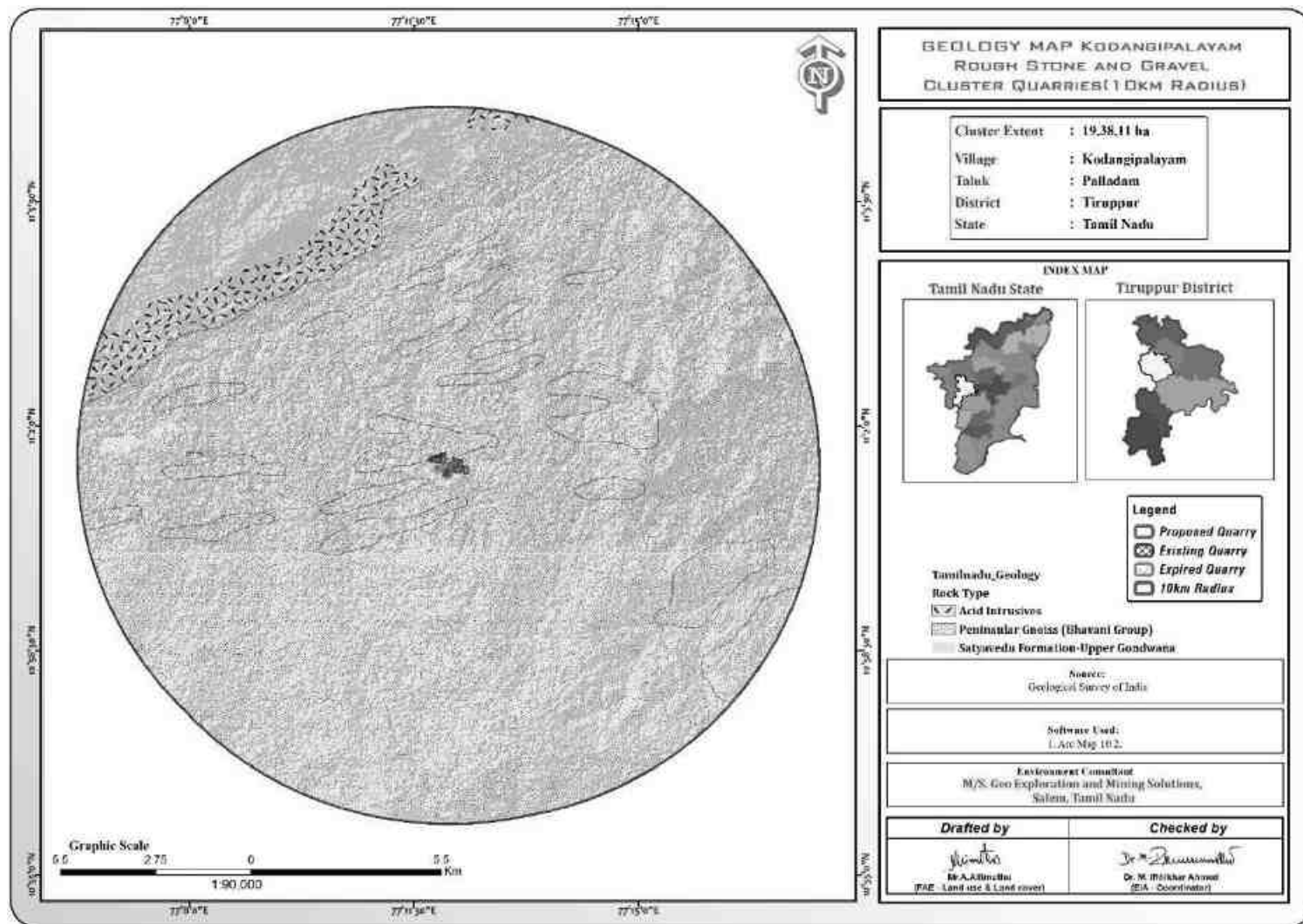
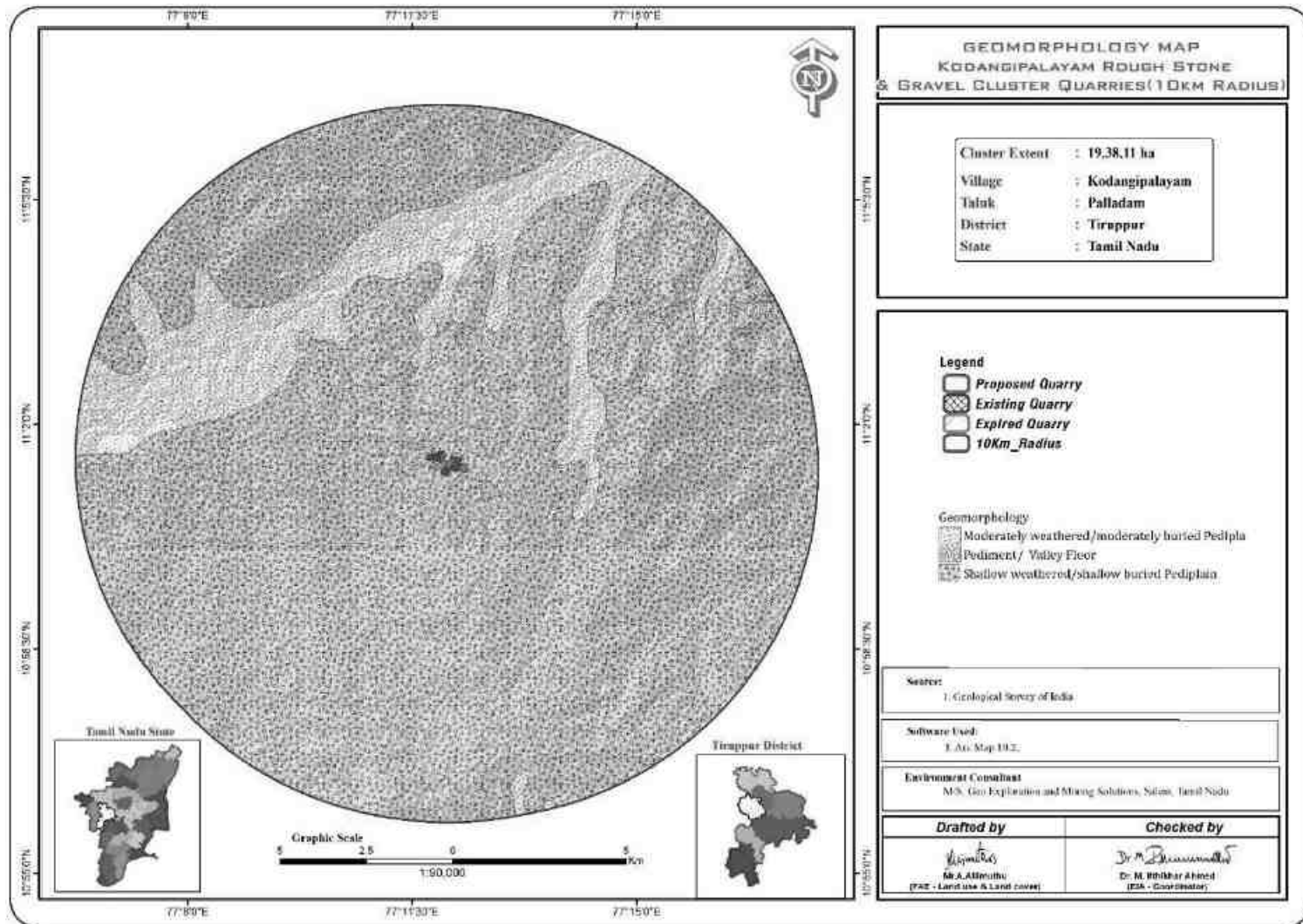
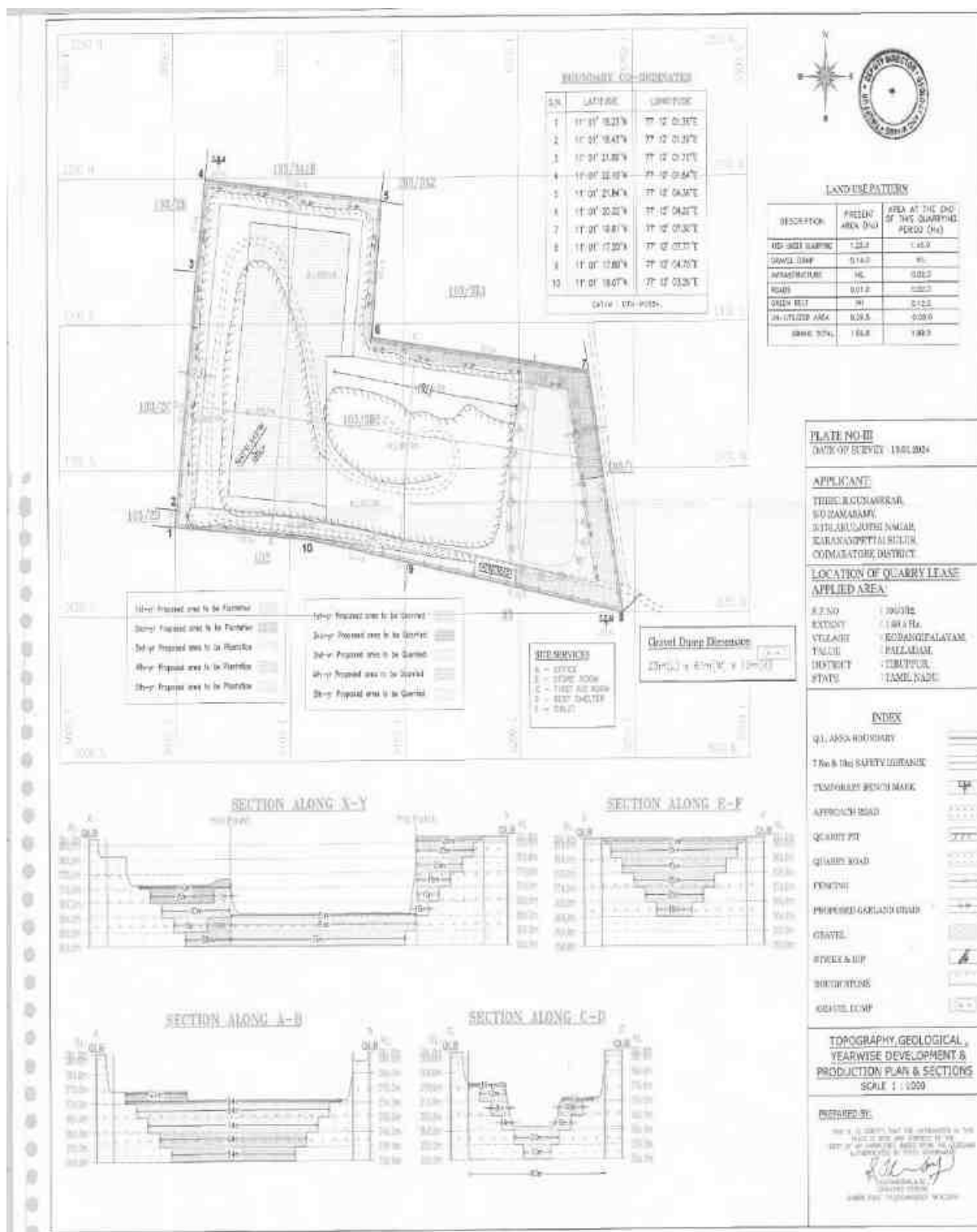
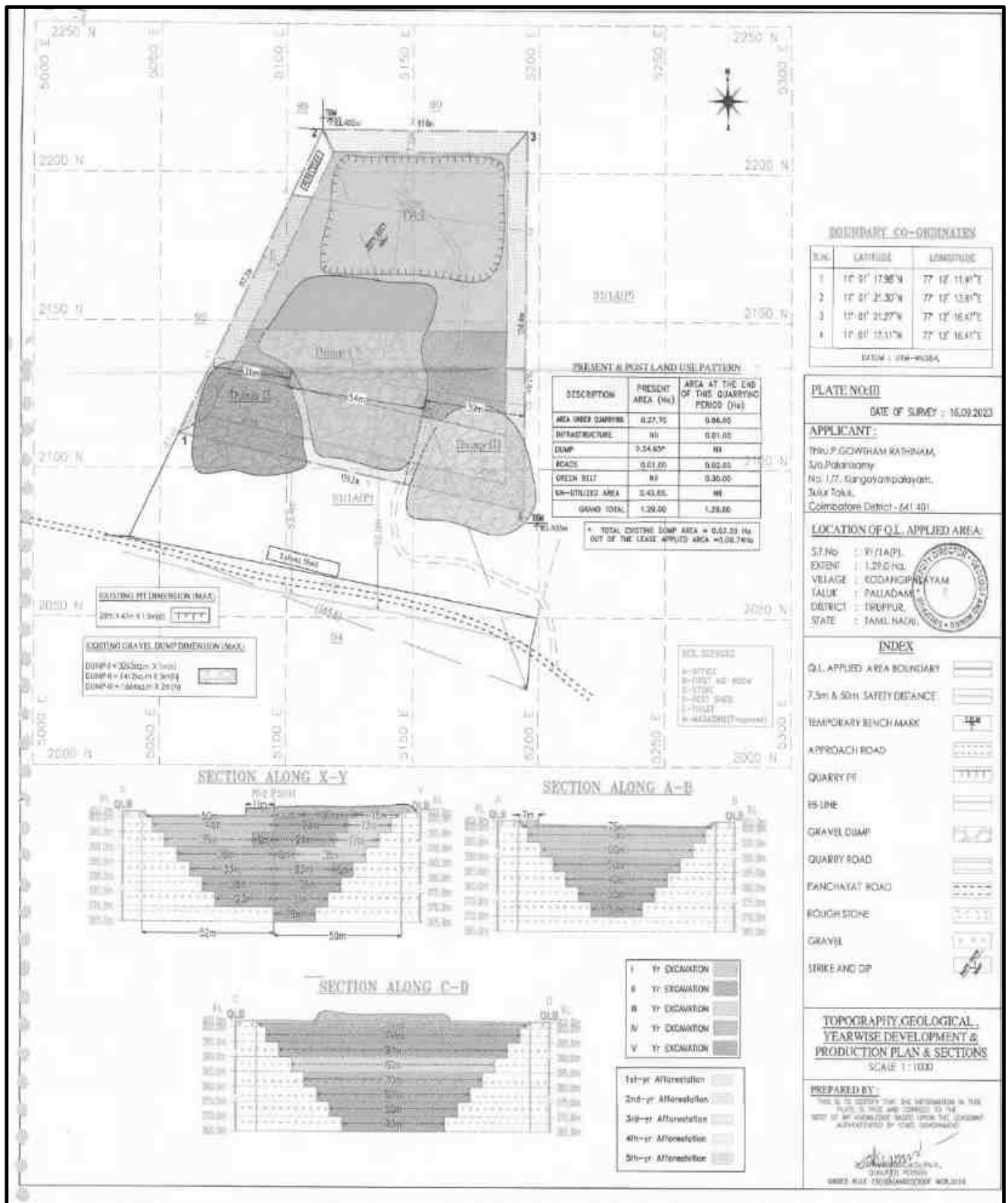
FIGURE 2.12: REGIONAL GEOLOGY MAP

FIGURE 2.13: GEOMORPHOLOGY MAP

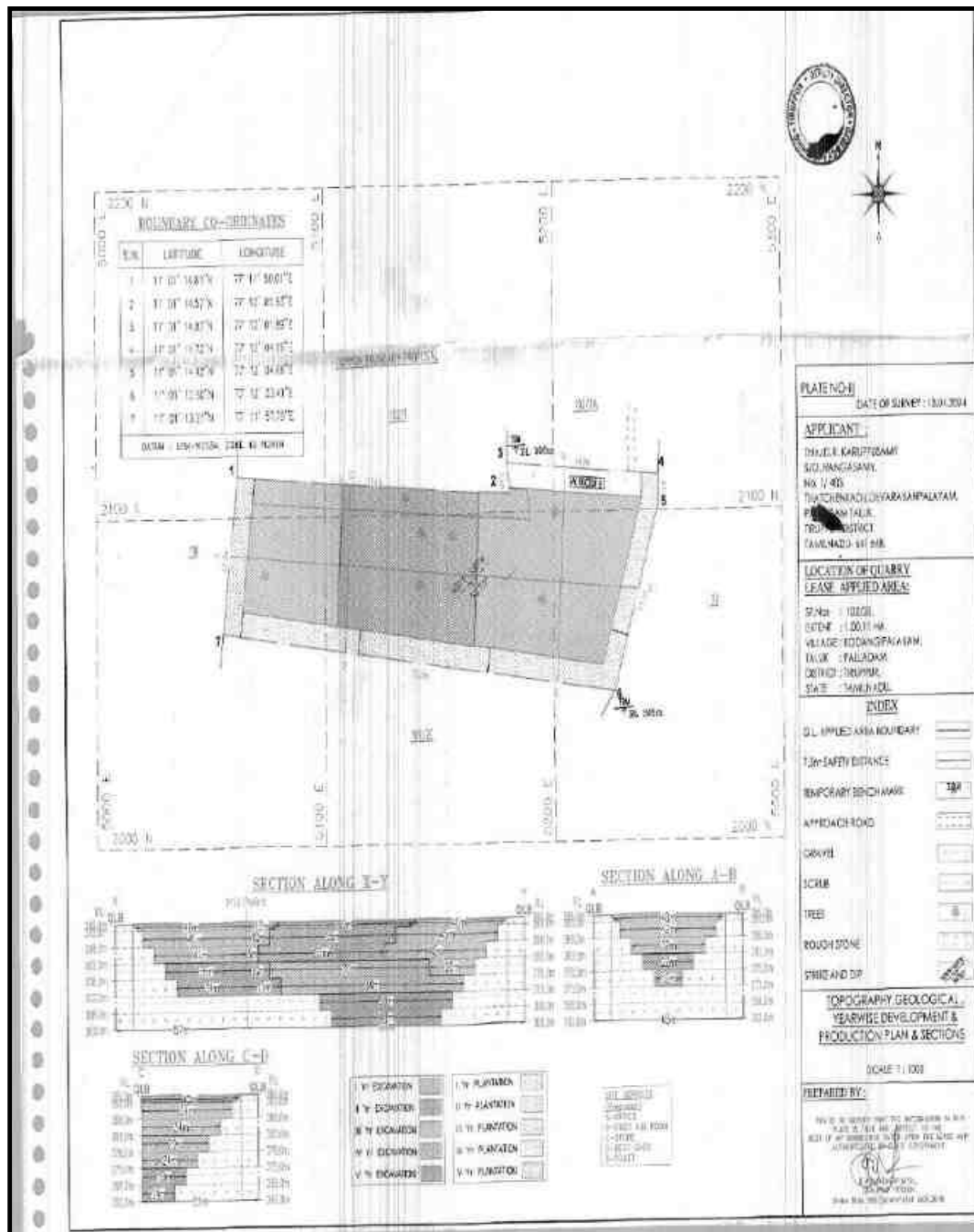
**FIGURE 2.14: TOPOGRAPHY, GEOLOGICAL, YEARWISE DEVELOPMENT PRODUCTION
PLAN AND SECTION- P1-P2-P3**
Thiru.R. Gunasekar- P1



Thiru.P. Gowtham Rathinam-P2



Thiru.D.R. Karuppusamy -P3



2.4 Resources and Reserves of the Cluster quarries

The available mineable reserves are calculated after leaving necessary safety distances prescribed in the Precise area communication letter.

TABLE 2.7: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECTS- P1- P2-P3

Description	P1		P2		P3	
	Rough Stone quarry	Gravel	Rough Stone quarry	Gravel	Rough Stone quarry	Gravel
Geological Resource	413646 m ³	26484 m ³	449120m ³	30281 m ³	296280m ³	19752m ³
Mineable Reserves	94735 m ³	20252m ³	135250 m ³	23205.5- m ³	96110m ³	14196 m ³
Proposed production for five years	94735 m ³	20252m ³	135250 m ³	23205.5 m ³	96110m ³	14196 m ³

Source: Approved Mining Plan

TABLE 2.8: YEAR-WISE PROPOSAL FOR FIRST FIVE YEARS PRODUCTION PLAN-P1

YEAR	ROUGH STONE QUARRY (m ³)	GRAVEL (m ³)
I	15625	20252
II	18760	-
III	18840	-
IV	18590	-
V	22920	-
TOTAL	94735	20252

Source: Approved Mining Plan

TABLE 2.9: YEAR-WISE PROPOSAL FOR FIRST FIVE YEARS PRODUCTION PLAN-P2

YEAR	ROUGH STONE QUARRY (m ³)	GRAVEL (m ³)
I	27300	7373.5
II	27700	9112
III	27350	6720
IV	27350	-
V	25550	-
TOTAL	135250	23205.5

Source: Approved Mining Plan

TABLE 2.10: YEAR-WISE PROPOSAL FOR FIRST FIVE YEARS PRODUCTION PLAN-P3

YEAR	ROUGH STONE QUARRY (m ³)	GRAVEL (m ³)
I	19020	5796
II	20075	5040
III	19325	3360
IV	19750	-
V	17940	-
TOTAL	96110	14196

Disposal of Waste

In the entire cluster quarries no waste is anticipated, quarried out materials (Rough stone and Gravel) will be utilized (100%).

Conceptual Mining Plan/ Final Mine Closure Plan

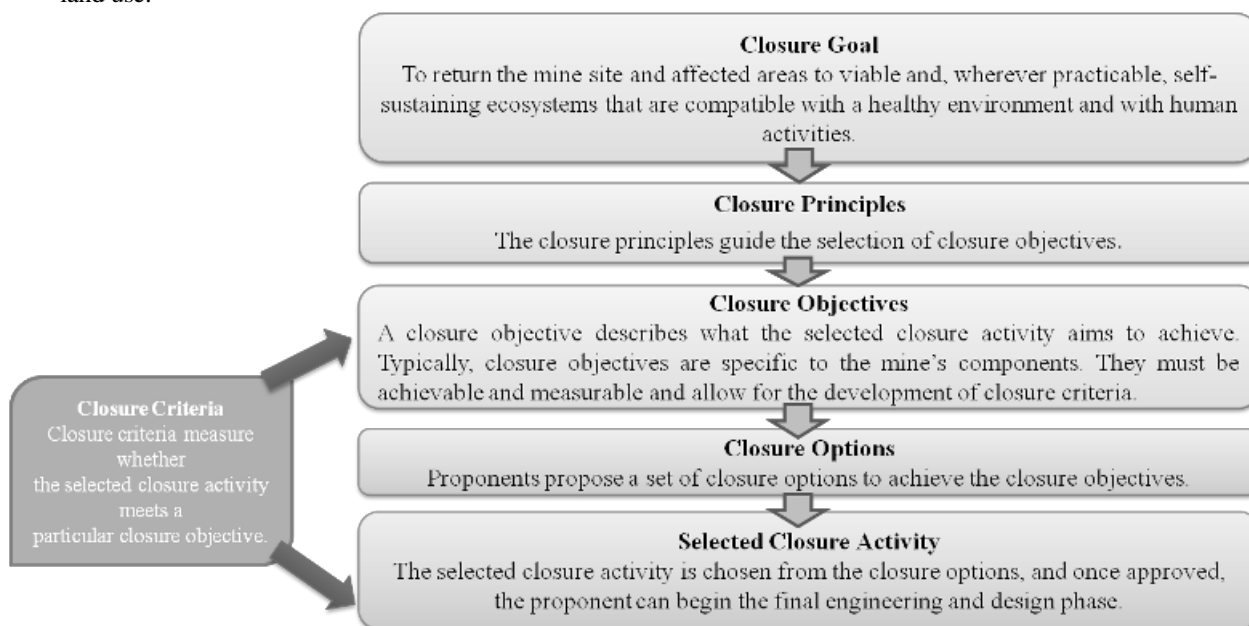
The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.

TABLE 2.11: ULTIMATE PIT DIMENSIONS- P1- P2-P3

Code	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
P1	167	114	37m Bgl
P2	103	108	37m Bgl
P3	161	48	32m Bgl

Source: Approved Mining Plan

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



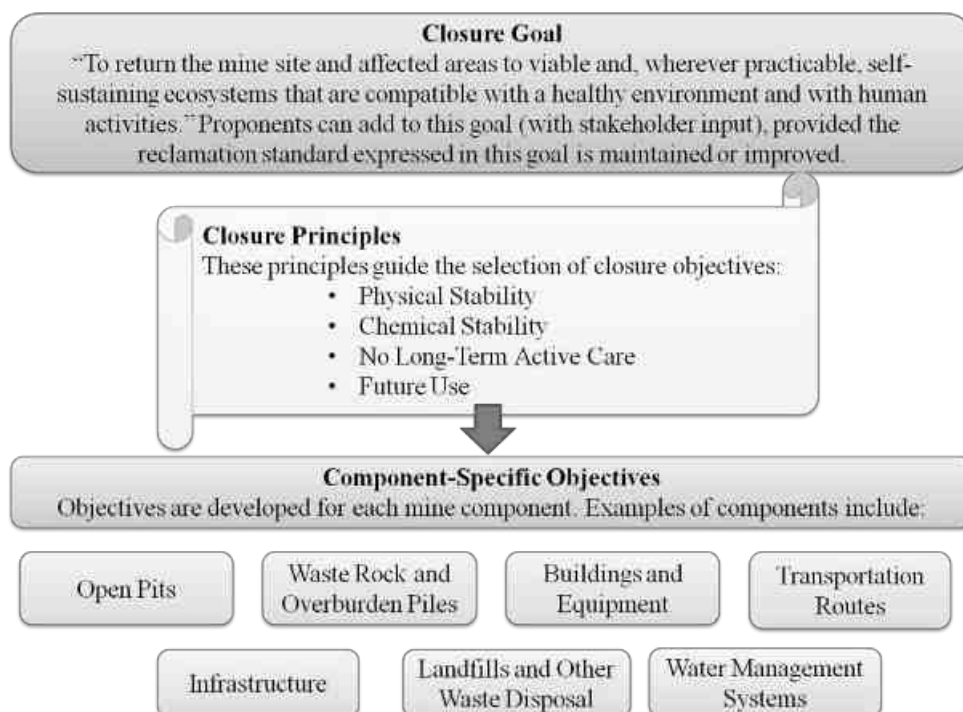
Closure Objectives

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

- Emergency access and escape routes from flooded pits for humans and wildlife are in place.
- Dust levels are safe for people, vegetation, aquatic life, and wildlife.

Closure Planning & Options Considerations in Mine Design –

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



Post-Closure Monitoring –

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

- Monitor physical and geotechnical stability of remnant pit walls.

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

TABLE 2.12: MINE CLOSURE BUDGET-P1

ACTIVITY		YEAR					RATE	AMOUNT (INR)	
		I	II	III	IV	V			
Plantation under safety zone	Nos.	100	100	100	100	100	@200 Rs Per sapling	Rs.1,00,000/-	
	Cost	20000	20000	20000	20000	20000			
Plantation cost in approach road and panchayat road	Nos.	300	-	-	-	-			Rs.60,000/-
	Cost	60000	-	-	-	-			
Wire Fencing (In Mtrs) 480		1,95,000					@300 Rs Per Meter	Rs.1,95,000/-	
Garland drain (In Mtrs) 400		1,20,000					@300 Rs Per Meter	Rs.1,20,000/-	
TOTAL								Rs.4,75,000/-	

TABLE 2.13: MINE CLOSURE BUDGET-P2

ACTIVITY		YEAR					RATE	COST (Rs.)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	100	100	100	100	100	@200 Rs Per sapling	1,00,000/-
	Cost	20000	20000	20000	20000	20000		
Plantation in quarried out top bench	Nos.	-	-	100	100	100		60,000/-
	Cost	-	-	20000	20000	20000		
Approach road and nearby village road	Nos	100	-	-	-	-		20,000/-
Wire Fencing (In Mtrs) 500 Mtrs		150000					@300 Rs Per Meter	1,50,000/-
Garland drain (In Mtrs) 250 Mtrs		120000					@300 Rs Per Meter	1,20,000/-
TOTAL								4,50,000/-

Source: Proposed by FAE's and EC

TABLE 2.14: MINE CLOSURE BUDGET-P3

ACTIVITY	YEARS					RATE	COST (Rs.)
	I	II	III	IV	V		

Plantation under safety zone	Nos.	50	50	50	50	50	@ 200 Rs Per sapling	50,000/-
	Cost	10000	10000	10000	10000	10000		
Plantation in the quarried out top benches	Nos.	-	-	100	100	100		60,000/-
	Cost	-	-	20000	20000	20000		
Plantation in the approach road and nearby village road	Nos.	200	-	-	-	-		40,000/-
	Cost	40000	-	-	-	-		
Wire Fencing (In Mtrs) 350 Mtrs		105000					@ 300 Rs Per Meter	1,05,000/-
Garland Drain (In Mtrs) 300 Mtrs		90000						90,000/-
TOTAL								3,45,000/-

2.5 Method of Mining

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

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

2.5.1 Drilling

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

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

2.5.2 Blasting

Blasting will be done as per details below: -

- Controlled blasting parameter: -

Spacing – 1.2m

Burden – 1.0 m

Depth of hole – 1.5 m

Charge per hole – 0.5Kg

Powder factor – 6.0 tonnes/kg

Dia of hole – 32 mm

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

No of Holes to be drilled per day: -

Volume of Rough Stone will be excavated from one hole	=	3 Tonnes
Total Volume from three proposed quarries	=	3,26,095m ³
	=	3,26,095/5
	=	65,219/300
	=	217* 2.6
	=	564 Tonnes per day

Therefore, Number of Holes per day = 564/3
 = **188 Holes per day (for 3 Quarries)**

Type of Explosives to be used –

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

2.5.3 Extent of Mechanization

TABLE 2.15 PROPOSED MACHINERY DEPLOYMENT P1-P3

PROPOSAL – P1				
S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	4	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Tippers	3	20 Tonnes	Diesel Drive
PROPOSAL – P2				
S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	4	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Tippers	2	20 Tonnes	Diesel Drive
PROPOSAL – P3				
S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	3	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Tippers	2	20 Tonnes	Diesel Drive

Source: Approved Mining Plan of the respective projects.

2.6 General Features

2.6.1 Existing Infrastructures

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

2.6.1 Drainage Pattern

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

2.6.2 Traffic Density

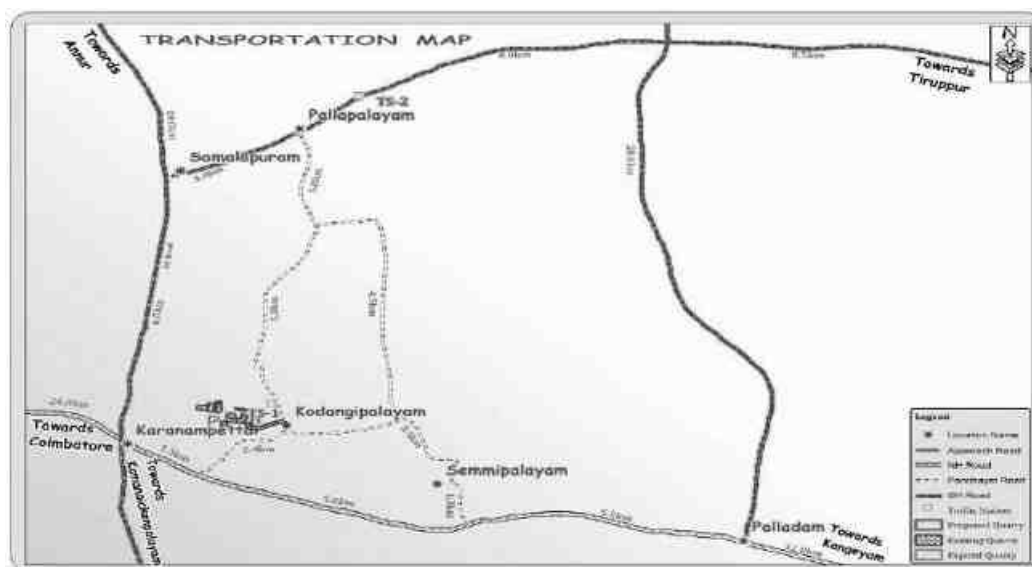
Traffic density measurements were performed as per IRC 1960 Guidelines at three locations based on the transportation route. Traffic density measurement were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

TABLE 2.16 – TRAFFIC SURVEY LOCATION'S

Station code	Station location	Distance and Direction	Type of Road
TS1	Kodangipalayam Panchayat Road	500m- NE	Panchayat Road
TS2	Tiruppur-Somandur SH Road	7.0km-NE	SH Road

Source: On-site monitoring by GEMS FAE & TM

FIGURE 2.15: TRAFFIC SURVEY LOCATIONS & TRANSPORTATION ROUTE MAP



(Source: Survey of India Toposheet)

TABLE 2.17 – EXISTING TRAFFIC VOLUME

Station code	HMV (Hourly Average)		LMV hourly average		2/3 Hourly average		Total PCU per hour
	No	PCU	No	PCU	No	PCU	
TS1	55	165	50	50	75	75	290
TS2	150	300	100	100	150	75	475

Source: On-site monitoring by GEMS FAE & TM

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

TABLE 2.18 – ANTICIPATED TRAFFIC DUE TO THIS PROPOSED PROJECT

Transportation of Rough stone per day		
Capacity of trucks	Cumulative Trips	Volume in PCU
10/20 tonnes	30	90

Source: Anticipated based on Approved Mining Plan Production

TABLE 2.19 – SUMMARY OF TRAFFIC VOLUME

Route	Existing traffic value in PCU	Incremental traffic from the quarry in PCU	Total traffic volume	Hourly Capacity in PCU as per IRC guidelines
TS1	290	90	380	1200
TS2	475	90	565	1500

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

As per the IRC 1960 this existing 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 transportation.

2.6.3 Mineral Beneficiation and Processing

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

2.6.4 Existing Infrastructure

It is a Existing quarry, no infrastructural facility available within the project area. The infrastructural facilities to be made after the start of the quarrying operations will be prepared outside limit as per the rules and safe distance to be adopted.

2.6.2 Drainage Pattern

The drainage pattern of the area is dendritic – sub dendritic.

2.7 Project Requirement

2.7.1 Water Source & Requirement

Detail of Total water requirements in KLD as given below:

TABLE 2.20 – WATER REQUIREMENT FOR THE CLUSTER PROJECT -P1-P2-P3

PROPOSAL – P1		
*Purpose	Quantity	Source
Domestic & Drinking purpose	0.3KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Dust Suppression	0.7KLD	From Existing bore wells from nearby area
Green Belt	0.5KLD	From Existing bore wells from nearby area
Total	1.5 KLD	
PROPOSAL – P2		
*Purpose	Quantity	Source
Domestic & Drinking purpose	0.3KLD	From Existing, bore wells and drinking water will be sourced from Approved Water vendors.
Dust Suppression	0.7KLD	From Existing bore wells from nearby area
Green Belt	0.6KLD	From Existing bore wells from nearby area
Total	1.6 KLD	
PROPOSAL – P3		
*Purpose	Quantity	Source
Dust Suppression	0.7KLD	The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
Green Belt	1.0KLD	The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
Sanitation & Drinking	0.3KLD	Approved water vendors
Total	2.0 KLD	

Source: Prefeasibility Report

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

2.7.2 Power and Other Infrastructure Requirement

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

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

2.7.3 Fuel Requirement

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

For Rough stone and gravel: P1

Per hour Excavator will consume = 16 liters / hour
 Per hour Excavator will excavate = 20m³ of Rough stone
 Rough stone = $94735/20 = 4737$ hours
 Diesel consume = 4737 hours' x 16 liters
 Total diesel consumption = **75792** Liters of HSD will be utilized for rough stone

Total diesel consumption is around **75792 Liters** of HSD for the entire period of life.

Gravel: P1

Per hour Excavator will consume = 10liters / hour
 Per hour Excavator will excavate = 60m³ of Gravel
 Gravel quantity = $20252/60 = 101$ hours
 Diesel consume = 338 hours x 10liters
 Total diesel consumption = 3380 Liters of HSD will be utilized for Gravel

For Rough stone and gravel: P2

Per hour Excavator will consume = 16 liters / hour
 Per hour Excavator will excavate = 20m³ of Rough stone
 Rough stone = $135250/20 = 6763$ hours
 Diesel consume = 6763 hours x 16 liters
 Total diesel consumption = **108208** Liters of HSD will be utilized for rough stone

Total diesel consumption is around **108208 Liters** of HSD for the entire period of life.

Gravel: P2

Per hour Excavator will consume = 10liters / hour
 Per hour Excavator will excavate = 60m³ of Gravel
 Gravel quantity = $23205.5/60 = 387$ hours
 Diesel consume = 387 hours x 10liters
 Total diesel consumption = 3870 Liters of HSD will be utilized for Gravel

For Rough stone and gravel: P3

Per hour Excavator will consume = 16 liters / hour
 Per hour Excavator will excavate = 20m³ of Rough stone
 Rough stone = $96110/20 = 4806$ hours
 Diesel consume = 4806 hours' x 16 liters
 Total diesel consumption = **76896** Liters of HSD will be utilized for rough stone

Total diesel consumption is around **76896 Liters** of HSD for the entire period of life.

Gravel: P3

Per hour Excavator will consume = 10liters / hour
 Per hour Excavator will excavate = 60m³ of Gravel

Gravel quantity	=	14196/60 = 237 hours
Diesel consume	=	237 hours' x 10liters
Total diesel consumption	=	2370 Liters of HSD will be utilized for Gravel

2.7.4 Employment Requirement:

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

TABLE 2.21: EMPLOYMENT POTENTIAL FOR PROPOSED QUARRIES -P1-P2-P3

Identification code	Employment in Nos
P1	23
P2	19
P3	20
Total	62

A total of 62 people will get employment due to these 3quarries in the cluster quarries.

2.7.5 Project Cost**TABLE 2.22 – PROJECT COST OF PROPOSED PROJECTS P1-P2-P3**

Identification code	Project Cost
P1	Rs. 1,33,23,000/-
P2	Rs. 64,82,000/-
P3	Rs. 79,08,000/-
Total	Rs. 2,77,13,000/-

Source: Approved Mining Plan &Prefeasibility Report of the respective projects

2.8 Project Implementation Schedule

The commercial operation will commence after the grant of Environmental Clearance. CTO will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the Environmental Clearance will be compiled before the start of mining operation.

TABLE 2.23 – EXPECTED TIME SCHEDULE FOR THE PROPOSED QUARRIES

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

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

CHAPTER – 3: DESCRIPTION OF ENVIRONMENT

3.0 General

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering Oct to Dec 2024 with CPCB guidelines. Environmental data has been collected with reference to cluster quarries by Global Lab and Consultancy Services, approved by NABL Accredited Testing Laboratory ISO/IEC 17025:2017 for the below attributes-

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

Study Area

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

Study Period

The baseline study was conducted during the **Post Monsoon** season i.e. **Oct to Dec 2024**

Study Methodology

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

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

5. In order to assess the Ambient Air Quality (AAQ), samples of Ambient Air were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM₁₀ and SO₂, NO_x with gaseous attachments & Fine Dust Samplers (FDS) for PM_{2.5} and other parameters as per NAAQ norms and analysed for primary air pollutants to work out the existing status of air quality
6. The noise level measurements were also made at various locations in different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone
7. Baseline biological studies were carried out to assess the ecology of the study area to study the existing flora and fauna pattern of the area
8. Socio-Economic survey was conducted at village and household level in the study area to understand the present socio-economic conditions and assess the extent of impact due to the proposed mining project

The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of samples analysis, etc., are given below Table 3.1.

TABLE 3.1 – ENVIRONMENTAL MONITORING ATTRIBUTES AND FREQUENCY OF MONITORING

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (2 core & 4 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM ₁₀ PM _{2.5} SO ₂ NO _x Fugitive Dust	24 hourly twice a week (Oct to Dec 2024)	7 (2 core & 5buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (2 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 Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

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

3.1 LAND ENVIRONMENT

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

3.1.1 LAND USE/ LAND COVER

To study the land use pattern of the core as well as a buffer zone, land use/land cover details have been identified/ maps have been prepared in accordance with the **Standard ToR point no. 4 & 10 Stating:** Point No. 4 All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ 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).

Point No. 10. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted.

Current vintage data of Indian Remote Sensing Satellite Resourcesat1 LIII (False Color Composite) has been used for Land Use / Land Cover study. Satellite image has been procured from National Remote Sensing Centre, Hyderabad.

3.1.2 OBJECTIVE

The objectives of the LULC study are as follow:

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

Technical specification of Satellite imagery Data Used:

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

- ☞ Satellite Image - Resourcesat1-LISSIII, 23.5m Resolution
- ☞ Satellite Data Source - NRSC, Hyderabad
- ☞ Satellite Vintage - 14st July 2020, Swath 141km wide.
- ☞ SOI Toposheet No - 58 -E/08
- ☞ Software Used - ArcGIS 10.8

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

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

TABLE 3.2: Resourcesat1-LISSIII SENSOR characteristics

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

Source: NRSC, Hyderabad

3.1.3 METHODOLOGY

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

- ∞ Preliminary/primary data collection of the study area
- ∞ Satellite data procurement from NRSC
- ∞ Secondary data collection from authorized bodies
- ∞ Survey of India Toposheet (SOI)
- ∞ Mine Layout
- ∞ Cadastral / Khasra map
- ∞ GPS Coordinates of Lease Boundary
- ∞ Processing of satellite data using ArcGIS 10.8 and preparing the Land Use & Land cover maps (e.g. Plant/Mine area, Existing Quarry, Settlements, Agriculture land, Non agriculture land, water bodies, etc.) by Digital Image Processing (DIP) technique.
- ∞ Geo-Referencing of the Survey of India Toposheet
- ∞ Geo-Referencing of satellite Imagery with the help of Geo-Referenced Toposheets
- ∞ Enhancement of the Satellite Imagery
- ∞ Base Map layer creation (Roads, Railway, Village Names, and other Secondary data, etc.)
- ∞ Data analysis and Classification using Digital interpretation techniques.
- ∞ Ground truth studies or field Verification.
- ∞ Error fixing / Reclassification
- ∞ Final Map Generation.

The land use/Land cover Map of the buffer zone is given in 3.3. Land Use Pattern of the Buffer Zone (Study area) Details of the same are given in Table - 3.3 and the map is shown in Figure - 3.3.

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

S.No	CLASSIFICATION	AREA_HA	AREA_%
BUILTUP			
1	URBAN	2246.58	6.56
2	RURAL	2758.45	8.05
3	MINING	538.49	1.57
AGRICULTURAL LAND			
4	CROP LAND	18847.99	55.00
5	PLANTATION	2117.73	6.18
6	FALLOW LAND	6182.94	18.04
BARREN/WASTE LANDS			
7	SCRUB LAND	1058.07	3.09
WETLANDS/ WATER BODIES			
9	WATER BODIES/LAKE/RIVER	520.64	1.52
TOTAL		34270.87	100.00

Source: Bhuvan, NRSC.

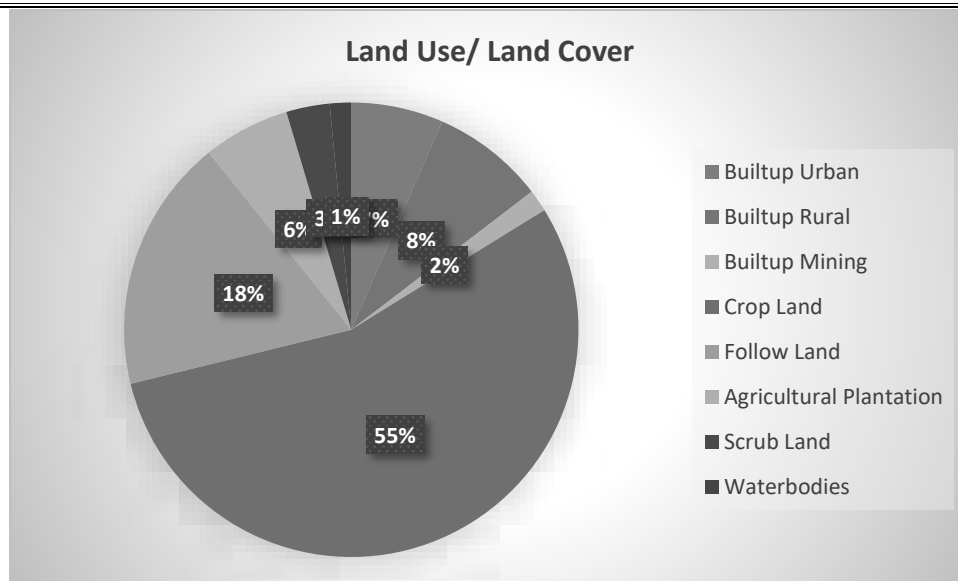


FIGURE 3.1: CHART SHOWING LANDUSE/LANDCOVER ANALYSIS USING LISS III Data

FIGURE 3.2: MAP SHOWING FALSE COLOR COMPOSITE (3,2,1) SATELLITE IMAGERY OF THE STUDY AREA

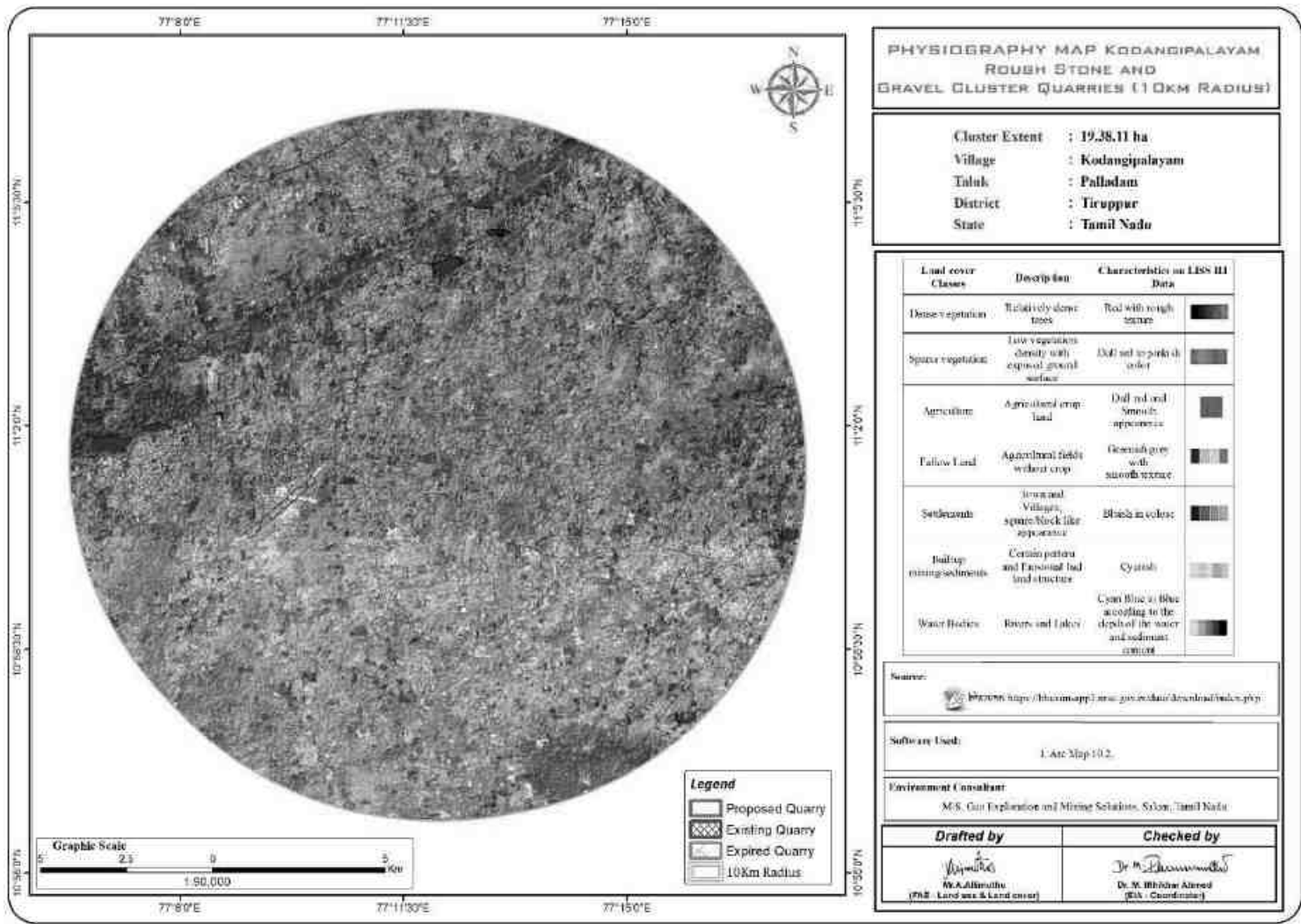
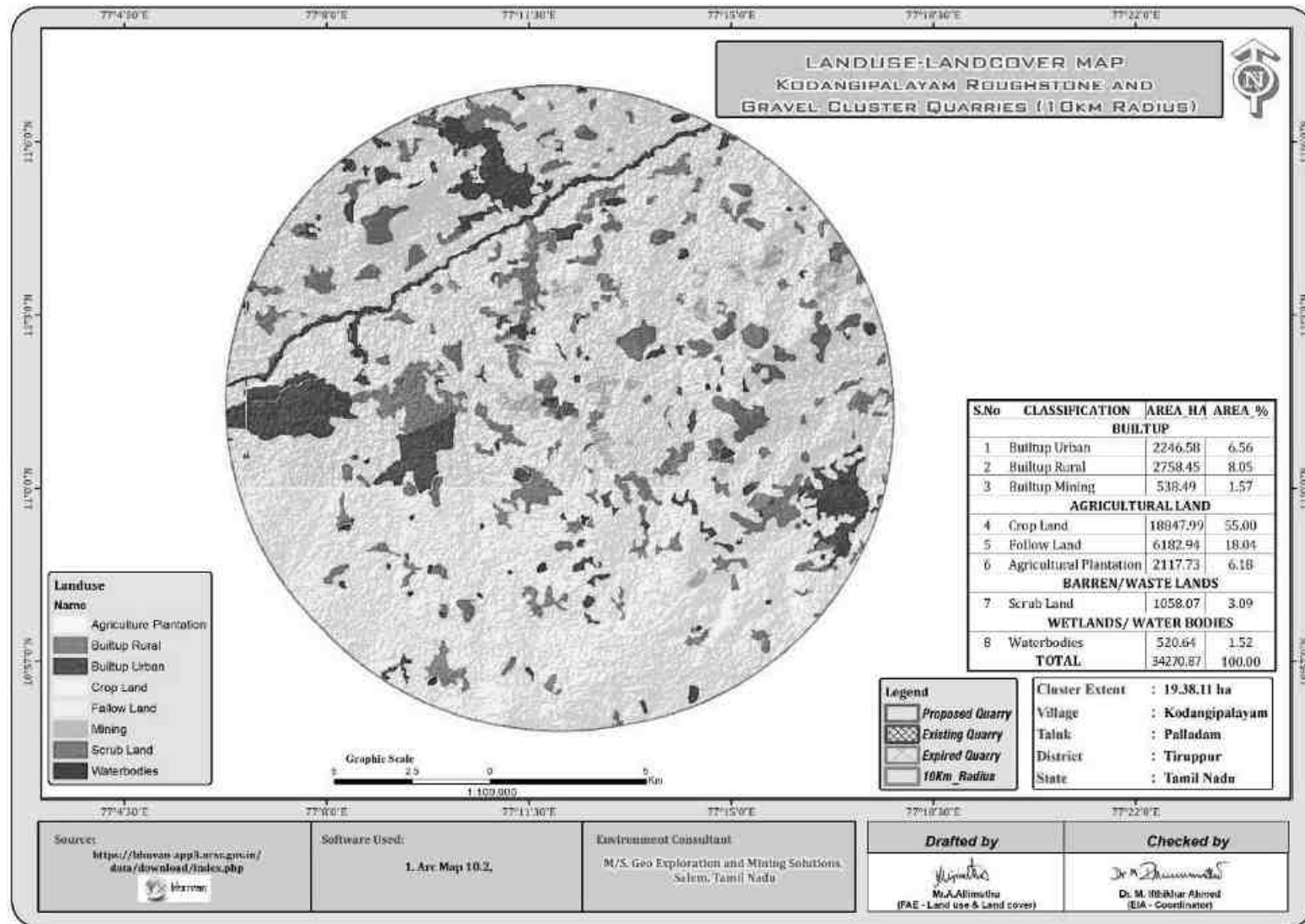


FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS

3.1.4 Interpretation

- ⌘ The 10 km radius study area mainly comprises of Crop land & Agriculture Plantation land accounting of 55% & 6.18% of the total study area. The study area also consists of fallow land of 18.04%.
- ⌘ The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.).
- ⌘ Water Bodies such as Odai, ponds/ lakes comprise of 1.52% of the total buffer area. There are some River found in the study area like Noyyal River (5.8km-NW), of the total study area.
- ⌘ The Scrub land accounts of 3.09%. As per the primary survey, it was observed the scrub land is mainly occupied by the stony waste and left-over domestic waste generated by the nearby areas.
- ⌘ 1.57% of the total study area is occupied by the mine industries. The area occupied by Mainly Roughstone and gravel of the total buffer area. As also observed within the primary survey, the 10 km buffer area is also occupied by the medium scaled roughstone industries located in the study area.
- ⌘ 14.61% of the area is covered under the Builtup Land including rural area. The project site falls under the Roughstone and gravel region. Therefore, the area is appropriate for developing Road development and building etc., it shows that the region has good prospects in the future. Due to proposed Roughstone and gravel quarry in this region, economic condition of locals is expected to be improved directly & indirectly. Hence project will prove to be the best economic proposal for the coming times.

3.1.5 Topography

The project area is almost plain terrain with gentle gradient towards Southeast – Southwestern side, maximum elevation of the area is 391-402 m above Mean Sea Level There are no hilly regions in and around the area.

3.1.6 Drainage Pattern of the Area

There are no developed surface drainage channels in the study area. Noyyal, a non-perennial pass 480m-South from the project site. The area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. The area is mostly dry in all seasons except rainy seasons.

The general drainage pattern of the area is of sub dendritic and dendritic pattern. No prominent water course or nallah is inferred. During rainy season the surface runoff flows in W to E direction. The drainage pattern of the study area is given in Fig. 3.5. The quarrying activity will not hinder the natural flow of rainwater.

3.1.7 Environmental Features in the Study Area

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

3.1.8 Seismic Sensitivity

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

TABLE 3.3 – DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE PROJECT AREA

Sl. No	Sensitive Ecological Features	Name	Arial Distance in km from Mine Lease Boundary
1	National Park / Wild life Sanctuaries	None	Nanjarayan Bird Sanctuary – 23km - NE Sathiyamangalam Tiger Reserve – 50 km - NW
2	Reserve Forest	None	Bolampatti I Reserve Forest- 29.5km - SW
3	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	None	Nil within 10Km Radius

4	Critically Polluted Areas	None	Nil within 10Km Radius
5	Mangroves	None	Nil within 10Km Radius
6	Mountains/Hills	None	Nil within 10Km Radius
7	Notified Archaeological Sites	None	Kodumanal Archaeological Excavation – 36Km – North East
8	Defence Installation	None	Nil within 10Km Radius

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

TABLE 3.4 – WATER BODIES WITHIN THE CLUSTER FROM PROPOSED QUARRIES

P1

S.No	NAME	DISTANCE & DIRECTION
1	Odai	600m East
	Odai	1km SW
2	Odai	3km East
3	Samalapuram Lake	5.4km North
4	Noyyal River	5.8km NW
5	Sendevipalayam Check Dam	5.8km NW
6	Odai	600m East

P2

S.No	NAME	DISTANCE & DIRECTION
1	Odai	350m East
	Odai	1.3km SW
2	Odai	2.7km East
3	Samalapuram Lake	5.5km North
4	Noyyal River	6.0km NW
5	Sendevipalayam Check Dam	6.2km NW
6	Odai	350m East

Source: Village Cadastral Map and Field Survey and Toposheet

P3

S.No	NAME	DISTANCE & DIRECTION
1	Odai	700m East
	Odai	920m SW
2	Odai	3.1km East
3	Samalapuram Lake	5.6km North
4	Noyyal River	6km NW
5	Sendevipalayam Check Dam	6km NW

6	Odai	700m East
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Source: Village Cadastral Map and Field

3.1.9 Soil Environment

Soil quality of the study area is one of the important components of the land environment. The composite soil samples were collected from the study area and analysed for different parameters. The locations of the monitoring sites are detailed in Table 3.4 and Figure 3.3.

TABLE 3.5 – SOIL SAMPLING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Core Zone	Project Area	11° 1'17.97"N 77°12'7.36"E
2	S-2	Core Zone	Project Area	11° 1'14.33"N 77°11'58.56"E
3	S-3	Paruvai	3.2km SW	10°59'44.82"N 77°10'56.32"E
4	S-4	Kalipalayam	6.0km NE	11° 4'36.71"N 77°13'6.85"E
5	S-5	Sengathurai	5.5km NW	11° 2'57.69"N 77° 9'31.44"E
6	S-6	Ayyampalayam	4.3km South	10°59'2.01"N 77°13'8.20"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

The objective of the soil sampling is -

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

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

Methodology –

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the proposed quarry site representing various land use conditions. The samples were collected by auger boring into the soil up to 90-cm depth. Six (6) locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were analysed for physical and chemical characteristics. The sealed samples were sent to laboratory for analysis. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology in respect are given in below Table 3.5.

TABLE 3.6 – METHODOLOGY OF SAMPLING COLLECTION

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

Source: On-site monitoring/sampling by Global Lab and Consultancy Services

Soil Testing Result –

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

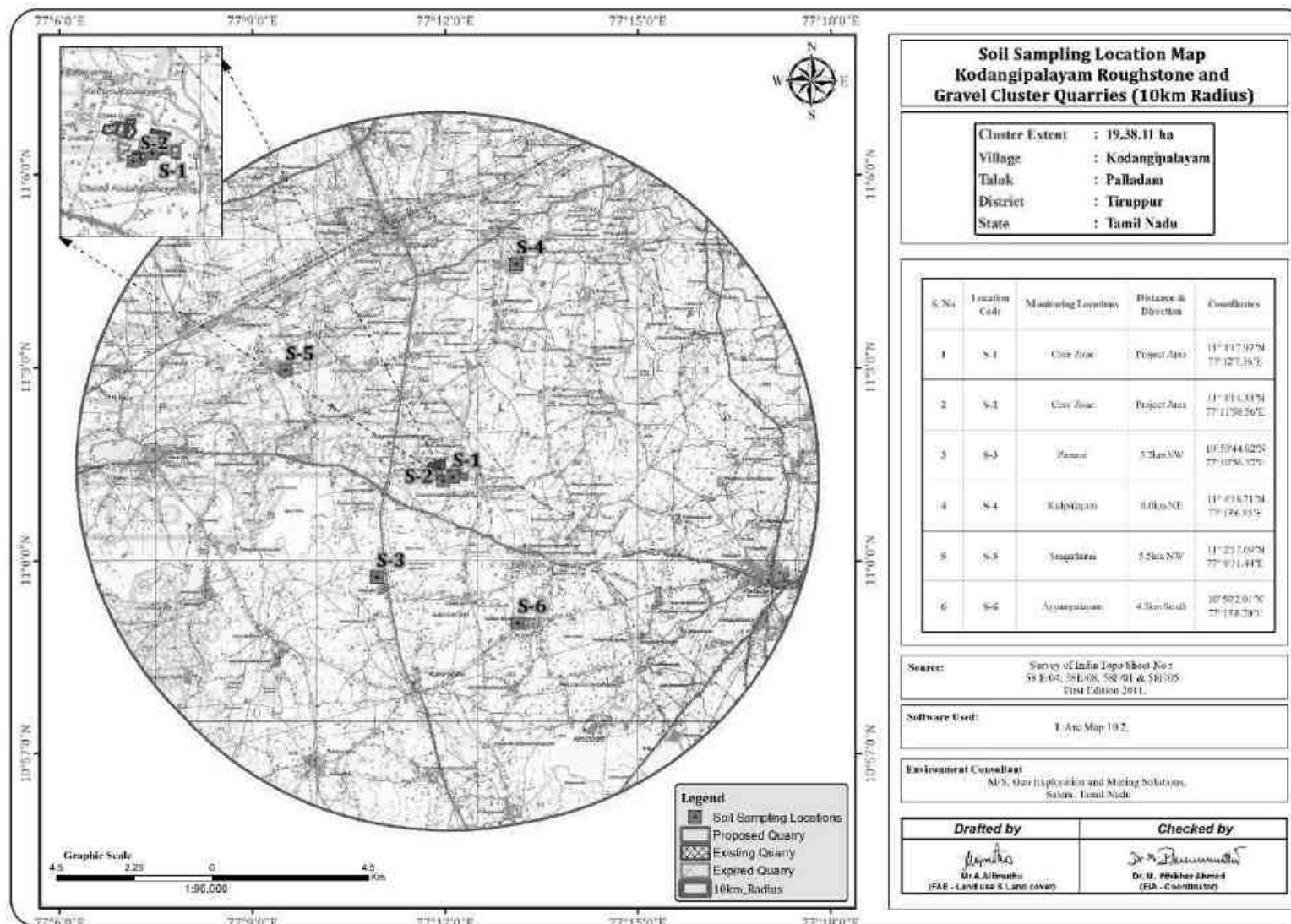
FIGURE 3.4: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS

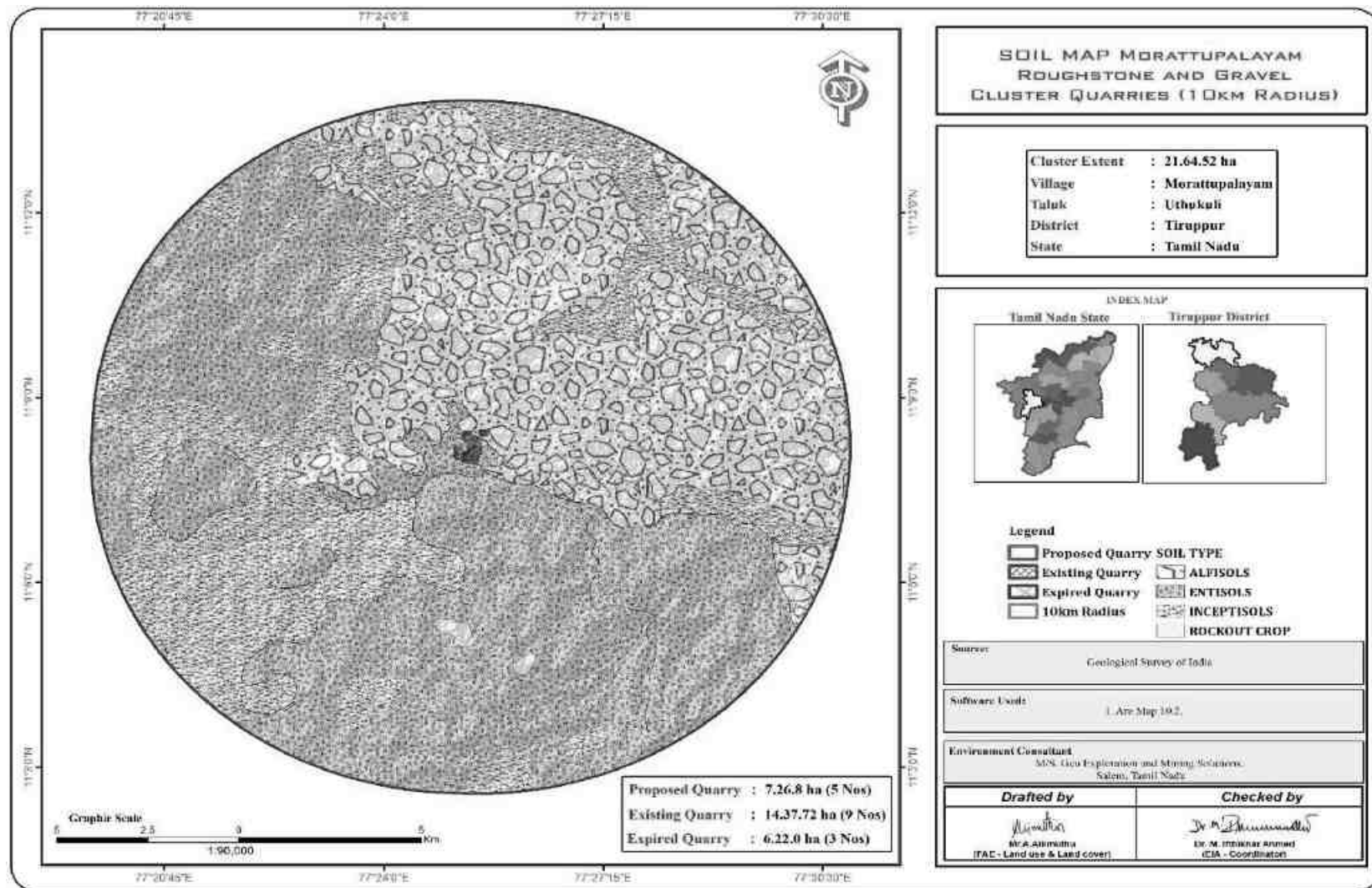
FIGURE 3.5: SOIL MAP

TABLE 3.7 – SOIL QUALITY MONITORING DATA

Sl. No	TEST PARAMETERS	TEST METHOD	UNIT	S-1 Core Zone	S-2 Core Zone	S-3 Paruvai	S-4 Kalipalayam	S-5 Sengathurai	S-6 Ayyanpalaya m
1	Available Nitrogen as N	GLCS/SOP/S/029 ;Issue no:02: 2024	kg/ha	313.6	363.77	263.42	476.67	376.32	413.95
2	Available Phosphorous(as P)	GLCS/SOP/S/005 ; Issue no:02: 2024	mg/kg	18.7	4.9	17.9	17.3	6.5	14.5
3	Boron	USEPA-6010D:2014	mg/kg	BDL (DL : 0.5)	BDL (DL : 0.5)	BDL (DL : 0.5)	BDL (DL : 0.5)	BDL (DL : 0.5)	BDL (DL : 0.5)
4	Bulk Density	GLCS/SOP/S/017; Issue no:02: 2024	g/cc	1.06	1.12	1.11	1.17	1.07	1.20
5	Cadmium	USEPA-6010 D-2014	mg/kg	8.74	11.98	12.50	16.25	9.0	6.25
6	Cation Exchange Capacity	GLCS/SOP/S/024; Issue no:02: 2024	meq/100g	36.76	39.05	35.39	49.29	37.17	40.19
7	Chlorides (as Cl-) in saturation extract	GLCS/SOP/S/004; Issue no:02: 2024	meq/l	2.6	2.1	2.9	3.8	3.1	1.9
8	Chromium	USEPA-6010D-2014	mg/kg	15.48	12.22	14.99	15.5	8.25	15.5
9	Copper	USEPA-6010D :2014	mg/kg	6.24	5.14	5.75	6.5	5.5	4.0
10	Exchangeable Calcium (as Ca)	GLCS/SOP/S/020; Issue no:02: 2024	meq/100g	1.7	2.9	3.85	2.1	3.3	3.9
11	Exchangeable Magnesium (as Mg)	GLCS/SOP/S/021; Issue no:02: 2024	meq/100g	0.9	1.2	1.5	0.9	1.9	2.2
12	Iron	USEPA-6010 D-2014	mg/kg	57.44	51.85	41.24	19.5	23.75	22.75
13	Lead	USEPA-6010D-2014	mg/kg	1.50	BDL (DL : 0.5)	BDL (DL : 0.5)	3.0	BDL (DL : 0.5)	BDL (DL : 0.5)
14	Manganese	USEPA-6010 D-2014	mg/kg	20.48	22.26	14.5	15.5	11.75	12.0
15	Organic Carbon	GLCS/SOP/S/003; Issue no: 02: 2024	%	0.27	0.43	0.37	0.37	0.29	0.22
16	Organic Matter	GLCS/SOP/S/003; Issue no:02: 2024	%	0.46	0.75	0.63	0.64	0.51	0.39
17	pH Value	IS 2720 (Part 26): 1987(Reaffirmed 2021)	-	8.17	8.49	8.05	7.97	8.11	7.90
18	Soluble Potassium (as K) in saturation extract	GLCS/SOP/S/006; Issue no:02 : 2024	mg/100g	1.20	1.32	1.21	1.05	1.13	1.14
19	Specific Electrical Conductivity	IS 14767: 2000(Reaffirmed 2021)	µS/cm	415.1	550.6	510.4	355	394.6	388

20	Sulphate (as SO ₄)	GLCS/SOP/S/009; Issue no:02: 2024	mg/100g	5.26	5.26	2.88	3.89	4.3	3.69
21	Texture : Clay	GLCS/SOP/S/015 ;Issue no:02: 2024	%	25.08	26.41	22.44	29.99	12.19	23.34
22	Texture : Sand	GLCS/SOP/S/015; Issue no:02: 2024	%	35.68	34.09	35.31	27.87	46.08	29.16
23	Texture : Silt	GLCS/SOP/S/015 ; Issue no:02: 2024	%	39.24	39.50	42.25	42.14	41.73	47.50
24	Water Holding Capacity	GLCS/SOP/S/016; Issue no:02: 2024	%	50.6	50.2	51.0	52.2	52.4	51.8
25	Zinc	USEPA-6010D-2014	mg/kg	20.48	7.09	5.75	6.0	8.0	9.5

Source: Sampling Results by Global Lab and Consultancy Services

Interpretation & Conclusion**Physical Characteristics –**

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay to Sandy Soil and Bulk Density of Soils in the study area varied between 1.06 – 1.20 g/cc. The Water Holding Capacity 50.2 to 52.4%

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline in nature with pH range 7.90 to 8.49
- The available Nitrogen content range between 263.42 to 476.67 mg/kg
- The available Phosphorus content range between 4.9 to 18.7mg/kg
- The available Potassium range between 1.05 to 1.32 mg/100g

Whereas, the micronutrient as zinc (Zn), iron (Fe) and copper (Cu) were found in the range of 5.75 to 20.48mg/kg; 19.5 to 57.44 mg/kg and 4.0 to 6.5 mg/kg

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

3.2 Water Environment

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

3.2.1 Surface Water Resources:

Noyyal river lies at 5.8km- NW from the project cluster-P1, 6.0km-S from the project cluster-P2 & P3. The area is studded with few tanks that serve as the source for agriculture and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells, trenches is in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

3.2.2 Ground Water Resources:

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

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

3.2.3 Methodology

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

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

two (2) surface water and four (4) ground water samples were collected in the study area and physico-chemical, heavy metals and bacteriological parameters were analysed. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the Examination of Water and Waste water' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.8 and shown as Figure 3.6.

TABLE 3.8 – WATER SAMPLING LOCATIONS

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	SW-1	Noyyal River	6.5km NW	11° 3'7.86"N 77° 8'53.86"E
2	SW-2	Samalapuram Lake	5.5km North	11° 4'20.02"N 77°12'1.18"E
3	WW-1	Near Project Area	110m SE	11° 1'9.63"N 77°12'5.83"E
4	WW-2	Paruvai	3.8km SW	10°59'28.33"N 77°10'57.83"E
5	BW-1	Near Project Area	430m North	11° 1'36.14"N 77°12'3.21"E
6	BW-2	Kalipalayam	6.0km NE	11° 4'34.72"N 77°13'19.49"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services

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

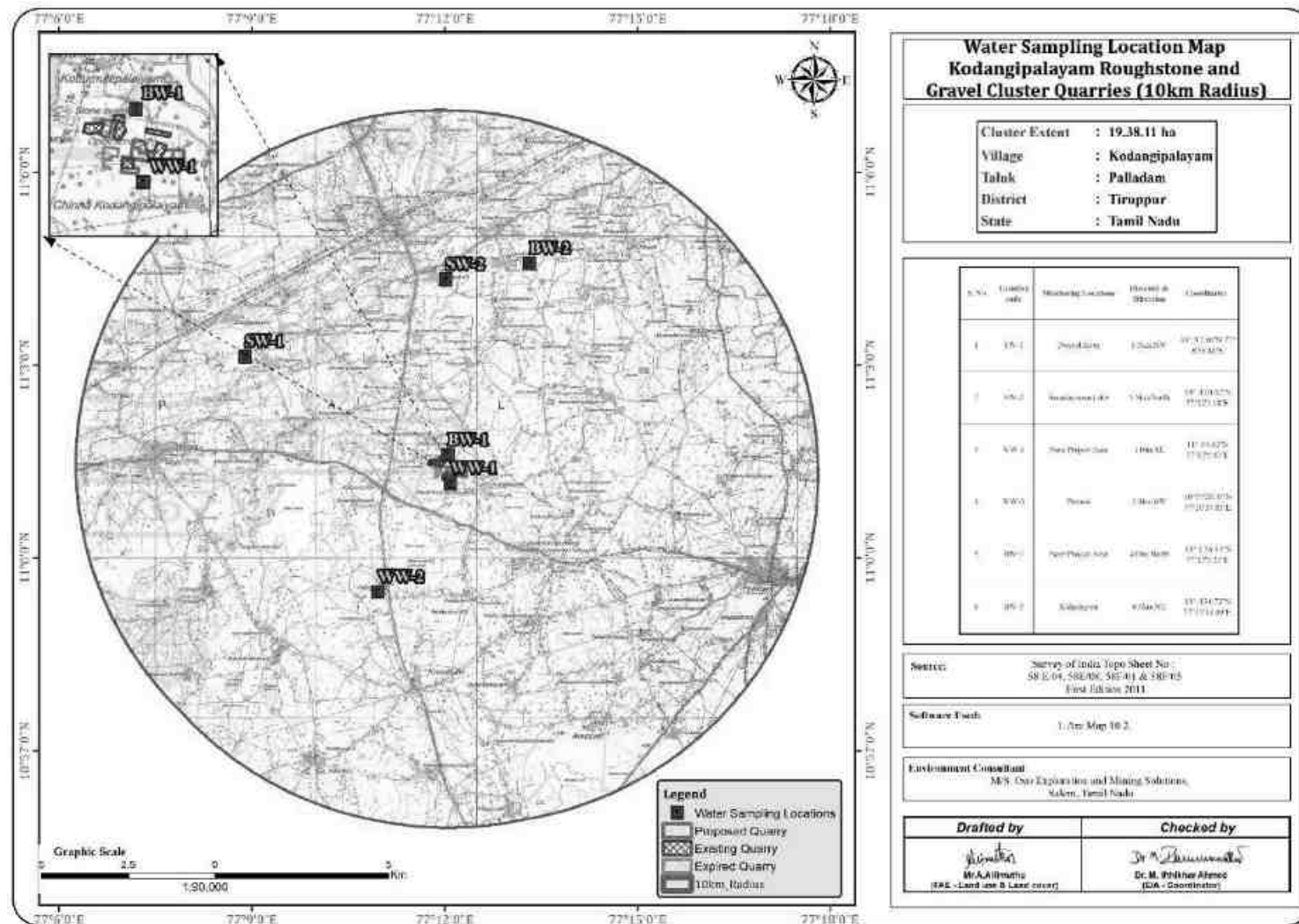
FIGURE 3.6: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS

TABLE 3.9 – SURFACE WATER ANALYSIS RESULTS

S.No	Parameters	Units	SW-1 Noyyal River	SW-2 Samalapuram Lake	Acceptable limit	Permissible limit
1	Aluminium	mg /l	0.12	BDL (DL : 0.01)	0.03	0.2
2	Ammoniacal Nitrogen as NH ₃ -N	mg /l	1.59	1.97	0.5	No Relaxation
3	Arsenic as As	mg /l	BDL (DL : 0.002)	BDL (DL : 0.005)	0.01	0.05
4	Barium as Ba	mg /l	0.021	BDL (DL : 0.01)	0.7	No Relaxation
5	Biochemical Oxygen Demand (BOD) at 27°C for 3 Days	mg /l	8.4	12.0	30	30
6	Boron as B	mg /l	BDL (DL : 0.1)	BDL (DL : 0.1)	0.5	1.0
7	Cadmium as Cd	mg /l	BDL (DL : 0.01)	BDL (DL : 0.01)	0.003	No Relaxation
8	Calcium as Ca	mg /l	60.92	78.55	75	200
9	Chemical Oxygen Demand (COD)	mg /l	30.0	40.12	250	250
10	Chloride as Cl ⁻	mg/l	141.95	157.95	250	1000
11	Chromium as Cr	mg/l	BDL (DL : 0.01)	BDL (DL : 0.01)	0.05	No Relaxation
12	Color	CU	7	10	5	15
13	Copper as Cu	mg/l	BDL (DL : 0.01)	BDL (DL : 0.01)	0.05	1.5
14	Cyanide as CN	mg/l	BDL (DL : 0.02)	BDL (DL : 0.02)	0.05	No Relaxation
15	Dissolved Oxygen (DO)	mg/l	4.4	4.2	4-6	4-6
16	Electrical Conductivity (EC)	µS/cm	1566	1233	2000	2000
17	Fluoride as F ⁻	mg/l	0.38	0.35	1.0	1.5
18	Free Residual Chlorine as Cl ₂	mg/l	BDL (DL : 1.0)	BDL (DL : 1.0)	0.2	1
19	Iron as Fe	mg/l	0.33	0.39	0.3	No Relaxation
20	Lead as Pb	mg/l	BDL (DL : 0.01)	BDL (DL : 0.01)	0.01	No Relaxation
21	Magnesium as Mg	mg/l	28.21	25.29	30	100
22	Manganese as Mn	mg/l	BDL (DL : 0.1)	BDL (DL : 0.01)	0.1	0.3
23	Mercury as Hg	mg/l	BDL (DL : 0.002)	BDL (DL : 0.002)	0.001	No Relaxation
24	Molybdenum as Mo	mg/l	0.016	0.018	0.07	No Relaxation
25	Nitrate as NO ₃	mg/l	3.66	3.09	45	No Relaxation
26	Odor	-	Agreeable	Agreeable	Agreeable	Agreeable
27	pH	-	7.55	7.01	6.5-8.5	No Relaxation
28	Phenols	mg/l	BDL (DL : 0.1)	BDL (DL : 0.1)	0.001	0.002

29	Selenium as Se	mg/l	BDL (DL : 0.005)	BDL (DL : 0.005)	0.01	No Relaxation
30	Sulphate as SO ₄	mg/l	27.43	33.63	200	400
31	Sulphide as S (Iodometric Method)	mg/l	BDL (DL : 1.0)	BDL (DL : 1.0)	0.05	No Relaxation
32	Total Alkalinity as CaCO ₃	mg/l	245.2	281.4	200	600
33	Total Dissolved Solids (TDS)	mg/l	924.0	728	500	2000
34	Total Hardness as CaCO ₃	mg/l	268	300	200	600
35	Total Suspended Solids (TSS)	mg/l	8.0	11	500	2000
36	Turbidity	NTU	4.1	5.3	1	5
37	Zinc as Zn	mg/l	BDL (DL : 0.01)	BDL (DL : 0.01)	5	15
38	Escherichia coli	per 100ml	Absent	Absent	Shall not be detectable in any 100 ml	-
39	Total Coliforms		Present	Present		-

TABLE 3.10 – GROUND WATER ANALYSIS RESULTS

S.No	Parameters	Units	WW-1	WW-2	BW-1	BW-2	Acceptable limit	Permissible limit
1	Aluminium	mg /l	0.054	BDL (DL :0.01)	BDL (DL :0.01)	0.124	0.03	0.2
2	Ammoniacal Nitrogen as NH ₃ -N	mg /l	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	0.5	No Relaxation
3	Arsenic as As	mg /l	BDL (DL : 0.002)	BDL (DL :0.002)	BDL (DL :0.002)	BDL (DL :0.002)	0.01	0.05
4	Barium as Ba	mg /l	0.046	BDL (DL :0.01)	BDL (DL :0.01)	0.020	0.7	No Relaxation
5	Boron as B	mg /l	BDL (DL : 0.1)	BDL (DL :0.1)	BDL (DL : 0.1)	BDL (DL : 0.1)	0.5	1.0
6	Cadmium as Cd	mg /l	BDL (DL : 0.01)	BDL (DL :0.01)	BDL (DL : 0.01)	BDL (DL :0.01)	0.003	No Relaxation
7	Calcium as Ca	mg /l	52.90	44.89	59.32	49.69	75	200
8	Chloride as Cl ⁻	mg/l	121.96	131.95	107.97	91.97	250	1000
9	Chromium as Cr	mg/l	BDL (DL : 0.01)	BDL (DL :0.01)	BDL (DL :0.01)	BDL (DL :0.01)	0.05	No Relaxation
10	Color	CU	<1	<1	<1	<1	5	15
11	Copper as Cu	mg/l	0.058	BDL (DL :0.01)	0.012	BDL (DL :0.01)	0.05	1.5
12	Cyanide as CN	mg/l	BDL (DL : 0.02)	BDL (DL :0.02)	BDL (DL :0.02)	BDL (DL :0.02)	0.05	No Relaxation
13	Electrical Conductivity (EC)	µS/cm	942	905	1015	968	2000	2000
14	Fluoride as F ⁻	mg/l	0.14	BDL (DL : 0.1)	0.13	0.13	1.0	1.5
15	Free Residual Chlorine as Cl ₂	mg/l	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	0.2	1
16	Iron as Fe	mg/l	0.11	0.16	BDL (DL : 0.1)	0.19	0.3	No Relaxation
17	Lead as Pb	mg/l	BDL (DL : 0.01)	BDL (DL :0.01)	BDL (DL :0.01)	BDL (DL :0.01)	0.01	No Relaxation
18	Magnesium as Mg	mg/l	24.32	20.42	33.07	35.02	30	100
19	Manganese as Mn	mg/l	BDL (DL : 0.1)	BDL (DL : 0.1)	BDL (DL : 0.1)	BDL (DL :0.01)	0.1	0.3
20	Mercury as Hg	mg/l	BDL (DL : 0.002)	BDL (DL :0.002)	BDL (DL :0.002)	BDL (DL :0.002)	0.001	No Relaxation
21	Molybdenum as Mo	mg/l	0.020	0.020	0.021	0.022	0.07	No Relaxation
22	Nitrate as NO ₃	mg/l	3.04	4.22	2.06	5.98	45	No Relaxation
23	Odor	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
24	pH	-	7.21	7.35	7.81	7.66	6.5-8.5	No Relaxation
25	Phenols	mg/l	BDL (DL : 0.1)	BDL (DL : 0.1)	BDL (DL : 0.1)	BDL (DL : 0.1)	0.001	0.002
26	Selenium as Se	mg/l	BDL (DL : 0.005)	BDL (DL :0.005)	BDL (DL :0.005)	BDL (DL :0.005)	0.01	No Relaxation
27	Sulphate as SO ₄	mg/l	13.18	18.09	11.91	12.31	200	400

28	Sulphide as S (Iodometric Method)	mg/l	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	0.05	No Relaxation
29	Total Alkalinity as CaCO ₃	mg/l	221.1	192.96	269.34	237.18	200	600
30	Total Dissolved Solids (TDS)	mg/l	556	525	599	571	500	2000
31	Total Hardness as CaCO ₃	mg/l	232	196	284	268	200	600
32	Total Suspended Solids (TSS)	mg/l	BDL (DL : 2.0)	BDL (DL : 2.0)	BDL (DL : 2.0)	BDL (DL : 2.0)	500	2000
33	Turbidity	NTU	<1	<1	<1	<1	1	5
34	Zinc as Zn	mg/l	0.897	0.077	0.055	BDL (DL : 0.01)	5	15
35	Escherichia coli	MPN/ 100ml	Absent	Absent	Present	Absent	Shall not be detectable in any 100 ml	-
36	Total Coliforms		Present	Present	Present	Present		-

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

3.2.4 Interpretation & Conclusion

Surface Water

The pH of surface 7.01-7.55 while turbidity found within the standards. Total Dissolved Solids 728 to 924 mg/l and Chloride 141.95 to 157.95mg/l. Nitrates 3.09 to 3.66mg/l, while sulphates 27.43 to 33.63mg/l.

Ground Water

The pH of the water samples collected ranged from 7.21 to 7.81 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. on Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 525 to 599 mg/l in all samples. The Total hardness varied between 196 - 284mg/l for all samples.

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

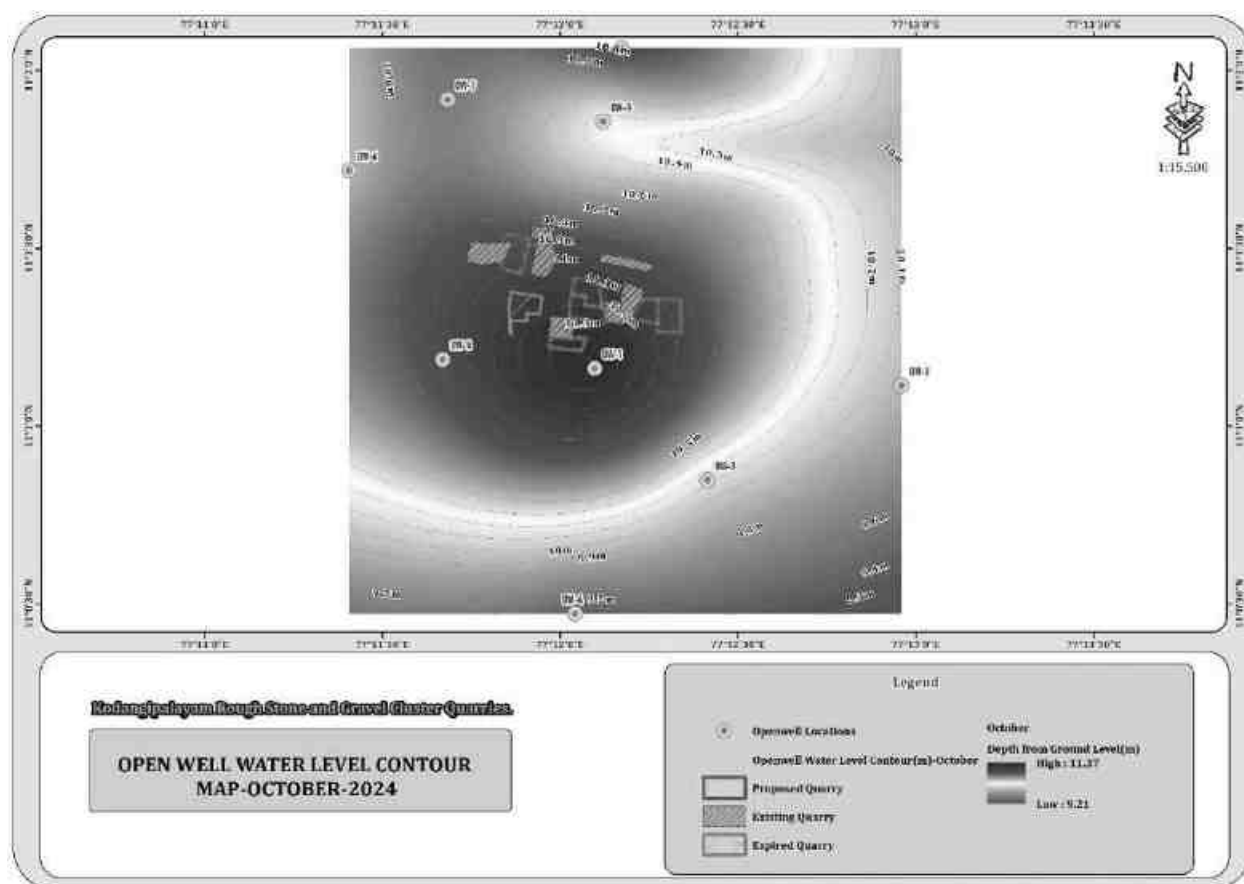
3.2.5 Hydrology and Hydrogeological studies

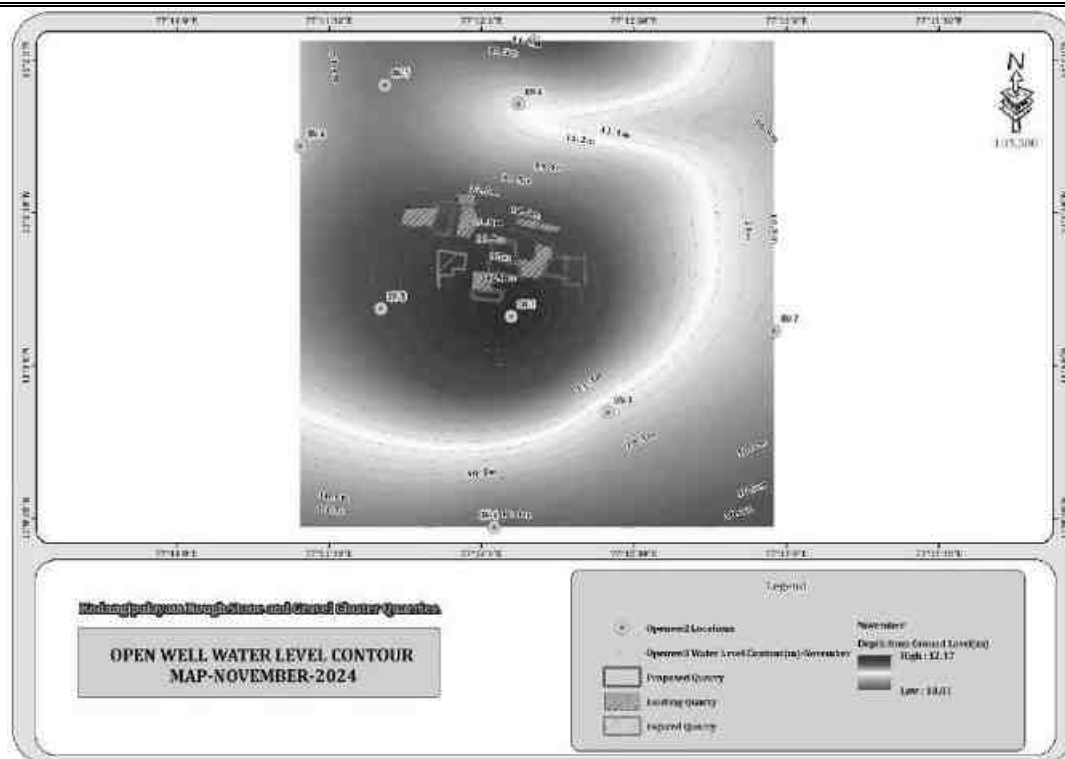
The district is underlain by hard rock formation Fissured and Fractured crystalline rocks constitute the important aquifer systems in the district. Geophysical prospecting was carried out in that area by SSRMP-ATS Instrument by qualified Geo physicist with the help of IGIS software and it was inferred that the low resistance encountered at the depth between 68m. the quarrying operations is restricted upto 32-37m hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area. There is no necessity of stream, channel diversion due to this upcoming project.

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

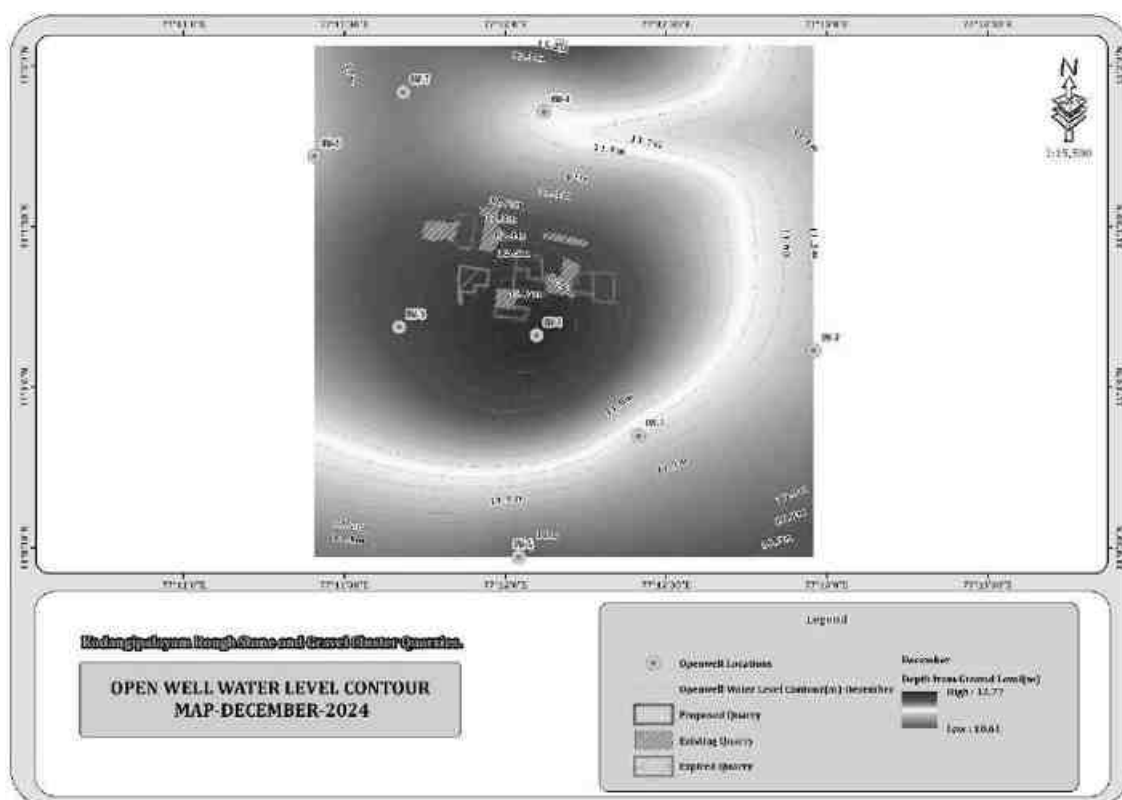
TABLE 3.11: POST MONSOON WATER LEVEL OF OPEN WELLS 1 KM RADIUS

S.No	LABEL	LONGITUDE	LATITUDE	Oct-24	Nov-24	Dec-24
1	OW-1	77° 12' 05.8300" E	11° 01' 09.6700" N	11.4	12.2	12.8
2	OW-2	77° 12' 57.5584" E	11° 01' 06.7971" N	10	10.8	11.4
3	OW-3	77° 12' 24.8536" E	11° 00' 50.8397" N	10.2	11	11.6
4	OW-4	77° 12' 02.4868" E	11° 00' 28.3024" N	9.4	10.2	10.8
5	OW-5	77° 11' 40.1593" E	11° 01' 11.1853" N	10.9	11.7	12.3
6	OW-6	77° 11' 24.3601" E	11° 01' 43.0654" N	10.5	11.3	11.9
7	OW-7	77° 11' 40.9968" E	11° 01' 54.9946" N	10.7	11.5	12.1
8	OW-8	77° 12' 07.2456" E	11° 01' 51.3077" N	10.3	11.1	11.7
9	OW-9	77° 12' 10.3129" E	11° 02' 03.6781" N	10.9	11.7	12.3

FIGURE 3.7: CONTOUR MAP OF OPEN WELL WATER LEVEL**October 2024**



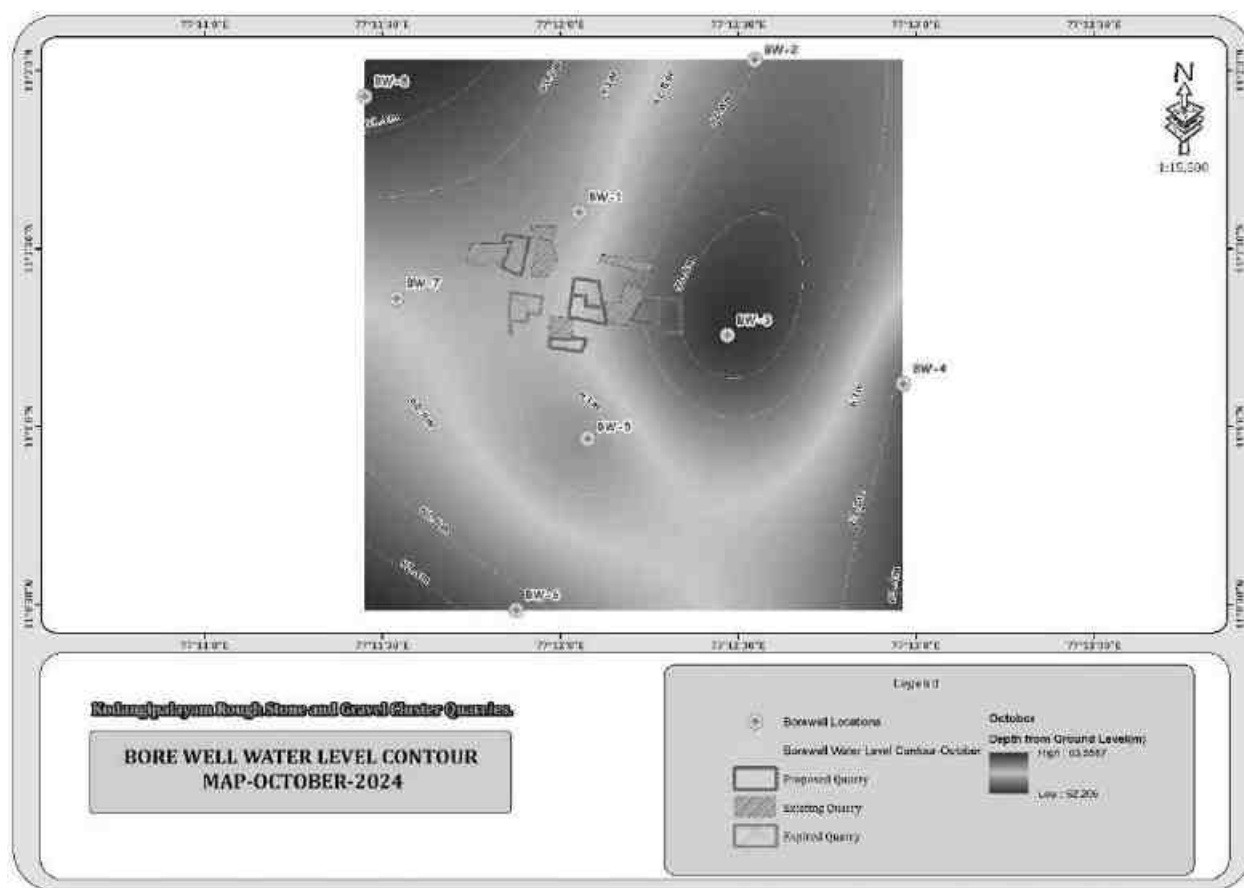
November 2024

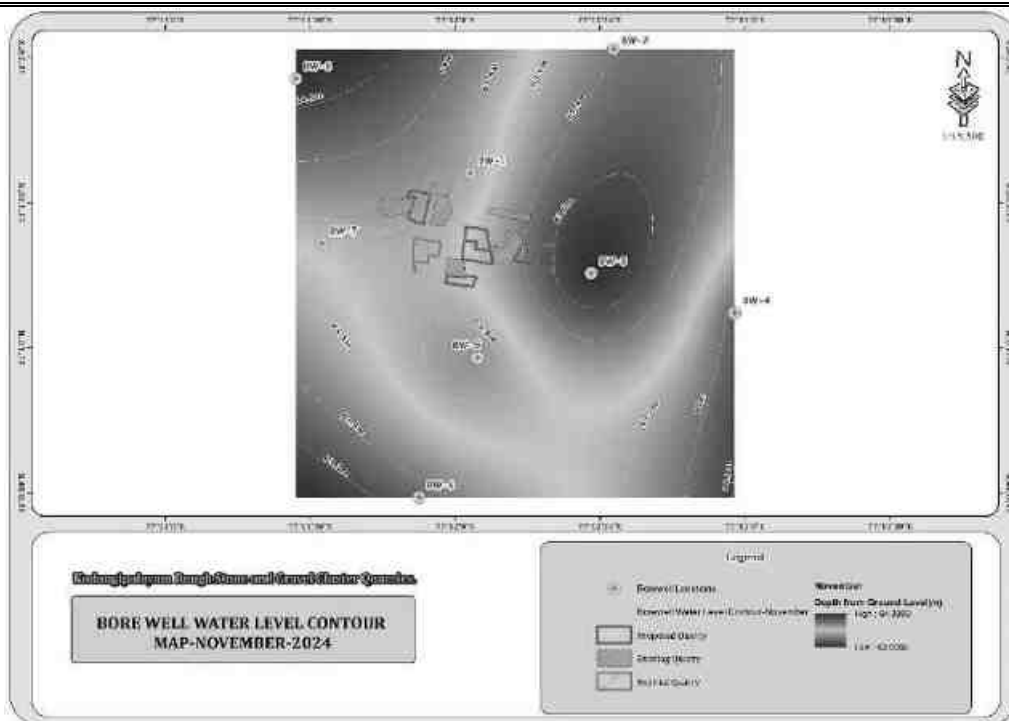


December 2024

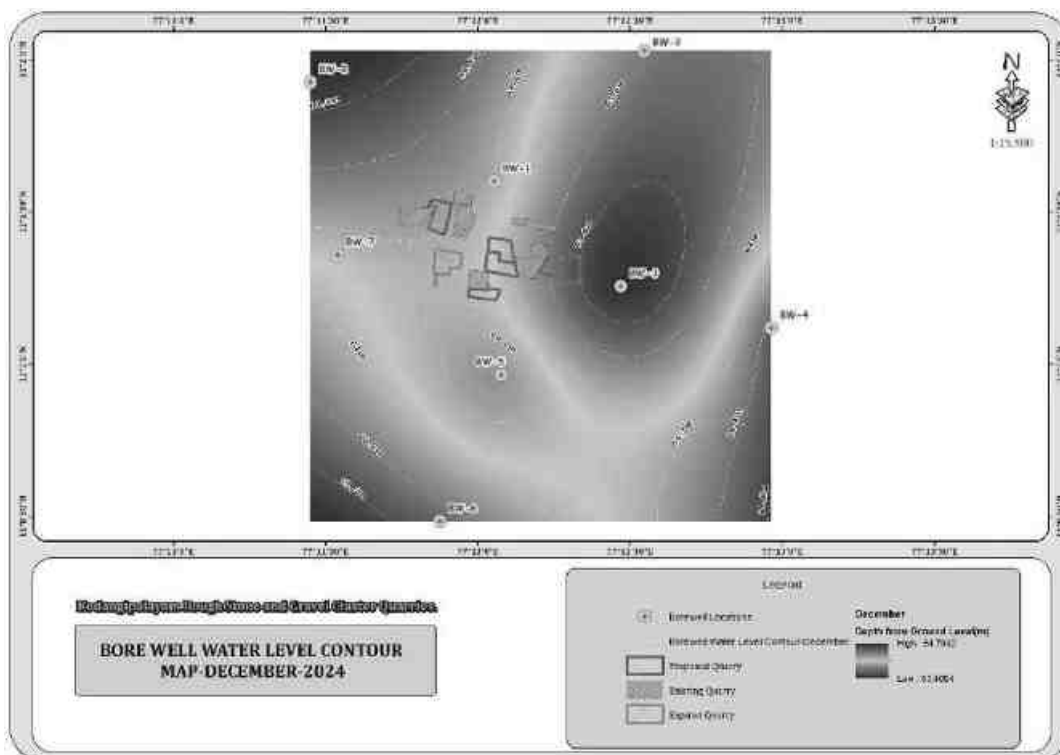
TABLE 3.12: POST MONSOON WATER LEVEL OF BOREWELLS 1 KM RADIUS

S.No	LABEL	LONGITUDE	LATITUDE	Oct-24	Nov-24	Dec-24
1	BW-1	77° 12' 03.1863" E	11° 01' 36.0832" N	63	63.8	64.2
2	BW-2	77° 12' 32.7756" E	11° 02' 01.7148" N	62.6	63.4	63.8
3	BW-3	77° 12' 28.1637" E	11° 01' 15.3618" N	62.2	63	63.4
4	BW-4	77° 12' 57.8523" E	11° 01' 07.1686" N	63.3	64.1	64.5
5	BW-5	77° 12' 04.5849" E	11° 00' 57.9215" N	63.1	63.9	64.3
6	BW-6	77° 11' 52.5031" E	11° 00' 29.0929" N	62.5	63.3	63.7
7	BW-7	77° 11' 32.3796" E	11° 01' 21.5591" N	62.9	63.7	64.1
8	BW-8	77° 11' 26.9976" E	11° 01' 55.5474" N	63.5	64.3	64.7

FIGURE 3.8: CONTOUR MAP OF BORE WELL WATER LEVEL**October 2024**



November 2024



December 2024

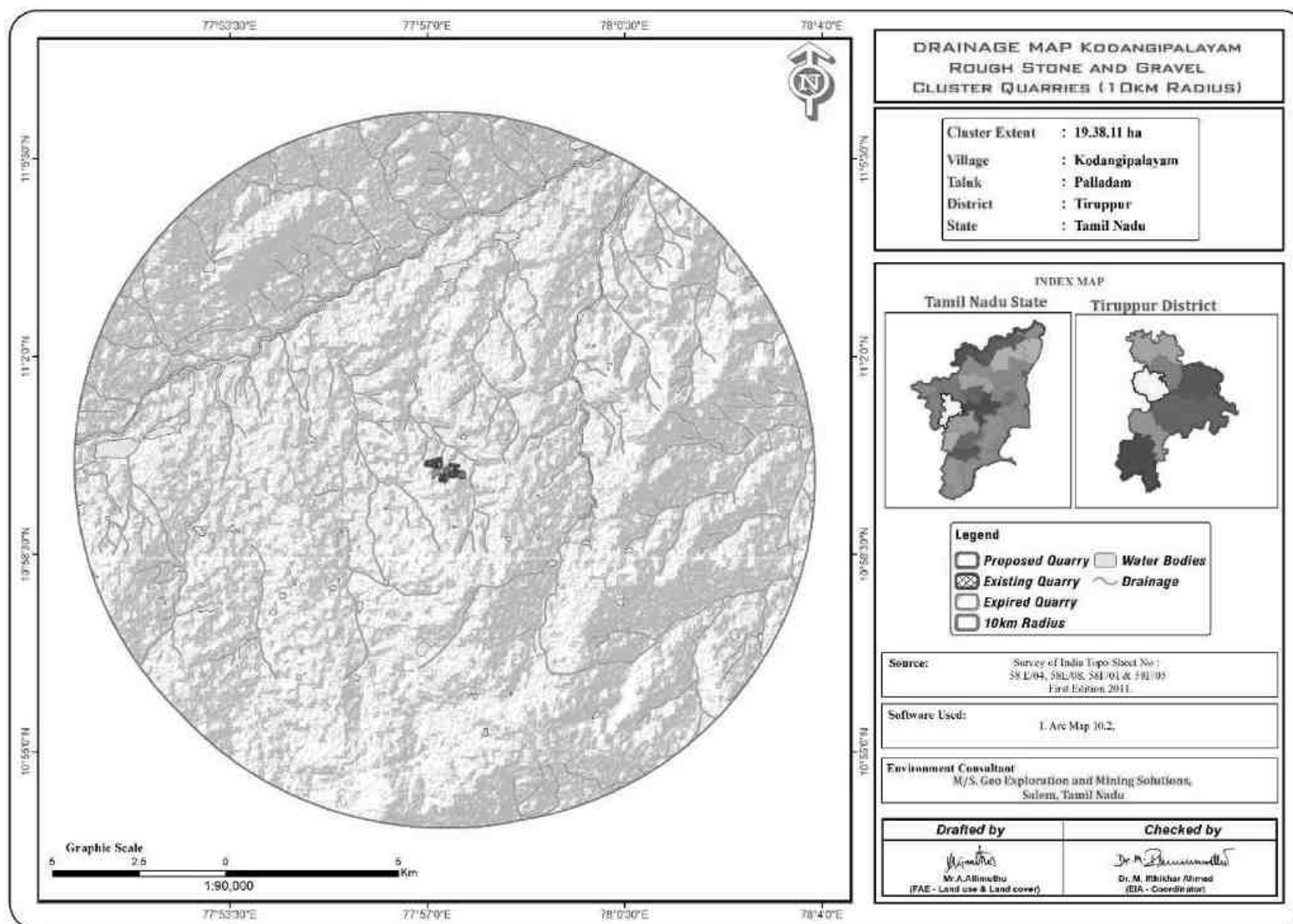
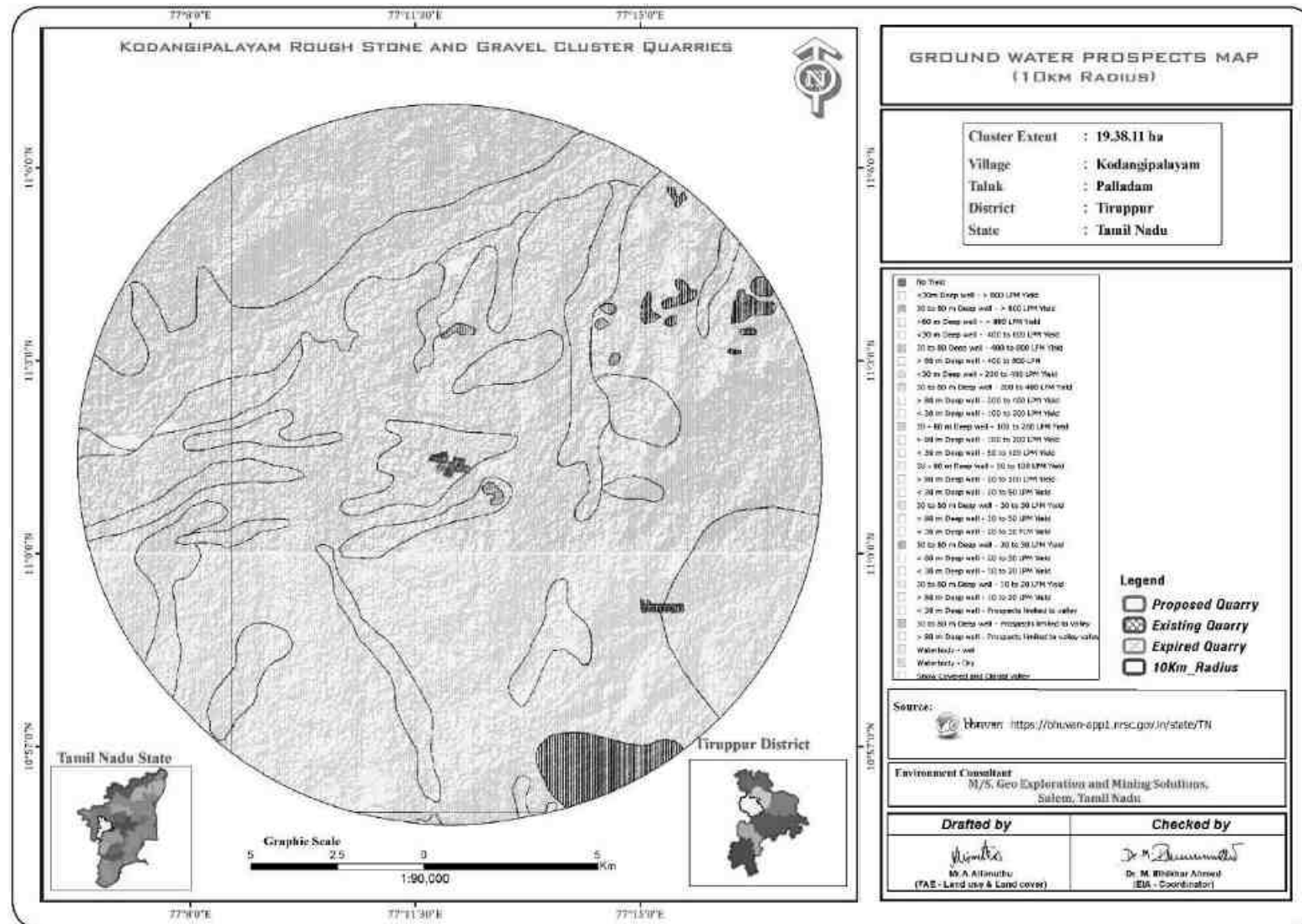
FIGURE 3.9: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

FIGURE 3.10: GROUND WATER PROSPECTS MAP

Source: Bhuvan

3.2.5.1 Methodology and Data Acquisition

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

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

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

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

ΔV = potential difference between receiving electrodes

G = Geometric Factor.

Rocks show wide variation in resistivity ranging from 10-8 more than 10¹⁴ ohmmeter. On a broad classification, one can group the rocks falling in the range of 10-8 to 1 ohmmeter as good conductors, 1 to 106 ohmmeter as intermediate conductors and 106 to 10¹² ohmmeter as more as poor conductor. The resistivity of rocks and subsurface lithology, which is mostly dependent on its porosity and the pore fluid resistivity is defined by Archie's Law,

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

ρ_r = Resistivity of Rocks

ρ_w = Resistivity of water in pores of rock

F = Formation Factor

ϕ = Fractional pore volume

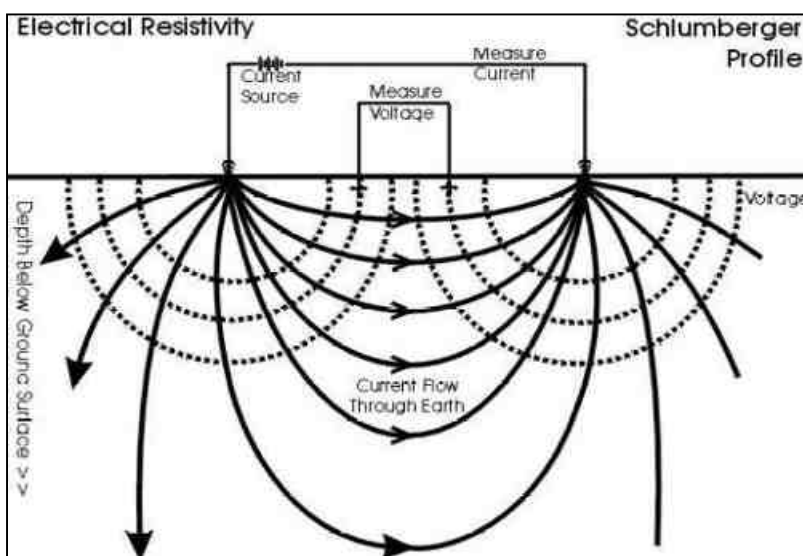
A = Constants with values ranging from 0.5 to 2.5

3.2.5.2 Survey Layout

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

The field equipment deployed for the study is in a deep resistivity meter with a model of SSR – MP – AT. This Signal stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation features for Earth resistivity. In the presence of random earth Noises the signal to noise ratio can be enhanced by $\sqrt{N}$ where N is the number of stacked readings. This SSR meter in which running averages of measurements $[1, (1+2)/2, (1+2+3)/3 \dots (1+2+\dots+16/16)]$ up to the chosen stacks are displayed and the final average is stored automatically, in memory utilizing the principles of stacking to achieve the benefit of high signals to noise ratio. Based on these above significations the signal stacking resistivity meter was used for (VES) Vertical Electric Resistivity Sounding.

RESISTIVITY SURVEY PROFILE



Measurements of ground Resistivity is essentially done by sending a current through two electrodes called current electrodes (C_1 & C_2) and measuring the resulting potential by two other electrodes called potential electrode (P_1 & P_2). The amount of current required to be sent into the ground depends on the contact resistance at the current electrode, the ground resistivity and the depth of interest.

3.2.5.3 Data Presentation

It was inferred that the low resistance encountered at the depth between 78-73m. The maximum depth proposed out of proposed projects is 30-36m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area.

3.2.5.4 Geophysical Data Interpretation

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

3.3 Air Environment

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

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

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

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

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

3.3.1 Meteorology & Climate

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

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

Climate –

The Tiruppur lies on 300m above sea level The climate here is considered to be a local steppe climate. There is not much rainfall in Tiruppur all year long. This location is classified as BSh by Köppen and Geiger. In Tiruppur.

- The average annual temperature is 27.3°C | 81.1°F.
- The annual rainfall here is around 605mm | 23.8 inch.
- The driest month is January with 7mm | 0.3 inch of rainfall. The greatest amount of precipitation occurs in October, with an average of 155mm | 6.1 inch.
- The warmest month of the year is April, with an average temperature of 30.0°C | 86.0°F. The lowest average temperatures in the year occur in December, when it is around 24.8°C | 76.6°F.
- The difference in precipitation between the driest month and the wettest month is 148 mm | 6 inch. The variation in annual temperatures throughout the year is 5.2°C | 41.4°F.

Source: <https://en.climate-data.org/asia/india/tamil-nadu/tiruppur-2789/>

Rainfall –

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

TABLE 3.13 – RAINFALL DATA

Actual Rainfall in mm					Normal Rainfall in mm
2017	2018	2019	2020	2021	606.8
679.8	716.2	488.1	748.8	845.1	

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

TABLE 3.14 – METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Oct-2024	Nov-2024	Dec-2024
1	Temperature (°C)	Max	28.91	25.88	25.35
		Min	23.85	23.27	21.38
		Avg	26.38	24.575	23.365
2	Relative Humidity (%)	Avg	78.54	82.81	85.475
3	Wind Speed (m/s)	Max	4.8	3.47	3.84
		Min	0.9	1.32	0.9
		Avg	2.85	2.395	2.37
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		WSW,W	ENE,E	ENE,E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

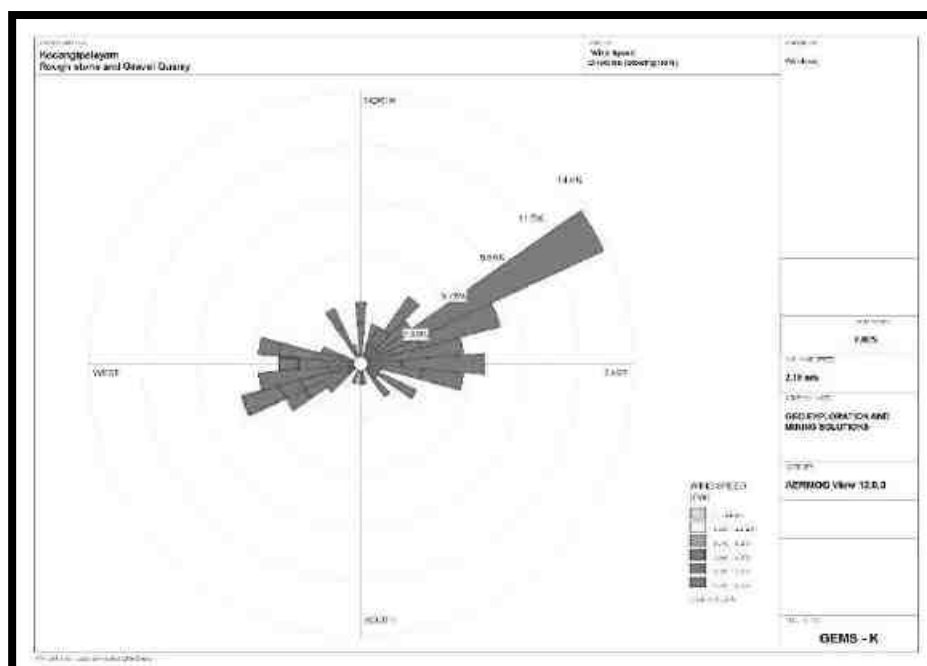
Correlation between Secondary and Primary Data

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

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

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

FIGURE 3.9: WINDROSE DIAGRAM



3.3.2 Methodology and Objective

The prime objective of the ambient air quality study is to assess the existing air quality of study area and its conformity to NAAQS. The observed sources of air pollution in the study area are industrial, traffic and domestic activities. The baseline status of the ambient air quality has been established through a scientifically designed ambient air quality monitoring network considering the followings:

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

3.3.3 Sampling and Analytical Techniques

TABLE 3.15 – METHODOLOGY AND INSTRUMENT USED FOR AIR QUALITY ANALYSIS

Parameter	Method	Instrument
PM _{2.5}	Gravimetric Method Beta attenuation Method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM ₁₀	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hochheiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by Global Lab and Consultancy Services & CPCB Notification.

TABLE 3.16 – NATIONAL AMBIENT AIR QUALITY STANDARDS

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

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

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

3.3.4 Frequency & Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at seven (7) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period Mar-May2022. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂) & Nitrogen Dioxide (NO₂).

3.3.5 Ambient Air Quality Monitoring Stations

Seven (7) monitoring stations were set up in the study area as depicted in Figure 3.6.1 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

TABLE 3.17 – AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Core Zone	Project Area	11° 1'17.80"N 77°12'7.02"E
2	AAQ-2	Core Zone	Project Area	11° 1'13.48"N 77°11'58.37"E
3	AAQ-3	Kodangipalayam	720m East	11° 1'19.49"N 77°12'31.44"E
4	AAQ-4	Paruvai	3.2km SW	10°59'45.51"N 77°10'55.40"E
5	AAQ-5	Kalipalayam	6.0km NE	11° 4'30.38"N 77°13'3.75"E
6	AAQ-6	Sengathurai	5.5km NW	11° 2'56.74"N 77° 9'25.04"E
7	AAQ-7	Ayyampalayam	4.3km South	10°59'4.22"N 77°13'4.74"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

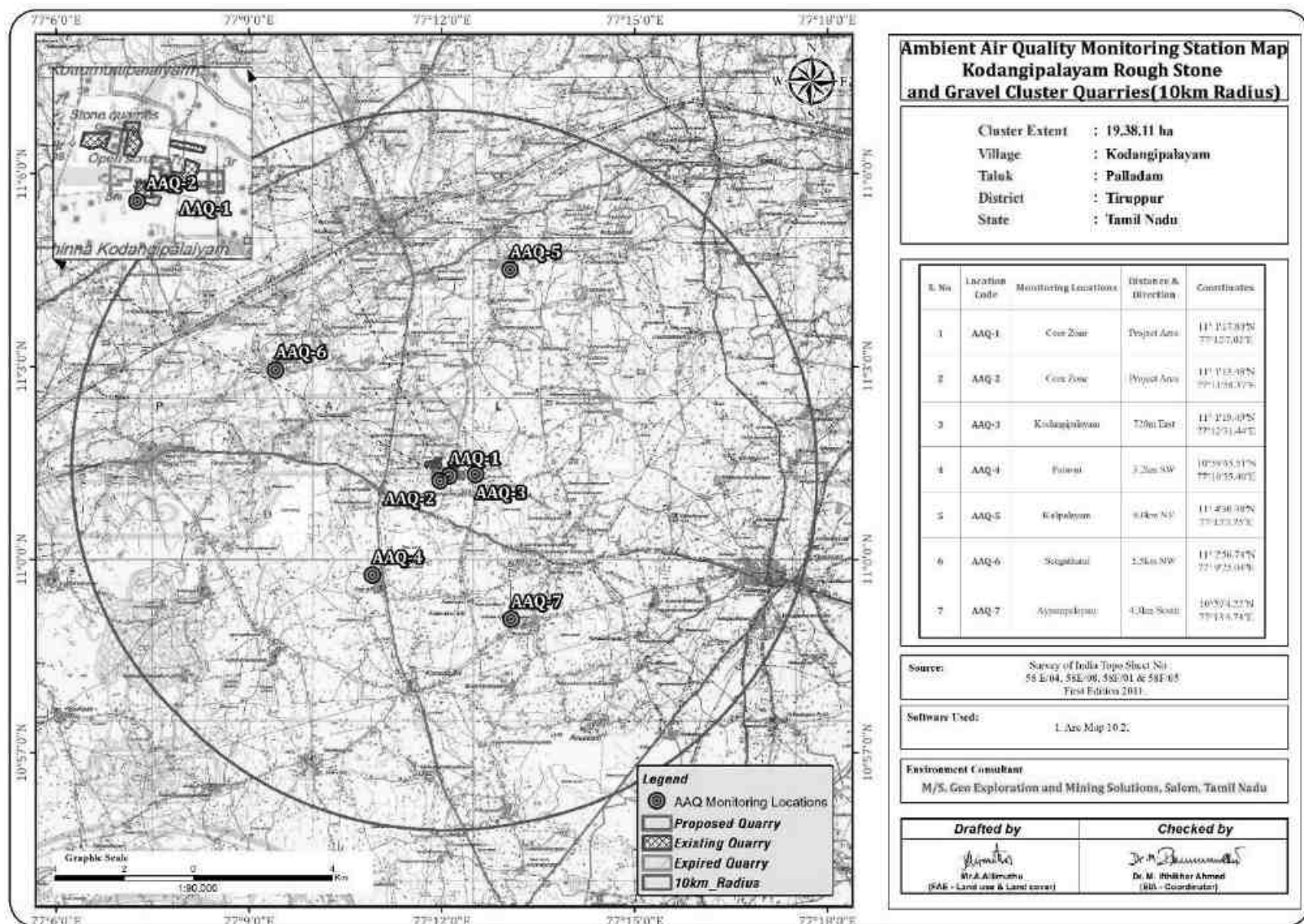
FIGURE 3.10 AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

TABLE 3.25 – ABSTRACT OF AMBIENT AIR QUALITY DATA

1	Parameter	PM10	PM2.5	SO ₂	NO ₂
2	No. of Observations	260	260	260	260
3	10 th Percentile Value	40.6	19.3	5.9	23.2
4	20 th Percentile Value	41.7	20.0	6.4	24.0
5	30 th Percentile Value	42.5	20.4	6.7	24.5
6	40 th Percentile Value	42.9	20.6	7.0	25.0
7	50 th Percentile Value	43.5	20.9	7.2	25.2
8	60 th Percentile Value	43.9	21.4	7.5	25.4
9	70 th Percentile Value	45.4	21.7	7.7	25.6
10	80 th Percentile Value	46.3	22.6	8.1	25.9
11	90 th Percentile Value	47.6	23.7	8.4	26.5
12	95 th Percentile Value	48.4	24.8	8.5	26.7
13	98 th Percentile Value	48.6	25.6	8.8	27.1
14	Arithmetic Mean	44.7	21.9	7.5	25.4
15	Geometric Mean	44.6	21.8	7.4	25.4
16	Standard Deviation	2.8	2.0	0.9	1.2
17	Minimum	40.6	19.3	5.9	23.2
18	Maximum	48.6	25.6	8.8	27.1
19	NAAQ Norms*	100.0	60.0	80.0	80.0
	% Values exceeding Norms*	0.0	0.0	0.0	0.0

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

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

TABLE 3.26 –SUMMARY OF AMBIENT AIR QUALITY DATA

PM10	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	45.1	44.7	44.5	44.6	44.5	44.2	44.1
Minimum	42.1	41.6	41.5	41.9	41.2	42.0	41.4
Maximum	48.8	47.1	47.0	47.8	47.2	47.0	46.8
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PM2.5	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	23.8	23.7	24.1	23.9	23.5	23.6	23.7
Minimum	20.0	19.1	19.5	19.5	19.5	19.1	19.5
Maximum	27.9	26.6	27.0	27.0	26.6	26.6	27.0
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0
SO2	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	4.7	4.9	5.0	4.8	4.7	4.8	4.7
Minimum	4.2	4.2	4.1	4.1	4.2	4.2	4.1
Maximum	5.9	6.7	7.3	6.1	5.6	5.9	5.7
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0
NO2	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	20.0	19.3	19.6	19.5	19.9	19.7	19.8
Minimum	18.4	16.1	17.3	17.0	17.5	17.0	17.6
Maximum	23.7	22.7	22.9	22.8	23.6	24.4	23.9
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

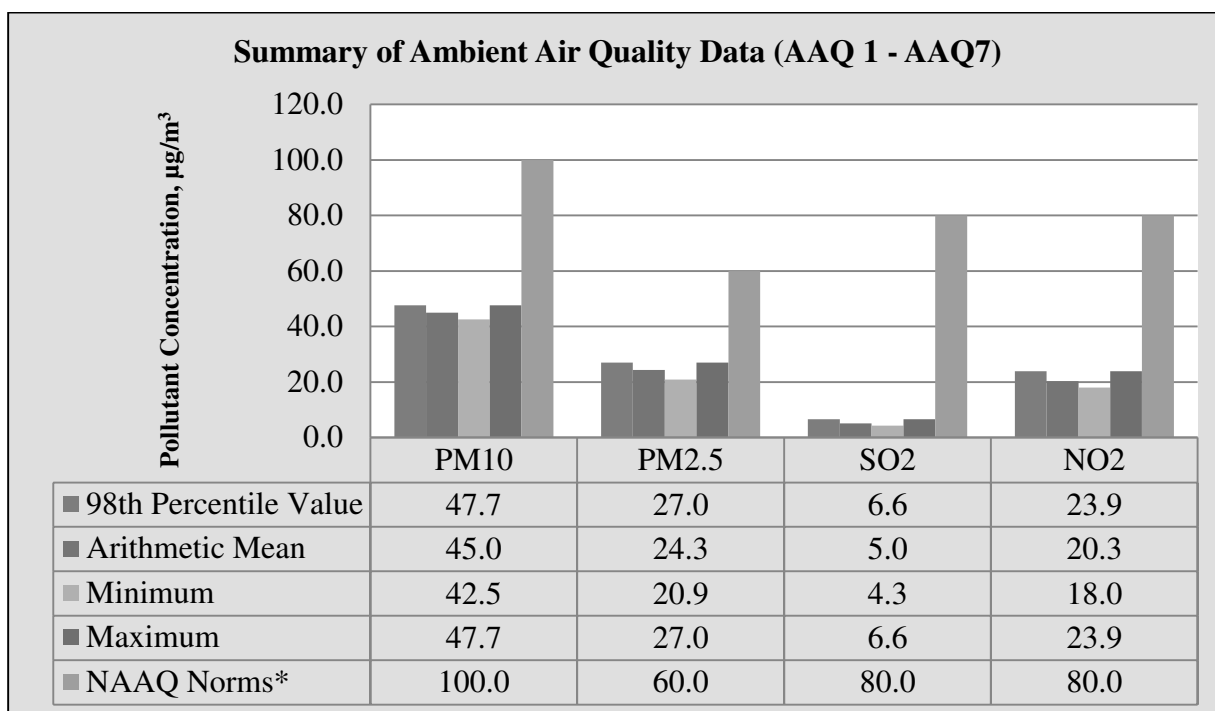
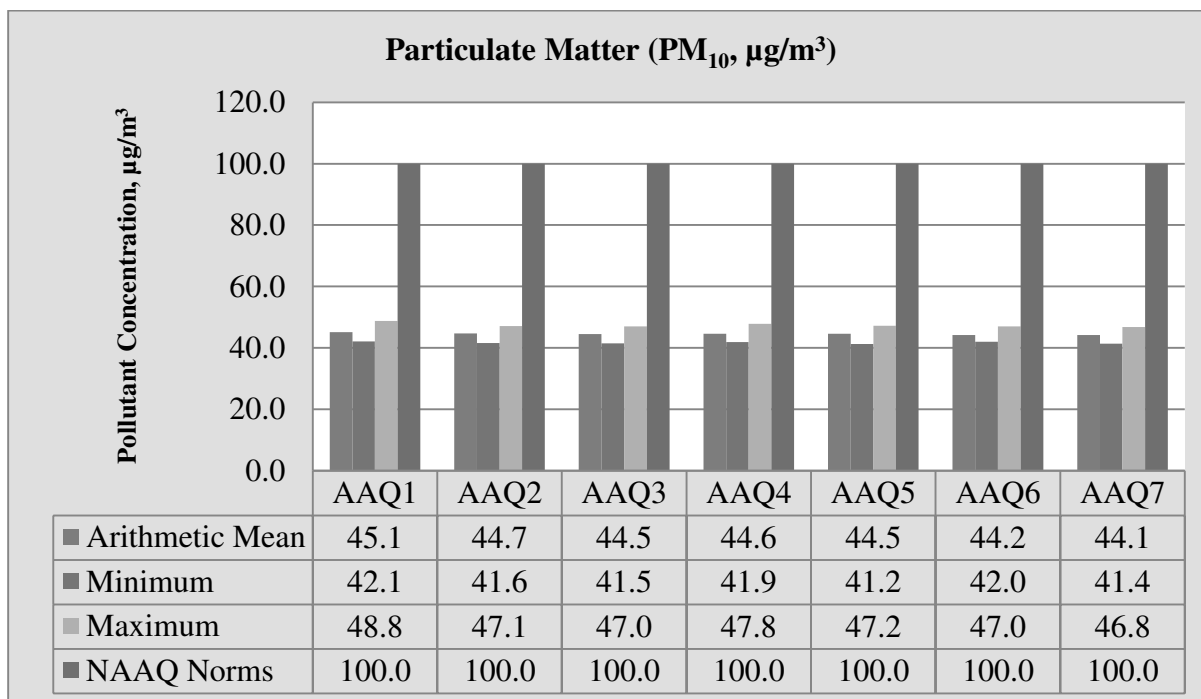
**FIGURE 3.11 : BAR DIAGRAM OF SUMMARY OF AAQ****FIGURE 3.12: BAR DIAGRAM OF PARTICULATE MATTER (PM₁₀)**

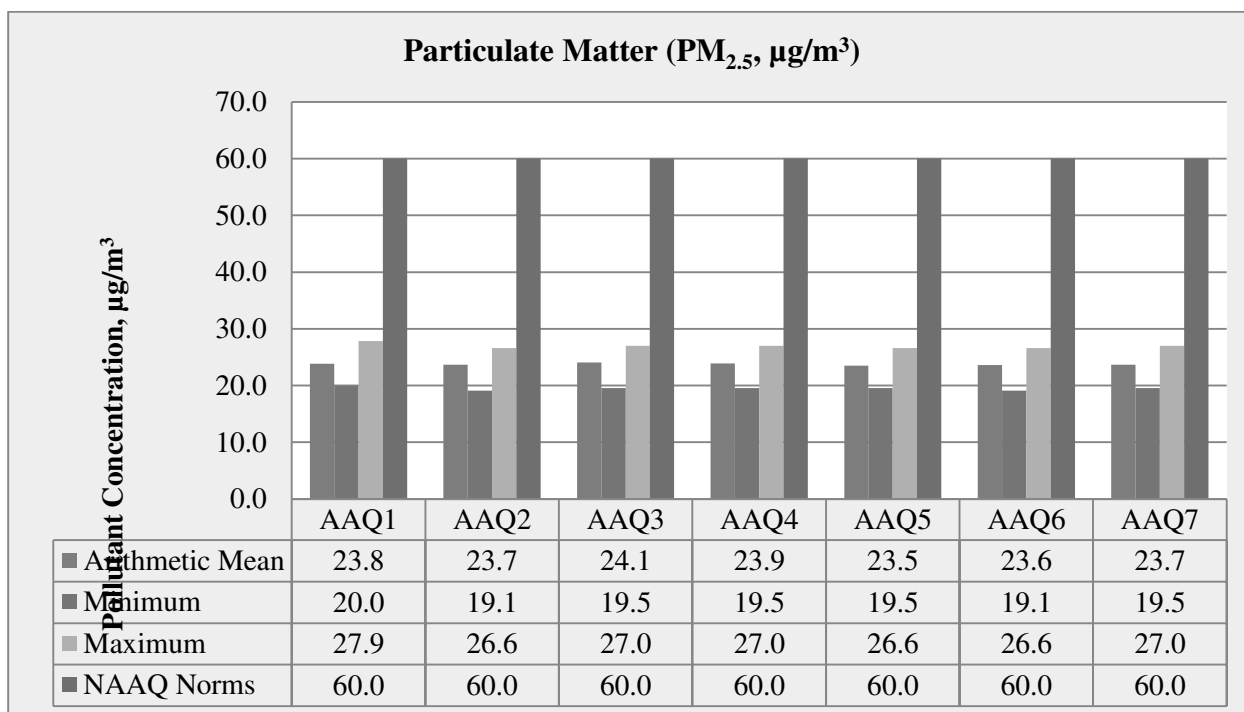
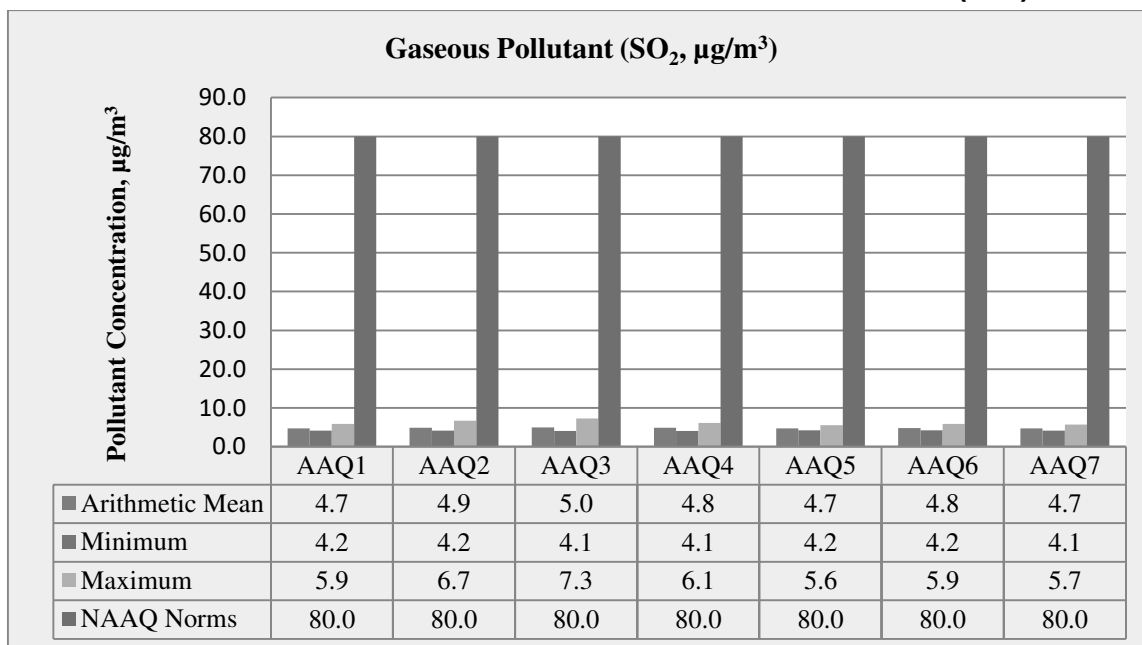
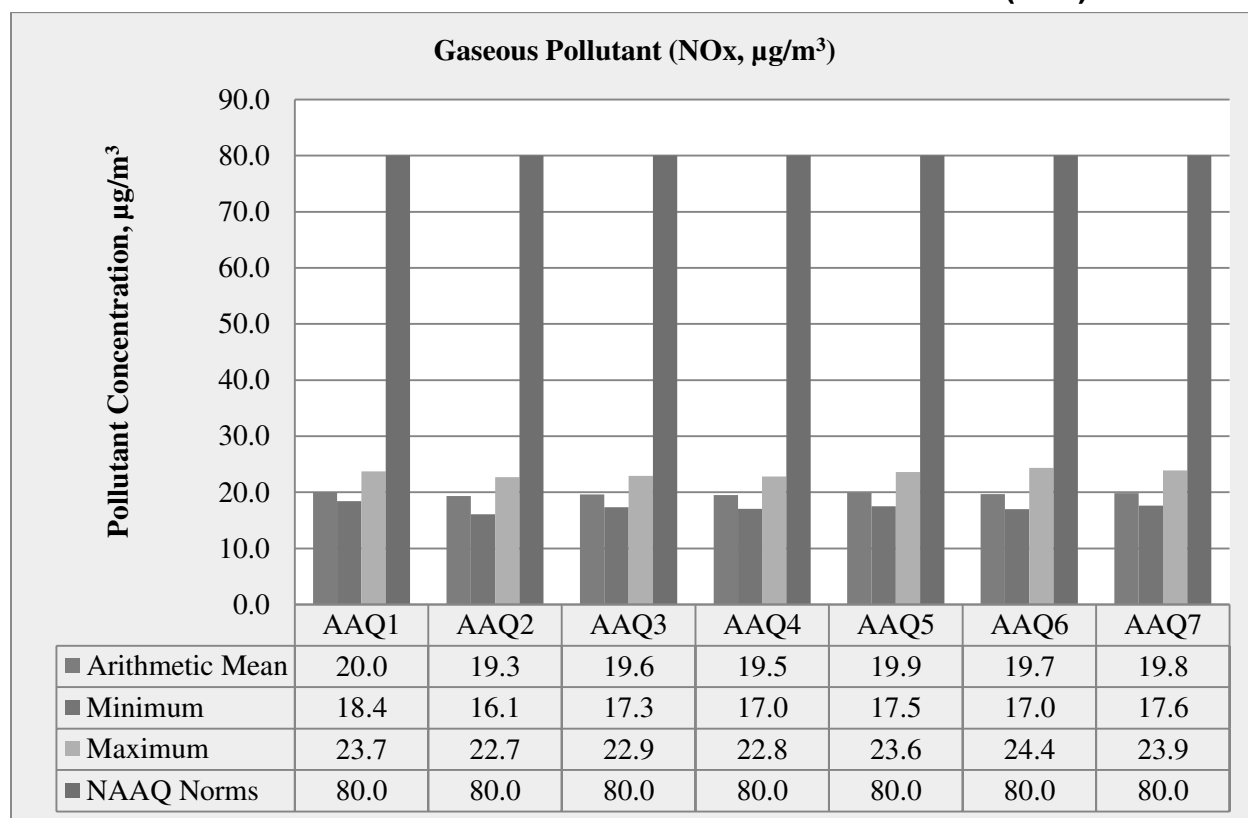
FIGURE 3.13: BAR DIAGRAM OF PARTICULATE MATTER (PM_{2.5})**FIGURE 3.14: BAR DIAGRAM OF PARTICULATE MATTER (SO₂)**

FIGURE 3.15: BAR DIAGRAM OF PARTICULATE MATTER (NO_x)

3.3.6 Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 44.1 µg/m³ to 45.1 µg/m³, PM_{2.5} data ranges from 23.5 µg/m³ to 24.1 µg/m³, SO₂ ranges from 4.7 µg/m³ to 5.0 µg/m³ and NO₂ data ranges from 19.5 µg/m³ to 20.0 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.4 Noise Environment

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

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

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (7) locations. The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that best suited the purpose and objectives of the study.

TABLE 3.29 – DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Core Zone	Project Area	11° 1'18.34"N 77°12'7.19"E
2	N-2	Core Zone	Project Area	11° 1'14.16"N 77°12'3.37"E
3	N-3	Kodangipalayam	720m East	11° 1'19.24"N 77°12'32.37"E

4	N-4	Paruvai	3.2km SW	10°59'45.24"N 77°10'55.63"E
5	N-5	Kalipalayam	6.0km NE	11° 4'30.27"N 77°13'3.82"E
6	N-6	Sengathurai	5.5km NW	11° 2'56.59"N 77° 9'24.94"E
7	N-7	Ayyampalayam	4.3km South	10°59'4.24"N 77°13'5.01"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

3.4.2 Method of Monitoring

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

$$Leq = 10 \log L / T \sum (10L_n/10)$$

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

T = Time interval of observation

3.4.3 Analysis of Ambient Noise Level in the Study Area

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

Day time : 6:00 hours to 22.00 hours.

Night time : 22:00 hours to 6.00 hours

TABLE 3.30 – NOISE MONITORING RESULTS IN CORE AND BUFFER ZONE

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
N-1	Core Zone	43.4	36.5	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
N-2	Core Zone	49.2	35.8	
N-3	Kodangipalayam	48.2	37.2	
N-4	Paruvai	50.5	39.6	
N-5	Kalipalayam	50.1	45.5	Residential Day Time- 55 dB (A) Night Time- 45 dB (A)
N-6	Sengathurai	49.7	42.5	
N-7	Ayyampalayam	47.9	38.2	

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

FIGURE 3.16: NOISE MONITORING STATIONS AROUND 10 KM RADIUS

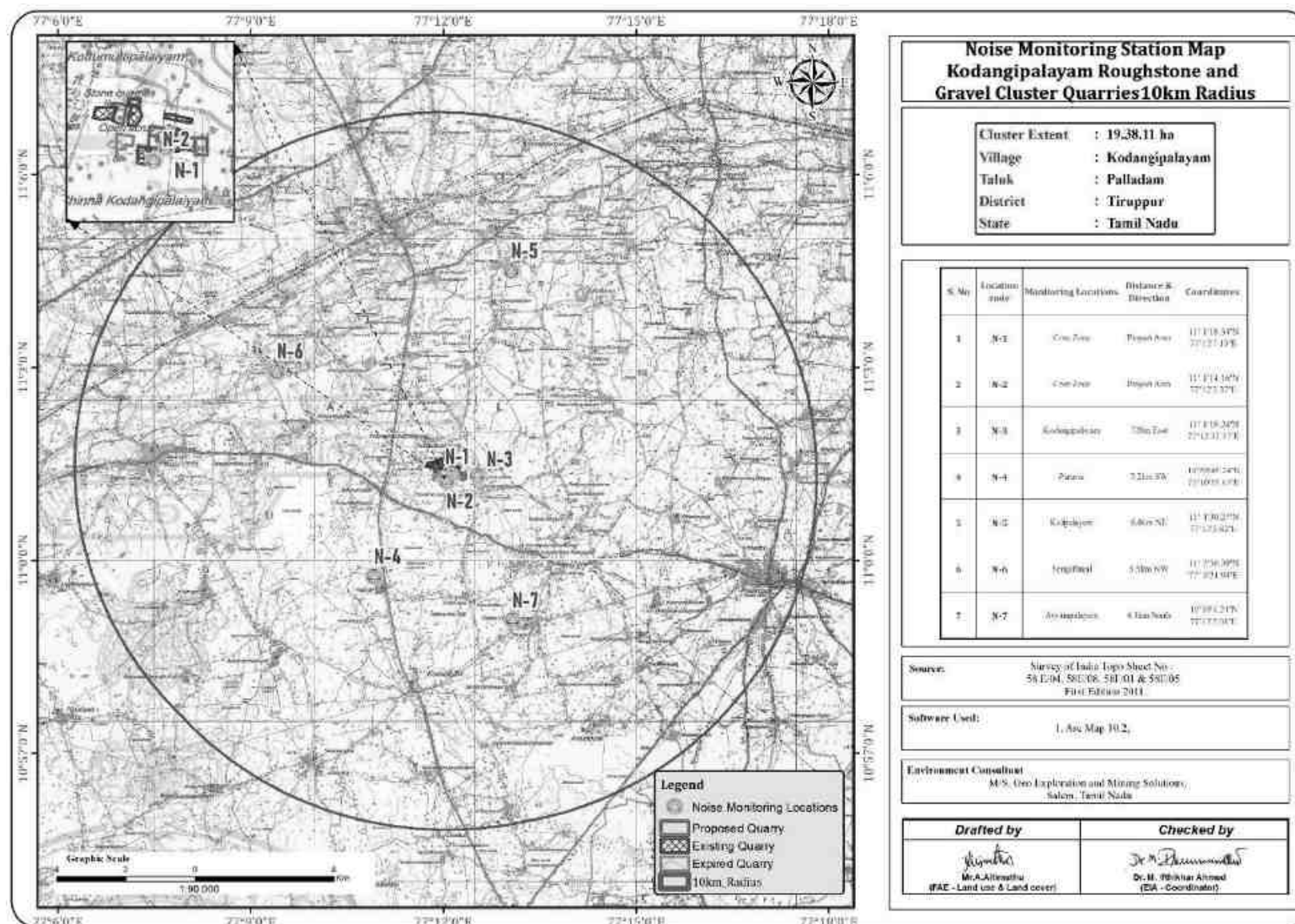
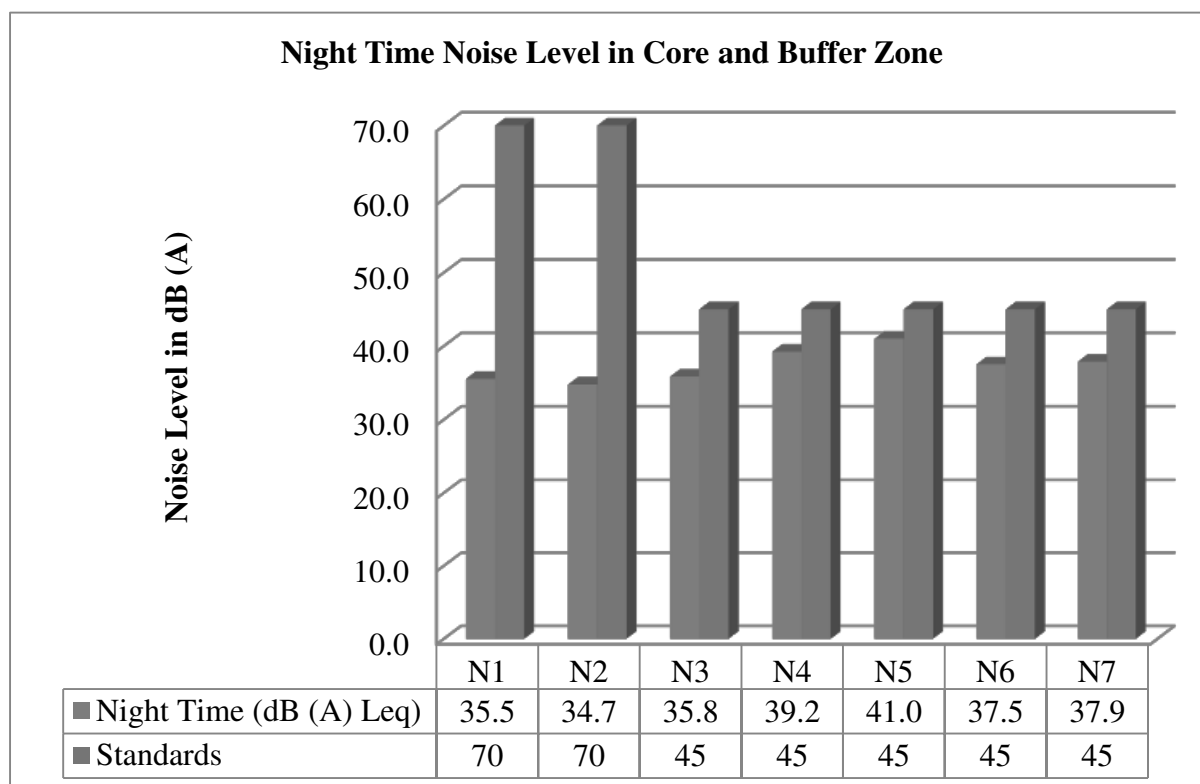
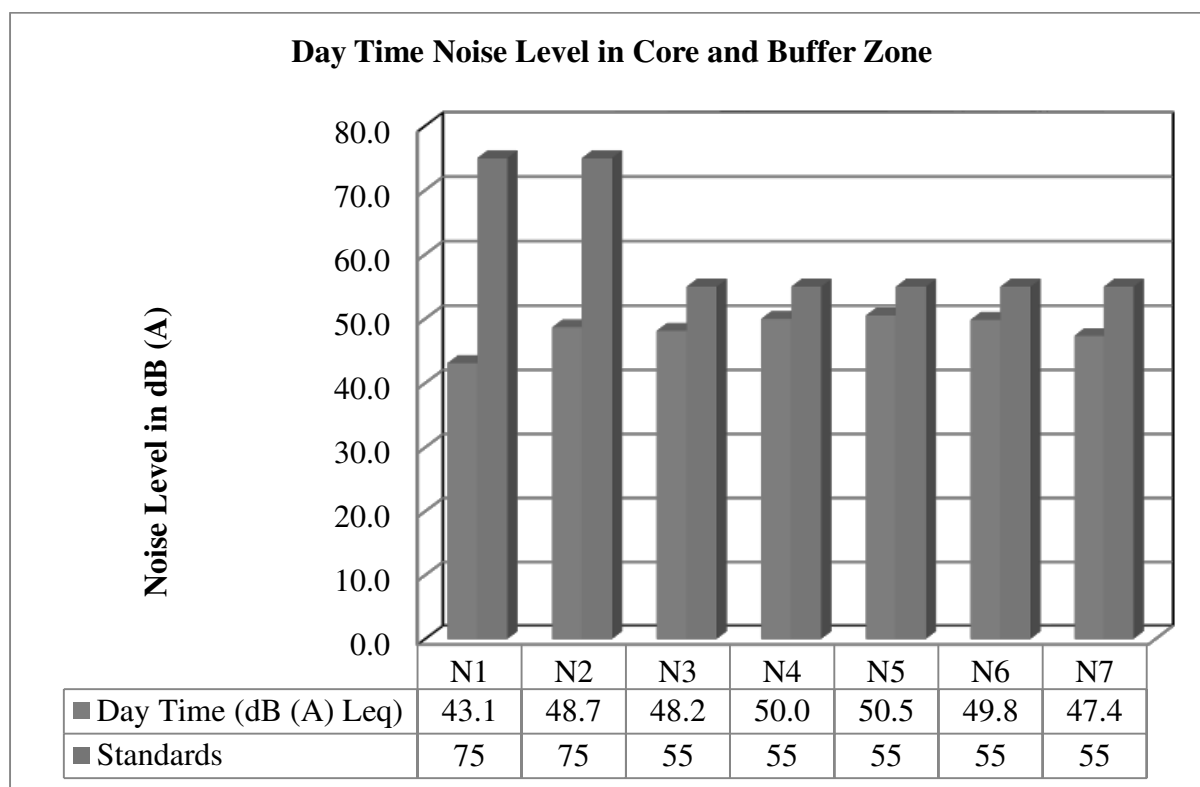


FIGURE 3.17: DAY & NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE

3.4.4 Interpretation & Conclusion:

Ambient noise levels were measured at 7 (Seven) locations around the project area considering cluster quarries. Noise levels recorded in core zone during day time were from 43.1- 48.7 dB (A) Leq and during night

time were from 34.7 – 35.5 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 47.4– 50.5dB (A) Leq and during night time were from 35.8 – 41.0 dB (A) Leq.

3.5 ECOLOGICAL ENVIRONMENT

Biological Environment

3.5.1. Study area Ecology

Biodiversity, or biological diversity, refers to the variety of life forms on Earth, encompassing all species of plants, animals, fungi, and microorganisms, as well as the ecosystems they create. This diversity can be broadly measured by the number of species in a given area. Biodiversity is crucial for maintaining ecosystem resilience, as each species plays a vital role in essential functions such as pollination, nutrient cycling, and climate regulation. Moreover, biodiversity is crucial to human well-being, providing resources like food, medicine, and clean water. Unfortunately, human activities-including deforestation, pollution, climate change, and mining threatening biodiversity at an alarming rate, leading to habitat destruction and biodiversity loss. The preservation of biodiversity is therefore critical for sustaining natural systems and ensuring the health and stability of our planet for future generations.

Rough stone open-cast mining involves extensive land use, removing vegetation, topsoil, and large portions of the earth's surface to extract stones, leading directly to habitat loss. Many species are forced to relocate or remove if they cannot adapt to the changes. Furthermore, open-cast mining exacerbates soil erosion, disrupts water flow, and releases dusts pollutants, all of which harm the surrounding land and water systems, making it increasingly stress on native flora and fauna. Additionally, mining often fragments habitats, creating isolated populations of species that struggle to reproduce and thrive.

Baseline studies are critical before granting environmental clearance for mining projects, as they provide a comprehensive understanding of the existing environmental, ecological, and social conditions of a given area. These studies assess biodiversity, air and water quality, soil composition, and the presence of sensitive habitats or endangered species. By collecting this baseline data, we can accurately predict the potential environmental impacts of mining and develop strategies to minimize and mitigate the negative impact. Furthermore, baseline studies serve as a benchmark to monitor changes over time, ensuring accountability and adherence to environmental regulations. In the context of mining, it is essential to protect and conserve rare, endangered, endemic, or threatened (REET) species of flora and fauna in both the core and buffer zones to ensure the conservation these species.

3.5.2. Project Description

The Kodangipalayam Cluster quarries is involved in the undertaking of establishment, construction, development, and closure of opencast mines. She, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone and gravel. The proposed quarry project is located in Kodangipalayam Village, Palladam Taluk, Tiruppur District, Tamil Nadu. The area lies between latitudes from 11°01'17.20" N to 11°01'22.10" N and longitudes from 77°12'01.36"E to 77°12'07.77" E. The altitude of the area is 391m above Mean Sea level.

3.5.3. Study Area

The study area, in and around the core and buffer zones, is a plain, open land, with less vegetation, agricultural land and farms. The core zone of Ha Rough Stone and Gravel Quarry located at Kodangipalayam Village, Palladam Taluk, Tiruppur District. The core mining site is located plain topography. The images of the study area are shown in Figure 2. Buffer zone is covered by mainly rainfed agriculture land as well as irrigated agriculture farms with diverse crops.

3.5.4. Scope of the Assessment

This rapid biodiversity assessment for the Rough Stone and Gravel Quarry involves a comprehensive baseline survey of the existing flora, fauna, and other ecological features, including rare, endemic, or threatened species within the project site and surrounding areas. The assessment employs rapid visual surveys, quadrat sampling, and targeted sampling of key habitats. Additionally, secondary data is collected from existing literature, reports, online biodiversity databases, and expert discussions. The study estimates population sizes and distributions of key species, particularly those with conservation status (e.g., endangered species), and evaluates population trends if historical data is available. It also identifies breeding sites, migration routes, and nesting areas critical to species' life cycle processes. The study predicts the potential direct and indirect impacts of mining on biodiversity, including habitat loss, pollution, noise, dust, and soil degradation, and recommends measures to minimize, mitigate, and, where possible, restore or offset biodiversity loss. This detailed biodiversity report has been prepared on behalf of the stakeholders involved in the Rough Stone and Gravel Quarry and is submitted to the Tamil Nadu State Environment Impact Assessment Authority (TN-SEIAA) for review and approval.

3.5.5. Objectives of Biodiversity Study

- To conduct field surveys in the proposed rough stone and gravel quarry area to document qualitative and quantitative analysis of flora and fauna in core mining and buffer zones.
- To identify and list out the flora and fauna, and check the existence of species categorized under IUCN Red List and Wildlife Protection Act Schedules.
- To calculating the species diversity and evenness index for biodiversity (flora) in core and buffer zones of the proposed quarry site.
- To identify the impacts of mining activities on local ecosystems, including agricultural lands, and evaluate how these changes may affect biodiversity.
- To recommend biodiversity conservation and management plans for the proposed mining site.

3.5.5.1. Field survey

Field survey study was conducted twice in the month Dec 2024 to survey the existing flora and fauna in the core area (actual mining place) (Cluster Extent.19.38.11 hectares) as well as the buffer area (1000-meter radius from the core zone). The study was conducted by a team consisting of experts in Biodiversity assessment, NABET certified Functional Area Expert (FAE) in Ecology and Biodiversity, and local residents for guidance. The study team visited the mining site twice to collect the field data on floral and faunal species in the study areas.

3.5.6. Methodology

3.5.6.1. Primary data collection

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

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

Plot method is used in the floral documentation in the core and buffer zone. For trees (10x10-m), shrubs (5x5-m) and herbs (1x1-m) plots were taken. Birds and butterflies were mainly focused during faunal assessment, transect method was employed for birds and butterflies. Transect is a path along which one counts and records the occurrence of an individual for study. A straight-line walk covering desired distance, within a time span of one hour to 30 minutes was carried out in the proposed region. Bird species were recorded during the hours of peak activity. 0700 to 1100 Hrs and 1430 to 1730 Hrs (Bibby et al. 2000).

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

Known species of flora and fauna were recorded and identified in the field. Doubtful plant specimens were photographed and collected and further identified in the lab using appropriate guides, literature, online resources.

Quadrat method was used to estimate the floral count in core and buffer zones within 1000-meter periphery from the core area. Sampling locations were selected with reference to topography, land use, vegetation pattern, etc. In this study, quadrats of 10 m × 10 m were laid down to assess trees, and sub quadrats of 5 m × 5 m were laid down for shrubs, 1 m x 1 m were laid done for herbs (Figure 3 and 4). Field observation data were recorded in filed note book/data sheets. Photographs and videos were taken for ecological components, flora and available fauna species.

3.5.6.2. Secondary data

The secondary baseline data such as the morphological features, flowering and fruiting phenology, habitat and distribution of flora and fauna have been collected from various data sources:

1. Forest working plan.
2. Schedule I to V: Indian Wildlife (Protection) Act, 1972
3. Vivek Menon, Indian Mammals: A Field Guide. Hachette Book publishing India Pvt.Ltd., India.
4. Daniel J.C. The Book of Indian Reptiles and Amphibians, Bombay Natural History Society., India.

5. Ali, S and Ripley. Handbook of the Birds of India and Pakistan together with those of Nepal, Sikkim and Bhutan, Oxford University Press, Bombay.
6. ENVIS Centre on Wildlife and Protected Area.
7. Birds Life Data Zone
8. Ebird.org
9. Global Biodiversity Information Facility
10. http://tnenvis.nic.in/Content/1_2878.aspx
11. Endemic Birds in Tirupur, tirupur Ornithological

3.5.6.3. Data compilation and analysis

Based on the collected data, analysis was done for species identification, habit distribution pattern analysis, and phytosociological relationship, and ecological index and identify the REET categories. Endemic species were analysed using distribution in the regional and local floras and online databases. Rare or Endangered or Endemic or Threatened species were analysed based on the IUCN Red List database and threatened plants of BSI (India database of Botanical Survey of India)

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

<https://www.iucnredlist.org/>

3.5.7. Phytosociological Studies

Phytosociological studies are the scientific investigations that focus on understanding the structure, composition, and distribution of plant communities within a specific area. These studies examine how different plant species interact with each other and their environment, and how these interactions contribute to the overall ecological balance. Phytosociology involves categorizing plant communities based on factors like species diversity, abundance, and the physical environment, such as soil, moisture, and light availability. Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the study area. Analysis of the vegetation will help in determining the relative importance of each species in the study area and to reveal if species is threatened. Phytosociological parameters, such as *Density*, *Frequency*, *Abundance* and *Importance Value Index* of individual species were determined in randomly placed quadrat of different sizes in the study area, as shown the formula below.

$$\text{Density} = \frac{\text{Total No. of individuals of species}}{\text{Total No. of Quadrats used in sampling}}$$

$$\text{Frequency (\%)} = \frac{\text{Total No. of Quadrats in which species occur}}{\text{Total No. of Quadrats studied}} \times 100$$

$$\text{Abundance} = \frac{\text{Total No. of individuals of species}}{\text{No. of Quadrats in which they occur}}$$

$$\text{Relative Density} = \frac{\text{Total No. of individuals of species}}{\text{Sum of all individuals of all species}}$$

$$\text{Relative Frequency} = \frac{\text{Total No. of Quadrats in which species occur}}{\text{Total No. of Quadrats occupied by all species}} \times 100$$

3.5.7.1. 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 considers 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 corresponding formulas are given below.

$$\text{Shannon-Wien Index} \quad H = -\sum [(p_i) * \ln(p_i)]$$

Where p_i : Proportion of total sample represented by species

i : number of individuals of species i / total number samples

$$\text{Evenness} \quad H/H_{\max}$$

Where $H_{\max} = \ln(s) = \text{maximum diversity possible}$; $S = \text{No. of species}$

$$\text{Species Richness by Margalef} \quad RI = S - 1 / \ln N$$

Where $S = \text{Total Number of species in the community}$

$N = \text{Total Number of individuals of all species in the community}$

3.5.7.2. Data compilation:

Based on the collected data, exclusive checklists were prepared for both endemic and REET plants of Tamil Nadu.

3.6. Floral Diversity Analysis

3.6.1. Floral Diversity in core zone

Identification of plant species for the natural flora and cultivated crops was conducted through field surveys and onsite observations. The plant species identification was done based on the reference materials and also by examining the plant morphological and reproductive characteristics of the plants i.e. flowers, fruits and seeds. Unidentified and double samples were photographed and minimally collected for further investigation in the laboratory. Land use pattern in relation to agriculture crop varieties were identified through physical verification of agriculture field.

A total number of 121 species were recorded from the study area. of the 121 species, 22 different species were observed in the core site. These floral species include 34% (6) herbs and grasses, 2% (2) shrubs (shrubs, under shrubs and climbing shrubs) 23% (5) Climbers & liana 11% (3) Trees 29% (5), (Fig No 3.34). The observed floral species are most commonly distributed plants and most of the herbs are annual plants herbs. Herbs are dominant in the core site (Table No.3.55). The members of Poaceae are abundant in number followed by Fabaceae, Malvaceae, Asteraceae (Table No.3.55).

Table No: 3.28. Occurrence of different floral habits in core and buffer zones of the study area.

Habit	Core Zone	Buffer Zone
Herbs	6	33
Grasses	2	2
Undershrubs	1	9

Shrubs	3	11
Climbing shrub	1	3
Climbers	2	9
Liana	1	3
Trees	5	29
Total	22	99

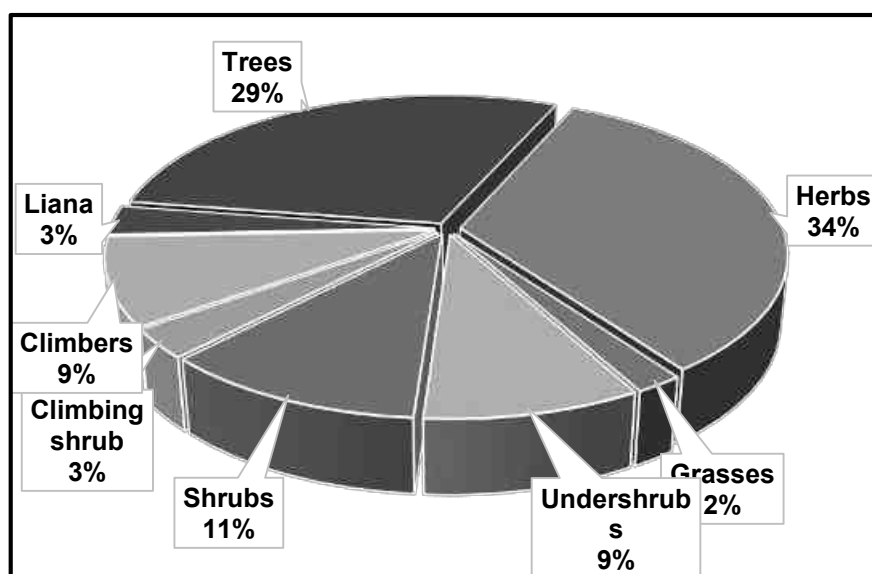
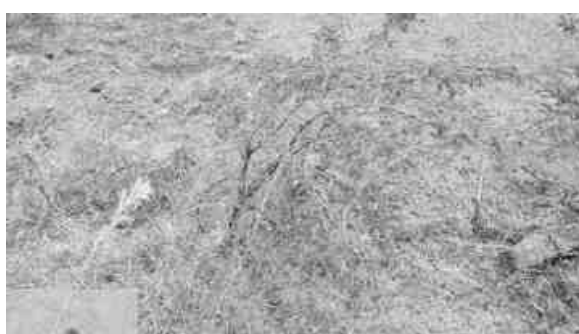


Fig No: 3.28. Habit analyses of the species recorded from core zone of the study area.



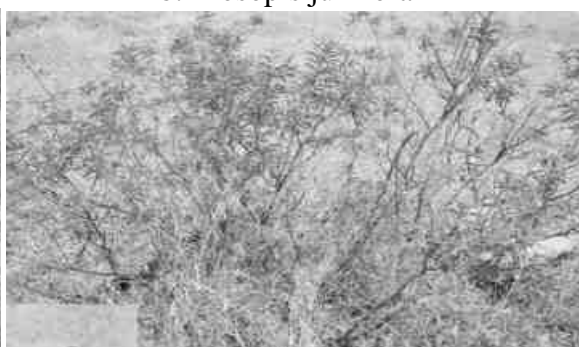
a. *Azadirachta indica*



b. *Prosopis juliflora*



c. *Calotropis gigantea*



d. *Senna auriculata*



Fig No: 3.29. Flora species observation in the Buffer zone area

3.6.2. Tree survey around 300m radius

The trees surveys were conducted around 300m radius from the proposed project site cluster are of Kodangipalayam village. This is the standard scientific method followed by various workers in respect of phytosociological studies (Cottom and Curtis 1956; Ralhan et al. 1982; Saxena and Sing 1982; Nayak et al. 2000; Lu et al. 2004; Nautiyal 2008). While sampling, circumference at breast Height (CBH) of tree species was measured at 1.36m from ground level, along with the name of the species, phenology (flowering, fruiting, and flushes), and uses. After surveying areas, a detailed trees inventory has been compiled. A list of all plants from the study area was prepared and their habitats were recorded. The species of trees were documented during this base line survey. The dominant plant species growing in this area were *Cocos nucifera* *Prosopis juliflora*, etc. Please refer the Table No.3.54.

Table No: 3.29. Tree survey around 300m radius from the proposed project site (Primary data)

S. No	English Name	Vernacular Name	Scientific Name	No of trees
Trees				
1.	Acacia Nilotica	Karuvelammaram	<i>Vachellianilotica</i>	4
2.	Mesquite	Mullumaram	<i>Prosopis juliflora</i>	10
3.	Neem	Vembu	<i>Azadirachta indica</i>	60
4.	Madras Thorn	Kodukapuli	<i>Pithecellobium dulce</i>	10
5.	White Bark Acacia	Vela maram	<i>Vachellia leucophloea</i>	10
6.	Mango	Manga	<i>Mangifera indica</i>	3
7.	Coconut	Thennai maram	<i>Cocos nucifera</i>	138

(Sources: Species observation in the field study)

3.7. Floral Diversity in buffer zone

The buffer zone area (observed within 1000 meter) encompassed different land use patterns. The survey in the buffer zone reveals that a total of 99 plant species were recorded from both natural and agricultural habitats. Of the recorded species, 92 species are wild and 7 are cultivated or planted species in agricultural land. The vegetation habit type analysis of buffer zone indicates that the flora composed of 34% herbs, 23% shrubs, 12% climbers and 29% trees species (Fig No.3.36 and Table.3.56). These 99 species belong to the 43 families. The occurrence of maximum number of species are from family Fabaceae (11), followed by Lamiaceae (6), Mimosaceae (6), Apocynaceae. Other family have less than 5 species. The details of scientific name,

common name, vernacular name and habit type and status of IUCN category are given in Table No.3.56. Diversity of floral families and number of species recorded from each family are given in Table No.3.55 and Fig No3.37.

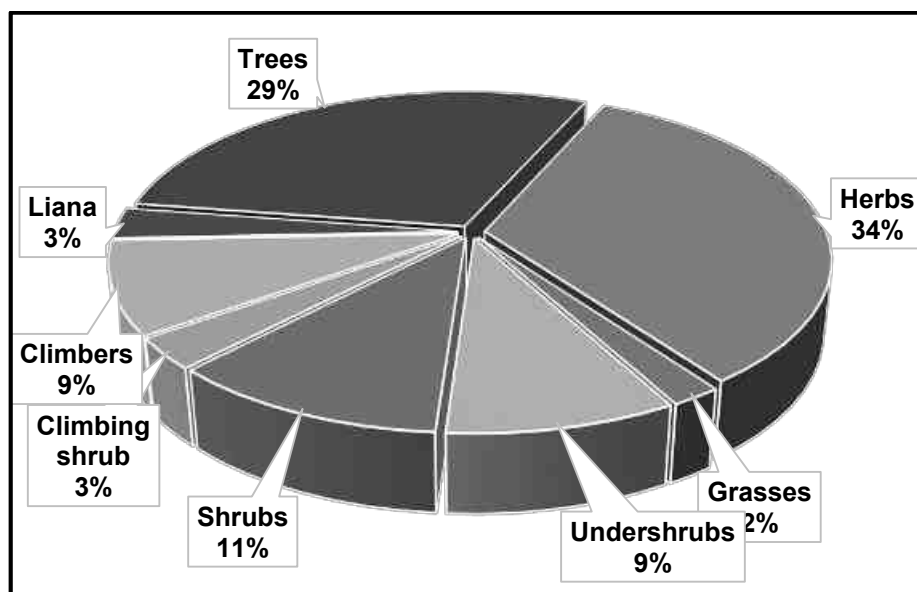


Fig No: 3.30. Habit analyses of the species recorded from buffer zone of the study area.

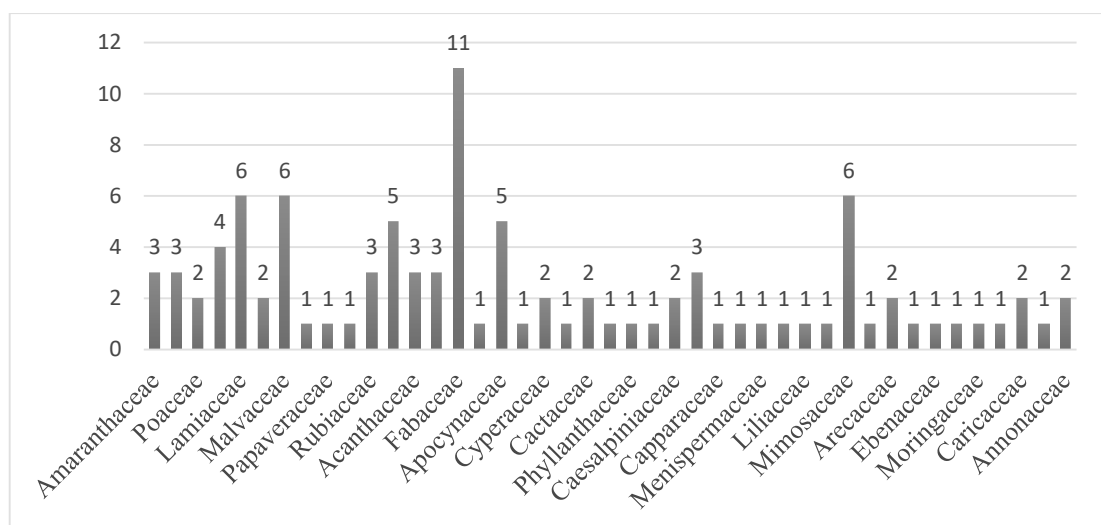


Fig No: 3.37. Family wise occurrence of flora in buffer zone.

Table No: 3.30. Diversity of plant families and number of species recorded in the study area

S.No.	Family Name	Number of Species Recorded	S.No.	Family Name	Number of Species Recorded
1	Amaranthaceae	3	26	Rhamnaceae	3
2	Asteraceae	3	27	Capparaceae	1

3	Poaceae	2	28	Sapindaceae	1
4	Euphorbiaceae	4	29	Menispermaceae	1
5	Lamiaceae	6	30	Cucurbitaceae	1
6	Cleomaceae	2	31	Liliaceae	1
7	Malvaceae	6	32	Simaroubaceae	1
8	Nyctaginaceae	1	33	Mimosaceae	6
9	Papaveraceae	1	34	Meliaceae	1
10	Plantaginaceae	1	35	Arecaceae	2
11	Rubiaceae	3	36	Burseraceae	1
12	Convolvulaceae	5	37	Ebenaceae	1
13	Acanthaceae	3	38	Moraceae	1
14	Solanaceae	3	39	Moringaceae	1
15	Fabaceae	11	40	Myrtaceae	1
16	Molluginaceae	1	41	Caricaceae	2
17	Apocynaceae	5	42	Verbenaceae	1
18	Pedaliaceae	1	43	Annonaceae	2
19	Cyperaceae	2			
20	Zygophyllaceae	1			
21	Cactaceae	2			
22	Vitaceae	1			
23	Phyllanthaceae	1			
24	Lythraceae	1			
25	Caesalpiniaceae	2			

a. *Abutilon indicum*b. *Jatropha curcas*

c. *Azadirachta indica*d. *Ricinus communis*e. *Vachellia leucophloea*f. *Cocos nucifera*g. *Psidium guajava*h. *Musa paradisiaca***Fig No: 3.31. Flora species observation in the Buffer zone area**

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

There are neither reserved (RF) nor protected (PF) forests either in the mine lease area or in the buffer zone. Thus, no forest land is involved in any manner. Hence, no certificate from the Forest department is required. There are no impacts due to this mining activity. There are no protected or ecologically sensitive areas such as National parks or Important Bird Areas (IBAs), or Wetlands or migratory routes of fauna or water bodies or human settlements within the proposed mine lease area. There are no Biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thus, the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive. It is away from the proposed project site. There are neither forests nor forest dwellers nor forest-dependent communities in the mine lease area. There shall be no forest-impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project. There is no invasive species present in the study area.

Table No: 3.31. Flora recorded from the study area (Core and Buffer zones) of the proposed rough stone and gravel quarry.***Herbs and Grasses***

S.No	Scientific Name	Family	English Name	Vernacular Name	Recorded Zone	IUCN Status
1.	<i>Achyranthes aspera</i>	Amaranthaceae.	Prickly chaff flower	Nayuruv	C+B	Not Evaluated
2.	<i>Tridax procumbens</i>	Asteraceae	Tridax daisy	Veetukaayapoondur	C+B	Not Evaluated
3.	<i>Cynodactylon</i>	Poaceae	Indian doab	Arugampul	C+B	Not Evaluated
4.	<i>Acalypha indica</i>	Euphorbiaceae	Copperleaf	Kuppaimeni	B	Not Evaluated
5.	<i>Anisomeles malabarica</i>	Lamiaceae	Indian Catmint Plant	Pei viratti	B	Not Evaluated
6.	<i>Cleome viscosa</i>	Cleomaceae	Cleome viscosa	Nai kadugu	C+B	Not Evaluated
7.	<i>Sida acuta</i>	Malvaceae	Common Wireweed	Arivalmanaipoondur	B	Not Evaluated
8.	<i>Boerhaaviadiffusa</i>	Nyctaginaceae	Punarnava	Mukkirattai	B	Not Evaluated
9.	<i>Argemone mexicana</i>	Papaveraceae	Mexican prickly poppy	Kudiyotti	B	Least Concern
10.	<i>Leucas aspera</i>	Lamiaceae	Common leucas	Thumbai	C+B	Not Evaluated
11.	<i>Scoparia dulcis</i>	Plantaginaceae	Licorice weed	Kallurukki	B	Not Evaluated
12.	<i>Oldenlandiaumbellata</i>	Rubiaceae	Chay root	Chaaya ver	B	Least Concern
13.	<i>Evolvulusalsinoides</i>	Convolvulaceae	Slender dwarf morning-glory	Vittunu-k-kiranti	B	Not Evaluated
14.	<i>Hygrophila auriculata</i>	Acanthaceae	Marsh barbel	Neermulli	B	Not Evaluated
15.	<i>Solanum surattense</i>	Solanaceae	Yellow-fruit nightshade	Kandakathirika	B	Not Evaluated
16.	<i>Mimosa pudica</i>	Fabaceae	Shameplant	Thottachenunki	B	Not Evaluated

17.	<i>Justicia procumbens</i>	Acanthaceae	Water willow	Kotakacalai	B	Not Evaluated
18.	<i>Mollugocerviana</i>	Molluginaceae	Threadstem carpetweed	Parppatakam	B	Not Evaluated
19.	<i>Euphorbia hirta</i>	Euphorbiaceae	Asthma-plant	Ammanpacharisi	C+B	Not Evaluated
20.	<i>Hyptissuaveolens</i>	Lamiaceae	Pignut	Nattapoochedi	B	Not Evaluated
21.	<i>Ocimumtenuiflorum</i>	Lamiaceae	Holy basil	Thulasi	B	Not Evaluated
22.	<i>Catharanthus roseus</i>	Apocynaceae	Madagascar Periwinkle	Nithykalyani	B	Least Concern
23.	<i>Cleome viscosa</i>	Cleomaceae	Asian spiderflower	Naaikaduku	B	Not Evaluated
24.	<i>Digeria muricata</i>	Amaranthaceae	Digeria muricata	Thoiyakeerai	B	Not Evaluated
25.	<i>Parthenium hysterophorus</i>	Asteraceae	Carrot grass	Parttiniyam	B	Not Evaluated
26.	<i>Sesamum alatum</i>	Pedaliaceae	Wing-Seed Sesame		B	Not Evaluated
27.	<i>Sorghum vulgaris</i>	Poaceae	Sorghum bicolor	Cholam	B	Not Evaluated
28.	<i>Cyperus articulatus</i>	Cyperaceae	Jointed flatsedge	Korai kizhangu	C+B	Least Concern
29.	<i>Cyperus rotundus</i>	Cyperaceae	Nut grass	Korai kizhangu	B	Least Concern
30.	<i>Tephrosia pumila</i>	Fabaceae	Indigo Sauvage	Kolinchi	B	Least Concern
31.	<i>Tephrosia purpurea</i>	Fabaceae	Wild indigo	Kolinchi	B	Not Evaluated
32.	<i>Tephrosia villosa</i>	Fabaceae	Shaggy wild Indigo	Punaikkaivettalai	B	Not Evaluated
33.	<i>Tribulus terrestris</i>	Zygophyllaceae	Puncture Vine	Nerunji	C+B	Least Concern
34.	<i>Tridax procumbens</i>	Asteraceae	Mexican daisy	Kenathuppoondu	B	Not Evaluated
35.	<i>Vigna radiata</i>	Fabaceae	Green Gram	Pachai-payaru	B	Not Evaluated

Shrubs, Undershrubs, and Climbing shrubs

S.No.	Scientific name	Family Name	Common Name	Local name	Recorded Zone	IUCN Status
36.	<i>Abrus precatorius</i>	Fabaceae	Black-Eyed Susan	Kundumani	B	Not Evaluated
37.	<i>Abutilon indicum</i>	Malvaceae	Indian Mallow	Thuthi	C+B	Not Evaluated
38.	<i>Barleria prionitis</i>	Acanthaceae	porcupine flower	Sulli poo	B	Not Evaluated
39.	<i>Calotropis gigantea</i>	Apocynaceae	Giant Milk-Weed	Erukku	C+B	Not Evaluated
40.	<i>Canthium coromandelicum</i>	Rubiaceae	Coromandel Canthium	Mullukkarai	B	Not Evaluated
41.	<i>Cereus pterogonus</i>	Cactaceae		Sippaai kathaalai	B	Not Evaluated
42.	<i>Cissus quadrangularis</i>	Vitaceae	Adament creeper	Pirandai	C+B	Not Evaluated
43.	<i>Datura innoxia</i>	Solanaceae	Pricklyburr	Oomathai	B	Not Evaluated
44.	<i>Euphorbia tricalli</i>	Euphorbiaceae		Kodi kalli	B	Least Concern
45.	<i>Flueggea leucopyrus</i>	Phyllanthaceae	Spinous Fluggea	Vellaipula	B	Least Concern
46.	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Cotton leaf	Aatalai	B	Least Concern
47.	<i>Lawsonia inermis</i>	Lythraceae	Henna	Maruthani	B	Least Concern
48.	<i>Ocimum sanctum</i>	Lamiaceae	Holy Basil	Nallathulasi	C+B	Not Evaluated
49.	<i>Opuntia dillenii</i>	Cactaceae	Prickly Pear	Sappathikalli	C+B	Not Evaluated
50.	<i>Parthenium hysterophorus</i>	Asteraceae	Congress Weed	Vishachedi	B	Not Evaluated
51.	<i>Pavonia zeylanica</i>	Malvaceae	Ceylon Swamp Mallow	Mammatti	B	Not Evaluated
52.	<i>Pupalia lappacea</i>	Amaranthaceae	Sweethearts	Adai-otti	B	Least Concern
53.	<i>Ricinus communis</i>	Euphorbiaceae	Castor Plant	Aamanakku	B	Not Evaluated

54.	<i>Senna auriculata</i>	Caesalpiniaceae	Eared Senna	Aavarai	B	Not Evaluated
55.	<i>Sida acuta</i>	Malvaceae	Horn bean leaved sida	Ariva-mooku keerai	B	Not Evaluated
56.	<i>Sida cordifolia</i>	Malvaceae	Country Mallow	Nilatutti	B	Not Evaluated
57.	<i>Waltheria indica</i>	Malvaceae	Boater Bush	Sengalipundu	B	Least Concern
58.	<i>Ziziphus oenoplia</i>	Rhamnaceae	Jackal Jujube	Chooraimullu	B	Not Evaluated
Climbers. Liana						
59.	<i>Canavalia ensiformis</i>	Fabaceae	Sword Bean	Kattuthammatti	B	Not Evaluated
60.	<i>Capparis zeylanica</i>	Capparaceae		Suduthorat	B	Not Evaluated
61.	<i>Cardiospermum halicacabum</i>	Sapindaceae	Balloon vine	Modakkathan	B	Least Concern
62.	<i>Cissampelos pareira</i>	Menispermaceae	Velvet Leaf Pareira	Appatta	B	Not Evaluated
63.	<i>Coccinia grandis</i>	Cucurbitaceae	Ivy Gourd	Kovai	C+B	Not Evaluated
64.	<i>Cuscuta reflexa</i>	Convolvulaceae		Thuthuma Kothan	B	Least Concern
65.	<i>Gloriosa superba</i>	Liliaceae	Glorious lily	Kanvalikodi	B	Least Concern
66.	<i>Ipomoea pes-tigridis</i>	Convolvulaceae	Tiger's foot creeper	Punaikkirai	B	Not Evaluated
67.	<i>Ipomoea staphylina</i>	Convolvulaceae	Pretty Morning Glory	Oonankodi	B	Not Evaluated
68.	<i>Merrimeia tridentata</i>	Convolvulaceae	Arrow-leaf Morning Glory	Mutiyar-kuntal	C+B	Not Evaluated
69.	<i>Pergularia daemia</i>	Apocynaceae	Trellis Vine	Veli Paruthi	B	Least Concern
70.	<i>Rhynchosia minima</i>	Fabaceae	Jumby-bean	Kaliyanthuvarai	B	Least Concern

Trees						
71.	<i>Ailanthus excels</i>	Simaroubaceae	Indian Tree of Heaven	Perumaram	B	<u>Data Deficient</u>
72.	<i>Pithecellobium dulce</i>	Fabaceae	Madras Thorn	Kodukapuli	B	Least Concern
73.	<i>Albizia amara</i>	Mimosaceae	Oil cake tree	Usilai	B	Least Concern
74.	<i>Albizia lebbeck</i>	Mimosaceae	Siris Tree	Vagai	B	Least Concern
75.	<i>Azadirachta indica</i>	Meliaceae	Neem Tree	Veppa maram	C+B	Least Concern
76.	<i>Borassus flabellifer</i>	Arecaceae	Palmyra Palm	Panai maram	B	Least Concern
77.	<i>Cocos nucifera</i>	Arecaceae	Coconut Palm	Thennai	B	Not Evaluated
78.	<i>Commiphora berryi</i>	Burseraceae	Indian Balm of Gilead	Mul-kiluvai	B	Least Concern
79.	<i>Diospyros cordifolia</i>	Ebenaceae	Mountain Persimmon	Vakkanai maram	B	Not Evaluated
80.	<i>Ficus benghalensis</i>	Moraceae	Banyan	Alamaram	B	Least Concern
81.	<i>Euphorbia antiquorum</i>	Euphorbiaceae	Triangular spurge	Sadhurakalli	B	Least Concern
82.	<i>Morinda tinctoria</i>	Rubiaceae	Indian mulberry	Nuna	B	Not Evaluated
83.	<i>Moringa oleifera</i>	Moringaceae	Drumstick Tree	Murungai	B	Least Concern
84.	<i>Prosopis juliflora</i>	Mimosaceae	Mesquite	Semai parambai	B	Not Evaluated
85.	<i>Syzygium cumini</i>	Myrtaceae	Indian Blackberry	Naval	B	Least Concern
86.	<i>Albizia amara</i>	Fabaceae	Bitter Albizia	Arappu	C+B	Not Evaluated
87.	<i>Tamarindus indica</i>	Caesalpiniaceae	Tamarind Tree	Puliyamaram	B	Not Evaluated
88.	<i>Vachellia leucophloea</i>	Fabaceae	White Bark Acacia	Vela maram	C+B	Not Evaluated

89.	<i>Ziziphus mauritiana</i>	Rhamnaceae	Indian jujube	Elanthaimaram	B	Not Evaluated
90.	<i>Carica papaya</i>	Caricaceae	Papaya	Pappali maram	B	Not Evaluated
91.	<i>Tectona grandis</i>	Verbenaceae	Teak wood tree	Thaekku	B	Not Evaluated
92.	<i>Annona reticulata</i>	Annonaceae	Custard apple	Seethapazham	B	Not Evaluated
93.	<i>Terminalia catappa</i>	Combretaceae	Indian almond	Padam maram	B	Not Evaluated
94.	<i>Thespesia populnea</i>	Malvaceae	Portia Tree	Puvarasu	B	Not Evaluated
95.	<i>Vachellia leucophloea</i>	Mimosaceae	White Babool	Velvelam	B	Least Concern
96.	<i>Vachellia nilotica</i>	Mimosaceae	Gum Arabic Tree	Karuvelam	B	Least Concern
97.	<i>Wrightia tinctoria</i>	Apocynaceae	Milky Way Tree	Vetpalai	B	Least Concern
98.	<i>Ziziphus mauritiana</i>	Rhamnaceae	Indian jujube	Ilanthai	C+B	Least Concern
99.	<i>Prosopis juliflora</i>	Fabaceae	Mesquite	Mullu maram	C+B	Not Evaluated

C – Core zone; B Buffer zone C+B species occur in both zones

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, indirect assessment of its risk of extinction based on its distribution and/or population status].

3.9. IUCN Red List species recorded in the in the core to buffer zone area.

Based on the IUCN Red List global assessment (Version 3.1), out of 99 species, 31 species belong to 20 families come under IUCN category. Of the 31 species, the Least Concern taxon include 12 trees, 4 climbers, and 3 shrubs. A maximum of 11 LC species belongs to the family Leguminosae (Fabaceae, Caesalpiniaceae, and Mimosaceae) followed by Apocynaceae, Euphorbiaceae and Malvaceae. Thorough analysis floral species indicates that there are no threatened (Vulnerable, Endangered & Critically Endangered) species recorded from the project area (both core and buffer zones). A list of the IUCN Red List analysed plant species recorded in the core and buffer zone of the proposed project site is Tabulated in Table No 3.57.

<https://www.iucnredlist.org/>

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

Table No:3.32. List of IUCN categorized Plant Species

Scientific name	Family Name	Common Name	Local name	IUCN
<i>Ailanthus excelsa</i>	<i>Simaroubaceae</i>	Indian Tree of Heaven	Perumaram	DD
<i>Albizia amara</i>	Mimosaceae	Oil cake tree	Usilai	LC
<i>Albizia lebbeck</i>	Mimosaceae	Siris Tree	Vagai	LC
<i>Alternanthera sessilis</i>	Amaranthaceae	Joy Weed	Ponnaankannikeerai	LC
<i>Azadirachta indica</i>	Meliaceae	Neem Tree	Veppa maram	LC
<i>Borassus flabellifer</i>	Arecaceae	Palmyra Palm	Panai maram	LC
<i>Cardiospermum halicacabum</i>	Sapindaceae	Balloon vine	Modakkathan	LC
<i>Celosia argentea</i>	Amaranthaceae	Quail grass	Pannaikkerai	LC
<i>Commiphora berryi</i>	Burseraceae	Indian Balm of Gilead	Mul-kiluvai	LC
<i>Cuscuta reflexa</i>	Convolvulaceae		Thuthuma Kothan	LC
<i>Cyperus articulatus</i>	Cyperaceae	Jointed flatsedge	Korai kizhangu	LC
<i>Cyperus rotundus</i>	Cyperaceae	Nut grass	Korai kizhangu	LC
<i>Euphorbia antiquorum</i>	Euphorbiaceae	Triangular spurge	Sadhurakalli	LC
<i>Euphorbia heterophylla</i>	Euphorbiaceae	Green Poinsettia	Palperukki	LC
<i>Euphorbia tricalli</i>	Euphorbiaceae		Kodi kalli	LC
<i>Flueggea leucopyrus</i>	Phyllanthaceae	Spinous Fluggea	Vellaipula	LC
<i>Gloriosa superba</i>	Liliaceae	Glorious lily	Kanvalikodi	LC
<i>Jatropha gossypifolia</i>	Euphorbiaceae	Cotton leaf	Aatalai	LC
<i>Lawsonia inermis</i>	Lythraceae	Henna	Maruthani	LC
<i>Moringa oleifera</i>	Moringaceae	Drumstick Tree	Murungai	LC
<i>Pergularia daemia</i>	Apocynaceae	Trellis Vine	Veli Paruthi	LC
<i>Pupalia lappacea</i>	Amaranthaceae	Sweethearts	Adai-otti	LC
<i>Rhynchosia minima</i>	Fabaceae	Jumby-bean	Kaliyanthuvarai	LC
<i>Syzygium cumini</i>	Myrtaceae	Indian Blackberry	Naval	LC
<i>Tephrosia pumila</i>	Fabaceae	Indigo Sauvage	Kolinchi	LC
<i>Tribulus terrestris</i>	Zygophyllaceae	Puncture Vine	Nerunji	LC
<i>Vachellia leucophloea</i>	Mimosaceae	White Babool	Velvelam	LC
<i>Vachellia nilotica</i>	Mimosaceae	Gum Arabic Tree	Karuvelam	LC
<i>Waltheria indica</i>	Malvaceae	Boater Bush	Sengalipundu	LC
<i>Wrightia tinctoria</i>	Apocynaceae	Milky Way Tree	Vetpalai	LC
<i>Ziziphus mauritiana</i>	Rhamnaceae	Indian jujube	Ilanthai	LC

3.10. Phytosociological analysis of floral community

For quantitative phytosociological analysis of floral community of the study area, the quadrat sampling technique was used for sampling vegetation. Sampling quadrats of the regular shape of dimensions 10×10 m, 5×5 m, and 1×1 m, were nested within each other and were defined as the units for sampling the area and measuring the diversity of trees, shrubs, and herbs, respectively. Phyto-sociological parameters, such as Density, Frequency, and Abundance individual species of wild Trees were determined in randomly placed quadrat of different sizes in the study area, as shown in Table No.3.58. Species Diversity index such as Shannon-Wiener Index, Evenness and Richness were calculated for 29 trees. The results of above phyto-sociological parameters are given in Table No.3.58 and Fig No.3.39. The Shannon-Weiner Index (H) value 3.27 indicates that the trees are rich in diversity in the study area.

Table No: 3.33. Species diversity index

Scientific Name	Total No Counts	Quadrats with species	Total Quadrats	Density	Frequency	Abundance	Total No All Species	Total No of Quadrts with all species	Relative Density (RD)	Relative Frequency (RF)	Pi	lnPi	Pi x lnPi
<i>Ailanthus excels</i>	6	3	10	0.6	30	2.0	143	64	4.2	4.7	0.04	-3.17	-0.13
<i>Pithecellobium dulce</i>	6	2	10	0.6	20	3.0	143	64	4.2	3.1	0.04	-3.17	-0.13
<i>Albizia amara</i>	2	2	10	0.2	20	1.0	143	64	1.4	3.1	0.01	-4.27	-0.06
<i>Albizia lebbeck</i>	8	3	10	0.8	30	2.7	143	64	5.6	4.7	0.06	-2.88	-0.16
<i>Azadirachta indica</i>	10	5	10	1.0	50	2.0	143	64	7.0	7.8	0.07	-2.66	-0.19
<i>Borassus flabellifer</i>	6	3	10	0.6	30	2.0	143	64	4.2	4.7	0.04	-3.17	-0.13
<i>Cocos nucifera</i>	5	2	10	0.5	20	2.5	143	64	3.5	3.1	0.03	-3.35	-0.12
<i>Commiphora berryi</i>	4	2	10	0.4	20	2.0	143	64	2.8	3.1	0.03	-3.58	-0.10
<i>Diospyros cordifolia</i>	2	1	10	0.2	10	2.0	143	64	1.4	1.6	0.01	-4.27	-0.06
<i>Ficus benghalensis</i>	5	1	10	0.5	10	5.0	143	64	3.5	1.6	0.03	-3.35	-0.12
<i>Euphorbia antiquorum</i>	2	2	10	0.2	20	1.0	143	64	1.4	3.1	0.01	-4.27	-0.06
<i>Morinda tinctoria</i>	4	2	10	0.4	20	2.0	143	64	2.8	3.1	0.03	-3.58	-0.10
<i>Moringa oleifera</i>	3	2	10	0.3	20	1.5	143	64	2.1	3.1	0.02	-3.86	-0.08
<i>Prosopis juliflora</i>	4	2	10	0.4	20	2.0	143	64	2.8	3.1	0.03	-3.58	-0.10
<i>Syzygium cumini</i>	5	2	10	0.5	20	2.5	143	64	3.5	3.1	0.03	-3.35	-0.12
<i>Albizia amara</i>	6	3	10	0.6	30	2.0	143	64	4.2	4.7	0.04	-3.17	-0.13
<i>Tamarindus indica</i>	3	1	10	0.3	10	3.0	143	64	2.1	1.6	0.02	-3.86	-0.08
<i>Vachellia leucophloea</i>	10	5	10	1.0	50	2.0	143	64	7.0	7.8	0.07	-2.66	-0.19
<i>Ziziphus mauritiana</i>	5	3	10	0.5	30	1.7	143	64	3.5	4.7	0.03	-3.35	-0.12
<i>Carica papaya</i>	3	1	10	0.3	10	3.0	143	64	2.1	1.6	0.02	-3.86	-0.08
<i>Tectona grandis</i>	4	1	10	0.4	10	4.0	143	64	2.8	1.6	0.03	-3.58	-0.10
<i>Annona reticulata</i>	3	1	10	0.3	10	3.0	143	64	2.1	1.6	0.02	-3.86	-0.08
<i>Terminalia catappa</i>	3	1	10	0.3	10	3.0	143	64	2.1	1.6	0.02	-3.86	-0.08
<i>Thespesia populnea</i>	4	1	10	0.4	10	4.0	143	64	2.8	1.6	0.03	-3.58	-0.10
<i>Vachellia leucophloea</i>	3	1	10	0.3	10	3.0	143	64	2.1	1.6	0.02	-3.86	-0.08
<i>Vachellia nilotica</i>	10	4	10	1.0	40	2.5	143	64	7.0	6.3	0.07	-2.66	-0.19
<i>Wrightia tinctoria</i>	5	2	10	0.5	20	2.5	143	64	3.5	3.1	0.03	-3.35	-0.12
<i>Ziziphus mauritiana</i>	8	3	10	0.8	30	2.7	143	64	5.6	4.7	0.06	-2.88	-0.16
<i>Prosopis juliflora</i>	4	3	10	0.4	30	1.3	143	64	2.8	4.7	0.03	-3.58	-0.10
	143	64											3.27

Table No: 3.34. Species Richness Index

Details	H	H max	Evenness	Species Richness
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Trees	3.27	3.37	0.97	5.64
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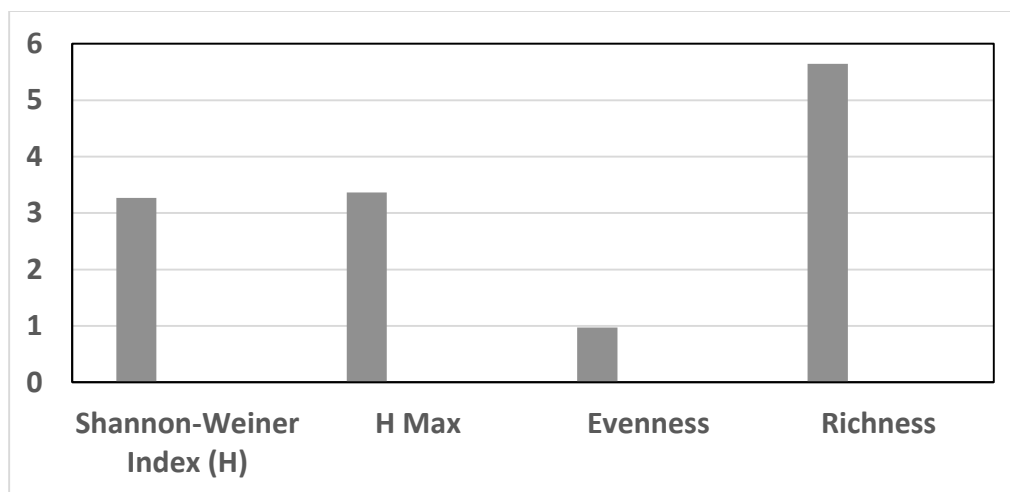


Fig No: 3.32. Species richness and evenness index.

3.10.1. Forest details

There are no biosphere reserves, wildlife sanctuaries, National parks, important bird areas (IBAs), RAMSAR Wetland sites, or faunal migration routes within and nearby the study area. The study area, encompassing the quarry lease area and a 1 km buffer zone, is not considered ecologically sensitive. Furthermore, there are no reserve forests within the buffer zone. Information regarding reserve forests was obtained from the Protected Area Gazette Notification Database (Tamil Nadu).

https://wiienvs.nic.in/Database/Tamil_Nadu_7838.aspx

https://wiienvs.nic.in/Database/ramsar_wetland_sites_8224.aspx

<https://dfe.gov.in/uploads/documents/ramsar-sites-pub.pdf>

3.10.2. Agriculture & Horticulture flora in the study area

Agriculture is the most predominant sector of the District economy, as 30 percent of the population is engaged in Agriculture and allied activities for their livelihood. Inattentive agriculture activities were observed in the buffer area and the region beyond the buffer area in rainfed and irrigated land. Twenty-four 24 different crop species were recorded in the sounding areas as given below (Table No.3.60).

Table No: 3.35. Agricultural activities and flora recorded from the study area

Scientific Name	Common Name	Vernacular Name
<i>Cocos nucifera</i>	Coconut Palm	Thennai
<i>Moringa oleifera</i>	Drumstick Tree	Murungai
<i>Musa paradisiaca</i>	Banana	Vazhai
<i>Ricinus communis</i>	Castor Plant	Aamanakku
<i>Sorghum vulgare</i>	Sorghum bicolor	Cholam
<i>Vigna radiata</i>	Green Gram	Pachai payiru



Banana



Coconut



Green Gram



Groundnut

Fig No: 3.33. Agriculture activity observed in buffer zone area.**3.11. Fauna diversity**

The baseline information of the proposed project site helps predict potential impacts on wildlife and habitats in the region. Field faunal survey was conducted to gather the existing mammals, birds, reptiles, amphibians, and butterflies in core and buffer zones of the proposed project. The methodologies used included random walks, opportunistic observations (for birds and insects), visual encounter surveys (for reptiles), and tracking signs (for mammals). Additionally, during the field survey, information was collected from local residents, using images and videos as tools to know the occurrence of faunal species in the study area. Our study team engaged in discussions and consultations with locals from nearby villages, as well as with herders and farmers to get more details. To identify and analyze the data, thoroughly searched and referred the secondary literature on flora, fauna, protected areas, natural habitats, and wildlife species. Species identification was conducted and online databases. Finally, cross checked the list of identified fauna with the IUCN Red List database to determine the presence of any REET species in the study area.

3.11.1. Fauna Composition in the Core Zone and Buffer zone

The faunal species observed in the study area are given below. A total of 53 species were recorded in both the core and buffer zones of the study area. The core zone exhibited fewer species, with only a limited number of insects, mammals and reptiles, while the buffer zone showed greater species diversity. Among the 53 species recorded, the distribution pattern was as follows: 34% birds, 26% insects, 17% reptiles, and 23% mammals (Fig No.3.41). All these species were cross-checked against the IUCN Red List Database version 3.1 to identify any threatened species. Data analysis revealed that 23 species belong to IUCN categorized list as Least Concern, while 11 species were not

listed. The analysis indicates that there are no REET species in the core and buffer zones of the proposed colour rough stone and gravel quarry.

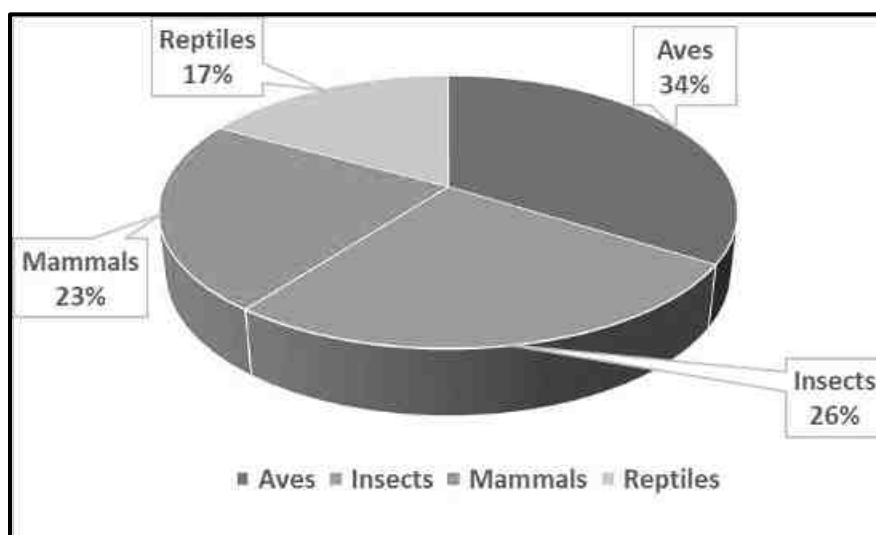


Figure No: 3.34. Occurrence of fauna in core and buffer zone

3.11.2. Mammals

The list of mammals observed including domesticated animals observed in the study areas are listed, a total 12 species were identified. Mammals traced from the site are common. There was no threatened species identified (Table No.3.61).

Table No: 3.36. diversity of mammal's species observed in the study area.

Common Name	Scientific Name	Family	IUCN Status
Indian Palm Squirrel	<i>Funambulus palmarum</i>	Sciuridae	LC
Indian mole rat	<i>Bandicota bengalensis</i>	Muridae	LC
Greater bandicoot rat	<i>Bandicota indica</i>	Muridae	LC
Cow	<i>Bos taurus</i>	Bovidae	NL
Goat	<i>Capra hircus</i>	Bovidae	NL
Sheep	<i>Ovis aries</i>	Bovidae	NL
Dog	<i>Canis lupus familiaris</i>	Canidae	NL
Cat	<i>Felis catus</i>	Felidae	NL
Indian hare	<i>Lepus nigricollis</i>	Leporidae	LC
Indian Field Mouse	<i>Mus booduga</i>	Muridae	LC
House mouse	<i>Mus musculus</i>	Muridae	LC
Domestic Water buffalo	<i>Bubalus bubalis</i>	Bovidae	NL

3.11.3. Aves

A total of 18 species of birds were identified by direct observations and voice-calls from the field. Also the expert opinion was sought to list the number of birds probably occurred in the area using the photographic field guide. There was no threatened species identified from the proposed site as per the IUCN status (Table No.3.61)

Table No: 3.37. Diversity of aves species observed in the study area.

Common Name	Scientific Name	Family	IUCN Status
Indian myna	<i>Acridotheres tristis</i>	Sturnidae	LC
Rose-ringed Parakeet	<i>Alexandrinus krameri</i>	Psittaculidae	LC
Oriental Darter	<i>Anhinga melanogaster</i>	Anhingidae	LC
Eastern Cattle-Egret	<i>Ardea coromanda</i>	Ardeidae	NE
Purple Sunbird	<i>Cinnyris asiaticus</i>	Nectariniidae	LC
Rock Pigeon	<i>Columba livia</i>	Columbidae	LC
Indian robin	<i>Copsychus fulicatus</i>	Muscicapidae	LC
Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	LC
Large-billed crow	<i>Corvus macrorhynchos</i>	Corvidae	LC
House Crow	<i>Corvus splendens</i>	Corvidae	LC
Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Anatidae	LC
Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC
Asian koel	<i>Eudynamis scolopaceus</i>	Cuculidae	LC
Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Nectariniidae	LC
Scaly-breasted Munia	<i>Lonchura punctulata</i>	Estrildidae	LC
Black Kite	<i>Milvus migrans</i>	Accipitridae	LC
White browed Wagtail	<i>Motacilla maderaspatensis</i>	Motacillidae	LC
House Sparrow	<i>Passer domesticus</i>	Passeridae	LC

3.11.4. Insects

Among invertebrate, Butterflies were the most dominant category identified from the field. A total of 14 species were identified from the field and one species is in the least concerned category (Table No.3.63).

Table No: 3.38. Diversity of insects' species observed in the study area.

Common Name	Scientific Name	Family	IUCN Status
Tawny coster	<i>Acraea terpsicore</i>	Nymphalidae	NL
Yellow crazy ant	<i>Anoplolepis gracilipes</i>	Formicidae	NL
Red dwarf honey bee	<i>Apis florea</i>	Apidae	NL
Indian black ant	<i>Camponotus compressus</i>	Formicidae	NL
Lemon emigrant	<i>Catopsilia pomona</i>	Pieridae	NL
Mottled emigrant	<i>Catopsilia pyranthe</i>	Pieridae	NL

Oriental latrine fly	<i>Chrysomya megacephala</i>	Calliphoridae	NL
Cotton tipworm moth	<i>Crociosema plebejana</i>	Tortricidae	NL
Plain Tiger butterfly	<i>Danaus chrysippus</i>	Nymphalidae	LC
Potter wasps	<i>Delta esuriens</i>	Vespidae	NL
Blue-eyed ensign wasp	<i>Evania appendigaster</i>	Evaniidae	NL
Chocolate pansy	<i>Junonia iphita</i>	Nymphalidae	NL
Lemon pansy	<i>Junonia lemonias</i>	Nymphalidae	NL
Termite	<i>Odontotermes assmuthi</i>	Termitidae	NL

3.11.5. Reptiles

There were 9 different reptile species were spotted in the study area. All the species are least concern category.

Table No: 3.39. Diversity of reptile's species observed in the study area.

Common Name	Scientific Name	Family	IUCN Status
Oriental garden lizard	<i>Calotes versicolor</i>	Agamidae	LC
Indian chameleon	<i>Chamaeleo zeylanicus</i>	Chamaeleonidae	LC
House lizards	<i>Hemidactylus flaviviridis</i>	Gekkonidae	LC
White-spotted supple skink	<i>Lygosoma albopunctata</i>	Scincidae	LC
Common skink	<i>Mabuya carinatus</i>	Scincidae	LC
Streaked kukri snake	<i>Oligodon taeniolatus</i>	Colubridae	LC
Snake eyed lizard	<i>Ophisops leschenaultii</i>	Lacertidae	LC
South Indian rock agama	<i>Psammophilus dorsalis</i>	Agamidae	LC
Green keelback	<i>Rhabdophis plumbicolor</i>	Colubridae	LC

3.12. Findings/Results

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

Records of threatened species in the area

No threatened species were observed

Endangered Species as per Wildlife (Protection) Act

No Endangered fauna was recorded in the project area.

Endemic Species of the Project areas

No endemic species were observed in the project area.

Migratory species of the Project areas

No migratory fauna observed in project area.

Migratory corridors and Flight paths

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

Breeding and spawning grounds

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

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

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

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

3.13. Summary

The biodiversity assessment of the proposed project site has identified no ecologically sensitive areas within and nearby the core or buffer zone that are home to IUCN-listed endangered species. Additionally, the site is not located on a migratory route for any fauna. While the operation of the stone and gravel quarry generate rock dust, which could affect the local ecosystem. Implementation of a green belt composed of triple layer of native tree species to be established to mitigate the impact on surrounding flora and fauna. Key recommendations from the assessment include: The adoption of green mining strategies to minimize environmental impact, Development of a green belt with native trees to reduce dust movement from mining activities and increase the biodiversity.

References

Some of the online databases referred for species identification and verification of threatened species category.

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3.6 SOCIO ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

It is expected that the Socio-Economic Status of the area will substantially improve because of this proposed project. As the proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area and, thus, improve their standard of living.

3.6.1 Objectives of the Study

The objectives of the socio-economic study are as follows:

- To study the socio-economic status of the people living in the study area of the proposed mining project.
- To assess the impact of the project on Quality of life of the people in the study area.
- To recommend Community Development measures needs to be taken up in the study Area.

3.6.2 Scope of Work

- To study the Socio-economic Environment of the area from the secondary sources;
- Data Collection & Analysis
- Prediction of project impact
- Mitigation Measures

3.6.3 District Profile

Tiruppur or Tirupur is a city in the Indian state of Tamil Nadu. Tiruppur is the administrative headquarters of Tiruppur district and the eighth largest city as well as urban agglomeration in Tamil Nadu. Located on the banks of Noyyal River, it has been ruled at different times, by the Early Pandyas, Medieval Cholas, Later Cholas, Mysore Kingdom and the British. It is about 450 kilometres (280 mi) southwest of the state capital Chennai about 50 kilometres (31 mi) east of Coimbatore 50 kilometres (31 mi) south of Erode and 50 kilometres (31 mi) north of Dharapuram.

Tiruppur is administered by municipal corporation which was established in 2008 and the total area of the corporation is 159.6 km² divided into 60 wards. The total population of the city as per the 2011 census is 877,778. Tiruppur is a part of the Tiruppur constituency that elects its member of parliament.

Tiruppur is a major textile and knit wear hub contributing to 90% of total cotton knit wear exports from India. The textile industry provides employment to over six lakh people and contributed to exports worth ₹200 billion (US\$2.8 billion) in 2014–15.

3.6.4 Study area:

KODANGIPALAYAM VILLAGE

Kodangipalayam is a village located in Palladam Taluk of Tiruppur district in Tamil Nadu. Around 606 families reside in Kodangipalayam village. Kodangipalayam village is administered by Sarpanch (Head of village) who is elected every five years.

As per the Census India 2011, Kodangipalayam village has population of 2018 of which 1006 are males and 1012 are females. The population of children between ages 0-6 is 176 which is 8.72% of total population.

The sex-ratio of Kodangipalayam village is around 1006 compared to 996 which is average of Tamil Nadu state. The literacy rate of Kodangipalayam village is 66.2% out of which 75.55% males are literate and 56.92% females are literate. There are 17.54% Scheduled Caste (SC) and 0 Scheduled Tribe (ST) of total population in Kodangipalayam village.

TABLE 3.37: KODANGIPALAYAM VILLAGE POPULATION FACTS

Number of Households	606
Population	2018
Male Population	1006 (49.85%)
Female Population	1012 (50.15%)

Children Population	176
Sex-ratio	1006
Literacy	66.2%
Male Literacy	75.55%
Female Literacy	56.92%
Scheduled Tribes (ST) %	0
Scheduled Caste (SC) %	17.54%

Source: <https://www.censusindia2011.com/tamil-nadu/tiruppur/palladam/kodangipalayam-population.html>

Gram Panchayat name of the Kodangipalayam village is Kodangipalayam. CD Block name is Palladam and Teshil/Taluk or sub-district is Palladam. Data Reference year is 2009 of Census 2011. Sub District HQ Name is PALLADAM and Sub District HQ Distance is 11 Km from the village. District Head Quarter name is TIRUPPUR and its distance from the village is 25KM. Nearest Town of the Kodangipalayam village is SULUR and nearest town distance is 7 km. Pincode of Kodangipalayam village is 641662. As per census 2011 village code of village Kodangipalayam is 644815.

TABLE 3.38: DEMOGRAPHICS POPULATION OF VILLAGE KODANGIPALAYAM

Total Population	Male Population	Female Population
6987	3494	3493

Source: <https://etrace.in/census/village/kodangipalayam-palladam-district-tiruppur-tamil-nadu-644815>

Sex Ratio of Kodangipalayam Village -Census 2011

As per the Census Data 2011 there are 1000 Females per 1000 males out of 6987 total population of village. There are 1016 girls per 1000 boys under 6 years of age in the village.

Literacy of Kodangipalayam Village

Out of total population total 4614 people in Kodangipalayam Village are literate, among them 2568 are male and 2046 are female in the village. Total literacy rate of Kodangipalayam is 74.22%, for male literacy is 82.52% and for female literacy rate is 65.89%.

Worker's profile of Kodangipalayam Village

Total working population of Kodangipalayam is 3595 which are either main or marginal workers. Total workers in the village are 3595 out of which 2322 are male and 1273 are female. Total main workers are 3146 out of which female main workers are 2109 and male main workers are 1037. Total marginal workers of village are 449.

TABLE 3.39: KODANGIPALAYAM VILLAGE CENSUS 2011 DATA

Description	Census 2011 Data
Village Name	Kodangipalayam
Teshil Name	Palladam
District Name	Tiruppur
State Name	Tamil Nadu
Total Population	6987
Total Area	1767 (Hectares)
Total No of House Holds	1961
Total Male Population	3494
Total Female Population	3493
0-6 Age group Total Population	770
0-6 Age group Male Population	382
0-6 Age group Female Population	388
Total Person Literates	4614

Total Male Literates	2568
Total Male Literates	2046
Total Person Illiterates	2373
Total Male Illiterates	926
Total Male Illiterates	1447
Scheduled Cast Persons	1207
Scheduled Cast Males	595
Scheduled Cast Females	612
Scheduled Tribe Persons	0
Scheduled Tribe Males	0
Scheduled Tribe Females	0

Source: <https://etrace.in/census/village/kodangipalayam-palladam-district-tiruppur-tamil-nadu-644815>

TABLE 3.40: KODANGIPALAYAM WORKING POPULATION ---CENSUS 2011

	Total	Male	Female
Total Workers	3595	2322	1273
Main Workers	3146	2109	1037
Main Workers Cultivators	354	222	132
Agriculture Labourer	463	202	261
Household Industries	217	141	76
Other Workers	2112	1544	568
Marginal Workers	449	213	236
Non Working Persons	3392	1172	2220

Source: <https://etrace.in/census/village/kodangipalayam-palladam-district-tiruppur-tamil-nadu-644815>

TABLE 3.41: POPULATION DATA OF STUDY AREA

Sl.No.	Village Name	No of House Holds	Total Population	Male	Female	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate
1	Anuppatti	606	2018	1006	1012	1336	760	576	682	246	436
2	Appanaickenpatti	1121	3992	1998	1994	2665	1413	1252	1327	585	742
3	Arasur	38	123	61	62	88	50	38	35	11	24
4	Ichipatti	2754	9527	4892	4635	6315	3577	2738	3212	1315	1897
5	Iduvai (CT)	2183	8006	3984	4022	5212	2837	2375	2794	1147	1647
6	Kadampadi	2370	8147	4131	4016	5913	3184	2729	2234	947	1287
7	Kalangal	1639	5590	2853	2737	3889	2158	1731	1701	695	1006
8	Kangayampalayam	2247	8251	4394	3857	6485	3643	2842	1766	751	1015
9	Kaniyur (CT)	3444	12011	6028	5983	8648	4728	3920	3363	1300	2063
10	Karadibavi	1040	3647	1809	1838	2479	1327	1152	1168	482	686
11	Kasba Ayyampalayam	1024	3430	1728	1702	2451	1358	1093	979	370	609
12	Kodangipalayam	1961	6987	3494	3493	4614	2568	2046	2373	926	1447
13	Madappur	1609	5496	2770	2726	3440	1955	1485	2056	815	1241
14	Mallegoundenpalayam	421	1448	755	693	940	549	391	508	206	302
15	Naranapuram	3862	14018	7047	6971	10117	5456	4661	3901	1591	2310
16	Neelambur (CT)	2471	8382	4109	4273	5875	3155	2720	2507	954	1553
17	Palladam	12276	43246	22243	21003	31448	17253	14195	11798	4990	6808
18	Panickampatti	1196	3982	1968	2014	2576	1410	1166	1406	558	848
19	Paruvai	1098	3778	1909	1869	2682	1470	1212	1096	439	657
20	Poomalur	2209	7605	3829	3776	4602	2614	1988	3003	1215	1788
21	Puliampatti	604	2041	1000	1041	1529	821	708	512	179	333
22	Rasipalayam	1364	4407	2208	2199	3164	1757	1407	1243	451	792
23	Sellakkarchal	1863	6209	3109	3100	4368	2447	1921	1841	662	1179
24	Semmandampalayam	1718	5970	2954	3016	4114	2195	1919	1856	759	1097
25	Semmipalayam (CT)	2380	8429	4285	4144	6413	3467	2946	2016	818	1198
26	Sukkampalayam	1247	4420	2238	2182	2947	1665	1282	1473	573	900
27	Sulur	18822	65216	32914	32302	47830	25992	21838	17386	6922	10464
28	Vadugapalayam	1569	5595	2733	2862	3912	2077	1835	1683	656	1027
29	Velampalayam	1206	3943	1941	2002	2634	1470	1164	1309	471	838

Source: www.censusindia.gov.in - Tamilnadu Census of India – 2011

TABLE 3.42: WORKERS PROFILE OF STUDY AREA

Sl.No.	Village Name	Total Workers Population	Male Workers	Female Workers	Total Main Workers	Main Workers Male	Main Workers Female	Main Cultivation Workers	Main Agriculture Workers	Main Other Workers	Non-Worker Population
1	Anuppatti	889	634	255	882	631	251	67	188	620	1129
2	Appanaickenpatti	2199	1285	914	2006	1197	809	115	430	1416	1793
3	Arasur	87	43	44	87	43	44	72	13	2	36
4	Ichipatti	4980	3290	1690	4825	3225	1600	223	484	3536	4547
5	Iduvai (CT)	3868	2558	1310	3593	2430	1163	151	305	2986	4138
6	Kadampadi	3832	2536	1296	3397	2320	1077	273	369	2579	4315
7	Kalangal	3112	1893	1219	2784	1806	978	243	639	1863	2478
8	Kangayampalayam	3493	2748	745	2753	2337	416	112	46	2513	4758
9	Kaniyur (CT)	5650	3814	1836	5268	3649	1619	121	137	4819	6361
10	Karadibavi	1842	1153	689	1678	1055	623	143	524	982	1805
11	Kasba Ayyampalayam	1692	1110	582	1372	916	456	251	290	798	1738
12	Kodangipalayam	3595	2322	1273	3146	2109	1037	354	463	2112	3392
13	Madappur	2699	1780	919	2533	1700	833	386	837	1280	2797
14	Mallegoundenpalayam	832	532	300	793	524	269	173	261	348	616
15	Naranapuram	6577	4500	2077	6251	4363	1888	177	401	5496	7441
16	Neelambur (CT)	3926	2673	1253	3718	2599	1119	65	131	3450	4456
17	Palladam	21309	14544	6765	19945	13838	6107	528	1414	17686	21937
18	Panickampatti	2015	1290	725	1925	1260	665	189	376	1345	1967
19	Paruvai	1889	1249	640	1778	1233	545	312	378	900	1889
20	Poomalur	3960	2612	1348	3563	2446	1117	310	461	2597	3645
21	Puliampatti	1141	716	425	1093	697	396	332	431	246	900
22	Rasipalayam	2016	1404	612	1735	1288	447	126	121	1424	2391
23	Sellakkarchal	3200	2034	1166	2662	1768	894	403	1024	1097	3009
24	Semmandampalayam	2833	1861	972	2684	1793	891	382	459	1760	3137
25	Semmipalayam (CT)	4231	2687	1544	4053	2596	1457	105	271	3612	4198
26	Sukkampalayam	2760	1560	1200	2290	1356	934	404	242	1490	1660
27	Sulur	30906	21090	9816	27871	19643	8228	719	991	25575	34310
28	Vadugapalayam	2883	1794	1089	2806	1751	1055	175	504	2090	2712
29	Velampalayam	2315	1329	986	2260	1302	958	546	971	651	1628

Source: www.censusindia.gov.in – Tamil Nadu Census of India – 2011

TABLE 3.43: COMMUNICATION & TRANSPORT FACILITIES IN THE STUDY AREA

Sl	Village Name	PO	SPO	PTO	T	PCO	MP	IC / CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Anuppatti	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
2	Appanaickenpatti	2	1	2	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
3	Arasur	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
4	Ichipatti	2	1	2	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
5	Kadampadi	2	1	2	1	1	1	2	1	1	1	2	1	2	1	1	1	2	1
6	Kalangal	2	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
7	Kangayampalayam	1	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1
8	Karadibavi	1	2	1	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
9	Kasba Ayyampalayam	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	2	2	1
10	Kodangipalayam	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
11	Madappur	2	1	2	1	1	1	2	1	1	1	2	1	1	1	1	1	2	1
12	Mallegoundenpalayam	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
13	Naranapuram	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
14	Panickampatti	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
15	Paruvai	2	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
16	Poomalur	2	1	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
17	Puliampatti	2	1	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
18	Rasipalayam	2	1	2	1	2	1	2	2	1	1	2	2	2	2	1	1	2	1
19	Sellakkarichal	2	1	2	1	1	1	2	2	1	1	2	1	2	1	1	1	2	1
20	Semmandampalayam	2	1	2	1	1	1	1	2	1	1	2	2	1	1	1	1	2	1
21	Sukkampalayam	2	1	2	1	1	1	2	2	1	2	2	1	1	1	1	1	2	1
22	Vadugapalayam	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
23	velampalayam	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1

Abbreviations: PO - Post Office; MP - Mobile Phone Coverage; RS - Railway Station; GR - Gravel Roads; SPO - Sub Post Office; IC / CSC - Internet Cafe/Common Service Centre; NH - National Highways; NWR - Navigate waterways River; PTO - Post & Telegraph office; PCF - Private Courier Facility; SH - State Highways; FP - Foot path; T- Telephone (Landline); BS - Public Bus Service; MDR - Major District Road; PCO - Public call office / Mobile; PBS - Private Bus Service; BTR - Black Topped (Pucca Roads). Note: 1 - Available within the village 2 - Not available

TABLE 3.44: WATER & DRAINAGE FACILITIES IN THE STUDY AREA

Sl	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1	Anuppatti	1	1	1	2	1	2	2	2	1	1	2
2	Appanaickenpatti	1	1	1	1	1	2	2	2	1	1	2
3	Arasur	2	2	1	2	1	2	2	2	2	1	2
4	Ichipatti	1	1	1	2	1	1	2	2	1	1	2
5	Kadampadi	1	2	1	2	2	2	2	2	1	1	2
6	Kalangal	1	1	1	1	1	2	1	2	1	1	2
7	Kangayampalayam	1	1	1	1	1	1	2	1	1	1	2
8	Karadibavi	1	1	1	1	1	2	2	2	1	1	1
9	Kasba Ayyampalayam	1	1	1	2	1	1	2	2	1	1	2
10	Kodangipalayam	1	1	1	1	1	2	2	2	1	1	2
11	Madappur	1	1	1	1	1	2	2	2	1	1	2
12	Mallegoundenpalayam	1	1	1	2	1	2	2	2	1	1	2
13	Naranapuram	1	1	1	1	1	2	2	2	1	1	1
14	Panickampatti	1	1	1	2	1	2	2	2	1	1	2
15	Paruvai	1	1	1	2	1	1	2	2	1	1	2
16	Poomalur	1	1	1	2	1	2	1	2	1	1	2
17	Puliampatti	1	1	1	2	1	2	2	2	1	1	2
18	Rasipalayam	1	2	2	1	2	2	2	2	1	1	2
19	Sellakkarichal	1	1	1	1	1	1	2	2	1	1	2
20	Semmandampalayam	1	1	1	2	1	1	2	2	1	1	2
21	Sukkampalayam	1	1	1	1	1	2	2	2	1	1	2
22	Vadugapalayam	1	1	1	2	1	1	2	2	1	1	2
23	velampalayam	1	1	1	2	1	2	1	2	1	1	2

Abbreviations: T - Tap Water; R / C - River / Canal; CW - Covered Well; T/P/L - Tank / Pond / Lake; UCW - Uncovered Well; CD - Covered Drainage; HP - Hand Pump; OD - Open Drainage; TW/BH - Tube / Bore Well; CT - Community Toilet Complex for General public; S - Spring

Note – 1 - Available within the village; 2 - Not available

TABLE 3.45: OTHER FACILITIES IN THE STUDY AREA

Sl	Village Name	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	NPS	APS	BDRO	PS
1	Anuppatti	2	2	1	2	1	1	2	2	1	1	2	1	1	1	1	1	1
2	Appanaickenpatti	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
3	Arasur	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
4	Ichipatti	2	2	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1
5	Kadampadi	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1	1
6	Kalangal	2	2	2	1	1	1	2	2	1	1	1	1	2	1	1	1	1
7	Kangayampalayam	1	2	1	2	1	1	2	1	1	1	2	2	2	1	1	1	1
8	Karadibavi	2	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
9	Kasba Ayyampalayam	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1
10	Kodangipalayam	2	2	1	2	1	1	2	2	1	1	1	1	2	1	1	1	1
11	Madappur	2	2	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1
12	Mallegoundenpalayam	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
13	Naranapuram	2	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1
14	Panickampatti	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
15	Paruvai	2	2	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1
16	Poomalur	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1
17	Puliampatti	2	2	2	1	1	1	2	2	1	1	2	1	1	1	1	1	1
18	Rasipalayam	2	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1
19	Sellakkarichal	2	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1
20	Semmandampalayam	2	2	1	2	1	1	2	2	1	1	1	2	1	1	1	1	1
21	Sukkampalayam	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1	1
22	Vadugapalayam	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
23	velampalayam	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1

Abbreviations: ATM - Automatic Teller Machine; PDS - Public Distribution System (Shop); CB - Commerical Bank; RM - Regular Market; COB - Co-operative Bank; AMS - Agricultural Market Society; ACS - Agricultural Credit Societies; NC - Nutritional Centres; SHG - Self Help Group; NC-AC - Nutritional Centres - Anganwadi Centre; DBRO - Birth & Death Registration Office; PS - Power Supply
 Note – 1 - Available within the village; 2 - Not available

TABLE 3.46: EDUCATIONAL FACILITIES IN THE STUDY AREA

Sl	Village Name	PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
		G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
1	Anuppatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	Appanaickenpatti	1	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	Arasur	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Ichipatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Kadampadi	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Kalangal	1	2	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	Kangayampalayam	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Karadibavi	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	Kasba Ayyampalayam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Kodangipalayam	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	Madappur	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	Mallegoundenpalayam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
13	Naranapuram	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14	Panickampatti	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Paruvai	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Poomalur	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
17	Puliampatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	Rasipalayam	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	Sellakkarichal	1	2	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20	Semmandampalayam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
21	Sukkampalayam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	Vadugapalayam	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
23	velampalayam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Abbreviations: PPS-Pre Primary School; SSS-Senior Secondary School; DC-Degree School; PT-Polytechnic; PS-Primary School; G-Government; EC-Engineering College; VTS-Vocational School/ITI; MS-Middle School; P-Private; MC-Medical College; SSD-Special School For Disabled; SS-Secondary School; MI-Management College/Institute;

Note – 1 - Available within the village; 2 - Not available

TABLE 3.47: MEDICAL FACILITIES IN THE STUDY AREA

Sl. No.	Village Name	CHC	PHC	PHSC	MCW	TBC	HA	HAM	D	VH	MHC	FWC	NGM-I/O
1	Anuppatti	0	0	0	0	0	0	0	0	0	0	0	b
2	Appanaickenpatti	0	0	1	0	0	0	0	0	0	0	0	b
3	Arasur	0	0	0	0	0	0	0	0	0	0	0	a
4	Ichipatti	0	0	1	1	0	0	0	0	1	0	0	b
5	Kadampadi	0	0	1	0	0	0	0	0	1	0	0	b
6	Kalangal	0	0	1	0	0	0	0	0	0	0	0	c
7	Kangayampalayam	0	0	1	0	0	0	0	0	0	0	0	c
8	Karadibavi	0	0	1	1	0	0	0	0	1	0	0	b
9	Kasba Ayyampalayam	0	0	1	0	0	0	0	0	0	0	0	a
10	Kodangipalayam	0	0	1	0	0	0	0	0	0	0	0	b
11	Madappur	0	0	2	0	0	0	0	0	2	0	0	b
12	Mallegoundenpalayam	0	0	0	0	0	0	0	0	0	0	0	b
13	Naranapuram	0	2	7	2	2	0	0	2	0	0	2	
14	Panickkampatti	0	0	1	0	0	0	0	0	0	0	0	b
15	Paruvai	0	0	1	0	0	0	0	0	0	0	0	b
16	Poomalur	0	1	1	1	1	0	0	1	0	0	1	
17	Puliampatti	0	0	1	0	0	0	0	0	0	0	0	b
18	Rasipalayam	0	1	1	1	1	0	0	1	0	0	1	
19	Sellakkarichal	0	0	1	0	0	0	0	0	3	0	0	b
20	Semmandampalayam	0	0	1	0	0	0	0	0	0	0	0	a
21	Sukkampalayam	0	0	1	0	0	0	0	0	0	0	0	a
22	Vadugapalayam	0	0	1	0	0	0	0	0	0	0	0	b
23	Velampalayam	0	0	1	0	0	0	0	0	1	0	0	a

Abbreviations: CHC-Community Health Centre; TBC-TB Clinic; VH- Vetrernity Hospital; PHC-Primary Health Centre; HA-Aallopathic Hospital; FWC-Family Welfare Centre; PHSC-Primary Health Sub Centre; HAM-Alternative Medicine Hospital; MH-Mobile Health Clinic; MCW-Maternity and Child Welfare Centre; D-Dispensary; NGM-I/O-Non Government Medical Facilities In & Out Patient

Note – 1 - Available within the village; 2 - Not available a-facility available at <5kms b-facility available at>10kms

Source: www.censusindia.gov.in – Tamil Nadu Census of India – 2011

3.6.6 Recommendation and Suggestion

- Awareness program to be conducted to make the population aware to get education and a better livelihood.
- Vocational training programme can be organized to make the people self - employed, particularly for women and unemployed youth.
- On the basis of qualification and skills local community may be preferred. Long term and short-term employments can be generated.
- Health care centre and ambulance facility can be provided to the population to get easy access to medical facilities. Maternity facility should be made available at the place to avoid going to distant places for treatment which involves risks. Apart from that as these areas are prone to various diseases a hospital with modern facilities should be opened on a priority basis in a central place to provide better health facilities to the villagers around the project.
- 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 Summary & Conclusion

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

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

3.7 Structure Studies upto 300m Radius for P1

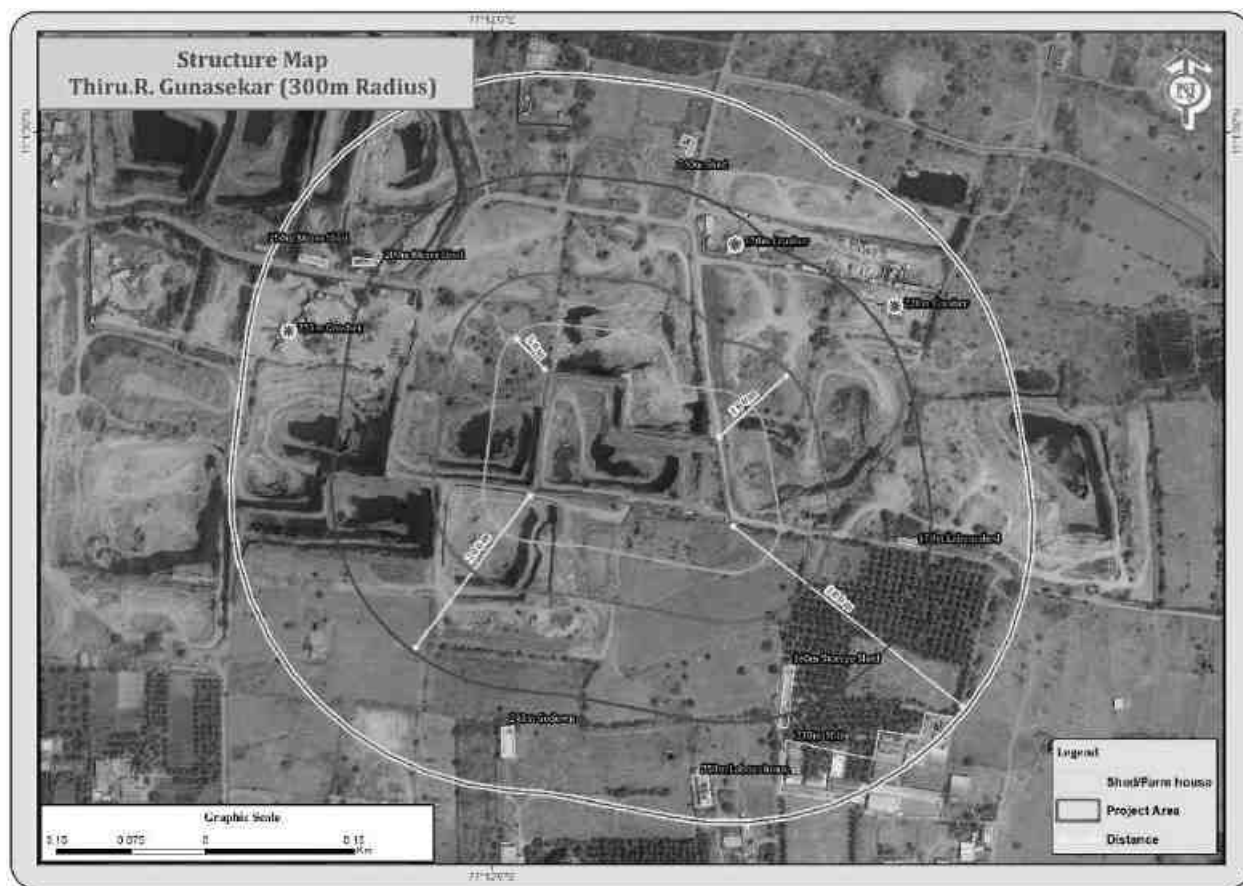


Fig.3.41 Structure map around 300m Radius

Table No 3.53 Structures details in the study area around 300m Radius**Enumeration of Structures from 0 - 300m Radius**

Structure Numbers	Distance & Direction from the project site	Structure Details and Usage Purpose	Type of Structure Structures (Kutcha/ Brick/ Cement/ RCC/ Framed Structures)	No.of Occupants	Structure belongs to owner (Yes/No)	Remarks
1	160m – SE	Storage Shed	Sheet Structure	Nil	No	Storage Purpose Only – No Stay
2	170m – North	Crusher	Sheet Structure	4 Nos	No	Production of M-Sand, P-Sand & Jelly
3	200m – NW	Mines Shed	Sheet Structure	Nil	No	Used to Store Mines Equipment's and materials – No Stay
4	220m – NE	Crusher	Sheet Structure	3 Nos	No	Production of M-Sand, P-Sand & Jelly
5	230m – SE	Cotton Mill	Sheet Structure	20 Nos	No	Manufacture of Cotton fabric and textile products
6	240m – South	Godown	Sheet Structure	Nil	No	Storage Purpose Only – No Stay
7	240m – North	Shed	Sheet Structure	Nil	No	Used to Store Crusher Equipment's and Materials – No Stay
8	250m – SE	Labour House	Brick Cement Structure	4 Nos	No	Used for Residential

9	250m – NW	Crusher	Sheet Structure	6 Nos	No	Production of M-Sand, P-Sand & Jelly
10	250m – NW	Mines Shed	Sheet Structure	Nil	No	Used to Store Mines Equipment's and materials – No Stay

Fig.3.41 Structure map around 300m Radius

TABLE 3.47: Structures Details in The Study Area Around 300m Radius

ENUMERATION OF STRUCTURE 0-300m						
Structure Numbers	Distance & Direction from the project site	Structure Details and Usage Purpose	Type of Structure Structures (Kutcha/ Brick/ Cement/ RCC/ Framed Structures)	No.of Occupants	Structure belongs to owner (Yes/No)	Remarks
1	30m - South	Labour Shed	Sheet & Brick Structure	Nil	Yes	Labour Used as a rest shelter
2	160m - NW	Crusher	Framed Structure	4 Nos	No	Production of M & P sand and Jelly
3	180m - South	Storage Shed	Sheet & Brick Structure	Nil	No	Storage Purposes
4	200m - South	Mill	Tiled, Sheet & Brick Structure	7 Nos	No	Producing yarn for the textiles
5	210m - SE	Temporary Shed	Sheet & Brick Structure	Nil	No	Not in Use
6	240m – NE	Crusher	Framed Structure	5 Nos	No	Production of M & P sand and Jelly
7	270 - East	Shed	Sheet & Brick Structure	2 Nos	No	Storage Purposes

3.7 Structure Studies upto 300m Radius for P3

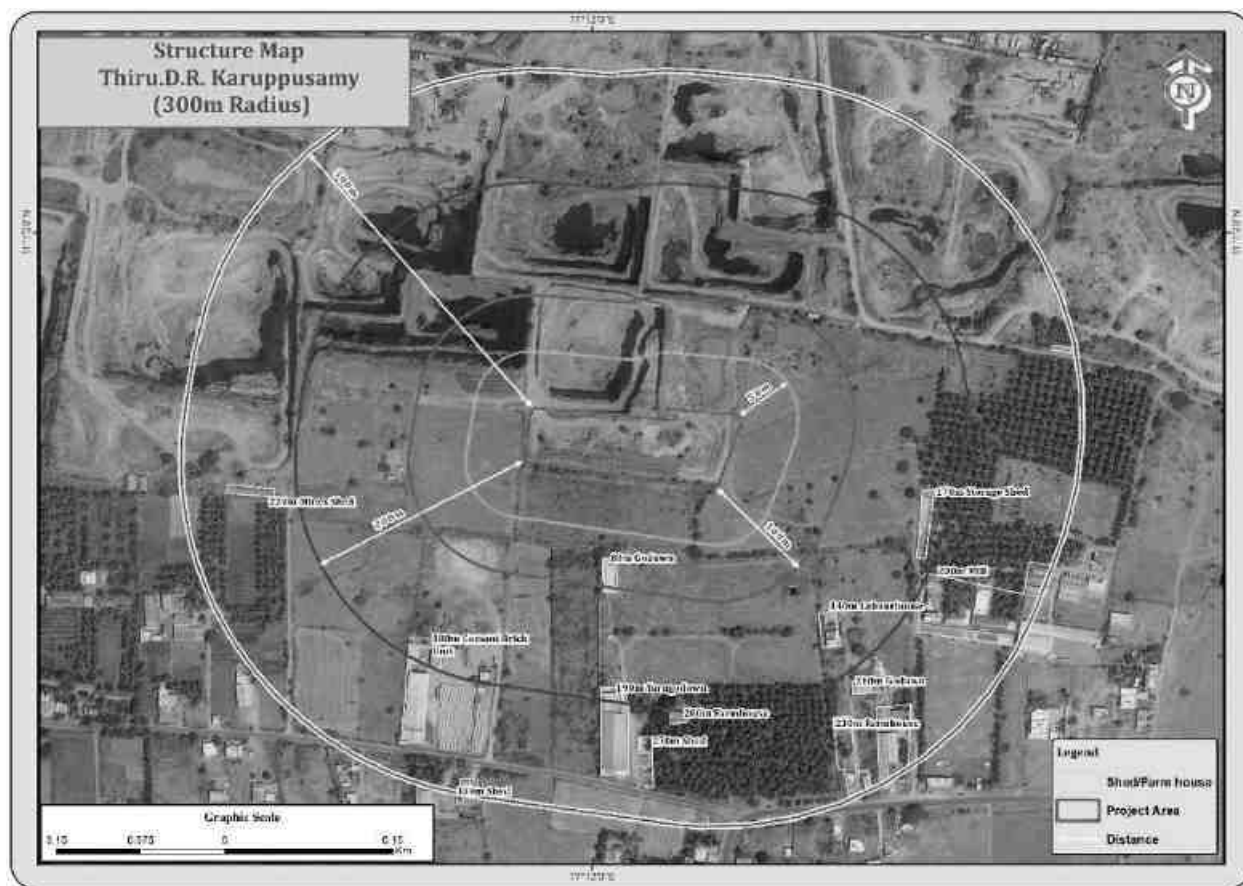


Fig.3.41 Structure map around 300m Radius

TABLE 3.47: Structures Details in The Study Area Around 300m Radius

Enumeration of Structures from 0 - 300m Radius						
Structure Numbers	Distance & Direction from the project site	Structure Details and Usage Purpose	Type of Structure Structures (Kutch/ Brick/ Cement/ RCC/ Framed Structures)	No.of Occupants	Structure belongs to owner (Yes/No)	Remarks
1	80m – South	Godown	Sheet Structure	Nil	No	Storage Purpose Only – No Stay
2	140m – SE	Labour shed	Brick Cement Structure	4 Nos	No	Used for temporary stay
3	170m – East	Storage Shed	Sheet Structure	Nil	No	Used to store Coconuts
4	180m – SW	Cement Brick Unit	Sheet Structure	6 Nos	No	Production of M Sand Bricks
5	190m – South	Cement Brick unit Godown	Sheet Structure	Nil	No	Temporarily not in use past 6 months
6	200m – South	Farmhouse	Brick Cement Structure	2 Nos	No	Used to store Agriculture goods
7	200m – SE	Mill	Sheet Structure	20 Nos	No	Manufacture of cotton fabric and textile products
8	210m – SE	Cement Bricks Manufactures	Sheet Structure	6 Nos	No	Production for Building Construction Materials
9	220m – SW	Mines Shed	Tiled Structure	Nil	No	Used to store Mines Equipment's and materials – No Stay
10	230m – SE	Farmhouse	Brick Cement Structure	2 Nos	No	Used to store Agriculture goods

11	230m –Mines Shed	Shed	Sheet Structure	Nil	Yes	Now not in use since the lease got expired
12	240m – SE	Godown	Sheet Structure	Nil	No	Storage Purpose only – No Stay

CHAPTER – 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 General

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

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

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

4.1 Land Environment

4.1.2 Anticipated Impact from all Proposed Projects

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

4.1.2.1 Common Mitigation Measures for Respective Individual Proposed Projects

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

4.1.3 Soil Environment

4.1.4 Impact on Soil Environment

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

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

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

4.1.5 Common Mitigation Measures for Respective Individual Proposed Projects

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

4.1.6 Waste Dump Management

There are no wastages anticipated in this rough stone and gravel quarrying operation. The entire quarried out materials will be utilized (100%).

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

4.2 Water Environment

4.2.1 Anticipated Impact on Surface and ground water

The impact due to quarrying on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity will not intersect ground water table as the maximum depth of the quarry in the cluster is 30m and water table is found at a depth of 70-65m BGL-P1 maximum depth of the quarry in the cluster is 36m and water table is found at a depth of 78-73m BGL-P2. maximum depth of the quarry in the cluster is 37m and water table is found at a depth of 68m BGL-P3. The quarrying operation will be carried out well above the water table. There is no intersection of surface water bodies (Streams, Canal, Odai etc.,) in the project area. During rainy season rain water will be collected in the quarry pit and later used for greenbelt development and for the water sprinkling in the haul roads. There is no proposal for discharging of quarry pit water outside the project area.

TABLE 4.1: WATER REQUIREMENTS P1-P3

PROPOSAL – P1

*Purpose	Quantity	Source
Domestic & Drinking purpose	0.3KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Dust Suppression	0.7KLD	From Existing bore wells from nearby area
Green Belt	0.5KLD	From Existing bore wells from nearby area
Total	1.5 KLD	
PROPOSAL – P2		
*Purpose	Quantity	Source
Domestic & Drinking purpose	0.3KLD	From Existing, bore wells and drinking water will be sourced from Approved Water vendors.
Dust Suppression	0.7KLD	From Existing bore wells from nearby area
Green Belt	0.6KLD	From Existing bore wells from nearby area
Total	1.6 KLD	
PROPOSAL – P3		
*Purpose	Quantity	Source
Dust Suppression	0.7KLD	The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
Green Belt	1.0KLD	The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
Sanitation & Drinking	0.3KLD	Approved water vendors
Total	2.0 KLD	

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

Source: Approved Mining Plan Pre-Feasibility Report

Total water requirement in the cluster quarries is about 5.1 KLD, the water for dust suppression and greenbelt development will be sourced from the mine pit water collected during rainy seasons, the water for domestic purpose and drinking will be sourced from the approved water vendors.

4.2.2 Common Mitigation measures:

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 months once) analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring (every 6 months once) and analysing the quality of water in open well, bore wells and surface water

4.3 Air Environment

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

1.3.1 Anticipated Impact

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

4.3.1.1. Modelling of Incremental Concentration from all Proposed Projects

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

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

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

The impact on Air Environment is due to the mining and allied activities during Land Development phase, Mining process and Transportation. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate Matter (PM₁₀) affecting Ambient Air of the area. Prediction of impacts on air environment has been carried out taking into consideration cumulative production three proposed quarries. Air environment and net increase in emissions by Open pit source modelling in AERMOD Software.

4.3.1.2 Emission Estimation

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

The general equation for emissions estimation is:

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

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER = overall emission reduction efficiency, %

The proposed mining activity includes various activities like ground preparation, excavation, handling and transport of ore. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 4-2.

TABLE 4.2: ESTIMATED EMISSION RATE FOR P1, P2 & P3

EMISSION ESTIMATION FOR QUARRY “P1”- Thiru.R.Gunasekar				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.066416896	g/s
	Blasting	Point Source	0.000312613	g/s
	Mineral Loading	Point Source	0.040809061	g/s
	Haul Road	Line Source	0.002488859	g/s/m
	Overall Mine	Area Source	0.048124952	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000420055	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000016323	g/s
EMISSION ESTIMATION FOR QUARRY “P2”- Thiru.P.Gowtham Rathinam				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.070147791	g/s
	Blasting	Point Source	0.000410851	g/s
	Mineral Loading	Point Source	0.039947163	g/s
	Haul Road	Line Source	0.002487571	g/s/m
	Overall Mine	Area Source	0.042995141	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000349746	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000010606	g/s
EMISSION ESTIMATION FOR QUARRY “P3”- Thiru.D.R.Karuppusamy				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.063827944	g/s
	Blasting	Point Source	0.000256253	g/s
	Mineral Loading	Point Source	0.038771956	g/s
	Haul Road	Line Source	0.002486174	g/s/m
	Overall Mine	Area Source	0.038641909	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000253175	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000006090	g/s

4.3.2 Frame work of Computation & Model details

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

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

Air Pollution Dispersion Modelling

Baseline Air Quality –

Baseline air quality has been measured at 2 locations in the cluster and 6 locations within the buffer zone of the study area. The 24 - hourly average samples of particulate matters (PM₁₀ and PM_{2.5}), SO₂ and NO_x were measured following the National Ambient Air Quality Standards (NAAQS), 2009. Monitoring data of 7 sampling stations are given below –

Meteorological Data –

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

A temporary meteorological station was installed at project site and monitored continually for study period without break. The station was installed at a height of 4 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis. A weather data was collected from IMD, Tiruppur agro for the month of Mar2022 – May2022 to correlate with site data and found not much of change in the parameters.

FIGURE 4.1: AERMOD TERRAIN MAP

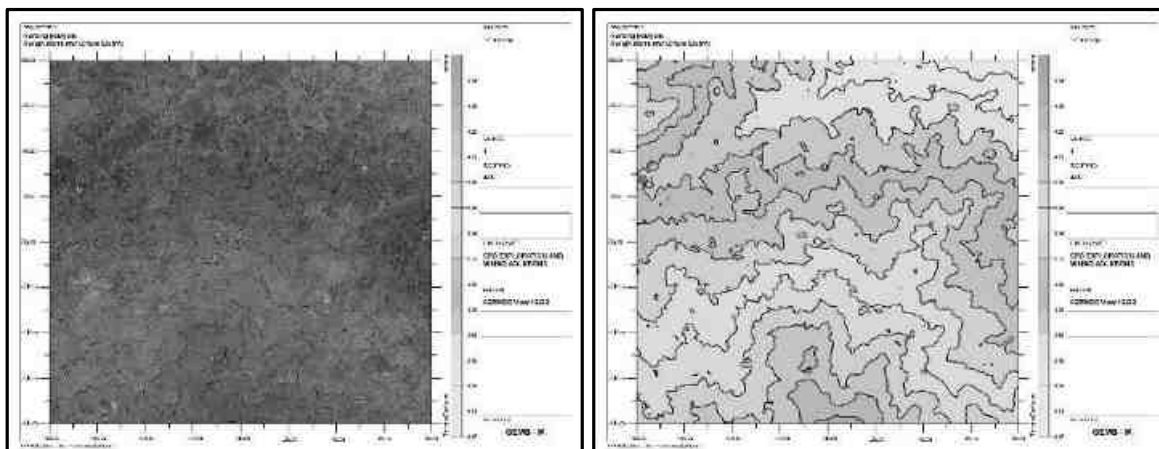


FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM₁₀

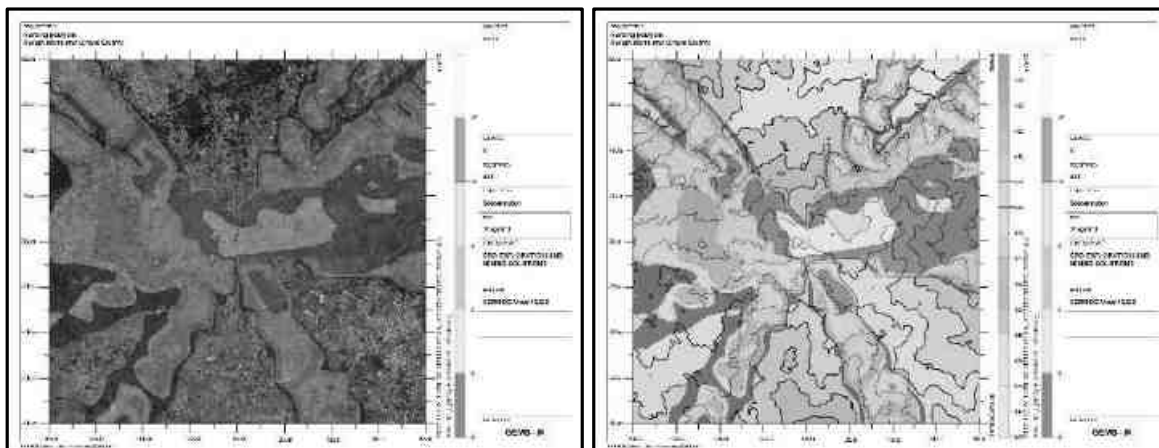


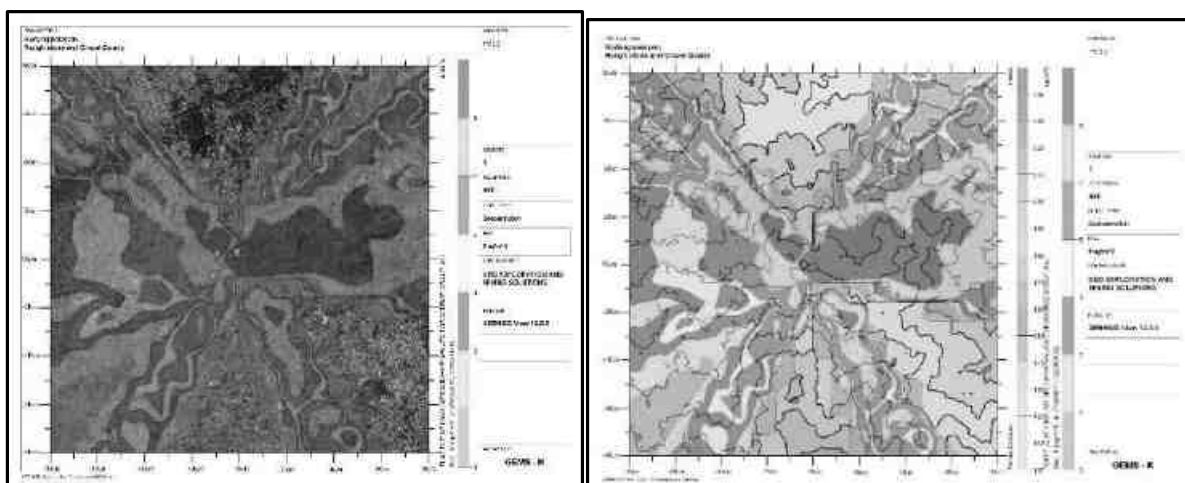
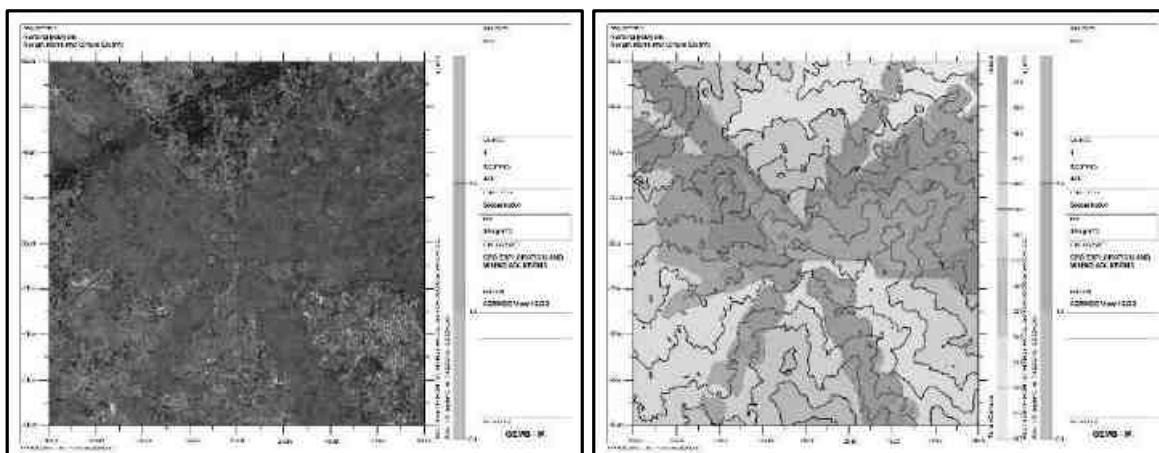
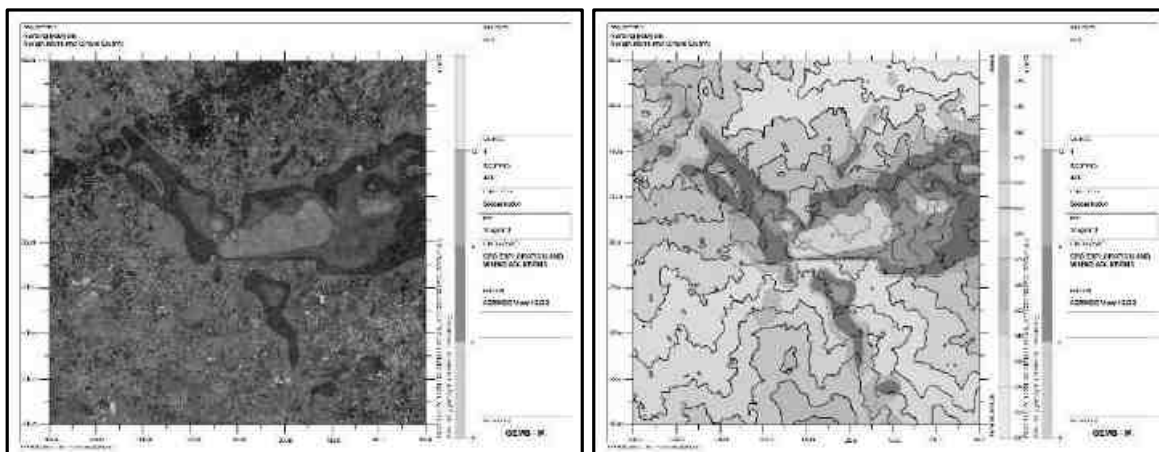
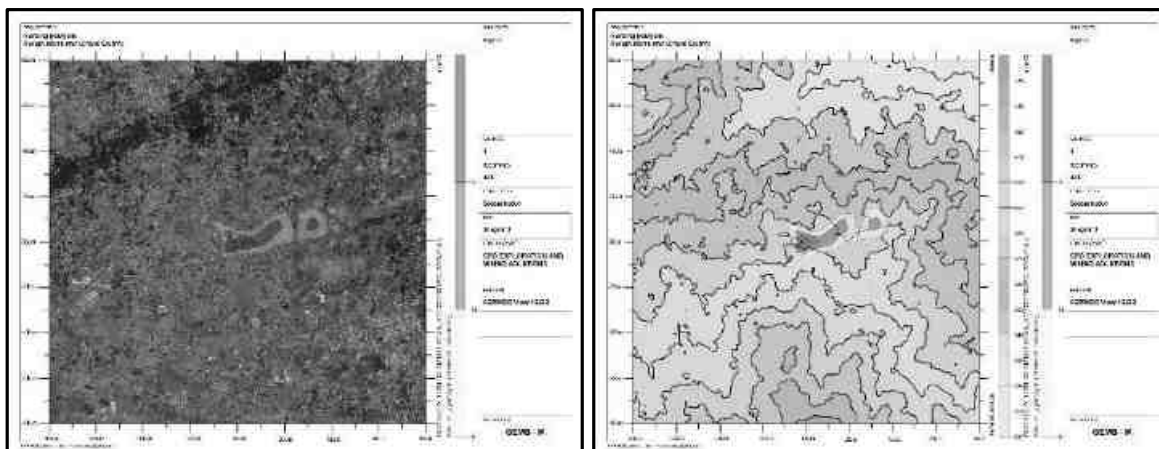
FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM_{2.5}**FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF SO₂****FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF NO_x**

FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST

4.3.2.1 Model Results

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

TABLE 4.3: INCREMENTAL & RESULTANT GLC OF PM₁₀

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ due to mining (µg/m ³)	Total PM ₁₀ (µg/m ³) (5+6)
AAQ1	11° 1'17.80"N 77°12'7.02"E	-81	-55	45.1	17.73	62.83
AAQ2	11° 1'13.48"N 77°11'58.37"E	-927	-112	44.7	14.38	59.08
AAQ3	11° 1'19.49"N 77°12'31.44"E	-1026	-1030	44.5	11.00	55.5
AAQ4	10°59'45.51"N 77°10'55.40"E	5209	2899	44.6	16.50	61.1
AAQ5	11° 4'30.38"N 77°13'3.75"E	-6729	1987	44.5	4.92	49.42
AAQ6	11° 2'56.74"N 77° 9'25.04"E	-4	-5219	44.2	0	44.2
AAQ7	10°59'4.22"N 77°13'4.74"E	-19	5102	44.1	0	44.1

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

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM _{2.5} (µg/m ³)	Incremental value of PM _{2.5} due to mining (µg/m ³)	Total PM _{2.5} (µg/m ³) (5+6)
AAQ1	11° 1'17.80"N 77°12'7.02"E	-81	-55	23.8	9.81	33.61
AAQ2	11°1'13.48"N77°11'58.37"E	-927	-112	23.7	8.00	31.7
AAQ3	11°1'19.49"N 77°12'31.44"E	-1026	-1030	24.1	6.79	30.89
AAQ4	10°59'45.51"N77°10'55.40E	5209	2899	23.9	9.04	32.94
AAQ5	11° 4'30.38"N 77°13'3.75"E	-6729	1987	23.5	3.40	26.9
AAQ6	11° 2'56.74"N 77° 9'25.04"E	-4	-5219	23.6	0	23.6
AAQ7	10°59'4.22"N 77°13'4.74"E	-19	5102	23.7	0	23.7

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF SO₂

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO ₂ (µg/m ³)	Incremental value of SO ₂ due to mining (µg/m ³)	Total SO ₂ (µg/m ³) (5+6)
AAQ1	11° 1'17.80"N 77°12'7.02"E	-81	-55	4.7	3.49	8.19
AAQ2	11° 1'13.48"N 77°11'58.37"E	-927	-112	4.9	3.00	7.9
AAQ3	11° 1'19.49"N 77°12'31.44"E	-1026	-1030	5.0	2.31	7.31
AAQ4	10°59'45.51"N 77°10'55.40"E	5209	2899	4.8	3.24	8.04
AAQ5	11° 4'30.38"N 77°13'3.75"E	-6729	1987	4.7	0.44	5.14
AAQ6	11° 2'56.74"N 77° 9'25.04"E	-4	-5219	4.8	0	4.8
AAQ7	10°59'4.22"N 77°13'4.74"E	-19	5102	4.7	0	4.7

TABLE 4.6: INCREMENTAL & RESULTANT GLC OF NO_x

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value of NO _x due to mining (µg/m ³)	Total NO _x (µg/m ³) (5+6)
AAQ1	11° 1'17.80"N 77°12'7.02"E	-81	-55	20.0	12.64	32.64
AAQ2	11° 1'13.48"N 77°11'58.37"E	-927	-112	19.3	9.79	29.09
AAQ3	11° 1'19.49"N 77°12'31.44"E	-1026	-1030	19.6	2.00	21.6
AAQ4	10°59'45.51"N 77°10'55.40"E	5209	2899	19.5	11.26	30.76
AAQ5	11° 4'30.38"N 77°13'3.75"E	-6729	1987	19.9	0	19.9
AAQ6	11° 2'56.74"N 77° 9'25.04"E	-4	-5219	19.7	0	19.7
AAQ7	10°59'4.22"N 77°13'4.74"E	-19	5102	19.8	0	19.8

From the resultant of cumulative concentration i.e., Backgr

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

4.3.4. Common Mitigation Measures for Respective Individual Proposed Projects

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

Advantages of Wet Drilling: -

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

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e., at the time lunch hours, controlled charge per hole as well as charge per round of hole

- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & Transportation –

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

Green Belt –

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

Occupational Health

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

4.4 Noise Environment (Impact & Mitigation Measures)

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. These activities will not cause any problem to the inhabitants of this area because there is no human settlement in close proximity to the project area. Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities.

Predictions have been carried out to compute the noise level at various distances around the working pit due to these major noise-generating sources. Noise modelling has been carried out to assess the impact on surrounding ambient noise levels. Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves, which are propagated outwards from the source through the air at a speed of 1,100 ft/sec, with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

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

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

Where:

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

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

$$Lp_{total} = 10 \log \{10^{(Lp_1/10)} + 10^{(Lp_2/10)} + 10^{(Lp_3/10)} + \dots\}$$

4.4.1 Anticipated Impact

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

- Source data
- Receptor data
- Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4-8.

TABLE 4.8: ACTIVITY AND NOISE LEVEL PRODUCED BY MACHINERY

Sl.No.	Machinery / Activity	Impact on Environment?	Noise Produced in dB(A) at 50 ft from source*
1	Blasting	Yes	94
2	Jack Hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total Noise Produced			95.8

*50 feet from source = 15.24 meters

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

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

TABLE 4.9: PREDICTED NOISE INCREMENTAL VALUES

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	48.2	48.2	48.9	49.3	45.4	43.2	43.99
Incremental Value dB(A)	47.30	66.12	32.14	27.43	24.25	26.48	23.84
Total Predicted Noise level dB(A)	46.30	66.19	48.99	49.33	45.43	43.29	44.03
NAAQ Standards	Industrial		Day Time- 75 dB (A)		Night Time- 70 dB (A)		
	Residential		Day Time- 55 dB (A)		Night Time- 45 dB (A)		

4.4.2 Common Mitigation Measures for Respective Individual Proposed Projects

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

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

4.4.3 Ground Vibrations

Ground vibrations due to the proposed mining activities are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc., However, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations

induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest habitation from the project area is located 330m South in Kodangipalayam village. The ground vibrations due to the blasting in proposed mine are calculated using the empirical equation.

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

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

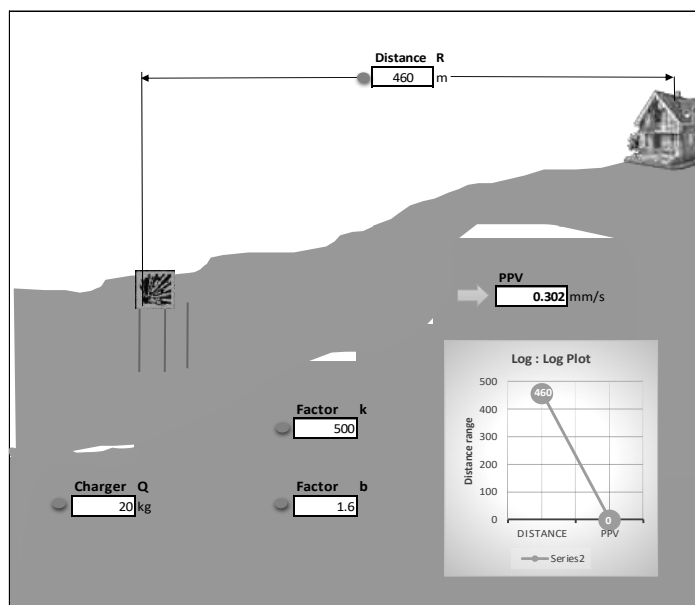
Q = maximum instantaneous charge (kg)

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

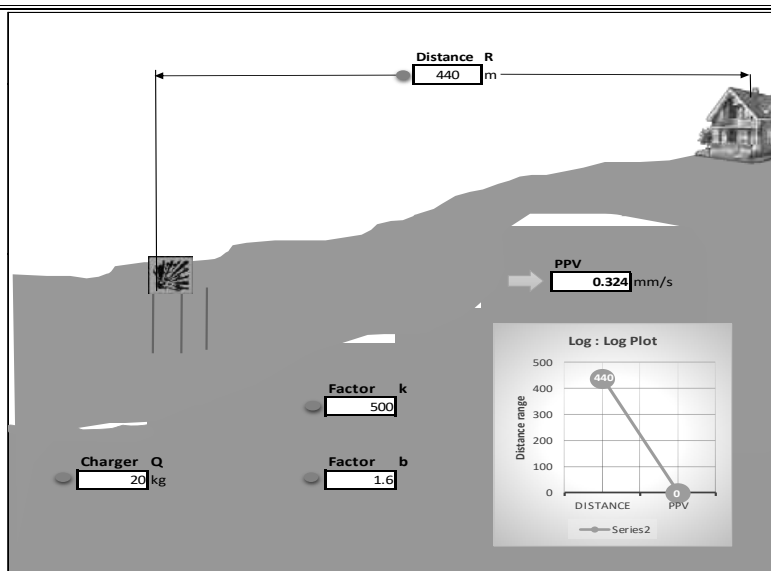
R = distance from charge (m)

TABLE 4.10: PREDICTED PPV VALUES DUE TO BLASTING

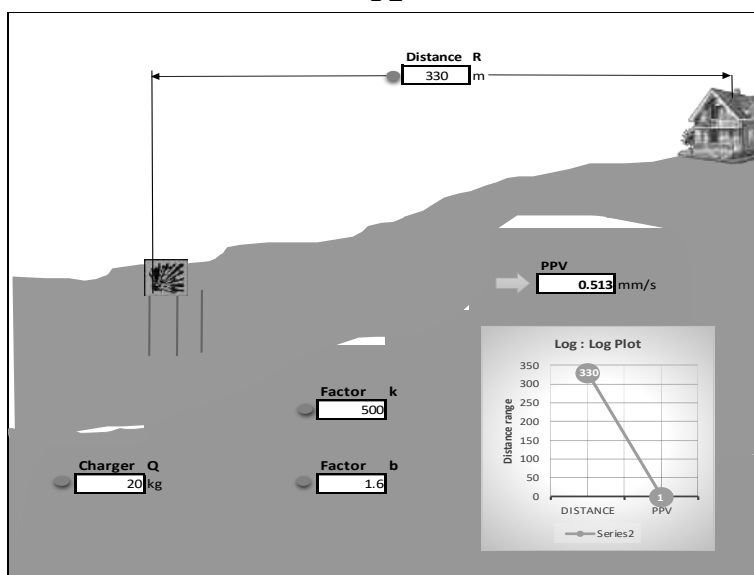
Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	20	460m-S	0.302
P2	20	440m-SE	0.324
P3	20	330m-S	0.513



P1



P2



P3

From the above, the charge per blast of Maximum 20Kg is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. It should be ensured that the explosives used for blasting at one blast should not exceed more than 2 Kg at any point of time. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.4.3.1 Common Mitigation Measures for Respective Individual Proposed Projects

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

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

4.5 Ecology and Biodiversity

Environmental impact studies are required for systematic identification, qualification, and interpretation of the anticipated changes. The main environmental problems associated with mining activities are deforestation, land degradation (change in topography, soil erosion), visual intrusion, disturbance to the hydrological system, and water, air, and noise pollution which ultimately impact the floral and faunal status of the project area. However, the occurrence and magnitude of these impacts entirely depend on project location, mode of operation, and adoption of the latest technologies.

4.5.1. Impact Identification and Evaluation

In general, impact prediction methods argue that the foremost step in impact appraisal must consider and identify project actions that are likely to bring significant changes in the project environment. The present study determined to predict the likely impacts of the Proposed Rough and Gravel Quarry mining Project in the surrounding environment with a specific focus on biological attributes covering habitats/ecosystems and associated biodiversity. Likely impacts identified were categorized into different levels like direct or primary and indirect or secondary impacts based on the influence of sources of impacts. There is no National Park or Wildlife Sanctuary in the study area. In addition, No Biosphere Reserves, Wildlife corridors, or, Tiger / Elephant reserves within 10 km of the project area. No Schedule- I species were found in the buffer zone of the proposed project area during the biodiversity assessment.

4.5.2. Impact on Flora

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

4.5.2.1. Anticipated Impact on agricultural land associated with flora

1. There are no impacts on the nearby agricultural land due to this mining activity.
2. None of the plants will be cut during the operational phase of the mine.
3. There shall be negligible air emissions or effluents from the project site. During the loading of the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

Most of the land in the buffer area is undulating terrain with croplands, grass patches, and small shrubs. Hence,

there will be no effect on the flora of the region.

4.5.3 Mitigation Measures

4.5.3.1. General Guidelines for Green Belt Development

In selecting plant species for green belt and plantation purposes in and around the proposed mine lease area native species, fruit-bearing trees, medicinal plants, and dense canopy trees should be selected. These species should be tolerant to pollution levels as per Bio- Geography zones of India.

After the operation of mining production capacity, Green belt, and Plantation species should be in accordance with the Terms and Conditions of the Environmental Clearance Green belt is created not only for the purpose of protecting sensitive areas or maintaining the ecological balance but because they also act as efficient biological filters or sinks for particulate and gaseous emissions, generated by vehicular movements and various industrial and mining activities.

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

- Plant species should be perennial and evergreen with thick canopy cover.
- The crown of the tree (mass of foliage/leaves and branches growing outward from the trunk of the tree) should be either Oblong, Round or Spreading for effective absorption of pollutant gases.
- Plants should have foliage of longer duration.
- The foliage should be freely exposed through the adequate height of the crown, Openness of foliage/leaves in the canopy, and Big leaves (long and broad laminar surfaces).

The project site should have land to develop a greenbelt in and around the limits of the mine, along roads, and another vacant area. The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. Although the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality through plantation services. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

Table No. 4.11. List of plant species proposed for Greenbelt development

S. No	Scientific name	Tamil Name
1	<i>Aegle marmelos</i>	Vilva maram
2	<i>Albizia lebbek</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limonia acidissima</i>	Vila maram
6	<i>Syzygium cumini</i>	Naval maram
7	<i>Toona ciliata</i>	Santhana Vembu
8	<i>Ficus hispida</i>	Aththi maram
9	<i>Borassus flabellifer</i>	Panai-maram

Table No. 4.12. Species suitable for abatement of noise and dust pollution

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

7	<i>Mangifera indica</i>	Manga maram
8	<i>Harwickia binata</i>	Anjan maram
9	<i>Delonix regia</i>	Neruppu Kondrai
10	<i>Cassia Fistula</i>	Sara Kondrai

The above-suggested list covers species with thick canopy cover, perennial green nature, native origin, and a large leaf area index. The proposed species will help in forming an effective barrier between the mine site area and the surroundings.

4.5.4. Anticipated Impact on Fauna

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

4.5.4.1. Measures for protection and conservation of wildlife species

- Topsoil has a large number of seeds of native plant species in the mining area.
- Checks and controls the movement of vehicles in and out of the mine.
- Undertaking mitigative measures for a conducive environment for the flora and fauna in consultation with the Forest Department.
- Plantation around the mine area will help in creating habitats for small faunal species and create a better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

4.5.5. Impact on Aquatic Biodiversity

Mining activities will not disturb the aquatic ecology as there is no effluent discharge proposed from the Rough Stone and Gravel quarry. There is no natural perennial surface water body within the mine lease area, like wetlands, rivers streams, lakes, and farmer sites. There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. There are a few seasonal water bodies located away from the proposed project site (10 km radius). Aquatic biodiversity is observed in the study area. Please refer the clause No.3.7. The project is not likely to affect the aquatic ecology.

Table No: 4.13. General Impacts vs. Mitigation Matrix

Particulars	Issues	Reason/Status in relation to the mine site	Reference/Method	Suggestions
Species	Rare/ Endangered/ Threatened species	Not reported	Field observation, interviews of local people	Nil
	Endemic Species	No endemic species of any flora, fauna or wildlife are present in the study area.	Field survey, Literature review	Nil
	Protected Areas	No National Park, Wildlife Sanctuary, Tiger reserve, and Biosphere Reserve falls in the 10-km radius study area	ENVIS, Government of Tamil Nadu protected area website, Google Earth, Project Maps, etc.	Nil
	Important Bird Areas	No Important Bird Areas are falling in the 10-km radius area for Migratory Bird Habitat	ENVIS Centre on Wildlife & Protected Areas, Important Bird Area in India, IBA Book (Birdlife International)	Nil

Important Natural Habitats	Ramsar site	No Ramsar sites present in the surrounding area region	Ramsar Web site	Nil
	Wetlands of National Importance	Nil	ENVIS Centre on Wildlife & Protected Areas, Wetlands directory of Government of India	Nil
	Wetlands of International Importance	Nil	Nil	Nil
	Wildlife Corridors	No Wildlife Corridor is falling in 10 km radius project study area	Protected Areas, Consultation with local naturalists & authenticated location map.	Nil
	Eco-sensitive zone identified by the government	No Eco-sensitive zone is falling 10 km radius project study area	ENVIS, Consultation with local naturalists & authenticated location map	Nil
	Forest Areas	No Reserve forest is falling in 10 km radius project study area	ENVIS, Government of Tamil Nadu protected area website, Google Earth, Project Maps, etc.	NIL, Applicant will create the green belt plantation on the periphery of mine sites.
	Water bodies	Nil	Project Map and local maps, Google Earth	Ensure minimum destruction during in operation phase.
	Breeding/nesting areas	No breeding/Nesting site are falling in the study area	Literature Survey Project Map and local maps, Google Earth	NIL

TABLE 4.14: GREENBELT DEVELOPMENT PLAN

PROPOSAL – P1				
Year	No. of trees proposed to be planted	Survial %	Area to be covered	Name of the species
I	850	80	Near 7.5m safety distance, panchayat road and village road	Neem, Panai , Vilvam, Ashokha etc.
PROPOSAL – P2				
Year	No. of trees proposed to be planted	Survial %	Area to be covered sq.m	Name of the species
I	645	80%	Near 7.5m safety distance, panchayat road and village road	Neem, Panai , Vilvam, Ashokha etc.
PROPOSAL – P3				
Year	No. of trees proposed to be planted	Survial %	Area to be covered sq.m	Name of the species
I	500	80%	Near 7.5m safety distance, panchayat road and village road	Neem, Panai , Vilvam, Ashokha etc.

TABLE 4.15: BUDGET FOR GREEBELT DEVELOPMENT PLAN-P1

ACTIVITY		YEAR					RATE	AMOUNT (INR)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	100	100	100	100	100	@200	Rs.1,00,000/-
	Cost	20000	20000	20000	20000	20000	Rs	

Plantation cost in approach road and panchayat road	Nos.	300	-	-	-	-	Per sapling	Rs.60,000/-
	Cost	60000	-	-	-	-		
Wire Fencing (In Mtrs) 480		1,95,000					@300 Rs Per Meter	Rs.1,95,000/-
Garland drain (In Mtrs) 400		1,20,000					@300 Rs Per Meter	Rs.1,20,000/-
TOTAL								Rs.4,75,000/-

TABLE 4.16: BUDGET FOR GREEBELT DEVELOPMENT PLAN-P2

ACTIVITY		YEAR					RATE	COST (Rs.)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	100	100	100	100	100	@200 Rs Per sapling	1,00,000/-
	Cost	20000	20000	20000	20000	20000		
Plantation in quarried out top bench	Nos.	-	-	100	100	100		60,000/-
	Cost	-	-	20000	20000	20000		
Approach road and nearby village road	Nos	100	-	-	-	-		20,000/-
Wire Fencing (In Mtrs) 500 Mtrs		150000					@300 Rs Per Meter	1,50,000/-
Garland drain (In Mtrs) 250 Mtrs		120000					@300 Rs Per Meter	1,20,000/-
TOTAL								4,50,000/-

TABLE 4.17: BUDGET FOR GREEBELT DEVELOPMENT PLAN-P3

ACTIVITY		YEARS					RATE	COST (Rs.)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	50	50	50	50	50	@200 Rs Per sapling	50,000/-
	Cost	10000	10000	10000	10000	10000		
Plantation in the quarried out top benches	Nos.	-	-	100	100	100		60,000/-
	Cost	-	-	20000	20000	20000		
Plantation in the approach road and nearby village road	Nos.	200	-	-	-	-		40,000/-
	Cost	40000	-	-	-	-		
Wire Fencing (In Mtrs) 350 Mtrs		105000					@300 Rs Per Meter	1,05,000/-
Garland Drain (In Mtrs) 300 Mtrs		90000						90,000/-
TOTAL								3,45,000/-

After complete extraction of mineral, the excavated pits will be allowed to collect rainwater and seepage water to serve as a reservoir to charge the nearby wells. Fish culture will also be attempted. A bund will be constructed around the pits. In order to minimize the impact of mining on the vegetation outside the mine lease area, it is recommended that adequate protection measures must be implemented. As mining involves movement of vehicles and increased

anthropogenic activities, some of the areas can be fenced by involving local people and educating them about increased benefits of such activities.

4.6 Socio Economic

4.6.1 Anticipated Impact from all Proposed 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

4.6.2 Common Mitigation Measures for Respective Individual Proposed Projects

- 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

4.7 Occupational Health and Safety

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

- Respiratory hazards
- Noise
- Physical hazards
- Explosive storage and handling

4.7.1 Respiratory Hazards

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

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

4.7.2 Noise

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

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

4.7.3 Physical Hazards

The following measures are proposed for control of physical hazards

- Specific personnel training on work-site safety management will be taken up;

- Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide, especially after blasting activities;
- Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level;
- Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up

4.7.4 Occupational Health Survey

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

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

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

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

4.8 Mine Waste Management

No waste is anticipated from any of the proposed quarries.

4.9 Mine Closure

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

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

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

4.9.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.9.1.1 Physical Stability

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The

design periods and factors of safety proposed should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

4.9.1.2 Chemical Stability

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

4.9.1.3 Biological Stability

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

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

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

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

CHAPTER – 5: ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 *Introduction:*

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

- This area denotes the indicative of flow pattern of the rock mass in N30°E to S30°W with dipping SE60°.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility.
- Socio – economic background.

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

5.1 Factors Behind the Selection of Project Site

Rough Stone and Gravel Cluster Quarry Projects at Kodangipalayam Village are a site specific. The proposed mining lease area has following advantages: -

- The mineral deposit occurs in a non-forest area.
- There is no habitation within the project area; hence no R & R issues exist.
- There is no river, stream, nallah and water bodies in the applied mine lease area.
- Availability of skilled, semi-skilled and unskilled workers in this region.
- All the basic amenities such as medical, 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.
- Study area falls in seismic zone – III, there is no major history of landslides, earthquake, subsidence etc., recorded in the past history.

5.2 *Analysis of Alternative Site*

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

5.3 Factors Behind Selection of Proposed Technology

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

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

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

5.4 *Analysis of Alternative Technology*

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

CHAPTER – 6: ENVIRONMENTAL MONITORING PROGRAMME

6.0 General

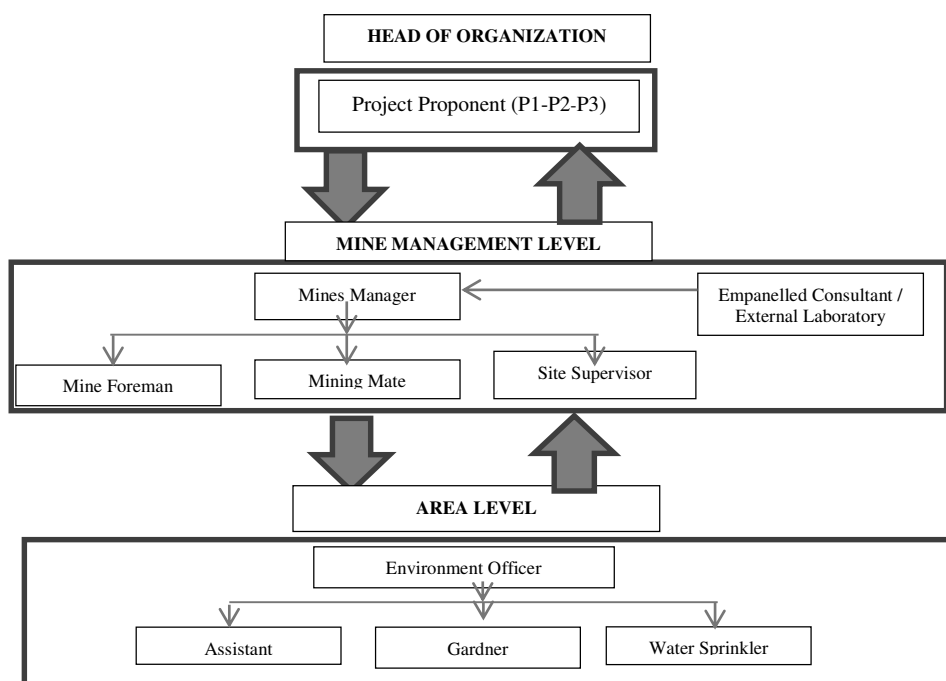
Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEF & Consent to Operate issued by the State Pollution Control Board. Monitoring reports will be submitted to regulator as per statutory requirements.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

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

6.1 Methodology of Monitoring Mechanism

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

FIGURE 6.1 ENVIRONMENTAL MONITORING CELL



The responsibilities of this cell will be:

- Implementation of pollution control measures
- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert's advice when needed

The environmental monitoring cell will co-ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies. The sampling and analysis report of the monitored environmental attributes will be submitted to the Tamil Nadu Pollution Control Board (TNPCB) at a frequency of monthly, half-yearly and yearly. The half-yearly reports will be submitted to Ministry of Environment and Forest, Regional Office and SEIAA as well.

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF & CC).

6.2 Implementation Schedule of Mitigation Measures

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

TABLE 6.1 IMPLEMENTATION SCHEDULE

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

6.3 Monitoring Schedule and Frequency

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

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil Quality; and
- Greenbelt Development

The details of monitoring are detailed in Table 6.2

TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC FOR P1 TO P3

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM _{2.5} , PM ₁₀ , SO ₂ and NO _x .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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

6.4 Environmental Policy of the Proponents

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

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

6.5 Budgetary Provision for Environmental Monitoring Programme

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

The proposed total cost for Environmental Monitoring Programme for three proposed quarries in cluster for the mining plan period is Rs 11,40,000/-

TABLE 6.3 ENVIRONMENT MONITORING BUDGET P1-P2-P3

Parameter	Sl. Nos	Capital Cost
Air Quality, Meteorology, Water Quality, Hydrology, Soil Quality Noise Quality, Vibration Study Greenbelt	P1	Rs.3,80,000/-
	P2	Rs.3,80,000/-
	P3	Rs.3,80,000/-
	Total	Rs. 11,40,000/-

Source: Approved Mining Plan

6.6 Reporting Schedules of Monitored Data

The monitored data on Air quality, Water quality, Noise levels and other environmental attributes will be periodically examined by the proponent with Environmental Monitoring cell and necessary corrective measures will be carried out. The monitoring data will be submitted to Tamil Nadu State Pollution Control Board in the Compliance to CTO Conditions & environmental audit statements every year to MoEF & CC and Half-Yearly Compliance Monitoring Reports to MoEF & CC Regional Office and SEIAA.

Periodical reports to be submitted to: -

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

Besides the Mines Manager/Agent will submit the periodical reports to –

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

CHAPTER – 7: ADDITIONAL STUDIES

7.0 General

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

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

7.1. **Public Consultation:**

Application to The Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with this Draft EIA / EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

7.2 **Risk Assessment**

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

The cluster quarry operation will be carried out under the direction of a Qualified Competent Mine manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. Factors of risks involved due to human induced activities in connection with mining & allied activities with detailed analysis of causes and control measures for the mine is given in below Table 7.1.

TABLE 7.1 RISK ASSESSMENT & CONTROL MEASURES

S. No	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries	Improper handling and unsafe working practice	▪ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations; ▪ Entry of unauthorized persons will be prohibited; ▪ Fire fighting and first-aid provisions in the mine office complex and mining area; ▪ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be 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 shall be daily done in order to avoid any overhang or undercut; ▪ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager;

			Maintenance and testing of all mining equipment as per manufacturer 's guidelines.
2	Drilling& Blasting	Due to improper and unsafe practices Due to high pressure of compressed air, hoses may burst Drill Rod may break	- Safe operating procedure established for drilling (SOP) will be strictly followed. - Only trained operators will be deployed. - No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places. - Drilling shall not be carried on simultaneously on the benches at places directly one above the other. - Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. - All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. - Operator shall regularly use all the personal protective equipment.
3	Blasting	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 While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	- Before commencing work, drivers personally check the dumper/truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. - 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 height.

7.3 Disaster Management Plan

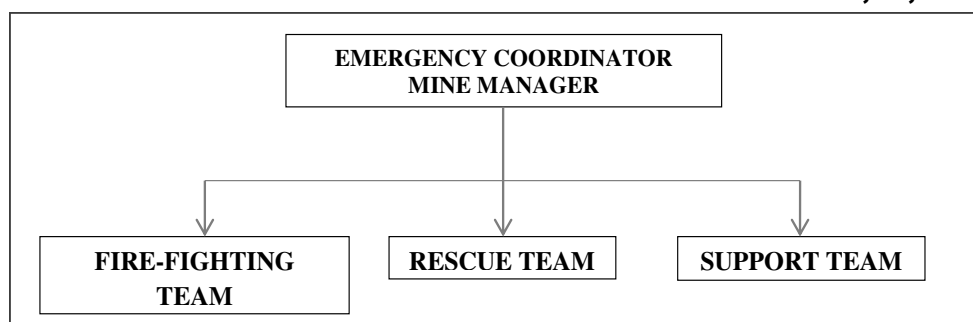
Natural disasters like Earthquake, Land slides has not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated. The Disaster Management Plan is aimed to ensure safety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

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations and the coordination among key personnel and their team has been shown in Fig 7.1.

FIGURE 7.1: DISASTER MANAGEMENT TEAM LAYOUT FOR P1,P2,P3



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

TABLE 7.2: PROPOSED TEAMS TO DEAL WITH EMERGENCY SITUATION

DESIGNATION	QUALIFICATION
FIRE-FIGHTING TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman

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

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

Roles and responsibilities of emergency team –

(a) Emergency coordinator (EC)

The emergency coordinator shall assume absolute control of site

(b) Incident controller (IC)

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

(c) Communication and advisory team

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

(d) Roll call coordinator

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

(e) Search and rescue team

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

(f) Emergency security controller

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

Emergency control procedure –

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

- On site fire crew led by a fireman will arrive at the site of incident with fire foam tenders and necessary equipment.
- Emergency security controller will commence his role from main gate office

- Incident controller shall rush to the site of emergency and with the help of rescue team and will start handling the emergency.
- Site main controller will arrive at MECR with members of his advisory and communication team and will assume absolute control of the site.
 - He will receive information continuously from incident controller and give decisions and directions to:
 - Incident controller
 - Mine control rooms
 - Emergency security controller

Proposed fire extinguishers at different locations

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

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

Alarm system to be followed during disaster –

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

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

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

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

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

7.4 CUMULATIVE IMPACT STUDY

There are Six (6) proposed and six (6) existing quarries, 1 abandoned & expired quarry falls in the cluster. The list of quarries is as below –

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

*PROPOSED QUARRIES				
CODE	Name of the Proponent and Address	S.F. Nos & Village	Extent in Ha	Status
P1	Thiru.R.Gunasekar	103/3B2&Kodangipalayam Village	1.69.5Ha	Obtained ToR vide, File No.11124 TOR Identification No. TO24B0108TN5770490N Dated: 21.09.2024.
P2	Thiru.P.Gowtham Rathinam	91/1A (P)&Kodangipalayam Village,	1.29.0 Ha	Obtained ToR vide, File No.11708 TOR Identification No TO25B0108TN5264313N Dated: 01.03.2025
P3	Thiru.D.R.Karuppusamy	102/2B&Kodangipalayam Village	1.00.11 Ha	Obtained ToR vide, File No.11106 TOR Identification No TO24B0108TN5808597N Dated: 06.03.2025 – P3
P4	Thiru.V.Kangesan	103/3A1A (P), 103/3A2,103/3B1&Kodangipalayam Village	1.81.0 Ha	Applied for quarry lease
P5	Thiru.R.Subramaniyan	114/1B & Kodangipalayam	1.99.5 Ha	Applied for quarry lease
P6	Thiru.P.Vasanthamani	91/A& Kodangipalayam	1.72.0 Ha	Applied for quarry lease
	Total		9.51.11 Ha	
*EXISTING QUARRIES				
CODE	Name of the Proponent and Address	S.F.Nos , Village & Taluk	Extent in Ha	Lease Period
E-1	Thiru.D.R.Karuppusamy	102/1	1.32.5	28.02.2022 to 27.02.2027
E-2	Thiru.D.R.Karuppusamy	89/2a, 89/3	1.19.0	26.08.2022 to 27.08.2027
E-3	Thiru.V.Prakash	113/6	0.86.0	20.09.2019 to 19.09.2024
E-4	Tmt.M.Subbathal	114/2C, 114/2D etc	1.82.0	28.12.2022 to 27.12.2027
E-5	Thiru.M.Venkatesh	114/1A,115/1B,115/2	2.25.5	14.12.2023 to 13.12.2028
E-6	Thiru.K.M.Chinnasamy	89/4B(P)	2.42.0	28.12.2023 to 27.12.2028
Total			9.87.0Ha	
ABANDONED/EXPIRED QURRIES				
CODE	Name of the Proponent and Address	S.F. Nos, Village & Taluk	Extent in Ha	Lease Period
Ex-1	Tmt.P.Vijayalakshmi	116/3B (P)	0.70.0	03.10.2018 to 02.10.2023
	Total		0.70.0Ha	
*TOTAL CLUSTER EXTENT			19.38.11 Ha	

Note: -

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

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

TABLE 7.4: SALIENT FEATURES OF THE PROPOSED PROJECTS IN CLUSTER

SALIENT FEATURES OF PROPOSAL “P1”	
Name of the Mine	Thiru.R.Gunasekar Rough Stone & Gravel Quarry
Land type & details	It is a Patta land classified as punjai (Barren land) It is a Patta land, registered in the name of applicant Thiru.R. Gunasekar vide patta no.1838
Previous Land Ownership details	It is a fresh application. But the applied area has been considered quarrying operation earlier

	S.No	Name of Lessee	Ditric collector's Proceeding Number and date	Lease Period
	1	Tmt.Ashwini Bala	Rc.No.2473/2005/X1 Dated: 17.12.2005	27.02.2006 to 26.02.2011
	2	Tmt.Ashwini Bala	Rc.No.128/Mines/2011 Dated: 07.03.2012	07.03.2012 To 06.03.2017
			Premature Termination vide proceedings Rc.No.105/Mines/2016, dated: 04.11.2016	
3	Thiru.R.Gunasekar	Rc.no.737/Mines/2016, Dated: 16.04.2018	16.04.2018 to 15.04.2023	
S.F. Nos	103/3B2			
Extent	1.69.5 Ha			
Maximum dimension of the existing quarry pit	Pit1: 134m (L) x 114m (W) x 27m(D)			
Geological Reserves	Rough Stone		Gravel	
	413646m³		26484m³	
Mineable Reserves	Rough Stone		Gravel	
	94735m³		20252m³	
Proposed Quantity of Reserves/Production for mining Period	94735m³		20252m³	
Mining Plan Period / Lease Period	5 Years			
Ultimate Pit Dimension	167m (L) x 114m (W) x 37m (D) Max			
Proposed Depth of mining	37m			
Toposheet No	58 E/04			
Latitude	11°01'17.20"N to 11°01'22.10"N			
Longitude	77°12'01.36"E to 77°12'07.77"E			
Elevation	391m Amsl.			
Water table depth	The Ground water occurrence in this area is 58-62m depth below the ground level.			
Previous obtained Environmental Clearance	DEIAA-TPR/F.No.601/3(III)/2017 Dated:08.03.2018			
Machinery proposed	Jack Hammer		4	
	Compressor		1	
	Excavator with Bucket and Rock Breaker		1	
	Tipper		3	
Blasting	Usage of Slurry Explosive with MSD detonators			
Water Bodies	Odai		600m East	
	Odai		1km SW	
	Odai		3km East	
	Samalapuram Lake		5.4km North	
	Noyyal River		5.8km NW	
	Sendevipalayam Check Dam		5.8km NW	
Water requirement & source	Total water requirement for 1.5KLD from from existing, bore wells and drinking water will be sourced from Approved water vendors.			
Manpower Deployment	18 Nos			
Total Project Cost	Operational Cost		Rs. 1,29,43,000/-	

	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 1,33,23,000/-
CER cost	Rs.5,00,000/-	
Nearest Habitation	460m-S	

Source: Approved Mining Plan of the respective proposals

SALIENT FEATURES OF PROPOSAL “P2”					
Name of the Mine	Thiru.P.Gowtham Rathinam Rough Stone & Gravel Quarry				
Land type & details	It is a Patta land. S.F. Nos 91/A(P) are jointly registered in the name of Tmt.P. Vasanthamani, Thiru.P. Mohan Rathinam and thiru.P. Gowtham Rathinam. vide patta no.1191. The applicant has obtained consent from the other pattadars				
Previous Land Ownership details	It is a fresh application. But the applied area has been considered quarrying operation earlier				
	S.No	Name of Lessee	S.F.No & Extent	Ditric collector’s Proceeding Number and date	Lease Period
	1	Thiru.R.Palanisamy	91/1(A) & 4.07.0	-	-
	2	Thiru.R.Palanisamy	91/1(A) & 4.07.0	Rc.No.2414/2005/X1 Dated: 19.12.2005	19.12.2005 to 18.12.2010
	3	Thiru.R.Palanisamy	91/1(A) & 4.07.0	Rc.no.20/Mines/2011, Dated: 02.09.2011	02.09.2011 to 01.09.2016
	4	Tmt.P.Vasanthamani	91/1(A) & 1.72.0	Rc.no.345/Mines/2016, Dated: 10.11.2017	10.11.2017 to 09.11.2022
S.F. Nos	91/1A (P)				
Extent	1.29.0 Ha				
Maximum dimension of the existing quarry pit	Pit I : 28m (L) x 47m (W) x 1.5m Bgl (D)				
Geological Reserves	Rough Stone			Gravel	
	449120m³			30281m³	
Mineable Reserves	Rough Stone			Gravel	
	1,35,250 m³			23.205.5 m³	
Proposed Quantity of Reserves /Production for mining Period	1,35,250 m³			23.205.5 m³	
Mining Plan Period / Lease Period	5 Years				
Ultimate Pit Dimension	103m (L) x 108m (W) x 37m Bgl (D) Max				
Proposed Depth of mining	37m below ground level				
Toposheet No	58 E/04				
Latitude	11°01'17.11"N to 11°01'21.30"N				
Longitude	77°12'11.91"E to 77°12'16.47"E				
Elevation	402m Amsl.				
Water table depth	The Ground water occurrence in this area is 68m depth below the ground level.				
Previous obtained Environmental Clearance	SEIAA-TN/F.No.5789/EC/1(a)/ No:3940/2016 Dated:14.07.2017				

Machinery proposed	Jack Hammer	4
	Compressor	1
	Excavator with Bucket and Rock Breaker	1
	Tipper	2
Blasting	Usage of Slurry Explosive with MSD detonators	
Water Bodies	Odai	350m East
	Odai	1.3km SW
	Odai	2.7km East
	Samalapuram Lake	5.5km North
	Noyyal River	6.0km NW
	Sendevipalayam Check Dam	6.2km NW
Water requirement & source	Total water requirement for 1.6KLD from from existing, bore wells and drinking water will be sourced from Approved water vendors.	
Manpower Deployment	19 Nos	
Total Project Cost	Operational Cost	Rs. 61,02,000/-
	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 64,82,000/-
CER cost	Rs.5,00,000/-	
Nearest Habitation	440m-SE	

Source: Approved Mining Plan of the respective proposals

SALIENT FEATURES OF PROPOSAL “P3”		
Name of the Mine	Thiru.D.R.Karuppusamy Rough Stone & Gravel Quarry	
Land type & details	It is a Patta land, Registered in the name of the applicant D.R.Karuppusamy S/o Rangasamy vide patta no.3143	
S.F. Nos	102/2B	
Extent	1.00.11 Ha	
Geological Reserves	Rough Stone	Gravel
	296280m ³	19752m ³
Mineable Reserves	Rough Stone	Gravel
	96110m ³	14196 m ³
Proposed Quantity of Reserves /Production for mining Period	96110m ³	14196 m ³
Mining Plan Period / Lease Period	5 Years	
Ultimate Pit Dimension	Pit1: 161m (L) x 48m (W) x 32m Bgl (D)	
Proposed Depth of mining	32m (2m Gravel + 30m Rough stone) below ground level	
Toposheet No	58 E/04	
Latitude	11°01'12.60"N to 11°01'14.87"N	
Longitude	77°11'57.79"E to 77°12'04.06"E	
Elevation	395m Amsl.	
Water table depth	The Ground water occurrence in this area is 58-62m depth below the ground level.	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Excavator with Bucket and Rock Breaker	1
	Tipper	2
Blasting	Usage of Slurry Explosive with MSD detonators	
Water Bodies	Odai	700m East
	Odai	920m SW
	Odai	3.1km East
	Samalapuram Lake	5.6km North
	Noyyal River	6km NW

	Sendevipalayam Check Dam	6km NW
Water requirement & source	Total water requirement for 2.0KLD from from existing, bore wells and drinking water will be sourced from Approved water vendors.	
Manpower Deployment	20 Nos	
Total Project Cost	Operational Cost	Rs.75,28,000/-
	EMP Cost	Rs.3,80,000/-
	Total Project cost	Rs.79,08,000/-
CER cost	Rs.5,00,000/-	
Nearest Habitation	330m-South	

Source: Approved Mining Plan of the respective proposals

SALIENT FEATURES OF EXISTING “P4		
Name of the Quarry	Thiru.V.Gangesan Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11 01'19.75" N to 11 01'25.26" N	
Longitude between	77 12'02.02" E to 77 12'7.38" E	
Geological Resources	Rough Stone in m ³	Gravel m ³
	259467	-
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	105830	2116
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs.35,00,000/-	
CER Cost	Rs. 5,00,000/-	

SALIENT FEATURES OF EXISTING “P5		
Name of the Quarry	Thiru.R.Subramaiyan Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11 01'25.60" N to 11 01'32.38" N	
Longitude between	77 11'50.15" E to 77 11'54.74" E	
Geological Resources	Rough Stone in m ³	Gravel m ³
	505480	10032
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	76420	8400
Ultimate Pit Dimension	140(L)* 114(W)*62(D)	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer	3 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	16 Nos	
Project Cost	Rs.1,12,96,000/-	
CER Cost	Rs. 5,00,000	

SALIENT FEATURES OF EXISTING “E1”

Name of the Quarry	D.R. Karuppasamy Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11°01'14.66"N to 11°01'18.64"N	
Longitude between	77°11'58.01"E to 77°12'02.17"E	
Highest Elevation	382 m AMSL	
Proposed Depth of Mining	42 m bgl (2 m Gravel + 40 m Rough Stone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	4,90,834	11,994
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	1,33,300	7,200
Ultimate Pit Dimension	104 m (L) * 96 m (W) * 42 m (D)	
Water Level in the surrounds area	58 – 62 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards northern side. The altitude of the area is 382 m (max) above mean sea level. The area is covered by 2 m thickness of Gravel Formation. Massive Charnockite is found after 2 m (Gravel Formation) which is clearly inferred from the nearby existing quarrying pit.	
Machinery proposed	Jack Hammer	3 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	2 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	17 Nos	
Project Cost	Rs. 55,36,000/-	
CER Cost @ 2% of Project Cost	Rs. 1,10,720/-	
Nearby Water Bodies	Kuttai	1.13 km South East
	Odai	3.89 km north East
	Sulur Lake	7.62 km North West
	Samalapuram Lake	5.68 km North East
	Noyyal river	5.92 km North West
Greenbelt Development Plan	Proposed to plant 200 trees in 2000 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	2 KLD	
Nearest Habitation	760 m South West	

SALIENT FEATURES OF EXISTING “E2

Name of the Quarry	D.R. Karuppasamy Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11°01'25.92"N to 11°01'29.06"N	
Longitude between	77°12'06.68"E to 77°12'15.67"E	
Highest Elevation	383 m AMSL	
Proposed Depth of Mining	17 m bgl (2 m Gravel + 15 m Rough Stone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	1,78,500	23,800
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	49,430	5,040
Ultimate Pit Dimension	210 m (L) * 31 m (W) * 17 m (D)	
Water Level in the surrounds area	58 – 62 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards northern side. The altitude of the area is 383 m (max) above mean sea level. The area is covered by 2 m thickness of Gravel Formation. Massive Charnockite is found after 2 m (Gravel Formation) which is clearly inferred from the nearby existing quarrying pit.	
Machinery proposed	Jack Hammer	3 Nos

	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	15 Nos	
Project Cost	Rs.82, 02,255/-	
CER Cost @ 2% of Project Cost	Rs. 1,64,051/-	
Nearby Water Bodies	Kuttai	1.19 km South East
	Odai	3.45 km North East
	Sulur Lake	7.80 km North West
	Samalapuram Lake	5.34 km North
	Noyyal river	5.76 km North West
Greenbelt Development Plan	Proposed to plant 275 trees in 2500 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	3.5 KLD	
Nearest Habitation	590 m North East	

SALIENT FEATURES OF EXISTING “E3

Name of the Quarry	V.Prakash Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11°01'33.74"N to 11°01'31.04"N	
Longitude between	77°11'59.05"E to 77°11'54.94"E	
Geological Resources	Rough Stone in m ³	Gravel m ³
	3,01,000	34,400
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	50,487	264
Ultimate Pit Dimension	96 (L) * 63 (W) * 39 (D)	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	13 Nos	
Project Cost	Rs.45,22,000/-	
CER Cost @ 2% of Project Cost	Rs. 90,440/-	

SALIENT FEATURES OF EXISTING “E4

Name of the Quarry	Tmt. M. Subbathal Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11°01'25.03"N to 11°01'31.60"N	
Longitude between	77°11'54.95"E to 77°11'59.49"E	
Highest Elevation	385 m AMSL	
Proposed Depth of Mining	42 m bgl (2 m Gravel + 43 m Rough Stone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	5,59,906	15,292
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	34,063	1,470
Ultimate Pit Dimension	139 m (L) * 69 m (W) * 42 m (D)	
Water Level in the surrounds area	58 – 62 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards northern side. The altitude of the area is 385 m (max) above mean sea level. The area is covered by 2 m thickness of Gravel Formation. Massive	

	Charnockite is found after 2 m (Gravel Formation) which is clearly inferred from the nearby existing quarrying pit.	
Machinery proposed	Jack Hammer	1 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	11 Nos	
Project Cost	Rs. 95,67,000/-	
CER Cost @ 2% of Project Cost	Rs. 1,91,340/-	
Nearby Water Bodies	Kuttai	1.45 km South East
	Odai	3.93 km South East
	Sulur Lake	7.50 km North West
	Samalapuram Lake	5.33 km North East
	Noyyal river	5.54 km North West
Greenbelt Development Plan	Proposed to plant 400 trees in 3900 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	3.5 KLD	
Nearest Habitation	600 m North West	

SALIENT FEATURES OF EXISTING “E5		
Name of the Quarry	M. Venkatesh Rough Stone & Gravel Quarry	
Proposal Type	Existing Quarry – Fresh Lease	
Existing Pit Dimension	112 m (L)* 85 m (W)*36 m (D)	
Toposheet No	58-E/04	
Latitude between	11° 01' 26.88"N to 11° 01' 31.04"N	
Longitude between	77° 11' 44.03"E to 77° 11' 51.66"E	
Highest Elevation	373 m AMSL	
Proposed Depth of Mining	52 m bgl (2 m Gravel + 50 m Rough Stone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	7,18,956	17,664
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	1,17,664	8,174
Ultimate Pit Dimension	183 m (L) * 90 m (W) * 52 m (D)	
Water Level in the surrounds area	73 – 78 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards northern side. The altitude of the area is 373 m (max) above mean sea level. The area is covered by 2 m thickness of Gravel Formation. Massive Charnockite is found after 2 m (Gravel Formation) which is clearly inferred from the existing quarrying pit.	
Machinery proposed	Jack Hammer	3 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	2 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	19 Nos	
Project Cost	Rs. 2,49,45,000 /-	
CER Cost @ 2% of Project Cost	Rs. 4,99,000/-	
Nearby Water Bodies	Kuttai	1 km SE
	Odai	4 km NE
	Samalapuram Lake	5.2 km North
	Noyyal River	5.8 km SW
	Sulur Lake	8.2 km West

Greenbelt Development Plan	Proposed to plant 150 trees in 1200 Sq.m area in the 7.5 m Safety Zone
Proposed Water Requirement	4.5 KLD
Nearest Habitation	570 m North

SALIENT FEATURES OF EXISTING “E6		
Name of the Quarry	K.M. Chinnaswamy Rough Stone & Gravel Quarry	
Toposheet No	58-E/04	
Latitude between	11 01'17" N to 11 01'24" N	
Longitude between	77 12'08" E to 77 12'14" E	
Geological Resources	Rough Stone in m ³	Gravel m ³
	7,26,000	48,400
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	94,375	1,782
Ultimate Pit Dimension	137(L)* 125(W)*22(D)	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	13 Nos	
Project Cost	Rs.56,26,000/-	
CER Cost @ 2% of Project Cost	Rs. 1,12,520/-	

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

Impact on Air Environment –

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

TABLE 7.5 CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Production for five-year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day @ 12m ³ per load
P1	94735	18947	63	5
P2	135250	27050	90	7
P3	96110	19222	64	5
P4	105830	21166	71	6
P5	76420	15284	51	4
P6	-	-	-	-
Total	413610	101669	339	27
E-1	133300	26660	89	7
E-2	49430	9886	33	3
E-3	50487	10097	34	3
E-4	34063	6812	23	2
E-5	117664	23533	78	7
E-6	94375	18875	63	5
Total	479319	95863	320	27
G.Total	892929	197532	659	54

TABLE 7.6: CUMULATIVE PRODUCTION OF GRAVEL IN CLUSTER

Quarry	Mineable Reserves in m ³	Per Year Production in m ³	Per Day in m ³	Number of Lorry Load @ 12m ³ per load
P1	20252	6751	23	2

P2	23205.5	7735	26	2
P3	14196	4732	16	1
P4	2116	705	2	1
P5	8400	2800	9	1
P6	-	-	-	-
Total	68169.5	22723	76	7
E-1	7200	2400	8	1
E-2	5040	1680	6	1
E-3	264	264	1	1
E-4	1470	490	2	1
E-5	8174	2725	9	1
E-6	1782	594	2	1
Total	23930	8153	28	6
G.Total	92099.5	30876	104	13

Source: Approved Mining plans of the respective projects (Blue color shade is Proposed quarries)

Based on the above production quantities the emissions due to various activities in all the 3-proposal quarry various activities like ground preparation, excavation, handling and transport of mineral. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 7.7.

TABLE 7.7: EMISSION ESTIMATION FROM CLUSTER

EMISSION ESTIMATION FOR QUARRY “P1”- Thiru.R.Gunasekar				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.066416896	g/s
	Blasting	Point Source	0.000312613	g/s
	Mineral Loading	Point Source	0.040809061	g/s
	Haul Road	Line Source	0.002488859	g/s/m
	Overall Mine	Area Source	0.048124952	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000420055	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000016323	g/s
EMISSION ESTIMATION FOR QUARRY “P2”- Thiru.P.Gowtham Rathinam				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.070147791	g/s
	Blasting	Point Source	0.000410851	g/s
	Mineral Loading	Point Source	0.039947163	g/s
	Haul Road	Line Source	0.002487571	g/s/m
	Overall Mine	Area Source	0.042995141	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000349746	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000010606	g/s
EMISSION ESTIMATION FOR QUARRY “P3”- Thiru.D.R.Karuppusamy				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.063827944	g/s
	Blasting	Point Source	0.000256253	g/s
	Mineral Loading	Point Source	0.038771956	g/s
	Haul Road	Line Source	0.002486174	g/s/m
	Overall Mine	Area Source	0.038641909	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000253175	g/s
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000006090	g/s

Source: Emission Formula

TABLE 7.8: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM ₁₀ in µg/m ³	
Location	AAQ1 – CORE
Background (average)	45.7

Highest Incremental	9.87
Resultant	55.6
NAAQ Norms	100 µg/m ³
PM2.5 in µg/m ³	
Background (average)	22.8
Highest Incremental	4.79
Resultant	27.6
NAAQ Norms	60 µg/m ³
SO ₂ in µg/m ³	
Location	AAQ1 – CORE
Background (average)	8.0
Highest Incremental	1.19
Resultant	9.2
NAAQ Norms	80 µg/m ³
NO _x in µg/m ³	
Location	AAQ1 – CORE
Background (average)	24.9
Incremental	7.85
Resultant	32.8
NAAQ Norms	80 µg/m ³

Noise Environment –

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

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

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

Where:

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

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

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

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

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

TABLE 7.9: PREDICTED NOISE INCREMENTAL VALUES FROM MINES

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	48.2	48.2	48.9	49.3	45.4	43.2	43.99
Incremental Value dB(A)	47.30	66.12	32.14	27.43	24.25	26.48	23.84
Total Predicted Noise level dB(A)	46.30	66.19	48.99	49.33	45.43	43.29	44.03
NAAQ Standards	Industrial		Day Time- 75 dB (A)		Night Time- 70 dB (A)		
	Residential		Day Time- 55 dB (A)		Night Time- 45 dB (A)		

Source: Lab Monitoring Data

The incremental noise level is found within the range of 23.84 – 32.14dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per The Noise Pollution (Regulation And Control) Rules, 2000 (The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.).

Ground Vibrations

Ground vibrations due to mining activities in the all the 3-proposal quarry within cluster are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from the all the 2 proposal quarries is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining areas and may cause injury to persons or damage to the structures. Nearest Habitations from 8 mines respectively are as in below Table 7.9

TABLE 7.10: NEAREST HABITATION FROM EACH MINE

Location ID	Distance in Meters
Habitation Near P1	460m- S
Habitation Near P2	440m-SE
Habitation Near P3	330m-S
Habitation Near P4	660m-SE
Habitation Near P5	520m-N
Habitation Near P6	-
Habitation Near E1	760 m SW
Habitation Near E2	590 m NE
Habitation Near E3	500m-N
Habitation Near E4	600m-NW
Habitation Near E5	570m-N
Habitation Near E6	640m-SE

Source: Satellite Imagery and Field Data

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

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

TABLE 7.11: GROUND VIBRATIONS AT 3 MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	20	460m- S	0.302
P2	20	440m-SE	0.324
P3	20	330m-S	0.513

Source: PPV Calculation

From the above table, the charge per blast is considered as maximum in each mine and the resultant PPV is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Socio Economic Environment –

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

TABLE 7.12: SOCIO ECONOMIC BENEFITS FROM 3MINES

Location Code	Employment	Project Cost	CER
P1	18	Rs. 1,33,23,000/-	Rs.5,00,000
P2	19	Rs. 64,82,000/-	Rs.5,00,000
P3	20	Rs.79,08,000/-	Rs.5,00,000
P4	18	Rs.35,00,000/-	Rs.5,00,000
P5	16	Rs.1,12,96,000/-	Rs.5,00,000
P6	-	-	-
E1	17	Rs. 55,36,000/-	Rs.110,720/-
E2	15	Rs.82, 02,255/-	Rs.164,045/-
E3	13	Rs.45,22,000/-	Rs.90,440/-
E4	11	Rs. 95,67,000/-	Rs.191,340/-
E5	19	Rs. 2,49,45,000 /-	Rs.4,98,900/-
E6	13	Rs.56,26,000/-	Rs.112,520/-
Total	179	10,09,07,255	Rs. 36,67,965/-

A total of 179 people will get employment due to 12 mines Proposal and Existing in cluster. Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018 by all the mines.

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

- 6 mines Proposed projects shall fund towards CER – **Rs 25,00,000/-**

TABLE 7.13: GREENBELT DEVELOPMENT BENEFITS FROM CLUSTER MINES

CODE	No of Trees proposed to be planted	Area Covered Sq.m	Name of the Species
P1	850	Near 7.5m safety distance, panchayat road and village road	Neem, Vilvam, Ashokha, Panai, etc.,
P2	645		
P3	500		
P4	905		
P5	1000		
P6	860		
Total	4760		
E1	265		
E2	238		
E3	172		
E4	364		
E5	451		
E6	484		
Total	1974		
G. Total	6734		

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Neem, Vilvam, Panai, Ashokha etc in the Cluster at a rate of 6734 Trees Planted over a period of 5 Years with Survival Rate of 80%

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR P1, P2 & P3

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.

Objective –

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

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

TABLE 7.14: ACTION PLAN TO MANAGE PLASTIC WASTE

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

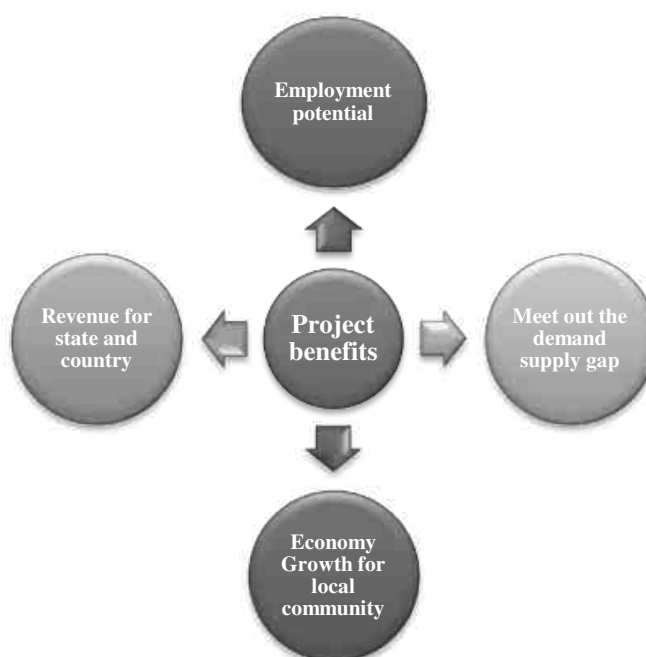
Source: Proposed by FAE's and EC

CHAPTER – 8: PROJECT BENEFITS

8.0 General

The three Proposed Projects for Quarrying Rough Stone and Gravel at Kodangipalayam Village aims to produce cumulatively 3,26,095m³ Rough Stone over a period of 5 Years & 57,653.5m³ of Gravel over a period of 1-2 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 62 persons for carrying out mining operations and give preference to the local people in providing employment. In addition, there will be opportunity for indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

8.2 Socio-Economic Welfare Measures Proposed

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

8.3 Improvement in Physical Infrastructure

The proposed project site is located in Kodangipalayam Village, Palladam Taluk, Tiruppur District of Tamil Nadu and area have communications, roads and other facilities already well established. The following physical infrastructure facilities will further improve due to the cluster quarry projects.

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

8.4 Improvement in Social Infrastructure

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

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

8.5 Other Tangible Benefits

The proposed quarry project is likely to have other tangible benefits as given below.

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

CORPORATE SOCIAL RESPONSIBILITY

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

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 10 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas –

- Health Services
- Social Development
- Infrastructure Development
- Education & Sports
- Self-Employment

CSR Cost Estimation

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

CORPORATE ENVIRONMENT RESPONSIBILITY–

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018.

As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is ≤ 100 crores, they shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC and the total CER amount from the 3 proposed mines is Rs. 15,00,000/-.

TABLE 8.1 CER – ACTION PLAN

Code	CER
P1	Rs 5,00,000/-
P2	Rs 5,00,000/-
P3	Rs 5,00,000/-
Total	Rs.15,00,000/-

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

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER - 10: ENVIRONMENTAL MANAGEMENT PLAN – P1

10.0 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 of 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 **Thiru.R. Gunasekar** will –

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

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of each Proposed Quarry.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies
- Collection of health statistics of the workers and population of the surrounding villages
- Green belt development
- Monitoring the progress of implementation of the environmental monitoring programme

- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.2 Land Environment Management –

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

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

TABLE 10.1: PROPOSED CONTROLS FOR LAND ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.3 Soil Management

Top Soil Management –

- There is no topsoil for this project site.

Overburden / Waste and Side Burden Management –

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

TABLE 10.2: PROPOSED CONTROLS FOR SOIL MANAGEMENT

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

Test soils for pH, EC, chloride, exchangeable cations, particle size and water holding capacity	Mines Manager
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Source: Proposed by FAE's & EIA Coordinator

10.4 Water Management

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

The quarrying operation is proposed upto a depth of 30 m BGL, the water table in the area is 70m – 65m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3: PROPOSED CONTROLS FOR WATER ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.5 Air Quality Management

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

TABLE 10.4: PROPOSED CONTROLS FOR AIR ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.6 Noise Management

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

TABLE 10.5: PROPOSED CONTROLS FOR NOISE ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.7 Ground Vibration and Fly Rock Control

TABLE 10.6: PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAE's & EIA Coordinator

10.8 Biological Environment Management

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

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

- Greenbelt development all along the safety barrier of the project area
- It is also proposed to implement the greenbelt development programme and post plantation status will be regularly checked for every season.

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

10.8.1 Green Belt Development Plan

About 840 nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7 PROPOSED GREENBELT ACTIVITIES FOR 5 YEAR PLAN PERIOD – P1

PROPOSAL – P1			
Year	No. of trees proposed to be planted	Area to be covered	Name of the species
I	840	Near 7.5m safety distance, panchayat road and village road	Neem, Vilvam, Ashokha, Panai etc.,

Source: Conceptual Plan of Approved Mining plan & proposed by FAE's & EIA Coordinator

The objectives of the greenbelt development plan are –

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

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

10.8.2 Species Recommended for Plantation

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

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

TABLE 10.8: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT – P1

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

Source: Proposed by FAE's & EIA Coordinator

10.9 Occupational Safety & Health Management

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

10.9.1 Medical Surveillance and Examinations –

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

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

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

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

TABLE 10.9: MEDICAL EXAMINATION SCHEDULE – P1

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

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

10.9.2 Proposed Occupational Health and Safety Measures –

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

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

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS – P1



10.9.3 Health and Safety Training Programme

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

TABLE 10.10: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES – P1

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation

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

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

10.9.4 Budgetary Provision for Environmental Management –

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

TABLE 10.11: EMP BUDGET FOR PROPOSED PROJECT – P1

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	16950	16950
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed Sprinkler Installation and New Water Tanker Cost for Capital; and Water Sprinkling (thrice a day) Cost for recurring	800000	50000
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance - 4 Units	100000	10000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per Tipper/Dumper deployed - 3 Units	15000	750
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000

	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	33900
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Compentent Person	0	0
	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	246311
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and	5000	20000

		disposal through authorized agency		
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Mine Closure	1. Progressive Closure Activity - Surface Runoff managent	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	16950	5000
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum	339000	10000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 850 Trees - 600 Inside Lease Area & 250 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)	120000	18000
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	75000	7500

	4. Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 15% of the proposed closure cost will be spent during the final mine closure stage - Last Year	71250	0
	5. Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budge and not necessarily implemented in the Project Site	852615	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
	Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 23 Employees	92000	23000
	Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	23000

	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	3390
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	84750	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR, 1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoeEF & CC OM	500000	0
TOTAL			2319650	1364801

In order to implement the environmental protection measures, an amount of Rs.23.19 lakhs as capital cost and recurring cost as Rs. 13.64 lakhs as recurring cost is proposed considering present market price considering present market scenario for the proposed project.

<u>Year Wise Break Up</u>	
1st Year	₹ 36,84,451
2nd Year	₹ 14,33,041
3rd Year	₹ 15,04,693

4th Year	₹ 15,79,928
5th Year	₹ 17,30,174
Total	Rs. 99 lakhs

10.10 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 - 10: ENVIRONMENTAL MANAGEMENT PLAN – P2

10.1 General

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of Environmental Management plan will ensure to keep all the environmental parameters of the project in respect of Ambient Air quality, Water quality, Socio – economic improvement standards.

Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.2 Environmental Policy

The Project Proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance.

The Proponent **Thiru.P. Gowtham Rathinam** will –

- Allocate necessary resources to ensure the implementation of the environmental policy
- 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
- 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 programmes to provide early warning of any deficiency or unanticipated performance in environmental safeguards
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of each Proposed Quarry.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies
- Collection of health statistics of the workers and population of the surrounding villages
- Green belt development
- Monitoring the progress of implementation of the environmental monitoring programme

- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.3 Land Environment Management –

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

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

TABLE 10.1: PROPOSED CONTROLS FOR LAND ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.4 Soil Management

Top Soil Management –

- There is nil topsoil for this project site.

Overburden / Waste and Side Burden Management –

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

TABLE 10.2: PROPOSED CONTROLS FOR SOIL MANAGEMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.5 Water Management

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

The quarrying operation is restricted upto a depth of 36m BGL as per the Approved mining plan, the water table in the area is 78m – 73m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3: PROPOSED CONTROLS FOR WATER ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.6 Air Quality Management

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

TABLE 10.4: PROPOSED CONTROLS FOR AIR ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.7 Noise Management

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

TABLE 10.5: PROPOSED CONTROLS FOR NOISE ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.8 Ground Vibration and Fly Rock Control

TABLE 10.6: PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

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10.8 Biological Environment Management

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

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

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

10.8.1 Green Belt Development Plan

About 645 nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7 PROPOSED GREENBELT ACTIVITIES FOR 5 YEAR PLAN PERIOD – P2

PROPOSAL – P2			
Year	No. of trees proposed to be planted	Area to be covered sq.m	Name of the species
I	645	Near 7.5m safety distance, panchayat road and village road	Neem, Vilvam, Ashokha , Panai etc.,

Source: Conceptual Plan of Approved Mining plan& proposed by FAE's & EIA Coordinator

The objectives of the greenbelt development plan are –

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

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

10.8.2 Species Recommended for Plantation

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

- Creating of bio-diversity.

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

TABLE 10.8: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT – P2

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

Source: Proposed by FAE's & EIA Coordinator

10.9 Occupational Safety & Health Management

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

10.9.1 Medical Surveillance and Examinations –

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

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

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

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

TABLE 10.9: MEDICAL EXAMINATION SCHEDULE – P2

Sl.No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check – up					
B	Audiometric Test					
C	Eye Check – up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					
Medical Follow ups:- Work force will be divided into three targeted groups age wise as follows:-						
Age Group		PME as per Mines Rules 1955		Special Examination		
Less than 25 years		Once in a Three Years		In case of emergencies		

Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

10.9.2 Proposed Occupational Health and Safety Measures –

- The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- Lightweight and loose-fitting clothes having light colours will be preferred to wear.
- Noise exposure measurements will be taken to determine the need for noise control strategies.
- The personal protective equipment will be provided for mine workers.
- Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
- At noisy working activity, exposure time will be minimized.
- Dust generating sources will be identified and proper control measure will be adopted.
- Periodic medical examinations will be provided for all workers.
- Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
- The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipment's will be provided to them.
- A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS – P2



10.9.3 Health and Safety Training Programme

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

TABLE 10.10: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES – P2

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

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

10.9.4 Budgetary Provision for Environmental Management –

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

TABLE 10.11: EMP BUDGET FOR PROPOSED PROJECT – P2

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	12900	12900
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed Sprinkler Installation and New Water Tanker Cost for Capital; and Water Sprinkling (thrice a day) Cost for recurring	800000	50000
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance - 4 Units	100000	10000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per Tipper/Dumper deployed - 2 Units	10000	500
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000

	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	25800
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Compentent Person	0	0
	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	351650
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and	5000	20000

		disposal through authorized agency		
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Mine Closure	1. Progressive Closure Activity - Surface Runoff managent	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	12900	5000
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum	258000	10000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 645 Trees - 460 Inside Lease Area & 185 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)	92000	13800
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	55500	5550

	4. Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 15% of the proposed closure cost will be spent during the final mine closure stage - Last Year	67500	0
	5. Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budget and not necessarily implemented in the Project Site	1217250	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
	Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 19 Employees	76000	19000
	Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	19000

	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	2580
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	64500	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR, 1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoEF & CC OM	500000	0
TOTAL			2141800	1442780

In order to implement the environmental protection measures, an amount of Rs.21.41 lakhs as capital cost and recurring cost as Rs. 14.42 lakhs as recurring cost is proposed considering present market price considering present market scenario for the proposed project.

Year Wise Break Up	
1st Year	₹ 35,84,580
2nd Year	₹ 15,14,919

3rd Year	₹ 15,90,665
4th Year	₹ 16,70,198
5th Year	₹ 18,21,208
Total	₹ 102 lakhs

10.10 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 - 10: ENVIRONMENTAL MANAGEMENT PLAN – P3

10.1 General

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of Environmental Management plan will ensure to keep all the environmental parameters of the project in respect of Ambient Air quality, Water quality, Socio – economic improvement standards.

Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.2 Environmental Policy

The Project Proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance.

The Proponent **Thiru.D.R.Karuppusamy** will –

- Allocate necessary resources to ensure the implementation of the environmental policy
- 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
- 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 programmes to provide early warning of any deficiency or unanticipated performance in environmental safeguards
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of each Proposed Quarry.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies
- Collection of health statistics of the workers and population of the surrounding villages
- Green belt development
- Monitoring the progress of implementation of the environmental monitoring programme

- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.3 Land Environment Management –

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

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

TABLE 10.1: PROPOSED CONTROLS FOR LAND ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.4 Soil Management

Top Soil Management –

- There is nil topsoil for this project site.

Overburden / Waste and Side Burden Management –

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

TABLE 10.2: PROPOSED CONTROLS FOR SOIL MANAGEMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.5 Water Management

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

The quarrying operation is restricted upto a depth of 37m BGL as per the Approved mining plan, the water table in the area is 68m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3: PROPOSED CONTROLS FOR WATER ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.6 Air Quality Management

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

TABLE 10.4: PROPOSED CONTROLS FOR AIR ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.7 Noise Management

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

TABLE 10.5: PROPOSED CONTROLS FOR NOISE ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.8 Ground Vibration and Fly Rock Control

TABLE 10.6: PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAE's & EIA Coordinator

10.8 Biological Environment Management

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

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

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

10.8.1 Green Belt Development Plan

About 500 nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7 PROPOSED GREENBELT ACTIVITIES FOR 5 YEAR PLAN PERIOD – P3

PROPOSAL – P2- Tmt.K. Sangeetha			
Year	No. of trees proposed to be planted	Area to be covered sq.m	Name of the species
I	500	Near 7.5m safety distance, panchayat road and village road	Neem, vilvam, Ashokha , Panai etc.,

Source: Conceptual Plan of Approved Mining plan& proposed by FAE's & EIA Coordinator

The objectives of the greenbelt development plan are –

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

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

10.8.2 Species Recommended for Plantation

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

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

TABLE 10.8: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT – P3

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

Source: Proposed by FAE's & EIA Coordinator

10.9 Occupational Safety & Health Management

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

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- Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.
- Evaluating the effect of noise on workers
- Enabling corrective actions to be taken when necessary
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4	Training (Mine Workers)					
Medical Follow ups:- Work force will be divided into three targeted groups age wise as follows:-						
Age Group		PME as per Mines Rules 1955			Special Examination	

Less than 25 years	Once in a Three Years	In case of emergencies
Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

10.9.2 Proposed Occupational Health and Safety Measures –

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

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS – P3



10.9.3 Health and Safety Training Programme

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

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

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

10.9.4 Budgetary Provision for Environmental Management –

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

TABLE 10.11: EMP BUDGET FOR PROPOSED PROJECT – P3

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	10011	10011
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed Sprinkler Installation and New Water Tanker Cost for Capital; and Water Sprinkling (thrice a day) Cost for recurring	800000	50000
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance - 3 Units	75000	7500
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per Tipper/Dumper deployed - 2 Units	10000	500
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000

	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	20022
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Compentent Person	0	0
	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	249886
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and	5000	20000

		disposal through authorized agency		
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Mine Closure	1. Progressive Closure Activity - Surface Runoff managent	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	10011	5000
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum	200220	10000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 500 Trees - 400 Inside Lease Area & 100 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)	80000	12000
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	30000	3000

	4. Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 15% of the proposed closure cost will be spent during the final mine closure stage - Last Year	51750	0
	5. Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budget and not necessarily implemented in the Project Site	864990	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
	Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 20 Employees	80000	20000
	Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	20000

	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	2002.2
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	50055	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR, 1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoEF & CC OM	500000	0
TOTAL			2005297	1326921.2

In order to implement the environmental protection measures, an amount of Rs.20.05 lakhs as capital cost and recurring cost as Rs. 13.26 lakhs as recurring cost is proposed considering present market price considering present market scenario for the proposed project.

Year Wise Break Up	
1st Year	₹ 33,32,218
2nd Year	₹ 13,93,267

3rd Year	₹ 14,62,931
4th Year	₹ 15,36,077
5th Year	₹ 16,64,631
Total	₹ 94 lakhs

10.10 CONCLUSION –

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

CHAPTER – 11: SUMMARY AND CONCLUSIONS

Kodangipalayam Rough Stone and Gravel Cluster Quarries (Extent: **19.38.11** ha) falls under “B” category as per MoEF & CC Notification (S.O. 3977 (E)).

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

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

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

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the months Oct to Dec 2024 for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suitable mitigation measures for likely adverse impacts due to the proposed project is suggested individually for the respective proposed project under Chapter 10.

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

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

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

Sustainable and modern mining leads us to see positive impact of mining operation and providing consistent employment for nearly 55 people directly in the cluster and indirectly around 100people.

As discussed, it is safe to say that the proposed quarries are not likely to cause any significant impact to the ecology of the area, as adequate preventive measures will be adopted to keep the various pollutants within the permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigate technique, as well as to serve as biological indicators for the pollutants released from the Kodangipalayam Rough Stone and Gravel Cluster Quarries (Cluster Extent: **19.38.11ha**).

CHAPTER 12.0: DISCLOSURE OF CONSULTANTS

The Project Proponent's –

1. **Thiru. R. Gunasekar**
2. **Thiru.P. Gowtham Rathinam**
3. **Thiru.D.R. Karuppusamy**

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

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaita Ashram Road,

Alagapuram, Salem – 636 004

Tamil Nadu, India

Email: infogeoexploration@gmail.com

Web: **www.gemssalem.com**

Phone: 0427 2431989.

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

Sl.No.	Name of the expert	In house/ Empanelled	EIA Coordinator		FAE	
			Sector	Category	Sector	Category
1	Dr. M. Ifthikhar Ahmed	In-house	1	A	WP GEO SC	B A A
2	Dr. P. Thangaraju	In-house	-	-	HG GEO	A A
3	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	B A B
4	Mr. N. Senthilkumar	Empanelled	38 28	B B	AQ WP RH	B B A
5	Mrs. Jisha parameswaran	In-house	-	-	SW	B
6	Mr. Govindasamy	In-house	-	-	WP	B
7	Mrs. K. Anitha	In-house	-	-	SE	A
8	Mrs. Amirtham	In-house	-	-	EB	B
9	Mr. Alagappa Moses	Empanelled	-	-	EB	A
10	Mr. A. Allimuthu	In-house	-	-	LU	B
11	Mr. S. Pavel	Empanelled	-	-	RH	B
12	Mr. J. R. Vikram Krishna	Empanelled	-	-	SHW RH	A A
Abbreviations						
EC	EIA Coordinator					
AEC	Associate EIA Coordinator					
FAE	Functional Area Expert					
FAA	Functional Area Associates					
TM	Team Member					
GEO	Geology					
WP	Water pollution monitoring, prevention and control					
AP	Air pollution monitoring, prevention and control					
LU	Land Use					
AQ	Meteorology, air quality modeling, and prediction					
EB	Ecology and bio-diversity					
NV	Noise and vibration					
SE	Socio economics					
HG	Hydrology, ground water and water conservation					
SC	Soil conservation					
RH	Risk assessment and hazard management					
SHW	Solid and hazardous wastes					
MSW	Municipal Solid Wastes					
ISW	Industrial Solid Wastes					
HW	Hazardous Wastes					

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the EIA/EMP for Kodangipalayam Rough Stone & Gravel Cluster Quarries over an Extent of **19.38.11** ha in Kodangipalayam Village, Palladam Taluk, Tiruppur District of Tamil Nadu. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge. I, hereby, certify that I was a part of the EIA team in the following capacity that developed the EIA/EMP Report.

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

Designation: **EIA Coordinator**

Date & Signature:

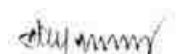
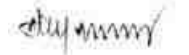


Period of Involvement: **January 2022 to till date**

Associated Team Member with EIA Coordinator:

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

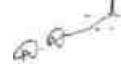
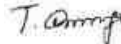
FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT

Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	- Identification of different sources of air pollution due to the proposed mine activity - Prediction of air pollution and propose mitigation measures / control measures	Mr. A. Jagannathan	
2	WP	- Suggesting water treatment systems, drainage facilities - Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Dr. M. Ifthikhar Ahmed	
			Mr. N. Senthilkumar	
3	HG	- Interpretation of ground water table and predict impact and propose mitigation measures. - Analysis and description of aquifer Characteristics	Dr. P. Thangaraju	
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.	Dr. M. Ifthikhar Ahmed	
			Dr. P. Thangaraju	
5	SE	- Revision in secondary data as per Census of India, 2011. - Impact Assessment & Preventive Management Plan - Corporate Environment Responsibility.	Mrs. K. Anitha	
6	EB	- Collection of Baseline data of Flora and Fauna. - Identification of species labelled as Rare, Endangered and threatened as per IUCN list.	Mrs. Amirtham	

		- Impact of the project on flora and fauna. - Suggesting species for greenbelt development.	Mr. Alagappa Moses	
7	RH	- Identification of hazards and hazardous substances - Risks and consequences analysis - Vulnerability assessment - Preparation of Emergency Preparedness Plan - Management plan for safety.	Mr. N. Senthilkumar	
			Mr. S. Pavel	
			Mr. J. R. Vikram Krishna	
8	LU	- Construction of Land use Map - Impact of project on surrounding land use - Suggesting post closure sustainable land use and mitigative measures.	Mr. A. Allimuthu	
9	NV	- Identify impacts due to noise and vibrations - Suggesting appropriate mitigation measures for EMP.	Mr. A. Jagannathan	
10	AQ	- Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. - Recommending mitigations measures for EMP	Mr. N. Senthilkumar	
11	SC	Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. M. Ifthikhar Ahmed	
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.	Mr. A. Jagannathan	
			Mr. J. R. Vikram Krishna	

LIST OF TEAM MEMBERS ENGAGED IN THIS PROJECT

Sl.No.	Name	Functional Area	Involvement	Signature
1	Mr. S. Nagamani	AP; GEO; AQ	- Site Visit with FAE - Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures - Provide inputs on Geological Aspects - Analyse & provide inputs and assist FAE with meteorological data, emission estimation, AERMOD modelling and suggesting control measures	
2	Mr. Viswanathan	AP; WP; LU	- Site Visit with FAE - Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures - Assisting FAE on sources of water pollution, its impacts and suggest control measures - Assisting FAE in preparation of land use maps	
3	Mr. Santhoshkumar	GEO; SC	- Site Visit with FAE - Provide inputs on Geological Aspects - Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan - Provide inputs & Assisting FAE with soil conservation methods and identifying impacts	
4	Mr. Umamahesvaran	GEO	- Site Visit with FAE - Provide inputs on Geological Aspects	

			Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan	
5	Mr. A. Allimuthu	SE	- Site Visit with FAE - Assist FAE with collection of data's - Provide inputs by analysing primary and secondary data	
6	Mr. S. Ilavarasan	LU; SC	- Site Visit with FAE - Assisting FAE in preparation of land use maps - Provide inputs & Assisting FAE with soil conservation methods and identifying impacts	
7	Mr. E. Vadivel	HG	- Site Visit with FAE - Assist FAE & provide inputs on aquifer characteristics, ground water level/table - Assist with methods of ground water recharge and conduct pump test, flow rate	
8	Mr. D. Dinesh	NV	- Site Visit with FAE - Assist FAE and provide inputs on impacts due to proposed mine activity and suggest mitigation measures - Assist FAE with prediction modelling	
9	Mr. Panneer Selvam	EB	- Site Visit with FAE - Assist FAE with collection of baseline data - Provide inputs and assist with labelling of Flora and Fauna	
10	Mrs. Nathiya	EB	- Site Visit with FAE - Assist FAE with collection of baseline data - Provide inputs and assist with labelling of Flora and Fauna	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. M. Ifthikhar Ahmed, Managing Partner, Geo Exploration and Mining Solutions, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared the Draft EIA/EMP for Rough Stone & Gravel Cluster Quarries over an Extent of **19.38.11** ha in Kodangipalayam Village, Palladam Taluk, Tiruppur District of Tamil Nadu. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature& Date:



Name:

Dr. M. Ifthikhar Ahmed

Designation:

Managing Partner

Name of the EIA Consultant Organization:

M/s. Geo Exploration and Mining Solutions

NABET Certificate No & Issue Date:

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

Validity:

Valid till 06.08.2025