Existing Maruvathur Limestone Mine over an Extent of 3.545 Ha in SF. Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/3B & 70/4B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu by Thiru.S. Saravanan

(Captive Mine of Dhandapani Cement Plant, Trichy)

Plan Period Production of 1,83,218 Tonnes with Peak ROM Production of 41,850 Tonnes per Annum upto a Depth of 22 m BGL

Mining Lease Grant vide GO 3(D) No. 263 dated 20.09.1995 for 20 years - Lease Valid till 17.10.2045 as per MMDR Amendment Act, 2015

Mining Plan Approval by IBM, Chennai Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024 (Plan Period 2025-26 to 2029-30) -Valid till 31.03.2030

Environmental Clearance under EIA Notification 2006

Schedule SI. No. 1(a) & Category 'B' (<250 Ha)

Environmental Impact Assessment Report

(after TOR for Public Hearing)

Awarded TOR Identification No. TO24B0000TN5850953N dated 20.08.2024

Baseline Data Collection : Mar.-May 2024 (Summer Season)

February 2025

EIA Consultant

ABC Techno Labs India Private Limited, Chennai

Accreditation Certificate : NABET/EIA/2225/RA0290 dated 11.06.2023 with Validity till 16.11.2025

(Sl. No. 4 of QCI/NABET List)

Lab Accreditation : NABL Certificate No. TC-5770 dated 03.04.2024-valid till 02.04.2026

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ABC Techno Labs®
India Private Limited

EIA Consultant Undertaking

[in compliance with MoEF Office Memorandum No. J-11013/41/2006-IA.II (I) dated 04.08.2009]

S.Saravanan, Director, Dhandapani Cements Private Limited, is operating Maruvathur Limestone Mining Lease over an extent of 3.545 Ha at SF Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu. The GO granted vide GO 3(D) No. 263 dated 20.09.1995 is valid for 50 years i.e. upto 17.10.2045 as per MMDR Amendment Act, 2015.

The existing Mining Lease requires EC as per MoEF&CC Notification SO 141(E) dated 15.01.2016. The validity of awarded TOR under Non-Violation Category vide Lr. No. SEIAA-TN/F.No.6275/TOR-381/2017 dated 18.05.2018 was expired on 17.05.2023. Thus, a fresh TOR Proposal has been filed vide Online Proposal No. SIA/TN/MIN/481764/2024 on 16.06.2024. The Proposal was deliberated by SEAC-TN in its 481st Meeting held on 01.08.2024 and SEIAA-TN in its 748th Meeting held on 13.08.2024. Fresh TOR has been awarded vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024, under File No. 11024/2024.

EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including Sector-1 (Mining Projects) for Category 'A' by the National Accreditation Board for Education & Training (NABET) vide Certificate NABET/EIA/2225/RA0290 dated 11.06.2023 with validity till 16.11.2025 (Sl. No. 4 of List). ABC Laboratory is accredited by the National Accreditation Board for Testing & Calibration Laboratories (NABL) vide Certificate No. TC-5770 dated 03.04.2024 - valid till 02.04.2026.

The Environmental Impact Assessment (EIA) Report and the Summary Environmental Impact Assessment Reports have been prepared as per the generic structure proposed in EIA Notification 2006 and in compliance with the awarded TORs and submitted. The data submitted in the EIA Report are factually correct.

ABC TECHNO LABS INDIA PVT. LTD. Chennai 600098

For ABC Techno Labs India Private Limited

Authorised Signatory

Date : 03.02.2025
Place : Chennai.

S. Saravanan,
Director-Dhandapani Cements Pvt. Ltd.,
69, Ganapathy Nagar,
Tiruvanaikovil,
Trichy-620 005.
Mob : 94892 01004
e-mail : dcplmaruthi@gmail.com

Project Proponent Declaration

[in compliance with MoEF Office Memorandum No. J-11013/41/2006-IA.II (I) dated 04.08.2009]

I, S.Saravanan- Director, Dhandapani Cements Private Limited, am operating Maruvathur Limestone Mining Lease over an extent of 3.545 Ha at SF Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu. The GO granted vide GO 3(D) No. 263 dated 20.09.1995 is valid for 50 years i.e. upto 17.10.2045 as per MMDR Amendment Act, 2015.

The existing Mining Lease requires EC as per MoEF&CC Notification SO 141(E) dated 15.01.2016. The validity of awarded TOR under Non-Violation Category vide Lr. No. SEIAA-TN/F.No.6275/TOR-381/2017 dated 18.05.2018 was expired on 17.05.2023. Thus, a fresh TOR Proposal has been filed vide Online Proposal No. SIA/TN/MIN/481764/2024 on 16.06.2024. The Proposal was deliberated by SEAC-TN in its 481st Meeting held on 01.08.2024 and SEIAA-TN in its 748th Meeting held on 13.08.2024. Fresh TOR has been awarded vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024, under File No. 11024/2024.

EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including Sector-1 (Mining Projects) for Category 'A' by the National Accreditation Board for Education & Training (NABET) vide Certificate NABET/EIA/2225/RA0290 dated 11.06.2023 with validity till 16.11.2025 (Sl. No. 4 of List). ABC Laboratory is accredited by the National Accreditation Board for Testing & Calibration Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2024 - valid till 02.04.2026.

The Environmental Impact Assessment (EIA) Report and the Summary Environmental Impact Assessment Reports have been prepared as per the generic structure proposed in EIA Notification 2006 and in compliance with the awarded TORs and submitted. The data submitted in the EIA Report are factually correct.

Date : 03.02.2025
Place : Trichy.

S. Saravanan
Lease Owner

S. Saravanan,
Director-Dhandapani Cements Pvt. Ltd.,
69, Ganapathy Nagar,
Tiruvanaikovil,
Trichy-620 005.
Mob : 94892 01004
e-mail : dcplmaruthi@gmail.com

Project Proponent Undertaking/Affidavit

(in compliance with awarded TOR vide Identification No. TO24B0000TN5850953N dated 20.08.2024)

I, S.Saravanan, s/o Shri.S.Subramanian, Director - Dhandapani Cements Private Limited, have applied for Environmental Clearance to the State Level EIA Authority-Tamil Nadu (SEIAA-TN) for my existing Maruvathur Limestone Mine. TOR has been awarded for the Project vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024. In compliance with awarded TOR, I sworn and submit the followings :

1. I undertake that there is no mining activity after 15.01.2016 and the Proposal is not falling under Violation Category.
2. I undertake that the Mining operation will be carried out with Rock Breakers and with out any Drilling & Blasting.
3. I undertake that no contractual persons provided by the explosive suppliers will be employed in the Mine.
4. I declare that no highly sensitive structure such as fire-cracker manufacturing units, Gas godown/explosive Magazine, LPG Bottling Units, etc are located within a radial distance of 300 m from the lease boundary.
5. Limestone is a major mineral and thus no Cluster approach is applicable to the Project. Accordingly, TORs under Sl. No. 4.1- 1 to 8 are not applicable.

Date : 03.02.2025
Place : Trichy.

S. Saravanan
Lease Owner

File No: 11024
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
***

Dated **20/08/2024**

To,

Thiru S Subramanian
M/s. DHANDAPANI CEMENTS PRIVATE LIMITED
69 Ganapathy NagarThirvanaikovil Trichy , TIRUCHIRAPPALLI, TAMIL NADU, , 620005
dcplmaruthi@gmail.com

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

Sir/Madam,

This is in reference to your application for seeking of Terms of Reference with Public Hearing (ToR) for EIA study the proposed Limestone Mine over an extent of 3.54.5 Ha in S.F.Nos. 49/1A,1B, 8A (P), 69/1B2, 1B3, 3C, 70/3A(P), 3B & 4B, of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu by **Thiru.S.Saravanan** submitted to SEIAA vide proposal number SIA/TN/MIN/481764/2024 dated 31/07/2024 under the provision of the EIA Notification 2006 and as amended.

Ref:
1. Online proposal No. SIA/TN/MIN/481764/2024, dt: 16/06/2024.
2. Your application submitted for Terms of Reference dated: 25.06.2024.
3. Minutes of the 481st SEAC meeting held on 01.08.2024.
4. Minutes of the 748th SEIAA meeting held on 13.08.2024

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO24B0000TN5850953N
(ii) File No.	11024
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Existing Perali (South) Limestone Mine over an Extent of 3.545 Ha at SF Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu by

	Mr.S.Saravanan - Sl. No. 1(a); Category B – Considered as Non-Violation Proposal-Application for fresh TOR (as earlier TOR validity expired on 17.05.2023).
(viii) Name of Company/Organization	DHANDAPANI CEMENTS PRIVATE LIMITED
(ix) Location of Project (District, State)	PERAMBALUR, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by SEIAA in the meeting held on 13/08/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C, EMP)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

5. The SEAC has based on information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference with Public Hearing under the provision of EIA Notification, 2006 and as amended thereof subject to stipulation of specific and general conditions as detailed in Annexure (2).

6. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to grant Terms of Reference with Public Hearing for instant proposal of M/s. Dhandapani Cements Private Limited, S Subramanian under the provisions of EIA Notification, 2006 and as amended thereof.

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

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

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

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

Copy To

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

Specific Terms of Reference for (Mining Of Minerals)

1. Seiaa Specific Conditions:

S. No	Terms of Reference
1.1	The subject was placed in this 747th meeting of SEIAA held on 12.08.2024. The SEIAA noted that the subject was placed in the 487rd meeting of SEAC held on 01.08.2024 and the SEAC has furnished its recommendations for the **Fresh Terms of Reference with Public Hearing** to the project subject to the conditions stated therein. After detailed discussions, the Authority accepted the recommendation of SEAC and decided to grant **Fresh Terms of Reference (ToR) with Public Hearing** based on studies, assessments and records to be produced as sought by the SEAC and SEIAA, for undertaking the Environment Impact Assessment Study and preparation of Environment Management Plan for the production quantity of **RoM of 183218 Tonne to** the **depth of 22m BGL** and **annual peak RoM production of 41850 Tonne as per the approved mining plan** subject to the conditions as recommended by SEAC & normal conditions and conditions in **Annexure 'B'** of this minutes

2. Seac Conditions - Site Specific

S. No	Terms of Reference
2.1	1. The project proponent shall submit a Certified Compliance Report obtained from the office of the concerned DEE/TNPCB (or) IRO, MoEF & CC, Chennai as per the MoEF&CC O.M dated.08.06.2022 for the previous EC and appropriate mitigating measures for the non-compliance items, if any. 2. For the existing quarry, the PP shall obtain a letter from the concerned AD (Mines) which shall stipulate the following information: i. Original pit dimension of the existing quarry ii. Quantity achieved Vs EC Approved Quantity iii. Balance Quantity as per Mineable Reserve calculated. iv. Mined out Depth as on date Vs EC Permitted depth v. Details of illegal/illicit mining carried out, if any vi. Quantity of material mined out outside the mine lease area (or) in the adjacent quarry/land. vii. Existing condition of Safety zone/benches viii. Details of any penalties levied on the PP for any violation in the quarry operation 3. PP shall furnish a letter from AD/DD mines stating that the project will not fall under violation category. 4. 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. 5. The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal. 6. The study on impact of the proposed quarrying operations on the surrounding environment which includes reserve forest, water bodies, etc. 7. The Project Proponent shall furnish the revised EMP based on the study carried out on impact of the dust & other environmental impacts due to proposed quarrying operations on the nearby agricultural lands for remaining life of the mine in the format prescribed by the SEAC considering the cluster situation. **8. The PP shall furnish a detailed progressive and final mine closure plan along with the EIA report.** **9. The PP shall detail the type of vehicles to be used for transporting the mineral to the**

S. No	Terms of Reference
	Cement plant, dust control measures envisaged and the emission standard of the fuel to be used.

3. Seac Standard Conditions

S. No	Terms of Reference
3.1	1. The PP shall furnish the letter obtained from the AD (Mines) indicating the existing pit dimensions and pit conditions showing the details on mine having worked during the earlier lease period. 2. The PP shall furnish 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. 3. The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site. 4. The Proponent shall justify the selection of the site for carrying out the stone quarrying with the total volume arrived for the excavation & production adequate details such as lithology of the deposit, reserve estimation, place for waste dump/mined mineral storage, end-use of mined materials, identified potential customers/end-users and travel path. 5. The PP shall also justify the selection of mining methodology (conventional or non-conventional) adopting blasting techniques/non-explosive techniques with proper ground reality & laboratory testing. 6. The proponent shall submit the "Blast Design Parameters for controlling the vibration and fly rock from the quarry blasting" considering the existence of sensitive structures including habitations within 500 m from the lease boundary. 7. The PP shall justify the estimation of HEMM population for excavation and transportation in the proposed quarries with proper calculation methodology adopted. 8. The PP shall enumerate the environmental settings situated within a radial distance of 1 km such rivers/water bodies/reserve forests/ grazing land/existence of the hospitals and educational institutions/structures. 9. The PP shall provide the details of the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same. 10. 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 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. 11. The PP shall submit a 'Slope Stability Action Plan' for the proposed quarry where the proposed depth exceeds 30 m and it shall cover the aspects of stability of quarry walls including the access ramp keeping the benches intact. 12. If the blasting operation is to be carried out, the PP shall present a conceptual design for carrying out the NONEL initiation based controlled blasting operation including the line drilling & muffle blasting techniques and a Simulation Model indicating the anticipated Blast-induced Ground Vibration levels in the proposed quarry as stipulated by the DGMS Circular No.7 of 1997, during the EIA Proposal. 13. 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. 14. The PP shall give an affidavit stating that no contractual persons provided by the explosive suppliers will be employed for carrying out the blasting operations in the proposed quarry.s 15. The PP shall also give an affidavit that no highly sensitive structure such as fire-cracker manufacturing units, Gas godown/explosive Magazine, LPG Bottling Units, etc are located within a

S. No	Terms of Reference
	radial distance of 300 m from the lease boundary of the proposed quarry. 16. 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 20 m from the blast site. 17. 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. 18. The PP shall provide the environmental mitigation measures implemented for the crusher(s) located within the mining lease. 19. 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, a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? b. Quantity of minerals mined out. c. Highest production achieved in any one year d. Detail of approved depth of mining. e. Actual depth of the mining achieved earlier. f. Name of the person already mined in that leases area. g. If EC and CTO already obtained, the copy of the same shall be submitted. h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches. 20. 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. 21. 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). 22. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc., 23. 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. 24. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment. 25. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. 26. 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. 27. 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.

S. No	Terms of Reference
	28. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted. 29. 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. 30. 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. 31. 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. 32. If the Village road/State highway/National highway are located within a radial distance of 500 m from the lease boundary of the quarry proposal, the PP shall carry out traffic studies to indicate impact on local transport infrastructure due to the Project and mitigation measures. 33. 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. 34. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific. 35. Public Hearing points raised and commitments 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 and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly. 36. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily. 37. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also. 38. 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. 39. 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 and local school/college authorities. 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. 40. 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 41. 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. 42. 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. 43. 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. 44. 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

S. No	Terms of Reference
	along with budgetary allocations. 45. 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. 46. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. 47. 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. 48. 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. 49. 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. 50. 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

4. Seiaa Standard Conditions:

S. No	Terms of Reference
4.1	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. 2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc., 3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines. 4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. 5. The committee shall deliberate on risk & emergency management plan, fire safety & evacuation plan and sustainable development goals pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. 6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail in the EIA Report. 7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner. 8. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity. Agriculture & Agro-Biodiversity 9. Impact on surrounding agricultural fields around the proposed mining Area. 10. Impact on soil flora & vegetation around the project site. 11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area

S. No	Terms of Reference
	shall committed mentioned in EMP. 12. The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horti-cultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. Forests 15. The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife. 16. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 17. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 18. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. 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. 20. Erosion Control measures. 21. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 23. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities. 24. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. 25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. 27. The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including environmental stress. c) Sediment geochemistry in the surface streams. Energy 28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished. 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. 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.

S. No	Terms of Reference
	31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood. Mine Closure Plan 32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued. 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. 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. Risk Assessment 35. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining. 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. 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. 38. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan. 39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

Standard Terms of Reference for (Mining of minerals)

1. Project Details

S. No	Terms of Reference
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.
1.2	A copy of the document in support of rightful lessee of the mine should be submitted. In case of new mines copy of LoI granted by State Government to be submitted. PP should ensure that LoI is valid at the time of grant of ToR. PP should submit the copy of lease deed/supplementary lease deed/extension letter/transfer deed, from its initial grant to subsequent renewals/ transfer/extension of validity.
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with

S. No	Terms of Reference
	one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
1.4	PP should submit the District Survey Report (DSR) as per S.O. 3611(E) dated 25.07.2018 in case of minor minerals.
1.5	Brief of proposal to be submitted which include total excavation of the material required for the production of certain quantity of the minerals, location of the project, mining lease area, latitude longitude, seismic zone etc. In case of expansion project details of expansion viz. expansion in mining lease area or expansion in production of any particular mineral or expansion in total excavation, latest certified Compliance report (CCR) from IRO of conditions granted in existing EC needs to be submitted.
1.6	The PP should submit the real-time aerial video footage & video of the mining lease area and of the transportation route.
1.7	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).
1.8	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
1.9	The PP should collect the Baseline data (BLD) in respect of initial level of the mining lease. For this permanent bench marks (BM) needs to be established at prominent location preferably close to mining leases in question and should have precisely known relationship to the level datum of the area, typically mean sea level.
1.10	In case of sand mining, the entire mining lease area should be divided suitably into grids of 25 m x 25 m with the help of sections across the width of river and along the direction of flow of the river. The levels (MSL & RL) of the corner point of each grid needs to be recorded. Each Grid should be suitably numbered for identification. PP should identity grids which will be worked out and grids which will come under no mining zone i.e. safety barriers from the river bank. PP should comply with the sustainable sand mining management guidelines 2016 and enforcement and monitoring guidelines, 2020 etc.
1.11	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
1.12	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

S. No	Terms of Reference
1.13	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
1.14	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
1.15	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
1.16	Compliance of the Ministry's Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgment of Hon'ble Supreme Court, dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.

2. Forest

S. No	Terms of Reference
2.1	PP shall submit a certificate from Chief Conservator of Forests regarding involvement of Forest Land in the mining lease area if any. In case forest land is involved i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & non-forest area.
2.2	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.
2.3	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.
2.4	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

3. Court Matters

S. No	Terms of Reference
3.1	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

4. Land Environment

S. No	Terms of Reference
4.1	PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area.
4.2	The study area will comprise of 10km zone around the mine lease from lease periphery and the data

S. No	Terms of Reference
	contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
4.3	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.
4.4	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.

5. Wildlife

S. No	Terms of Reference
5.1	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.
5.2	A detailed biological study of the study area [core zone and buffer zone] 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. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. 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/Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. Proof of its submission of conservation plan to the CWLW needs to be submitted.
5.3	PP shall submit a certificate from Chief Wildlife Warden regarding distance of mining lease from the protected area falling within 10 KM of the mining lease. In case project requires clearance under Wildlife (Protection) Act, 1972 then copy of application made for the same needs to be submitted.

6. Baseline Environment

S. No	Terms of Reference
6.1	One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season); December - February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
6.2	Air quality modelling should be carried out for prediction of impact of the project on the air quality

S. No	Terms of Reference
	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 windrose showing pre-dominant wind direction may also be indicated on the map.
6.3	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this, PP should submit the original test reports and certificates of the labs from which samples were analyzed.

7. Water Environment

S. No	Terms of Reference
7.1	The water requirement for the Project, its availability and source should be furnished. Quantity of surface or ground water to be used for the Project should be indicated. A detailed water balance should also be provided. Submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. 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 capital and recurring expenditure to be incurred needs to be submitted.
7.2	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.

8. Hydro Geology

S. No	Terms of Reference
8.1	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.
8.2	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.
8.3	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 bench 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. In case of surface water is proposed to be utilized then Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

9. Transportation

S. No	Terms of Reference
9.1	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.

10. Land Acquisition And R&r

S. No	Terms of Reference
10.1	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.
10.2	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.

11. Socio-economic Environment

S. No	Terms of Reference
11.1	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.
11.2	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.
11.3	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.
11.4	Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry’s OM F.No.22-65/2017-IA.III dated 30th September, 2020.

12. Environmental Monitoring And Management

S. No	Terms of Reference
12.1	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.
12.2	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.

13. Critically Polluted Areas, Aravali & Crz

S. No	Terms of Reference
13.1	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
13.2	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).

14. Risk Assessment & Disaster Management

S. No	Terms of Reference
14.1	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.
14.2	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.
14.3	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.

15. Miscellaneous

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

A. STANDARD TERMS OF REFERENCE

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

9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects

due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented

date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

30) Information on site elevation, working depth, groundwater table etc. Should be provided

both in AMSL and bgl. A schematic diagram may also be provided for the same.

31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.

32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

37) Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural

and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

44) Besides the above, the below mentioned general points are also to be followed:-

a) Executive Summary of the EIA/EMP Report

b) All documents to be properly referenced with index and continuous page numbering.

c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.

d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.

e) Where the documents provided are in a language other than English, an English translation should be provided.

f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.

h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the

ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

i) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.

j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, “A” register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.

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

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

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

a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
b. All documents may be properly referenced with index, page numbers and continuous page numbering.
c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -l1013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website http://www.moef.nic.in/ may be referred.

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.

Signature Not Verified

Digitally Signed by : A R Rahul Nadh IAS
Member Secretary, SEIAA

Date: 05/09/2024

Awarded TORs & their incorporation in EIA Report

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
I	**Specific Terms of Reference for Mining of Minerals**	
1	**SEIAA Specific Conditions**	
1.1	The subject was placed in this 747th meeting of SEIAA held on 12.08.2024. The SEIAA noted that the subject was placed in the 487rd meeting of SEAC held on 01.08.2024 and the SEAC has furnished its recommendations for the **Fresh Terms of Reference with Public Hearing** to the project subject to the conditions stated therein. After detailed discussions, the Authority accepted the recommendation of SEAC and decided to grant **Fresh Terms of Reference (ToR) with Public Hearing** based on studies, assessments and records to be produced as sought by the SEAC and SEIAA, for undertaking the Environment Impact Assessment Study and preparation of Environment Management Plan for the production quantity of **RoM of 183218 Tonne to** the **depth of 22m BGL** and **annual peak RoM production of 41850 Tonne as per the approved mining plan** subject to the conditions as recommended by SEAC & normal conditions and conditions in **Annexure 'B'** of this minutes.	Complied. Proposal is for the production quantity of ROM of 183218 Tonne to the depth of 22m BGL and annual peak ROM production of 41850 Tonne as per the approved mining plan.
2	**SEAC Conditions – Site Specific**	
2.1	1. The project proponent shall submit a Certified Compliance Report obtained from the office of the concerned DEE/TNPCB (or) IRO, MoEF & CC, Chennai as per the MoEF&CC O.M dated.08.06.2022 for the previous EC and appropriate mitigating measures for the non-compliance items, if any.	Applied for fresh EC and CCR is not applicable for the Proposal.
	2. For the existing quarry, the PP shall obtain a letter from the concerned AD (Mines) which shall stipulate the following information: i. Original pit dimension of the existing quarry ii. Quantity achieved Vs EC Approved Quantity iii. Balance Quantity as per Mineable Reserve calculated. iv. Mined out Depth as on date Vs EC Permitted depth v. Details of illegal/illicit mining carried out, if any vi. Quantity of material mined out outside the mine lease area (or) in the adjacent quarry/land. vii. Existing condition of Safety zone/benches viii. Details of any penalties levied on the PP for any violation in the quarry operation	DD-Mines, Perambalur Letter Rc. No. 239/G&M/2017 dated 12.04.2018. As per ROMP approval dated 08.11.2024 details given in Page Nos. 82-83.  No violation & No penalty levied for any purpose. Criteria / As on Date Existing pit dimension / P01-180x110x22 m, P02-60x45x16 m Quantity achieved / 1,38,515.44 T Balance quantity / 1,83,216 T Mined out depth / 16 m BGL & final 22 m Illicit mining, if any / Nil Condition of Safety zone/benches / Safe & Stable
	3. PP shall furnish a letter from AD/DD mines stating that the project will not fall under violation category.	DD-Mines, Perambalur Letter Rc. No. 239/G&M/2017 dated 12.04.2018.
	4. The structures within the radius of (i) 50 m, (ii) 100 m,	107-108

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	(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.	
	5. The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal.	104 69-70
	6. The study on impact of the proposed quarrying operations on the surrounding environment which includes reserve forest, water bodies, etc.	172
	7. The Project Proponent shall furnish the revised EMP based on the study carried out on impact of the dust & other environmental impacts due to proposed quarrying operations on the nearby agricultural lands for remaining life of the mine in the format prescribed by the SEAC considering the cluster situation.	197
	8. The PP shall furnish a detailed progressive and final mine closure plan along with the EIA report.	93, 101 & 102
	9. The PP shall detail the type of vehicles to be used for transporting the mineral to the Cement plant, dust control measures envisaged and the emission standard of the fuel to be used.	103
3	**SEAC Standard Conditions**	
3.1	1. The PP shall furnish the letter obtained from the AD (Mines) indicating the existing pit dimensions and pit conditions showing the details on mine having worked during the earlier lease period.	78-79 202-221
	2. The PP shall furnish 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.	76-77
	3. The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.	Will be complied
	4. The Proponent shall justify the selection of the site for carrying out the stone quarrying with the total volume arrived for the excavation & production adequate details such as lithology of the deposit, reserve estimation, place for waste dump/mined mineral storage, end-use of mined materials, identified potential customers/end-users and travel path.	Existing Mine. 90
	5. The PP shall also justify the selection of mining methodology (conventional or non-conventional) adopting blasting techniques/non-explosive techniques with proper ground reality & laboratory testing.	Non-conventional open cast mining, with out Drilling & Blasting. 90 Not Applicable
	6. The proponent shall submit the "Blast Design Parameters for controlling the vibration and fly rock from the quarry blasting" considering the existence of sensitive structures including habitations within 500 m	Not Applicable No Drilling & Blasting involved.

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	from the lease boundary.	
	7. The PP shall justify the estimation of HEMM population for excavation and transportation in the proposed quarries with proper calculation methodology adopted.	93
	8. The PP shall enumerate the environmental settings situated within a radial distance of 1 km such rivers/water bodies/reserve forests/ grazing land/existence of the hospitals and educational institutions/structures.	Nil 73 84-87 172
	9. The PP shall provide the details of the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	172
	10. 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 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.	107-108
	11. The PP shall submit a 'Slope Stability Action Plan' for the proposed quarry where the proposed depth exceeds 30 m and it shall cover the aspects of stability of quarry walls including the access ramp keeping the benches intact.	Not Applicable Conceptual Depth is 22 m BGL
	12. If the blasting operation is to be carried out, the PP shall present a conceptual design for carrying out the NONEL initiation based controlled blasting operation including the line drilling & muffle blasting techniques and a Simulation Model indicating the anticipated Blast-induced Ground Vibration levels in the proposed quarry as stipulated by the DGMS Circular No.7 of 1997, during the EIA Proposal.	Not Applicable No Drilling & Blasting involved.
	13. 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.	102
	14. The PP shall give an affidavit stating that no contractual persons provided by the explosive suppliers will be employed for carrying out the blasting operations in the proposed quarry.	8
	15. The PP shall also give an affidavit that no highly sensitive structure such as fire-cracker manufacturing units, Gas godown/explosive Magazine, LPG Bottling Units, etc are located within a radial distance of 300 m from the lease boundary of the proposed quarry.	8
	16. The PP shall present a conceptual design for	Not Applicable

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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 20 m from the blast site.	No Drilling & Blasting involved.
	17. 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.	64
	18. The PP shall provide the environmental mitigation measures implemented for the crusher(s) located within the mining lease.	Not Applicable No Crusher in the Lease
	19. 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, a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? b. Quantity of minerals mined out. c. Highest production achieved in any one year d. Detail of approved depth of mining. e. Actual depth of the mining achieved earlier. f. Name of the person already mined in that leases area. g. If EC and CTO already obtained, the copy of the same shall be submitted. h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	DD-Mines, Perambalur Letter Rc. No. 239/G&M/2017 dated 12.04.2018. As per ROMP approval dated 08.11.2024 details given in Page Nos. 78-79, 82-83 & 202-221. No violation & No penalty levied for any purpose. Criteria – As on Date Existing pit dimension – P01-180x110x22 m, P02-94 x 95 x 16 m Quantity achieved – 1,38,515.44 T Balance quantity – 1,83,210 T Mined out depth – 18 m BGL & final 22 m Illicit mining, if any – Nil Condition of Safety zone/benches – Safe & Stable
	20. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	Not Applicable. No EC was required for this <5 Ha before 15.01.2006.
	21. 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).	84 68 85-86
	22. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,	69-71
	23. 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.	69-71
	24. The Project Proponent shall provide the Organization	63-64

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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.	102
	25. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	135-136 No ground water-table intersection.
	26. 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.	Chapter 3.0 105-165
	27. 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.	Chapter 4.0 166-173
	28. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	103-104
	29. 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.	142 144-146 102
	30. 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.	No outside Dump. No R&R issue-Exsisting Mine. 93 & 65
	31. 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.	103-104

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	32. If the Village road/State highway/National highway are located within a radial distance of 500 m from the lease boundary of the quarry proposal, the PP shall carry out traffic studies to indicate impact on local transport infrastructure due to the Project and mitigation measures.	167-168
	33. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300 m buffer zone and its management during mining activity.	104
	34. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	93, 101 & 102
	35. Public Hearing points raised and commitments 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 and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.	To be submitted after Public Hearing. 181
	36. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	To be complied during Public Hearing
	37. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.	Complied.
	38. 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.	Complied during Filed visits.
	39. 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 and local school/college authorities. 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.	104
	40. 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	Complied. 101
	41. A Disaster Management Plan shall be prepared and included in the EIA/EMP Report for the complete life	176-178

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	of the proposed quarry (or) till the end of the lease period.	
	42. 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.	176-178
	43. 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.	173
	44. 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.	165 160
	45. 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.	159-165
	46. 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 or pending case against the Proposal
	47. 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.	179
	48. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	Not Applicable. No EC was required for this <5 Ha before 15.01.2006.
	49. 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.	181 To be complied after PH.
	50. 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 to comply.
4	**SEIAA Standard Conditions**	
4.1	**Cluster Management Committee** 1. Cluster Management Committee shall be framed	

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Not Applicable for this Major Mineral mining Proposal.
	2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,	-
	3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	-
	4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	No Drilling & Blasting involved
	5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	-
	6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	-
	7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	-
	8. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	-
	Agriculture & Agro-Biodiversity	
	9. Impact on surrounding agricultural fields around the proposed mining Area.	172-173
	10. Impact on soil flora & vegetation around the project site.	173
	11. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	104 No transplantation of any tree due to the Proposal.
	12.The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	173
	13.Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	173
	14.The project proponent shall study and furnish the impact of project on plantations in adjoining patta	172-173

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	lands, Horticulture, Agriculture and livestock.	
	Forests	
	15.The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.	146 172-173
	16.The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	146-147, 154 172-173
	17.The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	104 No transplantation of any tree due to the Proposal.
	18.The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	146
	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.	135-136 No ground water-table intersection
	20. Erosion Control measures.	166
	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.	172
	22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	157-158
	23. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	172
	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.	157-159
	25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	173
	26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	172
	27. The EIA shall include the impact of mining activity on the following:	

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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.	166 166 173
	Energy 28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	166-173
	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. 30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features. 31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	167 173 173 167
	Mine Closure Plan 32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	102
	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.. 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.	166-173 166-173
	Risk Assessment 35. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	176-178
	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.	176-178

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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. 38. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan. 39. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	73 To be complied after PH 173
	Standard Terms of Reference for Mining of Minerals	
1	**Project Details**	
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.	78-79
1.2	A copy of the document in support of rightful lessee of the mine should be submitted. In case of new mines copy of LoI granted by State Government to be submitted. PP should ensure that LoI is valid at the time of grant of ToR. PP should submit the copy of lease deed/supplementary lease deed/extension letter/transfer deed, from its initial grant to subsequent renewals/ transfer/extension of validity.	Doc 1 – 205 Doc 2 - 208
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.	Complied
1.4	PP should submit the District Survey Report (DSR) as per S.O. 3611(E) dated 25.07.2018 in case of minor minerals.	Not Applicable for this Major Mineral mining Proposal
1.5	Brief of proposal to be submitted which include total excavation of the material required for the production of certain quantity of the minerals, location of the project, mining lease area, latitude longitude, seismic zone etc. In case of expansion project details of expansion viz. expansion in mining lease area or expansion in production of any particular mineral or expansion in total	80 82-83 CCR is Not Applicable

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	excavation, latest certified Compliance report (CCR) from IRO of conditions granted in existing EC needs to be submitted.	
1.6	The PP should submit the real-time aerial video footage & video of the mining lease area and of the transportation route.	67-70
1.7	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).	84-87
1.8	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	85-86
1.9	The PP should collect the Baseline data (BLD) in respect of initial level of the mining lease. For this permanent bench marks (BM) needs to be established at prominent location preferably close to mining leases in question and should have precisely known relationship to the level datum of the area, typically mean sea level.	81
1.10	In case of sand mining, the entire mining lease area should be divided suitably into grids of 25 m x 25 m with the help of sections across the width of river and along the direction of flow of the river. The levels (MSL & RL) of the corner point of each grid needs to be recorded. Each Grid should be suitably numbered for identification. PP should identity grids which will be worked out and grids which will come under no mining zone i.e. safety barriers from the river bank. PP should comply with the sustainable sand mining management guidelines 2016 and enforcement and monitoring guidelines, 2020 etc.	Not Applicable
1.11	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.	104
1.12	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA	104

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	Report.	
1.13	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.	101-102
1.14	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	181 175
1.15	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.	179
1.16	Compliance of the Ministry's Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgment of Hon'ble Supreme Court, dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.	Not Applicable Non-Violation Proposal 88
2	**Forest**	
2.1	PP shall submit a certificate from Chief Conservator of Forests regarding involvement of Forest Land in the mining lease area if any. In case forest land is involved i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & non-forest area.	Existing Mine & No Govt. / Forest Land involved. 76-77
2.2	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
2.3	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
2.4	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	146-147 154
3	**Court Matters**	
3.1	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 or Pending Case against the Proposal
4	**Land Environment**	
4.1	PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area.	Doc-1 & Doc-2 205-215
4.2	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.	105 106
4.3	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary,	142 144-146

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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.	105
4.4	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.	No outside Dump. No R&R issue-Exsisting Mine. 93 & 65
5	**Wildlife**	
5.1	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.	172
5.2	A detailed biological study of the study area [core zone and buffer zone] 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. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. 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/Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. Proof of its submission of conservation plan to the CWLW needs to be submitted.	146-159
5.3	PP shall submit a certificate from Chief Wildlife Warden regarding distance of mining lease from the protected area falling within 10 KM of the mining lease. In case project requires clearance under Wildlife (Protection) Act, 1972 then copy of application made for the same needs to be submitted.	76-77
6	**Baseline Environment**	
6.1	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 predominant downwind	March - May (Summer Season) 2024 Data are utilised. 105-165 116-120 121

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	direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	134
6.2	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 windrose showing pre-dominant wind direction may also be indicated on the map.	168-171 105 120
6.3	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this, PP should submit the original test reports and certificates of the labs from which samples were analyzed.	109-110
7	**Water Environment**	
7.1	The water requirement for the Project, its availability and source should be furnished. Quantity of surface to be used for the Project should be indicated. A detailed water balance should also be provided. Submit the year wise target for reduction in consumption of the surface water by developing alternative source of water through rain water harvesting measures. 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 capital and recurring expenditure to be incurred needs to be submitted.	103-104
7.2	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.	172
8	**Hydrogeology**	
8.1	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.	No nalla crossing or diversion due to the Proposal
8.2	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.	80
8.3	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 bench will intersect groundwater table, a detailed Hydro Geological Study should be	80 No ground water-table intersection

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	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. In case of surface water is proposed to be utilized then Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Appliccable
9	**Transportation**	
9.1	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.	167-168
10	**Land Acquisition and R&R**	
10.1	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.	Doc-1 205
10.2	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.	No R&R is involved for this existing Mine
11	**Socio-economic Environment**	
11.1	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.	165 160
11.2	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	153-160 164-165

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	frames for implementation.	
11.3	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.	To be complied after PH
11.4	Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry's OM F.No.22-65/2017-IA.III dated 30th September, 2020.	To be complied after PH
12	**Environmental Monitoring and Management**	
12.1	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.	63-64
12.2	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.	180-181
13	**Critically Polluted Areas, Aravalli & CRZ**	
13.1	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	Nil 105
13.2	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 105
14	**Risk Assessment & Disaster Management**	
14.1	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in	176-178

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	case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	
14.2	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.	173
14.3	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.	176-178
15	**Miscellaneous**	
15.1	The general points are also to be followed: -	
	a) All documents to be properly referenced with index and continuous page numbering.	Complied
	b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	Complied
	c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Complied
	d) Where the documents provided are in a language other than English, an English translation should be provided.	Complied
	e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Complied
	f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	6-7
	g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC/SEIAA-TN 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.	Nil
	h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate	Not Applicable

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	Change, as may be applicable. i) The EIA report should also include i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	 94 95 No external dumps
A	**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.	78-79
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	Doc 1 -205 Doc 2 - 208
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.	Complied
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).	84-87
5	Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	85-86
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.	Doc 1 -205 Doc 2 - 208
7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of	63-64

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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.	176-178
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.	105-106
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.	142 144-146 105
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.	No outside Dump. No R&R issue-Exsisting Mine. 93 & 65
12	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	76-77
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
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
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	146-147 154
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	146 Nil Not Applicable

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	submitted.	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	85-86 76-77
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.	146-159 No Schedule-I Fauna noticed in the area.
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Nil 105
20	Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Nil 105
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	No R&R involved – Existing Mine

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	whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	
22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	March - May (Summer Season) 2024 Data are utilised. 105-165 116-120 121 134
23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	168-171 105 120
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.	103-104
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable
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.	103-104
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.	172
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	80 No ground water-table intersection

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	
29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	No nalla crossing or diversion due to the Proposal
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.	80
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.	104
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.	167-168
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	104
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.	101-102
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.	173

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
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.	165 160
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.	159-165
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.	166-173
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.	To be complied after PH
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.	Nil
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.	181 175
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	176-178
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.	179
44	Besides the above, the below mentioned general points are also to be followed:- a) Executive Summary of the EIA/EMP Report b) All documents to be properly referenced with index and continuous page numbering. c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. e) Where the documents provided are in a language other than English, an English translation should be provided. f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	 Chapter 11-182 Complied Complied Complied Complied Complied – TOR Stage

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	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.	6-7
	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.	Nil
	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,	94
	(ii) geological maps and sections and	95
	(iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	No external dumps
	In addition to the above, the following shall be furnished:- The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:	
	1. Project name and location (Village, District, State, Industrial Estate (if applicable).	185
	2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.	194-195
	3. Measures for mitigating the impact on the environment and mode of discharge or disposal.	196-197
	4. Capital cost of the project, estimated time of completion.	197 & 188
	5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.	184
	6. A detailed study of the lithology of the mining lease area shall be furnished.	187
	7. Details of village map, “A” register and FMB sketch shall be furnished.	182
	8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall	194

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	be shall be submitted along with EIA report.	
	9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.	187
	10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.	Complied
	11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.	194
	12. The EIA study report shall include the surrounding mining activity, if any.	190
	13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.	194
	14. A study on the geological resources available shall be carried out and reported.	188
	15. A specific study on agriculture & livelihood shall be carried out and reported.	195
	16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.	196
	17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)	187 190
	18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population	193
	19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.	195
	20. Likely impact of the project on air, water, land, flora-fauna and nearby population	194-195
	21. Emergency preparedness plan in case of natural or in plant emergencies	195
	22. Issues raised during public hearing (if applicable) and response given	To be complied after PH
	23. CER plan with proposed expenditure.	188
	24. Occupational Health Measures	197
	25. Post project monitoring plan	195
	26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.	No GWT intersection
	27. A detailed report on the green belt development	194 & 197

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	already undertaken is to be furnished and also submit the proposal for green belt activities.	
	28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.	196
	29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.	194-195
	30. Reserve funds should be earmarked for proper closure plan.	197
	31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.	197
	Besides the above, the below mentioned general points should also be followed:-	
	a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.	Complied
	b. All documents may be properly referenced with index, page numbers and continuous page numbering.	Complied
	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.	Complied
	d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.	6-7
	e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -l1013/77/2004- IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website http://www.moef.nic.in/ may be referred.	7
	➢ After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in	Agreed to comply

Sl. No.	Awarded TOR	Incorporation in EIA Report Page No.
	accordance with the procedure prescribed under the EIA Notification, 2006. ➢ The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.	Agreed to comply

1.0 Introduction

1.1 Purpose of the Report

M/s. Dhandapani Cements Private Limited (DCPL) are operating a 900 TPD Cement Plant at Thathamangalam Village near Mannachanallur in Trichy District. DCPL is producing Ordinary Portland Cement (OPC) & Portland Pozzolana Cement (PPC) and marketing the products in the name **Maruthi Cement** in the States of Tamil Nadu and Kerala. Shri.S.Subramanian, is the Chairman. He and his son Mr.S.Saravanan are the Directors of DCPL. Both of them and their Family Members are having Limestone Mines in Perambalur, Ariyalur and Trichy Districts which are Captive Mines to DCPL Cement Plant.

Maruvathur Mining Lease in Perali (South) is one of the Captive Mines of DCPL which has been granted to Mr.S.Saravanan Director-DCPL vide GO 3(D) No. 263 dated 20.09.1995 for 20 Years over an extent of 3.545 Ha at SF Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu. The Mine is accessible from Perambalur-Ariyalur Section of NH-136 (earlier SH-27) at Perali by Perali-Maruvathur Road. It is at 2.0 km from NH-136 and 4.0 km by road. The mine is at a distance of 0.35 km in northwest of Maruvathur village.

GO 3(D) No. 263 dated 20.09.1995 is granted for 20 Years. Lease Deed was executed and registered on 18.10.1995. As per MMDR Amendment Act, 2015 existing lease is valid for 50 years i.e. upto 17.10.2045. Mining operations with Opencast Conventional Mining Method was commenced in the Mine on 28.10.1995. Limestone raised from the Lease was supplied to Dhandapani Cement Plant near Trichy at a distance of 38 km in southwest (51 km by road). 'Temporary Discontinuance Notice' for the Lease was given to IBM on 01.02.2016 and the **Mine is not in operation** since then. Present Review of Mining Plan (ROMP) has been approved by IBM, Chennai vide Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024 for Plan Period 2025-26 to 2029-30 and is **valid till 31.03.2030**.

Mineable Reserves ('111' Category) is 1,83,218 Tonnes ROM as on 02.07.2024. As approved by IBM, the Mine will be worked by **Non-Conventional Opencast Mechanised Method of Mining** by deploying Rock Breakers **without Drilling & Blasting**. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year. Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. Ore:Waste Ratio will be 1:1.48. Ultimate Pit Limit will be **22.0 m BGL.** Ground Water-table is at 38 m (Postmonsoon) & 40 m BGL (Premonsoon). **Mining will not intersect ground water-table. Life of the Mine is 5 Years only.**

'No prior EC is required for Mine with <5 Ha Extent' in the context of MoEF&CC Office Memorandum No. J-11013/182/2012-IA-II(M) dated 04.01.2013. The existing Mining Lease requires EC as per MoEF&CC Notification SO 141(E) dated 15.01.2016. There was no Violation as per EIA Notification 2006. Accordingly, EC Application was filed to SEIAA-TN vide Proposal No. SIA/TN/MIN/27577/2018 dated 08.05.2017 for a production of 80,000 Tonnes per Annum over an extent of 3.545 Ha. Terms of Reference (TOR) was awarded under Non-Violation Category vide Lr. No. SEIAA-TN/F.No.6275/TOR-381/2017 dated 18.05.2018. Public Hearing was not happened on account of COVID-19 pandemic and operational constraints. The validity of awarded TOR was expired on 17.05.2023.

The mineral Limestone to be mined out from this Lease is a Major Mineral over an extent **of <250 Ha** and falls in **Category 'B'** of Sl. No. 1(a) of EIA Notification 2006, as amended vide Notification SO 1886(E) dated 20.04.2022, for prior EC from SEIAA-TN. Thus, a fresh TOR Proposal has been filed vide Online Proposal No. SIA/TN/MIN/481764/2024 on 16.06.2024 and hard copy on 25.06.2024. The Proposal was deliberated by SEAC-TN in its 481st Meeting held on 01.08.2024 and SEIAA-TN in its 748th Meeting held on 13.08.2024. **Fresh TOR** has been awarded vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024, under **File No. 11024**/2024, with Public Hearing.

EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including **Sector-1 (Mining Projects) for Category 'A'** by the National Accreditation Board for Education & Training (**NABET**) vide Certificate NABET/EIA/2225/RA0290 dated 11.06.2023 with validity till 16.11.2025 (Sl. No. 4 of List). ABC Laboratory is accredited by the National Accreditation Board for Testing & Calibration Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2024 - valid till 02.04.2026.

Baseline Data (BLD) has been collected during **Mar.-May 2024 (Summer Season)** for Environmental Impact Assessment (EIA) Study in compliance with MoEF&CC Office Memorandum No. J-11013/41/2006-IA-II(I)(Part) dated 29.08.2017. Draft EIA Report has been prepared in compliance with awarded TORs and submitted along with Summary EIA Reports (both in English and Tamil versions) for Public Consultation & Public Hearing.

1.2 Project Proponent

M/s. Dhandapani Cements Private Limited (DCPL) are operating a Cement Plant at Thathamangalam Village near Mannachanallur in Trichy District. Shri.S.Subramanian, (Chairman) and **Mr.S.Saravanan** are the Directors of DCPL. The Plant was expanded from 200 TPD to 900 TPD Cement production after obtaining the Environmental Clearance (EC) from State Environmental Impact Assessment Authority-Tamil Nadu (SEIAA-TN) vide its Letter No. SEIAA/TN/EC/3(b)/006/F-236/2010 dated 22.07.2010.

DCPL is producing Ordinary Portland Cement (OPC) & Portland Pozzolana Cement (PPC) and marketing the products in the name **Maruthi Cement** in States of Tamil Nadu and Kerala. The Plant operations are in full compliance with the conditions/norms stipulated in the EC and Consents to Operate (CTOs) granted by Tamil Nadu Pollution Control Board (TNPCB).

1.3 Environmental Policy

Shri S.Subramanian, Chairman is dealing with the environmental issues and EC compliances. Any non-compliance/violations of environmental norms and the corrective actions taken will be reported by the Unit Head & Mine Head to the Director and Chairman.

1.4 Identification of the Project

1.4.1 DCPL Captive Mines

DCPL Cement Plant requires **Limestone of about 4.0-6.0 Lakhs Tons per Annum** (LTPA) @ 1,500-2,000 TPD of different grades for the existing Clinker Production of 2.50 LTPA. Presently, the limestone requirement of the Plant is being met from only 3 Mines (out of 12 Leases) for which ECs are obtained and **all other Leases are in Non-Operative Stage for want of ECs**. The Captive Mine details are given in **Table 1.1**.

Table : 1.1 Existing DCPL Captive Mines

Sl. No.	Name of the Limestone Mine	Extent, Ha	Grade	Limestone Reserves, Mio. Tonnes	Marl Reserves, Mio. Tonnes	Total Reserves, Mio. Tonnes	Existing / Proposed Production, LTPA
1	**Chinnapattakadu Mine I***	4.940	HG	5,00,785	0	5,00,785	0.9600
2	**Chinnapattakadu Mine II***	4.930	HG	4,76,970	0	4,76,970	0.8300
3	Karuppursenapathy Mine	4.670	LG	4,01,710	1,80,770	5,82,480	0.2000
4	Vayalapadi Mine-I	3.570	CG	7,61,500	3,04,600	10,66,100	0.4500
5	Vayalapadi Mine-II	4.750	CG	3,38,140	1,35,256	4,73,396	0.8900
6	Perali (South) Mine	3.545	CG	2,86,036	2,28,829	5,14,865	0.8000
7	**Perali (South) Mine***	1.920	LG	22,500	0	22,500	0.0725
8	Venkatachalapuram Mine-I	3.253	CG	3,38,276	1,35,310	4,73,586	0.7310
9	Venkatachalapuram Mine-II	2.235	CG	1,55,298	62,119	2,17,417	0.1000
10	Pullambadi Mine	1.870	CG	1,99,040	79,616	2,78,656	0.2885
11	Reddimangudi Mine	2.185	LG	1,15,502	46,201	1,61,703	0.0500
12	Shanamangalam Mine	3.115	LG	3,02,275	2,41,820	5,44,095	0.0250
Total		**40.983**		**38,98,032**	**14,14,521**	**53,12,553**	**5.3970**

* : Leases in operation with valid ECs.

1.4.2 Maruvathur Limestone Mine at Perali (South)

Existing **Maruvathur Mining Lease at Perali (South)** (located Village Name as Mine name as approved in ROMP) is one of the Captive Mines of DCPL which has been granted to Mr.S.Saravanan Director-DCPL vide GO 3(D) No. 263 dated 20.09.1995 for 20 Years over an extent of 3.545 Ha at SF Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu (**Fig. 1.1**). Lease area is **Own Land** (Ryotwari Dry Land) and **in his possession**. Mine is accessible from Perambalur-Ariyalur Section of NH-136 (earlier SH-27) at Perali by Perali-Maruvathur Road. It is at 2.0 km from NH-136 and 4.0 km by road. The mine is at a distance of 0.35 km in northwest of Maruvathur village. Dhandapani Cement Factory is located at a distance of 38 km in southwest (51 km by road).

Lease Deed was executed and registered on 18.10.1995 with validity till 17.10.2015. Lease Owner has submitted the ML Renewal Application on 26.08.2014 for another 20 years within the Lease validity period. As per MMDR Amendment Act 2015, the granted GO is **valid for 50 Years i.e. till 17.10.2045**.

Mining operations with Opencast Conventional Mining Method was commenced in the Mine on 28.10.1995. The Mine was in operation for 10 Years during First Mine Plan Period (1995-96 to 1999-2000) and First Scheme Period (2000-01 to 2004-05). The Mining operation was discontinued in October 2005 for non-viability. The Mining operations were revived again with IBM Approval on 11.06.2013 (**after about 8 Years**) and **stopped again in October 2014**. The 'Temporary Discontinuance Notice' for the Lease was given to IBM on 01.02.2016 and the **Mine is not in operation since then.** However, to keep the Mine in active consideration within the statutory period of 2 years, the Transport Permit was given on 08.11.2016 **for lifting 130 Tonnes from the mine stock with no production in the Year** as confirmed by DD-Mines, Perambalur vide Letter Rc. No. 239/G&M/2017 dated 12.04.2018.

Regional Setting along with **Mineral Transportation Route** is shown as **Plate-I**. Lease in Google Earth Imagery & nearby Settlements are shown as **Plate II**. Site Photographs are shown as **Plates III-V**. FMB Sketch is given as **Plate VI**. VAO Certificate and DFO NOC Application are appended as **Plates VII & VIII**. There are **human habitations (in recent time) adjacent to the Lease** in eastern side.

The Lessee's communication address is:

Shri. S.Saravanan,
Director, Dhandapani Cements Private Limited,
69, Ganapathy Nagar,
Tiruvanai Kovil, Trichy -620 005.
Tel. No. : 94892 01004
e-mail : dcplmaruthi@gmail.com

Fig. : 1.1 Index Map

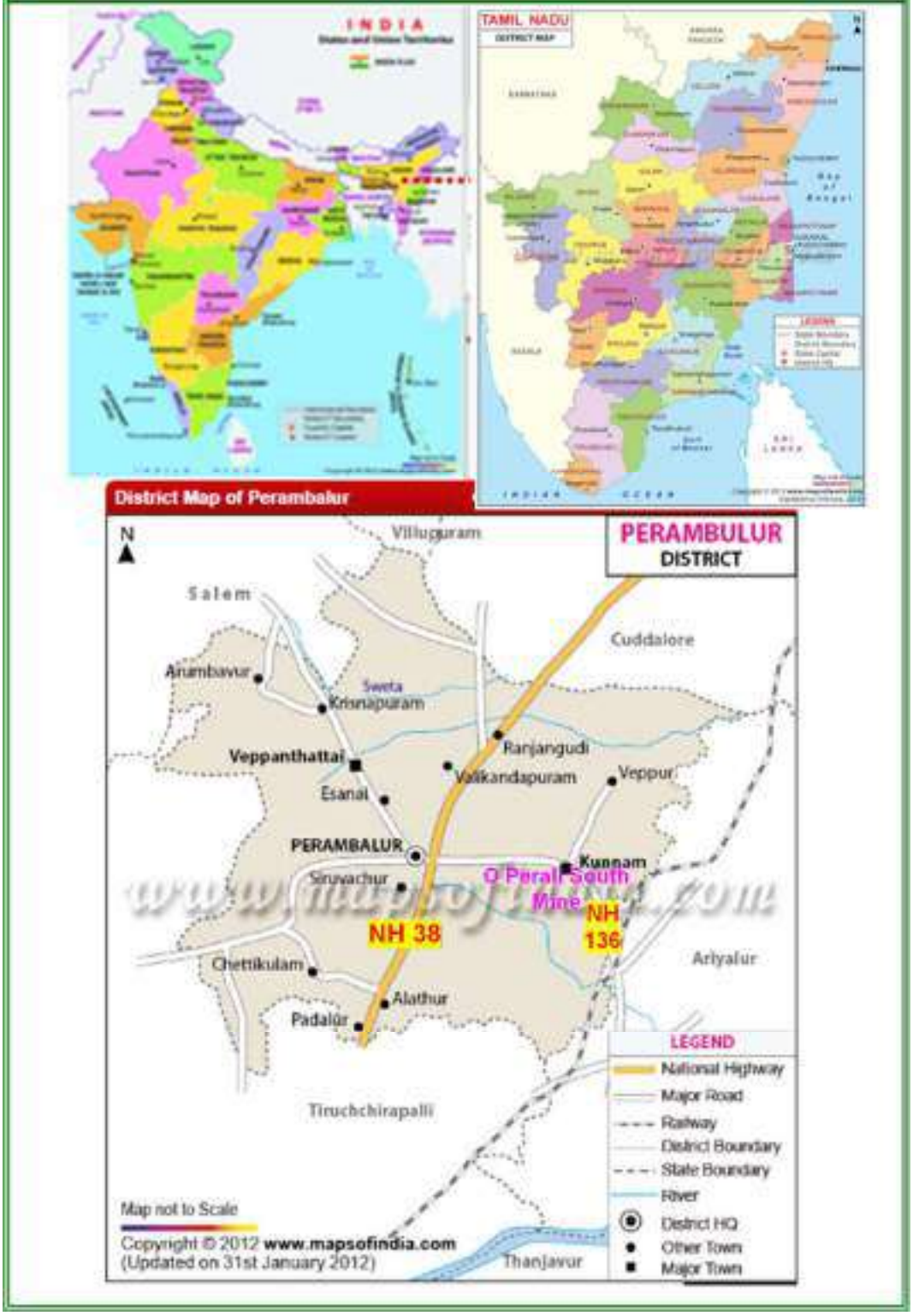

Plate : I Perali South Mine & DCPL Plant – Regional Setting
Ore Transportation Route

Plate : II Lease & its Environs in Google Earth Imagery

Plate : III Site Photographs dated 04.05.2024

Plate : IV Site Photographs dated 04.05.2024

Plate : V Site Photographs dated 04.05.2024

Wire Fencing around the Lease
With Entry/Exit Gate near Mine Office

Transportation Route adjacent to the Mine (-->)
To NH-136 & NH-38
DCPL Plant is at 51 km from the Mine

Habitations on the Eastern side
of the Lease

Plate : VI Lease Area in Village FMB

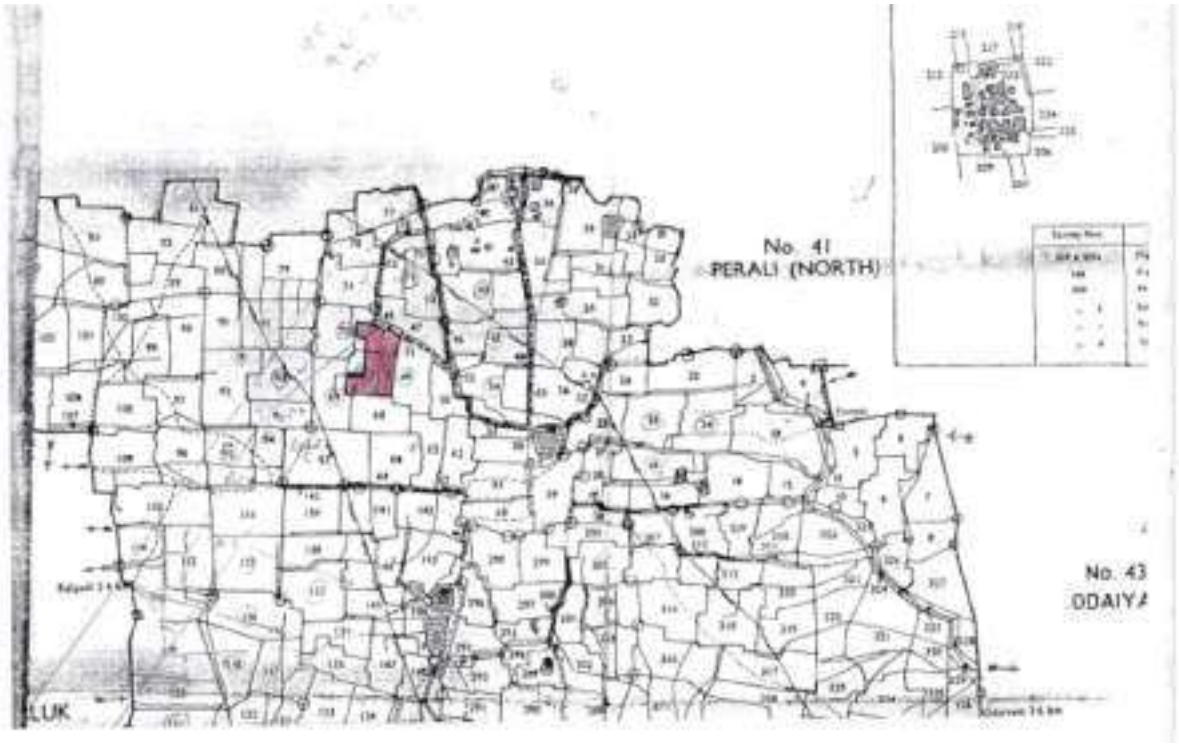

Plate : VII VAO Certificate

சான்று

பெரம்பலூர் மாவட்டம், குன்னம் வட்டம், பேரளி (தெ) கிராம புல எண் 49/1A, 49/1B 49/8A, 69/1B2, 69/1B3, 69/3C, 70/4B, 70/3B, தனிப்பட்டாவாகவும் மற்றும் 70/3A1 ல் இருப்பு பட்டாவாகவும் ஆக மொத்தம் 3.54.50 ஹெக்டேர் [illegible] சரவணன் என்பவர் பெயரில் பட்டா உள்ளது. இந்த நிலத்தின் வழியாக உயர் மின் அழுத்த மின் கம்பங்கள் ஏதும் செல்லவில்லை. 300 மீட்டர் சுற்றளவில் குடியிருப்புகள் (வீடுகள்) உள்ளன. A.D [illegible] [illegible] [illegible]

[signature]

கிராம நிர்வாக அலுவலர்
42, பேரளி (தெ),
குன்னம் வட்டம்

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ANNEXURE - 20A

தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : பெரம்பலூர் வட்டம் : குன்னம்

வருவாய் கிராமம் : பேரளி (தெ) பட்டா எண் : 309

உரிமையாளர்கள் பெயர்

1. சுப்பிரமணியன் மகன் சரவணன்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏ	ரூ - பை	ஹெக் - ஏ	ரூ - பை	ஹெக் - ஏ	ரூ - பை	
152	1A	0 - 12.00	0.30	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
152	1B	0 - 21.50	0.53	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
152	1C	0 - 12.00	0.30	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
152	1D	2 - 13.00	5.46	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
152	2	0 - 7.50	0.19	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
49	1A	0 - 32.50	1.60	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
49	1B	0 - 13.00	0.65	--	--	--	--	---- --இ இ இ-- --- 18-07-2001
49	2	0 - 12.00	0.60	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
49	3	0 - 10.50	0.52	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
49	6A	0 - 15.00	0.74	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
49	7	0 - 37.00	1.84	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
69	1B1	0 - 30.50	1.70	--	--	--	--	D2014/360--- - -இ இ இ----- 18-07-2001
69	1B2	0 - 32.00	1.78	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
69	1B3	0 - 33.00	1.83	--	--	--	--	---- --இ இ இ-- --- 18-07-2001
69	3C	0 - 51.50	2.84	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
70	3B	0 - 12.00	0.67	--	--	--	--	---- --இ இ இ-- --- 18-07-2001
70	4A	0 - 10.00	0.56	--	--	--	--	D2014/360--- - -இ இ இ----- 18-07-2001
70	4B	0 - 10.00	0.56	--	--	--	--	---- --இ இ இ-- --- 02-03-2002
		5 - 65.00	22.67					

தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : பெரம்பலூர் வட்டம் : குன்னம்

வருவாய் கிராமம் : பேரளி (தெ) பட்டா எண் : 1223

உரிமையாளர்கள் பெயர்

1. சுப்ரமணியன் மகன் சடையன்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்-ஏர்	ரூ-பை	ஹெக்-ஏர்	ரூ-பை	ஹெக்-ஏர்	ரூ-பை	
49	8A	1-53.00	7.56	--	--	--	--	---- --இ இ இ-- --- 18-07-2001
		1-53.00	7.56					

தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : பெரம்பலூர் வட்டம் : குன்னம்

வருவாய் கிராமம் : பேரளி (தெ) பட்டா எண் : 1248

உரிமையாளர்கள் பெயர்

1. ராமலிங்கம் மனைவி சரஸ்வதி
2. ராமலிங்கம் மனைவி காளியம்மி
3. சுப்பிரமணியன் மகன் சடையன்
4. நடேசப்பன் மகன் முத்துசாமி

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்-ஏர்	ரூ-பை	ஹெக்-ஏர்	ரூ-பை	ஹெக்-ஏர்	ரூ-பை	
70	3A1	1-10,50	2.49	--	--	--	--	2022/0105/16/104661-/2022/16/02/00008950 -------- 30-09-2022
		1-10,50	2.49					

குறிப்பு :

1. மேற்கண்ட தகவல் / சான்றிதழ் தகவல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இச்சான்று தொடர்புக்கு **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **16/02/682/01248/10205** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளலாம்.
2. இத் தகவல்கள் 26-06-2024 அன்று 06:00:02 PM மணிக்கு அச்சடிக்கப்பட்டது.
3. ஸ்மார்ட்போன் மூலமாக 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கலாம்

Plate : VIII DFO NOC-Application

S. Saravanan,
Lessee-Perali(South) Limestone Mining Lease (3.545 Ha),
Sathammai Chemicals Pvt. Ltd.,
69, Ganapathy Nagar,Tiruvanaikovil,
Trichy-620 005.
Mob : 9489201004
Mail : dcplmaruthi@gmail.com

Date :7th May 2024

To

The District Forest Officer,
Perambalur District

Respected Sir,

Sub :Environemntal Clearance for **ExistingPerali (South) Limestone Mine-Extent 3.545 Ha & Production 41,850 TPA ROM**- in S. F. Nos.49/1A, 1B, 8A(P), 69/1B2, 1B3, 3C, 70/3A(P), 4B & 3B of Perali (South) Vilages, Kunnam Taluk, Perambalur District of Tamil Nadu - Sl. No. 1(a); Category B –Requisition for NOC from Forest Department – reg.

Ref. : 1. Proposal No. IA/TN/MIN/64549/2017 dated 08.05.2017.
2. File No. SEIAA-TN/F.8275/2017/NGT.

The Perali (South) Limestone Mining Lease over an extent of 3.545 Ha in S. F. Nos.49/1A, 1B, 8A(P), 69/1B2, 1B3, 3C, 70/3A(P), 4B & 3B of Perali (South) Village, Kunnam Taluk, Perambalur District of Tamil Nadu is one of the Captive Mines of Dhandapani Cement Private Limited having the Cement Plant near Samayapuram. The Mine is in Temporary Discontinuance since 2016-17 for want of Environmental Clearance (EC) as it is mandatory for <5 Ha Mines also after 15.01.2016. We have applied to the State Level EIA Authority-Tamil Nadufor the EC. As per the Terms of Reference (TOR) of SEIAA-TN, NOC from the DFO are required as detailed below :

Forest	
1.	PP shall submit a certificate from Chief Conservator of Forests regarding involvement of Forest Land in the mining lease area if any. In case forest land is involved i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & non-forest area.

1.	PP shall submit a certificate from Chief Wildlife Warden regarding distance of mining lease from the protected area falling within 10 KM of the mining lease. In case project requires clearance under Wildlife (Protection) Act, 1972 then copy of application made for the same needs to be submitted.

Accordingly, we request your good office to issue the NOC for submission to SEIAA-TN.

Thanking you,

Yours faithfully,

S. Saravanan, Lease Owner

Attachement : earlier NOC issued to Perali (S) Mine.

TAMIL NADU FOREST DEPARTMENT

From
Thiru.A.S.Mohan ram, M.Sc.,
District Forest Officer (I/c),
Perambalur Forest Division,
Perambalur.
E.Mail dfopblrd@yahoo.com
Ph.No. 04328-224422.

To
The Managing Director,
Dhandapani Cements Pvt. Ltd.,
Ariyalur.

C.No.3033/2017/P, dated: 06.12.2017.

Sir,

Sub : Requisition of No Environmental Sensitive areas in the Mining site of Dhandapani Cements Pvt. Ltd., Tmt.S.Sathamai (Lease Owner) located in existing Perali Limestone Mines over an extent of 01.92. Ha. at S.F.No.23/12B, 16, 17, 18, 24/4, 24/6 & 24/7 of Perali (South) Village, Kunnam Taluk, Perambalur District – Regarding.

Ref :
1. Dhandapani Cements Pvt. Ltd., Ariyalur Letter No. Nil, dated 18.09.2017.
2. Forest Range Officer, Perambalur report C.No.356/2017, dated 17.10.2017.
3. This Office even Lr.No.3033/2017/P, dated 27.10.2017.

In continuance of reference 3rd cited, it is informed that "No Forest Land is involved" in the Mining lease of Tmt.S.Sathamai (Lease Owner) located in existing Perali Limestone Mines over an extent of 01.92. Ha. at S.F.No.23/12B, 16, 17, 18, 24/4, 24/6 & 24/7 of Perali (South) Village Kunnam Taluk, Perambalur District.

Further it is informed that "No National Park, Sanctuaries, Biosphere Reserves, Wildlife corridors lies within 10 km distance from the Mine boundary. There are 2 Resered Forests within 10 km radius from the mining site viz., Kunnam RF @ 0.25 km in east direction and Chithali RF @ 3.50 km in north direction Kunnam Taluk, Perambalur District. There is no objection for this existing mining operations in the area.

Yours faithfully,

6-12-2017

District Forest Officer (I/C),
Perambalur.

6/12/17

1.5 Project Profile

Project Name : Existing Maruvathur Limestone Mine over an Extent of 3.545 Ha at SF. Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/3B & 70/4B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu by Thiru.S. Saravanan.

Project Location : The Mine is accessible from Perambalur-Ariyalur Section of NH-136 (earlier SH-27) at Perali by Perali-Maruvathur Road. It is at 2.0 km from NH-136 and 4.0 km by road. The mine is at a distance of 0.35 km in northwest of Maruvathur village. Dhandapani Cement Factory is located at a distance of 38 km in southwest (51 km by road).

Statutory Approvals : GO 3(D) No. 263 dated 20.09.1995 is granted for 20 Years (**Document-1**). Lease Deed was executed and registered on 18.10.1995 (**Document-2**). As per MMDR Amendment Act, 2015 existing lease is valid for 50 years i.e. upto 17.10.2045. 'No prior EC is required for Mine with <5 Ha Extent' in the context of MoEF&CC Office Memorandum No. J-11013/182/2012-IA-II(M) dated 04.01.2013. No CTO was also there. The Lessee has applied and obtained Mining Plan Approvals from Indian Bureau of Mines (IBM), Chennai periodically, as appended. Present Review of Mining Plan (ROMP) has been approved by IBM, Chennai vide Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024 for Plan Period 2025-26 to 2029-30 and is **valid till 31.03.2030** (**Document-3**).

i. First Mining Plan (1995-96 to 1999-2000) approval vide IBM Ltr. TN/PCR/MT/LST-804-MDS dt. 01.05.1995.
ii. First Scheme of Mining (2000-01 to 2004-05) approval vide IBM Ltr. TN/PBR/LST/MS-90-MDS dt. 15.01.2001.
iii. Plan periods 2005-06 to 2009-10 & 2010-11 to 2012-13 – **No mining**.
iv. SoM Approval (2013-14 to 2015-16) approval vide IBM Ltr. TN/PBR/LST/MS-1076-MDS dt. 04.07.2014
v. Mining Plan (2015-16 to 2019-20) approval vide IBM Letter No. TN/PBR/MP/LST-1934.MDS dated 02/03.12.2014.
vi. Review of Mining Plan (2020-21 to 2024-25) approval vide IBM Letter No. TN/PBR/LST/ROMP-1577.MDS dated 10.12.2019 – **No mining**.
vii. ROMP approval (2025-26 to 2029-30) vide IBM Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024-**valid till 31.03.2030**.

Past Production : The authenticated production from the Lease, with Assistant Director (Geology & Mines), Ariyalur District **Proceedings references** (**Document-4**), is given in **Table 1.2**. Production achieved so far was 1,36,515.44 Tonnes and Transported quantity was 1,35,476.24 Tonnes. Balance quantity at Pit Head is 1,039.2 Tonnes. 'Temporary Discontinuance Notice' for the Lease was given to IBM on 01.02.2016 (**Document-5**) and the **Mine is not in operation** since then. Thus, there is **no Violation** as per EIA Notification vide SO 141€ dated 15.01.2016.

Table : 1.2 AD Mines Authenticated Production in the Lease since Commencement

Year	Period	Actual Production, Tonnes	Despatch, Tonnes	Balance Qty. in Mine Pit, Tonnes	AD Mine Proceeding Reference
Oct. 1995-96	-	34,804.000	34,760.870	43.130	Audit Report dt.17.05.1996
1996-97	I Half	51,880.000	51,909.590	13.540	Audit Report dt. 13.12.1996
1996-97	II Half	13,310.000	13,201.530	122.010	Audit Report dt. 05.06.1997
1997-98	I Half	11,890.440	10,980.370	1,032.080	Audit Report dt. 04.02.1998
1997-98	II Half	4,696.000	4,656.780	1,071.300	Audit Report dt. 29.06.1998
1998-99	Yrly.	0	0	1,071.300	Ltr. 175/99 dt. 07.02.2000
1999-2000	I Half	420.000	436.760	1,054.540	Ltr. 175/99 dt. 07.02.2000
1999-2000	II Half	280.000	261.710	1,072.830	Ltr. 289/2000 dt. 15.05.2000
2000-01	I Half	2,090.000	2,108.780	1,054.050	Ltr. 722/2000 dt. 08.11.2000
2000-01	II Half	0	0	1,054.050	Ltr. 62/2001 dt. 30.04.2001
2001-02	I Half	50.000	52.400	1,051.650	Ltr. 62/2001 dt. 15.10.2001
2001-02	II Half	10.000	0	1,061.650	Ltr. 62/2001 dt. 14.05.2002
2002-03	I Half	0	0	1,061.650	Ltr. 134/2002 dt. 29.10.2002
2002-03	II Half	0	0	1,061.650	Ltr. 232/2003 dt. 26.06.2003
2003-04	Yrly.	105.000	0	1,166.650	Proceedings dt. 04.07.2004
2004-05	Yrly.	50.000	53.710	1,162.940	Proceedings dt. 12.05.2007
2005-06	Yrly.	50.000	50.250	1,162.690	Proceedings dt. 12.05.2007
2006-07	Yrly.	50.000	50.810	1,161.880	Proceedings dt. 15.06.2009
2007-08	Yrly.	0	0	1,161.880	Proceedings dt. 15.06.2009
2008-09	Yrly.	0	0	1,161.880	Proceedings dt. 15.06.2009
2009-10	Yrly.	0	0	1,161.880	No Mining or Transportation
2010-11	Yrly.	0	0	1,161.880	No Mining or Transportation
2011-12	Yrly.	0	0	1,161.880	Rc.No.22/G&M/2016/05.02.2016
2012-13	Yrly.	0	0	1,161.880	Rc.No.22/G&M/2016/05.02.2016
2013-14	Yrly.	0	0	1,161.880	Rc.No.22/G&M/2016/05.02.2016
2014-15	Yrly.	11,880.000	11,894.970	1,146.910	Rc.No.22/G&M/2016/05.02.2016
2015-16	Yrly.	4,950.000	4,927.710	**1,169.200**	Rc.No.36/G&M/2016/20.04.2016
2016-17	Yrly.	**0 (no production)**	**130.000 (from stock)**	1,039.200	Rc.No.239/G&M/2017/12.04.2018
2017-18	Yrly.	0	0	1,039.200	Rc.No.115/G&M/2018/12.07.2018
2018-19	Yrly.	0	0	1,039.200	Rc.No.115/G&M/2019/20.07.2019
2019-20	Yrly.	0	0	1,039.200	-
2020-21	Yrly.	0	0	1,039.200	Rc.No.35/G&M/2021/26.08.2021
2021-22	Yrly.	0	0	1,039.200	-
2022-23	Yrly.	0	0	1,039.200	-
2023-24	Yrly.	0	0	1,039.200	-
Total		**1,36,515.44**	**1,35,476.24**	**1,039.200**	

1.6 Need for the Proposal

TOR was awarded for the Project under Non-Violation Category vide Lr. No. SEIAA-TN/F.No.6275/TOR-381/2017 dated 18.05.2018. SEIAA vide its Letter SEIAA-TN/F.No.6275/2017 dated 21.01.2019 intimated to follow TORs issued for preparing the EIA Report along with Public Hearing. The Public Hearing was not happened on account of COVID-19 pandemic and operational constraints. The validity of awarded TOR was expired on 17.05.2023 and thus, a **fresh TOR Proposal has been filed**.

1.7 The Proposal

Mineable Reserves ('111' Category) is 1,83,218 Tonnes ROM as on 02.07.2024. As approved by IBM, the Mine will be worked by **Non-Conventional Opencast Mechanised Method of Mining** by deploying Rock Breakers **without Drilling & Blasting**. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year. Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. Ore:Waste Ratio will be 1:1.48. Ultimate Pit Limit will be **22.0 m BGL.** Ground Water-table is at 38 m (Postmonsoon) & 40 m BGL (Premonsoon). **Mining will not intersect ground water-table. Life of the Mine is 5 Years only.** No Beneficiation/Screening is required. During the Plan Period, Top Soil of 18,720 Tons, OB material of Clay of 2,51,924 Tons & Mineral Rejects of 64,126 Tonnes will be generated and temporarily dumped in the northern part for further utilization. The DGPS Survey Plan is given as **Plate IX**. Mine Particulars are detailed in **Table 1.3**.

Mine Profile :

Pit Configuration-Existing	**:**	**Pit-1 : 110 x 118 x 18 m & Pit-2 : 68 x 45 x 2 m (d)**
Reserves '111' Category	:	1,83,218 Tonnes ROM
Proposed Production	:	1,83,218 Tonnes @ 41,850 TPA ROM (Maximum)
No. of Days	:	300 days on 1-Shift operation
Life of the Mine	**:**	**5 years**
Ore:Waste Ratio	:	1:1.48
Pit Configuration-Conceptual	:	**Pit-1 : 180 x 110 x 22 m (d) & Pit-2 : 68 x 45 x 16 m (d)**
Bench height	:	4 m
Bench width	:	6 m
Bench slope	:	60^{o} (from horizontal)
Ultimate Pit Limit-Conceptual	:	**22.0 m (BGL)**
		Top RL – 131 m & Bottom RL – 109 m
Ground Water-table at	:	38 m BGL (Postmonsoon) & 40 m (Premonsoon)

Mining will not intersect the ground water-table.

Plate : IX DGPS Survey Plan of the Lease

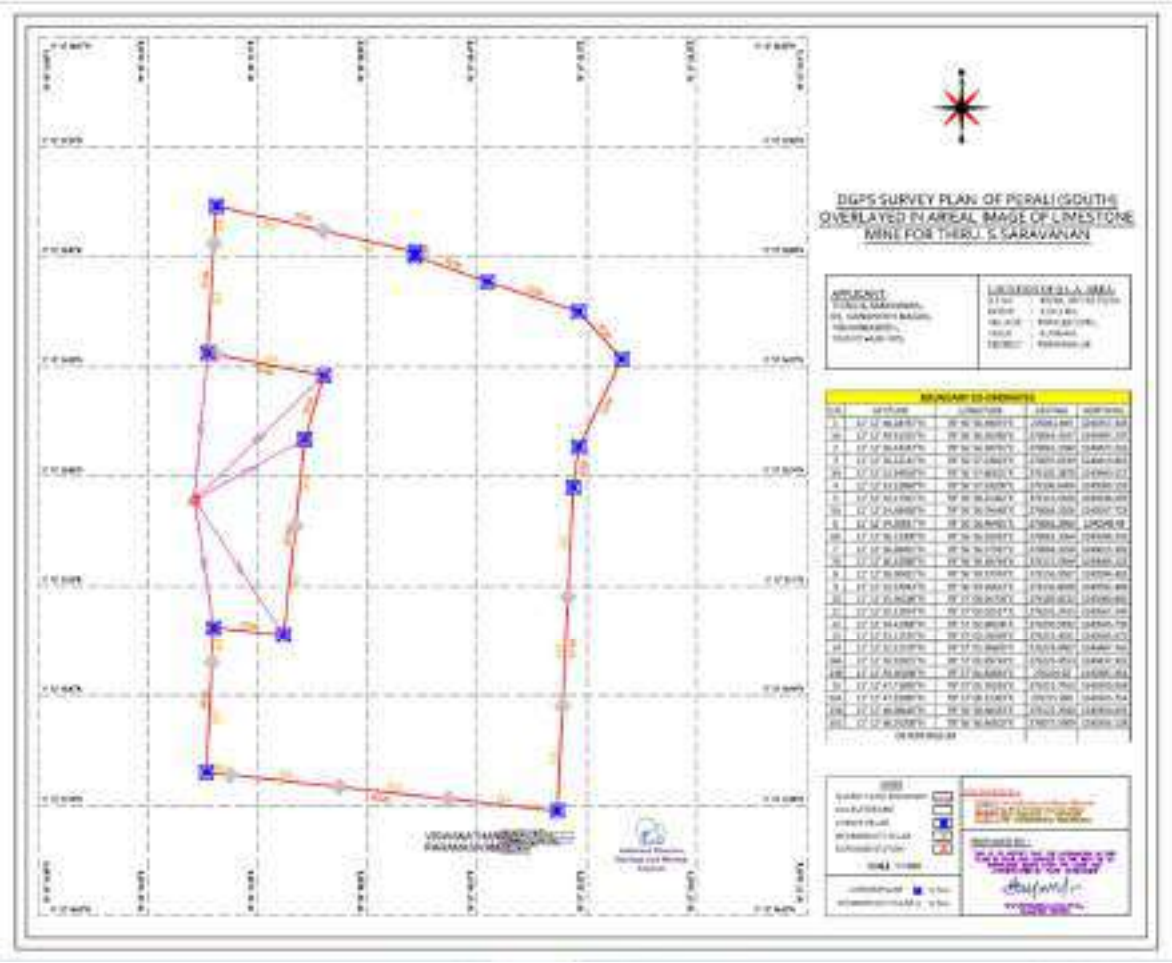


Table : 1.3 Mine Particulars

<table>
<tr><th>Sl. No.</th><th>Details on</th><th>Particulars</th></tr>
<tr><td>1</td><td>Name of the Lease</td><td>Existing Maruvathur Limestone Mine at Perali (South)
GO 3(D) No. 263 Industries (MMA2) Dept. dated 20.09.1995</td></tr>
<tr><td>2</td><td>Lease Owner</td><td>Mr.S.Saravanan, Director, DCPL, Trichy</td></tr>
<tr><td>3</td><td>Extent of Lease</td><td>3.545 Ha</td></tr>
<tr><td>4</td><td>Dead Execution</td><td>Lease Deed was executed & registered on 18.10.1995.</td></tr>
<tr><td>5</td><td>Lease Validity</td><td>20 years i.e. upto 17.10.2015. As per MMDR Amendment Act, 2015 existing lease is valid for 50 years i.e. upto 17.10.2045.</td></tr>
<tr><td>6</td><td>Lease Location</td><td>S. F. Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu. The mine is at a distance of 0.35 km in northwest of Maruvathur village.</td></tr>
<tr><td>7</td><td>Land Ownership</td><td>Own Land (Ryotwari Dry Land) in his possession</td></tr>
<tr><td>8</td><td>Lithology</td><td>Topsoil is black cotton soil up to a depth of 1 m BGL. Clay is below topsoil with thickness of 8 m. Below which, Limestone bed exists with 7-13 m thickness over Charnockites. There is no other Minerals/resources like sand in the Lease.</td></tr>
<tr><td>9</td><td>Permitted Mineral</td><td>Limestone (as ROM)</td></tr>
<tr><td>10</td><td>Commencement on</td><td>28.10.1995</td></tr>
<tr><td>11</td><td>Mining Plan / Scheme Approvals</td><td>i. First Mining Plan (1995-96 to 1999-2000) approval vide IBM Ltr. TN/PCR/MT/LST-804-MDS dt. 01.05.1995.
ii. First Scheme of Mining (2000-01 to 2004-05) approval vide IBM Ltr. TN/PBR/LST/MS-90-MDS dt. 15.01.2001.
iii. Plan periods 2005-06 to 2009-10 & 2010-11 to 2012-13 – No mining.
iv. SoM Approval (2013-14 to 2015-16) approval vide IBM Ltr. TN/PBR/LST/MS-1076-MDS dt. 04.07.2014
v. Mining Plan (2015-16 to 2019-20) approval vide IBM Letter No. TN/PBR/MP/LST-1934.MDS dated 02/03.12.2014.
vi. Review of Mining Plan (2020-21 to 2024-25) approval vide IBM Letter No. TN/PBR/LST/ROMP-1577.MDS dated 10.12.2019 – No mining.
vii. ROMP approval (2025-26 to 2029-30) vide IBM Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024-valid till 31.03.2030.</td></tr>
<tr><td>12</td><td>Past Production (since Commencement)</td><td>
<table>
<tr><th>Plan/ Scheme</th><th>Period</th><th>ROM, Tonnes</th><th>Dispatch, Tonnes</th></tr>
<tr><td>1st MP</td><td>1995-96 to 1999-2000</td><td>1,17,280.44</td><td>1,16,207.61</td></tr>
<tr><td>1st SoM</td><td>2000-01 to 2004-05</td><td>2,305.00</td><td>2,214.89</td></tr>
<tr><td>-</td><td>2005-06 to 2012-13</td><td>No Mining</td><td>-</td></tr>
<tr><td>2nd SoM</td><td>2013-14 to 2015-16</td><td>16,830.00</td><td>16,822.68</td></tr>
<tr><td>MP</td><td>2015-16 to 2019-20</td><td>0</td><td>130.00</td></tr>
<tr><td>ROMP</td><td>2020-21 to 2024-25</td><td>No Mining</td><td>0</td></tr>
<tr><td colspan="2">Total</td><td>1,36,515.44</td><td>1,35,476.24</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sl. No.</th><th>Details on</th><th>Particulars</th></tr>
<tr><td></td><td></td><td>Balance qty. at Pit Head is 1,039.2 Tonnes. The mine is now in temporary stoppage since 01.02.2016 and there was no Production from 15.01.2016 to till date.</td></tr>
<tr><td>13</td><td>Assessed Reserves</td><td>3,19,733 Tonnes ROM</td></tr>
<tr><td>14</td><td>Production so far</td><td>1,36,515.44 Tonnes @ maximum 51,910 TPA (1996-97)</td></tr>
<tr><td>15</td><td>Dispatch Quantity</td><td>1,35,476.24 Tonnes & balance 1,039.20 Tonnes at Pit Head</td></tr>
<tr><td>16</td><td>Mineable Reserves</td><td>1,83,218 Tonnes ROM as on 02.07.2024</td></tr>
<tr><td>17</td><td>Process Description</td><td>As approved by IBM, the Mine will be worked by Non-Conventional Opencast Method of Mining by deploying Rock Breakers without Drilling & Blasting. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year. Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. No Beneficiation/Screening is required. Life of the Mine is 5 years only.</td></tr>
<tr><td>18</td><td>Proposed Production</td><td><u>Plan Period (2025-26 to 2029-30) :-</u>
<table>
<tr><th>Year</th><th>Proposed ROM Production, Tonnes</th></tr>
<tr><td>2025-26</td><td>20,936</td></tr>
<tr><td>2026-27</td><td>40,412</td></tr>
<tr><td>2027-28</td><td>38,368</td></tr>
<tr><td>2028-29</td><td>41,652</td></tr>
<tr><td>2029-30</td><td>41,850</td></tr>
<tr><td>Total</td><td>1,83,218</td></tr>
</table></td></tr>
<tr><td>19</td><td>Ground water table intersection</td><td>Nil. Ultimate Pit Limit will be 22.0 m (BGL). Ground Water-table is at 38 m BGL (Postmonsoon) & 40 m (Premonsoon). Mining will not intersect ground water-table-No Hydrogeological study</td></tr>
<tr><td>20</td><td>Project Cost</td><td>Rs.10.00 Lakhs</td></tr>
<tr><td>21</td><td>Project Schedule</td><td>Existing mine will be operated immediately on receipt of EC & CTOs-Commencement from 01.07.2025 & Mine life is 5 years.</td></tr>
<tr><td>22</td><td>R & R Issue</td><td>Nil</td></tr>
<tr><td>23</td><td>Litigation/Case Details</td><td>Nil</td></tr>
<tr><td>24</td><td>CER Budget</td><td>2% of Project Cost</td></tr>
<tr><td>25</td><td>Financial Assurance</td><td>Financial assurance works out to Rs.8,74,800/-. Lessee has submitted BGs of Rs,10,00,000/- & another Rs.2,00,000/-</td></tr>
<tr><td>26</td><td>Violation, if any</td><td>No violation & No penalty levied for any purpose.
<table>
<tr><th>Criteria</th><th>As on Date</th><th>Approved Qty.</th></tr>
<tr><td>Existing pit dimension</td><td>Pit1-180x110x22 m
Pit2-68 x 45 x 16 m</td><td>As approved by IBM</td></tr>
<tr><td>Quantity achieved</td><td>1,36,515.44 T</td><td></td></tr>
<tr><td>Balance quantity</td><td>1,83,218 T</td><td></td></tr>
<tr><td>Mined out depth</td><td>18 m BGL & final 22 m</td><td>As approved</td></tr>
<tr><td>Illicit mining, if any</td><td>Nil</td><td>-</td></tr>
<tr><td>Condition of Safety zone/benches</td><td>Safe & Stable</td><td>-</td></tr>
</table></td></tr>
</table>

1.8 Environmental Setting

The Mine is located inbetween **11º12'47.83"- 11º12'56.76" N Latitude & 78º56'56.46"-78º57'02.68" E Longitude** (Survey of India Topo Sheet No. 58 I/16) (**Fig. 1.2**). The Boundary Coordinates are appended below :

1. 11º12'48.36''N 78º56'56.49''E 9. 11º12'56.03''N 78º56'59.57''E
2. 11º12'50.50''N 78º56'56.59''E 10. 11º12'55.66''N 78º57'00.66''E
3. 11º12'50.40''N 78º56'57.64''E 11. 11º12'55.23''N 78º57'02.03''E
4. 11º12'53.31''N 78º56'57.93''E 12. 11º12'54.53''N 78º57'02.68''E
5. 11º12'54.26''N 78º56'58.21''E 13. 11º12'53.23''N 78º57'02.04''E
6. 11º12'54.58''N 78º56'56.46''E 14. 11º12'52.62''N 78º57'01.97''E
7. 11º12'56.76''N 78º56'56.58''E 15. 11º12'47.83''N 78º57'01.76''E
8. 11º12'56.10''N 78º56'59.57''E .

There are no eco sensitive areas like National Parks, Biosphere Reserves, Wildlife Sanctuaries, Elephant Corridor, Archaeological/Historical Monuments, Heritage sites, etc. within 10 km from the Mine boundary. There are 2 Reserved Forests within 10 km radius area viz. Kunnam RF @ 1.5 km in east & Chithali RF @ 3.3 km in north (**Fig. 1.3**). Environmental Setting of 10 km Radius is dealt in **Table 1.4**. Area is with elevation of 80-140 m above MSL and the Mine area elevation is of about 137 m. It is almost flat with gentle gradient towards south. It falls in Seismic Zone-III.

Seasonal River Marudaiyar drains the region which flows at 2.5 km south from the Mine. A seasonal Odiyam Odai flows at a distance of 2.9 km in the east and joins the Marudaiyar River in southeast. Another Seasonal Nalla Elumur Ar originates (2.7 km) from Chithali RF and flows towards North in the Study Area.

National Highway (NH)-136 (Perambalur-Ariyalur-Thanjavur Section) runs at 2.0 km in north and NH-38 (earlier NH-45) (Vikravandi-Trichy Section) runs at 6.5 km in west. Southern Railway BG Line runs through Ariyalur at a distance of 15.0 km in southeast. The nearest Airport is Trichy at a distance of 55 km in the south-southwest. The nearest Ports are at Karaikkal (105-SE), Cuddalore (104 km-NE) and Chennai (225 km in NE).

Maruvathur is the nearest Hamlet (0.35 km from the Mine in SW) in Perali South village with Population of 2,560 (1,323 Males & 1,237 Females) in 671 Households. The District Head Quarters Perambalur is at 5.8 km in northwest.

Surrounding mining activity : Kaulpalayam Rough Stone quarries with their Stone Crushers are located at 3.3 km in the western parts of ML Area. **Non-operating Mines** viz. DCPL Perali (South) Mine (1.92 Ha @ 1.0 km in ESE), Parvin Mines (0.7-0.9 km in SSW), Chettinad Cement Azur Mine (@ 7.4 km in NE), Ramco Cement Varagupadi Mine (@ 7.8 km in SW) and Ultratech Varagupadi Mine (@ 9.7 km in SW) are located within the Study Area.

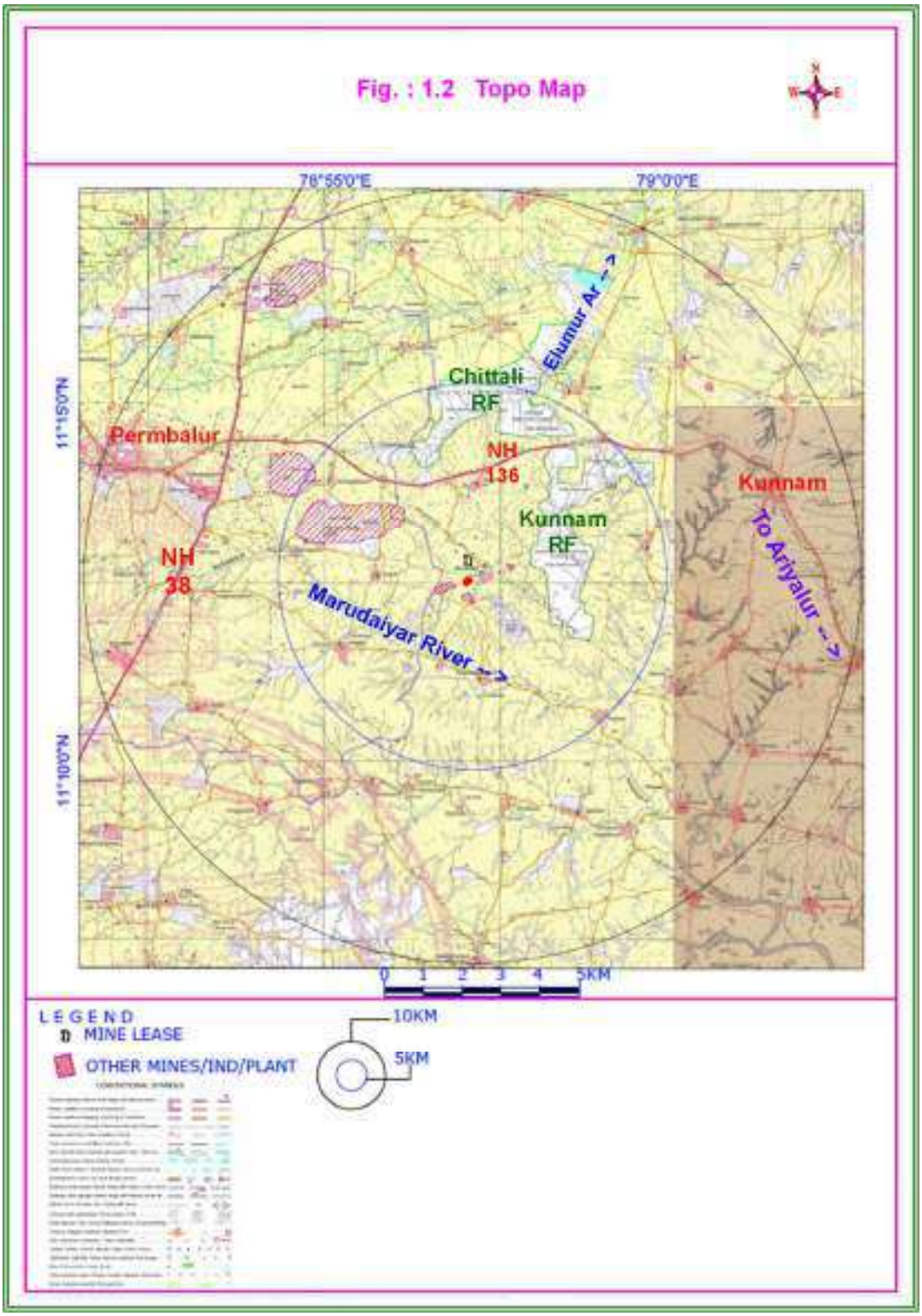


Fig. : 1.2 Topo Map
78°55'0"E
79°0'0"E
11°5'0"N
11°0'0"N
Elumur Ar
Chittali RF
Permbalur
NH 136
Kunnam
To Ariyalur
Kunnam RF
NH 38
Marudaiyar River
0 1 2 3 4 5KM
LEGEND
MINE LEASE
OTHER MINES/IND/PLANT
10KM
5KM

Fig. : 1.3 Environmental Setting

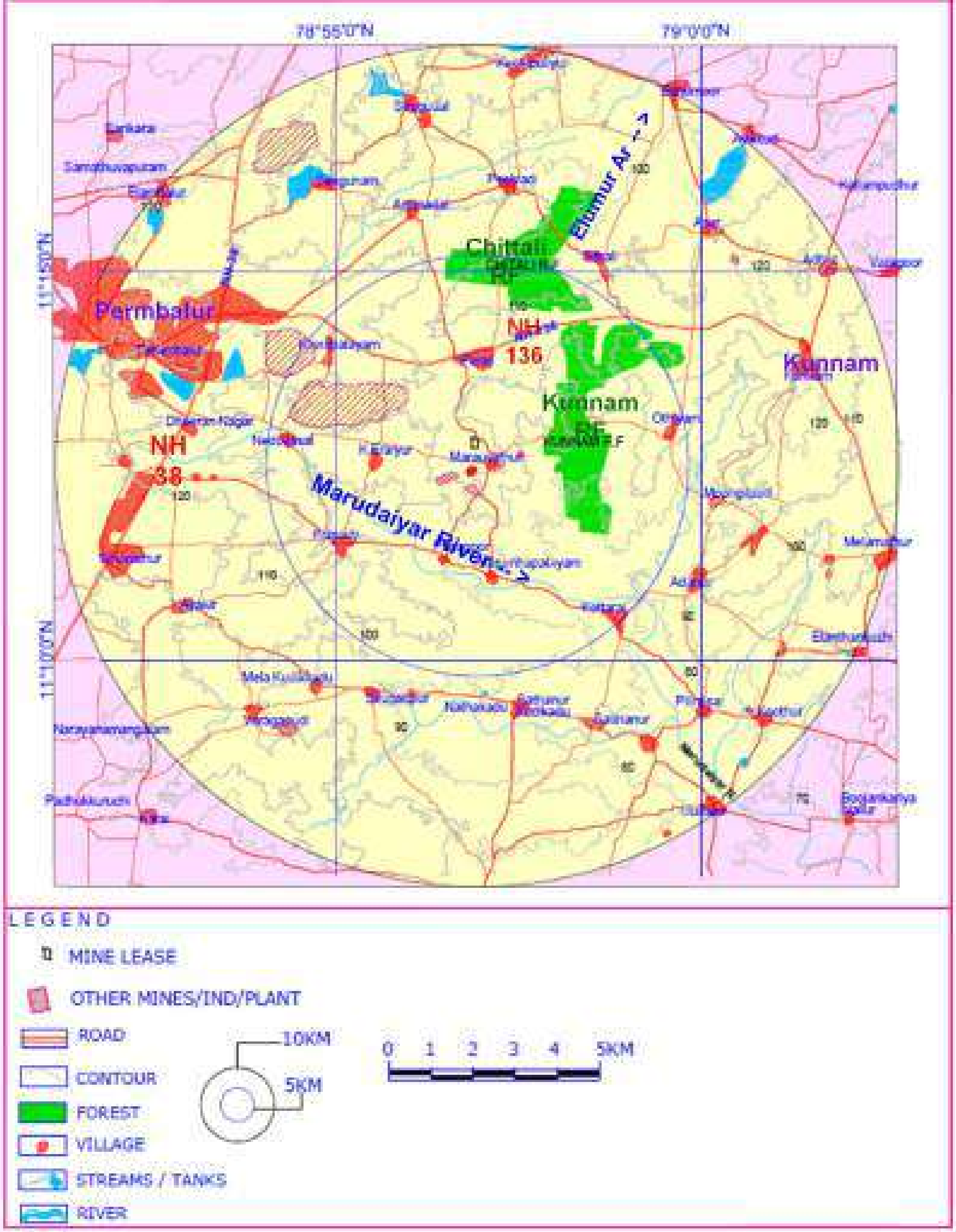


Table : 1.4 Environmental Setting – 10 km Radius

Sl. No.	Areas	Aerial Distance(within 10 km) Proposed Project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Nil
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Kunnam RF @ 1.5 km in east Chittali RF @ 3.3 km in north
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Nil
4	Inland, coastal, marine or underground waters	Seasonal River Marudaiyar-2.5 km in south Odiyam Odai - 2.9 km in east Elumur Ar-2.7 km in north
5	State, National boundaries	Nil
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	N)-136 (Perambalur-Ariyalur-Thanjavur Section) runs at 2.0 km in north
7	Defence installations	Nil
8	Densely populated or built-up area & Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities*	Perambalur - 5.8 km in northwest
9	Areas containing important, high quality or scarce resources*(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	Limestone bearing areas in Ariyalur Region.
10	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	Nil
12	Areas susceptible to natural hazard which could cause the project to present environmental problems	The region falls in Seismic Zone III.

None of the followings are also located in the Study Area :

- **Protected areas** notified under the Wild life (Protection) Act, 1972,
- **Critically polluted area** as notified by the Central Pollution Control Board constituted under Water (Prevention and Control of Pollution) Act, 1974,
- **Eco -Sensitive areas** as notified,
- **Interstate boundaries** within 5 km radius from the boundary of the proposed site.
- Coastal Regulation Zone (**CRZ**) Area.

1.9 Project Cost & Schedule

The Project Cost is **Rs.10.00 Lakhs**. Existing mine will be operated immediately on receipt of EC & CTOs-**Commencement from 01.07.2025 & Mine life is 5 years**.

1.10 EIA Study

No prior EC is required for Mine with <5 Ha Extent' in the context of MoEF&CC Office Memorandum No. J-11013/182/2012-IA-II(M) dated 04.01.2013. The existing Mining Lease requires EC as per MoEF&CC Notification SO 141(E) dated 15.01.2016. There was no Violation as per EIA Notification 2006. Accordingly, EC Application was filed to SEIAA-TN vide Proposal No. SIA/TN/MIN/27577/2018 dated 08.05.2017 for a production of 80,000 Tonnes per Annum over an extent of 3.545 Ha. Terms of Reference (TOR) was awarded under Non-Violation Category vide Lr. No. SEIAA-TN/F.No.6275/TOR-381/2017 dated 18.05.2018. Public Hearing was not happened on account of COVID-19 pandemic and operational constraints. The validity of awarded TOR was expired on 17.05.2023.

The mineral Limestone to be mined out from this Lease is a Major Mineral over an extent **of <250 Ha** and falls in **Category 'B'** of Sl. No. 1(a) of EIA Notification 2006, as amended vide Notification SO 1886(E) dated 20.04.2022, for prior EC from SEIAA-TN. Thus, a fresh TOR Proposal has been filed vide Online Proposal No. SIA/TN/MIN/481764/2024 on 16.06.2024 and hard copy on 25.06.2024. The Proposal was deliberated by SEAC-TN in its 481st Meeting held on 01.08.2024 and SEIAA-TN in its 748th Meeting held on 13.08.2024. **Fresh TOR** has been awarded vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024, under **File No. 11024**/2024, with Public Hearing.

EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including **Sector-1 (Mining Projects) for Category 'A'** by the National Accreditation Board for Education & Training (**NABET**) vide Certificate NABET/EIA/2225/RA0290 dated 11.06.2023 with validity till 16.11.2025 (Sl. No. 4 of List). ABC Laboratory is accredited by the National Accreditation Board for Testing & Calibration Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2024 - valid till 02.04.2026.

Baseline Data (BLD) has been collected during **Mar.-May 2024 (Summer Season)** for Environmental Impact Assessment (EIA) Study in compliance with MoEF&CC Office Memorandum No. J-11013/41/2006-IA-II(I)(Part) dated 29.08.2017. EIA Report has been **prepared in compliance with awarded TORs** and submitted as per generic structure proposed in Appendix-III of EIA Notification 2006 with the following Chapters :

Chapter-1 : Introduction with Need for the Project & Environmental Setting of the Project.
Chapter-2 : Project Profile - an outline of the Project and allied activities.
Chapter-3 : Description of Environment (Baseline Status).

Chapter-4 : Anticipated Impacts along with Prediction of Impacts and Mitigation Measures.
Chapter-5 : Analysis of Alternatives (Technology & Site).
Chapter-6 : Environmental Quality Monitoring Programme.
Chapter-7 : Additional Studies like Risk Assessment, DMP, Hydrogeological Study, etc.
Chapter-8 : Project Benefits.
Chapter-9 : Cost-Benefit Analysis, if any.
Chapter-10 : Environmental Management Plan
Chapter-11 : Summary EIA.
Chapter-12 : Disclosure of Consultants engaged.

Draft EIA Report has been prepared in compliance with awarded TORs and submitted along with Summary EIA Reports (both in English and Tamil versions) for Public Consultation & Public Hearing.

***

2.0 Project Description

2.1 Type of the Project

The mineral Limestone to be mined out from this Lease is a Major Mineral over an extent **of <250 Ha** and falls in **Category 'B'** of Sl. No. 1(a) of EIA Notification 2006, as amended vide Notification SO 1886(E) dated 20.04.2022, for prior EC from SEIAA-TN. A fresh TOR Proposal has been filed vide Online Proposal No. SIA/TN/MIN/481764/2024 on 16.06.2024 and hard copy on 25.06.2024. **Fresh TOR** has been awarded vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024, under **File No. 11024**/2024, with Public Hearing. **Present ROMP Data**, as approved by IBM, **are incorporated** in this EIA Report.

2.2 Magnitude of Operation

Mineable Reserves ('111' Category) is 1,83,218 Tonnes ROM as on 02.07.2024. As approved by IBM, the Mine will be worked by **Non-Conventional Opencast Mechanised Method of Mining** by deploying Rock Breakers **without Drilling & Blasting**. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year (**Table 2.1**). Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. Ore:Waste Ratio will be 1:1.48. Ultimate Pit Limit will be **22.0 m BGL. Mining will not intersect ground water-table. Life of the Mine is 5 Years only.**

Table : 2.1 Production during ROMP, Plan Period & Subsequent Periods

Year	Period	Top Soil, Tons	OB (Clay), Tons	ROM, Tonnes	Limestone @ 65%, ROM Tonnes	Mineral Rejects (@ 35% ROM), Tons	Rehandling of Waste Dump, Tons	Ore: Waste Ratio
I	**ROMP Period:**							
1	2024-25 **(non operational)**	7,582	61,560	41,850	27,202	14,648	-	1:2.80
II	**Plan Period:-**							
1	2025-26	0	53,592	20,936	13,608	7,328	-	1:2.56
2	2026-27	0	23,618	40,412	26,268	14,144	-	1:0.58
3	2027-28	0	15,778	38,368	24,939	13,429	-	1:0.41
4	2028-29	11,981	97,376	41,652	27,074	14,578	54,000	1:2.63
5	2029-30	6,739	61,560	41,850	27,202	14,648	-	1:1.63
	Total	**18,720**	**2,51,924**	**1,83,218**	**1,19,091**	**64,127**	**54,000**	**1:1.48**
III	**Residual Period**							
1	After 31.03.2030	0	0	0	0	0	-	-

2.3 Technology & Project Description

2.3.1 Geology

The sedimentary formations of coralline limestone belongs to the cretaceous system and rest over archaean formations. Marine organisms such as shells, corals, crinoids formed them and foraminifera are composed chiefly of $CaCO_3$ with varying amounts of impurities such as sand, glauconite, ferrugeneous, phosphatic and bituminous matter. The occurrences of such marine deposit in land suggest a marine transgressive phase in this area. The identification of shells and other marine organisms preserved as fossils indicate the age as Cretaceous in the stratigraphic set up.

Cretaceous formations comprise Calcareous limestones with fossils, thin clay bed in white and light brown. The stratigraphers have further classified these deposits into different stages of geological age on identification of fossils. The fossils are not found uniformly in the bedded fashion. However, this sedimentary Calcareous limestone has fossil formation segregated in the Calcareous limestone deposit. Some places it is accumulated and some places it is not found. This is the general formation of Ariyalur formation.

The area was surveyed in detail to prepare a Geological map in the scale of 1:1000 showing the various formations and attitude of the deposit. It is inferred that the Limestone mineral is of chemical industrial grade and in form single bed running NE-SW with SE 80 deg. Top soil cover upto a depth in about 1 m and found followed by the 8 m thickness of clay formation. Recovery of minerals is estimated as 65% of the total excavation of the ore body. The recovery percentage is based on the knowledge gained from the past mine workings and by the field tests carried out in the lease area and analysis done in NABL Laboratories. The general geological sequence of the limestone deposits is as follows:

AGE		ROCKFORMATION
Recent	-	Top Soil & Clay - Kankar Muram
----------Unconformities----------		
Cretaceous	-	Coral Limestone.
Archean	-	Boulders of Charnokites.

The physical attitude of the limestone deposit :

Strike length (m) : 308
Width (m) : 182 (avg)
Depth (m) Proved : 17 m (1 m Topsoil + 8 m Clay + 7 m Limestone + 1 m Clay)
Strike Direction : NE-SW
Dip amount and direction : SE 80°.

2.3.2 Assessed Reserves

The mineral reserves and resources related to G1, F1, E1 Axis of United Nations Framework Classification (UNFC) System are assessed by cross sections method. The bulk density has been reckoned as 2.0. Remaining, 35% is Mineral Reject. The bulk density and the recovery percentage are given based on the knowledge gained from the past mine workings, present mine workings and the adjacent working mine in this region. The drilled boreholes (4 Nos.in 2014 & 7 Nos. in 2019 for total 147.4 meterage), had proved the existence of ROM quantity in '111'Category is 1,83,218 Tonnes as on 02.07.2024 (**Table 2.2**).

Table : 2.2 Mineral Reserves & Resources (as on 02.07.2024)

Category of Reserve	Limestone (ROM), Tonnes
Mineable Reserves (111)	**1,83,218**
Resources locked in Benches- 221	34,096
Resources locked in Safety Barriers- 221	1,51,326
Total Reserves & Resources	**3,68,640**
Grade	>35% Cao & >80% $CaCO_3$

2.3.3 Ore Quality

The average analysis of the limestone from the lease area is given below:

Parameter	**Composition %**
Calcium Oxides (CaO)	35.08
Magnesium Oxides (MgO)	2.95
Iron (Fe_2O_3)	0.73
Alumina as (Al_2O_3)	0.82
Silica (SiO_2)	19.79
Loss of Ignition (LOI)	39.71

2.4 Mining Method

As approved by IBM, the Mine will be worked by **Non-Conventional Opencast Method of Mining by deploying Rock Breakers with out Drilling & Blasting**. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year. Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. During the Plan Period, Mineral Rejects generation will be 64,126 Tonnes. ROM:Waste Ratio will be 1:1.48. **No Beneficiation/Screening** is required.

The entire quantity of the Reserves will be mined out within this Plan Period. Thus, Life of the Mine is, now, 5 years only. The Ultimate Pit Limit will be 22 m BGL at Conceptual Stage. The water table is found at a depth of 38 m during rainy seasons and at 40 m during dry season. Thus, **the Mining will not intersect the ground water table**.

The Mine Layout/Surface Plan & Geological Plans, Geological Sections, **Yearwise Production Plan** and Conceptual Plan (from approved Mining Plan) are given as **Figs. 2.1-2.8**.

2.5 Solid Wastes, Dumps & Dump Mining

During the Plan Period, Top Soil of 18,720 Tons will be generated during 4th & 5th years of the Plan Period and will be temporarily dumped in the northern part of the Lease and will be fully utilized for Green Belt & Afforestation purpose. OB material of Clay of 2,51,924 Tons will be temporarily dumped in the northern part and utilized for backfilling of the mined out voids in northwestern part at the end. Mineral Rejects generation will be 64,126 Tonnes. Rehandling of existing and proposed Mineral Reject Dumps are proposed with final Dump-III in north (**Table 2.3**).

Table : 2.3 Dump Details

Dump ID		Extent, Ha	Length, m	Width, m	Height, m	Quantity, Tons	Remarks
Top Soil	Existing-to be utilsed	0.0400	-	-	1.0	1,080	Will be utilised fully for Green Belt and Afforestation
	Proposed in North	0.0675	25	27	13.2	18,720	
OB (Clay)	Temp. Dump	0.3100	-	-	17.0	2,51,924	For Backfilling
Mineral Reject Dump	Existing Dump-I	0.4500	-	-	6.0	54,000	To be rehandled to north as Dump-III
	Temp. Dump-II	0.2480	67	37	23.8	64,126	To be stacked at Dump-III
	Dump-III in North	0.2500	-	-	20.80	**1,18,126**	For future utilization
Proposed Backfilling		0.3060	68	45	42.0	2,51,924	Northwest

2.6 Machineries

The List of Machineries proposed are given in **Table 2.4**.

Table : 2.4 Mine Machineries

Sl. No.	Name of Machinery	Make & Capacity	Nos.
1	Hydraulic Excavator with Rock Breaker	Komatsu; 1.1 cu.m – 900 HP	1+1
2	Excavator – 1.1 cu.m	Komatsu – 900 HP	1
3	Dumpers	25 T	8+1
4	Tippers – 20 T	Ashok Leyland	2

Fig. : 2.1 Surface & Environment Plans

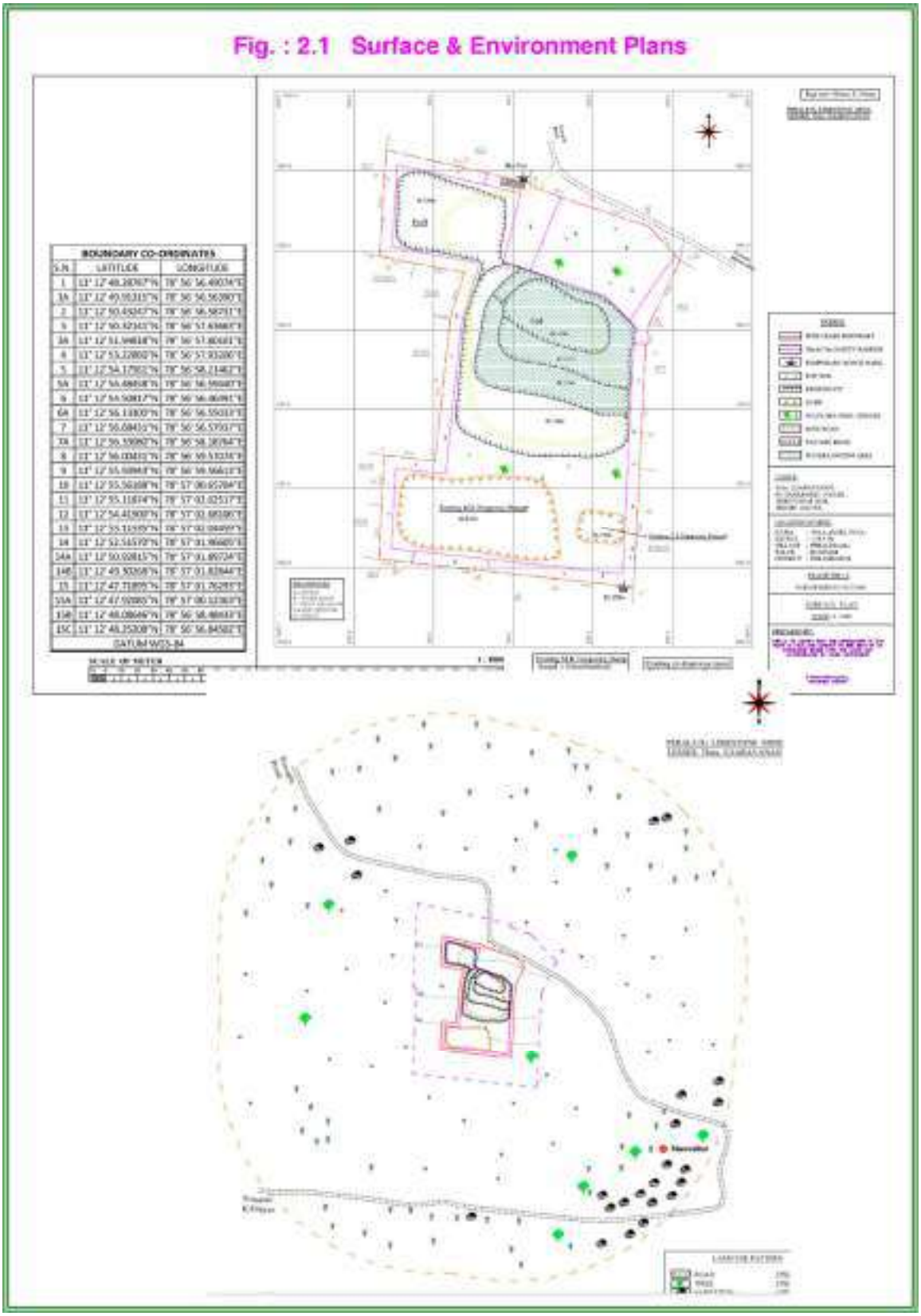


Fig. : 2.2 Geological Plan & Sections

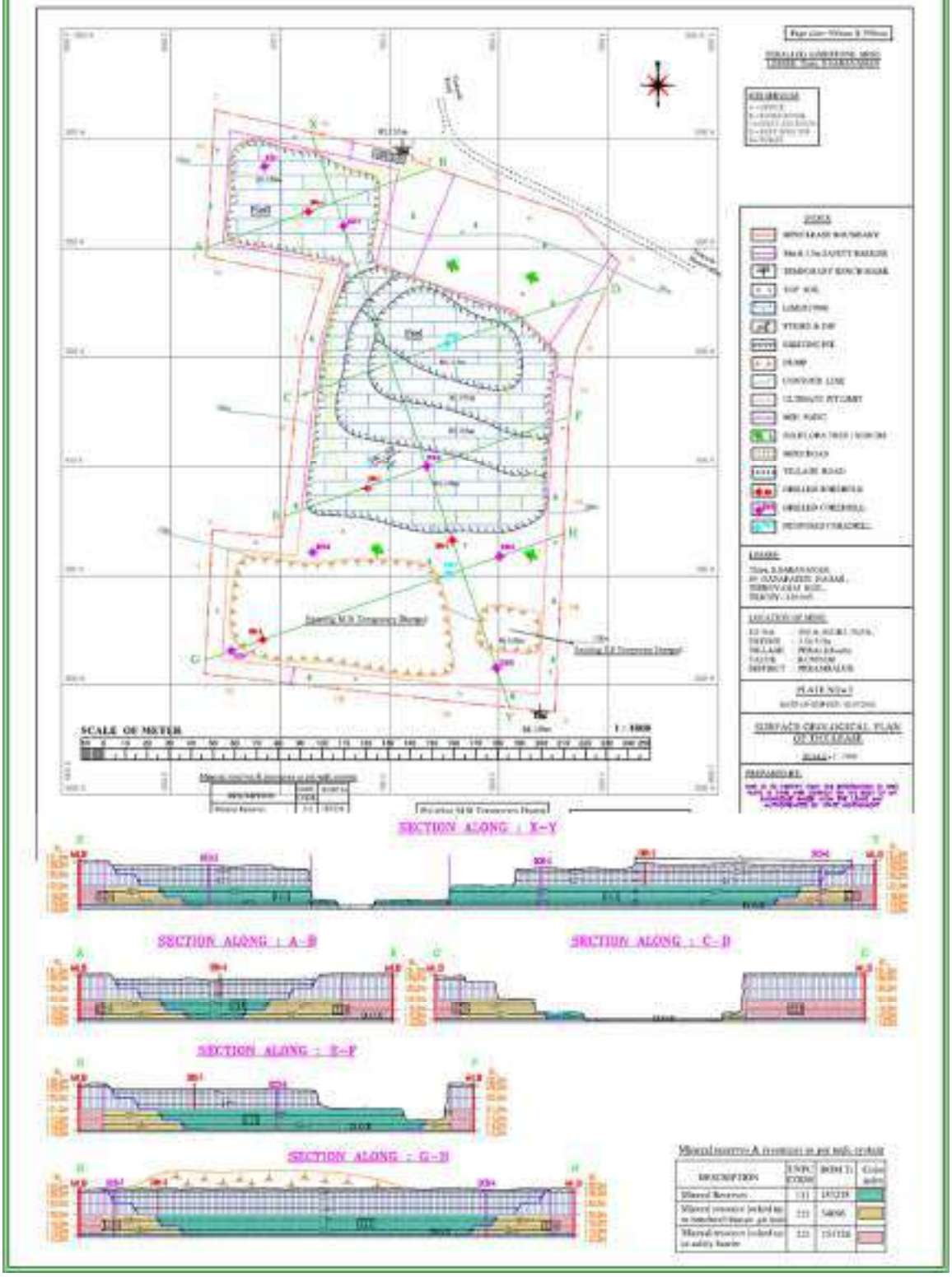


Fig. : 2.3 Development & Production Plan – 2025-26

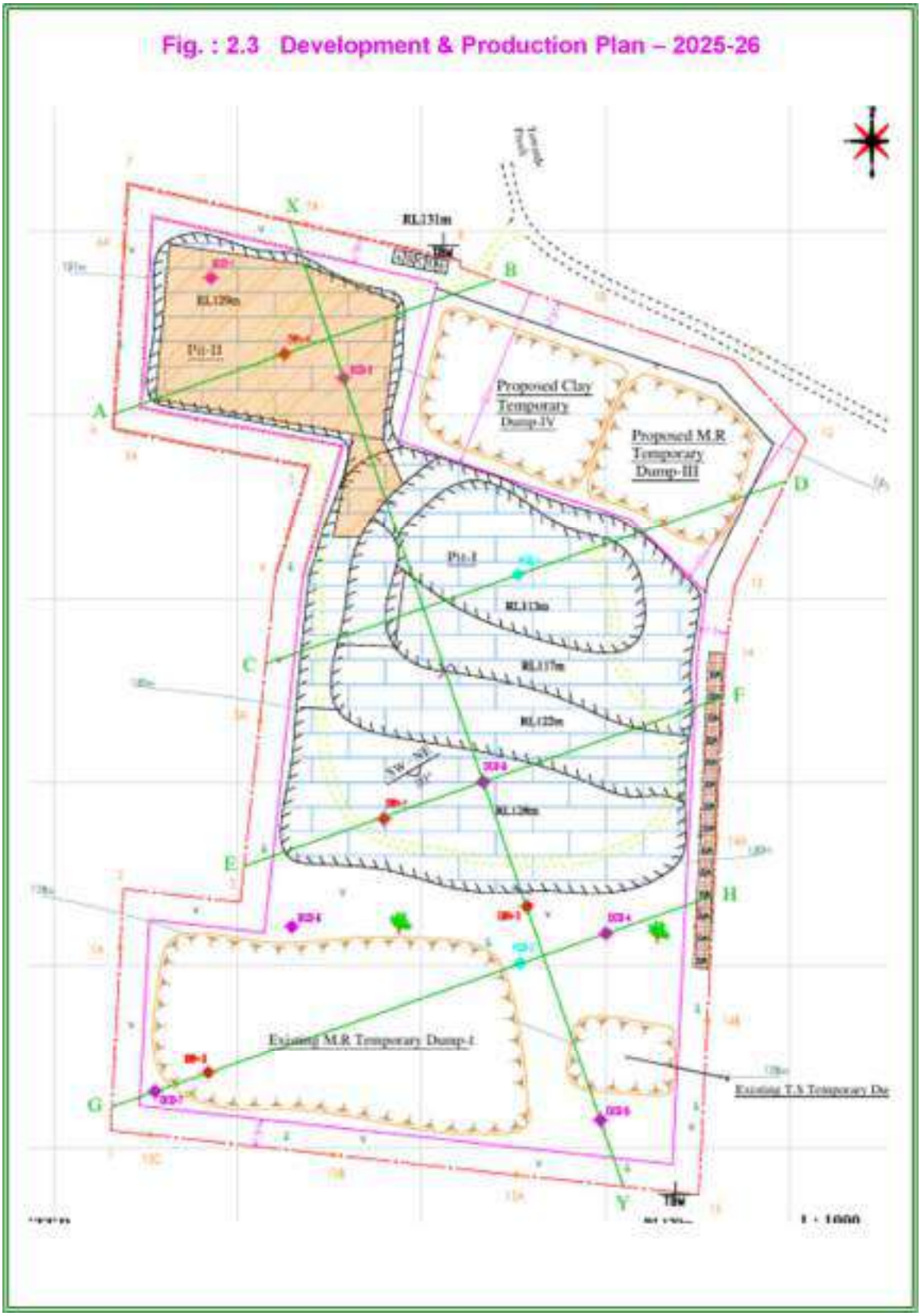


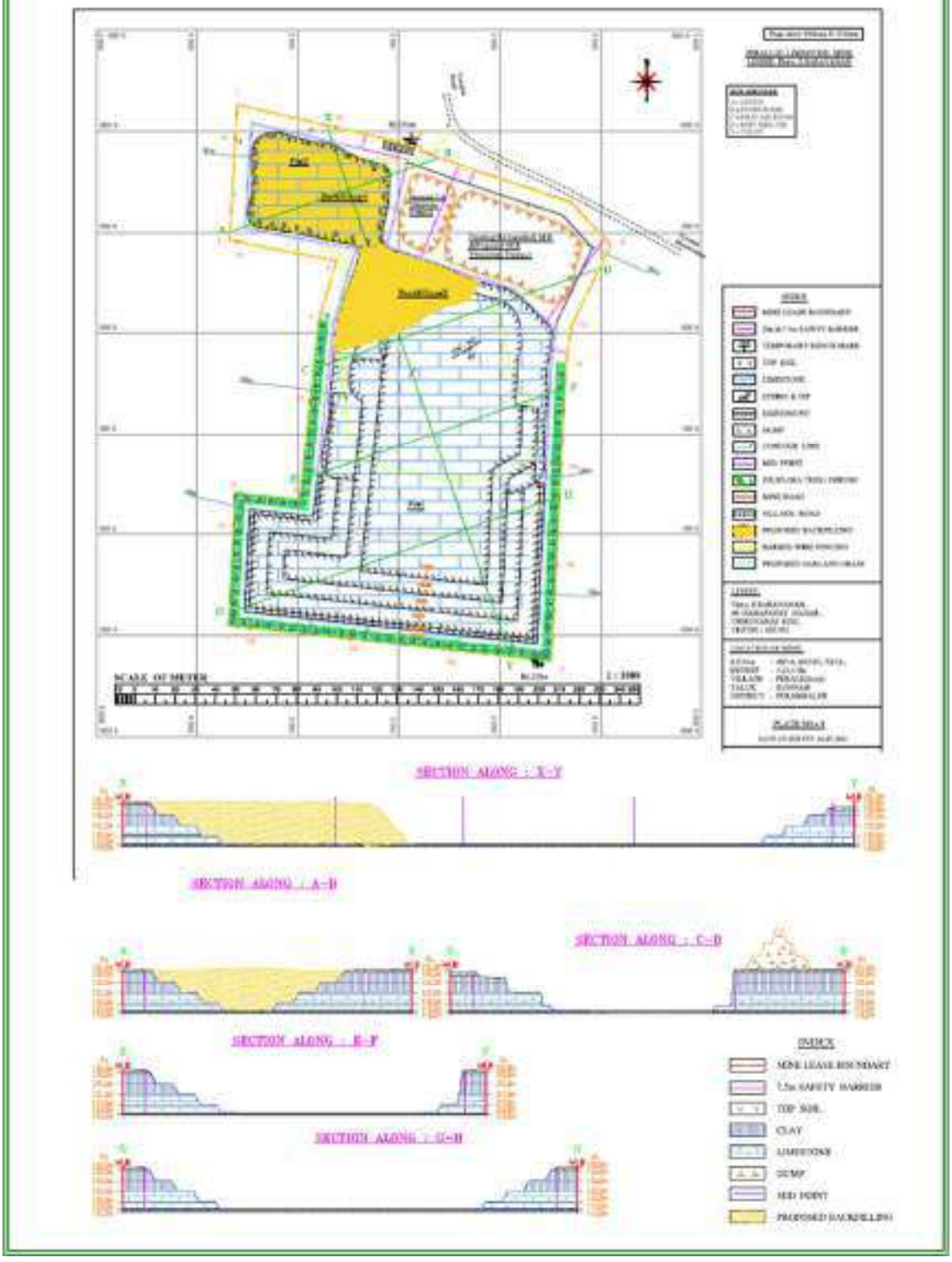
Fig. : 2.4 Development & Production Plan – 2026-27

Fig. : 2.5 Development & Production Plan – 2027-28

Fig. : 2.6 Development & Production Plan – 2028-29

Fig. : 2.7 Development & Production Plan – 2029-30

Fig. : 2.8 Conceptual Plan & Sections



2.7 Competent Mining Personnel

The **Mine will be operated with the required Statutory Officials and Competent Persons** mandatorily appointed as per the provisions of Mines Act 1952 and Metalliferous Mines Regulations 1961 (**Table 2.5**). There will 30 direct & 20 indirect Employees in the Mine.

Table : 2.5 Mining Personnel

Sl. No	Post	Qualification/ Experience	Numbers		Category
			Direct	Indirect	
1	Mining Engineer	I Class Manager's Certificate of Competency.	2	Nil	Skilled
2	Geologist	Master Degree in Geology	1	Nil	Skilled
3	Foreman	Foreman's Certificate of Competency	2	Nil	Skilled
4	HEMM Operators	Having heavy & Light vehicles license holders	6	10	Skilled
5	Semiskilled Labours	-	10	-	Semiskilled
6	Unskilled Labours	-	13	10	Unskilled
7	Office Clerk	-	1	-	-
Total			**35**	**20**	**-**

2.8 Proposed Land Use

Out of 3.545 Ha, at Conceptual Stage, 2.286 Ha will be the mine-out pit which will be partly backfilled) 0.306 Ha) and balance pit (1.980 Ha) will be left as Water Reservoir for harvesting rain water. About 0.34 Ha will be Mineral Rejects Dump, 0.010 Ha will be under Infrastructures and 0.020 Ha under Roads (**Table 2.6**). About 0.260 Ha will be covered under Green Belt – **7.33% Coverage**. Predominantly local species like Neem, Pungan, Teak, etc., will be planted and maintained with about 90% survival rate.

Table : 2.6 Land Use Pattern

Land Use	Existing Stage, Ha	At the End of Plan Period, Ha	At Conceptual Stage, Ha	
Mined Pit Area	1.604	2.286	2.286	Backfilled : 0.306 Reservoir : 1.980
Dumps	0.450	0.340	0.340	
Infrastructures	0.010	0.010	0.010	
Roads	0.020	0.020	0.020	
Green Belt	0.060	0.260	0.260	
Others to specify (Unutilised, etc.)	1.401	0.629	0.629	
Total	**3.545**	**3.545**	**3.545**	

2.9 Financial Assurance

The mining lease area put to use for mining and allied activities is about 2.286 Ha. The financial assurance works out to Rs.14,55,000/-. The Lessee has already submitted the **Bank Guarantees for Rs,14,55,000/-** vide Andhra Bank Guarantee No.01987IGFIN007 dated 23.05.2017 for Rs.8,00,000/-, BG bearing No. 0198191GFIN0009 dated 22.11.2019 for Rs.2,00,000/- and another Ksrur Vysya Bank BG for Rs.4,55,000/- vide TZ2\BGP2424B00O2 dated 04.09.2024. All BGs are with validity till 31.03.2030.

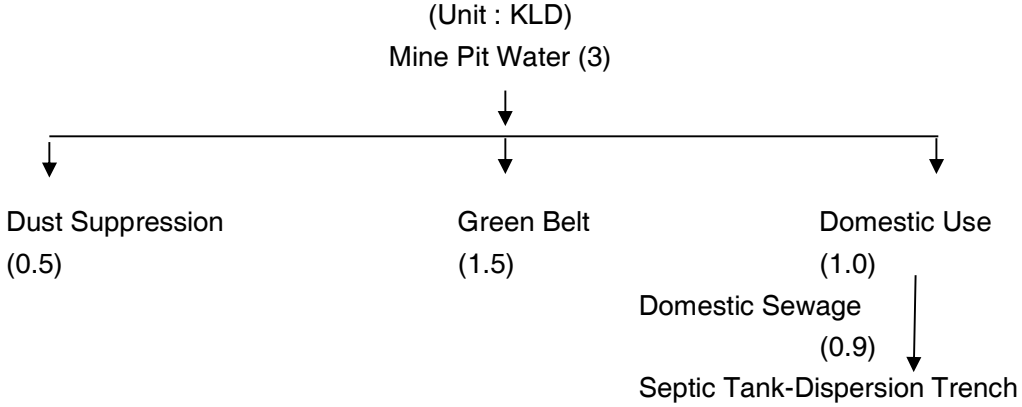
2.10 Power Demand & Source

The mining activities are carried out during day times only and thus, **there is no power demand**. There is no standby DG set also. HSD @ 500 lits./day is required for the mining equipments. **Tippers with BS Stage-VI emission compliance** will be deployed for mineral transportation.

2.11 Water Demand & Source

As per the State Ground Water Board (SGWB), the area falls in **Safe Area Category**. The mine requires about 3.0 KLD water and will be met from **the rainwater harvested in the mine pit**. **No workshop** and thus there is **no effluent generation** from the Mine. Domestic sewage generation is 0.9 KLD and is biologically treated in a Septic Tank followed by a Dispersion Trench (**Water Balance as Fig. 2.9**)

Fig. : 2.9 Water Balance



2.12 Mine Drainage

The Ultimate Pit Limit will be 22 m BGL. The water table is found at 38 m BGL (Postmonsoon) to 40 m BGL (Premonsoon). Thus, **the Mining will not intersect the ground water table**. Annual normal rainfall of the Region is **875 mm**. The Region receives rainfall during Northeast Monsoon periods (October-November months). In the Mine Pits of 25,980 sq.m area, rainwater of about **22,733 KL/annum** will be collected in the mine pit lowest bench, pumped out after Suspended Solids (SS) settlement and utilized for mine water demand (of about 900 KL/annum).

About **100% of water demand is met** from the rainwater harvested in the Pit. The excess water is being pumped out, during Monsoon Periods, to the natural drains. To pump out rain water collected in the Pit, a 5 HP Pump will be used.

2.13 Other Facilities

The mine will be operated throughout the year. The operation is carried out on **1-shift basis**. The requisite services like first aid kit, rest shelter, drinking water and mobile sanitation facilities are being provided at the mining site. **No workshop** will be provided within the lease area and all the machineries are being outsourced. **No fuel storage** tank is proposed as most of the machineries are being outsourced. Fire tending arrangement is provided at the mines site office, with different types of extinguishers to deal will all kinds of fire. First aid kit in the rest shelter and close to the workings are provided.

2.14 Green Belt

About 0.260 Ha will be covered under Green Belt – **7.33% Coverage**. About, **260 local tree species** like Neem, Pungan, Teak, etc. are planted @ 1,000 Trees/Ha with a Survival Rate of about 90% (**Table 2.7**).

Table : 2.7 Proposed Green Belt

Year	Location	Extent, Ha	No. of Plants
I	Safety Barrier Zone all along the Lease. Local tree species like Neem, Pungan, Teak, etc. will be planted and maintained with a Survival Rate of about 90%.	0.04	70
II		0.05	50
III		0.05	50
IV		0.05	50
V		0.07	40
	Total	**0.26**	**260**

2.15 Occupational Health

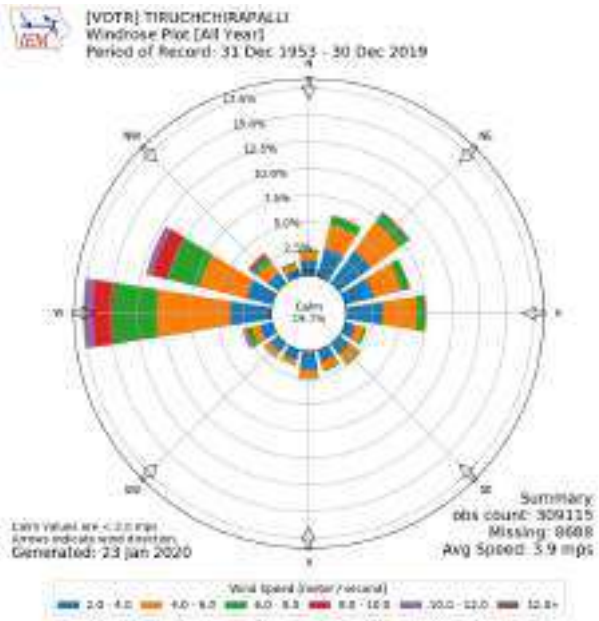
The occupational health surveillance program will be conducted for the workers periodically. Periodical medical examinations will be conducted as per the Mines Act and records maintained.

***

3.0 Description of the Environment (Baseline Status)

3.1 Study Area

Baseline Data (BLD) has been collected during **March-May 2024 (Summer Season)** for the EIA Study. The study area of 10 km radius (from ML boundary) (**Fig. 3.1**) has been considered for assessing the baseline environmental status. **Project area does not fall in Critically Polluted Industrial Clusters** listed by CPCB. As Bay of Bengal is at 100 km from the Lease, Coastal Regulation Zone (**CRZ) applicability is not there**. Nearest Structures located within 50 m, 100 m, 200 m, 300 m & 1.0 km with Population details are shown in **Plates X-XI**. The nearest IMD Station is Trichy Airport. Annual Wind Rose of Trichy for the Period 1953 to 2019 (Source IEM Website) is referred while fixing the Monitoring Stations. The monitoring stations were selected in such a way that the baseline environmental data reflects the **Cumulative Impact** of existing Mines in the Study area. Some of the Monitoring Stations are shown in **Plates XII-XIII**.



Physiography : Area is with elevation of 80-140 m above MSL and the Mine area elevation is of about 137 m. It is almost flat with gentle gradient towards south. It falls in Seismic Zone-III.

Drainage Pattern : There is no perennial river in the study area. Seasonal River Marudaiyar drains the region which flows at 2.5 km south from the Mine. A seasonal Odiyam Odai flows at a distance of 2.9 km in the east and joins the Marudaiyar River in southeast. Another Seasonal Nalla Elumur Ar originates (2.7 km) from Chithali RF and flows towards North in the Study Area. The overall drainage pattern of the region appears to be dendritic. There are also rainfed irrigation tanks and ponds in the study area.

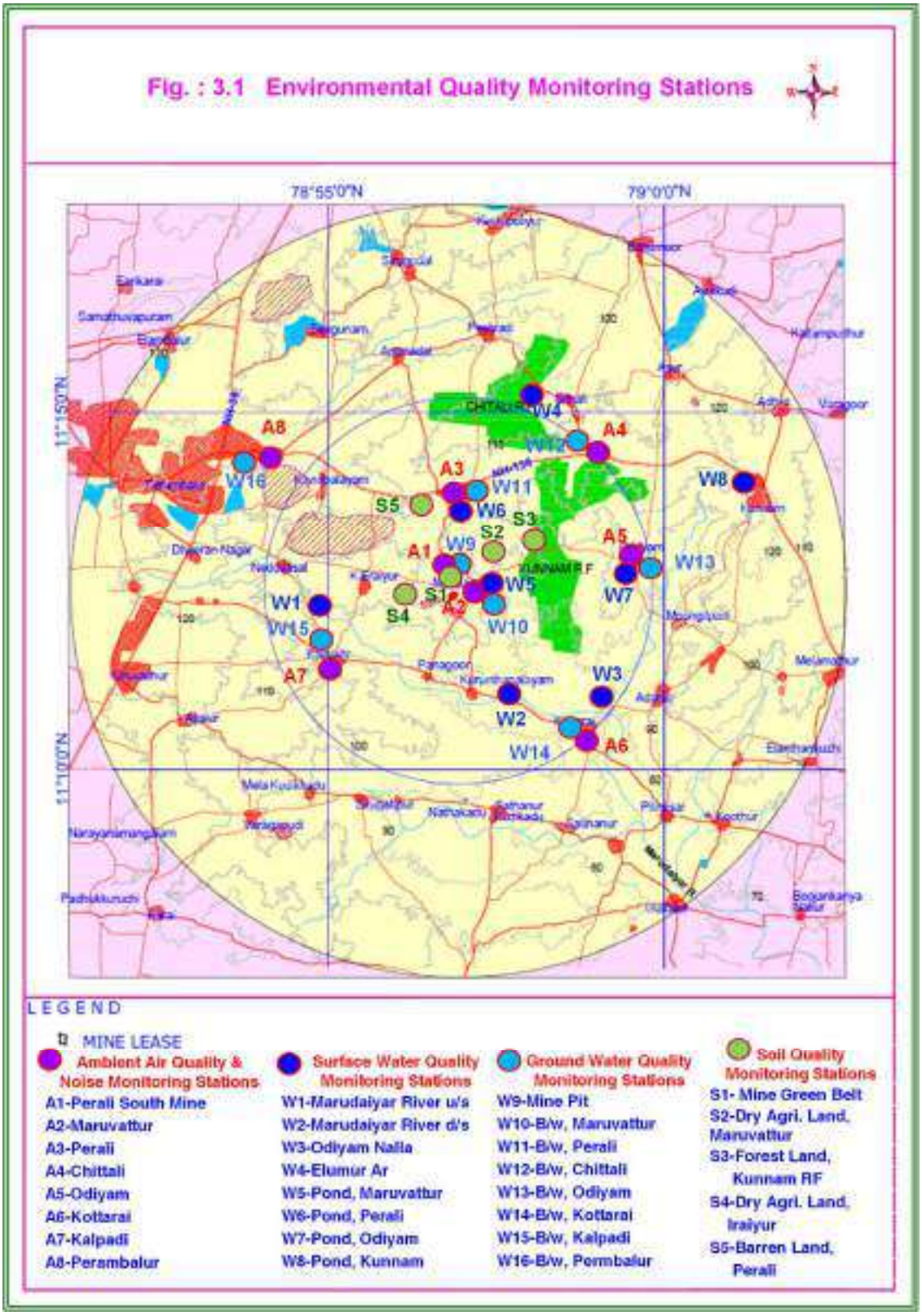
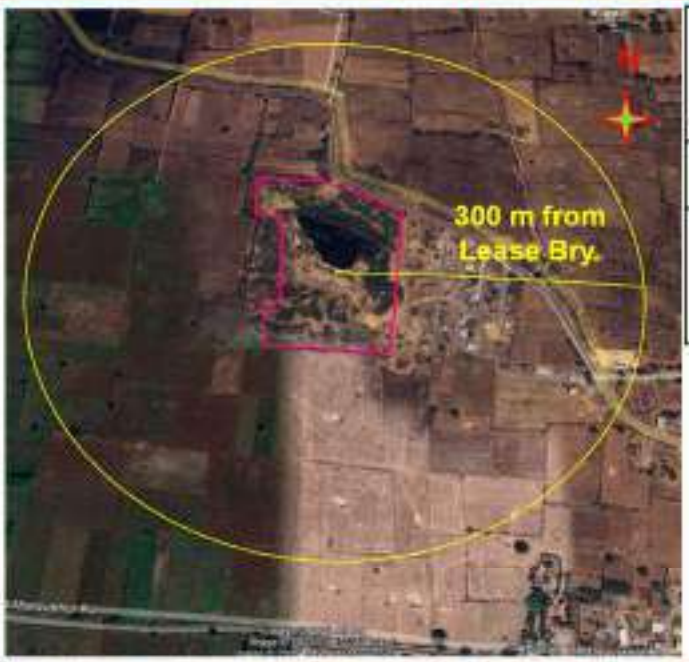


Fig. : 3.1 Environmental Quality Monitoring Stations
78°55'0"N
79°0'0"N
11°15'0"N
11°10'0"N
A1
A2
A3
A4
A5
A6
A7
A8
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
W14
W15
W16
S1
S2
S3
S4
S5
KUNNAM R F
LEGEND
MINE LEASE
Ambient Air Quality & Noise Monitoring Stations
A1-Perali South Mine
A2-Maruvattur
A3-Perali
A4-Chittali
A5-Odiyam
A6-Kottarai
A7-Kalpadi
A8-Perambalur
Surface Water Quality Monitoring Stations
W1-Marudaiyar River u/s
W2-Marudaiyar River d/s
W3-Odiyam Nalla
W4-Elumur Ar
W5-Pond, Maruvattur
W6-Pond, Perali
W7-Pond, Odiyam
W8-Pond, Kunnam
Ground Water Quality Monitoring Stations
W9-Mine Pit
W10-B/w, Maruvattur
W11-B/w, Perali
W12-B/w, Chittali
W13-B/w, Odiyam
W14-B/w, Kottarai
W15-B/w, Kalpadi
W16-B/w, Pombalur
Soil Quality Monitoring Stations
S1- Mine Green Belt
S2-Dry Agri. Land, Maruvattur
S3-Forest Land, Kunnam RF
S4-Dry Agri. Land, Iraiyur
S5-Barren Land, Perali

Plate : X Structures within Radius of 50 m, 100 m & 200 m with Population

Distance from Lease Boundary	No. of Private Houses & Type	Population
50 m	2 Buildings & 1 Thatched Shed	4
50-100 m	9 Buildings	23
100-200 m	10 Buildings	28

Plate : XI Structures within Radius of 300 m & 1.0 km with Population



Distance from Lease Boundary	No. of Private Houses & Type	Population
200-300 m	1 Shed	6
1.0 km	Entire Maruvathur Settlement – 671 HHs	2560

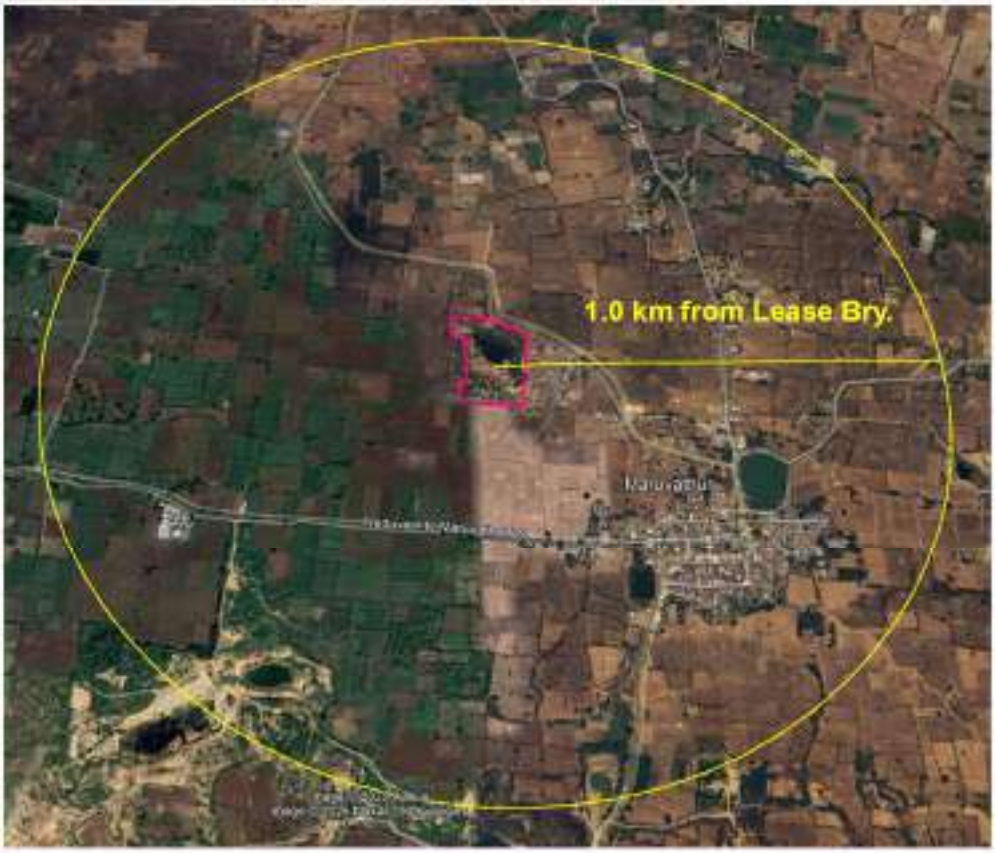


Plate : XII Monitoring Stations

Plate : XIII Monitoring Stations

3.2 Environmental Components

Considering the environmental setting of the project, project activities and their interaction, environmental regulations and standards, the Environmental Attributes covered for the EIA Study is given in **Table 3.1**.

Table : 3.1 Baseline Data Collection – Monitoring Locations

Attributes		Sampling		Remarks
		No. of Locations	Frequency	
Air	Meteorological Parameters	1	For a Season	Wind speed, wind direction (wind rose), temperature, humidity, cloud cover, atmospheric pressure, rainfall, etc.
	AAQ Parameters	8	24-hourly basis, continuously for 2 days in a week for 4 weeks in a month for a season	For the parameters as per Revised NAAQ Norms
Noise	Leq Levels	8	Once in the season	For Leq, Lday and Lnight values
Water	Surface Water Quality	8	Once in the Season	As per CPCB Norms
	Ground Water Quality	8		As per IS:10500 Norms
Land	Soil Quality	5	Once in the Season	Season for Textural & Physical Parameters & Nutrients.
	Land Use	Study Area	Once during the Study Period	Based on recent available Satellite Imagery
Biological	Aquatic	Study Area	Once during the Study Period	Flora & Fauna in Core & Buffer Zones
	Terrestrial			
Socio economic Parameters		Study Area	Once during the Study Period	Based on 2011-Census and Need Based Assessment, once in the study period for: Total Population / Household Size, Gender Composition, S.C / S.T Population, Literacy Levels, Occupational Structure, etc.

3.3 Methodology Adopted

Micrometeorology : As a part of the study, the micrometeorology and microclimatic parameters were recorded by installing a weather monitoring station (Envirotech WM 200) near the Lease at 10 m height. Data of wind velocity, wind direction, ambient temperature, relative humidity, cloud cover and atmospheric pressure were recorded at hourly intervals along with rainfall during the monitoring period.

Ambient Air Quality : The study area represents the Industrial, Residential, Rural and other Areas with respect to Revised National Ambient Air Quality (NAAQ) Norms stipulated by CPCB. Calibrated Fine Particulate Samplers (Envirotech APM 550) & Respirable Dust Samplers (Envirotech APM 460) were used for monitoring of PM2.5 & PM10. Gaseous samples are collected by integrated gas sampling assembly (Envirotech APM 411). A tapping provided in the hopper of the sampler is utilised for gaseous sampling. with proper flow controller and a flow of 1.0 l/min.

PM2.5 & PM10 : APM 550 system is a manual method for sampling fine particles and is based on impactor designs standardized by EPA for Ambient Air Quality Monitoring. Ambient Air enters the APM 550 system through an omni-directional inlet designed to provide a clean aerodynamic cut point for particles greater than 10 microns. Particles in the air stream finer than 10 microns proceed to a second impactor that has an aerodynamic cut point at 2.5 microns. The air sample and the fine particulates existing from the PM2.5 impactor is passed through a 47 mm dia filter. Teflon filter membrane that retains the FPM. The APM 550 system allows removal of the PM2.5 impactor from the sample stream so that the same system may be optionally used as a PM10 sampler also.

SO_2 : Modified West & Gaeke method (spectrophotometric) was adopted. SO_2 was collected in a scrubbing solution of sodium tetrachloro mercurate (TCM) and was allowed to react with sulphamic acid, formaldehyde and then with pararosaniline hydrochloride. The absorbance of product red-violet dye was measured using UV Visible Spectrophotometer at a wavelength of 560 nm. Concentration of SO_2 was calculated by multiplying the absorbance with calibration factor and dividing by volume of air sampled.

NOx : Jacob and Hocheiser modified method was adopted. Nitrogen oxides as nitrogen dioxide were collected by bubbling air through sodium hydroxide-sodium arsenite solution to form a stable solution of sodium nitrite. The nitrite ion produced during sampling was determined spectrophotometrically (at 540 nm) by reacting the exposed absorbing reagent with phosphoric acid, sulphanilamide and N (1-naphthyl) ethylamine dihydrochloride. Concentration of NOx was calculated as described in SO_2 measurement.

Ammonia : Indophenols method (APHA Method 401, Air Sampling and Analysis, 3rd Edition) was adopted. Ammonia in the atmosphere is collected by bubbling a measured volume of air through a dilute solution of sulphuric acid to form ammonium sulphate. The ammonium sulphate formed in

the sample is analysed colorimetrically by reaction with phenol and alkaline sodium hypochlorite to produce indophenols. The reaction is accelerated by addition of Sodium nitroprusside as catalyst.

Ozone : IS:5182 Part IX (Methods for Measurement of Air Pollution - Oxidants)/ APHA Method 410 was adopted. Micro amounts of ozone and the oxidants liberate iodine when absorbed in a 1% solution of potassium iodine buffered at pH 6.8 ±0.2. The iodine is determined spectrophotometrically by measuring the absorption of tri-oxide ion at 352 nm. Drager Multiwarn Detector was also used for real time value.

CO : Envirotech APM 850 Organic Vapour Samplers are used for CO monitoring. Standard MSA tubes are used for monitoring carbon monoxide. A measured volume of air is passed at the flow rate of 100 to 200 ml/min for 1 to 8 hours and the colour change (yellow to green) in indicating gel filled in the detector tubes and is matched with the colour chart provided with detector tubes for finding out CO concentration. Drager Multiwarn Detector was also used for real time value.

Particulate Lead : The exposed glass fibre filter papers were cut into small pieces and to it 100 ml distilled water and 10 ml nitric acid were added and heated on a hot plate for 4-6 hours. The clear solution obtained after digestion was filtered and made upto 25 ml and were analysed on a Analytic Jena Atomic Absorption Spectrophotometer (AAS) employing Lead Hollow Cathode Lamp. Concentration of lead was calculated by taking the result obtained from AAS analysis and dividing it with the volume of air sampled**.**

Benzene : The charcoal tubes are available in different sizes and contain varying amount of activated charcoal. The ambient air was sucked through the tube using a low flow sampler used for collection of BTX sample in a way that results in an enrichment of the relevant substances in the activated charcoal. Desorption of the adsorbed benzene was done using Carbon disulphide (CS_2). The substances desorbed in CS_2 were analyzed by capillary Gas Chromatography.

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo(a) Pyrene in the particulate phase. It is based on BIS method IS 5182 (Part XII). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary Gas Chromatography equipped with flame ionization detector.

Nickel and Arsenic : The Atomic Absorption Spectroscopy (AAS) technique makes use of absorption spectrometry to assess the concentration of an analyte in the sample. The method is based on active sampling using PM10 High Volume Sampler and then sample analysis is done by atomic absorption spectroscopy.

The **detectable range** of the Air Pollutants are given in **Table 3.2**.

Table : 3.2 AAQ Parameters– Detectable Range

Parameter	Method	Range
Respirable Particulate Matter (less than 10 μm or PM10)	IS 5182: (Part 23) : 2006 RA: 2017	5-1000 μg/m^3
Particulate matter (less than 2.5 μm or PM2.5)	USEPA Quality Assurance Handbook Vol II Part II - Guidance Documents 2.12 issue year: Nov-1998	10-1000 μg/m^3
Sulphur Dioxide	IS 5182: (Part 2), 2001 RA: 2017	5-1000 μg/m^3
Nitrogen Dioxide	IS 5182: (Part 6), 2006 RA: 2017	6-750 μg/m^3
Carbon Monoxide	IS 5182: (Part 10), 1999 RA: 2014	1-200 mg/m^3
Ammonia	Indophenol Method (Method of Air sampling and analysis 3rd edition method 401)	5-700 μg/m^3
Ozone	IS 5182: (Part 9), 1974, RA 2014	10-19000 μg/m^3
Benzene (C_6H_6)	IS 5182 (Part 11), 2006 RA: 2017	0.01-1000 μg/m^3
Banzo (ą) Pyrene Particulate Phase only	IS 5182: (Part 12): 2004, RA: 2014	0.1-10,000 ng/ m^3
Nickel	IS 5182: (Part 22), 2004, RA: 2014 /NAAQS Monitoring & Analysis Guidelines Volume-I	1.0 -50 ng/m^3
Arsenic		1.0-10 ng/ m^3
Lead		0.1-50 μg/m^3

Noise Levels : Noise levels were monitored at all air monitoring locations during day time as well as night time in a day. A totally portable measurement systems, Lutron SL 4001 with an internal calibrator and wind screen was used. The built-in internal oscillation system 1 KHz sine wave generator is used for on the spot calibration at 94.0 dB(A) at 1000 Hz. The basic unit of measurement is A-weighted sound level.

Water Quality : Water samples of both surface and ground waters were collected during the survey period and analysed for physico-chemical and bacteriological parameters (**Table 3.3**). Parameters like pH, conductivity, temperature, DO, etc. were measured in the field itself while collecting the samples using a microprocessor based Portable Water Analysis Kit (Elico Model PE136). Samples for chemical analysis were collected as per IS:2488. Sterilised bottles were used for collection of bacteriological samples.

Soil Quality : Samples at 3 depths viz. 0-30 cm, 30-60 cm and 60-90 cm were collected using sampling augers and field capacity apparatus. Soil extraction (10%) were used for analysis.

Calibration : The monitoring and analytical instruments are being calibrated periodically. The correction factors, if any, are being used in computation of the data**.**

Flora & Fauna : A general ecological survey covering an area of 10 km radius area were conducted and reported. Faunal survey covers the Terrestrial and Avian Fauna. This study included the identification of endangered and rare species as per Red Book.

Socio-Economic profile of population in study area is based on Census 2011 data.

Table : 3.3 Methodology Adopted for Water Analysis

Sl. No.	Parameter	Unit	Reference	Method
1	Taste & Odour	-	IS:3025 (5/7)*	As perceived
2	pH	-	IS:3025 (11)	Digital pH meter
3	Colour	Hazen units	IS:3025 (4)	Comparison with Standards
4	Turbidity	NTU	IS:3025 (10)	Nephelometric
5	Total Dissolved Solids	mg/l	IS:3025 (16)	Gravimetric
6	Total Hardness	mg/l	IS:3025 (21)	Titrimetric (EDTA)
7	Iron (as Fe)	mg/l	32 of IS3025	Colorimetric (Phenonthroline)
8	Chlorides (as Cl)	mg/l	IS:3025 (32)	Titrimetric (Argentometric)
9	Residual Chlorine	mg/l	IS:3025 (26)	Titrimetric
10	Calcium (as Ca)	mg/l	IS:3025 (40)	Titrimetric (EDTA)
11	Magnesium (as Mg)	mg/l	IS:3025 (46)	Titrimetric (by difference between Total Hardness and Calcium Hardness)
12	Alkalinity (as $CaCO_3$)	mg/l	IS:3025 (23)	Colour indicator titration
13	Dissolved Oxygen	mg/l	IS:3025 (38)	Winkler titrimetric-azide modification
14	Sulphate (as SO_4)	mg/l	IS:3025 (24)	Turbidimetric/Gravimetric
15	Fluoride (as F)	mg/l	IS:2488 (II)+	Distillation followed by Colorimetric (SPADNS)
16	Nitrate (as NO_3)	mg/l	IS:3025 (34)	Colorimetric (PDA)
17	Cyanide (as CN)	mg/l	IS:3025 (27)	Colorimetric (Pyridine-Bispyrazolone)
18	Pesticides	mg/	IS:2488 (III)	Gas chromatograph
19	Phenols (as C_6H_5OH)	mg/l	IS:3025 (43)	Distillation followed by colorimetric (4-Aminoantipyrine)
20	Manganese (as Mn)	mg/l	35 of IS3025	Colorimetric (Persulpahte)
21	Chromium (as Cr^{6+})	mg/l	IS:2488 (II)	Colorimetric (Diphenyl carbazide)
22	Copper (as Cu)	mg/l	IS:3025 (42)	Atomic Absorption Spectrophotometric
23	Selenium (as Se)	mg/l	IS:2488 (II)	Atomic Absorption Spectrophotometric
24	Cadmium (as Cd)	mg/l	IS:3025 (41)	Atomic Absorption Spectrophotometric
25	Arsenic (as As)	mg/l	IS:3025 (37)	Atomic Absorption Spectrophotometric
26	Boron (as B)	mg/l	IS:2488 (III)	Colorimetric (Curcumin)
27	Mercury (as Hg)	mg/l	IS:3025 (48)	Mercury analyser
28	Lead (as Pb)	mg/l	IS:3025 (47)	Atomic Absorption Spectrophotometric
29	Zinc (as Zn)	mg/l	IS:3025 (49)	Colorimetric (Dithizone)
30	Percent sodium	%	IS:2488 (V)	From Na, K, Ca & Mg values
31	BOD-3 days@27 °C	mg/l	IS:3025 (44)	3 days @ 27°C
32	COD	mg/l	IS:2488 (V)	Dichromate reflux
33	Oil & Grease	mg/l	IS:3025 (39)	Gravimetric
34	Coliforms	MPN/100 ml	IS:1622	Multiple tube fermentation (5 tubes)
35	Plate Counts	No. of Colonies/ml	IS:1622	Colony count in Agar-agar medium

* : IS:3025 (Parts)-Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater;

+ : IS:2488 (Parts)-Methods of Sampling and Test for Industrial Effluents.

3.4 Micrometeorology

Regional Status : Perambalur District enjoys a typical semi arid climate with hot summers and moderately cool winters. The hottest season is from March to May. During the period the maximum temperature often exceeds 40 °C. The district generally has a high humidity. The district receives the rainfall under the influence of both southwest and northeast monsoon. There is a gradual decrease in precipitation from northeast to southwest over the district. The normal rainfall for the period (1901-70) ranges from 843.5 to 1123.3 mm. The district experiences strong winds during the southwest monsoon season. The wind speed during June to August is more than 25 km/hr. Thereafter there is a gradual decrease in speed reaching the lowest value 7.7 km/hr.

Site Specific Status : The abstract of collected hourly meteorological data are presented in **Tables 3.4-3.6**. Based on the wind parameters, wind rose is drawn and presented as **Fig. 3.2**.

March 2024 : Predominant winds were from SE/ESE directions. Mean Wind velocity was 4.5 kmph. Temperature values were ranging from 29.2 ºC to 40.0 ºC with mean value of 33.9 ºC. Mean maximum relative humidity value was 60.4%. Mean atmospheric pressure value was computed as 756.9 mm of mercury. There was no rainy day in the month.

April 2024 : Predominant winds were from SSW/WSW directions. Mean Wind velocity was 4.9 kmph. Temperature values were ranging from 28.3 ºC to 42.0 ºC with mean value of 36.3 ºC. Mean maximum relative humidity value was 61.4%. Mean atmospheric pressure value was computed as 757.2 mm of mercury. There was no rainy day in the month.

May 2024 : Predominant winds were from SSW/SW directions. Mean Wind velocity was 4.8 kmph. Temperature values were ranging from 28.4 ºC to 43.1 ºC with mean value of 36.3 ºC. Mean maximum relative humidity value was 68.0%. Mean atmospheric pressure value was computed as 756.8 mm of mercury. There was no rainy day in the month.

Summer Season 2024 :

- Predominant winds were from SE/SW directions.
- Mean Wind velocity was 4.7 kmph with Calm condition 1.27%.
- Temperature values were ranging from 28.3 ºC to 43.1 ºC with mean value of 35.5 ºC.
- Mean maximum relative humidity value was 63.3%.
- Mean atmospheric pressure value was computed as 757.0 mm of mercury.
- There was no rainy day in the Season.

The monitored meteorological data were found to be **in compliance with local weather phenomena**.

Table : 3.4 Micrometeorological Data – March 2024

Location : Mine Area

Date	Mean Wind Velocity, kmph	Pred. Wind Direction (from)	Temperature, °C			Relative Humidity (Mean), %	Cloud Cover, oktas	Atm. Pressure (Mean), mm of Hg	Rain-fall, mm
			Min.	Max.	Mean				
01.03.2024	4.0	E/SE	29.4	36.0	31.6	61	1.6	756.0	0
02.03.2024	4.3	E/SE	30.0	37.0	34.0	60	1.9	756.0	0
03.03.2024	4.0	E/SSE	29.4	36.7	33.0	64	2.2	756.5	0
04.03.2024	4.2	SSE	29.2	36.0	32.6	64	2.0	757.0	0
05.03.2024	4.7	ESE	29.9	37.0	33.0	61	1.6	757.0	0
06.03.2024	3.8	E/SE	30.1	37.5	33.3	57	2.1	757.0	0
07.03.2024	4.1	SSW	30.5	38.0	33.7	60	2.0	758.0	0
08.03.2024	3.6	ESE	30.7	37.5	34.1	63	1.8	757.5	0
09.03.2024	4.5	ESE	31.2	38.0	34.6	61	2.3	757.0	0
10.03.2024	4.5	E/SE	31.0	38.0	35.0	58	2.4	757.5	0
11.03.2024	4.3	E/ESE	30.3	37.0	34.6	63	1.7	757.5	0
12.03.2024	4.7	ESE	30.6	38.0	33.6	60	1.7	758.0	0
13.03.2024	4.8	ESE	30.6	38.0	33.0	59	2.2	758.0	0
14.03.2024	4.8	NE	31.2	39.0	34.4	54	2.3	758.5	0
15.03.2024	4.5	SE	31.3	40.0	34.4	60	1.5	757.5	0
16.03.2024	5.0	SE	31.6	38.5	35.0	60	2.0	757.5	0
17.03.2024	5.0	SSE	30.3	38.3	34.0	63	2.7	757.0	0
18.03.2024	5.1	SE	29.8	37.0	33.0	60	1.7	757.0	0
19.03.2024	4.7	SE	29.9	38.0	33.0	62	1.7	757.0	0
20.03.2024	4.3	SSE	30.3	37.0	33.6	63	1.6	756.5	0
21.03.2024	4.5	ENE/SE	30.5	36.7	34.6	69	1.6	756.5	0
22.03.2024	4.5	NE	30.9	37.0	35.0	66	1.9	756.0	0
23.03.2024	4.3	SE	30.8	38.0	35.0	63	1.8	756.0	0
24.03.2024	4.5	SSW	30.5	37.1	34.0	61	2.4	756.5	0
25.03.2024	4.7	ESE	30.4	37.0	34.0	62	2.2	756.5	0
26.03.2024	4.5	SSE	30.7	37.0	33.0	55	1.8	756.0	0
27.03.2024	5.5	SE	33.1	38.0	33.6	58	1.7	756.5	0
28.03.2024	4.8	SE	32.8	38.5	33.8	56	2.0	756.0	0
29.03.2024	5.2	SSE	33.0	37.5	34.1	55	2.7	756.0	0
30.03.2024	4.6	SSE	32.9	38.5	34.4	57	2.3	756.5	0
31.03.2024	4.3	SE	33.1	39.0	35.7	56	2.2	756.3	0
Monthly Abstract	**4.5**	**SE/ESE**	**29.2**	**40.0**	**33.9**	**60.4**	**2.0**	**756.9**	**0**

Note : Abstract values are taken from the hourly readings (00:00-24:00 hrs.) recorded continuously during the monitoring period.

Table : 3.5 Micrometeorological Data – April 2024

Location : Mine Area

Date	Mean Wind Velocity, kmph	Pred. Wind Direction (from)	Temperature, °C			Relative Humidity (Mean), %	Cloud Cover, oktas	Atm. Pressure (Mean), mm of Hg	Rain-fall, mm
			Min.	Max.	Mean				
01.04.2024	4.0	SE/SSE	28.3	39.0	35.0	82	1.3	756.2	0
02.04.2024	3.7	S/SSE	29.7	39.5	34.4	81	0.9	756.7	0
03.04.2024	5.1	S/SE	33.0	41.0	35.0	63	1.3	756.6	0
04.04.2024	5.1	S/SSE	33.6	40.0	34.6	60	1.4	758.0	0
05.04.2024	5.1	S/SSW	34.1	41.0	37.6	54	0.8	757.4	0
06.04.2024	4.4	S/SE	32.8	41.5	34.7	57	1.0	757.3	0
07.04.2024	5.0	S/SW	33.0	40.5	37.2	51	1.3	756.7	0
08.04.2024	5.3	SSW/SSE	32.7	41.0	37.3	55	1.6	757.4	0
09.04.2024	4.7	S/SSW	31.8	40.7	36.4	63	1.5	758.6	0
10.04.2024	4.3	S/SSW	31.8	38.0	36.0	62	1.1	758.9	0
11.04.2024	4.5	S/SSE	32.4	39.0	36.0	64	0.8	758.5	0
12.04.2024	4.7	SW/SSW	31.0	38.1	34.6	74	1.1	757.7	0
13.04.2024	4.8	SW/SSW	31.8	38.2	35.0	68	0.9	757.1	0
14.04.2024	4.5	SW/WSW	31.7	38.0	36.0	64	1.0	757.9	0
15.04.2024	4.8	SW	32.3	39.0	36.6	65	0.8	757.9	0
16.04.2024	5.0	WSW/SW	32.6	39.0	34.5	61	1.4	757.7	0
17.04.2024	5.1	SW/SE	33.6	41.0	35.0	58	1.2	757.0	0
18.04.2024	5.6	WSW/SW	35.0	41.0	38.0	55	1.0	756.3	0
19.04.2024	5.3	SW/SSW	33.8	42.0	37.0	62	0.8	755.7	0
20.04.2024	4.7	W/WSW	33.9	41.3	37.6	61	0.9	756.2	0
21.04.2024	5.5	WSW	34.2	41.1	38.4	58	1.1	756.1	0
22.04.2024	5.5	SW/WSW	33.9	41.0	38.0	60	1.3	756.8	0
23.04.2024	5.6	WSW/W	33.5	41.0	37.0	54	1.7	756.5	0
24.04.2024	5.5	W/SW	33.8	41.0	37.0	51	1.5	756.4	0
25.04.2024	5.1	WSW/SW	33.6	40.5	37.6	60	1.3	756.8	0
26.04.2024	4.8	W/WSW	33.3	41.0	37.0	59	1.2	757.4	0
27.04.2024	5.0	W/SW	33.2	40.1	36.6	58	1.7	757.9	0
28.04.2024	4.8	W/WNW	32.9	40.0	36.6	64	1.5	757.3	0
29.04.2024	5.1	W/WSW	33.8	40.0	38.0	62	1.3	756.8	0
30.04.2024	5.8	WSW/W	35.1	42.0	38.0	57	1.6	757.1	0
Monthly Abstract	**4.9**	**SSW/WSW**	**28.3**	**42.0**	**36.3**	**61.4**	**1.2**	**757.2**	**0**

Note : Abstract values are taken from the hourly readings (00:00-24:00 hrs.) recorded continuously during the monitoring period.

Table : 3.6 Micrometeorological Data – May 2024

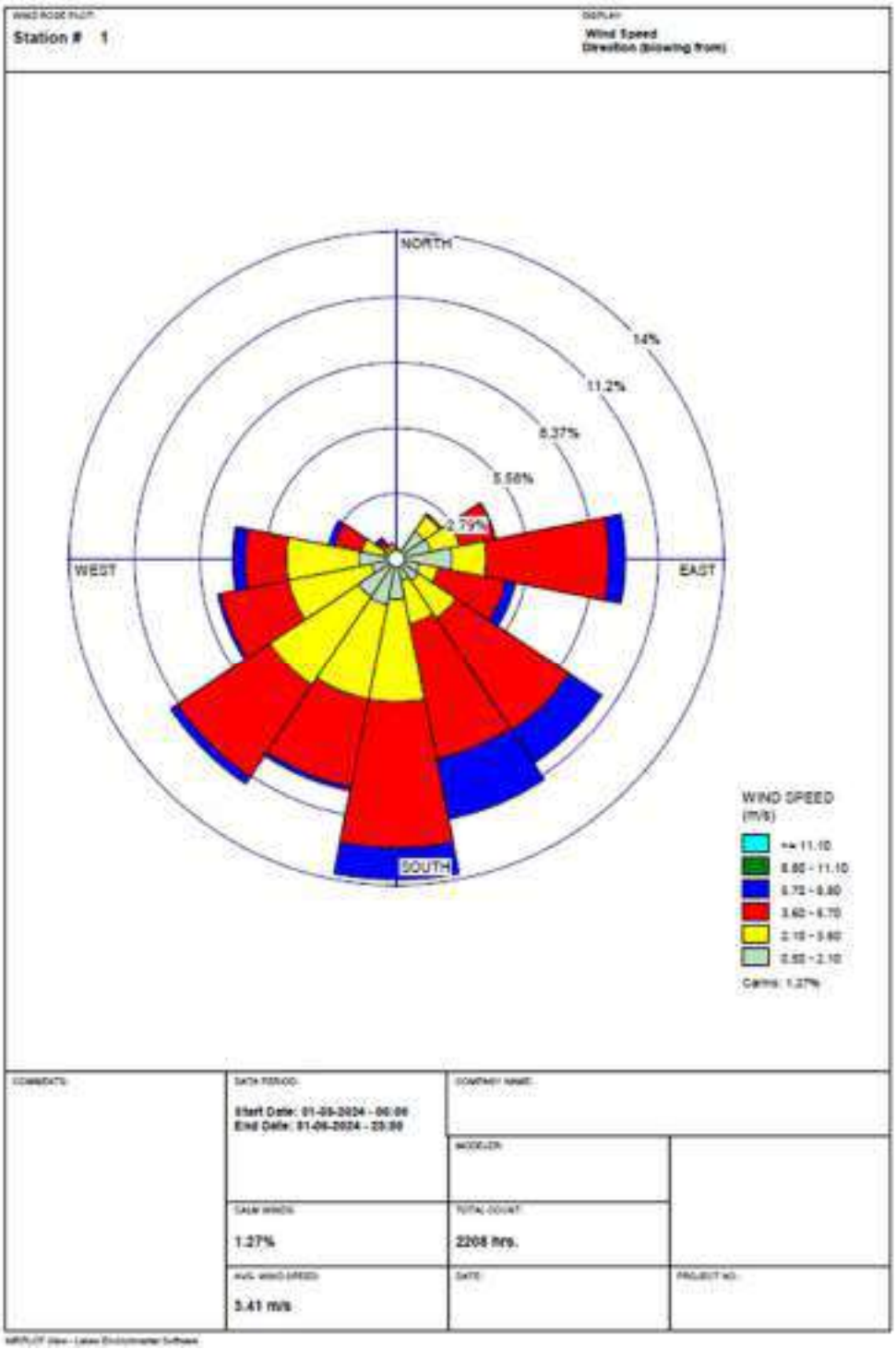
Location : Mine Area

Date	Mean Wind Velocity, kmph	Pred. Wind Direction (from)	Temperature, °C			Relative Humidity (Mean), %	Cloud Cover, oktas	Atm. Pressure (Mean), mm of Hg	Rain-fall, mm
			Min.	Max.	Mean				
01.05.2024	5.2	SSE/SW	35.0	42.0	37.8	61	0.7	757.2	0
02.05.2024	5.5	S/SSE	35.2	43.1	38.6	59	1.0	756.7	0
03.05.2024	5.1	SSE/SE	34.4	42.7	37.0	64	1.7	755.6	0
04.05.2024	5.0	SE/SSE	35.3	42.0	38.4	56	1.7	754.7	0
05.05.2024	4.8	SE/SSW	35.5	42.1	38.6	54	2.1	755.0	0
06.05.2024	5.3	S/SSW	35.3	42.0	39.5	56	2.6	755.4	0
07.05.2024	5.5	S/SSW	34.8	42.7	39.7	54	1.8	756.8	0
08.05.2024	4.8	S/SSW	33.6	42.1	37.0	61	1.8	757.0	0
09.05.2024	5.1	S/SSE	34.4	40.0	36.8	59	1.6	756.2	0
10.05.2024	4.7	SSW/S	32.7	41.0	35.4	66	1.0	755.9	0
11.05.2024	5.0	SSE/S	30.9	39.9	35.0	77	1.8	756.2	0
12.05.2024	5.1	S/SSE	32.2	39.0	36.0	69	1.7	756.5	0
13.05.2024	4.8	SSW/S	32.5	38.5	36.6	64	1.3	756.4	0
14.05.2024	5.1	S/SSW	32.4	38.0	36.1	63	1.7	756.6	0
15.05.2024	4.7	S/SSW	31.8	38.5	35.7	68	2.3	756.9	0
16.05.2024	4.5	SSW/S	28.8	36.7	34.4	84	2.3	757.2	0
17.05.2024	4.2	SW/S	29.7	36.0	34.0	83	1.9	756.8	0
18.05.2024	4.2	S/SSW	30.3	36.0	34.3	79	2.1	756.9	0
19.05.2024	4.0	S/SSW	28.8	35.1	34.0	86	1.7	757.4	0
20.05.2024	3.7	SW/S	28.4	36.0	35.0	85	2.0	757.7	0
21.05.2024	4.2	SW/SSW	29.5	36.0	34.4	82	1.7	758.0	0
22.05.2024	3.9	SW/S	29.5	34.1	33.7	83	1.9	757.9	0
23.05.2024	4.2	SSW/S	29.9	35.0	34.0	84	1.4	757.9	0
24.05.2024	4.7	SW/SSW	31.1	36.0	36.4	76	1.9	757.4	0
25.05.2024	4.7	SSW/S	31.6	35.1	37.4	66	1.9	756.9	0
26.05.2024	4.7	SW/SSW	32.7	37.0	38.4	61	2.0	757.1	0
27.05.2024	5.1	SW/SSW	33.5	38.0	39.0	57	1.6	756.8	0
28.05.2024	5.1	S/SSW	32.4	38.0	35.0	60	2.2	757.1	0
29.05.2024	5.3	SW/S	33.2	38.0	35.6	62	2.1	756.9	0
30.05.2024	5.3	SSW/SW	33.6	39.0	36.0	62	1.9	757.4	0
31.05.2024	4.8	WSW	32.9	40.0	36.4	68	1.8	757.8	0
Monthly Abstract	**4.8**	**SSW/SW**	**28.4**	**43.1**	**36.3**	**68.0**	**1.8**	**756.8**	**0**

Note : Abstract values are taken from the hourly readings (00:00-24:00 hrs.) recorded continuously during the monitoring period.

Fig. : 3.2 Seasonal Wind Rose

Period : Mar.-May 2024
(Summer Season)



3.5 Ambient Air Quality

3.5.1 Monitoring Locations

AAQ Monitoring Stations were selected based on **Upwind & Downwind directions** for the Season (**Table 3.7**) and covering existing Mines & Industries. **Mobile Stations** were also deployed for the monitoring. All **12 AAQ parameters** (**24/8/1 hourly basis**) were monitored in compliance with NAAQ Norms. The monitored ambient air quality data are presented in **Tables 3.8-3.15**. Abstract of those monitored data is given as **Table 3.16** and ambient air quality status in **Table 3.17**.

Table : 3.7 Ambient Air Quality Monitoring Stations-Location & Bearing

Sl. No.	Location	N-Latitude	E-Longitude	Direction from Mine	Distance from Mine, km	Location Scenario
1	A1-Perali (S) Mine	11°12'55.79"	78°56'59.94"	-	-	Core zone
2	A2-Maruvattur	11°12'39.18"	78°57'8.39"	SE	0.35	Upwind
3	A3-Perali	11°13'36.29"	78°56'52.39"	NNW	1.25	Downwind
4	A4-Chittali	11°14'20.24"	78°59'47.32"	NE	5.70	Downwind
5	A5-Odiyam	11°13'16.54"	78°59'41.58"	ENE	4.85	Downwind
6	A6-Kottarai	11°10'43.99"	78°58'33.66"	SE	5.00	Upwind
7	A7-Kalpadi	11°11'35.03"	78°55'30.24"	SW	3.50	Upwind
8	A8-Permabalur	11°14'30.34"	78°54'22.76"	NW	5.50	Downwind

3.5.2 AAQ Status

During the study, each 192 samples were collected, analysed and reported. On the synthesized data, the following observations are made :

PM2.5 values (24 hours Time Weighted) were monitored in the range between 10-37 **microgram/cu.m (ug/m^3)** in the Study Area with **mean value of 19.5 ug/m^3** against NAAQ Norm value of **60 ug/m^3** (24 hours Time Weighted).

PM10 values were monitored in the range between 17-68 ug/m^3 with **mean value of 37.7 ug/m^3** against NAAQ Norm value of **100 ug/m^3** (24 hours Time Weighted).

SO_2 values were monitored in the range between 6-24 ug/m^3 with **mean value of 11.4 ug/m^3** against NAAQ limit value of **80 ug/m^3** (24 hours Time Weighted).

NOx values were monitored in the range between 6-27 ug/m^3 with **mean value of 13.3 ug/m^3** against NAAQ limit value of **80 ug/m^3** (24 hours Time Weighted).

Ammonia (NH_3) concentrations were monitored less than 5 ug/m^3 at all monitoring locations against NAAQ limit value of 400 ug/m^3 (24 hours Time Weighted).

O_3 concentrations (**hourly samples reported for 8-hour average**) were monitored in the range between <10-30.4 ug/m^3 with **mean value of 18.9 ug/m^3** against NAAQ limit value of 100 ug/m^3 (8 hours Time Weighted).

CO : Monitored CO values were less than 1000 ug/m^3 during the study period against NAAQ limit value of 2 mg/m^3 (2,000 ug/m^3) (8 hours Time Weighted).

Particulate Lead (Pb) concentrations were monitored less than 0.1 ug/m^3 at all monitoring locations against NAAQ limit value of 1.0 ug/m^3 (24 hours Time Weighted).

Arsenic (As) concentrations were monitored less than 1 **nanogram/cu.m (ng/m^3)** at all monitoring locations against NAAQ limit value of 6 ng/m^3 (annual mean).

Nickel (Ni) concentrations were monitored less than 1 ng/m^3 at all monitoring locations against NAAQ limit value of 20 ng/m^3 (annual mean).

Benzene (C_6H_6) concentrations were monitored less than 0.01 ug/m^3 at all monitoring locations against NAAQ limit value of 5 ug/m^3 (annual mean).

Benzo(a) Pyrene (BaP) concentrations were monitored less than 0.1 ng/m^3 at all monitoring locations against NAAQ limit value of 1.0 ng/m^3 (annual mean).

While comparing with the National Ambient Air Quality (NAAQ) Standards revised as per GSR 826(E) dated 16.11.2009, **all monitored values were found to be well within the respective limit values for 24-hourly periods** for Industrial, Residential, Rural and other Areas.

Exceedance Factor (EF) : (Monitored Avg. Value of criteria Pollutant/NAAQ Norm of the Pollutant) : Critical Pollution if EF is 1.5; High Pollution if EF is between 1.0-<1.5, Moderate Pollution if EF is between 0.5-<1.0 and Low Pollution if EF is <0.5. **Study Area is falling under Low to Moderate Pollution Level**.

Pollutant	Mean Concentration	NAAQ Norm	Exceedance Factor (EF)	Pollution Category
PM2.5, ug/m^3	19.5	**60**	**0.32**	**Low**
PM10, ug/m^3	37.7	**100**	**0.38**	**Low**
SO_2, ug/m^3	11.4	**80**	**0.14**	**Low**
NO_2, ug/m^3	13.3	**80**	**0.17**	**Low**

Table : 3.8 Ambient Air Quality Data at A1-Perali South Mine (Not in Operation)

Season : Summer 2024 Sample Size : 24 hly. (otherwise mentioned)

Monitoring		Particulates, ug/m^3		Gaseous Pollutants, ug/m^3					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m^3	As, ng/m^3	Ni, ng/m^3	C_6H_6, ug/m^3	BaP, ng/m^3
04-05.03.2024	06:00-06:00	10	17	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	11	18	7	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	10	18	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	13	20	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	11	20	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	12	21	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	10	18	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	12	20	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	14	22	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	11	20	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	12	25	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	14	27	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	16	31	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	15	28	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	13	24	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	17	31	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	19	35	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	15	28	7	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	18	33	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	10	17	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	11	19	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	13	20	6	6	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	11	18	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	12	20	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**10-19**	**17-35**	**6-8**	**6-9**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**12.9**	**22.9**	**6.5**	**7.0**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2-**Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.9 Ambient Air Quality Data at A2-Maruvattur

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	20	38	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	17	32	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	16	30	11	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	14	26	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	18	31	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	13	25	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	16	30	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	15	29	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	21	38	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	20	37	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	17	35	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	15	28	9	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	17	32	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	19	37	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	22	40	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	20	38	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	18	39	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	23	42	14	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	21	40	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	24	47	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	18	40	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	20	43	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	19	40	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	22	46	12	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**13-24**	**25-47**	**8-14**	**9-15**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**18.5**	**36.0**	**9.9**	**11.7**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.10 Ambient Air Quality Data at A3-Perali

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	20	43	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	18	40	10	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	21	44	9	11	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	23	48	11	14	11.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	20	42	13	16	12.9	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	22	45	14	17	10.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	25	47	12	15	11.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	23	43	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	20	41	10	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	21	43	13	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	24	46	13	16	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	21	44	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	17	38	14	17	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	20	42	14	15	11.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	22	45	13	15	10.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	21	43	12	14	11.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	19	40	14	17	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	16	35	11	13	10.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	19	41	10	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	14	34	14	16	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	17	38	12	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	21	45	15	18	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	22	48	11	13	11.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	18	40	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**14-25**	**34-48**	**9-15**	**11-18**	**<10-12.9**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**20.2**	**42.3**	**12.0**	**14.5**	**11.1**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.11 Ambient Air Quality Data at A4-Chittali

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	26	53	17	20	21.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	31	57	14	17	18.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	28	53	12	16	15.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	24	49	16	20	16.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	33	60	13	17	20.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	28	54	15	20	17.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	23	45	12	15	18.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	22	43	18	22	15.9	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	34	62	13	18	17.0	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	36	60	17	20	20.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	27	51	14	18	18.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	30	55	21	24	19.0	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	25	53	15	17	23.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	30	57	18	20	25.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	28	54	20	23	20.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	33	60	22	25	21.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	27	53	17	19	17.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	30	57	19	21	20.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	29	55	21	24	18.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	32	60	23	27	20.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	37	62	18	20	24.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	33	58	20	22	18.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	27	47	21	24	19.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	31	51	18	21	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**22-37**	**43-62**	**12-23**	**15-27**	**12.7-25.1**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**29.3**	**54.5**	**17.3**	**20.4**	**19.1**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.12 Ambient Air Quality Data at A5-Odiyam

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	10	22	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	12	25	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	16	33	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	14	30	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	12	25	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	11	23	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	13	27	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	10	21	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	14	27	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	12	25	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	15	32	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	11	27	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	16	34	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	13	23	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	10	17	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	11	19	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	10	18	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	10	20	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	12	21	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	10	18	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	11	22	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	10	19	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	14	26	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	12	23	9	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**10-16**	**17-34**	**6-9**	**7-12**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**12.0**	**24.0**	**7.5**	**9.1**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.13 Ambient Air Quality Data at A6-Kottarai

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	16	30	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	18	33	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	20	37	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	15	30	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	12	22	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	13	25	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	16	30	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	21	37	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	18	34	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	15	27	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	18	31	7	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	14	25	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	17	32	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	12	22	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	15	28	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	17	33	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	14	27	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	13	25	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	15	30	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	16	33	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	20	38	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	14	31	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	17	33	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	21	40	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**12-21**	**22-40**	**6-9**	**7-11**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**16.1**	**30.5**	**7.3**	**8.9**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.14 Ambient Air Quality Data at A7-Kalpadi

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	19	40	11	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	21	43	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	23	45	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	24	47	12	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	22	40	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	27	51	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	25	48	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	23	45	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	17	30	10	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	23	41	9	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	20	37	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	18	40	12	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	16	33	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	19	37	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	15	33	9	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	18	35	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	20	42	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	17	34	12	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	14	27	12	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	14	30	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	11	23	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	13	27	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	15	29	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	14	27	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**11-27**	**23-51**	**8-12**	**9-15**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**18.7**	**36.8**	**10.3**	**12.5**	**<10**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.15 Ambient Air Quality Data at A8-Perambalur (Outskirt)

Monitoring		Particulates, ug/m³		Gaseous Pollutants, ug/m³					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO_2	NOx	O_3 (8-hly.)	NH_3	CO (8-hly.)	Pb, ug/m³	As, ng/m³	Ni, ng/m³	C_6H_6, ug/m³	BaP, ng/m³
04-05.03.2024	06:00-06:00	31	63	19	20	18.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.03.2024	06:00-06:00	25	54	20	23	20.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.03.2024	06:00-06:00	29	60	22	25	21.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.03.2024	06:00-06:00	34	63	17	19	18.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.03.2024	06:00-06:00	30	57	19	21	21.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.03.2024	06:00-06:00	32	63	21	24	22.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.03.2024	06:00-06:00	27	55	23	27	20.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.03.2024	06:00-06:00	36	68	18	20	25.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
04-05.04.2024	06:00-06:00	33	64	20	22	27.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.04.2024	06:00-06:00	30	57	21	23	30.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
12-13.04.2024	06:00-06:00	28	55	23	24	25.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.04.2024	06:00-06:00	24	51	20	22	29.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
20-21.04.2024	06:00-06:00	27	58	24	27	27.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.04.2024	06:00-06:00	26	50	17	19	29.0	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.04.2024	06:00-06:00	23	43	19	21	30.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.04.2024	06:00-06:00	22	40	22	23	21.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
05-06.05.2024	06:00-06:00	27	51	20	22	17.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
06-07.05.2024	06:00-06:00	33	58	21	24	20.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
13-14.05.2024	06:00-06:00	25	47	18	20	18.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
14-15.05.2024	06:00-06:00	22	45	20	23	20.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
21-22.05.2024	06:00-06:00	20	41	19	21	24.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
22-23.05.2024	06:00-06:00	30	57	20	23	18.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
28-29.05.2024	06:00-06:00	29	55	21	24	19.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
29-30.05.2024	06:00-06:00	32	60	23	25	21.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
Range (Minimum-Maximum)		**20-36**	**40-68**	**17-24**	**19-27**	**17.8-30.4**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
Mean Value		**28.1**	**54.8**	**20.3**	**22.6**	**22.8**	**<5**	**<1000**	**<0.1**	**<1**	**<1**	**<0.01**	**<0.1**
NAAQ Norms*		**60 (24 hrs.)**	**100 (24 hrs.)**	**80 (24 hrs.)**	**80 (24 hrs.)**	**100 (8 hrs.)**	**400 (24 hrs.)**	**2,000 (8 hrs.)**	**1.0 (24 hrs.)**	**6.0 (annual)**	**20 (annual)**	**5.0 (annual)**	**1.0 (annual)**

Legend : **PM2.5**-Particulate Matter size less than 2.5 um; **PM10**-Respirable Particulate Matter size less than 10 um; **SO_2**-Sulphur dioxide; **NOx**-Oxides of Nitrogen**; NH_3**-Ammonia; **O_3**-Ozone; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C_6H_6**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. ug-microgram & ng-nanogram. *** : NAAQ Norms-**National Ambient Air Quality Norms-**Revised as per GSR 826(E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas.

Table : 3.16 Abstract of Ambient Air Quality Data

Sl. No.	Parameter	Pollutant Concentration, ug/m³							
		PM2.5	PM10	SO_2	NOx	PM2.5	PM10	SO_2	NOx
		A1-Perali South Mine				A2-Maruvattur			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	10	17	6	6	13	25	8	9
3	10th Percentile Value	10	18	6	6	15	28	8	10
4	20th Percentile Value	11	18	6	6	16	30	9	11
5	30th Percentile Value	11	20	6	6	17	32	9	11
6	40th Percentile Value	12	20	6	7	18	35	10	11
7	50th Percentile Value	12	20	6	7	19	38	10	12
8	60th Percentile Value	13	22	6	7	20	38	10	12
9	70th Percentile Value	14	25	7	8	20	40	10	12
10	80th Percentile Value	15	28	7	8	21	40	11	13
11	90th Percentile Value	17	31	7	8	22	43	11	13
12	95th Percentile Value	18	33	8	8	23	46	12	14
13	98th Percentile Value	19	34	8	9	24	47	13	15
14	Maximum	19	35	8	9	24	47	14	15
15	**Arithmetic Mean**	**12.9**	**22.9**	**6.5**	**7.0**	**18.5**	**36.0**	**9.9**	**11.7**
16	Geometric Mean	12.7	22.3	6.4	7.0	18.3	35.4	9.8	11.6
17	Standard Deviation	2.6	5.5	0.7	0.9	2.9	6.1	1.4	1.5
18	**NAAQ Norms***	**60**	**100**	**80**	**80**	**60**	**100**	**80**	**80**
19	**% Values exceeding Norms***	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		A3-Perali				A4-Chittali			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	14	34	9	11	22	43	12	15
3	10th Percentile Value	17	38	10	12	24	48	13	17
4	20th Percentile Value	18	40	10	13	27	51	14	18
5	30th Percentile Value	19	41	11	13	27	53	15	19
6	40th Percentile Value	20	42	11	14	28	53	17	20
7	50th Percentile Value	21	43	12	15	30	55	18	20
8	60th Percentile Value	21	43	13	15	30	57	18	21
9	70th Percentile Value	21	44	13	15	31	57	19	22
10	80th Percentile Value	22	45	14	16	33	60	20	23
11	90th Percentile Value	23	47	14	17	34	60	21	24
12	95th Percentile Value	24	48	14	17	36	62	22	25
13	98th Percentile Value	25	48	15	18	37	62	23	26
14	Maximum	25	48	15	18	37	62	23	27
15	**Arithmetic Mean**	**20.2**	**42.3**	**12.0**	**14.5**	**29.3**	**54.5**	**17.3**	**20.4**
16	Geometric Mean	20.0	42.1	11.8	14.3	29.1	54.3	16.9	20.2
17	Standard Deviation	2.6	3.7	1.7	1.9	3.9	5.1	3.2	3.0
18	**NAAQ Norms***	**60**	**100**	**80**	**80**	**60**	**100**	**80**	**80**
19	**% Values exceeding Norms***	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO_2-Sulphur dioxide; NOx-Oxides of Nitrogen. ug-microgram. O_3-Ozone values are reported locationwise. NH_3-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C_6H_6-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below 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 Areas.

Table : 3.16 (Contn.) Abstract of Ambient Air Quality Data

Sl. No.	Parameter	Pollutant Concentration, ug/m³							
		PM2.5	PM10	SO_2	NOx	PM2.5	PM10	SO_2	NOx
		A5-Odiyam				A6-Kottarai			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	10	17	6	7	12	22	6	7
3	10th Percentile Value	10	18	6	8	13	25	6	8
4	20th Percentile Value	10	20	7	8	14	26	6	8
5	30th Percentile Value	11	21	7	8	15	28	7	8
6	40th Percentile Value	11	22	7	9	15	30	7	8
7	50th Percentile Value	12	23	8	9	16	31	7	9
8	60th Percentile Value	12	25	8	9	17	32	7	9
9	70th Percentile Value	13	26	8	10	17	33	8	10
10	80th Percentile Value	14	27	8	10	18	33	8	10
11	90th Percentile Value	15	31	9	10	20	37	9	11
12	95th Percentile Value	16	33	9	11	21	38	9	11
13	98th Percentile Value	16	34	9	12	21	39	9	11
14	Maximum	16	34	9	12	21	40	9	11
15	**Arithmetic Mean**	**12.0**	**24.0**	**7.5**	**9.1**	**16.1**	**30.5**	**7.3**	**8.9**
16	Geometric Mean	11.9	23.6	7.5	9.1	15.9	30.2	7.2	8.8
17	Standard Deviation	1.9	4.8	0.9	1.2	2.7	4.8	1.0	1.2
18	**NAAQ Norms***	**60**	**100**	**80**	**80**	**60**	**100**	**80**	**80**
19	**% Values exceeding Norms***	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		A7-Kalpadi				A8-Permabalur			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	11	23	8	9	20	40	17	19
3	10th Percentile Value	14	27	9	10	22	44	18	20
4	20th Percentile Value	15	30	9	11	25	49	19	21
5	30th Percentile Value	16	33	10	12	26	51	19	21
6	40th Percentile Value	17	34	10	12	27	55	20	22
7	50th Percentile Value	19	37	10	13	29	56	20	23
8	60th Percentile Value	20	40	11	13	30	57	21	23
9	70th Percentile Value	21	41	11	14	30	58	21	24
10	80th Percentile Value	23	44	11	14	32	61	22	24
11	90th Percentile Value	24	46	12	15	33	63	23	25
12	95th Percentile Value	25	48	12	15	34	64	23	27
13	98th Percentile Value	26	50	12	15	35	66	24	27
14	Maximum	27	51	12	15	36	68	24	27
15	**Arithmetic Mean**	**18.7**	**36.8**	**10.3**	**12.5**	**28.1**	**54.8**	**20.3**	**22.6**
16	Geometric Mean	18.2	36.0	10.2	12.3	27.8	54.3	20.2	22.5
17	Standard Deviation	4.2	7.7	1.2	1.7	4.2	7.5	1.9	2.2
18	**NAAQ Norms***	**60**	**100**	**80**	**80**	**60**	**100**	**80**	**80**
19	**% Values exceeding Norms***	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO_2-Sulphur dioxide; NOx-Oxides of Nitrogen. ug-microgram. O_3-Ozone values are reported locationwise. NH_3-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C_6H_6-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below 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 Areas.

Table : 3.17 Ambient Air Quality Status

Season : Summer 2024
No. of Locations : 8; Sample Size : 24-Hourly

Sl. No.	Parameter	Pollutant Concentration, ug/m^3			
		PM2.5	PM10	SO_2	NOx
1	No. of Observations	192	192	192	192
2	Minimum	10	17	6	6
3	10th Percentile Value	11	21	6	8
4	20th Percentile Value	13	25	7	8
5	30th Percentile Value	15	30	8	9
6	40th Percentile Value	17	33	9	11
7	50th Percentile Value	18	37	10	12
8	60th Percentile Value	20	40	11	13
9	70th Percentile Value	22	45	12	15
10	80th Percentile Value	25	51	17	19
11	90th Percentile Value	30	57	20	22
12	95th Percentile Value	32	60	21	24
13	98th Percentile Value	34	63	23	25
14	Maximum	37	68	24	27
15	**Arithmetic Mean**	**19.5**	**37.7**	**11.4**	**13.3**
16	Geometric Mean	18.4	35.5	10.4	12.3
17	Standard Deviation	6.8	12.9	5.0	5.5
18	**NAAQ Norms***	**60**	**100**	**80**	**80**
19	**% Values exceeding NAAQ Norms**	**0**	**0**	**0**	**0**

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO_2-Sulphur dioxide; NOx-Oxides of Nitrogen. ug-microgram. O_3-Ozone values are reported locationwise.
NH_3-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C_6H_6-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below 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 Areas.
National Ambient Air Quality Standard : The levels of air quality with an adequate margin of safety, to protect the public health, vegetation and property. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.
1. 24-hly./8-hly. values should be met 98% of the time in a year; however, 2% of the time it may exceed but not on two consecutive days.
2. Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24-hourly at uniform interval.

3.5.3 RSPM Analysis

With the samples of Respirable Suspended Particulate Matter (RSPM or PM_{10}) monitored, the main focus is on characterization and apportionment of PM_{10} to have a better understanding and correlation between the RSPM fraction at source and receptor. There was no significant variation in the characteristics of RSPM values in the upwind and downwind direction locations. Free Respirable Silica in RSPM was also monitored using Personal Sampler and FTIR Method of Analysis. The Silica Content was found to be 1.8% of RSPM that monitored in the Study Area.

Free Respirable Silica Content (FTIR Method) : 1.8%.

3.6 Ambient Noise Levels

Study area represents Industrial, Commercial & Residential Areas to compare with the MoEF&CC Ambient Noise Norms. The abstract of monitored noise data are presented in **Table 3.18**.

Table : 3.18 Ambient Noise Level Data (Abstract)

Monitoring Dates : 04-05.04.2024

Sl. No.	Location	Area	Noise Levels, dB(A)					
			Day Time (06:00-22:00 hrs.)			Night Time (22:00-06:00 hrs.)		
			Lmin.	Lmax.	Leq	Lmin.	Lmax.	Leq
1	A1- Perali South Mine	Industrial	32.7	88.4	**39.5**	31.1	84.5	**38.5**
2	A2-Maruvattur	Residential	33.9	91.7	**41.2**	32.4	88.4	**39.7**
3	A3-Perali	Residential	34.1	93.2	**43.2**	33.2	91.2	**40.4**
4	A4- Chittali (on NH)	Residential	34.8	102.1	**44.3**	33.4	100.4	**42.7**
5	A5-Odiyam	Residential	32.8	90.4	**40.5**	31.8	82.7	**39.0**
6	A6-Kottarai	Residential	32.4	88.7	**40.1**	32.0	83.0	**38.7**
7	A7-Kalpadi	Residential	33.1	90.4	**42.3**	32.7	88.5	**40.4**
8	A8-Perambalur	Commercial	35.2	101.3	**46.2**	34.2	97.3	**43.8**
Study Area			**32.4**	**102.1**	**42.1**	**31.1**	**100.4**	**40.4**
MoEF&CC Norms* for Residential Areas			-		**55**	-		**45**
MoEF&CC Norms for Commercial Areas			-		**65**	-		**55**
MoEF&CC Norms for Industrial Areas			-		**75**	-		**70**

* : MoEF&CC Norms-Ministry of Environment, Forest & Climate Change Ambient Noise Norms (Leq).
Day time is reckoned in between 6 a.m and 10 p.m. and Night time is reckoned in between 10 p.m. and 6 a.m.

Ambient Noise Levels were ranging from 32.4 dB(A) to 102.1 dB(A) during day times and from 31.1 dB(A) to 100.4 dB(A) during night times on the monitoring days. Day Equivalent Noise (Leq-d) level was found to be 42.1 dB(A) and Night Equivalent Noise (Leq-n) level was 40.4 dB(A). While comparing with the MoEF&CC Leq Norms for day and night times, the monitored **ambient noise levels were well within the limit values** for their respective Category Area.

3.7 Water Environment

3.7.1 Hydrogeology

About 75% of the District is covered by Sedimentary Formations like Upper Gondwana, Cretaceous, Tertiary and Alluvial Deposits. As per TWAD Department Data, the Thickness of Aquifer in this District varies from 15-35 m BGL. The Range of Aquifer Parameters are as below:

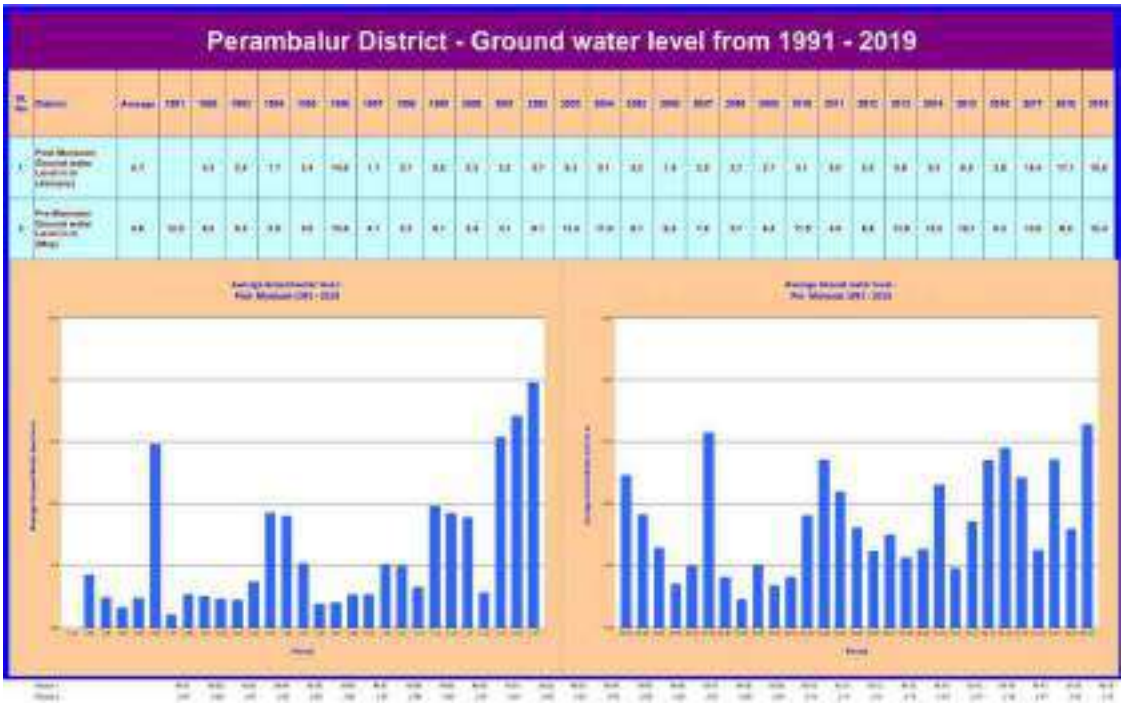
TWAD Data :	
Depth of Water Level	3-15 m BGL
Well Yield	300-550 lpm
Transmissivity	90-190 m^2/day
Permeability	15-30

Ground Water Levels : The Ground Water Levels (Monthly Data) from the **131 Observation Wells and 13 Piezometers of TWAD** in Perambalur District have been analysed for Post-Monsoon and Pre-Monsoon periods and give as 5 years average in **Table 3.19**. The Data for the Period 1991-2019 is also appended.

Based on the Mining operations carried out so far, the Ground Water-table was not intersected. Based on the Exploration Works carried out, the **Ground Water-table in the Mine vicinity is in between 38-40 m BGL and Mining will not intersect the Ground water-table**.

Table : 3.19 Ground Water Level Data (TWAD)

Monitored Month & Ground Water Level, m BGL													
Jan. 2013	May 2013	Jan 2014	May 2014	Jan 2015	May 2015	Jan 2016	May 2016	Jan 2017	May 2017	Jan 2018	May 2018	Jan 2019	May 2019
9.8	13.5	9.3	9.5	8.9	12.1	2.9	6.3	13.7	35.5	8.0	17.1	16.4	19.8
5-Years Maximum Depth – 35.5 m BGL Source : TWAD Data for Perambalur District.													



In the Mine vicinity, Transmissivity is 234 m^2/day and storativity is in the order of 3.527x10-4. Transmissivity ranges from 620 - 1455 m^2/day and storativity ranges from 3.29 to 7.74 x 10-5 in Tertiary formation. From the aquifer parameters, it is evident that the limestone aquifer has poor in transmitting capacity of groundwater and the **cone of depression will be confined within the mine area**.

Out of 10 Blocks, Groundwater development has reached more than 100% in 4 Blocks and in the rest of 6 Blocks, the development is in the range of 36 to 55%. As per Tamil Nadu Water Supply and Drainage Board (TWAD), the ground water Stage of Development of **Varagur Firka is in Safe Category** (<70%) [130724-G.O(Ms.) No.37 WRD dated 07.03.2024].

3.7.2 Water Quality

The Central Pollution Control Board (**CPCB**) has identified Five **Designated Best Use of Surface Waters** viz. **Class A** (Drinking Water Source without Conventional Treatment but after Disinfection), **B** (Out Door Bathing-Organised), **C** (Drinking Water Source after Conventional Treatment and Disinfection), **D** (Propagation of Wild life and Fisheries) & **E** (Irrigation, Industrial Cooling, Controlled Waste Disposal) and stipulated the Norms for the Classes; for few Parameters (**Table 3.20**).

Further, Bureau of Indian Standards (**BIS**) had also recommended Tolerance Limits for Inland Surface Waters for the different uses (**IS 2296:1982**). Even though, IS 2296:1982 has been withdrawn, the analysed data are compared with this Standard to have better understanding about the Surface Water Quality in the Study Area.

Table : 3.20 CPCB Criteria for Designated Best Use of Water

Parameter	Designated Best Use Class & Required Criteria				
	A	B	C	D	E
pH	6.5-8.5	6.5-8.5	6.5-9.0	6.5-8.5	6.5-8.5
EC, umhos/cm (max.)	-	-	-	-	2,250
DO, mg/l	6 or more	5 or more	4 or more	4 or more	6 or more
BOD-3 days @ 27 °C	2 or less	3 or less	3 or less	-	2 or less
Total Coliforms, MPN/100 ml	50 or less	500 or less	5000 or less	-	50 or less
Free Ammonia (as N), mg/l	-	-	-	1.2 or less	-
Boron, mg/l (max.)	-	-	-	-	2
Sodium Absorption Ratio (max.)	-	-	-	-	26

- : Not included/Not specified.

The Ground Water Quality Parameters are compared with **BIS 10500:2012 Standards** of Acceptable and Permissible Limits for Drinking purpose with Ground Water as source. The monitored water quality data are presented in **Tables 3.21-3.22** and the abstract of those data is given as **Table 3.23**.

The **Surface Water** samples were monitored with pH in the range 7.58-7.78 against the Limit value of 6.5-9.0. DO levels were in the range 3.8-5.2 mg/l against the minimum requirement value of 4.0 mg/l. TDS values were monitored in the range of 400-480 mg/l. Chloride values ranging from 87 mg/l to 112 mg/l. Iron content was found to be in the range 0.06-0.12 mg/l. Oil and grease, phenolic compounds, cyanides, sulphides and insecticides were found to be absent. Trace metals were found to be in traceable levels. BOD and COD values were found to be <2 mg/l and 2-18 mg/l respectively. The surface water quality were found to be within the prescribed CPCB Norms.

The pH of **Ground Water** samples were ranging from 7.60-7.83 against the BIS Norm of 6.5-8.5. TDS and Chloride values were found to be in the range 410-940 mg/l (Norm 500 mg/l or 2,000 mg/l in the absence of alternate source) and 93-320 mg/l (Norm 250/1000 mg/l) respectively. Iron 6content was found to be in the range 0.06-0.11 mg/l.

Oil & Grease, Cyanides, Phenols, Pesticides, etc. were found to be absent. Most of the trace metals were monitored to be below their detectable limits. In general, the water quality of ground waters were found to be within the prescribed IS 10500:2012 Norms for Drinking in the absence of an alternative source.

The pH value of **Mine Pit water (Mine not in operation)** was found to be 7.83. TDS value was 430 mg/l. Chloride value was 114 mg/l. Iron content was found to be 0.09 mg/l. BOD and COD values were monitored in lower levels. Oil & Grease value was found to be Nil. In general, mine pit water quality was found to be within the prescribed **TNPCB Norms** for Onland irrigation.

Table : 3.21 Surface Water Quality Data

Monitoring Date : 05.04.2024
(Worst case & Mean values are reported)

Sl. No.	Parameter	W1 Marudaiyar River U/s	W2 Marudaiyar River D/s	W3 Odiyam Nalla	W4 Elumur Aar	CPCB Norms*
1	pH	7.76	7.71	7.58	7.64	**6.5-8.5**
2	Colour, Hazen units	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	**10-30**
3	Temperature, °C	27.0	27.2	26.9	27.0	-
4	Turbidity, NTU	1.0	0.8	0.9	0.8	-
5	Residual Chlorine, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	-
6	Dissolved Oxygen, mg/l	5.0	5.2	5.1	5.2	**4.0-6.0**
7	Total Suspended Solids, mg/l	12	10	13	11	-
8	Electrical Conductivity, umhos/cm	700	720	640	680	-
9	Total Dissolved Solids, mg/l	440	450	400	430	**500-2100**
10	Total Hardness (as $CaCO_3$), mg/l	190	190	170	180	-
11	Calcium Hardness, mg/l	90	90	80	80	-
12	Magnesium Hardness, mg/l	100	100	90	100	-
13	Calcium (as Ca), mg/l	36	36	32	32	-
14	Magnesium (as Mg), mg/l	24	24	22	24	-
15	Sodium (as Na), mg/l	48	48	38	42	-
16	Potassium (as K), mg/l	1	1	1	1	-
17	Chlorides (as Cl), mg/l	102	102	87	93	**250-600**
18	Sulphates (as SO_4), mg/l	44	44	36	32	**400-1000**
19	Total Alkalinity (as $CaCO_3$), mg/l	90	90	90	100	-
20	BOD-3 days @ 27°C, mg/l	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	**<3**
21	COD, mg/l	3	3	2	2	-
22	Oil & Grease, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	Nil	Nil	-
23	Iron (as Fe), mg/l	0.08	0.07	0.08	0.06	**0.3-5.0**
24	Fluorides (as F), mg/l	0.14	0.16	0.12	0.11	**1.5**
25	Nitrates (as NO_3), mg/l	0.10	0.15	0.16	0.20	**20-50**
26	Phosphates (as PO_4), mg/l	<0.01	<0.01	<0.01	<0.01	-
27	Cyanides (as CN), mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	-
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	-
29	Phenols (as C_6H_5OH), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	-
30	Manganese (as Mn), mg/l	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	-
31	Chromium (as Cr), mg/l	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	-
32	Copper (as Cu), mg/l	<0.001	<0.001	<0.001	<0.001	**1.5**
33	Selenium (as Se), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	-
34	Aluminium (as Al), mg/l	<0.001	<0.001	<0.001	<0.001	-
35	Cadmium (as Cd), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	-
36	Arsenic (as As), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.05-0.2**
37	Boron (as B), mg/l	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	**2**
38	Mercury (as Hg), mg/l	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	-
39	Lead (as Pb), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.1**
40	Zinc (as Zn), mg/l	<0.001	<0.001	<0.001	<0.001	**1.5-15**
41	Percent Sodium, %	35.3	35.4	32.5	33.5	-
42	Total Coliforms, MPN/100 ml	20	17	20	17	**50-5000**
43	Faecal Coliforms, MPN/100 ml	14	11	11	12	-
44	E. Coli, MPN/100 ml	9	7	7	6	-

* : CPCB Norms-Central Pollution Control Board Norms for Surface Waters-**Class C**.
- : Not included/Not available.

Table : 3.21 (Contn.) Surface Water Quality Data

Monitoring Date : 05.04.2024

(Worst case & Mean values are reported)

Sl. No.	Parameter	W5 Pond, Maruvattur	W6 Pond, Perali	W7 Pond, Odiyam	W8 Pond, Kunnam	CPCB Norms*
1	pH	7.72	7.78	7.69	7.78	**6.5-8.5**
2	Colour, Hazen units	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	**10-30**
3	Temperature, °C	27.0	27.0	27.2	27.3	-
4	Turbidity, NTU	2.4	1.8	1.3	1.8	-
5	Residual Chlorine, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	-
6	Dissolved Oxygen, mg/l	3.9	4.2	4.6	3.8	**4.0-6.0**
7	Total Suspended Solids, mg/l	32	24	16	21	-
8	Electrical Conductivity, umhos/cm	650	680	750	700	-
9	Total Dissolved Solids, mg/l	410	440	480	440	**500-2100**
10	Total Hardness (as $CaCO_3$), mg/l	180	180	190	180	-
11	Calcium Hardness, mg/l	90	100	90	100	-
12	Magnesium Hardness, mg/l	90	80	100	80	-
13	Calcium (as Ca), mg/l	36	40	36	40	-
14	Magnesium (as Mg), mg/l	22	19	24	19	-
15	Sodium (as Na), mg/l	38	46	42	46	-
16	Potassium (as K), mg/l	1	2	2	1	-
17	Chlorides (as Cl), mg/l	95	102	112	98	**250-600**
18	Sulphates (as SO_4), mg/l	41	43	40	44	**400-1000**
19	Total Alkalinity (as $CaCO_3$), mg/l	80	80	110	100	-
20	BOD-3 days @ 27°C, mg/l	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	**<3**
21	COD, mg/l	8	6	4	18	-
22	Oil & Grease, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	-
23	Iron (as Fe), mg/l	0.08	0.12	0.06	0.11	**0.3-5.0**
24	Fluorides (as F), mg/l	0.21	0.21	0.13	0.26	**1.5**
25	Nitrates (as NO_3), mg/l	0.18	0.18	0.11	0.21	**20-50**
26	Phosphates (as PO_4), mg/l	<0.01	<0.01	<0.01	<0.01	-
27	Cyanides (as CN), mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	-
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	-
29	Phenols (as C_6H_5OH), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	-
30	Manganese (as Mn), mg/l	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	-
31	Chromium (as Cr), mg/l	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	-
32	Copper (as Cu), mg/l	<0.001	<0.001	<0.001	<0.001	**1.5**
33	Selenium (as Se), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	-
34	Aluminium (as Al), mg/l	<0.001	<0.001	<0.001	<0.001	-
35	Cadmium (as Cd), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	-
36	Arsenic (as As), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.05-0.2**
37	Boron (as B), mg/l	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	**2**
38	Mercury (as Hg), mg/l	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	-
39	Lead (as Pb), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.1**
40	Zinc (as Zn), mg/l	<0.001	<0.001	<0.001	<0.001	**1.5-15**
41	Percent Sodium, %	31.3	35.4	32.2	35.6	-
42	Total Coliforms, MPN/100 ml	30	90	31	50	**50-5000**
43	Faecal Coliforms, MPN/100 ml	17	32	14	21	-
44	E. Coli, MPN/100 ml	11	14	8	17	-

* : CPCB Norms-Central Pollution Control Board Norms for Surface Waters-**Class C**.

- : Not included/Not available.

Table : 3.22 Ground Water Quality Data

Monitoring Date : 05.04.2024
(Worst case & Mean values are reported)

Sl. No.	Parameter	W9 Mine Pit	W10 Borewell, Maruvattur	W11 Borewell, Perali	W12 Borewell, Chittali	IS:10500 Norms*
1	pH	7.83	7.74	7.63	7.60	**6.5-8.5**
2	Colour, Hazen units	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	**5/15#**
3	Temperature, °C	27.0	26.8	26.4	26.3	**-**
4	Turbidity, NTU	1.2	0.6	0.8	0.7	**1/5**
5	Residual Chlorine, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	**0.2/1.0**
6	Dissolved Oxygen, mg/l	4.4	4.2	4.3	4.4	**-**
7	Total Suspended Solids, mg/l	14	8	10	9	**-**
8	Electrical Conductivity, umhos/cm	680	660	760	740	**-**
9	Total Dissolved Solids, mg/l	430	420	480	470	**500/2000**
10	Total Hardness (as $CaCO_3$), mg/l	190	190	190	190	**200/600**
11	Calcium Hardness, mg/l	90	90	100	110	**-**
12	Magnesium Hardness, mg/l	100	100	90	80	**-**
13	Calcium (as Ca), mg/l	36	36	40	44	**75/200**
14	Magnesium (as Mg), mg/l	24	24	22	19	**30/100**
15	Sodium (as Na), mg/l	38	44	42	44	**-**
16	Potassium (as K), mg/l	1	1	1	1	**-**
17	Chlorides (as Cl), mg/l	114	96	121	112	**250/1000**
18	Sulphates (as SO_4), mg/l	38	36	40	41	**200/400**
19	Total Alkalinity (as $CaCO_3$), mg/l	90	100	100	90	**200/600**
20	BOD-3 days @ 27°C, mg/l	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	**-**
21	COD, mg/l	3	2	4	3	**-**
22	Oil & Grease, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	**-**
23	Iron (as Fe), mg/l	0.09	0.08	0.06	0.08	**0.3**
24	Fluorides (as F), mg/l	0.17	0.12	0.18	0.15	**1.0/1.5**
25	Nitrates (as NO_3), mg/l	0.10	0.10	0.10	0.10	**45**
26	Phosphates (as PO_4), mg/l	<0.01	<0.01	<0.01	<0.01	**-**
27	Cyanides (as CN), mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	**0.05**
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	**Abs./0.001**
29	Phenols (as C_6H_5OH), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.001/0.002**
30	Manganese (as Mn), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.1/0.3**
31	Chromium (as Cr), mg/l	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	**0.05**
32	Copper (as Cu), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.05/1.5**
33	Selenium (as Se), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.01**
34	Aluminium (as Al), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.03/0.2**
35	Cadmium (as Cd), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.003**
36	Arsenic (as As), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.01/0.05**
37	Boron (as B), mg/l	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	**0.5/1.0**
38	Mercury (as Hg), mg/l	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	**0.001**
39	Lead (as Pb), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.01**
40	Zinc (as Zn), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**5/15**
41	Percent Sodium, %	30.2	33.3	32.3	33.3	**-**
42	Total Coliforms, MPN/100 ml	<2	<2	<2	<2	**Absent**
43	Faecal Coliforms, MPN/100 ml	<2	<2	<2	<2	**Absent**
44	E. Coli, MPN/100 ml	<2	<2	<2	<2	**Absent**

* : IS:10500 :2012-Drinking Water Standards; # : Requirement/Permissible Limit in the absence of alternate source.

Table : 3.22 (Contn.) Ground Water Quality Data

Monitoring Date : 05.04.2024
(Worst case & Mean values are reported)

Sl. No.	Parameter	W13 Borewell, Odiyam	W14 Borewell, Kottarai	W15 Borewell, Kalpadi	W16 Borewell, Perambalur	IS:10500 Norms*
1	pH	7.68	7.62	7.72	7.80	**6.5-8.5**
2	Colour, Hazen units	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	BDL(DL:5.0)	**5/15#**
3	Temperature, °C	26.4	26.3	26.8	27.0	**-**
4	Turbidity, NTU	0.6	0.8	1.0	1.2	**1/5**
5	Residual Chlorine, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	**0.2/1.0**
6	Dissolved Oxygen, mg/l	4.3	4.4	4.2	4.0	**-**
7	Total Suspended Solids, mg/l	8	10	12	14	**-**
8	Electrical Conductivity, umhos/cm	650	750	780	1400	**-**
9	Total Dissolved Solids, mg/l	410	480	490	940	**500/2000**
10	Total Hardness (as $CaCO_3$), mg/l	180	180	200	340	**200/600**
11	Calcium Hardness, mg/l	90	100	110	160	**-**
12	Magnesium Hardness, mg/l	90	80	90	180	**-**
13	Calcium (as Ca), mg/l	36	40	44	64	**75/200**
14	Magnesium (as Mg), mg/l	22	19	22	43	**30/100**
15	Sodium (as Na), mg/l	40	47	42	108	**-**
16	Potassium (as K), mg/l	1	1	1	8	**-**
17	Chlorides (as Cl), mg/l	106	118	120	320	**250/1000**
18	Sulphates (as SO_4), mg/l	38	47	41	64	**200/400**
19	Total Alkalinity (as $CaCO_3$), mg/l	90	90	100	110	**200/600**
20	BOD-3 days @ 27°C, mg/l	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	**-**
21	COD, mg/l	3	4	2	4	**-**
22	Oil & Grease, mg/l	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	**-**
23	Iron (as Fe), mg/l	0.08	0.09	0.10	0.11	**0.3**
24	Fluorides (as F), mg/l	0.18	0.20	0.18	0.24	**1.0/1.5**
25	Nitrates (as NO_3), mg/l	0.05	0.10	0.10	0.15	**45**
26	Phosphates (as PO_4), mg/l	<0.01	<0.01	<0.01	<0.01	**-**
27	Cyanides (as CN), mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	**0.05**
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	**Abs./0.001**
29	Phenols (as C_6H_5OH), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.001/0.002**
30	Manganese (as Mn), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.1/0.3**
31	Chromium (as Cr), mg/l	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	BDL(DL:0.03)	**0.05**
32	Copper (as Cu), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.05/1.5**
33	Selenium (as Se), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.01**
34	Aluminium (as Al), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.03/0.2**
35	Cadmium (as Cd), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.003**
36	Arsenic (as As), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.01/0.05**
37	Boron (as B), mg/l	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	BDL(DL:0.025)	**0.5/1.0**
38	Mercury (as Hg), mg/l	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	BDL(DL:0.0005)	**0.001**
39	Lead (as Pb), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**0.01**
40	Zinc (as Zn), mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	**5/15**
41	Percent Sodium, %	32.4	36.0	31.2	40.1	**-**
42	Total Coliforms, MPN/100 ml	<2	<2	<2	<2	**Absent**
43	Faecal Coliforms, MPN/100 ml	<2	<2	<2	<2	**Absent**
44	E. Coli, MPN/100 ml	<2	<2	<2	<2	**Absent**

* : IS:10500 :2012-Drinking Water Standards; # : Requirement/Permissible Limit in the absence of alternate source.

Table : 3.23 Water Quality Status
Monitoring Date : 05.04.2024

Sl. No.	Parameter	Concentration Range & Norms			
		Surface Waters	CPCB Norms* for Surface Waters	Ground Waters	IS:10500 Norms** for Drinking Waters
1	pH	7.58-7.78	**6.5-8.5**	7.60-7.83	**6.5-8.5**
2	Total Dissolved Solids, mg/l	400-480	**-**	410-940	**500-2000***
3	Dissolved Oxygen, mg/l	3.8-5.2	**4.0-6.0**	4.0-4.4	**-**
4	BOD (3 days @ 27 °C), mg/l	BDL(DL:2.0)	**<3**	BDL(DL:2.0)	**-**
5	COD, mg/l	2-18	**-**	2-4	**-**
6	Oil & Grease, mg/l	BDL(DL:1.0)	**-**	BDL(DL:1.0)	**-**
7	Chlorides (as Cl), mg/l	87-112	**250-600**	96-320	**250-1000**
8	Iron (as Fe), mg/l	0.06-0.12	**0.3-5.0**	0.06-0.11	**0.3**
9	Trace Metals, mg/l	<0.01	**-**	<0.01	**<0.001-<0.01**
10	Total Coliforms, MPN/100 ml	17-90	**50-5000**	<2	**Absent**

* : CPCB Norms-Central Pollution Control Board Norms for Surface Waters-**Class C**. - : Not included/Not available.
** : * : IS:10500 :2012-Drinking Water Standards; # : Requirement/Permissible Limit in the absence of alternate source.

3.8 Land Environment

3.8.1 Soil Status

The collected soil quality data are given as **Table 3.24.** Soils with medium compaction and silty loam texture were predominant in the study area. Soil pH values (7.75-7.90) were found to be in alkaline range and Electrical Conductivity values were in the range 1.23-1.54 mmhos/cm. There was low moisture at all the monitoring locations. Low levels of Nitrogen, Phosphorous and Potassium (NPK) values were monitored at all locations. Sodium Absorption Ratio was in the range 2.09-3.15 (desirable value being <5). There was **no heavy metals intrusion**/leaching into the ground strata. Wilting coefficient in significant levels would mean that these soils would support the vegetation, if amended suitably and will suit for salt tolerant & semisalt tolerant plants.

3.8.2 Land Use Pattern

For Land use study of the Study Area, IRS P6 LISS-III **Satellite Imagery**/data (dated 14.02.2024) is used (**Fig. 3.3**). Visual interpretation technique has been adopted for the interpretation keys suggested in guidelines of NNRMS, Bangalore. Level-3 Classification with 1:50,000 scale was made for the preparation of land use mapping (**Fig. 3.4**). Land Use Pattern is given in **Table 3.25**. Crop land occupies about 33.84% and Plantations occupies about 22.82%. Fallow land occupies about 24.09% and Barren Land occupies 10.21%. Forests occupy about 3.31%. Water body occupies about 1.11%. About 3.43% of the study area is covered by built-up land.

Table : 3.24 Soil Status

Monitoring Date : 05.04.2024

Sl. No.	Parameter	S1	S2	S3	S4	S5	Desirable Range*
i	Colour	Brown	Brown	Reddish Brown	Brown	Grey	-
ii	Compaction	Medium	Medium	Medium	Medium	Medium	-
1	pH (10% Solution)	7.88	7.82	7.77	7.75	7.90	**5.5-9.0**
2	Electrical Conductivity, mmhos/cm	1.30	1.23	1.36	1.36	1.54	**0.2-0.5**
3	Natural Moisture Content, %	10.2	9.9	11.2	10.1	8.3	-
4	Organic Carbon, %	0.82	0.97	1.03	1.05	0.70	**>0.75**
5	Nitrogen (as N), %	0.008	0.010	0.010	0.010	0.005	**0.01-0.02**
6	Phosphorus (as P), %	0.004	0.004	0.006	0.005	0.004	**0.002-0.004**
7	Potassium (as K), %	0.006	0.010	0.004	0.005	0.010	**>0.01**
8	Sodium (as Na), ppm	110	160	120	140	180	-
9	Calcium (as Ca), ppm	60	90	100	90	80	-
10	Magnesium (as Mg), ppm	40	80	90	80	100	-
11	Chlorides (as Cl), ppm	170	210	180	190	220	-
12	Sulphates (as SO_4), ppm	90	80	90	100	100	-
13	Cation Exchange Capacity, meq/100 g	22.5	20.4	24.1	22.3	18.4	**10-30**
14	Grain Size Distribution :i. Sand, %	28.3	24.1	22.4	23.6	29.3	-
ii	Silt, %	61.3	64.7	68.9	66.0	60.5	-
iii	Clay, %	10.4	11.2	8.7	10.4	10.2	-
15	Textural Class	Silty loam	Silty loam	Silty loam	Silty loam	Sandy Loam	**Loam**
16	Bulk Density, g/cc	1.34	1.36	1.32	1.35	1.32	-
17	Infiltration Rate, cm/hr	3.6	4.0	3.8	4.0	4.2	-
18	Field Capacity, %	24.4	20.4	25.5	23.5	19.5	-
19	Wilting Coefficient, %	0.8	0.7	1.4	1.2	0.8	**>0.4**
20	Available Water Storage Capacity, %	23.6	19.7	24.1	22.3	18.7	-
21	Sodium Absorbing Ratio	2.69	2.94	2.09	2.58	3.15	**<5**

* : Desirable Range for High Production Soil.

Legend : **S1-Mine Green Belt; S2- Dry Agri. Land, Maruvattur; S3-Forest Land, Kunnam RF; S4- Dry Agri. Land, Iraiyur & S5-Barren Land, Perali.**

Fig. : 3.3 Satellite Imagery

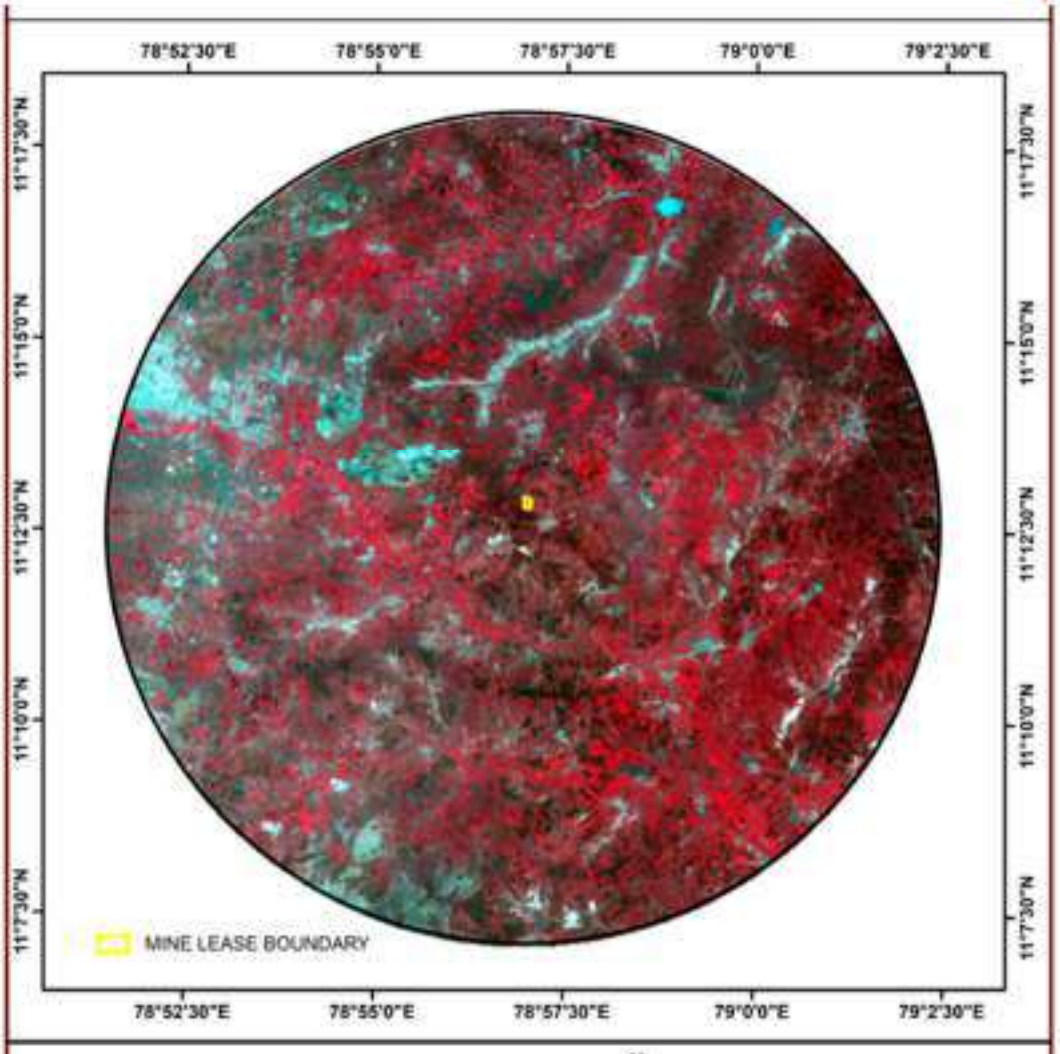


Fig. : 3.4 Land Use Pattern

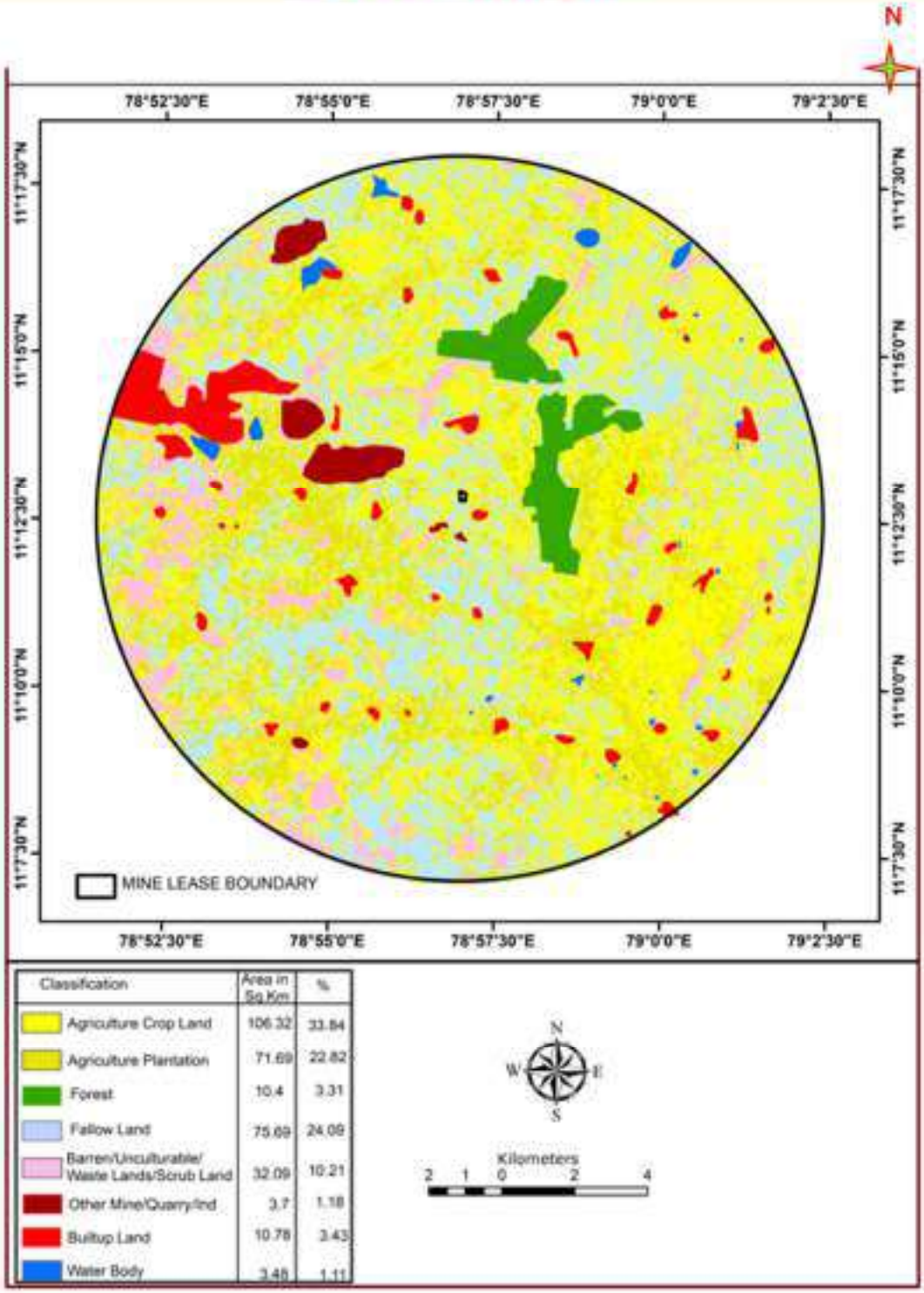


Table : 3.25 Land Use Pattern

Land Use	Area, sq.km	Coverage, %
Agri. Crop Land	106.32	33.84
Plantation	71.69	22.82
Forest Land	10.4	3.31
Fallow Land	75.69	24.10
Barren, Scrub Land, etc.	32.09	10.21
Other Mines, etc.	3.7	1.18
Built-up Land	10.78	3.43
Water body	3.48	1.11
Total	**314.15**	**100**

3.9 Flora and Fauna

3.9.1 Flora

A general ecological survey was carried out in the study area of 10 km radius around the Mine area. **Study Area is not part of any National Park, Sanctuary, Biosphere Reserve, Wildlife Corridors, Migratory Path, etc**. The primary data was generated through preparing a general checklist of all plants encountered in the study area. The species of vegetation found were identified and listed according to their families. The list of plant species **in the Reserved Forests Area** are presented in **Table 3.26.** The list of plant species in the Core and Buffer Zones are presented in **Table 3.27 & Table 3.28** respectively.

The nature of shrubs and trees in the study areas were of drought resistant types. Besides the natural vegetation, the agricultural and commercial crops were cultivated in and around the study area. Paddy, Maize, Green Gram, Black gram, Groundnut, Ragi, etc. were found to be cultivated among the agricultural crops whereas Sugarcane, Cotton, Turmeric, Cashew, etc. were commercially cultivated crops.

The vegetation of the study area was found to be predominantly occupied by dry deciduous species. The recorded plant species are largely herbaceous and grass species with some climbers and Trees. Tree species planted in social forestry, tree plantation program and along road side were also recorded. Direct observation showed that Pongamia pinnata, Delonix elata, Tamarindus indica, Delonix regia, etc. are the common plant species planted along the road side. The other tree species recorded were part of the social forestry and in the home gardens.

There are two Reserve Forests in the study area viz. Kunnam RF (@ 0.25 km in east) and Chithali RF (@ 3.4 km in north). The vegetation found in the Reserved Forests includes Butea monosperma, Dalbergia sisso, Dalbergia paniculata, Holoptelea integrifolia, Tectona grandis, Bambusa arundinacea, Dendrocalamus strictus, Hardwickia binata, etc.

Table : 3.26 List of Flora in the Reserve Forests

Sl. No.	Botanical Name	Family	Common Name	Habit
1	Acacia arabica	Mimosaceae	Karuvel, Black babool	Tree
2	Acaia catechu	Fabaceae	Karungali	Tree
3	Aegle marmelos	Rutaceae	Vilam	Tree
4	Albizia amara	Mimosaceae	Usilai, Siris	Tree
5	Anacardium occidentale	Anacardiaceae	Mundiri, Cashew	Tree
6	Azadirachta indica	Meliaceae	Vembu, Neem	Tree
7	Bambusa arundanacea	Poaceae	Bamboo, Mungil	Grass
8	Borassus flabelliformis	Arecaceae	Panai, Palm	Tree
9	Butea monosperma	Fabaceae	Flame of the forest	Tree
10	Cassia siamea	Caesaipinaceae	Kondrai	Tree
11	Dalbergia sisso	Fabaceae	Sissoo, Shisham	Tree
12	Holoptelea integrifolia	Ulmaceae	Indian elm, Jungle Cork	Tree
13	Dendrocalamus strictus	Poaceae	Kalamungil	Grass
14	Hardwickia binata	Fabaceae	Anjan, Aacha	Tree
15	Eucalyptus globulus	Myrtaceae	Araspadi, Thailam	Tree
16	Ficus benghalensis	Moraceae	Alamaram, Banyan	Tree
17	Lannea coromandelica	Anacardiaceae	Odhiyan	Tree
18	Peltophorum peterocarpum	Fabaceae	Perungkondrai	Tree
19	Phoenix sylvestris	Arecaceae	Echcha, Indian date	Tree
20	Pongamia pinnata	Fabaceae	Indian Beech, Pungan	Tree
21	Prosopis juliflora	Fabaceae	Babool, Velikaruvel	Tree
22	Senna occidentalis	Fabaceae	Ponnavarai	Tree
23	Tectona garandis	Lamiaceae	Tekku, Teak	Teak
24	Ziziphus oenoplia	Rhamnacceae	Suraimul	Shrub

Table : 3.27 List of Flora - Core Zone (including Green Belt)

Sl. No.	Botanical Name	Family	Common Name	Habit
1	Azadirachta indica	Meliaceae	Vembu, Veppa	Tree
2	Abutilon indicum	Malvaceae	Country Mallow, Tutti	Herb
3	Acalypha indica	Euphorbiaceae	Kuppaimeni	Herb
4	Albizia lebbek	Mimosaceae	Siris Tree, Vagai	Tree
5	Aristida adscensionis	Poaceae	Common Needle grass	Herb
6	Cassia auriculata	Fabaceae	Aavarampoo	Shrub
7	Cassia siamea	Caesalpiniaceae	Manja konnai	Tree
8	Datura metel	Solanaceae	Thorn apple, Oomathai	Shrub
9	Holoptelea integrifolia	Ulmacaea	Aavimaram, Indian elm	Tree
10	Leucaena leucocephala	Fabaceae	Periyatagarai, Horse Tamarind	Tree
11	Morinda tinctoria	Rubiaceae	Nuna	Tree
12	Pongamia pinnata	Fabaceae	Pungan	Tree
13	Samanea saman	Mimosaceae	Thoongumoonij maram	Tree
14	Tecoma stans	Bignoniaceae	Majarali, Yellow Bells	Shrub
15	Vitex negundo	Lamiaceae	Nochi	Shrub

Table : 3.28 List of Flora - Distribution of Vegetation in Buffer Zone

Sl. No.	Scientific Name	Family Name	Common Name	Habit
Agricultural Crops				
1	Arachis hypogea	Fabaceae	Groundnut	Herb
2	Oryza sativa	Poaceae	Rice	Herb
3	Phaseolus mungo	Fabaceae	Black gram	Herb
4	Sacharum officinarum	Poaceae	Sugarcane	Herb
5	Zea mays	Poaceae	Maize	Herb
Commercial Crops (including vegetables)				
1	Capsicum frutescens	Solanaceae	Milagaai	Herb
2	Carica papaya	Caricaceae	Papaya	Tree
3	Citrus limon	Rutaceae	Lemon	Tree
4	Cocus nucifera	Arecaceae	Coconut, Thennai	Tree
5	Cucurbita pepo	Cucurbitaceae	Pumpkin	Creeper
6	Cyamopsis tetragonoloba	Fabaceae	Cluster bean	Shrub
7	Gossypium arboreum	Malvaceae	Cotton, Paruthi	Shrub
8	Hibiscus esculentus	Malvaceae	Lady's finger, Vendai	Herb
9	Lagenaria vulgaris	Cucurbitaceae	Bottle gourd	Creeper
10	Lycopersicum esculentum	Solanaceae	Tomato	Herb
11	Mangifera indica	Anacardiaceae	Mango	Tree
12	Momordica charantia	Cucurbitaceae	Bittergourd	Creeper
13	Moringa oleifera	Moringaceae	Drumstick, Murungai	Tree
14	Musa paradisiaca	Musaceae	Plantain, Vazhai	Tree
15	Ricinus communis	Euphorbiaceae	Castor Bean Plant	Shrub
16	Sesamum indicum	Pedaliaceae	Seasame, Ellu	Herb
17	Solanum melongena	Solanaceae	Brinjal	Herb
18	Solanum torvum	Solanaceae	Turkey berry	Shrub
19	Trichosanthes cucurmina	Cucurbitaceae	Snake gourd	Creeper
20	Vicia faba	Fabaceae	Broad Bean	Creeper
Plantations				
1	Anacardium occidentale	Anacardiaceae	Cashew	Tree
2	Cocus nucifera	Arecaceae	Coconut, Thennai	Tree
3	Casuarina equisetifolia	Casuarinaceae	Casuarina, Savukku	Tree
4	Eucalyptus sp.	Myrtaceae	Eucalyptus	Tree
5	Musa paradisiaca	Musaceae	Plantain, Vazhai	Tree
6	Tectona grandis	Lamiaceae	Teak	Tree
Natural Vegetation				
1	Abrus precatorius	Fabaceae	Coral bead vine, Rosary pea,	Climber
2	Abutilon indicum	Malvaceae	Country Mallow, Tutti	Herb
3	Acacia leucophloea	Mimosaceae	Velvelam, White babool	Tree
4	Acacia nilotica	Mimosaceae	Babul, Karuvelam	Tree
5	Acalypha indica	Euphorbiaceae	Kuppaimeni	Herb
6	Acanthospermum hispidum	Asteraceae	Seruppadithazhai, Kenathupoondu	Herb
7	Achchyranthes aspera	Amaranthaceae	Prickly Chaff flower, Nayuruvi	Herb
8	Adathoda vasica	Acanthaceae	Vasaca, Adathodai	Shrub
9	Adina cordifolia	Rubiaceae	Manjakadambu	Tree
10	Aegle marmelos	Rutaceae	Wood Apple, Vilvam	Tree
11	Aerva lanata	Amaranthaceae	Sirupulai	Herb
12	Agave sisalana	Agavaceae	Kathalai, Sisal	Herb
13	Ageratum conyzoides	Asteraceae	Goat weed, Pumppillu	Herb
14	Ailanthus excelsa	Simaroubaceae	Indian Tree of Heaven, Perumaram	Tree

Sl. No.	Scientific Name	Family Name	Common Name	Habit
15	*Alangium salviifolium*	Cornaceae	Alingi	Tree
16	Albizia amara	Mimosaceae	Usilamaram	Tree
17	Albizia lebbek	Mimosaceae	Siris Tree, Vagai	Tree
18	Aloe vera	Liliaceae	Kathalai	Herb
19	Alstonia scholaris	Apocynaceae	Blackboard tree, Ezhilaipalai	Tree
20	Alternanthera sessilis	Amaranthaceae	Dwarf Copperleaf, Ponnanganni	Herb
21	Amaranthus spinosus	Amaranthaceae	Mullukkirai	Herb
22	Amaranthus viridis	Amaranthaceae	Kuppaikeerai	Herb
23	Ammannia baccifera	Lythraceae	Acrid weed, Kalluruvi	Herb
24	Anacardium occidentale	Anacardiaceae	Cashew	Tree
25	*Anisomeles malabarica*	Lamiaceae	Malabar Catmint/ Peimiratti	Shrub
26	Anona squamosa	Anonaceae	Custard apple	Tree
27	Apluda mutica	Poaceae	Mauritian Grass	Herb
28	Arachis hypogea	Faboideae	Ground nut	Herb
29	Argemone mexicana	Papaveraceae	Prickly poppy, Kudiyotti	Shrub
30	Aristida adscensionis	Poaceae	Coomon Needle grass	Herb
31	Artocarpus heterophyllus	Moraceae	Jackfruit	Tree
32	Azadirachta indica	Meliaceae	Neem, Vembu	Tree
33	Bambusa arundanacea	Poaceae	Bamboo	Tree
34	*Barleria buxifolia*	Acanthaceae	Rosemullipoondu	Shrub
35	Barleria prionitis	Acanthaceae	Porcupine flower, Semmulli	Shrub
36	Bassia latifolia	Sapotaceae	Iluppai	Tree
37	Blumea lacera	Asteraceae	Kattumullangi, Narakkarandai	Herb
38	Boerheavia diffusa	Nyctaginaceae	Pig weed, Mukkarattai Keerai	Herb
39	Borassus flabellifer	Arecaceae	Palmyra Palm	Tree
40	Bougainvillea spectabilis	Nyctaginaceae	Kaakithapoo	Shrub
41	Bulbostylis barbatta	Cyperaceae	Mukkutikorei	Herb
42	Butea monosperma	Fabaceae	Flame of Forest	Tree
43	Caeselpinia pulcherrima	Caesalpiniacea	Peacock Flower, Mayurkondrai	Tree
44	Calendula officinalis	Asteraceae	Marigold	Herb
45	Calophyllum inophyllum	Clusiaceae	Punnai	Tree
46	Calotropis gigantea	Asclepiadaceae	Crown Flower, Erukku	Shrub
47	Canna indica	Cannaceae	Indian shot, Kalvalai	Shrub
48	Capparis sepiaria	Capparaceae	Kattukkathiri	Shrub
49	Carica papaya	Caricaceae	Pappaali	Tree
50	Cassia auriculata	Fabaceae	Aavarampoo	Shrub
51	*Cascabela thevetia*	Apocynaceae	Yellow oleander/ Arali	Shrub
52	Cassia fistula	Fabaceae	Golden shower tree, Kondrai	Tree
53	Cassia occidentalis	Caesalpiniacea	Coffee weed, Payaverai	Herb
54	Cassia siamea	Caesalpiniacea	Manja konnai	Tree
55	Cassia tora	Caesalpiniacea	Sickle senna, Tagarai	Herb
56	Casuarina equisetifolia	Casuarinaceae	Whistling Pine, Savukku	Tree
57	Ceiba pentandra	Bombacaceae	Silk-Cotton Tree,	Tree
58	Cenchrus ciliaris	Poaceae	Buffel grass	Herb
59	*Chloris barbata*	Poaceae	Finger grass	Grass
60	Chloris dolichostachya	Poaceae	Finger grass, Kuruthupillu	Herb
61	*Chloroxylon swietenia*	Rutaceae	Porasu maram	Tree
62	Chrysanthemum sp.	Asteraceae	Chrysanthemum, Samanthi	Herb
63	Cissus quadrangularis	Vitaceae	Devil's Backbone, Pirandai	Climber
64	Citrus limon	Rutaceae	Lemon	Tree
65	*Clausena anisate*	Rutaceae	Horse wood/Kaatu Karuveppillai	Shrub

Sl. No.	Scientific Name	Family Name	Common Name	Habit
66	Cleome gynandra	Cleomaceae	Wild Spider flower, Nalvelai	Herb
67	Cleome viscosa	Cleomaceae	Tickweed, Naikkaduku	Herb
68	Clitoria ternatea	Fabaceae	Sankupushpam	Climber
69	Coccinia indica	Cucurbitaceae	Kovai	Climber
70	Cocculus hirsutus	Menispermacea	Broom Creeper, Kattukkodi	Climber
71	Cocos nucifera	Palmae	Coconut	Tree
72	Codiaeum variegatum	Euphorbiaceae	Croton	Shrub
73	Commelina benghalensis	Commelinacea	Dew Flower, Kanavachai	Herb
74	Corcorus olitorius	Tiliaceae	Perattikkirai	Shrub
75	Crotolaria retusa	Fabaceae	Rattlepod	Herb
76	*Croton bonplandianus*	Euphorbiaceae	Ban Tulsi/ Railpoondu	Herb
77	Cucumis melo	Cucurbitaceae	Musk melon, Thumattikai	Herb
78	Cucumis sativus	Cucurbitaceae	Cucumber	Climber
79	Cuscuta reflexa	Convolvulaceae	Verillakothan, Kodiyagundal	Climber
80	Cymbopogon sp.	Poaceae	Lemon grass	Herb
81	Cynodon dactylon	Poaceae	Bermuda grass, Arugampul	Herb
82	Cyperus difformis	Cyperaceae	Smallflower umbrella-sedge	Herb
83	Cyprus rotundus	Cyperaceae	Korai, Nut grass	Herb
84	Datura metel	Solanaceae	Thorn apple, Oomathai	Shrub
85	Delonix regia	Fabaceae	Gulmohar	Tree
86	Dendrophthoe falcata	Loranthaceae	Honey Suckle Mistletoe,	Herb
87	*Dentella repens*	Rubiaceae	Creeping lickstoop	Herb
88	*Desmostachya bipinnata*	Poaceae	Tharpai grass/halfa grass	Grass
89	Dichanthium annulatum	Poaceae	Marvel grass	Herb
90	Digetaria adscendens	Poaceae	Crab grass	Herb
91	Digetaria bicornis	Poaceae	Finger grass	Herb
92	*Dodonaea viscosa*	Sapindaceae	Hopbush/Virali	Shrub
93	Eclipta alba	Asteraceae	Bhringaraj, Karisalankanni	Herb
94	Eclipta prostrata	Asteraceae	False daisy, Karisalankanni	Herb
95	Eichhornia crassipes	Pontederiaceae	Water hyacinth	Aquatic
96	Emblica officinalis	Phyllanthaceae	Indian gooseberry, Nelli	Tree
97	Enicostemma axillare	Gentianaceae	Vellarugu	Herb
98	Eragrostis spectabilis	Poaceae	Bunchgrass	Herb
99	Erythrina indica	Fabaceae	Mullu murungai	Tree
100	Erythrina variegata	Fabaceae	Indian coral tree,	Tree
101	Eucalyptus globulus	Myrtaceae	Blue gum	Tree
102	Euphorbia antiquorum	Euphorbiaceae	Kalli, Triangular Spurge	Tree
103	Euphorbia heterophyla	Euphorbiaceae	Painted euphorbia	Herb
104	Euphorbia hirta	Euphorbiaceae	Asthma weed, Ammam Paccharisi	Herb
105	*Euphorbia lactea*	Euphorbiaceae	Indian spurge tree	Tree
106	*Euphorbia prostrata*	Euphorbiaceae	Prostrate sandmat	Herb
107	Euphorbia tirucalli	Euphorbiaceae	Pencil cactus, Thirukalli	Shrub
108	Evolvulus alsinoides	Convolvulaceae	Dwarf Morning Glory,	Herb
109	Ficus benghalensis	Moraceae	Banyan, Alamaram	Tree
110	Ficus religiosa	Moraceae	Peepal, Arasamaram	Tree
111	*Fimbristylis cymosa*	Cyperaceae	Button sedge, grass	Herb
112	*Fimbristylis dichotoma*	Cyperaceae	Forked fimbry	Grass
113	Gardenia jasminoides	Rubiaceae	Cape jasmine, Kumbai	Shrub
114	Gisekia pharnaceoides	Aizoaceae	Manal keerai	Herb
115	Gloriosa superba	Colchicaceae	Flame lily, Kallappai kilangu	Herb

Sl. No.	Scientific Name	Family Name	Common Name	Habit
116	Gomphrena globosa	Amaranthaceae	Globe Amaranth, Vaadamalli	Herb
117	Heliotropium indicum	Boraginaceae	Indian heliotrope, Thel kodukku	Herb
118	Hemidesmus indicus	Apocynaceae	Indian sarasaparilla, Nannari	Herb
119	Heterostemma tanjorense	Asclepiadaceae	Palakeerai	Herb
120	Hibiscus canabinus	Malvaceae	Pulichakeerai	Shrub
121	Hibiscus esculentus	Malvaceae	Lady's finger, Vendai	Herb
122	Hibiscus micranthus	Malvaceae	Tiny Flower Hibiscus	Herb
123	Hibiscus rosasinensis	Malvaceae	Shoeflower, Sembaruthi	Shrub
124	*Holoptelea integrifolia*	Ulmaceae	Indian elm/Tambachi	Tree
125	Hygrophila auriculata	Acanthaceae	Marsh Barbel, Neermulli	Herb
126	Hyptis suaveolens	Lamiaceea	Pignut	Shrub
127	Impatiens balsamina	Balsaminaceae	Garden Balsam,	Herb
128	*Indigofera linnaei*	Fabaceae	Birdsville indigo	Herb
129	Indigofera tinctoria	Fabaceae	Cassia Indigo, Avuri	Shrub
130	Ipomea carnea	Convolvulaceae	Bush Morning Glory	Shrub
131	Ipomea hederfolia	Convolvulaceae	Kanavalikkodi	Herb
132	Ipomea obscura	Convolvulaceae	Obscure morning glory, Chirutali	Herb
133	Ixora coccinea	Rubiaceae	Ixora, Vedchi	Shrub
134	Ixora parviflora	Rubiaceae	Torch tree, Shulundu	Tree
135	Jasmimunofficinalae L.	Oleaceae	Jasmine	Shrub
136	Jasminum arborescens	Oleaceae	Shrubby Jasmine, Kattumalligai	Shrub
137	*Jatropha gossypiifolia*	Euphorbiaceae	Bellyache Bush/ Adalai	Shrub
138	Jatropha glandulifera	Euphorbiaceae	Kaatuamanakku	Shrub
139	Kyllinga triceps	Cyperaceae	Spikes edge, Velutta Nirbasi	Herb
140	Lannea coromandelica	Anacardiaceae	Indian Ash Tree, Othiyamaram	Tree
141	Lantana camara	Verbenaceae	Lantana, Unnichedi	Shrub
142	Lawsonia inermis	Lythraceae	Henna, Maruthondri	Shrub
143	Lemna minor	Arecaceae	Common Duckweed	Weed
144	Leucaena leucocephala	Fabaceae	Periyatagarai, Horse Tamarind	Shrub
145	Leucas aspera	Lamiaceae	Common Leucas, Thumbai	Herb
146	Limonia acidissima	Rutaceae	Wood apple, Vilampazham	Tree
147	Lycopersicon esculentum	Solanaceae	Thakkali	Herb
148	Malvastrum	Malvaceae	False Mallow	Herb
149	Mangifera indica	Anacardiaceae	Mango	Tree
150	Marselia quadrifolia	Marsileaceae	Four Leaf Clover, Aaraikkeerai	Herb
151	Melia azadirachta	Meliaceae	Indian Liliac, Malaivembu	Tree
152	Merremia emarginata	Convolvulaceae	Kidney Leaf Morning Glory, Elikkadhukeerai	Herb
153	Millingtonia hortensis	Bignoniaceae	Tree Jasmine, Kattumalli	Shrub
154	Mimosa hamata	Mimosaceae	Hooked Mimosa	Shrub
155	Mimosa pudica	Mimosaceae	Touch-me-not, Thottachurungi	Herb
156	*Morinda coreia*	Rubiaceae	Indian Mulberry/ Manjanathi	Tree
157	Morinda tinctoria	Rubiaceae	Nuna	Tree
158	Moringa oleifera	Moringaceae	Drumstick, Murungai	Tree
159	Murraya koengii	Rutaceae	Curry leaf, Karuveppilai	Shrub
160	Musa paradisiaca	Musaceae	Banana	Tree
161	Nerium indicum	Apocynaceae	Sevvarali	Shrub
162	Nerium oleander	Apocynaceae	Oleander, Arali	Shrub
163	Ocimum americanum	Lamiaceae	Hoary Basil, Nai Thulasi	Herb
164	Ocimum basilicum	Lamiaceae	Sweet Basil, Thirunitruthulasi	Herb
165	Ocimum gratissimum	Lamiaceae	Wild Basil, Peruntulasi	Herb
166	Ocimum sanctum	Lamiaceae	Holy Basil, Thulasi	Herb

Sl. No.	Scientific Name	Family Name	Common Name	Habit
167	Oldenlandia umbellata	Rubiaceae	Choyroot, Chayaver	Herb
168	Opuntia dillenii	Cactaceae	Prickly Pear, Chappathikkalli	Shrub
169	*Opuntia ficus-indica*	Cactaceae	Fig opuntia/Kalli	Shrub
170	Opuntia vulgaris	Aizoaceae	Pricklypear	Shrub
171	Ouret lanata	Amaranthaceae	Mountain Knot grass	Herb
172	Oxalis corniculata	Oxalidaceae	Creeping Wood Sorrel, Paliakiri	Climber
173	Pandanus odoratissimus	Pandanaceae	Thazhai	Shrub
174	Parthenium hysterophorus	Asteraceae	Congress grass	Herb
175	Passiflora foetida	Passifloraceae	Stinking passionflower, Mosukkattan	Climber
176	Pavetta indica	Rubiaceae	Indian Pavetta,Kattukkaranai	Shrub
177	Pavonia zeylanica	Malvaceae	Sittamutti, Thengai poondu	Shrub
178	Peltophorum pterocarpum	Fabaceae	Copperpod, Perunkondrai	Tree
179	Pergularia daemia	Asclepiadaceae	Pergularia, Uttamani, Seendhal kodi	Climber
180	Phoenix acaulis	Arecaceae	Stemless Date Palm	Shrub
181	Phoenix sylvestris	Arecaceae	Eecham	Tree
182	Phyla nodifolia	Verbanaceae	Poduthalai	Herb
183	*Phyllanthus*	Phyllanthaceae	Madras Leaf flower/Nila neli	Herb
184	Phyllanthus nirurii	Phyllanthaceae	Keelanelli, Seed under leaf	Herb
185	Phyllanthus reticulatus	Phyllanthaceae	Black-berried featherfoil, kattukkilanelli	Herb
186	*Phyllanthus virgatus*	Phyllanthaceae	Joint weed/Kaadu nelli	Herb
187	Physalis minima	Solanaceae	Ground Cherry, Kupanti	Herb
188	*Pigea enneasperma*	Violaceae	Spade Flower/ Oorithal thamarai	Herb
189	Pistia stratiotes	Arecaceae	Water lettuce, Agasatamarai	Aquatic
190	Pithecellobium dulce	Mimosaceae	Sweet tamarind, Kodukkappuli	Tree
191	*Polypogon viridis*	Poaceae	Rabbit foot grass.	Grass
192	Polyalthia longifolia	Annonaceae	Indian mast tree, Vansulam	Tree
193	Pongamia pinnata	Fabaceae	Indian Beech, Pungam	Tree
194	Portulaca oleracea	Portulacaceae	Common Purslane, Paruppu	Herb
195	Premna tomentosa	Verbenaceae	Bastard Teak, Malaithaekku	Tree
196	Prosopis glandulosa	Mimosodeae	Vaelikkaruvai	Tree
197	Prosopis juliflora	Fabaceae	Algaroba, Seemaikaruvel	Tree
198	Psidium gujava	Myrtaceae	Guava	Tree
199	Punica granatum	Lythraceae	Pomegranate, Mathulai	Shrub
200	Rosa indica	Rosaceae	Rose	Herb
201	Saccharum munja	Poaceae	Munja grass	Herb
202	Saccharum spontaneum	Poaceae	Kans grass, Pekkarimpu	Herb
203	Samanea saman	Mimosodeae	Thoongumoonij maram	Tree
204	*Scoparia dulcis*	Plantaginaceae	Goat weed/Sarakkotthini	Herb
205	*Senna auriculata*	Fabaceae	Avaram	Shrub
206	*Senna siamea*	Fabaceae	Ironwood/ Majal Konai	Tree
207	*Senna tora*	Fabaceae	Sickle senna/ Thagarai	Herb
208	Sesbania grandiflora	Fabaceae	Agathikeerai	Tree
209	Sida acuta	Malvaceae	Common Wireweed, Palambasi	Herb
210	Sida cordifolia	Malvaceae	Country Mallow, Kurunthotti	Herb
211	Sida rhombifolia	Malvaceae	Wild mallow, Jelly Leaf	Herb
212	Solanum nigrum	Solanaceae	Black-berry night	Herb
213	Solanum surattense	Solanaceae	Kandankattiri	Herb
214	Solanum torvum	Solanaceae	Turkey berry, Sundaikkai	Shrub
215	Solanum trilobatum	Solanaceae	Thoodhuvalai	Shrub
216	*Solanum virginianum*	Solanaceae	Yellow fruit night shade	Herb

Sl. No.	Scientific Name	Family Name	Common Name	Habit
217	Sorghum bicolor	Poaceae	Fox tail millet, Maize	Herb
218	Syzygium cumini	Myrtaceae	Jamun, Navalpazham	Tree
219	Tabernaemontana coronaria	Apocynaceae	Nandiyarvattam	Shrub
220	Tamarindus indica	Fabaceae	Tamarind, Puliyamaram	Tree
221	Tectona grandis	Lamiaceae	Teak	Tree
222	Tephrosia purpurea	Fabaceae	Fish poison, Kollukkai Velai	Herb
223	Thespesia lampas	Malvaceae	Common Mallow, Kattupparuthi	Herb
224	Thespesia populnea	Malvaceae	Indian Tulip Tree, Poovarasu	Tree
225	Thevetia peruviana	Apocynaceae	Yellow Oleander, Arali	Tree
226	Tinospora cordifolia	Menispermacea	Guduchi, Shindilakodi	Climber
227	Tribulus terrestris	Zygophyllaceae	Puncture Vine, Nerunji	Herb
228	Tridax procumbens	Asteraceae	Tridax daisy, Vettukkaayapoondu	Herb
229	Typha angustifolia	Typhaceae	Narrow Leaf Cat tail reed	Herb
230	*Vachellia leucophloea*	Fabaceae	White bark Acacia/ Velvelam	Tree
231	*Vachellia nilotica*	Fabaceae	Balck bark Acacia/ Karuvelam	Tree
232	Vernonia cinerea	Asteraceae	Purple Fleabane, Mookuthipoondu	Herb
233	Vicoa indica	Asteraceae	Mukkuthipoo	Herb
234	Vinca rosea	Apocynaceae	Nithyakalyani	Herb
235	Vitex negundo	Lamiaceae	Nochi	Shrub
236	Xanthium strumarium	Asteraceae	Common Cocklebur,	Shrub
237	Ziziphus jujube	Rhamnaceae	Jujube, Elandhai	Tree
238	Ziziphus oenoplia	Rhamnaceae	Jackal Jujube, Suraimullu	Shrub
	Medicinal species			
1	Abrus precatorius	Fabaceae	Coral bead vine, Rosary pea,	Creeper
2	Achchyranthes aspera	Amaranthaceae	Prickly Chaff flower, Nayuruvi	Herb
3	Adathoda vasica	Acanthaceae	Vasaca, Adathodai	Shrub
4	Aegle marmelos	Rutaceae	Wood Apple, vilvam	Tree
5	Aloe vera	Liliaceae	Kathalai	Herb
6	Alternanthera sessilis	Amaranthaceae	Dwarf Copperleaf, Ponnanganni	Herb
7	Amaranthus viridis	Amaranthaceae	Kuppaikeerai	Herb
8	Asparagaus racemosus	Asparagaceae	Satawari, Tannir muttan	Herb
9	Azadirachta indica	Meliaceae	Neem, Vembu	Tree
10	Calotropis gigantea	Asclepiadaceae	Crown Flower, Erukku	Shrub
11	Cassia auriculata	Fabaceae	Tanners cassia, Avaram	Shrub
12	Cissus quadrangularis	Vitaceae	Devil's Backbone, Pirandai	Climber
13	Cynodon dactylon	Poaceae	Bermuda grass, Arugampul	Herb
14	Eclipta alba	Asteraceae	Bhringaraj, Karisalankanni	Herb
15	Enicostemma axillare	Gentianaceae	Vellarugu	Herb
16	Euphorbia hirta	Euphorbiaceae	Asthma weed, Ammanpaccharisi	Herb
17	Leucas aspera	Lamiaceae	Common Leucas, Thumbai	Herb
18	Ocimum sanctum	Lamiaceae	Holy Basil, Thulasi	Herb
19	Solanum surattense	Solanaceae	Yellow-berried Nightshade,	Herb
20	Solanum trilobatum	Solanaceae	Thoodhuvalai	Shrub
21	Tridax procumbens	Asteraceae	Tridax daisy,	Herb
22	Vitex negundo	Lamiaceae	Nochi	Shrub

The **air pollutant resistant plant species** such as Mangifera indica, Ficus religiosa, Ficus benghalensis, Alstonia scholaris, Sorghum sp., Nerium oleander, etc. were found to be without any setback in their growth and development. The moderately resistant plant species such as Tamarindus, Azadirachta indica and sugarcane have shown moderate growth. The sensitive plant species such as Morinda, Ipomoea, Moringa have shown minimum numbers in their population. Thick population of herbs was formed due to the moderate rainfall. The emergence of herbs in vacant places indicates the formation of plant diversity.

Besides the natural vegetation, the agricultural and commercial crops were cultivated in and around the study area. Paddy, Sorghum, Black gram, Groundnut, etc. were found to be cultivated among the agricultural crops. Sugarcane, Cotton, etc. were commercially cultivated crops.

No Endemic / Endangered / Rare floral species recorded in the study area during the survey period.

3.9.2 Fauna

Both direct and indirect observation methods were used for faunal survey. Visual Encounter Method was employed to record vertebrate species. Additionally, survey of relevant literature was also done to consolidate the list of vertebrate fauna distributed in the area. Since birds may be considered as indicators for monitoring and understanding human impacts on ecological systems, attempt was made to gather quantitative data on the group.

The list of Fauna is given with reference to the **Wild Life (Protection) Amendment Act, 2022** by clearly indicating the type and those short-listed as Schedule II or I are considered as endangered species. The details of fauna recorded are given in **Tables 3.29-3.31.**

Table : 3.29 List of Fauna in the Reserve Forests

Sl. No.	Scientific Name	Common Name	Schedule as per WP(A) Act, 2022
		Mammals	
1.	Funambulus palmarum	Indian Palm squirrel	II
2.	Lepus nigricollis	Indian Hare	II
3.	Pteropus giganteus	Bat, Indian Flying Fox	II
		Reptiles	
1	Ahaetulla nasuta	Common Green Whip Snake	II
2	Amphiesma stolatum	Stripped Keelback	II
3	Passerita mycterizaris	Common Green Snake	II
		Birds	
1.	*Ardea alba*	Large Egret	II
2.	Ardeola grayii	Pond Heron or PaddyBird	II
3.	Athene brama	Spotted Owlet	II
4.	Bubulcus ibis	Cattle Egret	II
5.	Corvus macrohynchos	Large billed Crow	II
6.	Dicrurus macrocerus	Black Drongo	II
7.	Egretta garzetta	Little egret	II
8.	Psittacula krameri	Rose Ringed Parakeet	II
9.	Tephrodornis pondicerianus	Common Wood shrike	II

Table : 3.30 List of Fauna in the Study Area

Sl. No.	Scientific Name	Common Name	WPA Schedule
		Insects	
1	Apis cerana indica	Indian Honey Bee	II
		Butterflies	
1	Pachliopta aristolochiae	Common Rose	II
2	Pachliopta hector	Crimson Rose	II
3	Papilio polytes	Common Mormon	II
		Mammals	
1	Funambulus palmarum	Three-striped Palm Squirrel	II
2	Lepus nigricollis	Indian Hare, Black-naped Hare	II
3	Pteropus giganteus	Indian Flying Fox	II
		Birds	
1	Acridotheres tristicus	Common myna	II
2	Actitis hypoleucos	Common sandpiper	II
3	Alcedo atthis	Common kingfisher	II
4	Anhinga melanogaster	Oriental Darter	II
5	Apus affinis	Indian House swift	II
6	*Ardea alba*	Large Egret	II
7	Ardeola grayii	Pond Heron or PaddyBird	II
8	Athene brama	Spotted Owlet	II
9	Bubulcus ibis	Cattle Egret	II
10	Centropus sinensis	Crow-Pheasant or coucal	II
11	Cinnyris asiaticus	Purple sunbird	II
12	Clamator jacobinus	Pied Cuckoo	II
13	Columba pallumbus	Common Wood Pigeon	II
14	Copsychus saularis	Magpie robin	II
15	Coracias benghalensis	Indian Roller	II
16	Corvus macrohynchos	Large billed Crow	II
17	Coturnix coturnix	Common quail	II
18	Cuculus canorus	Common Cuckoo	II
19	Cypsiurus balasiensis	Asian Palm Swift	II
20	Dendrocitta vagabunda	Rufous treepie	II
21	Dicaeum erythrorhynchos	Tickell's Flowerpecker	II
22	Dicrurus macrocerus	Black Drongo	II
23	Egretta garzetta	Little egret	II
24	Eudynamys scolopacea	Asian Koel	II
25	Gallus gallus	Red jungle fowl	II
26	Halcyon smyrnensis	White throated Kingfisher	II
27	Hierococys varius	Common hawk cuckoo	II
28	Hirundo rustica	Barn Swallow	II
29	Lanchura punctulata	Scaly-breasted munia	II
30	Mesophoyx intermedia	Intermediate egret	II
31	Milvus migrans	Black kite	II
32	Mirafra erythroptera	Indian Bushlark	II
33	Motacilla maderaspatensis	White browed wagtail	II

Sl. No.	Scientific Name	Common Name	WPA Schedule
34	Passer domesticus	House Sparrow	II
35	Phalacrocorax carbo	Large Commorant	II
36	Phalacrocorax niger	Little cormorant	II
37	Prinia socialis	Ashy Wren Warbler	II
38	Psittacula krameri	RoseRinged Parakeet	II
39	Pycnonotus cafer	Redvented BulBul	II
40	Saxicoloides fulicata	Indian Robin	II
41	Streptopelia chinensis	Spotted Dove	II
42	Tephrodornis pondicerianus	Common Wood shrike	II
43	Turdoides affinis	Yellow-billed babbler	II
	Reptiles		
1	Ahaetulla nasuta	Common vine snake	II
2	Amphiesma stolatum	Striped keelback	II
3	Boiga trigonata	Common cat snake	II
4	Dendrelaphis tristis	Common bronzeback	II
5	Gongylophis conicus	Rough tailed Sand boa, Pudaiyan	II
6	Hemidactylus flaviviridis	House gecko	II
7	Lissemys punctata	Indian mud turtle	II
8	Mabuya carinata	Brahminy Skink	II
9	Passerita mycterizaris	Common Green Snake	II

Table : 3.31 Other Fauna found in the Study Area

Sl. No.	Scientific Name	Common Name
	Insects	
1	Acrida exaltata	Toothpick grasshopper
2	Aiolopus thalassinus tumulus	Green grass hopper
3	Apis florea	Flower Bee
4	Argiope pulchella	Signature spider
5	Asemonea sp.	Green leaf spider
6	Attacus selene	Indian Lunar Moth
7	Camponotus compressus	Black Ant
8	Carrhotus viduus	Jumping spider
9	Cheilomenes sexmaculata	Ladybird Beetle
10	Chrysilla sp.	Spider
11	Creobroter sp.	Praying mantis
12	Culex sp.	Mosquito
13	Dysdercus sp.	Red Silk Cotton Bug
14	Episyrphus sp.	Hoverfly
15	Gryllodes sigillatus	Tropical house cricket
16	Heterometrus sp.	Black scorpion
17	Hippasa sp.	Tunnel sheet spider
18	Hyllus semicuperus	Jumping spider
19	Limnogonus nitidus	Water Strider
20	Lithobius forficatus	Common Centipede
21	Musca domestica	Housefly
22	Myrmarachne plateloides	Ant mimicking jumping spider
23	Pardosa sp.	Wolf Spider
24	Trigoniulus sp.	Millipede
	Butterflies	
1	Anaphaeis aurota	Pioneer
2	Catopsilia pomona	Common Emigrant
3	Catopsilia pyranthe	Mottled Emigrant
4	Cepora nerissa	Common Gull

Sl. No.	Scientific Name	Common Name
5	Chilades lajus	Lime Blue
6	Danaus chrysippus	Plain Tiger
7	Danaus genutia	Striped Tiger
8	Delias eucharis	Common Jezebel
9	Euploea core Cramer	Common Crow
10	Eurema brigitta	Small Grass Yellow
11	Eurema hecabe	Common Grass Yellow
12	Freyeria trochylus	Grass Jewel
13	Graphium agamemnon	Tailed Jay
14	Graphium doson	Common Jay
15	Hasora chromus Cramer	Common Banded Awl
16	Hypolimnas bolina	Great Egg fly
17	Hypolimnas misippus	Danaid Eggfly
18	Jamides celeno Cramer	Common Cerulean
19	Melanitis leda	Common Evening Brown
20	Papilio demoleus	Lime Butterfly
21	Papilio polymnestor Cramer	Blue Mormon
22	Tirumala limniace Cramer	Blue Tiger
23	Tirumala septentrionis	Dark Blue Tiger
24	Zizula hylax	Tiny Grass Blue
Mammals		
1	Bandicota indica	Large Bandicoot-rat
2	Bos indicus	Cow
3	Bubalus bubalis	Buffalo
4	Canis familiaris	Dog
5	Capra hircus	Goat
6	Cynopterus sphinx	Short-nosed Fruit Bat
7	Mus booduga	Indian Field Mouse
8	Mus musculus	House Mouse
9	Ovis aries	Sheep
10	Rattus norvegicus	Field mouse
11	Rattus rattus	House Rat
12	Sauria lacertidae	Lizard
13	Sorex caerulescens	Common mush shrew
14	Suncus murinus	House Shrew
Birds		
1	Corvus splendens	House crow
2	Fulica atra	Common coot
Reptiles		
1	Bangarus caeruleus	Common Indian Krait
2	Calotes versicolor	Indian garden lizard
3	Sauria lacertidae	Lizard

The **Fish fauna** of the area includes Major carps like Catla, Rohu, Mirgal, Silver carp, Grass carp, Minor carps, etc.

Endangered Species: Among the fauna recorded, **most of them are common resident population and no Schedule-I or endangered species encountered** in the study area.

Planktons : The aquatic ecosystems present in the study area of 10 km radius include lentic and lotic water body. To assess the planktonic profile of Phytoplankton and Zooplankton, water samples from 5 locations were collected at sub-surface level. The analysis of Phyto and Zoo-plankton was carried out as per the procedures of APHA (**Table 3.32**).

Table : 3.32 List of Planktons

Sl. No.	Scientific Name	Group Name	Species Population in identified Stations				
1	Acartia tonsa	Copepods	4	-	2	-	4
2	Alona quadria	Cladocera	8	11	-	-	19
3	Branchionus	Rotifers	13	7	4	-	10
4	Ceriodaphnia cornuta	Cladocera	2	14	-	1	-
5	Cypris sp.	Ostrocoda	9	-	3	-	22
6	Flatworm larvae	Trematods	-	-	7	7	-
7	Hookworm larvae	Nematods	12	5	2	28	-
8	Keratella tropica	Rotifers	-	2	5	14	4
9	Nauplius sp.	Copepods	1	3	-	9	26

Aquatic weeds are found to be growing in mostof the water body, pond, etc. in 10 km radius study area.(**Table 3.33**). Typha angustata is found growing all along the drains of villages, small water-logged depressions, and agricultural fields lacking water but containing enough moisture to support its growth. And where there is stagnated water is present, Eichhornia crassipes has taken its roots and covers the entire water surface by its sprawl and invasion.

Table : 3.33 List of Aquatic Plants

Sl. No.	Scientific Name	Common Name	Type
1	Cyperus articulates	Jointed flats edge	Emergent Hydrophytes
2	Eichhornia crassipes	Common water hyacinth	Free floating hydrophytes
3	Hydrilla verticillata	Hydrilla	Submerged hydrophytes
4	Ipomea aquatica	Water Morning Glory	Marshy amphibious hydrophytes
5	Pistia stratiotes	Water lettuce	Free floating hydrophytes
6	Typha angustata	Lesser Bulrush	Emergent hydrophytes

Shannon Wiener Index (SWI) is a way to measure the diversity of species in a community and it may be considered as an overall index of diversity as it concedes a true picture of the information theory. The species diversity of such a community may be computed by employing the SWI of diversity by applying the Index.

$$H = - \Sigma n/N \log n/N$$

Or

$$H = - \Sigma pi * \ln (pi)$$

where,

n = Number of individual species

N = Total number of individual species

Pi = Importance value for each species n/N.

The SWI can be interpreted based on the SWI-H values obtained by computing the values of quantitative plankton analysis. Based on the H-values of SWI, the quality of water can be classified into the following four categories.

Diversity Level	SWI values	Pollution Level
High	3.0-4.5	Slight
Moderate	2.0-3.0	Light
Low	1.0-2.0	Moderate
Very Less	0.0-1.0	Heavily Polluted

In the study area, four sampling sites were fixed as the field stations for the study of aquatic environment. (**Table 3.34**). The SWI-H values were calculated and the results indicate that the water bodies in the study area are not polluted due any industrial and domestic activity.

Table : 3.34 Diversity Index

Sl. No.	Water body	Usage	Diversity Index	
			Phytoplankton	Zooplankton
1	Pond, Maruvattur	Bathing, Washing & irrigation	2.37	2.81
2	Pond, Perali	Irrigation, Bathing & washing	1.93	1.66
3	Pond, Odiyam	Bathing, Washing & irrigation	2.11	1.93
4	Pond, Kunnam	Bathing, Washing & irrigation	2.74	3.12

3.10 Socio-economic Environment

Perali South (Maruvathur) is a village in Kunnam Taluka of Perambalur District with total 671 families residing. The Perali village has population of 2560 of which 1323 are males while 1237 are females as per Population Census 2011 (**Table 3.35**). The population of Schedule Caste. Schedule Caste (SC) constitutes 30.31 % while Schedule Tribe (ST) were 0.16 % of total population.

The population of children with age 0-6 is 253 which makes up 9.88 % of total population of village. Average Sex Ratio of Perali village is 935 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Perali as per census is 675, lower than Tamil Nadu average of 943.

Perali village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Perali village was 72.91 % compared to 80.09 % of Tamil Nadu. In Perali Male literacy stands at 81.57 % while female literacy rate was 63.96 %.

In the village out of total population, 1451 were engaged in work activities. 94.42 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 5.58 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1451 workers engaged in Main Work, 954 were cultivators (owner or co-owner) while 247 were Agricultural labourer.

Table : 3.35 Perali South – Dempgraphic Profile

Particulars	Total	Male	Female
Total No. of Houses	671	-	-
Population	2,560	1,323	1,237
Child (0-6)	253	151	102
Schedule Caste	776	399	377
Schedule Tribe	4	1	3
Literacy	72.91 %	81.57 %	63.96 %
Total Workers	1,451	787	664
Main Worker	1,370	-	-
Marginal Worker	81	7	74

The available **Health Infrastructures,** nearby Primary Health Centre and Hospitals, are listed in **Table 3.36**.

Table : 3.36 Nearby Health Infrastructures

PHC at	Type
Athiyur	Addl. PHC
Kunnam	Addl. PHC
Labbaikudikadu	Upgraded Block PHC
Maruvathur	Addl. PHC
Murukkangudi	Addl. PHC
Perumathur	Addl. PHC
Thungapuram	Addl. PHC
Perambalur	Urban PHC
Perambalur	Government Hospital
Perambalur	Government Head Quarters Hospital

In the study area of 10 km radius, there are 27 villages. The relevant socio-economic data such as demographic features including population distribution, literacy rate, occupational status, educational facilities, medical facilities, etc. are reported in **Tables 3.37-3.42**.

Population : There are 1,24,504 persons (61,963 males-49.8% and 62,541 females-50.2%) in 32,464 Households (HHs). As far as the population of Scheduled Castes and Scheduled Tribes are concerned, there were 40,763 (32.7%) Scheduled Castes Population and 176(0.2%) Scheduled Tribes. In the total population, the Literate population was 87,971(70.7%) whereas the illiterate population was 36,533 (29.7)%.

Table : 3.37 Demographic Profile- 2011 Census

Sl. No	Name of the Village	No. of Household	Population			Scheduled Castes			Scheduled Tribes			Literates			Illiterates		
			Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Adhanur (South)	427	1396	831	785	241	106	135	0	0	0	832	452	381	563	379	384
2	Asur	559	3091	1836	1655	1212	667	605	0	0	0	1175	697	478	916	339	577
3	Elunur (East)	778	3027	1967	1469	1126	571	557	0	0	0	1956	1144	812	1071	423	648
4	Elunur (West)	561	2165	1130	1057	1170	593	577	1	0	1	1356	773	583	809	335	474
5	Eriyur	1427	6974	3930	3044	1880	945	935	18	14	2	4559	2472	2087	1915	558	957
6	Gudalur	622	3012	1469	1543	579	273	306	0	0	0	2852	1142	910	960	327	633
7	Kalpadi (South)	617	2102	1053	1049	859	431	428	0	0	0	1355	747	608	747	306	441
8	Kalpadi (North)	1266	4380	2144	2236	862	434	428	1	1	0	2661	1452	1209	1719	692	1027
9	Keelapaliyur (North)	1337	5091	2539	2552	1912	931	981	4	1	3	3238	1823	1411	1857	716	1141
10	Keelapaliyur (South)	738	2687	1310	1369	1171	578	593	0	0	0	1553	862	691	1134	456	678
11	Koothur	495	1797	841	956	458	220	238	0	0	0	1102	613	489	695	228	467
12	Kottarai	611	2329	1237	1092	484	246	238	0	0	0	1479	810	669	850	367	533
13	Kunnam	891	3853	1950	1903	1502	822	780	0	0	0	2531	1447	1084	1322	503	819
14	Melamathur	1096	4282	2125	2157	1262	617	645	0	0	0	2452	1427	1025	1830	698	1132
15	Odium	416	1598	837	761	531	286	245	0	0	0	966	617	349	632	220	392
16	Perali (North)	782	3033	1585	1448	734	384	350	4	0	4	1882	1139	743	1151	446	705
17	Perali (South)	671	2560	1323	1237	776	399	377	4	1	3	1682	956	726	878	367	511
18	Perambalur (M)	12732	49648	24658	24988	14612	7171	7441	145	84	61	80099	39741	40358	9549	3918	5631
19	Sathanur	495	1749	875	874	661	342	319	0	0	0	1141	648	493	608	227	381
20	Sengunam	1264	4621	2319	2302	2125	1071	1054	0	0	0	2949	1650	1299	1672	669	1003
21	Sirukanpur (East)	175	665	325	340	303	141	162	0	0	0	493	225	168	272	100	172
22	Sirukanpur (West)	335	1208	592	626	613	299	314	0	0	0	799	439	360	409	143	266
23	Siruvachur	1427	5816	2672	2644	2016	958	1058	1	0	1	3676	2031	1975	1640	671	969
24	Sithali (East)	658	2400	1139	1261	548	268	274	0	0	0	1325	723	602	1075	416	659
25	Sithali West	473	1599	950	909	1126	568	558	0	0	0	1598	908	488	771	342	429
26	Varagupadi	458	1524	759	765	567	280	287	0	0	0	847	485	362	677	274	403
27	Varagur	961	3717	1880	1837	1359	784	855	0	0	0	2536	1469	1067	1181	421	760
	Total	32484	124504	61963	62541	40163	20241	20522	176	81	95	87971	47632	40339	36533	14331	22202
	Percentage	-	-	49.8	50.2	32.7	16.3	16.5	0.2	0.1	0.1	70.7	38.3	32.4	29.3	11.5	17.8

Table : 3.38 Occupation of Population and Work Forces- 2011 Census

Sl. No.	Name of the Census Village	Total Population	Workers			Non-Workers			Main Workers				Marginal Workers			
			Total	Male	Female	Total	Male	Female	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	Adhanur (North)	1396	851	378	481	545	281	264	452	355	8	20	1	15	0	8
2	Adhanur (South)	2091	1396	667	639	785	369	416	540	483	8	67	119	69	4	16
3	Asur	3027	1916	987	919	1111	570	541	682	293	14	97	296	581	8	25
4	Elunur (East)	2165	1101	648	453	1064	460	604	309	304	21	94	114	169	35	55
5	Elunur (West)	6974	2763	1665	1098	4211	1365	1946	116	1268	368	715	109	95	5	63
6	Eriyur	3012	1915	940	975	1097	529	568	753	714	23	79	3	386	3	34
7	Gudalur	2102	1282	658	624	820	395	425	396	391	6	211	199	224	0	18
8	Kalpadi (South)	4380	2671	1324	1347	1709	820	889	1536	530	27	388	32	121	5	41
9	Kalpadi (North)	5091	3081	1509	1552	2010	1030	1000	1766	1419	30	329	3	18	2	3
10	Keelapaliyur (North)	2687	1544	776	768	1143	542	601	775	580	1	149	4	18	0	3
11	Keelapaliyur (South)	1797	965	457	508	832	384	448	376	128	3	75	33	339	2	7
12	Koothur	2329	1549	883	743	780	438	342	1389	19	37	91	12	4	1	22
13	Kottarai	3853	2629	1143	886	1824	807	1017	1384	130	10	277	36	183	1	102
14	Kunnam	4282	2313	1237	1876	1969	888	1081	1249	549	23	361	41	63	7	26
15	Melamathur	1598	1000	516	484	598	321	277	401	27	16	34	9	484	3	26
16	Odium	3033	1796	954	832	1247	631	616	1065	447	2	128	16	127	2	5
17	Perali (North)	2560	1451	787	664	1199	536	573	954	247	30	139	7	60	6	8
18	Perali (South)	49648	18438	13309	5121	31218	11358	19868	990	1748	364	10762	40	380	78	1043
19	Sathanur	1749	1024	586	518	725	389	356	416	457	10	54	35	14	6	32
20	Sengunam	4621	2319	1410	909	2311	909	1402	724	1038	9	333	17	193	0	5
21	Sirukanpur (East)	665	407	196	211	278	129	149	27	339	8	20	1	7	0	7
22	Sirukanpur (West)	1208	715	348	367	493	234	259	486	130	7	114	0	7	0	3
23	Siruvachur	5816	2867	1496	1171	2899	1238	1773	517	1228	85	762	9	90	3	19
24	Sithali (East)	2400	1399	685	714	1001	454	547	782	470	7	125	1	7	1	6
25	Sithali West	1599	1199	588	612	700	362	337	399	688	1	64	0	8	0	0
26	Varagupadi	1524	955	484	468	569	275	294	437	388	9	90	1	21	0	5
27	Varagur	3717	1828	1111	717	1889	770	1119	700	312	15	229	18	535	2	17
	Total	124504	69273	35826	24747	54231	26437	27794	18893	14957	1083	10885	1062	3967	173	1613
	Percentage	-	48.4	28.5	19.9	51.6	21.2	30.4	15.2	11.8	0.9	55.1	0.9	3.2	0.1	1.3

Note: Others category includes Construction, Trade & Commerce, Transport Storage & Communications, Other Services, etc.

Table : 3.39 Educational Facilities in the Study Area

Sl.No.	Name of the Village	PPS*		PS*		MS*		SS*		SSS*		DC*	EC*	MC*	MP	PT*	VTS*	SSD*
		G	P	G	P	G	P	G	P	G	P							
1	Adhanur (South)	1	2	1	2	1	2	1	2	a	a	c	c	c	c	c	c	c
2	Asur	1	2	1	2	1	2	a	a	a	a	c	c	c	c	c	c	c
3	Elamur (East)	1	2	1	2	1	2	b	b	b	b	c	c	c	c	c	c	c
4	Elamur (West)	2	1	2	1	2	1	a	a	b	b	c	c	c	c	c	c	c
5	Eraiyur	1	2	1	2	1	2	1	2	b	b	c	c	c	c	c	c	c
6	Gudalur	1	1	1	1	1	1	2	1	2	1	c	c	c	c	c	c	c
7	Kalpadi (South)	1	1	1	2	1	2	b	b	b	b	c	c	c	c	c	c	c
8	Kalpadi (North)	1	2	1	2	1	2	1	2	c	c	c	c	b	c	c	c	c
9	Keelapuliyur (North)	1	2	1	2	1	2	a	a	b	b	b	b	b	b	b	b	c
10	Keelapuliyur (South)	1	2	1	2	1	2	1	2	1	2	c	c	c	c	c	c	c
11	Koothur	1	2	1	1	1	1	2	1	a	a	c	c	c	c	c	c	c
12	Kottaria	1	2	1	2	1	2	1	2	1	2	c	c	c	c	c	c	c
13	Kunnam	1	2	1	2	1	2	a	a	a	a	c	c	c	c	c	c	c
14	Melanathur	1	2	1	1	1	2	1	2	1	2	c	c	c	c	c	c	c
15	Odium	1	1	1	1	1	1	2	1	2	1	b	b	c	c	c	b	c
16	Perali (North)	1	2	1	2	1	1	2	1	a	b	c	c	c	c	c	c	c
17	Perali (South)	1	2	1	2	1	2	1	2	1	2	b	b	b	a	b	a	c
18	Perambalur (M)	1	2	1	2	1	2	1	2	1	2	c	c	b	c	c	c	c
19	Sathanur	1	2	1	2	1	2	b	a	a	b	c	c	c	c	c	c	c
20	Senguvarai	1	2	1	2	1	2	a	a	a	b	a	a	c	b	b	1	c
21	Sirukanpur (East)	1	2	1	2	a	a	b	a	a	b	c	a	a	c	c	c	c
22	Sirukanpur (West)	1	2	1	2	1	2	b	a	a	b	a	c	b	c	c	c	c
23	Siruvacher	1	1	1	1	1	2	1	2	1	2	a	a	2	b	a	a	c
24	Sithali (East)	1	2	1	2	1	2	b	a	a	b	c	c	c	c	c	c	c
25	Sithali West	1	2	1	2	1	2	a	a	a	a	c	c	c	c	c	c	c
26	Varagupadi	1	2	1	2	1	2	b	a	a	b	b	b	b	c	c	c	c
27	Varagur	1	1	1	1	1	1	2	1	a	a	c	c	c	c	c	c	c

PPS-Pre-Primary School
PS-Primary School
MS-Middle School
SS-Secondary School
SSS-Senior Secondary School
G-Government
P-Private
DC-Degree College
EC-Engineering College
MC-Medical College
M-Management College / Institute
PT-Polytechnic
VTS-Vocational School(IT)
SSD-Special School for Disabled
*-Numbers
a-Facility available at <5 Kms
b-Facility available at 5-10 Kms
c-Facility available at >10 Kms

Table : 3.40 Medical Facilities in the Study Area

Sl. No.	Name of the Village	CHC*	PHC*	PHSC*	MCW*	TBC*	HA*	HAM*	D*	VH*	MHC*	FWC*	NGM-I/O*
1	Adhanur (South)	c	1	1	1	1	b	b	1	b	0	1	0
2	Asur	c	a	a	a	a	c	c	a	a	0	a	0
3	Elamur (East)	c	b	b	b	b	0	b	b	b	0	b	0
4	Elamur (West)	c	b	1	1	b	b	b	b	b	0	b	0
5	Eraiyur	c	a	1	1	a	c	b	a	b	0	a	0
6	Gudalur	b	b	1	b	b	c	c	b	c	0	b	0
7	Kalpadi (South)	c	b	1	1	b	c	c	b	b	0	b	0
8	Kalpadi (North)	c	1	1	1	1	c	c	1	c	0	1	0
9	Keelapuliyur (North)	c	a	1	a	a	b	b	a	b	0	a	0
10	Keelapuliyur (South)	c	a	1	1	a	c	c	a	1	0	a	1
11	Koothur	c	a	1	a	a	c	c	a	a	0	a	0
12	Kottaria	c	b	b	b	b	c	c	b	1	0	b	0
13	Kunnam	c	a	a	a	a	b	b	a	c	0	a	0
14	Melanathur	c	1	1	1	1	1	1	1	b	0	1	0
15	Odium	c	1	1	1	1	b	b	1	1	0	1	0
16	Perali (North)	c	a	1	1	a	a	a	a	b	0	a	0
17	Perali (South)	b	b	1	1	b	b	b	b	1	0	b	0
18	Perambalur (M)	b	b	1	1	b	b	b	b	a	0	b	0
19	Sathanur	b	a	a	a	a	c	c	a	b	0	a	0
20	Senguvarai	c	b	1	b	b	b	b	b	b	0	b	0
21	Sirukanpur (East)	b	b	1	1	b	c	c	b	b	0	b	0
22	Sirukanpur (West)	b	1	1	1	1	c	c	1	b	0	1	0
23	Siruvacher	c	b	1	b	b	b	b	b	1	0	b	0
24	Sithali (East)	c	b	1	1	b	b	b	b	b	0	b	0
25	Sithali West	c	b	a	b	b	b	b	b	a	0	b	0
26	Varagupadi	b	b	b	b	b	c	c	b	b	0	b	0
27	Varagur	c	a	1	a	a	a	a	a	b	1	a	0

CHC-Community Health Centre
PHC-Primary Health Centre
PHSC-Primary Health Sub Centre
MCW- Maternity and Child Welfare Centre
TBC-TB Clinic
HA-Authopathic Hospital
HAM- Alternative Medicine Hospital
D-Dispensary
VH-Veterinary Hospital
FWC-Family Welfare Centre
MH-Mobile Health Clinic
NGM-I/O-Non Government Medical facilities In & Out Patient
*-Numbers
a-Facility available at <5 Kms
b-Facility available at 5-10 Kms
c-Facility available at >10 Kms

Table : 3.41 Communication & Transport Facilities in the Study Area

Sl. No.	Name of the Village	PO*	SPO*	P&T*	T*	PCO*	MP*	IC*	PCP*	BS*	PBS*	RS*	BTR*	GR*	AWR*	NW*	FP*
1	Adhanur (South)	a	1	a	1	1	1	a	1	1	a	a	1	1	1	2	1
2	Asur	a	1	c	1	1	1	c	c	1	1	c	1	1	1	2	1
3	Elamur (East)	a	1	b	1	c	1	c	c	a	1	c	1	1	1	2	1
4	Elamur (West)	a	1	b	1	b	1	c	c	1	a	c	1	1	1	2	1
5	Eraiyur	b	1	b	1	c	1	c	c	1	a	c	1	1	1	2	1
6	Gudalur	b	1	c	1	1	1	c	c	1	1	c	1	1	1	2	1
7	Kalpadi (South)	c	1	c	1	c	1	c	c	1	1	c	1	1	1	2	1
8	Kalpadi (North)	c	1	c	1	1	1	c	c	1	1	c	1	1	1	2	1
9	Keelapuliyur	b	1	b	1	a	1	b	b	1	1	c	1	1	1	2	1
10	Keelapuliyur	c	1	c	1	1	1	c	c	1	1	c	1	1	1	2	1
11	Koolhur	b	1	b	1	1	1	c	c	1	1	c	1	1	1	2	1
12	Kottavai	c	1	c	1	1	1	c	c	1	1	c	1	1	1	2	1
13	Kunnam	a	a	a	1	1	1	c	c	1	1	c	1	1	1	2	1
14	Melamathur	c	1	c	1	1	1	c	c	1	1	c	1	1	1	2	1
15	Odium	1	b	1	1	1	1	b	b	1	1	a	1	1	1	2	1
16	Perali (North)	a	1	a	a	a	1	c	c	1	1	c	1	1	1	2	1
17	Perali (South)	1	b	1	a	a	1	b	b	1	1	c	1	2	1	2	1
18	Perambalur (M)	a	b	a	1	1	1	c	c	1	1	c	1	2	1	2	1
19	Sathanur	1	b	1	b	b	1	c	c	1	1	c	1	1	1	2	1
20	Senguram	b	1	b	b	1	1	b	b	1	1	c	1	1	1	2	1
21	Sirukanpur (East)	b	a	b	1	a	1	c	c	1	1	c	1	1	1	2	1
22	Sirukanpur (West)	b	1	b	1	1	1	c	c	1	1	c	1	1	1	2	1
23	Siruvachur	b	1	b	1	1	1	b	b	1	1	c	1	1	1	2	1
24	Sithali (East)	c	b	b	1	a	1	b	c	1	1	c	1	1	1	2	1
25	Sithali West	c	a	b	1	1	1	b	c	1	1	c	1	1	1	2	1
26	Varagupadi	c	1	c	1	1	1	c	c	b	1	c	1	1	1	2	1
27	Varagur	c	1	c	1	a	1	c	c	1	1	c	1	1	1	2	1

PO-Post Office
SPO-Sub Post Office
P&T-Post/Telegraph Office
T-Telephones (landlines)
PCO- Public Call Office/Mobile PCO)
MP- Mobile Phone Coverage
IC-Internet Cafes / Common Service Centre (CSC)
PCP-Private Courier Facility
BS-Public Bus Service
PBS-Private Bus Service
RS-Railway Station
BTR-Black Topped (Pucca) Roads
GR-Gravel (Kuchha) Roads
AWR-All Weather Road
NW-Navigable Waterways (River/Canal)
FP-Foot Path
*-Status
1-Available
2-Not Available
a-Facility available at <5 Kms
b-Facility available at 5-10 Kms
c-Facility available at >10 Kms

Table : 3.42 Water & Drainage Facilities in the Study Area

Sl. No.	Name of the Village	TP	CW	UCW	HP	TWBW	S	R/C	T/PL	CD	OD	CT
1	Adhanur (South)	1	2	1	2	1	2	2	2	2	1	1
2	Asur	1	2	2	2	2	2	2	2	2	1	1
3	Elamur (East)	1	1	2	2	1	2	2	2	2	1	1
4	Elamur (West)	1	1	1	1	1	2	2	2	2	2	2
5	Eraiyur	1	1	1	1	1	2	2	1	2	2	2
6	Gudalur	1	1	1	1	1	2	2	2	2	1	2
7	Kalpadi (South)	1	2	1	2	1	2	2	2	2	1	2
8	Kalpadi (North)	1	1	1	1	1	2	2	2	2	1	2
9	Keelapuliyur (North)	1	1	1	2	1	2	2	2	2	1	2
10	Keelapuliyur (South)	1	1	2	1	1	2	2	2	2	1	2
11	Koolhur	1	2	2	1	1	2	2	2	2	1	2
12	Kottavai	1	2	2	2	1	2	2	2	2	1	1
13	Kunnam	1	2	2	2	2	2	2	2	2	1	2
14	Melamathur	1	1	1	1	1	2	2	1	2	1	2
15	Odium	1	1	2	1	1	2	2	1	2	1	2
16	Perali (North)	1	2	2	1	1	2	2	1	2	2	2
17	Perali (South)	1	1	1	1	1	1	1	2	2	2	2
18	Perambalur (M)	1	1	2	1	1	2	2	2	2	2	2
19	Sathanur	1	1	1	1	1	2	2	1	2	2	1
20	Senguram	1	2	1	1	1	1	2	2	2	2	2
21	Sirukanpur (East)	2	2	2	2	2	1	2	1	2	1	2
22	Sirukanpur (West)	2	2	1	2	1	2	2	2	2	1	1
23	Siruvachur	1	1	1	1	1	2	2	2	2	1	2
24	Sithali (East)	1	1	1	1	1	1	1	2	2	2	2
25	Sithali West	1	2	2	2	2	2	2	2	2	2	2
26	Varagupadi	1	2	1	1	1	2	2	2	2	1	1
27	Varagur	1	1	1	1	1	2	2	1	2	1	2

T-Tap Water
CW-Covered Well
UCW-Uncovered Well
HP-Hand Pump
TWBW-Tube Well/Bore Well
S-Spring
R/C- River/Canal
T/P/L-Tank/Pond/Lake
CD-Covered Drainage
OD-Open Drainage
CT-Community Toilet Complex for General Public
1-Available
2-Not Available

Table : 3.4 Other Facilities in the Study Area

Sl. No.	Name of the Village	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	MT	APS	EDRO	PS
1	Adhanur (South)	c	c	a	b	1	1	c	c	1	1	1	c	1	1	1	1	1
2	Anaı	c	c	b	c	1	1	c	c	1	1	c	c	1	1	1	1	1
3	Elanur (East)	c	b	b	1	1	1	c	c	1	1	a	c	1	1	1	1	1
4	Elanur (West)	c	c	c	1	1	1	c	c	a	1	a	c	1	1	1	a	1
5	Enaiyur	c	c	c	a	1	1	c	c	a	1	a	c	1	1	1	1	1
6	Gudalur	c	1	1	1	1	1	c	c	1	1	1	1	1	1	1	1	1
7	Kalpadi (South)	b	b	a	a	1	1	c	c	1	1	1	c	1	1	1	1	1
8	Kalpadi (North)	c	c	c	1	1	1	c	c	1	1	1	c	1	1	1	1	1
9	Keelapuliyur (North)	b	b	b	a	1	1	b	b	1	1	a	a	1	1	1	a	1
10	Keelapuliyur (South)	c	1	a	a	1	1	c	c	b	1	c	c	1	1	1	1	1
11	Kozhavi	c	c	1	1	1	1	c	c	1	1	1	c	1	1	1	a	1
12	Kottarai	c	c	1	1	1	1	c	c	1	1	c	c	1	1	1	1	1
13	Kunnam	c	c	a	c	1	1	c	c	1	1	a	c	1	1	1	1	1
14	Melamathur	c	1	1	1	1	1	c	c	1	1	a	c	1	1	1	1	1
15	Oduvai	b	b	b	b	1	1	b	b	1	1	a	c	1	1	1	1	1
16	Perali (North)	c	c	b	c	1	1	c	c	1	1	a	a	1	1	1	1	1
17	Perali (South)	b	b	1	1	1	1	c	c	1	1	a	c	1	1	1	1	1
18	Perambalur (M)	c	c	1	1	1	1	c	c	1	1	c	c	1	1	1	1	1
19	Sathanur	c	c	1	1	1	1	c	c	a	1	a	c	1	1	1	1	1
20	Senganam	b	b	b	b	1	1	b	b	1	1	b	c	1	1	1	1	1
21	Sirukanpur (East)	c	b	a	a	1	1	c	c	1	1	a	a	a	a	1	a	1
22	Sirukanpur (West)	c	b	1	1	1	1	c	c	1	1	b	c	1	1	1	1	1
23	Sirumadhi	b	1	1	b	1	1	b	b	1	1	a	c	1	1	1	1	1
24	Sirkali (East)	c	b	c	b	a	1	c	c	1	1	a	a	1	1	1	1	1
25	Sirkali West	c	a	c	a	1	1	c	c	1	1	a	c	1	1	1	a	1
26	Varagupadi	c	c	b	b	1	1	c	c	1	1	a	c	1	1	1	1	1
27	Varagur	c	a	a	a	1	1	c	c	1	1	a	c	1	1	1	1	1

CB-Commercial Bank
COB-Co-operative Bank
ACS-Agricultural Credit Societies
SHG-Self Help Group
PDS-Public Distribution System (Shop)
RM-Regular Market
AMS-Agricultural Marketing Society
NC-Nutritional Centres-ICDS
NC-AC-Nutritional Centres-Anganwadi Centre
CC-Community Centre with/without TV
SF-Sports Field
PL-Public Library
NP-Daily Newspaper Supply
APS-Assembly Polling Station
EDRO-Birth and Death Registration Office
PS-Power Supply
ATM-Automatic Teller Machine
a-Facility available at <5 Kms
b-Facility available at 5-10 Kms
c-Facility available at >10 Kms

Occupational Structure : According to the 2011 census, Total Workers in the total population were about 60,273 (48.4%). About 64,231 (51.6%) persons were non-workers. About 7.1% of the people were engaged in tertiary activities which included different services. The workers in the primary activities (Cultivators) and the secondary activities (Agricultural Labourers) were 16.1% and 15.0% respectively.

Educational, Medical & Infrastructural Facilities : Primary and Middle Schools are available in almost all villages whereas Senior secondary schools, are available in some of the villages. However, college education is available only at Ariyalur, Thanjavur, Perambalur, etc. Thanks to Tamil Nadu Government's constant encouragement, almost all villages are having one or more Self Help Groups through which the people earn various sources of livelihood and are financially secured. There are community based organizations in some of the villages.

Primary Health Sub Centres are available in most of the villages and primary health centers, Maternity & Child Welfare Centre are available only in some of the villages. For major ailments villagers have to go to Ariyalur, Perambalur, Thanjavur and Trichy.

Drinking water facilities are available almost in all villages in the study area. Wells and hand pumps are the major source of drinking water. Villagers depend upon both rain water and also irrigation tanks for the agriculture needs. Public water supply and Power supply are available in most of the villages. There are good approach roads in the form of panchayat roads, National Highway and State Highways passing through the study area and bus transportation is there to almost all villages.

The villages situated on the main road have marketing facilities for their day to day requirements and for major purchases they go to Ariyalur, Perambalur, Thanjavur and Trichy. Post and Telecommunications facilities are available in all villages. All the villages in the study area have the basic medical facilities, transport, phone connection, post and telegraph, Banking services and market facilities. Major Agricultural Commodoties includes Cotton, Maize, Sugarcane, Paddy, Chilli, Turmeric, Pumpkin, etc. whereas major manufacturers commodities and handicrafts commodities are blue metal and pottery respectively.

Public Health : Common diseases were only reported. Local people are occasionally suffering from fever, diarrhea, etc. and no occupational related diseases recorded. Primary Health Centres Maternity & Child Welfare Centre are available in some of the villages. For major ailments, villagers have to go to Perambalur, Ariyalur and Trichy.

3.11 Summary of Baseline Status

The findings of baseline environmental status of the study area are summarized below :

- The collected meteorological data during this season represented the local weather phenomena.
- The monitored ambient air quality in the study area was found to be in compliance with the Revised National Ambient Air Quality (NAAQ) 24-hourly Norms for Industrial, Residential, Rural and other areas.
- Ambient equivalent noise levels (Leq) during day and night times were found to be well within the MoEF&CC Norms.
- The water quality of surface waters was found to be in compliance with CPCB Norms.
- The ground water quality was found to be in compliance with the IS:10500-2012 Norms.
- The soil in the study area would very well support vegetation after amending it suitably.
- There is no eco sensitive area exists in the study area and only domesticated animals exist.
- The area is thinly populated and basic amenities are available almost in all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

***

4.0 Anticipated Environmental Impact and Mitigation Measures

4.1 Identification of Impacts

Environmental Impacts are categorized as Primary and Secondary Impacts. **Primary Impacts** are those which are attributed directly to the project and **Secondary Impacts** are those which are indirectly induced by the Project. Any Project would create impact on the environment in two distinct phases viz. Construction Phase which may be regarded as temporary & short term and Operation Phase which would have long term effects. Identification of all potential environmental impacts due to the Proposal are critically examined and major impacts (both **Beneficial & Adverse**) are studied.

4.2 Construction Phase

Being an existing Mines with all required infrastructures, it **does not involve any major establishment or construction**. Thus, Construction Phase Impacts are not there for Impact Assessment and Environmental Management Plan (EMP).

4.3 Impacts during Operation Phase

The impacts during Operation Phase have been divided into two categories, viz. Localised and Cumulative. The identified Impacts along with Mitigation Measures are given in **Table 4.1**.

Table : 4.1 Identified Impacts

Sl. No.	Environmental Component & Anticipated Impacts
1	**Land Environment :** Out of 3.545 Ha, at Conceptual Stage, 2.286 Ha will be the mine-out pit which will be partly backfilled) 0.306 Ha) and balance pit (1.980 Ha) will be left as Water Reservoir for harvesting rain water. About 0.34 Ha will be Mineral Rejects Dump, 0.010 Ha will be under Infrastructures and 0.020 Ha under Roads About 0.260 Ha will be covered under Green Belt – **7.33% Coverage**. The LST and carbonstocks distribution over the mining region can be observed for different land use/land cover changepatterns in the region. The results revealed that the District has indeed experienced warming in both maximum and minimum temperatures over the last decade and distributions of carbon densities over the study area. **Mitigating Measures :-** ❖ Earthen bunds are to be strengthened along the boundaries to arrest wash-offs. ❖ Garland drains are to be maintained periodically around the Lease. ❖ Green Belt has to be developed and maintained along Lease boundary. ❖ No. of **trees planted shall be numbered** and referenced for review.

<table>
<tr><th>Sl. No.</th><th>Environmental Component & Anticipated Impacts</th></tr>
<tr><td></td><td>❖ The mined out Pits shall be converted into a Water Reservoirs to harvest Rain Water and to recharge Ground Water-table in the vicinity.</td></tr>
<tr><td>2</td><td>Traffic Volume : Mine will deploy 2 Tippers, 2 trips/day (one way) to Limestone from the Lease. MDR runs adjacent to the Lease for transportation to DCPL Cement Plant via NH-136 (at 4 km road distance) & Perambalur NH-38. The existing Traffic Volume at the Mine Area is 84 Passenger Car Units (PCU)/day and will be 96 PCU/day during Operation Phase. The existing Roads are adequate to handle the proposed traffic volume due to the Project.
<table>
<tr><th rowspan="3">Type of Vehicle</th><th colspan="5">MDR near Mine</th></tr>
<tr><th colspan="3">No. of Vehicles/day</th><th rowspan="2">PCU Factor</th><th rowspan="2">PCU/day</th></tr>
<tr><th>Week Day (15.04.2024; Wednesday)</th><th>Week End (19.04.2024; Sunday)</th><th>Avg. Traffic</th></tr>
<tr><td>2-wheelers</td><td>63</td><td>72</td><td>64.3</td><td>0.5</td><td>32.1</td></tr>
<tr><td>Autos</td><td>12</td><td>8</td><td>11.4</td><td>1.0</td><td>11.4</td></tr>
<tr><td>Vans/Tempos</td><td>4</td><td>2</td><td>3.7</td><td>1.0</td><td>3.7</td></tr>
<tr><td>Cars</td><td>11</td><td>8</td><td>10.6</td><td>1.0</td><td>10.6</td></tr>
<tr><td>Buses</td><td>5</td><td>4</td><td>4.9</td><td>3.0</td><td>14.6</td></tr>
<tr><td>Trucks</td><td>4</td><td>3</td><td>3.9</td><td>3.0</td><td>11.6</td></tr>
<tr><td>Trailers</td><td>0</td><td>0</td><td>0.0</td><td>4.5</td><td>0.0</td></tr>
<tr><td>Total</td><td>99</td><td>97</td><td>98.7</td><td>-</td><td>84.0</td></tr>
<tr><td>Proposed Tippers</td><td></td><td></td><td>4</td><td>3.0</td><td>12.0</td></tr>
<tr><td>Total</td><td>-</td><td>-</td><td>102.7</td><td>-</td><td>96.0</td></tr>
</table>
Greenhouse gases include carbon dioxide, methane, nitrous oxides, and water vapour. The proposed mining and transporting activities will utilise about 500 Litres HSD/day. By considering the Transport Emission Factors for Medium & Heavy Duty Trucks viz. 0.997 g CO_2/km, 0.012 g CH_4/km and 0.008 g N_2O/km [as per US EPA 2014 emission factors for Green House Gases (GHGs) Inventories], the gaseous emissions are computed and given.
HSD consumption : 500 LPD
Total CO_2 Emissions : 50 kg/Annum
$CO_{2\text{-}e}$ for CH_4 Emissions : 15 kg/Annum
$CO_{2\text{-}e}$ for N_2O Emissions : 119 kg/Annum.

Thus, total CO_2 Emission due to the Proposal will be 0.184 Tons/Annum.

Mitigating Measures :-
❖ Regular wetting of haul roads has to be undertaken to arrest fugitive emissions.
❖ Tippers are to be fully covered with Tarpaulin to avoid any spillage.</td></tr>
</table>

<table>
<tr><th>Sl. No.</th><th>Environmental Component & Anticipated Impacts</th></tr>
<tr><td></td><td>❖ No overloading of Tippers is allowed strictly.
❖ A strict Speed Limit of 30 km/hr. has to be enforced and monitored continuously.
❖ Compliance to ‘Pollution under Control’ Certification has to be ensured.
❖ Restriction of Truck parking in the Public Road has to be implemented.
❖ Security Guards to be posted at the public road junction.</td></tr>
<tr><td>3</td><td>Air Quality : The Mining, Loading and Transporting activities would generate both fugitive dust emissions and smoke from HEM Machineries/Equipments & Transporting Tippers. Quantification of particulate emissions from the Mine is computed by the Emission Factor Technique. Emission factor is a statistical average of the rate at which a pollutant is released during an activity. This factor when multiplied by the level of that activity in a given situation will give the overall effect. The equations used for Inputs of various activities are as below :

<u>Activity</u> <u>Emission Factor</u>
Excavation of Waste & Ore = 23.6 kg/hr particulate matter for every 1,000 Tonnes per hour material handling
Ore & Waste transportation = 0.2 kg/vehicle/km.

Accordingly, the computed values for various activities are :

<table>
<tr><th rowspan="2">Activity</th><th colspan="2">Emissions on Amalgamation, g/sec</th></tr>
<tr><th>PM2.5</th><th>PM10</th></tr>
<tr><td>Excavation</td><td>7.40956E-08</td><td>2.46985E-07</td></tr>
<tr><td>Loading</td><td>1.1982E-08</td><td>3.99401E-08</td></tr>
<tr><td>Wastes-Haulage</td><td>6.53436E-08</td><td>2.17812E-07</td></tr>
<tr><td>Ore transportation</td><td>3.45028E-09</td><td>1.15009E-08</td></tr>
<tr><td>Total</td><td>1.54871E-07</td><td>5.16238E-07</td></tr>
</table>

Other pollutants SO_2 and NOx emissions due to mining activities are found to be low or insignificant.

As site specific mixing heights were not available, mixing heights based on CPCB publication, “Spatial Distribution of Hourly Mixing Depth over Indian Region”, PROBES/88/2002-03 has been considered.
Prediction Modelling : AERMOD View Software is used for Predicting the maximum Ground Level Concentrations (GLCs) including Transportation Impact. The predicted maximum GLC-PM2.5 for cumulative activities is 0.11 ug/m^3 and GLC-PM10 for cumulative activities is 0.37 ug/m^3 and found to be confined locally i.e. within 0.1 km radius. The predicted GLCs are superimposed on the baseline map to arrive at the likely resultant concentrations due to the Proposal</td></tr>
</table>

Sl. No.	Environmental Component & Anticipated Impacts

Pollutant	Baseline, ug/m³	Predicted, ug/m³	Total, ug/m³	Norms, ug/m³	Buffer, %
PM2.5	19.5	0.11	19.61	60	67.31
PM10	37.7	0.37	38.07	100	61.93

PM2.5-Input

Source Pathway - Source Inputs

AERMOD

Area Sources

Source Type	Source ID	X Coordinate (m)	Y Coordinate (m)	Base Elevation (Optional)	Release Height (m)	Emission Rate (g/(s-m^2))	Length of X Side (m)	Length of Y Side (m)	Orientation Angle from North (deg)	Initial Vertical Dim. (m)
AREA	1	276173.89 Maruvathur Pit	1240490.63	133.00	1.50	1.50E-6	50.00	50.00	0.00	

PM2.5-Output

Results Summary

C:\Lakes\AERMOD View\DCPL Maruvathur_PM2\DCPL Maruvathur_PM2.isc

PM2.5 - Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
24-HR	1ST	0.10642	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	11-03-2024, 24
24-HR	2ND	0.07952	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	06-03-2024, 24
24-HR	3RD	0.06381	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	12-03-2024, 24
24-HR	4TH	0.06199	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	09-03-2024, 24
24-HR	5TH	0.06106	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	07-03-2024, 24
24-HR	6TH	0.05779	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	25-04-2024, 24
24-HR	7TH	0.05684	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	10-03-2024, 24
24-HR	8TH	0.05670	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	08-03-2024, 24
24-HR	9TH	0.05626	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	03-03-2024, 24
24-HR	10TH	0.03846	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	13-03-2024, 24
PERIOD		0.01068	ug/m^3	276123.99	1240517.18	133.00	0.00	133.00	

PM10-Input

Source Pathway - Source Inputs

AERMOD

Area Sources

Source Type	Source ID	X Coordinate (m)	Y Coordinate (m)	Base Elevation (Optional)	Release Height (m)	Emission Rate (g/(s-m^2))	Length of X Side (m)	Length of Y Side (m)	Orientation Angle from North (deg)	Initial Vertical Dim. (m)
AREA	1	276173.89 Maruvathur	1240490.63	133.00	1.50	5.20E-8	50.00	50.00	0.00	

Sl. No.	Environmental Component & Anticipated Impacts

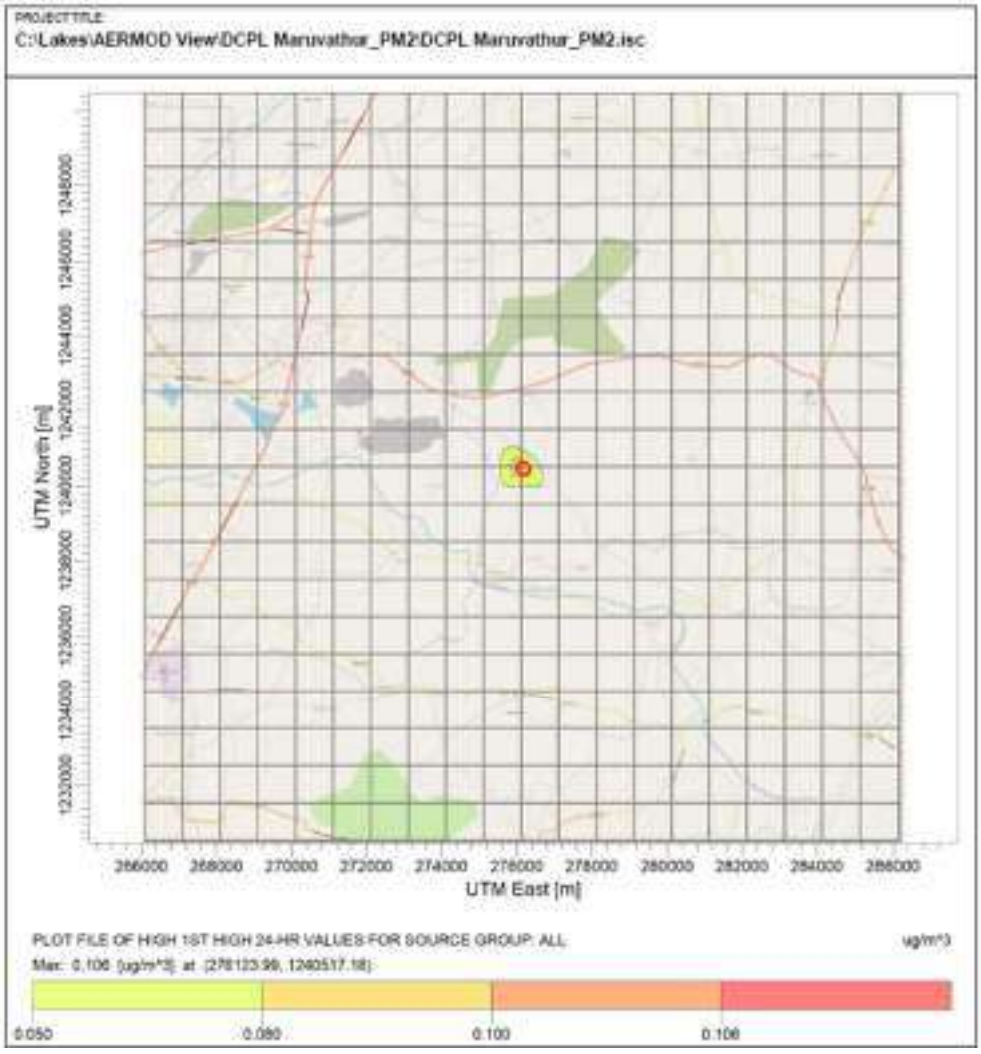
PM10-Ouput

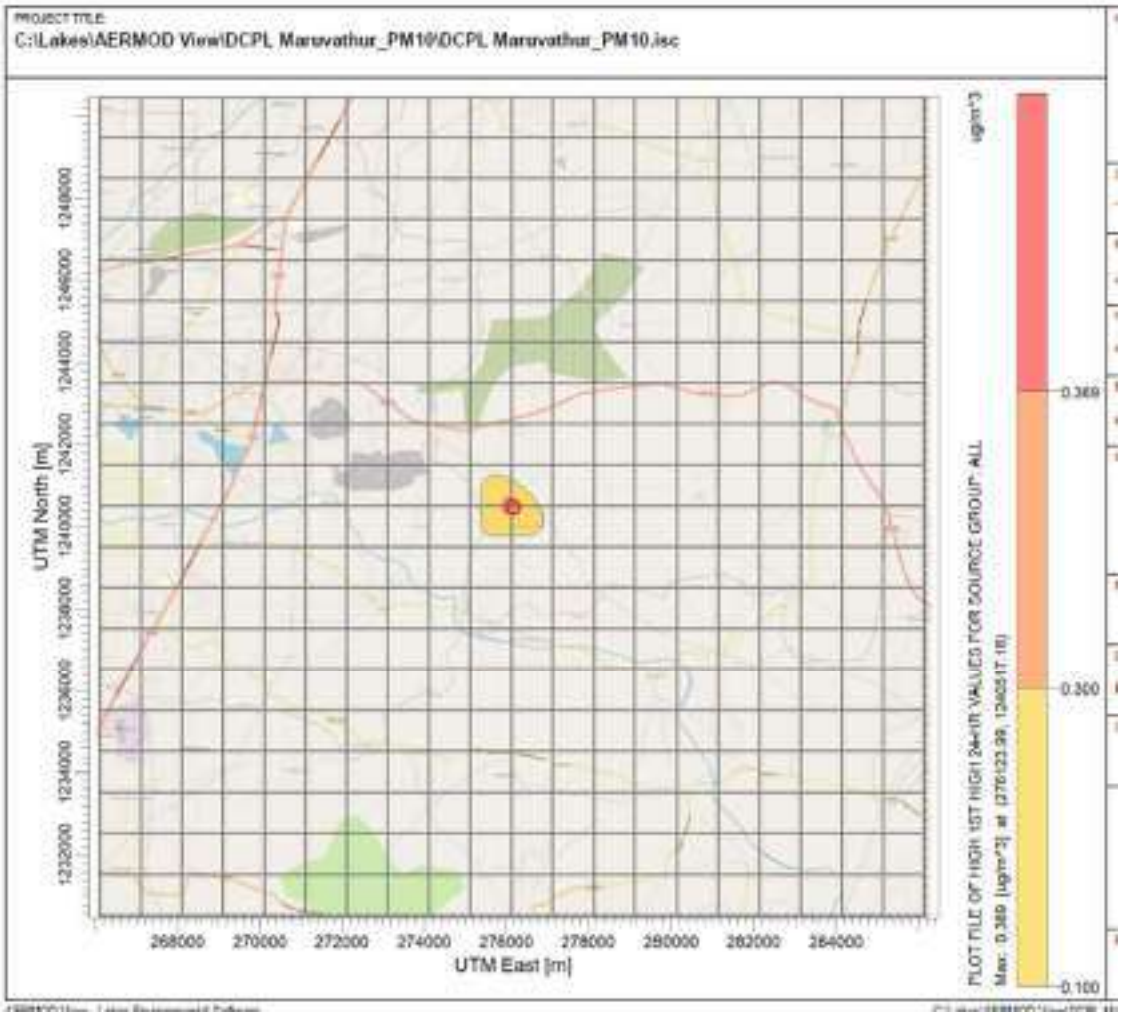
Results Summary

C:\Lakes\AERMOD View\DCPL Maruvathur_PM10\DCPL Maruvathur_PM10.isc

PM10 - Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
24-HR	1ST	0.36881	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	11-03-2024, 24
24-HR	2ND	0.27566	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	06-03-2024, 24
24-HR	3RD	0.21845	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	12-03-2024, 24
24-HR	4TH	0.21459	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	09-03-2024, 24
24-HR	5TH	0.21167	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	07-03-2024, 24
24-HR	6TH	0.20033	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	25-04-2024, 24
24-HR	7TH	0.19783	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	10-03-2024, 24
24-HR	8TH	0.19008	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	08-03-2024, 24
24-HR	9TH	0.19156	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	03-03-2024, 24
24-HR	10TH	0.13332	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	13-03-2024, 24
PERIOD		0.03762	ug/m**3	276123.99	1240517.18	133.00	0.00	133.00	



Sl. No.	Environmental Component & Anticipated Impacts
	 Also, adequate Buffer Level available in the Air Environment for the Proposal. The predicted value will not have any significant impact on the Air Environment. Other pollutants SO_2 and NOx emissions due to mining activities are found to be low and are not reported. **Mitigating Measures :-** ❖ Water sprinkling at mining areas, loading, haul roads, etc. has to be carried out. ❖ **Tyre washing facility** shall be installed. ❖ Periodical maintenance of mining equipments has to be carried out. ❖ Effective Green Belt with thick foliage has to be maintained along the boundaries. ❖ Periodical Air Quality Monitoring shall be carried out and Reports submitted.
4	**Noise Levels** : There will be **no Drilling and Blasting** in the Mine. Excavation, Loading and Transportation activities are the sources of Noise. In general, work force will be exposed to <85 dB(A) levels during 8-hours Shift. Noise level at nearest Lease boundary will be <55 dB(A) during

Sl. No.	Environmental Component & Anticipated Impacts
	day times and <45 dB(A) during night times as stipulated by MoEF&CC- Leq Noise Norms for Residential & Rural Areas. **Mitigating Measures :-** ❖ Deploying mining equipments shall be with in-built mechanism for reducing noise. ❖ Providing sound proof operator's cabin of equipments. ❖ Provision of ear muffs/ear plugs to the workers in higher noise zones. ❖ Green Belt with thick foliage shall be maintained around lease boundary as acoustic barriers. ❖ Periodical Noise Monitoring shall be carried out and Reports submitted to the Authorities.
5	**Water Environment** : **Impact on Surface Waters :** The ML Areas have the MDR as Northern Boundary and other areas are surrounded by Dry Agricultural Lands. There is **no Mine Pit Water Discharge**. Thus, there will not be any impact on the Surface Waters due to the Mine. **Impact on Ground Waters :** There is **no ground water-table intersection** due to mining. Due to poor transmissivity, there will be no impact on nearby borewells. The mine requires about 3.0 KLD water and will be met from **the rainwater harvested in the mine pit**. **No workshop** and thus there is **no effluent generation** from the Mine. Domestic sewage generation is 0.9 KLD and is biologically treated in a Septic Tank followed by a Dispersion Trench. **Mitigating Measures :-** ❖ Mine Pit Water shall not be directly discharged without ensuring its quality. ❖ Garland Drains and Settling Tanks are to be maintained and desilted periodically. ❖ Ground Water Levels and Water Quality are to be periodically monitored at identified Borewells & Dugwells in the Mine vicinity. ❖ Monitored Water Quality data are to be periodically submitted to IBM, SEIAA-TN & IRO-MoEF&CC, Chennai
6	**Biological Environment** : There is no habitat fragmentation or blocking of migratory corridors due to Project activities since there is no wild life movement or migratory birds movement in the study area. Thus, there will not be any significant impact on the existing flora-fauna of the area. ML area is surrounded by barren lands and dry agricultural lands within 1.0 km area. As the baseline AAQ are in lower levels as well as Predicted GLC is very low/insignificant, there will not be any impact on the surrounding dry agricultural lands due to the Project. **Mitigating Measures :-** ❖ Effective Green Belt has to be developed and maintained, with the guidance of DFO, with about 90% Survival Rate. ❖ Native species shall be preferred for Green Belt development. ❖ Fruit bearing trees may also be preferred. ❖ The primary way that carbon is stored in the soil is as **soil organic matter (SOM).** Climatic conditions, natural vegetation, soil texture, and drainage all affect the amount and length of time carbon is stored.

Sl. No.	Environmental Component & Anticipated Impacts
7	**Socio-economics** : Project employs 30 persons directly and 20 persons indirectly. The direct & indirect employment, CER & CSR activities, etc., will have a positive impact on the Socioeconomic Structure of the area. **Mitigating Measures :-** CSR activities shall be carried out by providing social and welfare measures for the local residents and nearby villages around the mine area. The prime focus will be on the creating and maintaining of drinking water facilities for the students at the nearby Government Schools, establishing toilets especially for girl students at the schools, setting up of computer centres, maintenance of village roads & ponds, providing solar street lights, free medical camps, etc.
8	**Occupational Health :** DCPL is committed to provide a Safety & Healthy working conditions. The **first aid box**es will be made available in the Mine Office for immediate treatment. **Occupational health surveillance programme** will be carried out for all the employees regularly. **Mitigating Measures :-** ❖ All employees are to undergo Medical Check-up on recruitment and periodically during employment. ❖ Maintenance of Pre, during & Post Employment Records are to be kept for periodical review. ❖ Required Personal Protective Equipments for the employees are to be provided. ❖ Provision of ergonomically designed seats for drivers/operators has to be ensured.
9	**Climate Change :** The mining activities are carried out during day times only and thus, **there is no power demand**. There is no standby DG set also. HSD @ 500 lits./day is required for the mining equipments. **Carbon sequestration** is the long-term storage of carbon in oceans, soils, vegetation (especially forests) and geologic formations. Adequate Green Belt shall be developed around the project for carbon sequestration. As trees grow, they store carbon in woody tissues and soil organic matter. Through the process of photosynthesis, plants assimilate carbon and return some of it to the atmosphere through respiration. The carbon that remains as plant tissue is then consumed by animals or added to the soil as litter when plants die and decompose. The primary way that carbon is stored in the soil is as *soil organic matter (SOM).* SOM is a complex mixture of carbon compounds, consisting of decomposing plant and animal tissue, **microbes (protozoa, nematodes, fungi, and bacteria), and carbon associated with soil minerals**. It will be ensured that Plant operations do not result in loss of soil biological properties and nutrients. Soil amendments as required will be caried out to improve **soil heath**. **Bio remediation** using micro organisms will be carried out to restore the soil environment to enable carbon sequestration. The Green Belt developed **will be a significant carbon sequestration step** to achieve climate goals in the Project vicinity. **Plastic Waste Management** : There will be ban on one-time use and throw away Plastic usage in the Lease. Encourage the use of eco friendly alternatives such as banana leaf, areca nut palm plate, stainless steel glass, porcelain plates / cups, cloth bag, jute bag etc.

***

5.0 Analysis of Alternatives (Technology & Site)

5.1 Technology

- The mining operation is carried out by adopting non- conventional mining method using Rock Breakers.
- Mine development including mine planning is being practiced in the mines and will be continued in future also.
- At Conceptual stage. it is proposed to utilise part of the Mine Pit to harvest the rain water so as to recharge the ground water-table.

5.2 Alternative Sites Considered

This is an existing Mineral bearing area and Mineral deposits are site specific. Thus, site selection criteria is not required.

***

6.0 Environmental Monitoring Programme

6.1 Environment Cell and Compliances

DCPLhas **EMP Monitoring Cell**. The quality of air, noise, water, soil, etc. are being monitored at the identified locations as per MoEF&CC, IBM &TNPCB Norms by appointing an accreditated external agency.

6.2 Post Project Monitoring

For the Lease, periodical monitoring of Ambient Air Quality (3 locations), Fugitive emissions/Workzone Air Quality (4 locations), Ambient & Workzone Noise Levels (7 locations), Water (4 Surface & 4 Ground waters along with Mine Pit water) and Soil Quality (3 Locations) shall be undertaken and reported to Authorities. The monitoring details are given in **Table 6.1**.

Table : 6.1 Post Project Monitoring Schedule

	Environmental Component				
	Ambient Air Quality	**Fugitive Emissions**	**Noise Levels**	**Water Quality**	**Soil Quality**
No. of Locations	3 (in & around Mine-Upwind & Downwind directions)	4 (Excavation area, Loading Area, Haul Road & Pit Edge)	Ambient-3 Workzones-4	Surface waters-4 Ground waters-4 Mine Pit water-1	3
Frequency	24-hourly once in fortnight continuously for whole year	Two 8-hourly samples, once in a week for 2 weeks in a Season	Once in a month	Surface & Ground Waters-Once in a Season Mine Pit water-Monthly once	Once in a Season
No. of Samples	72	64	84	32+12	12
Parameters	All 12 Parameters	PM10, SPM, SO2, NOx & CO	Day & Night Leq Noise levels dB(A	Physico-chemical & Trace Metals	Physico-chemical & Nutrients
Norms to be Complied	NAAQ Norms	IBM Norms for Limestone Mine	MoEF&CC Norms	CPCB/ IS:10500 & TNPCB Norms	Soil Fertility
Budget Allotted	Rs.3,60,000	Rs.3,20,000	Rs.42,000	Rs.1,14,000	Rs.36,000

About **Rs.8.72 Lakhs/annum** will be allotted for the Monitoring Works. The periodical reports shall be submitted to TNPCB monthly, IBM Quarterly and MoEF&CC Monitoring Cell & SEIAA as Half Yearly Status Reports.

***

7.0 Additional Studies

7.1 Hazards Identification & Risk Assessment

Hazards Identification & Risk Assessment (**HIRA**) is the Tool to identify the potential Hazards due to the proposed activities and assessment of the Risks to propose the Emergency Preparedness Plan (EPP). There is no storage of Hazardous Chemicals in the Quarry and thus, no Modelling is warranted. The Potential Hazards that could have impacts during Operation Phase are given in **Table 7.1**.

Table : 7.1 Potential Hazards due to Proposal

Potential Hazard	Probable Impact
Manmade :-	
Accident due to Mining Activities	Can occur at any time during the Mining.
Natural :-	
Natural Calamities	Can occur at any time.
Others :-	
Medical Emergency	Can occur at any time during the Operational Phase.

7.2 Emergency Preparedness Plan

The hazard scenarios were risk ranked using the Risk Matrix (R) are shown in **Table 7.2**.

Table : 7.2 Risk Matrix (R)

Potential Severity	Risk			
	Low (1)	Medium (2)	High (3)	Continuous (4)
Major (4)	2.5	3.0	3.5	4.0
Moderate (3)	2.0	2.5	3.0	3.5
Minor (2)	1.5	2.0	2.5	3.0
Negligible (1)	1.0	1.5	2.0	2.5

The Mining operations are ranked in Low-Major Risks with Score of 1-4. It shall be ensured that engaged Personnel are aware of the Hazards involved and are trained in responding to the Disasters. **First Aid Kits and Medical Supplies** should be maintained at the Lease. All personnel shall use **Personal Protective Equipment (PPEs)** like Safety Shoes, Helmets, Safety glasses, etc. They should be trained in Safety Procedures to ensure that accidents and injuries are minimised. Government Hospitals in the vicinity will be used for any Medical Emergencies.

7.3 Disaster Management Plan

The proposed Disaster Management Plan (DMP) for the Risks involved in the Mining Operations are listed in **Table 7.3**.

Table : 7.3 DMP Measures

Sl. No.	Factors	Causes of risks	Control measures
1	Removal of Top Soil & O.B	a) Top soil bench may slide due to unconsolidation. b) Vibration due to movement of vehicles in the O.B benches.	Not Applicable for this Lease.
2	Drilling & Blasting	a)Due to high pressure of compressed air hoses may burst. b)Drill rod may broken due to improper maintenance of the rod. c) Fly rock, ground vibration and noise etc., d) Improper charging of explosives	Not Applicable for this Lease- No Drilling & Blasting in the Mine
3	Excavation of Ore	a)Hauling and loading equipment are in such proximity while excavation b)Swinging of bucket over the body of tipper c) Driving of un authorized person	Operator shall not operate the machine when person & vehicles are in such proximity. Shall not swing the bucket over the cab and operator leaves the machine after ensuring the bucket is on ground. Shall not allow any unauthorized person to operate the machine by effective supervision.
4	Transportation of Ore	a)Operating the vehicle “nose to tail” b) Overloading of material c) While reversal & overtaking of vehicle d) Operator of Tipper leaving his cabin when it is loaded	It will be ensured that all these causes will be nullified by giving training to the operators No over loading Audio visual reverse horn will be provided Proper training will be given
5	Fire due to electricity and Oil	a)Due to the short circuit of cables & other electrical parts b) Due to the leakage of inflammable liquid like diesel, oil, etc.	Not Applicable for this Lease.
6	Flooding	a) Sudden collapse of peripheral bund due to torrential pour. b) Unusual seepage of water from River side.	Periodical checkup by the Security Not Applicable for this Lease.
7	Other Natural Calamities	Unexpected happenings	The Management is capable to deal with the situation

The objective of on site disaster management plan for the captive mine is tobe a state of perceptual readiness through training, development to immediately control and arrest any emergency situation so as to avert a full- fledged disaster and the consequence of human and property damage and in the event of a disaster still occurring, to manage the same so that the risk of the damage consequences to life and property is minimized.

DCPL has formulated a disaster management plan for Emergency Preparedness & Responses The salient features are elaborated as below:

- Emergency response Organization.
- Communication System.
- Action on the site.
- Facilities available at site.

Emergency Response organization :

Following officers of the mines will be responsible for coordination in case ofemergency situation in any section of the mine.

Person
Mines Manager
Shift In charge
Employee who gives the first informationabout the accident
P & A dept

As per Risk Assessment studies, the possibility of “Off site” emergency situation are ruled out as DCPL mine is not likely to pose any off site emergency and hence does not call for any preparation of an off-site emergency plan.

All safety precautions shall be taken care of as per rule.

DCPL is able to deal with the situation efficiently and will be coordinating to restore the normalcy of the situation.

***

8.0 Project Benefits

Environmental Benefits : The proposal ensures continuous limestone supply to the Cement Plant. Effective utilization of the Mineral for Cement manufacturing is a Mineral Conservation Measure.

Financial Benefits : Project cost is Rs.10.00 Lakhs. Mineable Reserves from the Lease is 0.183 Million Tonnes. As per MMDR Act 2015, 30% of Royalty Amount will be earmarked for District Mineral Foundation (DMF). Royalty to the Exchequer will improve local and regional economy.

Social Benefits : Project employs 30 persons directly and 20 persons indirectly. The direct & indirect employment, CSR/CER activities, etc., will have a positive impact on the Socioeconomic Structure of the area.

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9.0 Environmental Cost Benefit Analysis

Cost Benefit Analysis is not applicable for the Proposal as forest land involved for the Project and also no TOR awarded during the Scoping Process.

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10.0 Environmental Management Plan

Environmental Management Plan (EMP) is suggested to mitigate the possible negative impacts that may be caused to various attributes of environment due to the proposed mining operations.

10.1 EMP for Construction Phase

Being existing Mine, there will be **no Construction Phase** for the Project.

10.2 EMP for Operation Phase

The EMP Measures proposed for Operation Phase are given in **Table 10.1**.

Table : 10.1 Proposed EMP Measures

Sl. No.	Environmental Component & Proposed EMP Measures
1	**Land Environment :-** ❖ Earthen bunds are to be strengthened along the boundaries to arrest wash-offs. ❖ Garland drains are to be maintained periodically around the Lease. ❖ Green Belt has to be developed and maintained along Lease boundary. ❖ No. of **trees planted shall be numbered** and referenced for review. ❖ The mined out Pits shall be converted into a Water Reservoirs to harvest Rain Water and to recharge Ground Water-table in the vicinity.
2	**Transportation :-** ❖ Regular wetting of haul roads has to be undertaken to arrest fugitive emissions. ❖ Tippers are to be fully covered with Tarpaulin to avoid any spillage. ❖ No overloading of Tippers is allowed strictly. ❖ A strict Speed Limit of 30 km/hr. has to be enforced and monitored continuously. ❖ Compliance to 'Pollution under Control' Certification has to be ensured. ❖ Restriction of Truck parking in the Public Road has to be implemented. ❖ Security Guards to be posted at the public road junction.
3	**Air Quality** :- ❖ Water sprinkling at mining areas, loading, haul roads, etc. has to be carried out. ❖ **Tyre washing facility** shall be installed. ❖ Periodical maintenance of mining equipments has to be carried out. ❖ Effective Green Belt with thick foliage has to be maintained along the boundaries. ❖ Periodical Air Quality Monitoring shall be carried out and Reports submitted.
4	**Noise Levels** :- ❖ Deploying mining equipments shall be with in-built mechanism for reducing noise. ❖ Providing sound proof operator's cabin of equipments. ❖ Provision of ear muffs/ear plugs to the workers in higher noise zones.

Sl. No.	Environmental Component & Proposed EMP Measures
	❖ Green Belt with thick foliage shall be maintained around lease boundary as acoustic barriers. ❖ Periodical Noise Monitoring shall be carried out and Reports submitted to the Authorities.
5	**Water Environment** :- ❖ Mine Pit Water shall not be directly discharged without ensuring its quality. ❖ Garland Drains and Settling Tanks are to be maintained and desilted periodically. ❖ Ground Water Levels and Water Quality are to be periodically monitored at identified Borewells & Dugwells in the Mine vicinity. ❖ Monitored Water Quality data are to be periodically submitted to IBM, SEIAA-TN & IRO-MoEF&CC, Chennai
6	**Biological Environment** :- ❖ Effective Green Belt has to be developed and maintained, with the guidance of DFO, with about 90% Survival Rate. ❖ Native species shall be preferred for Green Belt development. ❖ Fruit bearing trees may also be preferred. ❖ The primary way that carbon is stored in the soil is as **soil organic matter (SOM).** Climatic conditions, natural vegetation, soil texture, and drainage all affect the amount and length of time carbon is stored.
7	**Socio-economics** :- CSR activities shall be carried out by providing social and welfare measures for the local residents and nearby villages around the mine area. The prime focus will be on the creating and maintaining of drinking water facilities for the students at the nearby Government Schools, establishing toilets especially for girl students at the schools, setting up of computer centres, maintenance of village roads & ponds, providing solar street lights, conducting free medical camps, etc.
8	**Occupational Health :-** ❖ All employees are to undergo Medical Check-up on recruitment and periodically during employment. ❖ Maintenance of Pre, during & Post Employment Records are to be kept for periodical review. ❖ Required Personal Protective Equipments for the employees are to be provided. ❖ Provision of ergonomically designed seats for drivers/operators has to be ensured.

EMP Budget : The Project Cost is **Rs.10.00 Lakhs**. An amount of Rs.7.00 Lakhs has been earmarked as Capital EMP Budget and Rs.10.00 Lakhs per Annum as Operating Cost. Public Hearing issued will be addressed and the **Action Plan with Budget will be included** in the EMP Budget for executing the Physical Activities as per MoEF&CC OM dated 30.09.2020.

***

11.0 Summary Environmental Impact Assessment Report

1.0 Introduction

1.1 Project Proponent

M/s. Dhandapani Cements Private Limited (DCPL) are operating a 900 TPD Cement Plant at Thathamangalam Village near Mannachanallur in Trichy District. DCPL is producing Ordinary Portland Cement (OPC) & Portland Pozzolana Cement (PPC) and marketing the products in the name **Maruthi Cement** in the States of Tamil Nadu and Kerala. Shri.S.Subramanian, is the Chairman. He and his son Mr.S.Saravanan are the Directors of DCPL. Both of them and their Family Members are having Limestone Mines in Perambalur, Ariyalur and Trichy Districts which are Captive Mines to DCPL Cement Plant.

Maruvathur Mining Lease in Perali (South) is one of the Captive Mines of DCPL which has been granted to Mr.S.Saravanan Director-DCPL vide GO 3(D) No. 263 dated 20.09.1995 for 20 Years over an extent of 3.545 Ha at SF Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu (**Fig. 1.1**). Lease area is **Own Land** (Ryotwari Dry Land) and in his possession. FMB Sketch is given as **Plate-I**. Lease in Google Earth Imagery & nearby Settlements are shown in **Plate-II**.

Plate : I Lease Area in Village FMB

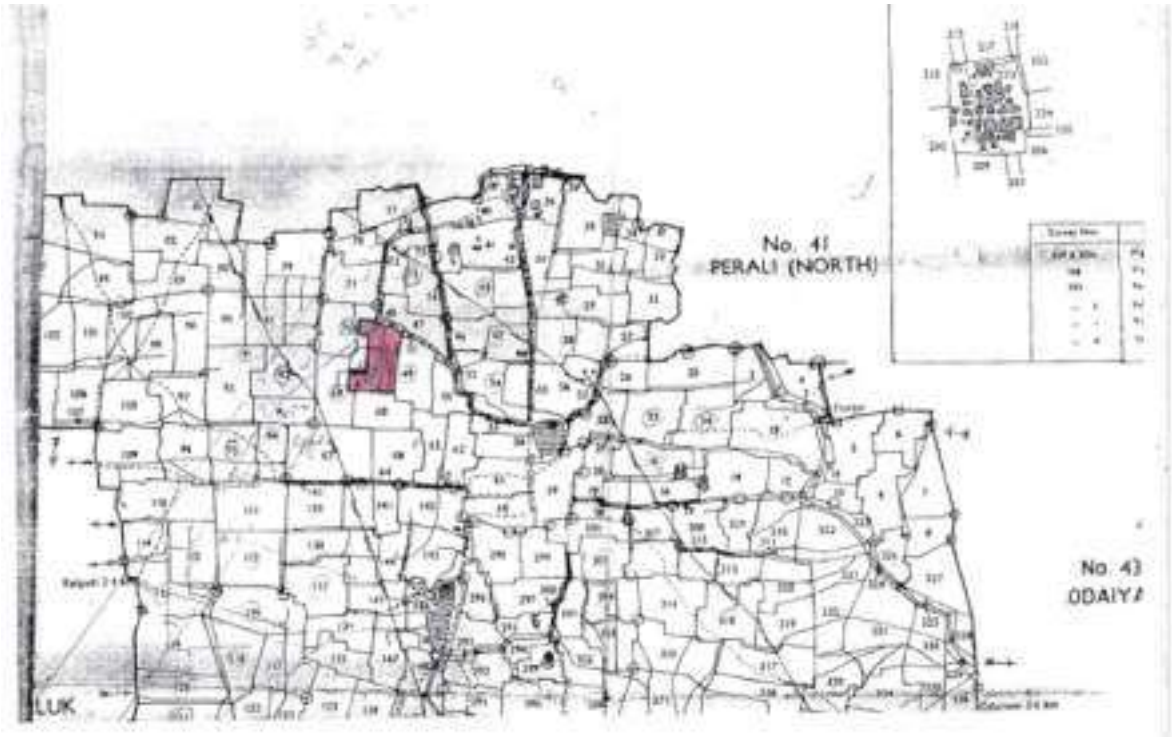

Fig. : 1.1 Index Map

Plate : II Lease & its Environs in Google Earth Imagery

The Lessee's communication address is:

Shri. S.Saravanan,
Director, Dhandapani Cements Private Limited,
69, Ganapathy Nagar,
Tiruvanai Kovil, Trichy -620 005.
Tel. No. : 94892 01004
e-mail : dcplmaruthi@gmail.com

1.2 Project Profile

Project Name : Existing Maruvathur Limestone Mine over an Extent of 3.545 Ha at SF. Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/3B & 70/4B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu by Thiru.S. Saravanan.

Project Location : The Mine is accessible from Perambalur-Ariyalur Section of NH-136 (earlier SH-27) at Perali by Perali-Maruvathur Road. It is at 2.0 km from NH-136 and 4.0 km by road. The mine is at a distance of 0.35 km in northwest of Maruvathur village. Dhandapani Cement Factory is located at a distance of 38 km in southwest (51 km by road).

Statutory Approvals : GO 3(D) No. 263 dated 20.09.1995 is granted for 20 Years. Lease Deed was executed and registered on 18.10.1995. As per MMDR Amendment Act, 2015 existing lease is valid for 50 years i.e. upto 17.10.2045. Mining operations with Opencast Conventional Mining Method was commenced in the Mine on 28.10.1995. Limestone raised from the Lease was supplied to Dhandapani Cement Plant near Trichy at a distance of 38 km in southwest (51 km by road). 'Temporary Discontinuance Notice' for the Lease was given to IBM on 01.02.2016 and the **Mine is not in operation** since then. Present Review of Mining Plan (ROMP) has been approved by IBM, Chennai vide Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024 for Plan Period 2025-26 to 2029-30 and is **valid till 31.03.2030**.

Mine Proposal : Mineable Reserves ('111' Category) is 1,83,218 Tonnes ROM as on 02.07.2024. As approved by IBM, the Mine will be worked by **Non-Conventional Opencast Mechanised Method of Mining** by deploying Rock Breakers **without Drilling & Blasting**. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year. Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. Ore:Waste Ratio will be 1:1.48. Ultimate Pit Limit will be **22.0 m BGL.** Ground Water-table is at 38 m (Postmonsoon) & 40 m BGL (Premonsoon). **Mining will not intersect ground water-table. Life of the Mine is 5 Years only.** No Beneficiation/Screening is required.

The Mine Layout is given as **Fig. 2.1**. Mine Particulars are detailed in **Table 1.1**.

Fig. : 2.1 Surface Plan

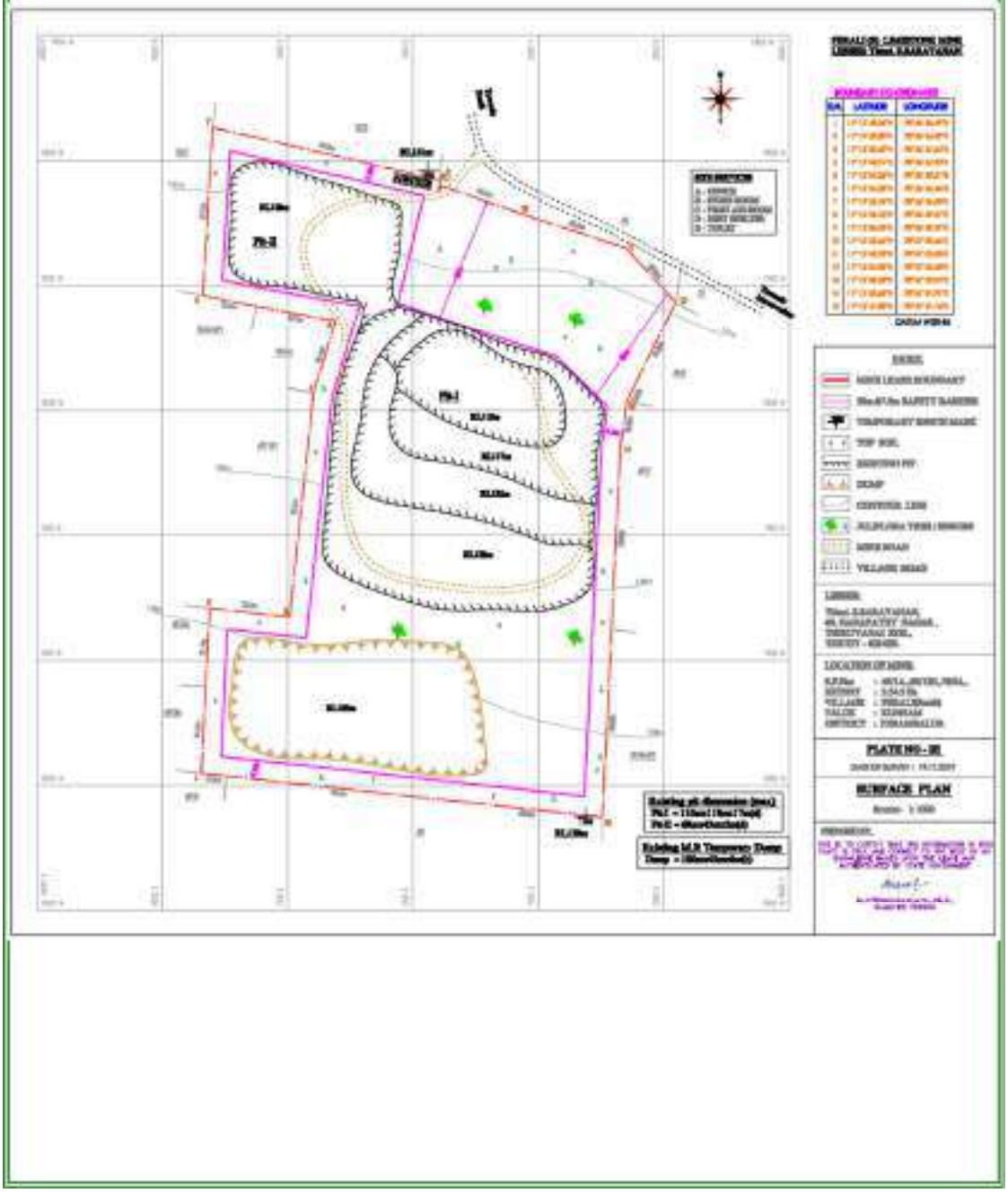

Table : 1.1 Mine Particulars

<table>
<tr><th>Sl. No.</th><th>Details on</th><th>Particulars</th></tr>
<tr><td>1</td><td>Name of the Lease</td><td>Existing Maruvathur Limestone Mine at Perali (South)
GO 3(D) No. 263 Industries (MMA2) Dept. dated 20.09.1995</td></tr>
<tr><td>2</td><td>Lease Owner</td><td>Mr.S.Saravanan, Director, DCPL, Trichy</td></tr>
<tr><td>3</td><td>Extent of Lease</td><td>3.545 Ha</td></tr>
<tr><td>4</td><td>Dead Execution</td><td>Lease Deed was executed & registered on 18.10.1995.</td></tr>
<tr><td>5</td><td>Lease Validity</td><td>20 years i.e. upto 17.10.2015. As per MMDR Amendment Act, 2015 existing lease is valid for 50 years i.e. upto 17.10.2045.</td></tr>
<tr><td>6</td><td>Lease Location</td><td>S. F. Nos. 49/1A, 49/1B, 49/8A(P), 69/1B2, 69/1B3, 69/3C, 70/3A(P), 70/4B & 70/3B of Perali (South) Village, Kunnam Taluk, Perambalur District, Tamil Nadu. The mine is at a distance of 0.35 km in northwest of Maruvathur village.</td></tr>
<tr><td>7</td><td>Land Ownership</td><td>Own Land (Ryotwari Dry Land) in his possession</td></tr>
<tr><td>8</td><td>Lithology</td><td>Topsoil is black cotton soil up to a depth of 1 m BGL. Clay is below topsoil with thickness of 8 m. Below which, Limestone bed exists with 7-13 m thickness over Charnockites. There is no other Minerals/resources like sand in the Lease.</td></tr>
<tr><td>9</td><td>Permitted Mineral</td><td>Limestone (as ROM)</td></tr>
<tr><td>10</td><td>Commencement on</td><td>28.10.1995</td></tr>
<tr><td>11</td><td>Mining Plan / Scheme Approvals</td><td>viii. First Mining Plan (1995-96 to 1999-2000) approval vide IBM Ltr. TN/PCR/MT/LST-804-MDS dt. 01.05.1995.
ix. First Scheme of Mining (2000-01 to 2004-05) approval vide IBM Ltr. TN/PBR/LST/MS-90-MDS dt. 15.01.2001.
x. Plan periods 2005-06 to 2009-10 & 2010-11 to 2012-13 – No mining.
xi. SoM Approval (2013-14 to 2015-16) approval vide IBM Ltr. TN/PBR/LST/MS-1076-MDS dt. 04.07.2014
xii. Mining Plan (2015-16 to 2019-20) approval vide IBM Letter No. TN/PBR/MP/LST-1934.MDS dated 02/03.12.2014.
xiii. Review of Mining Plan (2020-21 to 2024-25) approval vide IBM Letter No. TN/PBR/LST/ROMP-1577.MDS dated 10.12.2019 – No mining.
xiv. ROMP approval (2025-26 to 2029-30) vide IBM Letter No. TN/PBR/LST/ROMP-1768.MDS dated 08.11.2024-valid till 31.03.2030.</td></tr>
<tr><td>12</td><td>Past Production (since Commencement)</td><td>
<table>
<tr><th>Plan/ Scheme</th><th>Period</th><th>ROM, Tonnes</th><th>Dispatch, Tonnes</th></tr>
<tr><td>1st MP</td><td>1995-96 to 1999-2000</td><td>1,17,280.44</td><td>1,16,207.61</td></tr>
<tr><td>1st SoM</td><td>2000-01 to 2004-05</td><td>2,305.00</td><td>2,214.89</td></tr>
<tr><td>-</td><td>2005-06 to 2012-13</td><td>No Mining</td><td>-</td></tr>
<tr><td>2nd SoM</td><td>2013-14 to 2015-16</td><td>16,830.00</td><td>16,822.68</td></tr>
<tr><td>MP</td><td>2015-16 to 2019-20</td><td>0</td><td>130.00</td></tr>
<tr><td>ROMP</td><td>2020-21 to 2024-25</td><td>No Mining</td><td>0</td></tr>
<tr><td colspan="2">Total</td><td>1,36,515.44</td><td>1,35,476.24</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sl. No.</th><th>Details on</th><th>Particulars</th></tr>
<tr><td></td><td></td><td>Balance qty. at Pit Head is 1,039.2 Tonnes. The mine is now in temporary stoppage since 01.02.2016 and there was no Production from 15.01.2016 to till date.</td></tr>
<tr><td>13</td><td>Assessed Reserves</td><td>3,19,733 Tonnes ROM</td></tr>
<tr><td>14</td><td>Production so far</td><td>1,36,515.44 Tonnes @ maximum 51,910 TPA (1996-97)</td></tr>
<tr><td>15</td><td>Dispatch Quantity</td><td>1,35,476.24 Tonnes & balance 1,039.20 Tonnes at Pit Head</td></tr>
<tr><td>16</td><td>Mineable Reserves</td><td>1,83,218 Tonnes ROM as on 02.07.2024</td></tr>
<tr><td>17</td><td>Process Description</td><td>As approved by IBM, the Mine will be worked by Non-Conventional Opencast Method of Mining by deploying Rock Breakers without Drilling & Blasting. ROM Production of 41,850 Tonnes per Annum (TPA), maximum, will be on 1-Shift basis for 300 days in a Year. Limestone will be recovered @ 65% (27,203 TPA) and transported by 20 T Tippers to the Cement Plant via NH-136 and NH-38. Mineral Rejects @ 35% of ROM (14,648 TPA) will be temporarily stored in a Dump for future utilisation. No Beneficiation/Screening is required. Life of the Mine is 5 years only.</td></tr>
<tr><td>18</td><td>Proposed Production</td><td><u>Plan Period (2025-26 to 2029-30) :-</u>
<table>
<tr><th>Year</th><th>Proposed ROM Production, Tonnes</th></tr>
<tr><td>2025-26</td><td>20,936</td></tr>
<tr><td>2026-27</td><td>40,412</td></tr>
<tr><td>2027-28</td><td>38,368</td></tr>
<tr><td>2028-29</td><td>41,652</td></tr>
<tr><td>2029-30</td><td>41,850</td></tr>
<tr><td>Total</td><td>1,83,218</td></tr>
</table></td></tr>
<tr><td>19</td><td>Ground water table intersection</td><td>Nil. Ultimate Pit Limit will be 22.0 m (BGL). Ground Water-table is at 38 m bgl (Postmonsoon) & 40 m (Premonsoon). Mining will not intersect ground water-table-No Hydrogeological study</td></tr>
<tr><td>20</td><td>Project Cost</td><td>Rs.10.00 Lakhs</td></tr>
<tr><td>21</td><td>Project Schedule</td><td>Existing mine will be operated immediately on receipt of EC & CTOs-Commencement from 01.07.2025 & Mine life is 5 years.</td></tr>
<tr><td>22</td><td>R & R Issue</td><td>Nil</td></tr>
<tr><td>23</td><td>Litigation/Case Details</td><td>Nil</td></tr>
<tr><td>24</td><td>CER Budget</td><td>2% of Project Cost</td></tr>
<tr><td>25</td><td>Financial Assurance</td><td>Financial assurance works out to Rs.8,74,800/-. Lessee has submitted BGs of Rs,10,00,000/- & another Rs.2,00,000/-</td></tr>
<tr><td>26</td><td>Violation, if any</td><td>No violation & No penalty levied for any purpose.
<table>
<tr><th>Criteria</th><th>As on Date</th><th>Approved Qty.</th></tr>
<tr><td>Existing pit dimension</td><td>Pit1-110x118x18 m
Pit2-68 x 45 x 2 m</td><td>As approved by IBM</td></tr>
<tr><td>Quantity achieved</td><td>1,36,515.44 T</td><td></td></tr>
<tr><td>Balance quantity</td><td>1,83,218 T</td><td></td></tr>
<tr><td>Mined out depth</td><td>22 m BGL</td><td>As approved</td></tr>
<tr><td>Illicit mining, if any</td><td>Nil</td><td>-</td></tr>
<tr><td>Condition of Safety zone/benches</td><td>Safe & Stable</td><td>-</td></tr>
</table></td></tr>
</table>

Mine Profile :

Pit Configuration-Existing	**:**	**Pit-1 : 110 x 118 x 18 m & Pit-2 : 68 x 45 x 2 m (d)**
Reserves '111' Category	:	1,83,218 Tonnes ROM
Proposed Production	:	1,83,218 Tonnes @ 41,850 TPA ROM (Maximum)
No. of Days	:	300 days on 1-Shift operation
Life of the Mine	**:**	**5 years**
Ore:Waste Ratio	:	1:1.48
Pit Configuration-Conceptual	:	**Pit-1 : 180 x 110 x 22 m (d) & Pit-2 : 68 x 45 x 16 m (d)**
Bench height	:	4 m
Bench width	:	6 m
Bench slope	:	60° (from horizontal)
Ultimate Pit Limit-Conceptual	:	**22.0 m (BGL)**
		Top RL – 131 m & Bottom RL – 109 m
Ground Water-table at	:	38 m BGL (Postmonsoon) & 40 m (Premonsoon)

Mining will not intersect the ground water-table.

EIA Study : 'No prior EC is required for Mine with <5 Ha Extent' in the context of MoEF&CC Office Memorandum No. J-11013/182/2012-IA-II(M) dated 04.01.2013. The existing Mining Lease requires EC as per MoEF&CC Notification SO 141(E) dated 15.01.2016. There was no Violation as per EIA Notification 2006. Accordingly, EC Application was filed to SEIAA-TN vide Proposal No. SIA/TN/MIN/27577/2018 dated 08.05.2017 for a production of 80,000 Tonnes per Annum over an extent of 3.545 Ha. Terms of Reference (TOR) was awarded under Non-Violation Category vide Lr. No. SEIAA-TN/F.No.6275/TOR-381/2017 dated 18.05.2018. Public Hearing was not happened on account of COVID-19 pandemic and operational constraints. The validity of awarded TOR was expired on 17.05.2023.

The mineral Limestone to be mined out from this Lease is a Major Mineral over an extent **of <250 Ha** and falls in **Category 'B'** of Sl. No. 1(a) of EIA Notification 2006, as amended vide Notification SO 1886(E) dated 20.04.2022, for prior EC from SEIAA-TN. Thus, a fresh TOR Proposal has been filed vide Online Proposal No. SIA/TN/MIN/481764/2024 on 16.06.2024 and hard copy on 25.06.2024. The Proposal was deliberated by SEAC-TN in its 481st Meeting held on 01.08.2024 and SEIAA-TN in its 748th Meeting held on 13.08.2024. **Fresh TOR** has been awarded vide TOR Identification No. TO24B0000TN5850953N dated 20.08.2024, under **File No. 11024**/2024, with Public Hearing.

EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including **Sector-1 (Mining Projects) for Category 'A'** by the National Accreditation Board for Education & Training (**NABET**) vide Certificate NABET/EIA/2225/RA0290 dated 11.06.2023 with validity till 16.11.2025 (Sl. No. 4 of List). ABC Laboratory is accredited by the National Accreditation Board for Testing & Calibration Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2024 - valid till 02.04.2026.

Baseline Data (BLD) has been collected during **Mar.-May 2024 (Summer Season)** for Environmental Impact Assessment (EIA) Study in compliance with MoEF&CC Office Memorandum No. J-11013/41/2006-IA-II(I)(Part) dated 29.08.2017. Draft EIA Report has been prepared in compliance with awarded TORs and submitted along with Summary EIA Reports (both in English and Tamil versions) for Public Consultation & Public Hearing.

2.0 Description of the Environment

2.1 Environmental Setting

The Mine is located in between **11°12'47.83"- 11°12'56.76" N Latitude & 78°56'56.46"-78°57'02.68" E Longitude** (Survey of India Topo Sheet No. 58 I/16) (**Fig. 1.2**). There are no eco sensitive areas like National Parks, Biosphere Reserves, Wildlife Sanctuaries, Elephant Corridor, Archaeological/Historical Monuments, Heritage sites, etc. within 10 km from the Mine boundary. There are 2 Reserved Forests within 10 km radius area viz. Kunnam RF @ 1.5 km in east & Chittali RF @ 3.3 km in north.

Seasonal River Marudaiyar drains the region which flows at 2.5 km south from the Mine. A seasonal Odiyam Odai flows at a distance of 2.9 km in the east and joins the Marudaiyar River in southeast. Another Seasonal Nalla Elumur Ar originates (2.7 km) from Chithali RF and flows towards North in the Study Area. Area is with elevation of 80-140 m above MSL and the Mine area elevation is of about 137 m. It is almost flat with gentle gradient towards south.

Surrounding mining activity : Kaulpalayam Rough Stone quarries with their Stone Crushers are located in the western parts of ML Area. **Non-operating Mines** viz. DCPL Perali (South) Mine (1.92 Ha @ 1.0 km in ESE), Parvin Mines (0.7-0.9 km in SSW), Chettinad Cement Azur Mine (@ 7.4 km in NE), Ramco Cement Varagupadi Mine (@ 7.8 km in SW) and Ultratech Varagupadi Mine (@ 9.7 km in SW) are located within the Study Area.

The nearest Airport is Trichy at a distance of 55 km in the south-southwest. The nearest Ports are at Karaikkal (105-SE), Cuddalore (104 km-NE) and Chennai (225 km in NE).

2.2 Baseline Environmental Status

The study area of 10 km radius (from ML boundary) (**Fig. 3.1**) has been considered for assessing the baseline environmental status. The monitoring stations are selected in such a way that the baseline environmental data reflects the **Cumulative Impact of existing Mines** in the Study area. The summary of baseline status is given in **Table 2.1**.

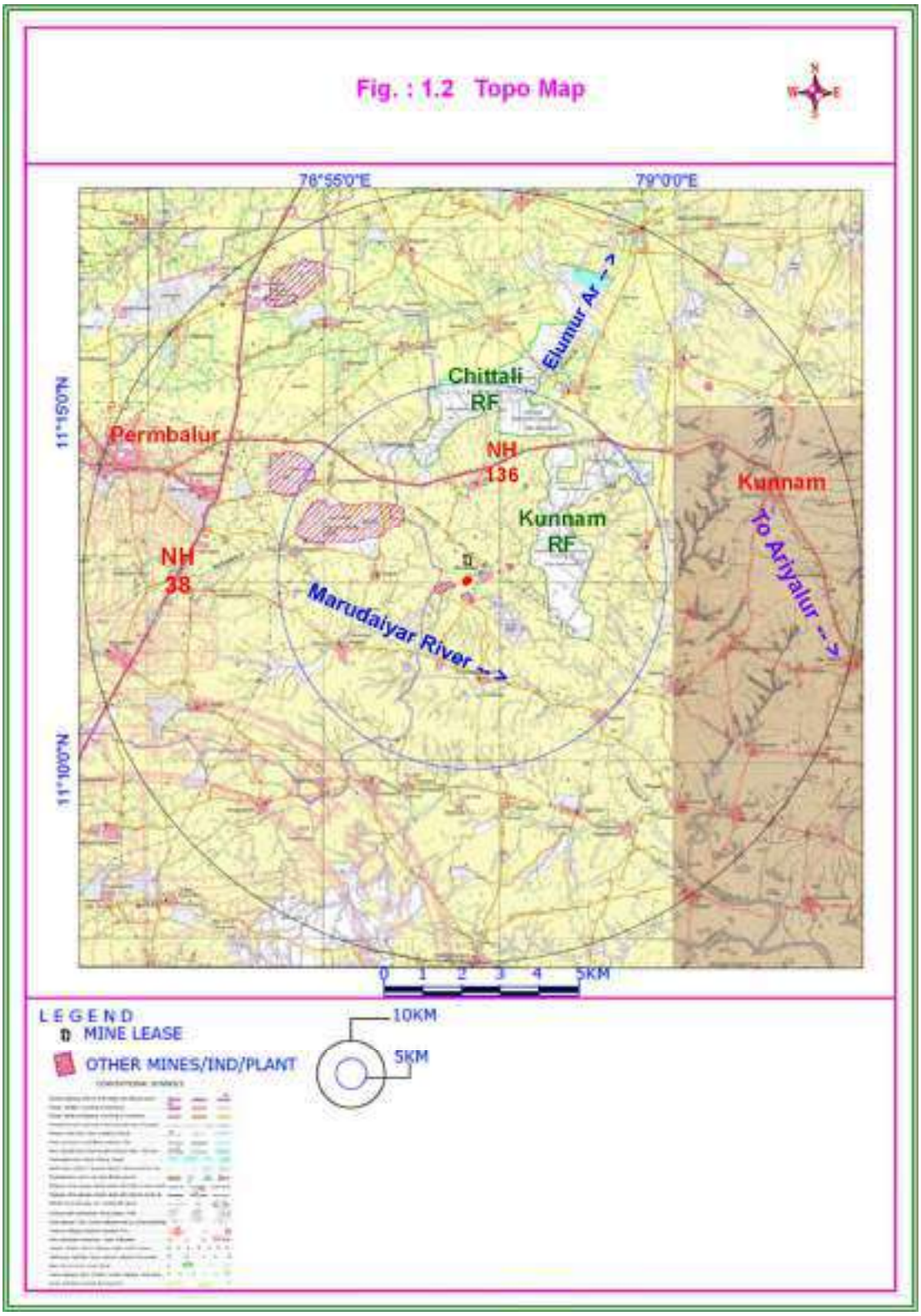
Fig. : 1.2 Topo Map
78°55'0"E
79°0'0"E
11°15'0"N
11°10'0"N
Elumur Ar
Chittali RF
Perambalur
NH 136
Kunnam
To Ariyalur
Kunnam RF
NH 38
Marudaiyar River
0 1 2 3 4 5KM
LEGEND
MINE LEASE
OTHER MINES/IND/PLANT
10KM
5KM

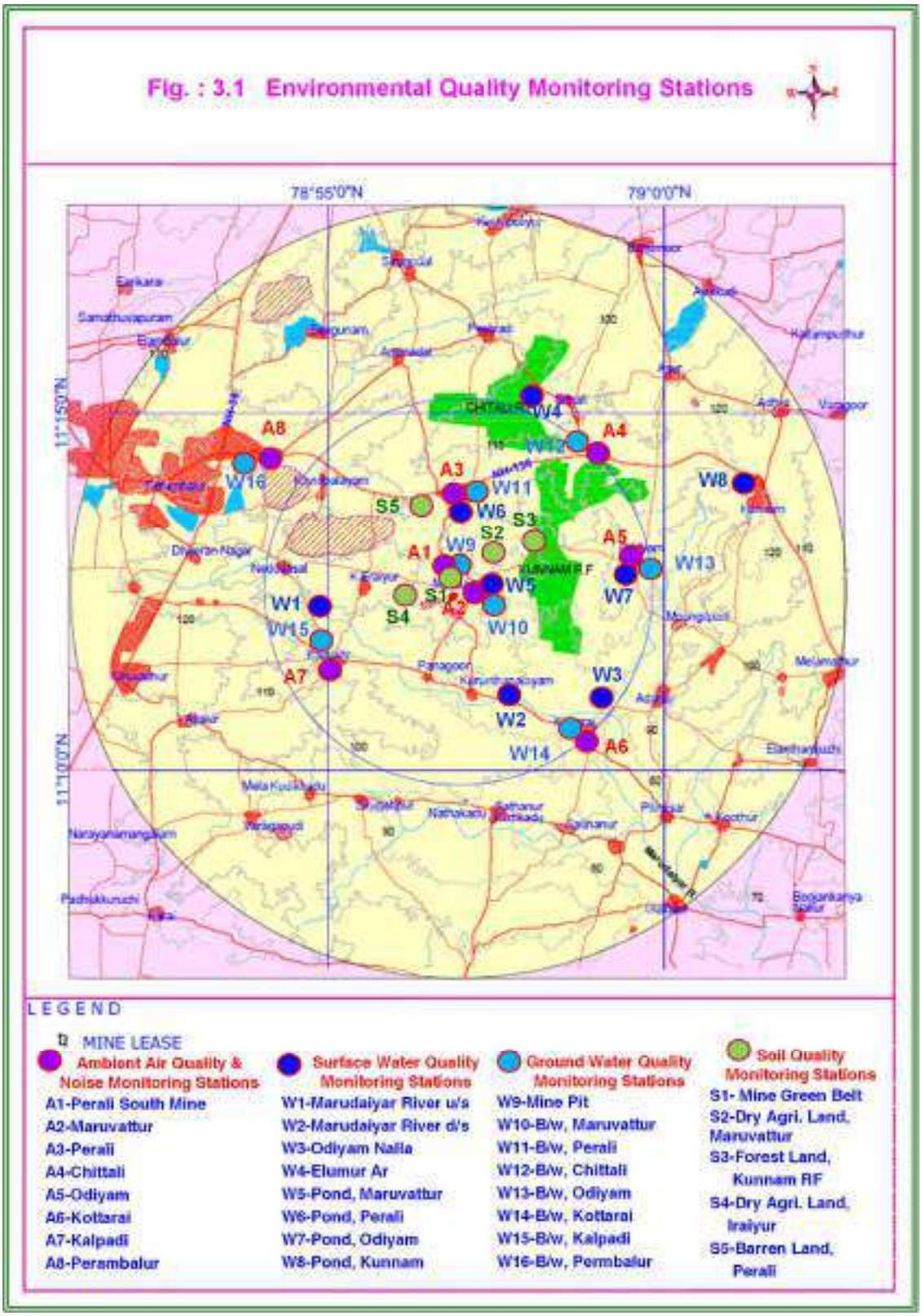
Fig. : 3.1 Environmental Quality Monitoring Stations
78°55'0"N
79°0'0"N
11°15'0"N
11°10'0"N
A1
A2
A3
A4
A5
A6
A7
A8
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
W14
W15
W16
S1
S2
S3
S4
S5
KUNNAM R.F
LEGEND
MINE LEASE
Ambient Air Quality & Noise Monitoring Stations
A1-Perali South Mine
A2-Maruvattur
A3-Perali
A4-Chittali
A5-Odiyam
A6-Kottarai
A7-Kalpadi
A8-Perambalur
Surface Water Quality Monitoring Stations
W1-Marudaiyar River u/s
W2-Marudaiyar River d/s
W3-Odiyam Nalla
W4-Elumur Ar
W5-Pond, Maruvattur
W6-Pond, Perali
W7-Pond, Odiyam
W8-Pond, Kunnam
Ground Water Quality Monitoring Stations
W9-Mine Pit
W10-B/w, Maruvattur
W11-B/w, Perali
W12-B/w, Chittali
W13-B/w, Odiyam
W14-B/w, Kottarai
W15-B/w, Kalpadi
W16-B/w, Pernbalur
Soil Quality Monitoring Stations
S1- Mine Green Belt
S2-Dry Agri. Land, Maruvattur
S3-Forest Land, Kunnam RF
S4-Dry Agri. Land, Iraiyur
S5-Barren Land, Perali

Table : 2 .1 Environmental Baseline Status

Envl. Component	Main Parameters	Minimum	Maximum	Mean	Desirable Norms
Ambient Air Quality, ug/m^3	PM2.5	10	37	**19.5**	**60**
	PM10	17	68	**37.7**	**100**
	SO_2	6	24	**11.4**	**80**
	NOx	6	27	**13.3**	**80**
Ambient Noise, dB(A)	Leq-Day	39.5	46.2	**42.1**	**55**
	Leq-Night	38.5	43.8	**40.4**	**45**
Surface Waters	TDS, mg/l	400	480	-	**500/2100**
Ground Waters	TDS, mg/l	410	940	-	**500-2000**
Soil Status	EC, mmhos/cm	1.23	1.54	-	**0.2-0.5**
	SAR	2.09	3.15	-	**<5**

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10- Particulate Matter size less than 10 um; SO_2-Sulphur dioxide; NOx-Oxides of Nitrogen; Leq-Day & Leq-Night - Equivalent Noise Levels during Day & Night Times; TDS-Total Dissolved Solids; EC-Electrical Conductivity & SAR-Sodium Absorption Ratio.

The findings of baseline environmental status of the study area are summarized below :

- The collected meteorological data during this season represented local weather phenomena.
- The monitored ambient air quality in the study area was found to be in compliance with the Revised National Ambient Air Quality (NAAQ) 24-hourly Norms for Industrial, Residential, Rural and other areas.
- Ambient equivalent noise levels (Leq) during day and night times were found to be well within the MoEF&CC Norms.
- The water quality of surface waters was found to be in compliance with CPCB Norms.
- The ground water quality was found to be in compliance with the IS:10500-2012 Norms.
- The soil in the study area would very well support vegetation after amending it suitably.
- There is no eco sensitive area exists in the study area and only domesticated animals exist.
- The area is thinly populated and basic amenities are available almost in all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

3.0 Anticipated Environmental Impacts

Being an existing Mine, it does not involve any major establishment or construction. Thus, Construction Phase Impacts are not there for Impact Assessment and Environmental Management Plan (EMP). The impacts during Operation Phase have been divided into two categories, viz. Localised and Cumulative. The identified Impacts are given in **Table 3.1**.

Table : 3.1 Identified Impacts

Sl. No.	Environmental Component & Anticipated Impacts
1	**Land Environment :** Out of 3.545 Ha, at Conceptual Stage, 2.286 Ha will be the mine-out pit which will be partly backfilled (0.306 Ha) and balance pit (1.980 Ha) will be left as Water Reservoir for harvesting rain water. About 0.34 Ha will be Mineral Rejects Dump, 0.010 Ha will be under Infrastructures and 0.020 Ha under Roads About 0.260 Ha will be covered under Green Belt – **7.33% Coverage**.
2	**Traffic Volume** : Mine will deploy 2 Tippers, 2 trips/day (one way) to Limestone from the Lease. MDR runs adjacent to the Lease for transportation to DCPL Cement Plant via NH-136 (at 4 km road distance) & Perambalur NH-38. The existing Traffic Volume at the Mine Area is 84 Passenger Car Units (PCU)/day and will be 96 PCU/day during Operation Phase. The existing Roads are adequate to handle the proposed traffic volume due to the Project.
3	**Air Quality** : The Mining, Loading and Transporting activities would generate both fugitive dust emissions and smoke from HEM Machineries/Equipments & Transporting Tippers. AERMOD View Software is used for Predicting the maximum Ground Level Concentrations (GLCs) including Transportation Impact. The predicted maximum GLC-PM2.5 for cumulative activities is 0.11 ug/m^3 and GLC-PM10 for cumulative activities is 0.37 ug/m^3 and found to be confined locally i.e. within 0.1 km radius. Also, adequate Buffer Level available in the Air Environment for the Proposal. Other pollutants SO_2 and NOx emissions due to mining activities are found to be low and are not reported.
4	**Noise Levels** : There will be **no Drilling and Blasting** in the Mine. Excavation, Loading and Transportation activities are the sources of Noise. In general, work force will be exposed to <85 dB(A) levels during 8-hours Shift. Noise level at nearest Lease boundary will be <55 dB(A) during day times and <45 dB(A) during night times as stipulated by MoEF&CC- Leq Noise Norms for Residential & Rural Areas.
5	**Water Environment** : **Impact on Surface Waters :** The ML Areas have the MDR as Northern Boundary and other areas are surrounded by Dry Agricultural Lands. There is **no Mine Pit Water Discharge**. Thus, there will not be any impact on the Surface Waters due to the Mine. **Impact on Ground Waters :** There is **no ground water-table intersection** due to mining. Due to poor transmissivity, there will be no impact on nearby borewells. The mine requires about 3.0 KLD water and will be met from **the rainwater harvested in the mine pit**. **No workshop** and thus there is **no effluent generation** from the Mine. Domestic sewage generation is 0.9 KLD and is biologically treated in a Septic Tank followed by a Dispersion Trench.
6	**Biological Environment** : There is no habitat fragmentation or blocking of migratory corridors due to Project activities since there is no wild life movement or migratory birds movement in the study area. Thus, there will not be any significant impact on

Sl. No.	Environmental Component & Anticipated Impacts
	the existing flora-fauna of the area. ML area is surrounded by barren lands and dry agricultural lands within 1.0 km area. As the baseline AAQ are in lower levels as well as Predicted GLC is very low/insignificant, there will not be any impact on the surrounding dry agricultural lands due to the Project.
7	**Socio-economics** : Project employs 30 persons directly and 20 persons indirectly. The direct & indirect employment, CER & CSR activities, etc., will have a positive impact on the Socioeconomic Structure of the area.
8	**Occupational Health :** DCPL is committed to provide a Safety & Healthy working conditions. The **first aid box**es will be made available in the Mine Office for immediate treatment. **Occupational health surveillance programme** will be carried out for all the employees regularly.
9	**Climate Change :** The mining activities are carried out during day times only and thus, **there is no power demand**. There is no standby DG set also. HSD @ 500 lits./day is required for the mining equipments. About 0.260 Ha will be covered under Green Belt – **7.33% Coverage**. Predominantly local species like Neem, Pungan, Teak, etc., will be planted and maintained with about 90% survival rate.

4.0 Environmental Monitoring Programme

For effective implementations of Environmental Cell will be there under the overall supervision of the Chairman. The quality of air, noise, water, soil, etc. will be monitored at identified locations as per MoEF&CC/TNPCB Norms by appointing an accreditated external agency. The status reports will be submitted periodically to TNPCB on monthly basis, IBM on quarterly basis and IRO, MoEF&CC Chennai on six monthly basis.

5.0 Additional Studies

Detailed Risk Assessment and mitigative measures are delineated and an effective Disaster Management Plan, for natural and man-made disasters, is also submitted. Safety aspects will also be ensured to reduce incidents, if any.

6.0 Project Benefits

Environmental Benefits : The proposal ensures continuous limestone supply to the Cement Plant. Effective utilization of the Mineral for Cement manufacturing is a Mineral Conservation Measure.

Financial Benefits : Project cost is Rs.10.00 Lakhs. Mineable Reserves from the Lease is 0.183 Million Tonnes. As per MMDR Act 2015, 30% of Royalty Amount will be earmarked for District Mineral Foundation (DMF). Royalty to the Exchequer will improve local and regional economy.

Social Benefits : Project employs 30 persons directly and 20 persons indirectly. The direct & indirect employment, CSR/CER activities, etc., will have a positive impact on the Socioeconomic Structure of the area.

7.0 Environmental Management Plan

Environmental Management Plan (EMP) is suggested to mitigate the possible negative impacts that may be caused to the various attributes of environment due to the proposed mining operations. Being Existing Mines, there will be **no Construction Phase** for the Project. The EMP Measures proposed for Operation Phase are given in **Table 7.1**.

Table : 7.1 Proposed EMP Measures

Sl. No.	Environmental Component & Proposed EMP Measures
1	**Land Environment :-** ❖ Earthen bunds are to be strengthened along the boundaries to arrest wash-offs. ❖ Garland drains are to be maintained periodically around the Lease. ❖ Green Belt has to be developed and maintained along Lease boundary. ❖ No. of **trees planted shall be numbered** and referenced for review. ❖ The mined out Pits shall be converted into a Water Reservoirs to harvest Rain Water and to recharge Ground Water-table in the vicinity.
2	**Transportation :-** ❖ Regular wetting of haul roads has to be undertaken to arrest fugitive emissions. ❖ Tippers are to be fully covered with Tarpaulin to avoid any spillage. ❖ No overloading of Tippers is allowed strictly. ❖ A strict Speed Limit of 30 km/hr. has to be enforced and monitored continuously. ❖ Compliance to 'Pollution under Control' Certification has to be ensured. ❖ Restriction of Truck parking in the Public Road has to be implemented. ❖ Security Guards to be posted at the public road junction.
3	**Air Quality** :- ❖ Water sprinkling at mining areas, loading, haul roads, etc. has to be carried out. ❖ **Tyre washing facility** shall be installed. ❖ Periodical maintenance of mining equipments has to be carried out. ❖ Effective Green Belt with thick foliage has to be maintained along the boundaries. ❖ Periodical Air Quality Monitoring shall be carried out and Reports submitted.
4	**Noise Levels** :- ❖ Deploying mining equipments shall be with in-built mechanism for reducing noise. ❖ Providing sound proof operator's cabin of equipments. ❖ Provision of ear muffs/ear plugs to the workers in higher noise zones. ❖ Green Belt with thick foliage shall be maintained around lease boundary as acoustic barriers. ❖ Periodical Noise Monitoring shall be carried out and Reports submitted to the Authorities.

Sl. No.	Environmental Component & Proposed EMP Measures
5	**Water Environment** :- ❖ Mine Pit Water shall not be directly discharged without ensuring its quality. ❖ Garland Drains and Settling Tanks are to be maintained and desilted periodically. ❖ Ground Water Levels and Water Quality are to be periodically monitored at identified Borewells & Dugwells in the Mine vicinity. ❖ Monitored Water Quality data are to be periodically submitted to IBM, SEIAA-TN & IRO-MoEF&CC, Chennai.
6	**Biological Environment** :- ❖ Effective Green Belt has to be developed and maintained, with the guidance of DFO, with about 90% Survival Rate. ❖ Native species shall be preferred for Green Belt development. ❖ Fruit bearing trees may also be preferred. ❖ The primary way that carbon is stored in the soil is as **soil organic matter (SOM).** Climatic conditions, natural vegetation, soil texture, and drainage all affect the amount and length of time carbon is stored.
7	**Socio-economics** :- CSR activities shall be carried out by providing social and welfare measures for the local residents and nearby villages around the mine area. The prime focus will be on the creating and maintaining of drinking water facilities for the students at the nearby Government Schools, establishing toilets especially for girl students at the schools, setting up of computer centres, maintenance of village roads & ponds, providing solar street lights, conducting free medical camps, etc.
8	**Occupational Health :-** ❖ All employees are to undergo Medical Check-up on recruitment and periodically during employment. ❖ Maintenance of Pre, during & Post Employment Records are to be kept for periodical review. ❖ Required Personal Protective Equipments for the employees are to be provided. ❖ Provision of ergonomically designed seats for drivers/operators has to be ensured.

Plastic Waste Management : There will be ban on one-time use and throw away Plastic usage in the Lease. Encourage the use of eco friendly alternatives such as banana leaf, areca nut palm plate, stainless steel glass, porcelain plates / cups, cloth bag, jute bag etc.

EMP Budget : The Project Cost is **Rs.10.00 Lakhs**. An amount of Rs.7.00 Lakhs has been earmarked as Capital EMP Budget and Rs.10.00 Lakhs per Annum as Operating Cost. Public Hearing issued will be addressed and the **Action Plan with Budget will be included** in the EMP Budget for executing the Physical Activities as per MoEF&CC OM dated 30.09.2020.

***

12.0 Disclosure of Consultants

EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including **Sector-1 (Mining Projects) for Category 'A'** by the National Accreditation Board for Education & Training (**NABET**) vide Certificate NABET/EIA/2225/RA0290 dated 11.06.2023 with validity till 16.11.2025 (Sl. No. 4 of List dated 29.10.2024). ABC Laboratory is accredited by the National Accreditation Board for Testing and Calibration Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2024 with validity till 02.04.2026. DCPL has utilized the services of Ensyscon, Chennai for the coordination of the Study.

ABC comprises a team of highly talented professionals, who work in sync with clients ensuring that the defined assessment and survey or reporting is executed with high level of efficiency. The proficient team consists of Environmentalists, Policy makers, Geologists, Chemists, Engineers, Industrial hygienists, Technicians, Research Associates, Sociologists and others with expertise in various key areas.

ABC has a proven successful track record of working with industry & institutions and in executing multi faceted projects funded by organizations like World Bank, UNDP, MoEF&CC, amongst others. ABC Techno labs India Private Ltd has laid down new benchmarks in all its areas of strategic operations by the dedicated team of outstanding professionals and client-centric approach, clearly evident by the accomplishments/ clients list.

The **accrediated Sectors and approved Experts** of ABC are appended.

***

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Certificate of Accreditation

ABC Techno Labs India Private Limited, Chennai

ABC Tower, 400, 13th Street, SIDCO Industrial Estate, North Phase, Ambattur, Chennai 600098

*The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
2	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3	River Valley projects	3	1 (c)	A
4	Thermal power plants	4	1 (d)	A
5	Mineral beneficiation including pelletisation	7	2 (b)	A
6	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
7	Cement Plants	9	3(b)	A
8	Petroleum refining industry	10	4 (a)	A
9	Leather/skin/hide processing industry	15	4 (f)	A
10	Chemical fertilizers	16	5 (a)	A
11	Petro-chemical complexes	18	5 (c)	A
12	Petrochemical based processing	20	5 (e)	A
13	Synthetic organic chemicals industry	21	5 (f)	A
14	Distilleries	22	5 (g)	A
15	Integrated paint industry	23	5 (j)	B
16	Sugar Industry	25	5 (j)	B
17	Oil & gas transportation pipeline, passing through national parks/ sanctuaries/coral reefs / ecologically sensitive areas including LNG terminal	27	6 (a)	A
18	Airports	29	7 (a)	A
19	Industrial estates/ parks/ complexes/ Areas, export processing zones(EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
20	Ports, harbours, break waters and dredging	33	7 (e)	A
21	Highways	34	7 (f)	A
22	Common Effluent Treatment Plants (CETPs)	36	7 (h)	B
23	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
24	Building and construction projects	38	8 (a)	B
25	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated June 09, 2023 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/2795 dated July 11, 2023. The accreditation needs to be renewed before the expiry date by ABC Techno Labs India Private Limited, Chennai following due process of assessment.

Sr. Director, NABET
Dated: July 11, 2023

Certificate No.
NABET/EIA/2225/RA 0290

Valid up to
Nov 16, 2025

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to the QCI-NABET website.

National Accreditation Board for Testing and Calibration Laboratories

NABL

CERTIFICATE OF ACCREDITATION

ABC TECHNO LABS INDIA PRIVATE LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

ABC TOWER,NO 400,13TH STREET,SIDCO INDUSTRIAL ESTATE-NORTH PHASE,AMBATTUR, CHENNAI, TAMIL NADU, INDIA

in the field of

TESTING

Certificate Number: TC-5770

Issue Date: 03/04/2024 Valid Until: 02/04/2026

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of thislaboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: ABC Techno Labs India Private Limited

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

List of Experts

search Search

Back

ABC Techno Labs India Private Limited (formerly known as ABC Environ Solutions Pvt. Ltd.)

S No	Name	Type	Designation	Sector	FA	Ren
1	Dr Devi Velusamy	In House	TM/FAE	33 Ports, harbours, break waters and dredging,38 Building and construction projects	WP,EB	
2	Dr Geetha S	In House	FAE		SE	
3	Dr Hemambika Balakrishnan	In House	FAE		EB	
4	Dr M Sangeetha	In House	EIA Coordinator	1. Mining of minerals including opencast/ underground mining,23 Integrated paint industry,38 Building and construction project,39. Townships and Area development projects,15 Leather/skin/hide processing industry	NV,AP	

S No	Name	Type	Designation	Sector	FA	Ren
5	Dr Mohit Kumar Ray	Empanelled	EIA Coordinator	4. Thermal power plants,10. Petroleum refining industry,18.Petro-chemical complexes,20. Petrochemical based processing	RH,SHW,AQ	
6	Dr Muthiah Mariappan	In House	EIA Coordinator	4. Thermal power plants,15.Leather/skin/hide processing industry,16 Chemical fertilizers,10.Petroleum refining industry	AP,WP	SHW
7	Dr N Rama Krishnan	In House	EIA Coordinator	33. Ports, harbours, break waters and dredging	LU ,SE	
8	Dr R K Jayaseelan	In House	EIA Coordinator	1. Mining of minerals including opencast/ underground mining,21. Synthetic organic chemicals industry,Industrial estates/ parks/ complexes/ Areas, export processing zones(EPZ Special economic zones (SEZs), Biotech parks, Leather complexes,37.Common Municipal Solid Waste Management Facility (CMSWMF),39. Townships and Area development projects	LU,HG,WP	SHW
9	Dr R Pannaivam	In House	EIA Coordinator	31. Industrial estates/ parks/ complexes/ Areas, export processing zones(EPZ Special economic zones (SEZs), Biotech parks, Leather complexes,36. Common Effluent Treatment Plants (CETPs)	HG,WP	

S No	Name	Type	Designation	Sector	FA	Ren
10	Dr S Veezhinathan	In House	EIA Coordinator	1. Mining of minerals including opencast/ underground mining,8.Metallurgical industries (ferrous & non-ferrous),27. Oil & gas transportation pipeline, passing through national parks/ sanctuaries/coral reefs / ecologically sensitive areas including LNG terminal,31 Industrial estates/ parks/ complexes/ Areas, export processing zones(EPZ Special economic zones (SEZs), Biotech parks, Leather complexes,39. Townships and Area development projects	Nuclear power projects and processing of nuclear fuel,Geo,HG	
11	Mr Abhik Saha	In House	EIA Coordinator	2. Offshore and onshore oil and gas exploration, development & production,21. Synthetic organic chemicals industry,22 Distilleries,9. Cement Plants,29. Airports	AP,WP,EB	SHV
12	Mr Arijit Panja	In House	FAE		AP,NV,LU	WP
13	Mr K R Haneesh	Empanelled	EIA Coordinator	36. Common Effluent Treatment Plants (CETPs),37. Common Municipal Solid Waste Management Facility (CMSWMF),38. Building and construction projects,39.Townships and Area development projects	AP,WP,NV	

S No	Name	Type	Designation	Sector	FA	Ren
14	Mr K Sekar	Empanelled	EIA Coordinator	1. Mining of minerals including opencast/ underground mining,7. Mineral beneficiation including pelletisation,9. Cement Plants,31. Industrial estates/ parks/ complexes/ Areas, export processing zones(EPZ Special economic zones (SEZs), Biotech parks, Leather complexes,33. Ports, harbours, break waters and dredging		
15	Mr Mohammand Akhtar	Empanelled	EIA Coordinator	29 Airports,34. Highways,38. Building and construction projects	AP,AQ	
16	Mr P Swamirajan	Empanelled	EIA Coordinator	34. Highways		
17	Mr Vinod Kumar Gautam	Empanelled	EIA Coordinator	29. Airports		
18	Mr Wriddhi Pratim Bose	In House	EIA Coordinator	2 Offshore and onshore oil and gas exploration, development & production,23 Integrated paint industry,38 Building and construction project,39. Townships and Area development projects	WP	SHV
19	Ms Kavita Zog	Empanelled	EIA Coordinator	3. River Valley projects,4 Thermal power plants,22. Distilleries,25. Sugar Industry,39. Townships and Area development projects	EB,SW,WP	

S No	Name	Type	Designation	Sector	FA	Ren
20	Ms Vaishnavi Dhinakaran	In House	EIA Coordinator	38 Building and construction projects	WP	SHV

***

GOVERNMENT OF TAMIL NADU

ABSTRACT

Mines and Minerals - Mining Lease - Limestone - Tiruchirapalli District - Perambalur Taluk - Perali (South) Village - Over an extent of 3.54.5 hectares in S.F. Nos.49/1A, 49/1B, 69/1B2, 69/1B3, 69/3C, 70/3B, 70/4B, 49/8A (Part) and 70/3A (Part) - Mining Lease application of Thiru. S. Saravanan, Tiruchirapalli- Grant of Mining Lease - Orders - Issued.

- -

INDUSTRIES (MMA2) DEPARTMENT

G.O. 3(D) No.263 Dated: 20.9.95.

Read:

1) From Thiru. S. Saravanan, Tiruchirapalli Mining Lease application dated 21.10.94.

2) From District Collector, Tiruchirapalli, Letter No.R.Dis.(A)/1976/94, dated 23.1.95.

3) From Director of Geology and Mining, Letter Rc.No.1116/B2/95, dated 13.3.95.

4) From Thiru. S. Saravanan, Tiruchirapalli, Letter dated 20.3.95, 7.5.95 and 18.9.95.

5) From Government of India, Ministry of Mines, Letter No.4/120/95, MIV, dated 7.9.95.

ORDER:

Thiru. S. Saravanan, Tiruchirapalli in his mining Lease application dated 21.10.94 has applied for grant of fresh mining lease for limestone over an extent of 3.54.5 hectares in S.F. Nos.49/1A, 49/1B, 69/1B2, 69/1B3, 69/3C, 70/3B, 70/4B, 49/8A (Part) and 70/3A (Part) of Peralai (South) Village, Perambalur Taluk, Tiruchirapalli District for a period of 20 years.

2. The District Collector, Tiruchirapalli has certified that the lands applied for are patta lands classified as Ryotwari Dry and the applicant has got surface rights over the entire lands applied for mining lease. He has stated that there are no permanent structures of any kind in and around 50 metres of the land applied for mining lease. The Village Administrative Officer and public have not raised any objection in granting mining lease in favour of the applicant. The Collector has recommended for mining lease in favour of the applicant.

3. The Director of Geology and Mining has certified that the area applied for mining lease satisfies Section 6(1) (c) of Mines and Minerals (Regulation and Development) Act, 1957. The Director of Geology and Mining has recommended for grant of mining lease in favour of applicant subject to the production of approved mining plan, Income Tax Clearance Certificate,

...2..

Affidavit towards no mining dues and solvency certificate, and subject to the following conditions:-

i) that a safety distance of 50 metres should be maintained from the existing road in S.F.Nos.48 and 51 which are adjacent to the lands applied for mining lease.

ii) that (a) high grade limestone should be supplied to lime based industries (b) Cement grade should be supplied to Cement industry and (c) only limestone of below Cement grade with less than 42% CaO should be pulverised for use as filler.

4. The applicant, Thiru. S Saravanan in his letters dated 20.3.95, 7.5.95 and 18.9.95 has furnished an affidavit towards No Mining Dues certificate, Solvancy Certificate, Approved Mining Plan and Income Tax Clearance Certificate respectively.

5. The Government have after careful consideration of the recommendations of the Collector, Tiruchirapalli District and Director of Geology and Mining, have decided to grant of mining lease in favour of Thiru. S. Saravanan, Tiruchirapalli and addressed to Government of India for their concurrence to grant mining lease to the applicant. The Government of India in their letter fifth read above have conveyed their approval under Section 5(1) of Mines and Minerals (Regulation and Development) Act, 1957 and under Rule 27 (3) of Mineral Concession Rules, 1960, to grant Mining Lease in favour of the applicant for a period of 20 years.

6. In exercise of the Powers conferred under Section 10(3) of Mines and Minerals (Regulation and Development) Act, 1957 (Central Act, 67 of 1957), the Governor of Tamil Nadu hereby sanctions the grant of Mining Lease in favour of Thiru. S.Saravanan, Tiruchirapalli for Mining Limestone over an extent of 3.54.5 Hectares in S.F. Nos.49/1A, 49/1 B, 69/1B2, 69/1B3, 69/3C, 70/4B, 49/8A (Part) and 70/3A (Part) of Perali (South) Village, Perambalur Taluk, Tiruchirapalli District for a period of 20 (Twenty) years, subject to the Special conditions mentioned in para 3 above and also other usual conditions specified in the Annexure to this order.

7. The rate of royalty, dead rent and surface rent shall be as follows:-

Royalty:- Limestone (Including Lime Kankar)

a) L.D. Grade (Less than 1.5% Silica Content) : Rs.50/- (Rupees fifty) per tonne.

b) Others : Rs.25/- (Rupees Twenty Five) Per tonne.

Dead Rent:-

First year of the lease	: Nil
Second year to fifth year of the lease	: Rs.30/- (Rupees thirty) per hectare per annum
Sixth to tenth year of the lease	: Rs.60/- (Rupees sixty) per hectare per annum
Eleventh year of the lease onwards	: Rs.90/- (Rupees Ninety) per hectare per annum.

Surface rent and Water Rate:-

At such rate as the land revenue and other cesses assessable in the land are paid.

8. The applicant should pay a deposit of Rs.2,000/- (Rupees two thousand only) as prescribed in rule 32 of Minerals Concessions,Rules, 1960 before the lease deed is actually executed.

9. The terms and conditions mentioned in this order are subject to such further modifications, additions and alterations as may be included in the lease when finalised.

10. The Collector, Tiruchirapalli District is requested to take necessary further action for execution of the lease deed in the prescribed form. As soon as the deed is executed, it should be reported to the Government and Director of Geology and Mining. The Collector is also requested to ensure compliance by the applicant firm of the amended provisions of Mines and Minerals (Regulation and Development) Act, 1957 and Minerals Concession Rules, 1960, and other applicable Acts and Rules including Forest (Conservation) Act, 1980 before the lease deed is executed.

(BY ORDER OF THE GOVERNOR)

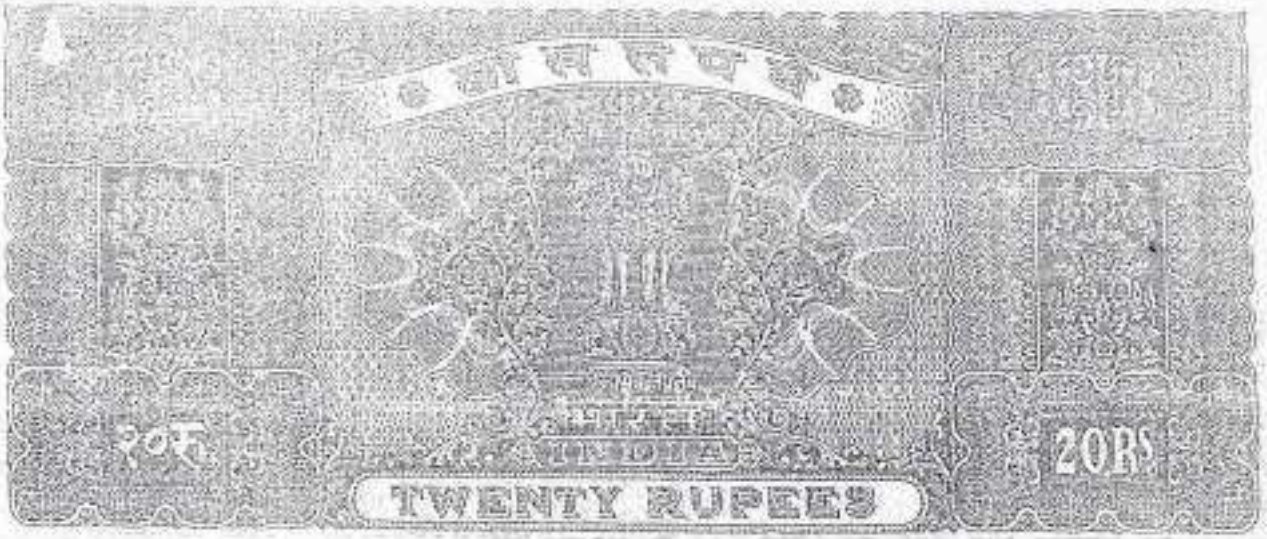
C. RAMACHANDRAN,
PRINCIPAL SECRETARY TO GOVERNMENT.

To
The Commissioner of Geology and Mining, Guindy, Madras-32.
The District Collector, Tiruchirapalli District, (W.e.) (BY ROAD)
Thiru. S. Saravanan, No.126, Ganapathy Nagar, Tiruvanaikoil, Tiruchirapalli -5.
The Secretary to Government of India, Ministry of Mines, New Delhi-110 001.
The Controller General, Indian Bureau of Mines, New Secretariat Building, Nagpur.
The Regional, Controller of Mines, Indian Bureau of Mines, No.29, Vijayaragahavan Road, T. Nagar, Madras-17.
The Industries (OP.II) Department, Madras-9.
SF/SC

//Forwarded/By order//

Section Officer.

20Rs.



FORM - K

RULE 31 OF MINERAL CONCESSION RULES, 1960
MINING LEASE DEED

MINING LEASE SANCTIONED IN G.O.3(D)No.263 INDUSTRIES (MA.2) DEPARTMENT, DATED: 20.9.95

...

THIS INDENTURE made this 18th day of October, 1995 between the Governor of Tamil Nadu (hereinafter referred to as the State Government which expression shall where the context so admits be deemed to include his successors and assigns) of the One part and Thiru S.Saravanan, No.126, Ganapathy Nagar, Tiruvanaikoil, Tiruchirappalli-5 (hereinafter referred to as " the lessee" which expression shall where the context so admits be deemed to include his successors and permitted assigns) of the other part.

DISTRICT COLLECTOR/
LESSOR

LESSEE

WHEREAS the lessee has applied to the State Government in accordance with the Mineral Concession Rules, 1960 (hereinafter referred to as the said rules) for a mining lease for LIMESTONE in respect of the lands described in Part-I of the Schedule hereunder written and have deposited with the State Government the sum of Rs.2,000/- as Security Deposit and a sum of Rs.1,000/- for meeting out the Preliminary Expenses for a mining lease.

WITNESSETH that in consideration of the rents and royalties, covenants and agreements by and in these presents and the Schedule hereunder written reserved and contained and on the part of the lessee to be paid, observed and performed, the State Government grants and demises unto lessee.

All those the mines bed /veins seems of LIMESTONE (hereinafter and in the Schedule referred to as the said mineral) situated lying and being in or under the lands which are referred to in Part-I of the said Schedule together with the liberties, powers and privileges to be exercised or enjoyed in connection herewith which are mentioned in Part-II of the said Schedule subject to the restrictions and conditions as to the exercise and enjoyment of such liberties, powers and privileges which are mentioned in Part-III of the said Schedule EXCEPT and reserving out of the demise, unto the State Government the liberties, powers and privileges mentioned in Part-IV of the said Schedule TO HOLD the premises hereby granted and demised unto the lessee from the 16th day of October, 1995 for a term of 20 (twenty) years thence next ensuing YIELDING AND PAYING THEREFORE unto the State Government the several

rates
rents/and royalties mentioned in Part-V of the said Schedule at the respective times therein specified subject to the provisions contained in Part-VI of the said Schedule and the lessee hereby covenant with the State Government as in Part-VII of the said Schedule as expressed and the State Government hereby covenants with the lessee as in Part-VIII of the said Schedule as expressed AND it is hereby mutually agreed between the parties hereto as in Part-IX of the said Schedule is expressed.

IN WITNESS WHEREOF these presents have been executed in manner hereunder appearing the day and year first above written.

(DISTRICT COLLECTOR)
LESSOR

LESSEE

The Schedule above referred to

PART - I

THE AREA OF THIS LEASE
LOCATIONS AND AREA OF THE LEASE.

..

All that track of land situated at PERALI (SOUTH) village of Perambalur Taluk, Tiruchirappalli District in the Registration District of Perambalur and in the Sub District of Perambalur, bearing cadastral survey number containing the area of 3.54.5 Hects. of thereabout delineated on the plan hereto annexed and thereon coloured RED and bounded as follows:-

(DISTRICT COLLECTOR)
LESSOR

LESSEE

S.F.No.	BOUNDARIES			
	NORTH	SOUTH	EAST	WEST
49/1A	48	49/1B	49/2	70
49/1B	49/1A	49/[illegible]	49/7	70 Part
69/1B2	70	69/3C	69/1B3	69/1B1
69/1B3	70	69/3C	49	69/1B2
69/3C	69/1B1 69/1B2 69/1B3	68 and 69/5 Part	49	69/3A 69/3B

(DISTRICT COLLECTOR)
LESSOR

LESSEE

S.F.No.	NORTH	SOUTH	EAST	WEST
70/3B	70/3A	69	49	70/4B
70/4B	70/3A	69	70/3B	70/4A
49/8A Part	49/1B	68	49/7 49/8A Part	69
70/3A Part	70/2 48 Part	70/4A, 70/4B, 70/3B 70/3A Part.	49 and 48 Part	70/1

(DISTRICT COLLECTOR)
LESSOR

LESSEE

PART - II

LIBERTIES, POWERS AND PRIVILEGES TO BE EXERCISED AND ENJOYED BY THIS LESSEE SUBJECT TO THE RESTRICTIONS AND CONDITIONS IN PART-III.

TO ENTER UPON LAND SEARCH AND FOR WIN WORK ETC.

1. Liberty and power at all times during the term hereby demised to enter upon the said lands and to search for mine bore dig drill for win work dress process convert, carry away and dispose of the said mineral.

TO SINK DRIVE AND MAKE PITS SHAFTS AND INCLINES ETC.

2. Liberty and power for or in connection with any of the purposes mentioned in this part to sink, drive, make, maintain and use in the said lands and pits, shafts, inclines drifts levels waterways, airways and other works (and to use, maintain, deepen or extend any existing works of the like nature in the said lands).

TO BRING AND USE MACHINERY EQUIPMENT ETC.

3. Liberty and power for or in connection with any of the purposes mentioned in this part to erect construct, maintain and use on or under the said lands any engines, machinery plants, dressing floors, furnaces coke ovens, brick kilns, workshops, store houses, bungalows, godowns, sheds and other buildings and other works and conveniences of the like nature on or under the said lands.

(DISTRICT COLLECTOR)
LESSOR

LESSEE

Email / Speed post

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE REGIONAL CONTROLLER OF MINES

Telephone no.: 044-24914461/1570
Telefax no. 044-24911295
Email ID: ro.chennai@ibm.gov.in

C-4-A Rajaji Bhavan
CGO complex, Besant Nagar
Chennai – 600 090.

No. TN/PBR/LST/ROMP-1577.MDS

Dated : 10 .12.2019

To :
Thiru S. Saravanan
No.69, Ganapathy Nagar
Tiruvanaikoil
Trichy – 620 005.

Sub. : Approval of Review of Mining Plan (including Progressive Mine Closure Plan) for Perali(South) Limestone Mine over an extent of 3.54.5 hectares in S.F.No.49/1A,1B, 8A(P), 69/1B2, 1B3, 3C, 70/3A(P), 4B & 3B in Perali(South) Village, Kunnam Taluk, Perambalur District submitted by Thiru S. Saravanan under Rule 17(1) of MCR, 2016.

Ref. : QP letter No.Nil dated 27.11.2019.

Sir,

In exercise of the powers delegated to me under Rule 16 of Minerals (Other than Atomic & Hydro Carbon Energy Minerals) Concession Rules, 2016 vide Gazette Notification No. S.O. 1857(E) dated 18.5.2016 issued by the Controller General, Indian Bureau of Mines under F.No. T-43004/CGBM/MM(DR)/2015, I hereby approve the above said Review of Mining Plan for **Limestone** mineral only. This approval is subject to the following conditions.

1) That the Review of Mining Plan (including Progressive Mine Closure Plan) is approved without prejudice to any other law applicable to the mine/area from time to time whether made by the Central Government, State Government or any other authority.
2) That this approval of the Review of Mining Plan (including Progressive Mine Closure Plan) does not in any way imply the approval of the Government in terms of any other provision of the Mines & Mineral (Development & Regulation) Act, 2015 or the Mineral Concession Rules, 2016 or any other law including Forest (Conservation) Act, 1960, Environment Protection Act, 1986 and the rules made there under.
3) That this Review of Mining Plan (including Progressive Mine Closure Plan) is approved without prejudice to any other order or direction from any court of competent jurisdiction.
4) Provisions of the Mines Act, 1952 and Rules & Regulations made thereunder including submission of notice of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.
5) The Provisions made under MM(D&R) Act, 2015 (Amended) and Rules made thereunder shall be complied with.
6) The contents of circular No. 2/2010 issued by the Chief Controller of Mines, IBM, Nagpur vide his letter No. 11013/3/MP/90-CCOM Vol. VII dated 06.04.2010 shall be complied with.
7) The execution of Mining Plan / Review of Mining Plan shall be subjected to vacation of prohibitory orders / notices, if any.
8) This approval of mining operations and associated activities is restricted to the mining lease area only. The mining lease area is as shown on the statutory plans under rule 32 of Mineral Conservation and Development Rules, 2017, by the lessee. Indian Bureau of Mines does not take any responsibility regarding correctness of the boundaries of the lease shown on the ground with reference to the lease map and other plans furnished by the lessee.
9) The Environmental Monitoring Cell of the Company shall continue monitoring ambient air quality, dust fall rate, water quality, soil sample analysis and noise level measurements on various stations established for the purpose both in the core zone and buffer zone, as per Department of Environment guidelines and keeping in view IBM's Circular No.3/92, season-wise every year or by engaging preferably the services of an Environmental laboratory approved by MOEF/CPCB. The data so generated shall be maintained in a bound paged register kept for the purpose and the same shall be made available to the inspecting officer on demand.
10) If anything is found to be concealed as required by the Mines Act in the contents of Review of Mining Plan and proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

11) Yearly report as required under Rule 26(2) of MCDR,2017setting for the extent of protection and rehabilitation works carried out as envisaged in the approved progressive mine closure plan and if there is any deviations, reasons thereof shall be submitted before 1st July of every year to the regional office, IBM , Chennai.
12) The Review of Mining Plan is approved for the proposals contained therein and as applicable from 01.04.2020 for the mining activities to be carried out within the mining leasehold. The earlier instances of irregular mining/illegal mining, if any, shall not be regularized through the approval of this document.
13) The financial assurance submitted should be renewed before expiry of the same.
14) In case mining lease falls within a radius of 10 kms. of National Park/Sanctuary, recommendations of NBWL have to be obtained as per the orders of the Hon'ble Supreme Court in I.A. No. 460/2004.
15) This approval is subject to the mining operations as per the proposals shall be carried out only after obtaining necessary clearances from MOEF, Pollution Control Board, Forest Department etc.
16) This approval is subjected to the extension of the validity of the mining lease by the State government as per MMDR Act, 2015 (Amended).
17) This approval is subject to submission of DGPS Plan duly authenticated by the State Government and submission of modifications in the approved Mining Plan if, consequent to the authentication of DGPS Survey Plan, any change in mining lease area is accepted by the State Government.

Yours faithfully,

10-12-19

(V. Jaya Krishna Babu)
Regional Controller of Mines

Encl. Copy of approved Review of Mining Plan
(including Progressive Mine Closure Plan)

Copy for information to:-

1. Dr. P. Thangaraju, Qaulified person, Old No.260-B, New No.17, Advaitha Ashram Road, Alagpuram, Salem – 636 004..
2. The Commissioner of Geology & Mining, Government of Tamilnadu, Guindy, Chennai – 600 032 along with copy of the approved Review of Mining Plan.

Encl : As above.

(V. Jaya Krishna Babu)
Regional Controller of Mines

By e-mail

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE REGIONAL CONTROLLER OF MINES, CHENNAI

No. TN/PBR/LST/ROMP-1768.MDS Dt : 08/11/2024

Shri/M/s. Saravanan Subramanian,
69, Ganapathy Nagar, Tiruvanaikovil Srirangam Taluk

Sub : Approval of Review of Mining Plan (including Progressive Mine Closure Plan) for Maruvathur Limestone Mine over an extent of 3.545 hectares in Vayalapadi Village, Kunnam Taluk, Perambalur District, Tamilnadu State, submitted by Shri. Saravanan Subramanian, under Rule 17(2) of MCR, 2016.

Ref : (i) Your online submission of draft Review of Mining Plan in IBM-MPAS portal on 12.08.2024 in respect of aforesaid ML Area.
(ii) This office letter of even no. dated 23.08.2024.
(iii) Your online submission of final Review of Mining Plan document in IBM-MPAS portal on 07.11.2024 in respect of aforesaid ML Area.

Sir,

In exercise of the powers delegated to me under Rule 16 of Minerals (Other than Atomic & Hydro Carbon Energy Minerals) Concession Rules, 2016 vide Gazette Notification No. S.O. 1857(E) dated 18.5.2016, I hereby accord approval for the above said Review of Mining Plan (including Progressive Mine Closure Plan) for **Limestone** mineral only. This approval is subject to the following conditions:

A. General Conditions:

1) That the Review of Mining Plan (including Progressive Mine Closure Plan) is approved without prejudice to any other law applicable to the mine/area from time to time whether made by the Central Government, State Government or any other authority.

2) That this approval of the Review of Mining Plan (including Progressive Mine Closure Plan) does not in any way imply the approval of the Government in terms of any other provision of the Mines & Mineral (Development & Regulation) Act, 2015 or the Mineral Concession Rules, 2016 or any other law including Forest (Conservation) Act, 1980, Environment Protection Act, 1986 and the rules made there under.

3) That this Review of Mining Plan (including Progressive Mine Closure Plan) is approved without prejudice to any other order or direction from any court of competent jurisdiction.

4) Provisions of the Mines Act, 1952 and Rules & Regulations made thereunder including submission of notice of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.

5) The Provisions made under MM(D&R) Act, 2015 (Amended) and Rules made thereunder shall be complied with.

6) The contents of circular No. 2/2010 issued by the Chief Controller of Mines, IBM, Nagpur vide his letter No. 11013/3/MP/90-CCOM Vol. VII dated 06.04.2010 shall be complied with.

7) The execution of Mining Plan / Review of Mining Plan shall be subjected to vacation of prohibitory orders / notices, if any.

8) This approval of mining operations and associated activities is restricted to the mining lease area only. The mining lease area is as shown on the statutory plans under rule 32 of Mineral Conservation and Development Rules, 2017, by the lessee. Indian Bureau of Mines does not take any responsibility regarding correctness of the boundaries of the lease shown on the ground with reference to the lease map and other plans furnished by the lessee.

9) The Environmental Monitoring Cell of the Company shall continue monitoring ambient air quality, dust fall rate, water quality, soil sample analysis and noise level measurements on various stations established for the purpose both in the core zone and buffer zone, as per Department of Environment guidelines and keeping in view IBM's Circular No.3/92, season-wise every year or by engaging preferably the services of an Environmental laboratory approved by MOEF/CPCB. The data so generated shall be maintained in a bound paged register kept for the purpose and the same shall be made available to the inspecting officer on demand.

10) If anything is found to be concealed as required by the Mines Act in the contents of Review of Mining Plan and proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

11) Yearly report as required under Rule 26(2) of MCDR,2017 setting forth the extent of protection and rehabilitation works carried out as envisaged in the approved progressive mine closure plan and if there is any deviations, reasons thereof shall be submitted before 1st July of every year to the regional office, IBM , Chennai.

12) The Review of Mining Plan is approved for the proposals contained therein and as applicable from 01.04.2025 for the mining activities to be carried out within the mining leasehold. The earlier instances of irregular mining/illegal mining, if any, shall not be regularized through the approval of this document.

13) The financial assurance submitted should be renewed before expiry of the same.

14) In case mining lease falls within a radius of 10 kms. of National Park/Sanctuary, recommendations of NBWL have to be obtained as per the orders of the Hon'ble Supreme Court in I.A. No. 460/2004.

15) This approval is subject to the mining operations as per the proposals shall be carried out only after obtaining necessary clearances from MOEF&CC, Pollution Control Board, Forest Department etc.

16) This approval is subjected to the extension of the validity of the mining lease by the State government as per Section 8A(5) of MMDR Act, 2015 (Amended).

17) This approval is subject to submission of DGPS Plan duly authenticated by the State Government and submission of modifications in the approved Mining Plan if, consequent to the authentication of DGPS Survey Plan, any change in mining lease area is accepted by the State Government.

18) This approval is subject to the conditions as per the directions given in W.P.(c) No. 114/2014 given by the Hon'ble Supreme Court of India should be taken care of while implementing the proposals given in the PMCP part of the documents.

B. Special Conditions:

It shall be mandatory for the project proponent, abstracting ground water, to obtain **No Objection Certificate** from Central Ground Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be.

Encl: Soft copy of approval letter of approved Review of Mining Plan.

Yours faithfully,

(G.C. Sethi)

Regional Controller of Mines

Copy forwarded for information to Shri. P. Viswanathan, Qualified Person, 4/366-D, Selva Nagar, Near Omega Church, Kamaraj Nagar Colony, Salem – 636 014.

(G.C. Sethi)

Regional Controller of Mines

Not on first two copies:
Copy forwarded for kind information to:

1) The Commissioner, Department of Geology & Mining, Government of Tamilnadu, Guindy, Chennai - 600 032.
2) The Controller of Mines (SZ), Indian Bureau of Mines, Bengaluru.
3) The Director of Mines Safety, DGMS, Chennai Region, Chennai.

(G.C. Sethi)

Regional Controller of Mines

From
Thiru.P.Saravanan M.Sc.,
Deputy Director(i/c).
Geology and Mining,
Perambalur.

To
Thiru.S.Saravanan,
69, Ganapathy Nagar,
Thiruvanaikovil,
Trichy – 620 005.

Rc.No. 239/G&M/2017, dated.12.04.2018

Sir,

Sub: : Perambalur District – Major Mineral – Limestone mining lease granted to Thiru.S.Saravanan – Issuance of transport permit details requested – details furnished – reg.

Ref: : Thiru.S.Saravanan, 69, Ganapathy Nagar, Thiruvanaikovil, Trichy – 620 005 letter dated.12.04.2018.

*****

The lessee Thiru.S.Saravanan has stated that he has been granted mining lease over an extent of 3.54.5 Hects., in S.F.Nos.49/5A,1B,8A (P),69/1B2,1B3,3C,70/3A(P),4B and 3b in Perali(South) village, Kunnam Taluk and the lease is valid till 17.10.2015 and the issue of transport permit was stopped by TamilNadu Government from 16.01.2017 and he has been asked to produce the Environmental Clearance form SEIAA and he wanted to apply for Environmental Clearance and requested to issue the details of last permit given to the above mine.

In this connection it is informed that on perusal this office records it is found that the lessee has obtained the transport permit on 22.07.2015 which was valid upto 26.07.2015 for transporting 160MTS of limestone vide bulk permit no.10752. Again the lessee has obtained the last permit on 08.11.2016 vide bulk permit no.11087 valid upto 11.11.2016 on payment of royalty of Rs.10,400/- to transport 130 MTS of limestone from the above said limestone mine. Further no transport permit was issued to the lessee from 11.11.2016 to till date.

12.04.18

Deputy Director(i/c),
Geology and Mining,
Perambalur.

PROCEEDINGS OF THE DEPUTY DIRECTOR GEOLOGY AND MINING (i\c), PERAMBALUR

Present :Thiru.P.Saravanan, M.Sc.,

Rc.No. 115 /G&M/2018 Dated:12.07.2018

Sub : Mines and Minerals – Perambalur District- Kunnam Taluk – Perali (South) Village - Mining lease for Limestone held by Thiru. S. Saravanan - Fixation of royalty/Dead rent for the year 2017-18-orders issued.

Ref : 1. G.O. No 3(D) 263 Industries Department dated: 20.09.1995
2. other connected records.

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ORDER:

Thiru.S. Saravanan, Trichy are holding mining lease as detailed below:

1.	G.O.Ms.No.in which the mining lease was granted	:	G.O. No 3(D) 263 dated: 20.09.1995
2.	Survey number	:	49/1A, 1B, 8A (P), 69/1B2, 1B3, 3C, 70/3A (P), 4B & 3B etc.,
3.	Kind of mineral for which lease was granted	:	Limestone
4.	Period of lease	:	20years 18.10.1995 to 17.10.2015

Particulars of leasehold area:

Taluk	Village	Survey No.	Extent (Hec.)	Classification
Kunnam	Perali (South)	49/1A, 1B, 8A (P), 69/1B2, 1B3, 3C, 70/3A (P), 4B & 3B etc.,	3.54.5Ha	Patta

There is no mining operation during period 2017-2018.

Under section 9 of Mines and Minerals (Development & Regulation) Act 1957 and 12(1) (a) and Rule 12(1) (6) of mineral concession Rules 2016, the royalty, dead rent etc. due from the lessee is fixed as detailed below.

Royalty:

For 0.000 M.Tons of Limestone at Rs.80/- Per Tonne from 01.04.2017 to 31.03.2018	- Rs.Nil/-

Dead rent

Amount remitted by lessee	-Rs.3545/-

Surface Rent

For 3.57.0Hec. used for the mining operation	-Rs.145/-
Total amount due	**-Rs. 3690/-**
Opening Balance Royalty	**- Rs.** 2583 /-
Royalty remitted during 01.04.2017 to 31.03.2018	-Rs.Nil/-
Amount remitted by the lessee towards Dead rent	-Rs.3545/-
Amount remitted by the lessee towards Surface rent	-Rs.145/-
Total amount Collected	-Rs.6273/-
Excess paid	-Rs.2583/-

The Royalty, Surface rent, dead rent due from the lessee for the year 2017-18 is fixed at Rs.3690/-. The lessee has remitted Rs.3690/-. The excess royalty amount of Rs.2583 /- to be adjusted during the financial year 2018-19.

12.07.18

Deputy Director (I/c)
Geology and Mining,
Perambalur.

To
Tvl. S. Saravanan
69, Ganapathy Nagar,
Tiruvanaikovil,
Trichy – 620 005.

(FORM D1)
NOTICE OF TEMPORARY DISCONTINUANCE OF MINE
(See Rule 24)

Notice in Form shall reach the concerned authorities within one hundred and five days of temporary discontinuance of work in the mine. If the discontinuance is due to natural calamity beyond the control of the lessee of Government orders, this notice shall be sent within fifteen days of such occurrence.

To

1. The Controller General,
   Indian Bureau of Mines,
   Nagpur – 440 001.

2. The Controller of Mines,
   Indian Bureau of Mines,
   Nagpur – 440 001.

3. The Regional Controller of Mines,
   Indian Bureau of Mines,
   Ministry of Mines, Government of India,
   C 4 A, Rajaji Bhavan,
   Besant Nagar, Chennai – 600 090.

4. State Government Concerned.

IMPORTANT

1. (i)	Name of the mineral worked	:	LIMESTONE
(ii)	Name of the other mineral worked, if any	:	NIL
2.	Name of the mine	:	Maruvathur Limestone Mines
3.	Name and address of the Lessee/Owner	:	S.Saravanan No.69 Ganapathy Nagar, Thiruvanaikovil, Trichy – 620 005.
4.	Particulars of Mining Lease(ML):		
(i)	Date of Execution	:	20.09.1995.
(ii)	Period	:	20 Years from 18.10.1995 to 17.10.2015
(iii)	Area under lease	:	3.54.5
(iv)	Hectares		

Contd...2

5. Location of Mines:

(i)	Village	:	Perali (South)
(ii)	Post Office	:	Maruvathur
(iii)	District	:	Perambalur
(iv)	State	:	Tamilnadu

6. Name and address of Agent : NIL

7. Name and address of Mining Engineer : -----

8. Date of temporary discontinuance : 1st February 2016

9. Reasons for temporary discontinuance
(Please tick whichever is applicable)

(i)	Lack of demand	√
(ii)	Non-availability of Labour	
(iii)	Rains	
(iv)	Transport Bottleneck	
(v)	Strike/Lockout	
(vi)	Operation becoming uneconomic	
(vii)	Other reasons (specify)	

10. Probable date of re-opening of the mine : Will be intimated later.

Signature of the Mine Owner

S.Saravanan,
No.69, Ganapathy Nagar,
Thiruvanaikovil, Trichy – 620 005.

Place: Trichy

Date: 01.02.2016